

**DYNAMIX VC-MP/SP
Master/Slave Ethernet Extender
with Remote Power
USER'S MANUAL**

Overview

Master Ethernet extender with remote power system delivers power and IP connectivity at distances up to 1km (3,280ft) using existing or new copper twisted pair phone cable. These innovative transmission techniques result in power feeding and data over a single pair phone wire and are ideal for deploying extended Ethernet where there are no or limited electricity at one end. With automatic fault protection and power monitoring, these ensures reliable delivery of essential power and data / video to and from remote locations. Operators in diverse enterprises will now be able to deploy PoE devices in any service location. Install network security cameras, wireless access points, security / RFID scanners or access control systems in any place where you have basic wire connectivity.

The Dynamix VC-MP/SP with remote power provide extended-length power and Ethernet connections over one pair Cat 3 or above twisted pair phone cable. The Master / Slave Ethernet extender with remote power work as Ethernet to / from VDSL subscriber site conversion bridge. The Master / Slave Ethernet extender with remote power use VDSL technology which support 5M / 15 / 25Mbps per port symmetrical bandwidth over phone wiring with long driver capable of a maximum 1km / 0.8km / 0.5km (3280ft / 2624ft / 1680ft).

The front-panel provides LED indicators of power system and interface status. Full- or half-duplex mode of LAN operation is automatically sensed and configured. VDSL link rates are configured by Master Ethernet extender with remote power over the auto-speed / fix speed function. Therefore, Master / Slave Ethernet extender with remote power support auto-speed / fix speed, plug & play operations on the subscriber-site and power protections as OVP(Over Voltage Protection), OCP(Over Current Protection), OTP(Over Temperature Protection), robust short-circuit protection and surge protection, as well as are part of an ideal solution for delivering cost-effective, high-performance broadband / multimedia services to point to point application.

Safety Warnings

For your own safety, make sure to read and follow all warning notices and instructions before using the device.

- DO NOT open the unit or device. Opening or removing the covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel can service the device. Please contact your vendor for further information.
- Use ONLY the dedicated power supply for your device. Connect the power cord or power adapter to the right supply voltage (e.g. 110V AC in North America or 230V AC in Europe).
- DO NOT use the device if the power supply is damaged as it might cause electrocution. If the power supply is damaged, remove it from the power outlet. DO NOT attempt to repair the power supply. Contact your local vendor to order a new power supply.
- Place connecting cables carefully so that no one will step on them or stumble over them. DO NOT allow anything to rest on the power cord and DO NOT locate the product where anyone can work on the power cord.
- DO NOT install nor use your device during a thunderstorm. There may be a remote risk of electric shock from lightning.
- DO NOT expose your device to dampness, dust or corrosive liquids.
- DO NOT use this product near water (e.g. in a wet basement or near a swimming pool).
- Connect ONLY suitable accessories to the device. Make sure to connect the cables to the correct ports.
- DO NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- DO NOT store things in the device.
- DO NOT use the device outside, and make sure all the connections are indoors. There may be a remote risk of electric shock from lightning.
- Be careful when unplugging the power due to transformer may be very hot.
- Keep the device and all its parts and accessories out of children's reach.
- Clean the device using a soft and dry cloth rather than liquid or atomizers. Power off the equipment before cleaning it.
- This product is recyclable. Dispose of it properly.

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1. Unpacking Information

Check List

Carefully unpack the package and check its contents against the checklist.

Package Contents

- 1 x Dynamix VC-MP (Master) + 1 x Dynamix MP VC-SP (Slave) with Remote Power Modem Kit
- 2 x 48V / 0.4A Power Adapter
- 2 x AC To DC Power Cord
- 2 x RJ-45 Ethernet cable
- User's Manual CD

Please inform your dealer immediately for any missing or damaged parts.

If possible, retain the carton including the original packing materials.

Use them to repack the unit in case there is a need to return for repair.

2. Installing the Modem

Hardware Installation

This chapter describes how to install the modem and establishes network connections. You may install the modem on any level surface (e.g. a table or shelf). However, please take note of the following minimum site requirements before you begin. Stick the 4 rubber feet at the bottom to avoid scratches.

