

Digital Modem Network Modules for The Cisco 3600, 3700, and 3800 Series Routers

The End of Sale (EoS) of the Digital Modem Network Modules has been announced. The EoS announcement and product migration options can be found at: http://www.cisco.com/en/US/prod/collateral/routers/ps274/prod_end-of-life_notice0900aecd8052c928.html

Figure 1. Digital Modem Network Module for Cisco 3600, 3700, and 3800 Series



The Cisco 3600, 3700, and 3800 Series comprise a product line of modular, multifunction access routers for medium and large-size offices and smaller Internet service providers (ISPs). With more than 70 modular interface options, the Cisco 3600, 3700, and 3800 Series provide solutions for voice and data integration, virtual-private-network (VPN) dial access, and multiprotocol data routing. Using Cisco voice and fax network modules, the Cisco 3600, 3700, and 3800 Series allow customers to consolidate voice, fax, and data traffic on a single network infrastructure. The high-performance, modular architecture of the Cisco 3600, 3700, and 3800 Series protects customers' investment in network technology and integrates the functions of several devices into a single, manageable solution.

The digital modem network modules allow the Cisco 3600, 3700, and 3800 Series to expand their role as multifunction, branch, and enterprise orientated platforms that support voice over data, dial access, and LAN-to-LAN or routing in one modular platform, making it an ideal solution for the "power branch" environment. To provide maximum flexibility in meeting different branch size requirements, the digital modems are available in a variety of densities. Table 1 details the different digital modem options available to Cisco 3600, 3700, and 3800 Series customers. Figure 1 shows the digital modem network module.

Table 1. Different Digital Modem Options Available to Cisco 3600, 3700, and 3800 Series Customer¹

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 (available in blocks of 6 modems)

Features At A Glance

- The product offers up to 30 digital modems per Cisco 3620, 3725, or 3825.
- The digital modem network module offers up to 60 digital modems per Cisco 3640, 3745, or 3845.
- The module offers up to 120 digital modems in a Cisco 3660.
- The network module requires one slot in a Cisco 3600, 3700, or 3800.
- Each network module supports up to 30 digital modems.
- Each modem is fully software upgradeable.
- Speeds up to 56 kbps (V.90 and V.92²) are supported.
- The module supports V.42 and V.44² compression algorithms.
- The number of modems per chassis can be easily increased on site.
- LEDs indicate when the network module is enabled or when modem banks are in use.
- The network module supports PRI, BRI, Channelized T1 (CT1), and R2 signaling
- The network module offers V.110 support.

Digital Modem Features/Benefits

The Cisco 3600, 3700, and 3800 Series, installed with the digital modem network modules, offer one of the most flexible, scalable, manageable, and high-performance dial access solutions available in the market today.

The digital modem network modules utilize either the single or dual PRI network module, the 4- and 8-port BRI network modules, or the mixed-media Fast Ethernet and PRI network module (Cisco 3600 only) to support up to 90 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 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.

¹ These digital modem network modules must operate in conjunction with a T1, E1, Primary Rate Interface (PRI), or Basic Rate Interface (BRI) network module. For details on supported PRI network modules, see the "Technical Specifications" section.

² V.92 and V.44 support is available initially in Cisco IOS® 12.2(11)YT. This support requires Portware (PW) Version 2.9.1.0 on the Cisco 3640 and 3640A, 3660, 3725, 3745, 3825, and 3845. Support for the Cisco 3620 will be added via the sixth Cisco IOS 12.2T release.

Support for the 56K 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 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.

V.92 and V.44 Support

The V.92 and V.44 standards provide consumers and teleworkers what is called a "broadband-lite" Internet experience at dialup prices. V.92 encompasses numerous specifications, including "Quick Connect," which dramatically improves how quickly users can connect with their ISP or a branch office, and "modem on hold," which enables users to suspend and reactivate their dialup connection to either receive or initiate a telephone call. This can be a tremendous productivity enhancement for teleworkers because they do not have to waste valuable time dialing back into a central site every time they get a phone call.

V.44 technology provides a new standard for compressing data. When compared to V.42, throughput is increased 20 to 60 percent because of a new compression algorithm that is optimized for typical Web content. Of all the new features, V.44 is the only one that speeds the delivery of Web pages to the end user.

