PLANET
Networking & Communication

Ethernet Over VDSL Converter

VC-101M/VC-101S

User's Manual

Trademarks

FCC Warning

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-101M / VC-101S

Part No.: EM-VC101V2

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1. Introduction

1.1 Checklist

Check the contents of your package for following parts:

- Ethernet over VDSL Converter
- Power Adapter
- Telephone line
- Cat.5 Ethernet Cable
- Quick Installation Guide
- User's manual and utility CD
- RS-232 Console cable(VC-101M only)

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.

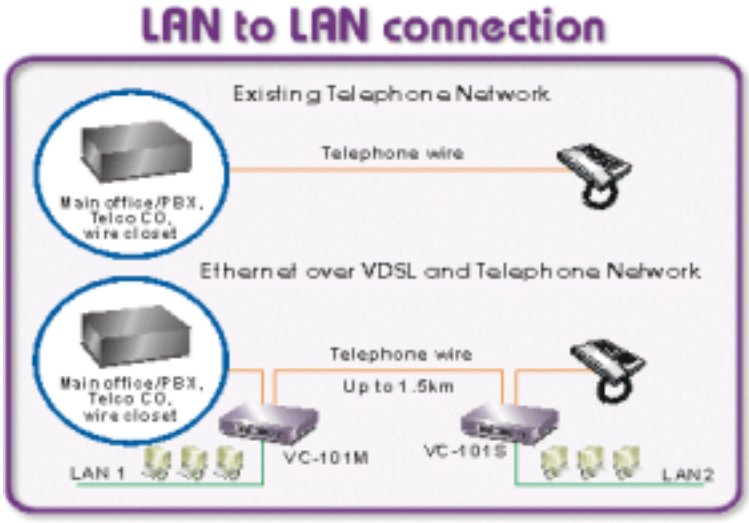
The converter is plug-n-play without any software to configure and also fully compliant with all kinds of network protocols. Moreover, the rich diagnostic LEDs on the front-panel provide the operating status of individual port and the whole system. There are two models of the converters, one is used 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:

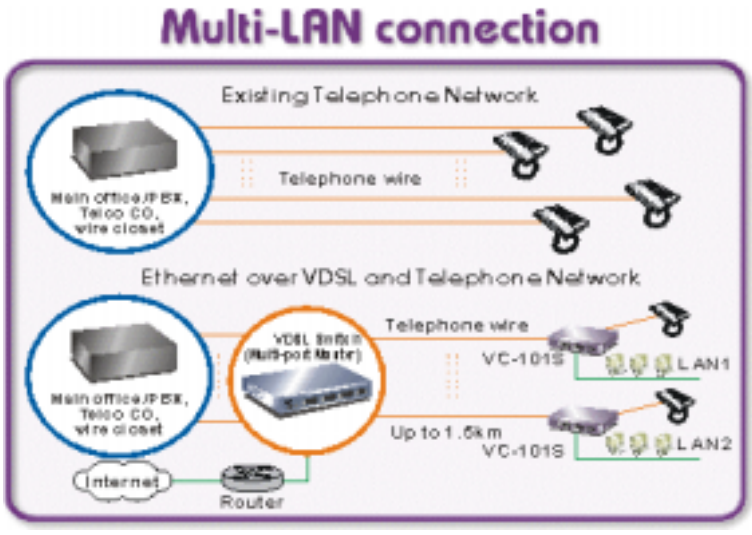
- 10BASE-T, Category 3, 4 or 5 UTP
- 100BASE-TX, Category 5 UTP
- Ethernet over VDSL, Twisted-pair telephone wires

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

Drawing 1: LAN to LAN connection



Drawing 2: Multi-port Master Connection



Note: Slave device must connect to Master device through the telephone wire. Slave cannot connect to Slave and Master cannot connect to Master. VC-101M works as Master device and VC-101S works as Slave device.

1.3 Key Features

The converter provides the following key features:

- Firmware upgradeable through console interface
- 11Mbps symmetric data rate in maximum 1.2km with R2 firmware
- 17Mbps upstream and 15Mbps downstream data rate in maximum 1.05 km with R4 firmware
- 1/4, 5/5, 11/11 and 17/15 Mbps adjustable data rate with R4.5 firmware (when VC-101S works with VC-412 only)
- Cisco LRE switch / CPE compatible with R4.5 firmware
- Complies with IEEE802.3, IEEE802.3u and IEEE802.3x standards
- Designed based on QAM modulation
- Designed based on FDD duplexing (Frequency Division Duplexing)
- Supports Store-and-forward mechanism
- Back pressure and IEEE802.3x compliant 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 extensive LED indicators for network diagnostics

