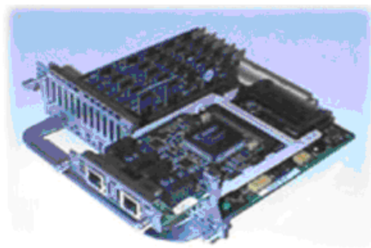
DATA SHEET

DIGITAL T1/E1 PACKET VOICE TRUNK NETWORK MODULE

Figure 1. Digital T1/E1 Packet Voice Trunk Network Module (NM-HDV-2E1-60 Pictured)



The Digital T1/E1 Packet Voice Trunk Network Module provides a flexible and scalable T1/E1 voice solution for Cisco 2600, 2600XM, 2811, 2821, 2851, 2691 3600, 3700 series and 3800 series multiservice Modular Access routers and supports up to 60 voice channels in a single network module. A single packet voice trunk network module supports both on-premise and off-premise connections to both Private Branch Exchanges (PBXs) and Public Switched Telephone Networks (PSTNs). These products are ideal for enterprise branches, large businesses and service providers wishing to migrate to packet-based multiservice infrastructures. This network module leverages existing legacy telephony equipment investments in addition to providing the ideal gateway interface for IP telephony within the Cisco Architecture for Voice, Video and Integrated Data (AVVID). It also enables the deployment of new packet voice applications while reducing recurring telephony charges.

The Digital T1/E1 Packet Voice Trunk Network Module uses a real-time cpu and powerful digital signal processors (DSPs) which support all functions needed to provide the highest levels of voice fidelity and quality, eliminating the processing burden from the Cisco 2600/2600XM/2691/2800/3600/3700/3800 main CPU. These DSPs can be scaled to support from six to 60 voice channels in a single Network Module using a number of different voice compression algorithms. The packet voice trunk network modules include a MultiFlex Voice/WAN interface card (VWIC) which offer single and dual port T1 or E1 interfaces for additional versatility and scalability. This flexibility allows voice and fax traffic to travel cost-efficiently across a user's wide area network (WAN) or directly over the PSTN.

The Digital T1/E1 Packet Voice Trunk network module combined with the Cisco 2600/2600XM/2691/2800/3600/3700/3800 series multiservice access routers make an ideal single-box solution for packetized voice in branches and regional offices. Up to six packet voice trunk network modules can be configured in a single modular access router, supporting from 6 to 300 voice channels. Now, enterprise offices of several hundred users can deploy multiservice networking using a single box solution. Service providers, providing data and telephony managed services can connect a single platform to their central offices or points of presence (POPs) with a single high-speed data connection. The packet voice trunk network modules seamlessly interoperate with smaller and larger multiservice platforms from Cisco.

The Digital T1/E1 Packet Voice Trunk Network Module provides an ideal migration path to a multiservice network. Customers can gradually shift voice traffic from traditional circuit-switched networks to a single infrastructure carrying data, voice and video over packet networks without replacing any legacy PBX and key communication system equipment. This network module also provides the perfect solution for PBX and PSTN access to IP telephony in the Cisco AVVID architecture.

With connectivity support for over 90% of the world's medium and large traditional circuit-switched PBXs and PSTNs, the Digital T1/E1 Packet Voice Trunk Network Module provides every Enterprise the ability to integrate voice and data into a single multiservice infrastructure. As a result Multinational Enterprises can be prepared to implement new integrated applications immediately.

The Digital T1/E1 Packet Voice Trunk Network Module provides:

- The gateway interface to PBXs to route voice along with data and video over a single data infrastructure
- The gateway to the PSTN allowing users to gain access to the public telephone network to and from traditional PBX, phone, fax, key communication systems, as well as IP telephony as an integral part of the Cisco AVVID architecture
- Support for VoIP, VoFR and VoATM (AAL2 & AAL5)

KEY FEATURES AND BENEFITS

Scalability

- Scales to meet Enterprise office requirements from small offices to large corporations
- Interoperable with Cisco multiservice voice and data products (such as Cisco 1750, 2600, 2600XM, 2691, 2800, 3600, 3700, 3800, 7200, 7500, 5300, 5800, Cisco IP Phones, CallManager, and Catalyst Switches)
- The packet voice trunk network module is shared across Cisco's entire line of modular access routers giving a scalable voice solution for branch, regional, and headquarter offices with six to 300 voice channels in a single box solution
- Provides Enterprises and managed service providers the ability to scale to any size campus using Cisco gateways
- Increases voice capacity without requiring the replacement of existing Cisco 2600/3600/3700 Series routers
- Enables the administration of large dial plans via H.323 v3/v4 gateway and gatekeeper interoperability and support
- Supports H.323 and MGCP for CallManager deployment

