

Mediant™ 4000 SBC

Session Border Controller

High-Availability System

# Hardware Installation Manual



Version 6.8

November 2014

Document # LTRT-41509



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## Notice

This Installation Manual describes the hardware installation of AudioCodes **Mediant 4000 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 4000 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:** Installation and service of this device must be made only by qualified service personnel in restricted access locations and connected to an earthed power socket.

**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.



### 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 élektrocution

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.



**Warning:** Modules may contain a non-rechargeable lithium battery. If you need to replace the battery, replace it only with batteries of the same type and manufacturer.

**Avertissement:** Les modules peuvent contenir une batterie lithium non-rechargeable. Si vous devez remplacer la batterie, remplacez-la uniquement par des batteries du même type et du même fabricant.

## Documentation Feedback

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# 1 Introduction

This document provides a hardware description of the Mediant 4000 (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 bumpers 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

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

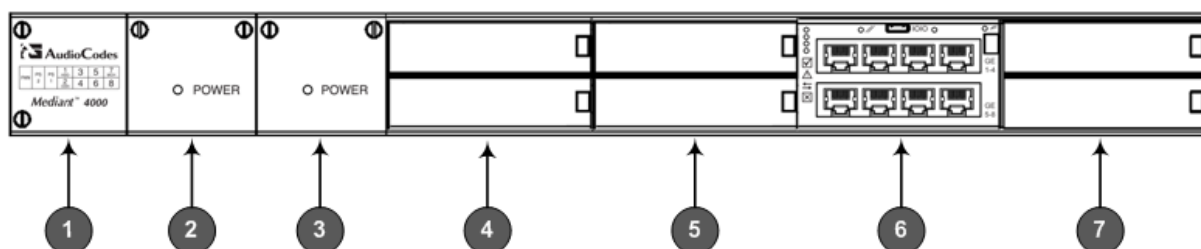
**Table 3-1: Physical Dimensions**

Item	Description
<b>Enclosure</b>	4/8-slot, 1U chassis
<b>Dimensions (H x W x D)</b>	1U x 19" (444 mm) x 14" (355 mm)
<b>Weight</b>	Approx. 11.7 lbs. (5.3 kg)
<b>Environmental</b>	<ul style="list-style-type: none"> <li>Operational: 0 to 40°C (32 to 104°F)</li> <li>Storage: -20 to 70°C (-4 to 158°F)</li> <li>Relative Humidity: 10 to 85% non-condensing</li> </ul>

### 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 4000 hardware configuration; module slot locations and type of modules (e.g., Media Processing Module) depend on the ordered hardware configuration.

**Table 3-2: Front-Panel Description**

Item #	Component Description														
1	<p>Fan Tray module with a schematic displayed on its front panel showing the chassis' slot numbers. For more information on this module, see Section 3.2.1 on page 14.</p> <p>The figure below shows the location of the Fan Tray module, Power Supply modules, and chassis slot numbers:</p> <table><tr><td>FAN</td><td>PS 2</td><td>PS 1</td><td>1</td><td>3</td><td>5</td><td>7</td></tr><tr><td></td><td></td><td></td><td>2</td><td>4</td><td>6</td><td>8</td></tr></table>	FAN	PS 2	PS 1	1	3	5	7				2	4	6	8
FAN	PS 2	PS 1	1	3	5	7									
			2	4	6	8									
2	Power Supply module No. 2. For more information, see Section 3.2.2 on page 14.														
3	Power Supply module No. 1. For more information, see Section 3.2.2 on page 14.														
4	<p>Slots 1-2, shown covered with blank AMC modules for unused AMC slots. These slots house the optional, Media Processing Module (MPM).</p> <p><b>Note:</b> The MPM is a customer-ordered item.</p>														
5	<p>Slots 3-4, covered with blank AMC modules for unused AMC slots.</p> <p><b>Notes:</b></p> <ul style="list-style-type: none"><li>▪ If you purchased this device in an initial release, Slots 3-4 may be occupied by the SBC CPU AMC module (instead of Slots 5-6).</li><li>▪ If this slot is occupied by the SBC CPU AMC module and you have subsequently purchased the MPM, you must re-locate the SBC module to Slots 5-6 instead.</li></ul>														
6	<p>Slot 5-6 with SBC CPU AMC module (hereafter referred to as <i>SBC</i>), providing CPU, serial interface, and Ethernet interface functionalities. For more information, see Section 3.2.3 on page 15.</p> <p><b>Note:</b> If you purchased this device in an initial release, the SBC module may be occupied in Slots 3-4 (instead of Slots 5-6).</p>														
7	<p>Slots 7-8, covered with blank covers for unused AMC slots.</p> <p><b>Note:</b> These slots are currently reserved for future use.</p>														

### 3.2.1 Fan Tray Module

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

The front panel of the module provides a label showing the chassis slot assignments for the different modules.

### 3.2.2 Power Supply Modules

The chassis houses up to 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 provides an AC power inlet on the rear panel of the chassis for connection to an electrical power outlet.

### 3.2.2.1 Power LED Description

Each Power Supply module provides a **POWER** LED on its front panel which indicates the status of the power supply, as described in the table below.

**Table 3-3: Power Supply Module LED Description**

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.

### 3.2.3 SBC Module

The SBC 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. The SBC module is installed in Slots 5-6 (see note below).



**Note:** If you purchased your Mediant 4000 in an initial release, your device may have been shipped with this module housed in Slots 3-4. If this is the case and you have subsequently purchased the Media Processing module (MPM), you must re-locate the SBC module to Slots 5-6.

