

# Cisco EtherSwitch Modules for Cisco 2600/3600/3700 Series Routers

## 16- and 36-Port 10/100 Ethernet Modules for Cisco 2600/3600/3700 Series Routers

The Cisco 16- and 36-port 10/100 EtherSwitch modules for Cisco 2600, 3600, and 3700 series routers offer branch office customers the option to integrate switching and routing in one platform. Combining robust Layer 3 flexible WAN routing with low-density line-rate Layer 2 switching, the EtherSwitch modules provide straightforward configuration, easy deployment and integrated management in a single platform.

The EtherSwitch options include a 16-port network module (NM) and a 36-port high density service module (HDSM) version. The 36-port HDSM utilizes the extra capacity from the wider interface form factor available only on the Cisco 3700 and Cisco 3660 routers to increase the port densities. The 16-port EtherSwitch NM is available for the Cisco 2600, 3600 and 3700 series routers.

The combination of Cisco 2600, 3600 or 3700 Series routers and the EtherSwitch modules utilize the powerful features

available in both Cisco IOS<sup>®</sup> software and Catalyst switching. The EtherSwitch module hardware supports 802.1p Layer 2 prioritization, while Cisco IOS software supports Layer 3 DiffServ and Class of Service (CoS) markings for critical business data. Coupling Layer 2/3 prioritization techniques, with the QoS for the WAN, this integrated routing and switching combination ensures low latency for critical business applications. The Cisco EtherSwitch modules includes 10/100 switched Ethernet ports with options for inline power and Gigabit Ethernet. Features such as port autosensing, QoS and VLAN support from 802.1p and 802.1Q standards, and 802.1D Spanning Tree protocols are standard on the EtherSwitch modules.

The Cisco 16- and 36-port EtherSwitch modules are available with optional inline power and Gigabit Ethernet support. EtherSwitch bundles are available with these options pre-installed for easy ordering. The inline power supports Cisco IP phones and Cisco Aironet wireless access points. An external power supply is needed for this feature in Cisco 2600/3600 platforms. An Internal power supply option is available on the Cisco 3700 Series.

Figure 1  
Cisco 16-port and 36-port  
EtherSwitch Modules

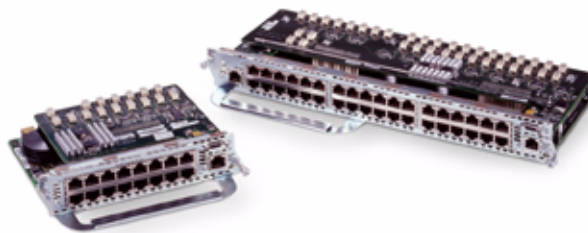




Figure 2  
Cisco 3725 and 3745 Series Platforms with EtherSwitch Modules



### Cisco EtherSwitch Module Summary

- NM-16ESW—One 16-port 10/100 EtherSwitch Network Module
- NM-16ESW-PWR\*—One 16-port 10/100 EtherSwitch NM with Inline Power support
- NM-16ESW-1GIG—One 16-port 10/100 EtherSwitch NM with 1 GE (1000BaseT) port
- NM-16ESW-PWR-1GIG\*—One 16-port 10/100 EtherSwitch NM with Inline Power and GE

\*This 16-port version should be ordered only if you require inline power. Be sure to have or order an external power unit to support inline power for the Cisco 2600 and 3600. Be sure to order the internal power unit for the Cisco 3700 Series.

- NMD-36-ESW—One 36-port 10/100 EtherSwitch High Density Service Module
- NMD-36-ESW-PWR\*—One 36-port 10/100 EtherSwitch HDSM with Inline Power
- NMD-36-ESW-2GIG—One 36-port 10/100 EtherSwitch HDSM with 2 GE (1000BaseT)
- NMD-36-ESW-PWR-2G\*—One 36-port 10/100 EtherSwitch HDSM +Inline Power and 2GE

\*This 36-port version should be ordered only if you require inline power. Be sure to have or order an external power unit to support inline power for the Cisco 3660. Be sure to order the internal power unit for the Cisco 3700 Series.

