

Ethernet over VDSL2 Converter/Bridge

VC-231G
VC-234G



Presentation Outlines



- ◆ VDSL2 Introduction
- ◆ Product Overview
- ◆ Product Positioning
- ◆ Hardware Introduction
- ◆ Product Features
- ◆ Product Benefits
- ◆ Applications
- ◆ Product Comparison
- ◆ Appendix



Product Overview



Product Overview

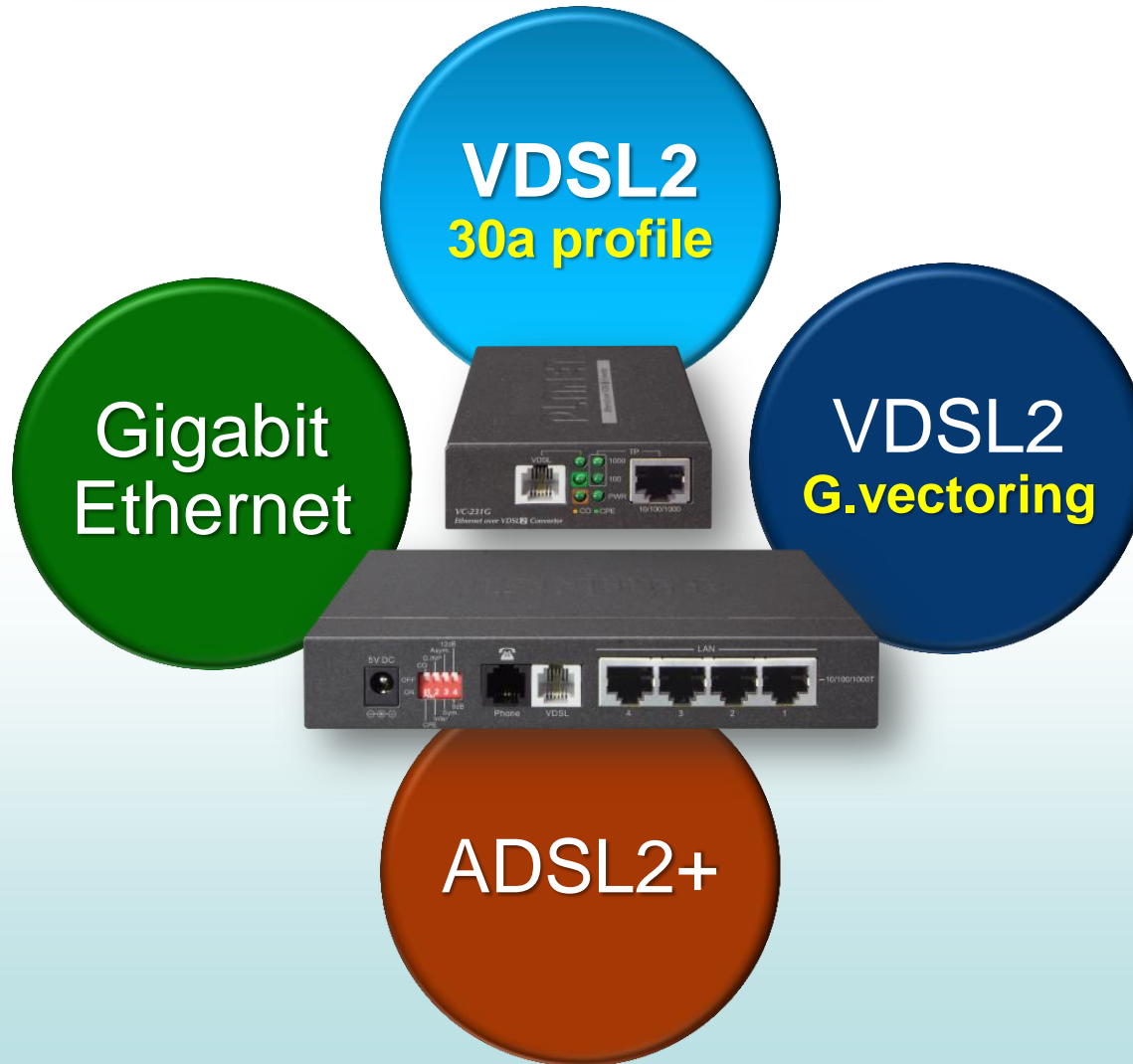
Get the Fast Speed of **200Mbps** with G.vectoring via the Phone Line!



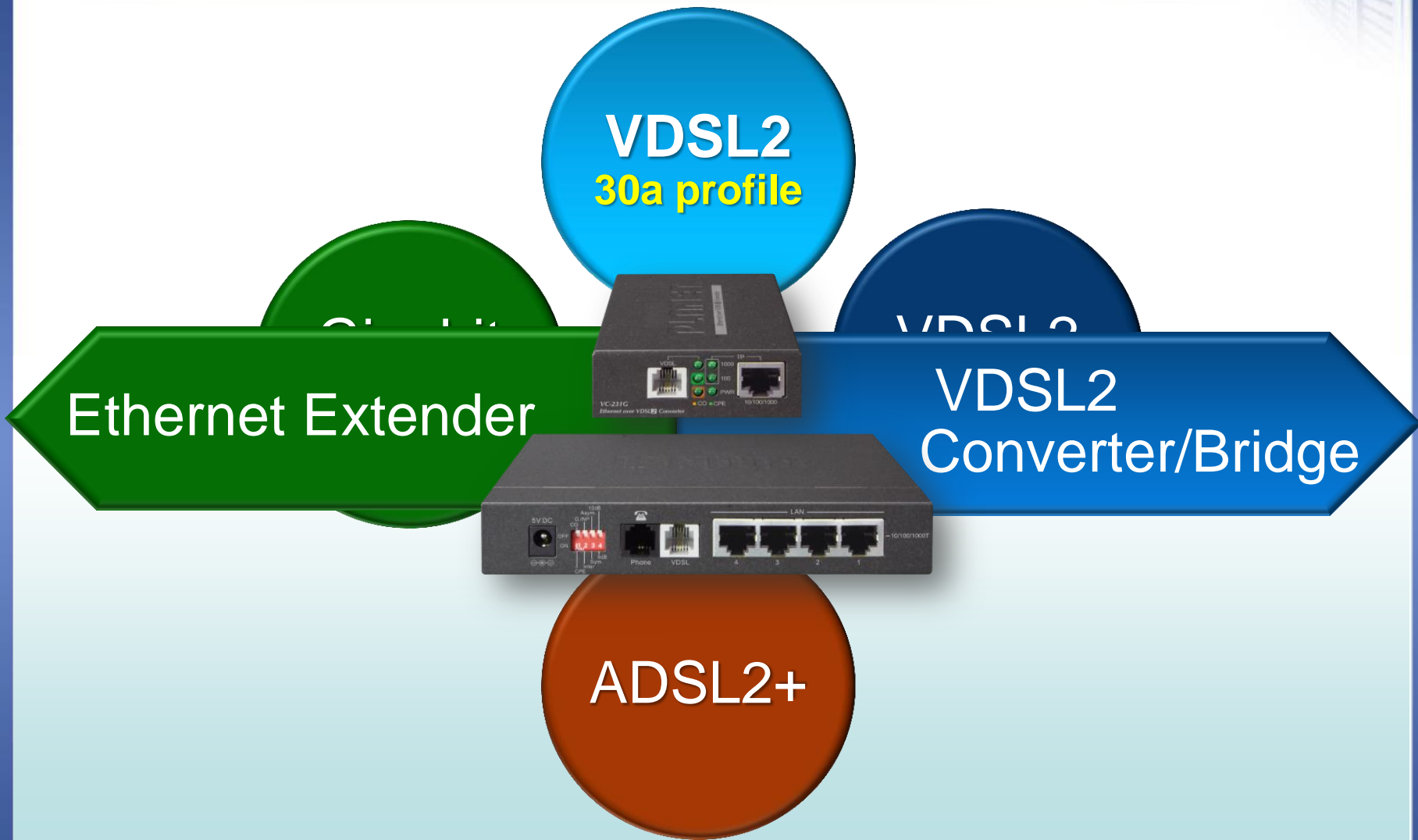
The Fastest Solution that Needs No Re-wiring!

