

Mediant 1000B Gateway & Enterprise SBC



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Notice

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This document is subject to change without notice.

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WEEE EU Directive

Pursuant to the WEEE EU Directive, electronic and electrical waste must not be disposed of with unsorted waste. Please contact your local recycling authority for disposal of this product.

Customer Support

Customer technical support and services are provided by AudioCodes or by an authorized AudioCodes Service Partner. For more information on how to buy technical support for AudioCodes products and for contact information, please visit our Web site at <https://www.audiocodes.com/services-support/maintenance-and-support>.

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 Gateway and E-SBC.

Related Documentation

Manual Name
SIP Release Notes
Mediant 1000B Gateway & E-SBC SIP User's Manual

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 must be installed **only** indoors.

Avertissement: L'appareil est une unité d'INTERIEUR et doit donc obligatoirement être installé en intérieur.



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

Avertissement: Le câblage de l'interface du port Ethernet doit être acheminé uniquement en intérieur et ne doit pas sortir du bâtiment.



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

Avertissement: FXS module intérieur: le câblage de l'interface du port FXS doit être acheminé uniquement en intérieur et ne doit pas sortir du bâtiment.



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

Avertissement: L'appareil doit obligatoirement être installé et entretenu par un agent de service qualifié.



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

Avertissement: Débranchez l'appareil du secteur et de la Tension du Réseau Téléphonique (TNV) avant toute réparation.

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.



Attention électrocution

Ne tentez pas d'ouvrir ni de démonter l'appareil. L'appareil transporte une haute tension et son contact avec des composants internes risque de vous exposer à l'électrocution et à des lésions corporelles.



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, 02GS2.
3. For FXO Only: 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. The REN for this product is 0.5.
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.

Document Revision Record

LTRT	Description
41414	New warning bulletin regarding plastic sticker covering spare AC power socket; New section for replacing Power Supply module; new drawings for replacing modules.
41415	Installing operating system (OS) on OSN was modified (OS is not installed by default).
41417	FXO warning statement added.
41418	Hardware Maintenance chapter was updated (rear-panel slot assignment section added; front-panel module replacement updated; OSN server module replacement updated).
41420	Correction to SWX module port labels; chassis weight.
41422	Fan Tray module replacement procedure added.
41424	MPM module slot assignment; BRI/PRI Fallback section updated.
41426	RS-232 cable adapter ordering information modified.
41427	Power surge protection warnings.
41430	HDMI connector.
41431	Power Supply module replacement update; physical dimensions; miscellaneous formatting.
41432	Module slot assignment update.
41433	FXS outdoor module added and relevant cabling instructions (for power surge protection); OSN 3/4 reset button described; HDMX module LED description typo; AC power cable note added (Japanese).
41434	REN for FXO.
41435	FXS outdoor limitation for simultaneous ring and off-hook long haul.
41436	FXS outdoor-routing warning bulletin updated.
41437	Ethernet port 0/3 added to CRMX.
41438	Dry-contact relay interface added.
41439	FXS module part numbers updated.
41441	Logo updated; fallback updated.

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 <https://online.audiocodes.com/documentation-feedback>.

1 Introduction

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

The device is a 19-inch industrial platform chassis, 1U high and 13.8 inch deep. The chassis' modular hardware design allows scalability to capacity demands and optional telephony interfaces to suite your requirements.

The device supports the following interfaces:

- Analog and Digital Telephony (Optional, customer-ordered):
 - Up to four digital trunks modules, supporting up to 6 x E1 / 8 x T1 (1, 2, or 4 E1/T1/J1 PRI spans per module)
 - Up to five BRI modules, where each module provides four BRI ports
 - Up to six FXO modules, where each module provides four FXO ports
 - Up to six FXS modules, where each module provides four FXS ports
- (Optional, customer-ordered) Up to four Media Processing modules (MPM), providing additional DSP resources for SBC transcoding and/or three-way conferencing
- Up to seven LAN Ethernet interfaces:
 - Three interfaces on the CRMX module
 - (Optional, customer-ordered) Four interfaces provided by a LAN Expansion module (SWX)
- (Optional, customer-ordered) Open Solution Network (OSN) server modules for hosting third-party applications (such as an IP PBX)
- Dry-contact alarm relays for connection to an external audible or visual alarm system (e.g., bell)
- Fan Tray module
- Up to two Power Supply modules

**Notes:**

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

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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
5. Check, retain and process any documents.

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

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3 Physical Description

This chapter provides a description of the device.

3.1 Physical Dimensions and Operating Environment

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

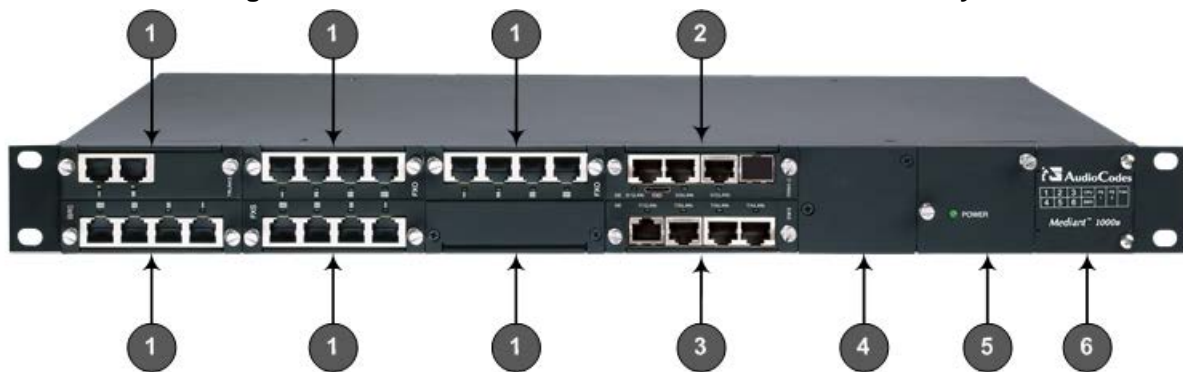
Table 3-1: Physical Dimensions and Operating Environment

Item	Description
Enclosure	1U chassis
Dimensions (H x W x D)	1U x 444 mm (17.5 in.) x 355 mm (14 in.)
Weight	Approx. 4.4 kg (9.7 lbs.)
Operating Environment	<ul style="list-style-type: none"> ▪ 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 of Mediant 1000B SBC and Gateway



Notes:

- The figure above is used only as an example. The number and type of interface modules depend on the ordered configuration.
- For module slot assignment, see Section 6.1 on page 61.

Table 3-2: Front-Panel Description

Item #	Label / Module	Component Description
1	FXS, FXO, BRI, TRUNKS, MPM	<p>Telephony and DSP resource modules:</p> <ul style="list-style-type: none"> ▪ FXS module. For more information, see Section 3.2.1 on page 17. ▪ FXO (or FXO G) module. For more information, Section 3.2.2 on page 18. ▪ BRI module. For more information, Section 3.2.3 on page 19. ▪ TRUNKS (E1/TE/J1) module. For more information, see Section 3.2.4 on page 20. ▪ MPM module. For more information, see Section 3.2.5 on page 21. <p>Note:</p> <ul style="list-style-type: none"> ▪ The number and type of modules depend on the ordered configuration. The modules can be ordered with the device or separately. ▪ For module slot assignment, see Section 6.1.1 on page 61.
2	CRMX	CRMX module. For more information, see Section 3.2.6 on page 22 for a description.
3	SWX	<p>(Optional) LAN Extension (SWX) module. For more information, see Section 3.2.7 on page 25.</p> <p>Note: The module is a customer-ordered item and can be ordered with the device or separately.</p>
4	Power 1	<p>(Optional) Spare Power Supply module slot. For more information, see Section 3.2.9 on page 27.</p> <p>Note: The module is a customer-ordered item and can be ordered with the device or separately.</p>
5	Power 2	Main Power Supply module. For more information, see Section 3.2.9 on page 27.
6	-	Extractable Fan Tray module with a schematic displayed on its front panel showing the chassis' slot numbers. For more information on the Fan Tray module, see Section 3.2.8 on page 26.

3.2.1 FXS Module

The FXS module provides the Foreign eXchange Subscriber (FXS) interfaces. Each FXS module can provide up to four FXS port interfaces.

The following types of FXS modules are available:

- FXS module for **indoor** FXS cable routing only (Catalog Part Number **M1KB-VM-4FXS**, Hardware Part Number **GTPM00056**). The device can house up to six of these modules (i.e., a total of 24 FXS ports).
- FXS Module for **indoor and outdoor** FXS cable routing (Catalog Part Number **M1KB-VM-4FXS-O**, Hardware Part Number **GTPM01046**). The device can house up to five of these modules (i.e., a total of 20 FXS ports). The module is compatible with the following software versions:
 - **Version 6.8:** 6.80A.270.002 and later
 - **Version 7.0:** 7.00A.021.004 and later
 - All other subsequent versions (e.g., 7.2)



Note:

- The FXS modules support loop- and ground-start signaling.
- The chassis can be installed with a combination of both types of FXS modules.
- For the FXS module supporting indoor and outdoor FXS routing, a maximum of 20 FXS channels (instead of 24) are supported for simultaneous ringing as well as for off-hook on long haul.

3.2.1.1 Ports 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 LEDs Description

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

Table 3-3: FXS Module LEDs Description

Color	State	Description
Green	On	Phone connected to the port is off-hooked.

Color	State	Description
	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 Ports 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 LEDs Description

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

Table 3-4: FXO Module LEDs Description

Color	State	Description
	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.

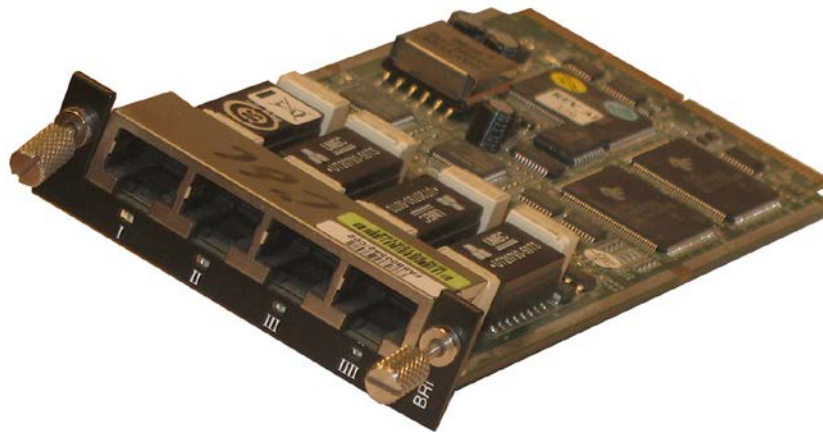
3.2.3 BRI Module

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 Ports 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 LEDs Description

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

Table 3-5: BRI Module LEDs 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.

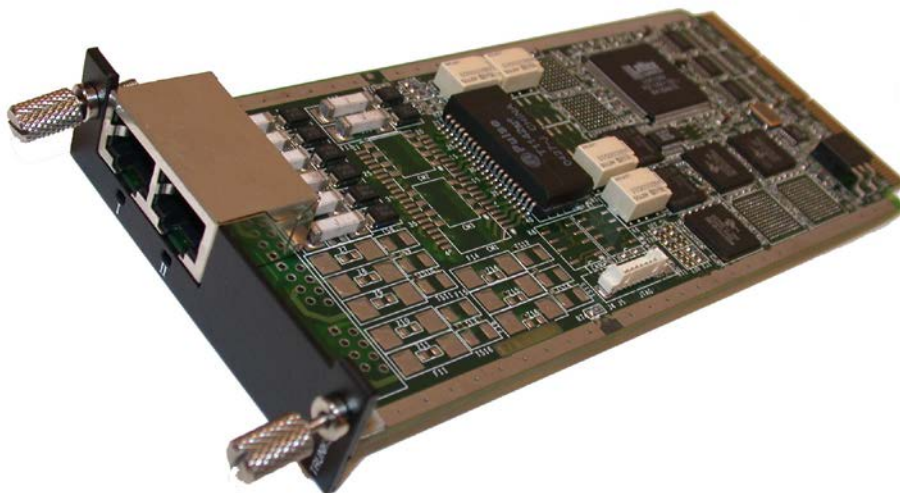
3.2.4 TRUNKS (E1/T1) Module

The device supports up to six E1 / eight T1 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 Ports 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 LEDs 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 LEDs Description

Color	State	Description
Green	On	Trunk is synchronized (normal operation).
Red	On	Loss due to any of the following signals: <ul style="list-style-type: none"> ▪ 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.

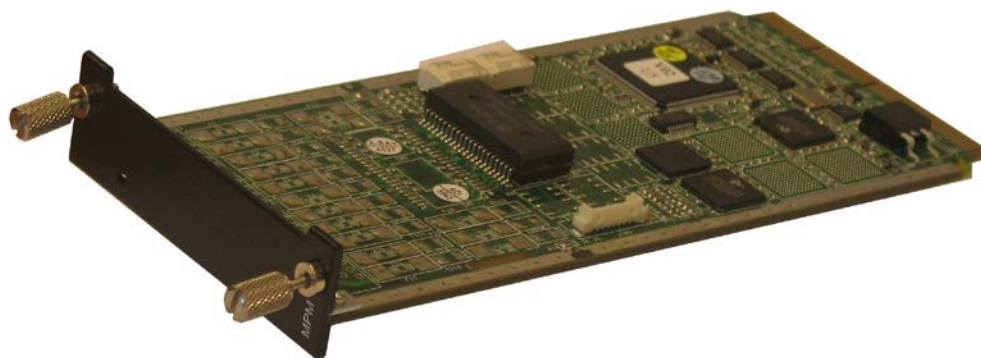
3.2.5 Media Processing Module (MPM)

The device supports up to four MPMs for providing additional DSP resources for applications such as SBC transcoding or three-way conferencing. Depending on required configuration, the MPM can be housed in chassis slots 1 through 5. For guidelines on slot assignment for MPM modules, see Section 6.1.1 on page 61.



Note: For a description on channel resources using MPMs, refer to 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 provides LAN Ethernet interfaces, dry-contact alarm interfaces, and other system functionality.

3.2.6.1 Ports Description

The port interfaces provided by the CRMX module are shown in the figure below and described in the subsequent table.

Figure 3-7: CRMX Module Ports (without Dry-Contact Relays)



Figure 3-8: CRMX Module Ports (with Dry-Contact Relays)

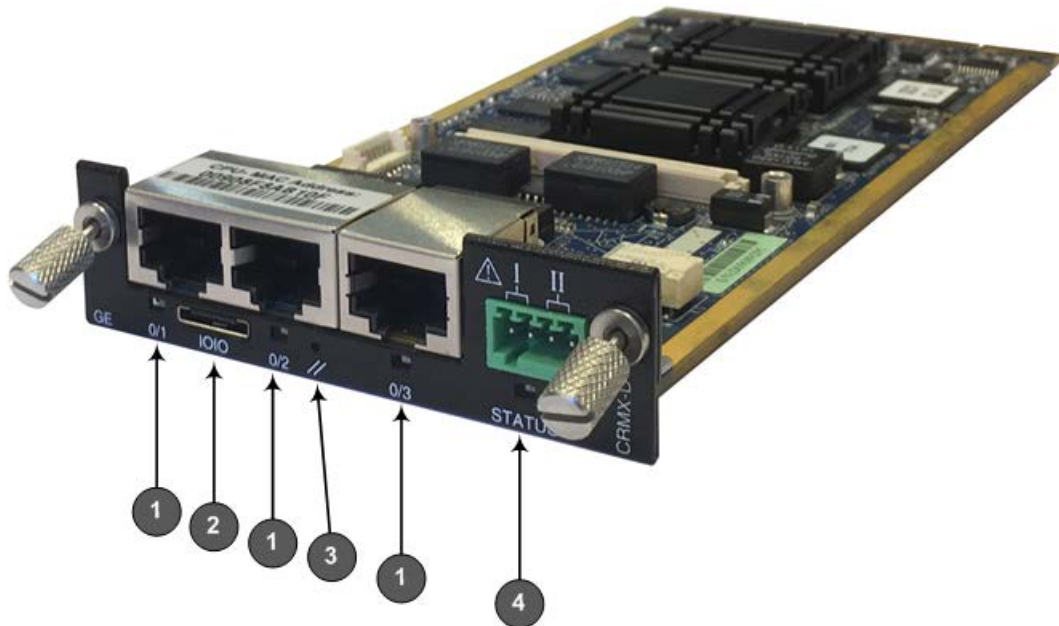


Table 3-8: CRMX Module Port Description

Item #	Label	Component Description
1	0/1(LAN), 0/2(LAN), 0/3(LAN)	Three 10/100/1000Base-T Gigabit Ethernet LAN ports. The ports can be configured for 1+1 port redundancy. By default, ports 0/1 and 0/2 are a port pair, where 0/1 is the active port and 0/2 the standby port.
2	IOIO	RS-232 serial port for accessing the CLI.
3	-	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).
4	I, II	Dry-contact relay connector for interfacing with a third-party, external alarm system. Note: The dry-contact relay is a customer-ordered item.