#### 3.2.3.1 Ports Description

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

**Figure 3-2: SBC Module Ports**

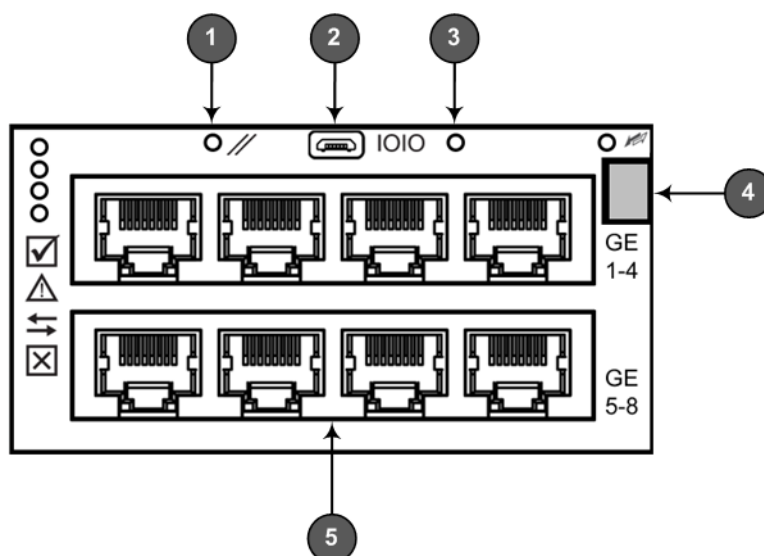



Table 3-4: SBC Module Ports Description

Item #	Label	Description
1		Reset pinhole button: <ul style="list-style-type: none"> <li>To reset the device, press the button for at least 1 second but no longer than 10 seconds.</li> <li>To reset the device to factory defaults, press the button for at least 12 seconds but no longer than 25 seconds.</li> </ul>
2	IOIO	RS-232 port for serial communication with a computer.
3	-	Pinhole button (reserved for future use).
4	-	Handle of AMC module for installing and removing the module.
5	-	LAN sub-module, providing 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. These ports support half- and full-duplex modes, auto-negotiation, straight-through and crossover cable detection.

### 3.2.3.2 LEDs Description

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

Figure 3-3: SBC Module LEDs

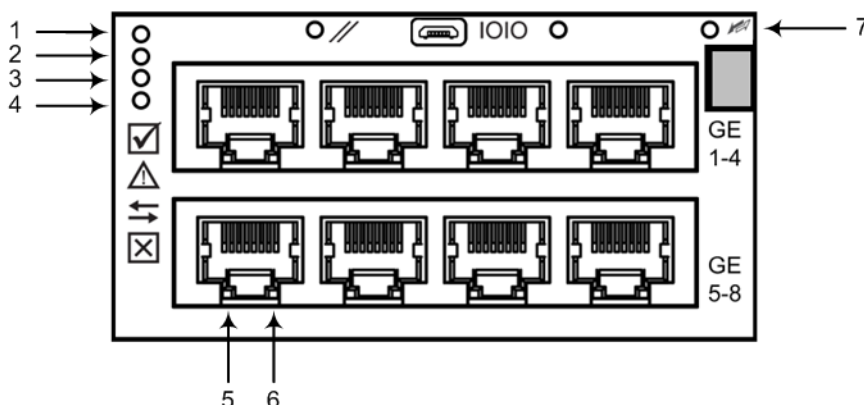







Table 3-5: SBC Module LEDs Description

Item #	LED	Color	State	Description
1		Green	On	Module in service
		-	Off	Module out of service
2		-	Off	During booting up state
		Red	On	Bootting 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 LED on Ethernet Ports	Green	On	Ethernet link established.
			Flashing	Data is being received or transmitted (activity) on the Ethernet port.
		-	Off	No Ethernet link.
6	Right LED on Ethernet Ports	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. <b>Note:</b> Do not remove the module before this LED turns blue.
		-	Off	The module insertion process is complete.

### 3.2.4 Media Processing Module

The Media Processing module (MPM) is an optional, customer-ordered module that provides additional digital signaling resources (DSP) required for transcoding call sessions. The addition of this module increases the maximum number of sessions that can undergo transcoding.

The MPM is an AMC-based module that is installed in Slots 1 and 2.



#### Notes:

- If you are installing the MPM, the device must be powered off during installation. For more information, see Section 6.3 on page 39.
- 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 3-4: MPM LEDs

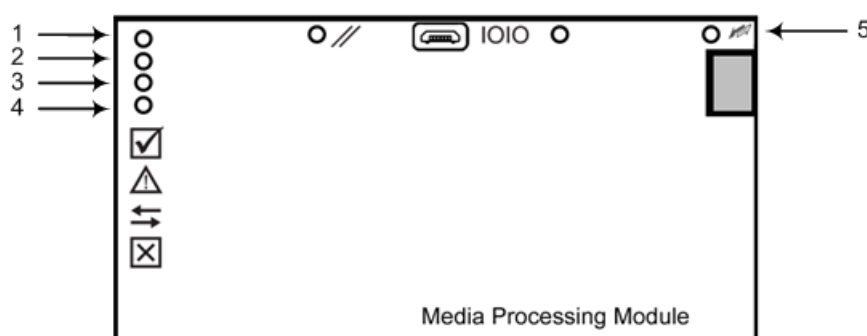







Table 3-6: MPM LEDs Description

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 module can be fully removed or inserted. <b>Note:</b> Do not remove the module before this LED turns blue.
		-	Off	The module insertion process is complete.

### 3.3 Rear Panel Description

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

Figure 3-5: Rear Panel

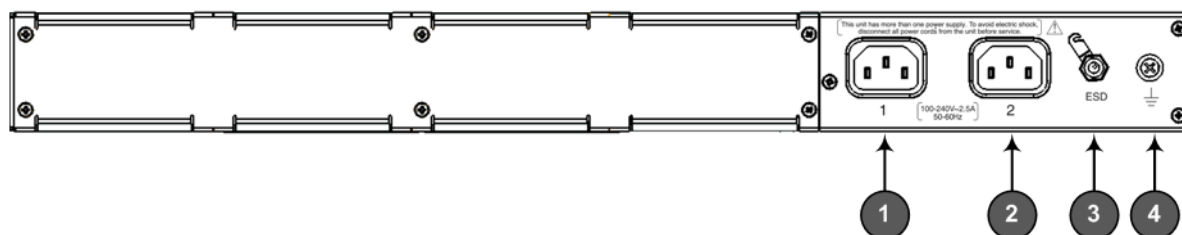



Table 3-7: Rear-Panel Description

Item #	Label	Description
1	1	AC power supply inlet (100-240V~2.5A, 50-60 Hz) for Power Supply module No. 1.
2	2	AC power supply inlet (100-240V~2.5A, 50-60 Hz) for Power Supply module No. 2.
3	ESD	Electrostatic Discharge (ESD) socket.
4		Protective earthing screw.

