

Cisco 12000 Series Dynamic Packet Transport Line Cards

The Cisco® 12000 Series Dynamic Packet Transport (DPT) line cards offer packet-optimized optical transport solutions by combining the bandwidth-efficient and services-rich capabilities of IP routing with the bandwidth-rich, self-healing capabilities of fiber rings to deliver fundamental cost and function advantages over existing solutions. DPT rings are dual, counter-rotating fiber rings. Both fibers are used concurrently to transport both data and control traffic. DPT rings run on a variety of transport technologies, including SONET/SDH, wavelength-division multiplexing (WDM), and dark fiber. DPT provides carriers with the flexibility to operate packet rings over their embedded fiber transport infrastructure as well as an evolution path to packet-optimized transport for high-bandwidth IP networks.

The Cisco DPT line cards offer the following connectivity options:

- 4-port OC-12c/STM-4c DPT IP services engine (ISE)
- 4-port OC-48c/STM-16c DPT
- 1-port OC-192c/STM-64c DPT

Figure 1. Cisco 12000 Series 4-Port OC-12c/STM-4c DPT ISE Line Card



Figure 2. Cisco 12000 Series 4-Port OC-48c/STM-16c DPT Line Card



Figure 3. Cisco 12000 Series 1-Port OC-192c/STM-64c DPT Line Card



PRODUCT FEATURES

Table 1 describes the basic features on the Cisco 12000 Series DPT line cards.

Table 1. Product Features

Feature	Description
Performance	<ul style="list-style-type: none"> • Line-rate throughput for IP forwarding and Multiprotocol Label Switching (MPLS) switching • Performance sustained in fully loaded system • Performance sustained for all IP prefix sizes
Reliability and availability	<ul style="list-style-type: none"> • Online insertion and removal (OIR) • Sub-50-ms ring restoration • Mean time between failure (MTBF) in excess of 80,000 hours
Network management	<ul style="list-style-type: none"> • Cisco IOS® command-line interface (CLI) • Cisco 12000 Manager for configuration, fault, and performance element management • Simple Network Management Protocol (SNMP) MIBs: <ul style="list-style-type: none"> – SONET/SDH MIB (RFC 2558) – MIB-II – Cisco-SRP-MIB (basic and extension)
Statistics and accounting	<ul style="list-style-type: none"> • Byte and packet counting per ingress port for IP and MPLS packets • Byte and packet counting per ingress port for IP and MPLS type-of-service (ToS) bits • Packet counting for Modified Deficit Round Robin (MDRR) and Weighted Random Early Detection (WRED) functions • Packet and byte counting for committed-access-rate (CAR) feature • Counting per ingress port for IP prefixes and Cisco Express Forwarding adjacencies • Byte and packet counting for Spatial Reuse Protocol (SRP) statistics • Access-control-list (ACL) match byte counting

SONET/SDH functions	<ul style="list-style-type: none"> • Error counts for B1, B2, and B3 • Threshold crossing alerts (TCAs), and far end block error path (FEBE) for B1, B2, and B3 with threshold that can be set • Loss of signal (LOS), loss of frame (LOF), line alarm indicator signal (LAIS), path alarm indicator signal (PAIS), loss of pointer (LOP), line remote defect indicator (LRDI), path remote defect indicator (PRDI), signal failure (SF), signal degrade (SD), line remote error indicator (line FEBE), and path remote error indicator (path FEBE) • Synchronization <ul style="list-style-type: none"> – Local (internal) or loop timed (recovered from network) – Stratum 3 clock accuracy over full operating temperature – Pointer activity monitoring • Local (diagnostic) and line (network) loopback • Payload mapping <ul style="list-style-type: none"> – $1 + X^{43}$ self-synchronous scrambler
Protocols	<ul style="list-style-type: none"> • SRP over SONET/SDH (RFC 2892) • Internet Control Message Protocol (ICMP) • Layer 3 routing protocols, including Border Gateway Protocol Version 4 (BGPv4), Open Shortest Path First (OSPF), Intermediate System-to-Intermediate System (IS-IS), Enhanced Interior Gateway Routing Protocol (EIGRP), Routing Information Protocol (RIP), Distributed Forwarding Information Base (FIB), IP switching, Cisco Discovery Protocol, Internet Message Protocol (IMP), Routing with Resource Reservation (RRR), and others • Multicast forwarding with support for source and shared distribution trees and the following protocols: Protocol Independent Multicast dense mode (PIM-DM), PIM sparse mode (PIM-SM), PIM sparse-dense mode, auto-rendezvous point (AutoRP), Internet Group Management Protocol Versions 1 and 2 (IGMPv1/v2), Multicast BGP (MBGP), Multicast Source Discovery Protocol (MSDP), and others • Comprehensive MPLS support

PRODUCT SPECIFICATIONS

Table 2 provides specifications for the different Cisco 12000 Series DPT line cards.