Flexibility

- Programmable digital signal processors can support G.711, G.723, G.726, G.728, G.729 and G.729a/b for customized solutions to meet the need for high voice quality and bandwidth efficiency
- Packet Voice Digital Signal Processor Modules (PVDM-12=), provide the ability to increase the voice processing capabilities within this single network module
- Single or dual connections to PBXs, PSTNs or both using E1 or T1 interfaces via either a single or dual port E1 or T1 MultiFlex Voice/WAN interface card (VWIC) with integrated T1 CSU/DSU or E1 DSU
- Modular voice processing on the packet voice trunk Network Module, the Cisco 2600, 3600, and 3700 provide the power to support additional office requirements such as routing, dial concentration, firewall and VPN

Feature Summary

Table 1. Digital T1/E1 Packet Voice Trunk Network Module Feature Summary

Feature	Benefits
Scalable from 6 to 60 Voice Channels	Single Network Module scales using from one to five 12-channel packet voice DSP modules (PVDM-12) upgrade SIMMs to support from 6 to 60 voice channels.
Platform Voice Scalability to 300 Voice Channels	Enables Cisco 2600, 2600XM, 2691, 2800, 3600, 3700, 3800 series modular access routers to scale from 6 to 300 voice channels in a single multiservice router solution.
Network Module	Enterprises and service providers can use a single box to support data and telephony services by sharing this Network Module with other interfaces in the Cisco 2600, 2600XM, 2691, 2800, 3600, 3700, 3800 series modular access routers.
Standards-Based PCM Encoding	Standards-based ITU-T G.711 PCM encoding provides 64 kbps analog to digital conversion using u-law or A-law.

Feature	Benefits
Standards-Based Compression Algorithm Support	Users can choose to either transmit voice across their networks as uncompressed PCM (G.711, u-law and A-law) or compressed from 5.3 kbps to 32 kbps using standards-based compression algorithms (G.729, G.729a/b, G.723.1, G.726, G.728).
Fax Support	Transmit Group III fax over any voice channel without sacrificing voice processing resources regardless of compression type.
Voice Over IP	Transmit data, voice, and video across a single frame relay, ATM, ISDN, channelized, or multilink point-to-point protocol (MLPPP) network.
Voice Over Frame Relay	Leverage existing or new frame relay network by transporting voice directly over this network using standards based transport methods (FRF.11) combined with standards based fragmentation for data (FRF.12). VoIP can also be transmitted over Frame Relay.
Voice Over ATM	Transport voice directly over ATM networks using AAL2 and AAL 5 encapsulation. Leverages existing ATM networks as a direct transport method for voice. VoIP can also be transported over ATM (VoATM requires ATM network modules such as IMA or OC-3).
Connection Trunk	Creates a tie-line replacement structure while only consuming bandwidth during a call (digital-to-digital, digital-to-analog, or analog-to-analog capabilities).
Toll Bypass	Reduce or eliminate toll charges assessed by long distance and local carriers by transporting voice and fax traffic across the enterprise intranet, LAN, metropolitan-area network (MAN), or WAN.
Integrated Data WAN Support	Connect one or two T1 or E1 interfaces on this network module as a WAN interface either as one or multiple groups of DS0's or as an entire T1 or E1 frame while still providing packet voice support for connections to PBXs and the PSTN.
LVBO (Local Voice Busy-Out)	Automatically busy out any desired voice trunk line (or individual DS0s) to a PBX or PSTN when a direct WAN or LAN connection to the router is down. Also, busy out a far end trunk connection when configured for Connection Trunk.
Call Admission Control Using RTR	Uses Response Time Reporter (RTR) to determine latency, delay and jitter and provide real-time ICPIF calculations before establishing a call across an IP infrastructure. RTR packets emulate voice packets receiving the same priority as voice throughout the entire network. A superior method to data and ping packets for determining congestion levels.
Off-Premise Extension (OPX)	Extends the capability of legacy PBX to off-premise phones.
Voice Activity Detection (VAD)	Consume bandwidth during a call only when there is voice traffic to send (silence suppression)
Comfort Noise Generation	While using VAD, the DSP at the destination emulates background noise from the source side, preventing the perception that a call is disconnected.

