

## Mediant 500Li Metal MSBR



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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: May-29-2023

## 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 500Li.

## Related Documentation

Document Name
Release Notes
Mediant 500Li User's Manual
Mediant 500Li CLI Reference Guide

## General Notes and Warnings, and Safety Information



### FCC Caution

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



### IMPORTANT NOTE: FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This transmitter and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



**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 device's Regulatory Information.

Open-source software may have been added and/or amended. For further information, visit AudioCodes website at <https://www.audiocodes.com/services-support/open-source> or contact your AudioCodes sales representative.



## Document Revision Record

LTRT	Description
10612-Reg	Compliance

## 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 500Li (hereafter referred to as *device*) and step-by-step instructions on mounting and cabling the device.

The device supports the following interfaces:

- Multiple WAN interfaces (depending on ordered configuration):
  - 1 x Gigabit Ethernet over Copper (10/100/1000Base-T) unshielded twisted pair (UTP) interface port
  - Dual-mode 1.25 Gbps Optical Fiber Small Form-Factor Pluggable (SFP)
  - ADSL2(2+) / VDSL2, Vectoring 17a / 30a / 35b
  - 4G Cellular WAN access, using an integrated Long-Term Evolution (LTE) modem
- 4 x Gigabit Ethernet (1000Base-T) LAN ports (RJ-45).
- (Optional) Wireless LAN 802.11n/b/g (Wi-Fi) access point, providing two integrated, multiple-input and multiple-output (MIMO) 2Tx/2Rx antennas that operate in the 2.4 GHz frequency range.
- 1 x USB 3.0 port for optional USB storage services.
- Optional PSTN telephony interfaces:
  - Up to 8 FXS port interfaces
- 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.



## 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:
  - 4 x anti-slide bumpers for desktop installation
  - 3 x Wi-Fi antennas (depending on ordered model)
  - 2 x cellular antennas (depending on ordered model)
  - 1 x 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"> <li>■ Operational: 5 to 40°C (41 to 104°F)</li> <li>■ Storage: -25 to 85°C (-13 to 185°F)</li> <li>■ Relative Humidity: 10 to 90% non-condensing</li> </ul>

### 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 table.

**Figure 1: Front Panel**





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

**Table 2: Front Panel Description**

Item #	LED Label	Description
1	<b>Power</b>	Indicates the status of the power supply to the device. For more information, see Section 3.2.1.1 on page 10.
2	<b>Status</b>	Indicates the operating status of the device. For more information, see Section 0 on page 11.
3	<b>Wi-Fi</b>	Indicates the operating status of the wireless LAN interface. For more information, see Section 3.2.1.3 on page 11. <b>Note:</b> The LED is available only on models ordered with wireless LAN functionality.
4	<b>WAN 4G</b>	Indicates the status of the LTE cellular WAN connection. For more information, see Section 3.2.1.4.1 on page 11. <b>Note:</b> The LED is available only on models ordered with LTE WAN functionality.
5	<b>WAN GE</b>	Indicates the status of the Gigabit Ethernet over Copper WAN connection. For more information, see Section 0 on page 11.
6	<b>WAN SFP</b>	Indicates the status of the optical fiber (SFP) WAN connection. For more information, see Section 3.2.1.4.4 on page 12.
7	<b>WAN DSL</b>	Indicates the status of the DSL WAN connection. For more information, see Section 3.2.1.4.5 on page 12.

## 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
<b>Green</b>	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"> <li>■ Initial rebooting stage.</li> <li>■ Software upgrade (.cmp file) in process.</li> </ul>
Red	On	Boot failure.
-	Off	Advanced rebooting stage.

### 3.2.1.3 Wi-Fi LED

The **Wi-Fi** LED indicates the Wi-Fi link status, as described in the table below.

**Table 5: Wi-Fi LED Description**

LED Color	LED State	Description
Green	On	Wi-Fi is activated.
	Flashing	Traffic on the wireless LAN.
-	Off	Wi-Fi is not configured.

### 3.2.1.4 WAN LEDs

This section describes the WAN LEDs.

#### 3.2.1.4.1 WAN 4G LED

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

**Table 6: WAN 4G LED Description**

LED Color	LED State	Description
Green	On	SIM card is installed and an LTE cellular connection has been established.
	Flashing	In the process of connecting to the cellular network.
Red	On	<ul style="list-style-type: none"> <li>■ No SIM card.</li> <li>■ SIM card is installed and an error exists - cannot connect to the cellular network (e.g., SIM failure).</li> </ul>
-	Off	<ul style="list-style-type: none"> <li>■ Cellular interface has been configured but has been shut down (regardless of whether a SIM card is installed).</li> <li>■ Cellular interface is not configured or no License Key, (regardless of whether a SIM card is installed).</li> </ul>

### 3.2.1.4.2 WAN GE LED

The **WAN GE** LED indicates the status of the Gigabit Ethernet over Copper WAN link, as described in the table below.

**Table 7: 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.

### 3.2.1.4.3 WAN SFP LED

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

**Table 8: 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.

### 3.2.1.4.4 WAN DSL LED

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

**Table 9: WAN DSL 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 + 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 10: Front Panel Description

Item #	Label	Description
1	<b>POWER</b>	DC power supply plug entry for connecting the device to the external AC/DC power supply adapter.
2	<b>ON / OFF</b>	Power button which powers on the device when pressed in and powers off the device when pressed again (pressed out).
3	<b>CONSOLE</b>	RJ-45 port for RS-232 serial communication with the device.
4		USB 3.0 port, which can be used with a third-party external USB hard drive or flash disk (disk on key) for USB storage capabilities (for example, for configuration file) <b>Note:</b> The USB port is not provided when the device is ordered with LTE cellular support.

Item #	Label	Description
5	//	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 15 seconds, but no longer than 25 seconds.
6	<b>S0 (Slot 0) WAN</b>	WAN interface ports, which can be any of the following (depending on ordered configuration): <ul style="list-style-type: none"> <li>■ <b>GE:</b> GE over Copper</li> <li>■ <b>GE SFP:</b> SFP module</li> <li>■ <b>DSL:</b> DSL interface</li> </ul> <b>Note:</b> For available WAN configurations, contact your AudioCodes sales representative.
7	<b>S1 (Slot 1) GE LAN</b>	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.
8	-	Ground lug.
9	<b>S2 (Slot 2) FXS S3 (Slot 3) FXS</b>	Slot #2 and #3 can each occupy four analog FXS port interfaces (RJ-11).
10	-	Cellular antennas for 4G LTE network. <b>Note:</b> The antennas are applicable only to models ordered with the 4G LTE cellular functionality.
11		SIM card slot for 4G LTE cellular. <b>Note:</b> The SIM card slot is applicable only to models ordered with the 4G LTE cellular functionality.
12	-	Multiple-input and multiple-output (MIMO) 3Tx/3Rx antennas, operating in the 2.4 GHz frequency range for wireless LAN 802.11n/b/g (Wi-Fi) access point functionality. <b>Note:</b> The antennas are applicable only to models ordered with the Wi-Fi 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 11: 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).