Note: The V.92 standard also includes support for pulse code modulation (PCM) upstream, which boosts the upstream data rates from the user. However, PCM upstream is not supported on the digital modem network modules because of limitations in the Modem ISDN Channel Aggregation (MICA) modem technology.

Single Solution for Modem and ISDN Callers

The Cisco 3600, 3700, and 3800 can take incoming ISDN or voice calls and automatically switch them to the appropriate internal circuitry. The PRI and BRI switching is based on Q.931 messaging in the 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, 3700, and 3800 direct 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. R2 and CT1 interfaces also support this switching ability.

Ease of Management

The Cisco 3600, 3700, and 3800 provide complete, centrally managed modem capabilities, key requirements for branches and enterprises building midsize dial-in pools. The Cisco 3600, 3700, and 3800 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, modem hard and soft busy out, and the ability to accomplish modem firmware upgrades.

The installed modems can be utilized by LAN users for dial-out and fax-out applications, utilizing third-party applications such as the one available from Tactical Software. 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 Multichassis Multilink PPP, allowing dial-in pools of lines to span numerous Cisco 3600, 3700, and 3800 routers. Through the use of Layer 2 Forwarding (L2F) technology and Cisco's exclusive Stack Group Bidding Protocol (SGBP), the Cisco 3600, 3700, and 3800 can grow to meet the requirements of the fast-growing and frequently changing dial environments. Because 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 set of central management features of the Cisco 3600, 3700, and 3800 Series. The Cisco 3600, 3700, and 3800 and their 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 (CHAP), Password Authentication Protocol (PAP), 56-bit Data Encryption Standard (DES) encryption, and the built-in firewall capabilities of the Cisco 3600, 3700, and 3800 Series 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 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.com Web site, 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, ISDN BRI, or Fast Ethernet and ISDN PRI and digital modem network modules, the Cisco 3600, 3700, and 3800 Series provide the ideal functionality for the branch and enterprise offices.

For basic telephone users, both 33.6K and 56K modem calls can be terminated through a PRI or BRI connection into a digital modem network module, including mobile workers and people working from hotel rooms. For teleworkers with access to BRI, the same phone number could be used to connect to the same Cisco 3600, 3700, or 3800, achieving 64 kbps noncompressed, 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.

Figure 2. Illustrates a Typical Application for the ISDN PRI and Digital Modem Network Modules

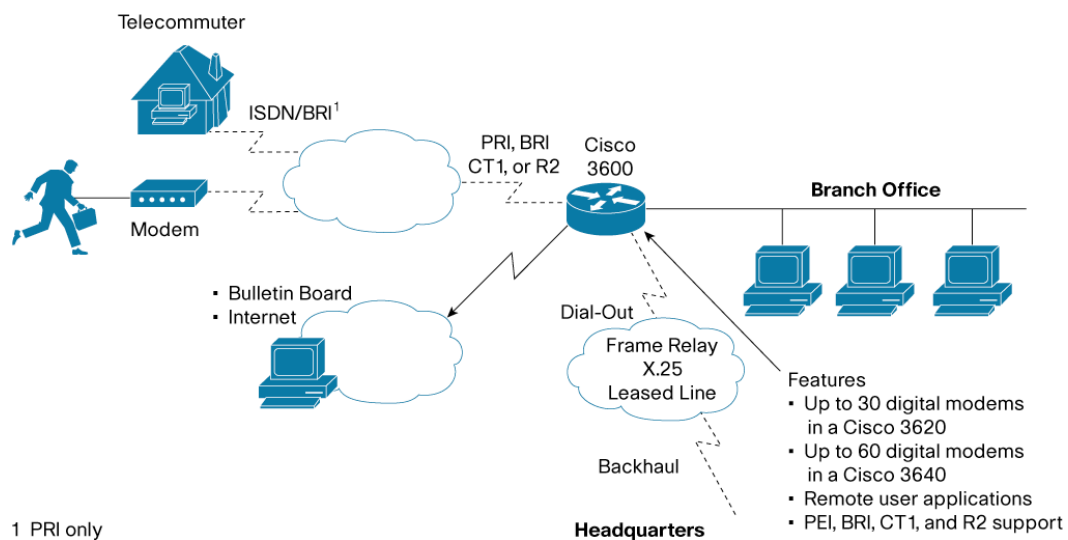


Table 2. Gives Ordering Information for the Digital Modem Network Modules

Product	Orderable	Available	Minimum Cisco IOS Version
NM-6DM	October 1997	October 1997	11.2 (9) XA ³
NM-12DM	October 1997	October 1997	11.2 (9) XA ³
NM-18DM	October 1997	October 1997	11.2 (9) XA ³
NM-24DM	October 1997	October 1997	11.2 (9) XA ³
NM-30DM	October 1997	October 1997	11.2 (9) XA ³
MICA-6MOD	October 1997	October 1997	11.2 (9) XA ³
MMTL-3600	October 1997	October 1997	11.2 (9) XA ³

