

**Gigabit Ethernet over VDSL2
Converter**

EVC-3101

User's Manual

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EVC-3101

If you find information in this manual that is incorrect, misleading, or incomplete, we would appreciate your comments and suggestions.

FCC Warning

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Mark Warning

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Energy Saving Note of the Device

This power required device does not support Standby mode operation. For energy saving, please remove the power cable to disconnect the device from the power circuit. Without removing the power cable, the device will still consume power from the power source. In view of Saving the Energy and reducing the unnecessary power consumption, it is strongly suggested to remove the power connection for the device if this device is not intended to be active.

WEEE Warning



To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

Revision

ANTAIRA Gigabit Ethernet over VDSL2 Converter User's Manual

For Models: EVC-3101

Revision: 1.1 (January 2018)

Part No.: 2350-AC0500-001

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1. PACKAGE CONTENTS

Thank you for purchasing Antaira Gigabit Ethernet over VDSL2 Converter, EVC-3101.

Open the box of the EVC-3101 Converter and carefully unpack it. The box should contain the following items:

- **EVC-3101**
- **5V, 2A Power Adapter**
- **User Manual**

If any of these are missing or damaged, please contact your dealer immediately; if possible, retain the carton including the original packing material, and use them again to repack the product in case there is a need to return it to us for repair.

2. PRODUCT FEATURES

➤ **Physical**

- **EVC-3101**
 - 1 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports
 - 1 RJ11, connector for VDSL port with VDSL connection

➤ **PRODUCT FEATURES**

- Cost-effective bridge function to connect two Ethernet LANs
 - ▶ Point-to-point application: LAN to LAN extension over phone wire
- Up to 150/150Mbps bandwidth (in **G.INP, Sym, 8dB** mode)
- ITU-T G.993.2 VDSL2 standard
- ITU-T G.993.5 G.vectoring and G.INP
- DMT-based coding technology
- CO/CPE mode selectable via DIP switch
- Selectable target band plan (symmetric and asymmetric) and SNR margin
- Half duplex back pressure and IEEE 802.3x full duplex pause frame flow control
- Voice and data communication can be shared simultaneously based on the existing telephone wire with distance up to 1.4km
- Supports a packet size of up to 9K bytes; IEEE 802.1Q VLAN tag transparency
- VDSL2 stand-alone transceiver for simple bridge modem application
- Advantage of minimum installation time (Simply by Plug and Play)
- Supports extensive LED indicators for network diagnosis

➤ **Hardware Features**

- Compact size, wall-mountable design
- Metal case, good for heat sinking
- Easy installation; ideal solution for space-limited locations
- Co-work with Antaira Media Chassis (FCU-RACK16 series)

3. HARDWARE INTRODUCTION

3.1. Front Panel and LED Indicators

■ EVC-3101 Front Panel

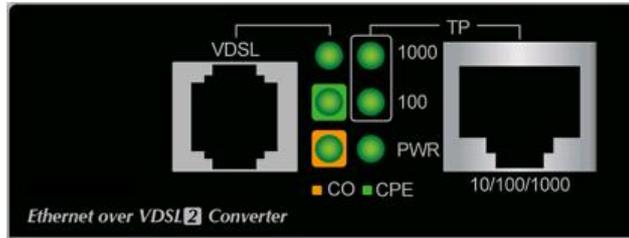


Figure 3-1-1: EVC-3101 Front Panel

- ▶ 10/100/1000BASE-T RJ45 connector for Ethernet
- ▶ RJ11 connector for VDSL2; connect to EVC-3101 Converter
- ▶ LEDs for power, Ethernet and VDSL

■ EVC-3101 LED Indicators

▶ System

LED	Color	Function	
PWR	Green	Lit	Indicates that the EVC-3101 has power.
		Off	Indicates that the EVC-3101 has no power.

