

HomePNA Converter Users Manual Ver. A.3

Foreword

The HomePNA Converter is an Ethernet to Home PNA adapter that enables high speed internet access to building residents, campuses students and hotel guests by connecting Ethernet equipped computers, set-top box or any internet access device to the existing telephone wires. The Home PNA converter uses the phonline networking technology endorsed by the Home PNA (Home Phonline Networking Alliance), an association of industry-leading companies for in-home networking focus on the existing telephone wire.

The Converter utilize the already existing telephone wire to deliver 1Mbps internet access with no interference on the existing telephone service. It allows user to make calls while access the internet on the same wire simultaneously. It even allows staying connected 24 hours on internet connections, thus, eliminating dial up prior to internet access.

The benefit of Converter allows multiple PC sharing peripherals, files and access the net at the same time by using only one telephone wire and without interrupting the telephone services.

The Converter can also act as bridge between buildings by connecting with the Router, Connect to another building within 500 feet allowing fast internet access on the second building at the same time to access the data base from the first building and transferring data between the two buildings.

The Converter is simple to install and use. Two RJ-45 Ethernet connects to a Router, HUB or to LAN card. The RJ11 ports available to connect to any existing modular phone jack.

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There are two RJ-11 jack on the Converter to provide a phone extensions or to connect to a 2nd converter for a second computer and to succeeding. No software installation makes the converter highly compatible with different operating system (Windows, Linux, Apple....etc).

The converter distributes bandwidth inside the building for applications that uses T-1, E-1, xDSL, Cable modems, IEEE 802.11b outdoor wireless connections.

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1. Unpacking Information

Check List

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

Package Contents

- Ethernet to HomePNA Converter
- Four plastic feet
- Diskette User Manual
- AC to DC 100V-240V Switching Power Adapter
- Ethernet Straight-through cable
- RJ-11 cable

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 Converter

Hardware Installation

This chapter describes how to install the converter and establishes network connections. You may install the converter 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 plastic feet at the bottom.

Pre-installation Requirements

Before you start 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 requirement:

- Power requirements: AC100 to 240V at 50 to 60 Hz.
The Switch power supply automatically adjusts to the input voltage level.
- The converter should be located in a cool dry place, with at least 10cm/4in of space at the front and back for ventilation.
- Place the Converter out of direct sunlight, and away from heat sources or areas with a high amount of electromagnetic interference.

Check if network cables and connectors needed for installation are available.

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General Rules

Before making any connections to the converter, note the following rules:

- Ethernet Port (RJ-45)

All network connections to the Converter 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.

- Home PNA Port (RJ-11)

All Home network connections to the RJ-11Port made using 18 ~ 26 Gauge phone wiring.

- We do not recommend using 28 Gauge or above phone line.

Connecting the Converter

The converter 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.

