

Mediant™ 500L MSBR

Version 7.2



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Notice

Information contained in this document is believed to be accurate and reliable at the time of printing. However, due to ongoing product improvements and revisions, AudioCodes cannot guarantee accuracy of printed material after the Date Published nor can it accept responsibility for errors or omissions. Updates to this document can be downloaded from <https://www.audiocodes.com/library/technical-documents>.

This document is subject to change without notice.

Date Published: January-03-2023

WEEE EU Directive

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

Customer Support

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

Stay in the Loop with AudioCodes



Abbreviations and Terminology

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

Throughout this manual, unless otherwise specified, the term *device* refers to Mediant 500L MSBR.

Related Documentation

Document Name
SIP Release Notes
Mediant 500L MSBR User's Manual
CLI Reference Guide

General Notes and Warnings, and Safety Information



Warning: The device is an **INDOOR** unit and therefore, must be installed **only** indoors.



Caution Electrical Shock

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



Warning: The device must be installed and serviced only by qualified service personnel.



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



Prior to installing and operating the device, please read the [Regulatory Information](#).



Open-source software may have been added and/or amended. For further information, contact your AudioCodes sales representative.

Document Revision Record

LTRT	Description
10443	A/VDSL LEDs updated.
10444	DSL connector pinouts updated
10445	AC power cable warning (Japanese); STATUS LED update.
10446	Wall mounting and 19-inch rack mounting.
10447	FE changed to GE.
10448	Typo re 19-inch rack mount shelf.
10449	Logo updated; PSTN Fallback/Analog Lifeline updated.
10450	Max. BRI ports increased; SFP module for WAN copper; LTE 4G Cellular WAN
10451	4G LTE; typos with AC and DC; AC/DC power adapter warnings
10452	No USB with LTE support.
10453	Package items updated (serial cable removed).
10454	Wi-Fi removed; 3G removed; illustrations updated

Documentation Feedback

AudioCodes continually strives to produce high quality documentation. If you have any comments (suggestions or errors) regarding this document, please fill out the Documentation Feedback form on our website at <https://online.audiocodes.com/documentation-feedback>.

1 Introduction

This document provides a hardware description of the Mediant 500 MSBR (hereafter referred to as *device*) and step-by-step procedures for mounting and cabling the device.

The device supports the following interfaces:

- Multiple WAN, depending on ordered configuration:
 - Single Gigabit Ethernet copper (10/100/1000Base-T) unshielded twisted pair (UTP) interface port
 - Dual-mode of 1.25 Gbps Optical Fiber Small Form-Factor Pluggable (SFP)
 - ADSL2+ / VDSL2
 - 4G Cellular WAN access, using an integrated LTE modem
- Four Gigabit Ethernet (1000Base-T) LAN ports (RJ-45).
- One USB port for optional USB storage services.
- Optional telephony interfaces:
 - Up to eight FXS port interfaces
 - Up to four FXO port interfaces
 - Up to four ISDN BRI port interfaces, supporting up to eight voice channels as well as PSTN fallback
- Serial console port (RJ-45) for device management



- Hardware configurations may change without notice. Currently available hardware configurations are listed in AudioCodes Price Book. For further enquiries, please contact your AudioCodes sales representative.
- The SFP module can be used for WAN fiber-optic interface or WAN copper interface.
- The USB port is not provided when the device is ordered with LTE cellular support.
- For information on 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 was shipped.

To unpack the device:

1. Open the carton and carefully remove 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:
 - Four anti-slide bumpers for desktop installation
 - Two cellular antennas (depending on ordered model)
 - AC/DC power adapter
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.

3.1 Physical Dimensions and Operating Environment

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

Table 1: Physical Dimensions and Operating Environment

Specification	Value
Dimensions (H x W x D)	51 x 296 x 165 mm (2 x 11.65 x 6.5 in.)
Weight	670 g (1.5 lbs.)
Operating Environment	<ul style="list-style-type: none">■ Operational: 5 to 40°C (41 to 104°F)■ Storage: -25 to 85°C (-13 to 185°F)■ Relative Humidity: 10 to 90% non-condensing

3.2 Front Panel Description

The front panel provides LEDs for indicating the status of various functionalities. The LEDs are shown in the figure below and described in the subsequent tables.

Figure 1: Front Panel



The figure above is used only as an example. The available LEDs depend on the ordered hardware configuration.

Table 2: Front Panel Description

Item #	LED Label	Description
1	Power	Indicates the status of the power supply to the device. For more information, see Section 3.2.1 on page 11.
2	Status	Indicates the operating status of the device. For more information, see Section 3.2.1.2 on page 11.
3	WAN 4G	Indicates the status of the LTE cellular WAN connection. For more information, see Section 3.2.1.3.1 on page 12. Note: The LED is available only on models ordered with LTE WAN functionality.
4	WAN GE	Indicates the status of the Gigabit Ethernet WAN connection. For more information, see Section 3.2.1.3.2 on page 12.
5	WAN SFP	Indicates the status of the optical fiber WAN connection. For more information, see Section 3.2.1.3.3 on page 12.
6	WAN A/VDSL	Indicates the status of the A/VDSL WAN connection. For more information, see Section 3.2.1.3.4 on page 13.

3.2.1 LED Descriptions

This section describes the device's LEDs.

3.2.1.1 Power LED

The **Power** LED indicates the operating status, as described in the table below.

Table 3: Power LED Description

LED Color	LED State	Description
Green	On	Power is received by the device.
-	Off	No power is received by the device.

3.2.1.2 Status LED

The **Status** LED indicates the operating status, as described in the table below.

Table 4: Status LED Description

LED Color	LED State	Description
Green	On	Device is operational.
	Flashing	<ul style="list-style-type: none"> Initial rebooting stage. Software upgrade (.cmp file) in process (currently supported only in Software Version 6.8).
Red	On	Boot failure.
-	Off	Advanced rebooting stage.

3.2.1.3 WAN LEDs

This section describes the WAN LEDs.

3.2.1.3.1 WAN 4G LED

The **WAN 4G** LED indicates the status of the cellular WAN link (4G LTE), as described in the table below.

Table 5: WAN 4G LED Description

LED Color	LED State	Description
Green	On	Connected to the cellular network.
	Flashing	In the process of connecting to the cellular network.
Red	On	No SIM card in the SIM slot, or if there is a SIM card, the device cannot connect to the cellular network.
-	Off	Cellular WAN interface has not been configured (or the functionality is not included in the device's installed License Key).

3.2.1.3.2 WAN GE LED

The **WAN GE** LED indicates the status of the Gigabit Ethernet (copper) WAN link, as described in the table below.

Table 6: WAN GE LED Description

LED Color	LED State	Description
Green	On	WAN GE link established.
	Flashing	Data is being received or transmitted.
-	Off	No WAN GE link or power not received by the device.

3.2.1.3.3 WAN SFP LED

The **WAN SFP** LED indicates the status of the optical fiber WAN link, as described in the table below.

Table 7: WAN SFP LED Description

LED Color	LED State	Description
Green	On	WAN fiber link established.
	Flashing	Data is being received or transmitted.
-	Off	No WAN fiber link or power not received by the device.

3.2.1.3.4 WAN A/VDSL LED

The **WAN A/VDSL** LED indicates the status of the A/VDSL WAN link, as described in the table below.

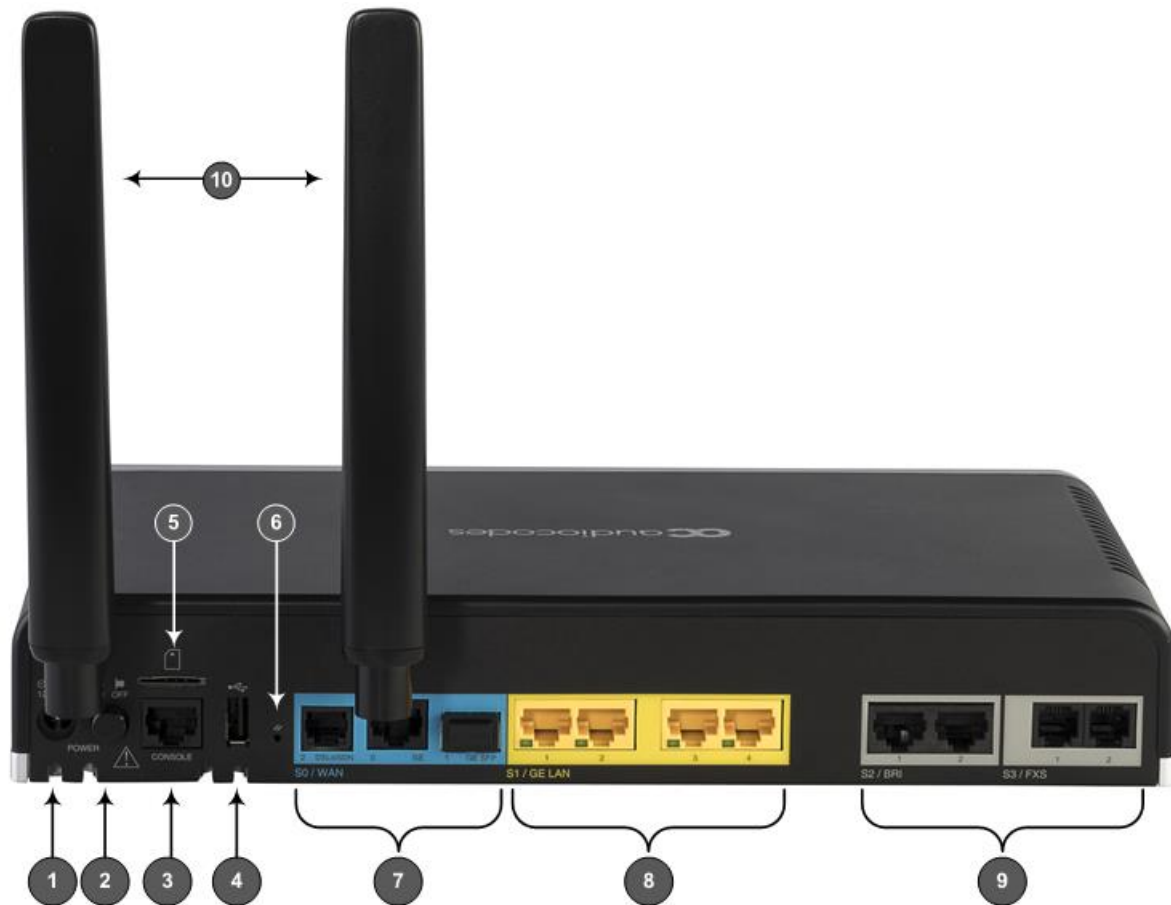
Table 8: WAN A/VDSL LED Description

LED Color	LED State	Description
Green	On	DSL link connected (trained) successfully with peer ("showtime").
	Fast Flashing	Training up (connection in progress) and negotiating with peer.
	Slow Flashing	DSL port is administratively up, but idle (not connected and no peer detected).
	Two Fast Flashes and then Idle Sequences	DSL port is initializing itself after being enabled or upon mode change.
-	Off	DSL port is administratively shutdown or not configured.

3.3 Rear Panel Description


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


Figure 2: Rear Panel



The figure above is used only as an example. The hardware configuration depends on the ordered model.