1.4 Specifications

Model		VC-101M	VC-101S
Ports	10/100Base-TX	1 RJ-45	1 RJ-45
	VDSL (Each with 2 RJ-11 connectors)	1 (Master)	1 (Slave)
Console		1 x RS-232 DB-9	
Mode/Distance (based on AWG24 wires)		R2 firmware: 11Mbps upstream and downstream R4 firmware: 17Mbps upstream and 15Mbps downstream R4.5 firmware: 5/10/15 adjustable between VC-101S and VC-412	
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 (AWG26 or better) up to 5000ft (1.5km)	
Protocols and Standards		IEEE 802.3 (Ethernet) IEEE 802.3u (Fast Ethernet) IEEE 802.3x (flow control) Ethernet over VDSL	
Splitter		Built-in splitters for POTS/ISDN connection	
Mounting Type		Desktop placement	
Dimensions (WxDxH)		140 x 91.6 x 30 mm	
Power Supply		5V/2A DC external power adapter	
Operational Environment		Temperature: 0~50 degree C (operating), -20~70 degree C (storage) Humidity: 0~90%, non-condensing	
Certification		FCC, CE	

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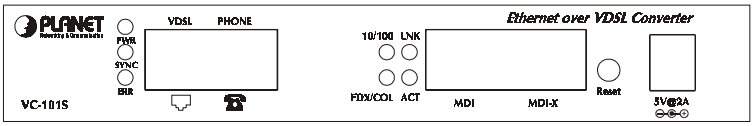
2. Hardware Description

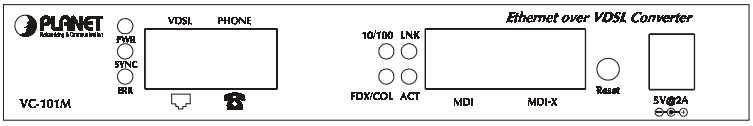
This product series provide 2 RJ-11 ports for voice connection (like telephone or ISDN) and for network line connection.
This product series also provide 1 RJ-45 ports for two different running speed –10Mbps, 100Mbps, in the same converter and automatically distinguish the speed of incoming connection.
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

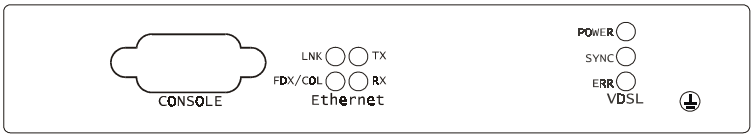
The units' front and real panel provides a simple interface monitoring the converter.

VC-101M and VC-101S front panel





VC-101M and VC-101S rear panel



2.1.1 LED indicators

LED	Function	Color	Status	Description
Power	Power indication	Green	On	Power on
			Off	Power off
VDSL Ports				
Sync	VDSL link	Green	On	VDSL link is established
			Off	No VDSL link
Err	Errors on line	Yellow	On	Errors has occurred on the line
			Off	No error
Ethernet Ports				
LNK	Ethernet link	Green	On	Ethernet link is established
			Off	No Ethernet link is established
FDX/ COL	Ethernet port Full duplex	Yellow	On	Full Duplex*1
			Blinking	Half duplex and Transmission collisions have occurred
			Off	Half duplex no collision
10/100	Speed	Green	On	Speed is at 100 Mbps
			Off	Speed is at 10 Mbps
ACT	Data Flow	Green	On	Sending and delivering data
			Off	Not active

NOTE: The current firmware have not supported Full Duplex.

2.1.2 Power Source

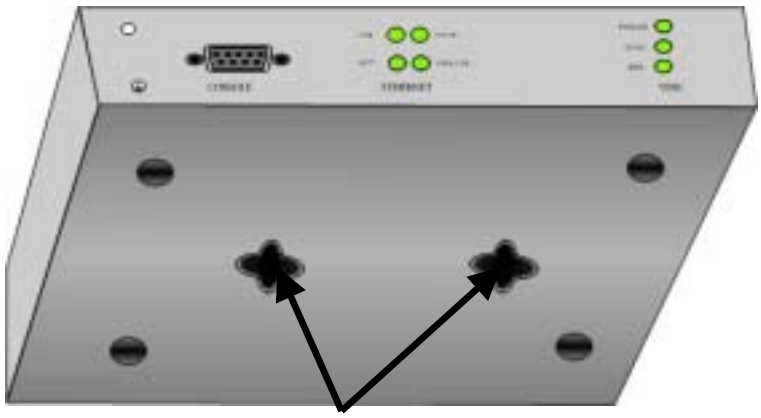
VC-101M and VC-101S require +5VDC power input. It will conform to the bundled AC adapter. Should you have the problem to make the power connection, please contact your local sales representative.

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.

2.2 Bottom Panel

The VC-101M/S can be installed on a desk or mounted on a wall. To mount the VC-101M/S on the wall simply hook holes on the bottom of the VC-101M/S to stable anchors on the wall.