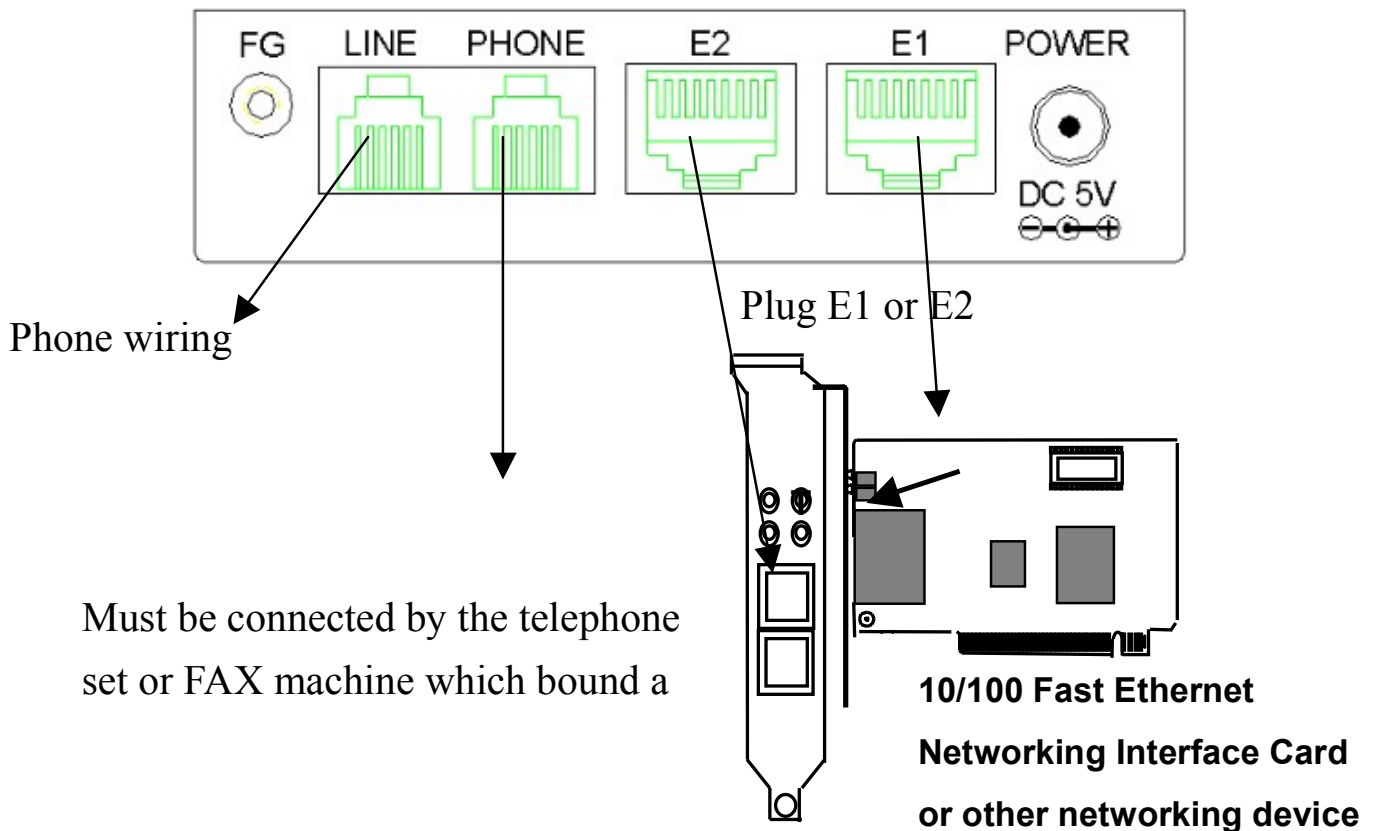
Use any of the Ethernet ports to connect to devices such as HUB, concentrator, bridge or router. You can also connect to another compatible converter to one of the two RJ-45 ports on the other device. The 2x RJ11 port are use to connect to the wall RJ-11 modular socket or to another converter that is connected through its RJ 45 to the LAN card of another set of PC, notebook, set-top box or other net access device.

The 2 RJ11 port of the converter an also be connected to a plain old telephone and a computer sharing one telephone wire for making calls and accessing the internet at the same time.

Connecting the RJ-11/RJ45 Ports

1. The Converter's RJ-11 ports support the transmission of data up to 1Mbps across existing phone wiring, without interfering with standard voice transmissions, easy-to-use does not require the installation of any additional wiring. Every RJ-11 modular phone jack in the home can become a port on the LAN. Multiple PC, peripherals, or networking devices can be installed on a single telephone wire that can span within 500M (1600 feet with 24guage phone wire) between the two farthest points. (Figure 1.0)

Figure 1.0 converter use as adapter to connect RJ-11 and the LAN card inside the computer



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1. The RJ-11 port support 1 Mbps connections. When inserting a RJ-11 plug, be sure the tab on the plug clicks into position to ensure that it is properly seated.
2. Do not plug a RJ-11 phone jack connector into the Ethernet port (RJ-45 port). This may damage the converter. Instead, use only twisted-pair cables with RJ-45 connectors that conform with FCC standard.

