

Digital Modem Network Modules for the Cisco 3600 Platform

Introduction

In late 1996, Cisco Systems introduced its Cisco 3600 series as a family of modular, cost-effective, high-performance, dial access solutions targeted at regional and branch offices and small to medium-sized Internet service providers (ISPs). In early 1997, Cisco announced further extensions to the capabilities of the platform, such as Fast Ethernet and high-density async, adding multifunction capabilities to the initial dial access solutions.

Now, with this announcement of the new digital modem network modules, the Cisco 3600 expands its role as a multifunction, branch/enterprise orientated platform that, supports dial access and LAN-to-LAN or routing in one modular platform, making it an ideal solution for the "power branch" environment.

The following network modules are being announced:

Table 1

Product	Product Description
NM-6DM	6 digital modem network module
NM-12DM	12 digital modem network module
NM-18DM	18 digital modem network module
NM-24DM	24 digital modem network module
NM-30DM	30 digital modem network module
MICA-6MOD	6 digital modem upgrade card for the Cisco 3600 digital modem network modules
MMTL-3600	Managed Modem Software License (available in blocks of 6 modems)

Note: These digital modem network modules *must* operate in conjunction with a Primary Rate Interface (PRI) network module. For details on supported PRI network modules, see the "Technical Specifications" section.

Features at a glance

- Up to 60 digital modems per chassis
- Network module requires one slot in a Cisco 3640
- Each network module supports up to 30 digital modems
- Each modem is fully software upgradable
- Speeds up to 56 kbps are supported
- The number of modems per chassis can be easily increased on site
- LEDs indicate when the network module is enabled
- LEDs indicate when modem banks are in use

Cisco 3600 Module Summary

Please reference Appendix A for the complete line of network modules and WAN interface cards (WICS) available for the Cisco 3600.

Digital Modem Features/Benefits

The Cisco 3640, installed with the digital modem network modules, offers the most flexible, scalable, manageable, and high-performance dial access solution available in the market today.

These new network modules utilize either the single or dual PRI network module to offer support for up to 60 remote modem users (using two digital network modules), at speeds up to 56 kbps. Each network module supports up to 30 digital modems. Flexible LAN topologies including Ethernet, Fast Ethernet, and Token Ring are supported. The benefit is the support of 60 digital modems in a space-saving 2 Rack Unit (2RU) chassis.

The internal digital modem network module is available with 6, 12, 18, 24, and 30 modems preinstalled, and can also be upgraded on site, from say 18 to 24 modems, as simply as upgrading computer memory! This scenario gives the maximum flexibility to grow a dial-in solution as the remote user base grows.

Support for the new K56Flex modem technology allows users to achieve maximum data transfer rates, while still allowing support for V.34 technologies. The modems are software upgradable, and will support future standards as they become available. This high speed support ensures the fastest downloads of Web pages and files.

Note: Actual speeds vary, depending on line conditions. Because of FCC limitations, speeds in the United States are less than 56 kbps.

The Cisco 3600 can take incoming Integrated Services Digital Network (ISDN) or voice calls and automatically switch them to the appropriate internal circuitry. The switching is based on Q.931 messaging in the PRI ISDN D channel. This out-of-band signaling channel provides a way for the telephone network to label each call as to the type of call. Specifically, when an incoming call is labeled "voice" by the telephone network, the Cisco 3600 directs it to one of its modems. When a call is labeled "ISDN data", it is directed to one of its High-Level Data Link Control (HDLC) controllers. The benefits here are one phone number for modem and ISDN users. Currently this support is available through the PRI interface.

The Cisco 3600 provides complete centrally managed modem capabilities, key requirements for branches and enterprises building midsized dial-in pools. The Cisco 3600 modems can be managed via the same Simple Network Management Protocol (SNMP)-based tools used to manage the rest of the network, providing network managers with one solution at a central management point. Optional enhanced modem management (Management Modem Technology License [MMTL]) capabilities allow for the gathering of modem statistics, real-time call-in-progress, monitoring modem activity log, and modem hard/soft busy out.

The installed modems will be able to be utilized by LAN users for dial-out applications, from a simple-to-use, Windows 95-based redirection application. The modems can be assigned as dial-in, dial-out, or both. Dial-out support

allows the LAN users to utilize the modems during the day for outgoing calls, and use the same modems in the evening for incoming calls from home users.