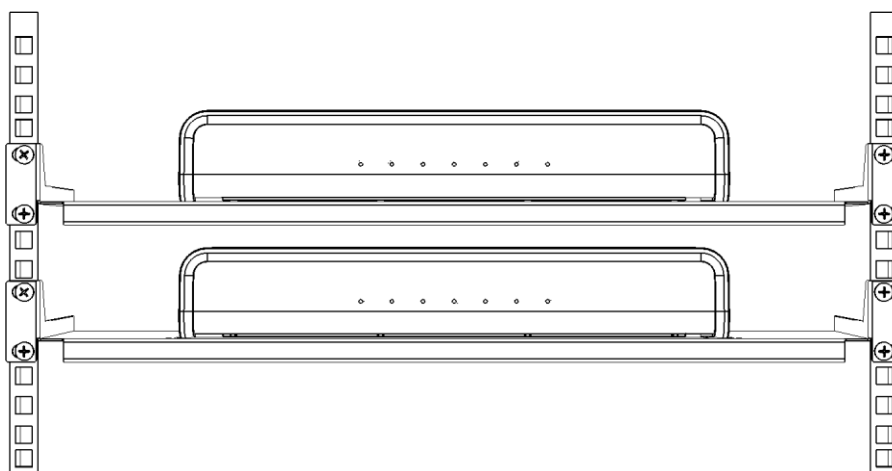
The AudioCodes 1U 19-inch rack mount shelf is not supplied with your product and can be ordered separately from an AudioCodes sales distributor.



**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.

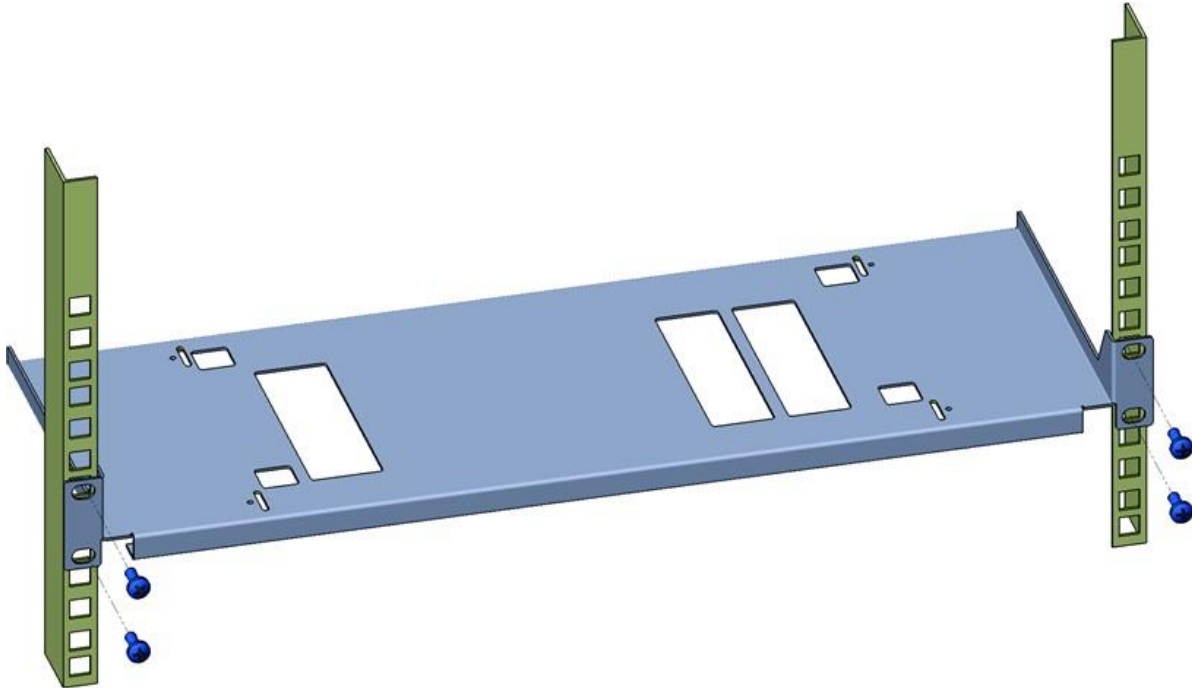
**Figure 3: Minimum Vertical Space for 19-inch Rack Mounting**





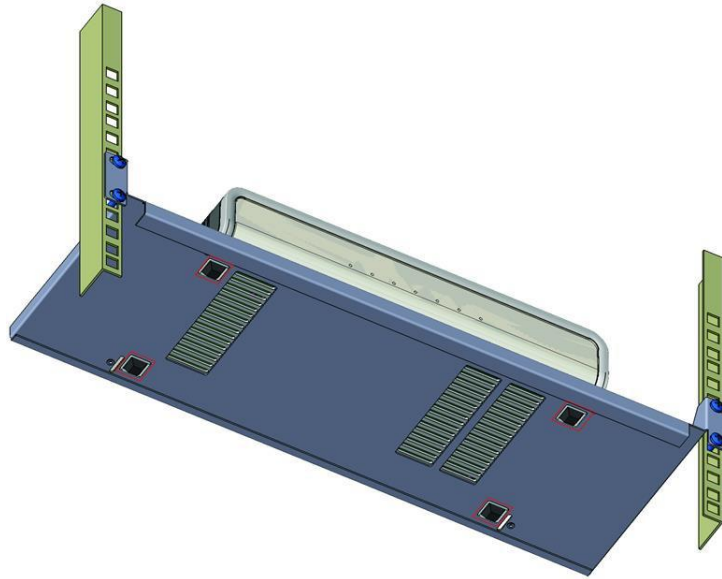
**To mount the device in a 19-inch rack:**

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.

