

Cisco's Gigabit Ethernet Family of Solutions (PA-GE) for Cisco 7200VXR and 7304 Series Routers

Cisco Gigabit Ethernet solutions (PA-GE) for the Cisco 7200VXR and 7304 series routers provide high-capacity Local Area Network (LAN) connectivity for enterprise edge, campus LAN and service provider networks with high-density, high-throughput requirements.

The following Gigabit Ethernet interface is available for the Cisco 7200VXR and the Cisco 7304 series routers:

Single Port Gigabit Ethernet Port Adapter (PA-GE)

The single port Gigabit Ethernet Port Adapter (PA-GE) provides a Gigabit Ethernet connection for the Cisco 7200 and Cisco 7304 series routers. This port adapter (PA), which offers moderate performance, is suitable for campus, enterprise edge and wide-area network (WAN) aggregation applications. When used on the campus, the Cisco 7200 and Cisco 7304 series routers with the PA-GE connects the enterprise WAN to the Gigabit Ethernet campus backbone. At the enterprise edge, the PA-GE connects the WAN to the Gigabit Ethernet campus backbone. When the Cisco 7200 series router is used for WAN aggregation, the PA-GE provides intra-pop connectivity between the router and high-speed WAN core devices, such as the Cisco 12000 series router. The PA-GE may be inserted into any open port adapter slot on Cisco 7200VXR routers while the PA-GE is supported on the Cisco 7304 by way of the Carrier Card.

Gigabit Ethernet Interface Processor (GEIP) and Enhanced Gigabit Ethernet Interface Processor (GEIP+)

The single-port Gigabit Ethernet Interface Processor and the Enhanced Gigabit Ethernet Interface Processor, both based on Versatile Interface Processor (VIP) technology, provide a Gigabit Ethernet connection for the Cisco 7500 series router. These interface processors (IP) are suitable for campus, enterprise edge and WAN aggregation applications. When used on the campus, the Cisco 7500 series router with the GEIP or GEIP+ connects the enterprise WAN and/or legacy LANs, such as FDDI or Token Ring to the Gigabit Ethernet campus backbone. At the enterprise edge, the GEIP or GEIP+ connects the WAN to the Gigabit Ethernet campus backbone. When the Cisco 7500 series router is used for WAN aggregation, the GEIP or GEIP+ provides intra-pop connectivity between the router and high-speed WAN core devices, such as the Cisco 12000 series router.



The GEIP and GEIP+ differ primarily in their performance. The GEIP+ provides up to 800 Mbps of aggregate throughput, while the GEIP performs at a more moderate level. In addition to performance, the GEIP+ is based on VIP4 technology, provided many benefits including error correcting code (ECC) circuitry for improved availability. The GEIP+ significantly extends Gigabit Ethernet performance on the Cisco 7500 series router, providing high performance solutions for Gigabit uplinks from the enterprise edge and data center, as well as in service provider points of presence.

The Gigabit Ethernet modules for the Cisco 7200 and 7500 series are IEEE standards compliant and support full duplex operation.

Table 1

Description	Cisco 7200VXR	Cisco 7304
Gigabit Ethernet Port Adapter (PA-GE)	X	X

Gigabit Interface Converters (GBIC)

A GBIC is a removable transceiver that provides an adaptation of the Interface Processor to a variety of physical layer Gigabit Ethernet cabling. Different model GBICs support different media types, wavelengths and distances, providing for highly flexible deployments. The GE interfaces can be configured for 1000BASE-SX (short wavelength), 1000BASE-LX (long wavelength), 1000BASE-LH (long haul), and 1000BASE-ZX (extended wavelength) applications. GBICs within the GE interfaces are hot-swappable, minimizing network disruption when changing media types.

All modules can be configured with a choice of shortwave (SX), longwave/long haul (LX/LH), or extended wavelength (ZX) GBIC. GBICs are selected as an option when the GE interface is ordered. The GE assembly for each interface is a field replaceable unit (FRU).