The ever expanding numbers of remote users can be easily accommodated with the support for Multilink Multichassis, allowing dial-in pools of lines to span numerous Cisco 3600 access servers. Through the use of Layer 2 Forwarding (L2F) technology and Cisco's exclusive Stack Group Bidding Protocol (SGBP), the Cisco 3600 can grow to meet the requirements of the fast-growing and frequently changing dial environments. Since the essential building block is a relatively small investment, enterprises and branch offices can scale from very small to larger installations.

The Cisco IOS™ software can help maximize dial bandwidth, utilizing numerous features such as bandwidth on demand and protocol spoofing. These software features directly reduce line usage and reduce the cost associated with a remote access solution.

Lower operating costs are achievable with the Cisco 3600's set of central management. The Cisco 3600 and its internal modems can be managed with CiscoWorks software. In addition, Cisco's configuration management capabilities provide network managers with complete control over network statistics and the ability to configure and tune network operations from a central location. Finally, comprehensive debugging tools in Cisco IOS software substantially reduce the time and cost associated with problem isolation and correction.

Utilizing TACACS+, Challenge Handshake Authentication Protocol/Password Authentication Protocol (CHAP/PAP), 56-bit Data Encryption Standard (DES) encryption and the built-in firewall capabilities of the Cisco 3600 allows secure access for remote users to sensitive company data.

Life Cycle-Focused Support Solutions

Cisco's comprehensive support portfolio delivers solutions that enhance the network throughout its life cycle. From design and installation, to preventive and scheduled maintenance, to performance optimization, Cisco's solutions promote network reliability, efficiency, and flexibility. Designed to function as an integral product component, these programs deliver seamless support. Together, they proactively help organizations sharpen their competitive edge. Through access to the Cisco Connection Online (CCO)

Website, customers can both use and market expanded functionality and new features as soon as they become available. Moreover, access to Cisco's technical expertise is available around the clock and around the globe. This virtual team of the world's top networking engineers is equipped to address every need from troubleshooting to network design and planning.

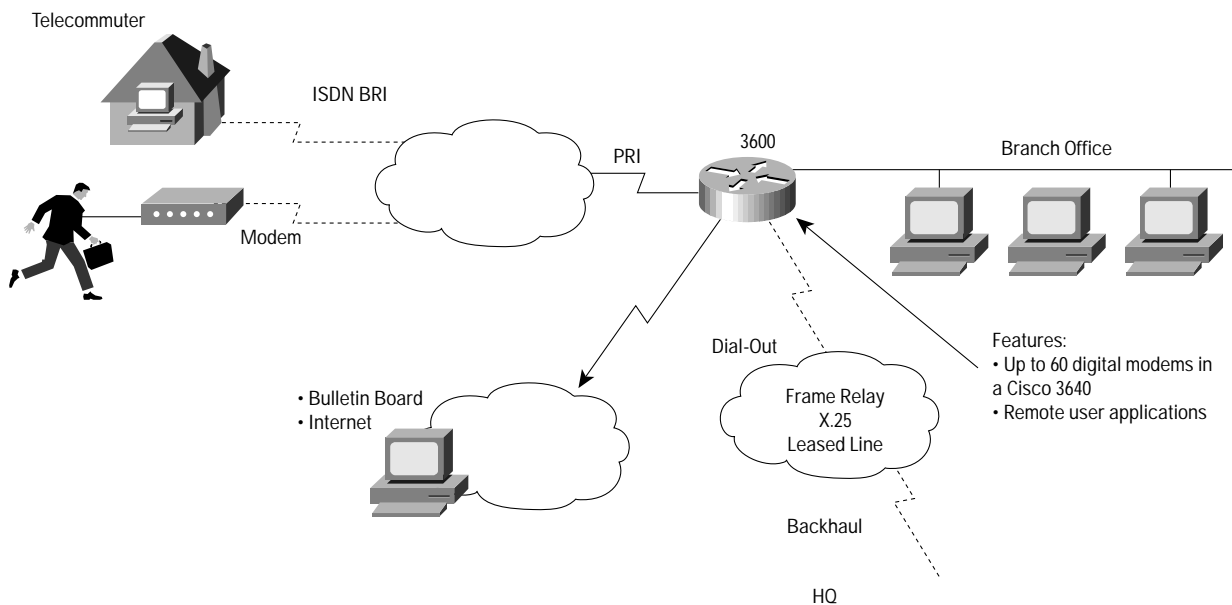
Digital Modem Applications

Historically, branch office connectivity has been synonymous with connecting the local LAN to a regional or central site. With the rapid growth in mobile computing and telecommuting, more and more branch offices need to add user-to-LAN capabilities.