3.2.6.2 LEDs Description

The LAN ports on the CRMX module provide LEDs for indicating operating status, as described in the table below:

Figure 3-9: CRMX Module LEDs (without Dry-Contact Relays)

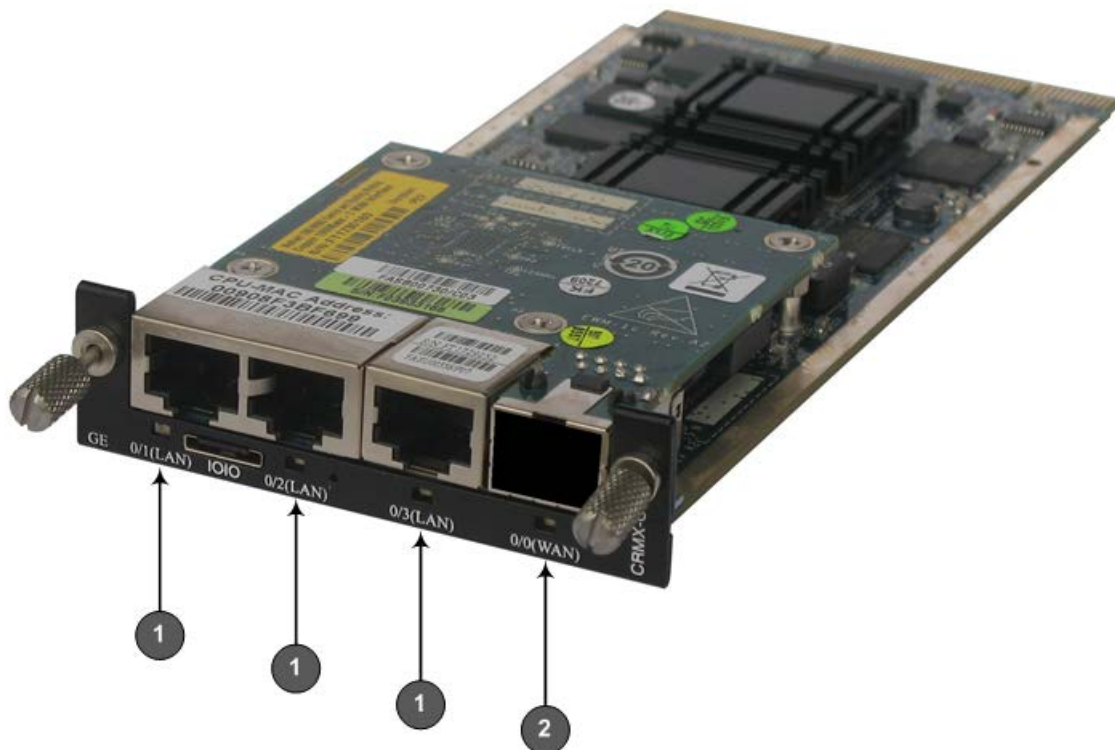


Figure 3-10: CRMX Module LEDs (with Dry-Contact Relays)

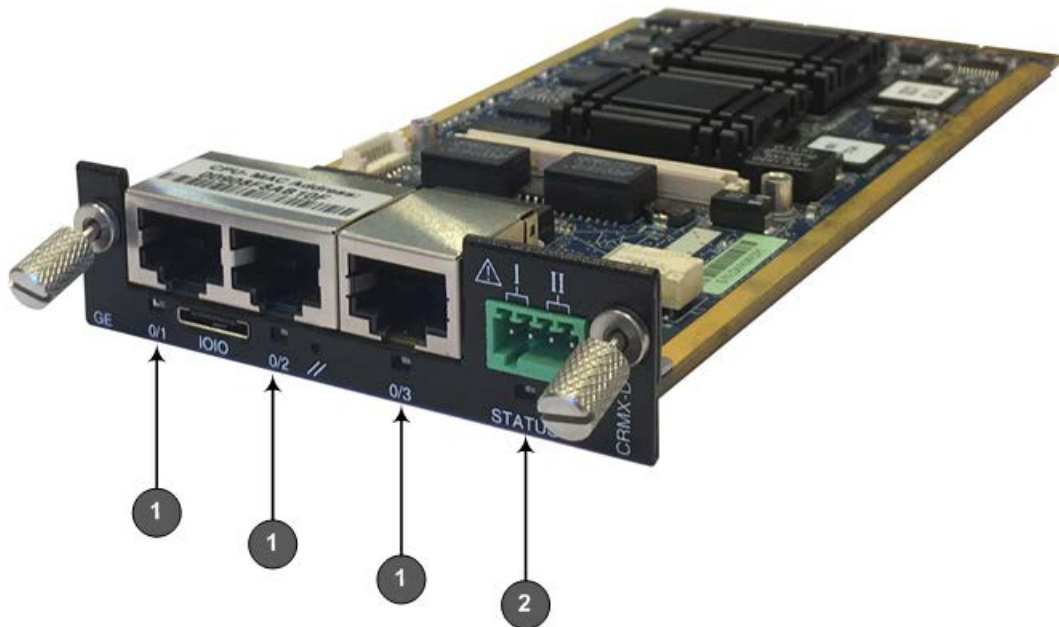


Table 3-9: CRMX Module LED Description

Item #	LED Name	Color	State	Description
1	0/1, 0/2, 0/3	Green	On	Ethernet link established.
			Flashing	Data is being received or transmitted.
		-	Off	No Ethernet link.
2	0/0 or STATUS	Red	On	Reset button has been pressed.
		Red	Flashing	<ul style="list-style-type: none"> Under-voltage condition on CRMX module. Booting up phase (U-boot) of the operating system kernel has completed successfully. <p>Note: For device's ordered with dry-contact relay interfaces, the LED label is STATUS. For devices without dry-contact relay interfaces, the label is WAN (even though WAN port interface is not supported).</p>
		Green	On	Dry-contact relay alarm states. For more information, see Section 5.7.
		Orange	On	
		Red	On	
		-	Off	
			<p>Note: For device's ordered with dry-contact relay interfaces, the LED label is STATUS.</p>	

3.2.7 SWX LAN Expansion Module

The SWX LAN Expansion module provides additional LAN Ethernet interfaces.

3.2.7.1 Ports Description

The SWX LAN Expansion module provides four 10/100/1000Base-T Ethernet LAN ports. The ports support port-pair (1+1) redundancy, where one port can serve as the active port and the other the redundant (for more information, see Section 5.2 on page 41).

The figures below show two hardware versions of the SWX module. Their functionality is identical; the only difference being the port labels (**7/1 – IIII; 7/2 – III; 7/3 – II; 7/4 – I**).

Figure 3-11: SWX LAN Expansion Module – Ver. 02



Figure 3-12: SWX LAN Expansion Module – Ver. 01



3.2.7.2 LED Description

The LAN ports on the SWX LAN Expansion module provide LEDs for indicating operating status, as described in the table below:

Table 3-10: SWX LAN Expansion Module LED Description

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

3.2.8 Fan Tray Module

The device provides a Fan Tray module, which is inserted in the far-right chassis slot on the front panel. The module contains six integrated fans which cool the device's internal components. The Fan Tray module draws in air through a perforated grill on the right side of the chassis. The incoming air passes through the entire set of modules, cooling each one, and then exits the device through perforated vents on the left side of the chassis.

Figure 3-13: Fan Tray Module



For replacing the Fan Tray module, see Section 6.2.3 on page 72.

3.2.9 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 load sharing and power redundancy in case of failure in one of the power sources or modules. When using this feature, you are advised to connect each power supply unit to a different AC supply circuit.

Figure 3-14: Power Supply Module



Table 3-11: 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.



Warning: When using only one Power Supply module, the second AC power socket on the rear panel is covered by a plastic sticker. Please **do not** remove the sticker and connect anything to this power socket. Remove the sticker only when two Power Supply modules are used.

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 OSN server platform. The chassis front panel is displayed in the figure below and described in the subsequent table.

Figure 3-15: Rear Panel of Mediant 1000B SBC and Gateway

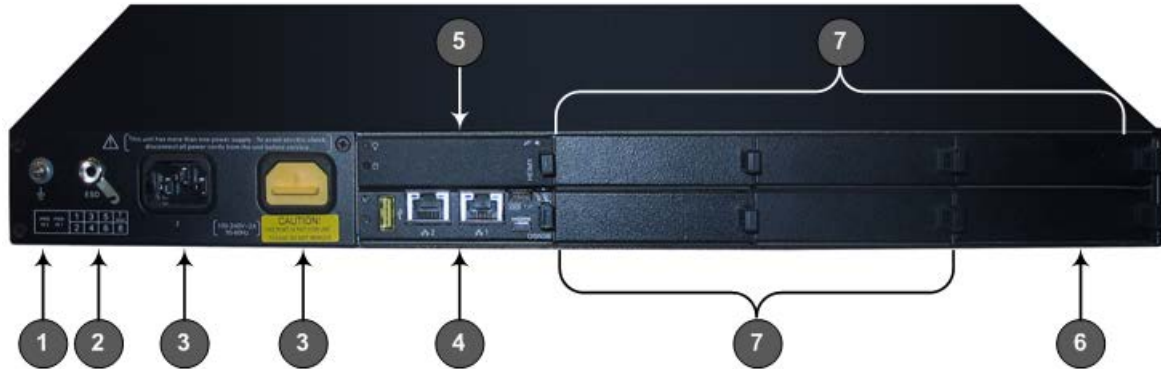


Table 3-12: Rear-Panel Description

Item #	Label	Description
1		Protective earthing screw.
2	ESD	Electrostatic Discharge (ESD) socket.
3	100-240V~1A	Dual AC Power Supply Entries.
4	OSN3B or OSN4	OSN3B or OSN4 AMC module. Note: OSN3 module is no longer available for purchase.
5	HDMX	Main hard-disk drive (HDD) AMC module for OSN server platform.
6	HDMX	Slot for second (optional) HDD for OSN server platform.
7	-	Unused and covered AMC module slots.



Warning: When using only one Power Supply module, the second AC power socket on the rear panel is covered by a plastic sticker. Please **do not** remove the sticker and connect anything to this power socket. Remove the sticker only when two Power Supply modules are used.



Notes:

- The AMC chassis slots must **only** be installed with AMC modules that have been approved and homologated by AudioCodes.
- For installing the OSN platform, see Appendix A on page 77.

4 Mounting the Device

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

- Placed on a desk top (see Section 'Desktop Mounting' on page 29)
- Installed in a standard 19-inch rack (see Section '19-inch Rack Mounting' on page 30)

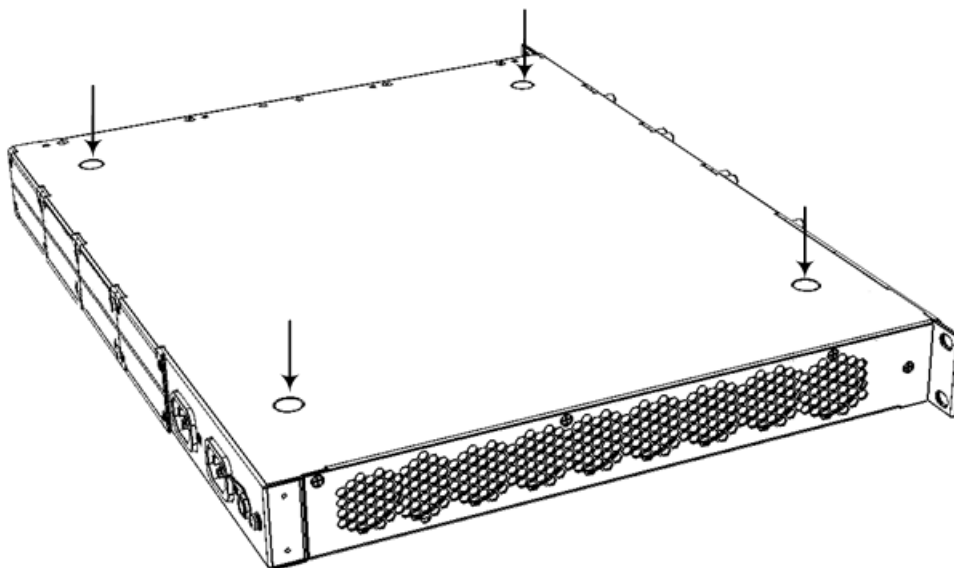
4.1 Desktop Mounting

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 30
- 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 31
- 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 32



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 (T_{ma}) 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 accidentally sliding off the shelf.

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

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 32.

Avertissements: Au moins deux personnes sont nécessaires pour monter l'appareil dans le bâti 19 pouces.

➤ **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 Front- and Rear-Mounting Brackets

The device can also be mounted in a 19-inch rack, using optional, rear-mounting brackets, 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.

Depending on the depth of the rack in which you are installing the device, you can order one of the following rear-mounting brackets, which differ in length, from AudioCodes as a *Rear-Rack Mounting Bracket Kit* accessory item (separate orderable item):

- Adjustable rear-mounting bracket from 59.3 to 62.7 cm (23.3 to 25 in.). 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. The customer part number (CPN) of this kit is **M1KB-REAR-RMK-60**.

Rear-Mounting Bracket x 2



Rear-Mounting Flange x 2

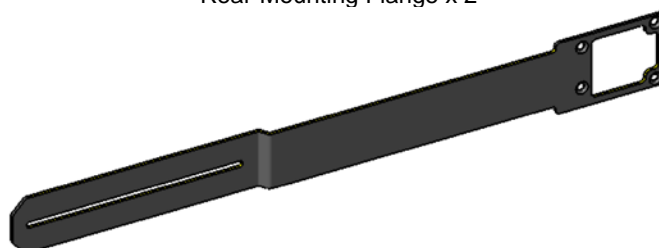


- Fixed-length rear-mounting bracket of 80 cm (31.5 in.). The CPN of this kit is **M1KB-REAR-RMK-80**.

Rear-Mounting Bracket x 2



Rear-Mounting Flange x 2



**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.

Avertissements:

- Au moins deux personnes sont nécessaires pour monter l'appareil dans le bâti 19 pouces.
- En fixant l'appareil au bâti en utilisant des supports de montage arrière, il est **impératif** de fixer également les supports de montage avant.
- Pour permettre l'extraction et l'insertion des modules sur le panneau arrière, assurez-vous que la distance entre le panneau arrière et les montants arrière du bâti soit d'au moins 580 mm. Ainsi, l'extraction de la carte pourra être effectuée sans démonter les supports de montage arrière.

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

1. Open the Rear Mounting Bracket kit and remove its contents. Make sure that all the items are included in the kit (see above).
2. Attach the two rear-mounting brackets to the two-rear rack posts, using two screws (not supplied) per 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 (60 cm)

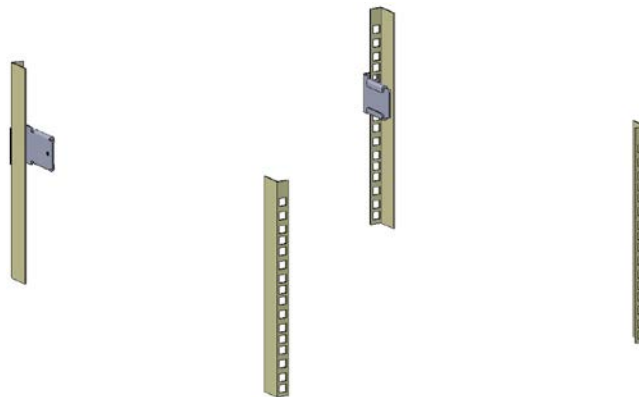
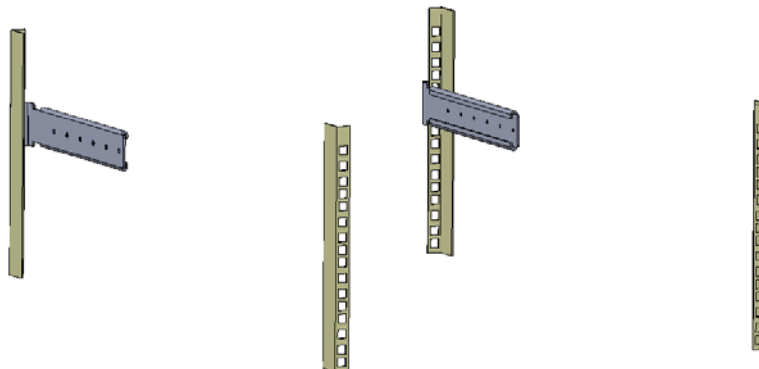


Figure 4-3: Rear-Mounting Brackets Attached to Rear-Rack Posts (80 cm)



3. Attach the rear-mounting flanges to the rear sides of the chassis, using three screws (supplied) per flange.

Figure 4-4: Attaching Rear-Mounting Flange to Chassis' Rear-Side Mounting Holes (60 cm)

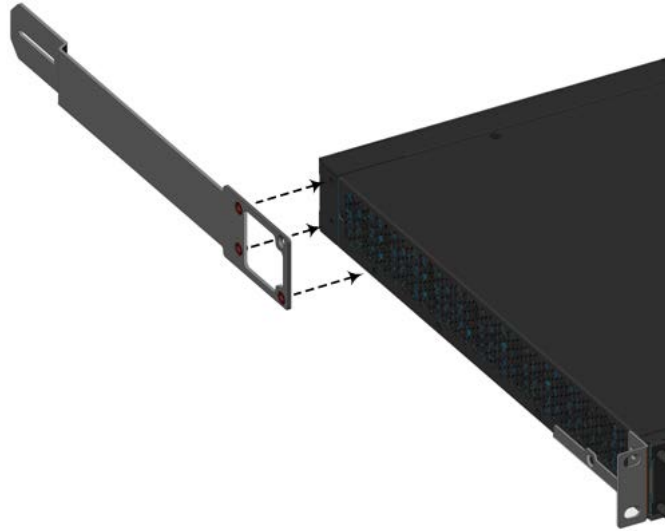
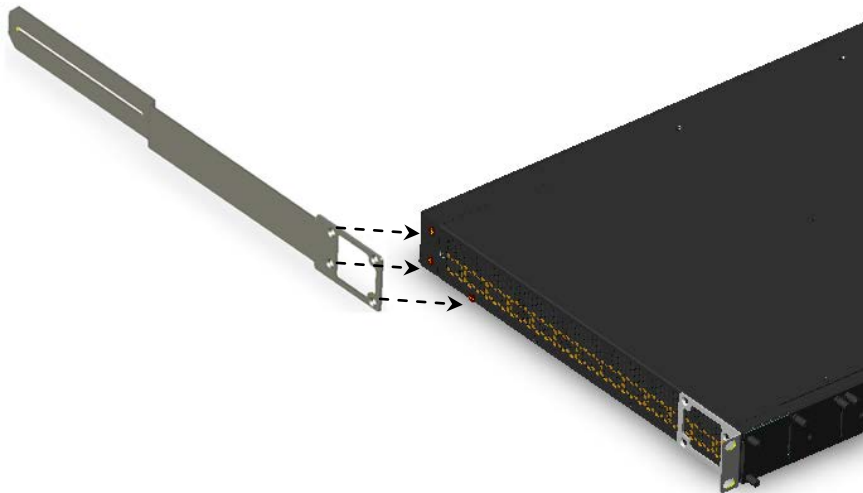


Figure 4-5: Attaching Rear-Mounting Flange to Chassis' Rear-Side Mounting Holes (80 cm)



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 4-6: Sliding the Rear-Mounting Flanges into the Rear-Mounting brackets (60 cm)