Table 2 GBIC Support

Description	PA-GE	GEIP	GEIP+	Part No.
Gigabit Interface Converter for 1000BASE-SX	x	x	x	GBIC-SX
Gigabit Interface Converter for 1000BASE-LX/LH	x	x	x	GBIC-LX/LH
Gigabit Interface Converter for 1000BASE-ZX	x	x	x	GBIC-ZX



Table 3 Features at a Glance: Gigabit Ethernet Family of Interfaces

Feature	PA-GE
Gigabit Interface Converter (GBICs) supported	1000BASE-SX, 1000BASE-LX/LH, 1000BASE-ZX
Online Insertion and Removal (OIR)	Supports online insertion and removal (OIR) of adapter/ interface and GBIC
Physical	Single-wide port adapter
Cisco 7200 Platform Support	Cisco 7200/NPE-300 and above
Minimum Cisco IOS®, Release Supported for Cisco 7200	12.0(6)T, 12.0(7)S, 12.1(1), 12.1(1)T, 12.1(1)E and after
Cisco 7304 Platform Support	Cisco 7304-NSE-100 and Cisco 7304-NPE-G100
Minimum Cisco IOS®, Release Supported for Cisco 7304	12.2S

Table 4 General Specifications

Specifications	PA-GE
Dimensions	The GE-PA occupies one port adapter slot and can only be operated in a Cisco 7200VXR router
Environmental Specifications	Operating Temperature: 0 - 40°C Storage Temperature: -20 to 65°C Relative Humidity: 10 to 90 percent non-condensing
Power Requirements	Power consumption: 30 Watts
Network connectors (per port/ interface)	SC-Duplex
Safety Certifications	UL 1950 IEC 950 CSA C22.2 No. 950-M29 EN60950



Table 4 General Specifications

Specifications	PA-GE
Electromagnetic Emissions Certifications	FCC Class A CISPR-22 Class A EN55022A Class B VCCI Class 2 CE Mark IEC 801-2, 3,4,5,6,11

Table 5 LEDs: PA-GE, GEIP and GEIP+

LED	State	Notes
Enabled	Green	Port Adapter Powered and Enabled
Link	Green	Gigabit Ethernet Link Active
Receive	Green	Receiving Packets
Transmit	Green	Transmitting Packets

GBIC Specifications

Table 6 Maximum Station-to-Station Cabling Distance

GBIC	62.5 mm Multimode Fiber (MMF)	50mm Multimode Fiber (MMF)	Single Mode Fiber (SMF)
1000BASE-SX	220 meters	550 meters	-----
1000BASE-LX	550 meters	550 meters	5000 meters
1000BASE-LH	550 meters	550 meters	10,000 meters
1000BASE-ZX	-----	-----	70,000 meters 100,000 meters (dispersion shifted single mode fiber)



Table 7 Link Power Budget for 1000BASE--SX, 1000BASE-LX and 1000BASE-LH

	Parameter	Link Power Budget	Operating Distance
1000BASE-SX link power budget	62.5 mm MMF	7.5 dB	220 meters
	50mm MMF	7.5 dB	550 meters
1000BASE-LX link power budget	62.5 mm MMF	7.5 dB	550 meters
	50mm MMF	7.5 dB	550 meters
	10mm SMF	8 dB	5000 meters
1000BASE-LH link power budget	62.5 mm MMF	7.5 dB	550 meters
	50mm MMF	7.5 dB	550 meters
	10 mm SMF	7.8 dB	10,000 meters
1000BASE-ZX link power budget	9/10 mm SMF	23 dB	70,000 meters 100,000 meters (dispersion shifted single mode fiber)

Note: A “mode-conditioning patch cord” will be needed for the 1000BASE-LX and the 1000BASE-LH connections at MMF if the distance between the two stations is longer than 300 meters (1000 feet)

Table 8 Ordering Information for Gigabit Ethernet Interfaces

Description	Cisco 7200VXR	Cisco 7304
Gigabit Ethernet Port Adapter (PA-GE)	X	X

Table 9 Ordering Information for GBICs

Description	PA-GE	GEIP	GEIP+	Part Number
Gigabit Interface Converter for 1000BASE-SX	x	x	x	GBIC-SX
Gigabit Interface Converter for 1000BASE-LX/LH	x	x	x	GBIC-LX/LH
Gigabit Interface Converter for 1000BASE-ZX	x	x	x	GBIC-ZX



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