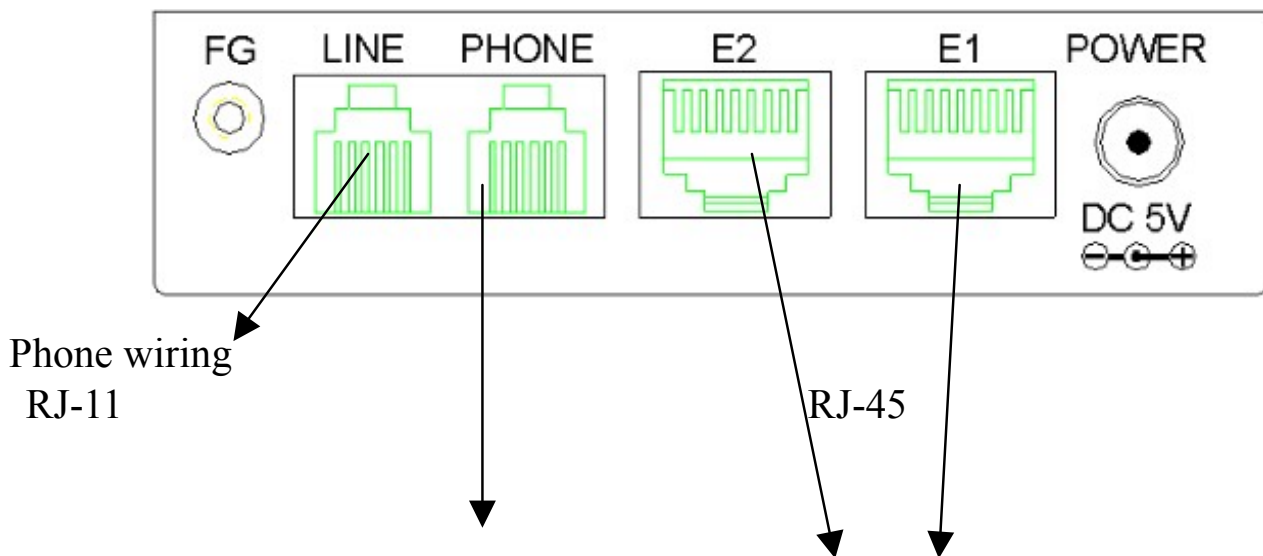
Notes:

1. Be sure each twisted-pair cable (RJ-45) does not exceeds 100 meters (333 feet).
2. RJ-11 port use 18 ~ 24 gauge phone wiring, we do not recommend 26 gauge or above.
3. We advise using Category 3,4,5 cable for Cable Modem or Router connections to avoid any confusion or inconvenience in the future when you upgrade attached to high band width devices.
4. Phone port must be connect by telephone set or FAX machine , which bound a POTS/ISDN splitter.

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The Converter can also be applied as bridge between the internet external trunk and the telephone closet in the home.

The external trunk E-1, T-1, Lease Line, xDSL, wireless connections or etc. connecting to a IP sharing device, using the RJ45 line to connect to the converter Ethernet port.



Must be connected by telephone set
or FAX machine

Computer, Set-Top Box, E-1, T-1,
xDSL, Cable Modem,
IEEE802.11 wireless connections
Or other External Trunk.

