



# 1000BASE-T GBIC Installation Notes

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## January 2001

This installation note provides instructions for installing 1000BASE-T Gigabit Interface Converters (GBICs) in Catalyst 2900 series XL and Catalyst 3500 series XL switches and provides troubleshooting information. The switches detect and enable the GBIC only when they are running Cisco IOS Release 12.0(5)XW or later.

The 1000BASE-T GBICs are hot-swappable, single-port modules. They provide 1000BASE-T full-duplex connectivity in Catalyst 2900 series XL and Catalyst 3500 series XL switches. Refer to the online *1000BASE-T GBIC Switch Compatibility Matrix* posted with the GBIC documentation on [www.cisco.com](http://www.cisco.com) for the latest list of products that support the GBIC.

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# Conventions

This document uses these conventions and symbols for notes, cautions, and warnings:



Note

Means *reader take note*. Notes contain helpful suggestions or references to materials not contained in this manual.



Caution

Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.



Warning

This warning symbol 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.

Waarschuwing

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen.

Varoitus

Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista.

Attention

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures. Avant d'accéder à cet équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures courantes de prévention des accidents.

Warnung

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt.

Avvertenza

Questo simbolo di avvertenza indica un pericolo. Si è in una situazione che può causare infortuni. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti.

Advarsel

Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker.

- Aviso** Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes.
- ¡Advertencia!** Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes.
- Varning!** Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador.

## Description

The single-port 1000BASE-T GBIC (part number WS-G5482) has the following features:

- Management through the Cisco IOS command-line interface (CLI) or the web-based Cluster Management Suite (CMS)
- Support for Cisco IOS Release 12.0(5)XW or later
- Full-duplex connectivity between two devices

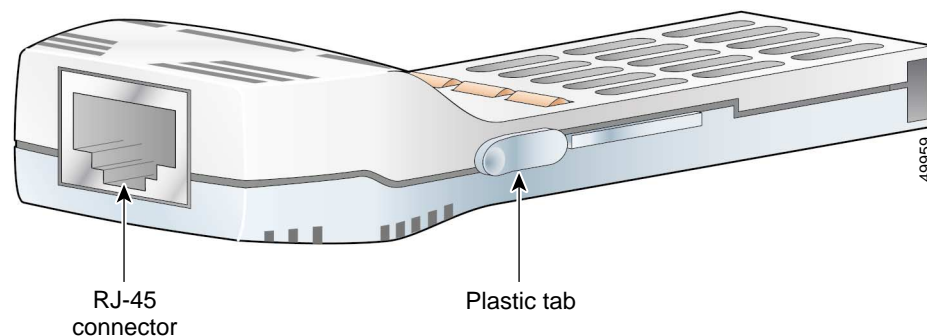


### Caution

The 1000BASE-T GBIC does not support half-duplex connections. Configuring the GBIC port for half duplex causes collisions.

Figure 1 shows the 1000BASE-T GBIC.

**Figure 1** 1000BASE-T GBIC



## Supported Switches

Table 1 lists the Catalyst 2900 series XL and Catalyst 3500 series XL switches and modules supporting the GBIC.

If your switch is running IOS Release 12.0(5)XW or later, it detects and enables the GBIC. You can manage the GBIC using the CLI or the CMS.

If the switch is running an IOS release earlier than Release 12.0(5)XW, it does not detect and enable the GBIC. You must upgrade your software to Release 12.0(5)XW or later. To upgrade to Release 12.0(5)XW, refer to the *Release Notes for Catalyst 2900 Series XL and Catalyst 3500 Series XL Cisco IOS Release 12.0(5)XW* on [www.cisco.com](http://www.cisco.com) (see the “Obtaining Documentation” section on page 15). After you upgrade the software, the switch detects and enables the GBIC.



