

Integrated V.92 Analog Modem Network Modules for Cisco 2600 Series, 3660, and 3700 Series Routers

The new Cisco® Integrated V.92 analog modem network modules provide cost-effective analog telephone service connectivity for lower-density remote-access service (RAS), dial-out and fax-out modem access, asynchronous dial-on-demand routing (DDR) plus dial backup, and remote router management. Combined with the differentiated services delivered through Cisco IOS® Software, Cisco 2600 Series, 3660, and 3700 series routers offer customers best-in-class scalability, flexibility, and investment protection, all in cost-effective, multifunctional platforms.

The 8-port and 16-port analog modem network modules (part numbers NM-8AM-V2 and NM-16AM-V2; Figure 1) are now available for the award-winning Cisco 2600 Series, 3660, and 3700 series modular router platforms. This addition expands the already extensive range of network modules and WAN interface cards (WICs) currently available for these products.

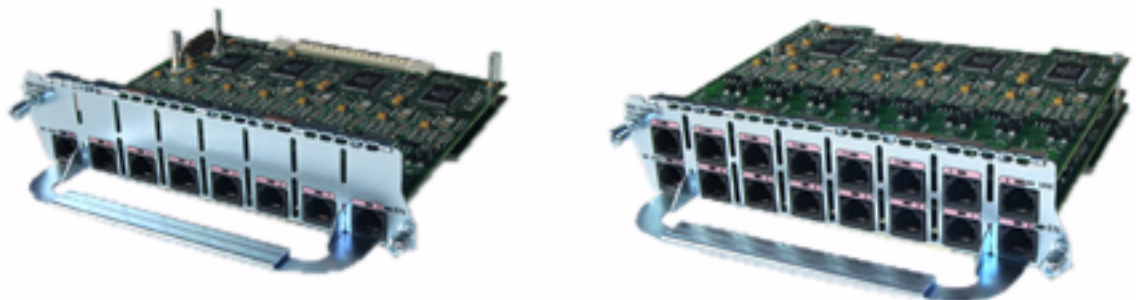
Both the 8-port and 16-port versions use RJ-11 jacks to connect the integrated modems to basic analog telephone lines on the public switched telephone network (PSTN) or private telephony systems.

Benefits

Combined with Cisco 2600 Series, 3660, and 3700 series routers, the 8-port and 16-port analog modem network modules provide:

- Scalable analog modem dialup concentration for regions without digital connectivity
- Centralized modem grouping for enterprise dial-out and fax-out services
- On-demand dial backup for critical WAN links
- A cost-effective alternative to leased lines or ISDN
- An integrated solution for ease of deployment and management
- Enhanced remote management capabilities

Figure 1
 8- and 16-Port V.92
 Analog Modem Network
 Modules for Cisco 2600
 Series, 3660, and 3700
 Series Routers





Features

Cisco 2600 Series, 3660, and 3700 series routers, equipped with the new Cisco Integrated V.92 analog modem network modules, offer the most flexible, scalable, and manageable dial access solution available on the market today:

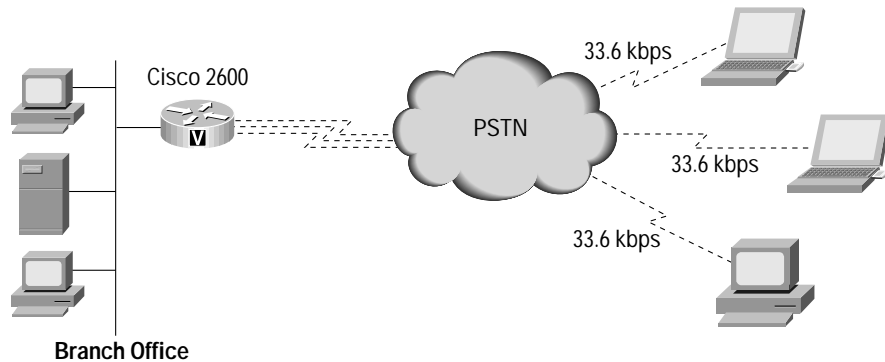
- Connection speeds up to 56 Kbps (per ITU-T V.90 specification)—When dialing out to a digital endpoint, this feature allows users to achieve maximum data transfer rates, resulting in faster file transfers, speedier Web access, and faster e-mail downloads.
- ITU-T V.92 Quick Connect—V.92 Quick Connect speeds the client-to-server startup negotiation, reducing the overall connect time by up to 30 percent. The client modem retains line condition information and characteristics of the connection to the digital endpoint, which reduces connect time by avoiding some of the initial signal handshaking.
- ITU-T V.44 compression—V.44 LZJH is a new compression standard based on Lempel-Ziv. It uses a new string-matching algorithm that increases upload and download speeds to make Internet access and Web browsing faster. The V.44 call success rate (CSR) is similar to V.42bis with significant compression improvement for most file types, including HTML files. V.44 applies more millions of instructions per second than V.42bis toward the same application data stream, and yields better compression rates in almost any data stream in which V.42bis shows positive results.
- Integrated analog modem dialup capability—Internal modems allow simple setup of a remote router. There are no extra cables or cumbersome external power supplies, and everything is in a single chassis.
- Line rate aggregate throughput—All modems on each module can be simultaneously used to V.90 speed limits without overall throughput degradation (up to platform limitations).
- Cisco IOS Software dial-access features—Cisco IOS Software provides numerous features for remote router management and dial backup, including:
 - Reverse Telnet support for LAN-based dial-out and fax-out
 - Point-to-Point Protocol (PPP), Multilink PPP (MLPPP), and Serial Line Internet Protocol (SLIP)
 - TACACS+, RADIUS, and PPP password security
- Modem Management Technology License (MRTL) Now Included—The Modem Management Technology License provides for modem statistics, real-time call-in-progress, monitoring modem activity log, modem hard/soft busy out, and the ability to accomplish modem firmware upgrades. All these features result in reduced downtime, lower support costs, and lower operating costs. This feature carried an additional charge per port on older models, but is included without additional cost on the NM-8AM-V2 and NM-16AM-V2.



Applications

Low-Density Analog RAS

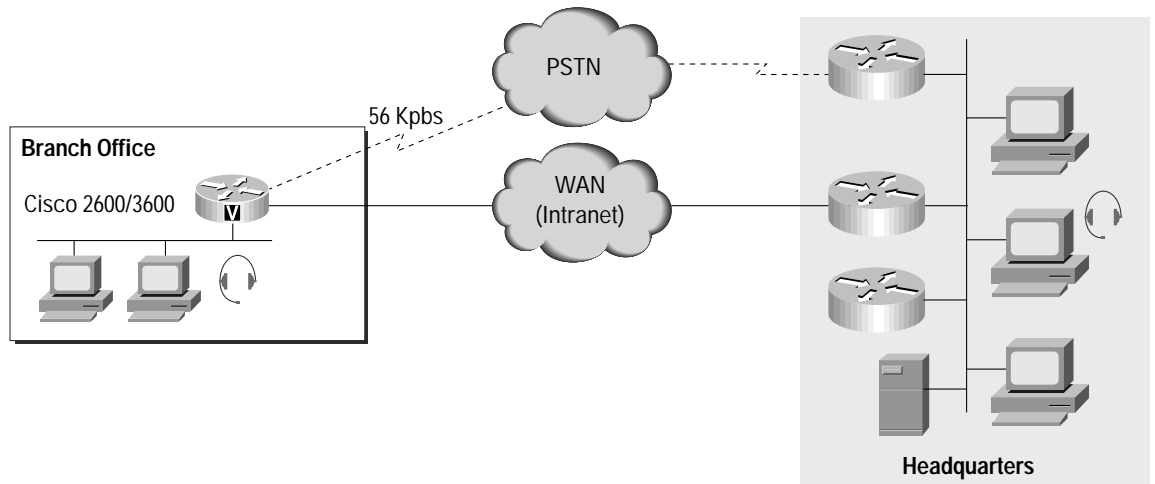
Figure 2
Low-Density Analog RAS



Dial-in users can take advantage of the router's capability to function as a small remote access server, allowing dialup access to the LAN (Figure 2). Cisco routers can support up to 96 modems per chassis (up to six modules in a Cisco 3660 Multiservice Platform), delivering a scalable and compact solution. Dial-in speeds of up to 33.6 Kbps (V.34bis) are possible. MLPPP is available to bond two or more calls together, allowing higher-speed RAS support.

