



VX-VEB160G4 (V3) 300Mbps Ethernet Extender Kit



User Manual

Version 1.0

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1 Introduction

Versa Technology's **VX-VEB160G4 (V3)** is a **Lite Industrial Grade Ultra-Speed Gigabit Ethernet Copper Extender** that supports a remarkable aggregated bandwidth up to **300Mbps** (Downstream: 150 Mbps/Upstream: 150 Mbps). It delivers fiber-optic like speeds on existing copper infrastructure, enabling a good alternative in place where fiber is not economical to deploy. The **VX-VEB160G4 (V3)** is equipped with **four Gigabit Ethernet Ports** (RJ-45 connector) and **one VDSL2 port** (RJ-45 connector or 2-PIN Terminal Block) in metal enclosure for easy installation in harsh environment. There are 8 different profile settings which can be flexibly selected via DIP switch to suit various applications and environments. Symmetric profile can be applied as a standard Ethernet connection while Asymmetric profile can be used for other services like video streaming or IP surveillance services which require high traffic flow in an uni-direction configuration. The **VX-VEB160G4 (V3)** supports transparent LAN bridging to extend Ethernet service over UTP, Cat 5+ or Coaxial cables. Versa Technology's **VX-VEB160G4 (V3)** has superior performance in its category. It is the best high throughput Long Reach Ethernet Extender for service providers to deploy their IP-based networking services to meet various application scenarios in harsh environments.

1.1 Features

- High speed Ethernet extension over UTP, CAT 5e/6/7 or Coaxial cables.
- Support ITU-T G.993.5 G.vectoring and G.INP
- Selectable 8 different profile settings via DIP Switch (G.INP/Interleaved, Target SNR 6/8/12/24 dB, Symmetric/Asymmetric Modes)
- Support wide operating temperature range
- Cost effective bridge function to connect two Ethernet LAN
- IEEE 802.1Q VLAN tag transparent
- Easy installation via simple plug-and-play in harsh environment

1.2 Specifications

VDSL Interface

- RJ-45 connector or 2-PIN Terminal Block
- DMT Encoding
- Complying with ITU-T
G993.1/G993.2/G993.5/G.997.1/G.998
- G.INP
- On-board surge protection

LAN Interface

- 4 x RJ-45 connectors
- 10/100/1000 Base-T; Auto-Negotiation, Auto-MDI/MDI-X.
- Complying with IEEE 802.3/802.3u/802.3z

4-position DIP Switch

- Selectable Master (OT) or Remote (RT) mode
- Selectable 8 different profile settings via DIP Switch (G.INP/Interleaved, Target SNR 6/8/12/24 dB, Symmetric/Asymmetric Modes)

LED

- Power: On/Off
- LAN: Fast Ethernet/Gigabit Ethernet
- VDSL2: Mode – CO (OT) / CPE (RT)
Sync - Idle / Trained / Link

Power supply

- VX-VEB160G4 (V3)-AC: 12V DC over 2.1mm DC Jack (Commercial Grade External Power Adaptor included)
- VX-VEB160G4 (V3)-DC: 12~24V (7.5-30 Max) DC over Terminal Block