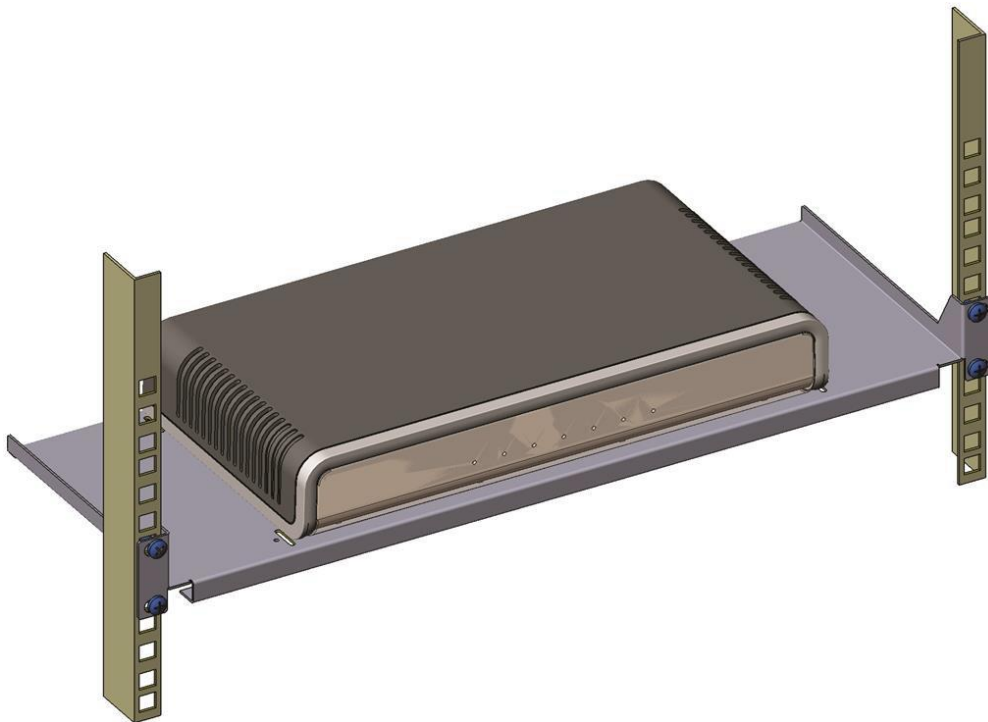
**Figure 4: Positioning Shelf in Rack**

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 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**

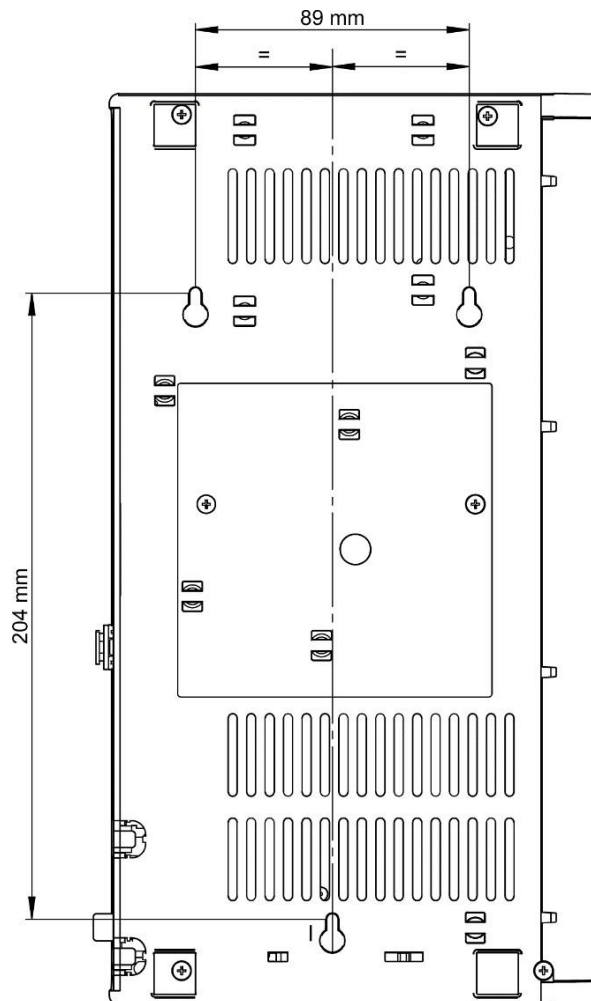
## 4.2 Wall Mounting

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

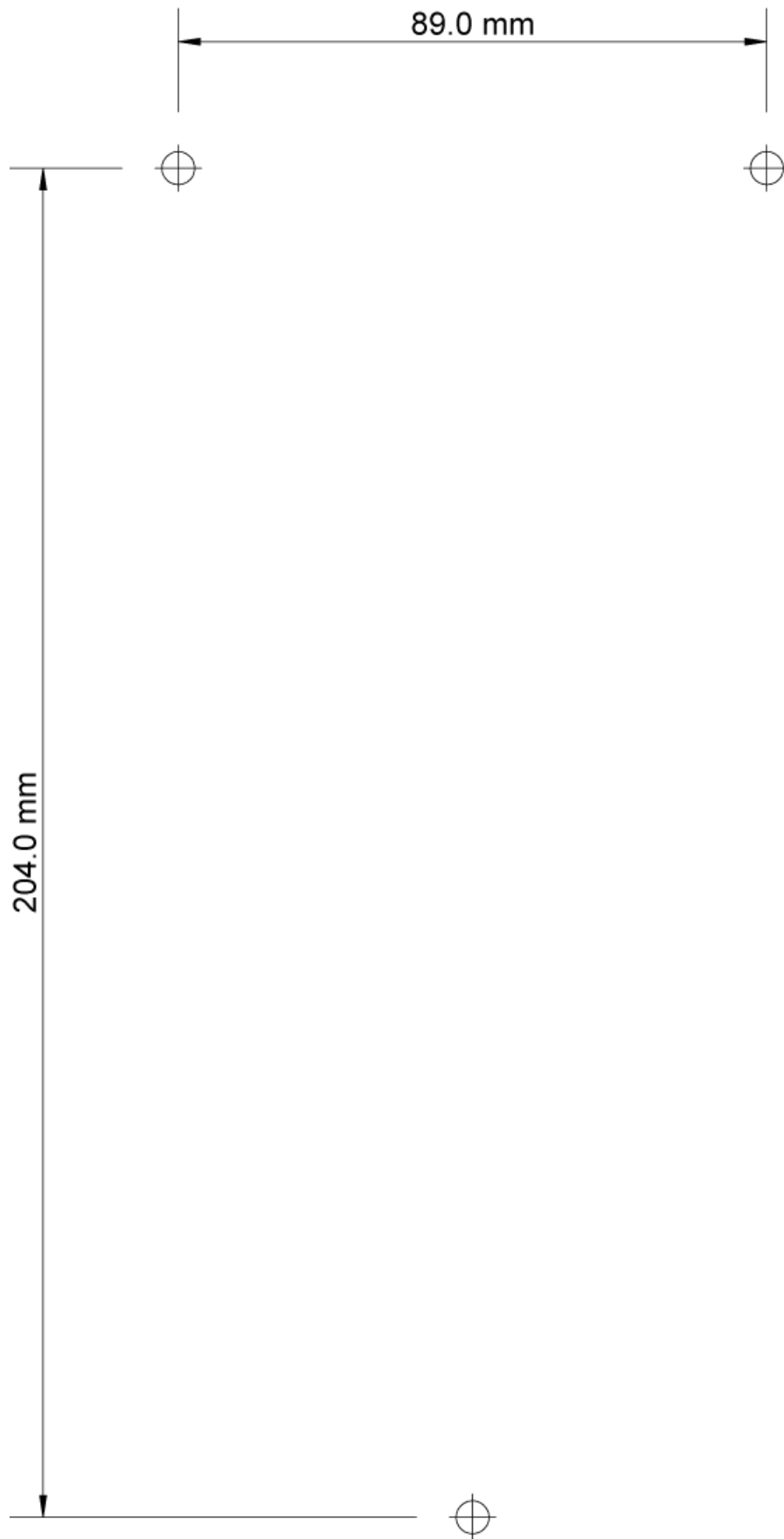
### To mount the device on a wall:

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



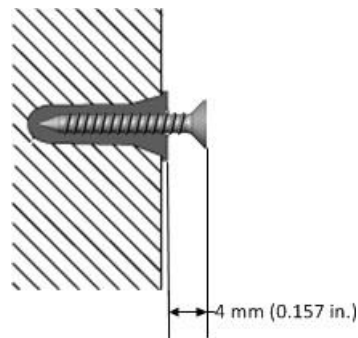
- When choosing the area on the wall to mount the device, make sure that sufficient space is available for attaching cables on the rear panel.
- Make sure that you drill the holes in the **same orientation** as shown in the above figure (i.e., two parallel holes on the top and the single hole on the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

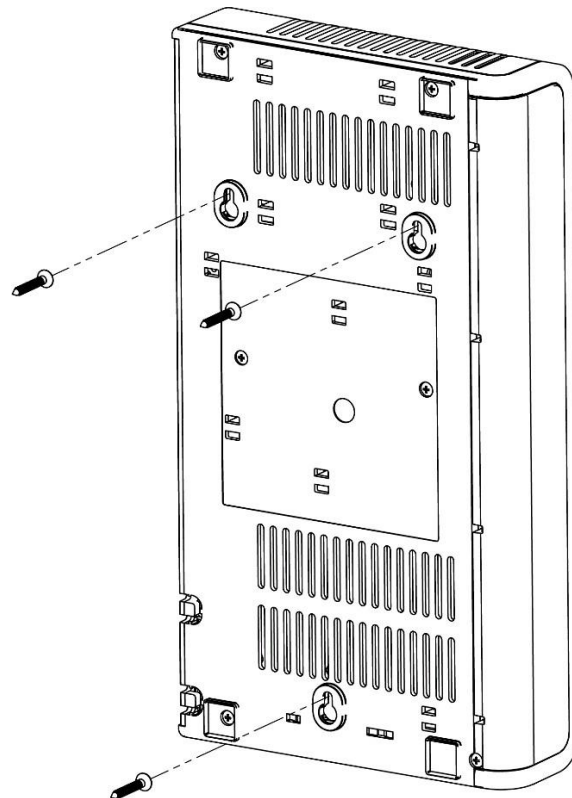
3. Thread screws (not supplied) into each of the wall anchors. The recommended screw type is DIN 7982 3.5x25 Phillips flat head. Make sure that the heads extend sufficiently (about 4 mm or 0.157 in.) from the wall for the device's keyholes to hang on:

**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 Wi-Fi Connection

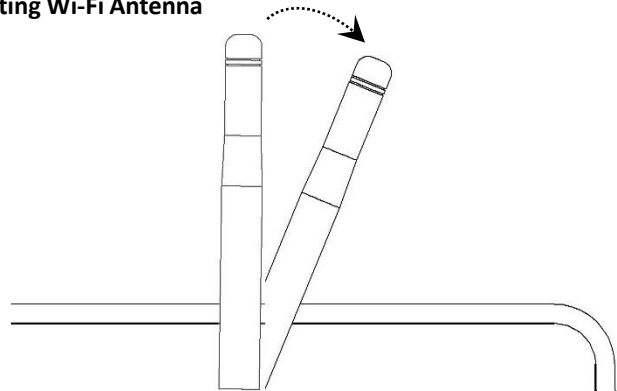


Wi-Fi functionality is a customer a separate orderable item.

### 5.1 Orienting the Wi-Fi Antennas

If you have ordered LAN wireless (Wi-Fi) functionality, the device is shipped with two pre-attached, external Wi-Fi antennas. You can orient the antennas in the vertical plane, from 0 to 180 degrees for optimal wireless transmission and reception. For best performance, it is recommended that the antennas be perpendicular (90 degrees) to the floor. In other words, orient the antennas straight up.

**Figure 10: Orienting Wi-Fi Antenna**



### 5.2 Switching On the Wi-Fi

The wireless LAN interface can be turned on or off by pressing the Wi-Fi pinhole button located on the rear panel.

## 6 Cabling the Device

This chapter describes device cabling.

### 6.1 Grounding and Surge Protection

The device must be connected to earth (grounded) using an equipment-earthing conductor.



#### Protective Earthing

- The equipment is classified as Class I EN 62368-1 and UL 62368-1 and must be earthed at all times.
- **For Finland:** "Laite on liltettava suojamaadoituskoskettimilla varustettuun pistorasiaan."
- **For Norway:** "Apparatet rna tilkoples jordet stikkontakt."
- **For Sweden:** "Apparatens skall anslutas till jordat uttag."