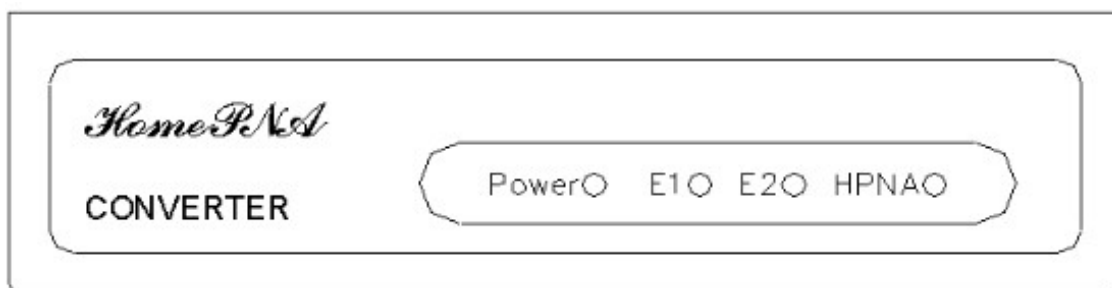
3. Hardware Description

This section describes the important parts of the converter. It features the front indicators and rear connectors.

3.1 Front Indicators

The following figure shows the front panel.

Figure Chapter 2.2 Front Indicators



Three LED indicators.

At a quick glance of the front panel, it will be easy to tell if the converter has power, if it has signal from its Ethernet RJ-45 port and if there is phone line signal from RJ-11port

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Front Indicators

Table 3A LED Description and Operation

The Converter has **Four** LED indicators.

LEDs	Status	Descriptions
Power (Power LED)	Steady Green	It will light up (ON) to show that the product is receiving power. Conversely, no light (OFF) means the product is not receiving power.
E1 (Ethernet LED)	Steady Green Flashing (LINK/ACT)	Each RJ45 station port on the Ethernet is assigned an LED light for monitoring port "Good Linkage". LED is normally OFF after the power on operation, but will light up steadily to show good linkage. And Flashing to show data transmission.
E2 (Ethernet LED)	Steady Green Flashing (LINK/ACT)	Each RJ45 station port on the Ethernet is assigned an LED light for monitoring port "Good Linkage". LED is normally OFF after the power on operation, but will light up steadily to show good linkage. And Flashing to show data transmission.
HPNA (HPNA LED)	Steady Green	RJ11 station port on the HomePNA is assigned an LED light for monitoring port "Good Linkage". LED is normally OFF after the power on operation, but will light up steadily to show good linkage. And Flashing to show data transmission.

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Rear Panel

The following figure shows the rear side of the converter

Figure Chapter 2.3 Rear side of the converter

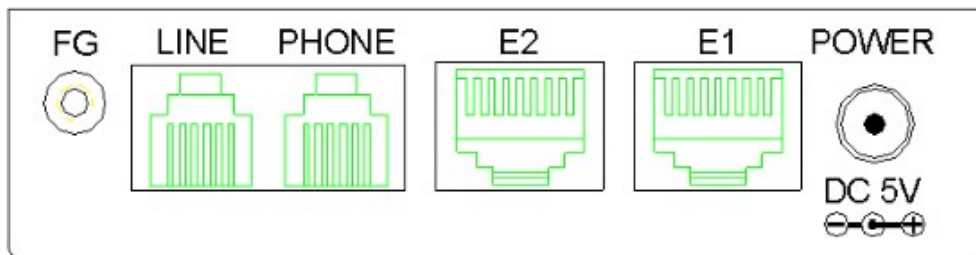


Table Connectors shown on the rear side of the converter

Connectors	Description	Type
Line	For connecting to the RJ-11 wall jack Using a RJ-11 cable	RJ-11
Phone	Must be connected by the telephone set or FAX machine	RJ-11
Ethernet	For connecting to a Ethernet equipped device	RJ-45

Note: The RJ 11 are wired identically and therefore are interchangeable.

Power On

1. Check if the adapter is properly connected
2. Verify the power LED is on steadily

3.Applications

APPLICATION FOR HOME NETWORKING

The 1Mbps Converter is used to connect any device equipped with a standard 10/100Mbps Ethernet port to a HomePNA LAN.