▶ VDSL

LED	Color	Function	
VDSL	Green	Lit	Indicates that the VDSL link is established.
		Fast Blink	Indicates that the VDSL link is at training status (about 10 seconds).
		Slow Blink	Indicates that the VDSL link is at idle status.
CO	Green	Lit	Indicates the EVC-3101 is running in CO mode.
CPE	Green	Lit	Indicates the EVC-3101 is running in CPE mode.

▶ 10/100/1000BASE-T Port

LED	Color	Function	
1000	Green	Lit	Indicates that the port is operating at 1000Mbps .
		Blink	Indicates that the EVC-3101 actively sending or receiving data over that port at 100Mbps or 10Mbps
		Off	Indicates that the port is link down or 10/100Mbps .
100	Green	Lit	Indicates that the port is operating at 100Mbps or 10Mbps .
		Blink	Indicates that the EVC-3101 is actively sending or receiving data over that port at 100Mbps or 10Mbps .
		Off	Indicates that the port is link down or 1000Mbps .

3.2. Rear Panel and Mode DIP Switch

■ EVC-3101 Rear Panel



Figure 3-2-1: EVC-3101 Rear Panel

- ▶ DIP switch
- ▶ DC jack (DC input) for power adapter

■ DC Power Jack

The EVC-3101 requires 5V DC, 2A power input, which conforms to the bundled AC adapter. Should you have the issue of power connection, please contact your local sales representative.



Note

The device is a power-required device, meaning it will not work till it is powered. If your networks should be active all the time, please consider using UPS (uninterrupted power supply) for your device. It will prevent you from network data loss or network downtime.

■ DIP Switch

The EVC-3101 provides 4 selective transmission modes. By switching the transmission modes, you can obtain a best transmission mode to suit with phone line quality or distance of connectivity. The following is the summary table of transmission setting, bandwidth and distance extensibility tested for AWG 24 (0.5mm) twisted-pair without noise and cross talk.

	DIP-1	DIP-2	DIP-3	DIP-4
	Mode	Transmission	Band Profile	SNR Margin
OFF	CO	G.INP	Asymmetric	12dB
ON (default)	CPE	Interleave	Symmetric	8dB

▶ DIP-1: Mode (CO / CPE)

CO (Central Office)	The Master device mode, usually the CO device, is located at the data center of ISP or enterprise to link to the backbone.
CPE (Customer Premises Equipment)	The Slave device mode, usually the CPE device, is located at branch office, home or remote side as the long reach data receiver. The CPE can be connected to the PC, IP camera or wireless access point or other network devices.



When the EVC-3101 operates in **CPE mode**, DIP switches 2, 3, and 4 are **without function**.

▶ DIP-2: Transmission (G.INP and Interleave mode)

G.INP	Method of protection against bursts from other devices or lines to impact your xDSL line.
Interleave	Method of error correction used on xDSL line. Interleave requires additional latency to improve resilience to burst of error.

▶ DIP-3: Band Profile (Asymmetric/Symmetric)

Asymmetric	Asymmetric mode provides more bandwidth than the other side. This mode provides the highest bandwidth in short range.
Symmetric	With G.997 band plan supported, symmetric mode can provide almost the same rate of downstream and upstream.

▶ DIP-4: SNR (Signal Noise Ratio) Margin

When the SNR margin is selected, the system provides 12dB/8dB SNR margin for across all usable loop lengths. Better channel noise protection is made with the higher SNR margin.



By default, the four DIP switches, set at the "**ON**" position, are operated as "**CPE**". For operating as "**CO**", please turn DIP 1 Switch to the "**OFF**" position. Then adjust the other DIP switches accordingly to fulfill different network application demands.

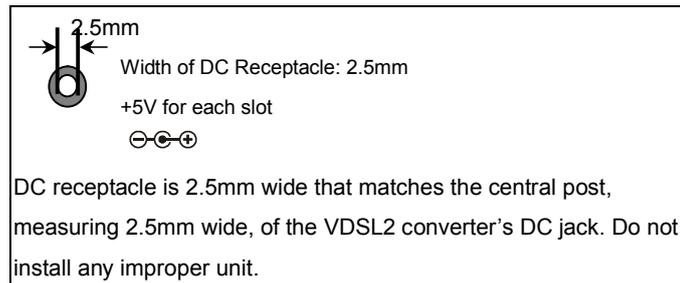


Please **power off** the EVC-3101 before making any transmission mode adjustment.