Feature	Benefits
Circuit Switched Leased Line Replacement	Businesses incur significant recurring monthly costs for leased lines purely for the interconnection of telecom PBXs and switches. This product gives these enterprises the ability to remove these costly rigid-bandwidth leased lines and replace them with flexible bandwidth lines, which will be used to carry data, voice, and video. The ability to support proprietary PBX signaling types exists by using connection trunking and transparent CCS.
Private Line Automatic Ringdown (PLAR)	Provides a direct connection to another digital or analog voice port by lifting a telephone handset on one end.
H.323 Version 3 and 4 Support	Uses industry-standard signaling protocols for call setup between gateways, gatekeepers, and H.323 end points (such as Intel Internet Phone or Microsoft Netmeeting).
DTMF Relay	Carries DTMF tones/information out-of-band for clearer transmission and detection.
Authentication, Authorization, and Accounting (AAA)	Supports debit and credit card (prepaid and post-paid calling card) applications.
Interactive Voice Response Support (IVR)	Utilizes IVR to provide automated-attendant, voice-mail support, and call routing based on desired service.
Open Settlement Protocol Support (OSP)	Provides the ability to settle account billing between service providers who are sharing resources to expand geographical coverage using third-party tools and standards-based OSP.
Any Call to Any Call with End-to-End Interoperability	Interoperates with Cisco IP phones, analog phones, fax machine connections, and PBX connections to and from any other Cisco voice enabled product.
Gateway for Legacy PBXs, Phones, Fax Machines, and Key Communication Systems to PSTN	Enables a connection for incoming and outgoing calls to and from the PSTN originating from and destined for legacy PBXs, phones, fax machines, and key communication systems connected to a data, voice, and video infrastructure.
Integrated Add/Drop Multiplexer	Performs add/drop multiplexing for voice within a dual-port voice Network Module. Eliminates the requirement, maintenance, support, and expense found when using an external add/drop multiplexer.
AVVID Interoperable	Interoperable within Cisco's AVVID architecture.
Call Control Signaling	Supports H.323 v3/v4, MGCP, and SIP call control protocols.
Gateway for IP phones to PSTN or Classic PBXs	Enables a connection for incoming and outgoing calls to and from the PSTN or classical PBXs using Cisco IP phones.

FEATURE HIGHLIGHTS

Voice Channel Support

- Up to 60 channels of medium-complexity voice or fax-relay (G729a/b, G726, G.711, Group 3 FAX up to 14.4K)
- Up to 30 channels of high-complexity voice or fax-relay (G729, G723.1, G728)
- Scalable number of on-board DSPs using PVDM-12=

Voice Feature Support

- Private line automatic ring-down (PLAR)
- Local Voice Busy-Out (LVBO)
- Connection trunk
- PBX tie-line replacement
- Answer-address, incoming-called-number on dial-peers
- G.168 Echo cancellation (up to 64 ms configurable)
- Silence suppression, voice activity detection (VAD)
- Comfort noise generation
- Hunt groups across cards
- Integrated add/drop multiplexer (drop and insert)
- LED indicators for voice processing resources and port status

Telephony Interface Signaling Support

- T1 and E1 PRI Q.931 user side and network side (NET5)
- T1 and E1 CAS
- T1 and E1 PRI QSIG
- T1 FGD
- E1 MelCAS
- E1 R2 CAS
- T1 and E1 Transparent CCS (with Multi-D channel)
- E&M (wink, immediate, delay), FXO/FXS loop-start and ground-start signaling
- Inbound signaling (such as DTMF, MF support)

Cisco IOS and Platform Support

- Fully supported via IOS CLI including device configuration, monitoring, link status, security, Layer 2 and 3 protocol configuration and management, and call history
- MPLS support
- Supported on all Cisco 2600, 3600, and 3700 series routers

Standards Support

- H.323 version 3 and 4 feature support
- H.323 CODEC-negotiation
- H.323 gateway RAS support (version 3/version 4)
- MGCP and SIP
- Supports ITU Standard Compression Algorithms (G.729, G.723.1, G.729a/b, G.711, G.728, G.726)

