

CISCO T3/E3 NETWORK MODULE DATA SHEET

The Cisco® T3/E3 Network Module provides high-speed WAN access for the Cisco 2600, 3600, and 3700 series Multiservice Access routers and well as the Cisco 2800 and 3800 Series Integrated Services Routers. The NM-1T3/E3 network module offers both Service Providers and Enterprise customer's unprecedented flexibility in provisioning clear-channel T3 or E3 connections.

Figure 1. Cisco T3/E3 Network Module



Cisco's Packet-over-T3/E3 network module for the Cisco 2600, 2691, 2800, 3600, 3700 and 3800 series offers the first software-configurable T3/E3 product from Cisco. This flexible network module allows the customer to switch between T3 and E3 applications with a single Cisco IOS® command. This feature provides customers increased flexibility and investment protection by allowing a Cisco Partner, service provider or enterprise customer to stock only a single product that can be deployed internationally.

The increased demand for bandwidth over the WAN and more attractive pricing of T3/E3 links by SP's has led to steady growth in T3/E3 deployments around the world. The Packet-over T3/E3 network module (part number NM-1T3/E3) eliminates the need for an external data service unit (DSU), reduces provisioning costs, and provides highly manageable T3/E3 line termination. The module provides an integrated line interface unit (LIU) DSU that allows T3 or E3 lines to be directly terminated on a Cisco router, eliminating the need for external DSU equipment. This simplifies the T3/E3 line management, reduces provisioning cost, and frees up valuable rack space.

The Cisco T3/E3 network modules provide support for the proprietary subrate and scrambling features of T3 DSU vendors such as Digital Link, Larscom, and ADC Kentrox. Subrate support in the Cisco T3/E3 Network Module maximizes the utility of these products in service provider environments. By simultaneously supporting interoperability with a wide range of third-party DSU vendors, this network module offers the flexibility to support installed equipment without locking customers into a proprietary solution.

The Cisco T3/E3 Network Module provides direct connectivity to a T3 line for full-duplex communications at the T3 rate of 44.736 MHz and full-duplex E3 communications at 34.368 MHz. Each T3 or E3 port consists of a pair of 75-ohm BNC coaxial connectors (Type RG-59), one for transmit data and one for receive data, along with six LED indicators for line status. The Cisco T3/E3 Network Module is supported in all Cisco IOS feature sets, and there are no additional memory requirements.

KEY BENEFITS

The combination of T3 and E3 options in a single network module provides the following key customer benefits:

- Physical space savings—Eliminates the need for external DSU device, saving valuable rack space
- Simplified management—Eliminates the need for two separate monitoring tools
- Software-configurable T3/E3—Provides the flexibility to deploy a single module worldwide

KEY FEATURES

- One-port T3 with DSU or E3 with DSU network module
- T3/E3-specific features for monitoring, bit error rate tester (BERT), Management Information Bases (MIBs), alarms, and more
- Ability to independently or simultaneously enable scrambling and subrate in each DSU mode; support for the following DSU vendors' algorithms: Digital Link, Kentrox, Larscom, Verilink, Adtran.
- Support for the serial encapsulation protocols: Frame Relay, Point-to-Point Protocol (PPP), High-Level Data Link Control (HDLC)
- 16-bit cyclic redundancy check (CRC)

KEY MANAGEMENT FEATURES

- Line and payload loopback capabilities
- DS3 remote-line loopback (via Far End Alarm and Control [FEAC] codes per American National Standards Institute [ANSI] T1.107a)
- Response to embedded loopback commands
- Insertion of loopback commands into transmitted signal
- Programmable pseudorandom pattern up to 32 bits long, including 223, 220, 215, 1s, 0s, alt-0-1
- 32-bit error count and bit-count registers
- Alarm detection—Alarm indication signal (AIS), remote alarm, far-end block error (FEBE), out of frame (OOF)
- Onboard processor for Maintenance Data Link (MDL)

