Industrial 4-Port 10/100/1000T
802.3at PoE+ to VDSL2 Extender

IVC-234GPT

User's Manual

Table of Contents

1. Package Contents

Thank you for purchasing PLANET Industrial 4-Port 10/100/1000T 802.3at PoE+ to VDSL2 Extender, IVC-234GPT. The table below shows the number of ports:

Model Name	VDSL2 BNC Port	VDSL2 RJ11 Port	10/100/1000T Copper Ports	802.3at PoE+ Ports
IVC-234GPT	1	1	4	4

In the following sections, the term **"Industrial Ethernet Extender"** means the IVC-234GPT.

Open the box of the Industrial Ethernet Extender and carefully unpack it. The box should contain the following items:

IVC-234GPT x 1	QR Code Sheet x 1	DIN-rail Kit

BNC Dust Cap x 1/RJ11 Dust Cap x 1	RJ45 Dust Cap x 4	Wall-mount Kit
BNC Dust Cap RJ11 Dust Cap		

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. Hardware Introduction

2.1 Extender Front Panel

The front panel of the Industrial Ethernet Extender consists of Ethernet, VDSL2 interfaces and LED indicators.

■ **Front View**
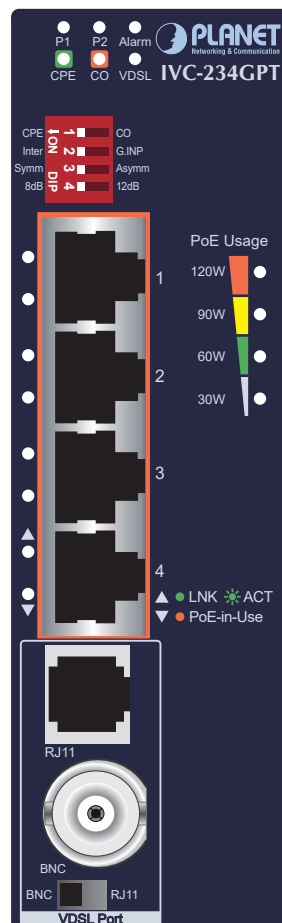
Figure 1: IVC-234GPT Front View

■ **Ethernet Interfaces**

Gigabit Ethernet 802.3at PoE+ TP interfaces (Port 1 to port 4)

10/100/1000BASE-T copper, RJ45 twisted-pair: Up to 100 meters.

■ **VDSL2 Interfaces**

One RJ11 female phone jack and one BNC female connector for VDSL2 with the VDSL2 **Super Vector 35b** profile.

■ **VDSL Port BNC/RJ11 DIP Switch**

One DIP switch for RJ11 female phone jack and one BNC female connector for better VDSL2 transmission performance.

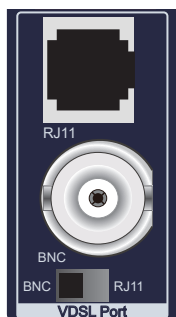| Mode	DIP Switch
	Description
RJ11	Choose this mode when using RJ11 VDSL2 transmission for better performance.
BNC (Default)	Choose this mode when using BNC VDSL2 transmission for better performance.

■ VDSL DIP Switch

The Industrial Ethernet Extender provides 4 selective transmission modes. By switching to a transmission mode, it can optimize transmission based on the quality and distance of your coaxial cable or phone line. The following is the summary table of transmission setting, bandwidth and distance.

	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)

Note	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.

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 a branch office 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.

Note	When the Industrial Ethernet Extender operates in **CPE mode**, DIP switches 2, 3, and 4 are **out of 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 all usable loop lengths. Better channel noise protection is made with the higher SNR margin.

|	
Note	Please **power off** the Industrial Ethernet Extender before making any transmission mode adjustment.

