

Cisco 3230 Rugged Integrated Services Routers (ISR)

The Cisco® 3230 Rugged ISR is a rugged router that uses Cisco IOS® Software to provide access, mobility, and interoperability across multiple wired and wireless networks. The Cisco 3230 Rugged ISR has a flexible, compact form factor that is ruggedized to withstand harsh environments. It offers highly secure data, voice, and video communications in mobile and outdoor embedded networks. For mobile applications, standards-based Mobile IP delivers transparent roaming across multiple wireless networks capable of covering wide geographic areas. The components can also be placed in customized enclosures or existing outdoor infrastructure to connect proprietary network devices with an IP network.

The Cisco 3230 Rugged ISR offers public safety, transportation, defense, and energy customers the following key benefits:

- A rugged router with a modular, compact form factor, designed for mobile and outdoor embedded networks
- Standards-based connectivity for a wide range of LAN and WAN wired or wireless links, including 4.9-GHz and 802.11a/b/g wireless capabilities, upgradable to future wireless technologies
- Always-on wireless access for vehicle networks, with easy mobility through Mobile IP regardless of location or movement
- Advanced IP services through standards-based Cisco IOS Software, offering robust network security, reliability, quality of service (QoS), and remote management functions
- Optional rugged enclosure from Cisco for in-vehicle deployments

Comparison of the Cisco 3230 and 3270 Rugged ISRs

Cisco 3200 Series Rugged ISRs consist of the Cisco 3230 and the Cisco 3270 models. Figure 1 shows the Cisco 3230 card bundle and a Cisco 3230 Rugged Enclosure bundle. Figure 2 shows the Cisco 3270 router card and a Cisco 3270 Rugged Enclosure bundle.

Figure 1. Cisco 3230 Rugged ISR (photos not to scale)



Figure 2. Cisco 3270 Rugged ISR (photos not to scale)



Cisco 3270 Router Card



Cisco Rugged Enclosure
for the Cisco 3270 Router

The Cisco 3230 models consist of a combination of PC/104-Plus mobile interface cards, including the Mobile Access Router Card (MARC), Serial Mobile Interface Card (SMIC), Fast Ethernet Switching Mobile Interface Card (FESMIC), Wireless Mobile Interface Card (WMIC), and Mobile Router Power Card (MRPC). The Cisco 3230 is offered as a card bundle to be placed in a third-party enclosure or as a complete system in the Cisco 3230 Rugged Enclosure.

The Cisco 3270 models include a larger router card capable of supporting two PC/104-Plus card stacks. The Cisco 3270 provides expanded interface support, which includes Gigabit Ethernet copper, fiber, USB, and Fast Ethernet ports. The Cisco 3270 is offered as a standalone router card for embedded applications or as a complete system in the Cisco 3270 Rugged Enclosure.

The following cards are used with both the Cisco 3230 and 3270 models:

- SMIC: Four synchronous/asynchronous serial ports
- FESMIC: Four Fast Ethernet ports
- WMIC: 802.11a/b/g and 4.9 GHz support
- MRPC: DC/DC power converter card

To learn more about the Cisco 3270 Rugged ISR, see the Cisco 3270 data sheet:

http://www.cisco.com/en/US/prod/collateral/routers/ps272/ps6990/product_data_sheet0900aecd804c207b.html

Cisco 3200 Series Rugged Enclosures

Customers can work with system integrators on enclosure solutions or they can choose a rugged enclosure from Cisco. Cisco provides rugged enclosures for the Cisco 3230 and Cisco 3270 models that address mobility needs for the public safety, transportation, and defense markets. Manufactured by Cisco, this rugged, sealed enclosure is designed for use in vehicles, trains, or airplanes. The rugged enclosure is designed and tested to withstand extended temperatures, high altitude, shock, vibration, and exposure to damp, wet, or dusty environments. The Cisco 3200 Rugged Enclosures provide:

- A rugged design meeting a wide range of environmental specifications, including MIL-STD-810F, MIL-STD-461E, NEMA 4, and SAE (J1211 and J1455) standards
- A sealed enclosure that uses conductive cooling without the use of internal fans
- A modular enclosure that offers expansion slots for future growth

Mobile Networks

The Cisco 3230 Rugged ISR offers a wireless, ruggedized, high-performance router designed to extend the IP network from wired premises out to moving infrastructure, including vehicles, trains, planes, and ships. The Cisco 3230 Rugged ISR creates a mobile network to establish a highly secure IP network for remote devices in a moving or stationary vehicle. Remote users can exchange voice, video, and data communications with a central site and securely access resources in real time. The Cisco 3230 forms a wireless network in and around a mobile network to allow users to roam while still maintaining a highly secure broadband connection.

