Mediant™ 1000B MSBR

Multi-Service Business Router

SIP Protocol

Hardware Installation Manual

SAS
Stand Alone Survivability
Continuous VoIP Service

SBC

HD VoIP
Sounds Better

AudioCodes

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Notice

This Installation Manual describes the hardware installation for AudioCodes **Mediant 1000B Multi-Service Business Router (MSBR)**.

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Abbreviations and Terminology

Each abbreviation, unless widely used, is spelled out in full when first used.

Throughout this manual and unless otherwise specified, the term *device* refers to the Mediant 1000B MSBR.

Related Documentation

Manual Name
SIP Release Notes
Mediant 1000B MSBR SIP User's Manual
MSBR Series CLI Reference Guide for System and VoIP Functionalities
MSBR Series CLI Reference Guide for Data Functionality

Notes and Warnings

Warning: Read and adhere to all warning statements in this document before installing the device.

Warning: The device is an **INDOOR** unit and thus, must be installed **only** indoors. In addition, FXS and Ethernet port interface cabling must be routed only indoors and must not exit the building.

Warning: The device is supplied as a sealed unit and must be installed and serviced only by qualified service personnel.

Warning: Disconnect the device from the mains and Telephone Network Voltage (TNV) before servicing.

Caution Electrical Shock

Do not open or disassemble this device. The device carries high voltage and contact with internal components may expose you to electrical shock and bodily harm.

Note: Open source software may have been added and/or amended for this product. For further information, please visit our website at: http://audiocodes.com/support or contact your AudioCodes sales representative.

Regulatory Information

VoIP Gateway:

1. This equipment complies with Part 68 of the FCC Rules and the requirements adopted by the ACTA. On the bottom of the unit or on the Interface card of this equipment is a label that contains among other information, a product identifier in the format US:AC1IS00BM1KMIX or US:AC1ISNANM1000 and ringer equivalence. If requested, this number must be provided to the telephone company.

2. This equipment is designed to be connected to the telephone network using an RJ-48C and/or RJ-11C connector, which is Part 68 compliant. The service order codes (SOC) are 6.0F for digital interfaces and 9.0Y for analog interfaces and the Facility interface codes (FIC) are: 04DU9.1SN, 04DU9.1KN, 04DU9.BN, 04DU9.DN, 02LS2, O2GS2.

3. The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is 0.01.

4. Should the product cause harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice is not practical, you will be notified as soon as possible. In addition, you will be advised of your right to file a complaint with the FCC if it is necessary.

5. The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

6. If trouble is experienced with this equipment, for repair or warranty information please contact AudioCodes Inc. 27 World's Fair Drive, Somerset, NJ 08873, Tel: +1-888-586-4743, Fax: +1-732-469-2298. If the equipment is causing harm to the telephone network, the telephone company may request to disconnect the equipment until the problem is resolved.

7. Connection to Telephone Company Provided coin service is prohibited. Connection to party lines service is subject to state tariffs.

CRMX-SD Module (SHDSL)

1. The RMX module (CRMX-SD) complies with Part 68 of the FCC Rules and the requirements adopted by the ACTA. On the bottom of the module is a label that contains among other information, a product identifier in the format US:6npDLNANRMX. If requested, this number must be provided to the telephone company.

2. This equipment is designed to be connected to the telephone network using an RJ-48C connector, which is Part 68 compliant. The service order code (SOC) is 6.0F and the Facility interface codes (FIC) is: 02LS2

3. Should the product cause harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. If advance notice is not practical, you will be notified as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if it is necessary.

4. The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

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Connection to Telephone Company Provided coin service is prohibited. Connection to party lines service is subject to state Tariffs.

Document Revision Record

LTRT	Description
40812	Initial document release for Version 6.6.
40819	No operating system installed on OSN by default; FXO power surge warning added.
40880	SHDSL LEDs added.
40881	AC power cable warning (Japanese).

Documentation Feedback

AudioCodes continually strives to produce high quality documentation. If you have any comments (suggestions or errors) regarding this document, please fill out the Documentation Feedback form on our Web site at http://www.audiocodes.com/downloads.

1 Introduction

This document provides a hardware description of the Mediant 1000B MSBR (hereafter referred to as *device*) and step-by-step procedures for cabling the device.

Note: For information on configuring the device, refer to the device's *User's Manual*.

Reader's Notes

2 Unpacking the Device

Follow the procedure below for unpacking the carton in which the device is shipped.

➢ **To unpack the device:**

1. Open the carton and remove the packing materials.
2. Remove the chassis from the carton.
3. Check that there is no equipment damage.
4. Ensure that in addition to the chassis, the package contains the following items:
   - One or two AC power cables (depending on customer order)
   - Four anti-slide bumpers for desktop installation
   - Two-meter RS-232 DB-9 adaptor cable (for direct serial connection to PC)
5. Check, retain and process any documents.

If there are any damaged or missing items, notify your AudioCodes sales representative.

Reader's Notes

3 Physical Description

The device is a 19-inch, 1U high, industrial platform chassis. The chassis modular hardware design allows scalability to capacity demands and required telephony interfaces to suite your network environment.

The chassis can host the following replaceable modules:

- Telephony interfaces (optional):
  - Up to 4 digital Trunk modules, providing 1, 2, or 4 E1/T1/J1 PRI spans
  - Up to 5 BRI modules, where each module provides 4 BRI ports
  - Up to 6 FXS modules, where each module provides 4 FXS ports
  - Up to 6 FXO modules, where each module provides 4 FXO ports
  - Up to 3 MPM modules for media processing such as announcements and conferencing
- Ethernet and WAN interfaces, provided on the CRMX module:
  - 3 x Ethernet LAN 10/100/1000Base-T ports
  - 1 x WAN port, available in one of the following configurations, depending on CRMX module type:
    - CRMX-C: RJ-45 port (4-twisted pair copper cabling) providing 1 Gigabit Ethernet (GbE) interface
    - CRMX-S: 1000Base-SX optical fiber port (multi-mode fiber)
    - CRMS-L: 1000Base-LX optical fiber port (single-mode fiber)
    - CRMX-SD: SHDSL port (providing 4 SHDSL wire-pairs on a single physical connector):
- Optional, OSN server platform for hosting third-party applications, such as an IP PBX.
- Fan Tray module
- Up to two Power Supply modules

Note: Hardware configurations may change without notice. Currently available hardware configurations are listed in AudioCodes Price Book. For further enquiries, please contact your AudioCodes sales representative.

3.1 Physical Dimensions

The device's physical dimensions are listed in the table below.

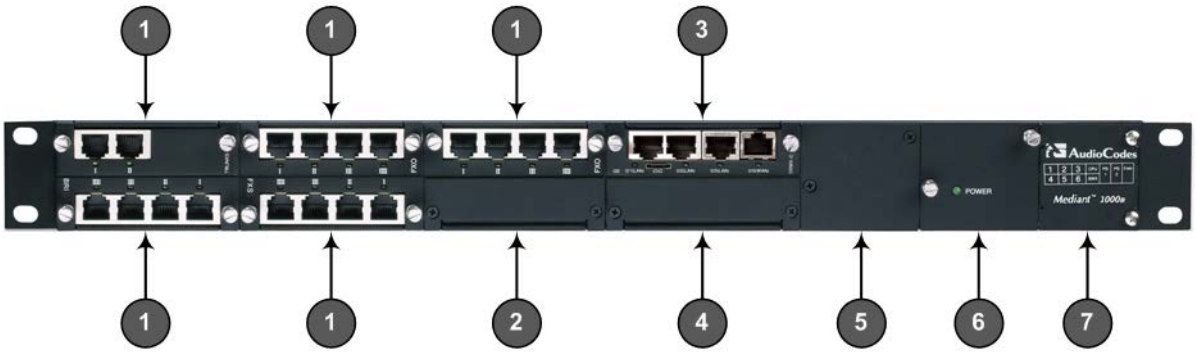
Table 3-1: Physical Dimensions

Item	Description
Enclosure	1U chassis
Dimensions (H x W x D)	1U x 440 mm (17 in.) x 350 mm (14 in.)
Weight	Approx. 52 kg (115 lbs) without modules - each module is approx. 110 g (0.114 lbs)
Environmental	▪ Operational: 0 to 40°C (32 to 104°F) ▪ Storage: -20 to 70°C (-4 to 158°F) ▪ Relative Humidity: 10 to 85% non-condensing

3.2 Front Panel Description

The device's front panel is shown in the figure below and described in the subsequent table.

Figure 3-1: Front Panel



Notes:

- The figure above is used only as an example. The number and type of interface modules depends on the ordered configuration.
- For module slot assignment, see Section 6.1.1 on page 51.

Table 3-2: Front-Panel Description

Item #	Label/ Module	Component Description
1	**FXS**	FXS module – see Section 3.2.1 on page 18 for a description.
	FXO	FXO (or FXO G) module – see Section 3.2.2 on page 19 for a description.
	BRI	BRI module – see Section 3.2.3 on page 20 for a description.
	TRUNKS	TRUNKS (E1/TE/J1) module – see Section 3.2.4 on page 21 for a description.
2	**MPM**	MPM module – see Section 3.2.5 on page 22 for a description.
3	**CRMX**	CRMX module – see Section 3.2.6 on page 23 for a description.
4	-	This slot is currently not used and is covered by a blank panel. In the next applicable release this slot is intended to host a LAN extension module (for more information, contact AudioCodes sales representative).
5	**Power 1**	(Optional) Spare Power Supply module slot. The device can provide two extractable power supply units (Power 1 and Power 2). Each power supply unit provides an AC power connector on its rear panel. If both Power 1 and Power 2 units are used, the load is shared between them. This (optional) load-sharing feature enables power failure protection (redundancy). When using this feature, you are advised to connect each power supply unit to a different AC supply circuit.
6	**Power 2**	Main Power Supply module (see description above).

Item #	Label/ Module	Component Description
7	**Schematic**	Extractable Fan Tray module with a schematic displayed on its front panel showing the chassis' slot numbers. The Fan Tray module cools the device's components.

3.2.1 FXS Module

The FXS module provides the Foreign eXchange Subscriber (FXS) interfaces. Up to six FXS modules can be installed in the device. Each FXS module can provide up to four FXS interfaces and therefore, the device can support up to 24 FXS interfaces (i.e., 6 modules x 4 ports).

Note: The FXS modules support both loop-and ground-start signaling.

3.2.1.1 Port Description

Each FXS module provides up to four analog RJ-11 ports. The ports are labeled **I**, **II**, **III**, and **IIII**.

Figure 3-2: FXS Module

3.2.1.2 LED Description

Each FXS port provides a LED for indicating operating status, as described in the table below:

Table 3-3: FXS Module LED Description

Color	State	Description
Green	On	Phone connected to the port is off-hooked.
	Blinking	Phone connected to the port rings.
Red	On	Error - malfunction in line or out of service due to Serial Peripheral Interface (SPI) failure.

3.2.2 FXO Module

The FXO module provides the Foreign eXchange Office (FXO) interfaces. Up to six FXO modules can be installed in the device. Each FXO module can provide up to four FXO interfaces and therefore, the device can support up to 24 FXO interfaces (i.e., 6 modules x 4 ports).

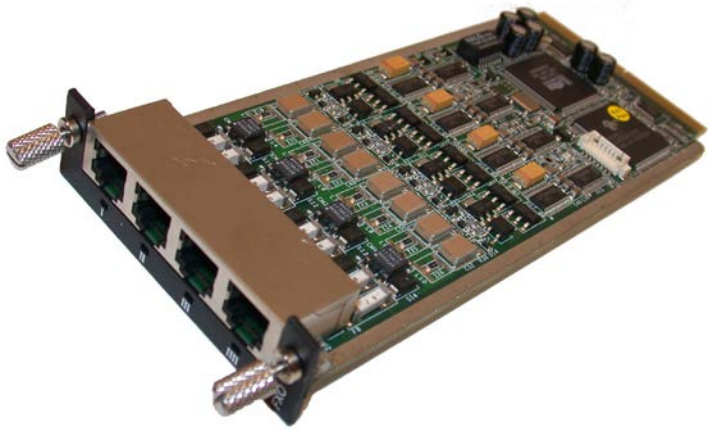
Notes:

- The standard FXO module supports outdoor and indoor (lightning protection) loop-start signaling. The **FXO G** module supports both loop- and ground-start signaling (but only supports indoor protection).
- To enable ground-start signaling, use the *ini* file parameter GroundKeyDetection (refer to the device's *User's Manual*).

3.2.2.1 Port Description

Each FXO module provides up to four analog RJ-11 ports. The ports are labeled **I**, **II**, **III**, and **IIII**.

Figure 3-3: FXO Module



3.2.2.2 LED Description

Each FXO port provides a LED for indicating operating status, as described in the table below:

Table 3-4: FXO Module LED Description

Color	State	Description
Green	On	Off-hooks the line toward the PBX.
	Blinking	Detects a ring signal from the PBX.
Red	On	Error - malfunction in line or out of service due to Serial Peripheral Interface (SPI) failure.

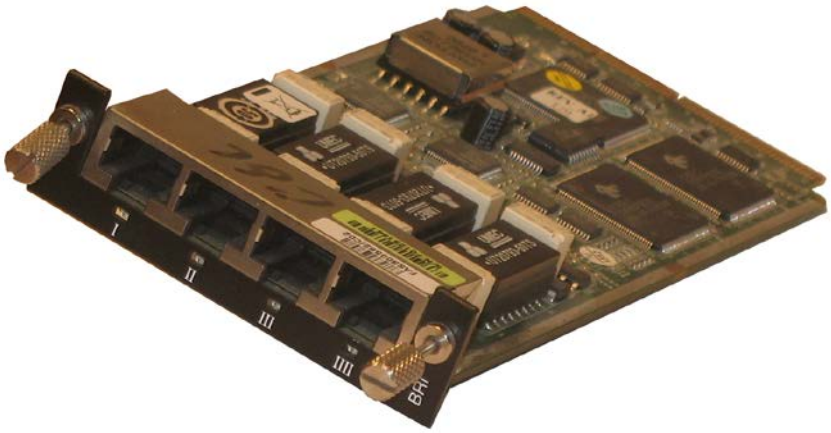
3.2.3 BRI Module

The BRI module provides the Integrated Services Digital Network (ISDN), Basic Rate Interface (BRI) interfaces. Up to five BRI modules can be installed in the device. Each BRI module can provide up to four BRI line interfaces and therefore, the device can support up to 20 BRI interfaces (i.e., 5 modules x 4 ports).

3.2.3.1 Port Description

Each BRI module provides up to four analog RJ-45 ports. The ports are labeled **I**, **II**, **III**, and **IIII**.