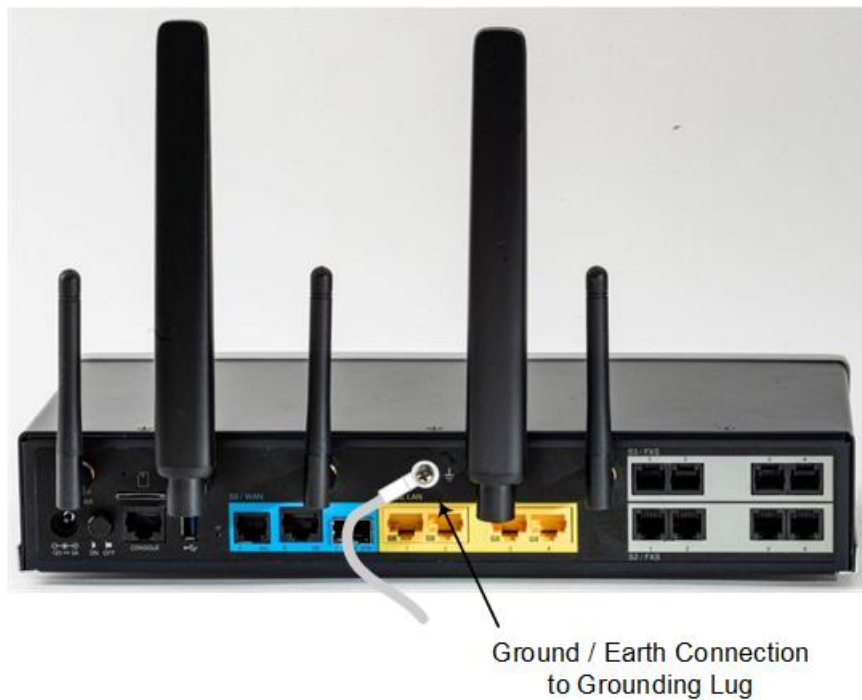
#### Grounding and Power Surge Protection

- The device must be installed only in telecommunication sites / centers in compliance with ETS 300-253 requirements "Earthing and Bonding of Telecommunication Equipment in Telecommunication Centers".
- Prior to installation, earth loop impedance test must be performed by a certified electrician to ensure grounding suitability at the power outlet intended to feed the unit. It is essential that the impedance will be kept below 0.5 ohms!
- Proper grounding is crucial to ensure the effectiveness of the lightning protection, connect the device permanently to ground (as described in the procedure below). The device's grounding screw must be connected to the equipotential grounding bus bar located in the Telecommunication rack or installation site, using a wire of 6 mm<sup>2</sup> 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<sup>2</sup>. The length of this cable must be as short as possible (no longer than 3 meters).
- The device does **not** include primary telecom protection! When the **FXO or DSL** telephone lines are routed **outside the building**, additional protection - usually a 350V three-electrode Gas Discharge Tube (GDT) as described in ITU-T K.44 - **must** be provided at the entry point of the telecom wires into the building (usually on the main distribution frame / MDF), in conjunction with proper grounding. The center pin of the GDT (MDF grounding bar) must be connected to the equipotential grounding bus bar of the Telecommunication room.
- Failing to install primary surge protectors and failing to comply with the grounding instructions or any other installation instructions, may cause permanent damage to the device!
- As most of the installation is the responsibility of the customer, AudioCodes can assume responsibility for damage only if the customer can establish that the device does not comply with the standards specified above (and the device is within the hardware warranty period).
- The device complies with protection levels as required by EN 55024/EN 300386. Higher levels of surges may cause damage to the device.
- To protect against electrical shock and fire, use a minimum of 26-AWG wire size to connect the FXO / DSL ports.

#### To earth 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.
2. Connect the other end of the strap to a protective earthing. This should be in accordance with the regulations enforced in the country of installation.

Figure 1: Earthing the Device



## 6.2 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. If this WAN interface also fails, the device switches over to the DSL WAN interface, and so on. For configuring WAN redundancy, refer to the *CLI Reference Guide*.

### 6.2.1 Connecting Gigabit Ethernet WAN over Copper

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 12: RJ-45 Connector Pinouts for WAN Copper GbE

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



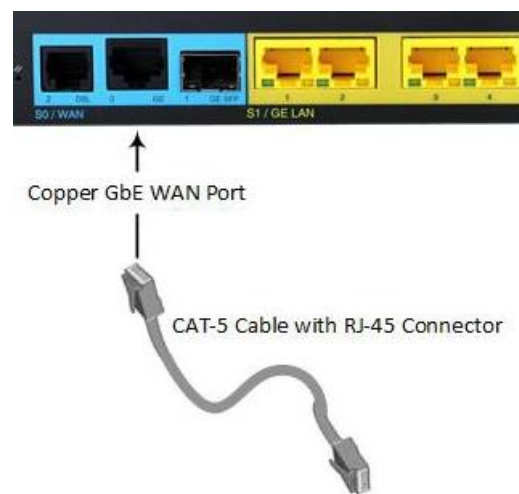
7	Ethernet signal pair
8	

#### 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 11: Cabling WAN Copper GbE Port**

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



## 6.2.2 Connecting Gigabit Ethernet WAN over Fiber-Optic

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 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 39, or contact your AudioCodes sales representative.
  - This AudioCodes device has been evaluated with the laser transceiver modules (SFP) listed in Appendix A on page 39. 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 39.

Cable specifications:

- WAN fiber-optic interface: LC-type plug
- WAN copper interface: see Section 6.1.1 on page 23

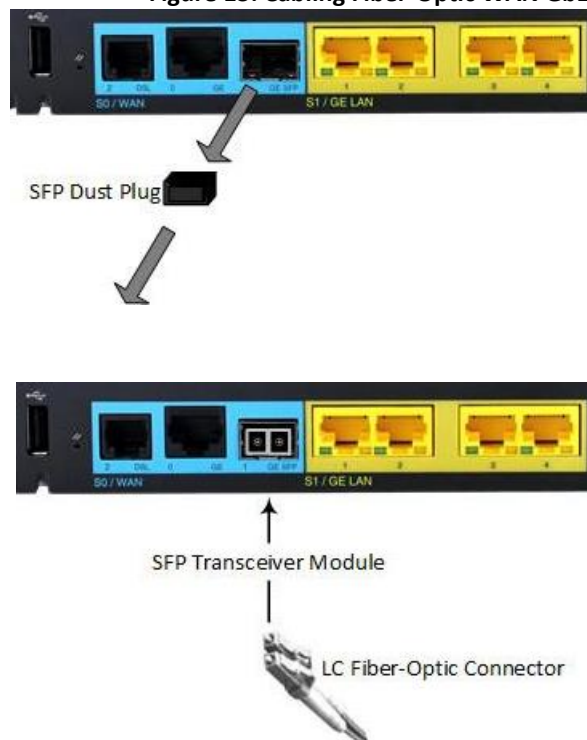
**To connect the fiber-optic WAN GbE port:**

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

**Figure 12: Removing Protective Dust Plug**

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

**Figure 13: Cabling Fiber-Optic WAN GbE Port**



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

### 6.2.3 Connecting VDSL2 and ADSL2(2+) WAN

The device supports VDSL2 / ADSL2(2+) with a signal bandwidth of up to profiles 17a / 30a / 35b. The WAN port provides a single xDSL interface through an RJ-11 port.