### Options

- PPWR-PS-CHASSIS—One power supply chassis for Cisco 48V (360W) power supply
- PWR-CHASSIS-360W—One power supply chassis and 48V power supply for EtherSwitch
- PPWR-PS-360W—One 48V (360W) power supply for EtherSwitch Modules
- PPWR-DCARD-16ESW—One inline power daughtercard for 16 port EtherSwitch NM
- PPWR-DCARD-36ESW—One inline power daughtercard for 36 port EtherSwitch HDSM
- GE-DCARD-ESW—One GE (1000BaseT) daughtercard for EtherSwitch Modules

### Platform Support

- Cisco 2600 Series—Supports one Cisco 16-port EtherSwitch Network Module; maximum 16 ports
- Cisco 3620 Series—Supports one Cisco 16-port EtherSwitch Network Module; maximum 16 ports
- Cisco 3640 Series—Supports two Cisco 16-port EtherSwitch Network Modules; maximum 32 ports\*
- Cisco 3660 Series—Supports two Cisco 16- or two 36-port EtherSwitch Module; maximum 72 ports\*
- Cisco 3725 Series—Supports two Cisco 16- or one 36-port EtherSwitch Module; maximum 36 ports\*
- Cisco 3745 Series - Supports two Cisco 16- or two 36-port Etherswitch Module, maximum 72 ports. \*



Each 16-port Cisco EtherSwitch Network Module can have a single Gigabit Ethernet port option. Each 36-port Cisco EtherSwitch HDSM can have 2 single Gigabit Ethernet port options. The Gigabit Ethernet ports are required for intra-chassis stacking of modules.

\* IOS 12.2(11)T enables stacking 2 modules in a single chassis. The Gigabit Ethernet port is required for stacking.

## Features and Benefits

Table 1 Features and Benefits of Cisco EtherSwitch Modules

Features	Benefits
16/36 10BaseT/100BaseTX Ports	Delivers up to 200 Mbps of bandwidth (full duplex) Layer 2; forwards and filters backflow at full wire speed on each port
Autosensing on Each Port	Detects the speed of the attached device and automatically configures the port for 10- or 100- Mbps operation
Integrated Switching	Provides fewer points of management for remote and small branch offices
Support for 802.1P QoS	Supports QoS based on the Institute of Electrical and Electronics Engineers (IEEE) class-of-service (CoS) and port-based prioritization, allowing the switch to change the CoS settings of tagged packets on a per-port basis
802.1Q Trunking	Allows the setup of separate VLANs with tagged and untagged framing; trunking is used to save ports when creating a link between two devices implementing VLANs
802.1D Spanning Tree (a Layer 2 link-management protocol that provides path redundancy while preventing undesirable loops in the network)	Simplifies network configuration and improves fault tolerance
Voice Virtual LAN (VLAN) Feature for IP Phones	Enables phones to be placed into their own VLANs without the need for end-user intervention; a user can plug the phone into the switch, and the switch provides the phone with the necessary VLAN information
Port-Based Reclassification for Queues on Each 10/100 That Are Configurable Using a Weighted Round Robin (WRR) Scheduler	Enables users to prioritize mission-critical traffic, such as VoIP and IP-based video applications over regular traffic
Media Access Control (MAC)-Based Port-Level Security	Prevents unauthorized stations from accessing the switch; Cisco fully supports the entire set of Requests for Comments (RFCs)
Multifunction LEDs per Port for Port Status	Provide a comprehensive and convenient visual management system
Cisco IOS Command-Line Interface (CLI)	Provides configuration through Cisco IOS CLI and provides common user interface for all the router functions
Multicast Management Support	Offers Internet Group Management Protocol (IGMP) snooping in hardware for management support
Memory	Features 4-/8-MB shared-memory architecture that is shared across all ports



Table 1 Features and Benefits of Cisco EtherSwitch Modules

Features	Benefits
SNMP Management	Offers support for Simple Network Management Protocol (SNMP) Management Information Base (MIB) manageable via a MIB browser
Inline Power (optional)	EtherSwitch with the external power chassis can power Cisco IP Phones and wireless access points
Gigabit Ethernet Support—One or Two 1000BaseT Ports per EtherSwitch	Allows external connections to other switches and Gigabit Ethernet file servers. Required for intra-chassis stacking of modules.