- Power Consumption: 4.5 Watts maximum

Physical Characteristics

- Dimension (WxHxD): 130 x 28 x 94.7 mm
- Installation: DIN Rail

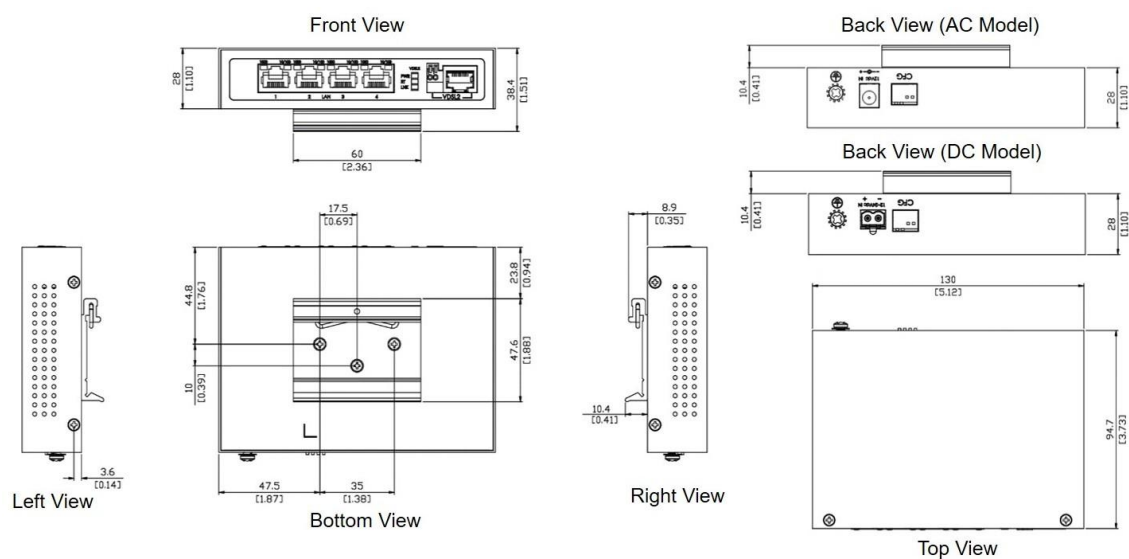
Environment

- Operating Temperature: -20°C ~65°C
- Humidity: 0%~95%RH (non-condensing)

Regulatory Compliance

- CE Class A
- FCC Part 15B Class A
- EN62368-1

1.3 Mechanical Dimensions

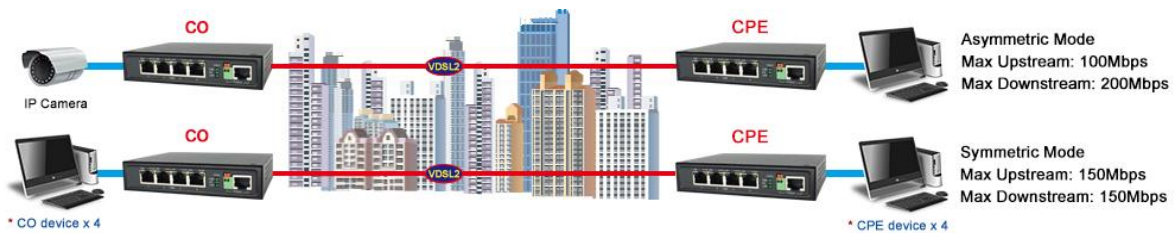


*The mechanical dimensions includes the layout of the DIN Rail.

1.4 Installation Procedure

The solution works in pairs for point to point connectivity. One unit must be configured as Master (OT) while the other unit must be configured as Remote (RT) by using DIP Switch.

- STEP 1:
Set the LAN extender to CO mode or CPE mode from the DIP Switch at the front panel. For Point to Point applications, one unit must be Master (CO mode) and the other one is Slave (CPE mode).
- STEP 2:
Connect the LAN extender (CPE) with a regular Cat. 5 cable to the LAN port from a PC or another device on LAN.
- STEP 3:
Power on LAN extender (CPE) by connecting the power adapter.
- STEP 4:
Connect the CPE and CO via a regular Cat. 5 cable or a telephone wire from each VDSL2 port.
- STEP 5:
Connect the LAN extender (CO) with a regular Cat. 5 cable to the LAN port and then connect the other end of the RJ45 cable to the service equipment.
- STEP 6:
Power on LAN extender (CO) by connecting the power adapter and then observe the status of VDSL link LED.