3.3. Power Information

The central posts of the EVC-3101 power jacks measure 2.5mm wide that require +5VDC power input. They conform to the bundled AC-DC adapter and Antaira media chassis. Should you have the issue of power connection, please contact your local sales representative.

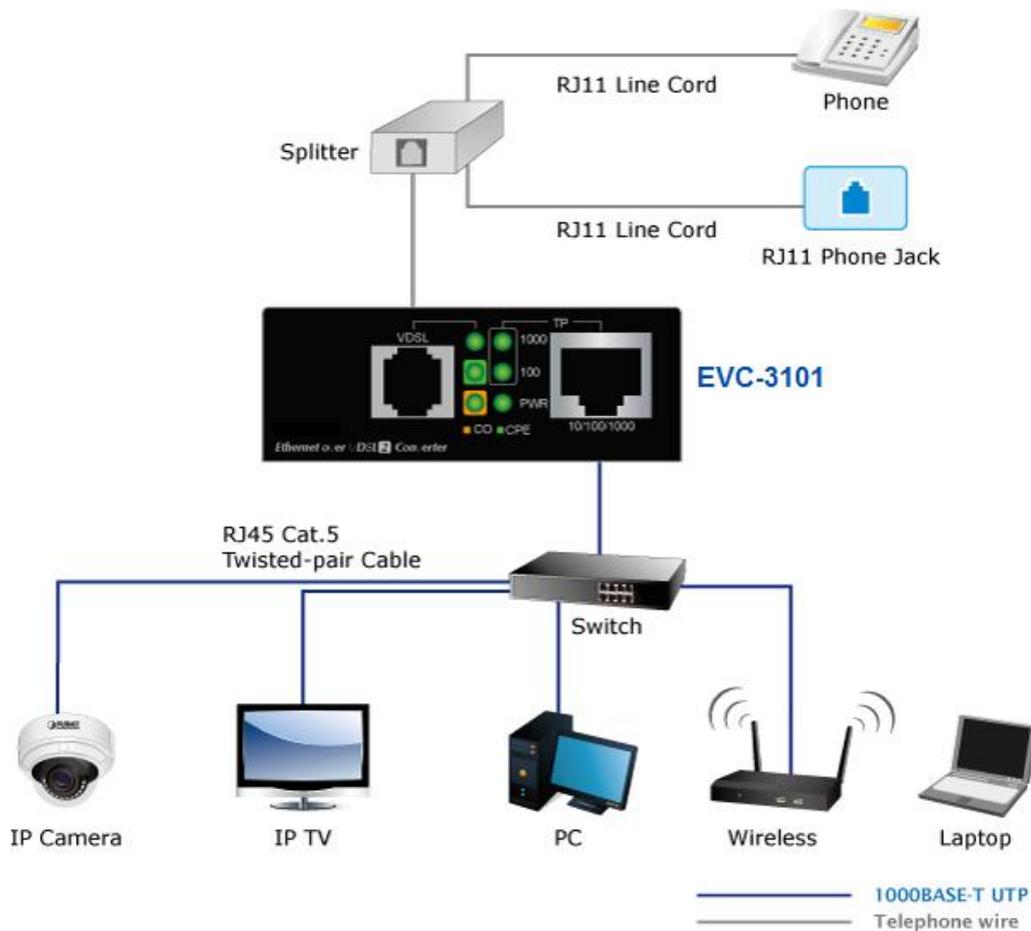
Please keep the AC-DC adapter as a spare part when the EVC-3101 is installed to a media chassis.



