

Mediant 4000B

Session Border Controller (SBC)

Version 6.8



Table of Contents

1	Introduction	11
2	Unpacking the Device	13
3	Physical Description	15
3.1	Physical Dimensions and Operating Environment	15
3.2	Front Panel Description.....	16
3.2.1	Module Slot Assignment	17
3.2.2	SBC CPU Module	18
3.2.2.1	Port Description.....	18
3.2.2.2	LED Description	19
3.2.3	Media Processing (MPM) Module	20
3.2.4	OSN Server Modules.....	22
3.2.4.1	OSN4 Module.....	22
3.2.4.2	HDMX Module	24
3.2.5	Fan Tray Module.....	26
3.3	Rear Panel Description	27
3.3.1	Power Supply Modules.....	28
4	Mounting the Device	29
4.1	Desktop Mounting	29
4.2	19-Inch Rack Mounting	30
4.2.1	Mounting in a 19-inch Rack using Pre-Installed Rack Shelf.....	31
4.2.2	Mounting in a 19-inch Rack using Front and Rear Brackets.....	32
5	Cabling the Device	37
5.1	Connecting the Ethernet Ports to the LAN	38
5.1.1	Deployment of a Standalone Device	39
5.1.2	Deployment of Two Devices for High Availability	40
5.2	Connecting the Serial Interface to a Computer	41
5.3	Connecting the OSN Server.....	42
5.3.1	Cabling for Installing Operating System	42
5.3.2	Cabling for Initial Installation of Third-Party Applications	44
5.3.3	Cabling for Remote Connectivity (Post-Initial Setup)	45
5.4	Connecting to Power.....	46
6	Hardware Maintenance	49
6.1	Preventing Electrostatic Discharge Damage.....	49
6.2	Replacing the SBC CPU Module	50
6.3	Installing the MPM Modules.....	52
6.4	Installing the OSN Server Modules	54
6.5	Replacing the Fan Tray Modules	56
6.6	Replacing the Power Supply Modules	58

List of Figures

Figure 3-1: Front Panel.....	16
Figure 3-2: Module Slot Assignment on Front Panel.....	17
Figure 3-3: SBC CPU Module.....	18
Figure 3-4: SBC CPU Module Ports	18
Figure 3-5: SBC CPU Module LEDs.....	19
Figure 3-6: MPM LEDs (e.g. MPM12B)	21
Figure 3-7: OSN4 Module Ports	22
Figure 3-8: OSN4 Module LEDs.....	23
Figure 3-9: HDMX Module LEDs	24
Figure 3-10: Fan Tray Modules (FAN 1 and FAN 2)	26
Figure 3-11: Rear Panel	27
Figure 3-12: Power Supply Module	28
Figure 4-1: Rubber Feet Locations.....	29
Figure 4-2: Attaching Front-Mounting Brackets to Chassis.....	31
Figure 4-3: Rear-Mounting Brackets Attached to Rear-Rack Posts (60 cm).....	33
Figure 4-4: Rear-Mounting Brackets Attached to Rear-Rack Posts (80 cm).....	33
Figure 4-5: Attaching Rear-Mounting Flange to Chassis' Rear-Side Mounting Holes (60 cm)	34
Figure 4-6: Attaching Rear-Mounting Flange to Chassis' Rear-Side Mounting Holes (80 cm)	34
Figure 4-7: Sliding the Rear-Mounting Flanges into the Rear-Mounting Brackets (60 cm).....	34
Figure 4-8: Sliding the Rear-Mounting Flanges into the Rear-Mounting Brackets (80 cm).....	34
Figure 4-9: Fastening Rear-Mounting Flange to Rear-Mounting Bracket (60 cm)	35
Figure 4-10: Fastening Rear-Mounting Flange to Rear-Mounting Bracket (80 cm)	35
Figure 4-11: Front-Mounting Brackets Flush and Aligned with Front-Rack Posts (60 cm)	36
Figure 4-12: Front-Mounting Brackets Flush and Aligned with Front-Rack Posts (80 cm)	36
Figure 5-1: Connecting the LAN Interface	38
Figure 5-2: Default Ethernet Groups.....	39
Figure 5-3: Cabling for 1+1 Ethernet-Port Redundancy (Example).....	40
Figure 5-4: Cabling for High Availability (Example).....	40
Figure 5-5: Serial Interface Cable Adapter and Connector Pinouts	41
Figure 5-6: Connecting the Serial Interface.....	41
Figure 5-7: Cabling OSN4 Module for Installing Operating System	43
Figure 5-8: Cabling OSN4 Module for Serial Communication	44
Figure 5-9: Cabling OSN4 Module to Network	45
Figure 5-10: Connecting to Power	47
Figure 6-1: Connecting ESD Wrist Strap to Chassis ESD Lug	49
Figure 6-2: Module Handle Partially Pulled Out (Top View)	50
Figure 6-3: SBC CPU Module Pulled out of Slot (Top View).....	50
Figure 6-4: Inserting SBC CPU Module.....	51
Figure 6-5: Extracting Blank AMC Modules (Top View)	52
Figure 6-6: Inserting MPM Module	53
Figure 6-7: Extracting Blank AMC Modules from Slots for OSN Server (Top View)	54
Figure 6-8: Inserting OSN Module.....	55
Figure 6-9: Inserting HDMX Module	55
Figure 6-10: Screws on Fan Tray Module	56
Figure 6-11: Extracting Fan Tray Module using Handle	57
Figure 6-12: Screws on Power Supply Module	58
Figure 6-13: Extracting Power Supply Module	59

List of Tables

Table 3-1: Physical Dimension and Operating Environment Specifications.....	15
Table 3-2: Front-Panel Description.....	16
Table 3-3: SBC CPU Module Ports Description	19
Table 3-4: SBC CPU Module LEDs Description.....	19
Table 3-5: MPM LEDs Description	21
Table 3-6: OSN4 Server Specifications.....	22
Table 3-7: OSN4 Module Port Description	23
Table 3-8: OSN4 Module LED Description.....	24
Table 3-9: HDMX Module LED Description.....	25
Table 3-10: STATUS LED per Fan Tray Module.....	26
Table 3-11: Rear-Panel Description	27
Table 3-12: PWR LED Description of Power Supply Module.....	28
Table 5-1: RJ-45 Connector Pinouts	38
Table 5-2: HDMI Type-D Connector Pinouts.....	43
Table 5-3: RJ-45 Connector Pinouts for Gigabit Ethernet Interface on OSN4 Module.....	45
Table 5-4: Power Specifications	46

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Notice

This Installation Manual describes the hardware installation of AudioCodes **Mediant 4000B Session Border Controller (SBC)**.

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Abbreviations and Terminology

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

Throughout this manual and unless otherwise specified, the term *device* refers to the Mediant 4000B SBC.

Related Documentation

Manual Name
SIP Release Notes
Mediant 4000 SBC User's Manual

Notes and Warnings



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

Avertissement: L'appareil est une unité d'INTERIEUR et doit donc obligatoirement être installé en intérieur. En outre, le câblage de l'interface du port Ethernet doit être acheminé uniquement en intérieur et ne doit pas sortir du bâtiment.



Warning: Installation of this device must be in a weather protected location of maximum ambient temperature of 40°C.

Avertissement: L'installation de cet appareil doit avoir lieu dans un local protégé des intempéries de température ambiante maximale de 40°C.



Warning: This device must be installed only in a **restricted access location**.

Avertissement: L'entretien de maintenance de cet appareil doit être effectué uniquement par un personnel de service qualifié dans des locaux à accès limité et l'appareil étant branché à une prise mise à la masse.



Warning: Service of the device must be made only by qualified service personnel.



Warning: The device must be connected only to a grounded AC mains power socket.



Caution Electrical Shock

Do not attempt to open or disassemble this device. The device carries high voltage. Contact with internal components may cause 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



Warning: This device is intended to accommodate only AMC modules approved by AudioCodes.

Avertissement: Cet appareil est destiné à recevoir uniquement des modules AMC approuvés par AudioCodes.

Document Revision Record

LTRT	Description
41740	Initial document release for Version 6.8.
41741	Two power modules must be connected; chassis grounding section removed.
41742	Miscellaneous formatting.
41744	Map of slots on front panel updated.
41747	Front-panel description regarding slot numbers updated; module slot assignment 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 <http://www.audiocodes.com/downloads>.

1 Introduction

This document provides a hardware description of the Mediant 4000B (hereafter referred to as *device*) and step-by-step procedures for cabling the device.



Note: For 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:
 - Two AC power cables.
 - Four anti-slide rubber feet for desktop installation.
 - Adjustable Rear-Rack Mounting Bracket Kit for mounting the chassis in a 19-inch rack
 - Two-meter serial interface cable adaptor.
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 section provides a physical description of the device.

3.1 Physical Dimensions and Operating Environment

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

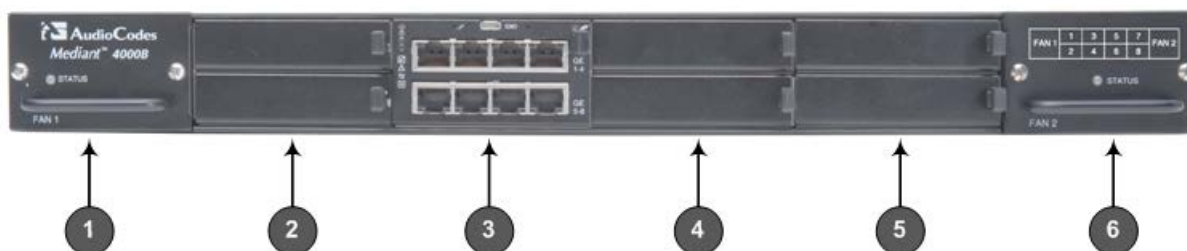
Table 3-1: Physical Dimension and Operating Environment Specifications

Item	Description
Enclosure	4/5-slot, 1U chassis
Dimensions (H x W x D)	1U x 19" (444 mm) x 14.9" (378 mm) / 16.7" (425 mm) with front and rear extraction handles
Weight	Approx. 7.4 kg (16.3 lbs.) with basic hardware configuration (i.e., without MPM and OSN server modules). For chassis weight of specific hardware configurations, please contact your AudioCodes sales representative.
Environmental	<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



Note: The figure above provides only an example of the Mediant 4000B. The modules housed in your Mediant 4000B may be slightly different, depending on the ordered hardware configuration (e.g., Media Processing Module / MPM and OSN server modules).

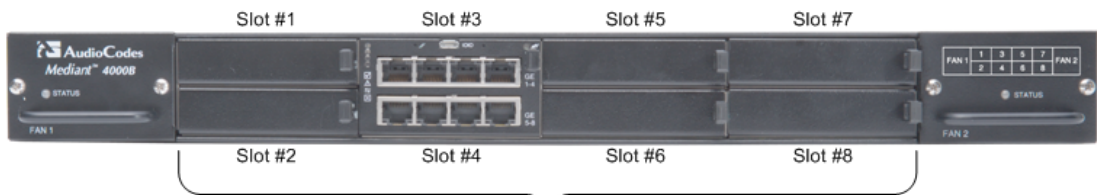
Table 3-2: Front-Panel Description

Item #	Component Description
1	Fan Tray module #1. For more information on the module, see Section 3.2.5 on page 26.
2	(Slots 1-2) Unused slots shown with two blank slot covers. The slots can house an optional, Media Processing Module (MPM). The MPM module occupies two slots. Note: The MPM is a customer-ordered item.
3	(Slots 3-4) SBC CPU AMC module (hereafter referred to as <i>SBC</i>). The SBC module occupies two slots. The module provides the central processing unit (CPU), serial interface, and Ethernet port interface functionalities. For more information, see Section 3.2.2 on page 18.
4	(Slots 5-6) Unused slots shown covered with two blank slot covers. The slots can house one of the following optional modules: <ul style="list-style-type: none"> OSN server modules (OSN4 and HDMX). The OSN4 module is housed in Slot 5 and the HDMX module in Slot 6. MPM module (on condition that an MPM module is also housed in the slot described in Item #2 - see above). The MPM module occupies two slots. Note: The OSN server modules and MPM modules are customer-ordered items.
5	(Slots 7-8) Unused slots shown covered with two blank slot covers. The slots can house one of the following optional modules: <ul style="list-style-type: none"> MPM module, on condition that MPM modules are also housed in the slots described in Item #2 and Item #4 (if not occupied by OSN modules). The MPM module occupies two slots. Secondary HDMX module for the OSN server (see Item #4). The module is installed in Slot 7. Note: The MPM is a customer-ordered item.
6	Fan Tray module #2 with a schematic displayed on its front panel showing the chassis' slot numbers. For more information on the module, see Section 3.2.5 on page 26.

