

Cisco 10000 Gigabit Ethernet Interface Module

THE CISCO 10000 GIGABIT ETHERNET INTERFACE MODULE ADDRESSES THE GROWING DEMAND AMONG INTERNET SERVICE PROVIDERS (ISPs) FOR INTRA-POP INTERCONNECT. GIGABIT ETHERNET TECHNOLOGY IS PREFERRED BY MANY SERVICE PROVIDERS BECAUSE IT IS STANDARDS-BASED, IS WIDELY IMPLEMENTED BY MANY VENDORS AND OFFERS EXCELLENT PERFORMANCE. THE GIGABIT ETHERNET MODULE IN THE CISCO 10000 PROVIDES A COST-EFFECTIVE HIGH PERFORMANCE UPLINK TO BACKBONE ROUTERS SUCH AS THE CISCO 12000 SERIES GIGABIT SWITCH ROUTER (GSR). BY USING GIGABIT INTERFACE CONVERTER (GBIC) TECHNOLOGY, THE CISCO 10000 GIGABIT ETHERNET MODULE PROVIDES THE INTERFACE FLEXIBILITY CUSTOMERS REQUIRE IN THEIR RAPIDLY EVOLVING POPs.

Figure 1 Cisco 10000 Gigabit Ethernet Interface Module



Product Description

The Gigabit Ethernet module is an 802.3z standards-based interface module which provides a high bandwidth yet cost-effective uplink solution for the Cisco 10000. The Gigabit Ethernet module occupies a full interface slot in the Cisco 10000 (with no slot dependency), is hot swappable, and multiple modules can be configured in the chassis to support network layer redundancy or different destinations. The module supports a single gigabit Ethernet interface based on GBIC technology enabling the user to select between a variety of gigabit Ethernet interface types (SX, LX/LH, ZX), which can be changed or upgraded at any time. (Note that individual GBICs are sold separately from the Gigabit Ethernet interface module.)

Key Benefits

Standards-Based Gigabit Ethernet Implementation for Compatibility and Interoperability

The Cisco 10000 Gigabit Ethernet module is based on the IEEE 802.3z industry standard. Strict compliance to this standard enables Cisco to ensure interoperability and compatibility with other standards-based gigabit Ethernet products in the customer's network. Using GBIC technology, customers can integrate the Cisco 10000 into their existing Gigabit Ethernet network with a minimum of configuration changes or training. Gigabit Ethernet standards compliance, along with Cisco manageability and standard Cisco IOS® software ensures high-speed interoperability with existing gigabit Ethernet products in the Cisco 12000 series GSR and Catalyst® switches.

High-Capacity Gigabit Ethernet Connectivity

The Cisco 10000 Gigabit Ethernet module is targeted at ISPs using gigabit Ethernet for Intra-POP interconnect. The Gigabit Ethernet module supports a full gigabit per second of traffic (full duplex) providing the highest total bandwidth and throughput per module in the Cisco 10000 platform. Further, multiple modules can be configured in a single Cisco 10000 chassis to support connectivity to multiple destinations and for network layer redundancy. All modules are connected directly to the Performance Routing Engine (PRE) (and redundant PRE if so configured) via their own dedicated point-to-point backplane

buses. This dedicated connection ensures that backplane capacity will never be oversubscribed between the PRE and the Gigabit Ethernet module.

Modular Gigabit Ethernet Interfaces for Maximum Upgrade Flexibility

The Cisco 10000 Gigabit Ethernet module supports GBIC modular technology to ensure customers have maximum flexibility in configuring physical network interfaces in their Gigabit Ethernet networks. GBICs in the Cisco 10000 Gigabit Ethernet module are hot swappable without powering down the card or the chassis and provide a quick and easy method of changing physical interfaces. Cisco currently supports three GBICs on the Cisco 10000 Gigabit Ethernet module (1000BaseSX, 1000BaseLX/LH GBIC, and 1000BaseZX) supporting connectivity of up to 100 kilometers (over premium single mode fiber or dispersion shifted single mode fiber). (See Table 1.)

Optimized for High Performance Intra-POP Connectivity Uplinks

The Cisco 10000 Gigabit Ethernet module is optimized to be a high-capacity uplink from the Cisco 10000 aggregation router to the high-speed backbone router in the POP. The Cisco 10000 is capable of aggregating thousands of leased lines, and using the high-capacity PRE, routing this traffic to the customer's backbone switches. Many ISPs have chosen gigabit Ethernet as the uplink from the aggregation router to backbone switches, such as the Cisco 12000 series GSR, as a way to control costs while improving transmission performance within the POP.