To address the need for always-on, mobile access for mission-critical applications, the Cisco 3230 Rugged ISR uses standards-based Mobile IP features in Cisco IOS Software to allow the mobile node or network to stay connected as it moves from one wireless network to another. Transition to different wireless networks is transparent to the users and devices (such as laptops, personal digital assistants [PDAs], and surveillance cameras), and applications maintain continuous connectivity without the user having to manually intervene as WAN links change. In addition to allowing a single node or device to stay connected, the Cisco 3230 Rugged ISR allows an entire mobile network or subnet to stay connected.

Embedded Outdoor Networks

Utility and energy companies are discovering the benefits of bridging proprietary networks with IP networks. The challenge arises when these proprietary networks are located in remote sites, without temperature-controlled environments. With industrial-grade components, the Cisco 3230 Rugged ISR is an ideal platform for connecting these disparate networks to an IP network. The Cisco 3230 Rugged ISR provides standard Ethernet, serial, and wireless interfaces used to connect isolated networks or devices such as utility substations, traffic signal controllers, and video cameras to an IP network.

Network Security, Reliability, and Manageability

Cisco 3230 Rugged ISRs run Cisco IOS Software which provide capabilities for network security, manageability, and scalability. Cisco IOS Software offers integrated network security features, including authorization and authentication, stateful firewall, intrusion detection, and Triple Digital Encryption Standard (3DES) or Advanced Encryption Standard (AES) encryption for VPNs. Remote management capabilities give network managers visibility into and control over the remote network, including devices connected to the router. Powerful debug and troubleshooting commands allow network managers to quickly isolate network problems and securely make changes to network configurations.

Primary Features and Benefits

Table 1 lists the features and benefits of the Cisco 3230 Rugged ISR.

Table 1. Features and Benefits of the Cisco 3230 Rugged ISR

Feature	Benefits
Ruggedized Router in a Flexible and Compact Hardware Design	
Single platform for multiple embedded hardware solutions	<ul style="list-style-type: none"> • Offers hardware architecture capable of being embedded in different system designs. • Allows for designs in unique environments for mobile or fixed outdoor networks.
Industry-standard hardware design	PC/104-Plus architecture allows for the use of off-the-shelf third-party components for use with the Cisco 3230 Rugged ISR.