### Caution

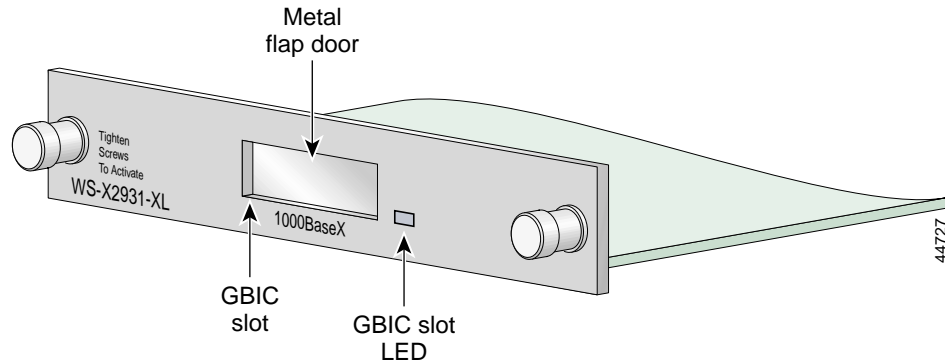
Installing this product in or connecting this product to an unauthorized device might damage the device. Refer to the online *1000BASE-T GBIC Switch Compatibility Matrix* posted with the GBIC documentation on [www.cisco.com](http://www.cisco.com) for the latest list of products that support the GBIC.

**Table 1 Catalyst 2900 XL and 3500 XL Switches and Modules Supporting the GBIC**

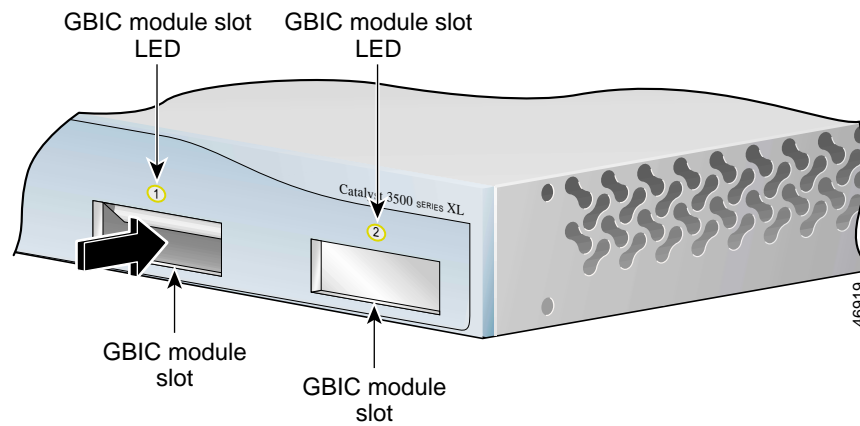
Model	Description
Catalyst 2912 MF XL	12 100BASE-FX ports with 2 high-speed expansion slots
Catalyst 2924 M XL	24 fixed autosensing 10/100 ports with 2 high-speed expansion slots
WS-X2931 module for Catalyst 2900 series XL switches	1 1000BASE-X port
Catalyst 3508G XL	8 GBIC-based Gigabit Ethernet ports
Catalyst 3512 XL	12 autosensing 10/100 Ethernet ports with 2 GBIC slots
Catalyst 3524 XL	24 autosensing 10/100 Ethernet ports with 2 GBIC slots
Catalyst 3548 XL	48 autosensing 10/100 Ethernet ports with 2 GBIC slots
Catalyst 3524 PWR XL	24 autosensing 10/100 inline-power Ethernet ports with 2 GBIC slots

Figure 2 shows the GBIC slot in a 1000BASE-X module for a Catalyst 2900 XL switch. Figure 3 shows the GBIC slots in a Catalyst 3500 XL switch front panel.

**Figure 2** GBIC Slot in a 1000BASE-X Module for a Catalyst 2900 XL Switch




**Figure 3** GBIC Slots in a Catalyst 3500 XL Switch Front Panel



## LEDs


The GBIC slot in a 1000BASE-X module for a Catalyst 2900 XL switch has an LED that displays information about the GBIC port. Table 2 explains how to interpret the LED colors. Refer to the *Catalyst 2900 Series XL Modules Installation Guide* and the *Catalyst 2900 Series XL Hardware Installation Guide* for more information about the 1000BASE-X modules.

