

Cisco 3200 Series Rugged Integrated Services Routers (ISR) Enclosures

The Cisco® 3200 Series Rugged Enclosure is designed for in-vehicle and outdoor use in public safety, transportation, and defense markets. Manufactured by Cisco, the rugged enclosure is completely sealed and is designed to withstand harsh environments, including high temperature variations, high altitude, intense shock and vibration, and exposure to dampness, moisture, or dust.

The Cisco 3200 Series Rugged Enclosures are designed to meet a wide range of environmental specifications, including NEMA 4, MIL-STD-810F, MIL-STD-461E, and SAE standards. Using conductive cooling, heat is transferred from the mobile interface cards (MICs) to the exterior of the enclosure. As a result, internal fans are not required. Figure 1 provides a front and rear view of a Cisco 3230 Rugged Enclosure. Figure 2 shows a front view of a Cisco 3270 Rugged Enclosure.

Figure 1. Cisco 3230 Rugged Enclosure, Front and Rear Views



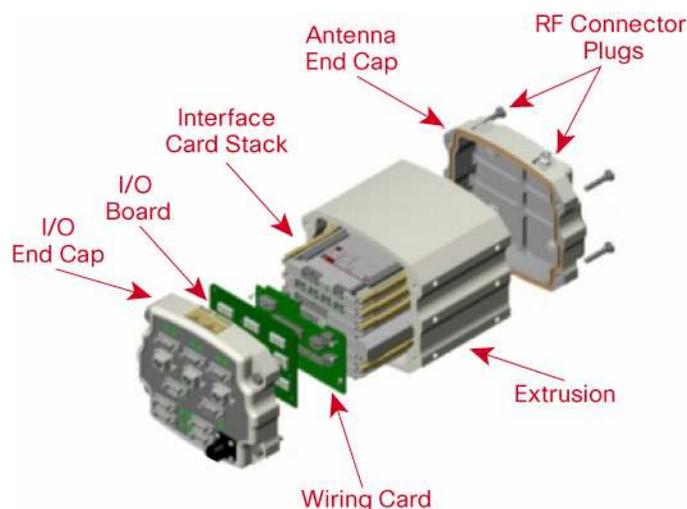
Figure 2. Cisco 3270 Rugged Enclosure



Rugged Enclosure Assembly

The Cisco 3200 Series Rugged Enclosures incorporate a modular design, allowing the system to be configured with zero to three Wireless Mobile Interface Cards (WMICs). The system may also be upgraded with additional wireless cards in the future. Figure 3 shows the components of a Cisco 3230 Rugged Enclosure.

Figure 3. Cisco 3230 Rugged Enclosure Assembly



The enclosure design is similar for both the Cisco 3230 and 3270 routers. The primary differences are the number of PC/104-Plus card slots and the interface types on the I/O end cap. The interface (I/O) end caps provide interfaces to address multiple configurations. The antenna end cap contains antenna connectors, allowing up to three WMICs to be used inside the rugged enclosure.

Figure 4. Cisco 3230 Rugged Enclosure, Showing Console Ports for Three WMICs



Cisco 3230 Rugged Enclosure

The Cisco 3200 Series card stack residing inside the Cisco 3230 enclosure may contain up to three WMICs. Each 3230 bundle consists of a base configuration of a Mobile Access Router Card (MARC), Serial Mobile Interface Card (SMIC), Fast Ethernet Switching Mobile Interface Card (FESMIC), and power card. The number of WMICs may vary from zero to three cards, depending on the configuration needed. Please refer to the Cisco 3200 Series ordering brochure for more details and information on the various bundles that are available. The brochure can be found at the following URL: http://www.cisco.com/en/US/products/hw/routers/ps272/prod_brochure_list.html

Depending on the number of WMICs included with the enclosure, the front end cap may include console ports along the top row that are labeled W1, W2, and W3. Each of the internal WMICs corresponds to one of these console ports. Figure 4 depicts the console ports.

The Cisco 3230 Rugged Enclosure contains three 10/100 Fast Ethernet ports. An additional two FE ports are available inside the enclosure for connecting up to two WMICs. Configurations containing three WMICs will route one of the external Fast Ethernet ports internal to the enclosure, leaving two Fast Ethernet ports on the front end cap.