Pre-installation Requirements

Before you start the actual hardware installation, make sure you can provide the right operating environment including power requirements, sufficient physical space and proximity to other network devices that are to be connected.

Verify the following installation requirements:

- Power requirements: 2 x 48VDC / 0.4A
- The modem should be located in a cool dry place with at least 10cm/4in of space at the front and back for ventilation.
- Place the modem out of direct sunlight and away from heat source or area with a high amount of electromagnetic interference.
- Check if the network cables and connectors needed for installation are available.

General Rules

Before making any connections to the modem, please note the following rules:

- Ethernet Port (RJ-45)
All network connections to the modem Ethernet port must be made using Category 5 UTP for 100Mbps, Category 3, 4 UTP for 10Mbps.
No more than 100 meters of cabling may be use between the MUX or HUB and an end node.
- Line Port (RJ-45 / Terminal block)
All Home network connections to the line port must use 22 ~ 26 gauge phone wiring. RJ-45 and terminal block is shared and cannot be used together at the same time.
- We do not recommend using 28 gauge or above phone line.

Connecting the Master / Slave Ethernet extender with remote power

The master Ethernet extender with remote power two power adapters must be connected first before switch can be powered on. Make sure to use AC power cord provided with your device as other AC power cord with grounding pin will make the distance reach shorter. The master / slave Ethernet extender with remote power has one Ethernet port which support connection to Ethernet operation. The devices attached to these ports must support auto-negotiation or 10Base-T OR 100Base-TX unless they will always operate at half-duplex. Slave Ethernet extender with remote power fast Ethernet port is used to connect to external power splitter(POE) or build in power splitter of networking devices such as IP CAM, VOIP, wireless AP, sensor scanner or other power splitter (PD side) more than 15.4W.

The line port has 2 connectors: RJ-45 and terminal block. It is used to connect from master Ethernet extender with remote power using single pair phone cable to slave Ethernet extender with remote power side (point to point solution). Take note that master / slave Ethernet extender with remote power line port cannot be used at the same time. Either RJ-45 port is connected or terminal block is connected using straight connection (Figure1) or cross-over connection (Figure2).

Figure 1: Master / Slave Ethernet extender with remote power straight connection

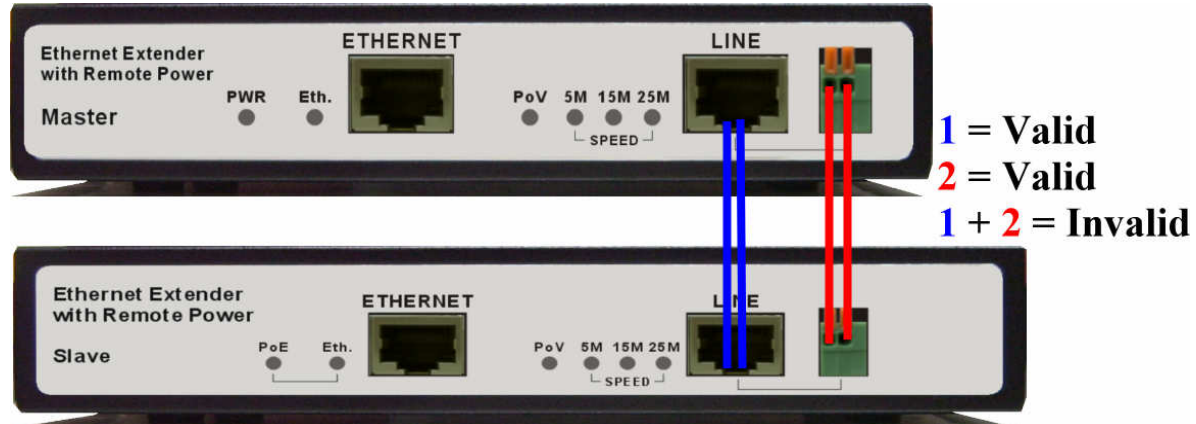
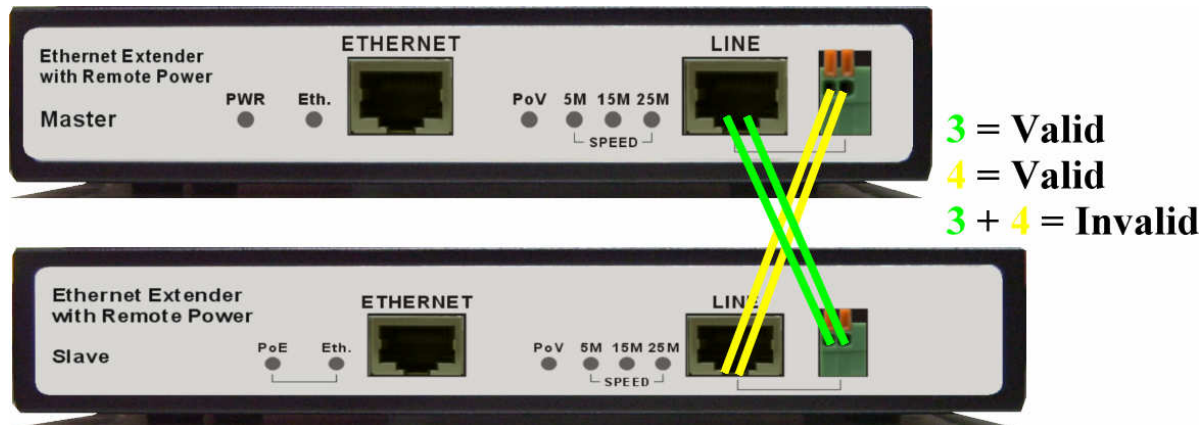