### Options

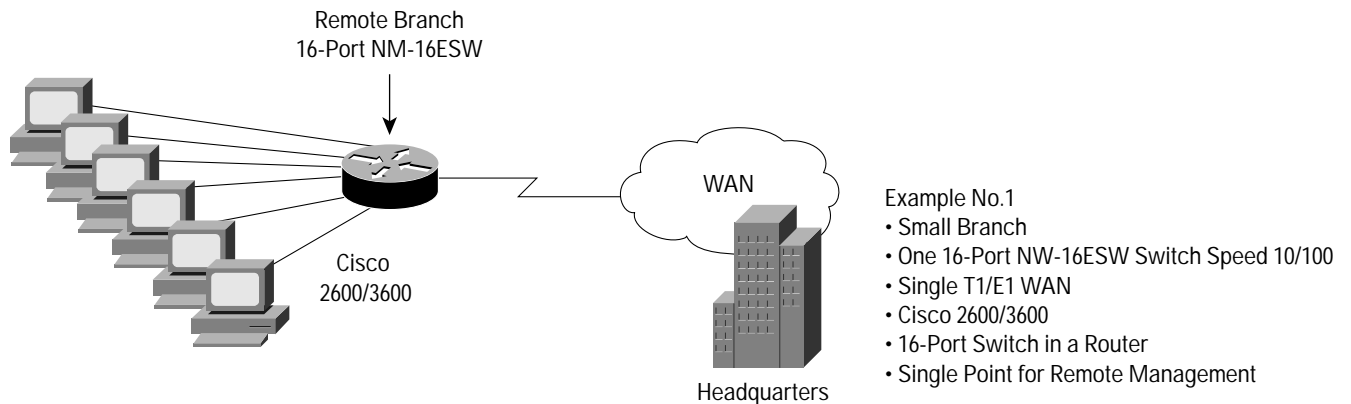
- **GE-DCARD-ESW**—This optional 1000BaseT Gigabit Ethernet port for NM-16ESW and NMD-36-ESW can be used for a gigabit connection for a file server or in the future could be used for intra-chassis stacking of the Cisco EtherSwitch module. Stacking is not supported at this time, but this feature will be available in a future supported in Cisco IOS release 12.2(11)T.
- **PPWR-PS-CHASSIS**—The power chassis is an external chassis that can support up to four 360W power supplies, which can provide inline phone power. This chassis can support up to 144 IP phones @ 10W per port (or less devices at <10W per port). Also available is a custom cable that connects the power supply to the Cisco EtherSwitch Modules. Cable options allowing for power supply redundancy are also available. The inline power works over standard Category 5 unshielded twisted-pair (UTP) cable up to 100 meters and allows direct power instead of using wall power with a transformer. This allows customers to use existing Category 5 UTP installations. The Cisco EtherSwitch Module inline power implementation passes the required U.S. and international safety regulations and compliance measures.
- **NM-16ESW-PWR and NMD-36ESW-PWR**—The 16- and 36-port Ethernet switch modules with power daughter cards support 48V inline power of IP telephones when either purchased with an external power chassis or when used with an internal power supply. This combination of components enables IP phones to be plugged into any EtherSwitch module port. Also, the integrated inline power for the 10/100BaseTX autosensing ports provides DC power to devices that can accept power over traditional UTP cabling (such as the Cisco 7900 Family of IP phones). This allows a standard RJ-45 jack to be powered from this EtherSwitch module source rather than having a separate plug into an AC wall outlet. Delivery of -48V power must be made to the 16-port Ethernet switch. This daughter card is required for inline power. A power supply is also required.
- **PPWR-PS-360W**—This single 360W power supply for the Cisco EtherSwitch module line power can be added to a power chassis or can added internally into the Cisco 3700 Series router to power additional IP phones or wireless access points. Each power supply supplies up to 360W and can power up to 36 IP phones.