Wall mounting holes

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3. Installing and Using VDSL Converter

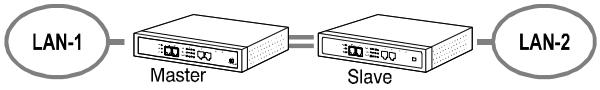
3.1 Install the Ethernet Over VDSL Converter

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 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 1.2km (4000ft) with AWG 24 telephone wires. The distance will change by the quality of telephone wires.

3.2 LAN to LAN connection

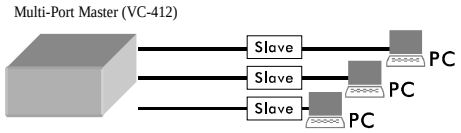
Two sets of the converters could be used to link two local Area networks that are located in different areas. Through the normal telephone line, it could setup a 11Mbps symmetric backbone, but one converter must be **Master(VC-101M)** and the other one is **Slave(VC-101S).**



3.3 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-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-101S)** 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:

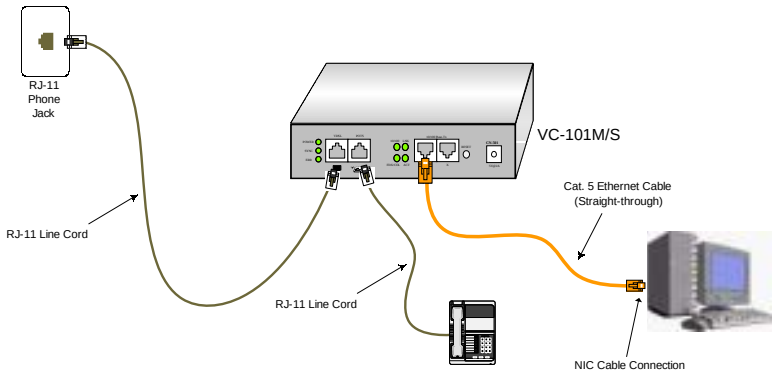
- Do not place objects on top of any unit or stack
- Do not obstruct any vents at the sides of the case

3.4 Connecting VC-101M/S

3.4.1 Connecting Standalone PC

Refer to the following procedures to setup the VC-101M/S to a standalone PC.

1. Power on the VC-101M/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-101M/S.
4. SYNC 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.



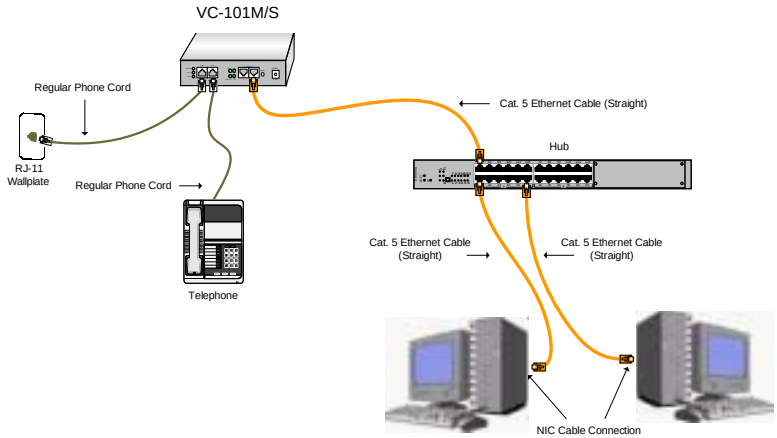
3.4.2 Connecting Multiple PCs to an Ethernet LAN

Refer to the following procedures to setup the VC-101M/S to an Ethernet LAN.

1. Power on the VC-101M/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-101M/S.
4. SYNC 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.



4. Update Firmware

4.1 Firmware version

In order for VDSL local and remote converters to communicate, both remote and local ends must set to the same communication speed. If speeds are different then remote and local modems will not link. The factory default firmware (R2) of VC-101M/S supports symmetric 11Mbps data rate. The data rate can be increase to 15Mbps downstream and 17Mbps upstream in trade off shorter distance by update the firmware to R4 version. PLANET also provides a R4.5 firmware for VC-101S to work with VC-412 and Cisco's LRE switch. The following table lists the feature of R2, R4 and R4.5 firmware.