On the back of the Cisco 3230 and 3270 Rugged Enclosures are three pairs of reverse polarity (RP) TNC connectors (indicated by red arrows). Each pair corresponds to a single WMIC card. The pair on the bottom belongs to the W1 card. The pair above this belongs to W2. The pair at the top of the mobile router belongs to W3. See Figure 1 for a picture of the antenna end cap.

For more information on the Cisco 3230 Rugged Enclosure, please see the Cisco 3200 Hardware Guide at the following URL:

http://www.cisco.com/en/US/products/hw/routers/ps272/products_technical_reference_book09186a0080227b02.html

Cisco 3270 Rugged Enclosure

Like the Cisco 3230 Rugged Enclosure, the Cisco 3270 rugged enclosure bundles support up to 3 WMICs. The interconnectivity of the WMICs is identical to that described earlier for the Cisco 3230 card bundles. The physical characteristics of the 3230 and 3270 enclosure end caps remain the same regardless of the configuration.

The Cisco 3270 enclosure end cap incorporates design enhancements which maximize the real estate on the end cap of the Cisco 3270 enclosure. The Cisco 3270 rugged enclosure end cap uses RJ-45 console ports for the WMICs instead of DB-9 serial ports on the Cisco 3230 rugged enclosure end cap. By using RJ-45 console ports, the ports can be factory configurable as either Fast Ethernet ports or WMIC console ports. Cisco 3270 system containing one or more WMICs will ship with end caps labeled with RJ-45 ports configured as WMIC console ports. If there are no WMICs configured in the system, all the RJ-45 ports on the 3270 end cap will be configured as ethernet interfaces. A Cisco 3270 Rugged Enclosure bundle with zero WMICs provides eight FE ports on the end cap.

For more information on the Cisco 3230 and Cisco 3270 routers, please see the Cisco 3200 Series Rugged ISR data sheets:

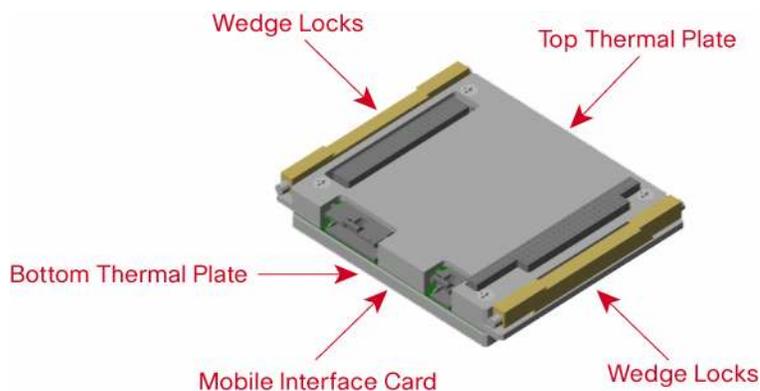
http://www.cisco.com/en/US/products/hw/routers/ps272/prod_literature.html

Thermal Design of The Cisco Mobile Interface Cards

Mobile networks must be reliable, given the harsh environments in which they operate. The Cisco 3200 Series Rugged Enclosures increase the efficiency and reliability of the mobile networking solution by using conductive cooling to keep internal components at an optimal temperature.

Each MIC uses a unique thermal design to allow heat transfer from the card to the exterior of the enclosure. Thermal plates are used to transfer heat from the MIC to the thermal clamps at the ends of the card. The thermal clamps fasten the cards to the extrusion to allow the heat transfer to occur. Figure 5 shows a MIC with thermal plates assembled.

Figure 5. Cisco Mobile Interface Card with Thermal Plates



Note: When ordering Cisco 3200 enclosure bundles, the MICs ship with thermal plates assembled to the cards.

Enclosure Customization

System integrators have the option to customize the rugged enclosure to meet customer requirements. For example, qualified system integrators can have thermal plates designed for third-party modems manufactured to the PC/104-Plus industry specification. Cellular modems, for example, can be integrated into the rugged enclosure along with Cisco MICs to provide WAN connectivity to the mobile router.

Primary Features and Benefits

Table 1 lists the features and benefits of the Cisco 3200 Series Rugged Enclosures.

