Hardware Installation Manual

AudioCodes Session Border Controller Series

Mediant 4000B

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Notes and Warnings

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.

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.

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.

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

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 életrocution

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

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.

Related Documentation

Document Name
Datasheet
Mediant 4000 SBC User's Manual

Document Revision Record

LTRT	Description
41743	Initial document release.
41745	Map of slots on front panel was updated.
41746	Front-panel description regarding slot numbers updated; module slot assignment updated.
41748	Output ratings removed.
41750	DC power added.
41751	AC/DC input ratings updated.
41752	Drawings of MPM8B, MPM12B, OSN modules.
41753	Troubleshooting added.
41754	Logo updated.
41755	Airflow illustration.
41756	19-inch rack mounting brackets updated.
41758	Chassis updated with new logo.
41759	Logo removed from chassis top.
41770	Duration of press for reset to defaults; trademarks.
41771	HDMX module slot assignment updated for hardware configuration "SBC CPU + OSN".
41772	Shipped items updated (rear-mounting brackets)
41773	Min. operating temp.
41774	Reset button press durations.
41776	EN/UL 60950 updated; 19-inch rack updated; shipped items updated.
41777	CPU replacement procedure update and new device replacement procedure.
41778	LEDs for HA state updated

Table of Contents

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.

> ⚠️ For configuring the device, refer to the device's *User's Manual*.

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:

   - Depending on ordered power supply configuration:

     ◆ AC Power: 2 x AC power cables.

     ◆ DC Power: 2 x DC power feed cables terminated with a crimp-connection type DC terminal block

   - 4 x anti-slide rubber feet for desktop installation.

   - 2 x front-mounting brackets with six screws for 19-inch rack mounting

   - 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.

3   Physical Description

This section provides a physical description of the device.

Physical Dimensions and Operating Environment

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

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, contact your AudioCodes sales representative.
Environmental	■ Operational: 5 to 40°C (41 to 104°F) ■ Storage: -20 to 70°C (-4 to 158°F) ■ Relative Humidity: 10 to 85% non-condensing

Front Panel Description

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

Figure 3-1:   Front Panel
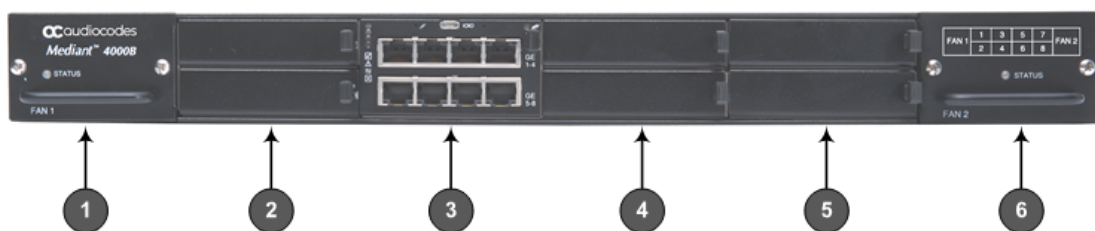
> ⚠️ The figure provides only an example of the device's chassis. The modules housed in your device may be slightly different, depending on the ordered hardware configuration (e.g., Media Processing Module / MPM and OSN server modules).
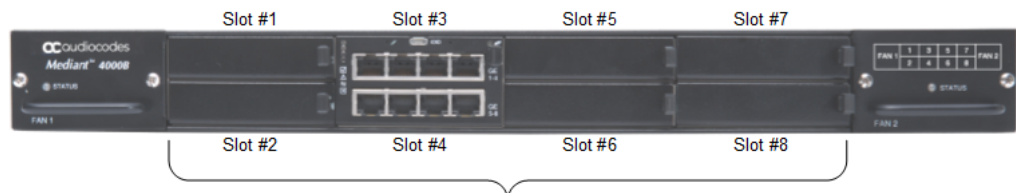
Table 3-2:   Front-Panel Description

Item #	Component Description
1	Fan Tray module #1. For more information on the module, see Fan Tray Module on page 16.
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 SBC). The SBC module occupies two slots. The module provides the central processing unit (CPU), serial interface, and Ethernet port interface functionality. For more information, see SBC CPU Module on the next page.
4	(Slots 5-6) Unused slots shown covered with two blank slot covers. The slots can house one of the following optional modules: ■ OSN server modules (OSN4 and HDMX). For slot assignment of these modules, see Module Slot Assignment below. ■ 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: ■ 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 Fan Tray Module on page 16.

Module Slot Assignment

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

Figure 3-2:   Module Slot Assignment on Front Panel
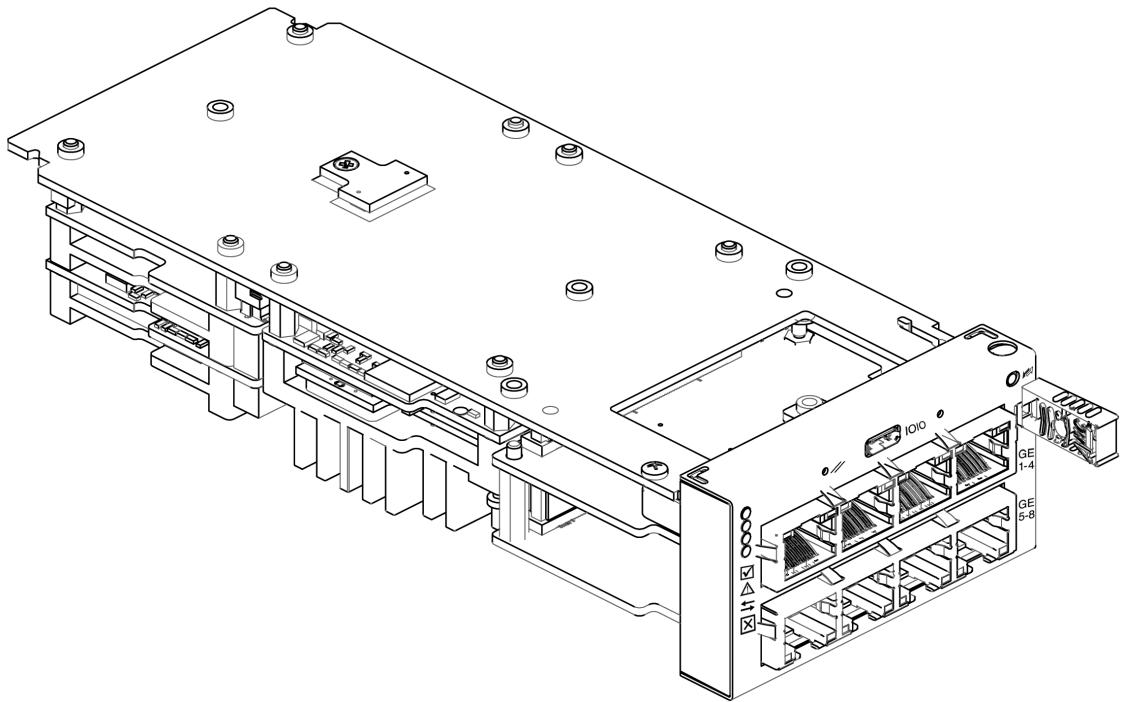

SBC CPU Module

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 Replacing the SBC CPU Module on page 38.

Port Description

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

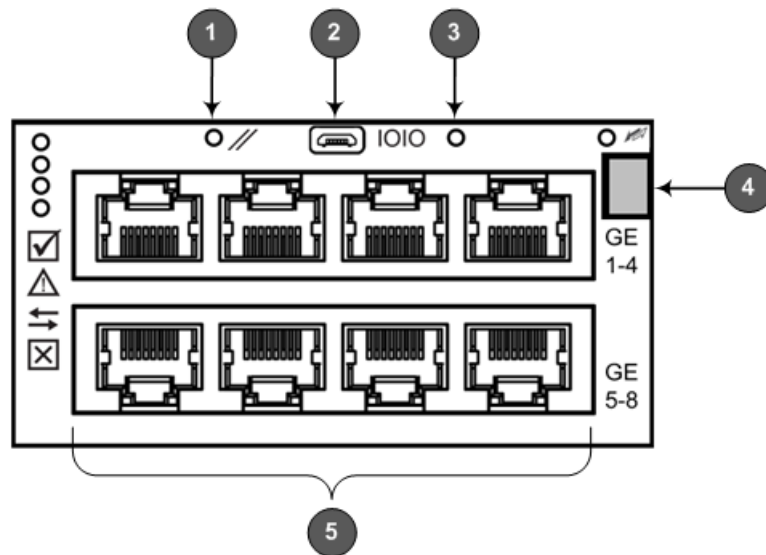**Figure 3-4:   SBC CPU Module Ports**

Table 3-3:   SBC CPU Module Ports Description

Item #	Label	Description
1	⫽	Reset pinhole button: ■ **To reset the device:** Press and hold the button for up to 5 seconds (and not longer). ■ **To reset the device to factory defaults:** Press and hold the button for at least 15 seconds, but no longer than 20 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.

LED Description

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

Figure 3-5:   SBC CPU Module LEDs
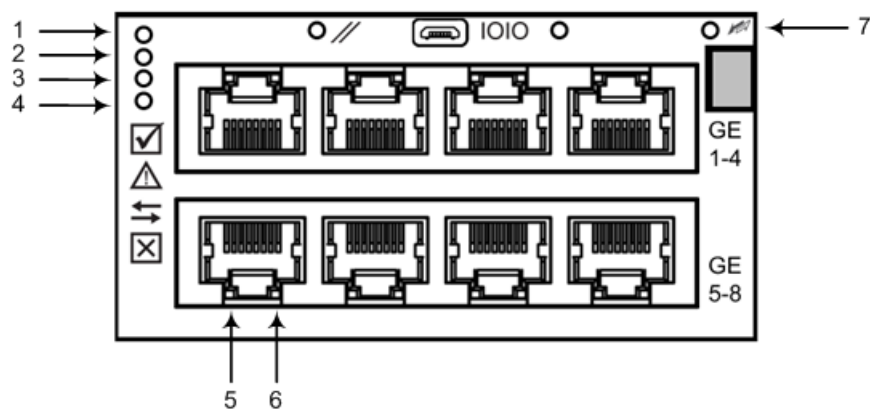

Table 3-4:   SBC CPU Module LEDs Description

Item #	LED	Color	State	Description
1	☑	Green	On	Module in service.
		-	Off	Module out of service.

| Item #	LED	Color	State	Description
2	⚠	-	Off	During booting up state.
		Red	On	Booting up phase / fault detected in module.
		Green	On	Normal operation.
3	⇄	-	Off	Indicates that the device is booting up.
		Green	On	Indicates that the device is in Standalone mode (not High Availability / HA).
			Flashing	Indicates that the device is in HA mode. **Note:** This color state appears only on the Active device.
		Yellow	On	Indicates that the Redundant device is still not synchronized with the Active device for HA. **Note:** This color state appears only on the Redundant device.
			Flashing	Indicates that the Redundant device is synchronized with the Active device for HA. **Note:** This color state appears only on the Redundant device.
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.