1.5 Reference Performance Data

26AWG Copper Wire

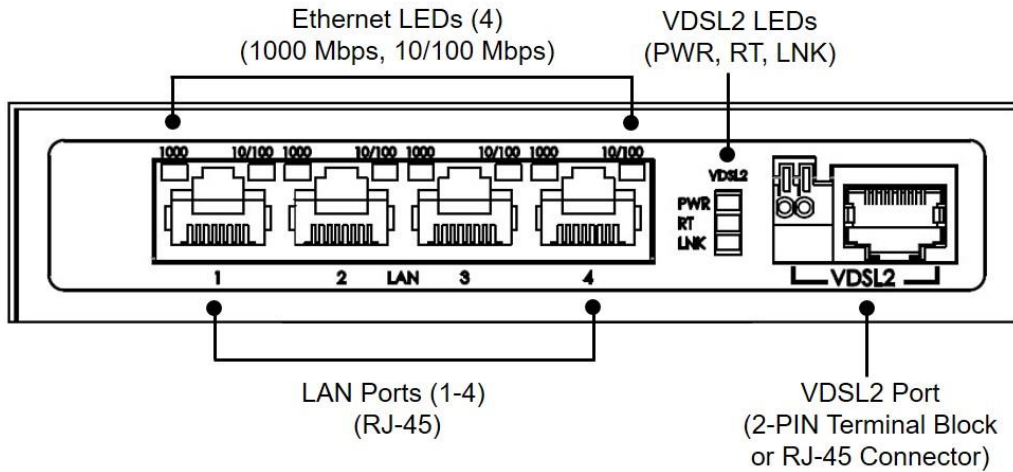
UTP, 26AWG Profile Setting 1: Symmetric, SNR 8dB, G.INP			UTP, 26AWG Profile Setting 1: Asymmetric, SNR 8dB, G.INP		
Distance (Feet)	Upstream Line Rate (Mbps)	Downstream Line Rate (Mbps)	Distance (Feet)	Upstream Line Rate (Mbps)	Downstream Line Rate (Mbps)
500	155	158	500	100	200
1,000	122	126	1,000	77	170
1,500	75	80	1,500	38	105
2,000	48	56	2,000	22	64
2,500	28	38	2,500	10	43
3,000	23	28	3,000	9	42

* The above performance data is for reference only, the actual data rate may vary depending on the quality of the copper wire and environmental factors.

2 Hardware Description

This chapter shows the hardware connector, and installation accessory.

2.1 Connector Architecture



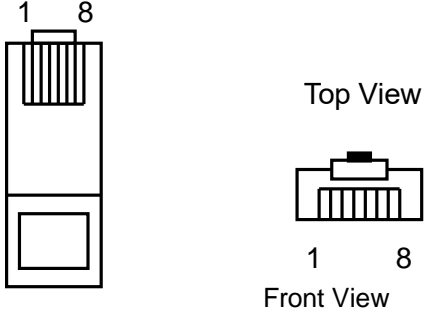
Ethernet Port Connector (RJ-45)

The Ethernet Port interface is an 8-position Modular Jack. The table below displays the pin out assignments.

Pin Number	Name	Description
1	BI_DA+	Bi-directional pair A +
2	BI_DA-	Bi-directional pair A -
3	BI_DB+	Bi-directional pair B +
4	BI_DC+	Bi-directional pair C +
5	BI_DC-	Bi-directional pair C -
6	BI_DB-	Bi-directional pair B -
7	BI_DD+	Bi-directional pair D +
8	BI_DD-	Bi-directional pair D -

VDSL Interface Pin Assignments (RJ-45)

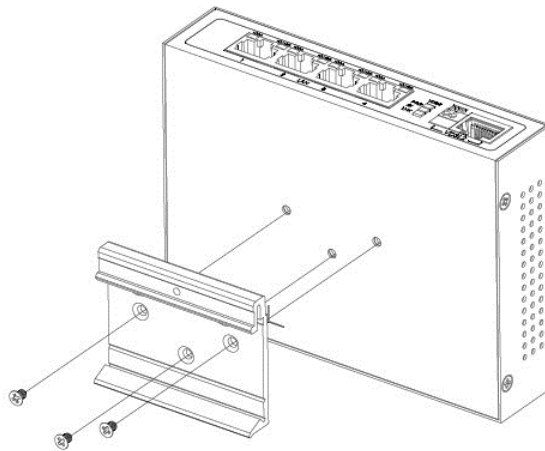
The VDSL interface is standard eight-pin modular jack. The table below displays the pin out assignments.