Figure 3-4: BRI Module



3.2.3.2 LED Description

Each BRI port provides a LED for indicating operating status, as described in the table below:

Table 3-5: BRI Module LED Description

Color	State	Description
Green	On	Physical layer (Layer 1) is synchronized (normal operation).
Red	On	Physical layer (Layer 1) is not synchronized.
-	Off	Trunk is not active.

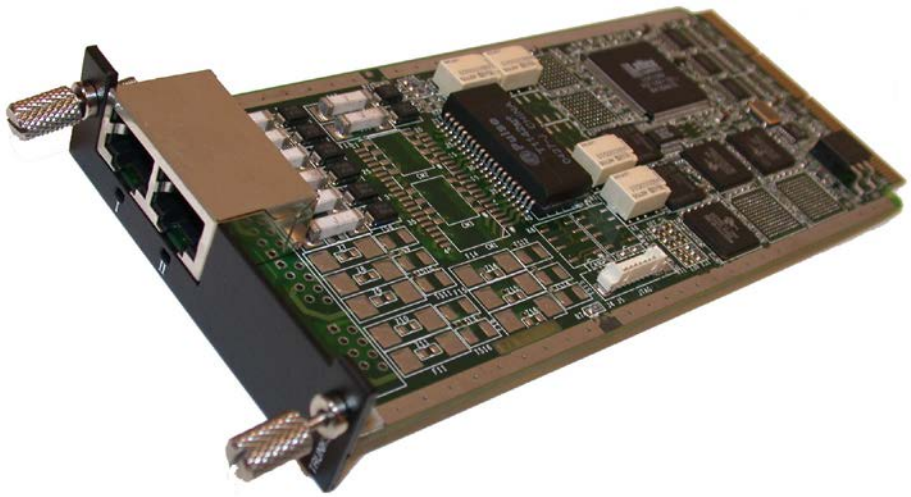
3.2.4 TRUNKS (E1/T1) Module

The device supports up to four digital E1/T1/J1 trunks. If the power fails, a relay connects Trunk 1 to Trunk 2 (in the same module) acting as a fallback for PSTN trunk.

3.2.4.1 Port Description

The module is available in 1-, 2-, or 4-span configurations, providing RJ-48c ports. The ports are labeled **I**, **II**, **III**, and **IIII**.

Figure 3-5: TRUNKS Module



3.2.4.2 LED Description

Each Trunk port provides a LED for indicating operating status, as described in the table below:

Table 3-6: E1/T1 PRI TRUNKS Module LED Description

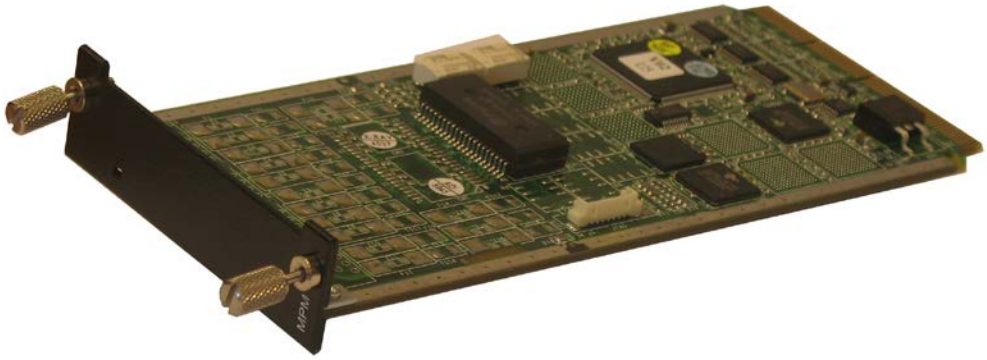
Color	State	Description
Green	On	Trunk is synchronized (normal operation).
Red	On	Loss due to any of the following signals: ▪ LOS - Loss of Signal ▪ LOF - Loss of Frame ▪ AIS - Alarm Indication Signal (the Blue Alarm) ▪ RAI - Remote Alarm Indication (the Yellow Alarm)
-	Off	Failure / disruption in the AC power supply or the power is currently not being supplied to the device through the AC power supply entry.

3.2.5 Media Processing Module (MPM)

The device supports up to three MPMs for IP media server capabilities (i.e., conferencing, SBC, and IP-to-IP routing applications). Depending on required configuration, the MPM can be housed in chassis slots 3, 4, 5, or 6.

Note: For a description on channel resources using MPMs, see the device's *User's Manual.*

Figure 3-6: Media Processing Module (MPM)



The module features a LED, described in the table below.

Table 3-7: MPM LED Description

Color	Description
Green	Following insertion of the MPM into the slot and an automatic hardware compatibility check, the LED lights up green to indicate (1) that the general status of the MPM is 'OK' and (2) that the device supports the module.
Red	If the LED lights up red following insertion of the MPM into the slot and the automatic hardware compatibility check, it indicates that the status of the MPM is 'General Failure', i.e., a hardware compatibility problem occurred or the DSPs cannot be identified. Contact support@audiocodes.com if you purchased the device / MPM from AudioCodes or if you're subscribed to AudioCodes Customer Technical Support (ACTS).

3.2.6 CRMX Module

The CRMX module supports data routing, switching, security, and voice security (SBC) capabilities.

3.2.6.1 Port Description

The CRMX module provides three LAN ports, a WAN port (available in different interfaces), and an RS-232 interface port, as shown in the figure below and described in the subsequent table.

Figure 3-7: CRMX Module (Example with WAN GbE)

Table 3-8: CRMX Module Port Description

Label	Component Description
0/1(LAN), **0/2(LAN)**, **0/3(LAN)**	10/100/1000Base-T Ethernet LAN ports for connecting computers and/or switches.
|O|O	RS-232 port for accessing the CLI. A 9-pin DB adaptor cable is supplied.
-	Reset pinhole button for resetting the device and restoring the device to factory defaults. This is done as follows: With a paper clip or any other similar pointed object, press and hold down the Reset button for **at least 12 seconds** (but **no longer than 25 seconds**).
0/0(WAN) - or – **SHDSL WAN**	WAN interface – type depends on CRMX module: • **CRMX-C:** RJ-45 port (4-twisted pair copper cabling) providing 1 Gigabit Ethernet (GbE) interface for connection to the Internet. • **CRMX-S:** 1000Base-SX optical fiber port (multi-mode fiber) • **CRMX-L:** 1000Base-LX optical fiber port (single-mode fiber). • **CRMX-SD:** Symmetric High-Speed Digital Subscriber Line (SHDSL) RJ-45 port (4 wire pairs).

3.2.6.2 LED Description

The LAN and WAN ports on the CRMX module provide LEDs for indicating operating status.

3.2.6.2.1 LAN LED

The following table describes the LAN LED.

Table 3-9: LAN LED Description

LED Color	LED State	Description
Green	On	Ethernet link established.
	Flashing	Data is being received or transmitted.
-	Off	No Ethernet link.

3.2.6.2.2 WAN Ethernet LED

The following table describes the LED for the WAN Ethernet port.

Table 3-10: WAN Ethernet LED Description

LED Color	LED State	Description
Green	On	WAN link established.
	Flashing	Data is being received or transmitted.
-	Off	No WAN link.
-	Off	No power received by the device.

3.2.6.2.3 WAN SHDSL LED

The following table describes the LED for the WAN SHDSL port.

Table 3-11: WAN SHDSL LED Description

LED Color	LED State	Description
Green	On	At least one of the links is synchronized (data received and transmitted).
	Fast Flashing	At least one of the links is negotiating with peers.
	Slow Flashing	SHDSL firmware is running.
-	Off	No WAN link or no power received by the device.

3.2.7 Power Supply Module and LED Description

The device can house up to two extractable power supply modules (Power 1 and Power 2), each providing an AC power connector on the device's rear panel. The dual power option provides the device with power redundancy.

Figure 3-8: Power Supply Module

Table 3-12: Power Supply Module LED Description

LED	Color	State	Description
POWER	**Green**	On	Power supply is operating correctly.
	-	Off	Failure / disruption in the AC supply, or the power is currently not being supplied to the device through the AC power supply entry.

3.3 Rear Panel Description

The Mediant 1000B supports up to eight single and mid-sized Advanced Mezzanine Card (AMC) / AdvancedMC form-factor modules on its rear panel, used for the OSN3 platform. The chassis front panel is displayed in the figure below and described in the subsequent table.

Figure 3-9: Rear Panel

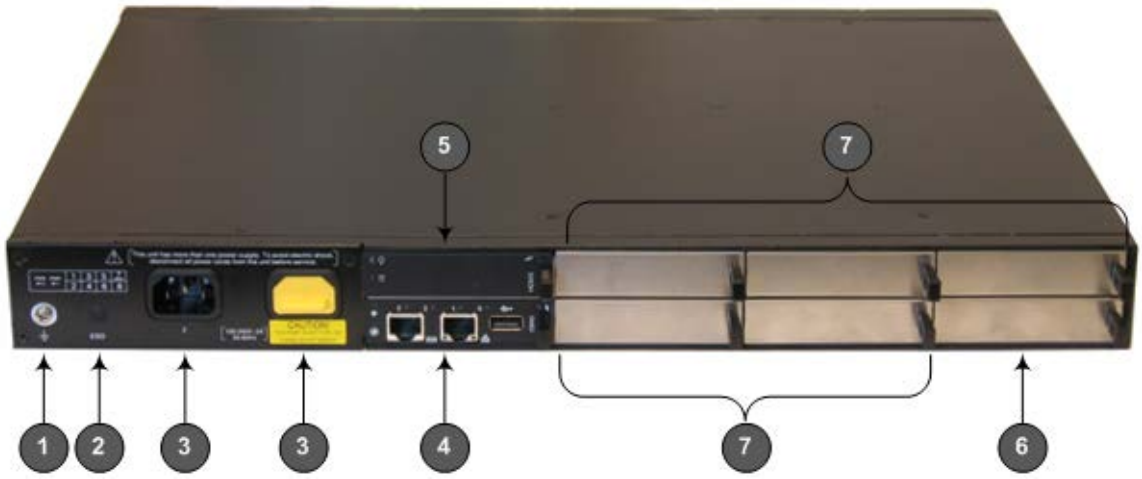


Table 3-13: Rear-Panel Description

Item #	Label	Description
1	⏚	Protective earthing screw.
2	ESD	Electrostatic Discharge (ESD) socket.
3	100-240V~1A	Dual AC Power Supply Entries.
4	OSN3	OSN3 AMC module.
5	HDMX	Main hard-disk drive (HDD) AMC module for OSN3 platform.
6	HDMX	Slot for second (optional) HDD for OSN3 platform.
7	-	Unused and covered AMC module slots.

Notes:

- The AMC chassis slots must **only** be installed with AMC modules that have been approved and homologated by AudioCodes.
- The OSN3 module can be customer ordered with the serial port type as RJ-45 or mini USB B-type.
- For installing the OSN3 platform, see Appendix A on page 57.

4 Mounting the Device

The device can be mounted in one of the following ways:

- Placed on a desk top (see Section 4.1 on page 27)
- Installed in a standard 19-inch rack (see Section 4.2 on page 28)

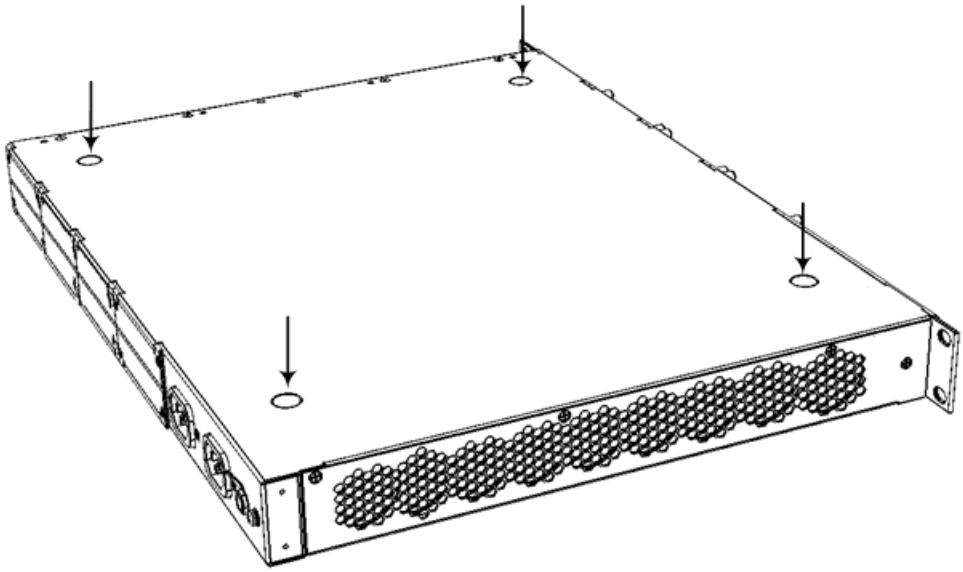
4.1 Desktop Mounting

The device can be mounted on a desktop by attaching the four anti-slide bumpers (supplied) to the underside of the device. Once you have attached these bumpers, simply place it on a desktop in the desired position.

➢ **To attach the anti-slide rubber bumpers to the device:**

1. Flip the device over so that its underside faces up.
2. Locate the four anti-slide grooves on the underside -- one on each of the four corners.

Figure 4-1: Location of Grooves for Rubber Feet



3. Peel off the adhesive, anti-slide rubber feet and stick one in each anti-slide groove.
4. Flip the device over again so that it rests on its underside and place it in the required position on a desktop.

4.2 19-inch Rack Mounting

The device can be installed in a standard 19-inch rack. You can mount it in the rack using any one of the following mounting options:

- (**Recommended**) Mounting the chassis on a pre-installed shelf in a 19-inch rack – see Section 4.2.1 on page 28.
- Mounting the chassis in a 19-inch rack by attaching it to the rack posts using the pre-installed front mounting brackets – see Section 4.2.2 on page 29.
- Mounting the chassis in a 19-inch rack by attaching it to the rack posts using the pre-installed front mounting brackets and the rear mounting brackets (customer ordered) – see Section 4.2.3 on page 30.

Rack Mount Safety Instructions

When installing the chassis in a rack, adhere the following safety instructions:

- **Elevated Operating Temperature:** If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) of 40°C (104°F).
- **Reduced Air Flow:** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation on the equipment is not compromised.
- **Mechanical Loading:** Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- **Circuit Overloading:** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- **Reliable Earthing:** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips.)

4.2.1 Mounting in a 19-inch Rack using a Pre-Installed Shelf

The device can be placed on a pre-installed shelf in a 19-inch rack, as described below.

➢ **To mount the device on a pre-installed shelf in the rack:**

1. Make sure that your rack shelf is secured to the rack posts and in a horizontal level position in the rack.
2. Place the device on the pre-installed shelf in the rack.
3. Position the chassis so that the front mounting brackets are flush against the front rack posts and that the holes of the brackets align with the holes on the posts.
4. Secure the front-mounting brackets to the rack posts using standard 19-inch rack bolts (not supplied). This step is crucial in that it prevents the chassis from accidently sliding off the shelf.