Table 2. Product Specifications

Line Card	Forwarding Engine	Cisco IOS Software Release	Chassis Supported	Per-Chassis Port Densities
4-port OC-12c/STM-4c DPT ISE	Engine 3 (ISE)	12.0(24)S or higher	Cisco 12404 Cisco 12x06 Cisco 12x10 Cisco 12x16	3 cards/6 DPT ring ports 5 cards/10 DPT ring ports 9 cards/18 DPT ring ports 15 cards/30 DPT ring ports
4-port OC-48c/STM-16c DPT	Engine 4+	12.0(23)S or higher	Cisco 12404 Cisco 12406 Cisco 12410 Cisco 12810 Cisco 12416 Cisco 12816	3 cards/6 DPT ring ports 5 cards/10 DPT ring ports 9 cards/18 DPT ring ports 9 cards/18 DPT ring ports 15 cards/30 DPT ring ports 15 cards/30 DPT ring ports

1-port OC-192c/STM-64c DPT	Engine 4+	12.0(23)S or higher	Cisco 12404	2 cards/1 DPT ring ports
			Cisco 12406	4 cards/2 DPT ring ports
			Cisco 12410	8 cards/4 DPT ring ports
			Cisco 12416	14 cards/7 DPT ring ports
			Cisco 12810	8 cards/4 DPT ring ports
			Cisco 12816	14 cards/7 DPT ring ports

PHYSICAL AND ELECTRICAL SPECIFICATIONS

Table 3 provides details about the physical and electrical specifications of the different Cisco 12000 Series DPT line cards.

Table 3. Physical and Electrical Specifications

Line Card	Dimensions	Weight	Power	Memory	LEDs
4-port OC-12c/STM-4c DPT ISE	Height: 14.5 in. (36.8 cm) Depth: 18 in. (45.7 cm)	6 lb (2.72 kg)	125 watts maximum	Packet: 512 MB Route: 512 MB	Active Carrier Receive packets Pass-through Wrap
4-port OC-48c/STM-16c DPT	Height: 14 in. (35.6 cm) Depth: 18 in. (45.7 cm)	6 lb (2.72 kg)	174 watts maximum	Default: 256 MB upgradable to 512 MB	Active Carrier Receive packets Pass-through Wrap
1-port OC-192c/STM-64c DPT	Height: 14.5 in. (36.8 cm) Depth: 18 in. (45.7 cm)	9.51 lb (4.31 kg)	174 watts maximum	Default: 256 MB upgradable to 512 MB	Active Carrier Receive packets Mate sync Pass-through Wrap

OPTICAL SPECIFICATIONS

Table 4 provides details about the optical specifications of the different Cisco 12000 Series DPT line cards.

Table 4. Optical Specifications

Line-Card Part Number	Tx	Power	Rx	Power	Target Distance (km) ¹	Wave-length (nm)	Compliance ²	
	P _{Tmax} (dBm)	P _{Tmin} (dBm)	P _{Rmax} (dBm)	P _{Rmin} (dBm)			Telcordia	ITU
OC-192							GR-253	G.691
OC-192 VSR-1 ³	-3	-10	-3	-16	300m	850	OIF-VSR4-01.0	
OC-192 SR-1-SC	-1	-6	-1	-11	2	1290-1565	SR-1	I-64.1
OC-192 IR-2-SC	2	-1	-1	-14	40	1290-1565	IR-2	S-64.2b
OC-48							GR-253	G.957
OC-48-SR-SC	-3	-10	0	-18	2	1290-1565		
OC-48-LR-SC	+3	-2	-9	-28	80	1290-1565		
OC-12							GR-253	G.957
OC-12-IR-LC	-8	-15	-8	-28	15	1310		
OC-12-XLR-LC	2	-3	-8	-28	80	1550		

ENVIRONMENTAL APPROVALS AND COMPLIANCE

Table 5 gives standards-compliance information for the Cisco 12000 Series DPT line cards.