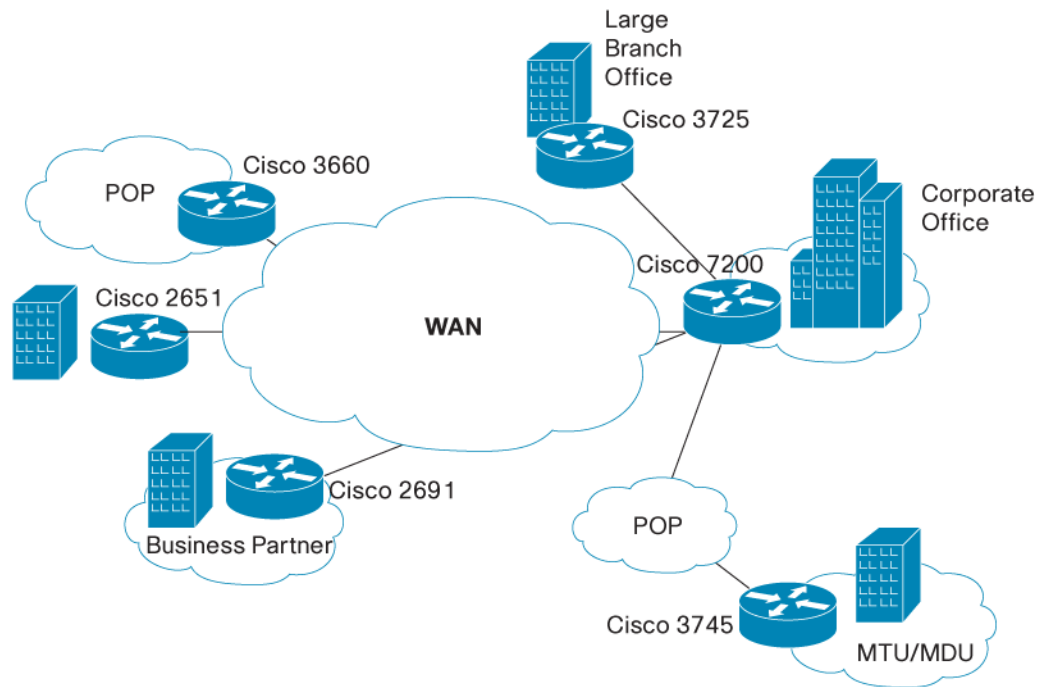
T3/E3 APPLICATIONS AND POSITIONING

The Cisco T3/E3 Network Module provides the performance requirements to deploy advanced, voice, video and data applications over the WAN and supports key IOS features and services such as QoS, NBAR, IPSec, FW, IDS, NAT and NeFlow. The Cisco 3845, for instance, is the highest-performing platform for the branch office and is recommended for deploying concurrent services at T3 line rate's. See table 1 below for performance recommendation for positioning of the NM-1T3/E3 in the branch office.

Table 1. Cisco T3/E3 Network Module Branch Office Positioning

Supported Platform	Recommended Type of Service	Recommended Branch-Office Size
Cisco 2650 and 2651XM	Subrate T3/E3	Small to medium branch offices
Cisco 2691	Subrate T3/E3	Small to medium branch offices
Cisco 2800	Subrate T3/E3 with concurrent services	Medium to large branch offices
Cisco 3661 and 3662	Sub and full-rate T3/E3 with limited services	Medium and large branch offices
Cisco 3725/3745	Full-rate T3/E3 with no services	Medium and large branch offices
Cisco 3825	Full rate T3/E3 with no services	Large and regional branch offices
Cisco 3845	Full-rate T3/E3 with concurrent services	Large and regional branch offices

Figure 2. Typical Cisco T3/E3 Network Module Deployments



SPECIFICATIONS

Software Support

Table 2 lists the minimum Cisco IOS Software requirements for the Cisco T3/E3 Network Module, and Table 3 gives support information.

Table 2. Minimum Cisco IOS Software Requirements for Cisco T3/E3 Network Module

Product Number	Description	Minimum Cisco IOS Software Version
NM-1T3/E3	One-port clear-channel T3/E3 network module	12.2(11)YT

Table 3. Platform Maximum T3/E3 Network Modules Support Comparison

Supported Platforms	Maximum T3/E3 Supported
Cisco 2650 and 51XM	1
Cisco 2691	1
Cisco 2800	1
Cisco 3660	1
Cisco 3725 and Cisco 3825	1
Cisco 3745 and Cisco 3845	2

Hardware Specifications

DS3/E3 Specifications

- DSX3 level interface with dual female 75-ohm BNC coaxial connectors per port (separate RX and TX)
- Full- and half-duplex connectivity at DS3 rate (44.736 MHz)
- Full- and half-duplex connectivity at E3 rate (34.368 MHz)
- Scrambling and subrate support of major DSU vendors
- Line build-out—Programmable for up to 450 feet of 734A or equivalent coaxial cable or up to 225 feet for 728A or equivalent coaxial cable
- C-bit, or M23 framing for T3, bypass and G.751 framing for E3 (software selectable)
- Binary 3-zero substitution (B3ZS) (T3) or high-density bipolar with three zeros (HDB3) (E3) line coding
- Support for 16- and 32-bit CRC (16-bit default)
- DS3 FEAC channel support
- Twenty-four-hour history maintained for error statistics and failure counts
- DS3 alarm and event detection (once per second polling)
- Alarm indication signal (AIS)
- Out of frame (OOF)
- Line code violation (LCV)
- Excessive zeros (EXZ)
- Far-end receive failure (FERF)

Table 4. LED Port Indicators and Status

LED Indicator	Color	Active state description
CD	Green	Carrier detect (off indicates loss of signal [LOS])
LP	Yellow	Loopback mode on
AIS	Yellow	Port is receiving AIS
FERF	Yellow	Port is receiving FERF signal
EN	Yellow	Network module is enabled
Alarm	Yellow	Port is receiving OOF errors

Serial Encapsulations

- HDLC
- PPP
- Frame Relay
- ATM Data Exchange Interface (ATM-DXI)

Physical Specifications

- Single-wide network module, no slot restrictions
- Dimensions (H x W x D) 1.55 x 7.10 x 7.2 inches (3.9 x 18.0 x 18.3 centimeters)

Environmental Specifications

- 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%, non condensing

Certification Compliance

DS3 Physical Layer

- ANSI T1.102, T1.107

E3 Physical Layer

- TBR24
- ITU-T G.703 & G.823
- ACA TS016

Safety

- United States (UL1950 3rd Edition/CSA C22.2, No.950)
- Canada (C1950)
- UK (BS6301, EN60950, EN41003)
- Germany (TUV GS)
- France (EN60950, EN41003, NFC98020)
- AS/NZS 3260 (Australia/New Zealand)
- EN60950/EN41003 (Europe)
- IEC 950 (national deviations)

EMC

- 47 CFR 15: 2001 Class A (FCC)
- ICES003 Class A
- EN55022 Class A: 1998
- EN300386: 2001
- EN55024:1998, EN50082-1:1997 and EN61000-6-2: 1999 including:
 - ESD: EN61000-4-2
 - Radiated Immunity: EN61000-4-3
 - Burst Transients: EN61000-4-4
 - Surges: EN61000-4-5
 - Injected RF: EN61000-4-6
 - Dips + Sags: EN61000-4-11
- EN61000-3-2: 1995
- EN61000-3-3: 1995
- AS/NZS 3548 Class A
- VCCI V-3/2000.04 Class A

Standards

- T3/E3 MIB (RFC 1407)



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