Gigabit Ethernet to VDSL2 Converter with G.vectoring ▶ VC-231G / VC-234G

Key Technologies



Product Applications



Product Positioning



Product Map

PLANET VDSL2 Product Line

- Planning
- Developing
- New Phase-in
- Available

Gigabit LAN

Fast Ethernet LAN

CO



VC-231G
- 1 RJ11 + 1RJ45

G.Vectoring
ADSL2+



VC-234G
- 2 RJ11 + 4 RJ45

G.Vectoring
ADSL2+



VC-232G
- 1 BNC + 1 RJ45



IVC-234GT
- 1 BNC, 1 RJ11
- 4 RJ45

G.Vectoring
ADSL2+
-40~75°C



VC-202A
- 1 BNC + 1 RJ45



IVC-2002
- 1BNC, 1 RJ11
- 4 RJ45

-40~75°C



VC-201A
- 2 RJ11 + 1 RJ45



VC-231
- 1 RJ11 + 1 RJ45



VC-234
- 2 RJ11 + 4 RJ45



VDR-300NU
- 1 RJ11 + 4 RJ45
- 2 USB

G.Vectoring
ADSL2+
11n 300Mbps



VDR-301N
- 1 RJ11 + 5 RJ45

G.Vectoring
ADSL2+
11n 300Mbps



VC-820M
- 8 x VDSL2
- 2 x Gigabit LAN



VDL-2420M
- 24 x VDSL2
- 2 x Gigabit LAN

VDSL2 17a

VDSL2 30a

Hardware Introduction



Hardware Introduction – VC-231G

◆ **Dimensions (W x D x H): 97 x 70 x 26 mm**

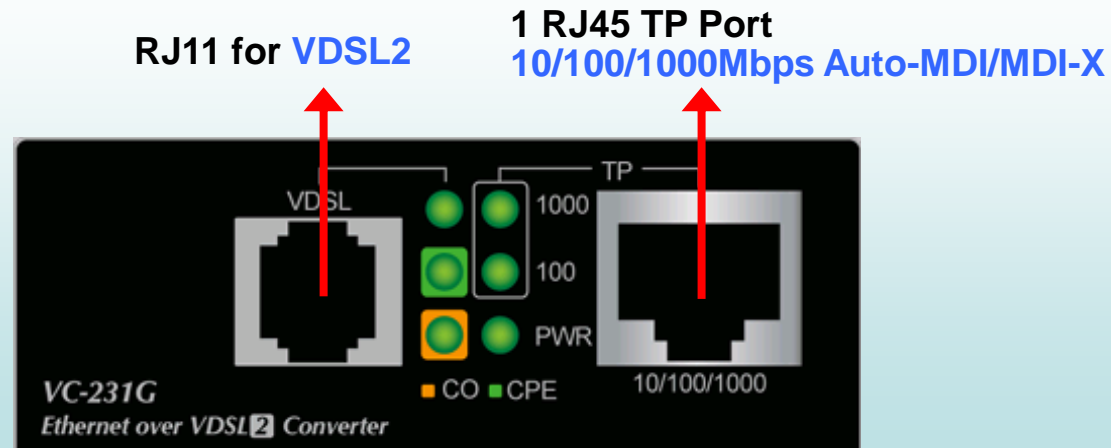
◆ **Front Panel – LED Indicators and Interface**

✓ **Interfaces**

- 1 x RJ45: 10/100/1000Mbps auto-MDI/MDI-X, auto negotiation
- 1 x RJ11: VDSL2 port

✓ **LEDs**

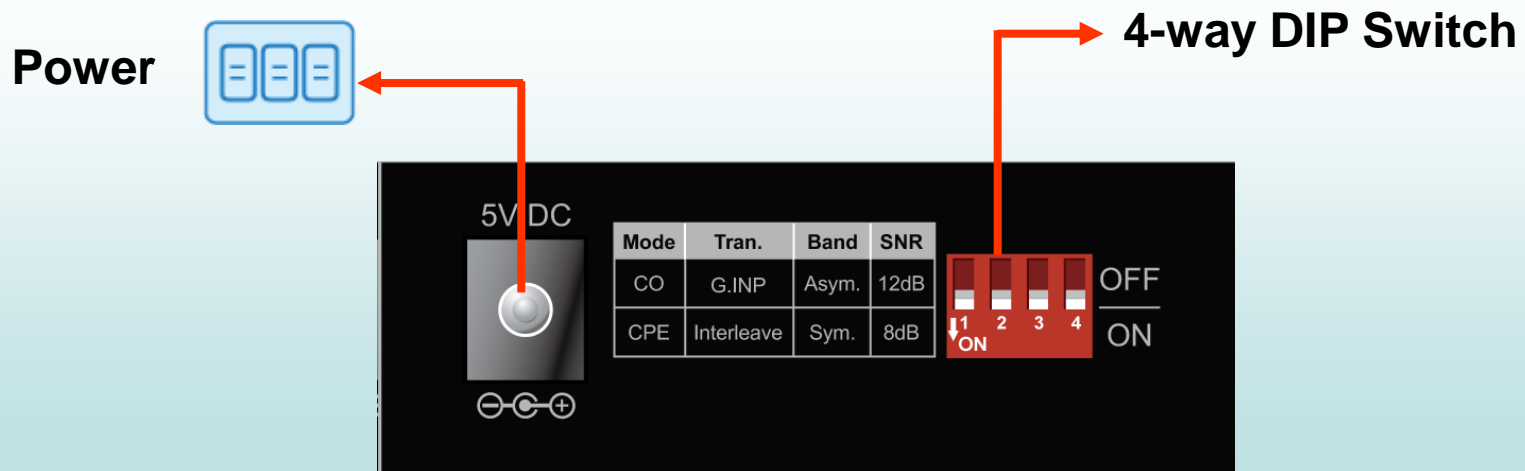
- 1 x PWR: Lights to indicate that the VDSL Converter has power.
- 2 x 100 LED and 1000 LED: To indicate that the port is operating at 10/100Mbps or 1000Mbps.
- 3 x VDSL LED: To indicate that the VDSL link is established in CO/CPE mode.



