Data Sheet

Cisco Catalyst 6500 Series 10 Gigabit Ethernet Modules

Cisco data center switching delivers relentless velocity: Architecture scalability supports growth in any direction; Operational manageability maximizes service velocity and IT staff productivity; Comprehensive resilience addresses many potential sources of downtime.

Figure 1.   Cisco Catalyst 6500 Series 4-Port 10 Gigabit Ethernet Module

Figure 2.   Cisco Catalyst 6500 Series 8-Port 10 Gigabit Ethernet Module

PRODUCT OVERVIEW

The Cisco Catalyst 6500 Series has an 8-port 10 Gigabit Ethernet module and a 4-port 10 Gigabit Ethernet module. These modules support pluggable optics to support distances up to 80km over single-mode fiber, 300m over multimode fiber, and 15m over copper. The 8-port 10 Gigabit Ethernet module provides up to 64 10 Gigabit Ethernet ports in a single Catalyst 6500 chassis, ideal for deployment in the aggregation layer of LAN campus and data centers. Both modules are interoperable with the Cisco Catalyst 6500 Series Supervisor Engine 720 and provide 40 Gbps connection to the switch fabric. Building upon the award-winning Catalyst 6500 Series, these 10 Gigabit Ethernet modules are backward compatible with all existing Catalyst 6500 line cards and services modules, enabling service providers and enterprises to offer new Layer 2 through 7 services and network capabilities to increase revenue and user productivity without complete equipment upgrades.

The Cisco Catalyst 6500 Series 10 Gigabit Ethernet modules are designed for deployment in the distribution and core of campus and data center for traffic aggregation or for interbuilding, points of presence (POPs), WAN edge, and MAN connections. These modules support IEEE 802.3ad link aggregation and Cisco EtherChannel® technology for fault-tolerant connectivity and bandwidth scalability of up to 80 Gbps per EtherChannel connection. In addition, they support hardware based quality of service (QoS), access control lists (ACLs), and jumbo frames to enable secure and predictable performance for bandwidth-intensive applications.

APPLICATIONS

8-port 10 Gigabit Ethernet module: server aggregation, LAN access uplinks aggregation, and links to and between core, where high-density 10 Gigabit Ethernet is required.

4-port 10 Gigabit Ethernet module: core, interbuilding connections, points of presence (POPs), WAN edge, and MAN connections, where medium to low 10 Gigabit Ethernet density is required.

See 10 Gigabit Ethernet Switching for Enterprises white paper for more details:
http://www.cisco.com/en/US/products/hw/switches/ps708/products_white_paper0900aecd802a648b.shtml

KEY FEATURES AND BENEFITS

Table 1.   Cisco Catalyst 6500 Series 10 Gigabit Ethernet Modules Key Features Comparison