Country Support

- World-wide country support

Traditional Circuit Switched PBX Support

- Qualified PBX interoperability for Lucent Definity series, Nortel Meridian, and ROLM/Siemens HICOM, NEC NEAX 2400, Toshiba Strada DK424, Mitel 2000SX, Ericsson, Nortel SL-1

Network Management Support

- SNMP protocol compliant
- Manageable via a MIB browser
- CiscoView interface for configuration
- ConfigMaker
- Cisco Voice Manager (CVM) supported, version 2.0
- NetSys supported
- Technical Specifications

Table 2. Digital T1/E1 Packet Voice Trunk Network Module Technical Specifications

Specification	Standard
Quality of Service (QoS) Standards	WFQ, WRED, CRTP, LLQ, Diffserv, RSVP, and other IOS capabilities
Signaling Standards	• ITU-T: H.323 v3 and v4 • MGCP, SIP • T1 CAS • E&M Wink Start, Immediate Start, Delay-Dial • FXS Loop-Start, Ground-Start • FXO Loop-Start, Ground-Start
Fax	T.38 & T.37
Clock Support	Pull-in range 64 PPM, Pass-through 32 PPM
Safety Standards	• UL 1950 3rd. edition • CSA 950, 1995 version • IEC 950 • EN 60950 • AS/NZS: 3260 with amendment 134
Maximum Simultaneous Call Setup	60 Calls per Network Module
Interface Type	RJ48 Connector
Telco Standards	• AT&T Accunet (62411) • ATT 54016
Line Bit Rate	• T1, 1.544Mbps • E1 2.048Mbps
Line Code	• AMI, B8ZS (T1) • HDB3 (E1)
AMI Ones Density	Enforced for N x 56kbps channels
Framing Format	D4 (SF) and ESF
Output Level (LBO)	0, -7.5, or -15 dB

Specification	Standard
Input Level	_ down to -24 dB0
Line Frequency	• 1.544 Mbps 75 bps/32PPM • 2.048 Mbps 75 bps/32PPM
DTE/DCE Interface (VIC Mode)	G.704/structured
Diagnostic Loopback Support	ANSI T1.403 Annex B/V.54 loopup/down code recognition, network loopback, and user initiated loopbacks, network payload loopback, local DTE loopback, remote line (codes: V.541, loop up, and loop down)
Alarm Detection	Alarm indication signal (AIS), remote alarm, far-end block error (FEBE), out of frame (OOF), cyclic redundancy check (CRC) multiframe OOF, signaling multiframe OOF, frame errors, CRC errors, Loss of network signal (red alarm), loss of network frame, receive (blue alarm) (AIS) from network, receive (yellow) from network Performance Reports/Error Counters CRC, errored seconds, burst errored seconds, severely errored seconds, Ft and Fs framing errors for SF framing, FPS framing errors for ESF framing, 24-hour history stored in 15-minute increments
LED Indicators	• Data carrier detect (CD) • Loopback (LP) • Alarm (AL) • Voice DSP processing status
DSU/CSU	• Selectable DSX-1 cable length in increments from 0 to 655 feet in DSU mode • Selectable DS1 CSU line build-out: 0, -7.5, -15, and -22.5 dB • Selectable DS1 CSU receiver gain: 26 or 36 dB
Physical Interface Standards	T1 ANSI, ATT T1.1, ANSI T1.403
Environmental	• Operating temperature: 0 to 40º C (32 to 104° F) • Storage temperature: -25 to º C (-13 to 158° F) • Relative humidity: 5 to 85% noncondensing operating; 5 to 95% noncondensing, nonoperating
MTBF	• NM-HDV-1T1-24E; 381,087 to 467,253 hours • NM-HDV-2T1-48; 366,394 to 445,354 hours

MANAGEMENT

Table 3. Digital T1/E1 Packet Voice Trunk Network Module Management

Type	Description
Telnet/Console	Remote and local configuration, monitoring, and troubleshooting from Cisco IOS CLI
SNMP	• Router and DSU/CSU managed by single SNMP agent • Router/DSU/CSU appear as single network entity to user standard MIB (MIB II) • Cisco integrated DSU/CSU MIB • RFC 1406 T1 MIB, including alarm detection and reporting
SNMP Traps	Generated in response to alarms