Firmware version	Upstream (Mbps)		Downstream(Mbps)		Maximum Distance
	Line speed	Data rate	Line speed	Data rate	
R2 (default)	12.5	11.38	12.5	11.38	1.2km
R4	18.75	17.06	16.67	15.17	1.05km
R4.5	1.56	1.43	4.17	3.77	1.5km
	6.25	5.69	6.25	5.69	1.5km
	12.5	11.38	12.5	11.38	1.2km
	18.75	17.06	16.67	15.17	1.05km

Note: The distance is based on good cable quality and connection status. The actual distance can be reduced by the following factors:

1. The age and type of the wiring.
2. The quality of the cable.
3. Each terminated bridge tap may reduce the distances by 300 feet.
4. If it run over bundled telco cabling, the maximum distance supported can be approximately 30 percent lower due to cross talk and interference.
5. The 5/10/15 data rate for R4.5 is only applicable between VC-101S and VC-412. If connect VC-101M and VC-101S with R4.5 firmware, the speed is only 4/1 Mbps.

4.2 Update Procedure

Users can adjust transmission speeds manually through an application called the “E2PROM Programmer” created by Infineon. This program can be found on “Utility” directory of bundled CD. Before running this program, please note that it is only for the following operation systems:

1. Windows 95, 98, NT, Me English version.
2. Windows 2000 and XP

However, Windows 2000 and XP should be configured to use English as default language settings for the system. To configure this,

Windows 2000: Click “Start” -> “Settings” -> “Control Panel” -> “Regional Options” -> “General” tab. Click “Set default” button and select “English [United States] as default language settings.

Windows XP: Click “Start” -> “Settings” -> “Control Panel” -> “Regional and Language Options” -> “Advanced” tab. On the ”Language for Non-Unicode programs” list, select “English [United States]”.

Below are the procedures to change its speed through “E2PROM Programmer”.

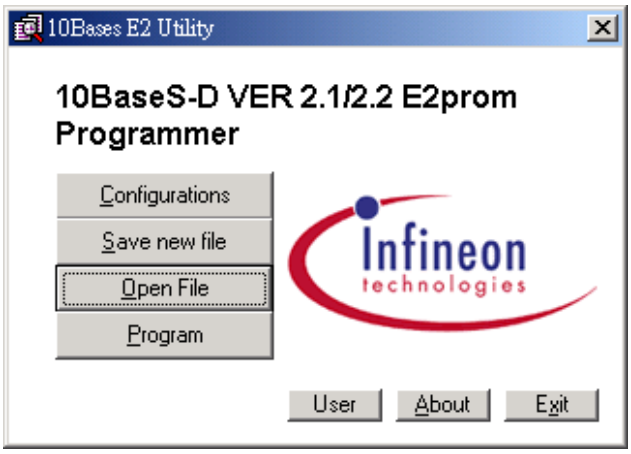
1. Connect VC-101 console port to a PC COM port. (DB9 to DB9 Cable)
2. Launch the “E2Prom Programmer” application.
3. Select “PEF22822 V2.2” option from the drop-down menu.
4. Press the “Continue” button.

5. Press “Open File” button to open the firmware file to be upload to the VC-101.

   Note: The firmware file should be placed on directory with only English character.

6. Locate and open the corresponding version of firmware file to be uploaded.

7. Press “Program” button to upload the file.



8. Select the COM port which the VC-101 is connected to.
9. Press “OK” button.
10. Repeat steps 1 to 9 for another VC-101.
11. Disconnect the console cable from VC-101 and PC COM port when finished.

To verify the new setting:

I. Connect the VC-101M and VC-101S and make sure they are linked. (If connection does not establish might due to distance restriction or environment factors)
II. Connect the VC-101M and a PC through console port via console cable. (DB-9 to DB-9 cable)
III. Launch terminal application and set its settings to:
    Baud Rate: 9600
    Data Bits: 8
    Parity: None
    Stop Bits: 1
    Flow Control: None
IV. Once connect you will be able to see the command prompt L>

Observe: *“L>” represents the command prompt at VC-101M(local modem, the console cable connected unit is consider the local one), to toggle to the VC-101S(remote modem), press [CTRL+E] on the keyboard, you should see*

*the command prompt change to "*R>*".*

V. Toggle to the VC-101S by holding and releasing [CTRL+E].

VI. Issue the command RD C020,4 at the command prompt to read the speed of the VC-101M/S.

VII. Compare the displayed variables with the variable in the table below to determine your VC-101M/S's speed.

Variables for 11 Mbps upstream/11 Mbps downstream (R2)
32 24 4F 00
Variables for 17 Mbps upstream/15 Mbps downstream (R4)
31 22 4F 00

VIII. Toggle back to the VC-101M by pressing and releasing [CTRL+E].

IX. Issue the same commands that issued in VC-101S.

5. Troubleshooting

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

CHECKPOINT:

1: Verify the length of the wire connected between VC-101M and VC-101S is not more than 1.5km.

2: Please note you must use 1 VC-101M and 1 VC-101S connect to each other to make it work.

SYMPTOM: Switch Link/Act LED not lit after cable is connected to the port.

CHECKPOINT:

1: Verify use the RJ-45 cable connected to the port.

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

EM-VC101V1