■ PoE Power Usage LED

The front panel of the IVC-234GPT has four Gigabit Ethernet 802.3at PoE+ ports, and four LEDs which indicate PoE Power Usages of 30W, 60W, 90W and 120W. With these LED indications, you can monitor the current PoE power-in-use status of the IVC-234GPT easily and efficiently.
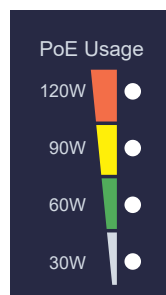
2.2 LED Definition

■ System

LED	Color	Function
P1	Green	Lights to indicate DC power input 1 has power.
P2	Green	Lights to indicate DC power input 2 has power.
Alarm	Red	Lights to indicate that DC power has failed.

■ VDSL

LED	Color		Function
VDSL	Green	Lit	Indicates that the VDSL connection is established.
		Fast Blink	Indicates that the VDSL connection is in training status.
		Off	Indicates that the VDSL connection is in idle status.
CO	Green	Lit	Indicates the Industrial Ethernet Extender is running in CO mode.
CPE	Green	Lit	Indicates the Industrial Ethernet Extender is running in CPE mode.

■ 10/100/1000BASE-T 802.3at PoE+ Port

LED	Color		Function
LNK/ ACT	Green	Lit	Indicates that the port is operating at 1000Mbps, 100Mbps or 10Mbps.
		Blink	Indicates that the Industrial Ethernet Extender is actively sending or receiving data over that port.
		Off	Indicates that the port is link down.
PoE-in-use	Amber	Lit	Indicates the port is providing DC in-line power.
		Off	Indicates the connected device is not a PoE powered device (PD).

■ PoE Power Usage (Unit: Watt) (Lower LED to Upper LED)

LED	Color	Function
30W	Amber	**Off** to indicate the PoE usage is less than 14W. **Blinks** to indicate that the PoE usage is around 15W to 30W. **Lights** to indicate the PoE usage is around/over 30W.
60W	Amber	**Blinks** to indicate that the PoE usage is around 45W to 60W. **Lights** to indicate the PoE usage is around/over 60W.
90W	Amber	**Blinks** to indicate that the PoE usage is around 75W to 90W. **Lights** to indicate the PoE usage is around/over 90W.
120W	Amber	**Blinks** to indicate that the PoE usage is around 100W to 120W. **Lights** to indicate the PoE usage is at the maximum 120W.

2.3 Extender Upper Panel

The upper panel of the Industrial Ethernet Extender consists of one terminal block connector within two DC power inputs. Figure 2 shows the upper panel of the Industrial Ethernet Extender.
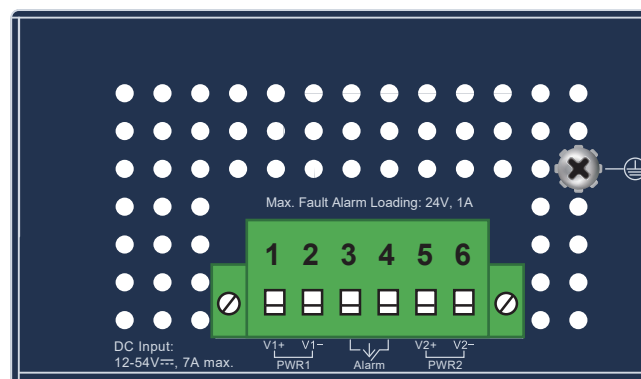

Figure 2: IVC-234GPT Upper Panel

2.4 Wiring the Power Inputs

The 6-contact terminal block connector on the top panel of Industrial Ethernet Extender is used for two redundant power inputs. Please follow the steps below to insert the power wire.

⚠ Caution	When performing any of the procedures like inserting the wires or tightening the wire-clamp screws, make sure the power is OFF to prevent from getting an electric shock.