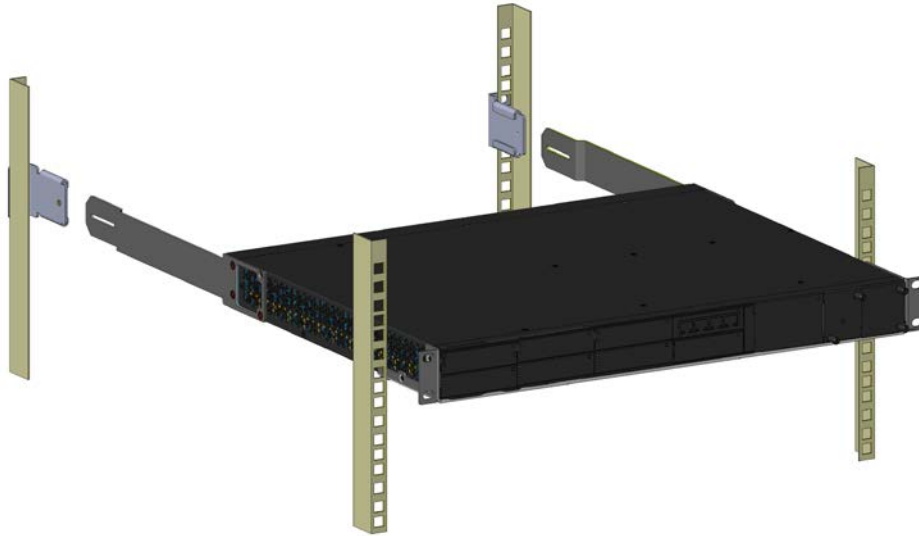
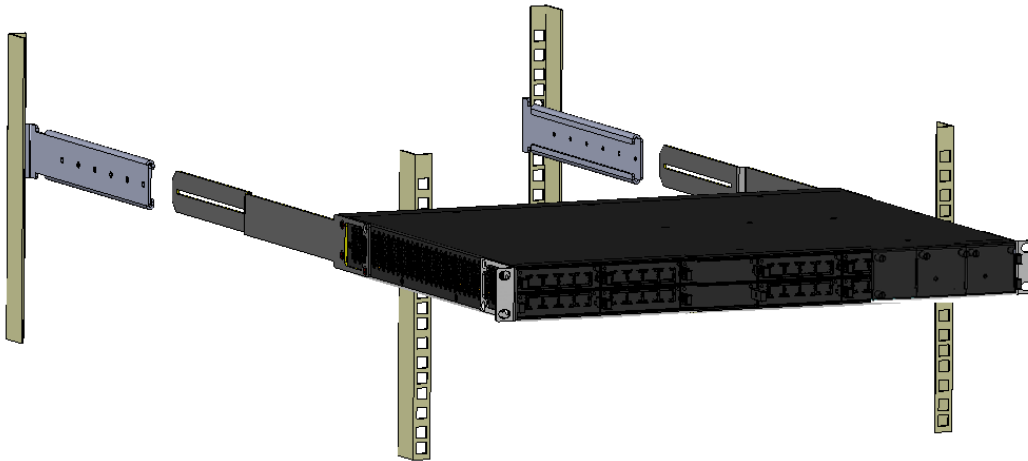


Figure 4-7: Sliding the Rear-Mounting Flanges into the Rear-Mounting Brackets (80 cm)



6. Hold the chassis in position while the second person secures the rear-mounting flanges to the rear-mounting brackets. Insert the supplied screws (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 screws but make sure that the screws are **NOT fully tightened** and that the flange can freely move on the slide rails of the rear-mounting bracket.

Figure 4-8: Fastening Rear-Mounting Flange to Rear-Mounting Bracket (60 cm)

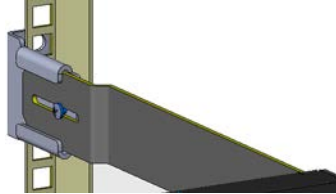
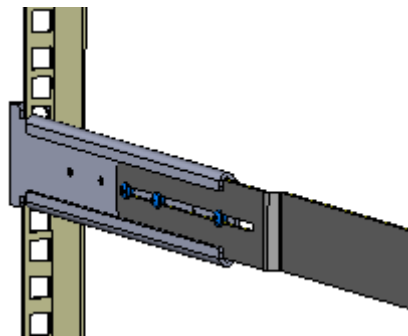


Figure 4-9: Fastening Rear-Mounting Flange to Rear-Mounting Bracket (80 cm)



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 front-mounting brackets align with the holes on the front-rack posts.

Figure 4-10: Front-Mounting Brackets Flush and Aligned with Front Rack Posts (60 cm)

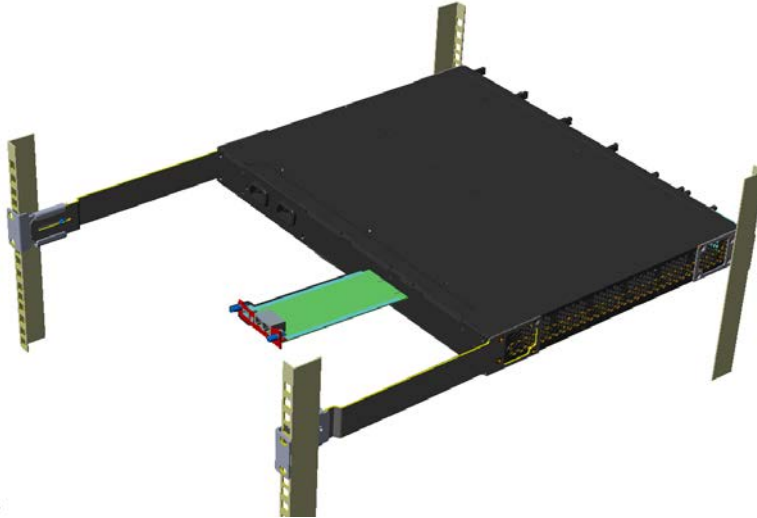
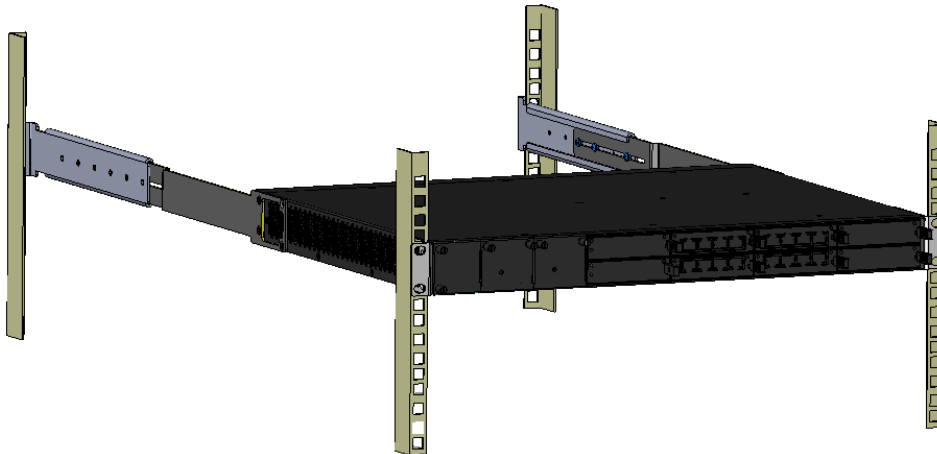


Figure 4-11: Front-Mounting Brackets Flush and Aligned with Front Rack Posts (80 cm)



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

9. Tighten the bolts on the front-mounting brackets.
10. With a Philips screwdriver, tighten the screws securing the rear-mounting flanges to the rear-mounting brackets.

**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.

5 Cabling the Device

This section describes how to cable the device.

5.1 Earth Grounding and Power Surge Protection

Connecting the device to earth ground is required.



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 suojavaadoituskoskettimilla varustettuun pistorasiaan."
- Norway: "Apparatet rna tilkoples jordet stikkontakt."
- Sweden: "Apparaten skall anslutas till jordat uttag."



Grounding and Power Surge Protection

- The device must be installed only in telecommunication sites / centers in compliance with ETS 300-253 requirements "Earthing and Bonding of Telecommunication Equipment in Telecommunication Centers".
- Prior to installation, earth loop impedance test must be performed by a certified electrician to ensure grounding suitability at the power outlet intended to feed the unit. It is essential that the impedance will be kept below 0.5 ohms!
- Proper grounding is crucial to ensure the effectiveness of the lightning protection, connect the device permanently to ground (as described in the procedure below). The device's grounding screw must be connected to the equipotential grounding bus bar located in the Telecommunication rack or installation site, using a wire of 6 mm² surface wire. If the device is installed in a rack with other equipment, the rack must be connected to the equipotential grounding bus bar of the Telecommunication room, using a stranded cable with surface area of 25 mm². The length of this cable must be as short as possible (no longer than 3 meters).
- The device does **not** include primary telecom protection! When the FXO and FXS telephone lines are routed **outside the building**, additional protection using a 350V three-electrode Gas Discharge Tube (GDT) **must** be provided at the entry point of the telecom wires into the building (usually on the main distribution frame / MDF), in conjunction with proper grounding. The center pin of the GDT (MDF grounding bar) must be connected to the equipotential grounding bus bar of the Telecommunication room.
- Failing to install primary surge protectors and failing to comply with the grounding instructions or any other installation instructions, may cause permanent damage to the device!
- As most of the installation is the responsibility of the customer, AudioCodes can assume responsibility for damage only if the customer can establish that the device does not comply with the standards specified above (and the device is within the hardware warranty period).
- The device complies with protection levels as required by EN 55024/EN 300386. Higher levels of surges may cause damage to the device.
- To protect against electrical shock and fire, use a minimum of 26-AWG wire size to connect the FXO and FXS ports.

➤ **To ground the device:**

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

Figure 5-1: Grounding the Device

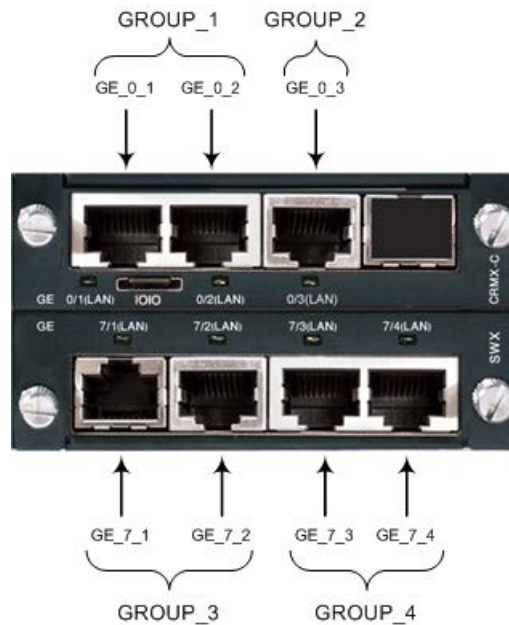


2. Connect the other end of the strap to a protective earthing. **This should be in accordance with the regulations enforced in the country in which the device is installed.** The grounding screw must be connected to the equipotential grounding bus bar located in the Telecommunication rack, using a **wire of 6 mm²** surface wire. This line must be connected to the equipotential bus bar of the electrical circuit board located in the Telecommunication room, using a stranded cable with **surface area of 25 mm²**. The length of this cable must be as short as possible (**no longer than 3 meters**).

5.2 Connecting to LAN with Port-Pair Redundancy

The LAN ports are provided on the CRMX and SWX LAN Expansion modules (see Section 3.2.6 on page 22 and Section 3.2.7 on page 25, respectively). These LAN ports can operate in pairs (*Ethernet Groups*) to provide 1+1 port redundancy. In each pair, one port serves as the active port while the other as standby. When the active port fails, the device switches to the standby port. By default, the Ethernet ports are grouped into pairs, as shown in the figure below. However, you can change this port assignment, including assigning only a single port to an Ethernet Group. For more information, refer to the *User's Manual*.

Figure 5-2: Default Ethernet Groups and Web Interface String Names



Notes:

- The SWX module is a customer ordered item.
- If your SWX module has different port labels (i.e., roman numerals) compared to those shown in the figure above, see Section 3.2.7.1 on page 25 for the corresponding port numbering.



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

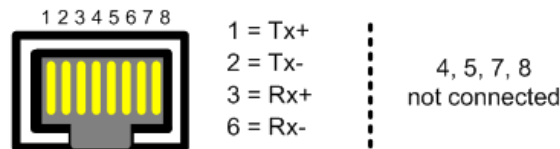
Avertissement: Le câblage de l'interface du port Ethernet doit être acheminé uniquement en intérieur et ne doit pas sortir du bâtiment.



Cabling specifications:

- **Cable:** Cat 5/5e
- **Connector:** RJ-45
- **Connector Pinouts:**

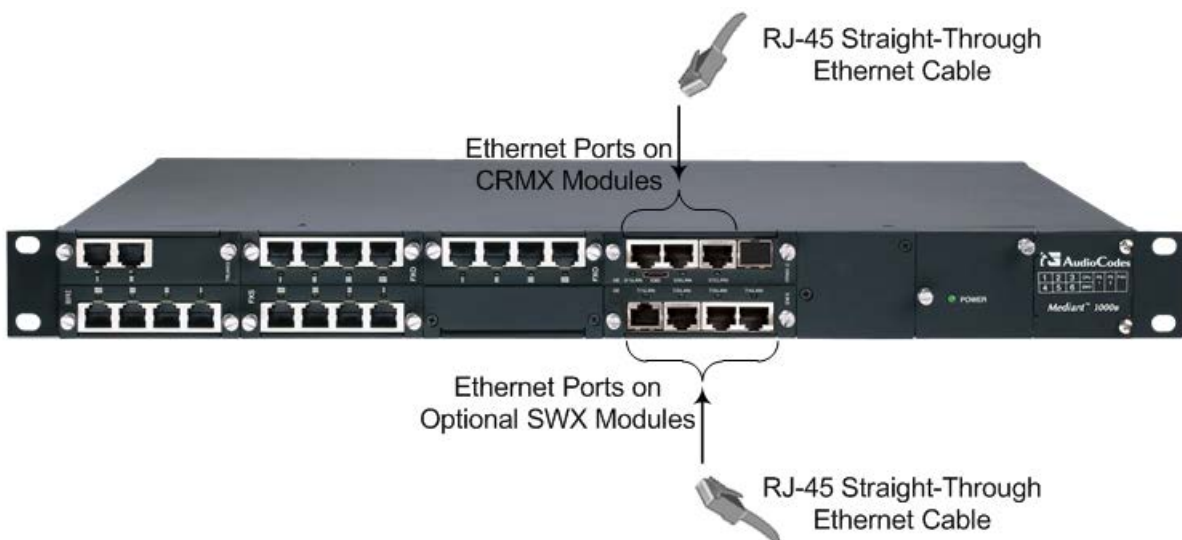
Figure 5-3: RJ-45 Connector Pinouts for LAN



➤ **To connect to the LAN:**

1. Connect one end of a straight-through RJ-45 Ethernet Cat 5/5e cable to the active LAN port on the CRMX module or optional SWX module.

Figure 5-4: Connecting to LAN



2. Connect the other end of the cable to the LAN.
3. For 1+1 LAN protection, repeat steps 1 and 2 for the standby port, but connect it to another network (in the same subnet).



Note: If you are implementing LAN port-pair redundancy, make sure that each port in the Ethernet Group is connected to a different network (in the same subnet).

5.3 Analog Interfaces

This section describes the cabling procedures for analog interfaces.

5.3.1 Connecting to FXS Interfaces

This section describes how to connect the FXS interfaces to FXS equipment such as fax machines, modems, and plain old telephone system (POTS) telephones. FXS cabling can be routed indoors or outdoors, **depending** on the FXS module used (see Section 3.2.1 on page 17).



Warnings:

- FXS modules for **indoor** cabling: The 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.

Avertissements:

- FXS module intérieur: Le câblage de l'interface du port FXS doit être acheminé uniquement en intérieur et ne doit pas sortir du bâtiment.
- Assurez-vous que les ports FXS sont connectés aux appareils externes appropriés ; autrement, vous risquez d'endommager l'appareil.



Note: The FXS module is a customer ordered item. This section is applicable only if your device is installed with such a module.

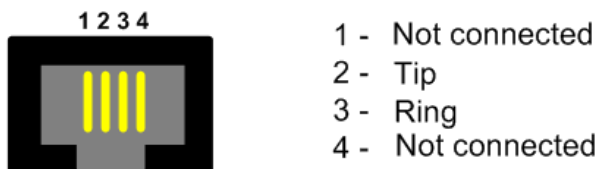
5.3.1.1 Indoor FXS Cabling

The following procedure describes how to cable FXS ports for indoor routing. Any FXS module can be used (see Section 3.2.1 on page 17).

Cabling specifications:

- **Cable:** Standard straight-through RJ-11-to-RJ-11 telephone cable
- **Connector:** RJ-11
- **Connector Pinouts:**

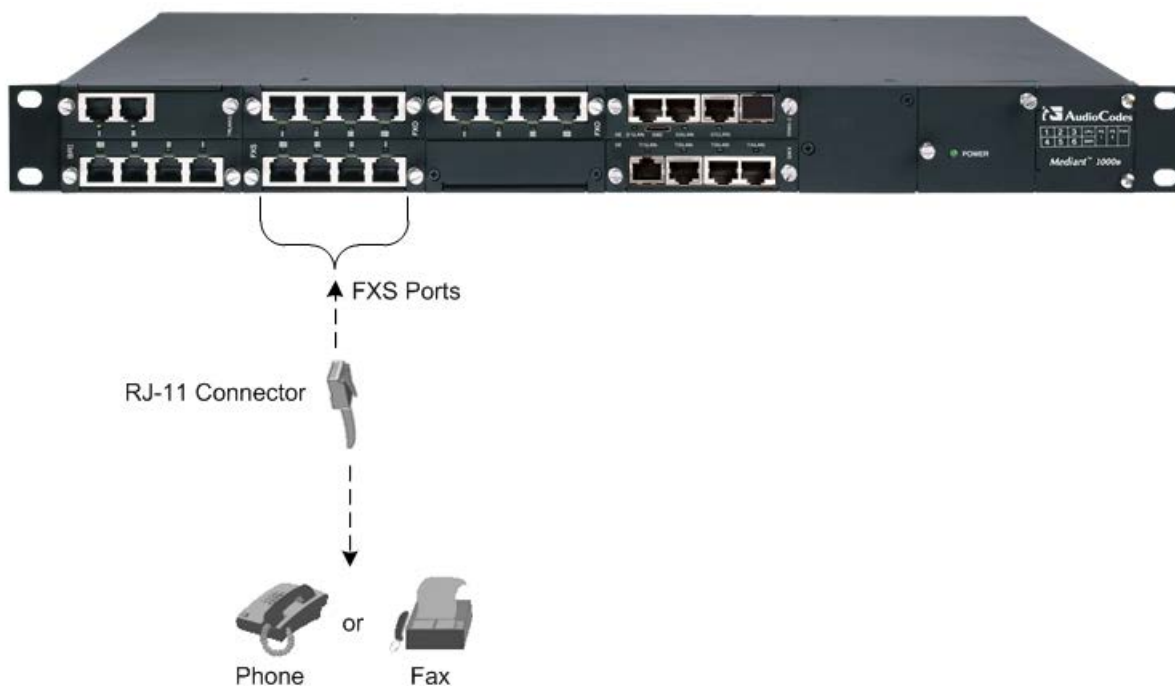
Figure 5-5: RJ-11 Connector Pinouts for FXS



➤ **To connect FXS interfaces for indoor routing:**

1. Connect one end of the straight-through RJ-11 cable to the RJ-11 port on the FXS module.
2. Connect the other end of the cable to the RJ-11 port on the analog equipment (e.g., telephone or fax machine).