4. CONNECTING AND USING THE EVC-3101

The EVC-3101 does not require any software configuration. Users can immediately use any feature of this product simply by putting the plug in the receptacle and turning it on. There is some key limitation on the VDSL2 Bridge. Please check the following items:

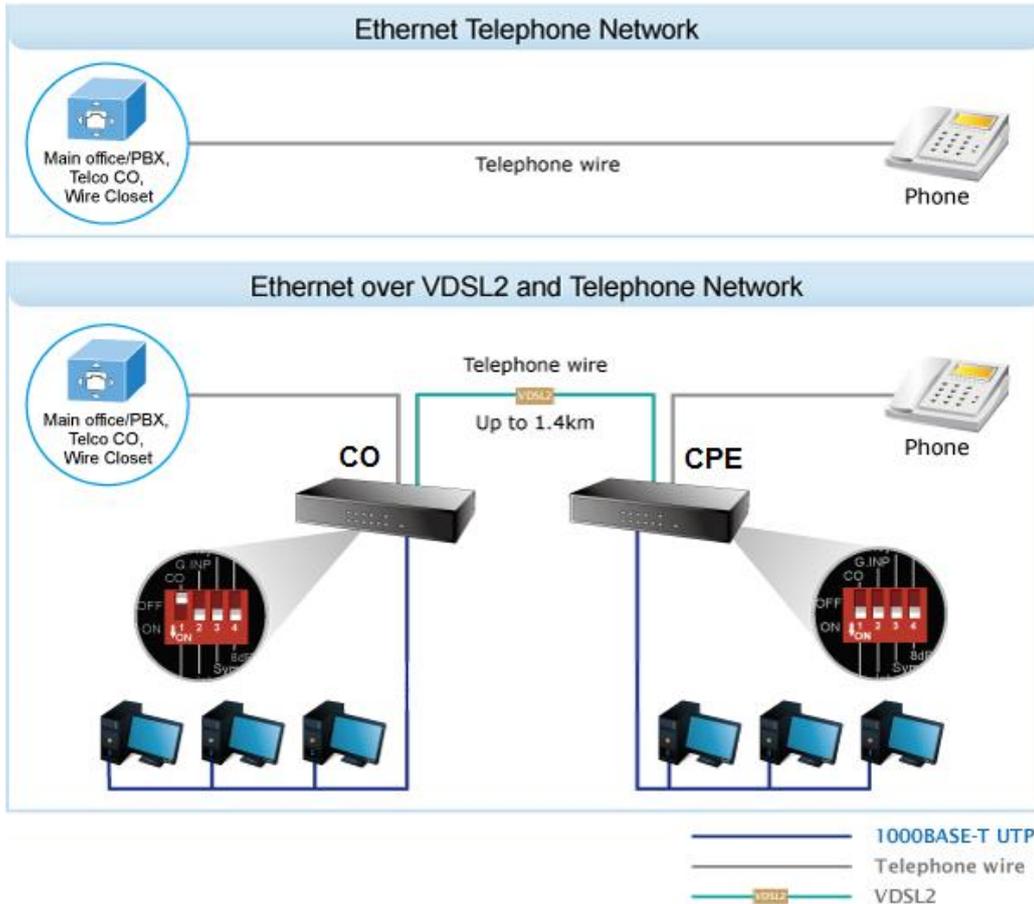
- The device can be used for **Point-to-Point** (one **CO** device to one **CPE** device) connection.
- The EVC-3101 provides only one RJ11 connector for VDSL2 port to build VDSL2 connection.
- Depending on the quality of telephone line, the maximum distance of one VDSL2 segment is 1.4km (4593ft) with AWG 24 telephone wires. The distance could vary on the quality of telephone wires.



4.1 Point-to-Point Application – LAN to LAN Connection

Two sets of the EVC-3101 could be used to link two local Area networks that are located in a different place. Through the normal telephone line, it could be set up a **150/150Mbps** (G.INP, Sym, 8dB) symmetric backbone, but one EVC-3101 must be Master (**CO mode**) and the other one is Slave (**CPE mode**).

LAN to LAN Connection



Refer to the following procedures to set up the EVC-3101 LAN to LAN connection.