**Table 2** *Meaning of 1000BASE-X Module LED Colors*

LED Color	Meaning
Off	No link.
Green	Link present.
Flashing green	Activity. GBIC port is transmitting or receiving data.
Alternating green-amber	Link fault. Error frames can affect connectivity, and errors such as excessive collision, CRC errors, and alignment and jabber errors are monitored for a link-fault indication.
Amber	GBIC port is not forwarding. Port was disabled by management or an address violation, it was blocked by Spanning Tree Protocol (STP), or the module failed power-on self-test (POST) and should be replaced.
	 <p><b>Note</b> After a port is reconfigured, the LED can remain amber for up to 30 seconds while STP checks the switch for possible loops.</p>

Each GBIC module slot in a Catalyst 3500 XL switch front panel has an LED. These LEDs, as a group or individually, display information about the switch and the individual ports. When you change the port mode, the meaning of the LED colors changes. Table 3 explains how to interpret the LED colors when you change the port mode to STAT (port status). Refer to the *Catalyst 3500 Series XL Hardware Installation Guide* for more information about the GBIC module slots.

**Table 3** *Meaning of Catalyst 3500 XL LED Colors*

LED Color	Meaning
Off	No link.
Solid green	Link present.
Flashing green	Activity. GBIC port is transmitting or receiving data.
Alternating green-amber	Link fault. Error frames can affect connectivity, and errors such as excessive collision, CRC errors, and alignment and jabber errors are monitored for a link-fault indication.
Solid amber	GBIC port is not forwarding. Port was disabled by management or an address violation, or it was blocked by STP.
	 <p><b>Note</b> After a port is reconfigured, the LED can remain amber for up to 30 seconds while STP checks the switch for possible loops.</p>

# Installation

This section describes how to install your 1000BASE-T GBIC.

## EMC Regulatory Statements

### U.S.A.

U.S. regulatory information for this product is at the end of this document.

### Taiwan

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

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### Hungary

Hungarian Class A Warning Notice:

This equipment is a class A product and should be used and installed properly according to the Hungarian EMC Class A requirements (MSZEN55022). Class A equipment is designed for typical commercial establishments for which special conditions of installation and protection distance are used.

Figyelmeztetés a felhasználói kézikönyv számára:

Ez a berendezés "A" osztályú termék, felhasználására és üzembe helyezésére a magyar EMC "A" osztályú követelményeknek (MSZ EN 55022) megfelelően kerülhet sor, illetve ezen "A" osztályú berendezések csak megfelelő kereskedelmi forrásból származhatnak, amelyek biztosítják a megfelelő speciális üzembe helyezési körülményeket és biztonságos üzemelési távolságok alkalmazását.

## Cabling Guidelines

The GBIC requires Category 5 cabling. Target devices must be within 328 feet (100 meters) of the GBIC and must be 1000BASE-T compatible.

If you are connecting to a target device with ports marked with an **X**, such as another switch or hub, use a crossover cable. If you are connecting to a target device with ports not marked with an **X**, such as a PC, workstation, or server, use a straight-through cable.

For connector pinouts and cable specifications, see the "Connectors and Cables" section on page 14.

## Handling the GBIC

Follow these guidelines when handling a GBIC:

- GBICs are static sensitive. To prevent electrostatic-discharge (ESD) damage, follow your normal board and component handling procedures.
- Keep the GBIC in the antistatic shielded bag until you install it.

## Inserting the GBIC

Gigabit Ethernet devices are shipped without the GBIC installed.



### Caution

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Installing this product in or connecting this product to an unauthorized device might damage the device. Refer to the online *1000BASE-T GBIC Switch Compatibility Matrix* posted with the GBIC documentation on [www.cisco.com](http://www.cisco.com) for the latest list of products that support the GBIC.

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GBICs are hot-swappable and are designed to prevent incorrect insertion.

To insert the GBIC in a GBIC slot, remove the GBIC from the protective packaging. Grip the two plastic tabs with your thumb and forefinger, insert the GBIC in the GBIC slot, and slide the GBIC in the slot until you hear a click. The click means the GBIC is locked in the slot.