Table 9: Rear Panel Description

Item #	Label	Description
1	POWER	DC power supply plug entry for connecting the device to the external AC/DC power supply adapter.
2	ON / OFF	Power button which powers on the device when pressed in and powers off the device when pressed again (pressed out).
3	CONSOLE	RJ-45 port for RS-232 serial communication with the device.
4		<p>USB 2.0 port, which can be used with an external USB hard drive or flash disk (disk on key) for USB storage capabilities (for example, for configuration file)</p> <p>Note: The USB port is not provided when the device is ordered with LTE cellular support.</p>

Item #	Label	Description
5		SIM card slot for 4G LTE cellular. Note: The SIM card slot is applicable only to models ordered with the 4G LTE cellular functionality.
6	//	Reset pinhole button for resetting the device or for restoring it to factory defaults. To restore the device to factory defaults, do the following: With a paper clip or any other similar pointed object, press and hold down the pinhole button for at least 12 seconds, but no longer than 25 seconds
7	WAN	WAN interface ports, which can be any of the following (depending on ordered configuration): <ul style="list-style-type: none"> ■ GE: Copper GE ■ GE SFP: SFP module - dual-mode supporting 1.25 Gbps ■ V/ADSLoPOTS: ADSL/2+ and VDSL2 Note: For available WAN configurations, contact your AudioCodes sales representative.
8	S1 (Slot 1) GE LAN	Up to four Gigabit Ethernet (1000Base-T) ports (RJ-45) for connecting to LAN network such as IP phones, computers, and switches. These ports support half- and full-duplex modes, auto-negotiation, and straight or crossover cable detection.
9	FXS / FXO / BRI	Telephony interfaces, depending on ordered configuration: <ul style="list-style-type: none"> ■ ISDN BRI port interfaces (RJ-45) ■ FXS port interfaces (RJ-11) ■ FXO port interfaces (RJ-11)
10	-	Cellular antennas for 4G LTE network. Note: The antennas are applicable only to models ordered with the 4G LTE cellular functionality.

3.3.1 LAN Interface LEDs

Each Ethernet port provides a LED for indicating LAN operating status, as described in the table below.

Table 10: LAN LED Description

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

4 Mounting the Device

You can mount the device using one of the following methods:

- Desktop mounting
- 19-inch Rack mounting
- Wall mounting

4.1 19-Inch Rack Mounting

You can mount the device in a standard 19-inch rack, using AudioCodes 1U 19-inch rack mount shelf (not supplied).



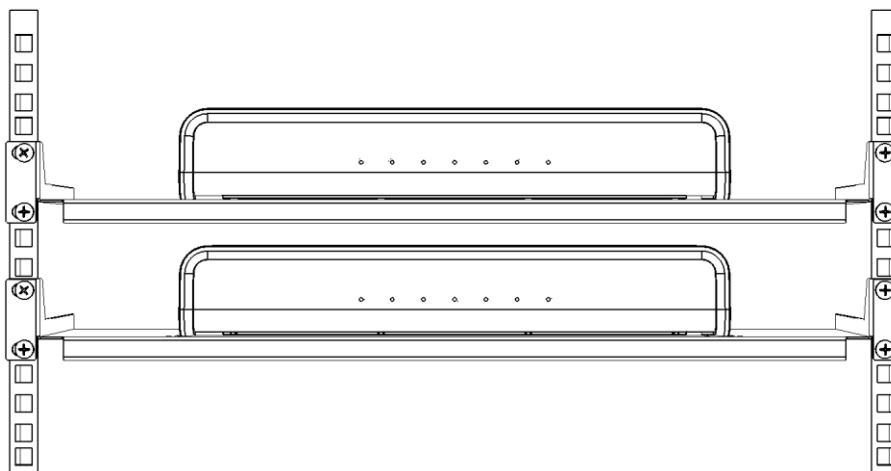
The AudioCodes 1U 19-inch rack mount shelf is not supplied with your product and can be ordered separately from an AudioCodes sales distributor.



Warning:

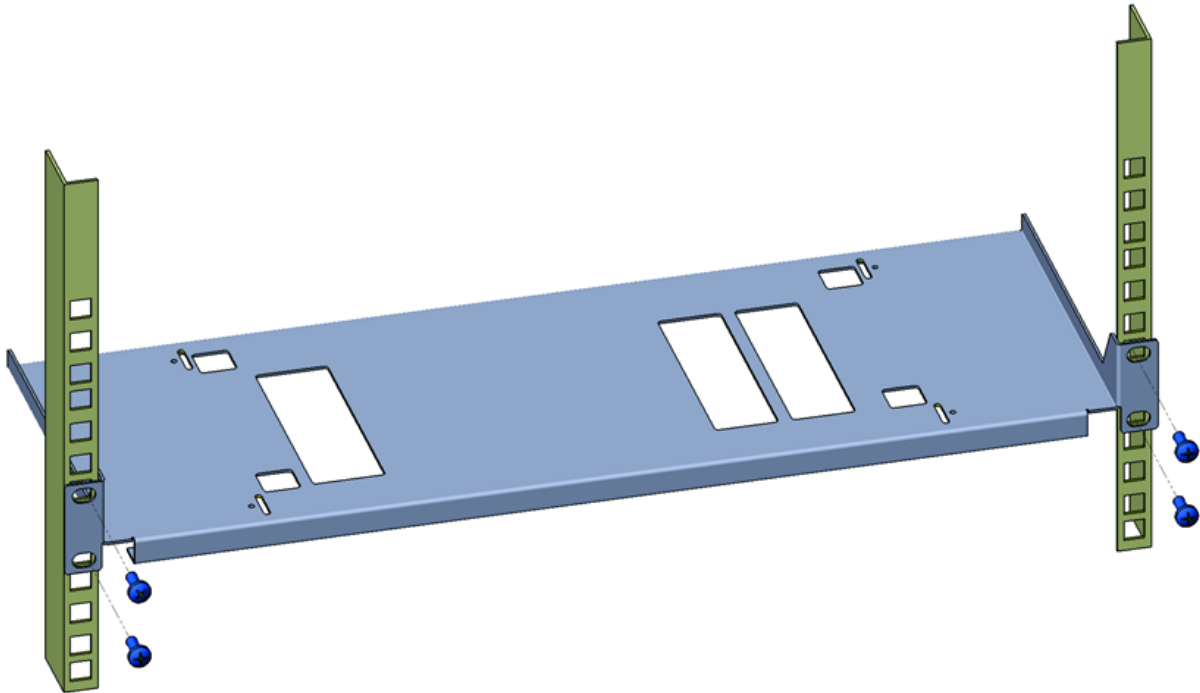
- **Elevated Operating Ambient:** If installed in a closed or multi-unit rack assembly, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tmax) of 40°C (104°F).
- **Reduced Air Flow:** Installation should be such that the amount of air flow required for safe operation on the equipment is not compromised. Do not stack equipment one on top of the other and keep the ventilation openings free from cables or any objects to allow free air circulation. The device must be mounted correctly on the rack mount shelf to avoid air blockage to the three vents located on the bottom of the device. Mounting the device on a shelf other than AudioCodes' rack mount shelf may cause the device to overheat, resulting in permanent damage to it.
- Only one device can be mounted per rack mount shelf.
- The minimum vertical rack space for mounting the device in a 19-inch rack must be 2Us (3.5 in. or 88.9 mm). See figure below.

Figure 3: Minimum Vertical Space for 19-inch Rack Mounting



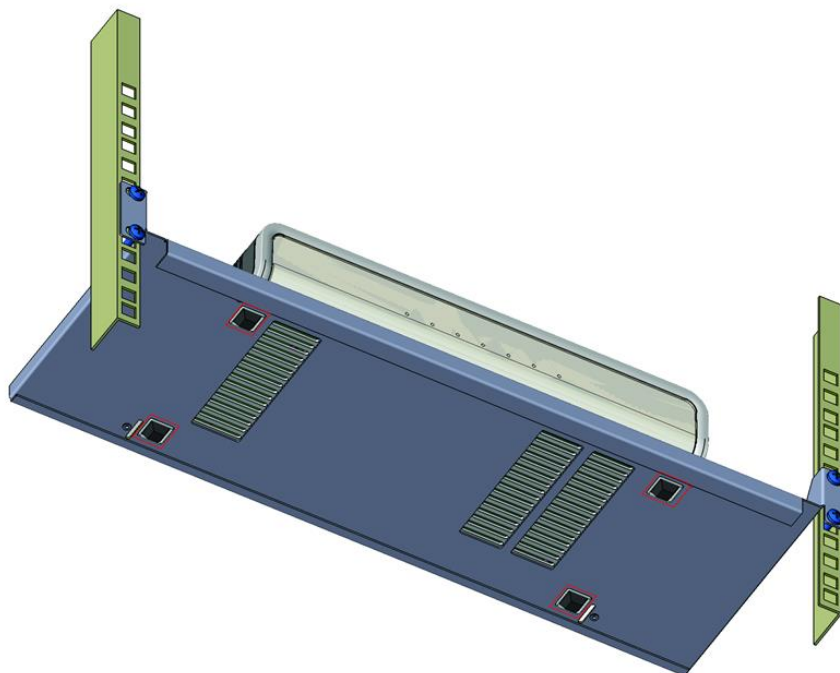
To mount the device in a 19-inch rack:

1. Position the rack mount shelf (ordered separately from AudioCodes) in the 19-inch rack, aligning the holes of the shelf's side brackets with the holes of the rack's front posts, as shown in the figure below.

Figure 4: Positioning Shelf in Rack

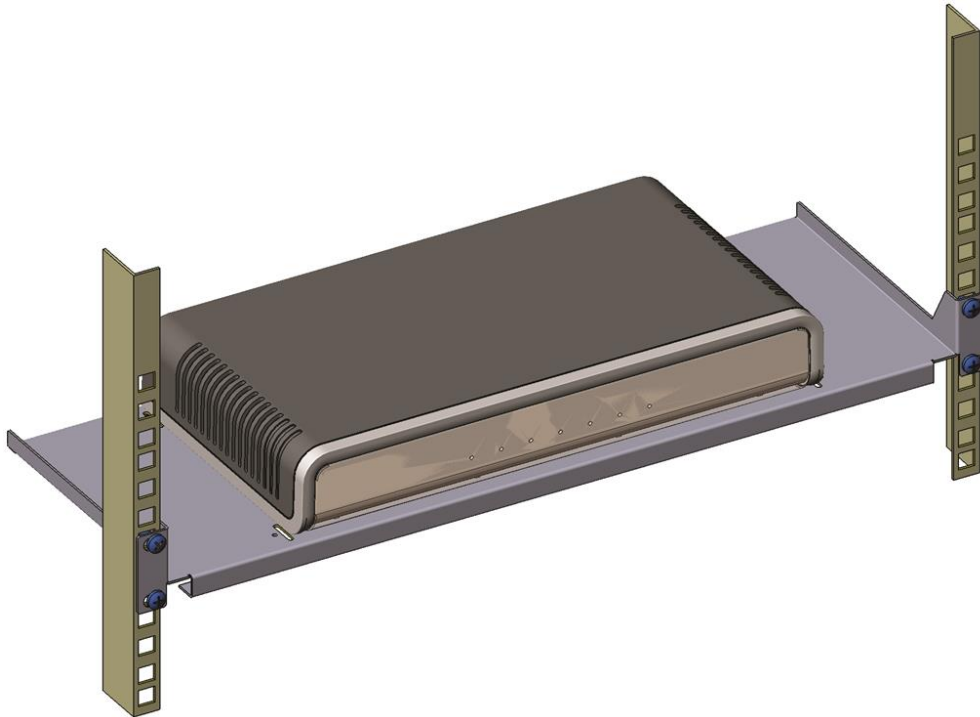
Make sure that you attach the shelf's side brackets (left and right) at the same height level in the rack so that the shelf is in a horizontal position.