4.2.2 Mounting in a 19-inch Rack using Front Mounting Brackets

The device can be mounted in a 19-inch rack by attaching it to the rack's frame, as described below.

Warnings:

- At least **two** people are required to mount the device in the 19-inch rack.
- For extra support for the chassis, you can also mount the device in the rack using optional, rear mounting brackets (orderable item). For instructions, see Section 4.2.3 on page 30.

➢ **To mount the device in a 19-inch rack using front mounting brackets:**

1. With two people, lift the chassis into the rack from the front of the rack.
2. Hold the chassis for support while the second person positions the chassis so that the front mounting brackets are flush against the front rack posts and that the holes of the brackets align with the holes on the posts.

Note: Make sure that the left and right front-mounting brackets are attached at the same level in the rack posts so that the chassis is supported in a horizontal position.

3. Hold the chassis in position while the second person secures the two front mounting brackets to the front posts, using 19-inch rack bolts (not supplied) to the rack posts.

4.2.3 Mounting in a 19-inch Rack using Rear Mounting Brackets

The device can also be mounted in a 19-inch rack, using an optional, rear-mounting bracket, in addition to the front mounting brackets. The rear mounting brackets provide extra weight support for the chassis. The rear-rack mounting brackets attach the rear of the chassis to the two rear-mounting posts. The length of the rear-rack mounting brackets is adjustable to suit the distance between the chassis' rear-mounting holes and the rear-mounting posts.

The rear mounting brackets can be ordered as an accessory item, Rear-Rack Mounting Bracket kit, which is available as Spare Parts (i.e., a separate orderable item). The customer part number (CPN) for ordering this kit is **M-REAR-RMK1**.

Warnings:

- At least **two** people are required to mount the device in the 19-inch rack.
- When attaching the device to the rack using the rear mounting brackets, it is **mandatory** to also attach the front mounting brackets.
- To allow extraction and insertion of modules on the rear panel, make sure that the distance between the rear panel and the rear rack posts is at least 580 mm. Thus, card extraction can be done without disassembling the rear mounting brackets.

➢ **To mount the device in a 19-inch rack with front and rear mounting brackets:**

1. Open the supplied Adjustable Rear Mounting Bracket kit and remove its contents. The kit includes the following items:

Rear Mounting Bracket x 2

Rear Mounting Flange x 2

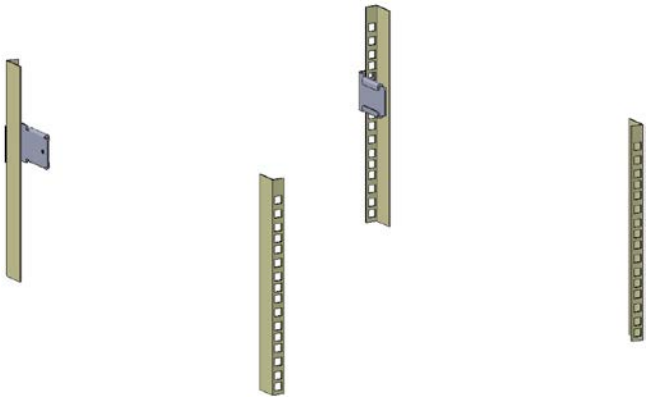
 x 2

 x 6

The length of the rear mounting brackets can be adjusted from 593 to 627 mm, to suit the distance between the chassis and the rear post.

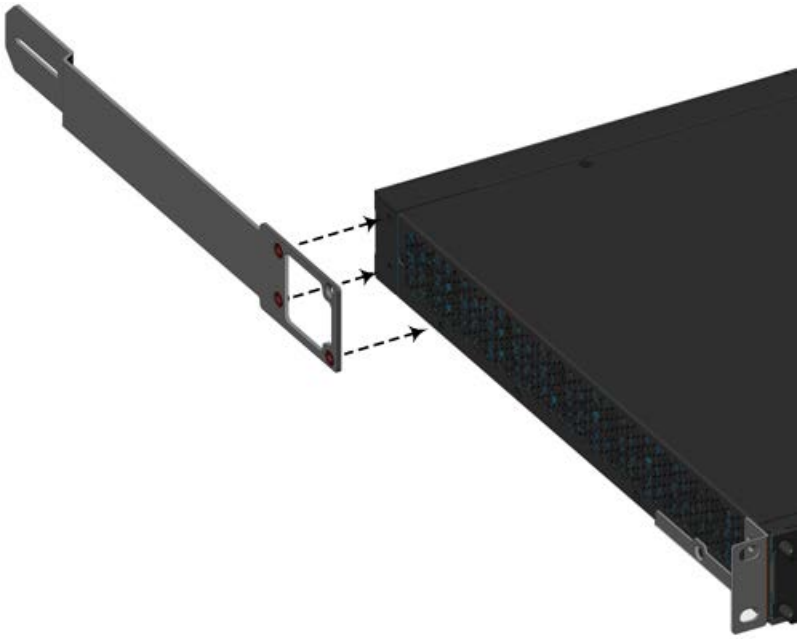
2. Attach the two rear mounting brackets to the two rear rack posts, using two screws (not supplied) for each bracket. Make sure that you attach the brackets at the same height level in the rack. See the figure below for correct orientation of the brackets when attaching them to the posts.

Figure 4-2: Rear Mounting Brackets Attached to Rear Rack Posts



3. Attach the flanges of the adjustable rear mounting brackets to the rear sides of the chassis, using the six supplied screws (three per bracket).

Figure 4-3: Attaching Rear Mounting Bracket Flange to Chassis' Rear-Side Mounting Holes



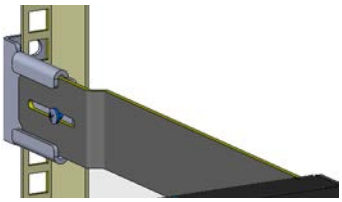
4. With two people, lift the chassis into the rack from the front of the rack.

5. Slide the two rear mounting bracket flanges into the slide rails of the rear mounting brackets that you previously attached to the rear posts.

Figure 4-4: Sliding the Rear Mounting Flanges into the Rear Mounting Brackets

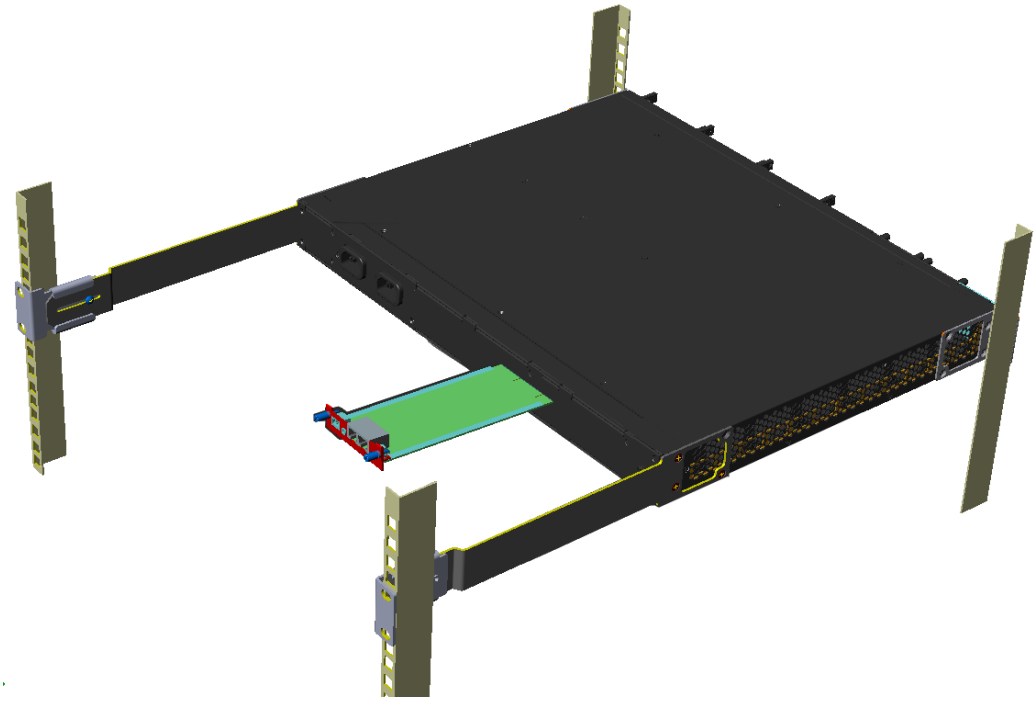
6. Hold the chassis in position while the second person secures the rear mounting flanges to the rear mounting brackets. Insert the supplied screw (6-32 x 5/16 inch) from the inside of the rack, through the flange's grid and into the screw hole on the rear mounting bracket. Finger-tighten the screw, but make sure that the screw is not fully tightened and that the flange can move on the slide rails of the rear mounting bracket.

Figure 4-5: Fastening Rear Mounting Flange to Rear Mounting Bracket



7. Hold the chassis for support while the second person positions the chassis so that the front mounting brackets are flush against the front rack posts and that the holes of the brackets align with the holes on the posts.

Figure 4-6: Front Mounting Brackets Flush and Aligned with Front Rack Posts



8. Hold the chassis in position while the second person secures the front mounting brackets to the front posts, by finger-tightening 19-inch rack bolts (not supplied) to the rack posts. Do this for both front-mounting brackets (left and right side).
9. Tighten the bolts on the front mounting brackets.
10. With a Philips screwdriver, tighten the screw that secures the rear mounting flange to the rear mounting bracket.

Notes:

- Make sure that all the mounting brackets are attached at the same level to the mounting posts so that the chassis is supported in a horizontal position.
- If the depth of the rack exceeds the maximum length of the adjustable rear mounting brackets, install an additional side rack post to accommodate the length of the rear mounting bracket.

Reader's Notes

5 Cabling the Device

This section describes how to cable the device:

- Connecting to earth or ground (see Section 5.1 on page 35)
- Connecting to the WAN (see Section 5.2 on page 36)
- Connecting to the LAN (see Section 5.3 on page 39)
- Connecting to Analog Devices (see Section 5.4.2 on page 41)
- Connecting the Analog Lifeline (see Section 5.4.3 on page 41)
- Connecting to BRI lines (see Section 5.5.1 on page 43)
- Connecting the PSTN Fallback for BRI lines (see Section 5.5.2 on page 44)
- Connecting to E1/T1 trunks (see Section 5.6.1 on page 45)
- Connecting the E1/T1 trunks for PSTN Fallback (see Section 5.6.2 on page 46)
- Connecting to a PC for serial communication (see Section 5.7 on page 47)
- Connecting to power (see Section 5.8 on page 49)

5.1 Grounding the Device

The procedure below describes how to ground the device.

Protective Earthing

The equipment is classified as Class I EN 60950 and UL 60950 and must be earthed at all times (using an equipment-earthing conductor).

- **Finland:** "Laite on liltettava suojamaadoituskoskettimilla varustettuun pistorasiaan."
- **Norway:** "Apparatet rna tilkoples jordet stikkontakt."
- **Sweden:** "Apparaten skall anslutas till jordat uttag."

➢ **To ground the device:**

1. Connect an electrically earthed strap of 16 AWG wire (minimum) to the chassis' earthing screw (located on the rear panel), using the supplied washer.

Figure 5-1: Grounding the Device

2. Connect the other end of the strap to a protective earthing. This should be in accordance with the regulations enforced in the country in which the device is installed.

5.2 Connecting to WAN

This section describes how to connect to the WAN. The type of WAN port interface depends on the CRMX module installed in the chassis and can be one of the following:

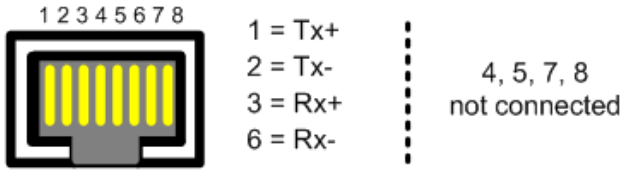
- RJ-45 port (4-twisted pair copper cabling) providing 1 Gigabit Ethernet (GbE) interface (see Section 5.2.1 on page 36)
- 1000Base-SX optical multi-mode fiber port (see Section 5.2.2 on page 36)
- 1000Base-LX optical single-mode fiber port (see Section 5.2.2 on page 36)
- RJ-45 Symmetric High-Speed Digital Subscriber Line (SHDSL) interface port (see Section 5.2.3 on page 38)

5.2.1 Gigabit Ethernet Copper Cabling

The procedure below describes how to connect to the WAN through the 100/1000Base-TX Gigabit Ethernet RJ-45 port provided on the CRMX-C module.

An RJ-45 cable connector with the following pinouts is used:

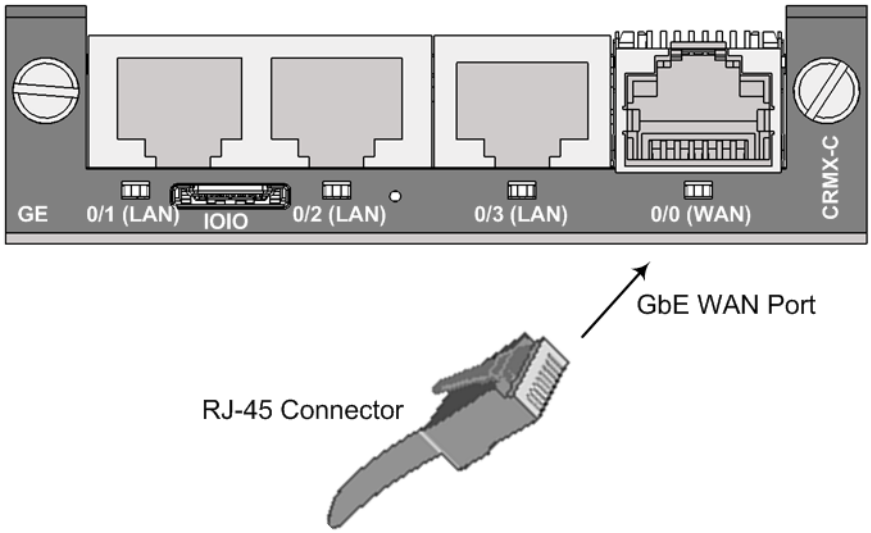
Figure 5-2: RJ-45 Connector Pinouts for WAN Ethernet



➢ **To connect to the WAN using the GbE port:**

1. Attach one end of a straight-through RJ-45 Ethernet Cat 6 or Cat 5e (two-pair Category 5 UTP) cable to the module's WAN port, labeled **WAN**.