Item #	LED	Color	State	Description
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.

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:
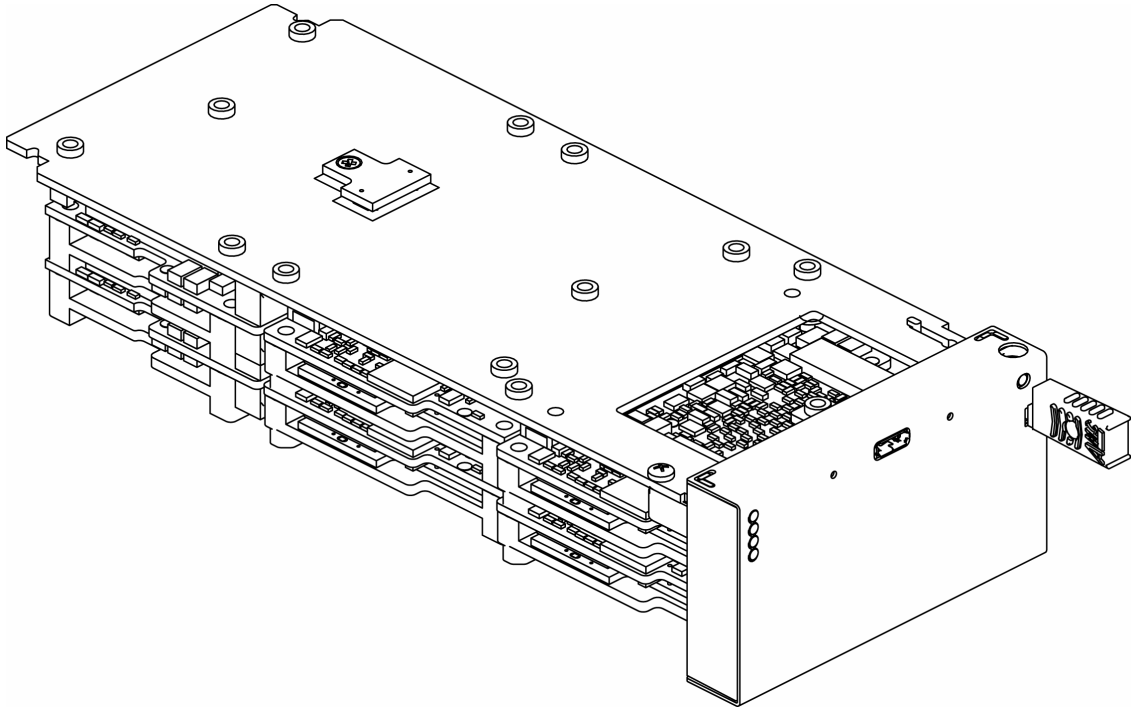
■ MPM8B module, providing 8 DSPs:

Figure 3-6:   MPM8B
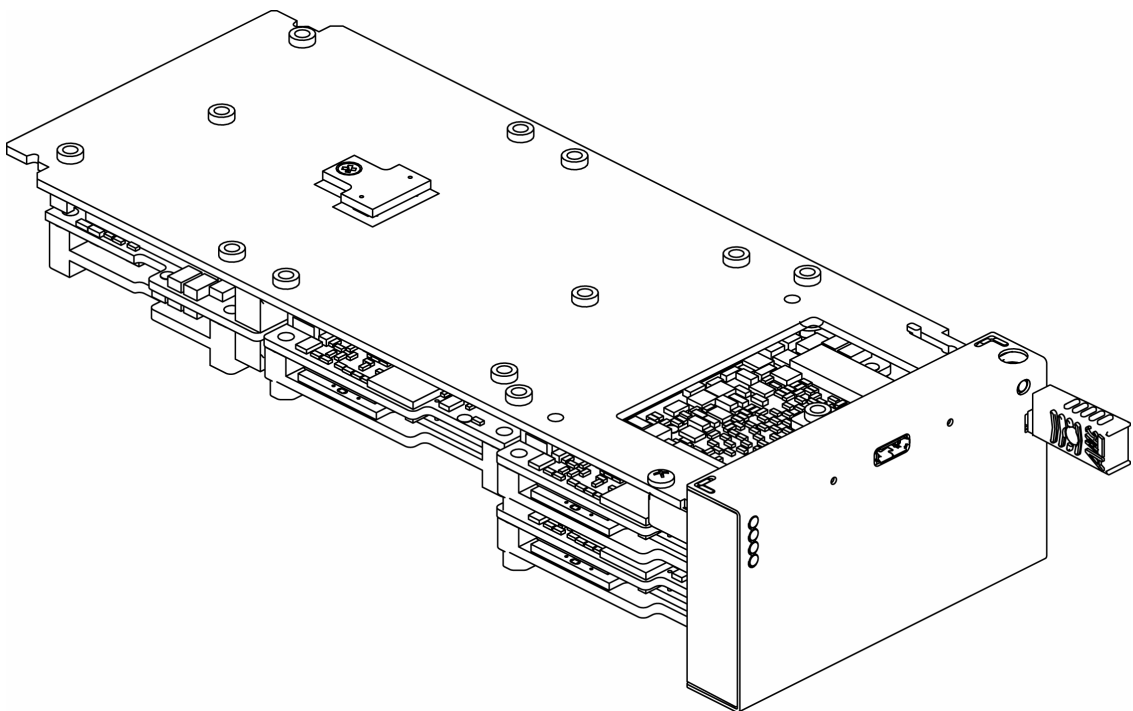
■ MPM12B module, providing 12 DSPs:

Figure 3-7:   MPM12B

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 Module Slot Assignment on page 4.

> ⚠ ● 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 Installing the MPM Modules on page 40.
> ● 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 following figure and described in the subsequent table.

Figure 3-8:   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.
2	⚠	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).

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 3rd Generation Dual Core 2.5 GHz	8 GB DDR3 with ECC	Up to 2 hard drives: HDD or SSD	■ Two external Gigabit Ethernet

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

For installing the OSN server modules, see Installing the OSN Server Modules on page 41.
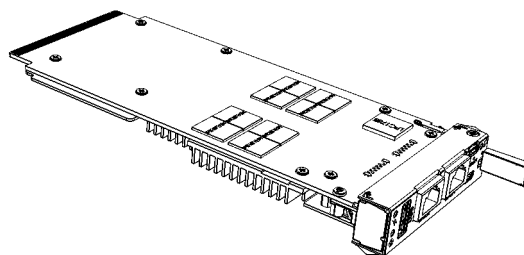
OSN4 Module

This describes the ports and LEDs on the OSN4 module.

> ⚡ 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

Figure 3-9:   OSN4 Module

Port Description

The ports of the OSN4 module are shown in the following figure and described in the subsequent table.
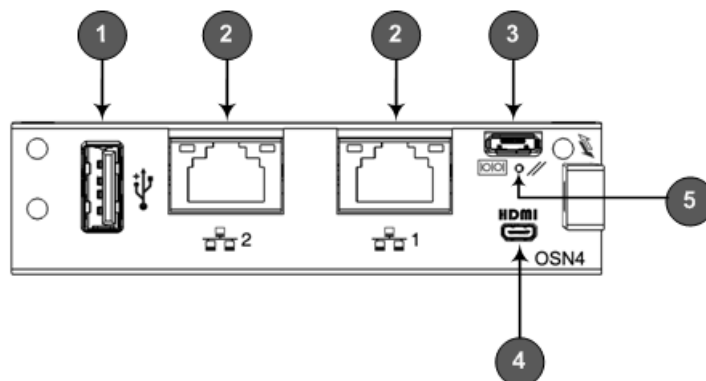
Figure 3-10:   OSN4 Module Ports

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 Connecting the Ethernet Ports to the LAN on page 23.
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	//	Reset pinhole button. ■ 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 LED Description on the next page for LED locations): ✔ Upon reset: 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 LED Description on the next page for LED locations): ✔ Upon reset: 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.

LED Description

The LEDs of the OSN4 module are shown in the following figure and described in the subsequent table.
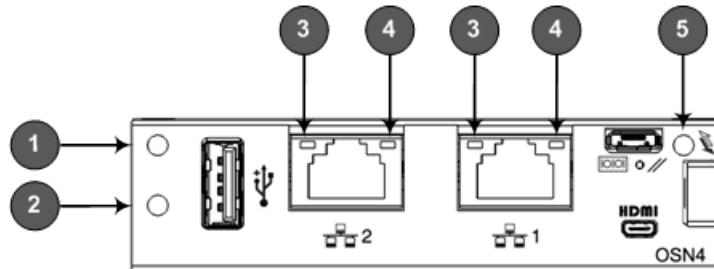
Figure 3-11:   OSN4 Module LEDs
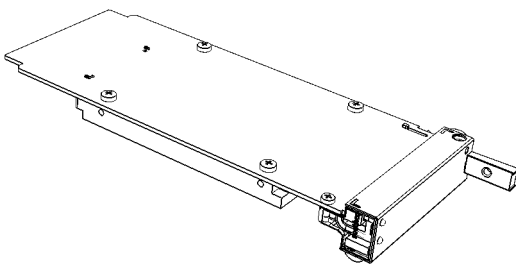
Table 3-8:   OSN4 Module LED Description

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.

Item	Color	State	Description
		On	Module shutdown sequence complete and the module can be extracted from the chassis slot.
		Off	Module correctly inserted in chassis slot.

HDMX Module

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

Figure 3-12:   HDMX Module

⚠️ 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 following figure and described in the subsequent table.

Figure 3-13:   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.

Item #	Label	Color	State	Description
3	![]	Blue	On	Module can be extracted from chassis slot once dismounted from the OSN operating system.
			Off	Module correctly inserted in chassis slot

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 in 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.

