

DATA SHEET

## CISCO 10000 SERIES 8-PORT UNCHANNELIZED E3/T3 LINE CARD

The Cisco® 10000 Series 8-Port Unchannelized E3/T3 Line Card provides flexibility, scalability, and an enhanced price-to-performance ratio in the E3/T3 aggregation market. Targeted primarily at Internet service providers (ISPs) for situations in which fiber interfaces are unavailable or prohibitively expensive, the Cisco 10000 Series Unchannelized E3/T3 Line Card supports eight E3/T3 ports (Layer 2 connectivity). Layer 3 services are supported by the Cisco 10000 Series advanced Cisco Performance Routing Engine (PRE). By taking advantage of the advanced PRE architecture, ISPs will enjoy the necessary processing performance to enable the advanced IP services that users demand.

Figure 1



### PRODUCT DESCRIPTION

The 8-Port unchannelized E3/T3 module is a full-height line card that supports maximum flexibility and can be used in any Cisco 10000 Series interface card slot. All cards are hot-swappable. The ports are software-configurable to support either E3 or DS3 on a per-port basis. Furthermore, a mixture of E3 and DS3 traffic can be supported on the same line card. The 8-Port unchannelized E3/T3 line card may be used in many customer applications. It is ideal for providing direct customer IP access or network-to-network connections where copper E3 or DS3 is the only service to a remote point of presence (POP). The line card supports Frame Relay, High-Level Data Link Control (HDLC), and Point-to-Point Protocol (PPP), thereby offering three different Layer 2 encapsulations of IP packets.

**Table 1.** Cisco 10000 Series Eight-Port Unchannelized E3/T3 Line Card Port Densities (Assuming Dual Uplinks Using Half-Height Line Cards)

Capabilities	Ports per Line Card	Ports per Chassis	Ports per 7-Foot Rack
E3/T3	8	56	336

As shown in Table 1, a fully configured Cisco 10008 chassis with unchannelized E3/T3 line cards and redundant uplinks (using half-height modules) can support up to 56 E3s/T3s, or up to 336 E3s/T3s per 7-foot rack.

## KEY BENEFITS

### Scalability to Increase Services

The Cisco 10000 Series provides industry-leading scalability that enables an ISP to add more customers and services without requiring additional rack space in the POP. Using the e8-Port unchannelized E3/T3 line card, the Cisco 10008 chassis can scale from 56 E3s/DS3s to 336 E3s/DS3s. Another benefit is its ability to be configured through software to support either E3 or DS3 on a per-port basis. This feature enhances flexibility and augments services without changing the E3/T3 connection.

The scalability of the Cisco 10000 Series with e8-Port unchannelized E3/T3 card enables ISPs to stay ahead of the tremendous demand for Internet connectivity while at the same time making highly efficient use of scarce POP space.

### Price and Performance Leadership

ISPs must be nimble, continuously providing new services such as quality of service (QoS), access lists, and Multiprotocol Label Switching (MPLS) virtual private networks (VPNs) to keep existing customers and to find new ones. But they also must be able to grow so that these new services are cost effective. The e8-Port unchannelized E3/T3 line card enables the Cisco 10000 Series to be one of the most cost-effective E3/T3 aggregation platforms on the market by:

- Integrating channel service unit (CSU) and data service unit (DSU) functionality right on the card, eliminating the cost of a standalone CSU/DSU
- Distributing costs over the largest number of ports, reducing the overall cost per port of the Cisco 10000 Series solution
- Enabling ISPs to continue to use the existing physical infrastructure of E3/DS3 circuits while supporting new IP services, reducing cost for the ISP and users

## KEY FEATURES

- Eight ports of unchannelized E3/T3 or subrate E3/DS3 configured on a per-port basis
- Line rate performance at 44-byte or higher packet sizes
- Integrated DSU functionality
- Per-port selection of internal or external (line) clock source
- Support for these serial encapsulation protocols—HDLC, Frame Relay, PPP
- Bit error rate test (BERT) at E3 and DS3 levels
- Error Correction Code (ECC) memory protection on the processor's synchronous dynamic RAM (SDRAM)
- Online insertion and removal (OIR), also called "hot swappable," with no chassis slot dependency
- Support for high-availability features, including Route Processor Redundancy Plus (RPR+), Nonstop Forwarding, and Stateful Switchover

- Alarm processing—The following alarms are continuously monitored by the eight-port unchannelized E3/T3 line card:
  - Loss of signal (LOS)
  - Loss of frame (LOF)
  - Out of frame (OOF)
  - Line alarm indication signal (AIS)
  - Line remote defect indication (RDI)
  - Far end alarm and control (FEAC)
  - Far end bit error (FEBE)

### **E3-Specific Features**

- European 34.368-Mbps serial interface specified by G.703 and G.704
- Support for G.751 basic framing mode
- Per-port full rate, scrambling and subrate support for Kentrox and Digital Link DSUs
- HDB3 line coding
- BERT at E3 level
- Internal or loop timing