Figure 2: Master / Slave Ethernet extender with remote power cross-over connection



Connecting the Line / Ethernet Ports

1. The modem's line port supports max distance of 1km at 5M / 5M or max speed of 25M symmetrically with distance up to 500m for data service across existing phone wiring. It is easy-to-use which do not require installation of additional wiring. Every modular phone jack in the home can become a port on the LAN. Networking devices can be installed on a single telephone wire that can span within 1km or 500m (depends on speed) between the two farthest points. (Figure 3).

Figure 3: Ethernet Extender Point-to-Point application
Ethernet Extender with Remote Power Application



2. Use only twisted pair cables with RJ-45 connectors that conform to Ethernet standard. When inserting RJ-45 plug, be sure the tab on the plug clicks into position to ensure that it is properly seated.

Notes:

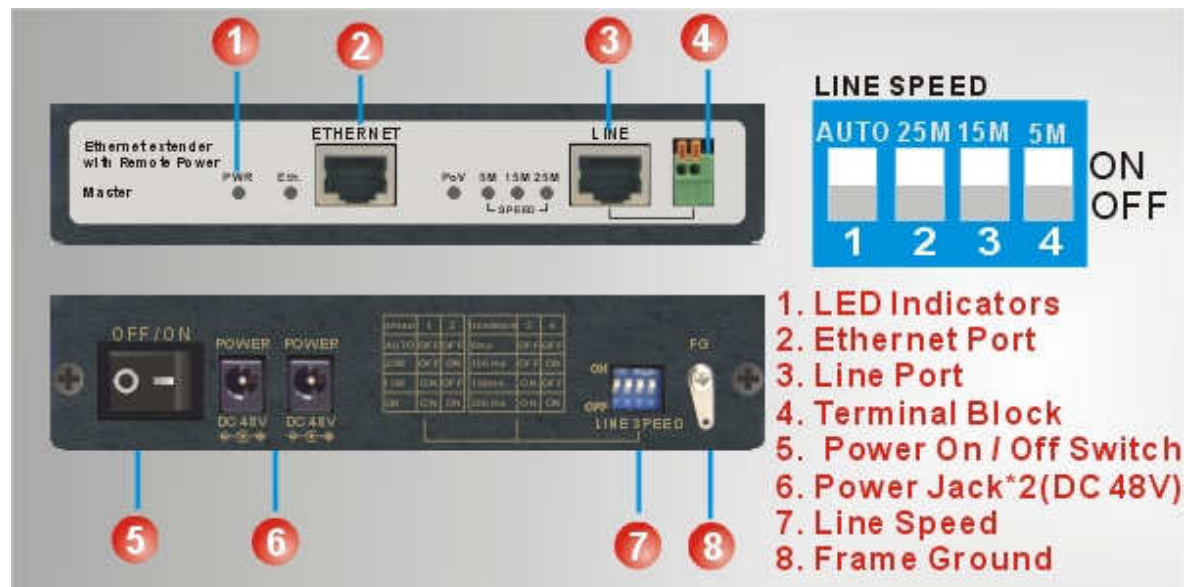
1. Be sure each twisted-pair Ethernet cable does not exceed 100 meters (328 feet).
2. Line port must use 24 ~ 26 gauge phone wiring, we do not recommend 28 gauge or above.
3. We advise using Category 3, 4, 5 cables for cable modem or router connections to avoid any confusion or inconvenience in the future when you attached to high bandwidth devices.
4. Be sure phone cable has been installed before the Master/Slave Ethernet extender powered on.