PART NUMBERS

Table 4. Digital T1/E1 Packet Voice Trunk Network Module Part Numbers

Product Number	Description
NM-HDV-1T1-12(=)	Single-port, 12-channel T1 voice/fax Network Module (supports 12-channels of medium complexity VoCoders: G.729a/b, G.726, G.711 and fax or 6 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711 and fax). This product can be upgraded to an NM-HDV-1T1-24 simply by adding one additional PVDM-12= module. This complete bundle includes one (1) NM-HDV=, one (1) PVDM-12=, and one (1) VWIC-1MFT-T1.
NM-HDV-1T1-24(=)	Single-port, 24 channel T1 voice/fax network module (supports 24 channels of medium complexity VoCoders: G.729a/b, G.726, G.711, and fax or 12 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax). This product can be upgraded to an NM-HDV-1T1-24E simply by adding two additional PVDM-12= modules. This complete bundle includes one (1) NM-HDV=, two (2) PVDM-12=, and one (1) VWIC-1MFT-T1.
NM-HDV-1T1-24E(=)	Single-port, enhanced 24-channel T1 voice/fax network module supports 24 channels of high and medium complexity VoCoders: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax. This is the Enhanced version of the NM-HDV-1T1-24 (i.e., this product has two more PVDM-12= modules than the NM-HDV-1T1-24). This complete bundle includes one (1) NM-HDV=, four (4) PVDM-12=, and one (1) VWIC-1MFT-T1.
NM-HDV-2T1-48(=)	Dual-port, 48 channel T1 voice/fax network module (supports 48 channels of medium complexity VoCoders: G.729a/b, G.726, G.711, and fax or 24 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax) and contains an integrated add/drop multiplexer. This complete bundle includes one (1) NM-HDV=, four (4) PVDM-12=, and one (1) VWIC-2MFT-T1-DI.
NM-HDV-1E1-12(=)	Single-port, 12-channel E1 voice/fax Network Module (supports 12-channels of medium complexity VoCoders: G.729a/b, G726, G.711 and fax or 6 channels of G.726, G.729, G.723.1, G.728, G729a/b, G.711 and fax). This product can be upgraded to an NM-HDV-1E1-30 simply by adding two additional PVDM-12= modules. This complete bundle includes one (1) NM-HDV=, one (1) PVDM-12=, and one (1) VWIC-1MFT-E1.

Product Number	Description
NM-HDV-1E1-30(=)	Single-port, 30 channel E1 voice/fax network module (supports 30 channels of medium complexity VoCoders: G.729a/b, G.726, G.711, and fax or 18 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax). This product can be upgraded to an NM-HDV-1E1-30E simply by adding two additional PVDM-12= modules. This complete bundle includes one (1) NM-HDV=, three (3) PVDM-12=, and one (1) VWIC-1MFT-E1.
NM-HDV-1E1-30E(=)	Single-port, enhanced 30-channel E1 voice/fax network module supports 30 channels of high and medium complexity VoCoders: G.729a/b, G.726, G.729, G.728, G.723.1, G.711, and fax. This product is the Enhanced version of the NM-HDV-1TE-30 (i.e., this product has two more PVDM-12= modules than the NM-HDV-1E1-30). This complete bundle includes one (1) NM-HDV=, five (5) PVDM-12=, and one (1) VWIC-1MFT-E1.
NM-HDV-2E1-60(=)	Dual-port, 60 channel E1 voice/fax network module (supports 60 channels of medium complexity VoCoders: G.729a/b, G.726, G.711, and fax or 30 channels of G.726, G.729, G.723.1, G.728, G.729a/b, G.711, and fax) and contains an integrated add/drop multiplexer. This complete bundle includes one (1) NM-HDV=, five (5) PVDM-12=, and one (1) VWIC-2MFT-E1-DI.
NM-HDV=	High-density voice/fax network module spare. This product can be used as the foundation to build any of the above products using any combination of VWICs and PVDM-12= modules. This product is only orderable separately as a spare.
PVDM-12=	12-channel packet voice DSP module upgrade spare. This product can be used in combination with the NM-HDV= to build any of the above products using any combination of VWICs and PVDM-12= modules. This product can also be used to upgrade the NM-HDV-1T1-24 or NM-HDV-1E1-30 to the Enhanced version of these products. This product is only orderable separately as a spare.

PLATFORM MAXIMUM NETWORK MODULES SUPPORTED

Table 5.

