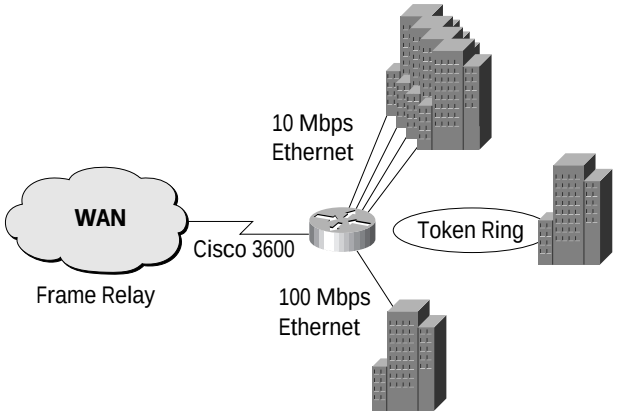
Data Sheet

Cisco 2600/3600/3700 Series LAN Connectivity Modules

The many LAN Connectivity Modules for the Cisco 2600/3600/3700 series platforms are designed to accommodate a range of application needs in customer networks. The LAN network module family assures customers that they can choose a LAN connectivity solution that fits their requirements. Available as network modules, LAN connectivity options offer several port densities, media options, and speeds. As modular components, they are easily and inexpensively field-upgradable as customer requirements change.

Figure 1
LAN Connectivity Applications



Available LAN connectivity network modules for the Cisco2600/3600/3700 series include the following:

Fast Ethernet

- NM-1FE-TX—One-port Fast Ethernet (10/100BaseTX interface)NM-1FE-FX—One-port Fast Ethernet (100BaseFX interface)
- NM-1FE-FX-V2 -One-port Fast Ethernet, revision 2, (100BaseFX interface)
- NM-1FE-SMF- One-port Fast Ethernet (100BaseFX Single Mode Fiber interface)
- NM-1FE1CT1—One 10/100 Ethernet with one ISDN/PRI or Channelized T1
- NM-1FE1CT1-CSU —One 10/100 Ethernet with one ISDN/PRI or Channelized T1 with integrated CSU
- NM-1FE2CT1—One 10/100 Ethernet with 2 ISDN/PRI or Channelized T1
- NM-1FE2CT1-CSU—One 10/100 Ethernet with two ISDN/PRI or Channelized T1 with integrated CSU's

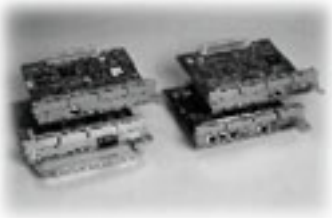
- NM-1FE1CE1B—One 10/100 Ethernet with one ISDN/PRI or Channelized E1 (balanced)
- NM-1FE2CE1B—One 10/100 Ethernet with two Channelized E1 or ISDN/PRI (balanced)
- NM-1FE1CE1U—One 10/100 Ethernet with one Channelized E1 or ISDN/PRI (unbalanced)
- NM-1FE2CE1U—One 10/100 Ethernet with two Channelized E1 or ISDN/PRI (unbalanced)

Ethernet

- NM-4E—Four-port Ethernet
- NM-1E—One-port Ethernet
- NM-1E2W—One-port Ethernet, plus two WAN interface card slots
- NM-2E2W—Two-port Ethernet, plus two WAN interface card slots
- Token Ring
- NM-1E1RW—One-port Token Ring, one-port Ethernet, plus two WAN interface card slots

Fast Ethernet Connectivity

Figure 2
Fast Ethernet and 10BaseT Ethernet Network Modules Including: NM-1FE-TX, NM-1FE-FX, NM-4E, NM-1E



Ideal for a wide range of LAN applications, the Fast Ethernet network modules support many internetworking features and standards. Single port network modules offer autosensing 10/100BaseTX or 100BaseFX Ethernet. The TX version supports virtual LAN (VLAN) deployment.

In customer networks, these modules may be useful for the following:

- Uplink to Fast Ethernet backbones on Catalyst® series switches and other Cisco routers.
- VLAN support on the NM-1FE-TX module, allows network managers to group users logically rather than by physical location, easing adds, moves, and changes within the network. The Cisco Inter-Switch Link (ISL) protocol enables VLAN traffic communication with Catalyst 6500, 5000, 5500, and Catalyst 3000 series switches.
- Provides inter-VLAN routing services between VLANs on any Catalyst series switch that supports VLANs. The module will offer future support the new 802.1Q VLAN standard.
  - *Cabling*—RJ-45 connector for 1FE-TX, fiber connector for 1FE-FX
  - *LEDs*—Network module status indicator, status LEDs for link status, LAN speed, and half/full duplex
  - *Network interfaces*—One 10/100 base-TX or FX port