Feature	WS-X6704-10GE	WS-X6708-10G-3C WS-X6708-10G-3CXL
Ports	4	8
Optics	XENPAK	X2
Switch fabric connection	40 Gbps (80 Gbps full duplex)	40 Gbps (80 Gbps full duplex)
Forwarding engine	Default: centralized forwarding (CFC) Optional: distributed forwarding with DFC3A, DFC3B, or DFC3BXL	WS-X6708-10G-3C: equipped with DFC3C for distributed forwarding, supporting 256K routes WS-X6708-10G-3CXL: equipped with DFC3CXL for distributed forwarding, supporting 1M routes
Queues	RX: 8q8t TX: 1p7q8t	RX: 8q4t TX: 1p7q4t
Queuing mechanisms	Class of service (CoS)-based queue mapping	CoS-based queue mapping Differentiated services code point (DSCP)-based queue mapping
Scheduler	Deficit Weighted Round Robin (DWRR)	DWRR and Shaped Round Robin (SRR)
Port buffers	16 MB per port	200 MB per port
Jumbo frame support for bridged and routed packets	Up to 9216 bytes	Up to 9216 bytes
Maximum port density	32 ports (9-slot chassis)	64 ports (9-slot chassis)
Supervisor engines supported	Supervisor Engine 720	Supervisor Engine 720
Chassis supported	Any Catalyst 6500 E-Series chassis, C6509-NEB-A chassis, non-E-Series chassis with Fan Tray 2, or Cisco 7600 chassis (NEBS compliant: operating temperature up to 55℃) Not supported in Catalyst 6503 non-E Series chassis	Any Catalyst 6500 E-Series chassis, including 6503-E, 6504-E, 6506-E, 6509-E, and C6509-NEB-A chassis, or the Cisco 7604 and 7609 chassis (NEBS compliant: operating temperature up to 55℃) Or Non-E-Series chassis with Fan Tray 2, including 6506, 6509, 6513, or the Cisco 7606 and 7613 chassis (non-NEBS compliant: operating temperature up to 40℃) Not supported in Catalyst 6503 non-E Series chassis
Slot requirements	Can occupy any slot in any Cisco Catalyst 6503-E, 6504-E, 6506, 6506-E, 6509, 6509-E, 6509-NEB-A, Cisco 7604, 7607, 7609 chassis; can only occupy slots 9 through 13 in a Cisco Catalyst 6513 or Cisco 7613 chassis	Can occupy any slot in any Cisco Catalyst 6503-E, 6504-E, 6506, 6506-E, 6509, 6509-E, 6509-NEB-A, Cisco 7604, 7606, 7609 chassis; can only occupy slots 9 through 13 in a Cisco Catalyst 6513 or Cisco 7613 chassis
Onboard memory	256 MB default, upgradable to 512 MB or 1 GB	1 GB default

Table 2. Pluggable Optics for Catalyst 6500 10 Gigabit Ethernet Modules

X2 Product ID	XENPAK Product ID	Transceiver Type[2]	Wavelength	IEEE Standard	Maximum Distance/Cable Type[3]
X2-10GB-SR[1]	XENPAK-10GB-SR	10GBASE-SR	850 nm serial	802.3ae	26 m over 62.5-micron FDDI grade multimode fiber 33 m over 62.5-micron 200 MHz*km multimode fiber 66 m over 50-micron 400 MHz*km multimode fiber 82 m over 50-micron 500 MHz*km multimode fiber 300 m over 50-micron 2000 MHz*km multimode fiber
X2-10GB-LR[1]	XENPAK-10GB-LR	10GBASE-LR	1310 nm serial	802.3ae	10 km over single-mode fiber
X2-10GB-ER[1]	XENPAK-10GB-ER	10GBASE-ER	1550 nm serial	802.3ae	40 km over single-mode fiber[4]
X2-10GB-LX4[1]	XENPAK-10GB-LX4	10GBASE-LX4	WWDM 1310 nm	802.3ae	300 m over 62.5-micron FDDI grade multimode fiber 240 m over 50-micron 400 MHz*km multimode fiber 300 m over 50-micron 500 MHz*km multimode fiber
X2-10GB-CX4[1]	XENPAK-10GB-CX4	10GBASE-CX4	Copper	802.3ak	15 m over 8 pair 100-Ohm Infiniband cable
Not available today	XENPAK-10GB-ZR	10GBASE-ZR	1550 nm serial	–	80km over single-mode fiber
Not available today	DWDM-XENPAK-xx.yy	DWDM	32 different wavelengths; C band	100GHz ITU grid	32 wavelengths over single strand of single-mode fiber; 80km[5]
Not available today	WDM-XENPAK-REC	RX only WDM	1530-1565nm	–	RX only; no TX; 80km over single-mode fiber
Not available today	XENPAK-10GB-LW	10GBASE-LW	1310 nm serial	802.3ae	10 km over single-mode fiber

[1] Only version -02 of these X2 optics is supported on WS-X6708-10G-3C and WS-X6708-10G-3CXL. See release notes or external Q&A for more details.

[2] Besides CX4, all XENPAKs and X2s have dual SC (female) connectors. CX4 has an Infiniband 4x connector.