Figure 5-6: FXS Cabling for Indoor Routing



5.3.1.2 Outdoor FXS Cabling

The following procedure describes how to cable FXS ports for outdoor routing. This is applicable **only** when the FXS modules supporting outdoor cabling are used, as described in Section 3.2.1 on page 17.



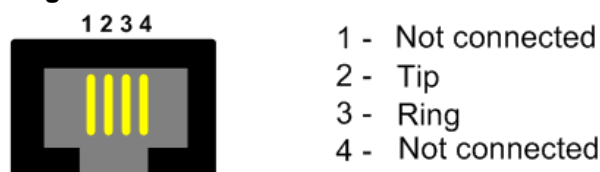
Warnings:

- The device must be installed only in telecommunication sites / centers in compliance with ETS 300-253 requirements “Earthing and Bonding of Telecommunication Equipment in Telecommunication Centers”.
- Prior to installation, earth loop impedance test must be performed by a certified electrician to ensure grounding suitability at the power outlet intended to feed the unit. It is essential that the impedance will be kept below 0.5 ohms!
- Proper grounding is crucial to ensure the effectiveness of the lightning protection, connect the unit permanently to ground as per the illustration in this section.
- The device includes an integrated secondary surge protection, but does not include primary telecom protection. Where the telephone lines are routed outside the building, it is essential to install additional three-electrode Gas Discharge Tube (GDT) rated 350V as a primary protection on the MDF, located at the entrance point of telephone wiring to the building. The center pin of the GDT must be connected to ground as per the illustration in this section.
- Failing to install primary surge protectors, and failing to comply with the grounding instructions or any other installation instructions, may cause permanent damage to the device.
- As most of the installation is the responsibility of the customer, AudioCodes can assume responsibility for damage only if the customer can establish that the device does not comply with the standards specified above (and the device is within the hardware warranty period).
- The device complies with protection levels as required by EN 55024/EN 300386. Higher levels of surges may cause damage to the unit.

Cabling specifications:

- **Cable:** Standard straight-through RJ-11-to-RJ-11 telephone cable
- **Connector:** RJ-11
- **Connector Pinouts:**

Figure 5-7: RJ-11 Connector Pinouts for FXS

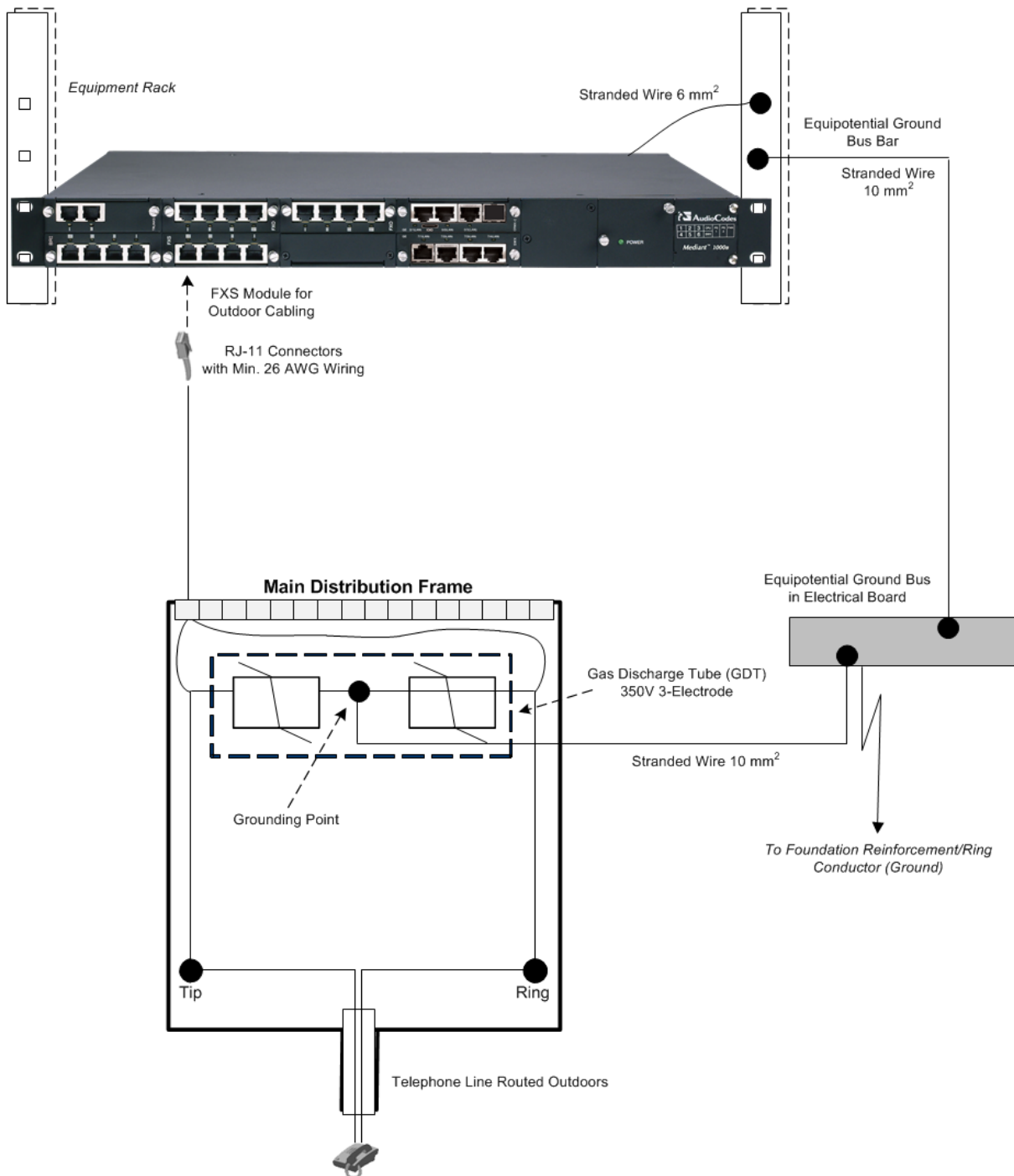


➤ To connect FXS interfaces for outdoor routing:

1. Ground the device as described in Section 5.1 on page 39 and shown in Figure 5-8.
2. Connect one end of a straight-through RJ-11 cable to the RJ-11 port on the outdoor FXS module.
3. Connect the other end of the cable to your MDF.

- Provide primary surge protection, by installing additional three-electrode Gas Discharge Tube (GDT) rated 350V as a primary protection on the MDF, located at the entrance point of telephone wiring to the building. The center pin of the GDT must be connected to ground as shown in the figure below:

Figure 5-8: FXS Cabling for Outdoor Routing



- Connect the telephone line from the MDF to your analog equipment.

5.3.2 Connecting to FXO Interfaces

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



Warnings:

- To protect against electrical shock and fire, use a 26 AWG min wire to connect FXO ports to the PSTN.
- Make sure that FXO ports are connected to the appropriate external devices; otherwise, damage to the device may occur.
- FXO ports are considered as TNV-3.

Avertissements:

- Pour vous protéger contre l'électrocution et le feu, utilisez un fil de 26 AWG au minimum pour connecter le port FXO au PSTN.
- Assurez-vous que le port FXO soit connecté à un appareil externe approprié ; autrement, vous risquez d'endommager l'appareil.
- Le port FXO est considéré être un TNV-3.



Note: The FXO module is a customer ordered item. This section is applicable only if your device is installed with such a module.

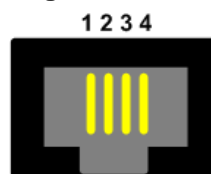
5.3.2.1 Indoor FXO Cabling

The following procedure describes how to cable FXO ports for indoor routing.

Cabling specifications:

- **Cable:** Standard straight-through RJ-11-to-RJ-11 telephone cable
- **Connector:** RJ-11
- **Connector Pinouts:**

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



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

➤ To connect FXO interfaces for indoor routing:

1. Connect one end of the straight-through RJ-11 cable to the RJ-11 port on the FXO module.
2. Connect the other end of the cable to an RJ-11 telephone wall outlet or PBX.

5.3.2.2 Outdoor FXO Cabling

The following procedure describes how to cable FXO ports for outdoor routing.



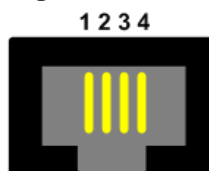
Warnings:

- The device must be installed only in telecommunication sites / centers in compliance with ETS 300-253 requirements “Earthing and Bonding of Telecommunication Equipment in Telecommunication Centers”.
- Prior to installation, earth loop impedance test must be performed by a certified electrician to ensure grounding suitability at the power outlet intended to feed the unit. It is essential that the impedance will be kept below 0.5 ohms!
- Proper grounding is crucial to ensure the effectiveness of the lightning protection, connect the unit permanently to ground as per the illustration in this section.
- The device accommodates only secondary surge protection. Where the FXO lines are routed outside the building, it is essential to install additional three-electrode Gas Discharge Tube (GDT) rated 350V as a primary protection on the MDF, located at the entrance point of telephone wiring to the building. The center pin of the GDT must be connected to ground as per the illustration in this section.
- Failing to install primary surge protectors, and failing to comply with the grounding instructions or any other installation instructions, may cause permanent damage to the device.
- As most of the installation is the responsibility of the customer, AudioCodes can assume responsibility for damage only if the customer can establish that the device does not comply with the standards specified above (and the device is within the hardware warranty period).
- The device complies with protection levels as required by EN 55024/EN 300386. Higher levels of surges may cause damage to the unit.

Cabling specifications:

- **Cable:** Straight-through RJ-11-to-RJ-11 telephone cable; 26-AWG minimum wire
- **Connector:** RJ-11
- **Connector Pinouts:**

Figure 5-10: RJ-11 Connector Pinouts for FXO



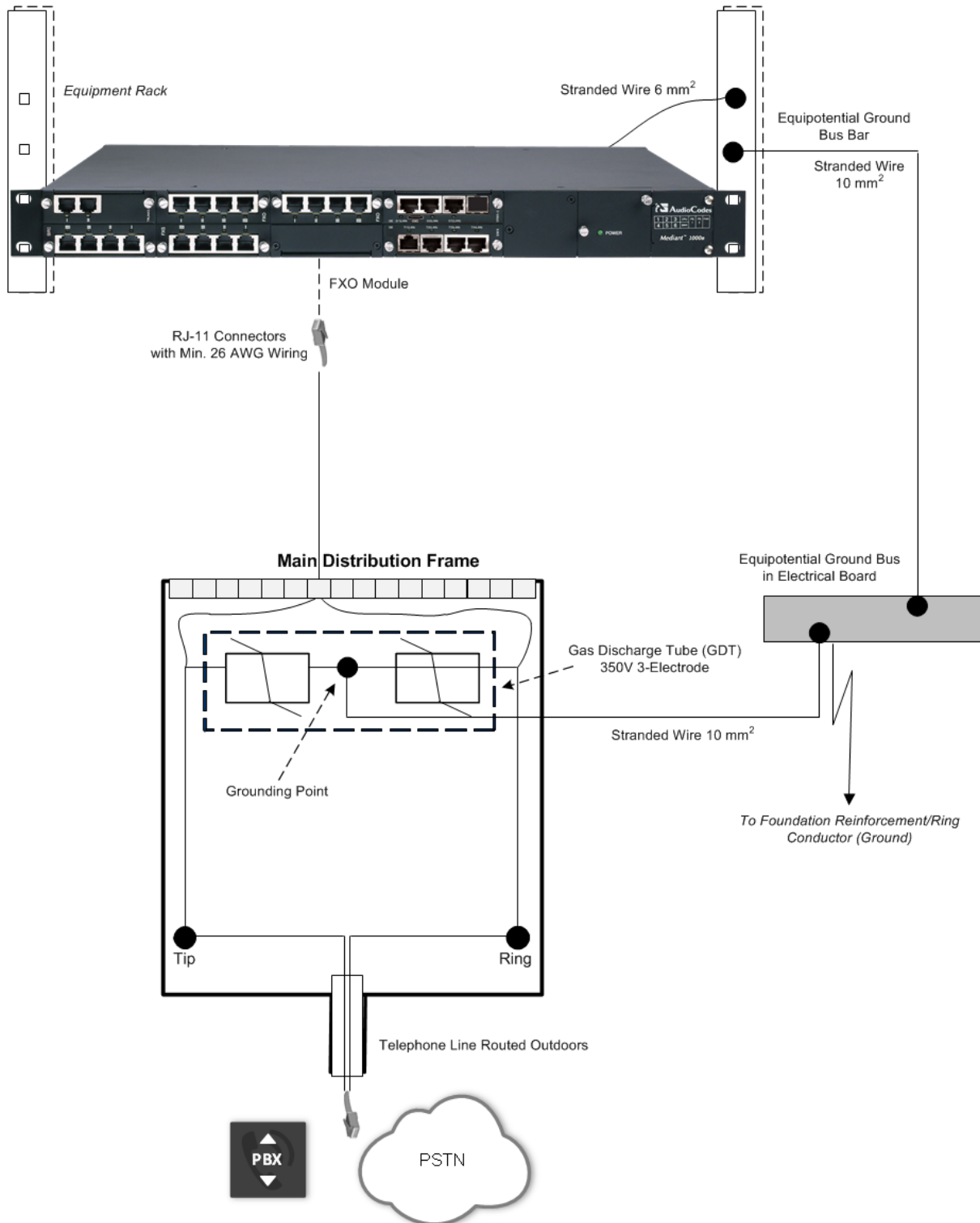
- 1 - Not connected
- 2 - Tip
- 3 - Ring
- 4 - Not connected

➤ **To connect FXO interfaces for outdoor routing:**

1. Ground the device as described in Section 5.1 on page 39 and shown in Figure 5-11.
2. Connect one end of a straight-through RJ-11 cable to the RJ-11 port on the FXO module.
3. Connect the other end of the cable to your MDF.

4. Provide primary surge protection, by installing additional three-electrode Gas Discharge Tube (GDT) rated 350V as a primary protection on the MDF, located at the entrance point of telephone wiring to the building. The center pin of the GDT must be connected to ground as shown in the figure below:

Figure 5-11: FXO Cabling for Outdoor Routing



5. Connect the FXO line from the MDF to the PBX/PSTN equipment.

5.3.3 Connecting the FXS Analog Lifeline Phone

The device supports Analog Lifeline. If the device loses power, for example, due to a power outage or the unplugging of its power cable, it automatically routes calls from a POTS telephone ("lifeline" phone), connected to an FXS port, to the PSTN (instead of the IP network).



Notes:

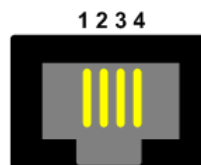
- Analog Lifeline is supported only on FXS modules.
- An analog Lifeline can be setup for each FXS module installed in the chassis.

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:

Cabling specifications:

- **Cable:** Splitter cable adaptor with RJ-11 on one end and two RJ-11 jacks on the other
- **Connector:** RJ-11
- **Connector Pinouts:**

Figure 5-12: RJ-11 Connector Pinouts for Analog Lifeline

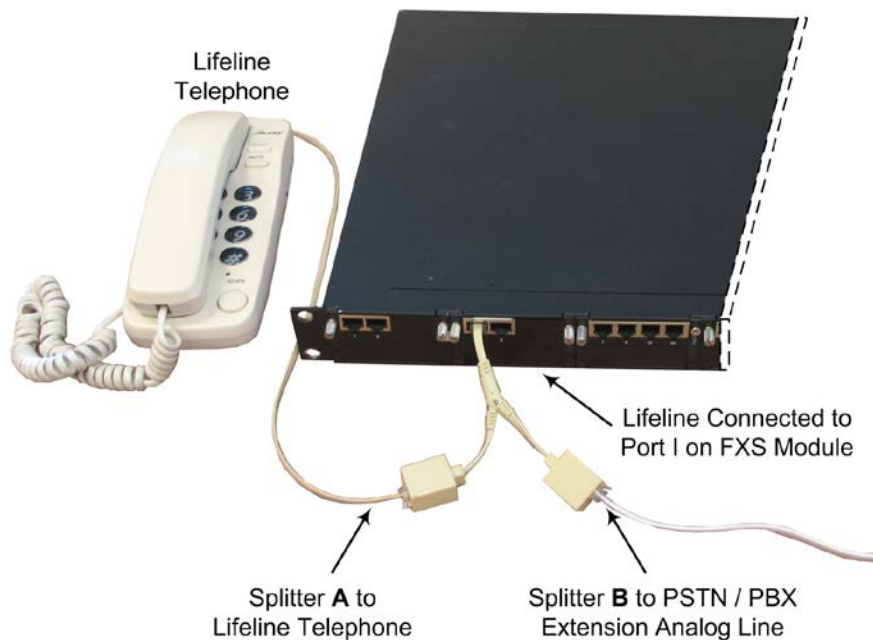


- 1 - Not connected
- 2 - Tip
- 3 - Ring
- 4 - Not connected

➤ **To cable the analog Lifeline:**

1. Connect the RJ-11 connector on one end of the Splitter cable (supplied) to Port **I** on the FXS module.
2. Connect the Lifeline POTS phone using an RJ-11 connector cable to Port **A** on the Lifeline Splitter.
3. Connect an analog PSTN line using an RJ-11 connector cable to Port **B** on the Lifeline Splitter.

Figure 5-13: Cabling the Analog Lifeline



5.4 ISDN BRI Interfaces

This section describes the cabling procedures for BRI interfaces.

5.4.1 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.

Avertissements: Pour vous protéger contre l'électrocution et le feu, utilisez un fil de 26 AWG au minimum pour connecter le port BRI au PSTN.