Using ISDN PRI and digital modem network modules, the Cisco 3600 provides the ideal functionality for the branch and enterprise offices.

The following diagram illustrates a typical application for the ISDN PRI and digital modem network modules:

Figure 1



- Features:
- Up to 60 digital modems in a Cisco 3640
 - Remote user applications

For basic telephone users, both 33.6K and 56K modem calls can be terminated through a PRI connection into a digital modem network module, including mobile workers and people working from hotel rooms.

For teleworkers with access to Basic Rate Interface (BRI), the same phone number could be used to connect to the same Cisco 3600, achieving 64 kbps, or with multilink PPP, 128 kbps.

Multiple backhaul options are available to link back to a corporate network, at speeds up to 8 Mbps. Additionally, a slower speed (T1 or Frame Relay, for example) connection could link the branch to the World Wide Web.

Orderability, Availability, Software Requirements, Memory Requirements

Product	Orderable	Available	Cisco IOS Version
NM-6DM	October 1997	October 1997	11.2 (9) XA
NM-12DM	October 1997	October 1997	11.2 (9) XA
NM-18DM	October 1997	October 1997	11.2 (9) XA
NM-24DM	October 1997	October 1997	11.2 (9) XA
NM-30DM	October 1997	October 1997	11.2 (9) XA
MICA-6MOD	October 1997	October 1997	11.2 (9) XA
MMTL-3600	October 1997	October 1997	11.2 (9) XA

Memory requirements for the each digital modem network module include:

300 KB main memory

200 KB input/output (I/O) memory

Ordering Information

Product Number	Product Description
NM-6DM	6 digital modem network module
NM-12DM	12 digital modem network module
NM-18DM	18 digital modem network module
NM-24DM	24 digital modem network module
NM-30DM	30 digital modem network module
MICA-6MOD	6 digital modem upgrade card for the Cisco 3600 digital modem network modules
MMTL-3600	Managed Modem Software License (per 6 modems)

Supported Configurations

- Cisco 3620 – not supported
- Cisco 3640 – two digital modem network modules

Technical Specifications

Physical Characteristics

- Six modems per modem module
- Up to five modem modules per network module
- Up to two network modules in a Cisco 3640

Modem Protocols Supported

Carrier protocols:

- K56Flex
- ITU V.23 at 75/1200 bps
- Bell 103 at 300 bps
- ITU V.21 at 300 bps
- ITU V.22 at 1200 bps

- Bell 212A at 1200 bps
- ITU V.22bis at 2400 bps
- ITU V.32 up to 9600 bps
- ITU V.32bis up to 14,400 bps
- V.32 turbo up to 19,200 bps
- V.34 up to 33,600 bps

Error correcting link access protocols:

V.42 LAPM, MNP 2-4

Compression protocols:

V.42bis (includes MNP-5)

Upgradability

- Software upgradable to future modem and fax standards.


Modem Management (optional)

This option provides for modem statistics, real-time call-in-progress, monitoring modem activity log, and modem hard/soft busy out. For further details, reference the digital modem management document support.

Requirements

- Operates in conjunction with the following network modules, operating in PRI-only mode:
 - NM-1CT1
 - NM-1CT1-CSU
 - NM-2CT1
 - NM-2CT1-CSU
 - NM-1CE1B
 - NM-1CE1U
 - NM-2CE1B
 - NM-2CE1U

(Future support for these PRI network modules in CT1 and CE1 modes will be available in CY '98)



Positioning

The Cisco 3600 expands the Cisco dial product line, now with products from the Cisco 2509-12 series, through the Cisco 3600 series, to the Cisco 5X00 series, making up a broad range of dial solutions targeted at different market segments, including small branch, enterprise, ISPs, telcos, and carriers.

The dial-focussed network modules of the Cisco 3600 include 16- and 32-port high-density async network modules, ISDN network modules, and digital modem network modules. These modules address the high-density async market (up to 96 ports in a 2RU chassis) for external modem banks and terminal servers, the ISDN consolidation market (6 PRI or 24 BRI in a 2 RU chassis) and the mid-density hybrid market (30–60 digital modems), all utilizing a high-performance routing engine.