Memory requirements for the each digital modem network module include:

- 300 KB main memory
- 200 KB input/output (I/O) memory

³ V.92 is not supported on 3620 until sixth Cisco IOS 12.2T release.

Table 3.

Product Number	Product Description
NM-6DM	6 digital modem network module
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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, 3700, and 3800 digital modem network modules
MMTL-3600	Managed Modem Software License (per 6 modems)

Ordering Information

Supported Configurations

- Cisco 3620, 3725, and 3825-One digital modem network module
- Cisco 3640, 3745, and 3845-Two digital modem network modules
- Cisco 3660-Four digital modem network modules

Technical Specifications

Physical Characteristics

- Six modems per modem module
- Up to five modem modules per network module

Modem Protocols Supported

Carrier protocols:

V.92⁴ (does not include PCM support; requires Portware 2.9.1.0 and Cisco IOS 12.2(11)YT)

- V.90 (requires Portware 2.5.1.0 and Cisco IOS 11.(2)16P or Cisco IOS 11.3.(6)T or higher)
- K56Flex
- V.110 support
- ITU V.23 at 75 and 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

⁴ V.92 is not supported on 3620 until sixth Cisco IOS 12.2T release.

Error correcting link access protocols:

- V.42 Link Access Procedure for Modems (LAPM), Microcom Networking Protocols (MNP) 2-4

Compression protocols:

- V.42bis (includes MNP-5)
- V.44⁵ (requires Portware 2.9.1.0 and Cisco IOS 12.2(11)YT)

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 and soft busy out. For further details, reference the digital modem management document support.

Requirements

The digital modem network modules operate in conjunction with the following network modules, operating in PRI, BRI (requires Cisco IOS 12.0(2)XC or higher), R2 (requires Cisco IOS 12.0(1)T or higher), and CT1 mode:

- NM-1CT1
- NM-1CT1-CSU
- NM-2CT1
- NM-2CT1-CSU
- NM-1CE1B
- NM-1CE1U
- NM-2CE1B
- NM-2CE1U
- NM-4B-S/T or U
- NM-8B-S/T or U
- NM-1FE1CT1⁶
- NM-1FE1CT1-CSU⁶
- NM-1FE2CT1⁶
- NM-1FE2CT1-CSU⁶
- NM-1FE1CE1B⁶
- NM-1FE1CE1U⁶
- NM-1FE2CE1B⁶
- NM-1FE2CE1U⁶
- NM-1CE1T1-PRI
- NM-2CE1T1-PRI

⁵ V.44 is not supported on 3620 until sixth Cisco IOS 12.2T release.

⁶ All the NM1FExCT1 and NM-1FExCE1x are not supported on the Cisco 3700 Series or the Cisco 3800 Series.

Positioning

The Cisco 3600, 3700, and 3800 expand the Cisco dial product line, with products from the Cisco 3600, 3700, and 3800 Series, to the Cisco VPN 5000 Series concentrators, making up a broad range of dial solutions targeted at different market segments, including small branch, enterprise, ISPs, telcos, and carriers.

Other dial-focused network modules of the Cisco 3600, 3700, and 3800 Series include 16- and 32-port high-density asynchronous network modules, ISDN network modules, and 8- and 16-port analog modem networks. These modules address the high-density asynchronous market (up to 192 asynchronous ports) for external modem banks and terminal servers, the ISDN consolidation market (8 PRI or 48 BRI), the middensity analog modem market, and the middensity hybrid market (30-120 digital modems), all utilizing a high-performance routing engine.

Summary

The Cisco 3600, 3700, and 3800 Series are multifunction platforms, 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, 3700, and 3800 multifunction platforms directly address the many varied needs of the power branch environment.



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