Data Sheet

Cisco 12000 Series TDM Line Cards

The Internet is an electronic agent for commerce, entertainment, communication, and information retrieval. New network-enabled intranet and Internet applications and services are accelerating an exponential growth in network traffic, resulting in increased demand for available and guaranteed bandwidth.

In response to higher bandwidth and capacity demand, carriers and Internet service providers (ISPs) are now offering DS-3 (45 Mbps) or E3 (34 Mbps) dedicated access connections. For service providers looking to simplify the deployment and delivery of DS-3 or E3 leased-line services with Cisco® 12000 Series Internet routers, Cisco Systems® offers the following set of line cards:

The Cisco 12000 Series 6- and 12-port DS3 time-division multiplexing (TDM) line cards simplify the deployment of DS-3 services (Figure 1).

The Cisco 12000 Series 6- and 12-port E3 TDM line cards allow the delivery of E3 leased-line services on the Cisco 12000 Series router (Figure 2).

Figure 1. Cisco 12000 Series 6- and 12-Port DS3 Line Cards

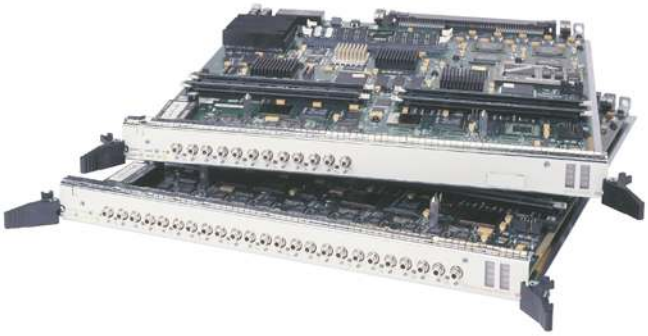
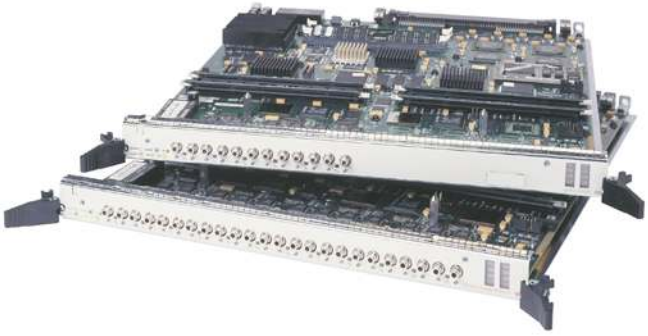


Figure 2. Cisco 12000 Series 6- and 12-Port E3 Line Cards



PRODUCT FEATURES

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

Table 1. Product Features

Feature	Description
Reliability and Availability	• Online insertion and removal (OIR), enabling insertion and removal of line cards without affecting traffic flows through other line cards
Network Management	• Cisco IOS® Software command-line interface (CLI) • Simple Network Management Protocol (SNMP) MIBs: – DS-3/E3 MIB (RFC 1407) – Frame Relay MIB (RFC 1315) – MIB-II • Receive and transmit alarm processing
Interfaces	• Local (internal) or loop (recovered from network) clocking mode • Both local (diagnostic) and network (line) loopback
Packet-Layer Features	• Cisco Express Forwarding table that can accommodate up to 1 million forwarding entries • Application-specific integrated circuit (ASIC)-based queuing • QoS support: – Committed access rate (CAR) – Weighted Random Early Detection (WRED) – Modified Deficit Round Robin (MDRR) • Multiprotocol Label Switching (MPLS) – VPN – Traffic engineering – Class of service (CoS)
Layer 2 Encapsulations	• High-Level Data Link Control (HDLC) • Point-to-Point Protocol (PPP; RFCs 1661 and 2153) • IETF RFC 1490 Frame Relay Encapsulation
DS-3 Specifications	• Full- and half-duplex connectivity at DS-3 rate (44.736 MHz) • Scrambling and subrate support of major data-service-unit (DSU) vendors • C-bit or M13 framing (software selectable) • Support for16- and 32-bit cyclic redundancy checks (CRCs) (16-bit default) • Line build-out: configurable for up to 450 ft • 24-hour history maintained for error statistics and failure counts • DS-3 alarm and event detection (once per second polling) • Alarm indication signal (AIS) • Out of frame (OOF) • Far-end receive failure (FERF)

Feature	Description
	• Complete compatibility of T3 DSU/channel service unit (CSU) subrate and scrambling features with the following vendors: Cisco, ADC Kentrox, Digital Link, and LarseCom
E3 Specifications	• ITU-T G.751 as applicable • Full-duplex connectivity at E3 rate (34 Mbps) • Scrambling and subrate support of major DSU vendors • Support for 16- and 32-bit cyclic redundancy checks (CRCs) (16-bit default) • 24-hour history maintained for error statistics and failure counts • E3 alarm and event detection (once per second polling) • AIS • Loss of frame (LOF) • Remote alarm indication (RAI) • Complete compatibility of E3 DSU/CSU subrate and scrambling features with the following vendors: Cisco, ADC Kentrox, and Digital Link

