

Cisco ISR 4000 Family Analog Voice Network Interface Modules

These NIM cards support multiple voice applications on the Cisco ISR 4000 routers.

Introduction

The Cisco ISR 4000 family hosts the Cisco NIM cards which have evolved from the enhanced high-speed WAN interface card (EHWIC), increasing port density and module capability. Up to three integrated NIM slots on the Cisco ISR 4000 allow for flexible configurations. NIMs support OIR, reducing downtime required for new or replacement modules.

The NIM cards include 2-port and 4-port foreign exchange station (FXS), direct inward dial (DID), foreign exchange office (FXO), a combination of 2-port FXS and 4-port FXO, 4-port ear and mouth (E/M), and 2-port and 4-port basic rate interface (BRI). BRI cards support only voice features. The NIM cards have dedicated DSP on the module during purchasing, and it will be used for TDM analog voice services.

Note: These NIMs are not supported with Cisco 2900 and 3900 Integrated Services Routers.

Figure 1. Cisco FXO, FXS, Combo 2FXS/4FXO NIMs Compatible with the Cisco ISR 4000 Family



Table 1. Cisco FXO and FXS NIM Types and Feature Comparison

Part Number	Number of Ports	ISR G2 comparison
NIM-2FXO	2	VIC2-2FXO
NIM-4FXO	4	VIC2-4FXO
NIM-2FXS	2	VIC3-2FXS/DID
NIM-4FXS	4	VIC3-4FXS/DID
NIM-2FXS/4FXO	6	VIC2-4FXO and VIC3-2FXS/DID
NIM-4E/M	4	VIC3-2E/M
NIM-2BRI-NT/TE	2	VIC2-2BRI-NT/TE
NIM-4BRI-NT/TE	4	VIC2-2BRI-NT/TE

Cisco FXS, FXO, E/M and BRI NIMs can be inserted into the NIM slot on the supported Cisco 4000 Integrated Services Routers (ISRs) without powering off the router (support for Online Insertion and Removal).

The new generation Cisco FXO/FXS NIMs, add improvements over the previous WAN Interface Cards (VICs and VIC2s). The FXO, FXS, E/M and BRI NIMs contain an onboard DSP (Digital Signal Processor) and don't require the router to have dedicated PVDM on the motherboard. The DSP on the voice module is necessary for the voice features. It also provides for echo cancellation of up to 128-ms echo-tail length for demanding network conditions.

Since the fourth-generation Cisco NIM modules have its own DSP to support voice, there is no need to synchronize clock to the backplane and the clock participate CLI is not supported to BRI, FXO/FXS and E/M NIMs.

The NIMs support:

- Caller Line ID support
- Support for G.711, G.729a & G.726
- Support for G723, iSAC and iLBC is on the roadmap
- Fax detection, pass through and relay (T.38)
- Modem detection and pass through
- DTMF detection
- Echo cancellation
- Voice activity detection
- Comfort noise generation
- RTCP
- Acoustic Shock Protection
- Noise reduction is on the roadmap
- Secured RTP
- RFC4733 Digti Relay

The FXS features include:

- Capable of supporting either FXS or DID functionality
- Configurable long loop ports
- MWI
- Cable detection

The FXO features include:

- Supports both Ground Start and Loop Start modes
- Provide CDR record information
- Support for inter-working with Cisco Unified Call Manager (SCCP), H.323, SIP and MGCP 1.0
- Cable detection
- Overload Protection

FXO port is used to connect to PBX or key system, or to provide off-premise connections to PSTN. Supports battery reversal detection and caller ID. These VICs can be software configured to work in all countries. Also used to connect to analog CAMA trunk to provide dedicated E-911 service (North America only).

FXS port is used to connect directly to phones, fax machines, and key systems. Generates battery polarity reversal and caller ID. NIM FXS modules are designated as an "Off-Premise Extension Lite" product offering. This means that while the module addresses a subset of the off-premise extension applications, it should be noted that the module is not in full compliance for off-premise usage.

DID port is used to provide off-premises DID connection from central office. Serves only incoming calls from the PSTN. Does not support caller ID in DID mode.

The Cisco ISR 4000 routers also supports a NIM carrier card, which converts the SM-X slot into an equivalent NIM slot and can support either one single-wide NIM or a double-wide NIM. This allows the router to support higher port densities.