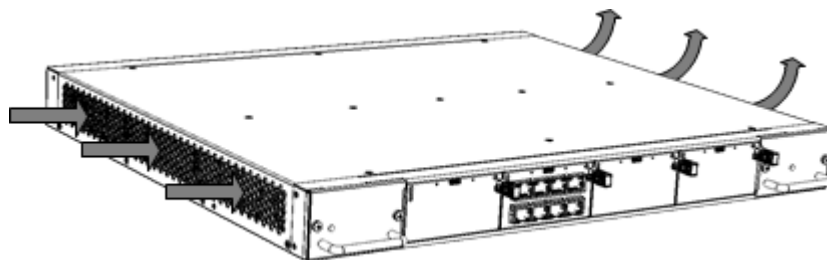**Figure 3-14:   Airflow Directions through Chassis**

Figure 3-15:   Fan Tray Modules (1 and 2)
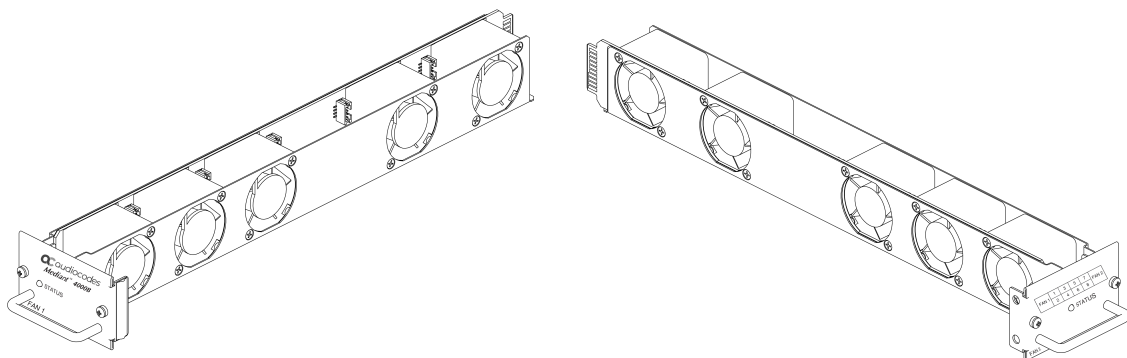
> ⚠️ When installing the chassis, make sure there is sufficient right- and left-side clearance for airflow into and out of the chassis.

For replacing Fan Tray modules, see Replacing the Fan Tray Modules on page 44.

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: ■ Fan Tray module failure. ■ Power failure due to any of the following: ✓ 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: ■ 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.

Rear Panel Description

The chassis rear panel with AC and DC power configurations are displayed in the figures below and described in the subsequent table.

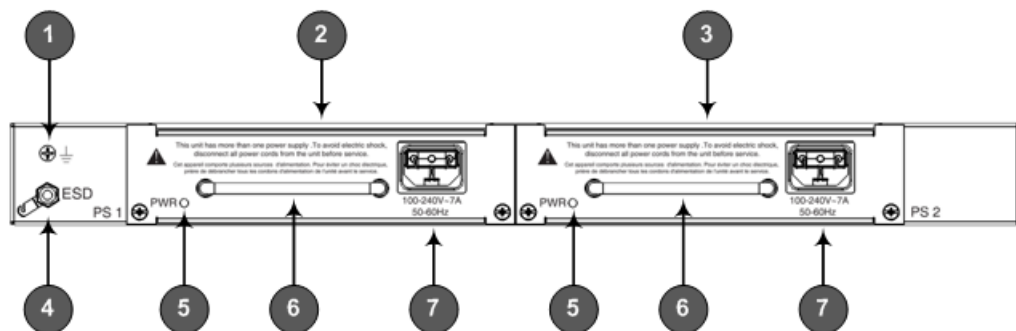**Figure 3-16:   Rear-Panel AC Power Configuration**
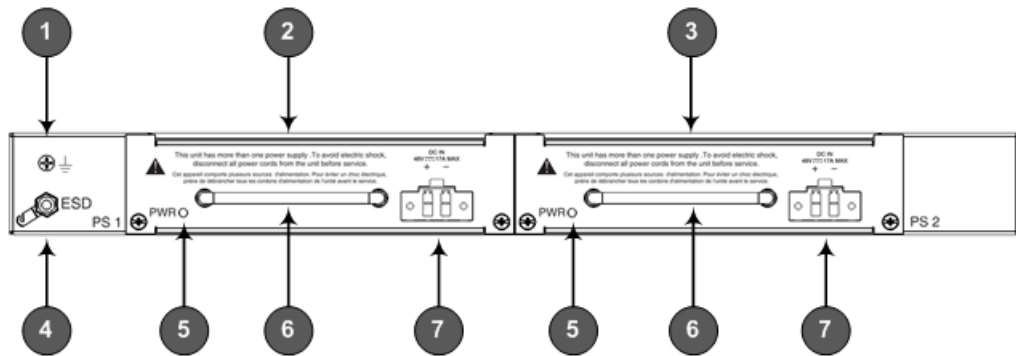
Figure 3-17:   Rear-Panel DC Power Configuration

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 Power Supply Modules below.
3	**PS 2**	Power Supply module No. 2. For more information, see Power Supply Modules below.
4	**ESD**	Electrostatic Discharge (ESD) lug.
5	**PWR**	Power status LED for indicating the status of the Power Supply module. For more information, see Power Supply Modules below.
6	-	Extraction-handle for removing the Power Supply module.
7	AC: **100-240V~7A 50-60Hz** DC: **DC IN 48V 17A MAX**	■ **AC Module:** AC power supply inlet (100-240V~7A, 50-60 Hz) of Power Supply module. ■ **DC Module:** DC power supply inlet with pre-installed terminal block

Power Supply Modules

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

The device can be ordered with AC (Catalog Part Number PS/AC/4000K) or DC (Catalog Part Number DC PS/DC/4000K) Power Supply modules.

Figure 3-18:   AC Power Supply Module
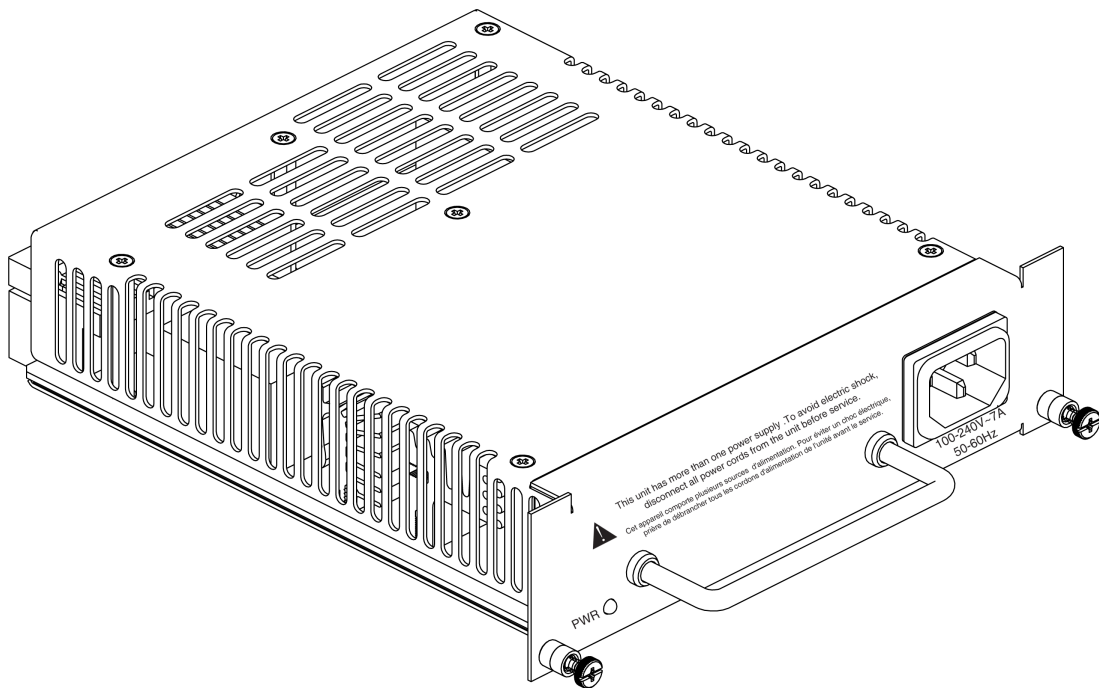
Figure 3-19:   DC Power Supply Module
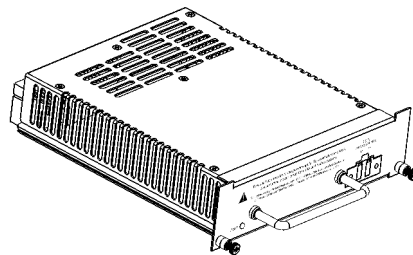
For installing and replacing the Power Supply modules, see Replacing the Power Supply Modules on page 45.

Each Power Supply module provides a **PWR** LED for indicating the status of the power supply, as described in the following table.

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 power supply, or the power is currently not being supplied to the device through the power supply entry.

4   Mounting the Device

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

■ Placed on a desktop (see Desktop Mounting below)

■ Installed in a standard, 19-inch rack (see 19-Inch Rack Mounting on the next page)

> ⚡ • 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.
> • Do not rest any object on top of the device.

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
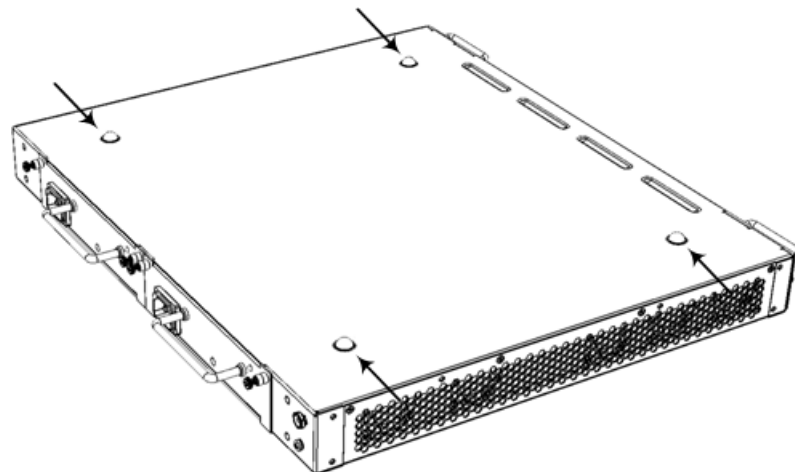
3. Peel off the adhesive, anti-slide rubber feet (supplied) and stick one in each anti-slide groove.