1. **[LAN1]** Set the EVC-3101 at LAN 1 to be **CO** mode from the DIP switch
2. **[LAN2]** Set the EVC-3101 at LAN 2 to be **CPE** mode from the DIP switch
3. Power on the EVC-3101 CO and CPE at both sides by connecting its power source.
4. Power LED will illuminate.
5. Connect VDSL line from another VDSL device to RJ11 **VDSL port** of the EVC-3101.
6. **VDSL LNK LED** will blink to illuminate at both EVC-3101 devices.
7. Connect telephone to the RJ11 **Phone port** of the EVC-3101.
8. Connect the EVC-3101 Ethernet **LAN port** to other network device via regular Cat.5 UTP cable.

5 PRODUCT SPECIFICATIONS

Product	EVC-3101
Hardware Specifications	
LAN Ports	1 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports
VDSL Port	1 VDSL2 RJ11 female phone jack Twisted-pair telephone wires (AWG24 or better) up to 1.4km
Phone Port	Additional splitter for POTS connection
Dimensions (W x D x H)	97 x 70 x 26 mm
Weight	184g
Power Requirement	DC 5V, 2A external power
LED Indicators	<ul style="list-style-type: none"> ● Power: Green ● 1000BASE-T LNK/ACT: Green ● 100BASE-T LNK/ACK: Green ● VDSL: Green ● CO: Green ● CPE: Green
Housing	Metal
DIP Switch & Functionality	4-position DIP switch <ul style="list-style-type: none"> ● CO/CPE mode select ● Selectable G.INP and interleaved mode ● Selectable target Band Profile ● Selectable target SNR mode
Switch Specifications	
Switch Processing Scheme	Store-and-Forward
Address Table	2K entries
Flow Control	Back pressure for half duplex IEEE 802.3x pause frame for full duplex
Jumbo Packet Size	9K bytes
System Specifications	
VDSL Compliance	<ul style="list-style-type: none"> ● VDSL-DMT <ul style="list-style-type: none"> ■ ITU-T G.993.1 VDSL ■ ITU-T G.997.1 ■ ITU-T G.993.2 VDSL2 (Profile 17a/30a Support) ■ ITU-T G.993.5 G. Vectoring ■ ITU-T G.998 ■ G.INP
ADSL Compliance	<ul style="list-style-type: none"> ● Capable of ADSL2/2+ standard [Note1] <ul style="list-style-type: none"> ■ ITU G.992.3 G.dmt.bis ■ ITU G.992.5 G.dmt.bisplus ● Data Rate: Up to 24Mbps
Standards Conformance	
Standards Compliance	IEEE 802.3 Ethernet

	IEEE 802.3u Fast Ethernet IEEE 802.3ab Gigabit Ethernet IEEE 802.3x Full-duplex Flow Control IEEE 802.1p Class of Service ITU-T G.993.1 VDSL ITU-T G.997.1 ITU-T G.993.2 VDSL2 (Profile 17a/30a Support) ITU-T G.993.5 G.Vectoring & G.INP ITU-T G.998
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[Note1] When EVC-3101 connects to an ADSL 2/2+ device, this ADSL2/2+ device has to be CPE device, does not support to be CO device.

6 PERFORMANCE TABLE

■ EVC-3101 Performance, unit: Mbps

Distance (meter)	Interleave (Downstream/Upstream)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	190/87	178/84	147/139	135/127
400m	161/60	143/53	112/110	96/96
600m	118/36	99/32	75/73	61/59
800m	59/24	48/22	44/44	40/40
1000m	47/7	41/5	26/25	23/18
1200m	39/4	33/3	24/13	22/9
1400m	25/4	23/3	20/9	16/7
Distance (meter)	G.INP (Downstream/Upstream)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	197/101	185/89	150/150	140/140
400m	168/65	148/54	117/117	97/97
600m	109/34	95/32	77/77	60/60
800m	65/20	58/14	43/43	35/35
1000m	53/7	46/6	29/28	26/21
1200m	44/4	37/3	27/15	25/11
1400m	28/4	25/3	22/10	18/8

The actual data rate will vary on the quality of the copper wire and environmental factors.