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## 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 21
- Installed in a standard, 19-inch rack - see Section 'Rack Mounting' on page 22



**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.

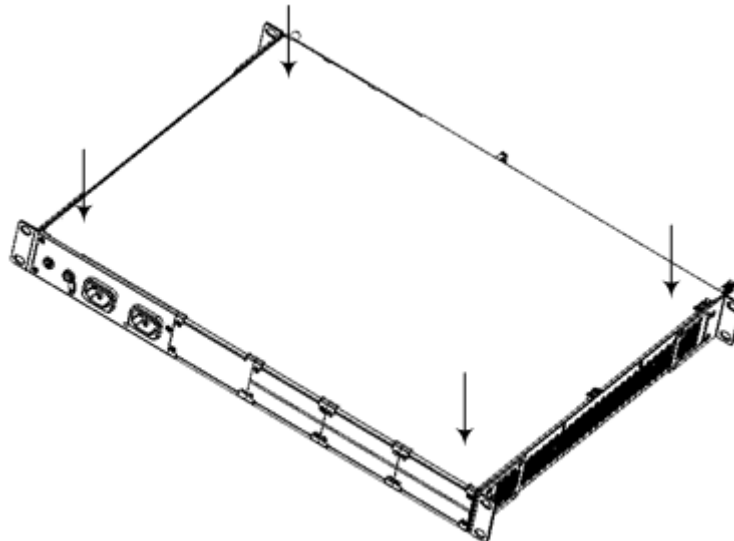
### 4.1 Desktop Mounting

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

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

1. Flip the device over so that its underside faces up.
2. Locate the four anti-slide grooves on the underside -- one on each 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 23
- Mounting the chassis by attaching it directly to the 19-inch rack frame (posts) using both the pre-installed front-mounting brackets and the rear-mounting brackets – see Section 4.2.2 on page 23



### 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.
- **Reliable Earthing:** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips.)

### 4.2.1 Mounting in a 19-inch Rack using a Pre-Installed 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. Make sure that your rack shelf is secured to the rack posts and in a horizontal level position in the rack.
2. Place the device on the pre-installed shelf in the rack.
3. Position the chassis so that the 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.
4. Secure the front-mounting brackets to the rack posts using standard 19-inch rack bolts (not supplied). This step is crucial in that it prevents the chassis from accidentally sliding off the shelf.

### 4.2.2 Mounting in a 19-inch Rack using Front 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.



**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).

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

- Adjustable rear-mounting bracket from 59.3 to 62.7 cm (23.3 to 25 in.). The length of the rear-mounting brackets can be adjusted from 59.3 to 62.7 mm, to suit the distance between the chassis and the rear post. The customer part number (CPN) of this kit is **FRU/M4K83/REARRMK60**

Rear-Mounting Bracket x 2



Rear-Mounting Flange x 2

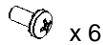
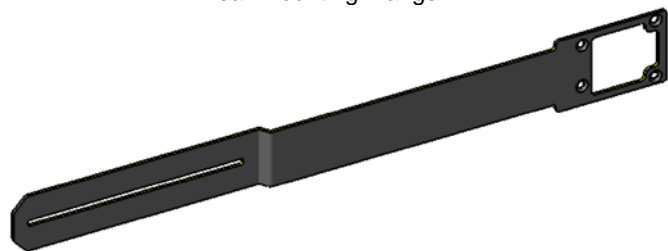


- Rear-mounting bracket of length 80 cm (31.5 in.) The CPN of this kit is **FRU/M4K85/REARRMK80**.

Rear-Mounting Bracket x 2



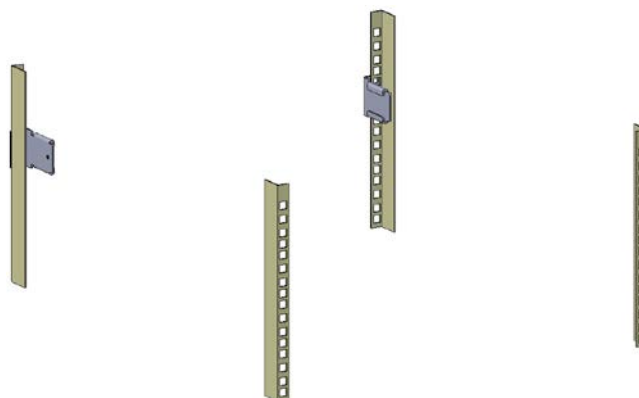
Rear-Mounting Flange x 2



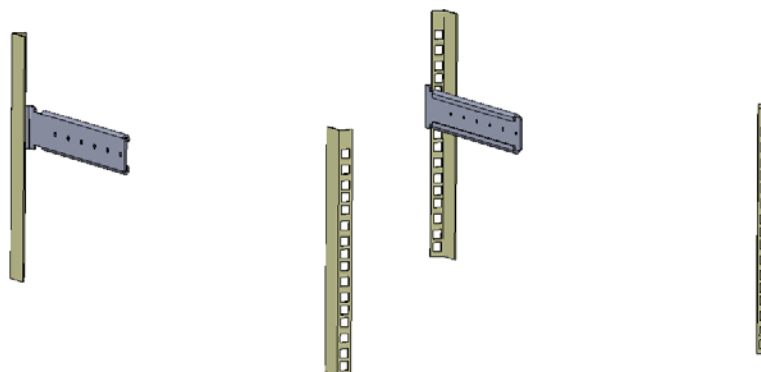
➤ **To mount the device in a 19-inch rack using front- and rear-mounting brackets:**

1. Open the Rear Mounting Bracket kit and remove its contents. Make sure that all the items are included in the kit (see above).
2. Attach the two rear-mounting brackets to the two-rear rack posts, using two screws (not supplied) per bracket. Make sure that you attach the brackets at the same height level in the rack. See the figure below for correct orientation of the brackets when attaching them to the posts.