PRODUCT SPECIFICATIONS

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

Table 2. Product Specifications

Line-Card Name/Description	Cisco IOS Software Release	Chassis Supported	Port Densities
6-Port DS-3 6-port DS-3 with error correction code (ECC)	12.0(8)S or higher	Cisco 12404 Cisco 12006 Cisco 12406 Cisco 12010 Cisco 12410 Cisco 12810 Cisco 12016 Cisco 12416 Cisco 12816	Cisco 12404: 18 ports Cisco 12006 and 12406: 30 ports Cisco 12010, 12410, and 12810: 54 ports Cisco 12016, 12416, and 12816: 90 ports
12-Port DS-3 12-port DS-3 with ECC	12.0(8)S or higher		Cisco 12404: 36 ports Cisco 12006 and 12406: 60 ports Cisco 12010, 12410, and 12810: 108 ports Cisco 12016, 12416, and 12816: 180 ports
6-Port E3 6-port E3 with ECC	12.0(15)S or higher		Cisco 12404: 18 ports Cisco 12006 and 12406: 30 ports Cisco 12010, 12410, and 12810: 54 ports Cisco 12016, 12416, and 12816: 90 ports
12-Port E3 12-port E3 with ECC	12.0(15)S or higher		Cisco 12404: 36 ports Cisco 12006 and 12406: 60 ports Cisco 12010, 12410, and 12810: 108 ports Cisco 12016, 12416, and 12816: 180 ports

PHYSICAL AND ELECTRICAL SPECIFICATIONS

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

Table 3. Physical and Electrical Specifications

Line Card	Dimensions	Weight	Power	Memory	LEDs	Connectivity
6- or 12-port DS-3	• Height: 14.5 in. (36.8 cm) • Depth: 18.5 in. (46.99 cm) • Width: (occupies single thin slot): 1.25 in. (3.2 cm)	6.0 lb (2.7 kg)	54W maximum	• Route: 64 MB upgradable to 256 MB • Packet: 128 MB	• Enable • Port down • Carrier detect hunt • Carrier detect • Remote alarm • Local alarm • Loop mode • Alphanumeric management display	Two SMB (Tx and Rx) connectors per port
6- or 12-port E3	• Height: 14.5 in. (36.8 cm) • Depth: 18.5 in. (46.99 cm) • Width: (occupies single thin slot): 1.25 in. (3.2 cm)	6.0 lb (2.7 kg)	80W maximum	• Route: 128 MB upgradable to 256 MB • Packet: 128 MB		Conversion cable from SMB connector to male or female BNC connector

ENVIRONMENTAL, APPROVALS AND COMPLIANCE

Table 4 gives standards-compliance information about the Cisco 12000 Series TDM line cards.

Table 4. Compliance and Agency Approvals

Feature	Description
Environmental	• Operating temperature: 32 to 104°F (0 to 40°C) • Storage temperature: –4 to 149°F (–20 to 65°C) • Relative humidity: – 10 to 90%, noncondensing, operating conditions – 5 to 95%, noncondensing, nonoperating conditions
Safety	• UL 1950 • CSA 22.2-No. 950 • EN60950 • IEC 60950 CB Scheme • ACA TS001 • AS/NZS 3260
EMI	• FCC CFR 47-Part 15 1998 Class A • ICES 003 Class A • AS/NRZ 3548 Class A • EN55022 Class B (up to 1 GHz) • VCCI Class A

Feature	Description
	• CISPR 22 Class B (up to 1 GHz) • BSMI/CNS 13438: 1997 Class A • IEC-1000-3-2 Power line harmonics • IEC 61000-3-3 Voltage fluctuations and flicker
Immunity (basic standards)	• IEC-1000-4-2 ESD (8-kV contact, 15-kV air) • IEC-1000-4-3 Radiated immunity (10 V/m) • IEC-1000-4-4 EFT (2-kV power port, 1-kV signal port) • IEC-1000-4-5 Surge AC port (4-kV CM, 2-kV DM) • IEC-1000-4-5 Surge Signal port (2-kV CM, 1-kV DM) • IEC-1000-4-5 Surge DC port (0.5-kV CM, 0.5-kV DM) • IEC-1000-4-6 Low Frequency Conductive Immunity, (10V) • IEC-1000-4-11 Voltage dips and sags • EN55024\CISPR24 ITE Immunity
ETSI and EN	EN300 386
Network Equipment Building Standards (NEBS)	• These products have been designed to meet the following requirements: – SR-3580—NEBS: criteria levels (Level 3 compliant) – GR-63-Core—NEBS: physical protection – GR-1089-Core—NEBS: EMC and safety
Frame Relay	• RFC 1490—Multiprotocol Encapsulation • RFC 1315—Frame Relay Management Information Base • RFC 1293—Frame Relay Inverse Address Resolution Protocol • FRF 1.1—User-Network Interface (UNI) • FRF 2.1—Frame Relay Network-to-Network Interface (NNI) • FRF 3.1—Multiprotocol encapsulation
Other Standards	• Gang of Four LMI • Q.922 Annex A • ANSI T1.617 Annex D • ANSI T1.618, T1.606 • ITU-T Q.933, Q.922

ORDERING INFORMATION

To place an order, contact your local Cisco representative or visit the ordering page on the Cisco Website. Use the ordering information in Table 5.

Table 5. Ordering Information

Product Part Number	Product Description
12DS3-SMB-B( )	12-port DS-3 line card with ECC
6DS3-SMB-B( )	6 port DS-3 line card with ECC
12E3-SMB(=)	12-port E3 line card with ECC
6E3-SMB(=)	6-port E3 line card with ECC
MEM-GRP/LC-256(=)	256-MB route memory upgrade option
2CBLE-SMB-BNC-F(=)	2 SMB to BNC female conversion cables*
2CBLE-SMB-BNC-M(=)	2 SMB to BNC male conversion cables*

* Conversion cables must be ordered for non-spare orders.

SERVICE AND SUPPORT

Cisco Systems delivers innovative services programs through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, contact your local Cisco representative or visit the Cisco Website.

FOR MORE INFORMATION

For more information about the Cisco 12000 Series TDM line cards, contact your local Cisco representative or visit: http://www.cisco.com/go/12000

Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on **the Cisco Website at www.cisco.com/go/offices.**

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia • Cyprus Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland • Israel Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe

Printed in the USA C78-331596-00 02/06