Trademarks

Disclaimer

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 Instruction manual, may cause harmful interference to radio communications, however, there is no guarantee that interface 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.

CE Mark Warning

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

Revision

Ethernet Over VDSL Converter User's Manual

FOR MODELS: VC-102M / VC-102S

Part No.: EM-VC102

Table of Contents

Chapter 1
Introduction

1.1 Checklist

Check the contents of your package for following parts:

- Ethernet over VDSL Converter
- Power Adapter
- Telephone line
- User's Manual

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

1.2 Introduction to Ethernet over VDSL Converter

The converter is a switching architecture with one RJ45 10/100Mbps Fast Ethernet ports and one RJ11 symmetric Ethernet over VDSL port (symmetry means upstream and downstream rate are the same or similar). It is ideal for signal conversion by transmitting the Ethernet data from the standard twisted pair cable to the telephone cable and extending the distance.

The Ethernet over VDSL combines the well proven Ethernet and VDSL technology to transmit the Ethernet format data by using VDSL signaling over the most widespread telephone wires and has no impact to current voice service. Therefore, it is very good for Internet building phone line network because every room or house could use the existing phone line to transmit data to the Internet and the whole building could share the Internet line to the wide area network with minimum cost.

With much enough bandwidth, the 5/10/15 Mbps symmetric capability enables many multi-media services on local Internet come true, like VOD (Video on Demand), Internet caching server, distance education, and so on.

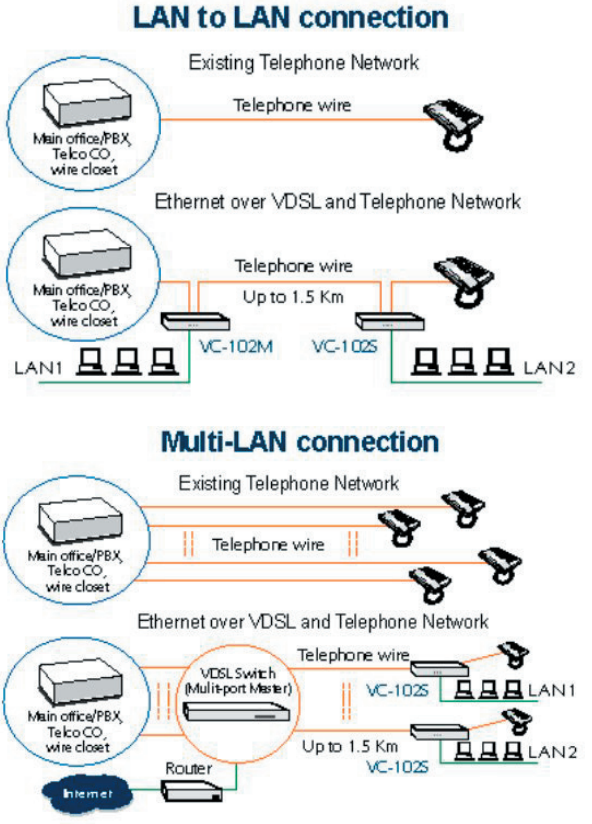
In one community or hotel, we just need to install one local server then the multi-media services will be localized that is people do not need to access the services through Internet but using local area network with better bandwidth and efficiency. Meanwhile, this kind of infrastructure will minimize the burden on the Internet.

The converter is plug-n-play without any software to configure and also fully compliant with all kinds of network protocols. Moreover, the rich diagnostic LEDs on the front-panel provide the operating status of individual port and the whole system. There are two models of the converters, one is used for client side and the other is central side. If you want to setup one pair of converters for point-to-point connection then one set must be slave (client) mode and the other one is master mode.

The cable specifications of the connection are listed as following:

- 10BASE-T, Category 3, 4 or 5 UTP
- 100BASE-TX, Category 5 UTP
- Ethernet over VDSL, Twisted-pair telephone wires

The two drawings listed below are typical application for the Ethernet over VDSL converter.



Note: Slave device must connect to Master device through the telephone wire. Slave cannot connect to Slave and Master cannot connect to Master. VC-102M works as Master device and VC-102S works as Slave device.