7 Troubleshooting

SYMPTOM:

VDSL LNK LED does not light up after wire is connected to the VDSL port.

CHECKPOINT:

1. Verify the length of the wire (not more than 1.4km) connected between the two EVC-3101. Please also try to adjust the DIP switch or the EVC-3101 to the other SNR mode.
2. Please note you must use one EVC-3101 in CO mode and the other EVC-3101 in CPE mode to make connection to each other work.

SYMPTOM:

TP LED does not light after cable is connected to the port.

CHECKPOINT:

1. Verify you are using the Cat.5 or better cable with RJ45 connector to connect to the port.
2. If your device (like LAN card) supports to auto-negotiation, please try to manually set at a fixed speed of your device to solve this issue.
3. The Converter/Bridge and the connected device's power are on or not.
4. The port's cable is firmly seated in its connectors in the switch and in the associated device.
5. The connecting cable is good and with the correct type.
6. The connecting device, including any network adapter, is functional.

8 FAQs

Q1: What is VDSL2?

A1: VDSL2 (Very High-Bit-Rate Digital Subscriber Line 2), G.993.2, is the newest and most advanced standard of xDSL broadband wire line communications.

Designed to support the wide deployment of Triple Play services such as voice, data, high definition television (HDTV) and interactive gaming, VDSL2 enables operators and carrier to gradually, flexibly, and cost efficiently upgrade the existing xDSL-infrastructure.

Q2: What is SNR and what's the effect?

A2: In analog and digital communications, Signal-to-Noise Ratio, often written as SNR, is a measure of signal strength relative to background noise. The ratio is usually measured in decibels (dB).

In digital communications, the SNR will probably cause a reduction in data speed because of frequent errors that require the source (transmitting) computer or terminal to resend some packets of data. SNR measures the quality of a transmission channel over a network channel. The greater the ratio, the easier it is to identify and subsequently isolate and eliminate the source of noise.

Generally speaking, the higher SNR value gets, the better the line quality gets, but performance is lower.

Q3: What is the best distance for the EVC-3101?

A3: In order to guarantee the stability and better quality of network, we suggest the distance should not exceed 1.4 kilometers.

Q4: What is the best data rate for the EVC-3101?

A4: The best data rate of the EVC-3101 is up to 190Mbps/100Mbps (downstream / upstream) in asymmetric mode and 150Mbps/150Mbps in symmetric mode over a distance of 200 meters.

Q5: Why it is not workable when I set ADSL2/2+ device to be CO and set EVC-3101 to be CPE?

A5: Because EVC-3101 must be set to CO and ADSL2/2+ must be set to CPE.

9 CUSTOMER SUPPORT

Thank you for purchasing Antaira products. If you need more support information, please contact Antaira support team.

Antaira support team mail address:

support@antaira.com

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APPENDIX: Wall-mount and Chassis Installation

This part describes how to install your VDSL2 Bridge and make connections to it.

Please read the following topics and perform the procedures in the order being presented.

■ Wall-mount Installation

Step 1: Please find the wall that can mount the EVC-3101

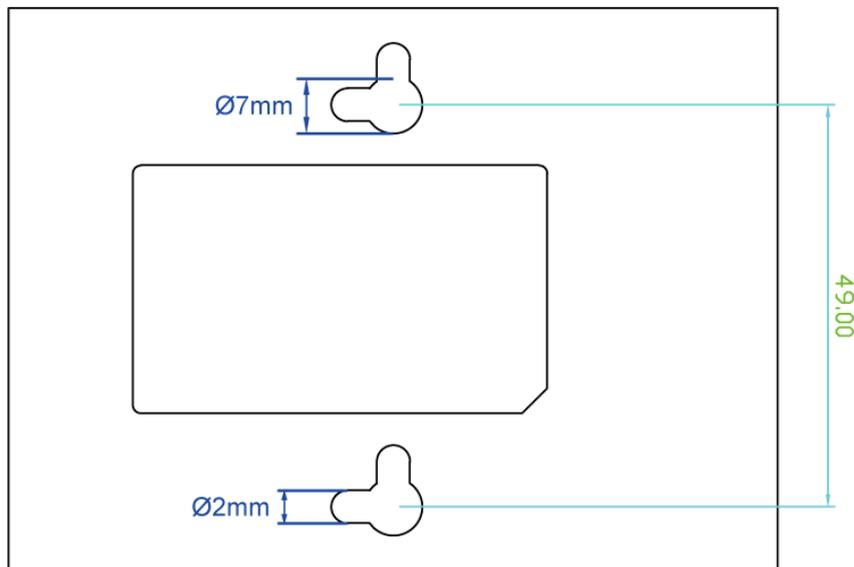
Step 2: Screw two screws on the wall.