2. Attach the shelf to the rack posts using four standard 19-inch rack bolts (not supplied).
3. Place the device on the shelf so that the device's front panel faces the front of the rack and the device's four anti-slide rubber legs (located on the bottom of the device) fit into the four square openings on the shelf, as shown in the figure below (viewed from underneath):

Figure 5: Positioning the Device's Anti-Slide Rubber Legs into Shelf's Openings

4. Make sure the device is firmly mounted on the shelf so it does not horizontally slide in any direction:

Figure 6: Device Mounted on Shelf in 19-inch Rack



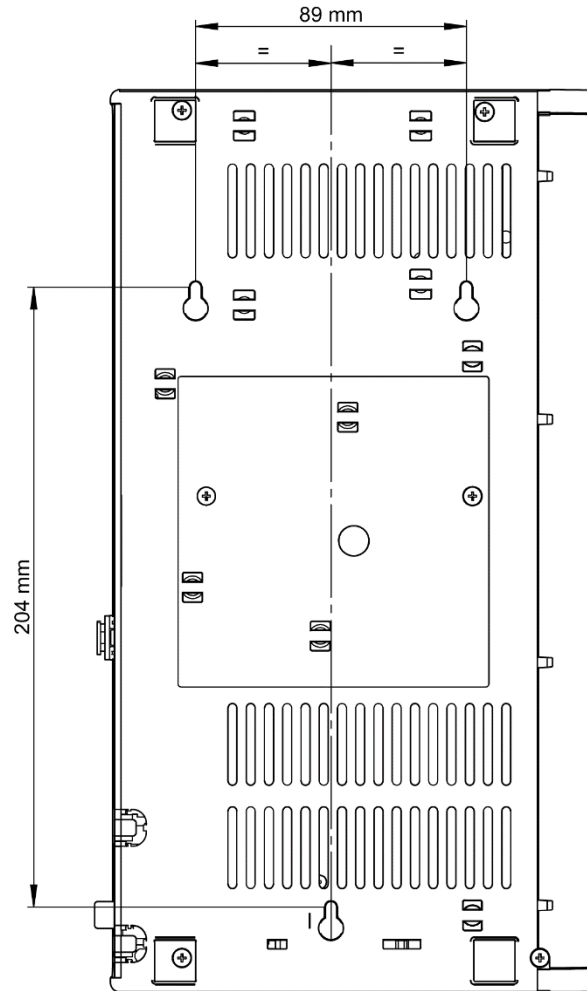
4.2 Wall Mounting

You can mount the device on a wall using the keyholes on the bottom of the device.

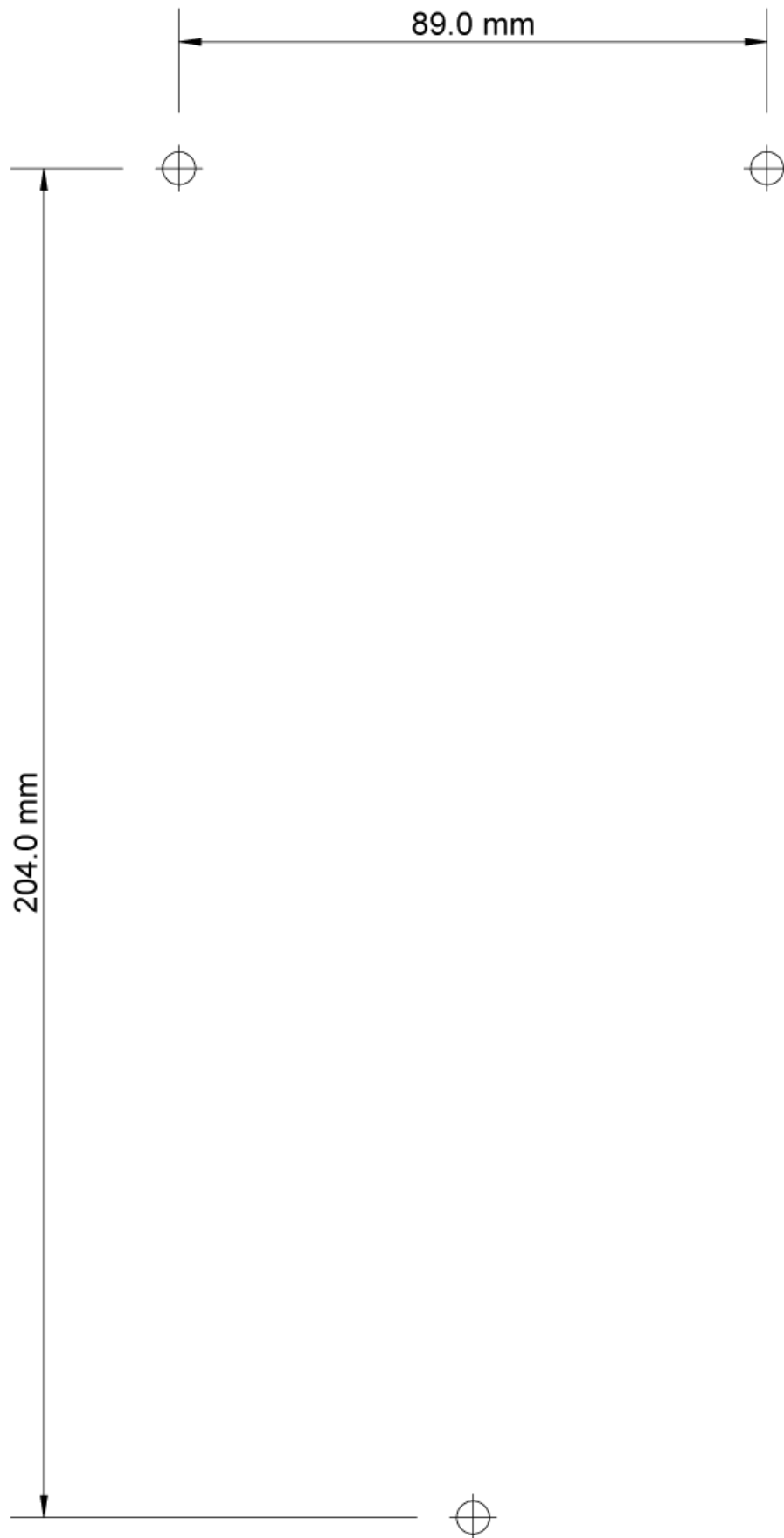
To mount the device on a wall:

1. Drill three holes in the wall where you want to mount the device, using the distances between the holes as shown in the figure below:
 - Horizontal distance between the top two parallel holes: 89 mm (5.51 in.)
 - Vertical distance between the top two parallel holes and bottom hole: 204 mm (8.03 in.)
 - Horizontal distance between a top hole and the bottom hole: 44.5 (1.75 in.)

Figure 7: Dimensions for Drilled Holes



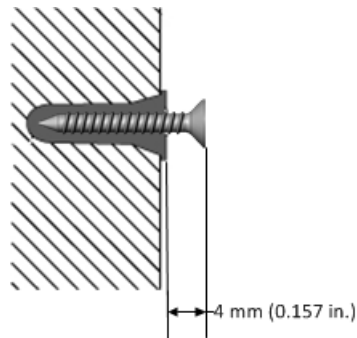
- When choosing the area on the wall to mount the device, make sure that sufficient space is available for attaching cables on the rear panel.
- Make sure that you drill the holes in the **same orientation** as shown in the above figure (i.e., two parallel holes on the top and the single hole on the bottom).
- Use the **mounting template** on the following page (print out) to mark the locations for the mounting holes on the wall.



2. Insert wall anchors of the appropriate size into each hole.

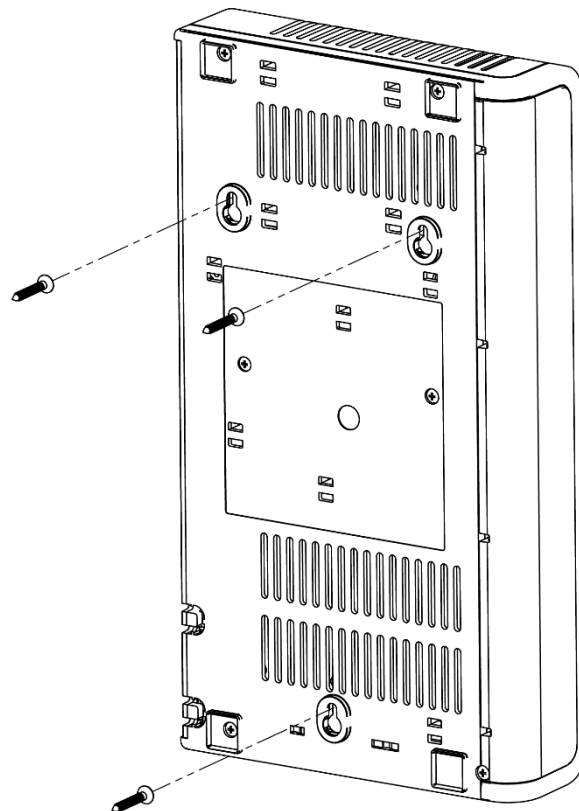
3. Thread screws (not supplied) into each of the wall anchors. The recommended screw type is DIN 7982 3.5x25 Phillips flat head. Make sure that the heads extend sufficiently (about 4 mm or 0.157 in.) from the wall for the device's keyholes to hang on:

Figure 8: Protruded Screw Distance from Wall Surface



4. Hold the device so that it is orientated with the bottom panel with the keyholes facing the wall and the rear panel with the ports facing your right.
5. Mount the device on the wall by hanging the device's keyholes on the screw heads:

Figure 9: Hanging Device on Screw Heads



5 Cabling the Device

This chapter describes device cabling.

5.1 Connecting to WAN

This section describes how to cable the WAN port interfaces.



The device supports WAN redundancy, whereby multiple WAN interfaces can serve as backups for the primary or a backup WAN interface. For example, if the main WAN interface is Copper GbE and it fails, the device switches over to the fiber-optic WAN interface. For configuring WAN redundancy, refer to the *CLI Reference Guide*.

5.1.1 Copper Gigabit Ethernet

The device provides a copper Gigabit Ethernet (GbE) port interface for connecting to the WAN.