### Example Solutions

Figure 3



Typical Deployments: Small Branch Data Only

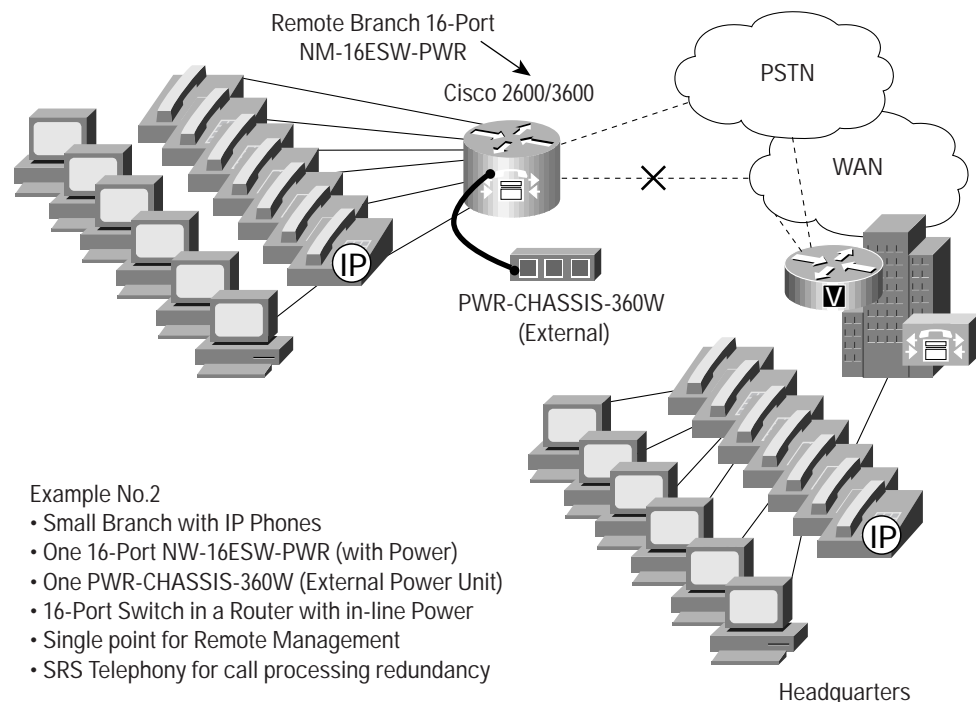


### Small Branch Data Only

A Cisco EtherSwitch Network Module in a branch data deployment provides the flexibility of integrated routing and switching functions in one unit for low port densities. This deployment provides high-speed connections between individual desktops, servers, and other network resources in a single unit for Layer 2 and allows WAN connection at Layer 3 through the router. The Cisco EtherSwitch NM and Cisco 2600 router also provide an ideal solution for Cisco 2505, 2507, and 2516 users whose requirements have expanded beyond the existing Cisco 2500 Router/hub capabilities.

Figure 4

Typical Deployment: Small Branch Data and IP Phones using Cisco 2600 and 3600 Series Routers





## Small Branch Data and IP Phones

The Cisco EtherSwitch Network Module combined with analog or digital voice modules for the Cisco 2600 and 3600 routers provide a small branch office infrastructure for IP Telephony deployments. This solution can be combined with Cisco CallManager IP Telephony and the Cisco IOS Survivable Remote Site Telephony (SRS Telephony) solution. SRS Telephony runs on the local branch office router allowing it to automatically detect a failure in the network, and initiates a process to intelligently auto-configure the router to provide call-processing backup redundancy for the IP phones in that office.