Fast Ethernet with One and Two Port ISDN/PRI or Channelized T1/E1 Connectivity

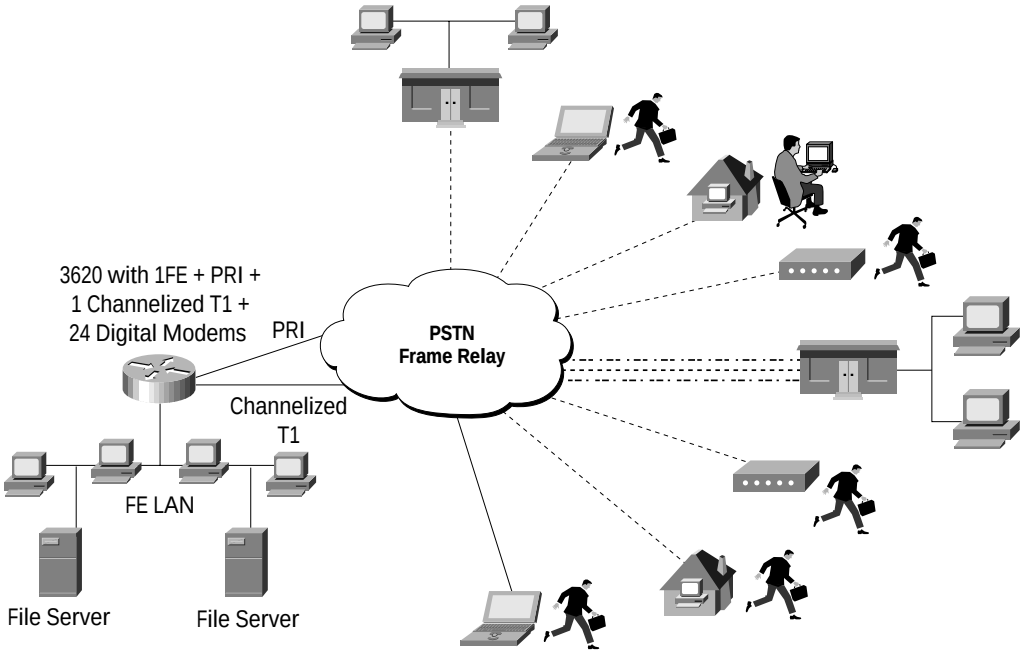
Figure 3

NM-1FE1CT1, NM-1FE1CT1-CSU, NM-1FE2CT1, NM-1FE2CT1-CSU, NM-1FE1CE1B, NM-1FE1CE1U, NM-1FE2CE1B, and NM-1FE2CE1U Network Modules

The new mixed media LAN/WAN network modules series offers a single network module that combines a single 10/100BaseTX interface with eight combinations of either one or two ISDN/PRI or Channelized T1/E1 to support a wide range of LAN-to-LAN, LAN-to-WAN, and dial applications in a single network module. The single-port 10/100Base-TX interface supports autosensing and autonegotiation of 10/100 Mbps, and the ISDN/PRI interfaces support most of the Cisco IOS software related dial features up to and including 11.3(4)T. The single-port 10/100BaseTX interface has one RJ-45 port. This port connects to two-pair Category 5 UTP cabling following the 100BaseTX physical layer protocol. The ISDN/PRI/Channelized T1/E1 interfaces are available with and without an integrated CSU and in one or two-port versions. The network modules without integrated CSUs have a DB-15 connector and require a connection to an external CSU, whereas the network modules with integrated CSUs connect directly to the network with an RJ-48 cable.