Key Features

Hardware Features

- Single-port Gigabit Ethernet line card running at 1 Gbps, full duplex
- Functions in any Cisco 10000 interface card slot
- All modules are hot swappable
- SC duplex connectors at the physical layer
- Support for the following GBICs
 - 1000BaseSX multimode, compliant with IEEE 802.3z specifications
 - 1000BaseLX/LH compliant with IEEE 802.3z specifications
 - 1000BaseZX

Ethernet Features

- Media Access Control (MAC) with full-duplex operation and flow control
- Hardware address filtering on received frames of up to 4000 address entries
- 802.3x flow control
- Ethernet encapsulation formats:
 - Ethernet V2
 - 802.2 SAP
 - 802.2 SNAP

Software Features

- Autonegotiation
- 64-bit counters
- 802.1Q VLANs

Table 1 Gigabit Ethernet Interface Configurations

Module	Interface	62.5 um Multimode 160/500 MHz-km	62.5 um Multimode 200/500 MHz-km	50 um Multimode 400/400 MHz-km	50 um Multimode 500/500 MHz-km	9/10 um Single Mode
WS-G5484	1000BaseSX	220m	275m	500m	550m	—
WS-G5486	1000BaseLX/LH	550m ¹	550m ¹	550m ¹	550m ¹	10km
WS-G5487	1000BaseZX	—	—	—	—	70km ²

1. 1000BaseLX frequently needs a mode-conditioning patch cord when used with multimode fiber

2. 100 km over premium single mode fiber or dispersion shifted single mode fiber

Specifications

Physical

- Weight: 4.75 lb (2.16 kg)
- Dimensions: 16.0 x 1.12 x 9.97 in. (40.64 x 2.83 x 25.32 cm) (H x W x D)

Environmental

- Storage temperature: –38 to 150 F (–40 to 70 C)
- Operating temperature, nominal: 41 to 104 F (5 to 40 C)
- Operating temperature, short term: 23 to 131 F (–5 to 55 C)
- Storage relative humidity: 5% to 95% relative humidity (RH)
- Operating humidity, nominal: 5% to 85% RH
- Operating humidity, short term: 5% to 90% RH
- Operating altitude: –60 m to 4000 m

Regulatory Compliance

Safety

- UL 1950, Third Edition (Safety of Information Technology Equipment, Including Electrical Business Equipment), with No D3 Deviations
- CSA 22.2 No. 950-95 Third Edition (Safety of Information Equipment Technology, Including Electrical Business Equipment)
- EN 60950 (Safety of Information Equipment Technology, Including Electrical Business Equipment) incorporating Amendments 1, 2, 3 and 4, with all National Deviations
- IEC 950 incorporating Amendments 1, 2, 3 and 4, with all National Deviations
- ACA TS001 1997 Test Report and Statement of Compliance AS/NZS3260 incorporating Amendments 1, 2, 3 and 4
- 21CRF1040
- EN60825-1
- EN60825-2

Electromagnetic Emissions Certification

- FCC Part 15 Class B
- EN55022: 1998 Class B
- CISPR 22:1997 Class B
- CFR 47 Part 15 Class A
- ICES -003, Issue 2, Class B, April 1995
- VCCI V-3/97.04 Class II
- AS/NZS 3548:1992, Class B
- CNS-13438 Class B - BSMI (BCIQ) in Taiwan

Immunity

- | | |
|--------------|--|
| EN61000-4-2 | ESD immunity |
| EN61000-4-3 | Radiated RF field immunity |
| EN61000-4-4 | Immunity to electrical fast transients |
| EN61000-4-5 | Surge immunity |
| EN61000-4-6 | RF conducted immunity |
| EN61000-4-6 | RF conducted immunity |
| EN61000-4-11 | Dips and sags (AC input) |
| EN61000-3-2 | Power line harmonics (AC input) |

Network Equipment Building Systems

- Network Equipment Building Systems (NEBS): Criteria Levels (Level 3-compliant)
- NEBS: Physical Protection
- NEBS: EMC and Safety
- GR-1089-Core
- GR-63-Core
- SR-3580

European Telecommunication Standards Institute

- ETS 300 386-1—Levels for equipment with a “high priority of service” that is installed in “locations other than Telecommunication centers”
- ETS 300 386-2:1997—Levels for equipment with a “high priority of service” that is installed in “locations other than Telecommunication centers”
- ETSI 300 132-2: December 1994—Power supply interfaces at the input to telecommunications equipment Sections 4.8, 4.9

LEDs

- Link Status (green, one per port per card)
- Transmit activity (green, one per port per card)
- Receive activity (green, one per port per card)
- Fail (yellow, one per card)

Connector

- SC-duplex connector
- Support for the following GBICs
 - 1000BaseSX multimode, compliant with IEEE 802.3z specifications
 - 1000BaseLX/LH compliant with IEEE 802.3z specifications
 - 1000BaseZX

Network Management

- Simple Network Management Protocol (SNMP)
- MIB-II
- RFC 1213
- RFC 1573

Power Budget

- Component: Gigabit Ethernet module
- Unit Power: 25W

Optical Power Budget

- 1000BaseSX GBIC
 - Power budget: 7.5 dB
 - Transmit power: -9.5 to 0 dBm
 - Receive power: -17 to 0 dBm
- 1000BaseLX/LH GBIC
 - Power budget: 7.5 dB (multimode fiber), 8 dB (single mode)
 - Transmit power: -11.5 to -3 dBm (multimode fiber), -11 to -3 dBm (single mode)
 - Receive power: -19 to -3 dBm (multimode and single mode fiber)
- 1000BaseZX GBIC
 - Power budget: 23 dB
 - Transmit power: 0 to 4.77 dBm
 - Receive power: -23 to 0 dBm

Ordering Information

Product Number	Product Description
1GE	1-port Gigabit Ethernet line card
WS-G5484	1000BaseSX GBIC
WS-G5486	1000BaseLX/LH GBIC
WS-G5487	1000BaseZX GBIC



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