### Note

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If the GBIC is not inserted securely (not locked in the slot), the switch might not recognize it or might display the wrong media type following a **show interface** command. If this problem happens, remove and reinsert the GBIC. See the “Troubleshooting” section on page 10 for more information about solving this problem.

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To connect a 1000BASE-T-compatible device to the GBIC, see the “Connecting to 1000BASE-T Ports” section on page 9.



## Removing the GBIC

To remove the GBIC from the GBIC slot, disconnect the cable from the RJ-45 connector on the GBIC. Release the GBIC from the slot by simultaneously squeezing the two plastic tabs, and pull the GBIC out.



**Warning**

Ultimate disposal of this product should be handled according to all national laws and regulations.

**Waarschuwing**

Dit produkt dient volgens alle landelijke wetten en voorschriften te worden afgedankt.

**Varoitus**

Tämän tuotteen lopullisesta hävittämisestä tulee huolehtia kaikkia valtakunnallisia lakeja ja säännöksiä noudattaen.

**Attention**

La mise au rebut définitive de ce produit doit être effectuée conformément à toutes les lois et réglementations en vigueur.

**Warnung**

Dieses Produkt muß den geltenden Gesetzen und Vorschriften entsprechend entsorgt werden.

**Avvertenza**

L'eliminazione finale di questo prodotto deve essere eseguita osservando le normative italiane vigenti in materia.

**Advarsel**

Endelig disponering av dette produktet må skje i henhold til nasjonale lover og forskrifter.

**Aviso**

A descartagem final deste produto deverá ser efectuada de acordo com os regulamentos e a legislação nacional.

**¡Advertencia!**

El desecho final de este producto debe realizarse según todas las leyes y regulaciones nacionales.

**Varning!**

Slutlig kassering av denna produkt bör skötas i enlighet med landets alla lagar och föreskrifter.

## Connecting to 1000BASE-T Ports

If you are connecting to a target device with ports marked with an **X**, such as a switch or hub, use a crossover cable. If you are connecting to a target device with ports not marked with an **X**, such as a PC, workstation, or server, use a straight-through cable.

Insert one end of the cable in an RJ-45 connector on a 1000BASE-T-compatible target device, and insert the other end of the cable in the RJ-45 connector on the GBIC.

## Where to Go Next



**Caution**

The GBIC only supports 1000-Mbps full-duplex connections. If the port configuration settings are changed, the switch does not detect and enable the GBIC. An error message appears in the CLI or CMS.

If your Catalyst 2900 XL or Catalyst 3500 XL switch is running IOS Release 12.0(5)XW or later, it detects and enables the GBIC. You can manage the GBIC by using the CLI or CMS.

If your Catalyst 2900 XL or Catalyst 3500 XL switch is running an IOS release earlier than Release 12.0(5)XW, it does not detect and enable the GBIC. You must upgrade your software to Release 12.0(5)XW or later. To upgrade to Release 12.0(5)XW, refer to the *Release Notes for Catalyst 2900 Series XL and Catalyst 3500 Series XL Cisco IOS Release 12.0(5)XW* on [www.cisco.com](http://www.cisco.com) (see the “Obtaining Documentation” section on page 15). After you upgrade the software, the switch detects and enables the GBIC.


## Troubleshooting

The following tables describe how to detect and solve problems that might arise when you are installing the GBIC. If you are installing the GBIC in a 1000BASE-X module for a Catalyst 2900 series XL switch, see Table 4. If you are installing the GBIC in a Catalyst 3500 series XL switch, see Table 5.