3.2.1 Module Slot Assignment

The slot assignments on the front panel for the various modules per hardware configuration are shown in the figure below:

Figure 3-2: Module Slot Assignment on Front Panel



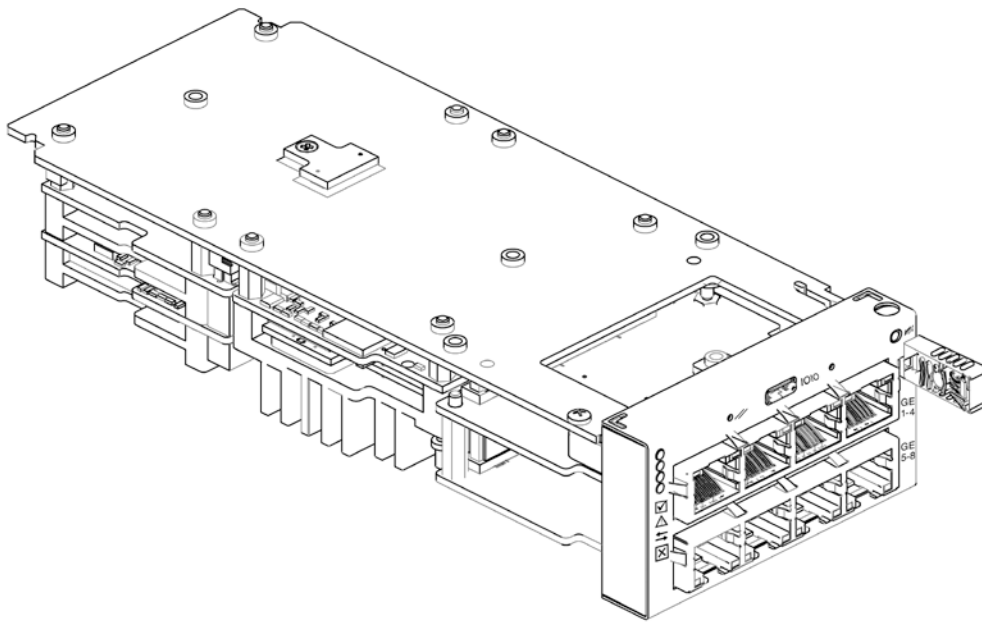
Optional Hardware Configurations

SBC CPU Only		CPU		
SBC CPU + 1 x MPM	MPM	CPU		
SBC CPU + 2 x MPM	MPM	CPU	MPM	
SBC CPU + 3 x MPM	MPM	CPU	MPM	MPM
SBC CPU + OSN		CPU	OSN	
			HDMX	
SBC CPU + 1 x MPM + OSN	MPM	CPU	OSN	
			HDMX	
SBC CPU + 2 x MPM + OSN	MPM	CPU	OSN	MPM
			HDMX	
SBC CPU + 1 x MPM + OSN with 2 x HDMX	MPM	CPU	OSN	HDMX
			HDMX	
SBC CPU + OSN with 2 x HDMX		CPU	OSN	HDMX
			HDMX	

3.2.2 SBC CPU Module

The SBC CPU module provides the main functionalities of the device. These functionalities include the central processor unit (CPU), Ethernet port interfaces, serial interface, and a reset pinhole button.

Figure 3-3: SBC CPU Module



For replacing the SBC CPU module, see Section 6.2 on page 50.

3.2.2.1 Port Description

The SBC CPU module provides various port interfaces as shown in the figure below and described in the subsequent table.

Figure 3-4: SBC CPU Module Ports

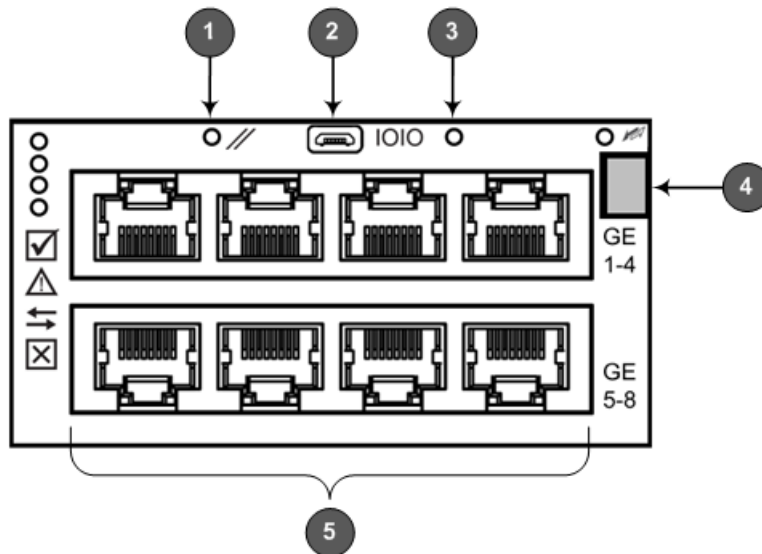



Table 3-3: SBC CPU Module Ports Description

Item #	Label	Description
1		Reset pinhole button: <ul style="list-style-type: none"> To reset the device, press the button for at least 1 second but no longer than 10 seconds. To reset the device to factory defaults, press the button for at least 12 seconds but no longer than 25 seconds.
2	IOIO	RS-232 port for serial communication with a computer.
3	-	Pinhole button (reserved for future use).
4	-	Handle of module for installing and removing the module.
5	-	Eight 1000Base-T Gigabit Ethernet ports for connecting to the IP network. The Ethernet ports operate in pairs, where one port is active and the other standby, providing 1+1 Ethernet redundancy. The ports support half- and full-duplex modes, auto-negotiation, straight-through and crossover cable detection.

3.2.2.2 LED Description

The SBC CPU module provides LEDs for indicating various operating status, as described in the table below.

Figure 3-5: SBC CPU Module LEDs

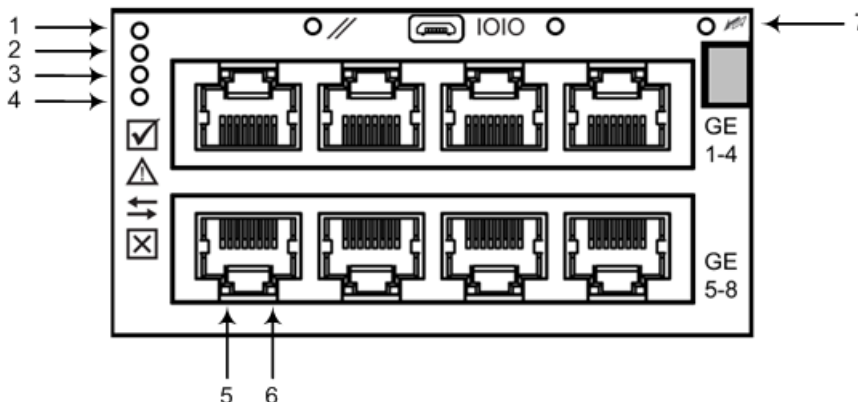







Table 3-4: SBC CPU Module LEDs Description

Item #	LED	Color	State	Description
1		Green	On	Module in service.
		-	Off	Module out of service.
2		Red	On	Booting up phase / fault detected in module.
		Green	On	Normal operation.
3		-	Off	During booting up state.
		Green	On	Application running in Standalone state.
		Green	Flashing	Application running in High Availability (HA) Active state.

Item #	LED	Color	State	Description
		Yellow	On	Application is starting Boot / synchronizing HA.
			Flashing	Application is running in HA Redundant state.
4		Red	On	Out of service.
		-	Off	Normal operation.
5	Left Ethernet Port LED	Green	On	Ethernet link established.
			Flashing	Data is being received or transmitted (activity) on the Ethernet port.
		-	Off	No Ethernet link.
6	Right Ethernet Port LED	Orange	On	1000Base-T (Gigabit) Ethernet link established.
		-	Off	No Ethernet link or 100Base-Tx link established.
7		Blue	On	Blue hot-swap LED indicating that the AMC module can be fully removed or inserted. Note: Do not remove the module before this LED turns blue.
		-	Off	Module insertion process is complete.

3.2.3 Media Processing (MPM) Module

The Media Processing Module (MPM) is an optional, customer-ordered AMC-based module that provides additional digital signaling resources (DSP) required for transcoding call sessions. You can install up to three MPM modules. Two different MPM module types are available for purchase, according to your deployment regarding the number of required transcoding sessions:

- MPM8B module, providing 8 DSPs
- MPM12B module, providing 12 DSPs

You can install both module types in the same chassis. For maximum number of supported transcoding sessions per MPM module type, refer to the *User's Manual*.

For module slot assignment, see Section 3.2.1 on page 17.



Notes:

- MPM installation can only be done when the device is powered off. Therefore, before installing an MPM module, make sure that the device is powered off. For more information, see Section 6.3 on page 52.
- The serial port and reset pinhole button are reserved for future use. Please do not use these items.

The MPM provides LEDs for indicating various operating status, as shown in the figure below and described in the subsequent table.

Figure 3-6: MPM LEDs (e.g. MPM12B)

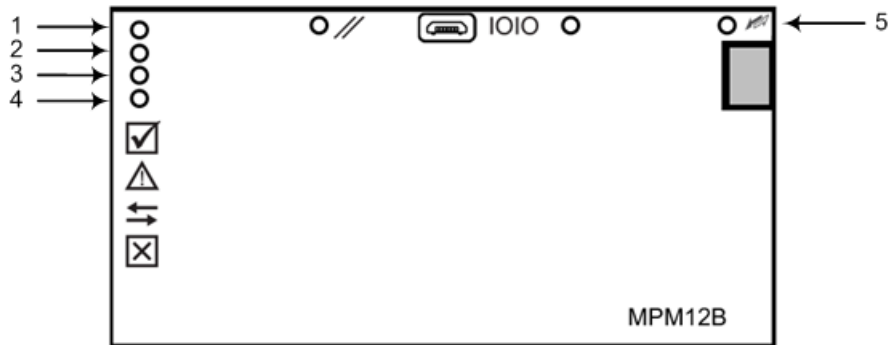


Table 3-5: MPM LEDs Description

Item #	LED	Color	State	Description
1	☑	Green	On	Module in service.
		-	Off	Module out of service.
	⚠	Red	On	Booting up phase.
		Green	On	Normal operation.
3	↔	Green	On	Application running.
		Yellow	On	Application is starting boot up.
		-	Off	During booting up state.
4	☒	Red	On	Out of service.
		-	Off	Normal operation.
5	➡	Blue	On	Blue hot-swap LED indicating that the AMC module handle is pulled out. If this occurs, push on the handle until it is flush with the chassis (i.e. module locked in the slot).
		-	Off	Module handle is locked (i.e., module is securely installed in the slot).

3.2.4 OSN Server Modules

The OSN4 server modules are customer-ordered items. The OSN server consists of two modules:

- OSN4 - central processing unit (CPU), RAM, and port interfaces
- HDMX - hard-disk drive (HDD or SSD) providing storage capacity

The specifications of the OSN server are listed in the following table:

Table 3-6: OSN4 Server Specifications

CPU	Memory	Storage	Interfaces
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 ■ USB 2.0 ■ RS-232 COM ■ HDMI Graphic

For installing the OSN server modules, see Section 6.4 on page 54.

3.2.4.1 OSN4 Module

This section describes the ports and LEDs on the OSN4 module.



Warning: The OSN4 module contains a non-rechargeable Lithium-ion (LI-ion) battery. If required, replace the Lithium battery **only** with the following battery type:

- Manufacturer: Hitachi Maxell Energy Ltd.
- Battery Type: CR2032M1SB-LF; Li/MnO₂, 3V 210mAh

3.2.4.1.1 Port Description

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

Figure 3-7: OSN4 Module Ports

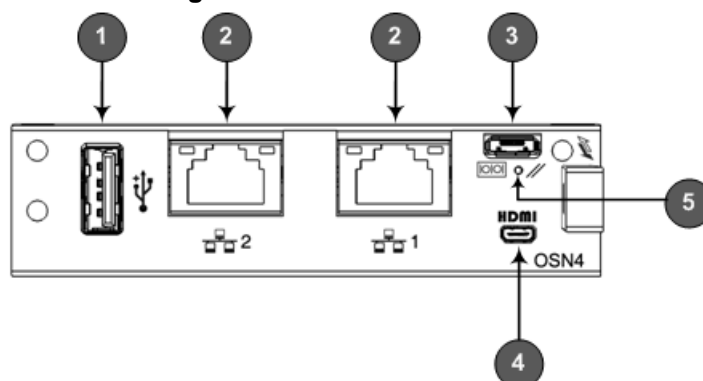






Table 3-7: OSN4 Module Port Description

Item #	Label	Description
1		USB 2.0 port.
2		Two RJ-45 ports 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). For connector pinouts, see
3		Console (serial) port (micro-USB) for serial interface (COM1).
4	HDMI	HDMI port (19-pin Type D) for connecting to a graphic display monitor.
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 3.2.4.1.2 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 3.2.4.1.2 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.

3.2.4.1.2 LED Description

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

Figure 3-8: OSN4 Module LEDs

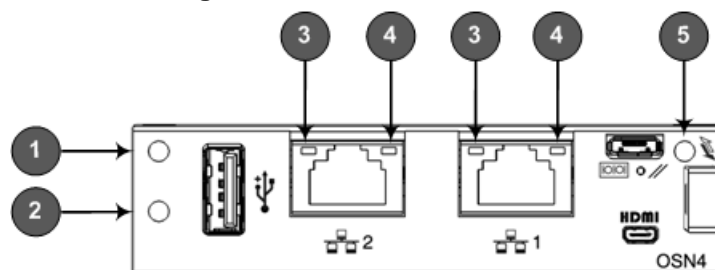


Table 3-8: OSN4 Module LED Description

Item	Color	State	Description
1	Green	Flashing	Firmware (BIOS) application active, payload (x86) in sleep.
		On	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 the 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.