4. Flip the device over again so that it rests on its underside with the rubber feet in contact with the surface.

19-Inch Rack Mounting

The device is designed to fit into a 19-inch industrial rack of 1 rack-unit height (1U). The device is mounted in the 19-inch rack by placing it on a pre-installed shelf (not supplied) and securing it to the rack, using front-mounting brackets.

> ⚡ **Rack Mount Safety Instructions**
> When installing the chassis in a rack, adhere to 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.

➤ **To mount the device in a 19-inch rack:**

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

Figure 4-2:   Attaching Front-Mounting Brackets to Chassis
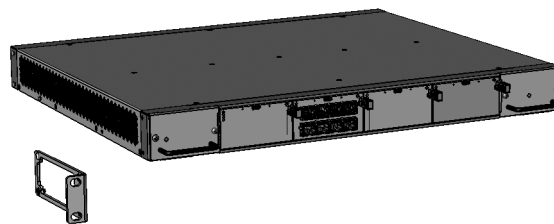
2. Make sure that your rack shelf is secured to the rack posts and in a horizontal level position in the rack.

3. Place the device on the pre-installed shelf in the rack.

4. Position the chassis so that the front-mounting brackets (attached in Step 1) 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 sliding off the shelf.

5   Cabling the Device

This section describes how to cable the device.

Earthing (Grounding) the Device

The procedure below describes how to ground the device.

> ⚡ **Protective Earthing**
>
> This equipment is classified as Class I according to EN 62368-1 and UL 62368-1 and must be earthed at all times (using an equipment-earthing conductor).
>
> Finland: "Laite on liltettava suojamaadoituskoskettimilla varustettuun pistorasiaan."
>
> Norway: "Apparatet rna tilkoples jordet stikkontakt."
>
> Sweden: "Apparaten skall anslutas till jordat uttag."

> ⚡ **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 this section). 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 mm^2 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 mm^2. The length of this cable must be as short as possible (no longer than 3 meters).

➤ **To ground the device:**

1. Connect an electrically earthed strap of 16-AWG wire (minimum) to the chassis' ground lug screw (located on the rear panel).

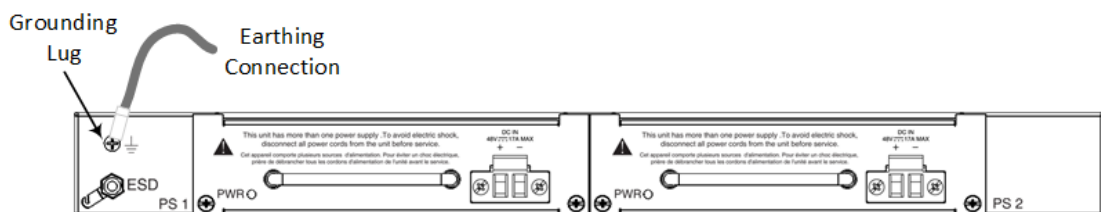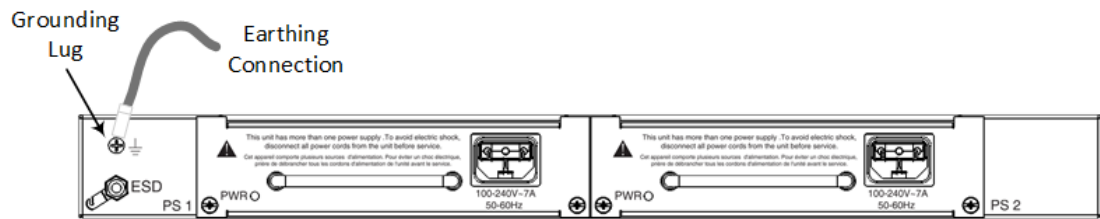**Figure 5-1:   Grounding the DC-Powered Device**

Figure 5-2:   Grounding the AC-Powered Device

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

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 5-3:   Connecting the LAN Interface
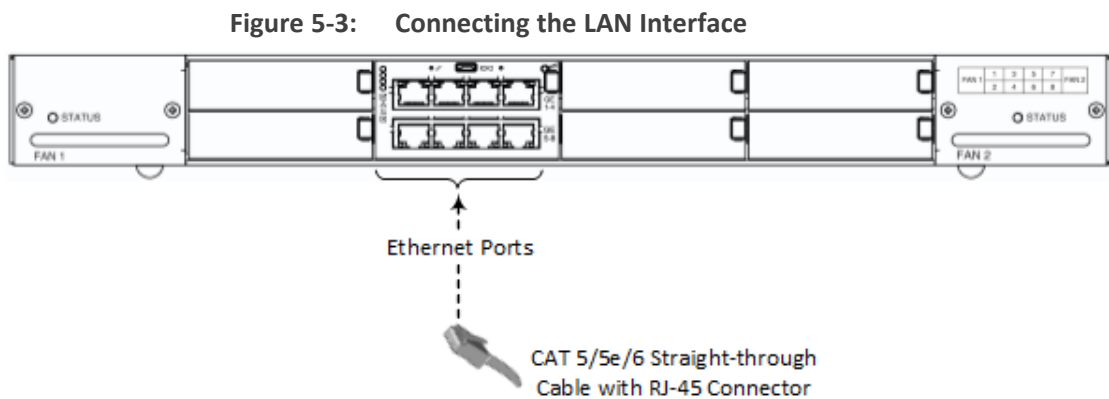
2.   Connect the other end of the cable to your LAN network.

> ⚠️ 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 Deployment of a Standalone Device below.

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 following figure. 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 5-4:   Default Ethernet Groups
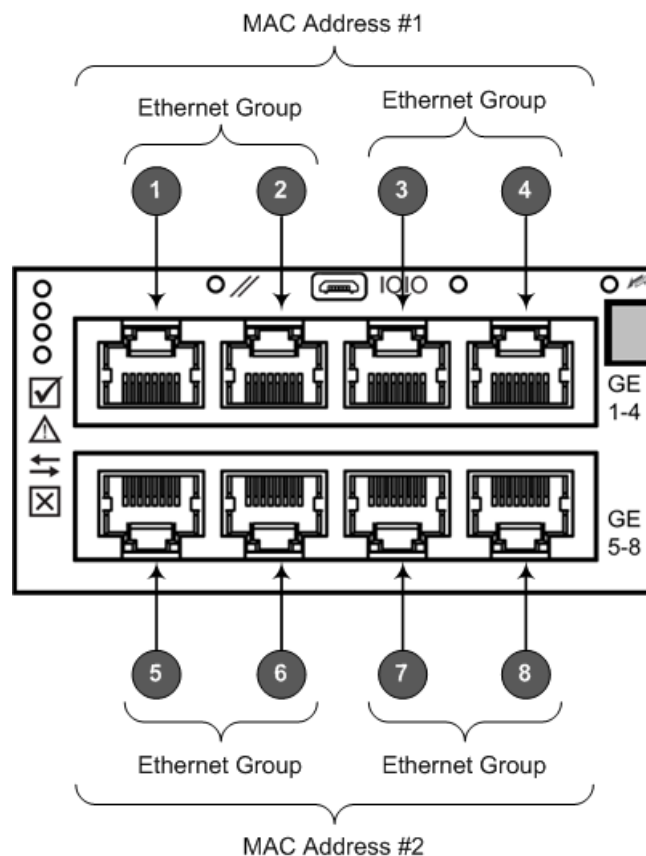
> ⚠ ● Two different MAC addresses are assigned to the Ethernet ports: one to ports GE
> 1-4 (upper ports) and another to ports GE 5-8 (lower ports). See previous figure.
> ● When implementing 1+1 Ethernet port redundancy, please adhere to the
> following guidelines:
> ✔ Each port in the Ethernet Group (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 5-5:   Cabling for 1+1 Ethernet-Port Redundancy (Example)
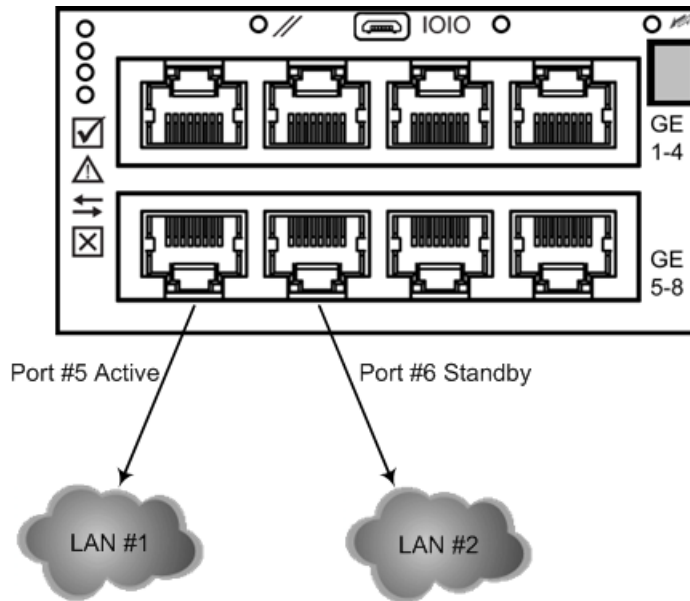
Deployment of Two Devices for High Availability

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 following figure:

Figure 5-6:   Cabling for High Availability (Example)
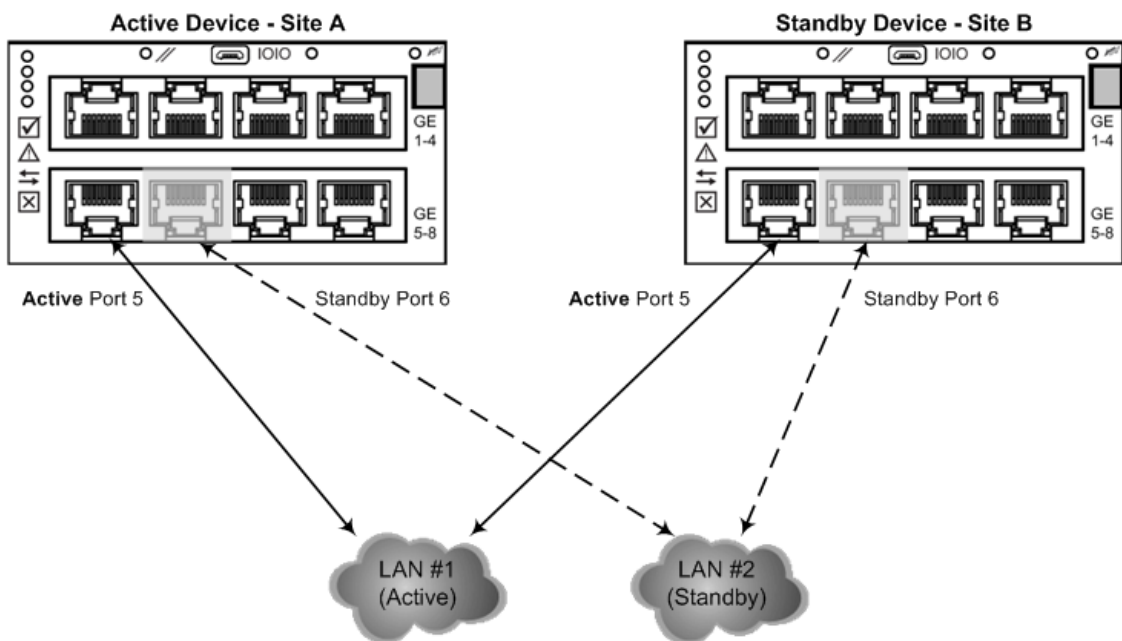
In High Availability, the two devices interconnect through their Maintenance interfaces, using the same Ethernet Port Group.