**Figure 4-2: Rear-Mounting Brackets Attached to Rear-Rack Posts (60 cm)**



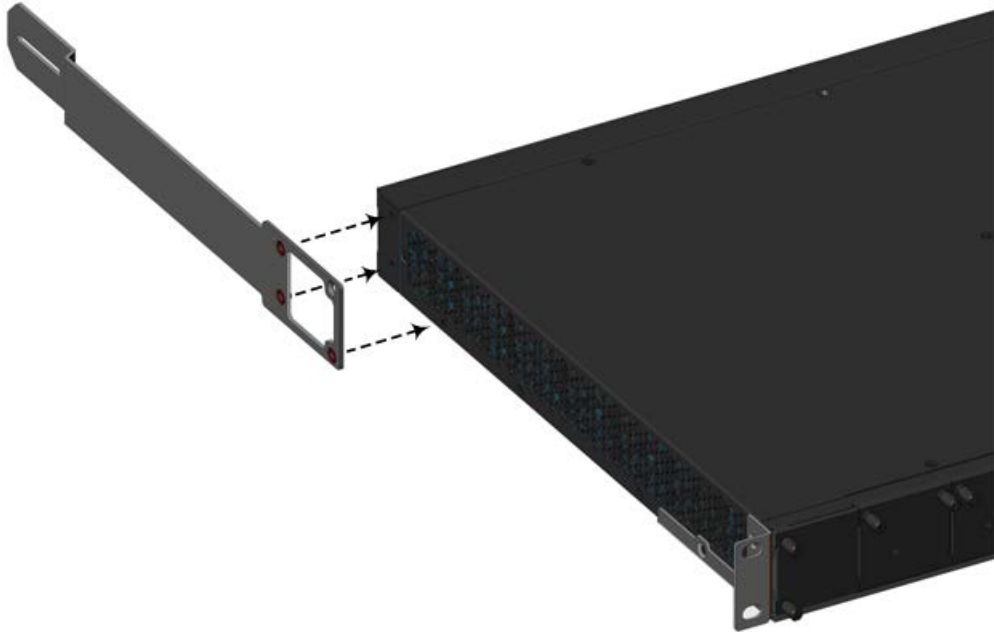
**Figure 4-3: Rear-Mounting Brackets Attached to Rear-Rack Posts (80 cm)**



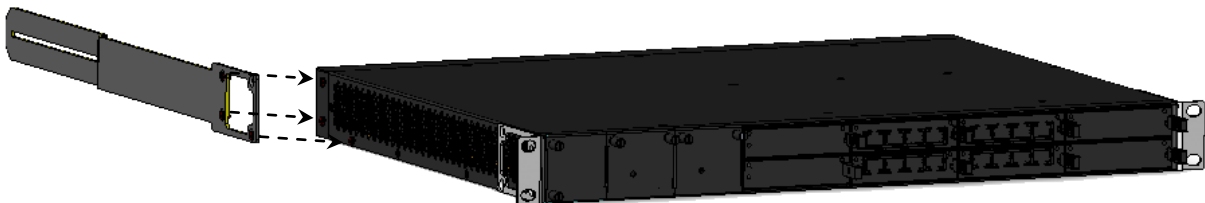


3. Attach the rear-mounting flanges to the rear sides of the chassis, using three screws (supplied) per flange.

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



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



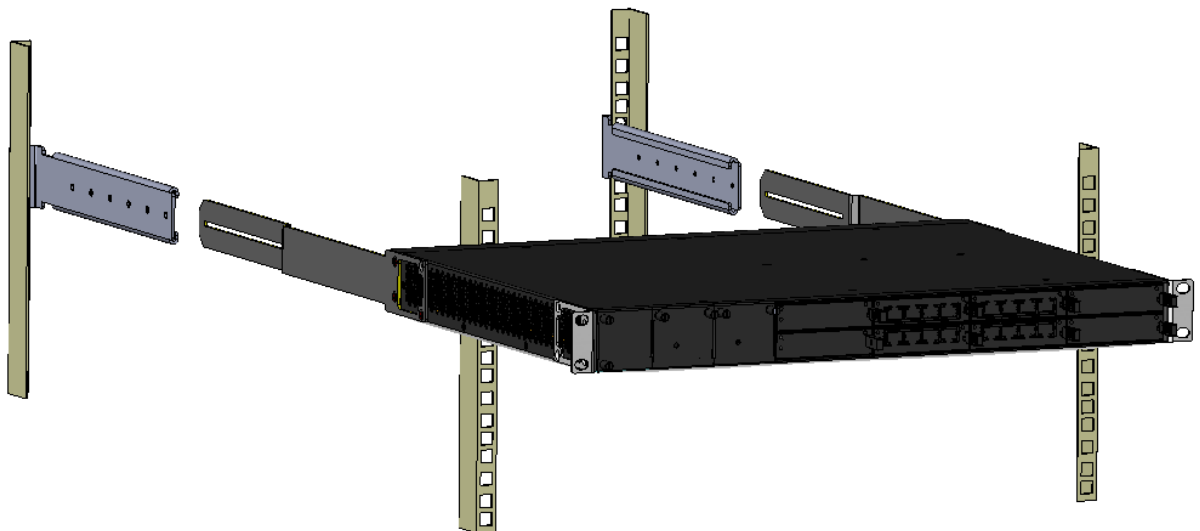
4. With two people, lift the chassis into the rack from the front of the rack.