Feature	Benefits
Industrial-grade components	<ul style="list-style-type: none"> Extended temperature ranges of -40° to +85°C (temperature ranges for completed solutions are dependent on hardware configuration variables, including enclosures and third-party components). Meets MIL-STD-810F and SAE standards.
Lightweight, compact size with low power consumption	Provides flexibility to be deployed in many different environments where space, heat dissipation, and low power consumption are critical factors.
Configurable hardware design with stackable interface or component cards	<ul style="list-style-type: none"> Design allows for added functions by stacking Cisco interface or third-party component cards into a hardware configuration. Third-party cards can give added use to provide various LAN or WAN functions, including security, computing, global positioning system (GPS), and cellular connectivity.
Multiple WAN and LAN Connections, Including Integrated 4.9 GHz and 802.11a/b/g	
Multiple Fast Ethernet and serial interfaces	<ul style="list-style-type: none"> Multiple LAN and WAN devices can be connected to standard 10/100 Ethernet or serial interfaces. The FESMIC and SMIC provide additional ports as needed. WAN links can use external devices such as cellular or satellite modems or integrated 4.9-GHz and 802.11a/b/g bridges. LAN devices can be PCs, video cameras, DVRs, chemical sensors, printers, etc. or an integrated 4.9-GHz and 802.11a/b/g access point.
Integrated 4.9-GHz capabilities	<ul style="list-style-type: none"> 4.9-GHz WMICs can be configured as a bridge for WAN connectivity or as access points for wireless LAN connectivity. Licensed technology eliminates interference from unauthorized sources. High-power mask for all power output levels offers a high-fidelity signal that reduces cross-channel interference.
Integrated 802.11a/b/g capabilities	<ul style="list-style-type: none"> WMICs eliminate the need for external 802.11 LAN and WAN devices. WMICs can be configured as 802.11 bridges for WAN connectivity or as access points for wireless LAN connectivity.
Interoperability and upgradability	<ul style="list-style-type: none"> Connectivity and interoperability for a wide range of LAN and WAN wired and wireless applications and network technologies. Standards-based PC/104+ design facilitates adoption of 3rd party components into solution Upgradable to future wireless technologies for reduced cost of ownership.
Seamless Roaming Between Wireless Networks	
Mobile IP features in Cisco IOS Software	<ul style="list-style-type: none"> Mobile IP offers seamless roaming for mobile networks, establishing a transparent Internet connection regardless of location or movement. Mission-critical applications stay connected even when roaming between networks. Assigned IP address to the home network is maintained in private or public networks.
Mobile network features in Cisco IOS Software	Ability to allow an entire subnet or vehicle network to maintain connectivity to the home network while roaming.
Ability to use any type of wireless technology	Allows users to use the best wireless technology or network available.
Advanced IP Services in Standards-Based Cisco IOS Software	
Advanced security features	<ul style="list-style-type: none"> Authorization and authentication determines who and what devices are allowed to use the network. Firewall protection provides perimeter security when using public networks. 3DES and AES encryption provides for highly secure VPNs when transmitting and receiving data over public networks. Intrusion detection monitors potential malicious activity within the network. Layer 2 wireless LAN security authorizes who is allowed to gain access to the 4.9-GHz and 802.11 wireless LAN.
Cisco Unified CallManager Express (CUCME) support	<ul style="list-style-type: none"> Supports up to 24 phones for remote IP telephony on vehicles or in outdoor locations Provides primary or back up telephony services for command and control communications
QoS features	<ul style="list-style-type: none"> Gives traffic precedence to delay-sensitive or prioritized applications. Facilitates low-latency routing of delay-sensitive applications such as streaming video.
IP multicast	Allows efficient broadcast of data or video for increased situational awareness, multiuser communications, or surveillance applications.

Feature	Benefits
Cisco IOS Software management	<ul style="list-style-type: none"> Enables remote management and monitoring with Simple Network Management Protocol (SNMP), Telnet, or HTTP, and enables local management through console port. Supports intuitive network management tools such as CiscoWorks for Windows and HP OpenView.

Cisco IOS Software Feature Availability

Table 2 lists the features of Cisco IOS Software that are supported on the Cisco 3230 Rugged ISR.

Table 2. Cisco IOS Software Features Supported on the Cisco 3230 Rugged ISR

Features	Enterprise Base Image	Advanced Enterprise Image
Routing and Bridging		
Up to 32 VLANs supported per system	X	X
IPv4	X	X
IPv6	-	X
Point-to-Point Protocol (PPP), Frame Relay, X.25, XOT, High-Level Data Link Control (HDLC), Telnet, Asynchronous Tunneling, Dial-on-Demand Routing (DDR), PPP over Frame Relay	X	X
802.11 and 4.9 GHz features: Refer to separate Cisco 3200 WMIC data sheets		
Routing Protocols		
Routing Information Protocol (RIP), RIPv2, Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP)-IP, Cisco Discovery Protocol, IP Policy Routing, IP Multicast Protocol Independent Multicast (PIM) Versions 1 and 2, Internet Group Management Protocol (IGMP) Versions 1 and 2, IP Multicast Load Splitting, Cisco Group Management Protocol (GMP)	X	X
Mobility Features		
Mobile IP and Cisco Mobile Networks in Cisco IOS Software		X
Cisco Mobile Networks Network Address Translation (NAT) Traversal over Mobile IP		X
Home agent and mobile router redundancy; mobile router preferred interfaces; mobile router reverse tunneling; mobile router asymmetric links; mobile router static and dynamic networks; static colocated care-of address; authentication, authorization, and accounting (AAA) server; and Mobile IP		X
Mobile IP tunnel templates support, allowing configuration of IP Multicast and IPsec on Mobile IP tunnels		X
Mobile IP foreign agent local routing optimization		X
Security		
Route and router authentication, Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), Microsoft CHAP (MS-CHAP) local password, IP basic and extended access lists, and time-based access control lists	X	X
Stateful inspection firewall	-	X
Firewall intrusion detection system	-	X
Port-to-application mapping	-	X
Generic routing encapsulation (GRE)	X	X
IP Security (IPsec)	-	X
Easy VPN Version 4.1 for client and server		X
Tunnel endpoint discovery	-	X
Secure Shell (SSH) Protocol Client and Server Version 1.5		X
Fast switching, Cisco Express Forwarding, process switching, STAC compression, Routing Table Protocol (RTP) header compression	X	X
Voice		
Cisco Unified CallManager Express (CUCME)		X
Management		