Dial-Out and Fax-Out Modem Access

Figure 3
Dial-Out and Fax-Out Modem Access



The Cisco Integrated V.92 analog modem network modules comply with RFC 2217 and provide dial-out and fax-out modem capabilities to LAN-connected devices (Figure 3). Using the recommended DialoutEZ for Cisco Access Servers software available from Tactical Software, customers can use the analog modems as if they were connected



directly to the PC communications (COM) port. This allows convenient access to dialup services and remote fax machines without requiring dedicated phone lines and modems at each PC. For more details on using dial-out/fax-out software, visit:

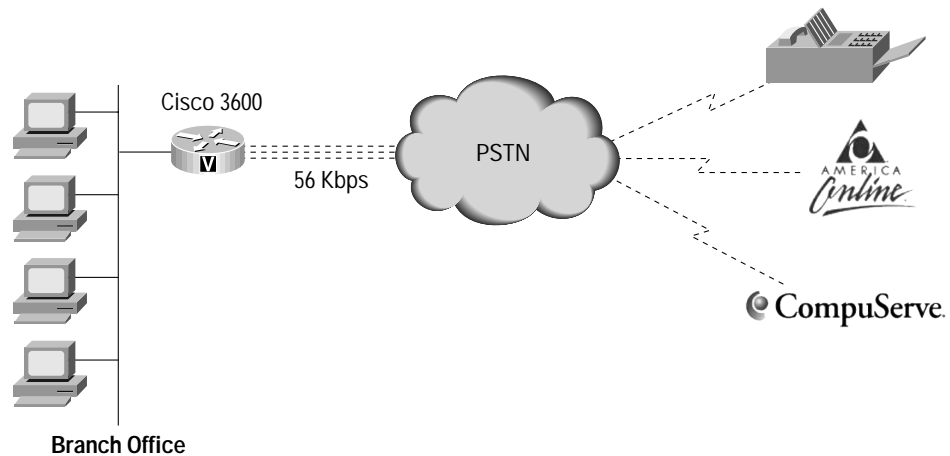
<http://www.cisco.com/warp/public/cc/pd/iosw/ioft/dlout/index.shtml>

<http://www.tacticalsoftware.com>

Note: The Cisco Integrated V.92 analog modem network modules do not have the capability to receive faxes—only fax-out is supported.

Dial Backup and Asynchronous DDR

Figure 4
Dial Backup and Asynchronous DDR



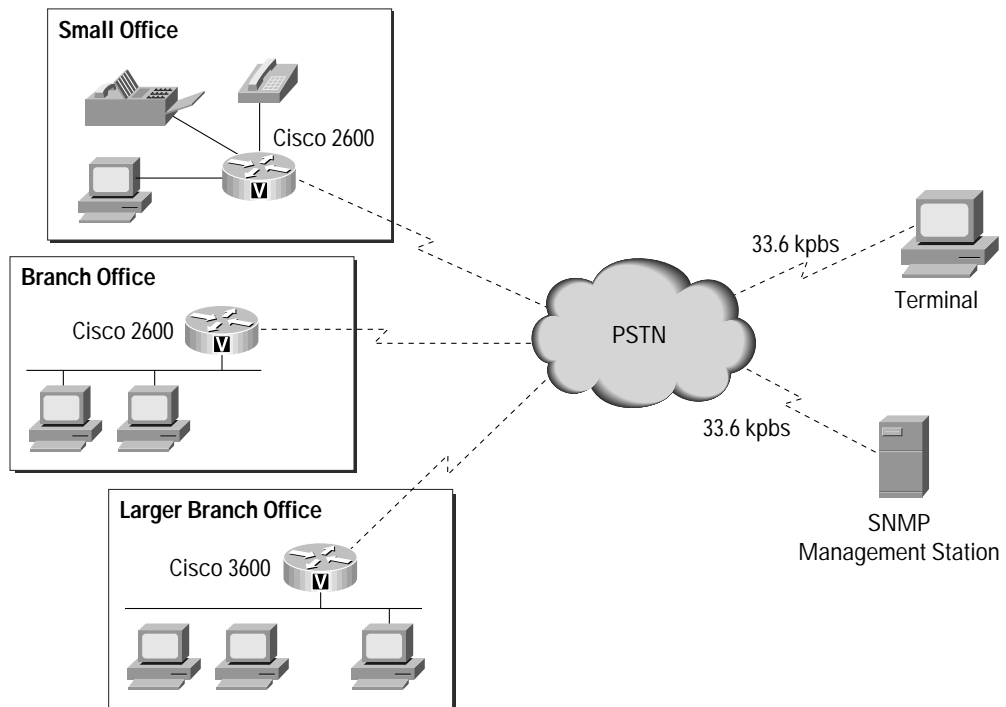
Constant WAN access is often a requirement for branch offices connecting to a corporate site or the Internet. Whereas DSL, Frame Relay, ISDN, and leased line are common choices for a primary WAN link, an alternate data path is sometimes needed. The Cisco Integrated V.92 analog modem network modules, combined with Cisco 2600 Series, 3660, and 3700 series routers, offer the ability to automatically dial a backup connection when the primary WAN link is unavailable (Figure 4). In addition, the analog modem network modules can be used to provide supplemental bandwidth when the primary WAN link is overused. Multiple modem calls can be aggregated using MLPPP when one 56-Kbps connection is insufficient.