1. Insert positive and negative DC power wires into contacts 1 and 2 for POWER 1, or contacts 5 and 6 for POWER 2.
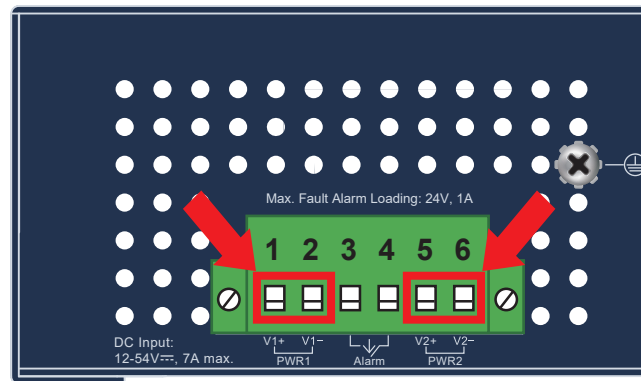
V1+   V1-   V2+   V2-

PWR1   PWR2

2. Tighten the wire-clamp screws for preventing the wires from loosening.
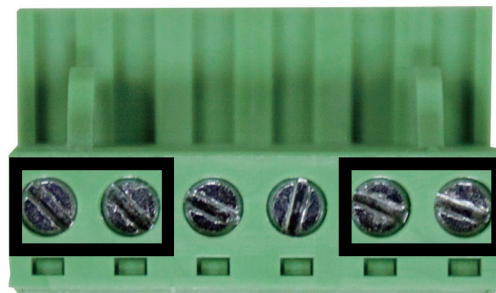
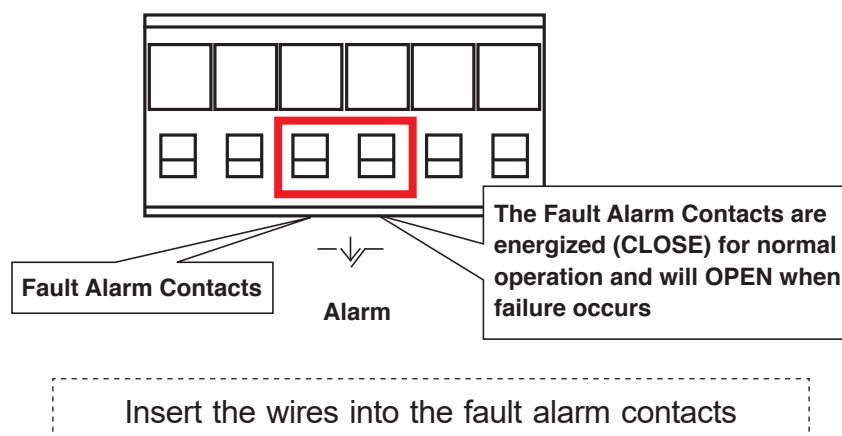| 1	2	3	4	5	6
Power 1		Alarm		Power 2	
V+	V-			V+	V-

⚠ Caution	PWR1 and PWR2 must provide the **same DC voltage** for power load balance while operating with dual power input.

2.5 Wiring the Faulty Alarm Contact

The faulty alarm contacts are in the middle of the terminal block connector as the picture shows below. Inserting the wires, the Industrial Ethernet Extender will detect the fault status of the power failure and then forms an open circuit. The following illustration shows an application example for wiring the faulty alarm contacts.
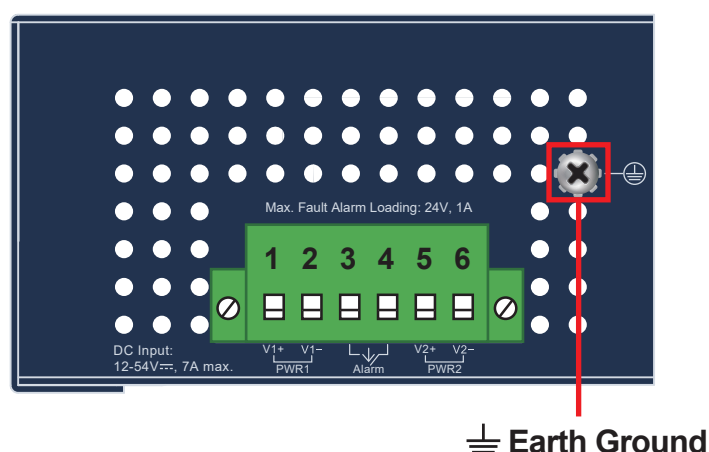

Fault Alarm Contacts

Alarm

The Fault Alarm Contacts are energized (CLOSE) for normal operation and will OPEN when failure occurs

Insert the wires into the fault alarm contacts

Note	1. The wire gauge for the terminal block should be in the range of 12 ~ 24AWG. 2. Alarm relay circuit accepts up to 24V, max. 1A currents.