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

**Figure 4-6: Sliding the Rear-Mounting Flanges into the Rear-Mounting Brackets (60 cm)**

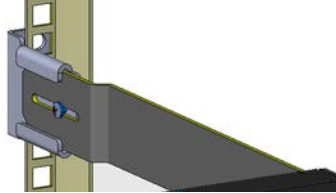


**Figure 4-7: Sliding the Rear-Mounting Flanges into the Rear-Mounting Brackets (80 cm)**

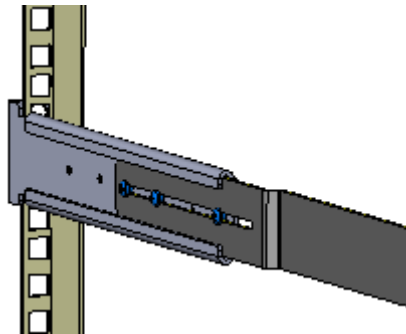


6. Hold the chassis in position while the second person secures the rear-mounting flanges to the rear-mounting brackets. Insert the supplied screws (6-32 x 5/16 inch) from the inside of the rack, through the flange's grid and into the screw hole on the rear-mounting bracket. Finger-tighten the screws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

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



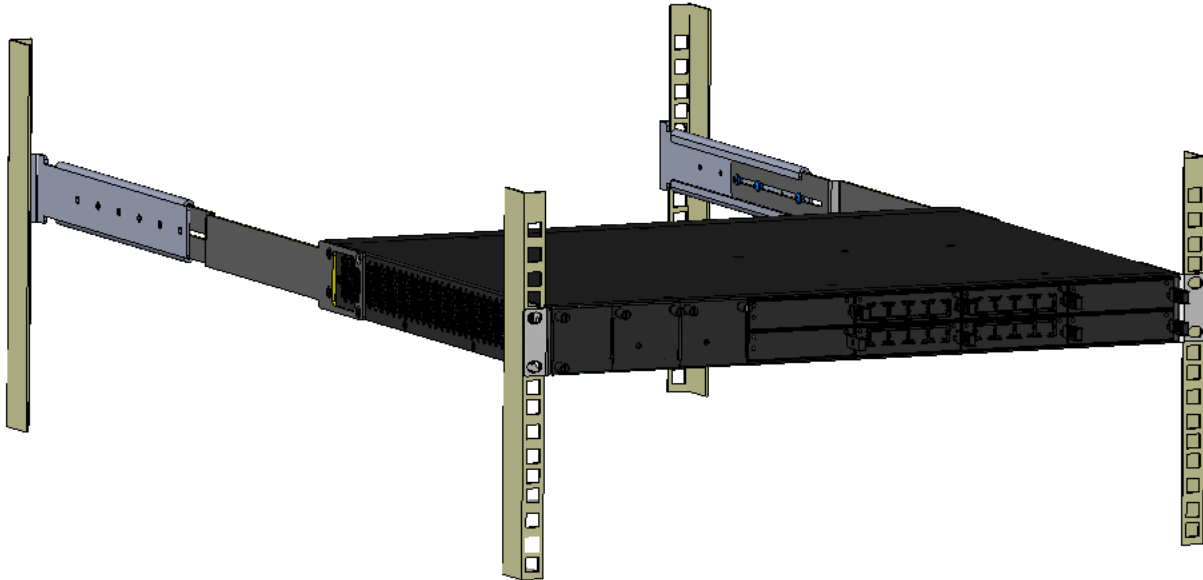
**Figure 4-9: Fastening Rear-Mounting Flange to Rear-Mounting Bracket (80 cm)**



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

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



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

8. Hold the chassis in position while the second person secures the two front-mounting brackets to the front posts, by finger-tightening 19-inch rack bolts (not supplied) to the rack posts.
9. Tighten the bolts on the front-mounting brackets.
10. With a Philips screwdriver, tighten the screws securing the rear-mounting flanges to the rear-mounting brackets.

**Notes:**

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

## 5 Cabling the Device

This section describes how to cable the device:

- Grounding the device – see Section 5.1 on page 29
- Connecting to the LAN – see Section 5.2 on page 30
- Connecting to a computer for serial communication – see Section 5.3 on page 33
- Connecting to power – see Section 5.4 on page 34

### 5.1 Grounding the Device

The procedure below describes how to ground the device.



#### Protective Earthing

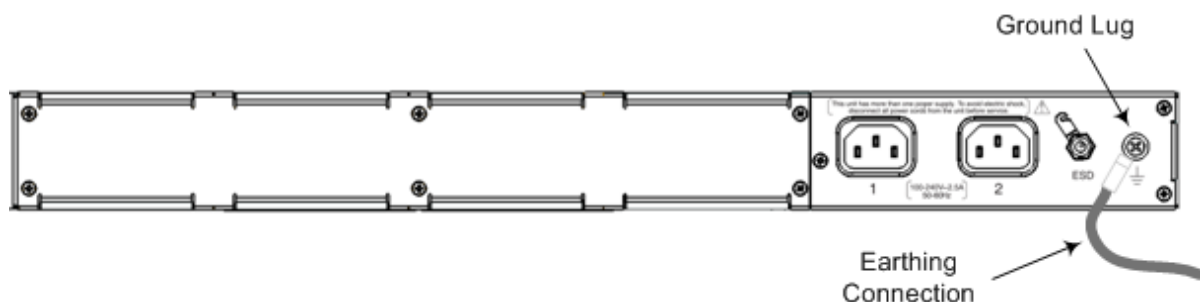
The equipment is classified as Class I according to EN-60950-1 and UL 60950-1 and must be earthed at all times (using an equipment-earthing conductor).

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

#### ➤ To ground the device:

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

Figure 5-1: Grounding the Device



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

## 5.2 Connecting the Ethernet Ports

This section describes the cabling of the LAN interfaces.

### 5.2.1 RJ-45 LAN Connector Pinouts

The RJ-45 connectors with the following pinouts are used for the LAN interfaces:

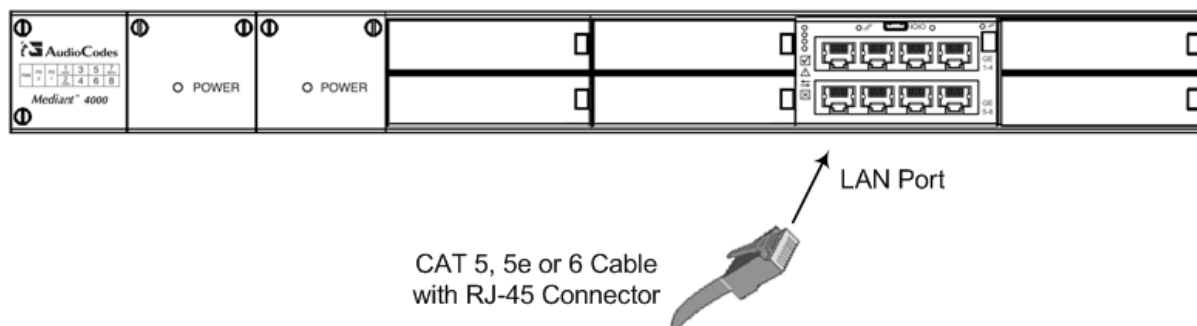
**Table 5-1: RJ-45 Connector Pinouts**

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 one end of a straight-through RJ-45 Ethernet Cat 5, 5e, or 6 cable to the Ethernet ports on the LAN module.