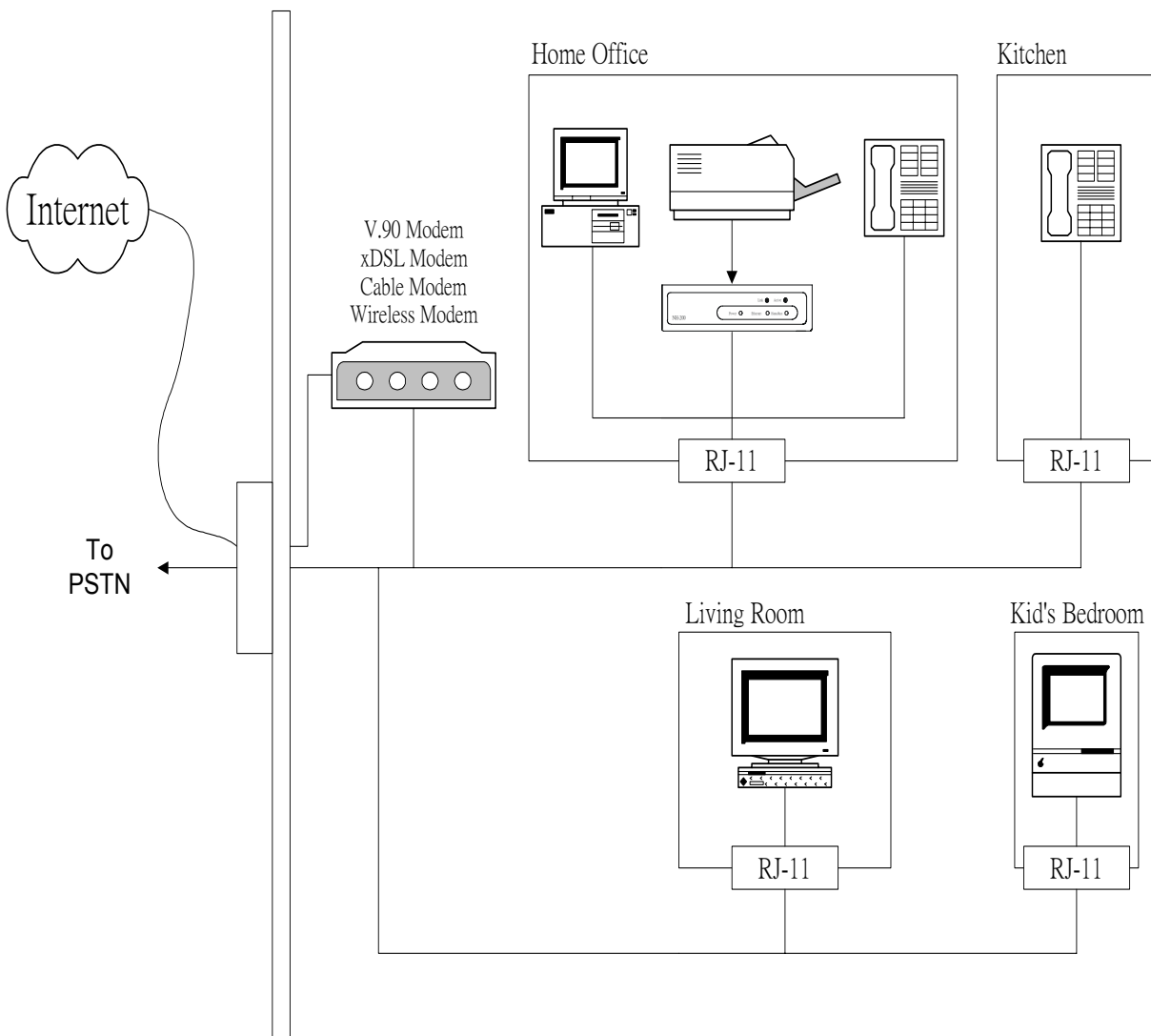
The Converter has been designed to operate on the telephone wire installed in homes throughout the world. They utilize the same modular patch cords and connectors commonly used for telephones.

Once all the RJ11 telephone wire in the premises are Internet ready. Device connected to HomePNA network can share any high speed internet access line-V.90, ISDN, cable, XDSL or wireless modem.