For some customers, dialup telephone service connectivity may be the only available choice for WAN access to the Internet or to a corporate home office. For those situations and for installations that only require a dialup connection, Cisco routers with integrated V.92 analog modem network modules offer WAN connectivity through asynchronous DDR. As with dial backup, MLPPP can be used to aggregate multiple dialup connections into one data stream, providing higher throughput.



Remote Router Management

Figure 5
Remote Router Management



Cisco Integrated V.92 analog modem network modules can also be used for dialup access for remote router configuration and management (Figure 5). Similar to connecting a modem to the router's auxiliary port, the V.92 analog modem network modules allow out-of-band management, but through an integrated device. Both the 8- and 16- port models can receive calls at speeds as fast as 33.6 Kbps, depending on line conditions.

Feature Summary

A summary of the features and benefits of the integrated analog modem network modules is provided below:

V.90/V.92 Modem Specification

- Supports V.90 speeds when placing calls to a digital endpoint. Provides connect speeds up to 56 Kbps upstream and 33.6 Kbps downstream, depending on line conditions.
- V.92 quick-connect reduces modem train-up times.
- Achieves maximum data transfer rates, resulting in faster file transfers, speedier Web access, and faster e-mail downloads.

V.44 Compression

- Yields better compression ratios than traditional V.42bis (in many cases).



Fax Class 2

- Fax-out capability at speeds up to 14.4 Kbps.
- Allows customers to access fax machines and servers from their LAN-connected PCs.

MLPPP

- Increases connection speeds across modems in the same V.92 analog modem network module, and across other modem network modules and WAN interface cards (WIC)s in the same chassis.

Multiple Platform Support

- Cisco Integrated V.92 analog modem network modules are supported on Cisco 2600 Series, 3660, and 3700 series routers.

Cisco IOS Software

- Supported today in Cisco IOS Software Release 12.3(4)XD.
- Will be supported in the Cisco IOS Software T train in the first quarter of 2004.

No Module Restriction

- No restriction on the number of analog modem modules supported per chassis, other than network module slot availability (Table 1).

Major Modem Vendor Compatibility

- Works with AT&T, Boca, Cisco, Hayes, Lucent, Motorola, Microcom, Multitech, USR, Xircom, and Zoom modems (compatibility with other modem vendors is fully expected, but not lab tested).

Fax Vendor Compatibility

- Compatible with Class 2 HP and Panasonic fax machines (compatibility with other fax vendors is fully expected, but not lab tested).

Current Analog and Digital Modem Network Module Compatibility

- Integrates with current integrated analog modem network modules, integrated V.90 modem WAN interface cards, and integrated digital modem network modules on supported platforms.

Worldwide Support for Country-specific Standards

- Supports various regulatory requirements. For the latest per-country approval information for the Cisco Integrated V.92 analog modem network modules, contact your local Cisco representative, or visit:
http://www.cisco.com/cgi-bin/compliance/approvals_search.pl

Modem Firmware Upgrade Capability

- Modem firmware is bundled with the Cisco IOS Software image, but can also be upgraded without reloading the router.