[3] To calculate the exact distances that your module will support before installation, see optical specifications in the XENPAK and X2 data sheets. The exact distance supported varies according to the number of splices and connectors in a single-mode fiber strand.

Cisco 10GBASE XENPAK Modules data sheet:
http://www.cisco.com/en/US/products/hw/modules/ps5455/products_data_sheet09186a008007cd00.html

Cisco 10GBASE X2 Modules data sheet: http://www.cisco.com/en/US/products/hw/modules/ps5455/products_data_sheet0900aecd801f92aa.html

Cisco 10GBASE DWDM XENPAK Modules data sheet:
http://www.cisco.com/en/US/products/hw/modules/ps5455/products_data_sheet0900aecd801f9333.html

[4] According to the IEEE 802.3ae standard, requires 5 dB 1550 nm fixed loss attenuator for <20 km; a 5 dB fixed loss attenuator is available as a spare, part number WS-X6K-5DB-ATT=.

[5] Any passive mux demux can be used with the DWDM XENPAKs. The ONS 15216 Flexlayer filters is one of the options.

PRODUCT SPECIFICATIONS

Table 3.   Product Specifications

Standard protocols	IEEE 802.1d, IEEE 802.1p, IEEE 802.1q, IEEE 802.1s, IEEE 802.1w, IEEE 802.3x, IEEE 802.3ad, IEEE 802.3ae, and IEEE 802.3ak
Physical specifications	Occupies one slot in the Cisco Catalyst 6500 Series chassis or Cisco 7600 chassis Dimensions (H x W x D): 1.2 x 14.4 x 16 in. (3.0 x 35.6 x 40.6 cm) Weight: ● WS-X6708-10G-3C: 13 pounds ● WS-X6708-10G-3CXL: 13 pounds ● WS-X6704-10GE with DFC3BXL: 10 pounds ● WS-X6704-10GE with DFC3B: 9.8 pounds ● WS-X6704-10GE with CFC: 9 pounds
Environmental conditions	Operating temperature: Certified for operation: 32° to 104°F (0° to 40°C) Design and tested for operation 32° to 130°F (0 to 55 °C) Storage temperature: -40° to 167°F (-40° to 75°C) Relative humidity: 10 to 90 percent, noncondensing Operating altitude: ● Certified for operation: 0 to 2000 m (0 to 6500 ft) ● Designed and tested for operation -60 to 3000 m (-200 to 10000 ft)
Regulatory compliance	Cisco Catalyst 6500 Series 10 Gigabit Ethernet modules, when installed in a system, comply with the following EMI and safety standards: ● UL 60950 ● CSA C22.2 No. 60950 ● EN 60950 ● IEC 60950 ● CE marking ● AS/NZS 60950 ● FCC Part 15 (CFR 47) Class A ● VCCI Class A ● EN55022 Class A ● EN55024 ● CISPR 22 Class A ● AS/NZS CISPR 22 Class A ● ETS 300 386
Network management	EHERLIKE-MIB (RFC 1643) IF-MIB (RFC 1573) Bridge MIB (RFC 1493) CISCO-STACK-MIB CISCO-VTP-MIB CISCO-CDP-MIB RMON MIB (RFC 1757) CISCO-PAGP-MIB CISCO-STP-EXTENSIONS-MIB CISCO-VLAN-BRIDGE-MIB CISCO-VLAN-MEMBERSHIP-MIB ENTITY-MIB (RFC 2037) HC-RMON RFC1213-MIB (MIB-II) SMON-MIB

Power requirements	WS-X6708-10G-3C: 444.36W (10.58A @ 42v)
	WS-X6708-10G-3CXL: 473.76w (11.28A @ 42V)
	WS-X6704-10GE with DFC3BXL: 402.36W (9.58A @ 42V)
	WS-X6704-10GE with DFC3B: 377.16W (8.98A @ 42V)
	WS-X6704-10GE with DFC3A: 389.76W (9.28A @ 42V)
	WS-X6704-10GE with CFC: 295.26W (7.03A @ 42V)
	Go to http://www.cisco.com/go/powercalculator for easy power consumption calculation
Indicators	Status: green (operational); red (faulty); orange (module booting)
	Link: green (port enabled and connected); orange (port disabled); off (port enabled and not connected)