Pin Number	Description	Figure
1	Not used	
2	Not used	
3	Not used	
4	ANALOG Input / Output	
5	ANALOG Input / Output	
6	Not used	
7	Not used	
8	Not used	

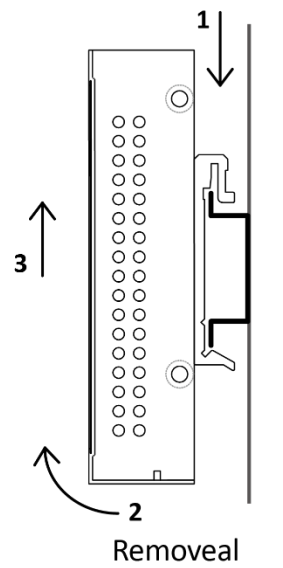
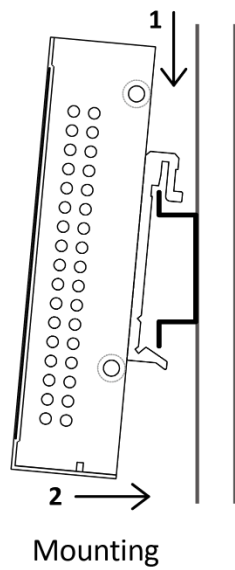
2.2 Installation Accessory

DIN Rail Accessory:

- Fasten the DIN Rail clip to the device using a screwdriver and three machine screws.
- The diameter of each screw is 3mm and the length of each screw is 5mm.



2.3 DIN Rail Mounting



■ Mounting Step

STEP 1: Hook the unit over the DIN Rail.

STEP 2: Push the bottom of the unit towards the DIN Rail until it snaps into place.

■ Removal Step

STEP 1: Push the unit down to free the bottom of the DIN Rail.

STEP 2: Rotate the bottom of the unit away from the DIN Rail.

STEP 3: Unhook top of unit from DIN Rail.

3 LED Definition

3.1 LED Indicators

The LED indicators could provide instant feedback to users; the behaviors of the LED are given in below table.

(1) LEDs for VDSL

LED	Color	Blinking	On	Off
PWR	Green		Device Power On	Device Power Off
RT	Green		CPE (Remote)	CO (Master)
LNK	Green	Slow: Idle Fast: Training / Data Transmitting	Link UP	Link Down

(2) LEDs for Ethernet Port

LED	Color	Blinking	On	Off
10/100	Yellow	Data Transmitting	Link at speed of 10/100 Mbps	Link Down
1000	Green	Data Transmitting	Link at speed of 1000 Mbps	Link Down

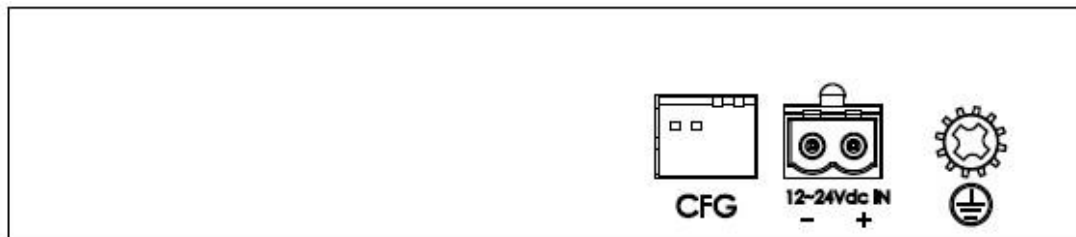
4 Power Connection

The earth terminal and the power interface with screw terminal plug are placed. Connect the earth terminal to the protective earthing conductor of the buildings installation.

1. **VX-VEB160G4 (V3)-AC:** Input from DC Jack range 12V DC (Commercial Grade External Power Adaptor included)



2. **VX-VEB160G4 (V3)-DC:** Input from Terminal Block range 12V~24V (7.5-30 Max)
Insert the positive and negative wires into V+ and V- contact on the terminal block and tighten the wire-clamp screws to prevent the wires from being loosened.



Note: There is a picture of 2-PIN Terminal Block (Male Connector).



2-PIN Terminal Block
Male Connector

3. Power Consumption: 4.5 Watts maximum
4. Protection: Reverse polarity protection

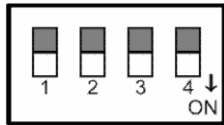
5 4-Position DIP Switch

The device is equipped with DIP Switch selection which allows users to select the parameters in order to meet the needs of different applications.