Cable specification:

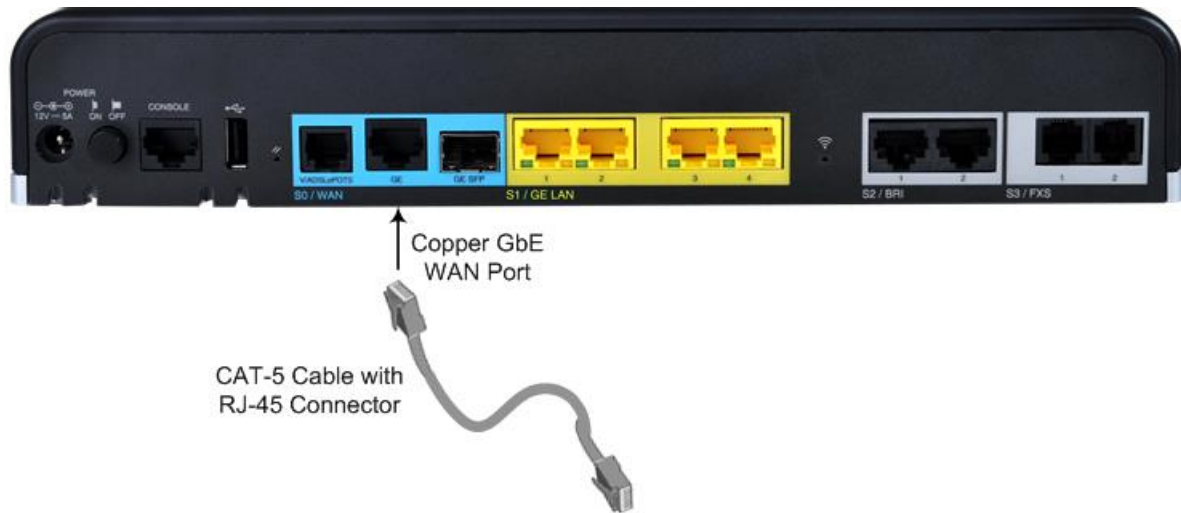
- **Cable:** straight-through Cat 5 cable
- **Connector:** RJ-45
- **Connector Pinouts:**

Table 11: RJ-45 Connector Pinouts for Copper GbE WAN

Pin	Signal Name
1	Ethernet signal pair
2	
3	Ethernet signal pair
6	
4	Ethernet signal pair
5	
7	Ethernet signal pair
8	

To connect the copper GbE WAN port:

1. Connect one end of a straight-through RJ-45 Ethernet cable to the RJ-45 port labeled **S0 / WAN GE** (located on the front panel).

Figure 10: Cabling the WAN Copper GbE Port

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

5.1.2 Fiber-Optic Gigabit Ethernet

The device supports up to two pairs of 1.25 Gbps optical, small form-factor pluggable (SFP) transceiver modules (see note below). The SFP module can be used for fiber-optic or copper WAN interface.

**Caution Laser**

This device contains a Class 1 LED/Laser emitting device, as defined by 21CFR 1040 and IEC825. Do not stare directly into the beam or into fiber optic terminations as this can damage your eyesight.

**Care in Handling Fiber Optic Cabling**

1. Excessive bending of the Fiber Optic Cable can cause distortion and signal losses.
2. Ensure the minimum bending radius recommended by the Fiber Optic Cable supplier.
3. Incoming optic cabling from the network infrastructure can originate from the top of the rack or from another shelf within the rack. Preserve the minimum-bending ratio indicated by the cable manufacturer.
4. To ensure full high-availability capabilities, the configuration of the interface to the IP backbone must include certain redundant features from which two separate fiber optic cables are entering the device.



- The SFP module and fiber-optic cable are not supplied. It is recommended that you purchase the SFP modules from AudioCodes. For a list of orderable SFP modules, see Appendix A on page 41, or contact your AudioCodes sales representative.

- This AudioCodes device has been evaluated with the laser transceiver modules (SFP) listed in Appendix A on page 41. If other SFP modules are used, the person installing the device is solely responsible for the usage of correct SFP modules to comply with local, applicable laser safety requirements and certification. AudioCodes will not be held responsible for any damage to human body or equipment caused as a result from the usage of SFP modules that are not listed in Appendix A on page 41.

Cable specifications:

- WAN fiber-optic interface: LC-type plug
- WAN copper interface: see Section 5.1.1 on page 22

To connect the fiber-optic WAN GbE port:

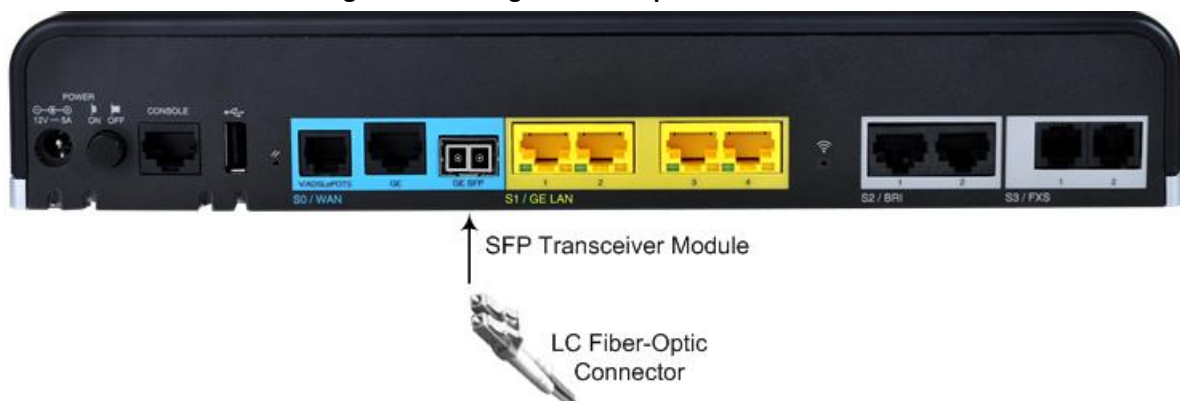
1. Remove the protective dust plug from the SFP transceiver module. Save the dust plugs for future use.

Figure 11: Removing Protective Dust Plug



2. Immediately connect a cable with LC-type plugs to the SFP transceivers (labeled **GE SFP**).

Figure 12: Cabling the Fiber-Optic WAN GbE Port



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

5.1.3 ADSL2+ and VDSL2

The ADSL2+ and VDSL2 (xDSL) WAN port provides a single xDSL interface through an RJ-11 port. The specifications of the xDSL interface include the following:

- **ADSL2+:**
 - RFC 2684 in Routed (IPoA) and Bridged (ETHoA) modes, supporting LLC-SNAP and VC-Multiplexed encapsulations over AAL5
 - ATM UNI 4.1 compliant
 - UBR, CBR, VBR classes of service
 - RFC 2364 PPPoA
 - RFC 2516 PPPoE over ATM
 - Up to 8 PVCs
- **VDSL2:**
 - ITU G.991.2 Annex E for Ethernet, also known as EFM or 2Base-TL, as defined in IEEE 802.3ah
 - 802.1q VLANs over EFM
 - PPPoE



The xDSL interface is a customer-ordered item which is supported only on specific hardware configurations. For more information, contact your AudioCodes sales representative.

Cable specification:

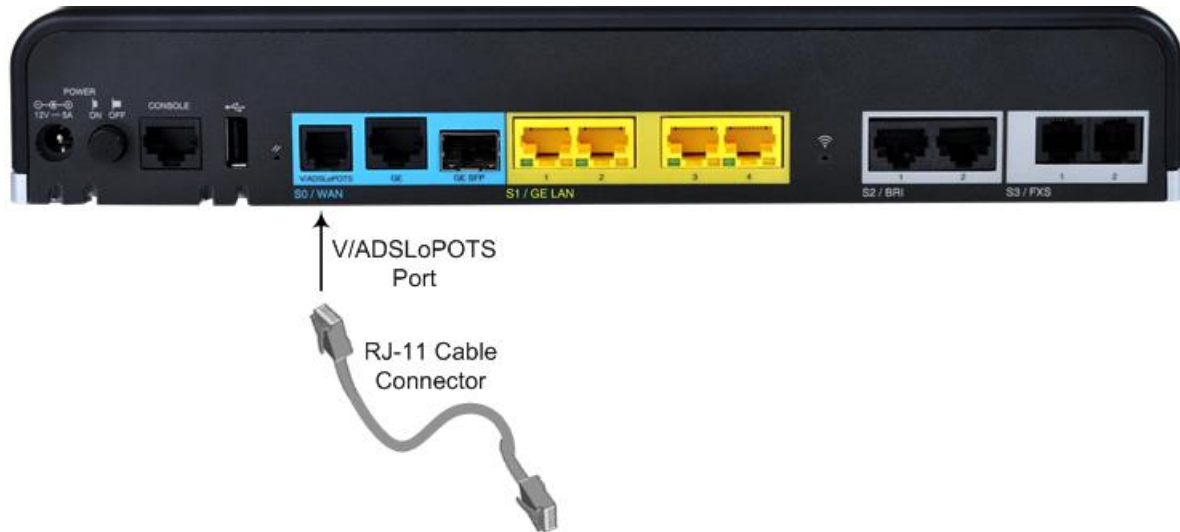
- **Connector:** RJ-11
- **Connector Pinouts:**

Table 12: RJ-11 Connector Pinouts for xDSL

Pin	Function
3	CH0 – P/TIP
4	CH0 – N/RING
1	Not connected
2	Not connected
5	Not connected
6	Not connected

To connect the WAN xDSL port:

1. Connect an RJ-11 cable connector to the device's xDSL WAN port (labeled **V/ADSLoPOTS**).

Figure 13: Cabling the xDSL WAN Port

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



The xDSL filter/splitter is not supplied and should be provided by your service provider.

5.1.4 Integrated 4G LTE Cellular Modem

The device provides an integrated 4G Long-Term Evolution (LTE) cellular modem and a SIM card slot. The cellular WAN interface can be used as the primary WAN interface or as an optional WAN backup when the primary WAN (e.g., WAN Ethernet) fails. The cellular interface connection type is according to the modem technology. The integrated LTE acts as an Ethernet device, acquiring its network address using DHCP.

The LTE modem is a series of LTE Category 4 module, adopting standard PCI Express® Mini Card form factor (Mini PCIe). It delivers 150-Mbps downlink and 50-Mbps uplink data rates.

- **4G LTE:**
 - LTE FDD: 150 Mbps max. download / 50 Mbps max. upload
 - LTE TDD: 130 Mbps max. download / 35 Mbps max. upload
- **DC-HSPA+:** 42 Mbps max. download / 5.76 Mbps max. upload
- **UMTS:** 384 Kbps max. download / 384 Kbps max. upload
- **EDGE:** 236.8 Kbps max. download / 236.8 Kbps max. upload
- **GPRS:** 85.6 Kbps max. download / 85.6 Kbps max. upload

The LTE modem contains three variants for worldwide coverage, as listed in the following table:

Table 13: LTE Variant Types

Type	Region	Bands
E	EMEA and Asia	<ul style="list-style-type: none"> ■ LTE FDD: B1/B3/B5/B7/B8/B20 ■ LTE TDD: B38/B40/B41 ■ WCDMA: B1/B5/B8 ■ GSM: B3/B8

Type	Region	Bands
A	North America	<ul style="list-style-type: none"> ■ LTE FDD: B2/B4/B12 ■ WCDMA: B2/B4/B5
AU	Australia-New Zealand and Latin America	<ul style="list-style-type: none"> ■ LTE FDD: B1/B2/B3/B4/B5/B7/B8/B28 ■ LTE TDD: B40 ■ WCDMA: B1/B2/B5/B8 ■ GSM: B2/B3/B5/B8



- LTE cellular is a separate orderable item.
- The device's SIM slot supports mini-SIM card size. If you have a micro-SIM card, you can use a SIM card adapter to convert it to mini-SIM size.
- It is recommended to attach the antennas before mounting the device; you may have difficulty in attaching them once the device is mounted.
- For configuring LTE cellular WAN, refer to the document, *Mediant MSBR LAN-WAN Access CLI Configuration Guide Ver. 7.2*.
- The USB port is not provided when the device is ordered with LTE cellular support.