**Figure 5-2: Connecting the LAN Interface**

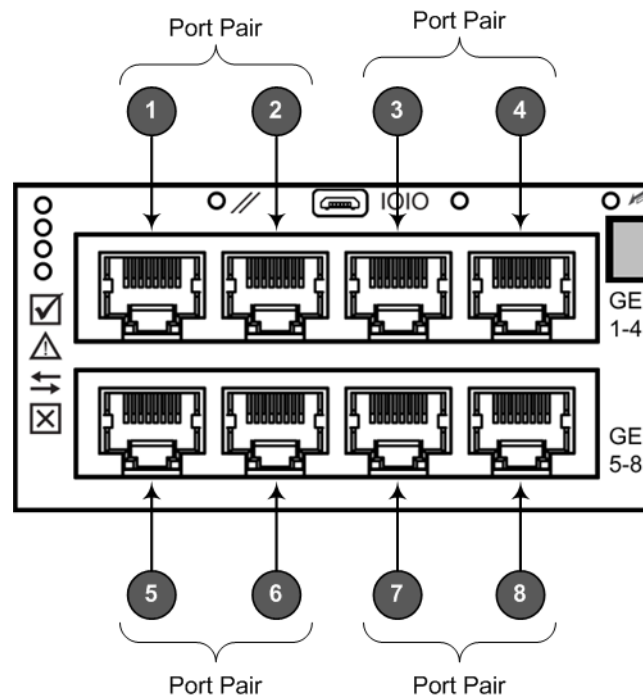


2. Connect the other end of the cable to the LAN network.

## 5.2.2 Deployment of a Standalone Device

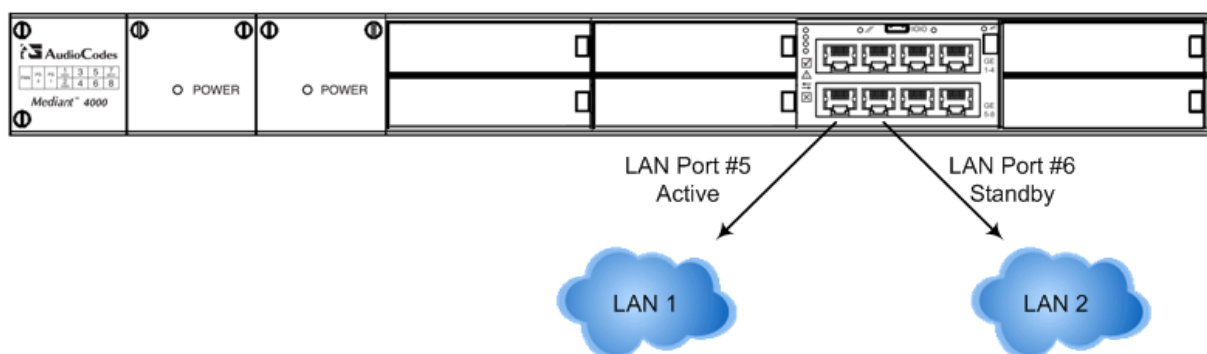
The Ethernet ports on the SBC module operate in pairs to provide Ethernet port 1+1 redundancy. In each pair, one port serves as the active Ethernet port while the other as standby. When the active port fails, the device switches to the standby Ethernet port. The port pairs are shown in the figure below:

**Figure 5-3: Ethernet Port Pairs**



It is important that the two ports making up a pair are connected to different switches (but in the same subnet). The figure below illustrates an example of implementing Ethernet-port redundancy:

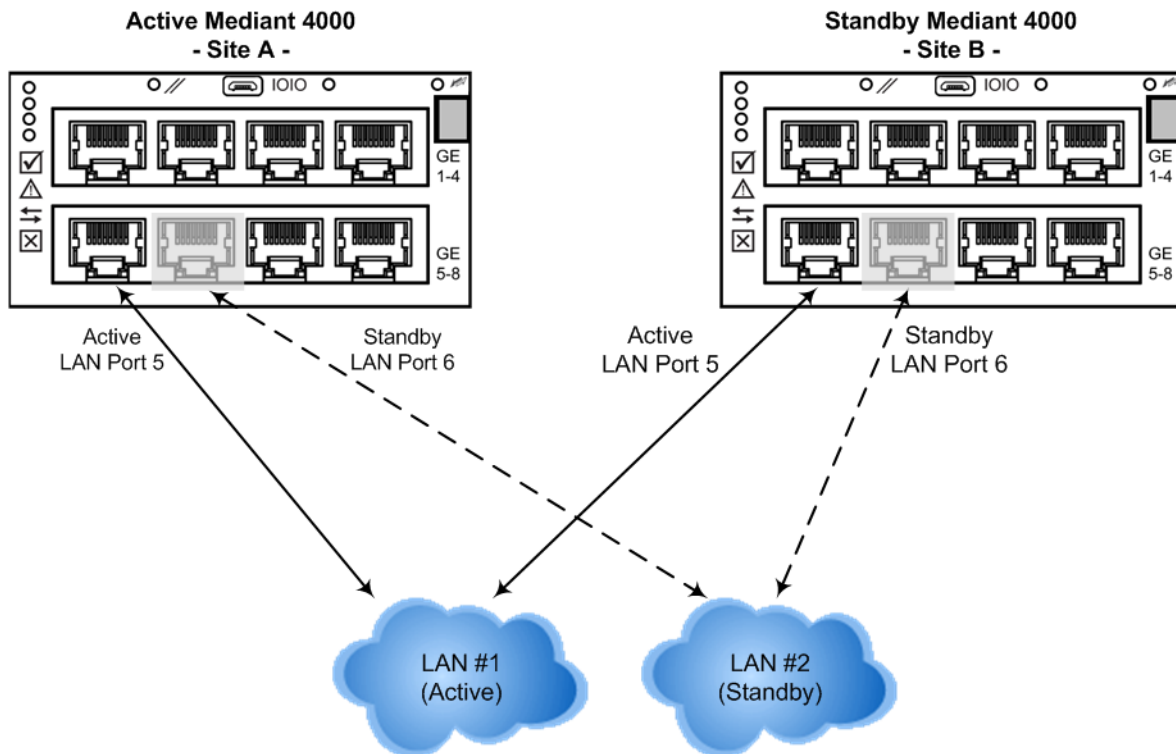
**Figure 5-4: Cabling for 1+1 Ethernet-Port Redundancy (Example)**