The specifications of the xDSL interface include the following:

- **VDSL2/ADSL2+ Data Engine:**
  - Supports all VDSL2 (G.993.21), ADSL2+ (G.992.5), ADSL2 (G.992.3) and ADSL full-rate (G.992.1)
  - Supports retransmission (G.998.4)
  - Supports G.Vector (G.993.5)
  - Supports G.Bond (G.998.2)
- High-performance VDSL2 supports profile up to 35b, 30a, 17a, 12x, 8x and ADSL2+ with on-chip Interleaver/Retransmission Memory for Annex-Q
- Supports simultaneous Retransmission and Vectoring
- **ADSL:**
  - 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
- **VDSL:**
  - 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. For more information, contact your AudioCodes sales representative.

Cable specification:

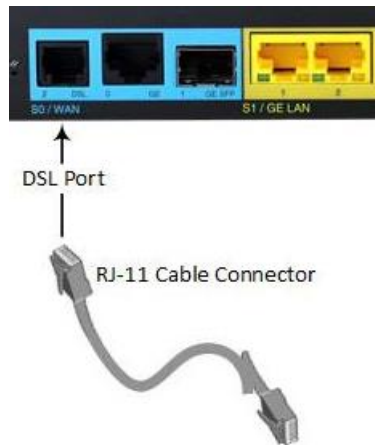
- **Connector:** RJ-11
- **Connector Pinouts:**

**Table 13: RJ-11 Connector Pinouts for WAN DSL**

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 DSL port:**

1. Connect an RJ-11 cable connector to the device's DSL WAN port (labeled **DSL**).
2. Connect the other end of the cable to the access point.

**Figure 14: Cabling DSL WAN Port**

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

## 6.2.4 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 14: LTE Variant Types**

Type	Region	Bands
E	EMEA and Asia	<ul style="list-style-type: none"> <li>■ LTE FDD: B1/B3/B5/B7/B8/B20</li> <li>■ LTE TDD: B38/B40/B41</li> <li>■ WCDMA: B1/B5/B8</li> <li>■ GSM: B3/B8</li> </ul>
A	North America	<ul style="list-style-type: none"> <li>■ LTE FDD: B2/B4/B12</li> <li>■ WCDMA: B2/B4/B5</li> </ul>
AU	Australia-New Zealand and Latin America	<ul style="list-style-type: none"> <li>■ LTE FDD: B1/B2/B3/B4/B5/B7/B8/B28</li> <li>■ LTE TDD: B40</li> <li>■ WCDMA: B1/B2/B5/B8</li> <li>■ GSM: B2/B3/B5/B8</li> </ul>



- 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:

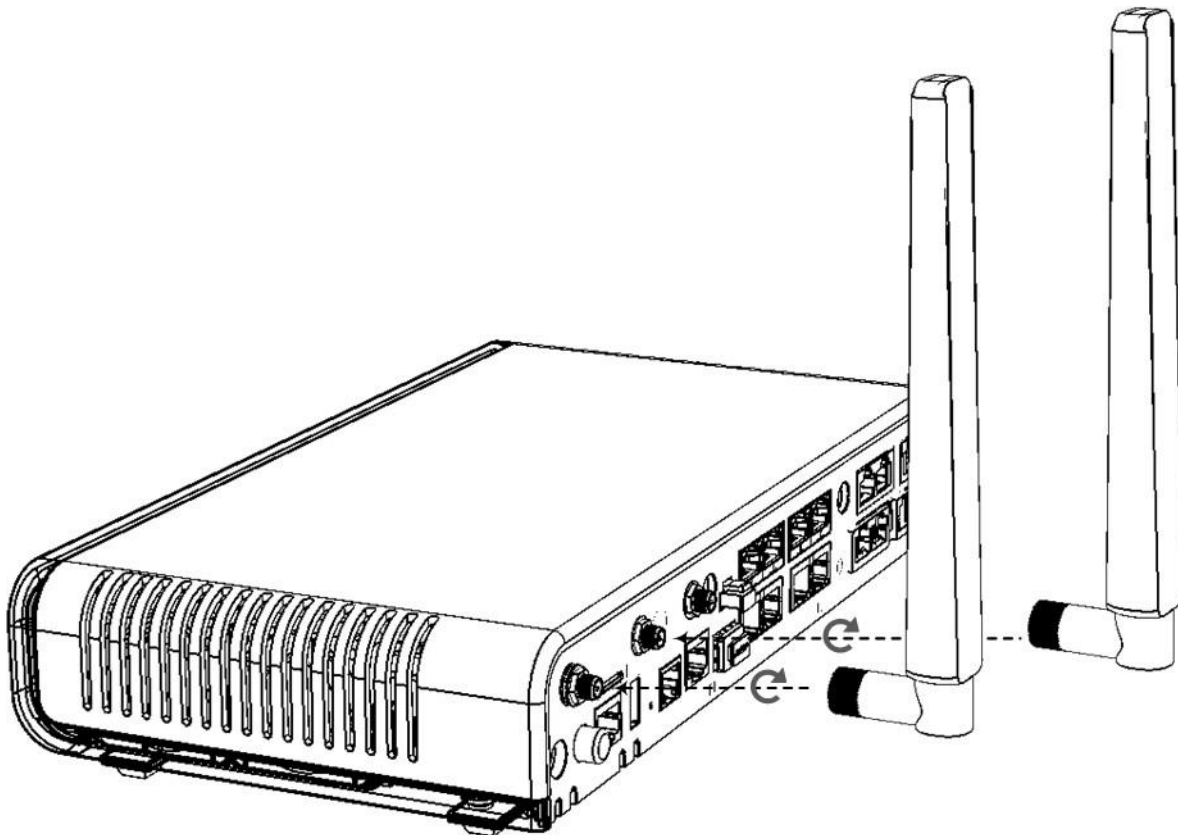
- Two cellular antennas (supplied unattached with the device)
- SIM card provided by your service provider

**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.)

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 16: 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).