Figure 5-3: Connecting the GbE WAN Port



2. Attach the other end of the cable directly to the WAN network (e.g., to an ADSL or Cable modem).

5.2.2 Optical Fiber Cabling

The CRMX-S and CRMX-L modules provide a 1000Base-SX and 1000Base-LX Gigabit Ethernet optical fiber port (multi- or single-mode fiber), respectively. This port provides a

1.25 Gbps optical small form-factor pluggable (SFP) transceiver. To interface with this SFP transceiver, you need to provide (i.e., not supplied) the following items:

- **Cable:** twin, single-mode or multi-mode optic fiber
  - **Single-Mode Fiber 1000Base-LX:**
    - Input Sensitivity: -20 dBm maximum
    - Output Power: -9 dBm minimum; -3 dBm maximum
  - **Multi-Mode Fiber 1000Base-SX:**
    - Input Sensitivity: -18 dBm maximum
    - Output Power: -9 dBm minimum; -3 dBm maximum
- **Connector:** LC-type plug

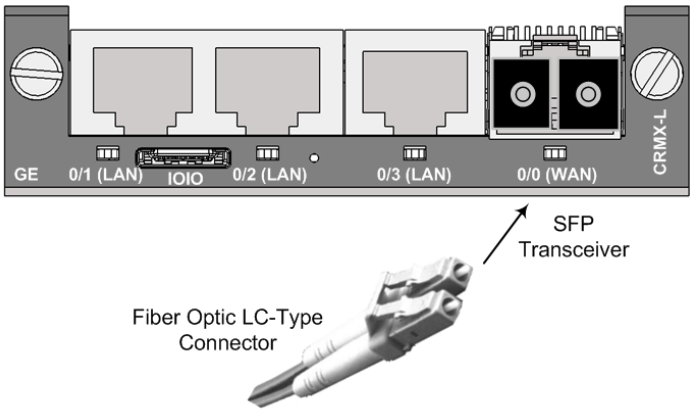
Caution Laser

- If the CRMX-S or CRMX-L modules are used, then the device is considered a Class 1 LED/Laser emitting device, as defined by 21CFR 1040 and IEC825.
- Do not stare directly into the beam or into fiber optic terminations as this can damage your eyesight.
- Avoid exposure to laser radiation by ensuring that you insert dust / EMI plugs into SFP transceiver modules to which no cables are connected. Laser radiation may be emitted from the aperture of the SFP transceiver modules when no cables are connected.
- Excessive bending of the fiber optic cable can cause distortion and signal losses. Ensure that you adhere to the minimum bending radius (and ratio) recommended by the fiber optic cable manufacturer.

➢ **To connect to the WAN using optical fiber cabling:**

1. Remove the protective dust plug covering the WAN port's SFP transceiver.
2. Connect the LC-type plugs at the end of the fiber optic cable to the WAN port's SFP transceiver (labeled **WAN**).

Figure 5-4: Connecting the SFP Fiber Optic WAN Port



3. Connect the other end of the cable to the fiber network.

5.2.3 SHDSL WAN Cabling

The CRMX-SD module provides a WAN connection through an SHDSL interface port. The SHDSL port has four wire-pairs, supporting up to four SHDSL ports on a single physical RJ-45 connector. The specifications of the SHDSL interface are listed below:

- Conforms to ITU G.991.2 Annexes A, B, E, F and G SHDSL
- Up to 5,696 Kbps over a single wire pair
- Up to 22,784 Kbps over four wire pairs bonding, according to SHDSL.bis (ITU G.991.2 Annexes F, G)
- EFM and ATM support
- Wetting current support on the CPE side, according to G991.2
- Supports both Central Office (CO) and CPE (wetting current on CO - excluded)
- TC-PAM 16/32 Line Code

An RJ-45 cable connector with the following pinouts is used:

Table 5-1: RJ-45 Connector Pinouts for SHDSL

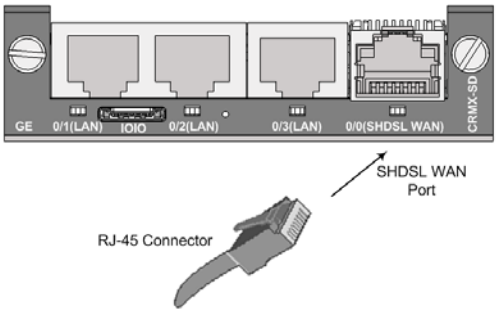
Pin	Function
4	CH0-TIP
5	CH0-RING
1	CH1-TIP
2	CH1-RING
3	CH2-TIP
6	CH2-RING
7	CH3-TIP
8	CH3-RING

Warning: Do **NOT** use an RJ-11 connector for SHDSL cabling; use only an RJ-45 connector as instructed in the below procedure.

➢ **To connect the SHDSL WAN port to an SHDSL access point:**

1. Connect an RJ-45 SHDSL cable to the device's SHDSL WAN port (labeled **SHDSL WAN**).

Figure 5-5: Connecting the SHDSL WAN Port



2. Connect the other end of the cable to the access point.

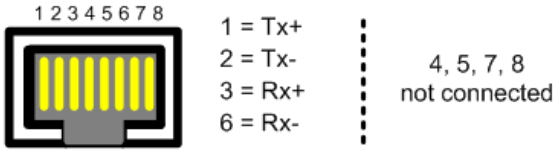
5.3 Connecting to LAN

The procedure below describes how to connect to the LAN (e.g., computer or switch). The CRMX module provides three 10/100/1000Base-T Gigabit Ethernet RJ-45 LAN ports.

Warning: Ethernet port interface cabling must be routed only indoors and must **not** exit the building.

An RJ-45 cable connector with the following pinouts is used:

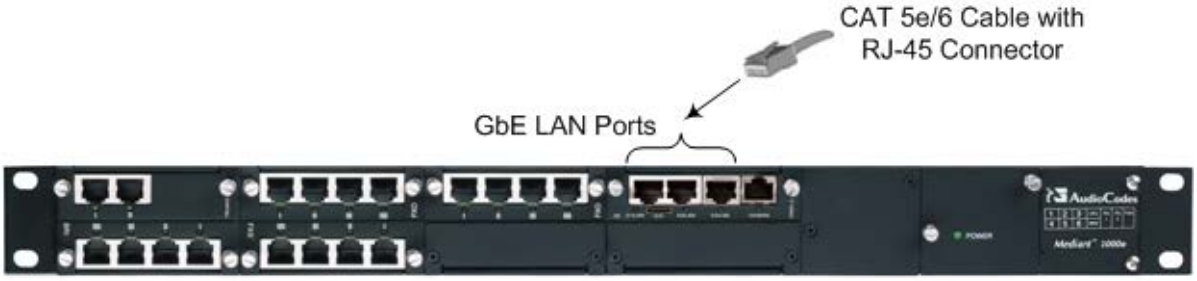
Figure 5-6: RJ-45 Connector Pinouts for LAN



➢ **To connect to the LAN:**

1. Using a straight-through RJ-45 Ethernet Cat 6 or Cat 5e (two-pair Category 5 UTP) cable, connect the CRMX module's LAN port/s (labeled **I**, **II**, and **III**) to the LAN.

Figure 5-7: Connecting to LAN Ports



2. Connect the other end of the cable to the network.

5.4 Connecting to Analog Devices

This section describes the cabling procedures for analog interfaces.

5.4.1 Connecting to FXS Interfaces

The procedure below describes how to connect to FXS interfaces such as fax machines, modems, and plain old telephone system (POTS) telephones.

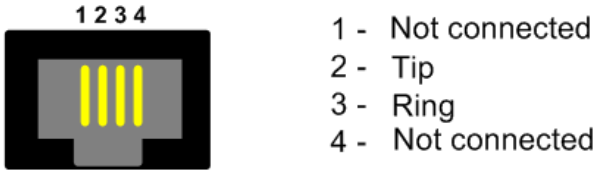
Warnings:

- The device is an **INDOOR** unit and thus, must be installed **only** indoors.
- FXS port interface cabling must be routed only indoors and must **not** exit the building.
- Make sure that FXS ports are connected to the appropriate external devices; otherwise, damage to the device may occur.
- The FXS ports are considered as TNV-2.

Note: This section is applicable only if your device is installed with an FXS module.

An RJ-11 cable connector with the following pinouts is used:

Figure 5-8: RJ-11 Connector Pinouts for FXS



➢ **To connect to FXS interfaces:**

- Using an RJ-11 connector, connect the FXS port/s to the required telephone interface.

5.4.2 Connecting to FXO Interfaces

The procedure below describes how to connect the FXO port interfaces to telephone exchange analog lines or PBX extensions.

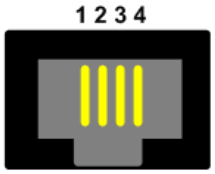
Warnings:

- The device does not include primary telecom protection! Additional protection (usually a 350V 3-pin Gas Arrestor as described in ITU-T K.44) must be provided at the entry point of the telecom wires into the building (usually on the main distribution frame or MDF), in conjunction with proper grounding. If primary protection is not implemented, permanent damage to the device may occur due to external power surges and/or lightning over the telecom lines.
- To protect against electrical shock and fire, use a 26 AWG min wire to connect FXO ports to the PSTN.
- Ensure that FXO ports are connected to the appropriate external devices; otherwise, damage to the device may occur.
- FXO ports are considered as TNV-3.

Note: This section is applicable only if your device is installed with an FXO module.

An RJ-11 cable connector with the following pinouts is used:

Figure 5-9: RJ-11 Connector Pinouts for FXO



1 - Not connected
2 - Tip
3 - Ring
4 - Not connected

➢ **To connect to FXO interfaces:**

■ Using an RJ-11 connector, connect the FXO port/s to the required telephone interface.

5.4.3 Connecting the FXS Lifeline Phone

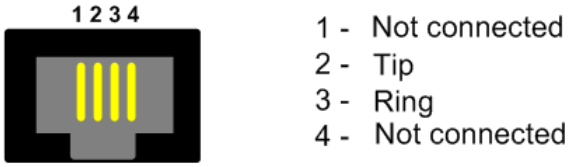
The device supports an analog Lifeline phone feature, whereby upon a power outage or IP network connectivity loss, IP calls are re-routed to the PSTN. Therefore, this feature guarantees call continuity.

Notes:

- Analog Lifeline is supported only on FXS modules.
- An analog Lifeline can be setup for each FXS module installed in the chassis.
- The scenarios (i.e., power outage and/or IP network loss) upon which Lifeline is triggered is configured by the LifeLineType parameter. For more information, see the *User's Manual*.

The analog Lifeline is provided only by Port **I** on an FXS module. This port connects to the POTS phone and the PSTN or PBX, using a splitter cable. The splitter cable connects pins 1 and 4 to another source of an FXS port, and pins 2 and 3 to the POTS phone, as shown in the figure below:

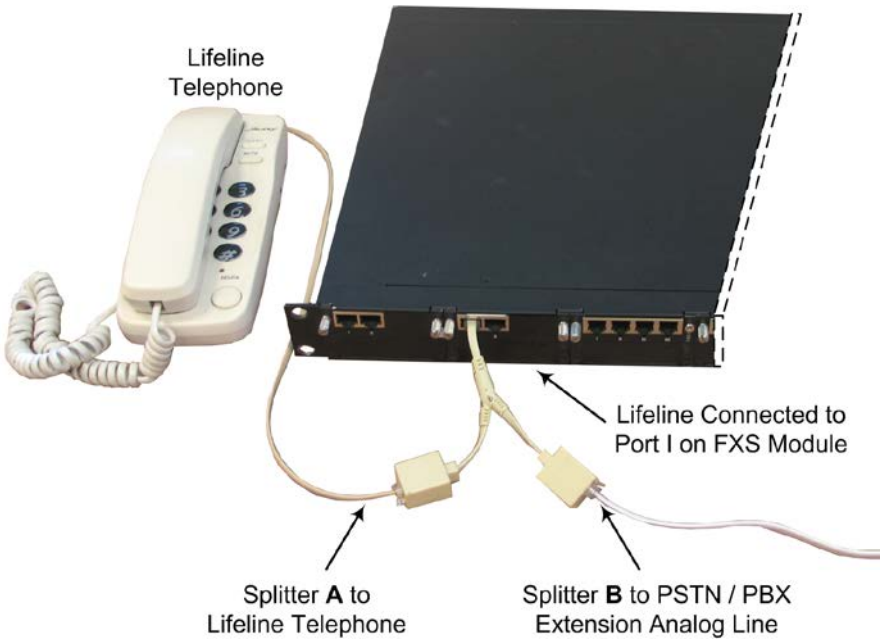
Figure 5-10: RJ-11 Connector Pinouts for Analog Lifeline



➢ **To cable the analog Lifeline:**

1. Connect the Lifeline Splitter (supplied) to Port **I** on an FXS module.
2. Connect the Lifeline POTS phone to Port **A** on the Lifeline Splitter.
3. Connect an analog PSTN line to Port **B** on the Lifeline Splitter.

Figure 5-11: Cabling the Analog Lifeline



5.5 ISDN BRI Interfaces

5.5.1 Connecting to BRI Lines

The procedure below describes how to connect to BRI lines.

Warning: To protect against electrical shock and fire, use a 26 AWG min wire to connect the BRI ports to the PSTN.

Note: This section is applicable only if your device is installed with a BRI module.

➢ **To connect to BRI lines:**

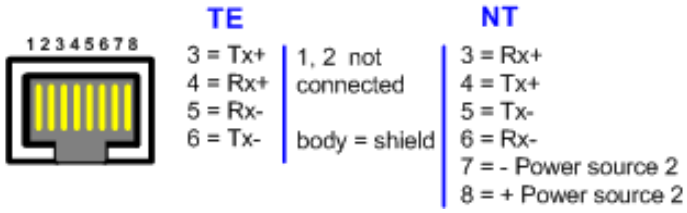
1. Connect the BRI cable to the device's BRI RJ-45 port.

Figure 5-12: Connecting BRI Ports

2. Connect the other end of the cable to your ISDN telephone or PBX/PSTN switch.

A BRI port can be configured either as TE (Termination Equipment/user side) or NT (Network Termination/network side). The connector pinouts vary according to the configuration, as shown below:

Figure 5-13: RJ-45 Connector Pinouts for BRI



When configured as NT, the BRI port drives a nominal voltage of 38 V with limited current supply of up to 100 mA. The voltage is of Power Source 1 type (line voltage). Power Source 2 is optional.

5.5.2 Connecting the PSTN Fallback for BRI Lines

The device supports a PSTN Fallback feature for BRI lines, whereby if a power outage or IP connectivity problem (e.g., no ping) occurs, IP calls are re-routed to the PSTN. This guarantees call continuity.

PSTN Fallback is supported if the device houses one or more BRI modules, where each BRI module provides two or four spans.