1.3 Key Features

The converter provides the following key features:

- Cisco LRE switch / CPE compatible
- Complies with IEEE802.3, IEEE802.3u and IEEE802.3x standards
- 5 selectable transmission modes through DIP switch on VC-102M or management interface of VC-1602
- QAM (Quadrature Amplitude Modulation) line code
- Designed based on Frequency Division Duplex
- Half duplex Back pressure and IEEE802.3x Full Duplex Pause frame flow control
- Built-in POTS/ISDN splitter
- Two RJ-11 connectors for each VDSL port, one for VDSL connection and one for POTS/ISDN connection
- Voice and data communication can be shared on the existing telephone wire simultaneously
- Support up to 1536 bytes packet size, 802.1Q VLAN tag transparent
- Support extensive LED indicators for network diagnostics

1.4 Specifications

Product		Ethernet over VDSL Converter	
Model		VC-102M	VC-102S
Ports	10/100 Base-TX	1 RJ-45	1 RJ-45
	VDSL(Each with 2 RJ-11 connectors)	1 (Master)	1 (Slave)
LED	System	PWR, STATUS	PWR
	Ethernet	100, LNK/ACT, FDX/COL	
	VDSL	LNK, ACT	
DIP switch		5 positions DIP switch	N/A
Mode/ Distance(Based on AWG24 wires)		ANSI - 15/4Mbps asymmetrical rate up to 4100 feet (1.25km) ETSI - 11/4Mbps asymmetrical rate up to 4100 feet (1.25km) VE-5 - 5/5 Mbps symmetrical rate up to 5000 feet (1.5km) VE-10 - 11/11Mbps symmetrical rate up to 4100 feet (1.25km) VE-15 - 15/17Mbps asymmetrical rate up to 3500 feet (1.05km)	
Cables		10Base-T: 2-pair UTP Cat.3,4,5 up to 100m (328ft) 100Base-TX: 2-pair UTP Cat.5, up to 100m (328ft) VDSL: twisted-pair telephone or ISDN wires (AWG24 or better) up to 5000ft (1.5km)	
Splitter		Built-in splitters for POTS/ISDN connection	
System Memory		8k bytes Ethernet transmit and 16k bytes Ethernet receive buffers	
Dimensions (WxDxH)		117x93x25mm	
Mounting Type		Desktop placement	
Power Supply		12V/1A DC external power adapter	
Operational Environment		Temperature: 0~50 degree C (operating), -20~70 degree C (storage) Humidity: 10~90%, non-condensing	
Certification		FCC Class B, CE	

Standard Compliance	IEEE 802.3 10Base-T IEEE 802.3u 100Base-TX IEEE802.3x Full Duplex PAUSE frame flow controlEthernet over VDSL

Chapter 2
Hardware Description

This product series provide 2 RJ-11 ports for voice connection (like telephone or ISDN) and for network line connection.

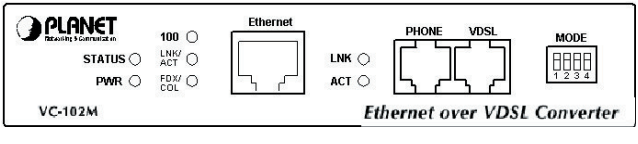
This product series also provide 1 RJ-45 ports for two different running speed –10Mbps, 100Mbps, in the same converter and automatically distinguish the speed of incoming connection.

This section describes the hardware features of these Converters. For easier control of the converter, familiarize yourself with its display indicators, and ports. Front panel illustrations in this chapter display the unit LED indicators. Before connecting any network device to the converter, read this chapter carefully.

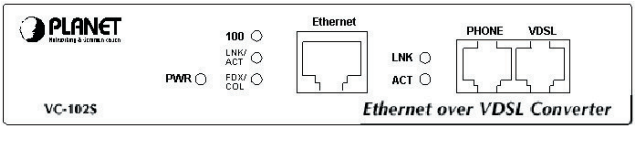
2.1 Front Panel and Real Panel

The units' front panel provides a simple interface monitoring the converter.

VC-102M Front Panell



VC-102S Front Panel



2.1.1 LED indicators

The rich diagnostic LEDs on the front panel can provide the operating status of individual port and whole system.

STATUS LED (VC-102M only)

The LED blinks periodically to show the converter is working normally. If the LED stays green/dark that means the system is fail, you need to contact your agent or try to reboot the converter.