### 5.2.3 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 5-5: Cabling for High Availability (Example)**



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



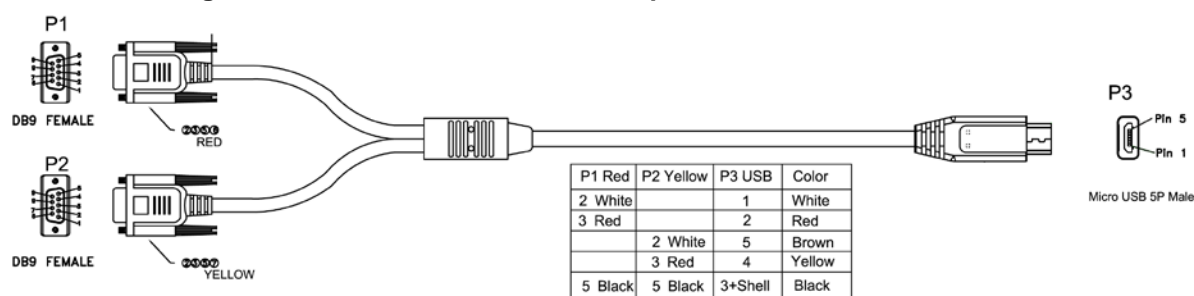
**Note:** For possible connections (including Tx / Rx settings) between the HA devices, refer to the User's Manual.



## 5.3 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 cable adapter shown below is provided for this purpose:

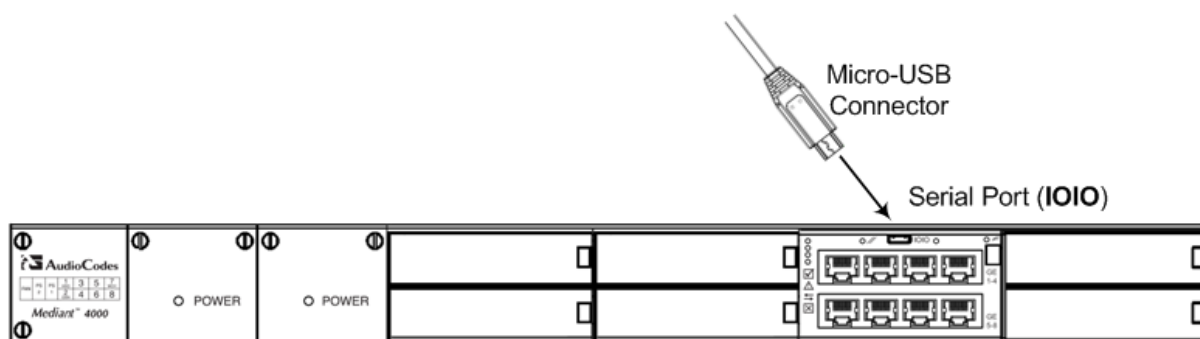
**Figure 5-6: Serial Interface Cable Adapter and Connector Pinouts**



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

1. Connect the Micro-USB connector (labeled "P3" in the figure above) to the serial port (labeled **IOIO**) located on the SBC module.

**Figure 5-7: Connecting the Serial Interface**



2. On the other end of the cable, connect the DB-9 connector labeled "P1" (red) 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.

## 5.4 Connecting to Power

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

**Table 5-2: Power Specifications**

Item	Description
<b>Power Supply</b>	Up to two hot swappable, power supply modules for power load sharing and AC power redundancy in case of failure of one of the modules.
<b>Input Ratings</b>	Single universal power supply 100-240 VAC, 50-60 Hz, 2.5A max.
<b>Output Ratings</b>	12 VDC / 10 A max.
<b>Connection to Electrical Outlet</b>	AC power supply inlet.



### Warnings:

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

### Avertissements:

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



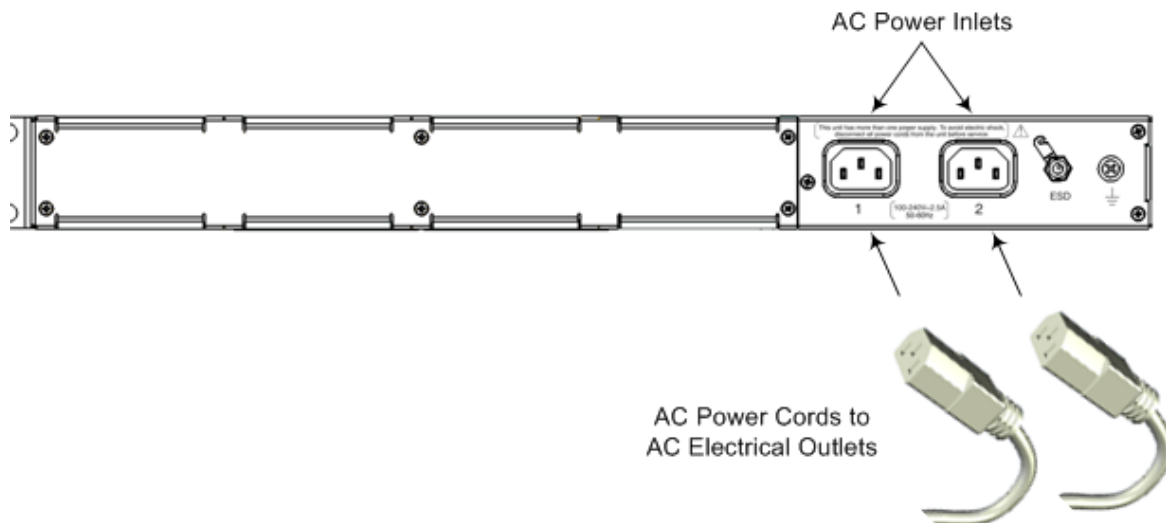
### Notes:

- You can connect both Power Supply modules (1 and 2), for 1+1 power load-sharing and redundancy. Each module provides an AC power socket on the device's rear panel. If both power modules are used, ensure that you connect each one to a different AC supply socket.
- The two AC power sources must have the same ground potential.