Step 3: Hang the EVC-3101 on the screws from the wall.

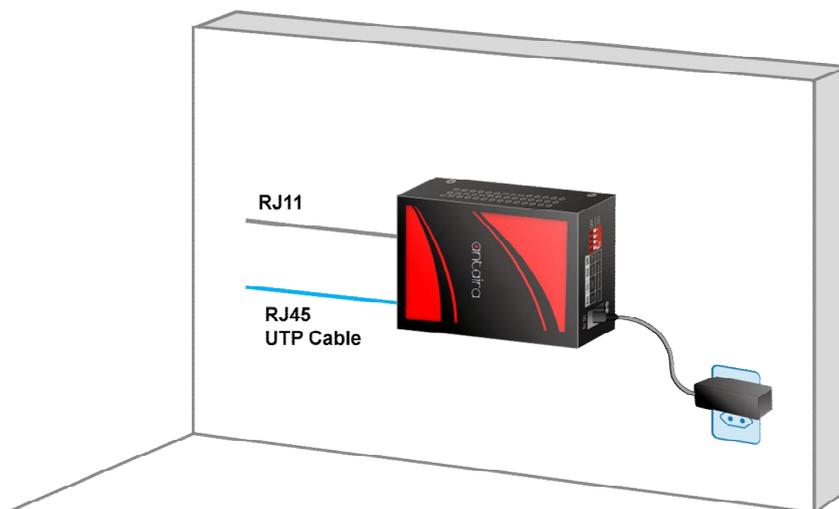
Step 4: Refer to chapter 3.3 Power Information for power supply to the EVC-3101.



Before mounting the device to the wall, please check the location of the electrical outlet and the length of the Ethernet cable.



EVC-3101 Switch Bottom Side



■ Chassis Installation and Rack Mounting (EVC-3101)

To install the Ethernet over VDSL2 Converter in a **19-inch** Converter Chassis with standard rack, follow the instructions described below.

Step 1: Place your EVC-3101 on a hard-flat surface, with the front panel positioned towards your front side.

Step 2: Carefully slide in the module until it is fully and firmly fitted into the slot of the converter chassis.

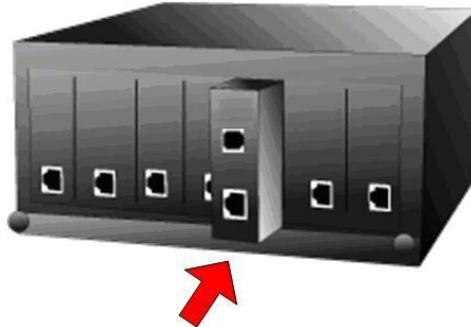


Figure 4-8-1: Insert a VDSL2 converter into an available slot

Step 3: Attach a rack-mount bracket to each side of the Converter Chassis with supplied screws attached to the package.

Step 4: After the brackets are attached to the Converter Chassis, use suitable screws to securely attach the brackets to the rack.

Step 5: Connect one end of the power cable to the **19-inch** Converter Chassis.

Step 6: Connect the power plug of the power cable to a standard wall outlet, and then power on the **19-inch** Converter Chassis. The PWR LED should be lit.



Note

Please refer to your User's Manual for setting up the device.