PWR LED

This indicator lights green when the converter is receiving power; otherwise, it is off.

100 LED (Ethernet)

The RJ-45 port has a 100 LED. Steady green indicates that the port is operating at 100Mbps. If the LED is off, the link speed is 10Mbps.

LNK/ACT LED (Ethernet)

The RJ-45 port has a LNK/ACT LED. Steady green indicates that the port has good linkage to its associated device. Flashing green indicates that the port is receiving or transmitting data from/to its associated partner.

If the port is connected but the LNK/ACT LED is dark, check the following items:

1. The converter and the connected device's power are on or not.
2. The port's cable is firmly seated in its connectors in the switch and in the associated device.
3. The connecting cable is good and with correct type.
4. The connecting device, including any network adapter is functional.

FDX/COL LED (Ethernet)

A collision occurs when two stations within a collision domain attempt to transmit data at the same time. Intermittent flashing amber of the collision LED is normal; the contending adapters resolve each collision by means of a wait-then-retransmit algorithm. Frequency of collisions is an indicator of heavy traffic on the network.

If the FDX/COL lights amber which means the port is under full-duplex operation or dark for half-duplex mode.

LNK LED (VDSL)

If both ends of the VDSL devices are connected then the LED will blink for a while (in 10 seconds), this is the stage of speed auto-negotiation. After the negotiation process, the LNK LED will stay green. If the LED blinks always, that means the link process is fail.

ACT LED (VDSL)

If there is any traffic transverses the port then the LED will light green. Otherwise, off means no traffic on the network.

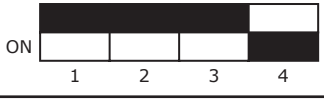
2.1.2 MODE DIP Switch (VC-102M only)

The converter provides 5 selective transmission modes that defined by predetermined profiles. 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 modes, bandwidth and distance extensibility tested for AWG 24 (0.5mm) twisted-pair without noise and cross talk.

Profile Name	Profile Type	Downstream Rate (Mbps)	Upstream Rate (Mbps)	Maximum Distance between the Master and Slave device
ANSI	Public	15.17	4.27	4100 feet (1.25km)
ETSI	Public	11.38	4.27	4100 feet (1.25km)

VE-5	Private	5.69	5.69	5000 feet (1.5km)
VE-10	Private	11.38	11.38	4100 feet (1.25km)
VE-15	Private	15.17	17.06	3500 feet (1.05km)

The following table lists the DIP switch settings for all 5 transmission mode. Please power off the converter before making any transmission mode adjustment.

Transmission mode	DIP switch
ANSI	
ETSI	
VE-5	
VE-10 (Default)	
VE-15	

2.2 The Rear Panel

The rear panel of the converter is shown below.

VC-102M and VC-102S require 12V DC power input. It will conform to the bundled AC adapter. Should you have the problem to make the power connection, please contact your local sales representative.

Power Notice:

1. The device is a power-required device, it means, it will not work till it is powered. If your networks should 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.

2. In some area, installing a surge suppression device may also help to protect your converter from being damaged by unregulated surge or current to the converter or the power adapter.

Chapter 3
Installing and Using VDSL Converter

3.1 Install the Ethernet Over VDSL Converter

The Converter does not require any software configuration. Users can immediately use any feature of this product simply by attached the cables and plug power on. There is some key limitation on the Ethernet over VDSL converter. Please check the following items:

- The device is used for point-to-point connection only (master device to slave device) and allows data and voice work on the same telephone or ISDN lines.
- Two RJ-11 connectors for VDSL port. One for voice device connection (like telephone) and the other one for network link connection.
- Depending on the quality of telephone line, the maximum distance of one VDSL segment is 1.5km (5000ft) with AWG 24 telephone wires. The distance will change by the quality of telephone wires.

3.1.1 LAN to LAN connection

Two sets of the converters could be used to link two local Area networks that are located in different areas. Through the normal telephone line, it could setup an up to 15/17Mbps asymmetric backbone, but one converter must be Master (VC-102M) and the other one is Slave (VC-102S).