3.2.4.2 HDMX Module

The HDMX module provides the hard-disk drive (HDD or SDD) functionality for the OSN platform, providing storage capacity.






Note: The OSN server can optionally, be ordered with dual hard-disk drives (two HDMX modules).

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

Figure 3-9: HDMX Module LEDs



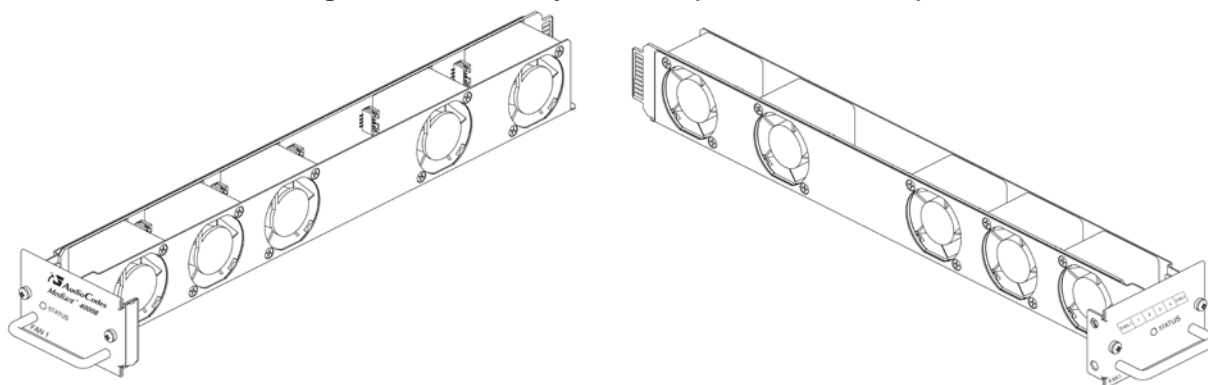
Table 3-9: HDMX Module LED Description

Item #	Label	Color	State	Description
1		Green	On	Power received by module.
		-	Off	No power received by module.
2		Red	On	Hard disk drive in use (active).
		-	Off	Hard disk drive not in use.
3		Blue	On	Module can be extracted from chassis slot once dismantled from the OSN operating system.
			Off	Module correctly inserted in chassis slot

3.2.5 Fan Tray Module

The device provides two Fan Tray modules, located on either side of the chassis. Each module contains five integrated fans which cool the device's internal components. The Fan Tray module located on the left side of the chassis draws air from the outside through its perforated grill. The incoming air passes through the chassis, cooling each module, and then the Fan Tray module located on the right side of the chassis expels the air through its perforated vents.

Figure 3-10: Fan Tray Modules (FAN 1 and FAN 2)



For replacing Fan Tray modules, see Section 6.5 on page 56.

Each Fan Tray module provides a **STATUS** LED on its front panel, which indicates the operating status of the Fan Tray module and its corresponding (closest) Power Supply module. In other words, Fan Tray module #1 corresponds to Power Supply module #2, and Fan Tray module #2 corresponds to Power Supply module #1.

Table 3-10: STATUS LED per Fan Tray Module

Color	State	Description
Green	On	Fan Tray module and corresponding Power Supply module are operating normally.
Red	On	Indicates one or both of the following: <ul style="list-style-type: none"> ▪ Fan Tray module failure. ▪ Power failure due to any of the following: <ul style="list-style-type: none"> ✓ Failure in corresponding Power Supply module. ✓ Failure in power source (e.g., disconnected power cord). ✓ Corresponding Power Supply module not installed in the chassis.
-	Off	Indicates one or both of the following: <ul style="list-style-type: none"> ▪ No power received by the chassis. This indicates a problem related to both Power Supply modules. This could be due to a failure in both Power Supply modules or a failure in the power source (e.g., disconnected power cords) to which the modules are connected. ▪ Fan Tray module not receiving power due to a failure in the module or module not inserted correctly.

3.3 Rear Panel Description

The chassis rear panel is displayed in the figure below and described in the subsequent table.

Figure 3-11: Rear Panel

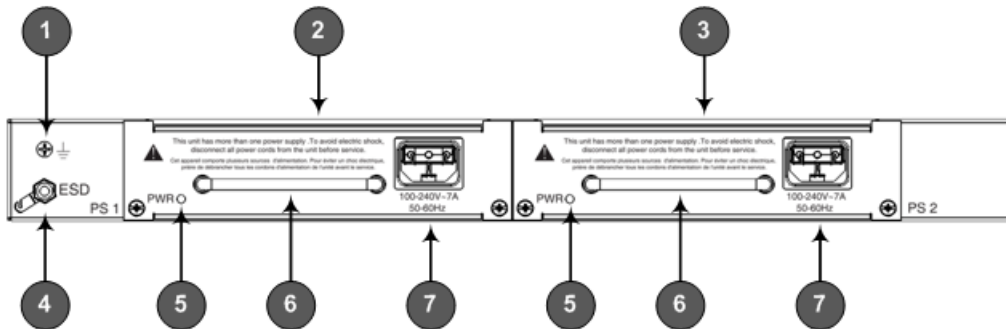


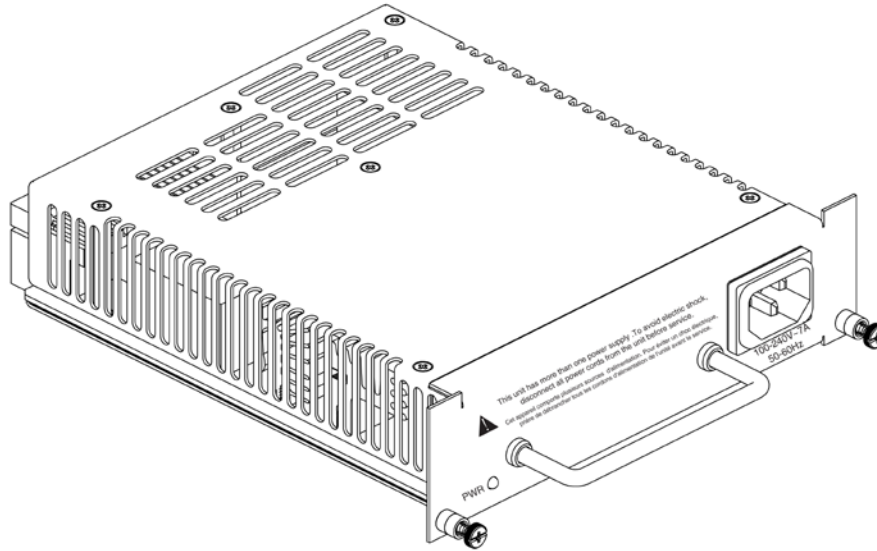
Table 3-11: Rear-Panel Description

Item #	Label	Description
1		Protective earthing (grounding) screw.
2	PS 1	Power Supply module No. 1. For more information, see Section 3.3.1 on page 28.
3	PS 2	Power Supply module No. 2. For more information, see Section 3.3.1 on page 28.
4	ESD	Electrostatic Discharge (ESD) lug.
5	PWR	Power status LED for indicating the status of the Power Supply module. For more information, see Section 3.3.1 on page 28.
6	-	Extraction-handle for removing the Power Supply module.
7	100-240V~7A 50-60Hz	AC power supply inlet (100-240V~7A, 50-60 Hz) of Power Supply module.

3.3.1 Power Supply Modules

The chassis houses two Power Supply modules for providing power load sharing and AC power redundancy in case of failure of one of the Power Supply modules. Each module is associated with an AC power inlet located on the rear panel of the chassis for connection to an electrical power outlet.

Figure 3-12: Power Supply Module



For installing and replacing the Power Supply modules, see Section 6.6 on page 58. Each Power Supply module provides a **PWR** LED for indicating the status of the power supply, as described in the table below.

Table 3-12: PWR LED Description of Power Supply Module

Color	State	Description
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.

4 Mounting the Device

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

- Placed on a desktop - see Section 'Desktop Mounting' on page 29
- Installed in a standard, 19-inch rack - see Section 'Rack Mounting' on page 30



Warning: The side panels of the chassis where the air vents are located must remain unobstructed to ensure adequate airflow and prevent overheating inside the chassis. Pay attention to wiring and cable routes to avoid blocking of the ventilation openings.

Avertissement : Les panneaux latéraux du châssis où se trouvent les buses de ventilation doivent être dégagés pour assurer un flux d'air adéquat et prévenir la surchauffe à l'intérieur du châssis. Faites attention au câblage et aux chemins de câbles pour éviter de bloquer les bouches d'aération.

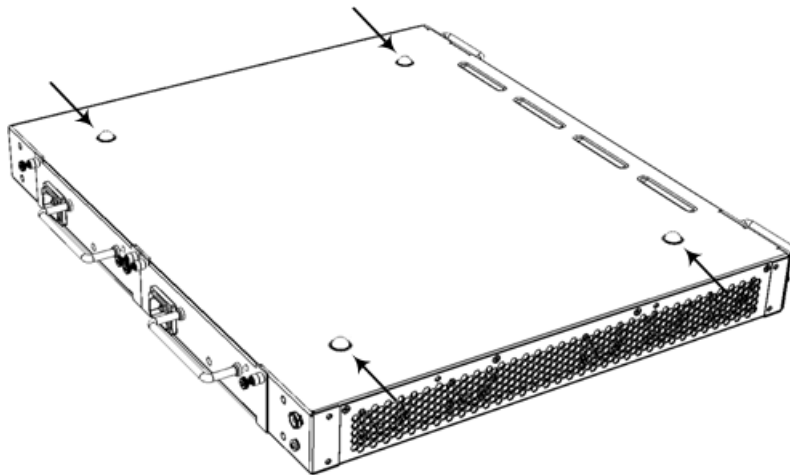
4.1 Desktop Mounting

The device can be mounted horizontally on a flat surface. The device provides four anti-slide rubber feet (supplied) that first need to be attached to its underside.

➤ **To attach the anti-slide rubber feet 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 corner.

Figure 4-1: Rubber Feet Locations



3. Peel off the adhesive, anti-slide rubber feet (supplied) and stick one in each anti-slide groove.
4. Flip the device over again so that it rests on its underside with the rubber feet in contact with the surface.

4.2 19-Inch Rack Mounting

The device is designed to fit into a 19-inch industrial rack of 1 rack-unit height (1U). 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 31
- Mounting the chassis by attaching it directly to the 19-inch rack frame (posts) using both the front- and the rear-mounting brackets – see Section 4.2.2 on page 32



Rack Mount Safety Instructions

When installing the chassis in a rack, implement 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_A) 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.

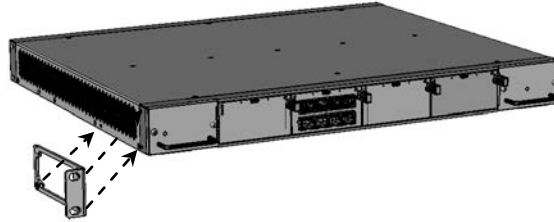
4.2.1 Mounting in a 19-inch Rack using Pre-Installed Rack Shelf

The device can be placed on a pre-installed shelf in a 19-inch rack, as described below. This is the recommended method for mounting the device.

➤ **To mount the device on a pre-installed shelf in a 19-inch rack:**

1. Attach the two front-mounting brackets to the front-sides of the chassis using the supplied screws (three screws per bracket), as shown in the figure below.

Figure 4-2: Attaching Front-Mounting Brackets to Chassis



2. Make sure that your rack shelf is secured to the rack posts and in a horizontal level position in the rack.
3. Place the device on the pre-installed shelf in the rack.
4. Position the chassis so that the pre-attached, front-mounting brackets are flush against the front rack posts and that the holes of the brackets align with the holes on the posts.
5. 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 and Rear Brackets

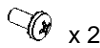
The device can be mounted in a 19-inch rack by attaching the chassis directly to the rack frame, using both front- and rear-mounting brackets. The device is shipped with two types of rear-mounting kits, each suited for a specific rack depth (60 or 80 cm):

- **60-cm Rear-mounting Kit:** Adjustable rear-mounting bracket where the length of the rear-mounting brackets can be adjusted from 59.3 to 62.7 mm (23.3 to 25 in.) to suit the distance between the chassis and the rear-rack post.

Rear-Mounting Bracket x 2



Rear-Mounting Flange x 2

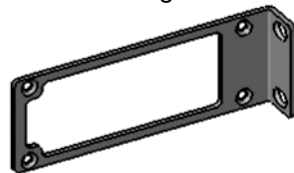


x 2



x 6

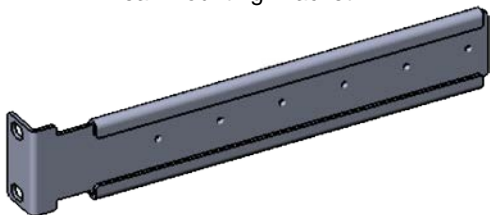
Front-Mounting Bracket x 2



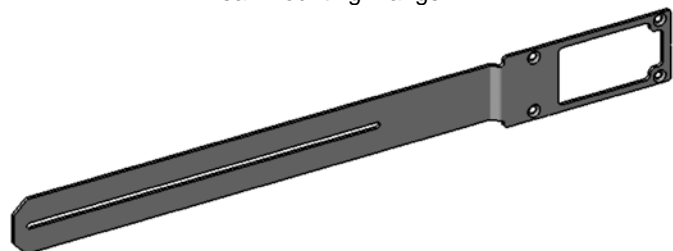
x 6

- **80-cm Rear-mounting Kit:** Adjustable rear-mounting bracket where the length of the rear-mounting brackets can be adjusted to up to 80 cm (31.5 in.)