3. Hardware Description

This section describes the important parts of the modem. It features the front panel and rear connectors.

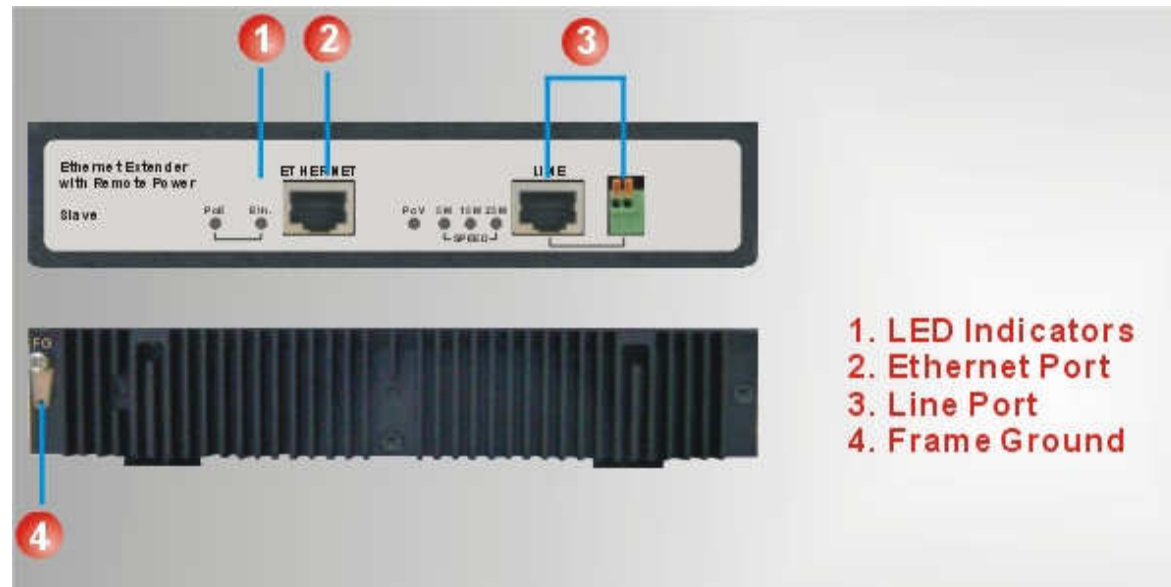
Master Ethernet extender with remote power detailed view

Figure 4: Master Ethernet extender with remote power detailed view



Slave Ethernet extender with remote power detailed view

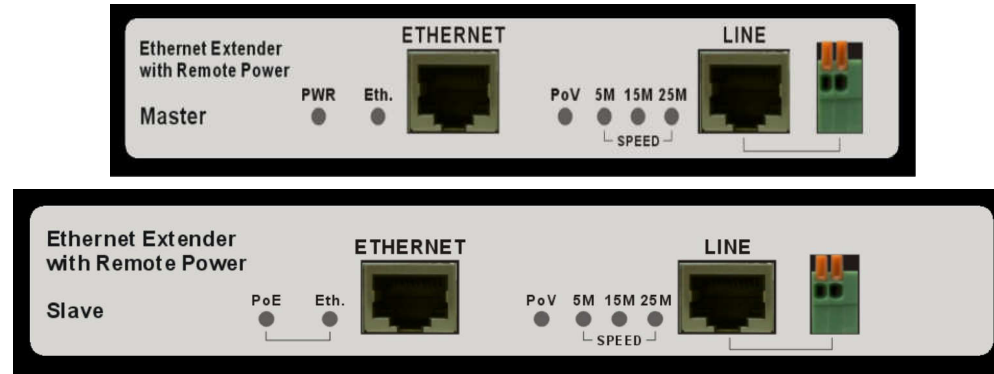
Figure 5: Slave Ethernet extender with remote power detailed view