Network Management Support

The Cisco Integrated V.92 analog modem network modules work with the following configuration and network management methods:

- CiscoWorks
- Telnet and console port command-line interface (CLI) configuration

Memory and Software Requirements

- The minimum software requirement for all supported platforms is Cisco IOS Software Release 12.3(4)XD.
- Supported in all feature sets
- No additional memory is required to support a single Cisco Integrated V.92 Analog Modem Network Module (8-port or 16-port) per chassis. Additional memory may be required as the number of modules per chassis increases or as additional features are enabled. (see the Cisco IOS Software release notes for platform memory requirements per feature set)

Maximum Analog Modem Network Modules per Chassis

Table 1 Maximum V.92 Analog Modem Network Modules Per Platform

Platform	Maximum V.92 Analog Modem Network Modules per Chassis
Cisco 2610XM-51XM	1
Cisco 2691	1
Cisco 3660	6
Cisco 3725	2
Cisco 3745	4

Note: Please refer to the platform documents for more details on other hardware restrictions. The Cisco 3660 and 3700 series also support digital modems in a network module form factor. For more information, visit:

http://www.cisco.com/warp/public/cc/pd/rt/3600/prodlit/d3600_ds.htm

Modem Specifications

Carrier Protocols

- ITU V.90
- ITU V.92
- K56Flex
- ITU V.23
- Bell 103
- ITU V.21
- ITU V.22



- Bell 212A
- ITU V.22bis
- ITU V.32
- ITU V.32bis
- ITU V.32 turbo
- ITU V.34
- ITU V.34bis

Error-correcting Link Access Protocols

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

Compression Protocols

- ITU-T V.44
- ITU V.42bis (includes MNP-5)

Fax Protocols

- ITU-T V.27ter
- ITU-T V.29
- ITU-T V.17
- FAX Class 2
- TIA/EIA-592 Class 2 and TIA/EIA-592 draft SP- 2388
- Class 2 Group III fax transmission, at ITU-T V.33, V.17, V.29, V.27ter, and V.21 modulations

Hardware and Environmental Specifications

Hardware and environmental specifications of the integrated modem network modules are described in Table 2.

Table 2 Specifications for Cisco Integrated V.92 Analog Modem Network Modules

Specification	Data
Hardware/Platform Compatibility	Cisco 2600 Series, 3660, and 3700 models
Dimensions	Width—7.1 inches Height—1.59 inches Depth—7.19 inches
Weight	(8-port)—0.8 pounds (16-port)—1.05 pounds
Ports	Eight or sixteen RJ-11 ports
Cabling	Eight or sixteen RJ-11 cables (not included)
LED Indicators	<i>Per Module</i> —EN (Network module is enabled by Cisco IOS) <i>Per Modem</i> —IN USE (indicates the modem is off-hook)



Table 2 Specifications for Cisco Integrated V.92 Analog Modem Network Modules (Continued)

Specification	Data
NEBS Compliance	Designed for Compliance to GR-63-Core, GR-1089-Core, NEBS Level 3, Type 1/3 Interface. NEBS certification to be completed in CY04
Environmental Operating Ranges	Operating temperature: 32 to 104 F (0 to 40 C) Non-operating temperature: -4 to 149 F (-20 to 65 C) Relative humidity: 10 to 85 percent non-condensing operating; 5 to 95% non-condensing, non-operating safety Environmental operating ranges are based on supported chassis ratings

For additional information on mechanical, environmental, power, and agency certifications, refer to the Cisco 2600 Series, 3660, and 3700 series data sheets, available at:

- Cisco 2600 Series
http://www.cisco.com/warp/public/cc/pd/rt/2600/prodlit/2600_ds.htm
- Cisco 3660
http://www.cisco.com/warp/public/cc/pd/rt/3600/prodlit/36kmp_ds.htm
- Cisco 3700 Series
http://www.cisco.com/warp/public/cc/pd/rt/ps282/prodlit/3700a_ds.htm

Country Availability

Cisco integrated V.92 analog modem network modules are designed for worldwide operation. For the latest information regarding per-country approval, contact your local Cisco representative or visit:

http://www.cisco.com/cgi-bin/compliance/approvals_search.pl

Ordering Information

Table 3 Part Numbers

Part Number	Description
NM-8AM-V2	8 Port Analog Modem Network Module with v.92
NM-8AM-V2=	8 Port Analog Modem Network Module with v.92
NM-16AM-V2	16 Port Analog Modem Network Module with v.92
NM-16AM-V2=	16 Port Analog Modem Network Module with v.92

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