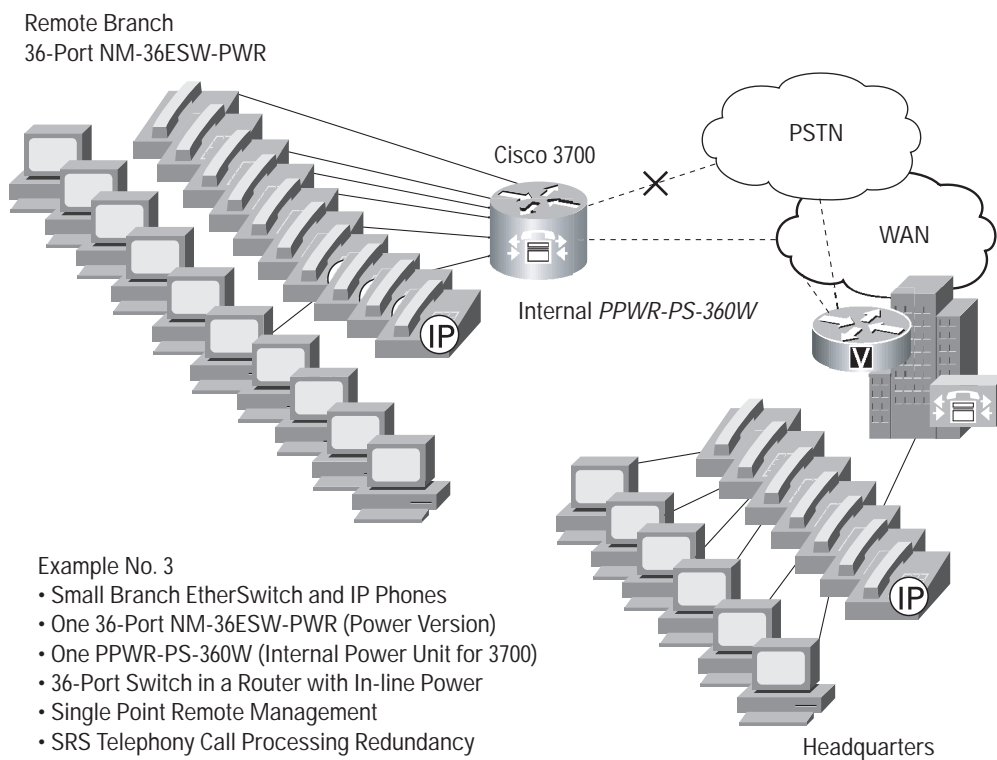
The Cisco EtherSwitch NM with the external power chassis provides IP Phone power and phone discovery for IP phones. In addition, the Cisco EtherSwitch NM supports automatic VLAN configuration for IP Phones. The auxiliary VLAN feature allows network administrators to segment phones into separate logical networks even though the data and voice infrastructures are physically the same. The phone discovery allows the EtherSwitch NM-16ESW-PWR to automatically detect the presence of an IP phone and supplies inline power.

For more information on the voice features for the Cisco 2600 and 3600 series routers, visit:

Cisco 2600 Series <http://www.cisco.com/warp/public/cc/pd/rt/2600/prodlit/index.shtml>

Cisco 3600 Series <http://www.cisco.com/warp/public/cc/pd/rt/3600/prodlit/index.shtml>

Figure 5  
Typical Deployment: Small Branch Data and IP Phones





### Small Branch Data and IP Phones with 3700 Series

In this example we maintain all the features of Figure 4 above but we have now used the internal IP Phone Power capabilities from the Cisco 3700 series and added the 36-port EtherSwitch HDSM. The Cisco EtherSwitch HDSM combined with analog or digital voice modules for the Cisco 3700 routers provide a small branch office infrastructure for IP Telephony deployments at a higher port density. This solution can also be combined with Cisco CallManager IP Telephony and the Cisco IOS Survivable Remote Site Telephony (SRS Telephony) solution.