Summary

The Cisco 3600 is a multifunction platform, with the ability to support dial access, LAN-to-LAN routing, and multiservice functions in the same chassis. The benefits of this multifunction positioning include modularity, scalability, investment protection, and flexibility. The Cisco 3600 multifunction platform is the Swiss army knife of routers, directly addressing the many varied needs of the power branch environment.

Appendix A

Cisco 3600 Family Overview, Network Module, and WIC Summary

The following tables detail the range of platforms and current network modules available in the Cisco 3600 series.

The Cisco 3600 Platforms

Cisco 3600 Series		
Feature	Cisco 3640	Cisco 3620
Processor Type	100-MHz IDT R4700 RISC	80-MHz IDT R4700 RISC
Flash Memory	4 MB, upgradable to 32 MB	4 MB, upgradable to 32 MB
System Memory	16 MB DRAM, upgradable to 128 MB DRAM	16 MB DRAM, upgradable to 64 MB DRAM
Network Module Slots	4 slots	2 slots
Power	AC, DC, Redundant Power Option	AC, DC, Redundant Power Option
Dimensions	17.5 in. width x 3.44 in. height x 15.75 in. depth	17.5 in. width x 1.69 in. height x 14.25 in. depth
Performance	50 – 70 Kpps	20 – 40 Kpps
Console and Auxiliary Ports (up to 115.2 kbps)	Yes	Yes
Rack and Wall Mounting	Yes	Yes
Dual Type II PCMCIA Card Slots	Yes	Yes

The Cisco 3600 Network Modules

Cisco 3600 Series Network Modules	
Module	Description
Serial Network Modules	
NM-16A	16 port high-density async network module
NM-32A	32 port high-density async network module
NM-4T	Four-port serial network module
NM-4A/S	Four-port async/sync serial network module
NM-8A/S	Eight-port async/sync serial network module
LAN Network Modules and Mixed-Media LAN/WAN Network Modules	
NM-1FE-TX	One-port Fast Ethernet network module (10/100BaseTX only)
NM-4E	Four-port Ethernet network module
NM-1E	One-port Ethernet network module
NM-1E2W	One-port Ethernet, 2 WAN card slot network module
NM-2E2W	Two-port Ethernet, 2 WAN card slot network module
NM-1E1R2W	One-port Ethernet, one-port Token Ring, 2 WAN card slot network module
ISDN and Channelized Serial Network Modules	
NM-1CT1	One-port channelized T1/ISDN PRI network module
NM-1CT1-CSU	One-port channelized T1/ISDN PRI with CSU network module
NM-2CT1	Two-port channelized T1/ISDN PRI network module
NM-2CT1-CSU	Two-port channelized T1/ISDN PRI with CSU network module



Cisco 3600 Series Network Modules	
Module	Description
NM-1CE1B	One-port channelized E1/ISDN PRI balanced network module
NM-1CE1U	One-port channelized E1/ISDN PRI unbalanced network module
NM-2CE1B	Two-port channelized E1/ISDN PRI balanced network module
NM-2CE1U	Two-port channelized E1/ISDN PRI unbalanced network module
NM-4B-S/T	Four-port ISDN BRI network module
NM-4B-U	Four-port ISDN BRI with NT-1 network module
NM-8B-S/T	Eight-port ISDN BRI network module (S/T Interface)
NM-8B-U	Eight-port ISDN BRI with NT-1 network module (U Interface)
Modem Modules	
NM-6DM	6 digital modem network module
NM-12DM	12 digital modem network module
NM-18DM	18 digital modem network module
NM-24DM	24 digital modem network module
NM-30DM	30 digital modem network module
MICA-6MOD=	6 digital modem upgrade card
Other	
RPS	600W redundant power supply option (requires 3600 RPS chassis)
NM-COMPR	Compression network module

The Cisco 3600 WAN Interface Cards	
WAN interface cards are available as daughter cards to the mixed-media LAN/WAN network modules. Up to two WAN interface cards can be installed on a single mixed-media LAN/WAN network module. The WAN interface cards are not included in the price of the mixed-media network modules.	
WAN Interface Card	Description
Serial WIC	
WIC-1T	One-port sync serial
WIC-1DSU-56K4	One-port, 4-wire 56 kbps CSU/DSU
ISDN WIC	
WIC-1B-S/T	One-port ISDN BRI
WIC-1B-U	One-port ISDN BRI with NT1

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