Front Panel

The figure shows the front panel. (Figure 6)

Figure 6: Front Panel of Ethernet extender for Master and Slave respectively



At a quick glance of the front panel, it is easy to tell if the modem has power, if it has signal from its Ethernet RJ-45 port, if it is either providing or receiving power and if there is line signal on line port.

Table 1: Description of the modem front connectors

Connector	Type	Description
Line	RJ-45 / Terminal Block	For connecting to the Ethernet extender device.
Ethernet	RJ-45	For connecting to an Ethernet equipped device

Front Indicators

The modem has **Six** LED indicators. The following table shows the description. (Table 2)

Table 2: LED Indicators Description and Operation

LEDs	Color	Status	Descriptions
PWR (Power LED Master side only)	Green	On	The system power is normal and functioning properly.
		Off	The system power is not ready or has malfunctioned.
PoE (Power over Ethernet LED Slave side only)	Green	On	The power injector had detected the power splitter (IEEE802.3af).
		Blinking	The device connected to the power splitter is a non-standard POE.
		Off	The power injector has not detected the power splitter.
Eth. (Ethernet LED)	Green	On	The device has a good Ethernet connection.(Link)
		Blinking	The device is transmitting / receiving data.(Activity)
		Off	The LAN is not connected.
PoV (Power over VDSL)	Green	On	For master side the device power feeding is ready. For slave side the device is remote power link good.
		Off	The device is not ready or has malfunctioned.
5M (Speed LED)	Green	On	The device is in good linkage at 5Mbps data rate.
		Off	The device connection is down.
15M (Speed LED)	Green	On	The device is in good linkage at 15Mbps data rate.
		Off	The device connection is down.
25M (Speed LED)	Green	On	The device is in good linkage at 25Mbps data rate.
		Off	The device connection is down.

Rear Panel

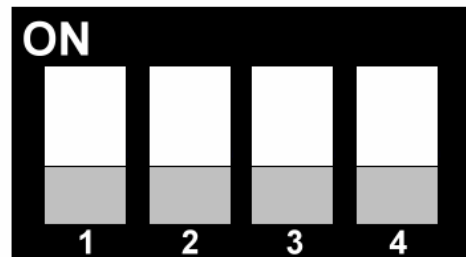
The following figure shows the rear connectors. (Figure 7)

Figure 7: Rear connectors of Ethernet extender for Master and Slave respectively



At quick glance, you can see the DIP switch setting at default mode, where it is in auto-speed and interleave delay is set to 0ms as shown in (figure 8).

Figure 8: DIP switch setting



To set the data speed to 25Mbps, pin2 must be switch ON while pin1 is OFF. For 15Mbps, pin1 must be switch ON while pin2 is OFF. And for 5Mbps, both pins1 and 2 must be switch ON.

To set the interleave delay to 0ms, switch OFF both pins 3 and 4. For 100ms, pin 4 must be switch ON while pin3 is OFF. For 150ms, pin3 must be switch ON while pin4 is OFF. And for 300ms, both pins3 and 4 must be switch ON. Table shows the summary of DIP switch configuration.