Rear-Mounting Bracket x 2



Rear-Mounting Flange x 2

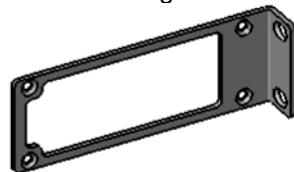


x 6



x 6

Front-Mounting Bracket x 2



x 6

**Warnings:**

- At least **two** people are required to mount the device in the 19-inch rack.
- When attaching the chassis to the rack, it is **mandatory** to connect it using both the front-mounting brackets and the rear-mounting brackets (supplied).

Avertissements:

- Au moins deux personnes sont nécessaires pour monter l'appareil dans le bâti 19 pouces.
- En fixant le châssis au bâti, il est **impératif** de le connecter à l'aide de supports de montage avant et de supports de montage arrière réglables (fournis).

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

1. Open the Mounting Bracket kit and remove its contents. Make sure that all items are included in the kit (see above).
2. Attach the two front-mounting brackets to the front-sides of the chassis using the supplied screws, as described in Section 4.2.1 on page 31.
3. 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 4-3: Rear-Mounting Brackets Attached to Rear-Rack Posts (60 cm)

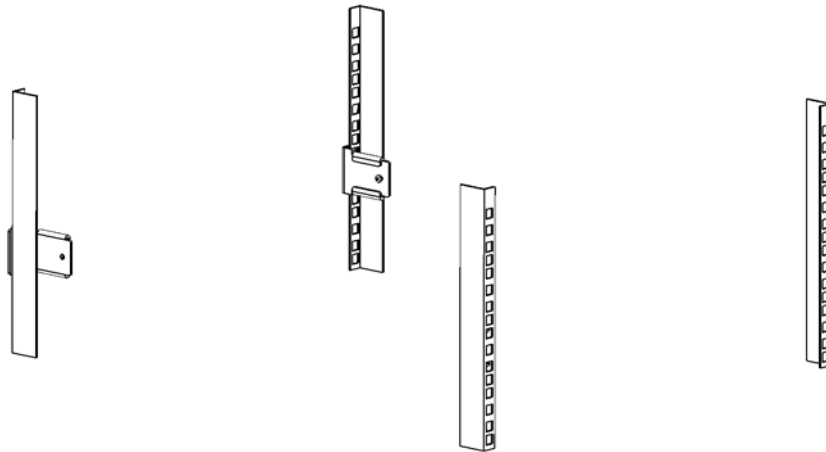
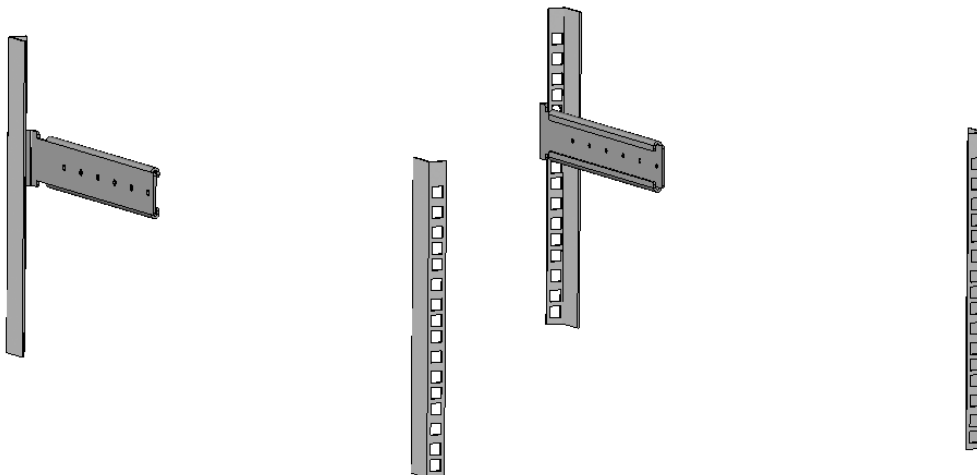


Figure 4-4: Rear-Mounting Brackets Attached to Rear-Rack Posts (80 cm)



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

Figure 4-5: Attaching Rear-Mounting Flange to Chassis' Rear-Side Mounting Holes (60 cm)

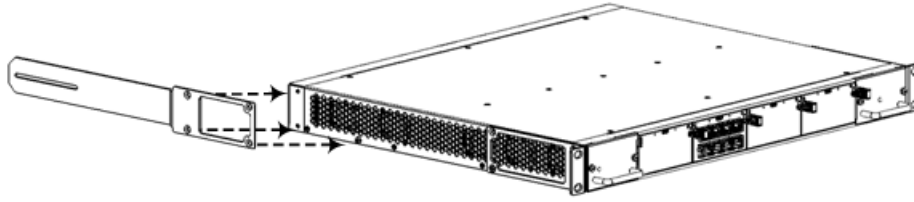
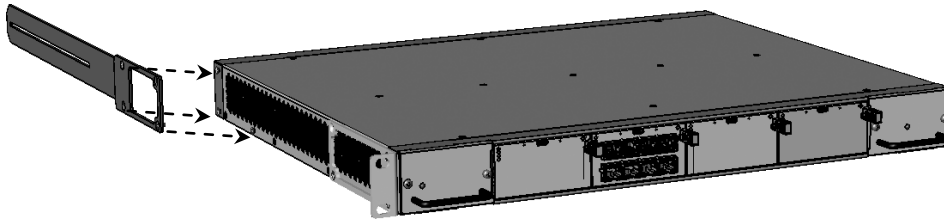


Figure 4-6: Attaching Rear-Mounting Flange to Chassis' Rear-Side Mounting Holes (80 cm)



5. With two people, lift the chassis into the rack from the front of the rack.
6. Slide the two rear-mounting flanges into the slide rails of the rear-mounting brackets that you previously attached to the rear posts.

Figure 4-7: Sliding the Rear-Mounting Flanges into the Rear-Mounting Brackets (60 cm)

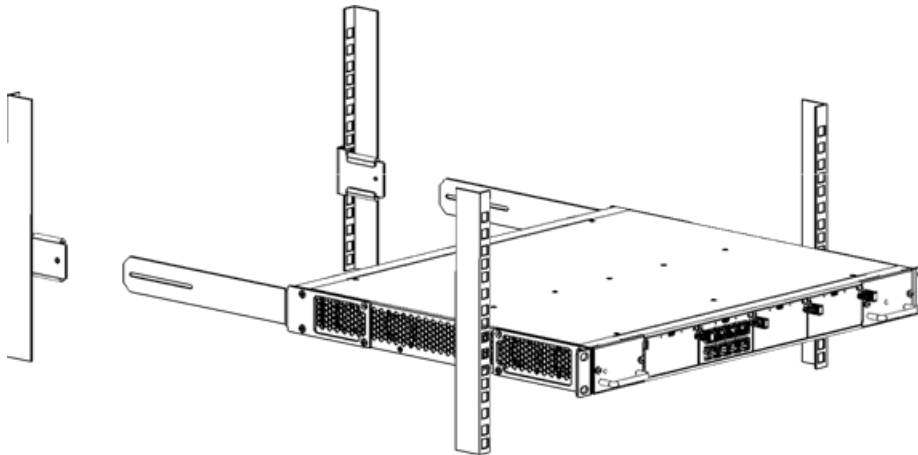
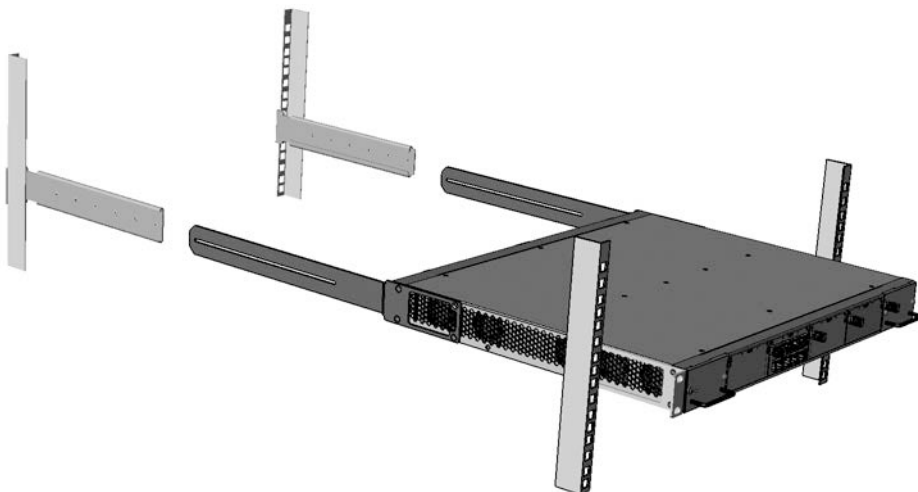


Figure 4-8: Sliding the Rear-Mounting Flanges into the Rear-Mounting Brackets (80 cm)



7. 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. For 80-cm rear mounting, up to two screws can be used to secure the flange to the rear-mounting bracket (if required).

Figure 4-9: Fastening Rear-Mounting Flange to Rear-Mounting Bracket (60 cm)

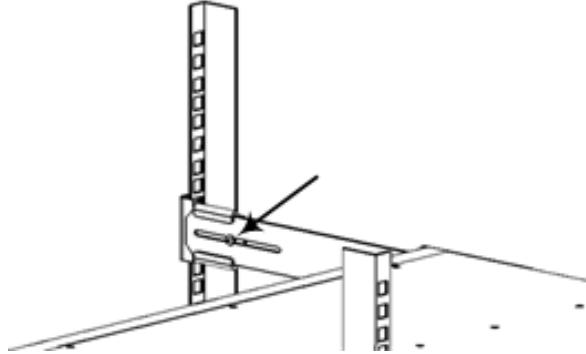
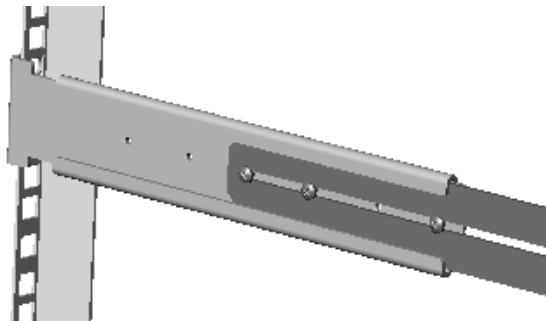


Figure 4-10: Fastening Rear-Mounting Flange to Rear-Mounting Bracket (80 cm)



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

Figure 4-11: Front-Mounting Brackets Flush and Aligned with Front-Rack Posts (60 cm)

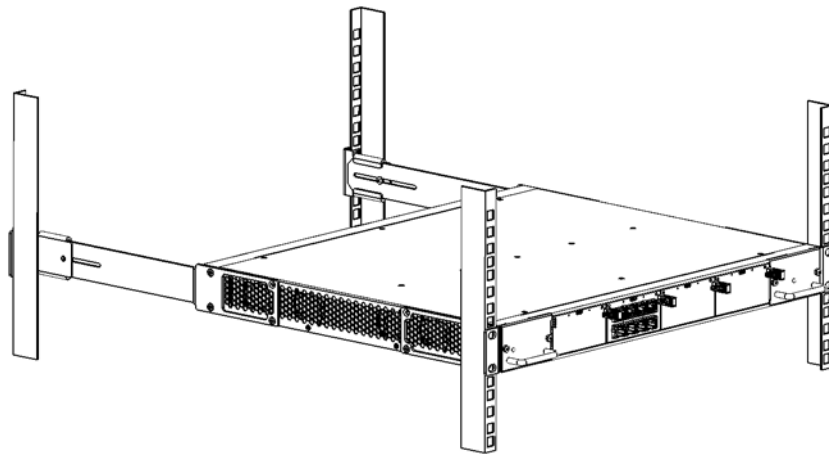
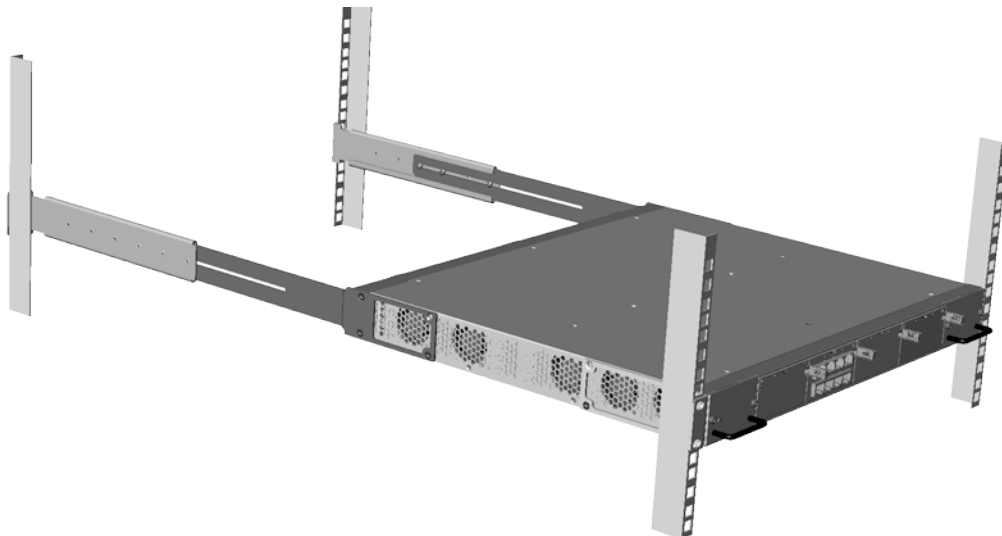