Warning:

- Only use the cellular antennas that are supplied with your device.
- Do not insert the SIM card into the SIM slot while the device is connected to powered; doing so may damage the SIM card or the device.
- Do not place the device near electrical equipment or appliances that transmit/radiate frequencies within the LTE frequency bands.

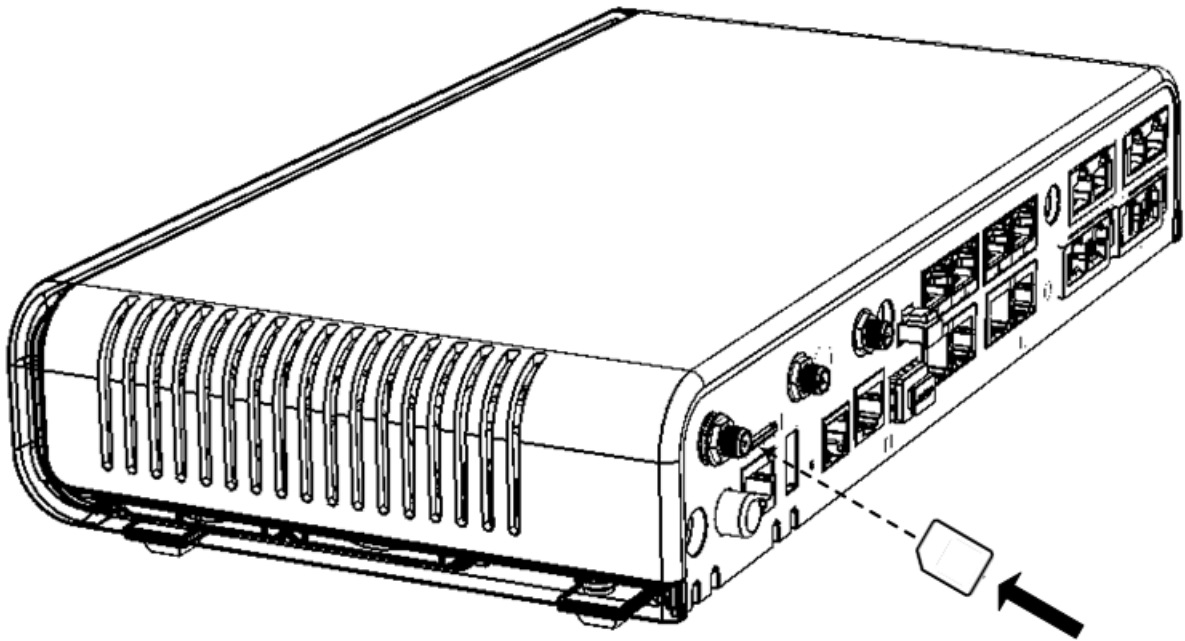
LTE connection requires the following items:

- Two cellular antennas (supplied unattached with the device)
- SIM card provided by your service provider

To connect LTE cellular WAN:

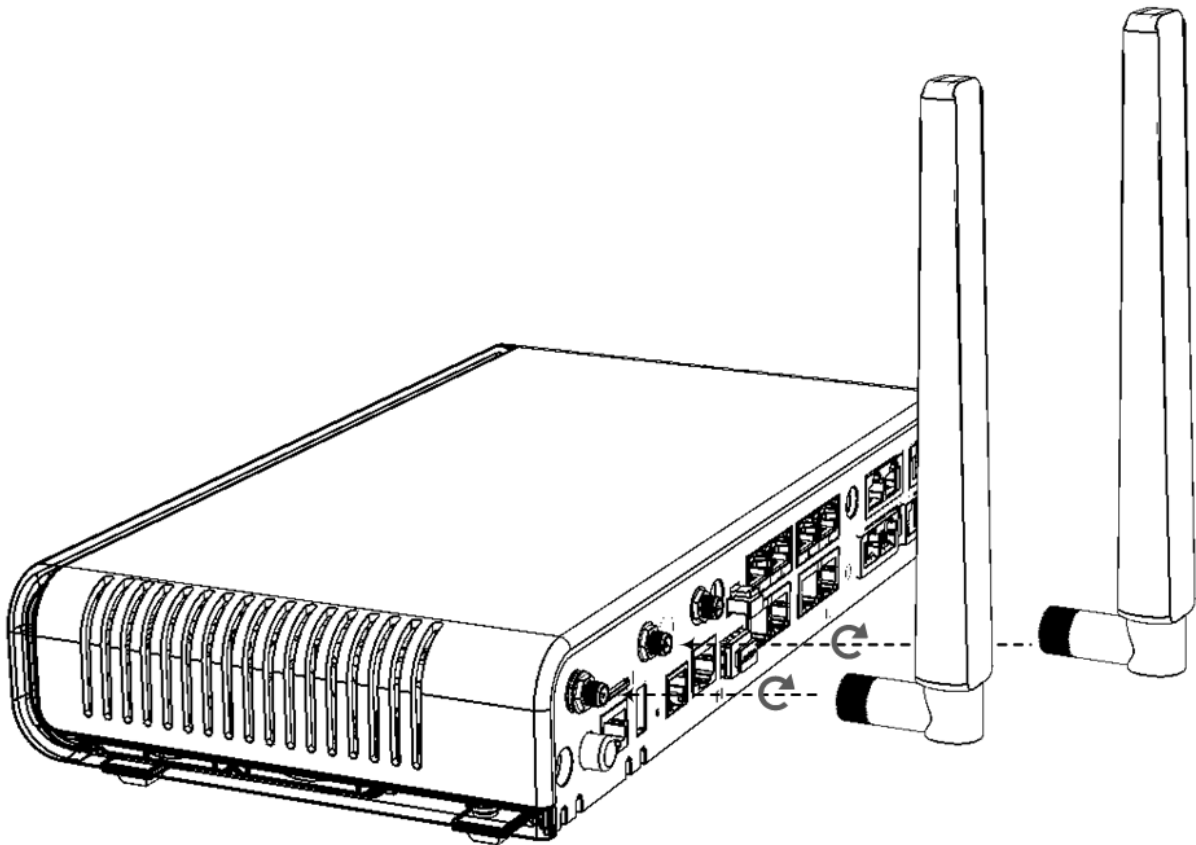
1. Power off the device.
2. Insert the SIM card (supplied by your service provider) into the SIM slot, located on the rear panel, by pushing it into the slot until you hear a clicking sound. Make sure that the orientation of the SIM card is as shown in the figure below, where the front of the card with the cut-off corner enters the slot first. (To remove the SIM card, push the SIM card to eject it out of the slot.)

Figure 14: Inserting SIM Card into SIM Slot



3. Attach the two cellular antennas (supplied) to the antenna connectors, located on the rear panel, by hand screwing the antennas onto the connectors. Make sure that the antennas are securely fastened to the connectors.

Figure 15: Connecting Cellular Antennas





- You must attach both antennas for LTE connectivity.
- The exact location of the second antenna post that is located to the right of the far-left antenna post, depends on the ordered hardware configuration. For convenience, the figure above shows the two possible locations of the second antenna post.

4. Orient the antennas as desired for optimal reception with the LTE network. The antennas can be orientated in the vertical and horizontal planes. For best performance, it is recommended that the antennas be perpendicular (90 degrees) to the floor. In other words, orient the antennas straight up.
5. Mount the device in a location that receives the best LTE connection (signal).

5.2 Connecting LAN Interfaces

The device's Gigabit Ethernet LAN ports (1000Base-T) can be connected to network equipment and entities such as computers, switches, and IP phones. These ports support half- and full-duplex modes, auto-negotiation, and straight or crossover cable detection.

Cable specification:

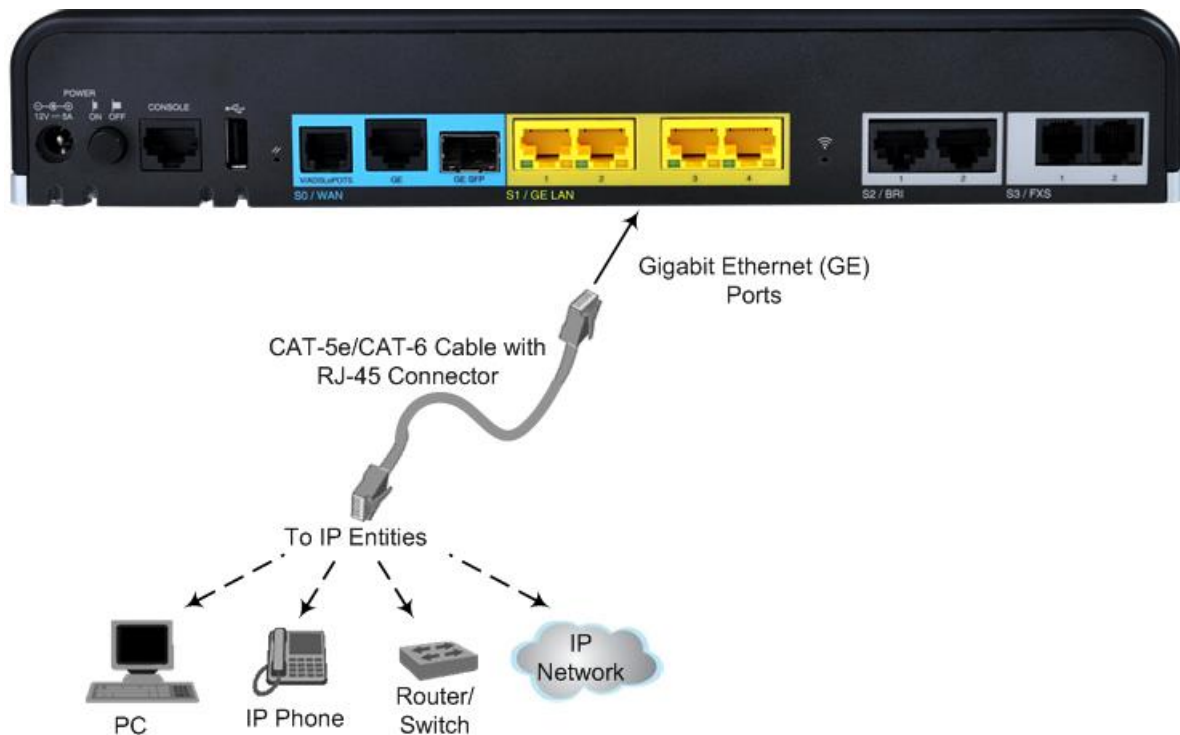
- **Cable:** straight-through Cat 5e or Cat 6 cable
- **Connector:** RJ-45
- **Connector Pinouts:**

Table 14: RJ-45 Connector Pinouts for GE

Pin	Signal Name
1	Ethernet signal pair (1000Base-T)
2	
3	Ethernet signal pair (1000Base-T)
6	
4	Ethernet signal pair (1000Base-T)
5	
7	Ethernet signal pair (1000Base-T)
8	
Shield	Chassis ground

To connect the device to the LAN:

1. Connect one end of a straight-through RJ-45 Cat 5e or Cat 6 cable to the LAN port, located on the rear panel and labeled **GE LAN**.

Figure 16: Cabling LAN Ports

2. Connect the other end of the cable to a network device or entity.

5.3 ISDN BRI Interfaces

This section describes how to connect the device to ISDN BRI lines.