Hardware Introduction – VC-231G

◆ Rear Panel

- ✓ 1 DC jack for 5V DC, 2A adapter
- ✓ 4-position DIP switch



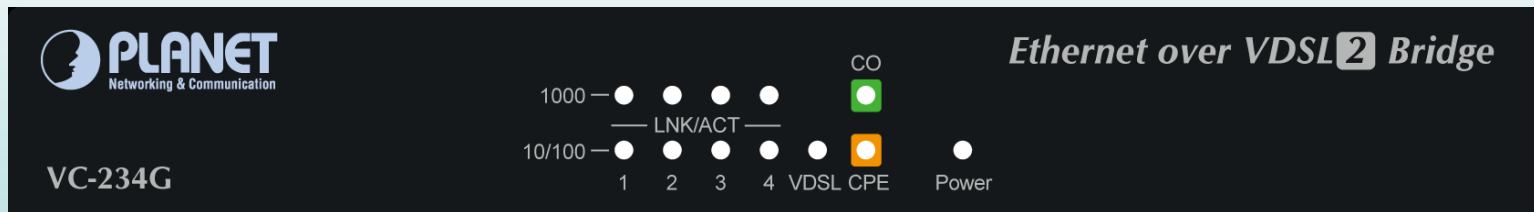
Hardware Introduction – VC-234G

◆ **Dimensions (W x D x H):** 154.6 x 86.0 x 26.3 mm

◆ **Front Panel with LED Indicators**

✓ **LEDs**

- **1 x PWR:** Lights to indicate that the VDSL Converter has power.
- **4 x 1000 LED:** To indicate that the port is operating at 1000Mbps.
- **4 x 100 LED:** To indicate that the port is operating at 10/100Mbps.
- **3 x VDSL LED:** To indicate that the VDSL link is established in CO/CPE mode.

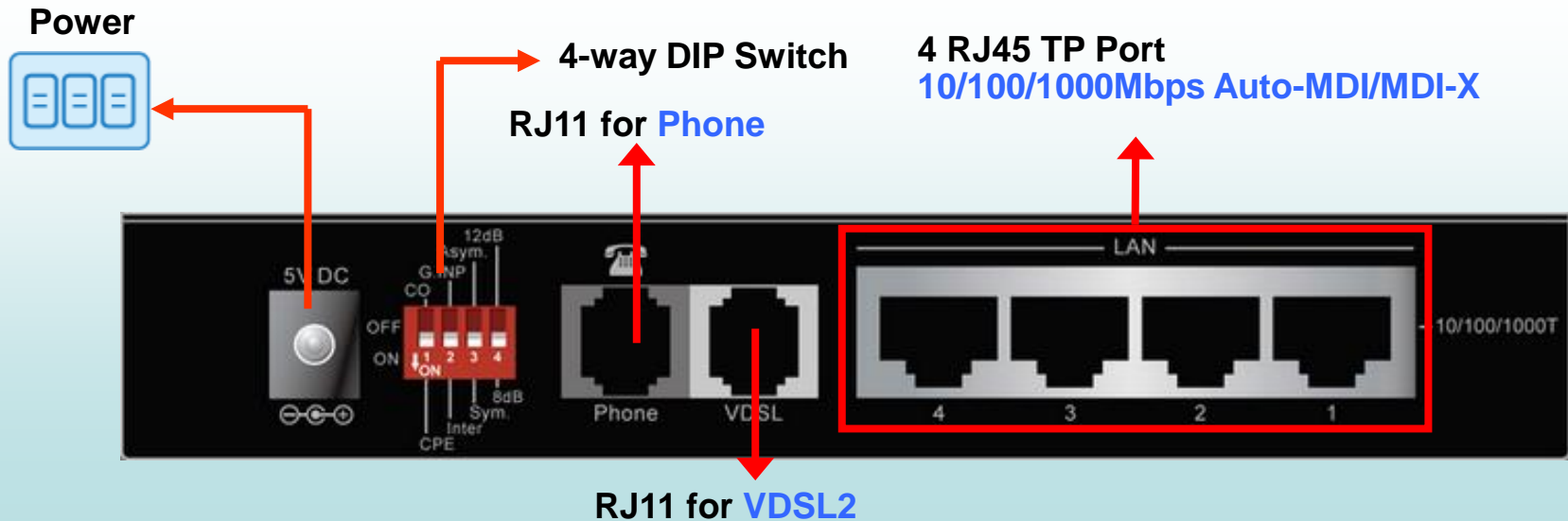


Hardware Introduction – VC-234G

◆ Rear Panel –Interface

✓ Interface

- 4 x RJ45: 10/100/1000Mbps auto-MDI/MDI-X, auto negotiation
- 2 x RJ11: VDSL2 Port
 - 1 for VDSL connection
 - 1 for POTS connection
- 1 DC jack for 5V DC, 2A adapter
- 4-position DIP switch



Product Features



Product Features

◆ G. Vectoring:

- ✓ **G.993.5 (G.Vectoring)** significantly reduces crosstalk and improves VDSL2 line performance.
- ✓ The VC-231G and VC-234G work in conjunction with vectoring-enabled DSLAMs to **remove crosstalk interference** and **improve maximum line bandwidth** across the existing copper infrastructure.



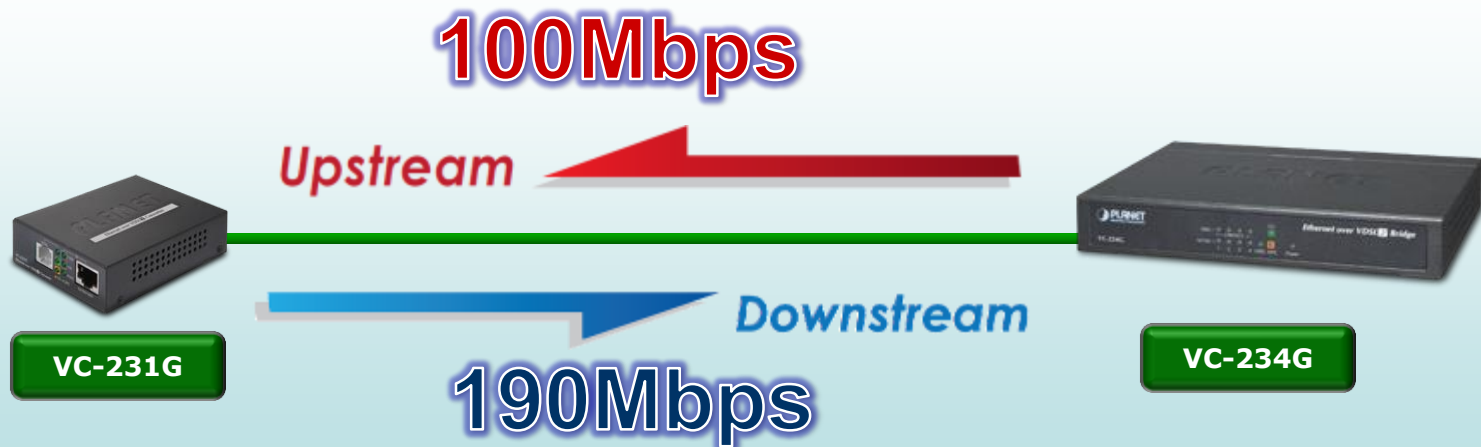
Product Features

◆ High-performance Ethernet Over VDSL

- ✓ The VC-231G and VC-234G provide fast access to Internet, up to **190Mbps** for downstream data transmission and **100Mbps** for upstream data transmission.