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

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:

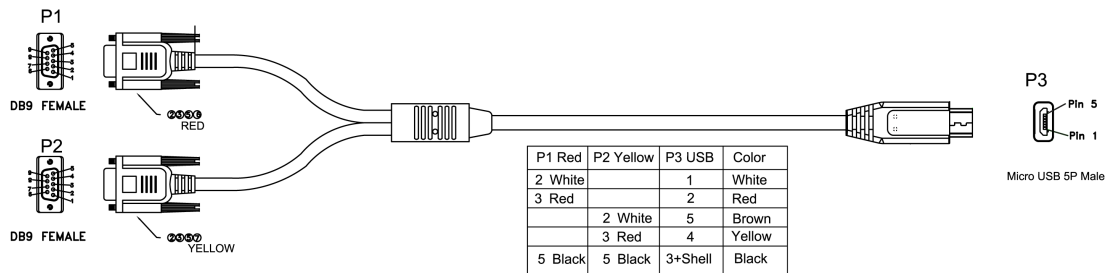**Figure 5-7:   Serial Interface Cable Adapter and Connector Pinouts**

P1 Red	P2 Yellow	P3 USB	Color
2 White		1	White
3 Red		2	Red
	2 White	5	Brown
	3 Red	4	Yellow
5 Black	5 Black	3+Shell	Black

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

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

Figure 5-8:   Connecting the Serial Interface
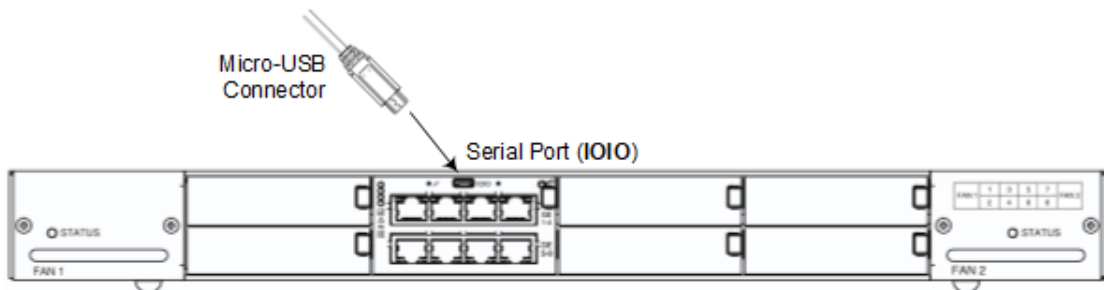
2. Connect the DB-9 connector labeled "P1" (red), at the other end of the cable, to the RS-232 communication port on your computer.

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

Connecting the OSN Server

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

> ⚠️ ● The OSN server is a customer-ordered item.
>   ● To install the OSN server modules in the chassis, see Installing the OSN Server Modules on page 41.
>   ● For specifications of the OSN server, including ports and LEDs, see OSN Server Modules on page 11.

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 Cabling for Installing Operating System above).

Figure 5-9:   Cabling OSN4 Module for Installing Operating System
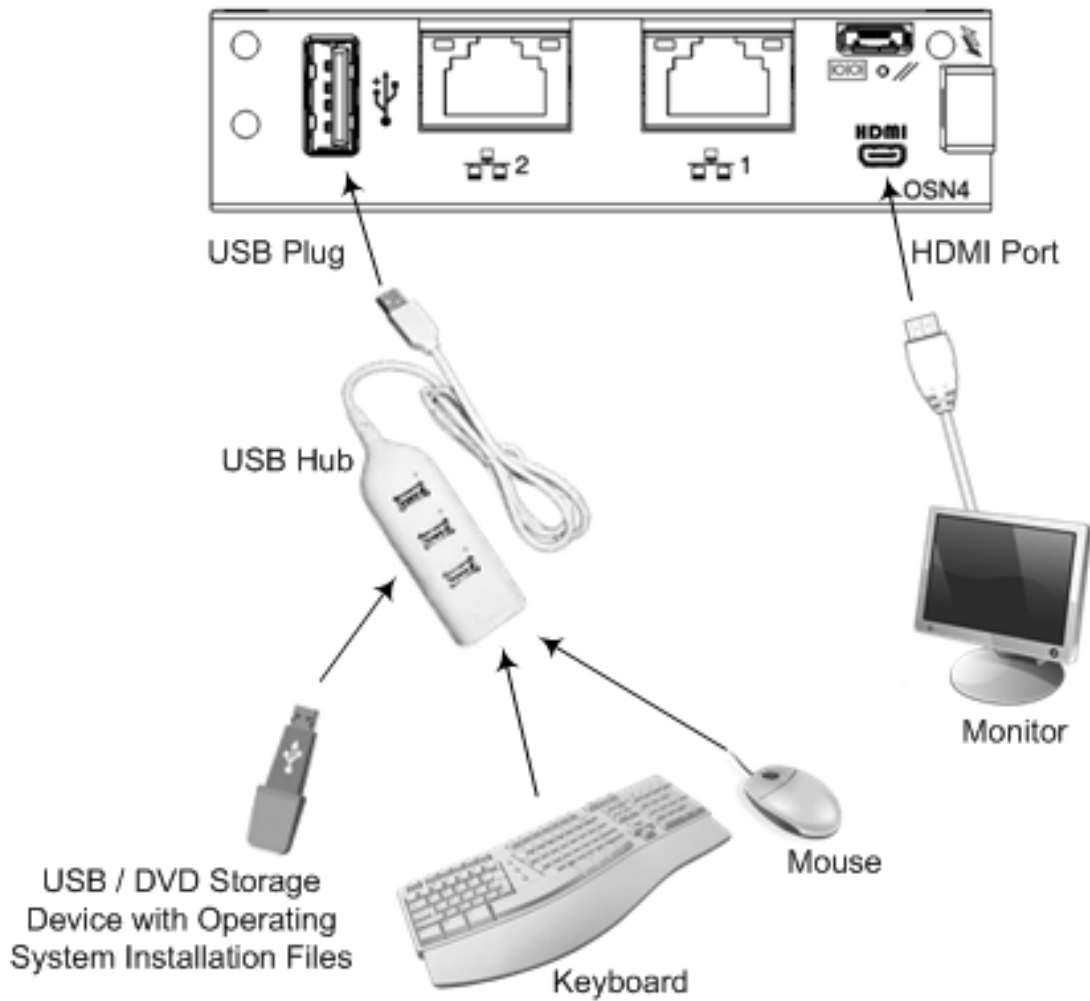
4. Reconnect the device to the power sources; the OSN server boots up from the USB storage device and the operating system installation begins.

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-

Pin	Signal
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

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 Cabling for Installing Operating System on page 28.

■ 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 5-10:   Cabling OSN4 Module for Serial Communication
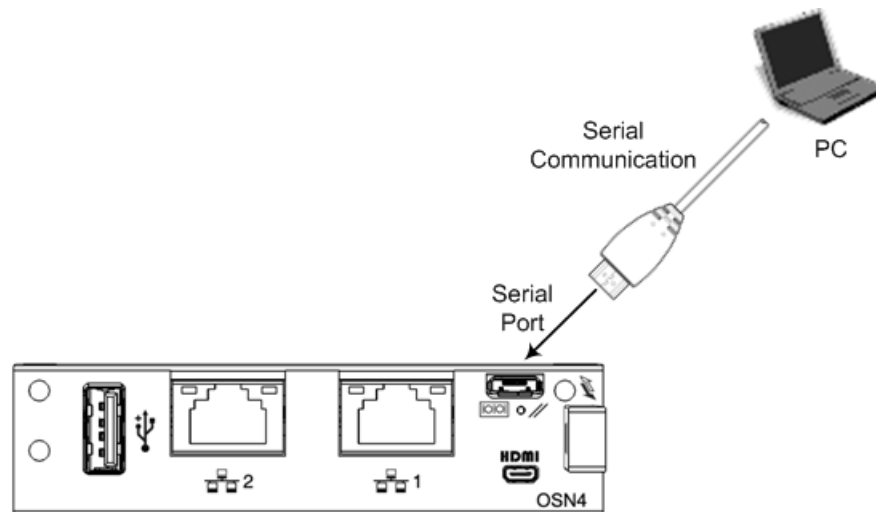
3. Establish serial communication with the OSN server through a terminal emulation program (such as HyperTerminal), using the following serial communication settings:

● Baud Rate: 115200 (bits per second)

● Data Bits: 8

● Parity: None

● Stop Bits: 1

● Flow Control: None

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 Error! Reference source not found..