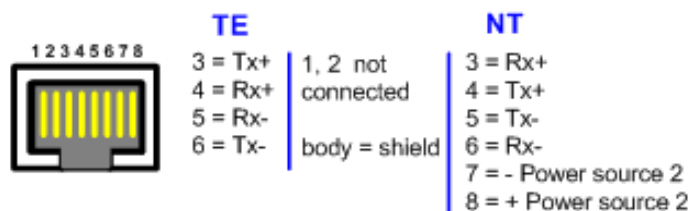


Note: The BRI module is a customer ordered item. This section is applicable only if your device is installed with such a module.

Cabling specifications:

- **Cable:** 26 AWG min.
- **Connector:** RJ-45
- **Connector Pinouts:** 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 5-14: 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.

➤ **To connect to BRI lines:**

1. Connect the RJ-45 connector on one end of the cable to the port on the device's BRI module.
2. Connect the other end of the cable to your ISDN telephone or PBX/PSTN switch.

5.4.2 Connecting the PSTN Fallback for BRI Lines

The device supports PSTN Fallback for BRI lines. If the device loses power, for example, due to a power outage or the unplugging of its power cable, it automatically routes calls from the Tel side to the PSTN (instead of the IP network). This guarantees call continuity.

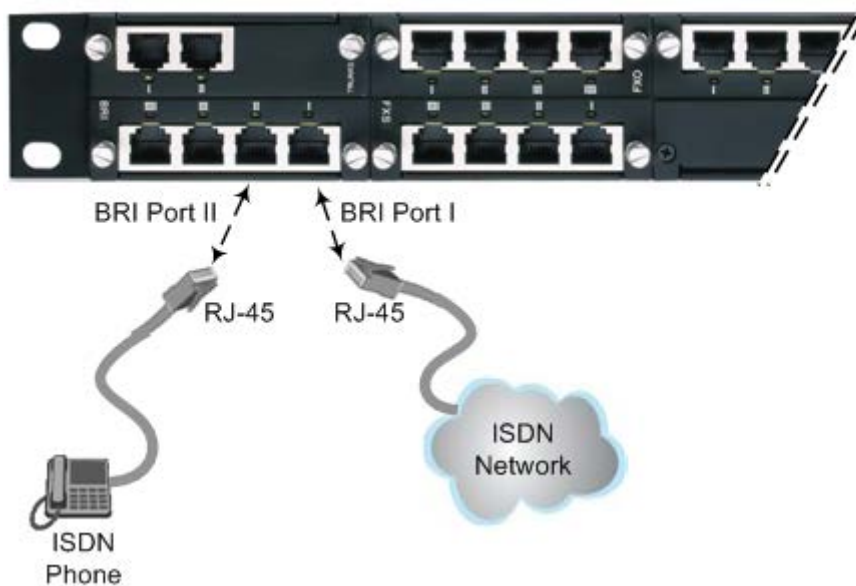
PSTN Fallback is supported only on BRI modules that provide two or four spans. In the event of a PSTN fallback, the BRI module's metallic relay switch automatically connects line Port 1 (I) to Port 2 (II), and / or line Port 3 (III) to Port 4 (IIII) of the **same** BRI module.

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 5-15: Cabling (Ports 1 and 2) PSTN Fallback



Notes:

- PSTN Fallback is supported only between ports on the same BRI module.
- This PSTN Fallback feature has no relation to the PSTN Fallback Software Upgrade Key.

5.5 ISDN E1/T1 Interfaces

5.5.1 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.

Avertissements: Pour vous protéger contre l'électrocution et le feu, utilisez un fil de 26 AWG au minimum pour connecter le port T1/E1 au PSTN.

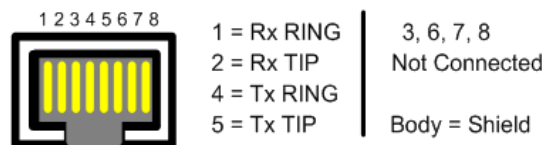


Note: The TRUNKS module is a customer ordered item. This section is applicable only if your device is installed with such a module.

Cabling specifications:

- **Cable:** 26 AWG min.
- **Connector:** RJ-48c
- **Connector Pinouts:**

Figure 5-16: RJ-48c Connector Pinouts for E1/T1



➤ **To connect to E1/T1 trunks:**

1. Connect the RJ-48c connector on one end of the E1/T1 trunk cable to the port on the device's TRUNKS module.
2. Connect the other end of the trunk cable to the PBX/PSTN switch.

5.5.2 Connecting the PSTN Fallback for E1/T1 Trunks

The device supports PSTN Fallback for E1/T1 lines. If the device loses power, for example, due to a power outage or the unplugging of its power cable, it automatically routes calls from the Tel side to the PSTN (instead of the IP network). This guarantees call continuity.

PSTN Fallback is supported on E1/T1 ("TRUNKS") modules that provide 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 between ports on the same TRUNKS module.
- This PSTN Fallback feature has no relation to the PSTN Fallback Software Upgrade Key.

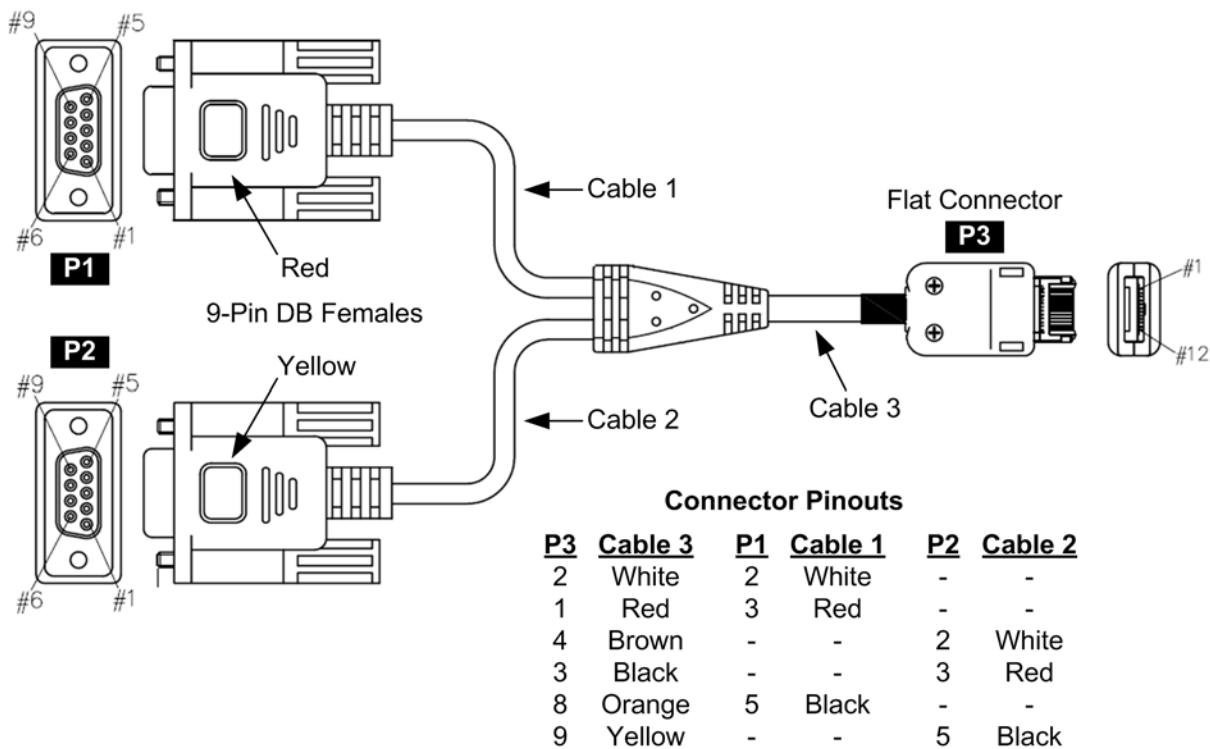
5.6 Connecting the RS-232 Serial Interface

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. "P1" and "P2" are standard 9-pin DB for PC COM connectivity; "P3" is the Hirose male connector.

For cabling, you can purchase an RS-232 cable adapter (9-pin DB to flat connector) from AudioCodes. You can either order a single cable adapter (only upon ordering the Mediant 1000B) or a kit of 10 cable adapters (can be purchased any time).

Figure 5-18: Orderable RS-232 Cable Adapter



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.
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.

5.7 Connecting a Dry-Contact Relay Alarm System

You can connect the device to an external audible or visual alarm system (e.g., bell, siren, hooter, or light). The external alarm system connects to the device's two dry-contact relays (I and II), each with a switch contact, on the CRMX module. When the device raises an alarm (e.g., Ethernet link down), the device reports the alarm's severity level (Minor, Major, or Critical) to the external alarm system, by triggering the dry contacts to open or close. The dry contacts also signal when the device powers off.

The table below describes the operational status of the dry-contact relays.

Table 5-1: Dry-Contact Relays Description

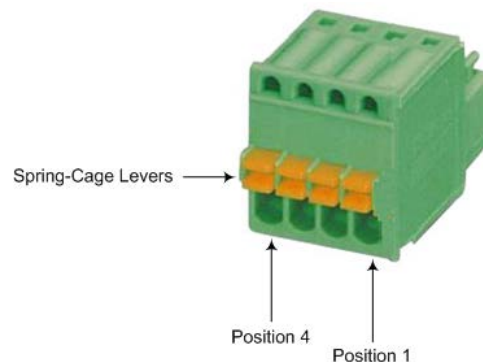
Operation	Dry-Contact I State	Dry-Contact II State	STATUS LED
No Power	Normally Open (NO)	Normally Closed (NC)	Off
No Alarm	Open	Open	Solid Green
Minor Severity Alarm	Closed	Open	Solid Orange
Major Severity Alarm	Closed	Closed	Solid Red
Critical Severity Alarm	Open	Closed	Solid Red

If the dry-contact relay is short-circuited (for whatever reason), the device sends the SNMP alarm, `acUserInputAlarm`. For more information, refer to the *SNMP Reference Guide*.

Cabling specifications:

- **Connector:** (Not Supplied) Dry-contact wires mate, consisting of a four spring-cage pluggable terminal block connector, as shown in the figure below. The connections correspond to the four pins of the dry-contact connector on the CRMX module.

Figure 5-19: Dry-Contact Terminal Block (Example)





Note: AudioCodes recommends the pluggable printed circuit board (PCB) terminal block **FK-MC 0,5 / 4-ST-2,5** manufactured by Phoenix Contact, or any other vendor providing similar specifications.

- **Wiring:** (Not Supplied) 20 to 28 AWG wire size.



Warning:

- The dry contact port is rated **1.5A @ 30V AC/DC maximum**.
- To avoid fire and electrical shock hazard, the dry contact may be connected only to a SELV power limited source.

➤ **To cable the dry-contact relay system:**

1. For each dry-contact relay (Port I and Port II), connect two wires to the terminal block's corresponding connector positions (see table below):

Table 5-2: Terminal Block Position No. and Dry-Contact Relay Ports

Terminal Block Position No.	Dry-Contact Relay Port on CRMX Module
Position 1	Port II
Position 2	
Position 3	Port I
Position 4	

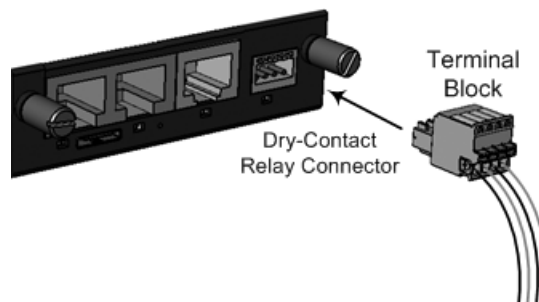
- a. With a sharp, pointed object, press and hold the position's orange button to open the spring-cage connector.
- b. Insert the wire into the connector, and then release the orange button to close the connector, securing the wire in place.

Figure 5-20: Wires Inserted in Terminal Block



2. Plug the terminal block into the dry-contact relay connector on the CRMX module:

Figure 5-21: Plugging Terminal block into Dry-Contact Relay Connector



3. Connect the other ends of the dry-contact wires to your external alarm system, according to your requirements.

5.8 Connecting to Power

The procedure below describes how to connect the device to the AC power supply. You can install up to two Power Supply modules (Power 1 and Power 2) for power redundancy. For installing the Power Supply modules in the chassis, see Section 6.2.4 on page 74.



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.
- When using only one Power Supply module, the second AC power socket on the rear panel is covered by a plastic sticker. Please **do not** remove the sticker and connect anything to this power socket. Remove the sticker only when two Power Supply modules are used.

Avertissements:

- L'appareil doit être branché à une prise murale à condition qu'elle soit mise à la masse.
- Utilisez uniquement le cordon AC fourni avec l'appareil.



ご注意

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Note: For dual power supply:

- Connect each Power Supply module to a different AC supply circuit.
- The two AC power sources must have the same ground potential.
- 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, refer to 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 5-22: Connecting to AC Power Supply



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.

Avertissement: Pour prévenir des dégâts d'électricité statique au circuit imprimé du module, ne touchez pas les composants sur le module. A la place, tenez le module par ses extrémités où il n'y a pas de composants électriques.



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

6.1 Chassis Slot Assignment for Modules

This section describes the chassis' slot assignment for the different modules.

6.1.1 Front-Panel Module Slot Assignment

The figure below displays the chassis' slot assignment on the front panel for the different modules:

Figure 6-1: Chassis Front-Panel Slot Assignment for Modules

Slot #1 I/O or MPM Module	Slot #2 I/O or MPM Module	Slot #3 I/O or MPM Module	CRMX Module	Power Supply Module (Spare)	Power Supply Module (Main)	Fan Tray Module
Slot #4 I/O or MPM Module	Slot #5 I/O or MPM Module	Slot #6 I/O	SWX LAN Expansion			

Please adhere to the following guidelines for slot assignment of these modules:

- **TRUNKS (PRI), BRI, FXS, and FXO Modules:**
 - The modules can be housed only in slots **1, 2, 3, 4, 5 and 6**.
 - The modules must be housed in **consecutive** slots. In other words, if the device houses three modules, they must occupy slots 1, 2, and 3 (**no skipping of slots**).

- It is recommended to house the modules **starting from Slot 1** and according to the order of priority listed below:
 - TRUNKS
 - BRI
 - FXS and/or FXO

For example, if you need one TRUNKS module and two FXS modules, you must install the TRUNKS module in Slot 1 and the two FXS modules in Slot 2 and Slot 3. However, if at a later stage you wish to add a BRI module, you must remove the FXS module from Slot 2 and insert it in Slot 4, and then insert the BRI module in Slot 2, as shown in the figure below:

Figure 6-2: Example of Module Slot Assignment


Slot #1 TRUNKS Module	Slot #2 BRI Module	Slot #3 FXS Module	CRMX Module	Power Supply Module (Spare)	Power Supply Module (Main)	Fan Tray Module
Slot #4 FXS Module	Slot #5	Slot #6	SWX LAN Expansion			

- MPM Module:** The module provides additional DSP resources for applications such as three-way conferencing and SBC transcoding:
 - MPM modules can be housed only in slots **1, 2, 3, 4, and 5**. It is recommended to house the MPM modules starting from the last slot (i.e., Slot 5) toward the first slot. For example, if you want to use 4 MPM modules, house the MPM modules in slots 2, 3, 4, and 5. For information on the number of media channels (DSP resources) provided by the MPM modules per slot, refer to 'DSP Channel Resources for Transcoding' section in the *User's Manual*
 - The device can acquire additional media channel resources (for SBC transcoding) from the TRUNKS modules. For more information, refer to the 'DSP Channel Resources for Transcoding' section in the *User's Manual*.

6.1.2 Rear-Panel Module Slot Assignment

The figure below displays the chassis' slot assignment on the rear panel for the OSN server platform modules:

Figure 6-3: Chassis Rear-Panel Slot Assignment for OSN Server Modules

	Slot #1 HDMX Module	Slot #3	Slot #5	Slot #7
	Slot #2 OSN Module	Slot #4	Slot #6	Slot #8 Optional, Spare HDMX Module

6.2 Installing and Replacing Modules

This section describes how to install and replace the different modules in the chassis.

6.2.1 Front-Panel I/O Modules

This section describes how to install and replace the input/output modules on the front panel of the chassis. The I/O modules include FXS, FXO, BRI, TRUNKS (E1/T1), MPM, CRMX, and SWX LAN Expansion modules.

6.2.1.1 Replacing Blank-Panel Slot Covers with I/O Modules

The procedure below describes how to install a module into a slot that is currently not used (unoccupied) and covered by a blank panel.



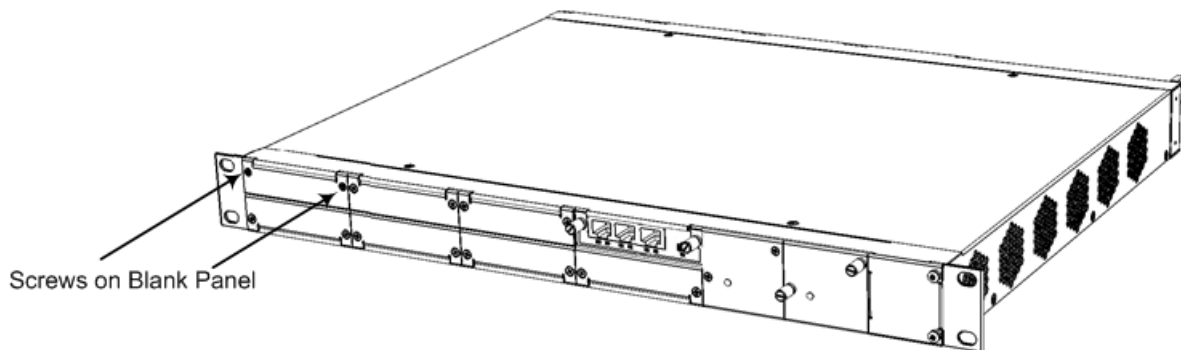
Warning: Before replacing a blank-panel slot cover with a module, power down the device.

Avertissement: Assurez-vous de bien éteindre l'appareil avant d'installer un module dans une fente vide.

➤ **To replace a blank-panel slot cover with a module:**

1. Power down the device.
2. On the device's front panel, locate the two screws securing the blank-panel slot cover to the slot in which you want to install the module.