5.3.1 Connecting BRI Lines

The BRI ports can be connected to ISDN terminal equipment such as ISDN telephones or PBXs. Each BRI port can be configured either as termination equipment/user side (TE) or network termination/network side (NT). Up to eight terminal equipment (TE) devices can be connected per BRI S/T port, using an ISDN S-bus providing eight ISDN ports. When configured as NT, the BRI port drives a nominal voltage of 38V with limited current supply of up to 100 mA.



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

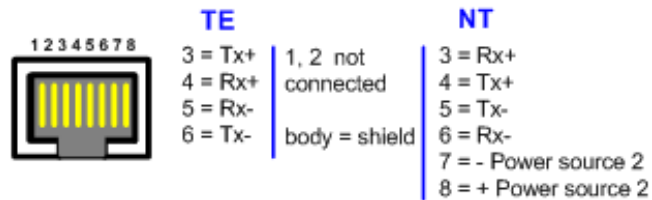


BRI interface is a customer-ordered item which is supported only on specific hardware configurations. For more information, contact your AudioCodes sales representative.

Cable specification:

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

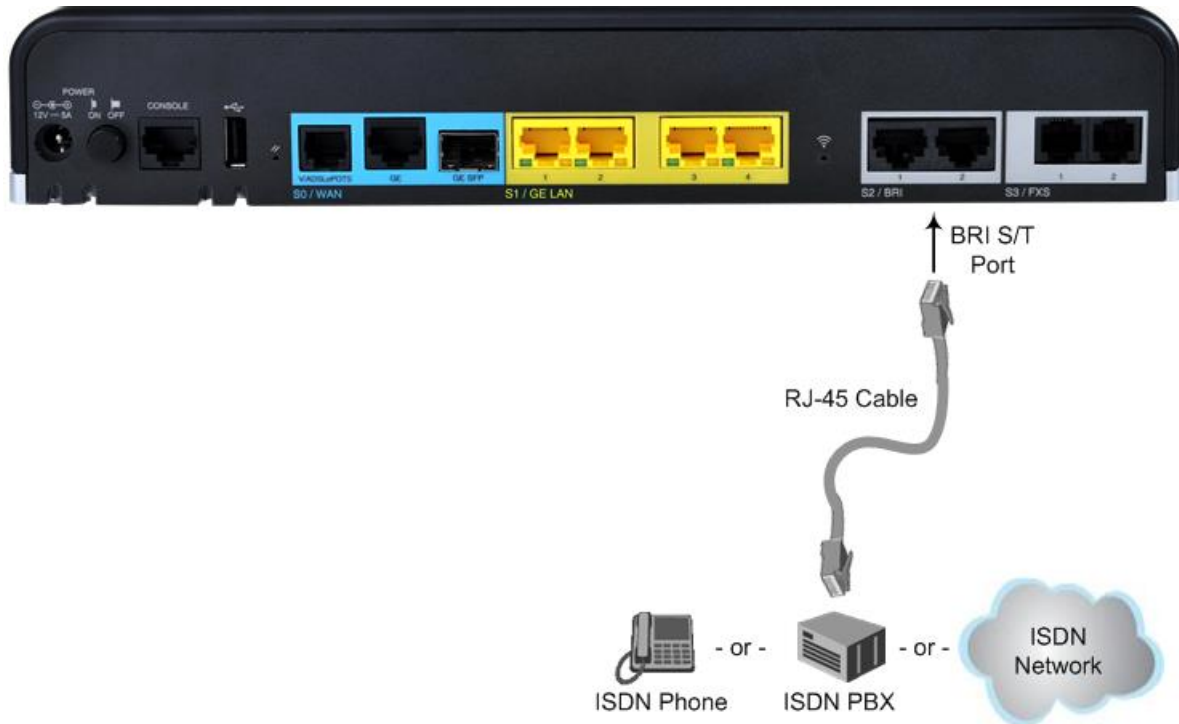
Figure 17: RJ-45 Connector Pinouts for BRI Ports



To connect a BRI line:

1. Connect the RJ-45 cable to the device's BRI port, located on the rear panel and labeled **BRI**.

Figure 18: Cabling BRI Ports



2. Connect the other end of the cable to your ISDN equipment.

5.3.2 Connecting PSTN Fallback for BRI Lines

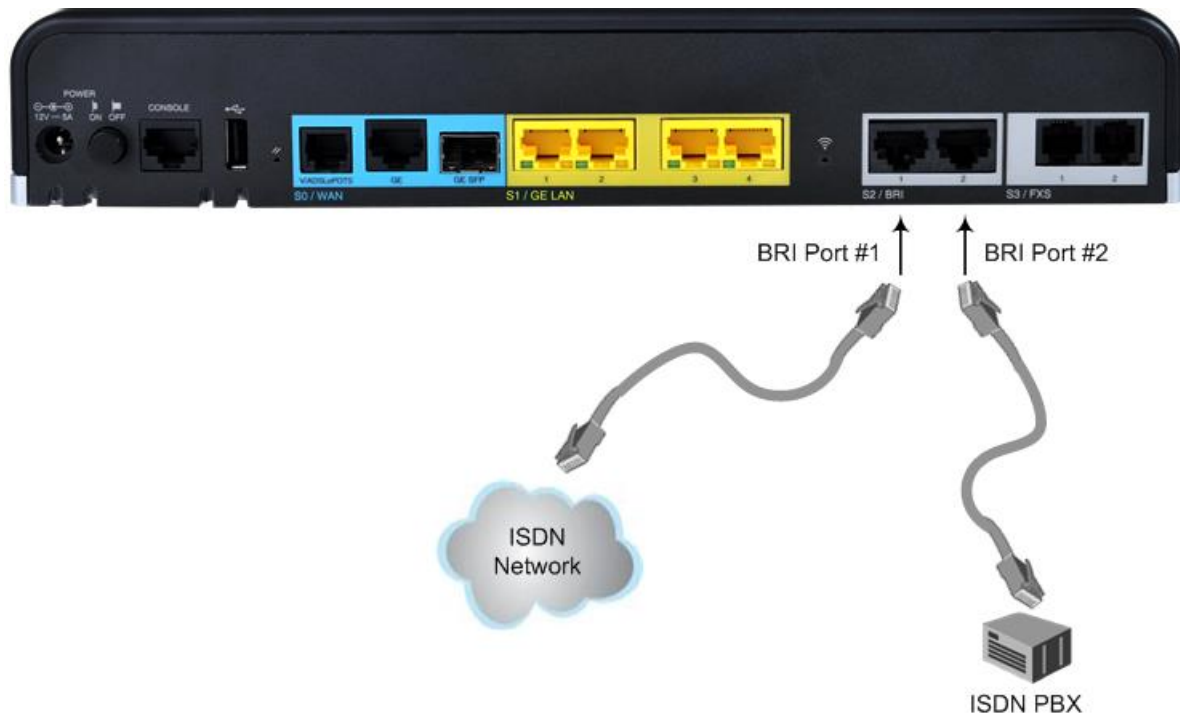
The device supports PSTN Fallback for BRI lines. If the device loses power, for example, due to a power outage or the unplugging of its power cable, it automatically routes calls from the Tel side to the PSTN (instead of the IP network).

The BRI PSTN Fallback uses BRI ports #1 and #2. When the BRI PSTN Fallback is activated, the BRI port #1 metallic relay switch automatically connects BRI ports #1 and #2, and calls can be routed and established between these entities.

To cable the BRI PSTN Fallback:

1. Connect BRI line 1 (Port #1), located on the rear panel, to an ISDN PBX.
2. Connect BRI line 2 (Port #2), located on the rear panel, to the ISDN network (PSTN).

Figure 19: Cabling BRI PSTN Fallback



- The BRI PSTN Fallback feature is a customer-ordered item, which is supported only on specific hardware configurations providing BRI interfaces. For more information, contact your AudioCodes sales representative.
- The BRI PSTN Fallback feature has no relation to the PSTN Fallback Software License Key.

5.4 Analog Interfaces

This section describes how to connect the device to analog equipment.

5.4.1 Cabling FXS Interfaces

The procedure below describes how to cable the device's FXS interfaces. FXS is the interface replacing the Exchange—Central Office (CO) or Private Branch Exchange (PBX)—and connects to analog telephones, dial-up modems, and fax machines. The FXS is designed to supply line voltage and ringing current to these telephone devices.



Warnings:

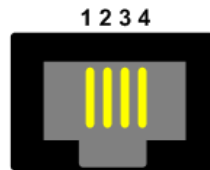
- The device is an **INDOOR** unit and thus, must be installed and located only indoors.
- Ensure that the FXS ports are connected to the appropriate, external devices; otherwise, damage to the device may occur.
- FXS ports are considered TNV-2.



- FXS interface is a customer-ordered item which is supported only on specific hardware configurations. For more information, contact your AudioCodes sales representative.
- The FXS/FXO interfaces support loop-start signaling (indoor only).

Cable specification:

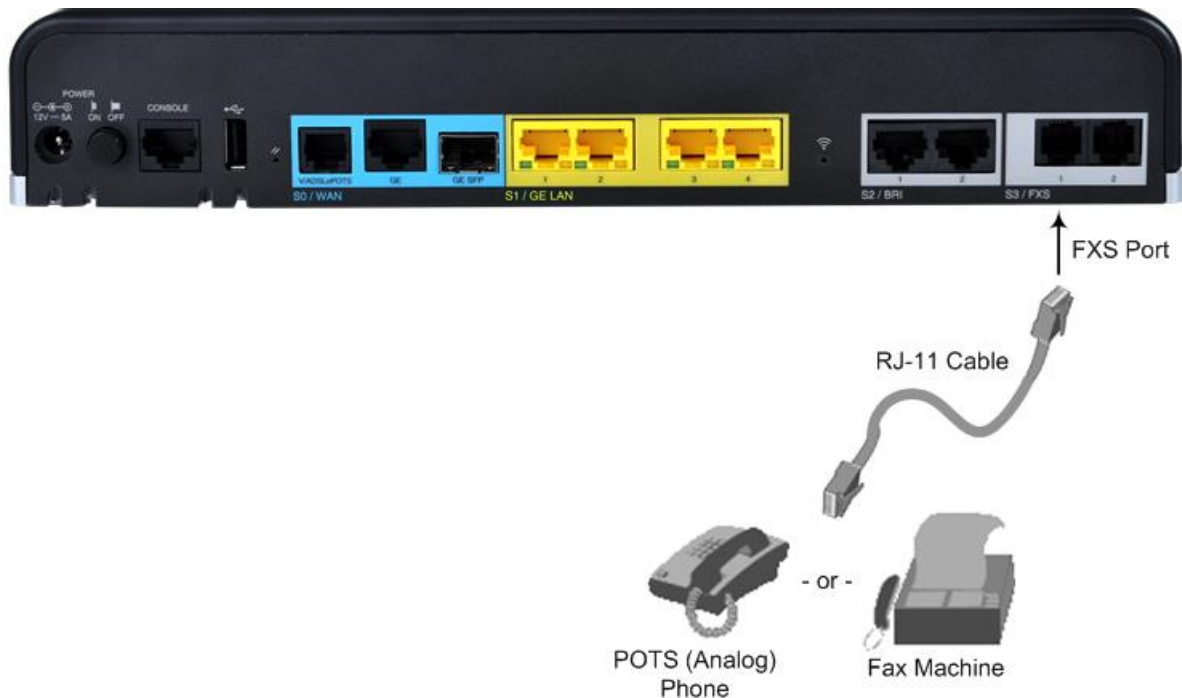
- **Cable:** Standard straight-through RJ-11 telephony cable
- **Connector:** RJ-11
- **Connector Pinouts:**

Figure 20: RJ-11 Connector Pinouts for FXS Interfaces

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

To connect an FXS interface:

1. Connect one end of an RJ-11 cable to an FXS port, located on the rear panel and labeled **FXS**.

Figure 21: Cabling FXS Interfaces

2. Connect the other end of the cable to the required telephone interface (e.g., fax machine, dial-up modem, or analog POTS telephone).