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

Figure 5-11:   Cabling OSN4 Module to Network
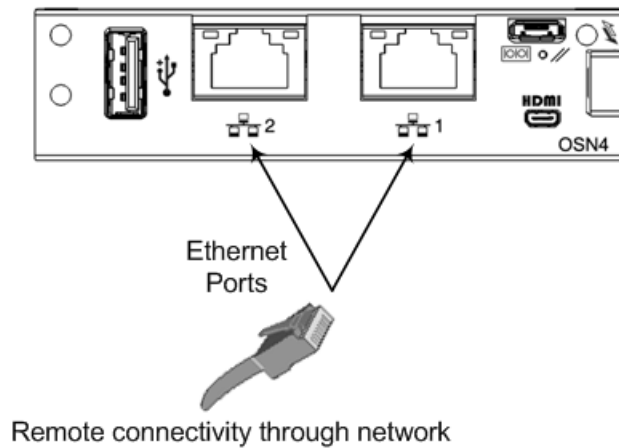
The RJ-45 connector pinouts for the Gigabit Ethernet interface are listed in the following table:

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	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-

Connecting to Power

The section describes how to connect the device to the AC or DC power supply.

Connecting to AC Power Supply

The following table lists the AC power supply specifications:

Table 5-4:   AC 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	Dual universal power supply 100-240 VAC, 50-60 Hz, 7A max.
Connection to Electrical Outlet	AC power supply inlet
External Power Cable Connector Type	3-Conductor power cord
Safety Standards	IEC60950-1, UL60950-1

● 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 mm^2 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 Replacing the Power Supply Modules on page 45.

ご注意
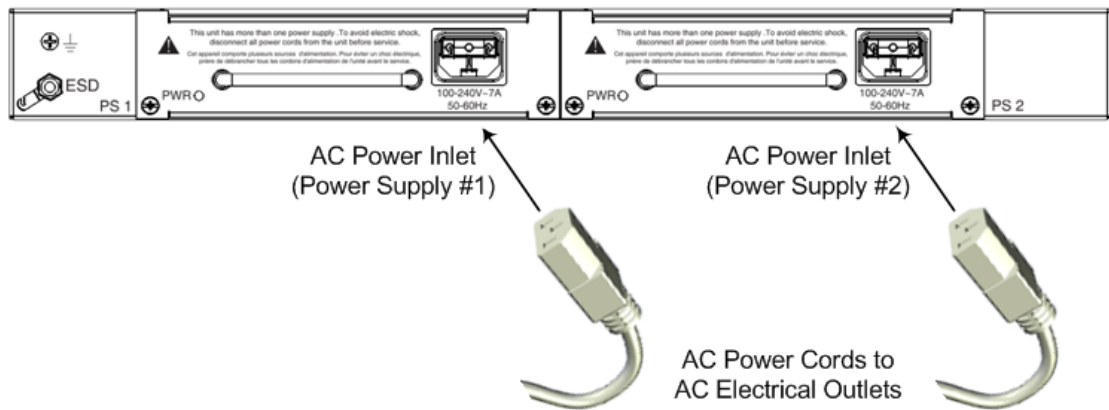本製品に添付の電源ケーブルは、Mediant 4000B SBC に専用設計されているため、汎用性がありません. 本電源ケーブルを他の機器に使用されないよう、ご注意ください.

➤   **To connect the device to AC power supply:**

1.   Connect the AC power cord (supplied) to one of the power sockets located on the rear panel.

Figure 5-12:   Connecting to AC 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.

Connecting to DC Power Supply

The following table lists the DC power supply specifications:

Table 5-5:   DC Power Specifications

Item	Description
Power Supply	Two hot swappable, power supply modules for power load sharing and DC power redundancy in case of failure of one of the modules.
Input Ratings	Dual universal power supply 40-60 VDC, 17A max.
Connection to Electrical Outlet	DC power supply inlet.
External Power Cable Connector Type	DC Power feed using two 48 VDC insulated wires
Safety Standards	IEC60950-1, UL60950-1

> ⚠ ● Connection of the device to the DC mains power must be done only by a certified electrician in accordance with local national electrical regulations.
> ● Both Power Supply modules (1 and 2) must be connected. Ensure that you connect each one to a different DC power supply source. Two Power Supplies provide 1+1 power load-sharing and redundancy. The DC power sockets are located on the device's rear panel.
> ● The two DC 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.
> ● If a failure occurs in any one of the Power Supply modules, replace the module immediately. For replacing the Power Supply modules, see Replacing the Power Supply Modules on page 45.

The device is shipped with a DC terminal block pre-installed in the chassis DC inlet on each Power Supply module. The device is supplied with two DC power feed cables terminated with a crimp-connection type DC terminal block for connecting the DC inlets to the DC power source. The cable includes two insulated 14-AWG wires (for positive and negative polarity).

**Figure 5-13:   DC Power Feed Cable Terminated with Crimp-Connection Type DC Terminal Block**
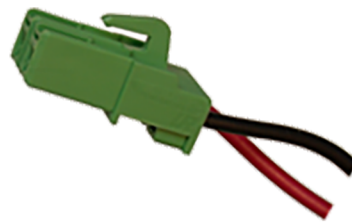
➤ **To connect the device to DC power supply:**

1. Connect the open ends of the two wires on the DC power feed cable (supplied) to the DC power source. Make sure that the wires are connected to the correct polarity (positive and negative).

> ⚠ Make sure that you connect the DC power feed cable to the power source in the correct polarity. The cable's two wires are color-coded and numbered to indicate polarity:
> ● Black Wire (1): negative (-) polarity
> ● Red Wire (2): positive (+) polarity

2. Plug the DC power feed cable, crimped to the terminal block, into the DC inlet (labeled **DC IN**), making sure that the hook on the terminal block snaps into the groove above the DC inlet. The following figure shows the correct orientation of the terminal block to the DC inlet (i.e., hook is above terminal block):

Figure 5-14:   Connecting to DC Power
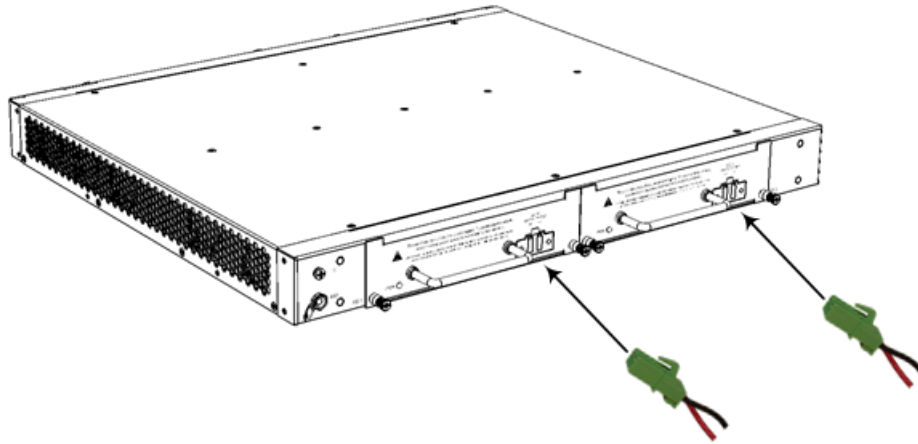
3. Verify that the chassis is receiving power - the **PWR** LED on the Power Supply module should be lit (green).

4. Repeat the procedure for each Power Supply module.

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 describes the procedures for installing or replacing modules.

> ⚡ Maintenance service of this device must be made only by qualified service personnel.

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

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
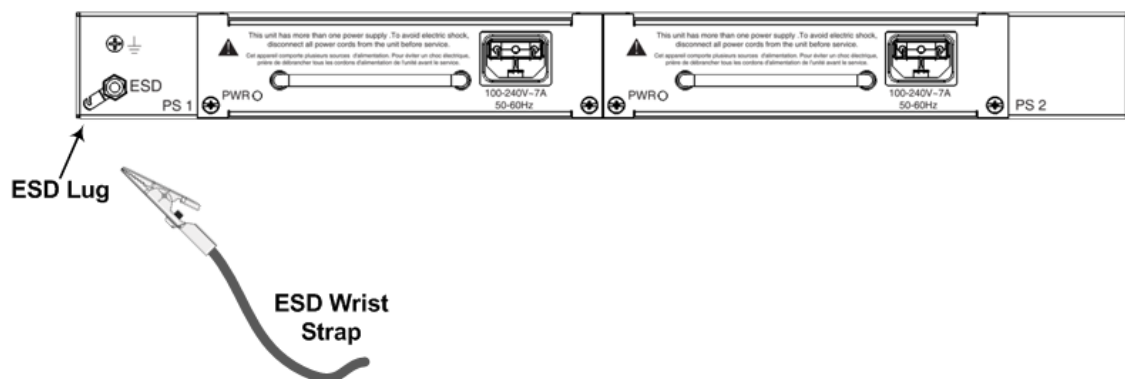
Replacing the SBC CPU Module

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

⚠️ Before extracting the module, power off the device.

➤ **To replace the SBC CPU module:**

1. Make sure that you have a new License Key for the module. If not, contact your AudioCodes sales representative.

2. 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 CPU module handle until you hear a click sound:

   Figure 6-2:   Module Handle Partially Pulled Out (Top View)
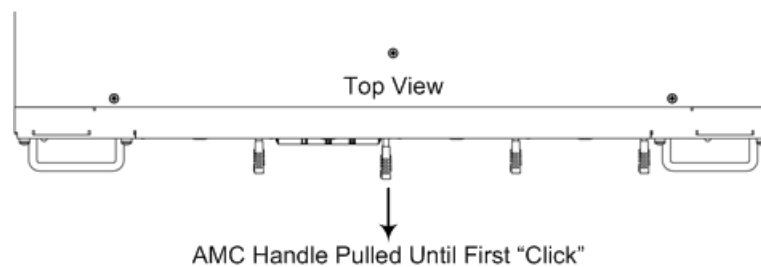
   c. Firmly but gently pull the CPU module handle until the entire module slides out of the chassis slot:

   Figure 6-3:   SBC CPU Module Pulled out of Slot (Top View)
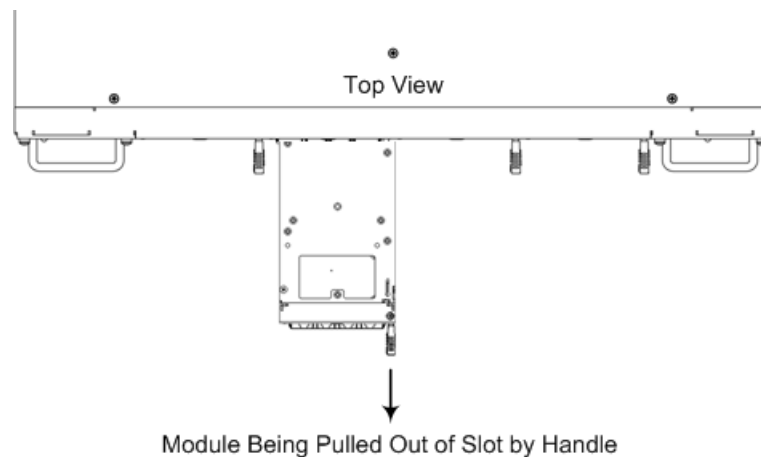
3. Install the new CPU module:

   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
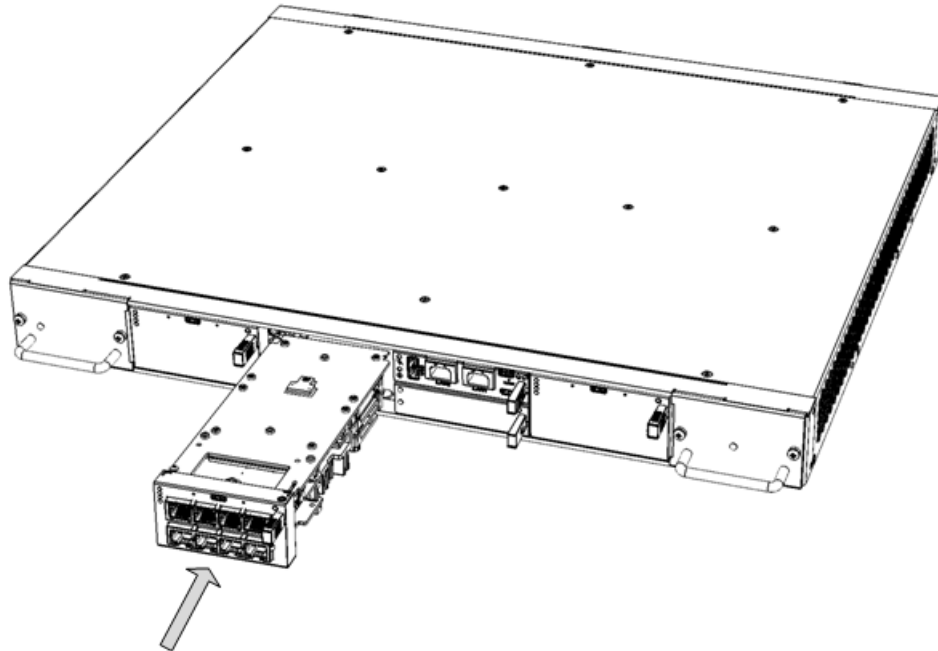
c. Push the module's handle until it clicks firmly in to engage the module with the slot rails.

d. Connect all external interfacing cables to the module, as required.

e. Power up the device.

4. From your local computer, access the device's Web interface with the device's default IP address (192.168.0.2/24), through one of the first two Ethernet ports (GE 1 or GE 2) on the top-left row of the CPU module.

5. Load the software file (.cmp) to the device. If you don't have the file, ask your AudioCodes sales representative for it.

6. Load the License Key file to the device.

7. For **Standalone** devices, load your backup (saved) Configuration Package file or individual files (e.g., ini file, certificate files, Dial Plan file, and CPT file), if you have, to the device. For **HA**, load only the ini file (the other files are transferred to the device from the active device when you connect it to the network - see Step 9).

8. For **Standalone** devices, check that the required certificate is installed on the device (TLS Context). If not, load it.

9. Re-cable the module to your network. If the device is part of an HA system, it synchronizes with the active device (and obtains all the configuration files etc. from it).

10. Verify that the device is operating correctly (e.g., alarms are cleared and call traffic is being routed) and that it is successfully communicating with third-party equipment (e.g., monitoring system, billing system, or routing system), if relevant.

11. If the device is monitored by OVOC, access the OVOC web-based management interface, remove the device from the OVOC topology, and then re-add it.

Installing the MPM Modules

This section 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.
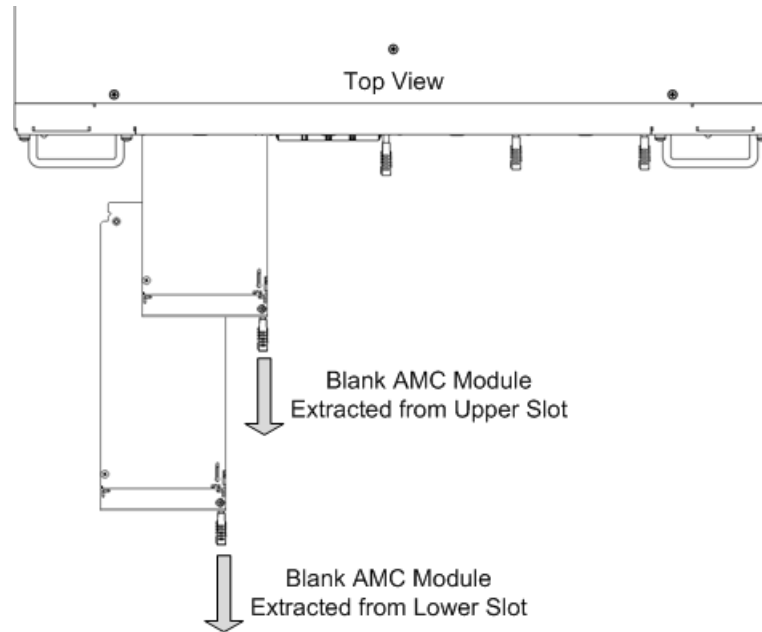
> Power off the device before installing the MPM.
> Avertissement: Mettez l'appareil hors tension avant d'installer le MPM.

> This section 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 Module Slot Assignment on page 4.

➤ **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.

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.

⚡ Power off the device before installing the OSN modules.
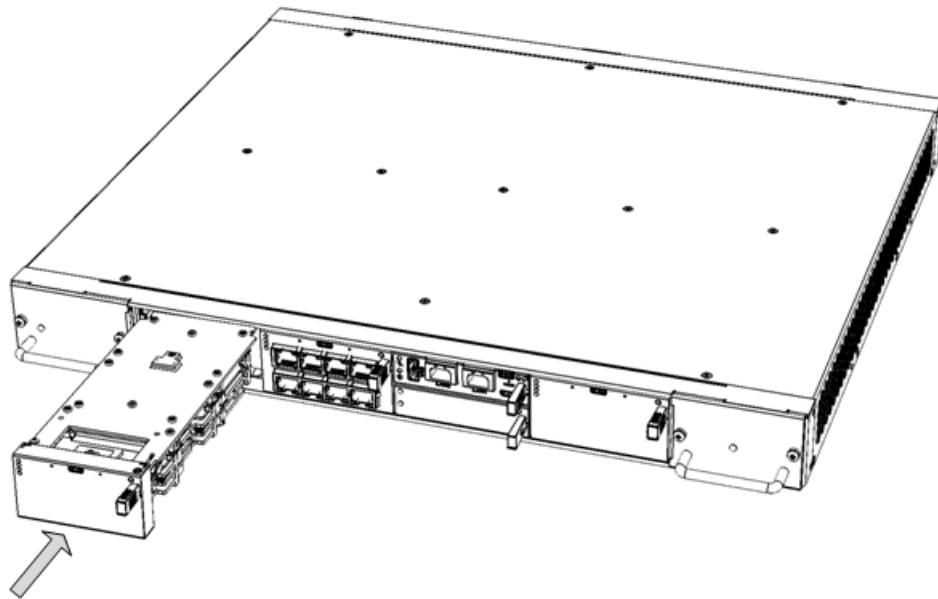Avertissement: Mettez l'appareil hors tension avant d'installer le OSN.

⚠ Before installing the OSN server modules, see Module Slot Assignment on page 4 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. Install the OSN Module:

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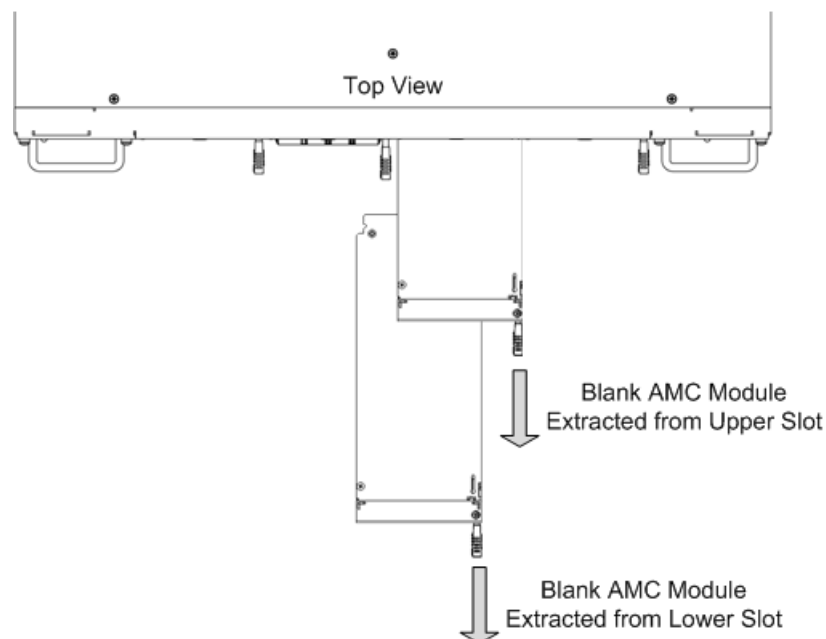
    b. Hold the OSN module in the correct orientation as shown in the following figure, and then gently insert the module into the upper slot, sliding it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

Figure 6-8:   Inserting OSN Module

Upper Slot

    c.   Push the module's handle until it clicks firmly in to engage the module with the slot rails.

3. Install the HDMX Module:

    a.   Hold the HDMX module in the correct orientation as shown in the following figure, 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

Lower Slot

      b. Push the module's handle until it clicks firmly in to engage the module with the slot rails.

4. Power up the device.

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.