2.6 Grounding the Device

Users **MUST** complete grounding wired with the device; otherwise, a sudden lightning could cause fatal damage to the device.

Max. Fault Alarm Loading: 24V, 1A

1 2 3 4 5 6

DC Input:
12-54V===, 7A max.   V1+ V1−   V2+ V2−
                      PWR1   Alarm   PWR2

⏚ **Earth Ground**

Note	EMD (Lightning) DAMAGE IS NOT COVERED UNDER WARRANTY.

2.7 Physical Dimensions

■ **IVC-234GPT Dimensions (W x D x H):** 56 x 86.1 x 135mm

Dimensions (W x D x H): 56 x 86.1 x 135 mm
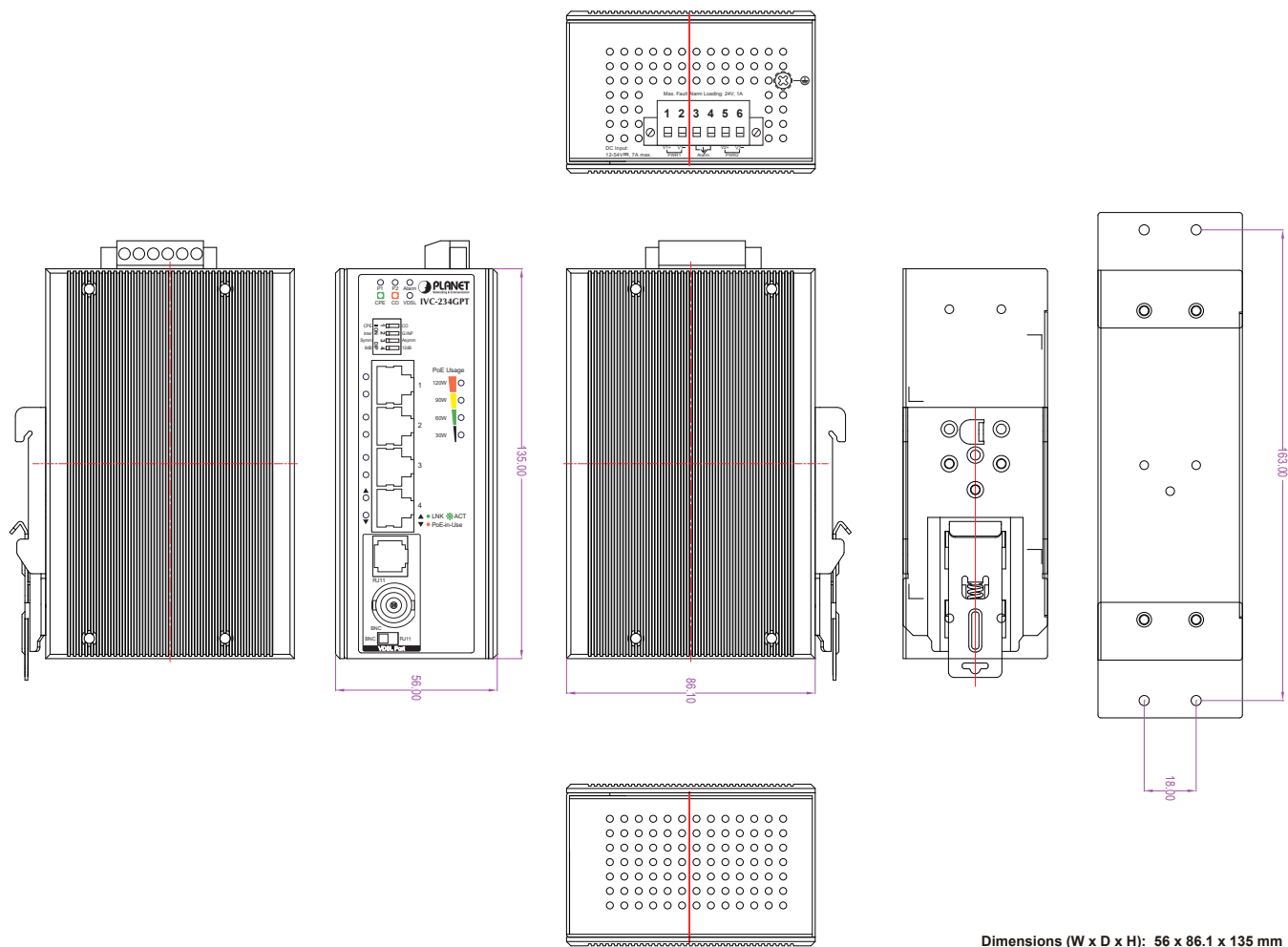
3. Installation