Figure 4-12: Front-Mounting Brackets Flush and Aligned with Front-Rack Posts (80 cm)



9. 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.
10. Tighten the bolts on the front-mounting brackets.
11. 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:

- Connecting to the LAN – see Section 5.1 on page 38
- Connecting to a computer for serial communication – see Section 5.2 on page 41
- Connecting to power – see Section 5.3 on page 42

5.1 Connecting the Ethernet Ports to the LAN

The cabling specifications and procedure for connecting the device to the LAN is as follows:

- **Cable:** Straight-through, Category (Cat) 5, 5e or 6 cable
- **Connector:** Standard RJ-45
- **Connector Pinouts:**

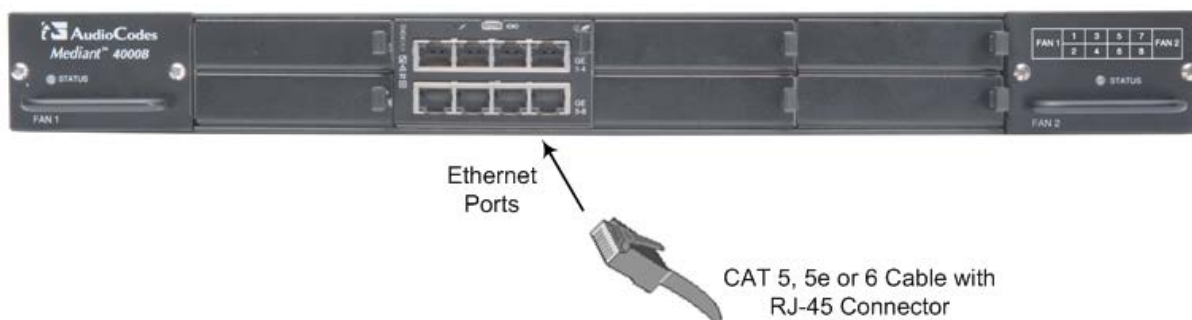
Table 5-1: RJ-45 Connector Pinouts

Pin	Name	Description
1	BI_DA+	Bi-directional pair A+
2	BI_DA-	Bi-directional pair A-
3	BI_DB+	Bi-directional pair B+
4	BI_DC+	Bi-directional pair C+
5	BI_DC-	Bi-directional pair C-
6	BI_DB-	Bi-directional pair B-
7	BI_DD+	Bi-directional pair D+
8	BI_DD-	Bi-directional pair D-

➤ **To connect to the LAN:**

1. Connect the RJ-45 port at one end of the cable to an Ethernet port on the SBC module:

Figure 5-1: Connecting the LAN Interface



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



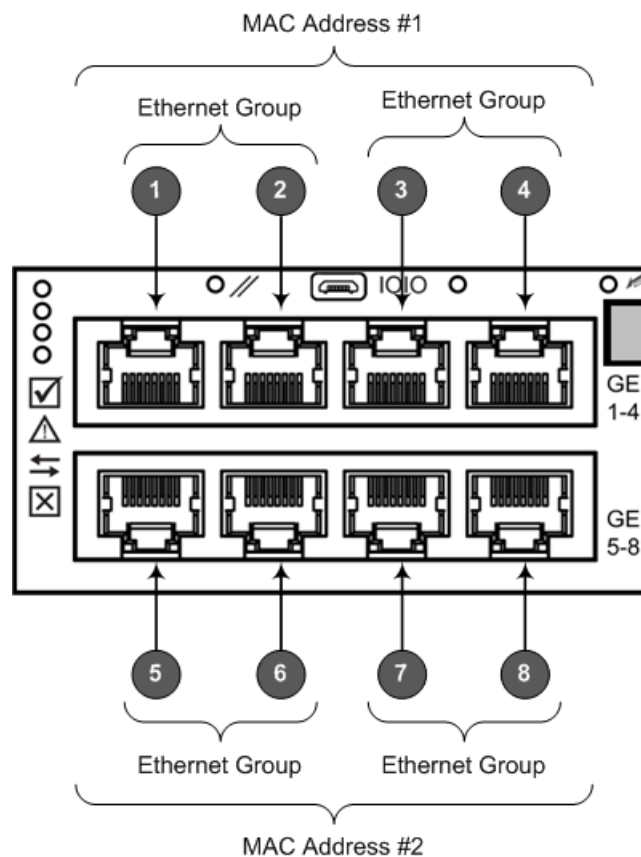
Note: For initial network connectivity to the device, use ports **GE 1** or **GE 2** to connect to the LAN. These ports (or this Ethernet Group) are assigned to the OAMP interface (192.168.0.2) by default. For port names as well as Ethernet port groups (for 1+1 redundancy), see Section 5.1.1 on page 39.

5.1.1 Deployment of a Standalone Device

The Ethernet ports on the SBC CPU module can operate in pairs, called *Ethernet Groups*, to provide Ethernet port 1+1 redundancy. In each pair, one port serves as the active Ethernet port while the other as standby. When the active port fails, the device switches to the standby Ethernet port.

By default, the ports are assigned to pairs, as shown in the figure below. However, you can change the port assignment, including the option to assign only one port to an Ethernet Group (i.e., no 1+1 redundancy scheme). For more information, refer to the *User's Manual*.

Figure 5-2: Default Ethernet Groups



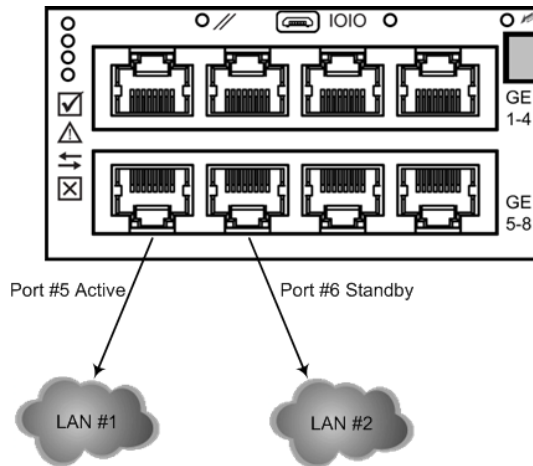
Notes:

- Two different MAC addresses are assigned to the Ethernet ports: one to ports **GE 1-4** (upper ports) and another to ports **GE 5-8** (lower ports). See above figure.
- When implementing 1+1 Ethernet port redundancy, please adhere to the following guidelines:
 - ✓ Each port in the Ethernet Group (port pair) must be connected to a different switch (but in the same subnet).
 - ✓ Ports with the same MAC address (e.g., GE 1-4 ports) must each be connected to a different Layer-2 switch (as the ports share the same MAC address).



The following example shows an Ethernet Group comprised of ports 5 and 6, where Port 5 is connected to the main network ("LAN #1") and Port 6 to the redundant network ("LAN #2"). Upon connectivity failure with LAN #1 through Port 5, the device connects to the redundant LAN #2 through Port 6.

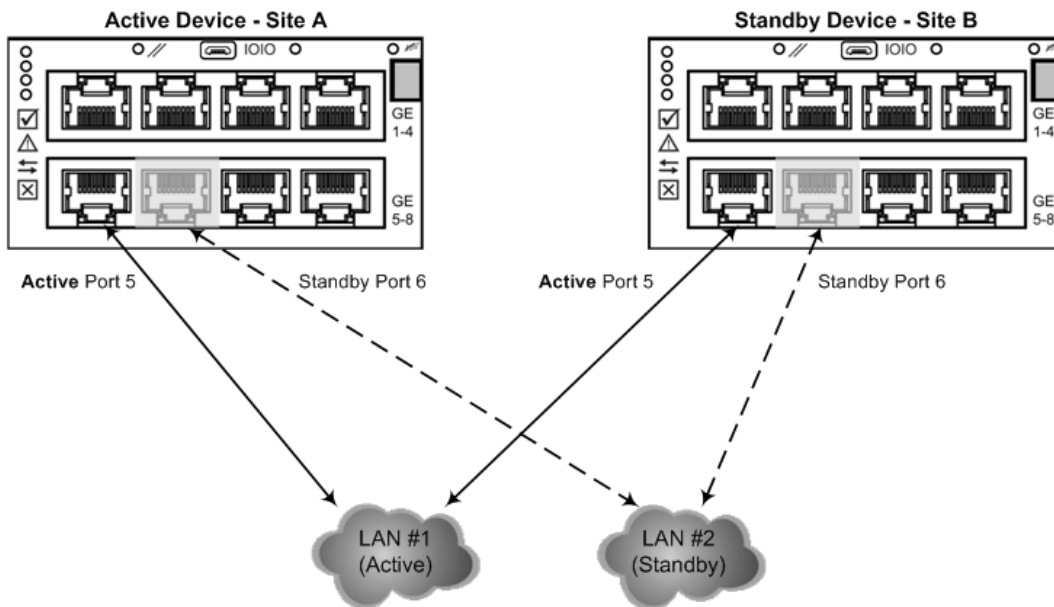
Figure 5-3: Cabling for 1+1 Ethernet-Port Redundancy (Example)



5.1.2 Deployment of Two Devices for High Availability

The device supports 1+1 high availability, whereby two devices are deployed and connected to the same broadcast domain/s. In such a setup, the same Ethernet port-pair redundancy setup is done for each device. For example, if port-pair 5 and 6 are used for Device "A", then Device "B" must also use port-pair 5 and 6, as shown in the figure below:

Figure 5-4: Cabling for High Availability (Example)



In High Availability, the two devices interconnect through their Maintenance interfaces, using the same Ethernet Port Group.

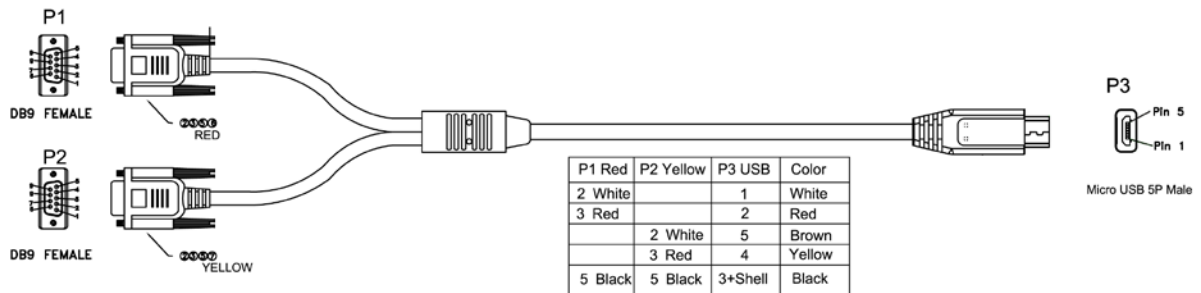


Note: For possible connections (including Tx / Rx settings) between the HA devices, refer to the *User's Manual*.

5.2 Connecting the Serial Interface to a Computer

The RS-232 interface port is used to access the command line interface (CLI) for serial communication. The DB-9 to micro USB cable adapter is provided for this purpose:

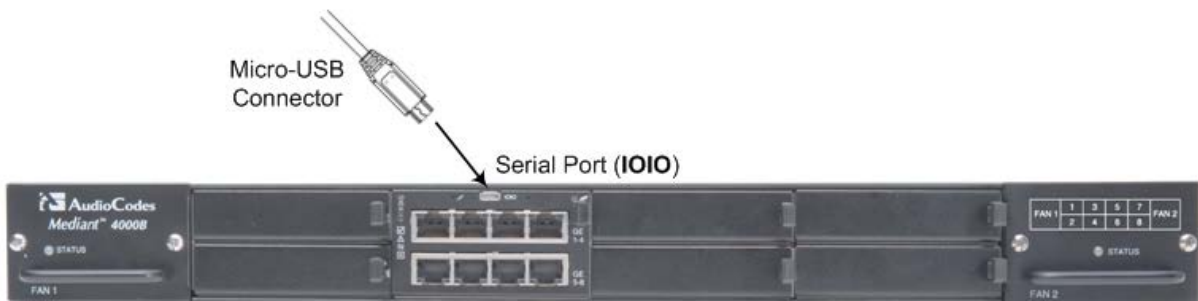
Figure 5-5: Serial Interface Cable Adapter and Connector Pinouts



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

1. Connect the Micro-USB connector (labeled "P3" in the figure above), at one end of the cable, to the serial port (labeled IOIO) located on the SBC module.

Figure 5-6: Connecting the Serial Interface



2. Connect the DB-9 connector labeled "P1" (red), at the other end of the cable, to the RS-232 communication port on your computer.



Notes:

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

5.3 Connecting the OSN Server

The OSN server can be used to host third-party services such as an IP PBX.