## 6.3 Connecting to LAN

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:

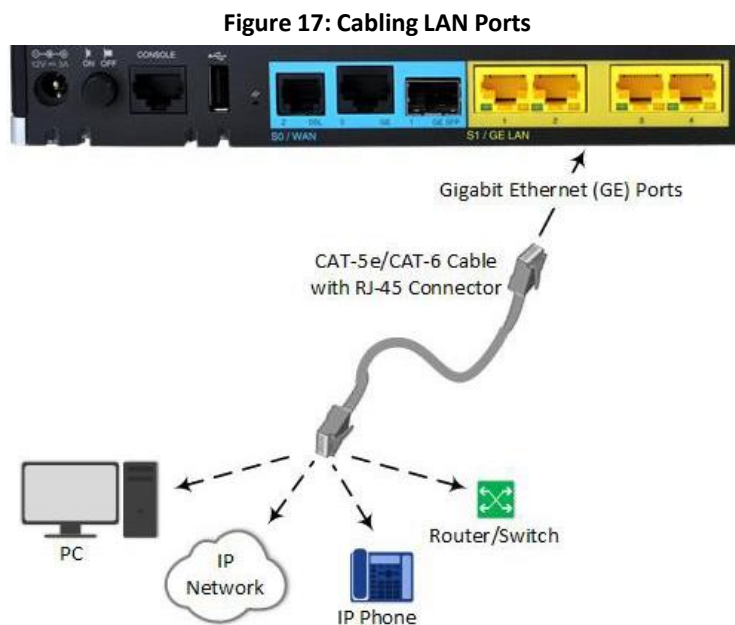
- **Cable:** straight-through Cat 5e or Cat 6 cable
- **Connector:** RJ-45
- **Connector Pinouts:**

**Table 15: 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	

#### 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**.



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

## 6.4 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.

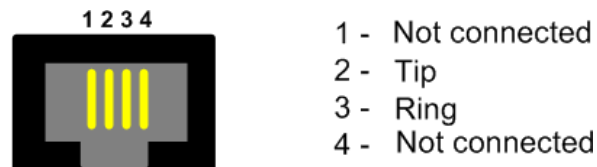


- FXS interface is a customer-ordered item which is supported only on specific hardware configurations. For more information, contact your AudioCodes sales representative.
- The FXS interfaces support loop-start signaling (indoor only).

Cable specification:

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

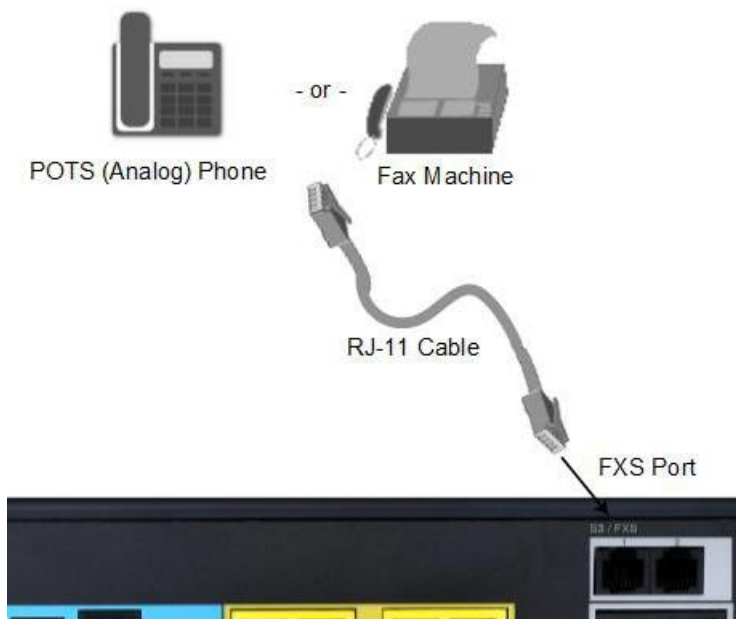
**Figure 18: RJ-11 Connector Pinouts for FXS Interfaces**



**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 19: 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).

## 6.5 Connecting Serial Interface to 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 needs to be ordered for serial cabling:



Figure 21: RS-232 Cable Adapter



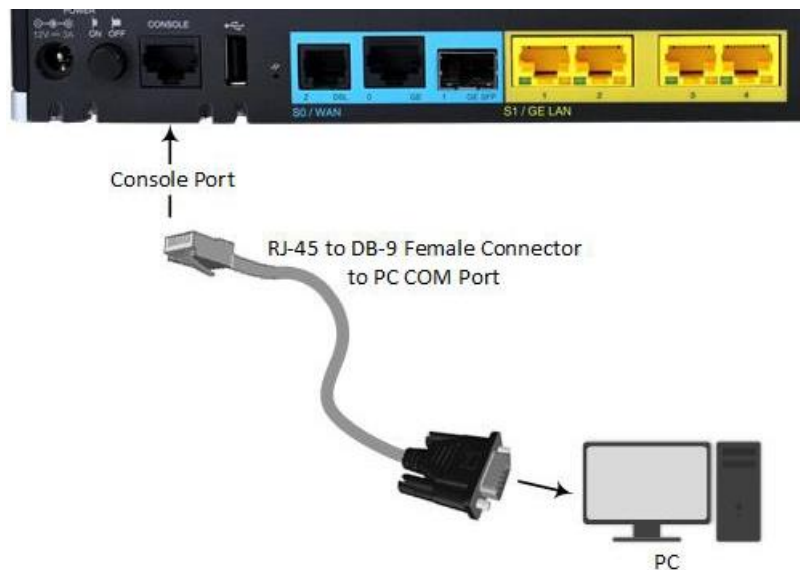
Table 17: RJ-45 to DB-9 Serial Cable Connector Pinouts

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 22: 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.

## 6.6 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 23: Connecting USB Storage Device**



Only a single USB storage (formatted to FAT/FAT32) operation is supported at any given time.

## 6.7 Connecting Power

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 6.7.1 on page 36
- 5A power supply – see Section 6.7.2 on page 38

**Table 18: Power Specifications**

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



**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).



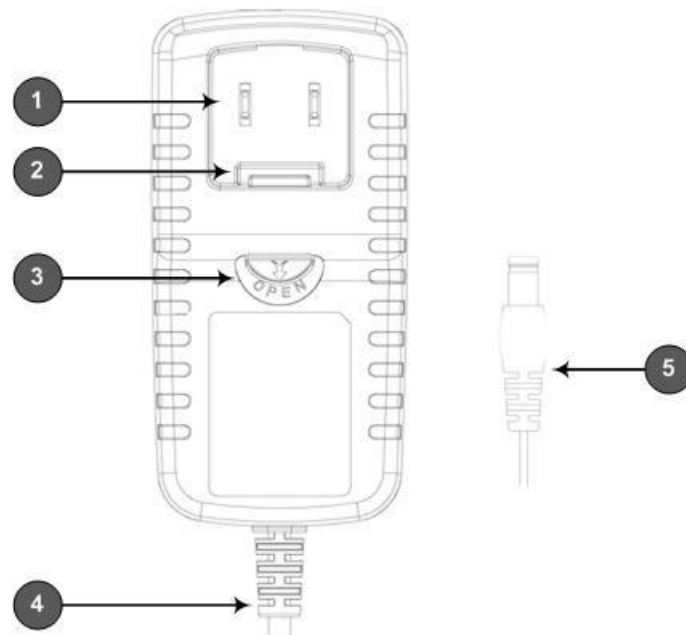
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## 6.7.1 3-Amp Power Supply Cabling