This section describes the functionalities of the Industrial Ethernet Extender's components and guides you to installing it on the DIN rail and wall. Please read this chapter completely before continuing.

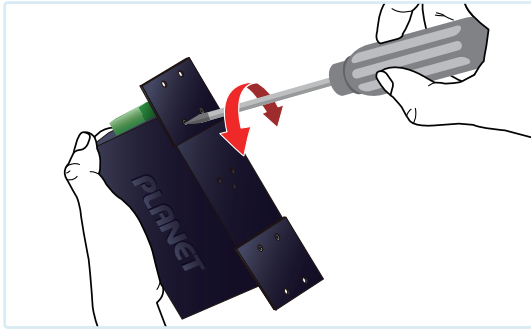|	
Note	The following pictures show how to install the device. However, the device in the picture is not Industrial Ethernet Extender.

3.1 DIN-rail Mounting Installation

IVC-234GPT DIN-rail Mounting Installation

3.2 Wall-mount Plate Mounting

	You must use the screws supplied with the wall-mounting brackets. Damage caused to the parts by using incorrect screws would invalidate your warranty.
⚠ Caution	

4. Product Specifications

This section describes the functionalities of the Industrial Ethernet Extender's components and guides you to installing the Industrial Ethernet Extender.

Product		IVC-234GPT
Hardware Specifications		
LAN Ports		4 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports
802.3at PoE Ports		4
VDSL Port	BNC	1 BNC female Ethernet over Coaxial port
		Coaxial cable: 75 ohm RG-6/U cable, less than 12Ω/1000 ft. RG-59/U cable, less than 30Ω/1000 ft.
		Max. 1400m with data transmission (4,593ft.)
	RJ11	1 VDSL2 RJ11 female phone jack
		Twisted-pair telephone wires (AWG-24 or better)
		Max. 1400m with data transmission (4,593ft.)
DIP Switch & Functionality	DIP-1	Select CO or CPE mode.
	DIP-2	Select G.INP or Interleaved mode.
	DIP-3	Select Band Profile (Asymmetric or Symmetric).
	DIP-4	Select SNR of 12dB or 8dB.
ESD Protection		6KV DC
Dimensions (W x D x H)		56 x 86.1 x 135mm
Weight		736g
Power Requirements		DC 12~54V Redundant power with reverse polarity protection
Power Consumption		DC 12V: 60 watts/204BTU DC 24V: 100 watts/341BTU DC 54V: 122 watts/416BTU