For more information on the voice and other features of the Cisco 3700 series routers, visit:

Cisco 3700 Series <http://www.cisco.com/warp/public/cc/pd/rt/3700/prodlit/index.shtml>

### Data Communications Networks (DCN)

Another unique application of the Cisco EtherSwitch NM with Cisco 2600/3600 routers is in a Cisco DCN (Data Communications Network) operations and facilities management solution. The Cisco DCN solution can be deployed using Cisco routers and Catalyst switches and delivers an out-of-band network used by service providers and large enterprises for managing their primary network. By integrating the routing and switching functionality into one form factor, service providers and enterprises can achieve a cost-effective solution for their facilities management, monitoring and billing applications. The benefit is the reduction in valuable floorspace use as well as the advantages of reduced management, maintenance and training costs.

### Software for the Cisco EtherSwitch Network Modules

The Cisco 16-port EtherSwitch NM is supported on Cisco IOS Software releases 12.2(2)XT Plus and greater version. The 36-port EtherSwitch HDSM is supported on Cisco IOS Software release 12.2(8)T and greater versions. Table 2 gives software requirements for the Cisco IOS 2600/3600/3700 Series Software, Table 3 gives memory requirements, and Table 4 gives product numbers and descriptions.

Table 2 Product Number and Description

Product Numbers	Description
NM-16ESW	One 16-Port 10/100 EtherSwitch Network Module
NM-16ESW-PWR	One 16 port 10/100 EtherSwitch NM with Inline Power support
NM-16ESW-1GIG	One 16 port 10/100 EtherSwitch NM with 1 GE (1000BaseT) port
NM-16ESW-PWR-1GIG	One 16 port 10/100 EtherSwitch NM with Inline Power and GE
PPWR-DCARD-16ESW	One Inline power daughter card for 16 port EtherSwitch NM
NMD-36-ESW	One 36 port 10/100 EtherSwitch High Density Service Module
NMD-36-ESW-PWR	One 36 port 10/100 EtherSwitch HDSM with Inline Power
NMD-36-ESW-2GIG	One 36 port 10/100 EtherSwitch HDSM with 2 GE (1000BaseT)
NMD-36-ESW-PWR-2G	One 36 port 10/100 EtherSwitch HDSM +Inline Power and 2GE
PPWR-DCARD-36ESW	One Inline Power daughter card for 36 port EtherSwitch HDSM
GE-DCARD-ESW	One GE (1000BaseT) daughter card for EtherSwitch Modules
PPWR-PS-360W	One 48V (360W) power supply for EtherSwitch Modules



Table 2 Product Number and Description

Product Numbers	Description
PPWR-PS-CHASSIS	One power supply chassis for Cisco 48V (360W) power supply
PWR-CHASSIS-360W	One power supply chassis and 48V power supply for EtherSwitch
CAB-PPWR-PS1-1	Connects 1 EtherSwitch power supply to 1 EtherSwitch Module
CAB-PPWR-PS1-2	Connects 1 EtherSwitch power supply to 2 EtherSwitch Modules
CAB-PPWR-PS2-1	Connects 2 EtherSwitch power supplies to 1 EtherSwitch Module

Table 3 Software Requirements

Cisco Part Number	Cisco IOS 2600 Series Software	Cisco IOS 3600 Series Software	Cisco IOS 3700 Series Software
NM-16ESW (=)	Cisco IOS 12.2(2)XT or greater	Cisco IOS 12.2(2)XT	Cisco IOS 12.2(8)T
NM-16ESW-PWR (=)	Cisco IOS 12.2(2)XT	Cisco IOS 12.2(2)XT	Cisco IOS 12.2(8)T
GE-DCARD-ESW (=)	Cisco IOS 12.2(2)XT	Cisco IOS 12.2(2)XT	Cisco IOS 12.2(8)T
PWR-CHASSIS-360W (=)	Cisco IOS 12.2(2)XT	Cisco IOS 12.2(2)XT	Cisco IOS 12.2(8)T
NM-36-ESW (=)	Cisco IOS 12.2(8)T	Cisco IOS 12.2(8)T	Cisco IOS 12.2(8)T
NM-36-ESW-PWR (=)	Cisco IOS 12.2(8)T	Cisco IOS 12.2(8)T	Cisco IOS 12.2(8)T