Cisco IOS-XE Software Release Requirements

The modules are supported on the Cisco 4400 and 4300 ISR routers and require Cisco IOS-XE Software Release 3.16. Voice applications require a minimum of the UC technology package, which is optional.

Table 2. Cisco FXO and FXS NIM IOS Releases

Product Number	IOS Release
NIM-2FXO	XE3.13.3, XE3.14.2, XE3.15.1, XE3.16 and above
NIM-4FXO	XE3.13.3, XE3.14.2, XE3.15.1, XE3.16 and above
NIM-2FXS	XE3.13.3, XE3.14.2, XE3.15.1, XE3.16 and above
NIM-4FXS	XE3.13.3, XE3.14.2, XE3.15.1, XE3.16 and above
NIM-2FXS/4FXO	XE3.14.2, XE3.15.1, XE3.16 and above
NIM-4E/M	XE3.14.2, XE3.15.1, XE3.16 and above
NIM-2BRI-NT/TE	XE3.14.2, XE3.15.1, XE3.16 and above
NIM-4BRI-NT/TE	XE3.14.2, XE3.15.1, XE3.16 and above

Network Interfaces Specifications

Table 3. Weight

All values are +/-0.01 lb (+/-5 g).

Product Number	Weight
NIM-2FXO	0.42 lb (191g)
NIM-4FXO	0.44 lb (200g)
NIM-2FXS	0.42 lb (191g)
NIM-4FXS	0.44 lb (200g)
NIM-2FXS/4FXO	0.52 lb (236g)
NIM-4E/M	0.44 lb (200g)
NIM-2BRI-NT/TE	0.42 lb (191g)
NIM-4BRI-NT/TE	0.44 lb (200g)

Table 4. Network Management Features

Management Feature	
Telnet or console	Remote and local configuration, monitoring, and troubleshooting from Cisco IOS-XE Software CLI
Simple Network Management Protocol (SNMP)	<ul style="list-style-type: none">• Router and DSU/CSU managed by single SNMP agent; router, DSU, and CSU appear as a single network entity to user• Standard MIB (MIB II)• Cisco Integrated DSU/CSU MIB• RFC 1406 T1 MIB, including Alarm Detection and Reporting
SNMP traps	Generated in response to alarms

Homologation

Table 5. Standards Cards Have Been Tested to

NIM-FXO	NIM-FXS	NIM-BRI	NIM-E/M
TIA-968-B (USA) CS-03 (Canada) AS/CA S002 (Australia) AS/CA S003 (Australia) PTC220 (New Zealand) TBR 21 (CE countries)	TIA-968-B (USA) CS-03 (Canada) AS/CA S003 (Australia) PTC220 (New Zealand)	TIA-968-B (USA) CS-03 (Canada) AS/ACIF S031 (Australia) PTC220 (New Zealand) TBR 3 (CE countries) ITU-T I.430	TIA-968-B (USA) CS-03 (Canada) AS/CA S003 (Australia)

Compliance

Table 6. Compliance Standards

Emission	Immunity
47 CFR Part 15 CISPR22: Edition 6.0: 2008 CNS13438: 2006 EN 300 386 V1.6.1 EN 55022:2010 EN61000-3-2: 2006 [Inc amd 1 '&' 2] EN61000-3-3: 2008 ICES-003 Issue 5: 2012 KN 22: 2009 TCVN 7189: 2009 VCCI: V-3/2013.04	CISPR24: 2010 EN 300 386 V1.6.1 EN55024: 2010 KN24: 2011 TCVN 7317: 2003

Ordering Information

Help customers understand all the components or parts they need to purchase in order to install and use the product. This section also provides a direct link to the Cisco Ordering Tool and lists part numbers for customer convenience.

To place an order, visit the [Cisco Ordering Home Page](#). To download software, visit the [Cisco Software Center](#).

Table 7. Ordering Information

Product Name	Product Description
NIM-2FXO	2-port Network Interface Module - FXO (Universal)
NIM-4FXO	4-port Network Interface Module - FXO (Universal)
NIM-2FXS	2-Port Network Interface Module - FXS, FXS-E and DID
NIM-4FXS	4-Port Network Interface Module - FXS, FXS-E and DID
NIM-2FXS/4FXO	2-Port FXS/FXS-E/DID and 4-Port FXO Network Interface Module
NIM-4E/M	4-Port E/M Network Interface Module
NIM-2BRI-NT/TE	2-Port BRI Network Interface Module
NIM-4BRI-NT/TE	4-Port BRI Network Interface Module

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