Data Sheet

Cisco E1/T1 ISDN PRI Network Modules for Cisco 2610-51XM, 2800, 2691, 3660, 3700 and 3800 Series Routers

The versatility of Cisco® 2610-51XM, 2800, 2691, 3660, 3700 and 3800 series routers is demonstrated by their broad support of E1/T1 connectivity and Integrated Services Digital Network Primary Rate Interfaces (ISDN PRI). Customers continue to deploy E1 and T1 circuits for Wide Area Network (WAN) connectivity, ISDN dial-backup, and digital modem termination in the Power Branch Office Environment. Cisco now makes it possible to terminate T1 and E1 PRI connections in a single network module. Available in single and dual port models, the NM-1CE1T1-PRI and NM-2CE1T1-PRI cards coupled with Cisco 2610-51XM, 2800, 2691, 3660, 3700 and 3800 Series routers, enhance and simplify customers' WAN connectivity options (Figure 1).

Figure 1. Single-Port E1/T1 ISDN PRI Network Module (NM-1CE1T1-PRI)

The Cisco E1/T1 ISDN PRI Network Module's integrated channel service unit (CSU) provides direct connection to the Telecommunications network, thus allowing customers to consolidate customer premises equipment (CPE). This provides multifunction dial access aggregation, routing functionality, VPN and firewall security, and other capabilities right inside the Cisco router in power branch office environments. Both the 1-port and 2-port versions offer support for balanced and unbalanced E1 connectivity and conform easily to customers' specific applications.

The Cisco E1/T1 ISDN PRI network modules also supply connectivity for internal digital modems in the Cisco 3660, 3700 and 3800 series routers, with connectivity options for PRI, T1 channel associated signaling (T1-CAS), and E1-CAS R2 signaling. This provides for a high concentration of V.92-compatible modems, while still allowing expandability for other critical services.

FEATURES AT-A-GLANCE

- Cisco IOS® Software configurable for T1 or E1 operation
- Balanced or unbalanced E1 termination in the same module
- Integrated CSU/DSU (channel service unit/data service unit) per port
- Full or fractional E1/T1—can be fully channelized
- Supports PRI for data, T1-CAS, and E1-CAS R2 signaling
- E1 unframed and framed modes (G.703/G.704) available
- Interoperates with NM-xDM digital modem network modules
- Bantam (tty) jacks for easy network monitoring
- V.54 loopback compatible

- Supported on Cisco 2610-51XM, 2800, 2691, 3660, 3700 and 3800 Series routers
- Online insertion and removal (OIR) supported on Cisco 3660 3745 and 3845 routers
- On-board expansion slot for future technologies

KEY BENEFITS

Enhanced Flexibility

The Cisco E1/T1 ISDN PRI network modules (NM-xCE1T1-PRI) are software configurable between E1 or T1 operation, balanced or unbalanced E1 termination, and CSU/DSU. Customers no longer need to buy a specific module for T1 support and then another card for E1 connectivity. In addition, the same modules provide for balanced (120-ohm) and unbalanced (75-ohm) E1 termination. See table 5 for available cable adaptors.

Support for G.703 Unstructured E1 Signaling

International Telecommunications Union (ITU) signaling standard G.703 was previously available only on Cisco midrange routers through the VWIC-xFT-G703 Voice/WAN interface card, which did not support data PRI. Framed E1 (G.704) is also supported for international customers without G.703 service.

High-Density PRI Connectivity Options

For midrange, high-density ISDN PRI applications, the Cisco 2610-51XM, 2800, 2691, 3660, 3700 and 3800 Series provide superior performance and port density. For example, a fully configured Cisco 3745 system can be configured for up to eight ISDN PRI connections in one chassis. These ports can be fully channelized to provide up to 192 T1 channels at 56/64 Kbps each, or 240 E1 channels at 56/64 Kbps each.

Increased Manageability and Troubleshooting

Critical loopback support makes the 1-port and 2-port Cisco E1/T1 ISDN PRI network modules easy to manage. Both models have the capability to internally loop back the on-board framer chip towards the interface, thus eliminating the need for an external loopback plug. Local, remote, line, and payload loopbacks, along with support for V.54 inline loop commands complement the Cisco E1/T1 ISDN PRI Network Modules' management features.

Integrated bantam (tty) jacks allow line monitoring equipment to be inserted for circuit troubleshooting. The single set of jacks can be software selected to monitor port-0 or port-1 without interrupting service.