**Table 4 Common Problems and Solutions for the Catalyst 2900 XL Switch**

Symptom	Possible Causes	Corrective Action
GBIC LED is amber.	<p>Module thumb screws have not been tightened.</p> <p>Spanning Tree Protocol (STP) is checking for loops.</p> <p>GBIC is initializing, it was disabled by management or an address violation, or it was blocked by STP.</p> <p>Module failed power-on self-test (POST).</p>	<p>Tighten thumbscrews.</p> <p>Wait for STP to complete the search and for the LED to turn green.</p> <p>Use the CLI or the CMS to check the GBIC status. If the GBIC was disabled, use the CLI or the CMS to enable the GBIC.</p> <p>Ensure that the switch is running IOS Release 12.0(5)XW or later.</p> <p>If the switch is running Release 12.0(5)XW or later, call your local account representative or Cisco Systems to replace the module.</p> <p>If the switch is running an IOS release earlier than Release 12.0(5)XW, upgrade your software to Release 12.0(5)XW or later. To upgrade to Release 12.0(5)XW, refer to the <i>Release Notes for Catalyst 2900 Series XL and Catalyst 3500 Series XL Cisco IOS Release 12.0(5)XW</i>.</p>

**Table 4 Common Problems and Solutions for the Catalyst 2900 XL Switch (continued)**

Symptom	Possible Causes	Corrective Action
GBIC LED is alternating between green and amber.	GBIC port is experiencing error frames. This problem could be due to a duplex mismatch caused by autonegotiation, collisions, CRC errors, or alignment errors.	<p>Ensure that the speed and duplex settings on both devices are 1000 Mbps and full duplex.</p> <p> <b>Note</b> The GBIC supports only 1000-Mbps full-duplex connections.</p> <p>If one parameter is manually set, manually set all of them, or set both devices to autonegotiate speed and duplex. Refer to the <i>Cisco IOS Desktop Switching Software Configuration Guide (Catalyst 2900 Series XL and Catalyst 3500 Series XL Software Configuration Guide Cisco IOS Release 12.0(5)WC</i>, effective March, 2001) for more information.</p>
GBIC LED is off.	<p>Module might not support the GBIC.</p> <p>Switch is running an IOS release earlier than Release 12.0(5)XW.</p> <p>Switch, switch module, or 1000BASE-T-compatible target device has no power.</p> <p>GBIC might not be inserted securely.</p> <p>Wrong cable type.</p> <p>Bad cable.</p> <p>No cable.</p>	<p>Ensure that the module supports the GBIC. See Table 1 on page 4, or refer to the online <i>1000BASE-T GBIC Switch Compatibility Matrix</i> posted with the GBIC documentation on <a href="http://www.cisco.com">www.cisco.com</a>.</p> <p>If the module does not support the GBIC, remove the GBIC from module.</p> <p>Upgrade your software to Release 12.0(5)XW or later. To upgrade to Release 12.0(5)XW, refer to the <i>Release Notes for Catalyst 2900 Series XL and Catalyst 3500 Series XL Cisco IOS Release 12.0(5)XW</i>.</p> <p>Ensure that the switch, switch module, and 1000BASE-T-compatible target device have power.</p> <p>Ensure that the switch module is installed correctly.</p> <p>Use the <b>show interface</b> command to ensure that the switch recognizes the GBIC and displays the correct media type, which is T. If the media type is not correct, the switch cannot establish a link with a 1000BASE-T-compatible target device.</p> <p>If the switch does not recognize the GBIC or it displays the wrong media type, remove and reinsert the GBIC.</p> <p>Ensure that the cable is correct: crossover or straight-through.</p> <p>Replace with a known good cable.</p> <p>Connect cable to the module and the target device.</p>