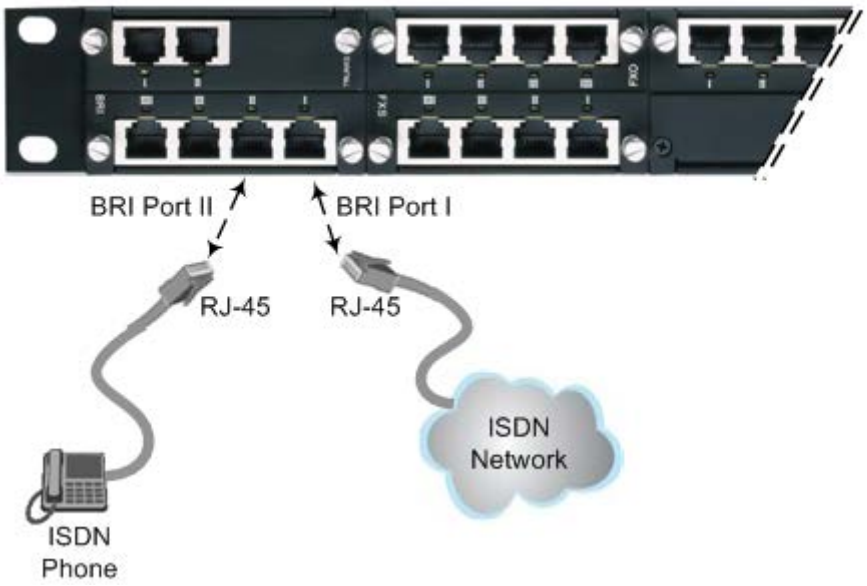
In the event of a PSTN fallback, the BRI module's metallic relay switch automatically connects line Port 1 (**I**) to Port 2 (**II**), and / or line Port 3 (**III**) to Port 4 (**IIII**) of the same BRI module.

For example, if a PBX trunk is connected to Port 1 and the PSTN network is connected to Port 2, when PSTN Fallback is activated, calls from the PBX are routed directly to the PSTN through Port 2.

➢ **To connect the BRI line interfaces for 1+1 PSTN Fallback:**

1. Connect line 1 to a PBX.
2. On the same BRI module, connect line 2 to the PSTN.

Figure 5-14: Cabling (Ports 1 and 2) PSTN Fallback



Notes:

- PSTN Fallback is supported only on the BRI module.
- PSTN Fallback is supported only between ports on the same BRI module.
- The scenarios that trigger PSTN Fallback (i.e., power outage and/or IP network loss) are configured by the **TrunkLifeLineType** parameter.
  For more information, see the *User's Manual*.
- This PSTN Fallback feature has no relation to the PSTN Fallback Software Upgrade Key.

5.6 ISDN E1/T1 Interfaces

5.6.1 Connecting to E1/T1 Trunks

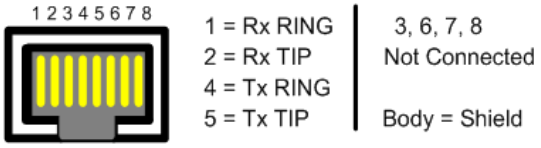
The procedure below describes how to connect to E1/T1 trunks.

Warning: To protect against electrical shock and fire, use a 26 AWG min wire to connect T1 or E1 ports to the PSTN.

Note: This section is applicable only if your device is installed with a TRUNKS module.

An RJ-48c trunk cable connector with the following pinouts is used:

Figure 5-15: RJ-48c Connector Pinouts for E1/T1



➢ **To connect to E1/T1l trunks:**

1. Connect the E1/T1 trunk cables to the ports on the device's TRUNKS module(s).

Figure 5-16: Cabling E1/T1 Trunk Ports

2. Connect the other end of the trunk cables to a PBX/PSTN switch.

5.6.2 Connecting the PSTN Fallback for E1/T1

The device supports a PSTN Fallback feature, whereby upon a power outage or IP connectivity problem (e.g., no ping), IP calls are re-routed to the PSTN. This guarantees call continuity.

PSTN Fallback is supported if the device houses one or two E1/T1 ("TRUNKS") modules, where each module provides two or four spans. In the event of a PSTN fallback, the module's metallic relay switch automatically connects trunk Port 1 (**I**) to Port 2 (**II**), and / or trunk Port 3 (**III**) to Port 4 (**IIII**) of the same module. For example, if a PBX trunk is connected to Port 1 and the PSTN network is connected to Port 2, when PSTN Fallback is activated, calls from the PBX are routed directly to the PSTN through Port 2.

➢ **To connect the digital trunk interfaces for 1+1 PSTN Fallback:**

1. Connect Trunk 1 to a PBX.
2. On the same TRUNKS module, connect Trunk 2 to the PSTN.

Figure 5-17: Cabling (Ports 1 and 2) PSTN Fallback

Notes:

- PSTN Fallback is supported only by the TRUNKS module.
- PSTN Fallback is supported only between ports on the same TRUNKS module.
- PSTN Fallback is supported only for ISDN when the number of supported channels (e.g., 30) is less than the maximum number of possible channels provided by the physical ports (e.g., two E1 trunks). When the number of supported channels (e.g., 60) equals the maximum number of channels provided by the physical ports (e.g., two E1 trunks), then other protocols such as CAS are also supported.
- The scenarios (i.e., power outage and/or IP network loss) upon which PSTN Fallback is triggered is configured by the TrunkLifeLineType parameter. For more information, see the *User's Manual*.
- This PSTN Fallback feature has no relation to the PSTN Fallback Software Upgrade Key.

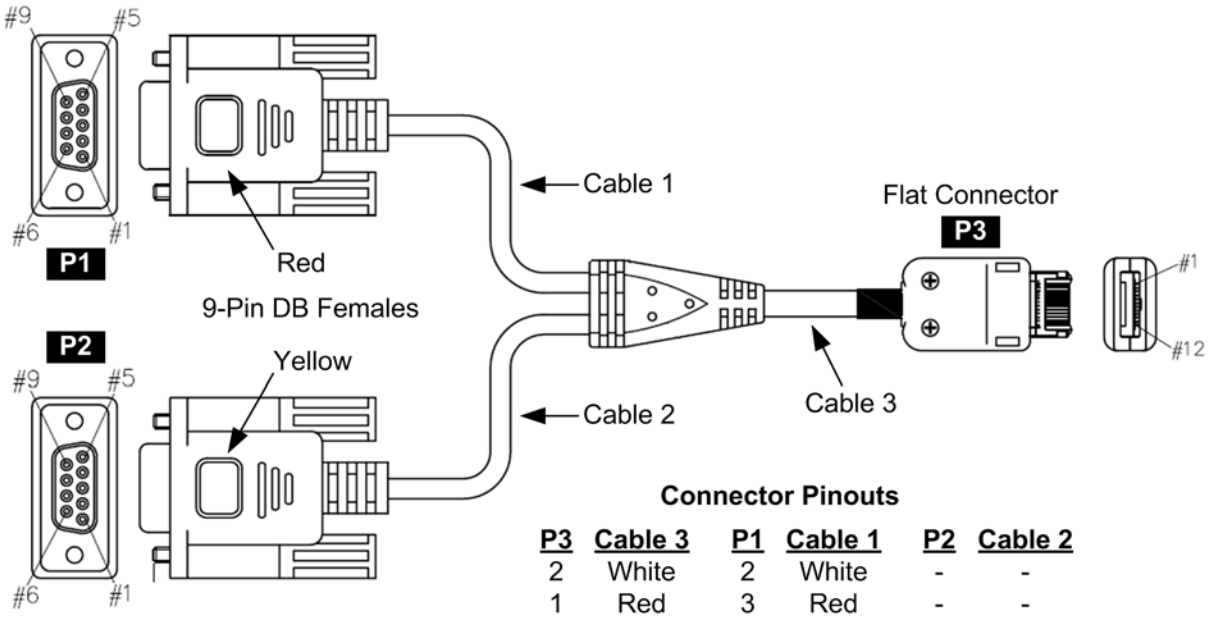
5.7 Connecting the RS-232 Serial Interface to a Computer

The device's RS-232 interface port is used to access the CLI for serial communication.

- **Connector Type:** 12-pin female LX40-12P Hirose connector
- **Connector Pinouts:** Refer to pinouts shown in orderable RS-232 cable adaptor below.

You can purchase an RS-232 cable adapter (9-pin DB to flat connector) from AudioCodes, using the Product Number (P/N) **PicoBlade-Serial**. This orderable item is supplied in a kit of 10 cables. "P1" and "P2" are standard 9-pin DB for PC COM connectivity; "P3" is the Hirose male connector.

Figure 5-18: Orderable RS-232 Cable Adapter



Connector Pinouts

P3	Cable 3	P1	Cable 1	P2	Cable 2
2	White	2	White	-	-
1	Red	3	Red	-	-
4	Brown	-	-	2	White
3	Black	-	-	3	Red
8	Orange	5	Black	-	-
9	Yellow	-	-	5	Black

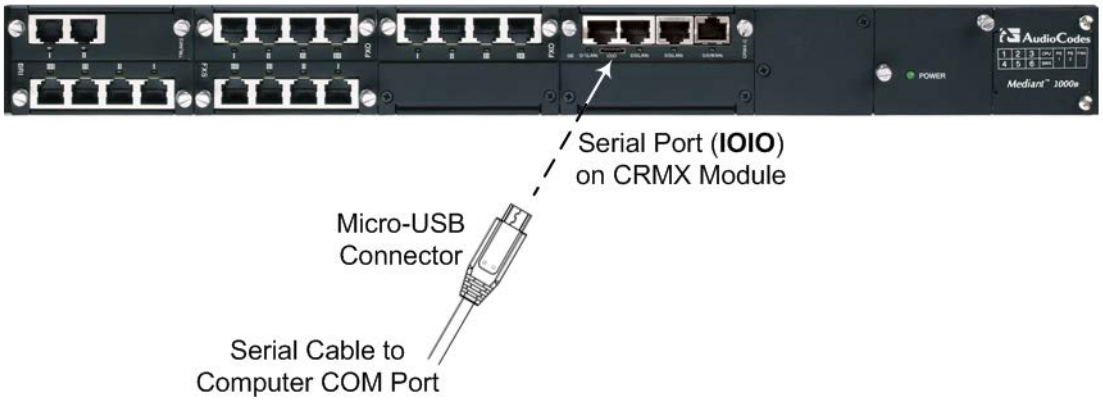
Note: Orderable RS-232 cable adapter:

- Conductive 30 (7/0.1)x3C, Tinned copper wire. PVC Coating dia=0.7mm, Color black. Shield: AL (MAYLER)+BRAID (16/4/0.12) Tinned copper wire, coverage 90% min. Assembly cotton paper. Jacket PU (4485AF), dia=3.5mm.
- Conductive 30 (7/0.1)x6C, Tinned copper wire. PVC Coating dia=0.6mm, Color black. Shield: AL (MAYLER)+BRAID (16/4/0.12) Tinned copper wire, coverage 90% min. Filler cotton yarn. Assembly cotton paper. Jacket PU (4485AF), dia=4mm.
- Operation Temp: -10 c ->+80 c
- Insulation resistance: DC/100V 5M OHM MIN.
- Withstand Voltage: AC/250V 2mA, for one minute.
- Continuity test: 100%.
- RoHS Note: All materials composing this item should comply with the requirements of directive 2002/95/ec on the restriction of the use of certain hazardous substances in electrical and electronic equipment
- UL Note: Cable components according to UL standard.

➢ **To connect the serial interface port to a computer:**

1. Connect the flat connector (labeled "P3" in the figure above) to the serial port (labeled **1010**) on the device's CRMX module.

Figure 19: Serial Connection with PC for CLI Communication



2. Connect the DB-9 connector labeled "P1" (red) to the COM1 or COM2 RS-232 communication port of your computer.

Notes:

- The RS-232 port is not intended for permanent connection.
- The DB-9 connector labeled "P2" is used only for debugging.

5.8 Connecting to Power

The procedure below describes how to connect the device to the AC power supply.

Warnings:

- Units must be connected (by service personnel) to a socket-outlet with a protective earthing connection.
- Use only the AC power cord supplied with the device.

ご注意

本製品に添付の電源ケーブルは、Mediant 1000B MSBR に専用設計されているため、汎用性がありません. 本電源ケーブルを他の機器に使用されないよう、ご注意ください.

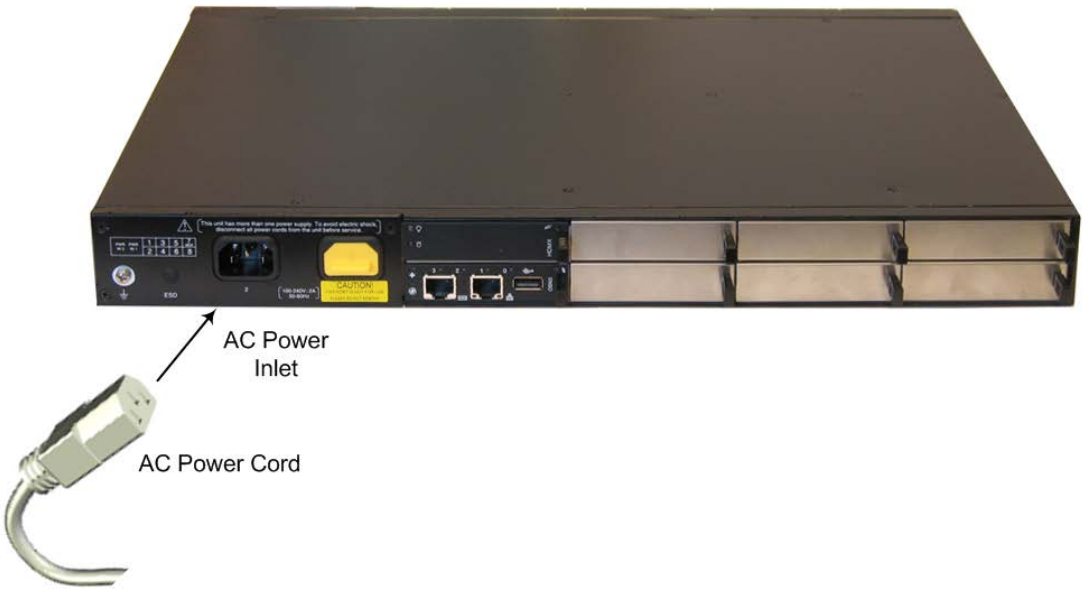
Notes:

- You can install up to two Power Supply modules (Power 1 and Power 2), each providing an AC power connector on the device's rear panel. The dual power option provides the device with power redundancy. If both power units are used (for load sharing - failure protection / redundancy), ensure that you connect each power supply unit to a different AC supply circuit. For installing the Power Supply modules in the chassis, see Section 6.1.3 on page 53.
- The two AC power sources must have the same ground potential.
- When the chassis houses two Power Supply modules, you must configure the device to send an SNMP alarm (acPowerSupplyAlarm) upon a failure or removal of any of the installed Power Supply modules. For enabling this functionality, use the ini file parameter, Mediant1000DualPowerSupplySupported. For more information, see the *User's Manual*.

