

## Cisco MRP3-8FXS and MRP3-16FXS cards for the Cisco ICS 7750: High Density FXS Voice Gateways

The Cisco ICS 7750 Integrated Communications System brings the benefits of converged IP services to midmarket businesses and enterprise branch offices. The Cisco ICS 7750 is a versatile IP telephony and services solution that helps businesses harness the power of the Internet through converged applications, enabling them to anticipate and respond to customer needs more efficiently. The Cisco ICS 7750 integrates call processing, voice applications, and multiservice IP routing within the system chassis to deliver true convergence while enhancing system manageability. The system's modular architecture enables expansion of call processing, routing capacity, IP services, and the power to deliver high availability and system scalability. The Cisco ICS 7750 gives customers the flexibility to choose the optimal configuration for their business environments, and allows them to increase profitability through improved customer interactions.

As companies adapt to the Internet economy, they need a communications solution that enables them to migrate their communications to a converged IP infrastructure while maintaining the investment protection of their existing analog telephone devices. The Cisco ICS 7750 Multiservice Route Processor (MRP) MRP3-8FXS and MRP3-16FXS (previous models named Analog Station Interface (ASI) 81 and ASI 160 cards bring businesses a cost-effective way to connect existing business communications devices like fax

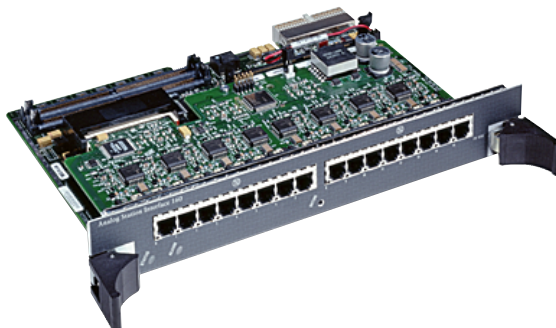
machines, analog phones, and teleconferencing devices to their converged IP network.

### Product Description

The Cisco MRP3-8FXS and MRP3-16FXS are high-density foreign exchange station (FXS) voice-gateway cards built from industry-proven Cisco hardware and Cisco IOS<sup>®</sup> Software technology to support both digital and analog voice trunks and station interfaces. The Cisco MRP3-8FXS offers eight FXS ports along with one modular voice interface card/WAN interface card (VIC/WIC) slot. The Cisco MRP3-16FXS offers greater analog density with 16 FXS ports in a single slot. These two cards provide you with the FXS density and flexibility to support the analog business communications devices in your offices.

The Cisco MRP3-8FXS and MRP3-16FXS are built on the same proven voice-over-IP (VoIP) technology used in Cisco 1700,

Figure 1:  
Cisco MRP3-16FXS card





2600, and 3600 Series multiservice routers to ensure end-to-end interoperability between IP and TDM endpoints. The Cisco MRP3-8FXS and MRP3-16FXS contain onboard flash memory for storing Cisco IOS Software images locally on the card, letting you configure a unique voice and data feature image for each MRP card in the Cisco ICS 7750 system. These cards also enable you to take advantage of all existing Cisco VoIP services and voice-compression formats to meet your quality voice and data bandwidth transmission requirements.

Each Cisco MRP3-8FXS card has one modular slot that accepts existing Cisco VICs and WICs. This slot provides the same VIC and WIC support available on the Cisco 1750/1, 2600, and 3600 routers, allowing you to build upon current Cisco networks while maintaining interoperability and consistent end-to-end service between locations. This is particularly important when networking an enterprise branch office throughout a distributed enterprise network.

### **Data Connectivity**

Cisco WICs support a wide range of services, including synchronous and asynchronous serial, ISDN Basic Rate Interface (BRI), and serial with digital service unit/channel service unit (DSU/CSU) options for primary and backup WAN connectivity. Bandwidth options range from 56 Kbps up to T1 data speeds per MRP card.

### **Voice Connectivity**

Cisco VIC cards include support for Foreign Exchange Office (FXO), for analog central office trunks in North America, Asia, Europe and Australia; Foreign Exchange Station (FXS), for analog station devices; ear and mouth (E&M), for analog tie-line support; analog direct-inward dial (DID); T1 Channel Associated Signaling (CAS); and Primary Rate Interface, E1 PRI and BRI for digital central office trunks. This support makes it simple to link your Cisco ICS 7750 system to the Public Switched Telephone Network (PSTN) and existing private branch exchanges (PBXs), as well as common analog devices like fax machines and teleconferencing stations. The modular design enables the Cisco MRP3-8FXS card to deliver new voice interface support, as these technologies become available in the marketplace.