Notes:

- The OSN server is a customer-ordered item.
- To install the OSN server modules in the chassis, see Section 6.4 on page 54.
- For specifications of the OSN server, including ports and LEDs, see Section 3.2.4 on page 22.
- Optional drivers for the OSN server modules can be downloaded from AudioCodes Web site (for registered users only) at <http://www.audiocodes.com/downloads>.

5.3.1 Cabling for Installing Operating System

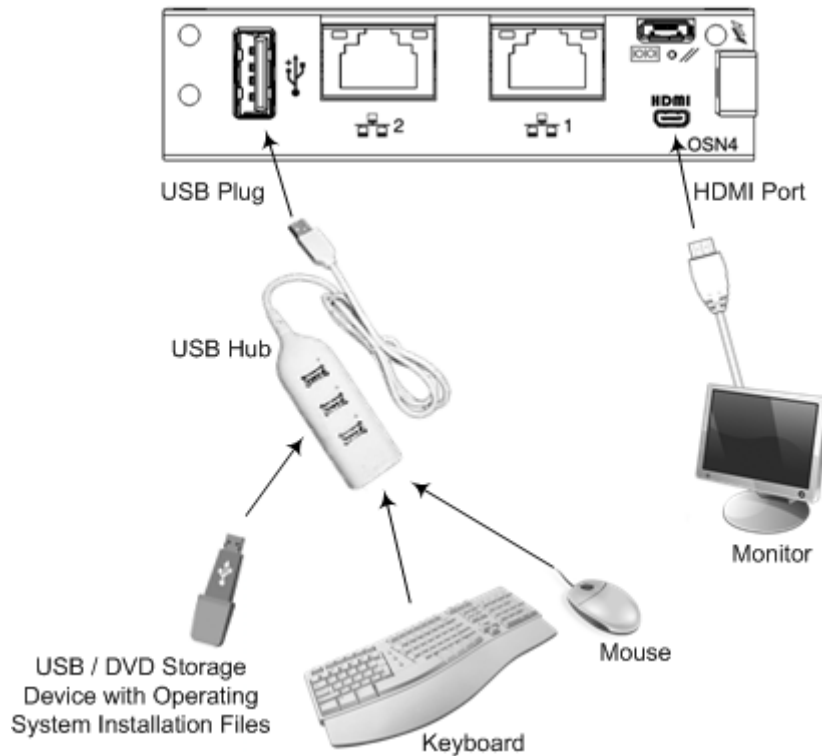
The OSN server can run on Linux™ or Microsoft Windows® operating systems. To install an operating system on your OSN server, follow the procedure below.

➤ To install an operating system on the OSN server:

1. Disconnect the power cords from the power sources, and then remove the power cords from the power connections on the Power Supply modules.
2. Connect a USB hub to the USB port located on the OSN4 module, 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 your monitor to the HDMI port on the OSN4 module, using a 19-pin micro-HDMI (type-D) male connector (see Table 5-2).

Figure 5-7: Cabling OSN4 Module for Installing Operating System



4. Reconnect the device to the power sources; 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 5-2: HDMI Type-D Connector Pinouts

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

Pin	Signal
2	Utility/HEAC+
17	SCL
18	SDA
16	DDC/CEC/HEAC Ground
19	+5 V Power
1	Hot Plug Detect/HEAC

5.3.2 Cabling for Initial Installation of Third-Party Applications

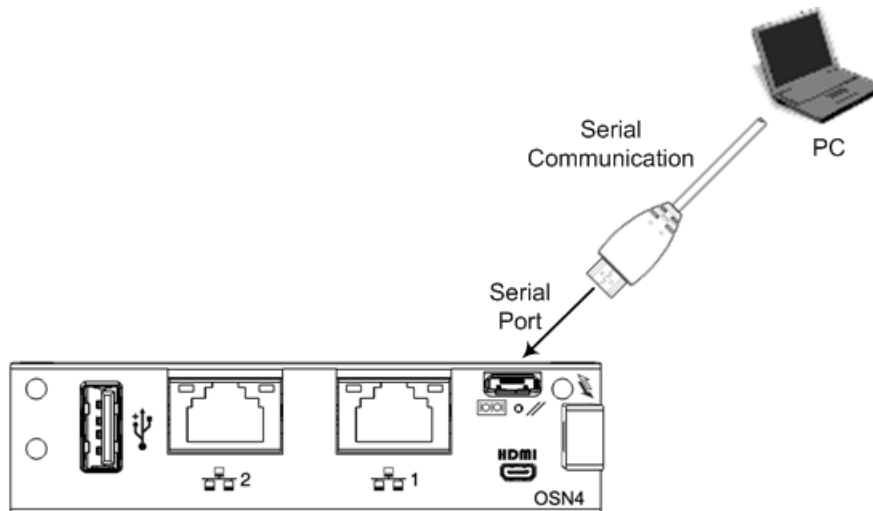
Once you have installed an operating system, you can connect to the OSN server in order to install and configure your third-party application (e.g., IP PBX). For this you can connect to the OSN server using the following local connectivity methods:

- USB and HDMI ports connected to computer peripherals, as described in Section 0 on page 42.
- Serial port for serial communication between a PC and the OSN server, as described below.

➤ **To connect the serial interface:**

1. Connect a serial cable with a micro-USB connector on one end, to the serial port (labeled **IOIOI**) on the OSN4 module.
2. Connect the other end of the cable to the COM port on your computer.

Figure 5-8: Cabling OSN4 Module for Serial Communication



3. Establish serial communication with the OSN server through a terminal emulation program (such as HyperTerminal), using the following serial communication settings:
 - Baud Rate: 115200 (bits per second)
 - Data Bits: 8
 - Parity: None
 - Stop Bits: 1
 - Flow Control: None

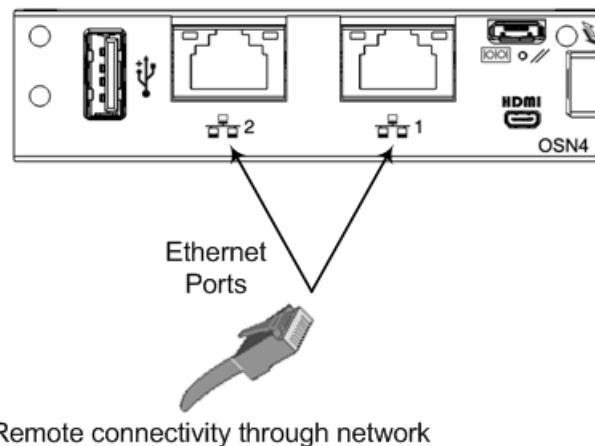
5.3.3 Cabling for Remote Connectivity (Post-Initial Setup)

Once you have installed and configured your operating system and third-party application, you can connect remotely to the OSN server through your network, using protocols such as remote desktop (RDP) or Telnet (SSH). The connection to the OSN server is through the Ethernet port(s) on the OSN4 module.

➤ **To connect to the LAN interface:**

1. Connect an RJ-45 connector, on one end of a CAT 5 (5e or 6) cable, to one of the Gigabit Ethernet ports on the OSN4 module. For connector pinouts, see [Table 5-3](#).
2. Connect the other end of the cable to your network.

Figure 5-9: Cabling OSN4 Module to Network



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

Table 5-3: RJ-45 Connector Pinouts for Gigabit Ethernet Interface on OSN4 Module

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

5.4 Connecting to Power

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

Table 5-4: Power Specifications

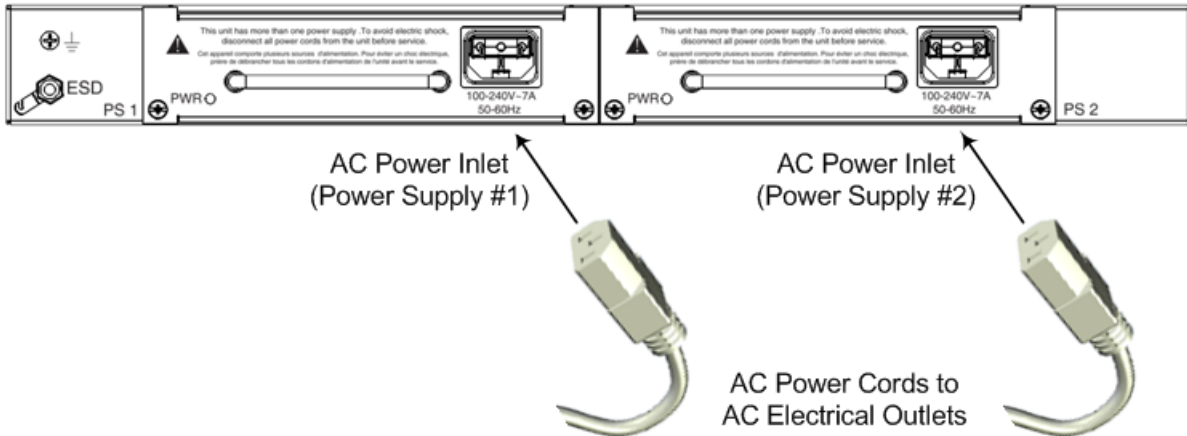
Item	Description
Power Supply	Two hot swappable, power supply modules for power load sharing and AC power redundancy in case of failure of one of the modules.
Input Ratings	Single universal power supply 100-240 VAC, 50-60 Hz, 7A max.
Output Ratings	<ul style="list-style-type: none"> ▪ Output 1: 12 VDC / 40A max ▪ Output 2: 12 VDC / 9A ▪ Output 3: 3.3 VDC / 2A
Connection to Electrical Outlet	AC power supply inlet.

Warnings:

- Both Power Supply modules (1 and 2) must be connected. Ensure that you connect each one to a different AC power supply source. Two Power Supplies provide 1+1 power load-sharing and redundancy. The AC power sockets are located on the device's rear panel.
- The two AC power sources must have the same ground potential.
- The device must be connected (by service personnel) to a socket-outlet with a protective earthing connection.
- Use only a certified 3-conductor power cord, utilizing 18 AWG or 1 mm² wires, and no longer than 4.5 meters (14.8 ft).
- If a failure occurs in any one of the Power Supply modules, replace the module immediately. For replacing the Power Supply modules, see Section 6.6 on page 58.



- **To connect the device to the power supply:**
- 1. Connect the AC power cord (supplied) to one of the power sockets located on the rear panel.

Figure 5-10: Connecting to Power

2. Connect the other end of the power cord to a standard AC electrical outlet (100-240V~50-60 Hz).
3. Repeat steps 1 through 2 for connecting the second Power Supply module, but using the power socket associated with the second Power Supply module and connecting this to a different supply circuit.
4. Turn on the power at the power source (if required).
5. Check that the **POWER** LED on each Power Supply module (front panel) is lit green, indicating that the device is receiving power.

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6 Hardware Maintenance

The device is designed as 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: Maintenance service of this device must be made only by qualified service personnel.



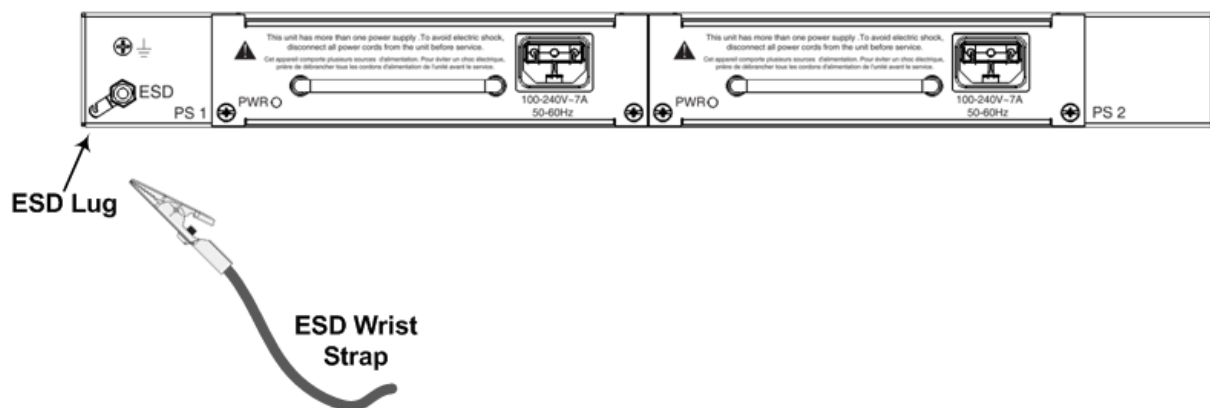
Note: Ensure that all unoccupied module chassis slots are covered with blank panels. This allows optimal internal airflow pressure within the chassis.

6.1 Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) due to improper handling of the device's modules and components can cause irreversible damage to the equipment. Therefore, adhere to the following guidelines for preventing ESD:

- When handling modules, always wear a grounded ESD wrist strap or ankle strap at a grounded work area to prevent ESD. Connect the equipment end of the strap to the chassis ESD screw (described in the procedure below).
 - To prevent static electrical damage to the module, do not touch the electrical components of the module. Instead, hold the module only on the edges where no electrical components are located.
 - Make sure that the modules are securely installed in the chassis.
- **To attach an ESD wrist strap to the chassis:**
1. Attach the ESD wrist strap to your body (typically, the wrist) so that it is in direct contact with your skin.
 2. Attach the other end of the wrist strap (e.g., an alligator clip) to the ESD spring screw located on the rear panel of the chassis, as shown below.

Figure 6-1: Connecting ESD Wrist Strap to Chassis ESD Lug



6.2 Replacing the SBC CPU Module

The procedure below describes how to replace the SBC CPU module.