Features	Enterprise Base Image	Advanced Enterprise Image
SNMP Versions 2 and 3, Telnet, console port, RADIUS, TACACS+, Cisco Service Assurance Agent, syslog, Response Time Reporter, Network Time Protocol (NTP) Client, Trivial File Transfer Protocol (TFTP) Client and Server, Dynamic Host Configuration Protocol (DHCP) Client and Server, DHCP Relay, Hot Standby Router Protocol (HSRP)	X	X
Tool Command Language (TCL) script support	X	X
Address Conservation		
Network Address Translation (NAT) Many-to-One (Port Address Translation [PAT]), NAT Many-to-Many (Multi-NAT), DHCP Client Address Negotiation, and Easy IP Phase I	X	X
QoS		
Generic traffic shaping, class-based Ethernet matching and mobile access routing (802.1p CoS), committed access rate, flow-based weighted random early detection (WRED), low-latency queuing, priority queuing, weighted fair queuing, link fragmentation and interleaving (LFI), dial backup, dialer profiles, dialer idle timeout, dial on demand	X	X
Class-based weighted fair queuing, Traffic Policing Resource Reservation Protocol (RSVP)	-	X
802.1q VLAN trunking support		X

Product Specifications

Table 3 gives additional product specifications for the Cisco 3230 Rugged ISR interface cards and enclosures.

Table 3. Product Specifications of the Cisco 3230 Rugged ISR

Feature	Description
Memory	
DRAM	128MB of DRAM default
Flash Memory	32MB of flash memory default
Dimensions	
Card dimensions	<ul style="list-style-type: none"> • MARC, SMIC, FESMIC, 802.11a/b/g WMICs and 4.9-GHz WMIC • Height dimension includes component side height, board height, and shroud height on solder side • Height: 23.8 mm (0.937 in.) • Width: 95.89 mm (3.775 in.) • Depth: 90.17 mm (3.550 in.)
Card weights (without thermal plates)	Weight <ul style="list-style-type: none"> • MARC: 0.091 kg (0.21 lb) • SMIC: 0.094 kg (0.21 lb) • FESMIC: 0.103 kg (0.23 lb) • 2.4-GHz WMIC: 0.102 kg (0.22 lb) • 4.9-GHz WMIC: 0.094 kg (0.21 lb)
Cisco 3230 Rugged Enclosure	<ul style="list-style-type: none"> • Height: 14.99 cm (5.9 in.) • Width: 17.27 cm (6.8 in.) • Depth: 20.32 cm (8.0 in.) • Weight: 6.441 kg (14.2 lb) (7 card max configuration)

Note: The Cisco 3251 Mobile Access Router Card is the same router card used in the Cisco 3230 card and enclosure bundles.

Ordering Information

For more information about ordering the Cisco 3230 Rugged ISR, see the Cisco 3200 Series Ordering Guide at the following URL:

http://www.cisco.com/en/US/prod/collateral/routers/ps272/prod_brochure0900aecd803fabbf.html

Service and Support

Cisco offers a wide range of service programs to accelerate customer success. These innovative service programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, refer to [Cisco Technical Support Services](#) or [Cisco Advanced Services](#).

For More Information

For more information about the Cisco 3230 Rugged ISR, visit <http://www.cisco.com/go/3200> or contact your local Cisco account representative.



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