### **Data Services**

For WAN and Internet connections, the Cisco MRP3-8FXS delivers enhanced security using IPsec software encryption technology. By supporting the IEEE 802.1p/q standard, the MRP cards can also be configured as a virtual LAN (VLAN) router for routing voice and data traffic over the LAN infrastructure. These cards support quality of service (QoS) to ensure your voice traffic receives the highest priority in your network.

### **Voice Services**

For IP voice networks, the Cisco MRP3-8FXS and MRP3-16FXS cards support G.711, G.726, and G.729a(b) codecs, enabling interoperability between different IP endpoints, such as analog devices and Cisco IP Phones. Configurable digital-signal-processing (DSP) resource modules, called packet voice/data modules (PVDMs), provide the codec compression and transcoding services to support different voice and data network traffic configurations, particularly for branch offices using VoIP.

Because the Cisco MRP3-8FXS and MRP3-16FXS support Cisco IOS Software, you can keep up with the latest in VoIP advances to adapt to your changing business communication requirements.



## Key Benefits

### **Versatile Voice/Data Connectivity and Cisco IOS Software Technology**

The modular VIC/WIC design enables you to configure the Cisco MRP3-8FXS to support your specific voice and data communication needs today, with the ability to easily add bandwidth, voice trunk capacity, new Cisco IOS Software services, and redundancy as your business needs change.

### **System Availability**

Onboard flash memory allows local storage of Cisco IOS Software images, speeding card boot time and improving Cisco ICS 7750 system availability, allowing the overall system to be brought up more quickly.

### **Scalable, High-Density Capacity**

Each high-density FXS card offers choices, allowing you to meet system-wide, analog station requirements—the universal card design lets you deploy multiple MRP cards to scale to your needs. With its six-slot chassis design, the Cisco ICS 7750 allows room for adding additional Cisco MRP3-8FXS and/or MRP3-16FXS cards to ensure investment protection over time.

### **Simplified Management**

The Cisco MRP3-8FXS card enables voice and data services to be consolidated in a single card, simplifying management and support. Both the Cisco MRP3-8FXS and MRP3-16FXS are designed to function within the Cisco ICS 7750; each MRP card in the Cisco ICS 7750 system is monitored by the (SAP) system alarm processor. In the rare event that the MRP experiences downtime, technicians are notified through page alerts or e-mail notifications, so the issue can be resolved immediately.

### **Industry-Proven Cisco IOS Software Delivers Reliability**

Cisco IOS Software technology delivers reliable, end-to-end connectivity over the PSTN and WAN for communications between your branch offices, customers, and partners. Field-replaceable VIC and WIC cards increase system connectivity uptime. QoS can also be configured through Cisco IOS Software, to ensure voice communications receive the highest priority in your network. VLANs help segregate your LAN voice and data traffic to ensure communications are secure and are delivered only to the intended audience.

## Cisco IOS Software Technology

### **Internet and Intranet Access**

Cisco IOS Software provides an extensive set of features that make the Cisco MRP3-8FXS card ideal for flexible, high-performance communications across both intranets and the Internet:

- Multiprotocol routing (IP, IPX, and AppleTalk); IBM/SNA; and transparent bridging over ISDN, asynchronous serial, and synchronous serial such as leased lines, Frame Relay, SMDS, Switched 56, and X.25
- WAN optimization, including dial-on-demand routing (DDR), bandwidth-on-demand (BOD) and Open Shortest Path First (OSPF)-on-demand circuit, Snapshot routing, compression, filtering, and spoofing to reduce WAN costs



## Security

Cisco IOS Software supports an extensive set of basic and advanced network security features, including access control lists (ACLs), user authentication, authorization, and accounting (such as PAP/CHAP, TACACS+, and RADIUS), and data encryption. To increase security, the integrated Cisco IOS Firewall Feature Set protects internal LANs from attacks with context-based access control (CBAC), while IPsec tunneling with data-encryption-standard (DES) and triple-DES encryption provide standards-based data privacy, integrity, and authenticity as data travels through a public network.

For remote access VPNs, Layer 2 Forwarding (L2F) and Layer 2 Tunneling Protocol (L2TP) combine with IPsec encryption to provide a secure multiprotocol solution for IP, IPX, and AppleTalk traffic. Mobile users can dial in to a service provider's local point of presence (POP), where data is "tunneled" (or encapsulated inside a second protocol such as IPsec or L2TP) back to the Cisco MRP3-8FXS card to securely access the corporate network via the Internet.