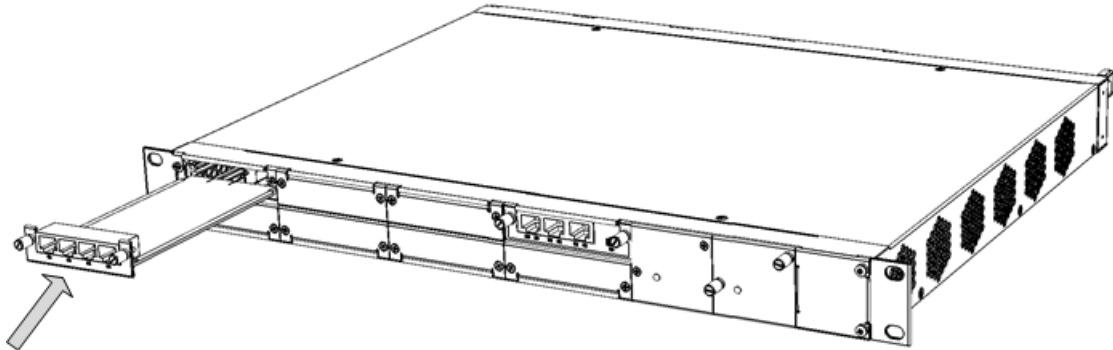
Figure 6-4: Screws on Blank-Panel Slot Cover



3. Using a Phillips screwdriver, unscrew the two screws to remove the blank-panel slot cover from the chassis.

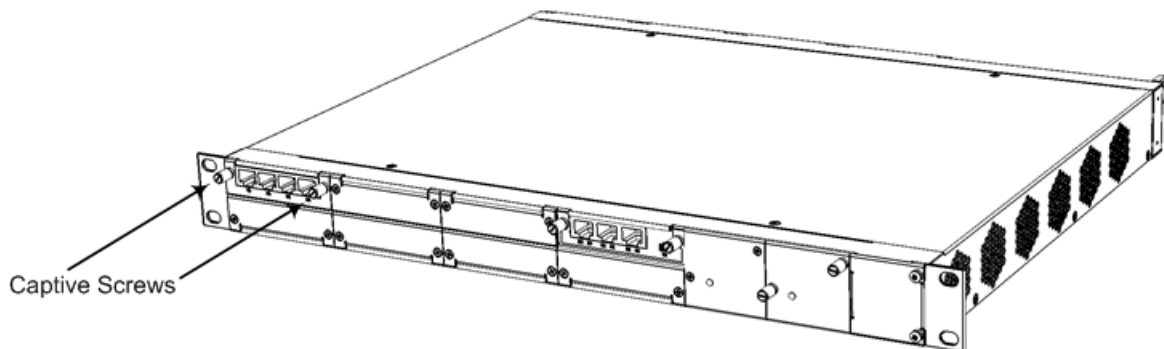
4. Gently insert the module into the empty slot, aligning the module with the rails in the slot in the following module orientation, depending on whether you are inserting it in the top- or bottom-row slots:
 - **Top-row slots:** Ensure that the module is orientated such that the port-number labels are located at the bottom of the module's front panel. This module orientation is considered as facing up.

Figure 6-5: Inserting a Module into the Empty Slot



- **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.
5. Push the module into the slot and press on it firmly to ensure that it has been fully inserted.
 6. Using a flathead screwdriver or your fingers, tighten the module's two captive screws to secure the module to the chassis.

Figure 6-6: Captive Screws on Module



6.2.1.2 Replacing I/O Modules

The procedure for replacing a front-panel I/O module depends on the type of module as well as hardware configuration.

If the chassis houses at least **two** I/O modules of any of the following types—**FXS**, **FXO**, **BRI**, **TRUNKS**, and/or **MPM**—you can replace any one of these modules with a module of the same interface type and same number of ports (e.g., a 2-port FXS module with a 2-port FXS module) using a hot-swappable process. In other words, you can replace the module without powering down the device and thus, without affecting other components and processes. The hot-swappable procedure includes physical removal and insertion of the module as well as software-based removal and insertion of the module through the Web interface.

For all other I/O module replacements, the device must be powered down before removing the module and then powered up again once the new module has been installed. This enables the device to reset in order to apply the new hardware configuration. This cold-reset replacement procedure applies to the following modules and hardware configurations:

- CRMX module
- SWX LAN Expansion module
- Replacement of a module with a module that supports a different number of ports and/or a different interface (e.g., replacing a 2-port FXS with a 4-port FXS module)
- Replacement of an FXS, FXO, BRI, TRUNKS or MPM module if it is the only module of these five module types installed in the chassis (e.g., a chassis that houses only an FXS module and a CRMX module)



Warnings:

- Only a **single** module can be replaced per hot-swappable module replacement process.
- For hot-swappable module replacement, make sure that the module is replaced with a module of the same interface type and same number of ports, and in the same chassis slot. For example, a 2-port FXS module in Slot #1 must be replaced with a new 2-port FXS module and inserted in Slot #1.

Avertissement:

- Remplacez le module par le même type de module et dans la même fente du châssis. Par exemple, un module TRUNKS endommagé avec deux portées numériques dans la Fente 1 doit être remplacé par un module TRUNKS avec deux portées numériques dans la Fente 1.



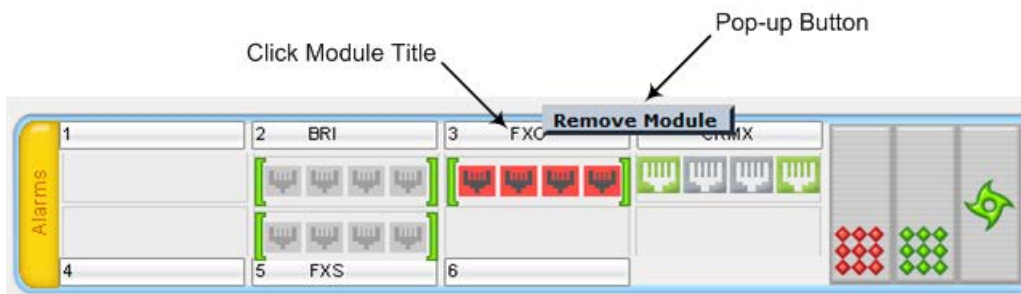
Note: If you are replacing a module with a module that supports a different interface (e.g., FXO instead of FXS) and provides a different number of ports, make sure that the Software Feature Key installed on the device provides support for this added hardware interface. For more information, contact your AudioCodes sales representative.

➤ To replace a front-panel I/O module:

1. For non-hot swappable module replacement, power down the device, and then skip the next step and continue to Step 3; otherwise, for hot-swappable module replacement, keep the device powered on and continue to Step 2.
2. **(Hot-Swap Only)** Software-remove the module, using the device's Web interface:
 - a. Access the device's Web interface.
 - b. Open the page with the graphical display of the device:
 - ◆ Version 7.2 and later: Monitor page (**Monitor** menu > **Monitor** tab > **Monitor**)
 - ◆ Pre Version 7.2: Home page

- c. Click the title of the module that you want to replace; the **Remove Module** button appears:

Figure 6-7: Clicking Module Title



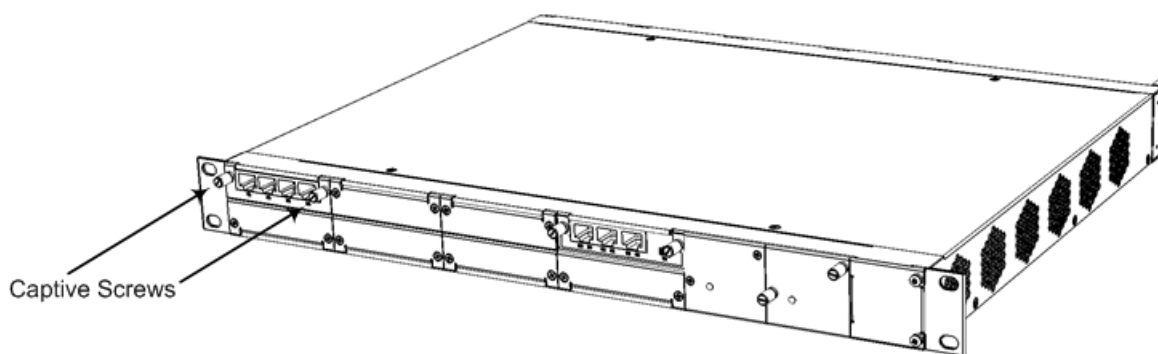
- d. Click the **Remove Module** button; a message box appears requesting you to confirm module removal.
- e. Click **OK** to confirm removal; after a few seconds, the module is software-removed, the port status icons of the module turn gray and the name of the module is suffixed with the word "Reserved":

Figure 6-8: Software-Removed Module

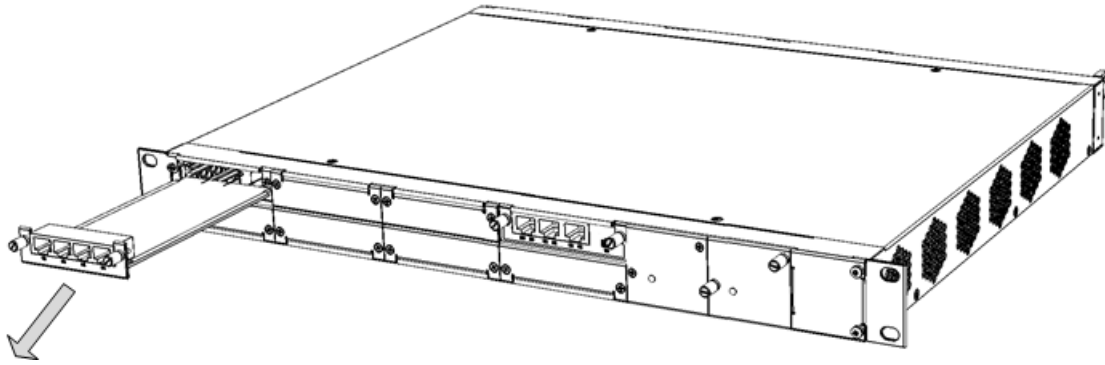


- 3. Disconnect all the cables from the module.
- 4. Physically remove the module from the slot:
 - a. Locate the two captive screws securing the module to the chassis:

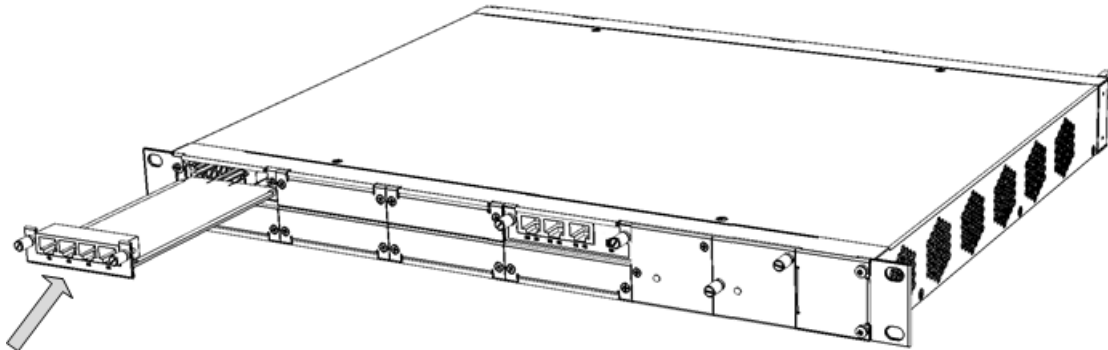
Figure 6-9: Captive Screws on Module



- b. Using a flathead screwdriver or your fingers, loosen the two captive screws.
- c. Firmly grip the two captive screws and extract the module from the slot by pulling the captive screw:

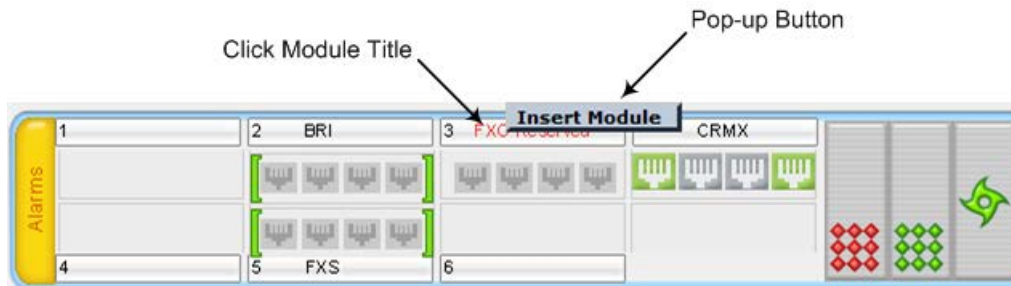
Figure 6-10: Extracting Module from Slot

5. Physically insert the new module into the same slot:
 - a. Gently insert the 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.

Figure 6-11: Inserting a Module into the Empty Slot

- ◆ **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.
- b. Push the module into the slot and press on it firmly to ensure that it has been fully inserted.
 - c. Using a flathead screwdriver or your fingers, tighten the module's two captive screws to secure the module to the chassis.
 6. Reconnect the cables to the module. For non-hot swappable module replacement, skip the next step and continue to Step 8; otherwise, for hot-swappable module replacement, continue to Step 7.

7. **(Hot-Swap Only)** Software-insert the module, using the device's Web interface:
 - a. Access the device's Web interface.
 - b. Open the page with the graphical display of the device.
 - c. Click the title of the module ("**<module name> Reserved**") that you want to insert; the **Insert Module** button appears:



- d. Click the **Insert Module** button; a message appears informing you that the module is currently being software-inserted. When the message disappears, the module is inserted, indicated by the disappearance of the word "Reserved" from the module's title.
8. For non-hot swappable module replacement only, power up the device.

6.2.2 OSN Server Modules

This section describes how to install and replace the OSN server modules (OSN and HDMX).

6.2.2.1 Replacing Blank-Panel Slot Covers with OSN Server Modules

The procedure below describes how to install an OSN server module into a slot that is currently not used (unoccupied) and covered by a blank panel.

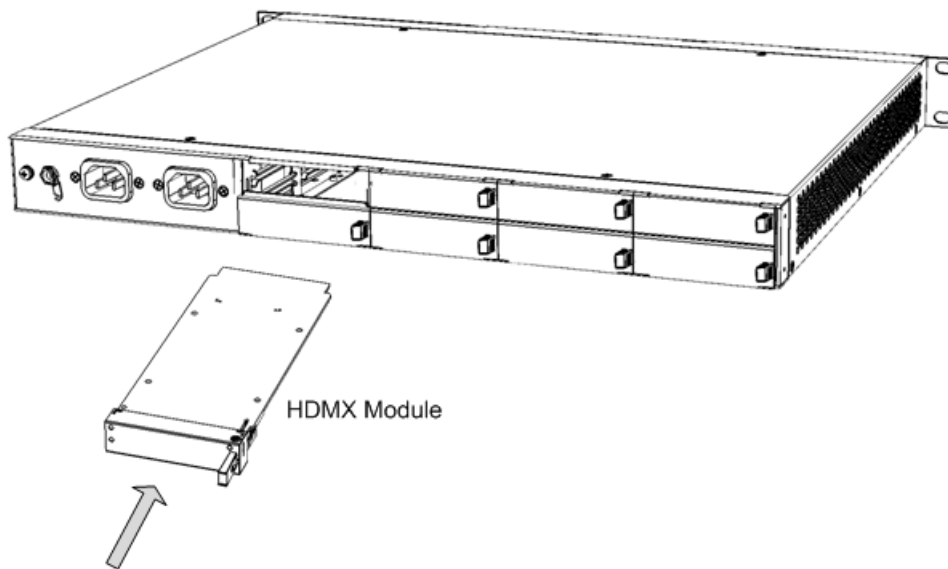


Notes:

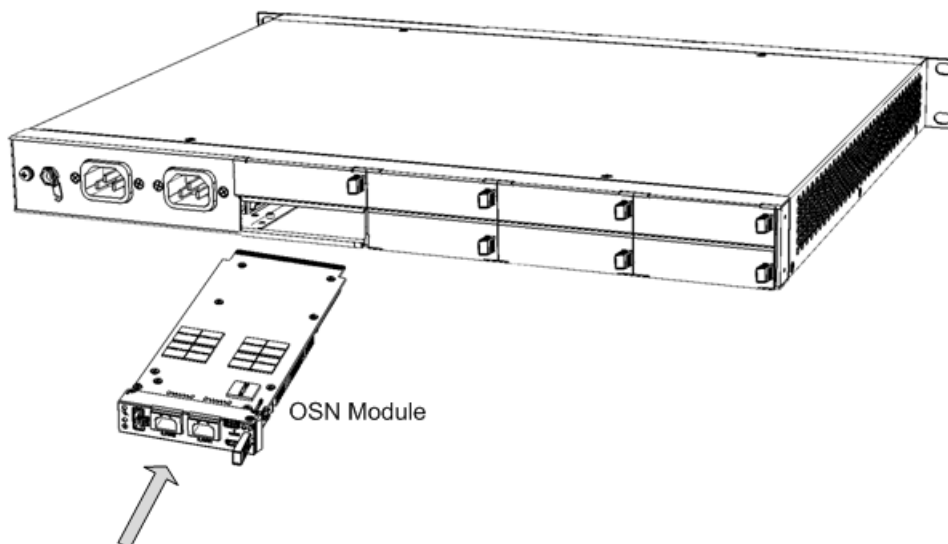
- Make sure that you install the HDMX module before you install the OSN module.
- The OSN server modules are hot-swappable and can be replaced without powering down the device and thus, without disrupting other non-related OSN services (e.g., Gateway and/or SBC functionality) running on the device.

➤ **To replace blank-panel slot covers with OSN server modules:**

1. Remove the new OSN server modules from their ESD shielding packets in which they were shipped.
2. **Install the HDMX Module:**
 - a. Remove the blank-panel slot cover from the slot intended for the HDMX module, by gently pulling on the handle of the module until it slides out of the slot.
 - b. Hold the HDMX module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure 6-12: Inserting HDMX Module into Slot

- c.** Push the module's handle until it clicks firmly into the slot.
- 3. Install the OSN Module:**
- a.** Remove the blank-panel slot cover from the slot intended for the OSN module, by gently pulling on the handle of the module until it slides out of the slot.
 - b.** Hold the OSN module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure 6-13: Inserting OSN Module into Slot

- c.** Push the module's handle until it clicks firmly into the slot.
- 4. Connect all external interfacing cables to the OSN module.**

6.2.2.2 Replacing OSN Server Modules

The procedure below describes how to replace the OSN server modules.



Note: The OSN server modules are hot-swappable and can be replaced without powering down the device and thus, without disrupting other non-related OSN services (e.g., Gateway and/or SBC functionality) running on the device. In addition, if the device is installed with two HDMX modules and you need to replace or remove one, you can do so without powering down the device and thus, without affecting OSN services.