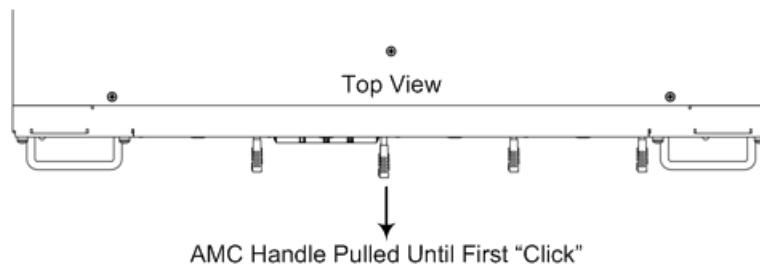
Warning: Before extracting the module, power off the device.

➤ **To replace the SBC CPU module:**

1. Remove the module:

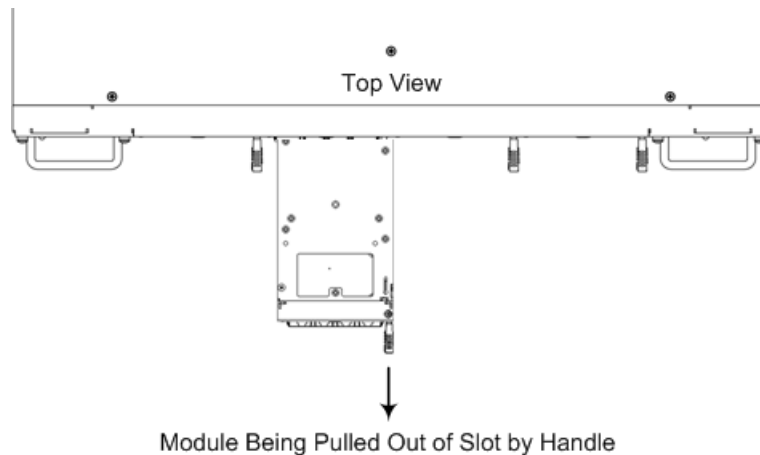
- a. Disconnect the power cord from the power sources, and then remove the power cord from the power connections on the two Power Supply modules.
- b. Gently pull the module handle until you hear a click sound:

Figure 6-2: Module Handle Partially Pulled Out (Top View)



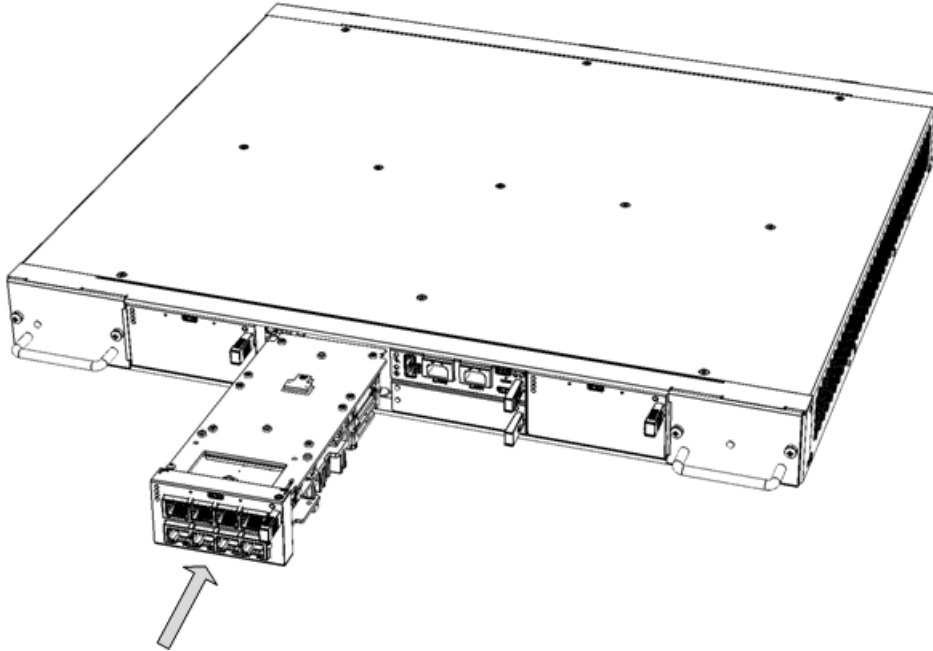
- c. Firmly but gently pull the module handle until the entire module slides out of the chassis slot:

Figure 6-3: SBC CPU Module Pulled out of Slot (Top View)



2. Install the module:

- a.** Remove the new module from its ESD shielding packet in which it was shipped.
- b.** Carefully insert the module into the slot, making sure of correct module orientation (handle on should be located on top-right side). Slide the module along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure 6-4: Inserting SBC CPU Module

- c.** Push the module's handle until it clicks firmly in to engage the module with the slot rails.
- d.** Connect all external interfacing cables to the module, as required.

6.3 Installing the MPM Modules

The procedure below describes how to install an MPM module into the chassis. Each MPM module occupies two standard AMC slots. Therefore, before installing an MPM module, you need to remove the blank AMC modules covering the slots.



Warning: Power off the device before installing the MPM.

Avertissement: Mettez l'appareil hors tension avant d'installer le MPM.

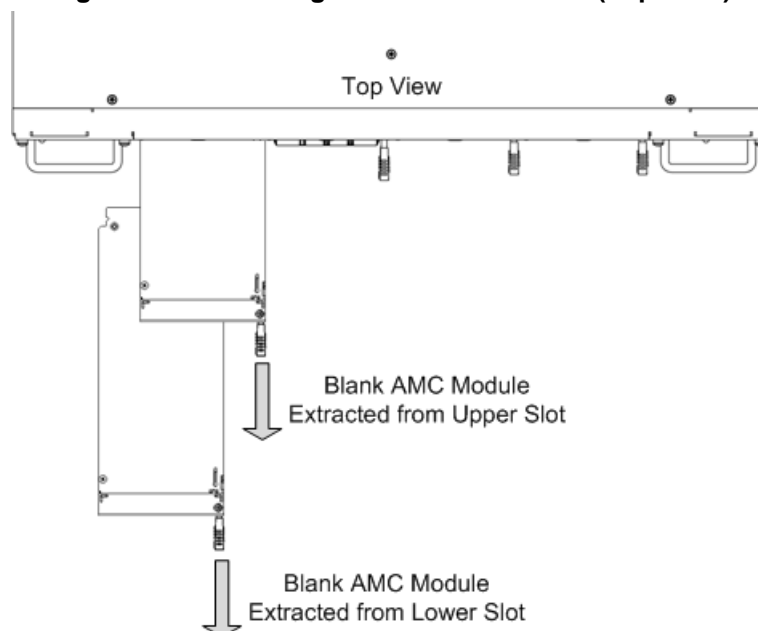


Note: The procedure below describes how to install the MPM module in Slots 1-2. Use the same procedure for inserting MPM modules in other slots designated for MPM modules. For module slot assignment, see Section 3.2.1 on page 17.

➤ **To install the MPM module:**

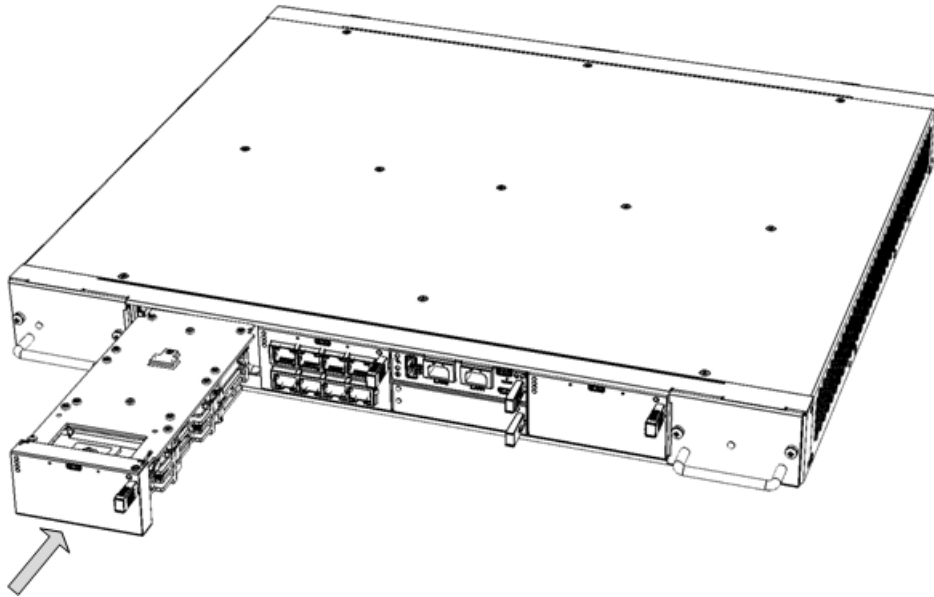
1. Remove the new MPM from its ESD shielding packet in which it was shipped.
2. Disconnect the power cord from the power sources, and then remove the power cord from the power connections on the two Power Supply modules.
3. Remove the blank AMC-module slot covers from the slots in which you want to install the MPM module, by gently pulling on the handle of the modules until they slide out of the slots completely.

Figure 6-5: Extracting Blank AMC Modules (Top View)



4. Carefully insert the MPM into the two empty slots, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure 6-6: Inserting MPM Module



5. Push the module's handle until it clicks firmly in to engage the module with the slot rails.
6. Power up the device.

6.4 Installing the OSN Server Modules

The OSN server is a customer-ordered item. The procedure below describes how to install the OSN server modules (OSN and HDMX) in the chassis.



Warning: Power off the device before installing the OSN modules.

Avertissement: Mettez l'appareil hors tension avant d'installer le OSN.

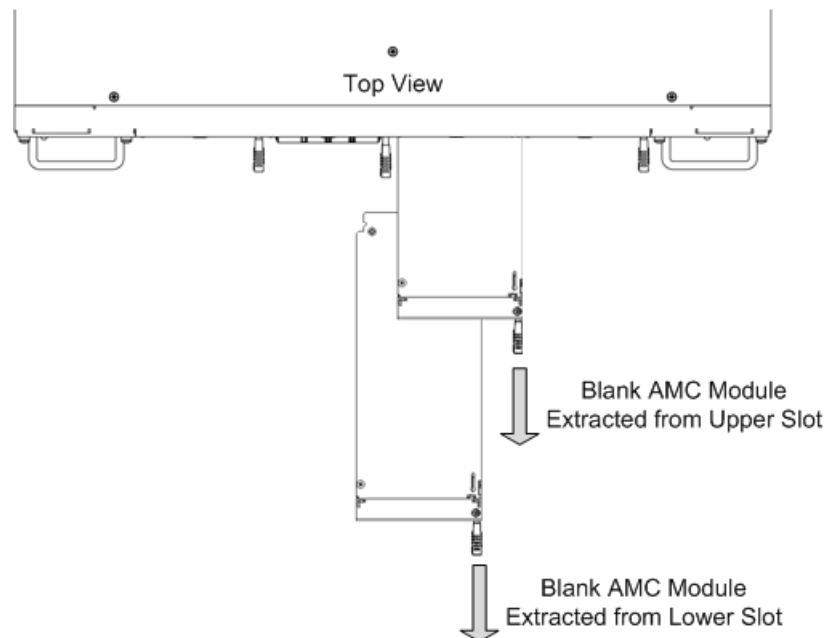


Note: Before installing the OSN server modules, see Section 3.2.1 on page 17 for module slot assignment.

➤ **To install the OSN sever modules:**

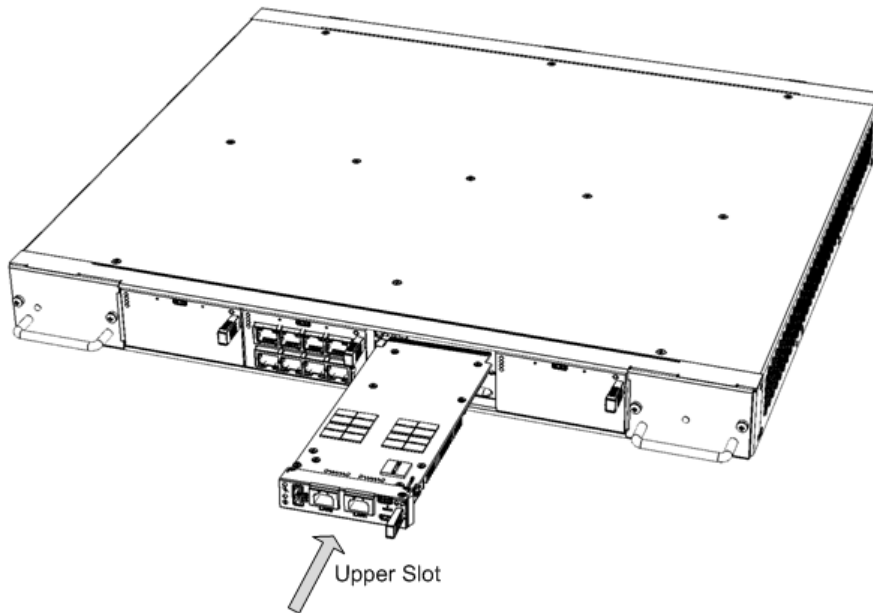
1. Disconnect the power cords from the power sources, and then remove the power cords from the power connections on the two Power Supply modules.
2. Remove the blank AMC-module slot covers from the two slots intended for the OSN server modules, by gently pulling on the handle of the modules until they slide out of the slots completely.