## Cisco IOS Software QoS Features

Through Cisco IOS Software, the Cisco MRP3-8FXS and MRP3-16FXS can support 802.1p/q inter-VLAN trunking and WAN QoS capabilities. WAN QoS features include Resource Reservation Protocol (RSVP), Weighted Fair Queuing (WFQ), Low-Latency Queuing (LLQ), Class-Based Weighted Fair Queueing (CBWFQ), traffic shaping, fragmentation interleaving, and IP Precedence. These features enable you to prioritize traffic on your networks by user, application, traffic type, and other parameters, to ensure that your business-critical data and delay-sensitive voice traffic receive the priority they need as they move across the network.

The Cisco MRP card also offers voice compression to allow for more efficient data performance and throughput. Cisco IOS Software technology enables more efficient use of a single digital-trunk interface to support converged voice and data services.

## Cisco MRP3-8FXS and MRP3-16FXS Technical Specifications

### Per Cisco MRP Board:

- Inserts as a card into universal slot within the Cisco ICS 7750 chassis
- Onboard memory: 64 MB DRAM (max 128 MB)
- One memory upgrade slot (options): 16, 32, and 64 MB DRAM
- Onboard Flash memory: 16 MB flash SIMM (max 80 MB)
- One Flash memory upgrade slot (options): 16, 32, and 64 MB flash SIMM
- MRP3-8FXS contains a single PVDM-256K-8 onboard
- MRP3-16FXS contains a single PVDM-256K-16 module onboard
- One modular VIC/WIC slot (MRP3-8FXS only)
- One PVDM module expansion slot (MRP3-8FXS only): supports 4-, 8-, 12-, 16-, and 20-channel PVDMs
- Advanced data networking feature support, including:
  - IPsec 56 and 3DES, firewall
- Supports Fax Relay, Fax Pass-Through, and Modem Pass-Through
- Interoperable with Cisco MRP 200, ASI 81, and ASI 160 in same Cisco ICS 7750 chassis



### Fixed Foreign Exchange Station (FXS) ports:

Distance:

Up to 1500 ft short loop, operation with CAT5 24awg wire

### FXS Port Specifications:

- On-premise station (ONS) analog FXS ports
- Terminal equipment support for analog voice devices, including analog phones, fax machines, modems and teleconferencing devices
- RJ-11 connectors
- LED activity indicator per port
- Loop start, ground start, wink start, and battery reversal capability
- Loop start, balanced sinusoidal ringing at >40Vrms
- Up to 5REN load per loop start
- Ground start, non-RS-464-level conventional ringing (~25Vrms) at 1REN load
- 20REN maximum loading for entire MRP3-8FXS or MRP3-16FXS card
- Battery reversal supported for wink-start signaling

### Voice and WAN Interface Cards:

Table 1 Cisco WAN Interface Cards for Cisco MRP3-8FXS VIC/WIC

WIC Module	Description
WIC-1T	One serial, async, and sync (T1/E1)
WIC-2T	Two serial, async, and sync (T1/E1)
WIC-2A/S	Two low-speed serial (up to 128 Kbps), async, and sync
WIC-1B-S/T	One ISDN BRI S/T
WIC-1B-U	One ISDN BRI U with integrated NT1
WIC-1DSU-56K4	One integrated 56/64 Kbps, four-wire DSU/CSU
WIC-1DSU-T1	One integrated T1/fractional T1 DSU/CSU

Table 2 Cisco Voice and Voice/WAN Interface Cards for Cisco MRP3-8FXS VIC/VWIC

VIC Module	Description
VIC-2FXS	Two-port FXS voice/fax interface card
VIC-4FXS/DID	Four-port FXS/DID voice/fax interface card (ports can be configured for either FXS or DID)
VIC-2FXO	Two-port FXO voice/fax interface card
VIC-2FXO-M1	Two-port FXO voice/fax interface card with battery reversal and caller ID (for North America)



Table 2 Cisco Voice and Voice/WAN Interface Cards for Cisco MRP3-8FXS VIC/VVIC (Continued)