Blue, yellow, and red alarm detection, as well as a new command to disable yellow alarm detection and generation, gives customers better control over their WAN connections. This feature, combined with support for the Cisco WAN Access Performance Management System (WAPMS), Cisco Intelligence Engine 2100, and CiscoWorks makes troubleshooting easy when necessary

Reliability

Integrating the external E1/T1 terminating device (CSU/DSU) increases the overall system reliability. Possible points of failure are reduced by eliminating the second power supply, additional fans, extra cabling, and other equipment that accompany a "two-box" solution. This increase in reliability allows Service Providers to more easily and cost effectively meet the requirements of their customers' Service Level Agreements (SLAs) and provides enterprises with maximum equipment uptime.

PLATFORM SUPPORT

Supported Platforms and Minimum Software and Memory Requirements

Memory requirements depend on the selected platform, software feature set, and other installed modules and features. The Cisco E1/T1 ISDN PRI network modules are supported in the Cisco 2610-51XM, 2800, 2691, 3660, 3700, and 3800 routers. For information about memory planning, refer to the software release notes, the Cisco IOS Software Upgrade Planner, or ask your local Cisco representative. Table 1 below shows the minimum Cisco IOS Software requirements for each platform.

Table 1. Supported Platforms and Minimum Software Requirements

Platform	Minimum Cisco IOS Software Release
Cisco 2610-51 (Non-XM Models)	Not supported
Cisco 2610-51XM	Cisco IOS Software Release 12.3 and 12.3T
Cisco 2800 Series	Cisco IOS Software Release 12.3(08)T
Cisco 2691	Cisco IOS Software Release 12.3 and 12.3T
Cisco 3620, 3640, 3640A	Not supported
Cisco 3660	Cisco IOS Software Release 12.3 and 12.3T
Cisco 3700 Series	Cisco IOS Software Release 12.3 and 12.3T
Cisco 3800 Series	Cisco IOS Software Release 12.3(11)T

Maximum Cisco NM-xCE1T1-PRI Network Modules per Platform

Table 2 shows the maximum Cisco E1/T1 ISDN Network Module supported in each platform.

Table 2. Maximum Supported NM-xCE1T1-PRI Modules per Platform

Type of Module	Cisco 2610-51XM	Cisco 2800	Cisco 2691	Cisco 3660	Cisco 3725	Cisco 3745	Cisco 3825	Cisco 3845
NM-1CE1T1-PRI	1	1	1	6	2	4	2	4
NM-2CE1T1-PRI	1	1	1	6	2	4	2	4

SOFTWARE AND MANAGEMENT FEATURES

Table 3 shows the software and management features for the Cisco E1/T1 ISDN PRI Network Modules.

Table 3. Software and Management Features

Feature	Description
Diagnostic Loopback Support	E1 loopback modes • Controller local loopback • Interface local loopback T1 loopback modes • Interface local loopback • Interface remote loopback

Feature	Description
	• Controller local loopback • Controller remote loopback CSU loopback modes for T1 CSU • Data terminal equipment (DTE) loopback • Network loopback • Payload loopback • V.54
Alarm Detection	• **Yellow Alarm**—Receive/Send from/to network • **Blue Alarm**—Receive alarm indication signal (AIS) from network • **Red Alarm**—Loss of network signal
Relevant Management Information Base (MIB) Support	• RFC1406-MIB • CISCO-ICSUDSU-MIB
Remote Management	• Supported by Cisco WAN Access Performance Management System (WAPMS) • Cisco Intelligence Engine (IE2100) • CiscoWorks
Signaling Debugging	• CAS debugs • ISDN Q.921 and Q.931 decode • All other previously existing applicable Cisco IOS debugs

HARDWARE SPECIFICATIONS

Table 4 shows the hardware specifications for the Cisco E1/T1 ISDN PRI Network Module.

Table 4. Hardware Specifications for the Cisco E1/T1 ISDN PRI Network Module

Feature	Description
Dimensions (H x W x D)	• 1.55 x 7.10 x 7.2 inches • 3.9 x 18.0 x 18.3 centimeters
Operating Temperature	32 to 104°F (0 to 40°C)
Nonoperating Temperature	–40 to 185°F (–40 to 85°C)
Relative Humidity	5-95% non-condensing
LEDs	LEDs per port • **T1**: T1 mode selected • **E1-BAL**: E1 balanced mode selected • **E1-UNBAL**: E1 unbalanced mode selected • **CD**: Carrier detect • **LP**: Loop condition present • **RA**: Remote alarm detected • **LA**: Local alarm detected