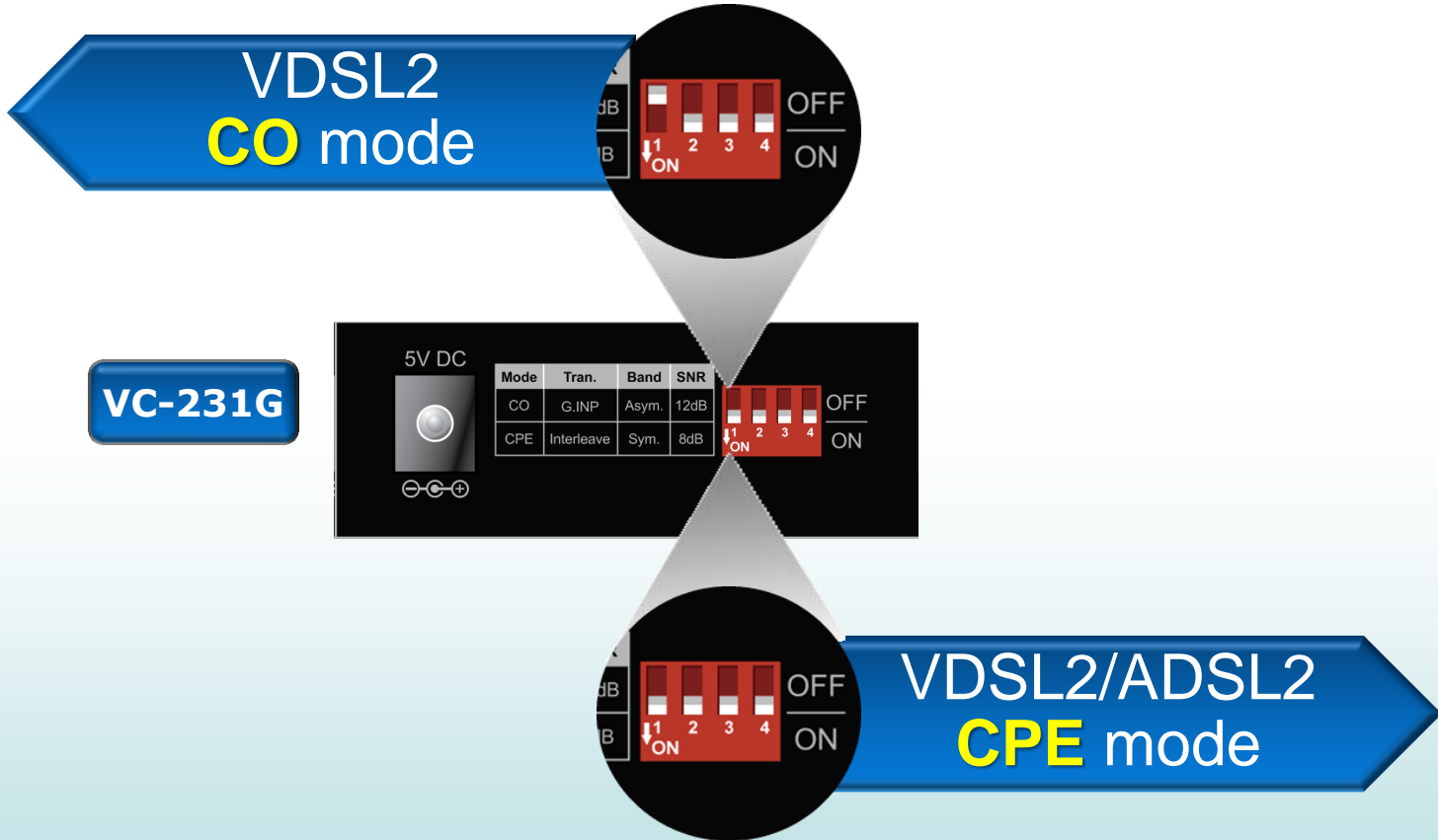
◆ ADSL2+ Fallback

- ✓ The VC-231G and VC-234G, with ADSL 2+ technology, support a downstream transmission rate of up to **24Mbps** and an upstream of **1Mbps**.



Product Features

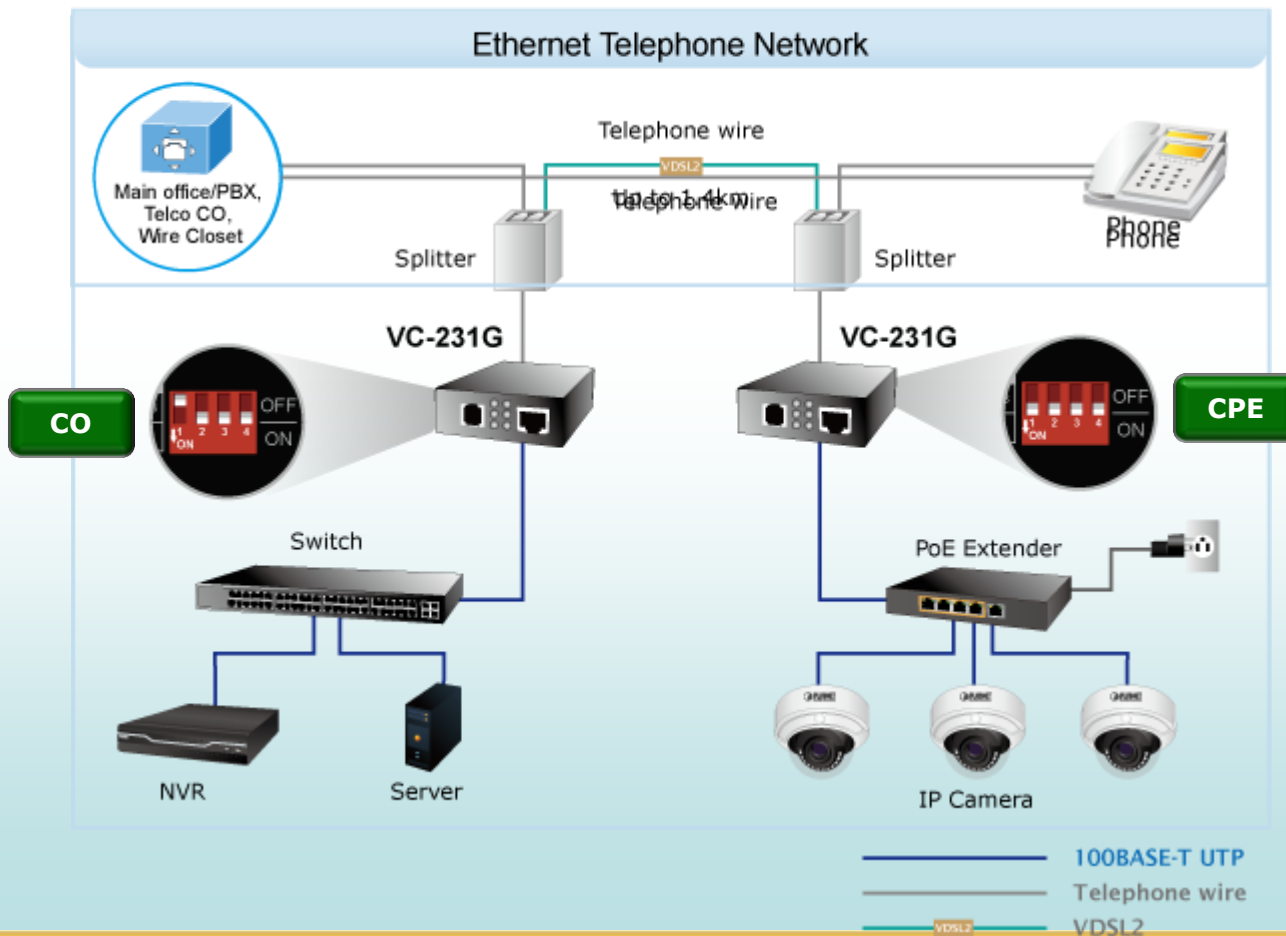
- ◆ **CO/CPE** mode selectable via DIP switch