Table 3: DIP Switch Configuration

Switch 1	Switch 2	Speed Mode
0	0	Auto Speed
0	1	25Mbps
1	0	15Mbps
1	1	5Mbps

Switch 3	Switch 4	Interleave Delay
0	0	0ms
0	1	100ms
1	0	150ms
1	1	300ms

4. Firmware Description

Auto and manual data speed selector description:

Dynamix VC-MP/SP with Remote Power solution supports real plug & play and can do auto and manual selection of the data speed, the setting of the data speed depends on the phone cable limit length, they can support 5M/15M/25Mbps symmetrical data service. If Master Ethernet Extender with Remote Power try to link at the data speed of 15Mbps but fails to do so, then Master Ethernet Extender with Remote Power data speed must be lower due to the limitation of the phone cable length. If the cable length is unsure, then auto selection of the data speed at the default setting is recommended. Power must be unplug before changing the data speed then power on and wait for VDSL to link again at the correct data speed function.

Speed mode limitation:

5M/5M mode within 1km (3280ft)

15M/15M mode within 800m (2624ft)

25M/25M mode within 500m (1640ft)

Note:

We recommend phone cable that must meet Cat 5 standard or above and without clustering, **otherwise the above guarantee will be void.**

Appendix A: Cable Requirements

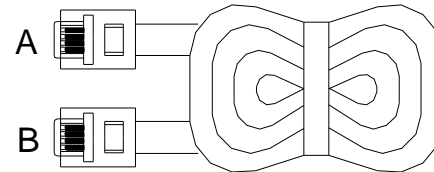
A CAT 3, 4 or 5 twisted pair cable is typically used to connect the Ethernet device to the modem. A 10Base-T cable often consists of four pairs of wires, two of which are used for data transmission and the other two pairs are used for power transmission. The connector at the end of the 10Base-T cable is referred to as RJ-45 connector and it consists of eight pins. The Ethernet standard uses pins 1, 2, 3 and 6 for data transmission purposes, power supply uses pins 4, 5 and ground uses pins 7, 8. (Table 4)

Table 4: RJ-45 Ethernet Connector Pin out Assignments

PIN #	MNEMONIC	FUNCTION
1	TX+	Ethernet differential Transmit signal (+)
2	TX-	Ethernet differential Transmit signal (-)
3	RX+	Ethernet differential receive signal (+)
4	48V	48Vdc Power Supply (Slave only)
5	48V	48Vdc Power Supply (Slave only)
6	RX-	Ethernet differential receive signal (-)
7	Ground	Ground
8	Ground	Ground

Standard telephone wire of any gauge or type-flat, twisted or quad is used to connect the modem to the telephone network. A telephone cable typically consists of three pairs of wires, one of which is used for transmission. The connector at the end of the telephone cable is called RJ-45 connector and it consists of eight pins. VDSL signal use pins 4 and 5 for data and power transmission. A telephone cable is shown below. (Figure 9)

Figure 9: Telephone cable



The A and B connectors on the rear of the modem are RJ-45 connectors. These connectors are wired identically. The RJ-45 connectors have eight positions, two of which are wired. The modem uses the center two pins. The pin out assignment for these connectors is presented below. (Table 5)

Table 5: RJ-11 Pin out Assignments

Pin #	MNEMONIC	FUNCTION
1	NC	Unused
2	NC	Unused
3	NC	Unused
4	Line +	VDSL signal +
5	Line -	VDSL signal -
6	NC	Unused
7	NC	Unused
8	NC	Unused

Appendix B: IEEE 802.3af PSE and Powered Device Power Classifications

Table 6: IEEE 802.3af PSE and Powered Device Power Classifications

Class	Usage	Minimum Power Levels Output at the PSE	Maximum Power Levels at the Powered Device
0	Default	15.4W	0.44 to 12.95W
1	Optional	4.0W	0.44 to 3.84W
2	Optional	7.0W	3.84 to 6.49W
3	Optional	15.4W	6.49 to 12.95W
4	Reserved for Future Use	Treat as Class 0	Reserved for Future Use: A class 4 signature cannot be provided by a compliant powered device