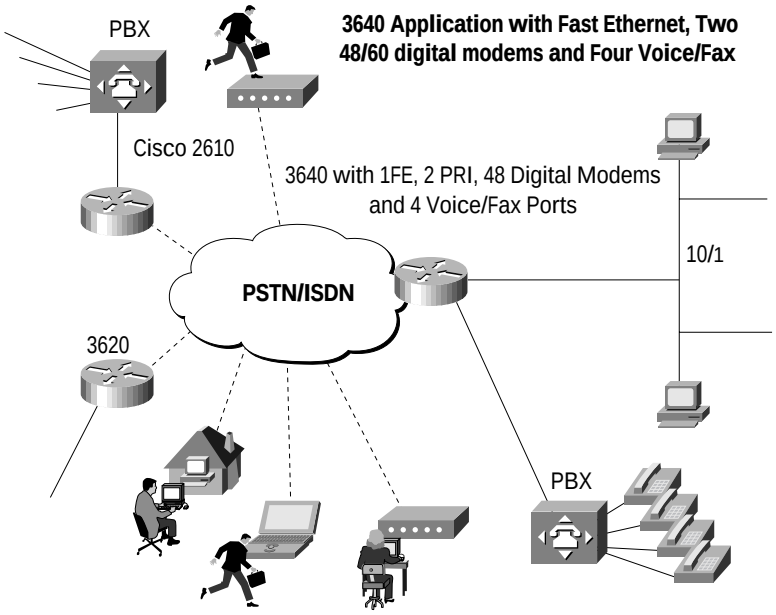
Figure 4

3620 Applications with Mixed Media Network Modules



Each of the T1 network module versions supports speeds of up to 1.544Mbps full duplex and provides up to 24 virtual interfaces in channelized mode and up to 23 ISDN b-channels in the PRI mode. The E1 network modules come in either balanced (120 ohm) or unbalanced (75 ohm) modes and are compatible with the ITU-T G.703/G.704 specifications. The E1 network modules support speeds of up to 2.048-Mbps full duplex and provide up to 30 virtual interfaces in channelized mode and up to 31 ISDN b-channels in PRI mode.

Figure 5
3640 Applications with Mixed Media Network Modules



These network modules enable the following applications:

- Low-end Hybrid Access Server—The 3620 can support up to four ISDN/PRI or Channelized T1/E1 interfaces with a single-port 10/100BaseTX interface or can support up to two ISDN/PRI or Channelized T1/E1 interfaces, with up to 30 digital modems with a single 10/100BaseTX interface.
- Increased Network Module slot utilization—The 3640 supports up to eight Channelized or ISDN/PRI T1/E1 interfaces for up to 240 simultaneous remote connections.
- Expanded versatility—The 3640 offers two ISDN/PRI interfaces with up to 60 digital modems and has an available slot for other uses, such as VoIP, ATM, hardware compression, HSSI, and WAN backhaul capabilities.
- Integrated CSUs for more efficient management, and both space and cost savings
- RJ-45 connector to attach to Category 5 unshielded twisted-pair (UTP; for example, 10 or 100BaseTX)
- Support for Inter-Switch Link (ISL) over Fast Ethernet to ensure compatibility with the Catalyst® 6500, 5000, Catalyst 5500, and Catalyst 3000 switches
- Conform with the IEEE 802.1Q Fast Ethernet specification, ensuring multivendor interoperability
- 10 or 100BaseTX operation, autosense, and autonegotiation support
- Full, and half-duplex operation

Cabling—RJ-45 connector for the 10/100baseTX interface and either RJ-45 connectors for the ISDN/PRI with integrated CSUs, or DB-15s for non-CSU and E1 versions. The following table provides cabling product numbers and descriptions:

Cable Description	Product Number
T1 RJ45-RJ45 Straight-Through Cable	CAB-DSU-RJ45
DB-15 to DB-15 Straight-Through Cable	CAB-7KCT1DB15
DB-15 to DB-15 Null Cable	CAB-7KCT1NULL
E1 Cable DB15 to RJ45	CAB-E1-PRI
E1 Cable DB-15 to DB-15	CAB-E1-DB15
E1 Cable Twinax 120 ohm Balanced	CAB-E1-Twinax
E1 Cable BNC 75 ohm Unbalanced	CAB-E1-BNC

LEDs—Network Module status indicator, FDX indicator, 10/100-Mbps indicator, link indicator, and collision indicator in reference to the 10/100baseTX, Carrier Detect, Remote Alarm, Local Alarm, and Loop indicators for T1/E1.

Network Interfaces—One RJ-45 10/100baseTX interface and either one or two RJ-45 for integrated CSU versions or one or two DB-15s for the T1/E1 connections.

Ethernet Connectivity

Five available network modules offer four-port, single-port, and dual-port Ethernet LAN connectivity in the Cisco 3600 series for maximum configuration flexibility as a multifunction platform.

Mixed Media Network Modules

The mixed-media network modules allow administrators to configure an Ethernet port (or two ports) with additional WAN connections using the WAN interface cards on the same module to conserve slot space.

For example, as part of a multifunction solution, a Cisco 3620 platform with a 2E2W can support two Ethernet LANs, together with two serial/ISDN backhaul lines, andstill allow multiple serial or ISDN in the same chassis. This solution outperforms the competition in industry-leading price/performance.

Four-Port Ethernet Module

The four-port Ethernet network module provides industry-leading price/performance, enabling high-density Ethernet connectivity. The four-port Ethernet network module offers a lower price point for multifunction solutions that require higher-density Ethernet than the mixed-media network modules.