➢ **To connect the device to the power supply:**

- On the device's rear panel, connect the left (active) 100-240V~50-60 Hz power socket to a standard electrical outlet using the supplied AC power cord.

Figure 20: Connecting to Power



When the device receives powers, the **POWER** LED on the front panel of the Power Supply module is lit green. If the LED is off, a power supply problem may be present.

6 Hardware Maintenance

The device is a modular chassis and allows you to order any module as a Field Replacement Unit (FRU). This section describes the procedures for installing or replacing modules.

Warning: To prevent static electrical damage to the module's printed circuit board, do not touch the components on the module. Instead, hold the module only on the edges where no electrical components are located.

Note: Cover all unoccupied module slots with blank panels. This ensures optimal internal airflow pressure within the chassis.

6.1 Installing and Replacing Modules

This section describes step-by-step procedures for installing or replacing modules.

Warning: Make sure that all unoccupied module slots are covered with blank panels. This prevents dust from entering the chassis' and ensures even air flow within the chassis for cooling.

6.1.1 Module Slot Assignment

The device's front-panel chassis provides slots (numbered as shown in the figure below) for housing the main input/output (I/O) interface modules (i.e., **TRUNKS**, **BRI**, **FXS**, **FXO**, **MPM**, and **CRMX**).

Figure 6-1: Module Chassis Slot Assignment

<table>
<tr><td>Slot #1
I/O Module</td><td>Slot #2
I/O Module</td><td>Slot #3
I/O or MPM Module</td><td>CRMX Module</td><td rowspan="2">Spare Power Supply Slot</td><td rowspan="2">Main Power Supply Unit</td><td rowspan="2">Fan Tray Unit</td></tr>
<tr><td>Slot #4
I/O or MPM Module</td><td>Slot #5
I/O or MPM Module</td><td>Slot #6
I/O or MPM Module</td><td>Blank Panel</td></tr>
</table>

The guidelines for slot assignment for these modules include the following:

- The CRMX module must always be housed in the slot located to the left of the Spare Power Supply slot (as illustrated in the figure above).
- The TRUNKS, BRI, FXS, and FXO modules must be housed in consecutive slots. In other words, if the device houses three modules, then they must occupy slots 1, 2, and 3 (no skipping of slots).
- It is recommended to assign the TRUNKS, BRI, FXS, and FXO modules to the slots (starting from Slot 1) according to the order of priority listed below:
  1. TRUNKS
  2. BRI
  3. FXS and/or FXO

For example, if the device requires one TRUNKS module and two FXS modules, then you must insert the TRUNKS module in Slot 1 and the two FXS modules in slots 2 and 3 respectively. If at a later stage, you wish to add a BRI module (for example), then you must replace the FXS module in Slot 2 with the new BRI module, and then re-insert this replaced FXS module in Slot 4.

The figure below displays an example illustration of correct module slot assignment:

Figure 6-2: Recommended Priority Module Slot Assignment (Example)

<table>
<tr><td>Slot #1
TRUNKS Module</td><td>Slot #2
TRUNKS Module</td><td>Slot #3
BRI Module</td><td>CRMX Module</td><td rowspan="2">Spare Power Supply Slot</td><td rowspan="2">Main Power Supply Unit</td><td rowspan="2">Fan Tray Unit</td></tr>
<tr><td>Slot #4
FXO Module</td><td>Slot #5
FXS Module</td><td>Slot #6
MPM Module</td><td></td></tr>
</table>

- The MPM module provides IP media channels for applications such as announcements, conferencing, SBC, and IP-to-IP call routing:
  - When no other modules are used, up to three MPM modules can be housed in the device.
  - For conferencing, one MPM module must be housed in Slot 6, providing 20 media channels. For additional media channels, you can add MPM modules to slots 4 (40 channels) and 5 (40 channels) as well, thereby providing a total of 100 media channels for conferencing.
  - For applications other than conferencing (e.g., SBC, IP-to-IP routing, and announcements), the MPM modules can be housed in slots 3, 4, and 5. Each module provides 40 channels; thereby, providing a total of 120 channels (60 for IP-to-IP call sessions).
  - The device can acquire additional media channel resources (for SBC, IP-to-IP routing, and conferencing) from the TRUNKS modules. For a description of this configuration, refer to the device's *User's Manual*.

6.1.2 Removing Kapton Tape before Installing Modules

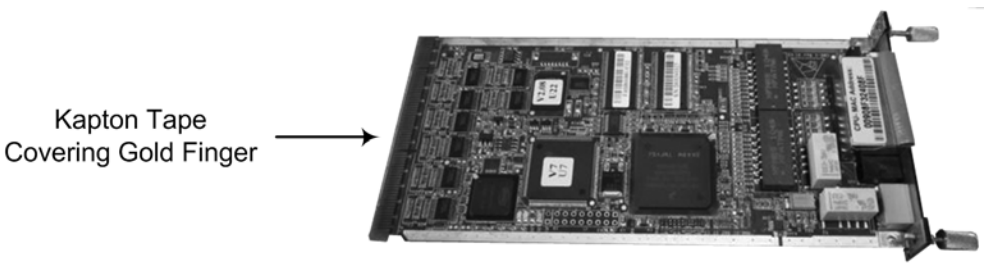
The following modules are supplied with Kapton tape covering their gold fingers (i.e., edge of the module):

- FXS, FXO, BRI, and TRUNKS (PRI)
- CMX and CRMX
- HDMX (OSN3 hard drive)
- Fan
- Power Supply

The Kapton tape is used to protect the module's BUS line. Before installing a new module, you must remove this Kapton tape. If not removed, the module may not be functional, chassis operation may be compromised and irreversible damage may be caused to the chassis.

The figure below shows an example of a module with the Kapton tape over the gold finger:

Figure 6-3: Kapton Tape Covering Module's Gold Finger



6.1.3 Special Instructions for Installing the Power Supply Module

The correct insertion of the Power Supply module in the chassis slot is crucial in preventing irreversible hardware damage to the module (and more specifically, the capacitor) and resulting in the inability to operate and power the chassis.

To avoid damaging the module, when inserting or removing the Power Supply module from the chassis slot, ensure that you adhere to the following precautions:

- Keep the module aligned with the slot's guiding rail.
- Keep the module lifted up towards the roof of the slot so that the base of the module does not touch the floor of the slot (and damage the electrical components located on the underside of the module).

The figure below shows the correct orientation of the module when inserting it into the chassis slot:

Figure 6-4: Incorrect Slot Insertion for Power Supply Module

6.1.4 Installing Modules into Previously Empty Front-Panel Slots

The procedure below describes how to install modules to previously empty slots in the device's chassis.

Warning: Ensure that you power down the device before installing a module to a previously empty slot.

➢ **To install a module into a previously empty slot:**

1. Power off the device.
2. On the device's front panel, using a Phillips screwdriver, remove the black metal cover plate protecting the module slot.
3. Insert the required module into the empty slot, aligning the module with the rails in the slot in the following module orientation depending on whether you are inserting it in the top- or bottom-row slots:
   - **Top-row slots:** ensure that the module is orientated such that the port number labels are located at the bottom of the module's front panel. This module orientation is considered as facing up.
   - **Bottom-row slots:** ensure that the module is orientated such that the port number labels are located at the top of the module's front panel. This module orientation is considered as facing down.
4. Push the module into the slot and press on it firmly to ensure it has been fully inserted.

5. Using a flathead screwdriver, tighten the module's mounting pins.
6. Power on the device.

6.1.5 Installing and Removing AMC-Based Modules on the Rear Panel

The OSN3 modules are hot-swappable and can be installed and removed without disrupting other non-related OSN3 services running on the device. If two HDMX modules are used and you need to replace or remove one, you can also do this without affecting OSN3 functionality. Therefore, you can replace or remove faulty modules without taking the entire device out of service (i.e., powering down the device).

The AMC modules provide a handle that allows you to easily install or remove them, as described in the subsequent subsections.

6.1.5.1 Installing an AMC Module

The procedure below describes how to install an AMC module into the chassis slot.

➢ **To install an AMC module:**

1. Carefully insert the module into the slot until it makes contact with the AMC card-edge connector located on the backplane.
2. Connect all external interfacing cables to the module, as required.
3. Using the module handle, engage the module with the chassis backplane.
4. When the handle is locked, the module is engaged and the **HS** LED turns off.

6.1.5.2 Removing an AMC Module

The procedure below describes how to remove an AMC module from the chassis.

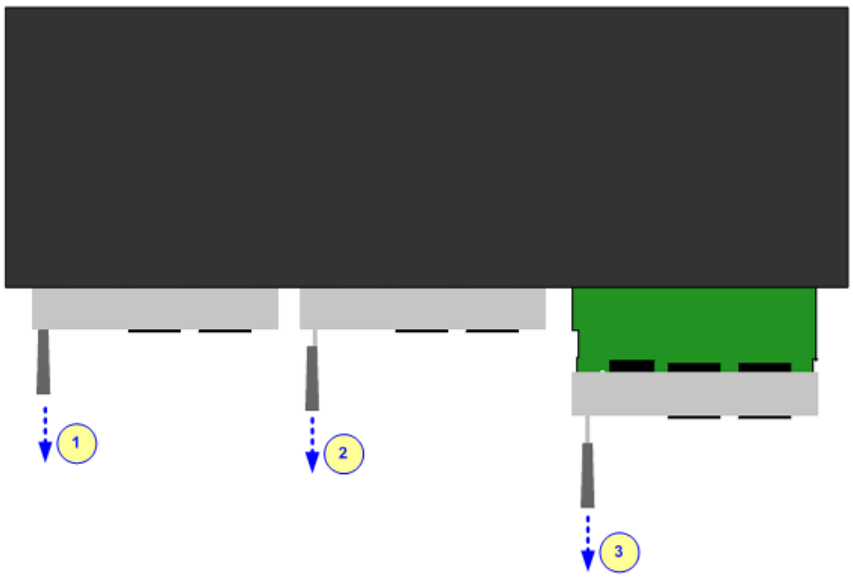
Note: Before removing the HDMX module (if required), you must do a hard-disk drive dismount (i.e., a logical disconnection of the hard drive).

➢ **To remove an AMC module:**

1. Pull on the module handle and partially extract the module to the first “click”; the module performs a shutdown sequence, which is indicated by the flashing blue **Hot Swap**  LED (see stages 1 and 2 in the figure below).
2. When the LED stops flashing and remains constantly on, disconnect any cables that may be connected to the module.

3. Using the module handle, pull the module out of the slot (see stage 3 in the figure below).

Figure 6-5: Removing AMC Modules



6.1.6 Replacing I/O Modules on the Front-Panel Slots

This section describes how to replace front-panel modules. The device's I/O modules are hot-swappable (except for the OSN Server modules and the CRMX module). The physical replacement of the I/O modules is done together with a software replacement procedure using the device's Web interface. Once you have 'software-removed' the module, you can then physically remove the module and replace it with a new module. Once the new module is inserted in the chassis slot, you then need to 'software-insert' it.

Warnings:

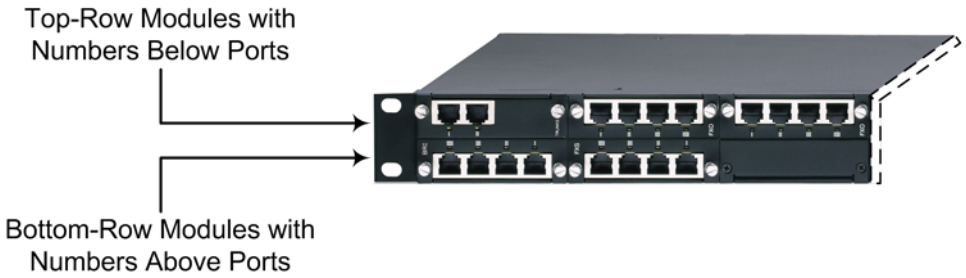
- Replace the module with the same module type and in the same chassis slot. For example, a damaged TRUNKS module with two digital spans in Slot 1 must be replaced with a TRUNKS module with two digital spans in Slot 1.
- When only one I/O module is housed in the chassis, the software-removal procedure is not applicable; instead, power down the device, physically replace the module, and then power up the device.

Note: For replacing the CRMX module, no software procedure is required (i.e., ignore steps 2 and 7 in the procedure below).

➢ **To replace I/O modules:**

1. If you are replacing the CRMX module, power down the device, and then skip to Step 3.
2. Software-remove the module, using the device's Web interface's 'Home' page (refer to the device's *User's Manual*).
3. Disconnect the cables from the module that you want to replace.
4. Physically remove the module from the device's front-panel slot, by performing the following:
   a. Using a flathead screwdriver, loosen the module's two mounting screws.
   b. Gently extract the module from the slot.
5. Physically insert the new module into the same slot from where the module that you are replacing resided, by performing the following:
   a. Insert the module into the empty slot, with the orientation of the module as follows:
      - **Top-row slots:** ensure that the module is orientated such that the port number labels are located at the bottom of the module's front panel. This module orientation is considered as facing up.
      - **Bottom-row slots:** ensure that the module is orientated such that the port number labels are located at the top of the module's front panel. This module orientation is considered as facing down.

Figure 6-6: Module Orientation in Top and Bottom Chassis Slots



   b. Align the module with the slot rails.
   c. Gently push the module into the slot and press on it firmly to ensure it has been fully inserted.
   d. Using a flathead screwdriver, tighten the module's mounting pins.
6. Reconnect the cables to the module. If you are replacing the CRMX module, skip to Step 8.
7. Software-insert the module, using the device's Web interface's 'Home' page (refer to the device's *User's Manual*).
8. If you have replaced the CRMX module, power up the device's chassis.

A Open Solution Network Server Platform

This section is intended for customers who wish to install the optional Open Solution Network (OSN) server platform functionality. The OSN platform allows you to host third-party applications such as an IP PBX, Pre-Paid, and IP PBX redundancy.

The OSN platform includes a hard disk to provide a complete solution within the device's chassis. The OSN is based on single and mid-sized Advanced Mezzanine Card / AMC (AdvancedMC form-factor) modules. These are housed in the chassis' AMC slots on the rear panel.

A.1 OSN Server Offerings

The table below lists available OSN server platforms that can be ordered from AudioCodes.