	2600 or 3620 Chassis Network Module Slots	3640 Chassis Network Module Slots	3660 Chassis Network Module Slots	3725 Chassis Network Module Slots	3745 Chassis Network Module Slots
Maximum Number of T1 or E1 Voice Ports and Voice Channels Supported	Two T1 or Two E1 (48 voice channels—T1) (60 voice channels—E1)	Five T1 or Four E1 (96 voice channels—T1) (96 voice channels—E1)	Twelve T1 or Ten E1 (288 voice channels—T1) (300 voice channels—E1)	Four T1 or Four E1 (96 voice channels—T1) (120 voice channels—E1)	Eight T1 or Eight E1 (192 voice channels—T1) (240 voice channels—E1)
Note: Maximum number of voice channels supported decreases when using Compressed RTP (CRTP).					

	2811 Chassis Network Module Slots	2821 Chassis Network Module Slots	2851 Chassis Network Module Slots	3825 Chassis Network Module Slots	3845 Chassis Network Module Slots
Maximum Number of T1 or E1 Voice Ports and Voice Channels Supported	Two T1 or Two E1 (48 voice channels—T1) (60 voice channels—E1)	Two T1 or Two E1 (48 voice channels—T1) (60 voice channels—E1)	Two T1 or Two E1 (48 voice channels—T1) (60 voice channels—E1)	Four T1 or Four E1 (96 voice channels—T1) (120 voice channels—E1)	Eight T1 or Eight E1 (192 voice channels—T1) (240 voice channels—E1)

CISCO IOS SOFTWARE AND MEMORY SUPPORT

Table 6. Digital T1/E1 Packet Voice Trunk Network Module IOS Software and Memory Support

Product Number	Platform	IOS SW Version	IOS Feature Sets	Minimum DRAM Memory for 12.2(x)T release	Minimum FLASH Memory for 12.2(x)T release
All Digital E1 and T1 Packet Voice Trunk Network Modules	Cisco 2600 and 3600 series	12.0(7)XK, 12.0(7)T, 12.1(2)T or greater. 12.2(8)T1 or greater for 2691	All Plus Feature Sets (some IOS Plus Feature Sets require additional DRAM and Flash Memory)	64-96 Mbyte for 2600/2600XM platforms 128 Mbyte for 2691 platform 64-128 Mbyte for 3600 platforms	16-32 MB
All Digital E1 and T1 Packet Voice Trunk Network Modules	Cisco 3700 series	12.2(8)T or greater	All Plus Feature Sets (some IOS Plus Feature Sets require additional DRAM and Flash Memory)	128 Mbyte for 3700 platforms	32 MB
All Digital E1 and T1 Packet Voice Trunk Network Modules	Cisco 2811, 2821, 2851	12.3(8)T4	IP Voice images and higher	256Mbyte for 2800 platforms	64MB
All Digital E1 and T1 Packet Voice Trunk Network Modules	Cisco 3800	12.3(11)T	IP Voice images and higher	256Mbyte for 2800 platforms	64MB

Note: Please refer to the Cisco IOS® release notes for determining the exact flash and DRAM memory requirements.

COUNTRY APPROVAL

Table 7. Digital T1/E1 Packet Voice Trunk Network Module T1 Interface Country Approval

Country	Specification
US	• US (UL 1950, T1) • FCC Part 68 • FCC Part 15 Class B, T1
Canada	• CS-03 • CSA 950, T1 • CSA C108.8 Class A, T1
Japan	• VCCI class 2 • VCCI:V-3/97.04, T1 • JATE green book • IEC950

Table 8. Digital T1/E1 Packet Voice Trunk Network Module E1 Interface Country Approval

Country	Specification
Austria (CE) Belgium (CE Denmark (CE) Finland (CE) France (CE) Germany (CE) Gibraltar (accepts CE) Greece (CE) Ireland (CE) Italy (CE) Liechtenstein (accepts CE) Luxembourg (accepts CE) Malta (accepts CE) Monaco (accepts CE) Netherlands (CE) Norway (CE) Portugal (CE) Spain (CE) Sweden (CE) Switzerland (CE) U.K. (CE)	• EMC EN55022/EN50082/EN61000 • Safety EN60950 • Telecom CTR13/CTR12
New Zealand	• EMC AS/NZS 3548 • Safety AS/NZS 3260 • Telecom TNA 117
China	• EMC CISPR22 • Safety EN60950
Singapore	• EMC EN55022/CISPR22 • Safety EN60950 • Telecom DLCN1/DLCN2
Poland	• EMC EN55022/EN50082/EN61000 • Safety EN60950 • Telecom CTR13/CTR12
Australia	• EMC AS/NZS 3548 • Safety AS/NZS 3260 • Telecom TS016