➤ **To replace an OSN module:**



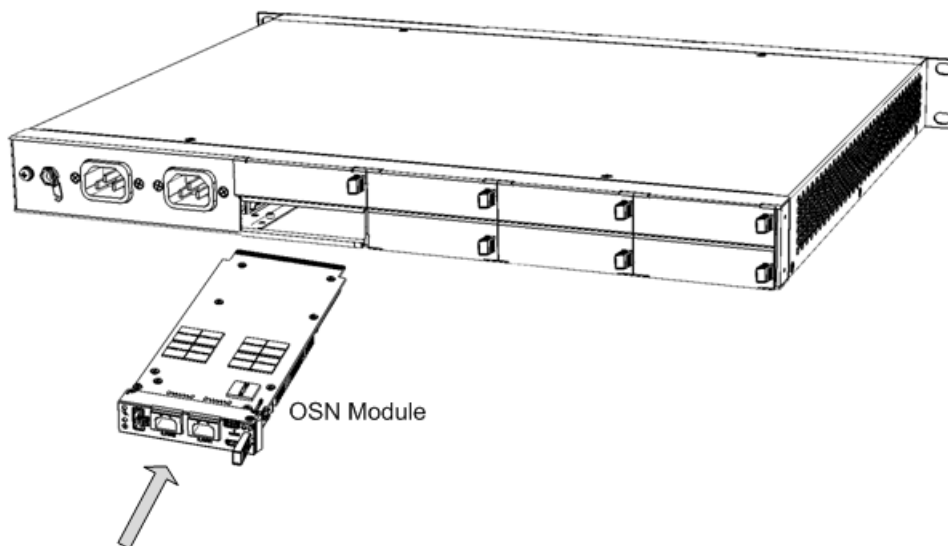

1. Shut down the operating system running on the OSN server (through RDP or monitor and keyboard).
2. Gently and slowly pull the module's handle until you hear the first click sound; the handle is now partially pulled out and the module undergoes a shutdown sequence indicated by the slow-flashing **Hot Swap Blue**  LED on the module.
3. When the  LED stops flashing and is constantly lit, indicating that the shutdown sequence is complete, disconnect any cables that may be connected to the module.
4. Grip and gently pull the module's handle to slide the module out of the slot.
5. Hold the new OSN module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure 6-14: Inserting OSN Module into Slot



6. Push the module's handle until it clicks firmly into the slot; the operating system on the OSN server starts up.

➤ **To replace an HDMX module:**

1. Shut down the operating system running on the OSN server (through RDP or monitor and keyboard).
2. Gently pull the module's handle until you hear the first click sound; the handle is now partially pulled out and the module undergoes a shutdown sequence, indicated by the slow-flashing **Hot Swap Blue**  LED on the module.


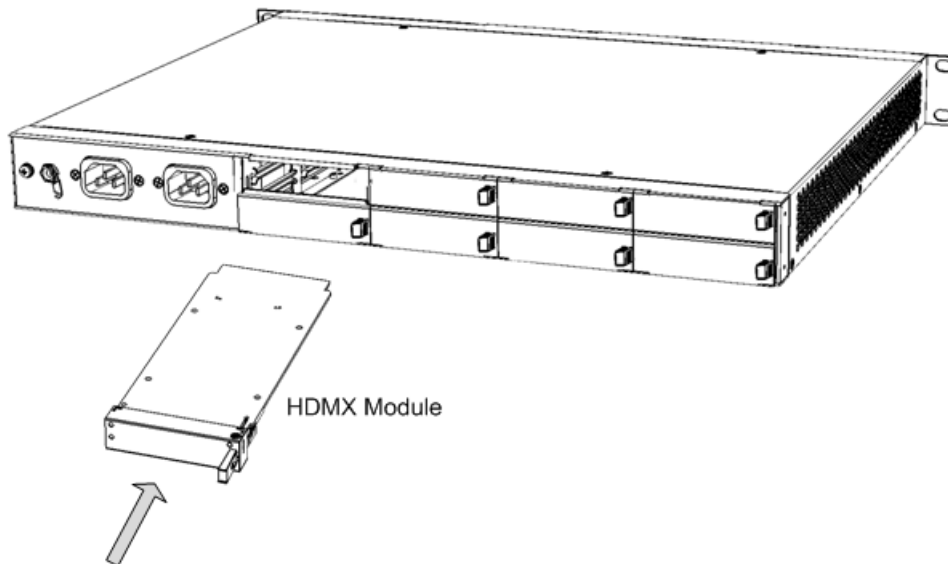
3. When the  LED stops flashing and is constantly lit, indicating that the shutdown sequence is complete, grip and gently pull the module's handle to slide the module out of the slot.
4. Hold the new HDMX module in the correct orientation, as shown in the figure below, and gently insert the module into the slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure 6-15: Inserting HDMX Module into Slot




5. Push the HDMX module's handle until it clicks firmly into the slot.
6. On the **OSN** module, gently pull the module's handle until you hear two click sounds, indicating that the handle has been fully pulled out, and then push the handle all the way in again; the module undergoes a reset, indicated by the **Hot Swap Blue**  LED switching off.

Figure 6-16: Pulling Out and then Pushing In Handle on OSN Module

- 1 Module Handle Pulled Out Half-Way (First "Click")



- 2 Module Handle Pulled Out All-the-way (Second "Click")



- 3 Module Handle Pushed-in Half-way



- 4 Module Handle Pushed-in All-the-way



6.2.3 Replacing the Fan Tray Module

The procedure below describes how to replace the Fan Tray module.



Warnings:

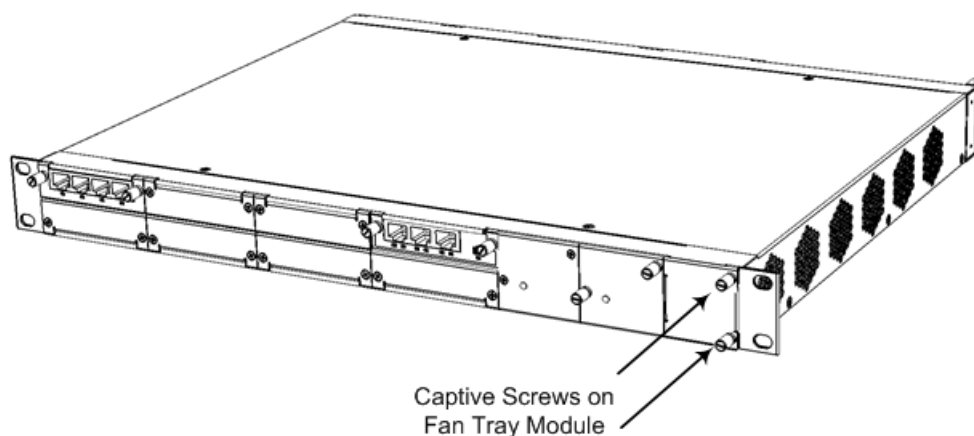
- **DO NOT** operate the device without the Fan Tray module.
- Before replacing the Fan Tray module, make sure that you have the replacement Fan Tray module on hand so that you can **immediately** replace the failed module with it.
- When removing the Fan Tray module, the blades may still be rotating at high speeds (even after the device has recently been switched off). Therefore, partially extract the module from the chassis and then wait a few seconds to allow the blades to stop, prior to extracting the module entirely from the chassis.

➤ **To replace the Fan Tray module:**

1. Remove the faulty Fan Tray module:

- a.** Locate the two captive screws on the front panel of the Fan Tray module.

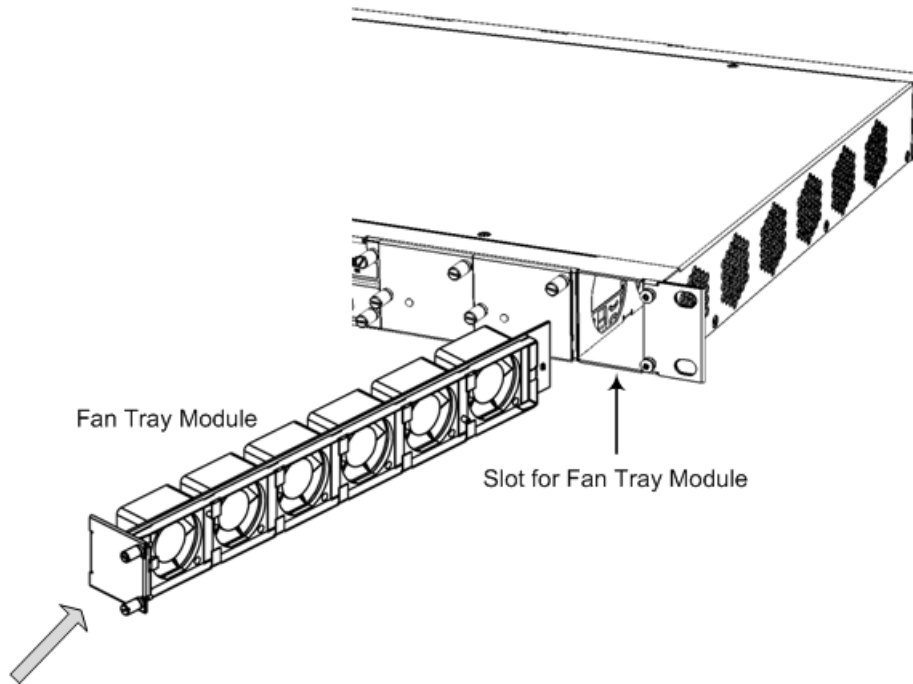
Figure 6-17: Captive Screws of Fan Tray Module



- b.** Loosen the two screws using your fingers or a flat-head screwdriver.
- c.** Grip and pull the two screws of the Fan Tray module to gently slide the module out of the chassis slot.

2. **Install the new Fan Tray module:**
 - a. Align the module with the guiding rails located in the chassis slot.

Figure 6-18: Installing Fan Tray Module



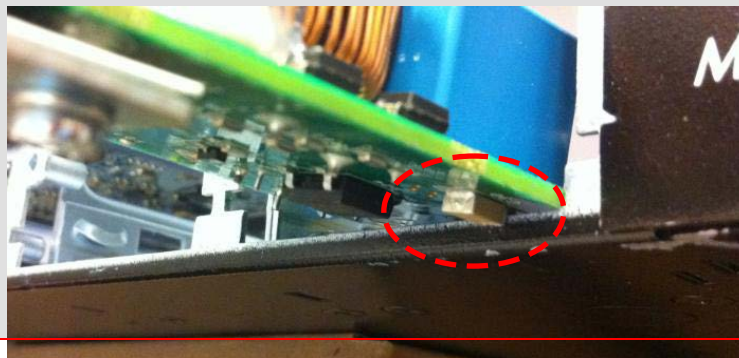
- b. Gently push the module into the slot until it is engaged with the chassis backplane and the module's front panel is flush with the chassis front panel plate.
 - c. Using your fingers or a flat-head screwdriver, tighten the two captive screws on the front panel of the Fan Tray module to secure the module to the chassis.

6.2.4 Power Supply Module

This section describes how to install and replace the Power Supply modules.

Warnings:

- When using only one Power Supply module, the second AC power socket on the rear panel is covered by a plastic sticker. Please **do not** remove the sticker and connect anything to this power socket. Remove the sticker **only** when two Power Supply modules are used.
- Correct insertion of the Power Supply module into the chassis slot is crucial in preventing irreversible hardware damage to the module (and more specifically, to 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). Below shows incorrect insertion where the underside components collide with the chassis:



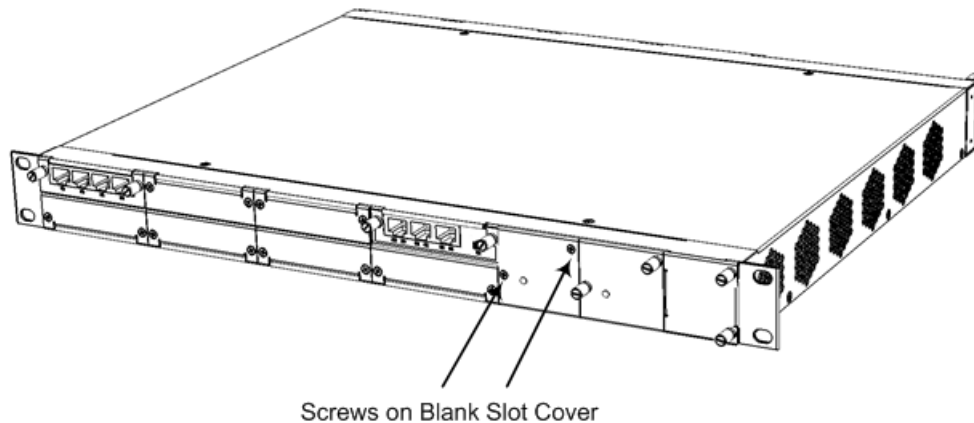
6.2.4.1 Installing an Optional, Secondary Power Supply Module

The procedure below describes how to install the optional, secondary (spare) Power Supply module.

➤ **To install the spare Power Supply module:**

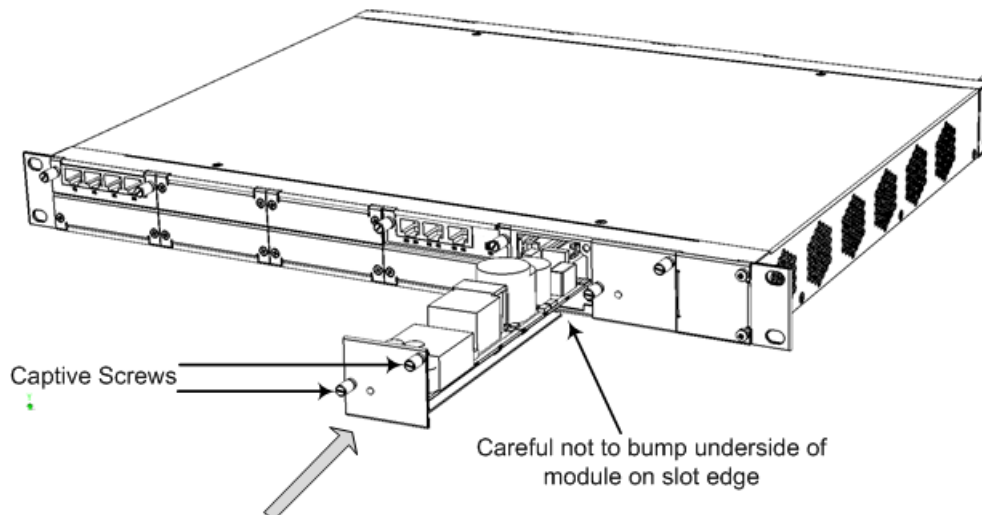
1. On the front panel, remove the blank panel covering the slot intended for housing the second Power Supply module, as shown in the figure below. To do this, use a Philips screwdriver to remove the two screws securing the blank panel to the chassis.

Figure 6-19: Screws on Blank Panel Cover



2. Hold the Power Supply module in the orientation as shown in the figure below, and then gently and carefully insert the module into the slot, by sliding the module along the slot's guiding rails and keeping 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). Slide the module into the slot until it makes contact with the card-edge connector located on the backplane.

Figure 6-20: Inserting Power Supply Module



3. Finger-tighten the two captive screws on the module to secure the module to the chassis.
4. On the rear panel, remove the plastic sticker covering the AC power socket, which corresponds to the second Power Supply module that you inserted into the chassis slot.
5. Cable to the power source, as described in Section 5.8 on page 59.

6.2.4.2 Replacing a Power Supply Module

The following procedure describes how to replace the Power Supply module.

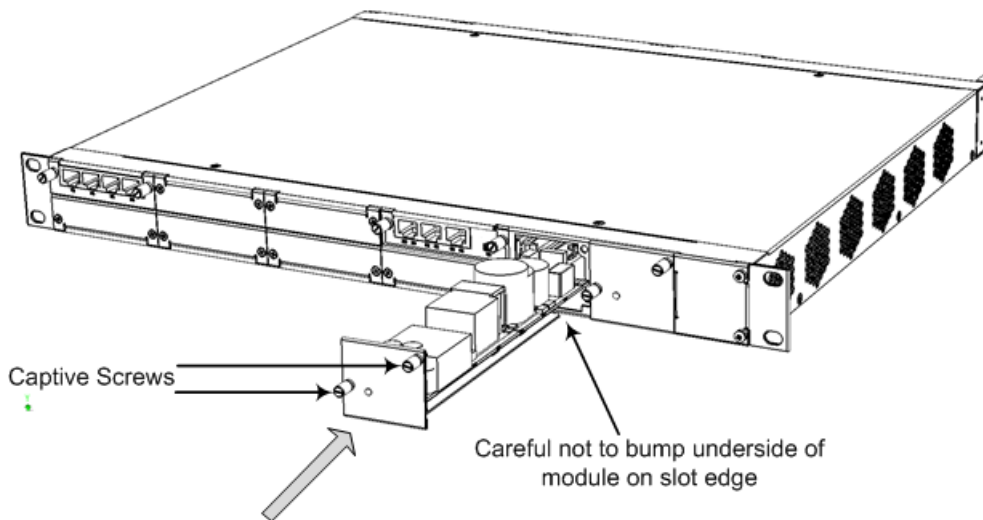


Note: If the device is installed with two Power Supply modules, the Power Supply module that is not being replaced can remain connected to power, ensuring uninterrupted power supply to the chassis.

➤ **To replace a Power Supply module:**

1. Disconnect the power cord of the faulty Power Supply module from the power source, and then remove the power cord from the AC power socket on the rear panel.
2. **Remove the module:**
 - a. On the front panel, loosen the two captive screws securing the module to the chassis, using your hand.
 - b. Grip the two captive screws and gently pull the module so that it completely slides out of the chassis slot.
3. **Install the module:**
 - a. Gently and carefully insert the module into the slot, by sliding the module along the slot's guiding rails and keeping 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). Slide the module into the slot until it makes contact with the card-edge connector located on the backplane.

Figure 6-21: Inserting Power Supply Module (e.g., Secondary Power Supply Module)



- b. Finger-tighten the two captive screws on the module to secure the module to the chassis.
4. Connect the AC power cord to the power socket of the new Power Supply module and then connect the other end to the AC power source, as described in Section 5.8 on page 59.