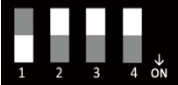
DIP Switch 1 allows you to configure the unit as Master (OT) or Remote (RT). Usually, the Master unit is located at the central office site of Service Providers or Headquarter of Enterprise while the Remote unit is located at home, remote sites or branch offices.

Please note the Remote Unit (RT) will always follow the setting of Master Unit (OT). When the unit operates in RT (CPE) Mode, DIP Switches 2,3,4 have no functions.

When the unit operates in OT (Master) Mode, the DIP Switches support 8 different profile settings for different applications and environments.



Role	DIP Switch				Symmetrical/ Asymmetrical	G.INP/ Interleaved Mode	Target SNR Margin (dB)	Max Data Rate DS/US (Mbps)
	1	2	3	4				
Master (OT)					Symmetrical	G.INP	8	160/160
					Asymmetrical	G.INP	8	220/110
					Symmetrical	Interleaved	6	160/160
					Asymmetrical	Interleaved	6	220/110
					Symmetrical	G.INP	12	150/150
					Asymmetrical	G.INP	12	220/100
	 *Special Profile Setting for poor environment				Symmetrical (Forcing 30a profile to link, and disable band 0 to 2.2MHz)	G.INP	24	20/20
					Asymmetrical (Standard profile Annex A 17a-eu32)	Interleaved	6	150/50

Remote (RT)		Remote Unit (RT) will always follow the setting of Master Unit (OT). When the unit operates in RT (CPE) Mode, Dip Switches 2, 3, 4 have no functions.
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6 Description of Setting

1. **Symmetrical profile** - Downstream and upstream rate are symmetrical.
2. **Asymmetrical profile** - Downstream and upstream rate are asymmetrical. Asymmetric profile can be used for services like Video streaming or IP surveillance services which require high traffic flow in an uni-direction configuration.
3. **GINP** - Retransmission mode that provides enhanced protection against impulse noise or to increase the efficiency of providing impulse noise protection (INP).
4. **Interleaved** - Interleaved mode has a slower transfer rate and increase latency in exchange for error correction. A general line setting mode that provides common impulse noise protection.
5. **Max Data Rate Downstream/ Upstream** - This parameter specifies the maximum net data rate for the bearer channel as desired by the operator of the system. The data rate is coded in steps of 1000 bit/s (G.997.1).
6. **Target SNR Margin Downstream/ Upstream setting** - This is the Noise Margin the xTU-R/C receiver shall achieve, relative to the BER requirement for each of the downstream bearer channels, or better, to successfully complete initialization. (G.997.1)
7. **Special Profile Setting (DIP2: Off, DIP3: On, DIP4: On)** is for application of near end distance or poor environment, Target SNR Margin is set to high value of 24dB and rate limit at 20Mbps to ensure channel stability. In addition, band 0 to 2.2MHz is disable to avoid possible effects by low frequency. Because this item is set to 30a profile, so its train up time is about 15sec to 20sec.
8. **Profile Setting (DIP2: On, DIP3: On, DIP4: On)** is standard profile Annex A 17a-eu32.



Precautions and Safety Warnings

- Disconnect all power from devices before attempting installation.
- This device is intended for installation only in **restricted access locations** as defined where both these conditions apply:
 - Access is through the use of a lock or tool and key, or other means of security, and is controlled by the authority responsible for the location.
 - Access can only be gained by service persons or by users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- All electric installations must be carried out in accordance with local and national regulations.
- Do not work on the system, connect or disconnect cables during periods of lightning activity.
- The equipment must be connected to earth.
- Shield of RJ-45 cables has to be connected to the same earth potential as the equipment.
- If the VDSL interface is used for the connection between two buildings, all necessary protective measures must be ensured externally.
- This equipment relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 1A is used.

Note:

- To reduce potential safety issues, only the AC Adapter provided with the product, a replacement AC Adapter provided by agency, or an AC adapter purchased as an accessory from agency should be used with the product.