Appendix C: Product Specification

Key Features & Benefits

- Supports Plug & Play (UPnP)
- Compliant with IEEE802.3 10BASE-T, IEEE802.3u, 100BASE-TX and IEEE802.3af Ethernet PD class 0, 1, 2, or 3 standards
- Compliant with ETSI, ITU and ANSI standards
- Support 5M symmetrical at distance up to 1km (3280ft), 15M symmetrical at distance up to 800m (2624ft) and 25M symmetrical at distance up to 500m (1640ft)
- Supports 1 x RJ-45 / Terminal block for VDSL line port using single pair phone cable
- Supports 1 x RJ-45 for fast Ethernet port with power injector (Slave only)
- Supports 1 x Dip switch for line speed setting (Master only)
- Supports Auto/5/15/25Mbps speed mode and full duplex for VDSL port
- Supports long packet size up to 1536 bytes
- Supports PBO(Power Back-Off) function for Slave Ethernet extender with remote power
- Data and Remote Power work on the same telephone line
- Spectral compatibility with xDSL, ISDN (2B1Q/4B3T)
- Supports flow control IEEE802.3x for Full Duplex & Back Pressure for Half Duplex
- Support VDSL and Ethernet surge protection
- Provide LED indicators for Power, Link/Active Status for Ethernet port and Link/Speed for VDSL port
- Mini size and metal case for outdoor application

Product Specification

Standard Compliant:	IEEE802.3 standard IEEE802.3u standard IEEE 802.3af PoE standard ITU-G993.1
EMC Compliant:	CE,FCC,VCCI
Safety Compliant:	EN60950,
Environmental Protection Compliant:	RoHS
Interface:	1 x RJ-45 for fast Ethernet port with power injector (Slave only) 1 x RJ-45 for single pair VDSL line port 1 x Terminal block for VDSL line port 1 x DIP switch for line speed setting (Master only) 2 x Power jack for 48V power adapter (Master only)

Power Protection:	OTP(Over Temperature Protection) OVP(Over Voltage Protection) OCP(Over Current Protection) Robust short circuit protection VDSL and Ethernet surge protection
System Management:	Provides DIP Switch for changing speed mode (Master only)
Cable Connection:	Ethernet: Category 3, 4, 5 UTP/STP Line: Category 3, 4, 5 twisted pair phone cable
LED Indication:	Power/Remote Power for system Link/Active Status for Ethernet port Remote Power Link good for POV Power link good for POE Line Speed for line port
VDSL Frequency Spectrum:	Master side: Transmitter: 900 kHz ~ 3.9MHz Receiver: 4MHz & 7.9MHz Slave side: Transmitter: 4MHz ~ 7.9MHz Receiver: 900 kHz ~ 3.9MHz

Power Injector (Slave only):	Using CAT 5 UL standard twisted-pair phone cable Max. 15.4W within 500m (1640ft) Max. 12W within 600m (1968ft) Max. 8W within 800m (2624ft) Max. 5.5W within 1000m (3280ft) Note: Real output power depends on slave side (power splitter) power transmission efficiency.
Power Injector mode:	Mid-span mode support connecting to Class 0,1,2,3 of PD side(power splitter)
Distance Reach:	25Mbps within 500m (1640ft) 15Mbps within 800m (2624ft) 5Mbps within 1000m (3280ft)
Operating Temperature:	-20°C ~ 50°C (-4°F ~ 122°F)
Storage Temperature:	-20°C ~ 70°C (-4°F ~ 158°F)
Humidity:	10% to 90% (non-condensing)
Dimensions:	Master side: 146mm x 97mm x 33mm (5.75" x 3.82" x 1.30") Slave side: 169mm x 106mm x 33mm (6.65" x 4.17" x 1.30")

Appendix D: Troubleshooting

Diagnosing the Modem's Indicators

The modem can be easily monitored through its comprehensive panel indicators. These indicators assist the network manager in identifying problems that hub may encounter. This section describes common problems you may encounter and possible solutions.

- 1. Symptom:** POWER indicator does not light up (green) after power on.
Cause: Defective External power supply
Solution: Check the power plug by plugging in another that is functioning properly. Check the power cord with another device. If these measures fail to resolve the problem, have the unit power supply replaced by a qualified distributor.
Note: Don't use other AC to DC power adapter
- 2. Symptom:** Link indicator does not light up (green) after making a connection.
Cause: Network interface (ex. a network adapter card on the attached device), network cable, or switch port is defective.
Solution:
 - 2.1 Power off and re-power on the modem.
 - 2.2 Verify that the switch and attached device are power on.
 - 2.3 Be sure the cable is plugged into both the switch and corresponding device.
 - 2.4 Verify that the proper cable type is used and its length does not exceed specified limits.
 - 2.5 Check the modem on the attached device and cable connections for possible defects.