LED Indicators	3 x LED for System and Power: ■ Green: DC Power 1 ■ Green: DC Power 2 ■ Red: Alarm 3 x LED for VDSL2 interface: ■ Green: VDSL ■ Green: CO ■ Green: CPE 2 x LED for Per Copper Port (Port-1~Port-4): ■ Green: 10/100/1000 LNK/ACT ■ Amber PoE-in-Use 4 x LED for PoE Usage ■ Amber 30W ■ Amber 60W ■ Amber 90W ■ Amber 120W
Housing	IP30 Aluminum Case
Power over Ethernet Specifications	
PoE Standard	IEEE 802.3af PoE PSE IEEE 802.3at PoE+ PSE
PoE Power Supply Type	End-span
Power PIN Assignment	1/2(+), 3/6(-)
PoE Power Output	Per port 54V DC, Max. 30.8 watts
PoE Power Output Budget	DC 12V, 60 watts maximum DC 24V, 100 watts maximum DC 48-54V, 120 watts maximum
Switch Specifications	
Switch Processing Scheme	Store-and-Forward
Address Table	1K entries
Maximum Packet Size	1522bytes

Standards Conformance	
VDSL Compliance	■ VDSL-DMT 　■ ITU-T G.993.1 VDSL 　■ ITU-T G.997.1 　■ ITU-T G.993.2 VDSL2 (Profile 17a/30a/35b support) 　■ ITU-T G.993.5 **G.vectoring** 　■ ITU-T G.998 　■ G.INP
ADSL Compliance	■ Capable of **ADSL2/2+** standard 　■ ITU G.992.3 G.dmt.bis 　■ ITU G.992.5 G.dmt.bisplus ■ Data Rate: Up to 24Mbps
Standards Compliance	IEEE 802.3 Ethernet IEEE 802.3u Fast Ethernet IEEE 802.3ab Gigabit Ethernet 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/35b support) ITU-T G.993.5 G.Vectoring & G.INP ITU-T G.998
Regulatory Compliance	FCC Part 15 Class A, CE
Environment	
Temperature	Operating: -40~75 degrees C Storage: -40~75 degrees C
Humidity	Operating: 5~95% (non-condensing) Storage: 5~95% (non-condensing)

5. Performance Table

5.1 IVC-234GPT

RJ11 Performance*				
Distance (meter)	Interleave (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	264/57	255/56	174/171	165/159
400m	212/53	182/49	140/131	125/114
600m	117/44	95/39	80/78	66/66
800m	92/32	76/25	66/52	55/40
1000m	40/29	33/19	42/29	33/25
1200m	30/19	33/19	28/27	26/18
1400m	29/11	25/7	29/11	21/12
Distance (meter)	G.INP (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	306/60	279/58	186/186	174/171
400m	221/57	192/52	146/134	129/116
600m	118/45	95/40	81/80	62/54
800m	92/33	77/28	65/51	54/42
1000m	39/22	32/17	42/42	35/25
1200m	30/21	25/16	32/22	26/19
1400m	28/12	24/9	25/16	21/12

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

Coaxial Performance*				
Distance (meter)	Interleave (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	264/57	255/56	177/172	168/164
400m	256/56	213/55	153/150	143/141
600m	184/56	159/51	129/117	111/105
800m	144/52	121/47	101/96	87/86
1000m	94/44	84/39	79/75	68/63
1200m	77/37	63/32	60/60	50/49
1400m	32/21	30/19	28/25	18/15
Distance (meter)	G.INP (Downstream/Upstream: Mbps)			
	Asymmetric		Symmetric	
	8dB	12dB	8dB	12dB
200m	302/60	277/59	187/182	176/171
400m	249/58	252/59	163/156	149/142
600m	191/58	167/56	133/121	118/107
800m	191/58	121/50	103/97	92/88
1000m	97/49	83/40	82/70	71/60
1200m	77/37	63/32	63/56	50/49
1400m	46/26	37/21	39/31	31/23

* As there are various resistance values in the category of RG-59/U or RG-6/U cable, the actual data rate will vary on the quality of the copper wire and environmental factors.

6. Customer Support

Thank you for purchasing PLANET products. You can browse our online FAQ resource on PLANET web site first to check if it could solve your issue. If you need more support information, please contact PLANET switch support team.

PLANET online FAQs:
https://www.planet.com.tw/en/support/faq

Switch support team mail address:
support@planet.com.tw

FCC Warning

This equipment has been tested and found to comply with the regulations 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 this user's guide, 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 device is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

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.