Table A-1: OSN Server Platforms

OSN Platform	CPU	Memory	Storage	Bus / Chipset	Cache	Interfaces
OSN3	Intel Core 2 Duo 1.5 GHz	2 or 4 GB DDR2 with ECC	Up to 2 hard drives: HDD or SSD	64-bit	2 MB	▪ External Gigabit Ethernet ▪ Internal Gigabit Ethernet ▪ USB 2.0 ▪ RS-232 COM
OSN4	Intel Core i7-3555LE Dual Core 2.5 GHz	8 GB DDR3 with ECC	Up to 2 hard drives: HDD or SSD	64-bit	4 MB	▪ Two external Gigabit Ethernet ▪ Internal Gigabit Ethernet ▪ USB 2.0 ▪ RS-232 COM ▪ HDMI Graphic

Notes:

- Any usage of AMC modules that are not described or mentioned in this document needs explicit approval by AudioCodes.
- For currently available OSN platforms, please contact your AudioCodes sales representative.

A.2 OSN Server Modules Physical Description

The OSN platform consists of the following modules, which are installed on the rear panel:

- OSN module, depending on OSN platform:
  - OSN3 platform: OSN3 module – see Section A.2.1 on page 58
  - OSN4 platform: OSN4 module – see Section A.2.2 on page 61
- HDMX module – see Section A.2.3 on page 63

A.2.1 OSN3 Module

The OSN3 module is part of the OSN3 server platform. This module provides the port connector interfaces and is housed in Slot #2 on the rear panel.

A.2.1.1 Ports Description

The OSN3 module is shown below and described in the subsequent table.

Figure A-1: OSN3 Module Ports

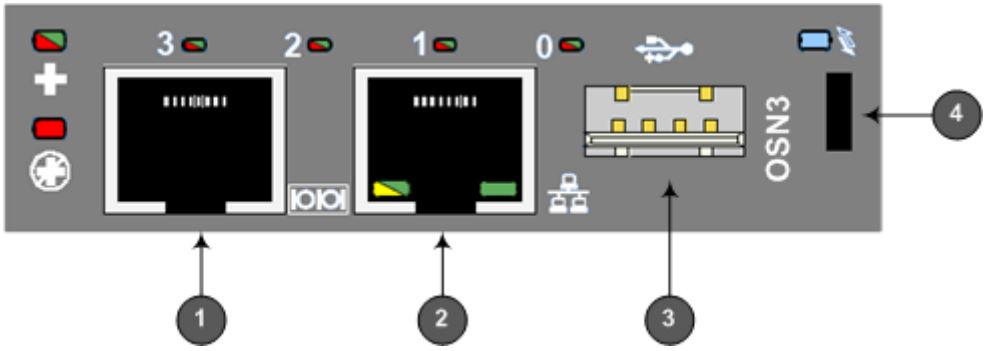


Table A-2: OSN3 Module Port Description

Item #	Label	Description
1		RJ-45 port for RS-232 serial interface (COM1).
2		RJ-45 port for Gigabit Ethernet. The interface provides automatic detection and switching between 10Base-T, 100Base-TX and 1000Base-T data transmission (Auto-Negotiation). Auto-wire switching for crossed cables is also supported (Auto-MDI/X).
3		USB 2.0 port.
4	-	Handle for inserting and extraction module from slot.

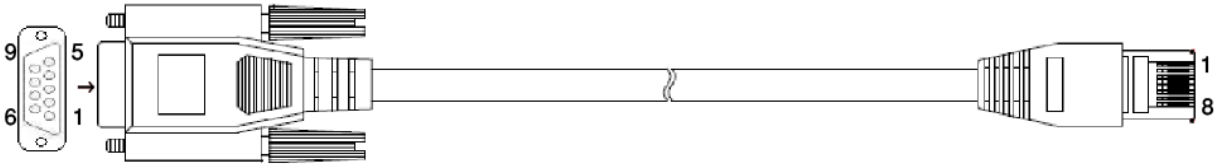
The RJ-45 connector pinouts for Gigabit Ethernet interface are listed in the table below:

Table A-3: Gigabit Ethernet Interface (RJ-45) Connector Pinouts

Pin	100Base-Tx		1000Base-T	
	I/O	Signal	Signal	Function
1	O	Tx+	I/O	BI_DA+
2	0	Tx-	I/O	BI_DA-
3	I	Rx+	I/O	BI_DB+
4			I/O	BI_DC+
5			I/O	BI_DC-
6	I	Rx-	I/O	BI_DB-
7			I/O	BI_DD+
8			I/O	BI_DD-

For serial cabling, an RJ-45-to-DB-9 female cable adapter is used, as shown below:

Figure A-2: RJ-45-to-DB-9 Serial Cable Adapter



The RJ-45 connector pinouts for RS-232 interface are listed in the table below:

Table A-4: RS-232 Serial Cable Connector Pinouts

RJ-45 Pin	DB-9 Pin
1	8
2	6
3	2
4	5
5	5
6	3
7	4
8	7

A.2.1.2 LEDs Description

The OSN3 module LEDs are shown in the figure below and described in the subsequent table.

Figure A-3: OSN3 Module LEDs

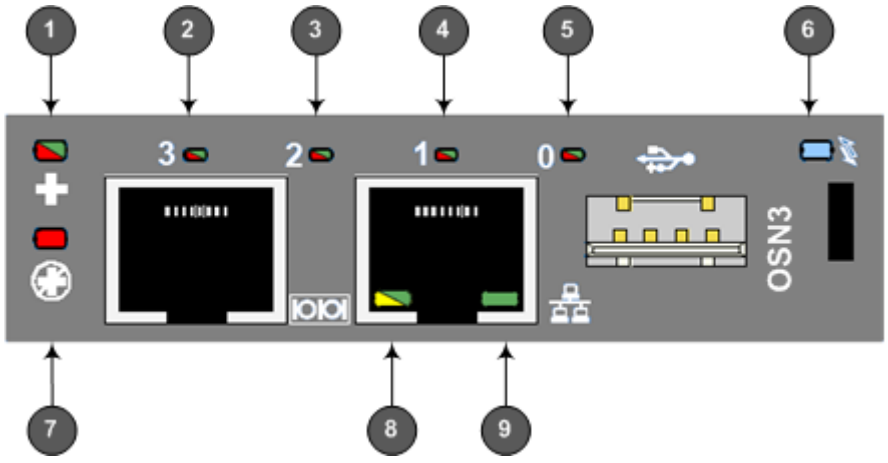


Table A-5: OSN3 Module LEDs Description

Item	Label	Color	State	Description
1	✚	Green	Flashing	Hardware normal operation
		Red	On	Hardware fault (over-temperature or excess

Item	Label	Color	State	Description
				voltage feed).
2	**3**	**Red**	On	When lit during boot-up, indicates power failure.
			Flashing	Processor over-temperature above 100°C. If LEDs 0, 1, and 2 are also flashing, there is a processor over-temperature above 125°C and as a result, the module shuts down.
		-	Off	Normal operation.
3	**2**	**Red**	On	When lit during boot-up, indicates clock failure.
			Flashing	Chipset over-temperature above 105°C. If LEDs 0, 1, and 3 are also flashing, there is a processor over-temperature above 125°C and as a result, the module shuts down.
		-	Off	Normal operation.
4	**1**	**Red**	On	When lit during boot-up, indicates a hardware reset.
			Flashing	Processor over-temperature above 125°C and as a result, OSN3 shuts down (if LEDs 0, 2, and 3 are also flashing)
		-	Off	Normal operation.
5	**0**	**Red**	On	When lit up during boot-up, indicates a BIOS boot failure.
			Flashing	Processor over-temperature above 125°C and as a result, OSN3 shuts down (if LEDs 1, 2, and 3 are also flashing)
		-	Off	Normal operation.
6		**Blue**	Flashing	Module undergoing shutdown sequence when module pulled out to first extraction position.
			On	Module shutdown sequence complete and the module can be extracted from the chassis slot.
			Off	Module correctly inserted in chassis slot.
7		**Red**	On	Hardware failure (supplied voltage is not within normal operating range – ensure CRMX is installed in chassis).
			Flashing	Upgrade in progress
		-	Off	Normal operation
8	**SPEED**	**Green**	On	100Base-TX connection
		Yellow	On	1000Base-T connection
		-	Off	10Base-T connection if ACT LED active
9	**ACT**	**Green**	On	Valid Ethernet link (cable connection) has been established
		-	Off	The LED goes temporarily off if network packets are sent or received. When this LED remains off, a valid link has not been established due to a missing or a faulty cable connection.

A.2.2 OSN4 Module

The OSN4 module is part of the OSN4 server platform. This module provides the port connector interfaces and is housed in Slot #2 on the rear panel.

A.2.2.1 Ports Description

The OSN4 module is shown below and described in the subsequent table.

Figure A-4: OSN4 Module Ports

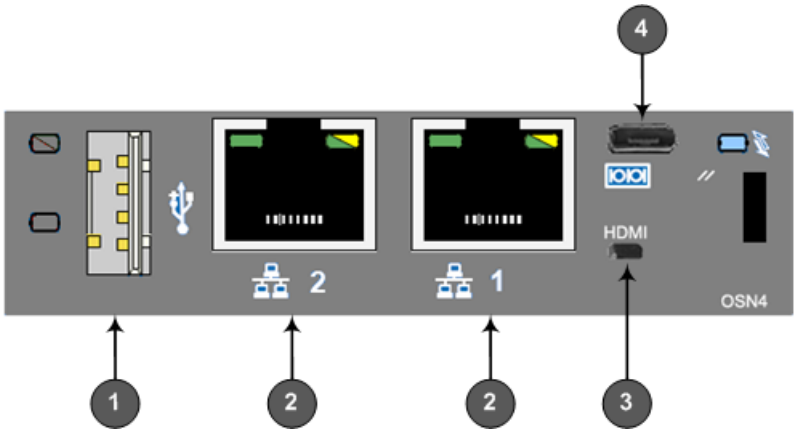


Table A-6: OSN4 Module Port Description

Item #	Label	Description
1		USB 2.0 port.
2		RJ-45 port for Gigabit Ethernet. The interface provides automatic detection and switching between 10Base-T, 100Base-TX and 1000Base-T data transmission (Auto-Negotiation). Auto-wire switching for crossed cables is also supported (Auto-MDI/X).
3	**HDMI**	HDMI port for connecting to a graphic display monitor.
4		Console (serial) port (micro-USB) for serial interface (COM1).

The RJ-45 connector pinouts for the Gigabit Ethernet interface are listed in the table below:

Table A-7: RJ-45 Connector Pinouts for Gigabit Ethernet Interface

Pin	100Base-Tx		1000Base-T	
	I/O	Signal	Signal	Function
1	O	Tx+	I/O	BI_DA+
2	0	Tx-	I/O	BI_DA-
3	I	Rx+	I/O	BI_DB+
4			I/O	BI_DC+
5			I/O	BI_DC-
6	I	Rx-	I/O	BI_DB-
7			I/O	BI_DD+
8			I/O	BI_DD-

A.2.2.2 LEDs Description

The OSN4 module LEDs are shown in the figure below and described in the subsequent table.

Figure A-5: OSN4 Module LEDs

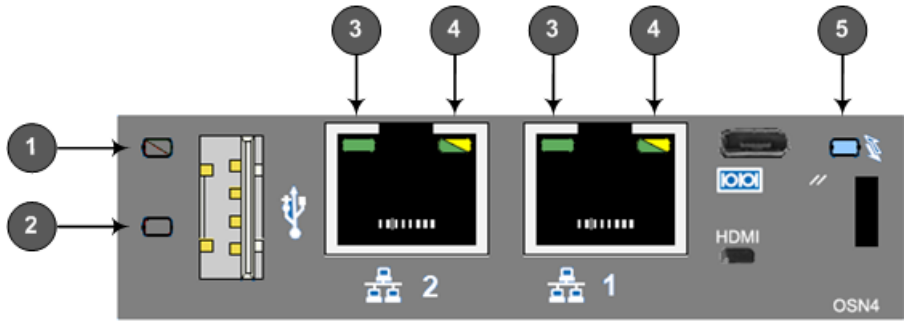


Table A-8: OSN4 Module LEDs Description

Item	Color	State	Description
1	Green	Flashing	Firmware (BIOS) application active, payload (x86) in sleep.
		Solid	Firmware (BIOS) application active, payload (x86) active.
2	Red	On	Out-of-service indicator due to hardware failure.
	-	Off	Normal operation.
3	Green	Solid	Valid Ethernet link (cable connection) established.
		Flashing	Activity in the link.
	-	Off	The LED goes temporarily off if network packets are sent or received. When this LED remains off, a valid link has not been established due to a missing or a faulty cable connection.

Item	Color	State	Description
4	Orange	On	1000Base-TX connection.
	Green	On	100Base-T connection.
	-	Off	10Base-T connection if LED #3 is active.
5	Blue	Flashing	Module undergoing shutdown sequence when handle is pulled out to first extraction position, or module had been inserted and handle is still in first extraction position
		On	Module shutdown sequence complete and the module can be extracted from the chassis slot.
		Off	Module correctly inserted in chassis slot.

A.2.3 HDMX Module

The HDMX module provides the hard-disk drive functionality for the OSN platform, providing storage capacity. The capacity depends on the OSN platform (see Section A.1 on page 57).

The HDMX module is housed in Slot **#1** on the rear panel.

Notes:

- For additional storage capacity per HDMX module, contact your AudioCodes sales representative.
- The OSN platform can optionally, be ordered with dual hard-disk drives (two HDMX modules). This second module is housed in Slot **#8** on the rear panel of the chassis.

The HDMX module is shown below and described in the subsequent table.

Figure A-6: HDMX Module

Table A-9: HDMX Module LEDs Description

Item #	Label	Color	State	Description
1		Green	On	Power received by module.
		-	Off	No power received by module.

Item #	Label	Color	State	Description
2		Blue	On	Module can be extracted from chassis slot once dismounted from the OSN operating system.
			Off	Module correctly inserted in chassis slot
1		Red	On	Hard disk drive in use (active).
		-	Off	Hard disk drive not in use.

A.3 Installing an Operating System on the OSN Server

The OSN can run on Linux™ or Microsoft Windows® operating systems.