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	Interfaces
OSN3B	Intel® Core™ i7 3 rd Generation Dual Core	4 GB DDR2 with ECC	Up to 2 hard drives: HDD or SSD	<ul style="list-style-type: none"> ▪ Two external Gigabit Ethernet ▪ Internal Gigabit Ethernet ▪ USB 2.0 ▪ RS-232 COM ▪ HDMI Graphic
OSN4	Intel® Core™ i7 3 rd Generation Dual Core 2.5 GHz	8 GB DDR3 with ECC	Up to 2 hard drives: HDD or SSD	<ul style="list-style-type: none"> ▪ Two external Gigabit Ethernet ▪ Internal Gigabit Ethernet ▪ USB 2.0 ▪ RS-232 COM ▪ HDMI Graphic



Notes:

- The OSN3 server platform is no longer available for purchase. However, the OSN3 description is provided in this section for the convenience of incumbent customers.
- 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 Physical Description of OSN Server Modules

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.2.2 on page 81
 - OSN3B platform: OSN3B module – see Section A.2.1 on page 78
 - OSN4 platform: OSN4 module – see Section A.2.1 on page 78
- HDMX module – see Section A.2.3 on page 85

A.2.1 OSN3B and OSN4 Modules

The OSN3B and OSN4 modules are identical with regard to their external interfaces and therefore, are documented together.

The OSN3B and OSN4 modules are part of the OSN3B and OSN4 server platforms, respectively. The module provides the port connector interfaces and is housed in Slot #2 on the rear panel.

A.2.1.1 Port Description

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

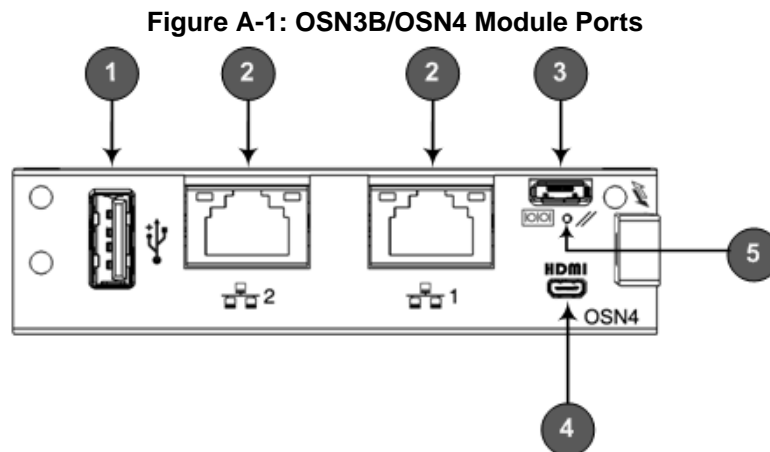






Table A-2: OSN3B/OSN4 Module Port Description

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		Console (serial) port (micro-USB) for serial interface (COM1).
4	HDMI	Micro-HDMI port (19-pin Type D) for connecting to a graphic display monitor.

Item #	Label	Description
5		<p>Reset pinhole button.</p> <ul style="list-style-type: none"> ▪ To warm reset the operating system of the OSN server (i.e., power remains on): Press and then immediately release the button (less than five seconds). The LED indications are as follows (see Section A.2.1.2 for LED locations): <ul style="list-style-type: none"> ✓ Upon reset: <ul style="list-style-type: none"> LED #1: On (solid green) LED #2: On (solid red) ✓ End of reset: LED #1 remains on (solid green); all other LEDs off. ▪ To cold (hard) reset the OSN server (i.e., powers off and then powers on): Press the button for longer than five seconds and then release. The LED indications are as follows (see Section A.2.1.2 for LED locations): <ul style="list-style-type: none"> ✓ Upon reset: <ul style="list-style-type: none"> LED #1: On (solid green) LED #2: On (solid red) LED #5: On (solid blue) ✓ End of reset: LED #1 remains on (solid green); all other LEDs off.

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

Table A-3: 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.2.1.2 LED Description

The OSN3B/OSN4 module LEDs are shown in the figure below and described in the subsequent table.

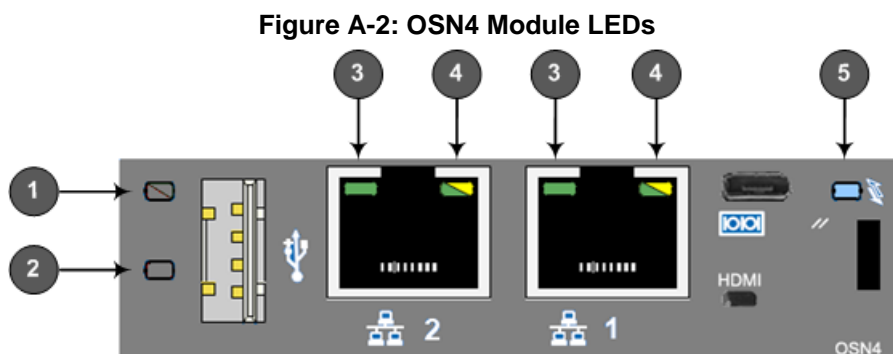


Table A-4: OSN3B/OSN4 Module LEDs Description

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.
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.2.2 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.2.2.1 Port Description

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

Figure A-3: OSN3 Module Ports

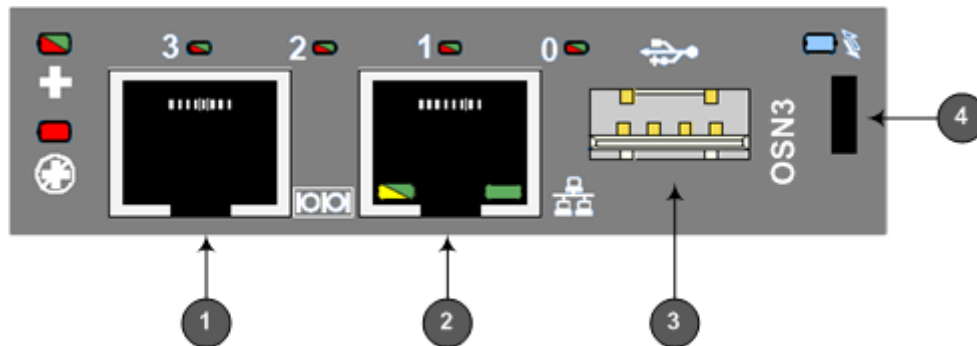





Table A-5: OSN3 Module Port Description

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.

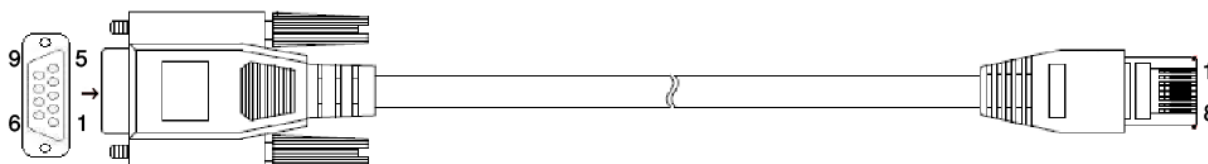
The RJ-45 connector pinouts for Gigabit Ethernet interface are listed in the table below:

Table A-6: 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-4: 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-7: 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.2.2.2 LED Description

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

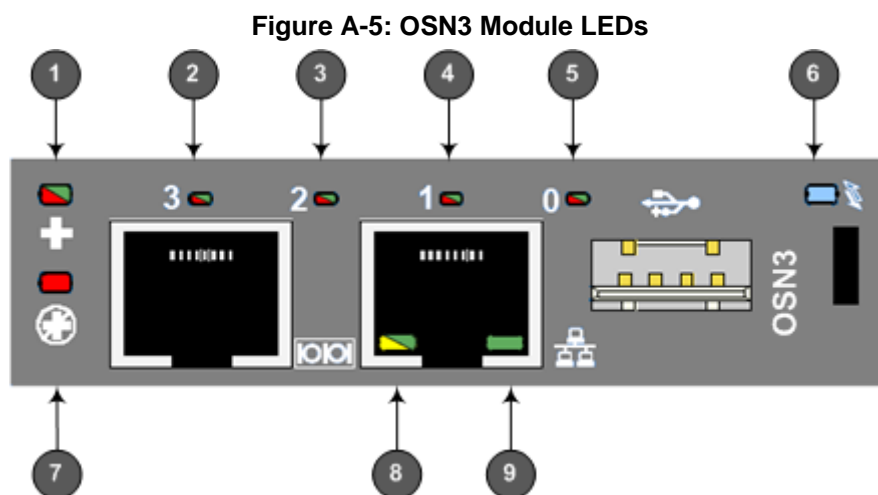




Table A-8: OSN3 Module LEDs Description

Item	Label	Color	State	Description
1	+	Green	Flashing	Hardware normal operation
		Red	On	Hardware fault (over-temperature or excess voltage feed).
2	3	Red	On	When lit during boot-up, indicates power failure.
		Red	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.
		Red	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.
		Red	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.

Item	Label	Color	State	Description
			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.2.3 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 77).

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.
2		Blue	On	Module can be extracted from chassis slot once dismantled from the OSN operating system.
			Off	Module correctly inserted in chassis slot
3		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.

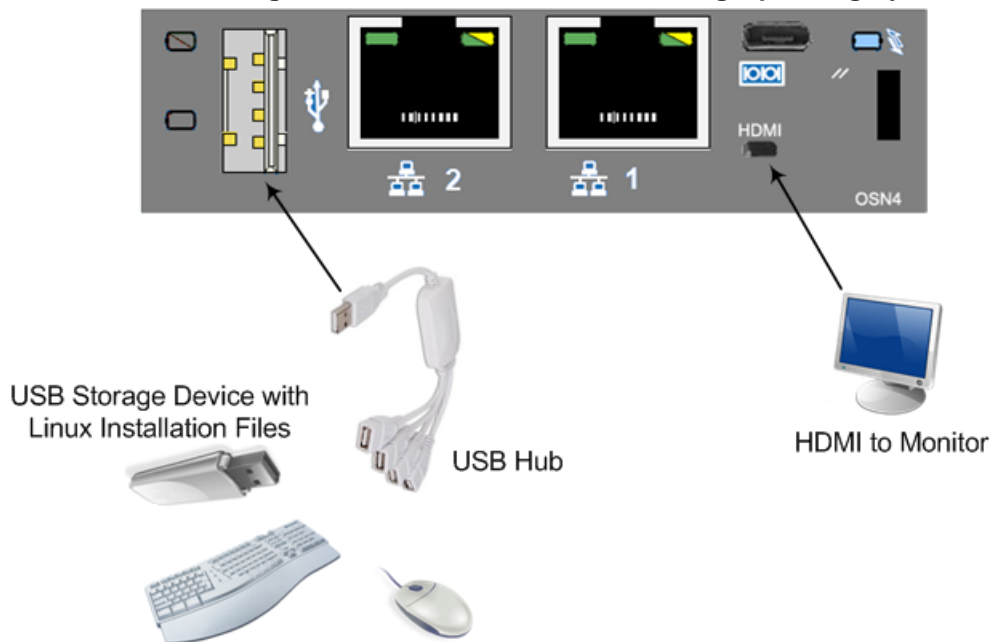
A.3.1 Cabling OSN3B/OSN4 for Installing Operating System

To install an operating system on your OSN server, follow the procedure below.

➤ **To install operating system on OSN3B/OSN4:**

1. Disconnect the power cord from the power source, and then remove the power cord from the power connection on the power socket.
2. Connect the USB port, located on the OSN3B/OSN4 module, to a USB hub, and then connect the USB hub to the following computer peripherals:
 - Mouse
 - Keyboard
 - USB storage device containing the operating system installation files (disk-on-key or external CD-ROM or DVD-ROM drive).
3. Connect the HDMI port, located on the OSN3B/OSN4 module, to your monitor.

Table A-10: Cabling OSN3B/OSN4 Module for Installing Operating System



4. Reconnect the device to the power source; the OSN server boots up from the USB storage device and the operating system installation begins.
5. Follow the online installation instructions to install the operating system.

Table A-11: Micro-HDMI Type-D Connector Pinouts

Pin	Signal
3	TMDS Data2+
4	TMDS Data2 Shield
5	TMDS Data2-
6	TMDS Data1+

Pin	Signal
7	TMDS Data1 Shield
8	TMDS Data1-
9	TMDS Data0+
10	TMDS Data0 Shield
11	TMDS Data0-
12	TMDS Clock+
13	TMDS Clock Shield
14	TMDS Clock-
15	CEC
2	Utility/HEAC+
17	SCL
18	SDA
16	DDC/CEC/HEAC Ground
19	+5 V Power
1	Hot Plug Detect/HEAC

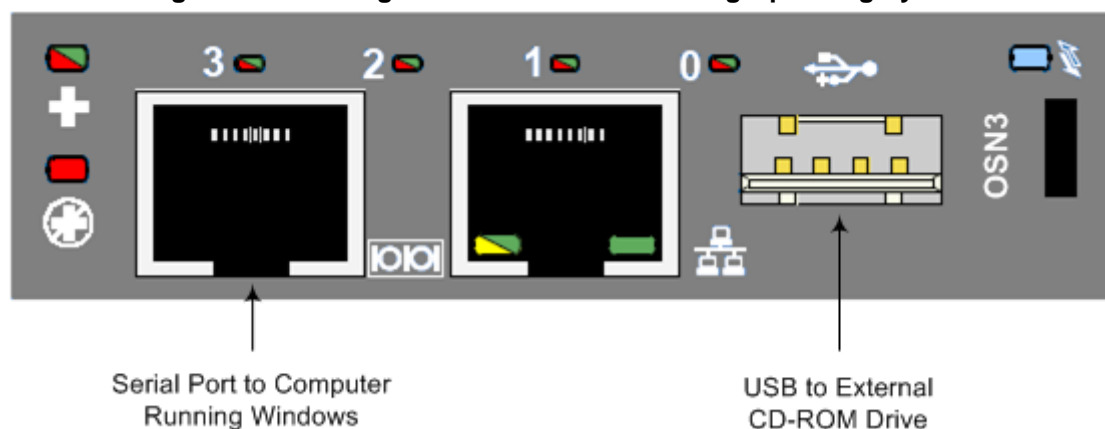
A.3.2 Cabling OSN3 for Installing Operating System

To install an operating system on your OSN server, follow the procedure below.

➤ **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 Operating System



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 operating system 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.
 5. Follow the online installation instructions to install the 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 Section A.4.1 on page 88.

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.2.2 on page 81).
 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.

- 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.

- Identify the network interface ID (NIC). For example, in the above, the Net ID is 55.
- 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
```

- 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
```

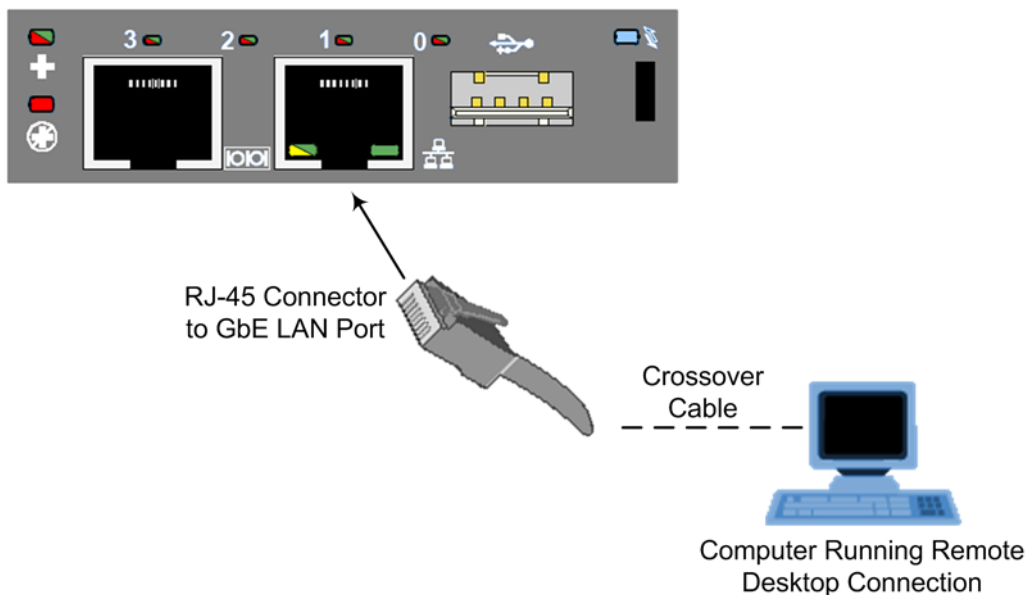
A.4.2 Connecting through Remote Desktop

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:

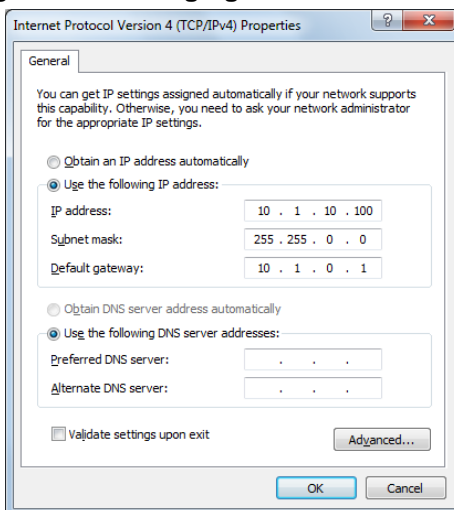
- Connect the Ethernet LAN port of the OSN3 module to the LAN network, by performing one of the following:
 - Remote PC connection:** Using a straight-through cable, connect the LAN port to a switch that is connected to the IP network.
 - Local PC connection:** Using a crossover cable, connect the LAN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

Figure A-8: Cabling OSN3 Module for Remote Desktop Connection from PC with Windows XP



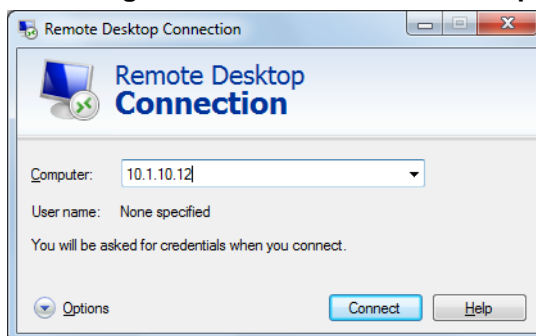
- Change the PC's IP address so that it is in the same subnet as the default OSN3 server's IP address (i.e., 10.1.10.12). The figure below displays an example of changing a PC's IP address:

Figure A-9: Changing the PC's IP Address



- 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-10: Entering IP Address in Remote Desktop Connection



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

Figure A-11: Entering User Name and Password in Remote Desktop Connection



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

B Module Hardware Revision Compatibility

The minimum input/output voice interface module hardware revisions that are compatible with the 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
FASU00556	CRMX-C (LAN 1, 2, 3, GE WAN copper Ethernet)	P2
FASU00736	SWX Copper Switch Extension for Mediant 1000B	All

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