5.4.2 Cabling FXO Interfaces

The procedure below describes how to cable the device's FXO interface. FXO is the interface replacing the analog telephone and connects to a Public Switched Telephone Network (PSTN) line from the CO or to a PBX. The FXO is designed to receive line voltage and ringing current, supplied from the CO or the PBX (similar to an analog telephone).

**Warnings:**

- To protect against electrical shock and fire, use a minimum 26-AWG wire to the connect FXO port to the PSTN.
- Make sure that the FXO port is connected to the appropriate, external device; otherwise, damage to the device may occur.
- The FXO port is considered TNV-3.

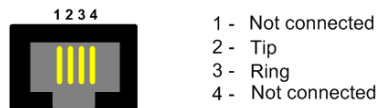


FXO interface is a customer-ordered item which is supported only on specific hardware configurations. For more information, contact your AudioCodes sales representative.

Cable specification:

- **Cable:** 26-AWG wire
- **Connector:** RJ-11
- **Connector Pinouts:**

Figure 22: RJ-11 Connector Pinouts for FXO Interface



To connect an FXO interface:

1. Connect one end of an RJ-11 cable to an FXO port, located on the rear panel and labeled **FXO**.

Figure 23: Cabling FXO Interfaces



2. Connect the other end of the cable to the required telephone interface (e.g., telephone exchange analog line or PBX extension).

5.4.3 Cabling the FXS Analog Lifeline

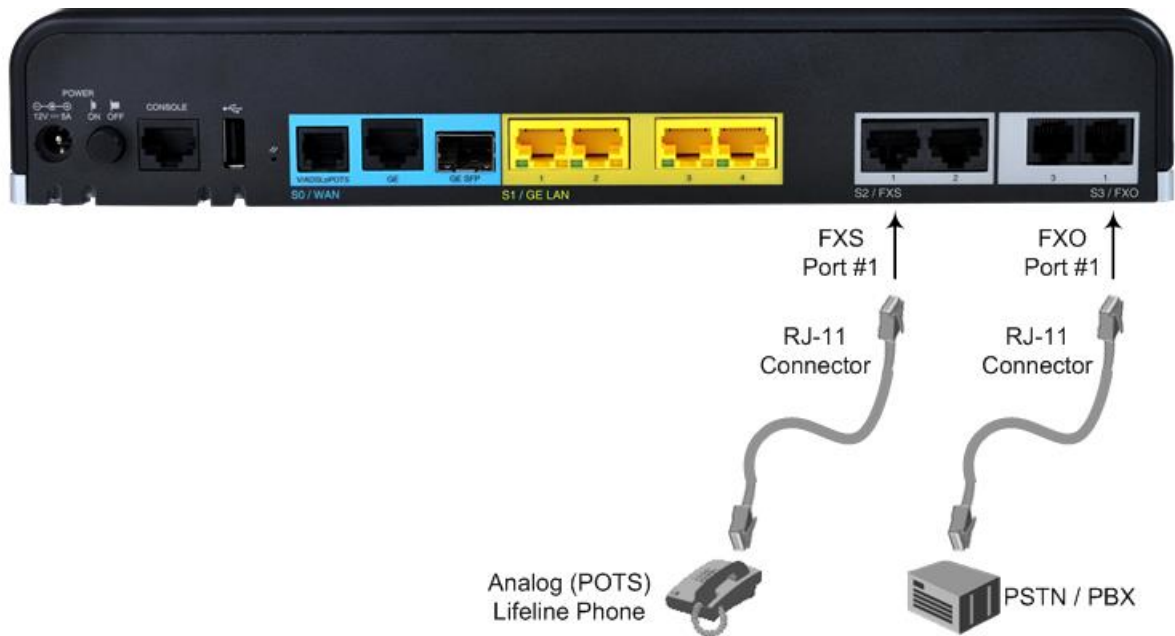
The device supports Analog Lifeline. If the device loses power, for example, due to a power outage or the unplugging of its power cable, it automatically routes calls from a POTS telephone ("lifeline" phone), connected to an FXS port, to the PSTN (instead of the IP network).

The FXS Analog Lifeline is available on the hardware configuration that provides a single FXO port and three FXS ports. The FXS lifeline phone connects to FXS port #1 and the PSTN/PBX connects to FXO port #1. When the Lifeline is activated, the FXS line automatically connects to the FXO line and calls between these entities can be established.

To cable the FXS Analog Lifeline:

1. Connect the analog lifeline telephone to FXS port #1, located on the rear panel.
2. Connect an analog PSTN line to FXO port #1, located on the rear panel.

Figure 24: Cabling the FXS Analog Lifeline



The FXS Analog Lifeline feature is a customer-ordered item, which is supported only on specific hardware configurations with combined FXS and FXO interfaces. For more information, contact your AudioCodes sales representative.

5.5 Cabling the Serial Interface to a PC

The device provides an RS-232 serial interface port on its rear panel. The RS-232 interface port is used to access the device's command line interface (CLI). An RJ-45 to DB-9 serial cable adapter is supplied for serial cabling:

Figure 25: RS-232 Cable Adapter

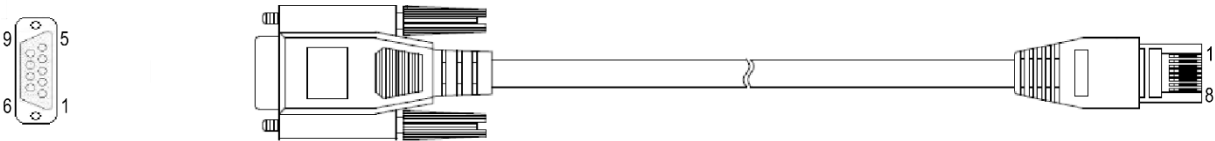


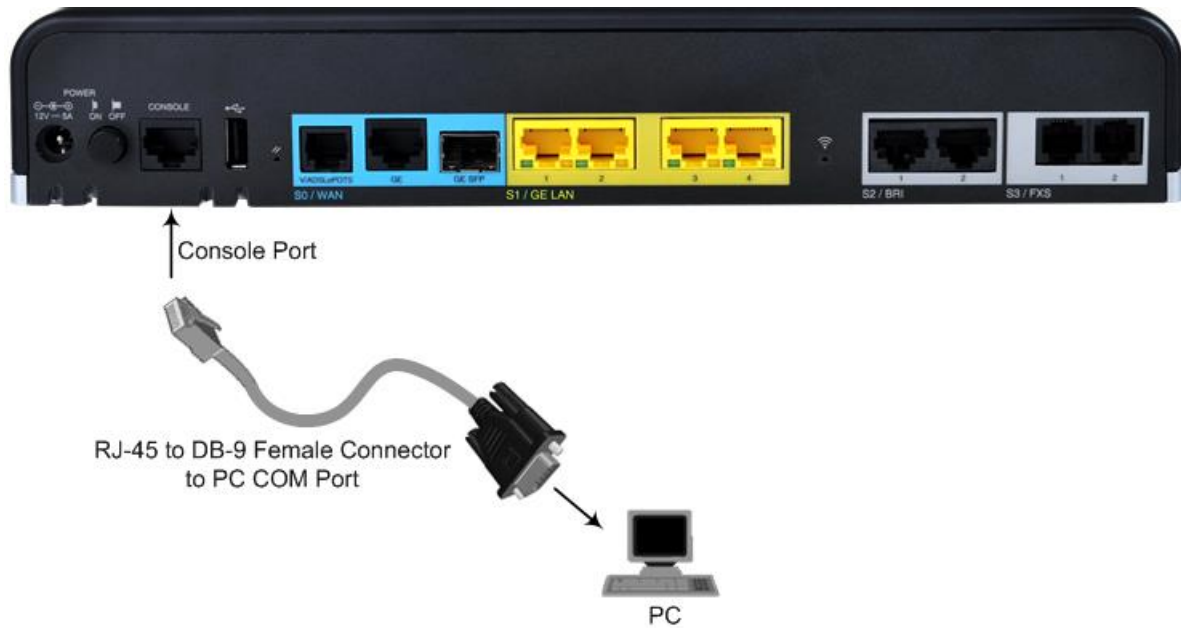
Table 15: RJ-45 to DB-9 Serial Cable Connector Pinouts

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

To connect the device's serial interface port to a PC:

1. Connect the RJ-45 connector at the end of the cable to the device's serial port, located on the rear panel and labeled **CONSOLE**.

Figure 26: Cabling Serial Port



2. Connect the 9-pin DB connector at the other end of the cable to the COM RS-232 communication port on your computer.

5.6 Connecting a USB Storage Device

The device supports USB storage capabilities, using an external USB hard drive or flash disk (disk on key) connected to the device's USB port. The storage capabilities are configured through CLI and include the following:

- Saving network captures to USB
- Upgrading the device's firmware from USB
- Updating the device's configuration from USB
- Saving the current configuration to USB

To connect the USB storage device:

- Connect the USB storage device to the USB port, located on the rear panel.

Figure 27: Connecting USB Storage Device





- Only a single USB storage (formatted to FAT/FAT32) operation is supported at any given time.
- The USB port is not provided when the device is ordered with LTE cellular support.

5.7 Connecting to the Power Supply

The device is powered by an external 12V AC/DC power adapter (supplied), connected to a standard alternating current (AC) electrical wall outlet. The type of AC/DC power adapter depends on the required amperage:

- 3A power supply – see Section 5.7.1 on page 37
- 5A power supply – see Section 5.7.2 on page 39

Table 16: Power Specifications

Item	Description
Power Supply	Single universal external AC power supply
Input Ratings	100-240 VAC, 50-60 Hz
Output Ratings	One of the following, depending on customer requirement: <ul style="list-style-type: none"> ■ 12V/3A ■ 12V/5A



Warning: Use only the AC/DC power adapter supplied with the device.



Warning: Do not open or service the AC/DC power adapter. If it's broken, do not use it and do not plug it into the electrical wall socket; contact AudioCodes for a Return Material Authorization (RMA).

