

# Digital Modem Network Modules for the Cisco 3600 Platform

## Introduction

The Cisco 3600 Series is a family of modular, multifunction access routers for medium and large-sized offices and smaller Internet Service Providers. With over 70 modular interface options, the Cisco 3600 family provides solutions for voice/data integration, virtual private networks (VPNs) dial access, and multiprotocol data routing. Using Cisco's Voice/Fax network modules, the Cisco 3600 Series allows customers to consolidate voice, fax, and data traffic on a single network infrastructure. The high-performance, modular architecture of the Cisco 3600 Series protects customers' investment in network technology and integrates the functions of several devices into a single, manageable solution.

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 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.

The following network modules are being announced:

Table 1

Product	Product Description <sup>1</sup>
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)

1. Note: These digital modem network modules *must* operate in conjunction with a T1/E1/PRI/BRI network module. For details on supported PRI network modules, see the "Technical Specifications" section.



## Features at a Glance

- Up to 30 digital modems per 3620
- Up to 60 digital modems per 3640
- Up to 120 digital modems in a 3660
- Network module requires one slot in a Cisco 3600
- Each network module supports up to 30 digital modems
- Each modem is fully software upgradable
- Speeds up to 56 kbps (V.90) are supported
- The number of modems per chassis can be easily increased on site
- LEDs indicate when the network module is enabled/modem banks are in use
- PRI, BRI, CT1, and R2 support
- V.110 support
- Dial-out and Fax-out capable

## Digital Modem Features/Benefits

The Cisco 3600, 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, the 4 and 8 port BRI Network Modules, or the mixed media Fast Ethernet/PRI network module to offer support for 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.

Support for the new 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.

The Cisco 3600 can take incoming Integrated Services Digital Network (ISDN) or voice calls and automatically switch them to the appropriate internal circuitry. The PRI/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 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. R2 and CT1 interfaces also support this switching ability.

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, modem hard/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 3rd 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 Multilink Multichassis PPP, allowing dial-in pools of lines to span numerous Cisco 3600 routers. 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) 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.

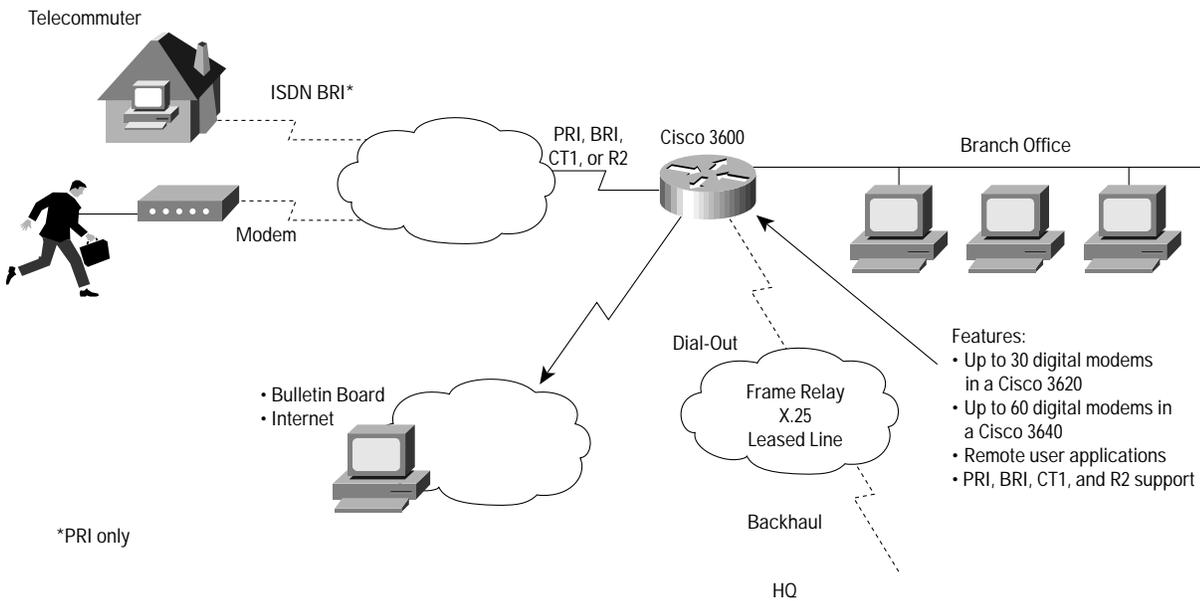
Using ISDN PRI, ISDN BRI or Fast Ethernet/ISDN PRI, and digital modem network modules, the Cisco 3600 provides the ideal functionality for the branch and enterprise offices.

Figure 1 illustrates a typical application for the ISDN PRI and digital modem network modules.

For basic telephone users, both 33.6K and 56K modem calls can be terminated through a PRI/BRI 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 non-compressed, 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 1



Orderability, Availability, Software Requirements, Memory Requirements

Product	Orderable	Available	Minimum 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

Orderability, Availability, Software Requirements, Memory Requirements

Product	Orderable	Available	Minimum Cisco IOS Version
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
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**Supported Configurations**

- Cisco 3620—one digital modem network module
- Cisco 3640—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.90 (requires Portware 2.5.1.0 and IOS 11.(2)16P or IOS 11.3.(6)T or higher.)
- K56Flex
- V.110 support
- 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, BRI (requires IOS 12.0(2)XC or higher), R2 (requires 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-1FE1CT1
- NM-1FE1CT1-CSU
- NM-1FE2CT1
- NM-1FE2CT1-CSU
- NM-1FE1CE1B
- NM-1FE1CE1U
- NM-1FE2CE1B
- NM-1FE2CE1U

#### 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.

Other dial-focused network modules of the Cisco 3600 include 16 and 32 port high-density async network modules, ISDN network modules, eight and 16 port analog modem network. These modules address the high-density async market (up to 192 async ports) for external modems banks and terminal

servers, the ISDN consolidation market (eight PRI or 48 BRI), the mid-density analog modem market, and the mid-density hybrid market (30-120 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.



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