> - 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

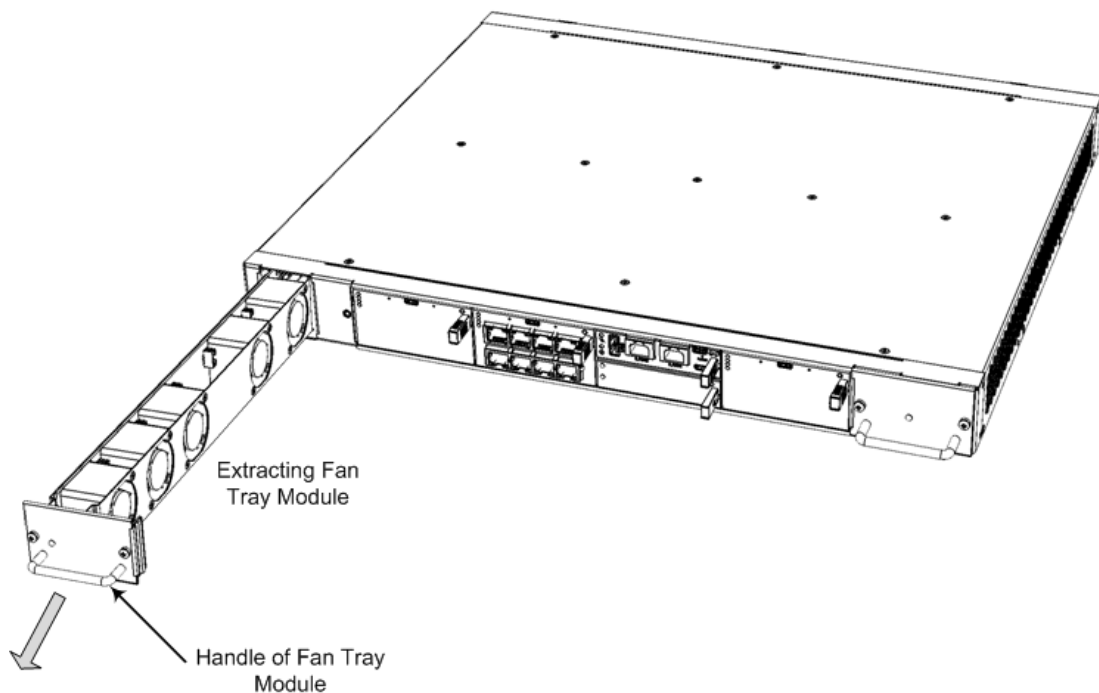Phillips Screws on
Fan Tray Module
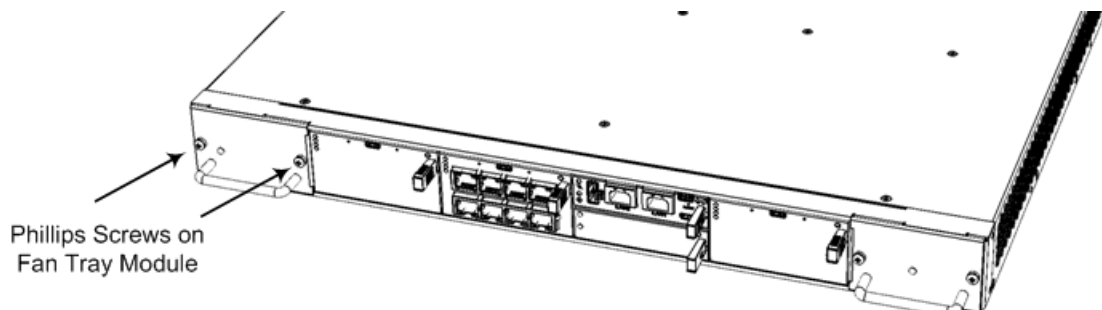
      b. Loosen the two screws using a Phillips screwdriver.

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

Extracting Fan Tray Module

Handle of Fan Tray Module

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.

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. In addition, it describes replacement of the AC Power Supply module, but it also applies to the DC Power Supply module.

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).

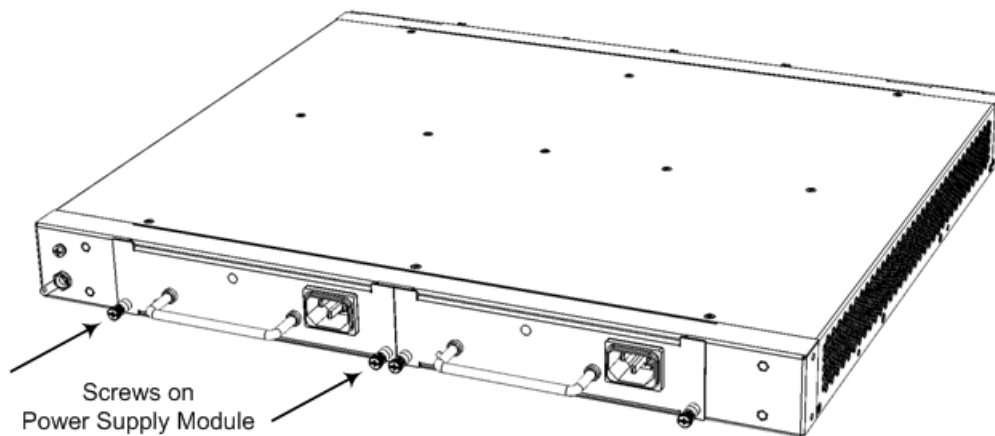> ● Before extracting the Power Supply module, disconnect the power cord from the module.

⚠ ● 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 (e.g. AC Power Supply Module)

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 (e.g., AC Power Supply Module)

Handle of Power
Supply Module
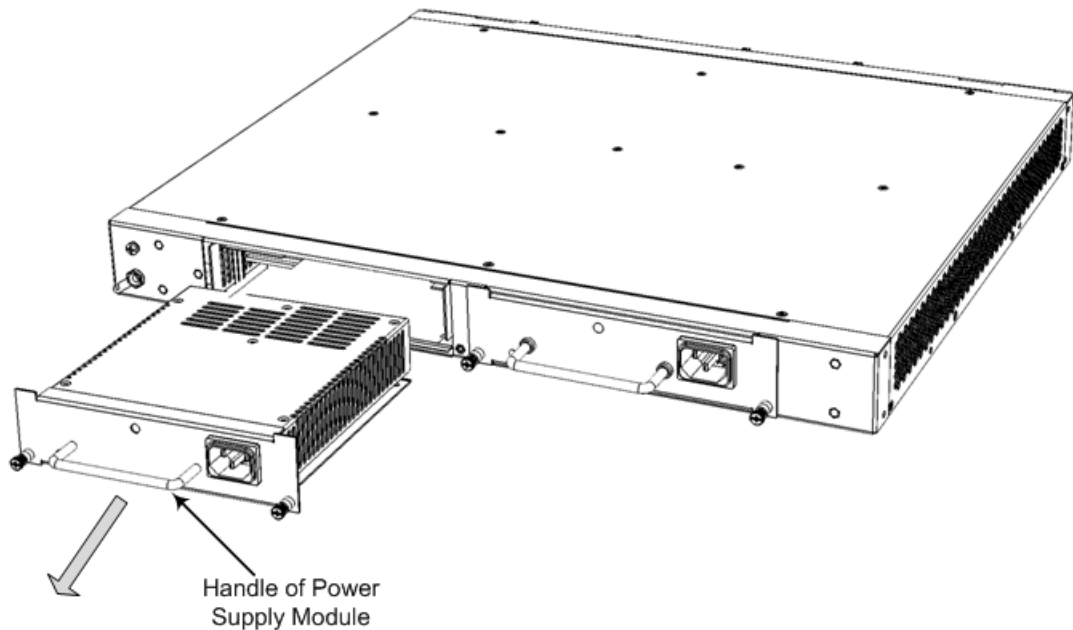
2. Install the module:

   a. Orientate the module as shown in the previous figure (power inlet on the right side).

   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.

Replacing a Faulty Device

If you need to replace a faulty device, for whatever reason, with a new device having the same hardware configuration, follow the below procedure:

➢ **To replace a faulty device:**

1. Make sure that you have a new License Key for the device. If not, ask your AudioCodes sales representative for the License Key.

2. Disconnect the faulty device from your power supply, and then unplug all cables connected to it.

3. Plug all the relevant cables into the new device, and then power it up.

4. From your local computer, access the device's Web interface with the device's default IP address (192.168.0.2/24), through one of the first two Ethernet ports (GE 1 or GE 2) on the top-left row of the CPU moduleone of the first two Ethernet ports GE 1 or GE 2 on the top row (rear panel).

the rear pane

5. Load the software file (.cmp) to the device. If you don't have the file, ask your AudioCodes sales representative for it.

6. Load the License Key file to the device.

7. **Standalone** device: Load your backup (saved) Configuration Package file or individual files (e.g., ini file, certificate files, Dial Plan file, and CPT file), if you have, to the device.

   HA device: Load only the ini file (the other files are transferred to the device from the active device when you connect it to the network - see below).

8. **Standalone** device: Check that the required certificate is installed on the device (TLS Context). If not, load it.

9. Disconnect your computer from the device, and then connect the device's Ethernet port to your network. If the device is part of an HA system, it synchronizes with the active device (and obtains all the configuration files etc. from it).

10. Verify that the device is operating correctly (e.g., alarms are cleared and call traffic is being routed) and that it is successfully communicating with third-party equipment (e.g., monitoring system, billing system, or routing system), if relevant.

11. If the device is monitored by OVOC, access the OVOC web-based management interface, remove the device from the OVOC topology, and then re-add it.

7   Troubleshooting

This chapter helps troubleshoot potential hardware issues with your device.

Table 7-1:   Troubleshooting

Symptom	Probable Causes and Solutions
Reoccurring high temperature alarms (acBoardTemperatureAlarm)	This alarm indicates that the chassis' internal temperature is too high for normal operation. Possible causes and solutions: 1. Check that the air temperature of the room in which the chassis is installed is at a level for normal operation. If not, reduce the room temperature for normal operating levels using, for example, an air conditioner. 2. If the room temperature is at normal operating levels, make sure that all unoccupied module slots are covered with blank panels. This ensures proper air flow (by the Fan Trays) inside the chassis for cooling. 3. Make sure that the perforated grills (ventilation outlets) of the Fan Tray modules on either side of the chassis are not obstructed for proper air flow. Obstruction can be due to an external object (e.g., being too close to a wall) or due to accumulation of dust particles or dirt on the perforated grills. 4. Make sure that the internal components are free of dust particles. Power off the chassis, and then pull out all the modules including the Fan Tray modules and clean them using an air pressure cleaning gun. 5. Check if a Fan Tray alarm (acFanTrayAlarm) also exists, which indicates a fault in a Fan Tray module. If this is the case, you need to replace the Fan Tray (as described in Replacing the Fan Tray Modules on page 44). You can also check the status of the Fan Tray modules using the **STATUS** LEDs on the Fan Tray modules (as described in Fan Tray Module on page 16).

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