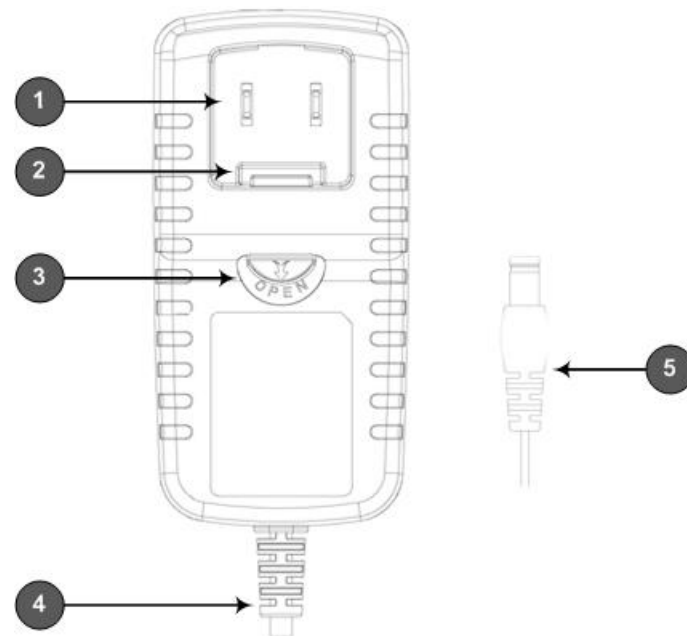


ご注意

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5.7.1 3-Amp Power Supply Cabling

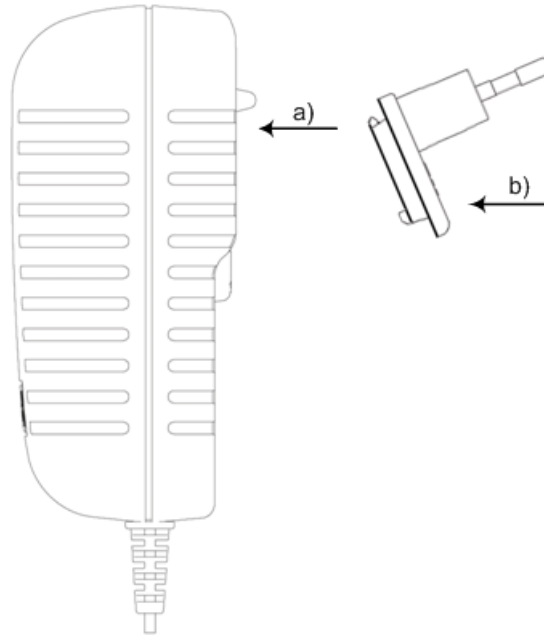
For 3-Amp power supply, the device is shipped with the AC/DC power adapter shown in the figure below. The power adapter also supports interchangeable plugs to suite the electrical wall outlet type requirement of the country in which the device is being installed.

Figure 28: 3A AC/DC Power Adapter**Table 17: Power Adapter with Interchangeable Plugs**

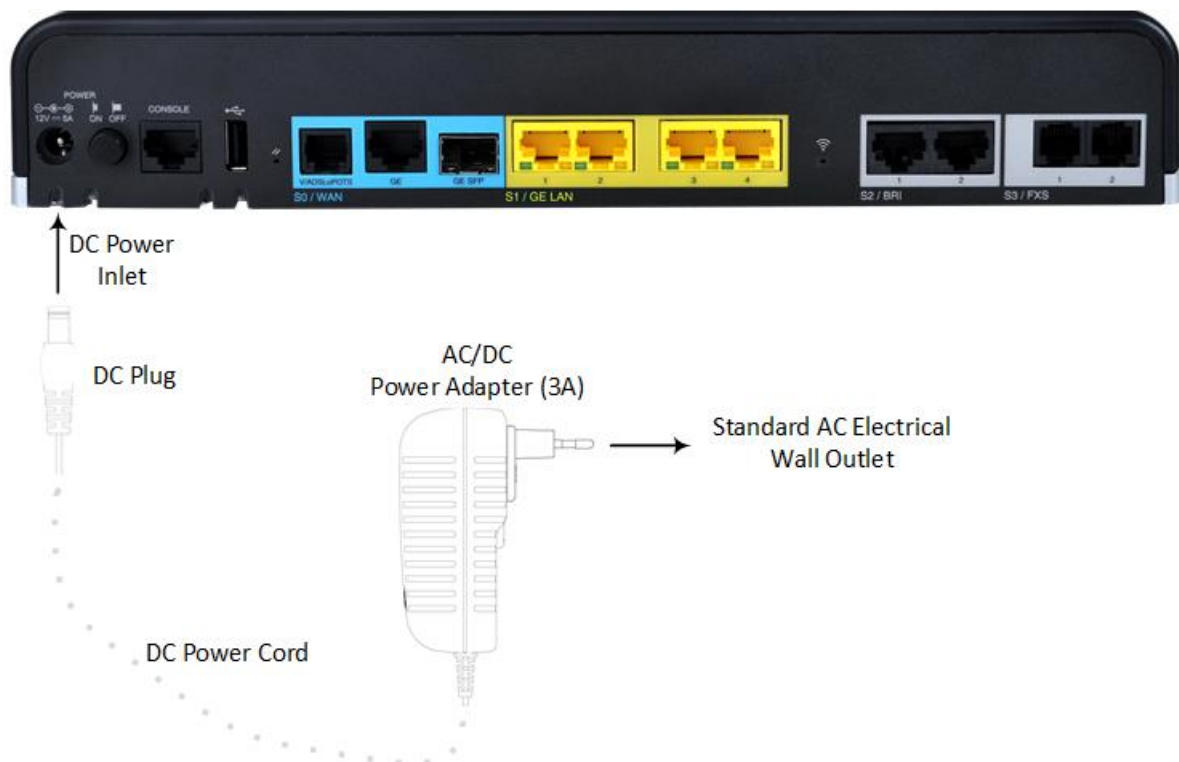
Item	Description
1	Plug slot
2	Plug lock
3	Plug release lever
4	DC power cord
5	DC power plug

To connect the device to the power supply using the 3-Amp power adapter:

1. Insert the relevant AC plug into the housing power adapter:
 - a. Insert the top part of the plug into the upper part of the housing slot (1).
 - b. Press down on the bottom part of the plug until a "click" sound is heard, indicating that the plug is securely inserted in the housing slot. To remove the plug, push and slide down the OPEN plug release lever (3).

Figure 29: Inserting Plug into Power Adapter

2. Insert the DC plug (5) located at the end of the power cord (4) of the power adapter into the device's power socket located on the rear panel.

Figure 30: Cabling to Power with 3A AC/DC Power Adapter

3. Plug the power adapter directly into a standard electrical wall outlet.

5.7.2 5-Amp Power Supply Cabling

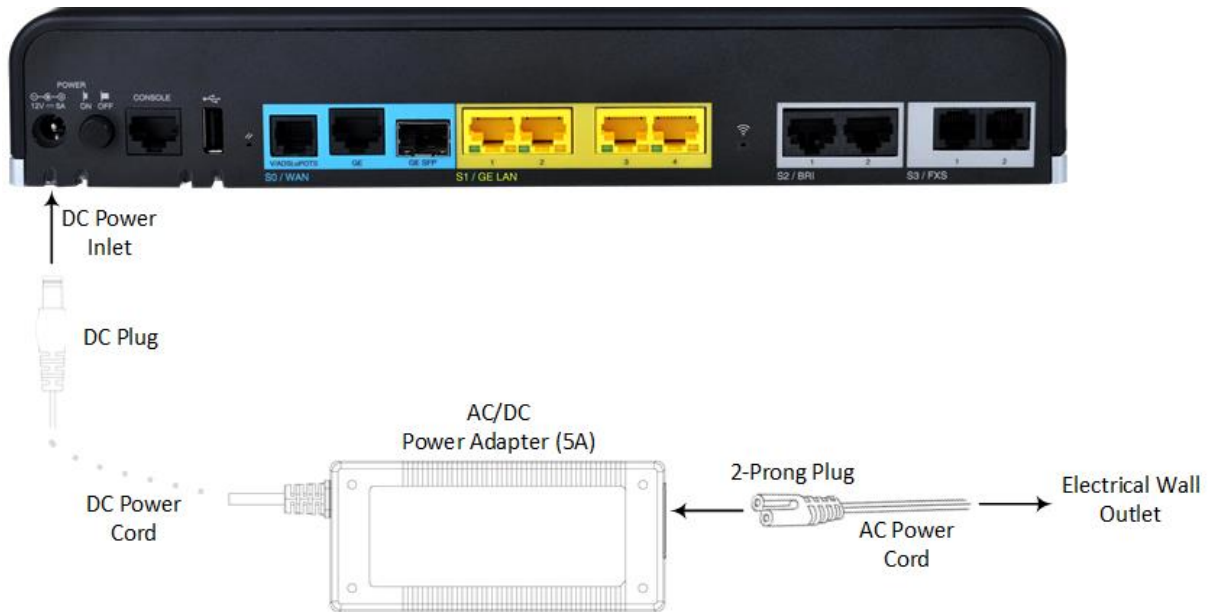
For 5-Amp power supply, the device is shipped with an AC/DC power adapter that supplies 5 amps. The adapter provides an integrated DC power cord with a DC plug for attaching to the device. For the connection to the standard AC electrical wall outlet, an AC power cord with a female, 2-prong plug

(C2) on one side for connecting to the AC/DC adapter and a plug on the other end for connecting to electrical wall outlet

To connect the device to the power supply using the 5-Amp power adapter:

1. Connect the DC plug at the end of the DC power cord to the device's power socket, located on the rear panel.
2. Connect the 2-prong plug at one end of the AC power cord to the power adapter.

Figure 31: Cabling to Power with 5A AC/DC Power Adapter



3. Connect the plug at the other end of the AC power cord to a standard electrical outlet.

5.7.3 Switching Power On and Off

The device is equipped with a power switch, which is located on its rear panel (see Section 3.3 on page 14) for turning it on or off.

To power on the device:

- Press in the power button; the device receives power, indicated by the lighting of the **Power** LED, located on the front panel.

To power off the device:

- Press out the power button; the device powers off, indicated by the **Power** LED going off.

A Approved Laser SFPs

The table below lists the recommended SFPs, which can be ordered from AudioCodes. For installing the SFPs and for fiber-optic WAN cabling, see Section 5.1.2 on page 23.

Table 18: Approved SFP Modules

Object / Part No.	Manufacturer / Trademark	Optional Types / Models	Technical Data	Standard (Edition / Year)	Mark(s) of Conformity
Laser SFP Insert	Source Photonics	<ul style="list-style-type: none"> ■ SPL-35-03-EBX-CDFM ■ SPL-53-03-EBX-CDFM ■ SPL-35-03-EBX-CDFM ■ SPL-34-GB-BX-CDFM ■ SPL-43-GB-BX-CDFN ■ SP-GB-LX-CDFN ■ SP-GB-SX-CDFB 	Class 1 <ul style="list-style-type: none"> ■ 1310 nm ■ 1550 nm ■ 1850 nm ■ 1490 nm 	<ul style="list-style-type: none"> ■ EN60950-1:2006+A11 ■ EN60825-1:2007, EN60825-2:2004+A1 ■ UL60950-1 	<ul style="list-style-type: none"> ■ UR ■ TUV
Alternate Laser SFP Insert	Neo Photonics	<ul style="list-style-type: none"> ■ PT7320-51-1W+ ■ PTB3350-3331W-LC/PC+ ■ PTB3530-3331W-LC/PC+ ■ PTB3370-553CW-LC/PC+ ■ PTB3830-553CW-LC/PC+ ■ PT7320-51-1W+ 	Class 1 <ul style="list-style-type: none"> ■ 1310 nm ■ 1550 nm ■ 1850 nm ■ 1490 nm 	<ul style="list-style-type: none"> ■ EN60950-1:2006+A11 ■ EN60825-1:2007 ■ EN60825-2:2004+A1 ■ UL60950-1 	<ul style="list-style-type: none"> ■ UR ■ TUV

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