**Table 5 Common Problems and Solutions for the Catalyst 3500 XL Switch**

Symptom	Possible Causes	Corrective Action
GBIC module slot LED is amber. (Port mode is STAT.)	STP is checking for loops.  GBIC is initializing, it was disabled by management or an address violation, or it was blocked by STP.	Wait for STP to complete the search and for the LED to turn green.  Use the CMS or the CLI to check the GBIC status. If the GBIC was disabled, use the CMS or the CLI to enable the GBIC.
GBIC module slot LED is alternating between green and amber. (Port mode is STAT.)	GBIC port is experiencing error frames. This problem could be due to a duplex mismatch caused by autonegotiation, collisions, CRC errors, or alignment errors.	Ensure that the speed and duplex settings on both devices are 1000 Mbps and full duplex.   <b>Note</b> The GBIC supports only 1000-Mbps full-duplex connections.  If one parameter is manually set, manually set all of them, or set both devices to autonegotiate speed and duplex. Refer to the <i>Cisco IOS Desktop Switching Software Configuration Guide (Catalyst 2900 Series XL and Catalyst 3500 Series XL Software Configuration Guide Cisco IOS Release 12.0(5)WC</i> , effective March, 2001) for more information.
GBIC module slot LED is off. (Port mode is STAT.)	Switch might not support the GBIC.  Switch is running an IOS release earlier than Release 12.0(5)XW.  GBIC might not be inserted securely.  Switch or 1000BASE-T-compatible target device has no power.  Wrong cable type.  Bad cable.  No cable.	Ensure that the switch supports the GBIC. See Table 1 on page 4, or refer to the online <i>1000BASE-T GBIC Switch Compatibility Matrix</i> posted with the GBIC documentation on <a href="http://www.cisco.com">www.cisco.com</a> .  If the switch does not support the GBIC, remove the GBIC from the switch.  Upgrade your software to Release 12.0(5)XW or later. To upgrade to Release 12.0(5)XW, refer to the <i>Release Notes for Catalyst 2900 Series XL and Catalyst 3500 Series XL Cisco IOS Release 12.0(5)XW</i> .  Use the <b>show interface</b> command to ensure that the switch recognizes the GBIC and displays the correct media type, which is T. If the media type is not correct, the switch cannot establish a link with a 1000BASE-T-compatible target device.  If the switch does not recognize the GBIC or it displays the wrong media type, remove and reinsert the GBIC.  Ensure that the switch and the 1000BASE-T-compatible target device have power.  Ensure that the cable is correct: crossover or straight-through.  Replace with a known good cable.  Connect cable to the switch and the target device.

# Technical Specifications and Agency Approvals

Table 6 lists the technical specifications and agency approvals.

**Table 6** *Technical Specifications and Agency Approvals*

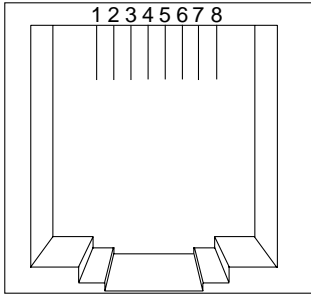
<b>Environmental Ranges</b>	
Operating temperature	32 to 113°F (0 to 45°C)
Storage temperature	-4 to 149°F (-10 to 65°C)
Operating humidity	10 to 85% (noncondensing)
Storage humidity	5 to 95% (noncondensing)
Operating altitude	Up to 10,000 ft (3000 m)
Storage altitude	Up to 15,000 ft (4570 m)
<b>Physical Dimensions</b>	
Dimensions (H x W x D)	0.7 x 1.55 x 4.32 in. (1.78 x 3.94 x 10.97 cm)
Weight	0.11 lb (0.05 kg)
<b>Power Consumption</b>	2.85W
<b>EMC</b>	FCC Part 15 Class A
	EN 55022 Class A (CISPR22 Class A)
	VCCI Class I
	BSMI
	CE

# Connectors and Cables

The GBIC has one RJ-45 connector. Figure 4 shows the connector pinout. Table 7 lists the cabling specifications.

**Figure 4** 1000BASE-T RJ-45 Connector

Pin	Label
1	TP0+
2	TP0-
3	TP1+
4	TP2+
5	TP2-
6	TP1-
7	TP3+
8	TP3-



34751

**Table 7** Cabling Specifications

Specification	Description
Connector	RJ-45
Cable	Category 5 UTP
Cabling distance (maximum)	328 ft (100 m)

## Related Publications

Use the following publications with this document:

- *1000BASE-T GBIC Switch Compatibility Matrix*
- *Catalyst 2900 Series XL Hardware Installation Guide*
- *Catalyst 2900 Series XL Modules Installation Guide*
- *Catalyst 3500 Series XL Hardware Installation Guide*
- *Cisco IOS Desktop Switching Software Configuration Guide*  
(*Catalyst 2900 Series XL and Catalyst 3500 Series XL Software Configuration Guide Cisco IOS Release 12.0(5)WC*, effective March, 2001)
- *Cisco IOS Desktop Switching Command Reference*  
(*Catalyst 2900 Series XL and Catalyst 3500 Series XL Command Reference Cisco IOS Release 12.0(5)WC*, effective March, 2001)
- *Release Notes for Catalyst 2900 Series XL and Catalyst 3500 Series XL Cisco IOS Release 12.0(5)XW*

# Obtaining Documentation

The following sections provide sources for obtaining documentation from Cisco Systems.