Feature	Description
	LEDs per module • **C0**: Tx/Rx Mon bantam jacks connected to port 0 • **C1**: Tx/Rx Mon bantam jacks connected to port 1 • **EN**: Network-module (NM) Enable • **AIM**: Integrated Advanced Integration Module (AIM) slot in use (future use—currently disabled)
Ports	• 1 or 2 E1/T1 ports on RJ-48C connectors • Tx/Rx Mon bantam (tty) jacks for monitoring network activity (port selectable through Cisco IOS Command Line Interface (CLI))
Line Bit Rate (Per Port)	• **E1**: (2.048 Mbps) • **T1**: (1.544 Mbps)
Line Coding	• **E1**: HDB3 • **T1**: AMI, B8ZS
Framing Formats	• **E1**: CRC4 • **T1**: SF and ESF
Output Levels	• **E1**: short-haul/long-haul • **T1 (LBO)**: - 0, -7.5, or -15 dB

PRODUCT NUMBERS AND ORDERING INFORMATION

Table 5 lists the product numbers of the Cisco E1/T1 ISDN PRI Network Module.

Table 5. Product Numbers of the Cisco E1/T1 ISDN PRI Network Module

Product Number	Description
NM-1CE1T1-PRI	1-Port Channelized E1/T1/ISDN-PRI Network Module
NM-2CE1T1-PRI	2-Port Channelized E1/T1/ISDN-PRI Network Module
CAB-E1-RJ45BNC	E1 Cable RJ-45 to Dual BNC (Unbalanced)
CAB-E1-RJ45TWIN	E1 Cable RJ-45 to Twinax (Balanced)

REGULATORY COMPLIANCE, SAFETY, EMISSIONS, AND EMC/IMMUNITY

Table 6 shows a partial listing of regulatory compliance and safety data.

Table 6. Regulatory Compliance and Safety (Partial Listing*)

Feature	Description
Regulatory Compliance	• FCC Part 68, TIA-968-A • CS-03 • Australia (S016, S038) • JATE (T1) • TBR4, 12, 13 (and NET5, ETS300156, ETS300 011)

Feature	Description
Telecommunication Interface Industry Standards	• CCITT/ITU G.703, G.704, G.706, I.431, G.823 • ANSI T1.403
Safety	• US (UL60950) • Canada (C22.2 No.60950) • Europe (EN60950) • Australia/New Zealand (AS/NZS3260, TS001) • Other Countries (IEC60950)
NEBS	GR-63, GR-78, GR-1089-CORE Type 1/3
EMC Emissions/Immunity	• EN 300 386 v1.3.1:2001 • AS/NZS3548:1995 • VCCI:V-3/2000.04 • CNS13438:1997 • CFR47 Part 15:2000 • EN61000-6-1:2001 • CISPR22:1997 [EN55022:1998] • EN55024:1998 • EN50082-1:1992, EN50082-1:1997 • EN61000-4-2:1995 [incl AMD1 + AMD2] • EN61000-4-3:1996 [Incl AMD 1 & 2] • EN61000-4-4:1995, EN61000-4-5:1995 • EN61000-4-6:1996 [incl AMD1]

* For more information, visit the Cisco Compliance home page (listed later in this document under Country Support) or consult your local Cisco representative for further details.

POWER AND ENVIRONMENTAL REQUIREMENTS

The Cisco NM-xCE1T1-PRI network modules, when installed in Cisco routers, do not change the power or environmental requirements and standards of the router itself. See platform-specific data sheets for more information:

- For information about Cisco 2610-51XM and 2691 routers, visit: http://www.cisco.com/en/US/prod/collateral/routers/ps259/product_data_sheet0900aecd800fa5be.html
- For information about Cisco 2800 routers, visit: http://www.cisco.com/en/US/products/ps5854/index.html
- For information about Cisco 3660 routers, visit: http://www.cisco.com/en/US/products/hw/routers/ps274/products_data_sheet09186a0080091ba4.html
- For information about Cisco 3700 Series routers, visit: http://www.cisco.com/en/US/prod/collateral/routers/ps282/product_data_sheet09186a008009203f.html
- For information about Cisco 3800 Series routers, visit: http://www.cisco.com/en/US/products/ps5855/index.html

COUNTRY SUPPORT

See the following URL or contact your local Cisco representative for country-specific approval status (Cisco.com login required):
http://www.cisco.com/cgi-bin/compliance/approvals_search.pl

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