➤ **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 5-8: Connecting to Power**



2. Connect the other end of the power cord to a standard AC electrical outlet (100-240V~50-60 Hz).
3. For load sharing and power redundancy, repeat steps 1 through 2, but using the power socket of 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. This indicates 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 in restricted access locations and connected to an earthed power socket.

**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.



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

### 6.1 Prerequisites

Before performing any maintenance procedures, read this section.

#### 6.1.1 Grounding the Device

Before performing any maintenance procedures, ensure that your device is properly grounded, as described in Section 5.1 on page 29.

#### 6.1.2 Preventing Electrostatic Discharge Damage

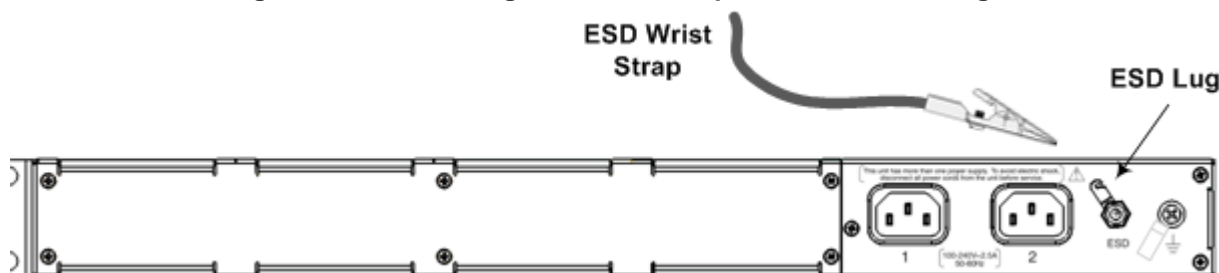
Electrostatic discharge (ESD) due to improper handling of the device's modules and components can cause irreversible damage to the equipment. Adhere to the following guidelines for preventing ESD:

- 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.
- Ensure 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 Module

The AMC-based SBC module is hot-swappable and can be replaced without powering down the device and disrupting other non-related services running on the device.



**Warning:** Do not remove an AMC module before its hot-swap LED turns solid blue. Removing it prematurely may cause damage to the device.

**Avertissement :** Ne retirez pas le module AMC avant que sa DEL remplacée à chaud ne passe au bleu stable. Son retrait prématuré risque d'endommager l'appareil.


➤ **To replace the SBC module:**

**1. Remove the module:**

- a. Gently pull the module handle until you hear a click sound. The module is now partially extracted and undergoes a shutdown sequence.

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



- b. Wait till the **Hot Swap Blue**  LED is lit, which indicates that the shutdown sequence has completed.
- c. Grip and pull the module handle firmly to slide the module out of the slot.

## 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 and slide it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.
- c. Using **only** the module handle, press the module into the chassis to engage it with the chassis backplane.

**Figure 6-3: Module Handle Pushed In (Top View)**



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

## 6.3 Installing the MPM

The procedure below describes how to install the MPM into the chassis.



**Warning:** Power down the device before installing the MPM.

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

### ➤ To install the MPM:

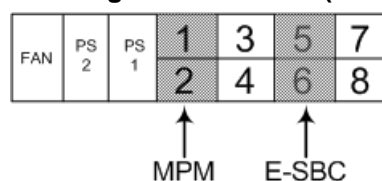
1. Remove the new MPM from its ESD shielding packet in which it was shipped.
2. **Power down** the device (i.e., disconnect the power cables).
3. Remove the blank AMC modules from Slot 1 and Slot 2, by gently pulling on the module's handle.

**Figure 6-4: Extracted Blank AMC Module (Top View)**



4. Carefully insert the MPM into Slot 1-2 and slide it along the slot's guide rails until it makes contact with the card-edge connector located on the backplane.

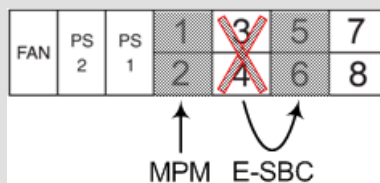
**Figure 6-5: Slot Assignment for MPM (and SBC Module)**



5. Push the module handle of the MPM until it clicks firmly in to engage the MPM with the chassis backplane.



**Note:** If you purchased this device in an initial release where the SBC module is housed in Slots 3-4, you **must** relocate this module to Slots 5-6 instead, as shown below:



Follow the instructions in Section 6.2 for replacing this module.

6. Power up the device.



## 6.4 Replacing the Fan Tray and Power Supply Modules

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



### Warnings:

- **Do not** operate the device without the Fan Tray module! Before replacing the Fan Tray module, ensure that you have the replacement Fan Tray module on hand.
- Before removing the Fan Tray module and after the device has been powered off, the blades may still be rotating at high speeds. Therefore, wait a few seconds to allow the blades to stop, prior to extracting the module from the chassis.
- Before extracting a Power Supply module from the chassis (after you have disconnected the power cord), wait at least three seconds for the capacitors to discharge.

### 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.
- 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 Fan Tray or Power Supply modules:

#### 1. Remove the module:

- a. Using a flathead screwdriver, on the front panel of the module, loosen the two screws securing the module to the chassis.
- b. Grip the two screws and gently slide the module out of the chassis slot.

#### 2. Install the module:

- a. Align the module with the guiding rails located inside the slot.
- b. Gently push the module into the slot until it has engaged with the chassis backplane.
- c. Using a flathead screwdriver, tighten the two module's mounting pins. Fasten the two screws on the top right-hand corner and the bottom right-hand corner of the front panel of the Fan Tray module.



# Hardware Installation Manual



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