Table 5. Compliance and Agency Approvals

Feature	Description
Environmental	<ul style="list-style-type: none"> • Operating temperature: 32 to 104°F (0 to 40°C) • Storage temperature: -4 to 149°F (-20 to 65°C) • Relative humidity: <ul style="list-style-type: none"> – 10 to 90%, noncondensing, operating conditions – Up to 95%, noncondensing, nonoperating conditions

¹ Target distances are used for classification only and not for specification.

² Contact your Cisco account team for details about compliance level to these standards.

³ Standard media termination point (MTP) (multipath optical [MPO]) multifiber optical connectors.

Safety	<ul style="list-style-type: none"> • UL/CSA/IEC/EN 60950-1 • AS/NZS 60950 • ACA TS001 • AS/NZS 3260 • EN60825/IEC 60825 Laser Safety (VSR-Class 1M) (SR, IR, Class 1) • FDA – Code of Federal Regulations (USA) Laser Safety (VSR-Class 1M) (SR, IR, Class 1)
EMI	<ul style="list-style-type: none"> • FCC Part 15 Class A • ICES 003 Class A • AS/NZS 3548 Class A • CISPR 22 Class B (up to 1 GHz) • EN55022 Class B (up to 1 GHz) • VCCI Class A • BSMI Class A • IEC/EN61000-3-2 Power Line Harmonics • IEC/EN61000-3-3 Voltage Fluctuations and Flicker
Immunity (basic standards)	<ul style="list-style-type: none"> • IEC/EN61000-4-2 Electrostatic Discharge Immunity (8-kV contact, 15-kV air) • IEC/EN61000-4-3 Radiated Immunity (10 V/m) • IEC/EN61000-4-4 Electrical Fast Transient Immunity (2-kV power, 1-kV signal) • IEC/EN61000-4-5 Surge AC Port (4-kV CM, 2-kV DM) • IEC/EN61000-4-5 Surge Signal Port (1-kV indoor, 2-kV outdoor) • IEC/EN61000-4-5 Surge DC Port (0.5-kV CM, 0.5-kV CM) • IEC/EN61000-4-6 Immunity to Conducted Disturbances (10V) • IEC/EN61000-4-11 Voltage Dips and sags
ETSI and EN	<ul style="list-style-type: none"> • EN 300 386 Telecommunications Network Equipment (EMC) • EN55024 Information Technology Equipment (Immunity)
Network Equipment Building Standards (NEBS)	<p>This product is designed to meet the following requirements:</p> <ul style="list-style-type: none"> • GR-1089-CORE EMC and Safety • GR-63-CORE Physical Protection • SR-3580 NEBS Criteria Levels (Level 3)

ORDERING INFORMATION

To place an order, contact your local Cisco Systems[®] representative or visit the ordering page on the Cisco Website. Use the ordering information in Table 6.

Table 6. Ordering Information

Product Part Number	Description
4OC12X/SRP-IR-LC	Cisco 12000 Series 4-Port OC-12c/ STM-4c DPT ISE Line Card, 1310 nm intermediate reach (IR), LC connector
4OC12X/SRP-XR-LC	Cisco 12000 Series 4-Port OC-12c/STM-4c DPT ISE Line Card, 1550 nm XR, LC connector
4OC-48/SRP-SFP	Cisco 12000 Series 4-Port OC-48c/STM-16c DPT Line Card
CBL-SRP-OC48	Mate interface cable (included with each line card)
OC192/SRP-VSR=	Cisco 12000 Series 1-Port OC-192c/STM-64c SRP Line Card, 850 nm very short reach (VSR), MTP
OC192/SRP-SR-SC=	Cisco 12000 Series 1-Port OC-192c/STM-64c SRP Line Card, 1310 nm short reach (SR), SC connector
OC192/SRP-IR-SC=	Cisco 12000 Series 1-Port OC-192c/STM-64c SRP Line Card, 1550 nm IR, SC connector
OC192/SRP-VSR-PR	Two OC-192/SRP-VSR line cards with one OC-192 cable (part number CBL-SRP-OC192)

OC192/SRP-SR-PR	Two OC-192/SRP-SR-SC line cards with one OC-192 cable (CBL-SRP-OC192)
OC192/SRP-IR-PR	Two OC-192/SRP-IR-SC line cards with one OC-192 cable (CBL-SRP-OC192)
CBL-SRP-OC192=	Coaxial Mate cable for OC-192/SRP

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FOR MORE INFORMATION

For more information about the Cisco 12000 Series DPT interfaces, contact your local Cisco representative or visit:

<http://www.cisco.com/go/12000>.



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