NOTE: VC-102M can be connected PLANET's previous slave model, VC-101S. The speed is also adjusted by the DIP-switch of VC-102M. VC-102S can also be connected to previous master, VC-101M. The speed depends on the firmware loaded on VC-101M. Please check the VC-101M's user's manual for detail.

3.1.2 Connect to Multi-Port Master

In order, to built up a local Internet in apartment, hotel, campus and hospitality environment.

The Multi-port Master (for example, VC-1602, VC-412 or Cisco LRE switch) need to be placed In the wiring center (MDF room) and connect to the telephone line system, on the other hand, need to install a Slave (VC-102S) converter on the individual client side and connect to the Multi-port Master through the telephone lines.

When deciding where to put the converter then you must ensure:

- It is accessible and cables can be connected easily. Cabling is away from sources of electrical noise such as radios, transmitters and power lines and fluorescent lighting fixtures.
- Water or moisture can not enter the unit

- Air flow around the unit and through the vents in the side of the case is not restricted (company recommend that you provide a minimum of 25mm inch clearance)

To prolong the operational life of your units:

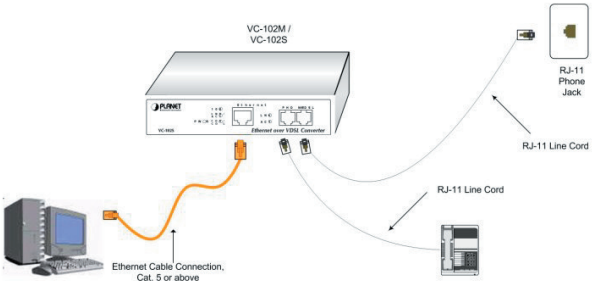
- Do not place objects on top of any unit or stack
- Do not obstruct any vents at the sides of the case

3.2 Connecting VC-102M/S

3.2.1 Connecting Standalone PC

Refer to the following procedures to setup the VC-102M/S to a standalone PC.

1. Power on the VC-102M/S by connecting its power source.
2. Power LED will illuminate.
3. Connect VDSL line from another VDSL device to VDSL port of the VC-102M/S.
4. LNK LED will illuminate.
5. Connect telephone to the POTS port.
6. Connect Ethernet port to PC Network Interface Card (NIC) via regular Cat. 5 cable.



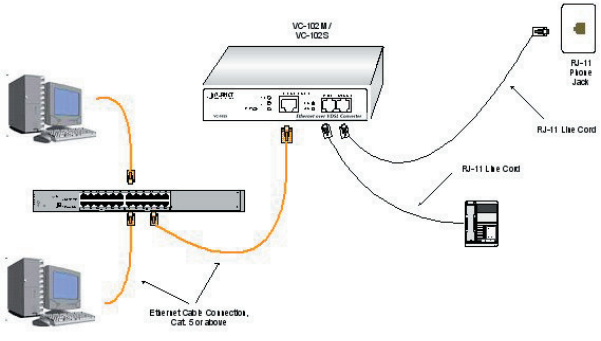
3.2.2 Connecting Multiple PCs to an Ethernet LAN

Refer to the following procedures to setup the VC-102M/S to an Ethernet LAN.

1. Power on the VC-102M/S by connecting its power source.
2. Power LED will illuminate.
3. Connect VDSL line from another VDSL device to VDSL port of the VC-102M/S.
4. LNK LED will illuminate.

5. Connect telephone to the POTS port.
6. Connect Ethernet port to Ethernet device via regular Cat. 5 cable.

NOTE: Please refer to your Ethernet device User's Manual for the device's set up information.



Chapter 4
Troubleshooting

SYMPTOM: VDSL LNK LED does not lit after wire is connected to the VDSL port.

CHECKPOINT:

1: Verify the length of the wire connected between VC-102M and VC-102S is not more than 1.5km. Please also try to adjust the DIP switch or VC-102M to other speed mode.

2: Please note you must use 1 VC-102M and 1 VC-102S connect to each other to make it work.

SYMPTOM: Switch LNK/ACT LED does not lit after cable is connected to the port.

CHECKPOINT:

1: Verify you are using the Cat.5 or better cable with RJ-45 connector to connect to the port.

2: If your device (like LAN card) supports to Auto-Negotiation, please try to manual set at a fixed speed of your device to solve this problem.

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