2.6 Make sure that the phone wire must be connected between the master and the slave first, when both are to be powered on.

2.7 Replace the defective modem or cable if necessary.

3. Symptom: Speed link cannot be established.

Cause: Modem speed mode setting failure or phone cable length is over the specification limit of the speed mode.

Solution: 3.1 Please make sure that the phone wire must be connected between the master and the slave when both are powered on. Master will link depending on speed mode setting and phone wire length. Therefore if master can't detect slave over the phone wire while both power on, then this will cause the link to fail.

3.2 Please check phone cable must be 24 gauge with twisted pair and without rust, and the length is not over 1km.

3.3 Please check the correct DIP switch setting.

Note: Phone cable must meet CAT 5 standard or above and without clustering, otherwise will cause more crosstalk issue to reduce DSL power driver.

4. Symptom: Modems speed mode LED are always flashing

Cause: Modems speed mode link are at the limit of phone cable length

Solution: Please change the speed mode through DIP switch.

Note: Don't use phone cable that is untwisted pair and under 0.4mm (26 Gauge) diameter.

System Diagnostics

Power and Cooling Problems

If the POWER indicator does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord, or internal power supply as explained in the previous section. However, if the unit power is off after running for a while, check for loose power connections, power losses or surges at the power outlet, and verify that the fan on back of the unit is unobstructed and running prior to shutdown. If you still cannot isolate the problem, then the internal power supply may be defective. In this case, please contact your local dealer.

Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (e.g. the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

Transmission Mode

The default method of selecting the transmission mode for Ethernet port is for 10/100Mbps Ethernet while line port is for 5/15/25Mbps speed mode. Therefore, if the link signal is disrupted (e.g. by unplugging the network cable and plugging it back in again, or by resetting the power), the port will try to reestablish communications with the attached device via auto-negotiation. If auto-negotiation fails, then communications are set to half duplex by default. Based on this type of industry-standard connection policy, if you are using a full-duplex device that does not support auto-negotiation, communications can be easily lost (e.g. reset to the wrong mode) whenever the attached device is reset or experiences a power fluctuation. The best way to resolve this problem is to upgrade these devices to a version that support Ethernet and VDSL.

Physical Configuration

If problems occur after altering the network configuration, restore the original connections, and try to track the problem down by implementing the new changes, one step at a time. Ensure that cable distances and other physical aspects of the installation do not exceed recommendations.

System Integrity

As a last resort verify the switch integrity with a power-on reset. Turn the power to the switch off and then on several times. If the problem still persists and you have completed all the preceding diagnoses, then contact your dealer.

Appendix E: Compliance and Safety Information

FCC Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a computing device, pursuant to Part 15 of 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 the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference 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, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. The equipment and the receiver should be connected to outlets on separate circuits.
4. Consult the dealer or an experienced radio/television technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If this telephone equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper functioning of your equipment. If they do, you will be notified in advance in order for you to make necessary modifications to maintain uninterrupted service.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

FCC Warning

This equipment has been tested and found to comply with the limits 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 the instruction manual, 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 is a CE class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Warranty

The original owner that the product delivered in this package will be free from defects in material and workmanship for one year parts after purchase.

There will be a minimal charge to replace consumable components, such as fuses, power transformers, and mechanical cooling devices. The warranty will not apply to any products which have been subjected to any misuse, neglect or accidental damage, or which contain defects which are in any way attributable to improper installation or to alteration or repairs made or performed by any person not under control of the original owner.

The above warranty is in lieu of any other warranty, whether express, implied, or statutory, including but not limited to any warranty of merchantability, fitness for a particular purpose or any warranty arising out of any proposal, specification or sample. We shall not be liable for incidental or consequential damages. We neither assume nor authorize any person to assume for it any other liability.



WARNING:

DO NOT TEAR OFF OR REMOVE THE WARRANTY STICKER AS SHOWN, OR THE WARRANTY IS VOID.