Table 4. Cables for 10GBASE-CX4 Optics

Product ID	Product Description
CAB-INF-28G-1=	Cisco 1 m CX4 patch cable
CAB-INF-28G-5=	Cisco 5 m CX4 patch cable
CAB-INF-28G-10=	Cisco 10 m CX4 patch cable
CAB-INF-26G-15=	Cisco 15 m CX4 patch cable

ORDERING INFORMATION

Table 5. Product Numbers for Ordering

Product ID	Product Description
WS-X6708-10G-3C	Cisco Catalyst 6500 8-Port 10 Gigabit Ethernet Module with DFC3C, requires X2
WS-X6708-10G-3CXL	Cisco Catalyst 6500 8-Port 10 Gigabit Ethernet Module with DFC3CXL, requires X2
X2-10GB-SR	10GBASE-SR X2 (multimode fiber)
X2-10GB-LR	10GBASE-LR X2 (single-mode fiber)
X2-10GB-ER	10GBASE-ER X2 (single-mode fiber)
X2-10GB-LX4	10GBASE-LX4 X2 (multimode fiber)
X2-10GB-CX4	10GBASE-CX4 X2 (copper Infiniband cable)
WS-X6704-10GE	Cisco Catalyst 6500 4-Port 10 Gigabit Ethernet Module, requires XENPAK
WS-F6700-DFC3BXL	Distributed Forwarding Card-3BXL Upgrade for WS-X6704-10GE
WS-F6700-DFC3B	Distributed Forwarding Card-3B Upgrade for WS-X6704-10GE
WS-F6700-DFC3A	Distributed Forwarding Card-3A Upgrade for WS-X6704-10GE
XENPAK-10GB-SR	10GBASE-SR XENPAK (multimode fiber)
XENPAK-10GB-LR	10GBASE-LR XENPAK (single-mode fiber)
XENPAK-10GB-ER	10GBASE-ER XENPAK (single-mode fiber)
XENPAK-10GB-LX4	10GBASE-LX4 XENPAK (multimode fiber)
XENPAK-10GB-CX4	10GBASE-CX4 XENPAK (copper Infiniband cable)
CAB-INF-28G-1=	Cisco 1 m CX4 patch cable for XENPAK-10GB-CX4
CAB-INF-28G-5=	Cisco 5 m CX4 patch cable for XENPAK-10GB-CX4
CAB-INF-28G-10=	Cisco 10 m CX4 patch cable for XENPAK-10GB-CX4
CAB-INF-26G-15=	Cisco 15 m CX4 patch cable for XENPAK-10GB-CX4
XENPAK-10GB-ZR	10GBASE-ZR XENPAK (single-mode fiber)
DWDM-XENPAK-xx.yy	DWDM XENPAK, where xx.yy ranges from 30.33 to 60.61 (single-mode fiber)
WDM-XENPAK-REC	RX only XENPAK (single-mode fiber)
XENPAK-10GB-LW	10GBASE-LW XENPAK (single-mode fiber) (WAN PHY)

Note:

WS-X6708-10G-3C ships with WS-X6708-10GE and WS-F6700-DFC3C.

WS-X6708-10G-3CXL ships with WS-X6708-10GE and WS-F6700-DFC3CXL.

The front panel of these modules is labeled as WS-X6708-10GE.

Cisco IOS® Software commands display WS-X6708-10GE with either WS-F6700-DFC3C or WS-F6700-DFC3CXL.

SERVICE AND SUPPORT

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you to protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, see Cisco Technical Support Services or Cisco Advanced Services.

FOR MORE INFORMATION

For more information about Cisco Catalyst 6500 Series Switches, visit http://www.cisco.com/en/US/products/hw/switches/ps708/index.html or contact your local account representative.

CISCO SYSTEMS

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