Product Features

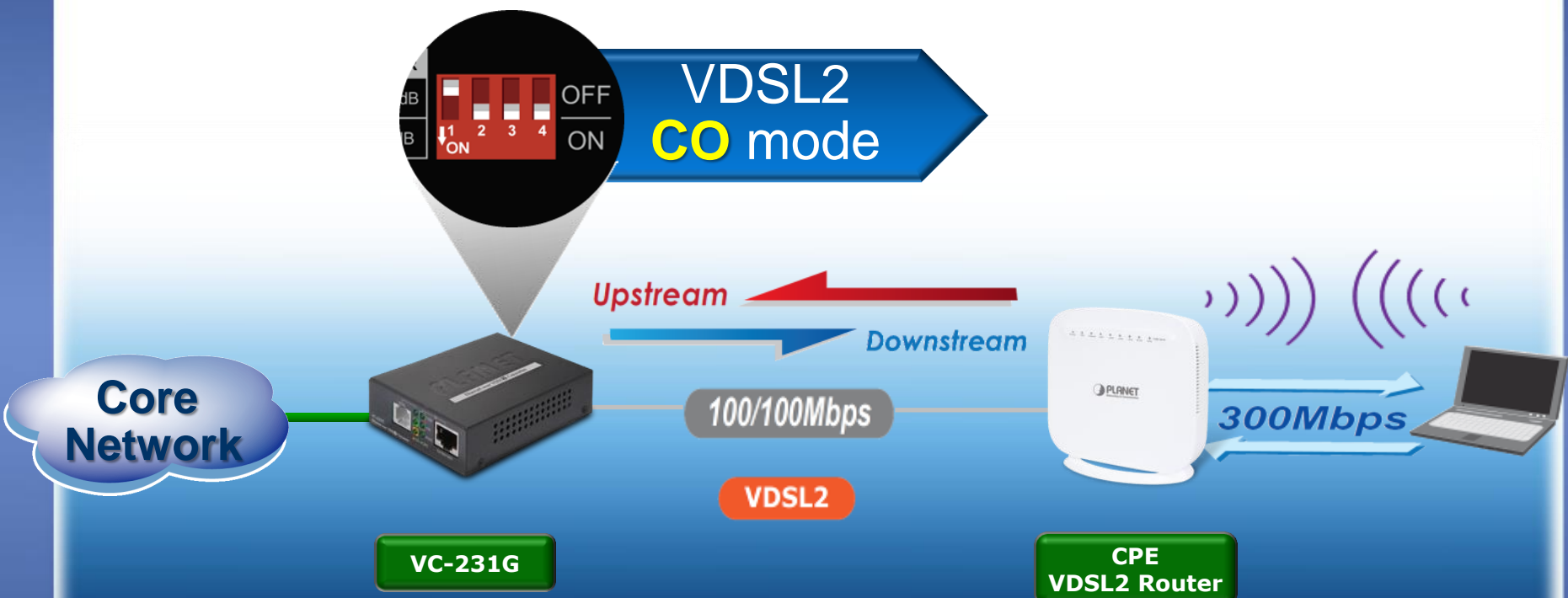
- ◆ **CO/CPE** mode selectable via DIP switch