## World Wide Web

You can access the most current Cisco documentation on the World Wide Web at the following sites:

- <http://www.cisco.com>
- <http://www-china.cisco.com>
- <http://www-europe.cisco.com>

## Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly and may be more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

## Ordering Documentation

Cisco documentation is available in the following ways:

- Registered Cisco Direct Customers can order Cisco Product documentation from the Networking Products MarketPlace:  
[http://www.cisco.com/cgi-bin/order/order\\_root.pl](http://www.cisco.com/cgi-bin/order/order_root.pl)
- Registered Cisco.com users can order the Documentation CD-ROM through the online Subscription Store:  
<http://www.cisco.com/go/subscription>
- Nonregistered CCO users can order documentation through a local account representative by calling Cisco corporate headquarters (California, USA) at 408 526-7208 or, in North America, by calling 800 553-NETS(6387).

## Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

You can e-mail your comments to [bug-doc@cisco.com](mailto:bug-doc@cisco.com).

To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.  
Document Resource Connection  
170 West Tasman Drive  
San Jose, CA 95134-9883

We appreciate your comments.

## Obtaining Technical Assistance

Cisco provides Cisco.com as a starting point for all technical assistance. Customers and partners can obtain documentation, troubleshooting tips, and sample configurations from online tools. For Cisco.com registered users, additional troubleshooting tools are available from the TAC website.

### Cisco.com

Cisco.com is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

Cisco.com provides a broad range of features and services to help customers and partners streamline business processes and improve productivity. Through Cisco.com, you can find information about Cisco and our networking solutions, services, and programs. In addition, you can resolve technical issues with online technical support, download and test software packages, and order Cisco learning materials and merchandise. Valuable online skill assessment, training, and certification programs are also available.

Customers and partners can self-register on Cisco.com to obtain additional personalized information and services. Registered users can order products, check on the status of an order, access technical support, and view benefits specific to their relationships with Cisco.

To access Cisco.com, go to the following website:

<http://www.cisco.com>



## Technical Assistance Center

The Cisco TAC website is available to all customers who need technical assistance with a Cisco product or technology that is under warranty or covered by a maintenance contract.

### Contacting TAC by Using the Cisco TAC Website

If you have a priority level 3 (P3) or priority level 4 (P4) problem, contact TAC by going to the TAC website:

<http://www.cisco.com/tac>

P3 and P4 level problems are defined as follows:

- P3—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- P4—You need information or assistance on Cisco product capabilities, product installation, or basic product configuration.

In each of the above cases, use the Cisco TAC website to quickly find answers to your questions.

To register for Cisco.com, go to the following website:

<http://www.cisco.com/register/>

If you cannot resolve your technical issue by using the TAC online resources, Cisco.com registered users can open a case online by using the TAC Case Open tool at the following website:

<http://www.cisco.com/tac/caseopen>

### Contacting TAC by Telephone

If you have a priority level 1 (P1) or priority level 2 (P2) problem, contact TAC by telephone and immediately open a case. To obtain a directory of toll-free numbers for your country, go to the following website:

<http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml>

P1 and P2 level problems are defined as follows:

- P1—Your production network is down, causing a critical impact to business operations if service is not restored quickly. No workaround is available.

P2—Your production network is severely degraded, affecting significant aspects of your business operations. No workaround is available.

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The following information is for FCC compliance of Class B devices: The equipment described in this manual generates and may radiate radio-frequency energy. If it is not installed in accordance with Cisco's installation instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device in accordance with the specifications in part 15 of the FCC rules. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

Modifying the equipment without Cisco's written authorization may result in the equipment no longer complying with FCC requirements for Class A or Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.
- Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

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