Table 4 Memory Requirements for Cisco 2600/3600 Series (Cisco IOS 12.2(2)XT)

Product Name 2600/3600/3660	Image Name	Software Image	Required Flash Memory 2600/3620/ 3640/3660	Required DRAM Memory 2600/3620/ 3640/3660
S26/362/364/366 CP-12202XT	IOS IP PLUS	C2600/3620/3640/3660 -is-mz	16/16/32/32	64/64/64/64
S26/362/364/366 BP-12202XT	IOS IP/IPX/AT/DEC PLUS	C2600/3620/3640/ 3660-ds-mz	16/16/32/32	64/64/64/64
S26/362/364/366 CK8 12202XT	IOS IP PLUS IPSEC 56	C2600/3620/3640/3660 -ik8s-mz	16/16/32/32	64/64/64/64

Table 4 Memory Requirements for Cisco 2600/3600 Series (Cisco IOS 12.2(2)XT)

Product Name	Image Name	Software Image	Required Flash Memory	Required DRAM Memory
S26/362/364/366 CK9-12202XT	IOS IP PLUS IPSEC 3DES	C2600/3620/3640/3660- -ik9s-mz	16/32/32/32	64/64/64/64
S26/362/364/366 CHK9-12202XT	IOS IP/FW/IDS PLUS IPSEC 3DES	C2600/3620/3640/3660- -ik9o3s-mz	16/32/32/32	64/64/64/64
S26/362/364/366 AP-12202XT	IOS ENTERPRISE PLUS IPsec 3DES	C2600/3620/3640/3660- -js-mz	16/32/32/32	64/64/96/96
S26/362/364/366 AK9-12202XT	IOS ENTERPRISE PLUS IPsec 3DES	C2600/3620/3640/3660- -jk9s-mz	16/32/32/32	64/64/96/96
S26/362/364/366 AHK9-12202XT	IOS ENTERPRISE PLUS FW/IDS PLUS IPSEC 3DES	C2600/3620/3640/3660 -jk9o3s-mz	16/32/32/32	64/64/96/96
S26/362/364/366 APU-12202XT	IOS ENTERPRISE PLUS/H323 MCM	C2600/3620/3640/3660 -jsx-mz	16/32/32/32	64/64/96/96

Specifications

- Standards network protocols
- Ethernet: IEEE 802.3, 10BaseT
- Fast Ethernet: IEEE 802.3u, 100BaseTX
- Fast Ethernet: IEEE 802.3, 100BaseFX
- IEEE 802.1D Spanning-Tree Protocol

Required Flash Memory: 2600/3620/3640/3660

Required DRAM Memory: 2600/3620/3640/3660

Weight: 21lb maximum

Dimensions and Weight of PPWR-PS-CHASSIS: 16.1 x 11.3 x 4.7 in. W x D x H (416 X 287 X 119 mm)

Operating humidity: 5 to 95%, noncondensing

Operating temperature: 32 F to 104 F (0 C to 40 C)

Nonoperating temperature: -40 F to 85 F (-40 C to 85 C)

Regulatory Compliance, Safety, EMC, Telecom, Network Homologation

When installed in a Cisco 2600/3600 Router the Cisco EtherSwitch Network Module does not change the standards (regulatory compliance, safety, EMC, telecom, network homologation) of the router itself. See data sheets for the Cisco 2600/3600 routers at:

[http://www.cisco.com/warp/public/cc/pd/rt/2600/prodlit/2600\\_ds.htm](http://www.cisco.com/warp/public/cc/pd/rt/2600/prodlit/2600_ds.htm)

[http://www.cisco.com/warp/public/cc/pd/rt/3600/prodlit/36002\\_ds.htm](http://www.cisco.com/warp/public/cc/pd/rt/3600/prodlit/36002_ds.htm)



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