LAN to LAN Connection



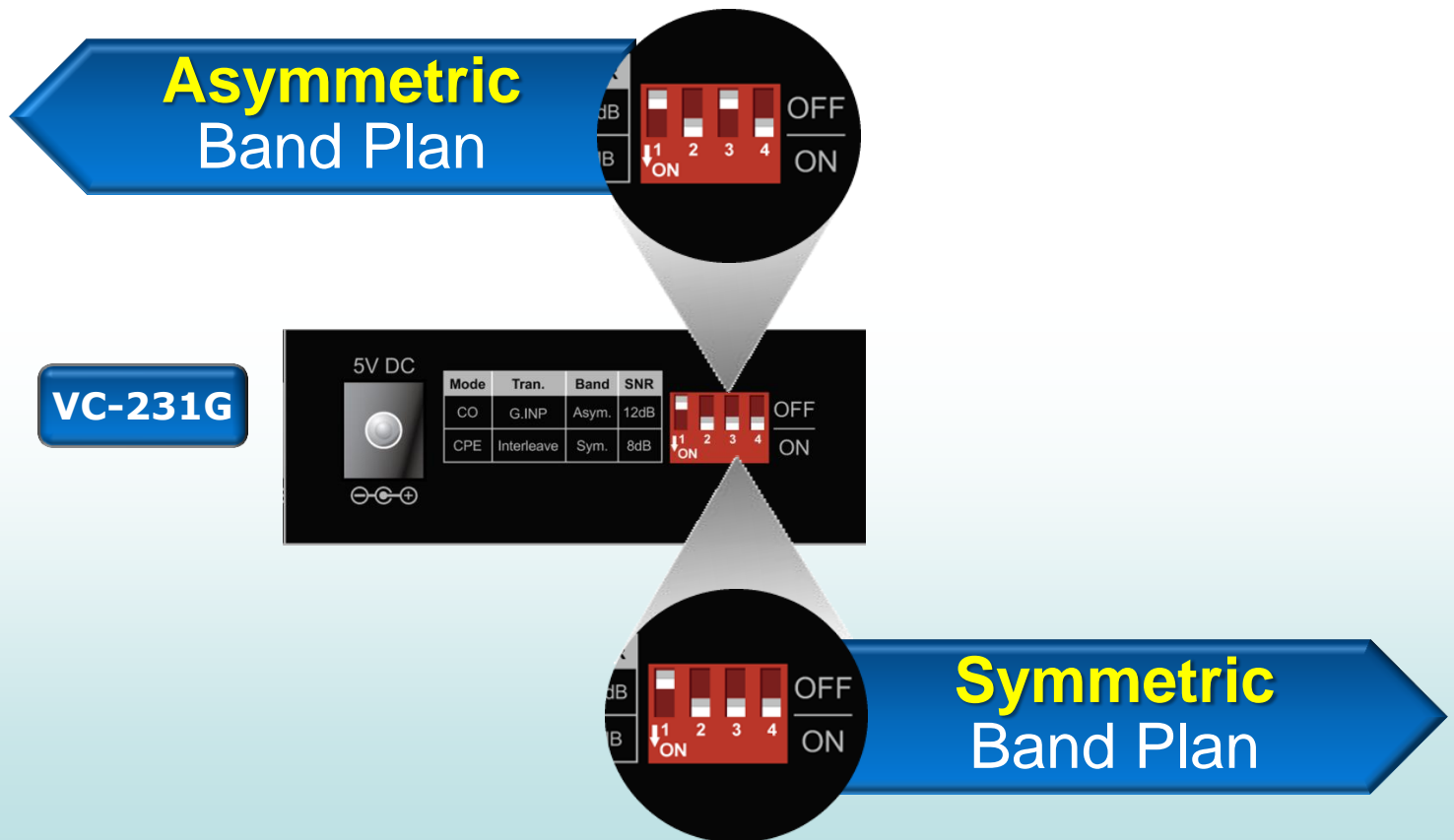
Product Features

- ◆ VDSL2 **CO mode** provides connectivity with **VDSL2 Routers**



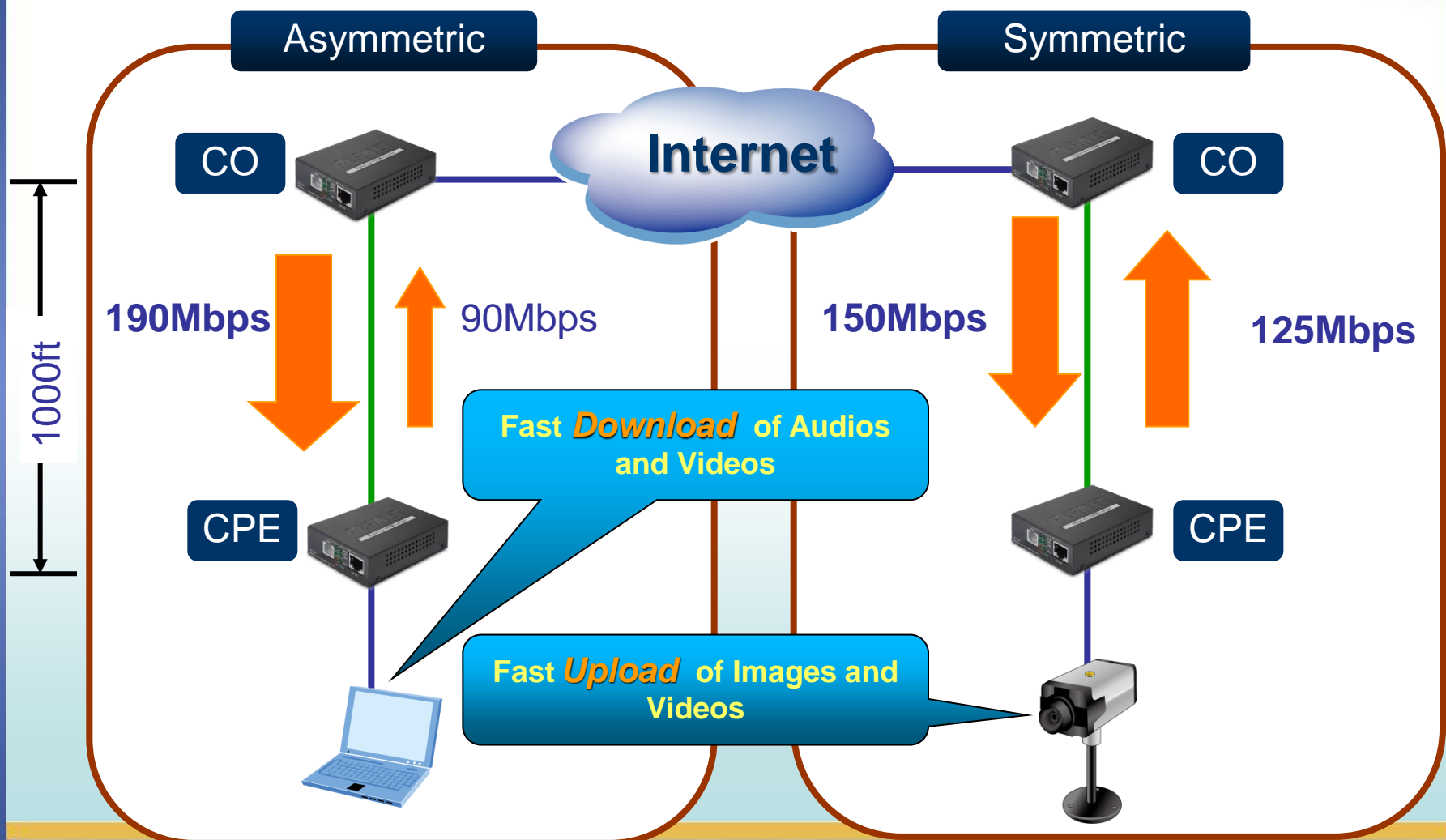
Product Features

- ◆ Selectable band plan -- **Asymmetric** and **Symmetric** via DIP switch



Product Features

- ◆ VC-231G selectable band: **Asymmetric** and **Symmetric**



Product Benefits



Product Benefits

High-performance Ethernet over VDSL Solution

G.993.5 vectoring technology to improve maximum line bandwidth

An asymmetric data rate of up to **190/100Mbps** within **300m**

Distance of **1.4km** for long reach Ethernet

Implementing with Existing Telephone Copper Wires

Voice and **data** communication can be shared on the existing telephone wire simultaneously