VIC Module	Description
VIC-2FXO-M2	Two-port FXO voice/fax interface card with battery reversal (for Europe)
VIC-2FXO-M3	Two-port FXO voice/fax interface card (for Australia)
VIC-2E/M	Two-port E&M voice/fax interface card
VIC-2DID	Two-port DID voice interface card
VIC-2BRI-NT/TE (NT & TE)	Two-port BRI voice interface card
VVIC-1MFT-T1	One-port T1/fractional T1 multiflex trunk with CSU/DSU (for CAS and PRI)
VVIC-2MFT-T1	Two-port T1/fractional T1 multiflex trunk with CSU/DSU (for CAS and PRI)
VVIC-1MFT-E1	One-port E1/fractional E1 multiflex trunk with CSU/DSU (for PRI)
VVIC-2MFT-E1	Two-port E1/fractional E1 multiflex trunk with CSU/DSU (for PRI)

Table 3 Cisco ICS 7750 Cisco IOS Software and Memory Requirements

Cisco IOS Software Data and Voice Feature Sets	DRAM
IP/Voice Plus	64 MB
IP/Voice Plus + Firewall + IPsec 56	64 MB
IP/Voice Plus + Firewall + 3DES	64 MB
IP/Voice Plus + IPX/AppleTalk/IBM	64 MB
IP/Voice Plus + IPX/AppleTalk/IBM + Firewall + IPsec 56	64 MB
IP/Voice Plus + IPX/AppleTalk/IBM + Firewall + 3DES	64 MB

## Physical Specifications

### Dimensions and Weight:

- Height: 10.5 in. (26.67 cm)
- Width: 1.6 in. (4.06 cm)
- Depth: 8.25 in. (20.96 cm) including ejector handle depth; 7.0 in. (17.78 cm) without ejector handle
- Weight (MRP3-8FXS): 1.15 lb (0.52 kg), with no VIC/WIC cards installed (update with Flash weights)
- Weight (MRP3-16FXS): 1.36 lb (0.62 kg) (update with Flash weights)

### Power Requirements:

All voltages are DC:

- 0.95A at +5V
- 0.55A at +3.3V
- 1.5A at +12V

Negligible current at -12V

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**Power Dissipation:**

23W (worst case)

**Environmental Range:**

**Operational**

- Acoustic noise: 43 dB (under normal operating conditions)
- Temperature range: 32 to 104 F (0 to 40 C)
- Altitude: 10,000 ft (3000 m)
- Relative humidity: 10 to 85%
- Shock: 54 in/s (1.37 m/s)
- Vibration: 0.35 g from 3 to 500 Hz

**Nonoperational**

- Temperature shock: -4 to 149 F(-20 to 65 C)at 41 F (5 C) per minute
- Temperature range: -4 to 149 F (-20 to 65 C)
- Altitude: 5,027 yds (4570 m)
- Relative humidity: 5 to 95%

**Safety:**

- UL 1950, 3rd edition
- C-UL per CSA C22.2 1950
- TUV Bauart per EN 60950

**EMC:**

- BSMI CNS13438, class B
- CAN/CSA-C22.2 No. 950-95 [Canada]
- CISPR22, 1997, class B
- CFR47, Part 15, Subpart B, 1995, class B
- EN 55024: 1998, class B ITE Immunity Standard
- EN 60950: 1992 [CENELEC; includes EU and EFTA]
- GB 4943-95 [PRC]
- ICES003, issue 3:1998, class B
- IEC 60950: 1991
- NOM-019-SCFI-1998 [Mexico]
- TS001 [Australia]
- UL 1950, 3rd Edition, 1995 [US]
- VCCI V- 3/97.04, class B

Table 4 EN 55024:1998

ITE Immunity Standard	
IEC 1000-4-2:1995	Immunity to Electrostatic Discharges
IEC 1000-4-3:1995	Immunity to Radio Frequency Electromagnetic Fields
IEC 1000-4-4:1995	Immunity to Electrical Fast Transients
IEC 1000-4-5:1995	Immunity to Power Line Transients (Surges)
IEC 1000-4-6:1996	Immunity to Radio Frequency Induced Conducted Disturbances
IEC 1000-4-8:1995	Immunity to Power Frequency Magnetic Fields
IEC 1000-4-11:1995	Immunity to Voltage Dips, Voltage Variations, and Short Voltage Interruptions

**Telecom:**

- FCC Part 68
- RS-464 compatible (exception for Ground Start conventional ringing voltage)
- European RTTE Directive 99/05/EC
- Australia ACA TS-002. TS-003. TS-004, TS 031
- Industry Canada CS-03



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