### **T3-Specific Features**

- U.S. 44.736-Mbps serial interface specified by American National Standards Institute (ANSI) T1.107/92-185
- Support for C-bit and M23 parity framing modes
- Bipolar three-zero substitution (B3ZS) line coding
- Per-port full rate, scrambling and subrate support for Digital Link, Verilink, Kentrox, Adtran, and Larson DSUs
- Per-interface line build-out-225 feet (6750 centimeters) of 75-ohm coaxial cable
- Loopback for each DS3 port—local, line, and remote
- BERT at DS3 level
- Counting of framing bit errors, C-bit parity errors, P-bit parity errors, far-end block errors

## **SPECIFICATIONS**

### **Physical**

- Weight: 4.75 pounds (2.16 kilograms)
- Dimensions: 16.0 x 1.12 x 9.97 inches (40.64 x 2.83 x 25.32 centimeters) (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 percent relative humidity
- Operating humidity, nominal: 5 to 85 percent relative humidity
- Operating humidity, short term: 5 to 90 percent relative humidity
- Operating altitude: –198 to 13,200 feet (–60 to 4000 meters)

## **REGULATORY COMPLIANCE**

### **Safety**

- UL60950/CAN/CSA-C22.2 No. 60950-00, Third Edition, December 1, 2000, with no deviation considered to be less stringent than IEC 60950
- EN60950 with Amendments 1–4, for CE marking to the LVD directive
- IEC 60950, Third Edition, with Amendments 1–4 including all national and group deviations
- AS/NZS 60950:2000
- AS/NZS 3260-1993 with Amendments 1–4
- ACA TS001-1997

### **Electromagnetic Emissions Certification**

- AS/NZ 3548: 1995 (including AMD I + II) Class B
- EN55022: 1998 Class B
- CISPR 22: 1997
- EN55022: 1994 (including AMD I+ II)
- 47 CFR Part 15:2000 (FCC) Class B
- VCCI V-3/01.4 Class 2
- CNS-13438: 1997 Class B
- GR1089: 1997 (including Revision 1: 1999)

### **Immunity**

- EN300386: 2000—Telecommunications Network Equipment (TNE) EMC requirements; product family standard; high priority of service; central office and non-central office locations
- EN50082-1: 1992/1997
- EN50082-2: 1995—Generic Immunity Standard, Heavy Industrial
- CISPR24: 1997

- EN55024: 1998—Generic ITE Immunity Standard
- EN61000-4-2: 1995+AMD I + II-ESD, Level 4, 8-kV contact, 15-kV air
- IEC-1000-4-3: 1995+AMD 1—Radiated Immunity, 10 V/m
- IEC-1000-4-4: 1995—Electrical Fast Transients, Level 4, 4 kV/B
- IEC-1000-4-5: 1995+AMD 1—DC Surge Class 3; AC surge Class 4
- EN61000-4-6: 1996+AMD 1—RF Conducted Immunity, 10V rms
- EN61000-4-11: 1995—Voltage Dips and Sags
- ETS300 132-2: 1996+corregendum, December 1996
- GR1089: 1997 (including Revision 1: 1999)

### **Network Equipment Building Standards**

- Network Equipment Building Standards (NEBS) Level 3
- Telcordia SR-3580
- GR-63-CORE—Issue 1, October 1995
- GR-1089-CORE—Issue 2, December 1997, with Revision 1, February 1999
- Verizon: SIT.NEBS.TE.NPI.2000.004 Revision 1
- SBC: TP76200MP Part 8 and TP76400MP

### **European Telecommunication Standards Institute**

- ETSI 300 386-1—Levels for equipment with a “high priority of service” that is installed in “locations other than telecommunication centers”
- ETSI 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**

- Yellow fail—Turns on for a few seconds during line card Power-On Self-Test (POST) and remains on if the line card POST fails; when the line card is operating properly, this LED stays off
- Yellow loopback active—When a loop status LED turns on, a part of the corresponding port data path is in a loopback state and is not available for normal operation
- Yellow alarm—When an alarm status LED turns on, an alarm condition exists at the corresponding port; it is possible to isolate an alarm condition at the Cisco Series 10000 console
- Green (carrier detected)—When the carrier status LED turns on, a carrier signal exists at the corresponding port and the interface is operating properly; when this LED turns off, a loss-of-signal alarm occurs

## Network Management (Management Information Base) Support

- RFC 2495
- RFC 2496
- Simple Network Management Protocol (SNMP)
- MIB-II

## Power Budget

- Component: eight-port unchannelized E3/T3 line card
- Unit Power: 60W maximum; 36W typical

## PRODUCT SYSTEM REQUIREMENTS AND COMPATIBILITY

### Hardware Requirements

- Chassis—The line card is supported on all Cisco 10000 Series chassis
- PREs—The line card is supported on all PREs available on the Cisco 10000 Series

### Software Requirements

Initial Cisco IOS® Software releases: The line card is supported in Cisco IOS Software Release 12.0(22)S and later releases. For the latest release information, refer to <http://www.cisco.com/cgi-bin/front.x/Support/HWSWmatrix/hwswwmatrix.cgi>

## ORDERING INFORMATION

Table 2 provides part numbers and descriptions.

**Table 2.** Part Numbers

Part Number	Description
ESR-8E3/DS3	8-port clear channel E3/DS3 line card
ESR-8E3/DS3=	8-port clear channel E3/DS3 line card, spare

## Service and Support

Cisco Systems® offers a wide range of service and support options for its customers. More information about Cisco service and support programs and benefits can be found at <http://www.cisco.com/en/US/support/>.

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