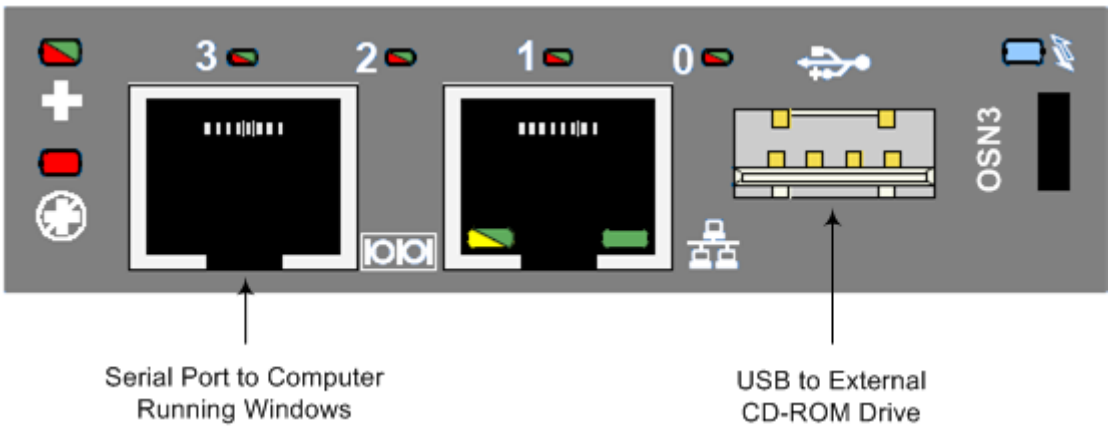
A.3.1 Cabling OSN3 for Installing Operating System

This section describes the installation of the operating system on the OSN3 server.

➢ **To install operating system on OSN3:**

1. Connect the RS-232 interface port (RJ-45), located on the OSN3 module, to a PC, using the RS-232 cable (supplied).

Figure A-7: Cabling OSN3 Module for Installing Linux



2. Start a terminal application (e.g., HyperTerminal) on your PC and create a new connection with the following settings:
   - Baudrate: 115200 (bits per second)
   - Data Bits: 8
   - Parity: None
   - Stop Bits: 1
   - Flow Control: None
3. Connect the USB port, located on the OSN3 module, to a USB storage device containing the installation files (disk-on-key or external CD-ROM / DVD-ROM drive).
4. Power up the device; the OSN server boots up from the USB storage device and the terminal application prompt appears. The installation begins.
5. Follow the online installation instructions to install the operating system.

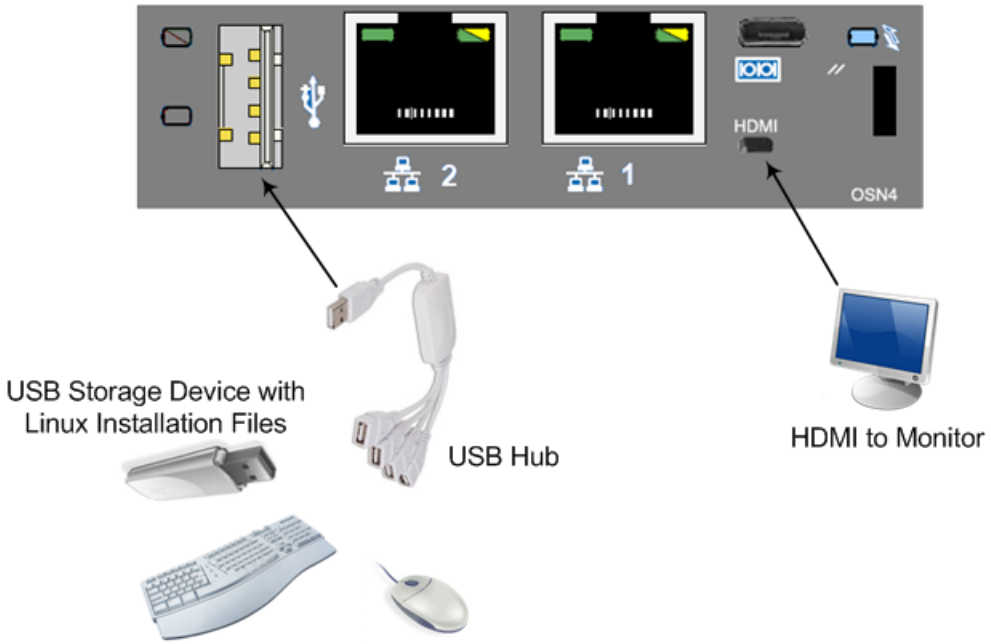
A.3.2 Installing Linux on OSN4

This section describes the installation of the Linux operating system on the OSN4 server.

➢ **To install Linux on OSN4:**

1. Connect the USB port, located on the OSN4 module, to a USB hub, and then connect the USB hub to the following computer peripherals:
   - Mouse
   - Keyboard
   - USB storage device containing the Linux distribution installation files (disk-on-key or external CD-ROM or DVD-ROM drive).
2. Connect the HDMI port, located on the OSN4 module, to your monitor.

Figure A-8: Cabling OSN4 Module for Installing Linux



3. Power up the device; the OSN server boots up from the USB storage device and the Linux installation begins.
4. Follow the Linux online installation instructions to install the Linux operating system.

A.4 Connecting Remotely to OSN3 using Windows

You can connect to the OSN3 server using Microsoft's Remote Desktop Connection program.

Notes:

- To connect remotely to the OSN3 server running Windows, make sure that Remote Desktop is enabled.
- The remote PC must be in the same subnet as the OSN server (default IP address is 10.1.10.12).
- If, for any reason, you use an HDMX module taken from another chassis with OSN3 running Windows 2008, the default static IP address (10.1.10.12) is no longer applicable. This is because the module becomes a DHCP client and acquires a different IP address. To configure a specific IP address, you need to use a serial console, as described in the following section.

A.4.1 Modifying the OSN3 IP Address

If, for any reason, you use an HDMX module taken from another chassis with OSN3 running Windows 2008, the default static IP address (10.1.10.12) is no longer applicable. This is because the module becomes a DHCP client and acquires a different IP address. To configure a specific IP address, you need to use a serial console, as described below.

➢ **To manually configure an IP address (for the scenario described in the note above):**

1. Connect the OSN3 serial interface port to a PC console using the RJ-45-to-DB-9 cable adapter (see Section A.2.1 on page 58).
2. Use a serial communication software (e.g., HyperTerminal) to establish a serial communication link, using the following communication port settings:
   - Baud Rate: 115,200 bps
   - Data Bits: 8
   - Parity: None
   - Stop Bits: 1
   - Flow Control: None
3. Wait until the following Windows 2008 message is displayed:

```
EVENT: The CMD command is now available.
```

4. To view the current IP address, at the SAC prompt, type i, and then press Enter:

```
SAC>i
Net: 55, Ip=169.254.225.21  Subnet=255.255.0.0
Gateway=0.0.0.0
Net: 55, Ip=fe80::8154:57cb:6b0e:e115
```

   Note: For Kontron OSN3, three Nets are displayed - two are disconnected and one is the same as above.
5. Identify the network interface ID (NIC). For example, in the above, the Net ID is 55.

6. To change the IP address, at the CLI prompt, enter the following command and then press Enter:

```
SAC>i<space><#><space><ip><space><subnet><space><Default_GW>
SAC>i 55 10.1.10.15 255.255.0.0 0.0.0.0
```

7. At the CLI prompt, type i to view the new IP address:

```
SAC>i
Net: 55, Ip=10.1.10.15  Subnet=255.255.0.0  Gateway=0.0.0.0
Net: 55, Ip=fe80::8154:57cb:6b0e:e115
```

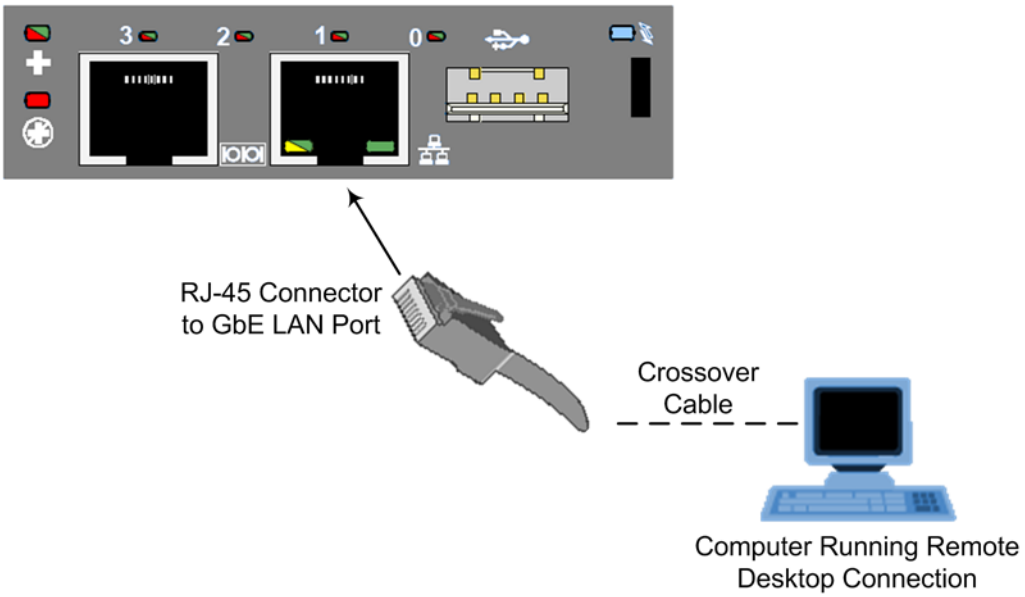
A.4.2 Connecting through Remote Desktop

Before you can connect remotely to the OSN3 server, you need to cable a PC (running Remote Desktop Connection) to the server's IP network interface. The server connects initially to the IP network through the LAN port of the OSN3 module.

➢ **To connect to OSN3 through Remote Desktop Connection:**

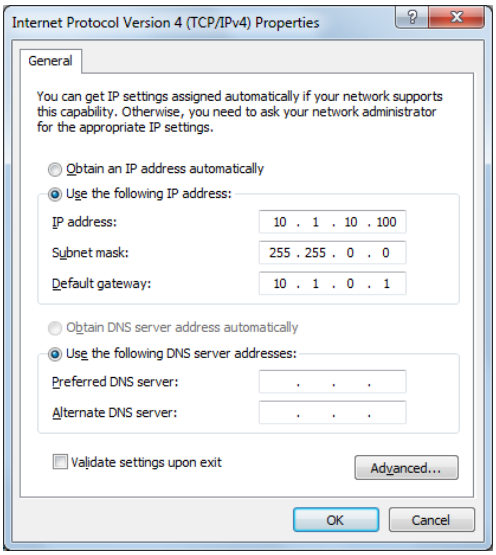
1. Connect the Ethernet LAN port of the OSN3 module to the LAN network, by performing one of the following:
   - **Remote PC connection:** Using a straight-through cable, connect the LAN port to a switch that is connected to the IP network.
   - **Local PC connection:** Using a crossover cable, connect the LAN port directly to the PC's LAN port.

Figure A-9: Cabling OSN3 Module for Remote Desktop Connection from PC with Windows XP



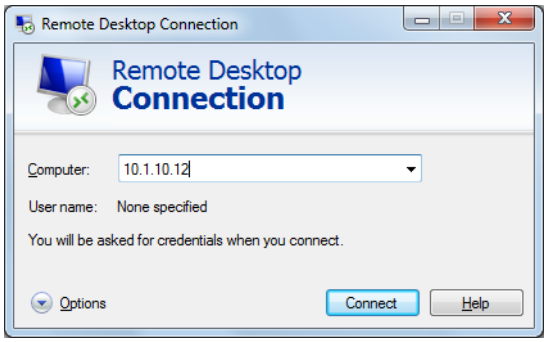
2. Change the PC's IP address so that it is in the same subnet as the default OSN3 server's IP address (i.e., 10.1.10.12). The figure below displays an example of changing a PC's IP address:

Figure A-10: Changing the PC's IP Address



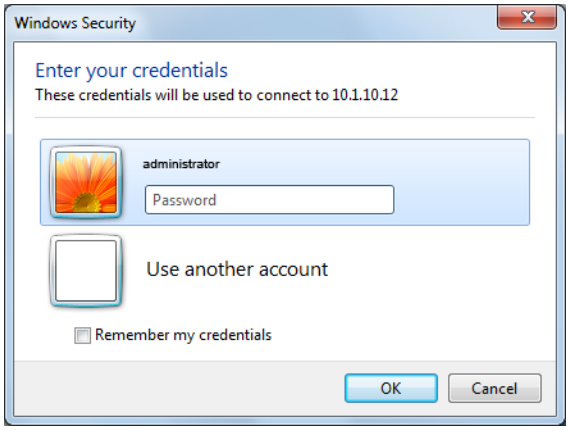
3. Start Microsoft's Remote Desktop Connection program - from the **Start** menu, point to **Programs**, to **Accessories**, to **Communications**, and then click **Remote Desktop Connection**.

Figure A-11: Entering IP Address in Remote Desktop Connection



4. In the 'Computer' field, enter the OSN server's default IP address (i.e., 10.1.10.12).
5. Click **Connect**.

Figure A-12: Entering User Name and Password in Remote Desktop Connection



6. Enter the OSN server's default username ("administrator") and password ("123456").
7. Click **OK**; Remote Desktop Connection connects you to the desktop of the device's OSN server.

B Module Hardware Revision Compatibility

The input/output voice interface module hardware revisions that are compatible with the Mediant 1000 MSBR chassis are listed in the table below.

Table B-1: Module Compatibility

Item No.	Description	H/W Revision
FASB00334	M1K-SMX-1A1V1 Quad FXS w/ Life-Line Module	C08
FASB00335	M1K-SMX-1A1V1 Dual FXS w/ Life-Line Module	C08
FASB00397	M1K-TMX-1A1V1 Quad Trunks w/ Life-line module	C08
FASB00398	M1K TMX-1A1V1 Dual Trunks w/ life-line module	C08
FASB00399	M1K TMX-1A1V1 Single trunks w/ life-line module	C08
FASB00510	M1K-OMX-S 4 Indoor Ports With GS Rev.A1	C05
FASB00511	M1K-CFMX-1 Conference Module Rev A1v1	C06
FASB00520	M1K-OMX-S 4 Outdoor Ports W/O GS Rev. A1	C04
FASB00582	M1K-BMX-4A1	C03
GTPM00046	M1K-VM-2FXS	P03
GTPM00050	M1K-VM-1SPAN	P03
GTPM00052	M1K-VM-2SPAN	P03
GTPM00051	M1K-VM-4SPAN	P03
GTPM00056	M1K-VM-4FXS	P03
GTPM00125	M1K-VM-4FXO-LS	P02
GTPM00126	M1K-VM-4FXO-GS/LS	P02
GTPM00127	M1K-M-CONF	P02
GTPM00174	M1K-VM-4BRI	P02
FASU00557	CRMX-L (LAN 1, 2, 3, GE WAN 1000Base-LX)	P1.5
FASU00556	CRMX-C (LAN 1, 2, 3, GE WAN copper Ethernet)	P2
FASU00557	CRMX-S (LAN 1, 2, 3, GE WAN 1000Base-SX)	P1.5
FASU00636	CRMX-SD (LAN 1, 2, 3, SHDSL WAN)	No Revision Constraint

Hardware Installation Manual

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