Figure 6-7: Extracting Blank AMC Modules from Slots for OSN Server (Top View)



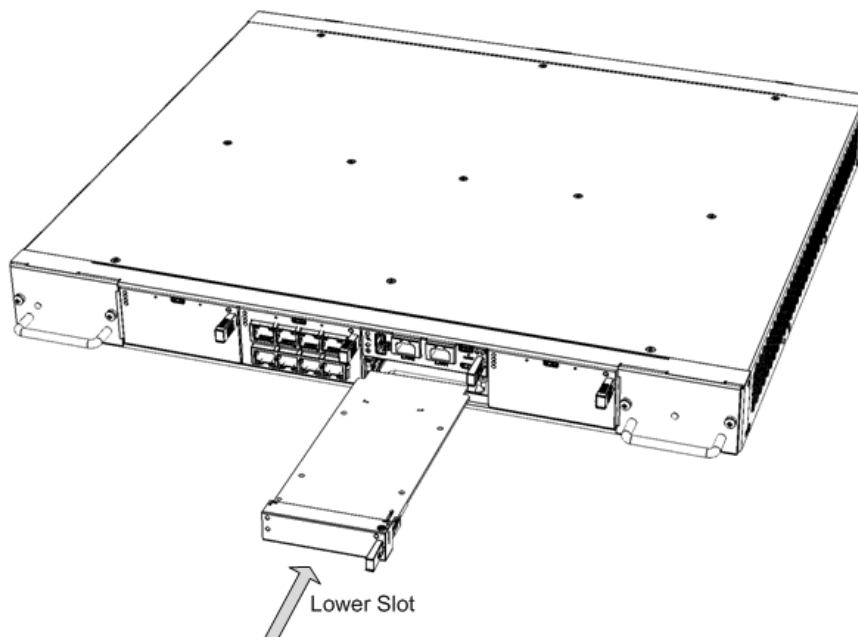
3. Hold the OSN module in the correct orientation as shown in the figure below, and then gently insert the module into the upper slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure 6-8: Inserting OSN Module



4. Push the module's handle until it clicks firmly in to engage the module with the slot rails.
5. Hold the HDMX module in the correct orientation as shown in the figure below, and then gently insert the module into the upper slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure 6-9: Inserting HDMX Module



6. Push the module's handle until it clicks firmly in to engage the module with the slot rails.
7. Power up the device.

6.5 Replacing the Fan Tray Modules

This section describes how to replace the Fan Tray module. It describes replacement of the Fan Tray module #1 (on left side of chassis), but it also applies to the Fan Tray module #2.

The Fan Tray module is hot-swappable and thus, can be replaced without powering down the device.



Warnings:

- **DO NOT** operate the device without the two Fan Tray modules.
- Before replacing a failed 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 if you power off the device). 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.

Avertissements:

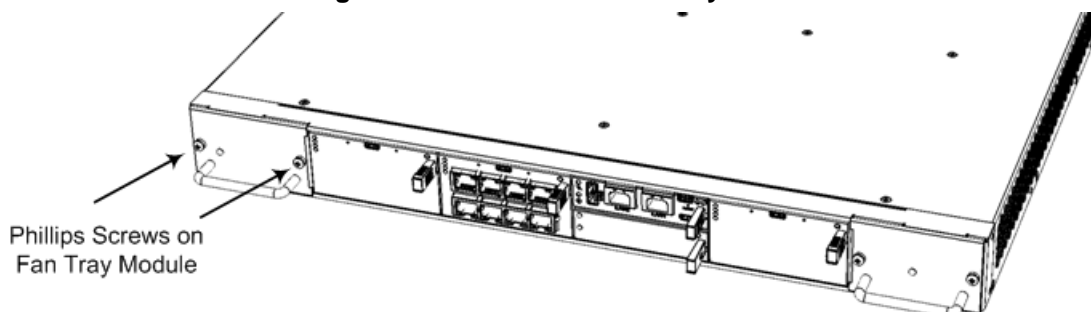
- **N'opérez pas** l'appareil sans module de Caisse de ventilateur ! Avant de remplacer le module de Caisse de ventilateur, assurez-vous que vous avez le module de remplacement en main.
- Avant de retirer le module de Caisse de ventilateur et une fois l'appareil mis hors tension, les lames risquent de continuer à tourner à grande vitesse. Aussi, patientez quelques secondes pour permettre aux lames de s'arrêter, avant d'extraire le module du châssis.

➤ To replace the Fan Tray module:

1. Remove the module:

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

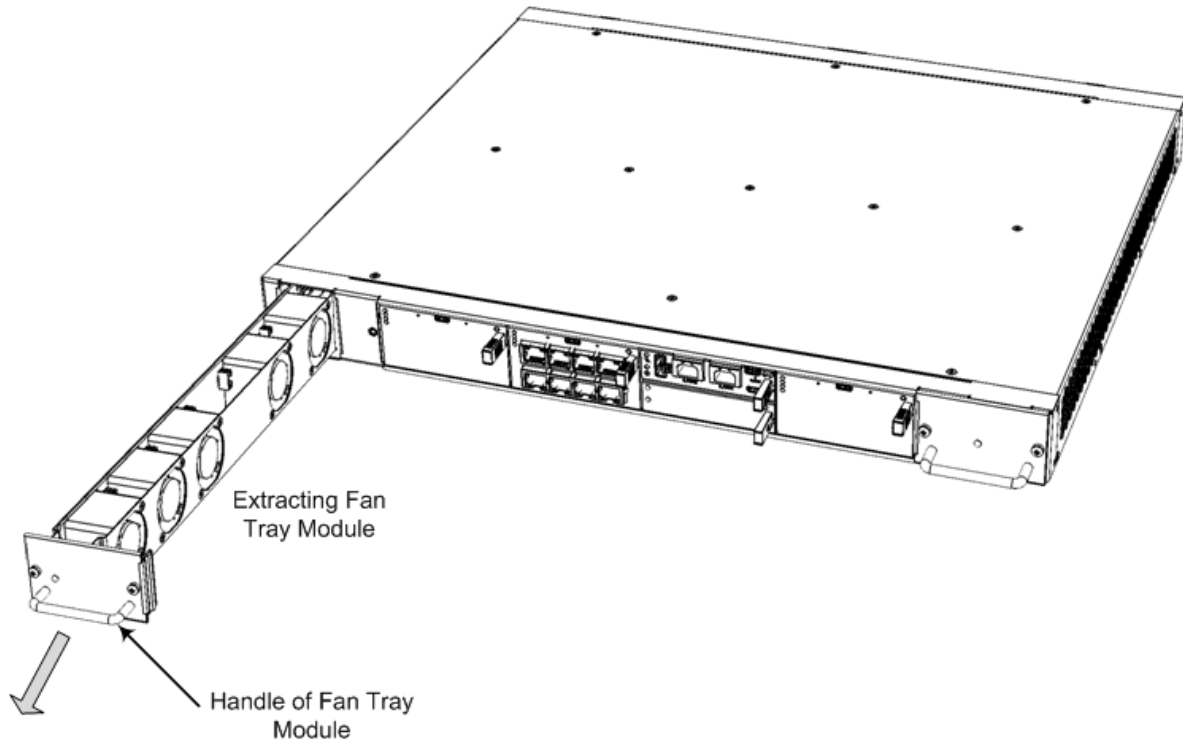
Figure 6-10: Screws on Fan Tray Module



- b. Loosen the two screws using a Phillips screwdriver.

- c. Grip the handle of the Fan Tray module, and gently slide the module out of the chassis slot.

Figure 6-11: Extracting Fan Tray Module using Handle



2. **Install the module:**
 - a. Align the module with the guiding rails located inside the slot.
 - b. Using the module's handle, gently push the module into the slot until it has engaged with the chassis backplane.
 - c. Using a Phillips screwdriver, tighten the two captive screws on the front panel of the Fan Tray module to secure the module to the chassis.
3. Verify that the newly installed Fan Tray module is receiving power and operating normally - the **PWR** LED on the module's front panel should be lit green.

6.6 Replacing the Power Supply Modules

This section describes how to replace the Power Supply module. It describes replacement of the Power Supply module #1 (on left side of chassis), but it also applies to the Power Supply module #2.

The Power Supply module is hot-swappable and thus, can be replaced without powering down the device (i.e., disconnecting the power source from the second Power Supply module).



Warnings:

- Before extracting the Power Supply module, disconnect the power cord from the module.
- Before extracting the Power Supply module (after you have disconnected the power cord), wait at least three seconds for the capacitors to discharge.

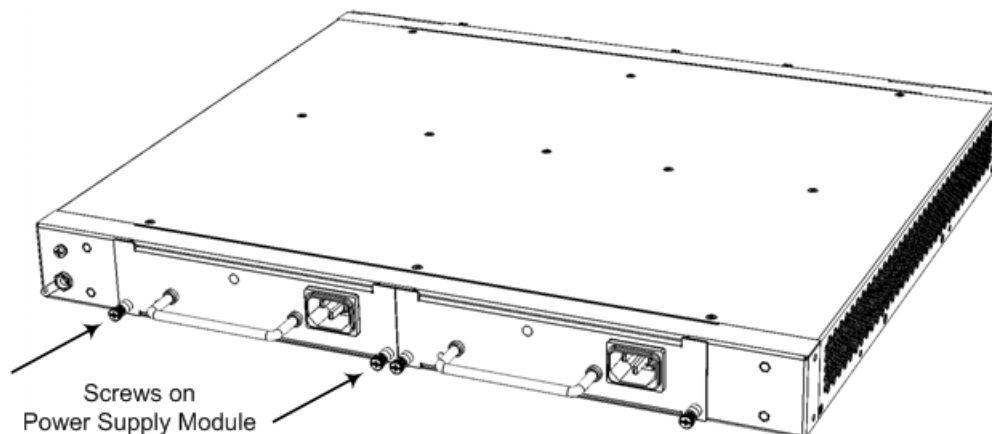
Avertissements: Avant d'extraire un module de Bloc d'alimentation du châssis (après avoir débranché le cordon électrique), patientez au moins 3 secondes que les capacités se déchargent.

➤ To replace the Power Supply modules:

1. Remove the module:

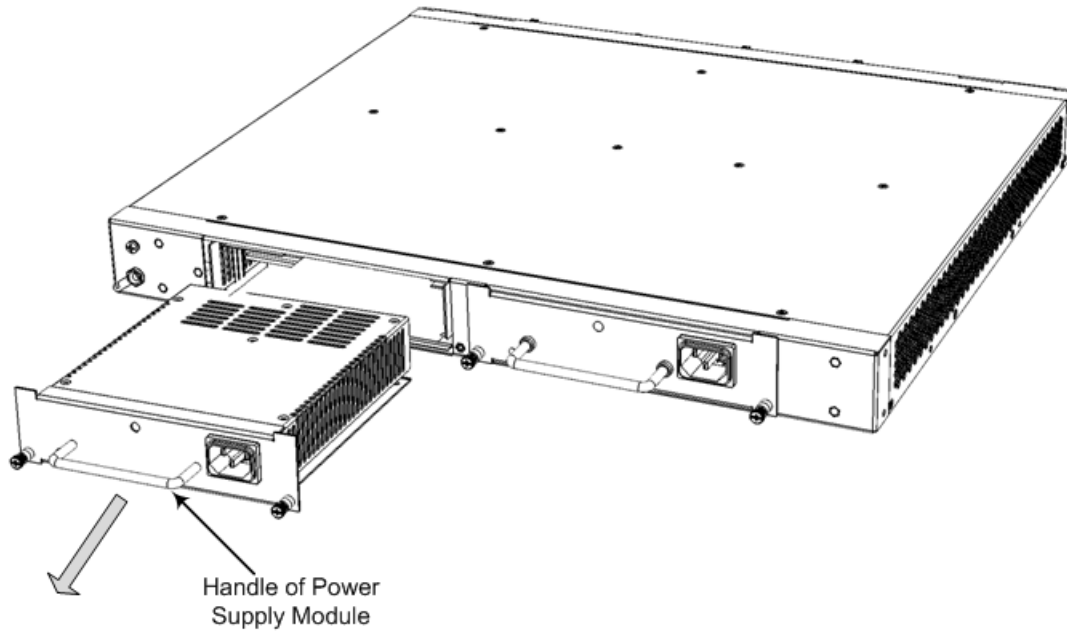
- a. Disconnect the power cord from the power source, and then remove the power cord from the power connection on the module.
- b. Loosen the two captive screws securing the Power Supply module to the chassis. You can use a Phillips or flathead screwdriver.

Figure 6-12: Screws on Power Supply Module



- c. Grip the handle of the Power Supply module, and gently but firmly pull the module out of the chassis slot.

Figure 6-13: Extracting Power Supply Module



2. **Install the module:**
 - a. Orientate the module as shown in the previous figure.
 - b. Align the module with the guiding rails located inside the slot.
 - c. Using the module's handle, gently push the module into the slot until it has engaged with the chassis backplane.
 - d. Tighten the two captive screws on the front panel of the module to secure the module to the chassis. You can use a Phillips or flathead screwdriver.

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