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 24: 3A AC/DC Power Adapter**

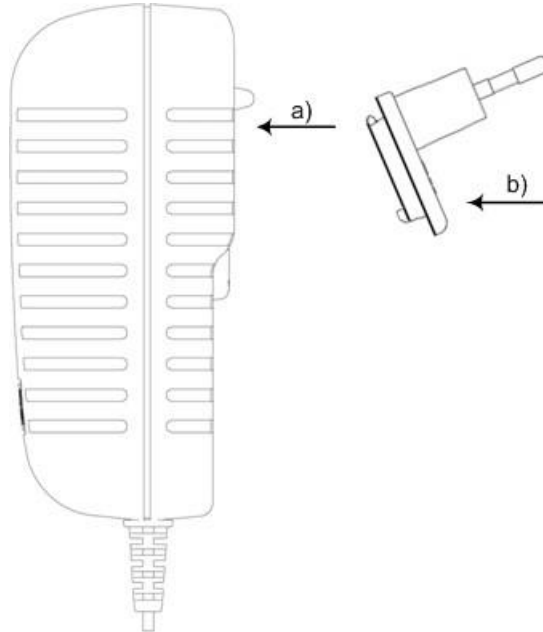


**Table 19: Power Adapter with Interchangeable Plugs**

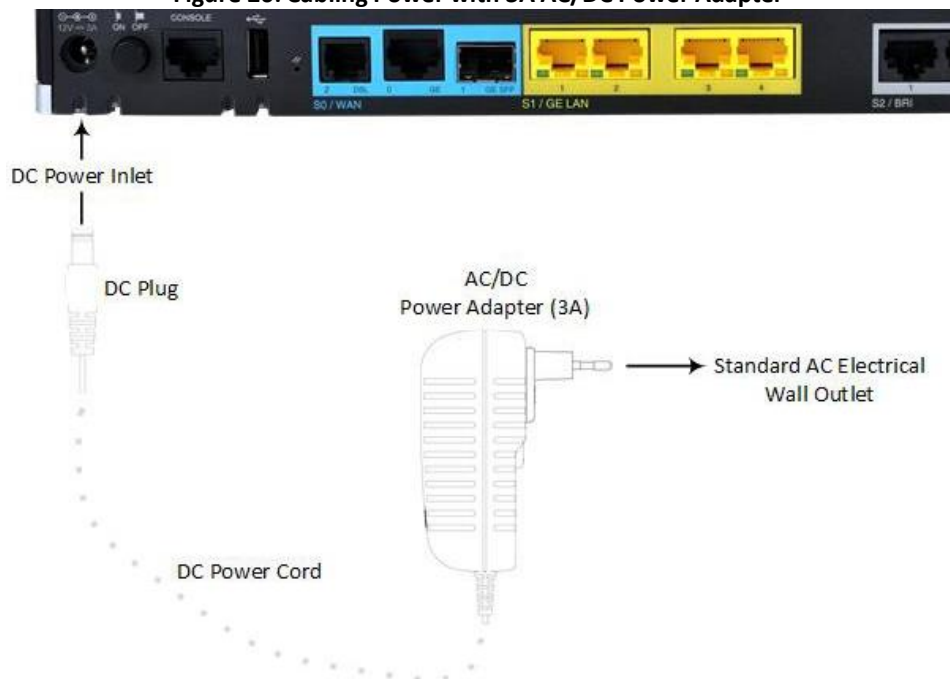
Item	Description
1	Plug slot
2	Plug lock
3	Plug release lever
4	DC power cord
5	DC power plug

**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 25: 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 26: Cabling Power with 3A AC/DC Power Adapter**

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

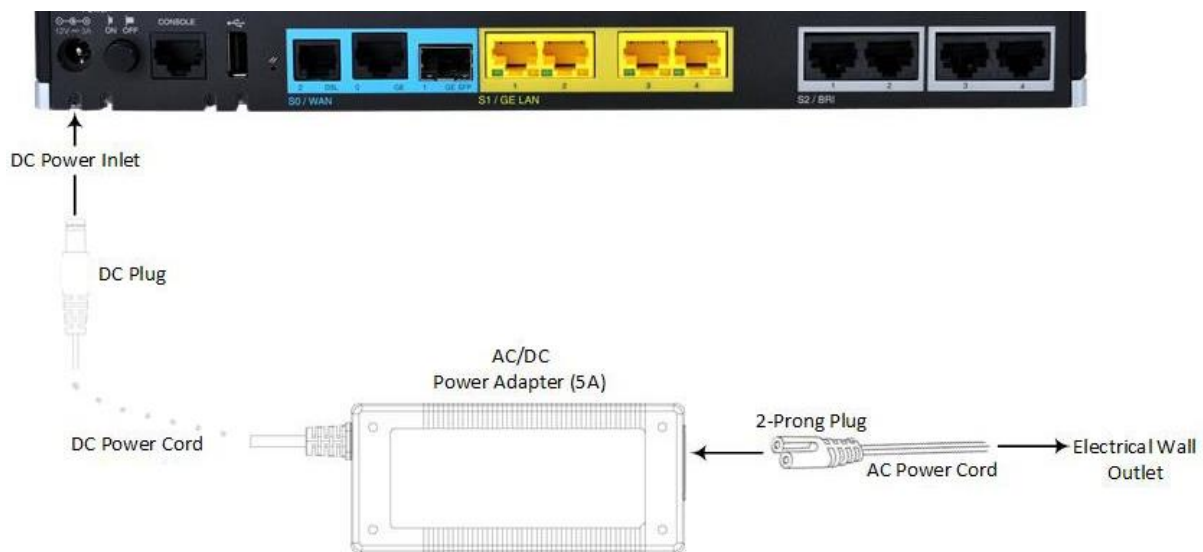
## 6.7.2 5-Amp Power Supply Cabling

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 27: Cabling 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.

## 6.7.3 Switching Device On and Off

The device is equipped with a power switch, which is located on its rear panel (see Section 0 on page 13) 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 6.1.2 on page 24.

**Table 20: Approved SFP Modules**

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

**International Headquarters**

1 Hayarden Street,  
Airport City  
Lod 7019900, Israel  
Tel: +972-3-976-4000  
Fax: +972-3-976-4040

**AudioCodes Inc.**

80 Kingsbridge Rd  
Piscataway, NJ 08854, USA  
Tel: +1-732-469-0880  
Fax: +1-732-469-2298

Contact us: <https://www.audiocodes.com/corporate/offices-worldwide>

Website: <https://www.audiocodes.com>

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