Delivering High-demand Connectivity for ISP/Triple Play Devices

VoD (video on demand), IPTV
voice over IP, video phone,
distance education

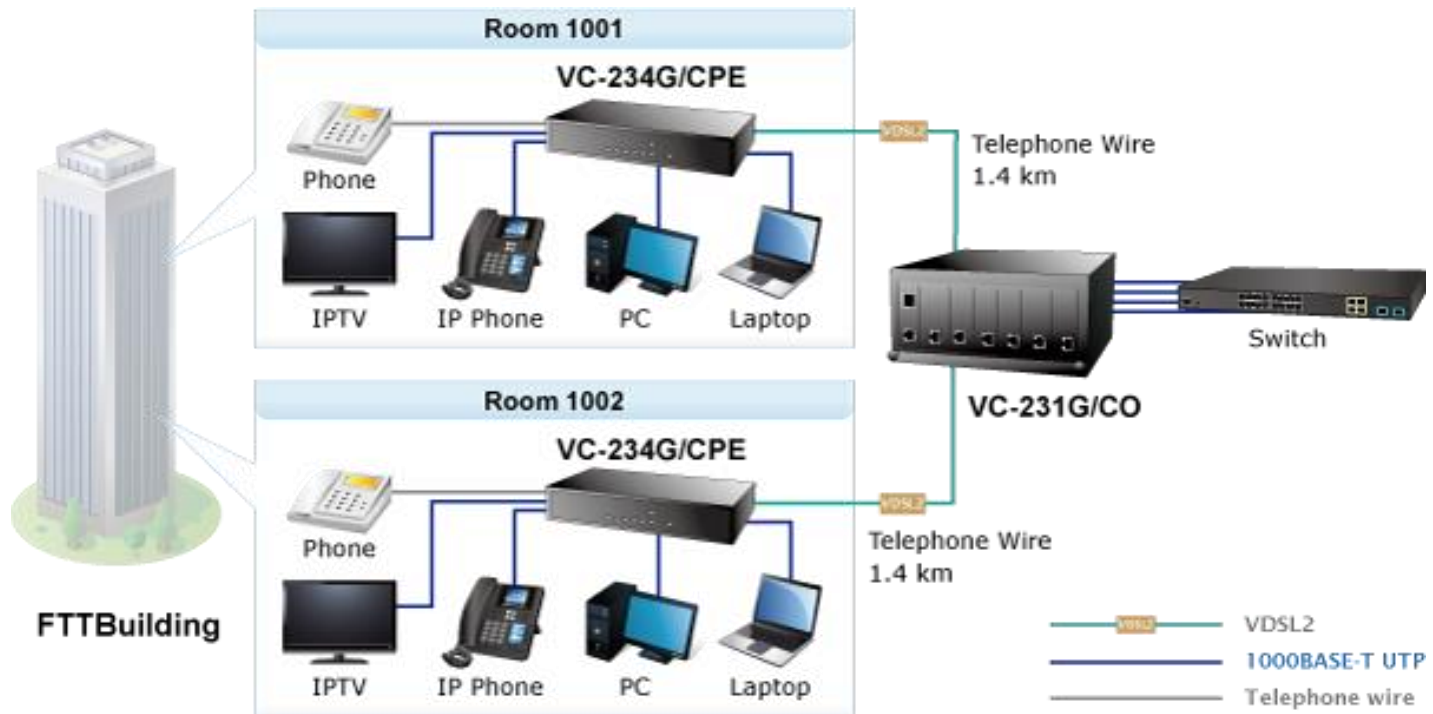
Applications



Applications

◆ Solution for Multi-unit Buildings

- ✓ The VC-231G and VC-234G are perfect for providing cost-effective, high speed network services to multi-unit buildings, using the existing telephony infrastructure without the need for new wiring.

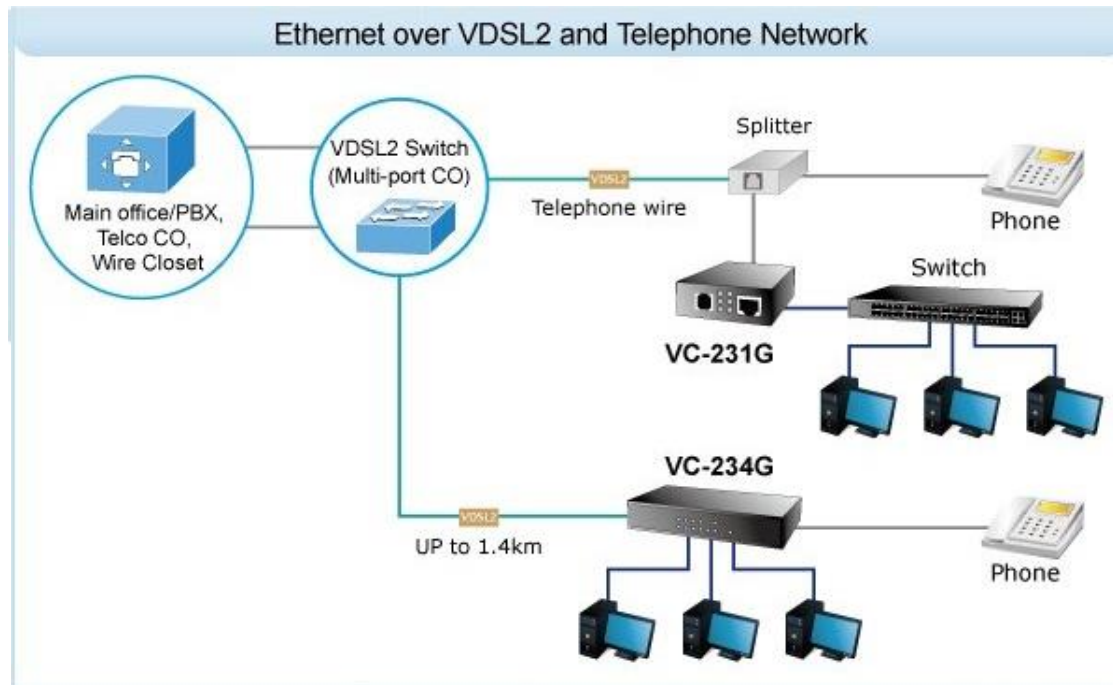


- ✓ With a transmission rate of up to **190/100Mbps**, video on demand, IP telephony and various broadband services can be easily provisioned.

Applications

◆ Ethernet Distance Extension

- ✓ The VC-231G and VC-234G, acting as a standalone pair, are good for Ethernet distance extension over the **existing telephone wires**.





- ✓ With just one pair of AWG-24 copper wire, you can easily connect two Ethernet networks together with a maximum data rate of **190/100Mbps**. With the built-in splitter (VC-234G) or additional splitter (VC-231G), the telephone service can still be used while the VC-234G (CPE) and VC-231G (CO) are in operation.



Product Comparison



Product Comparison

	VC-231G	VC-231
Product Outlook		
VDSL Standard	<input type="checkbox"/> ITU-T G.993.2 VDSL2 (Profile 17a/30a)	<input type="checkbox"/> ITU-T G.993.2 VDSL2 (Profile 17a/30a)
	<input type="checkbox"/> ITU-T G.993.5 G.Vectoring <input type="checkbox"/> ITU-T G.998.4 G.INP	N/A
ADSL Compliance	<input type="checkbox"/> ADSL2/2+ standard <input type="checkbox"/> Data Rate: Up to 24Mbps	N/A
LAN	1 x 10/100/1000T RJ45	1 x 10/100TX RJ45
DIP Switch	<ul style="list-style-type: none"> ■ CO/CPE mode ■ G.INP/Interleaved mode ■ Symm/Asymm band plan ■ 8dB/12dB SNR 	<ul style="list-style-type: none"> ■ CO/CPE mode ■ Fast/Interleaved mode ■ 17a/30a Profile ■ 6dB/9dB SNR
Performance	Asymmetric <ul style="list-style-type: none"> ■ 200m: 190/90Mbps ■ 800m: 57/29Mbps ■ 1.4km: 34/5Mbps 	30a Asymmetric <ul style="list-style-type: none"> ■ 200m: 100/100Mbps ■ 800m: 54/8Mbps ■ 1.4km: N/A
	Symmetric <ul style="list-style-type: none"> ■ 200m: 150/125Mbps ■ 1.4km: 28/12Mbps 	17a Asymmetric <ul style="list-style-type: none"> ■ 200m: 85/65Mbps ■ 1.4km: 50/2Mbps

Product Comparison

	VC-234G	VC-234
Product Outlook		
VDSL Standard	<input type="checkbox"/> ITU-T G.993.2 VDSL2 (Profile 17a/30a)	<input type="checkbox"/> ITU-T G.993.2 VDSL2 (Profile 17a/30a)
	<input type="checkbox"/> ITU-T G.993.5 G.Vectoring <input type="checkbox"/> ITU-T G.998.4 G.INP	N/A
ADSL Compliance	<input type="checkbox"/> ADSL2/2+ standard <input type="checkbox"/> Data Rate: Up to 24Mbps	N/A
LAN	4 x 10/100/1000T RJ45	4 x 10/100TX RJ45
DIP Switch	<ul style="list-style-type: none"> ■ CO/CPE mode ■ G.inp/Interleaved mode ■ Symm/Asymm band plan ■ 8dB/12dB SNR 	<ul style="list-style-type: none"> ■ CO/CPE mode ■ Fast/Interleaved mode ■ 17a/30a Profile ■ 6dB/9dB SNR
Performance	Asymmetric <ul style="list-style-type: none"> ■ 200m: 190/100Mbps ■ 800m: 69/23Mbps ■ 1.4km: 34/5Mbps 	30a Asymmetric <ul style="list-style-type: none"> ■ 200m: 100/100Mbps ■ 800m: 48/9Mbps ■ 1.4km: N/A
	Symmetric <ul style="list-style-type: none"> ■ 200m: 145/145Mbps ■ 1.4km: 28/12Mbps 	17a Asymmetric <ul style="list-style-type: none"> ■ 200m: 100/70Mbps ■ 1.4km: 20/4Mbps