Table 1. Features of the Cisco 3200 Series Rugged Enclosures

Feature	Benefit
Rugged enclosure	Meets a wide range of environmental specifications, including NEMA 4, IP-67, MIL-STD-810F, MIL-STD-461E, and SAE standards
Sealed enclosure	Keeps water, moisture, sand, and dust from internal components
Conductive cooling	Requires no internal fans
All I/O interfaces available on a single end cap	Simplifies in-vehicle installation
Manufactured by Cisco	Allows user to take advantage of Cisco product support

Applications

Public Safety

Public safety organizations install Cisco 3200 Series Rugged ISRs in these fully sealed rugged enclosures in police vehicles, ambulances, and emergency responder vehicles. These vehicles are often exposed to harsh conditions, including high temperature and humidity variances. Cisco 3200 Series routers in the rugged enclosures can be deployed for outdoor applications throughout a metropolitan area for enhanced communications among public safety agencies and increased citizen safety. Border patrols and port authorities requiring reliable enclosures for their mobile networks can deploy Cisco 3200 Series routers on boats and ships.

Transportation

Major railway operators are deploying Cisco 3200 Series routers on locomotives, passenger railcars, and rail yard vehicles. Rail operators need a highly rugged enclosure such as the Cisco 3200 Series enclosures, which keep dust, soot, and water away from the interior parts of the Cisco 3200 Series router solution.

Defense

The defense industry needs a robust communications network to help ensure that mission-critical information is passed securely and reliably through the network. The Cisco 3200 Series Rugged Enclosures deliver even greater network reliability by protecting the networking components from harsh environments common in military vehicles, including armored and unarmored vehicles, aircraft, and ships.

Product Specifications

Table 2 lists the product specifications for the Cisco 3200 Series Rugged Enclosures.

Table 2. Product Specifications for the Cisco 3200 Series Rugged Enclosures

Feature	Specification
Cooling method	Passive conduction
Temperature	
Operating	<ul style="list-style-type: none"> • -40 to +74°C • -40 to +165°F • (-40 to +65°C for 3270 enclosures with fiber optic)
Nonoperating	<ul style="list-style-type: none"> • -40 to +85°C • -40 to +185°F
Altitude (Low-Pressure Operation)	
Operating	15,200 ft (4572 m)
Nonoperating	40,000 ft (12,192 m)
Humidity	95 percent (± 4 percent) relative humidity
Fungus	Duration 28 days minimum at 86°F (± 2°F); non operating
Salt fog	48-hour salt fog test, operating
Sand and dust	<ul style="list-style-type: none"> • Blowing dust, operating • 6 hr: Room temperature • 6 hr: High temperature
Immersion	Designed to comply with NEMA 4 and 6
Vibration	15 hr per axis, operating
Shock	
Operating	<ul style="list-style-type: none"> • Acceleration: 20g • Duration: 9 ms
Nonoperating	<ul style="list-style-type: none"> • MIL-STD-810F • Peak acceleration: 40g • 15 to 23 ms duration
Electromagnetic interference/ Electromagnetic compatibility (EMI/EMC)	MIL-STD-461E for ground vehicles
3230 Rugged Enclosure Dimensions	<ul style="list-style-type: none"> • Height: 14.99 cm (5.89 in.) • Width: 17.27 cm (6.82 in.) • Depth: 20.32 cm (7.80 in.)
3230 Rugged Enclosure Weight	6.441 kg (14.5 lb) (includes enclosure, MARC, SMIC, FESMIC, Mobile Router Power Card [MRPC], and 2 WMICs)

Feature	Specification
3270 Rugged Enclosure Dimensions	<ul style="list-style-type: none"> Height: 14.99 cm (5.89 in.) Width: 17.27 cm (6.82 in.) Depth: 41.66 cm (16.4 in.) (for Cisco 3270 fiber-optic model)
3270 Rugged Enclosure Weight	Weight: 18.9 lb (8.6 kg) (enclosure with Cisco 3270 router card, MRPC, SMIC, FESMIC, and 3 WMICs)

Ordering Information for The Cisco 3200 Series Rugged Enclosure

The Cisco 3200 Series Rugged Enclosures are orderable as part of a configurable system from Cisco. The Cisco Rugged Enclosure bundles can be ordered directly from Cisco or authorized channel partners.

For more information on ordering Cisco 3200 Series Rugged ISR systems, please refer to the Cisco 3200 Series ordering brochure:

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

For More Information

For more information about the Cisco 3200 Series routers, please visit

<http://www.cisco.com/go/3200>.



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