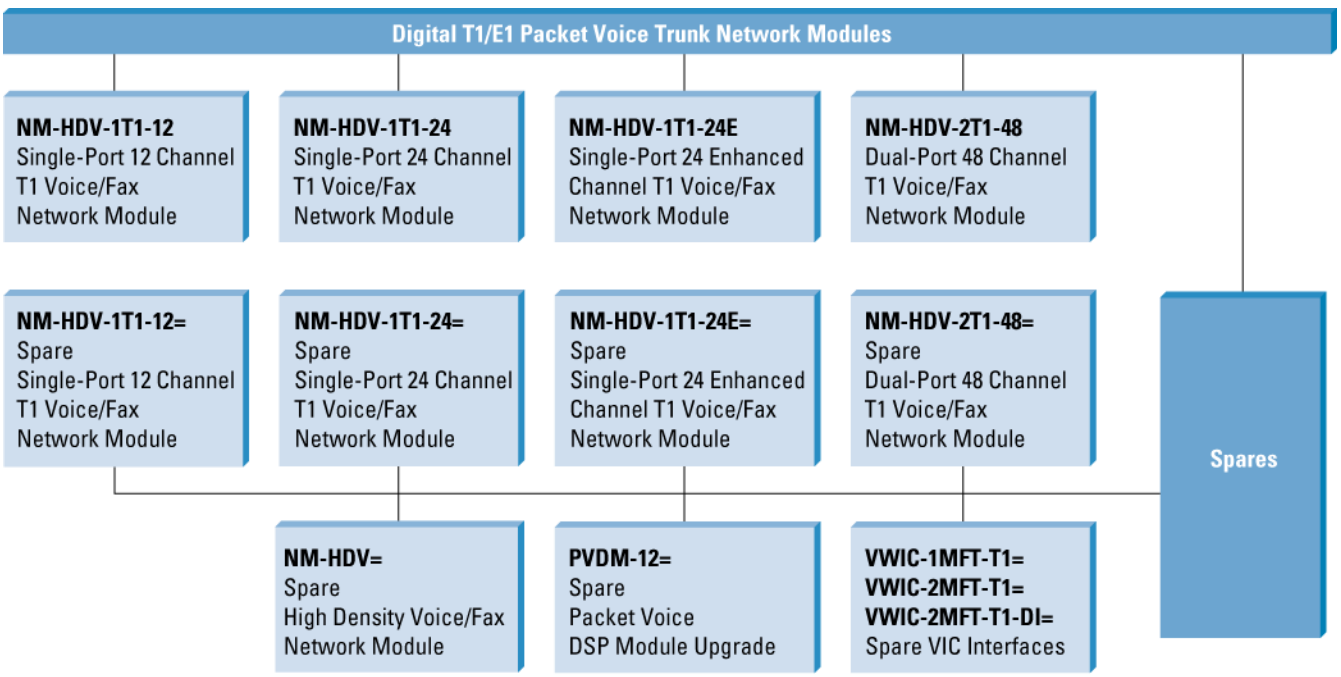
E1 R2 REGISTER, LINE AND COUNTRY VARIANT SIGNALING SUPPORT

- ITU Q411, Q421, ITU Supplement 7, Compelled Register Signaling, Non-Compelled Register Signaling, Semi-Compelled Register Signaling
- Country Variants: Argentina, Australia, Bolivia, Brazil, Bulgaria, China, Colombia, Costa Rica, Croatia, East Europe, Ecuador ITU, Ecuador LM, Greece, Guatemala, Hong Kong [China variant], India, Indonesia, Israel, ITU, Korea, LAOS Network (Thailand Variant), Malaysia, Malta, New Zealand, Paraguay, Peru, Philippines, Saudi Arabia, Singapore, South Africa Panaftel, Telmex, Telnor, Thailand, Uruguay, Venezuela, Vietnam

PRODUCT RELATIONSHIP

Collectively, this set of products is referred to as the Digital T1/E1 Packet Voice Trunk Network Modules. Figure 2 shows the relationship of all of these products (T1 versions are shown below only, E1 versions follow the same structure).

Figure 2.



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