Product Comparison

VDSL2



VC-231G

190/90Mbps

RJ11 phone wire, Data + Voice



VC-231G

VDSL2



VC-231

100/100Mbps

RJ11 phone wire, Data + Voice



VC-231

Long Reach
PoE



LRP-101UH

82/82Mbps

RJ11 phone wire, Data + **Power**



LRP-101UE



Product Comparison

VDSL2



VC-231G

57/29Mbps

RJ11 phone wire, Data + Voice



VC-231G

VDSL2



VC-231

54/8Mbps

RJ11 phone wire, Data + Voice



VC-231

Long
Reach
PoE



LRP-101UH

Not supported

RJ11 phone wire, Data + **Power**



LRP-101UE

800m

Appendix



Sales Targets



◆ Target Markets

- ✓ System Integrators
- ✓ Hotels, Hospitals
- ✓ Enterprises
- ✓ ISPs, Telecoms
- ✓ Communities



◆ Target Customers

- ◆ Extending network infrastructure solution

◆ Profitable Products





✓ Other VDSL2 products offered include:

- VDSL2 Switch/DSLAM: VC-820M, VDL-2420M
- VDSL2 Bridge: VC-231, VC-234
- VDSL2 Router: VDR-300NU, VDR-301N
- ADSL2 DSLAM: IDL-2402, IDL-4802







Appendix

◆ Related VDSL2 Bridge/VDSL2 Routers

Model Name	Max. Performance	VC-231G/VC-234G Mode
VC-231 	100/100Mbps	CO/CPE
VC-234 	100/100Mbps	CO/CPE
VDR-300NU  11n Wi-Fi	100/100Mbps	CO
VDR-301N  11n Wi-Fi	100/100Mbps	CO




Appendix

◆ Related xDSL Switch/DSLAM Products

Model Name		Max. Performance	VC-231G/VC-234G Mode
VC-820M		100/100Mbps	CPE
VDL-2420M		100/100Mbps	CPE
IDL-2402		24/1Mbps	CPE
IDL-4802			

Appendix

◆ **Related Media Converter Chassis Products**

Model Name		Description
MC-700		7-slot Media Converter Chassis
MC-1500		15-slot Media Converter Chassis
MC-1500R MC-1500R48		15-slot Media Converter Chassis (AC Power) 15-slot Media Converter Chassis (DC Power)

Appendix

◆ ADSL2 - ATM PVC default setting

PVC	VPI	VCI	Encapsulation	QoS
1	8	36	LLC	UBR
2	8	35	LLC	UBR
3	0	35	LLC	UBR
4	1	37	LLC	UBR
5	0	32	LLC	UBR
6	0	33	LLC	UBR
7	0	100	LLC	UBR
8	8	81	LLC	UBR



ACTIVATING IP POWER

VDSL2 Introduction



VDSL2 Introduction



◆ What is VDSL2?

- ✓ VDSL2 (Very-high-data-rate Digital Subscriber Line 2)
- ✓ VDSL2 is the newest and more advanced standard of DSL.
- ✓ VDSL2 has been standardized as ITU G.993.2.
- ✓ VDSL2 (ITU G.993.2) is an enhancement to VDSL (G.993.1).
- ✓ DMT (Discrete Multi-Tone) line coding

VDSL2 Introduction



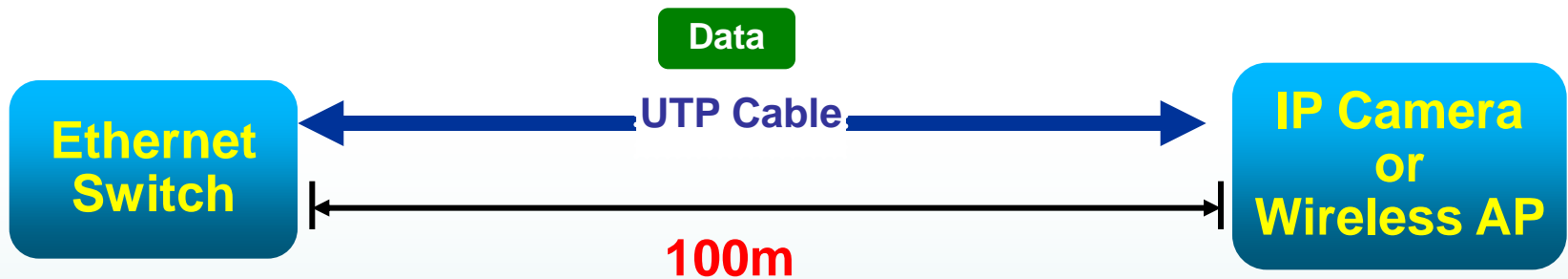
◆ DSL Standard

Family	ITU	Name	Ratified	Maximum Speed Capabilities
ADSL	G.992.1	G.dmt	1999	8Mbps for downstream 1Mbps for upstream
ADSL2	G.992.3	G.dmt.bis	2002	12Mbps for downstream 1Mbps for upstream
ADSL2plus	G.992.5	ADSL2plus	2003	24Mbps for downstream 1Mbps for upstream
ADSL2-RE	G.992.3	Reach Extended	2003	8Mbps for downstream 1Mbps for upstream
SHDSL (updated 2003)	G.991.2	G.SHDSL	2003	5.6Mbps for upstream/downstream
VDSL	G.993.1	Very-high-data-rate DSL	2004	55Mbps for downstream 15Mbps for upstream
VDSL2 -12 MHz Long reach	G.993.2	Very-high-data-rate DSL 2	2005	55Mbps for downstream 30Mbps for upstream
VDSL2 - 30 MHz Short reach	G.993.2	Very-high-data-rate DSL 2	2006	100Mbps for upstream/downstream
VDSL2-Vplus	ITU G.993.2 Amendment 1	VDSL2 Annex Q VPlus/35b	2015	300Mbps for downstream 100Mbps for upstream

What is Ethernet Extender ?

◆ The Limitation of Twisted-pair UTP Cable

- ✓ TIA/EIA 568b1: Maximum segment length of **100 meters** (328 feet).



A maximum cable length of 100 meters is not able to meet a wide range of **IP Surveillance / Wireless AP** deployments.

What is Ethernet Extender ?

◆ PLANET Ethernet Extender Solution

- ✓ Break 100-meter Ethernet limit of UTP cable
- ✓ Utilize the existing transmission media:
 - **Phone Wire**
 - **Coaxial Cable**
- ✓ PLANET Ethernet Extender solution offers the fastest possible data transmission speeds over the existing copper telephone lines or coaxial cable without the need for rewiring.
- ✓ It is based on two core networking technologies:
 - Ethernet (IEEE 802.3 and IEEE 802.3u)
 - VDSL2 (Very-high-data-rate Digital Subscriber Line 2)