An example is a Cisco 3640 platform with a four-port Ethernet network module, 16-port ISDN Basic Rate Interface (BRI), and a 32-port Asynchronous serial network module.

This configuration integrates branch office routing requirements with four Ethernet LAN segments and the mixed dial requirements of sync/async serial lines and ISDN.

Single-Port Ethernet Module

A single-port Ethernet network module allows customers to choose a configuration at the right price for their specific applications.

For example, as part of a multifunction solution, a Cisco 3640 platform with a single Ethernet connection to a LAN backbone can also support either six PRI connections to aggregate ISDN lines, or 24 synchronous/asynchronous ports. This solution handily outperforms the competition in industry-leading price/performance.

Cabling—RJ-45 connector

LEDs—Network module status indicator, status LEDs including send/receive, half/full duplex, and LAN speed indication

Network interfaces—One or four 10BaseT ports

Ethernet Network Module Summary

Table 1 LAN Connectivity Network Modules Functional Comparison

Network Module	Number of LAN Ports on Module	Number and Type of WAN Ports on Module
Single-Port Ethernet	1	None
Four-Port Ethernet	4	None
Single-Port Ethernet Mixed Media	1	Two WAN Interface Card (WICs) slots
Dual-Port Ethernet Mixed Media	2	Two WIC card slots
Single-Port Ethernet and Single-Port Token Ring	1/1	Two WIC card slots
Single-Port 10/100BaseTX	1	None
Single-Port 10/100BaseFX	1	None
Single-Port 10/100BaseTX with one ISDN/PRI or Channelized T1	1	One integrated T1 PRI/Channelized WAN interface
Single-Port 10/100BaseTX with one ISDN/PRI or Channelized T1 with CSU	1	One integrated T1 PRI/Channelized WAN with internal CSU interface
Single-Port 10/100BaseTX with two ISDN/PRI or Channelized T1's	1	Two integrated T1 PRI/Channelized WAN interfaces
Single-Port 10/100BaseTX with two ISND/PRI or Channelized T1's with CSU's	1	Two integrated T1 PRI/Channelized WAN with internal CSUs interfaces
Single-Port 10/100BaseTX with one ISDN/PRI or Channelized Balanced E1	1	One integrated balanced mode E1 PRI/ Channelized WAN interface
Single-Port 10/100BaseTX with ISDN/PRI or Channelized Unbalanced E1	1	One integrated unbalanced mode E1 PRI/ Channelized WAN interface
Single-Port 10/100BaseTX with two ISDN/PRI or Channelized Balanced E1's	1	Two integrated balanced mode E1 PRI/ Channelized WAN interfaces
Single-Port 10/100BaseTX with two ISDN/PRI or Channelized UnBalanced E1's	1	Two integrated unbalanced mode E1 PRI/ Channelized WAN interfaces

Table 2 Physical Limitation of Serial Modules per Chassis

Physical Characteristics Type of Module	Cisco 3660	Cisco 2600 and 2600xm	Cisco 3745	Cisco 3725	Cisco 3640	Cisco 3620
NM-1FE-TX, NM-1FE-FX, and NM-1FE-FX-V2	6	N/A	N/A	N/A	4	2
NM-1FE-SMF	6	1[1]	4	2	4	2
NM-1FE1CT1, NM-1FE1CT1-CSU, NM-1FE2CT1, NM-1FE2CT1-CSU, NM-1FE1CE1B, NM-1FE1CE1U, NM-1FE2CE1B, and NM-1FE2CE1U	6	N/A	4	2	4	2
NM-4E	6	1	N/A	N/A	3	2
NM-1E2W	6	N/A	N/A	N/A	4	2
NM-1E1R2W	6	N/A	N/A	N/A	4	2
NM-2E2W	6	N/A	N/A	N/A	4	2
NM-1E	6	1	N/A	N/A	3	2

1. Support for the NM-1FE-SMF is available on the Cisco 2691, only.

Table 3 Cisco IOS Software Release Requirements for Network Modules

Module Model	Cisco IOS Release Number
NM-1FE-TX	11.2.(6)P or later
NM-1FE1CT1, NM-1FE1CT1-CSU, NM-1FE2CT1, NM-1FE2CT1-CSU, NM-1FE1CE1B, NM-1FE1CE1U, NM-1FE2CE1B, and NM-1FE2CE1U	11.3(4)T or later
NM-4E	11.2.(5)P or later
NM-1E	11.2.(5!P or later
NM-1FE-FX	11.2(9)P or later
NM-1FE-FX-V2	12.0(24), 12.1(17), 12.2(13), 12.2(13)T, or later
NM-1FE-SMF	12.3(2)T or later

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