To install the Converter or to access the Internet, you simply plug into your existing telephone jacks just like you would for a telephone modem or a fax machine. There is no need for special splitters, terminators or filters. In fact, there is no need to add or modify the home telephone wiring at all.

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The 1Mbps Converter uses a frequency division multiplexing approach that enables standard telephone wiring to simultaneously carry voice, xDSL and home networking signals without any of the services impacting each other. Signals from the converter device are centered at 7.5Mhz, with the signal ranging between 5.5Mhz and 9.5Mhz. As shown in the figure below, this range is well above the frequencies used by voice services (POTS) and digital subscriber line (xDSL) services.



Appendix A: Cable Requirements

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

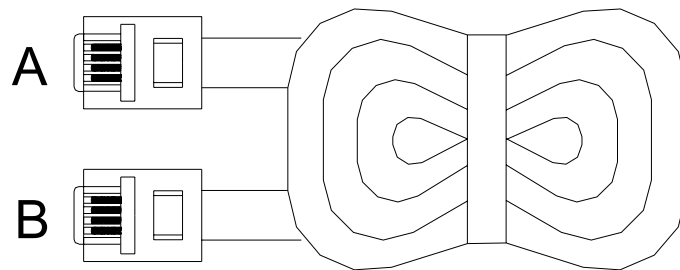
Table RJ-45 Ethernet Connector Pin out Assignments

PIN	MNEMONIC	FUNCTION
1	TX+	Ethernet differential Transmit signal(+)
2	TX-	Ethernet differential Transmit signal(-)
3	RX+	Ethernet differential receive signal(+)
4	NC	Unused
5	NC	Unused
6	RX-	Ethernet differential receive signal(-)
7	NC	Unused
8	NC	Unused

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Standard telephone wire of any gauge or type-flat, twisted or quad is used to connect the Converter 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 an RJ-11 connector and it consists of six pins. POTS (plain old telephone services) use pins 3 and 4 for voice transmission. A telephone cable is shown below.

Figure Telephone cable



The A and B connectors on the rear of the converter are RJ-11 connectors. These connectors are wired identically. The RJ-11 connectors have six positions, two of which are wired. The Converter uses the center two pins. The pin out assignment for these connectors is presented below.

Table RJ-11 Pin out Assignments

Pin#	MNEMONIC	FUNCTION
1	NC	Unused
2	NC	Unused
3	TIP	POTS
4	RING	POTS
5	NC	Unused
6	NC	Unused_

Appendix B: Product Specification

Product Name : 2 x 10/100Base-T to 1M HomePNA Converter With Splitter

- Compliant with 1M Home PNA V1.0/1.1 Specification
- Driver power up to 500 meters with 24 gauge phone wire
- Build in POTS/ISDN filter(splitter)
- Compliant with IEEE 802.3 & 802.3u Standard
- Connects 10/100Base-T to HomePNA
- Provides two RJ-11 for HomePNA & Line port and two RJ-45 for 10/100Base-T port
- Filter/Forward Rate : 148,800 Packet/second for 100Mbps
1,488 Packet/second for 1Mbps
- Supports Auto MDIX for Fast Ethernet ports
- Supports 1522 Long packet
- Supports broadcast storm filtering
- Plug & Play, no software require
- No need to Re-wire for RJ-11.
- Uses existing phone Jacks
- Provides up to 2k MAC address table
- Provides Queue Buffer : 2k bits per block.
- Support 802.1x and back pressure flow control
- Provides Led indication Link/Active Status for Ethernet port.
- Provides Led indication Link Status for **HomePNA** port.
- External power adapter Input :AC 100-240 volts/50-60Hz
Output :DC 5V/1A or above
- Dimensions:95 x 110 x 24 mm
- Operating Temperature : 0°C ~ 50°C(32F ~ 122F)
- Storage Temperature : - 20°C ~ 65°C(-4F ~ 149F)
- Humidity : 10%~90% non-condensing
- Safety by FCC & CE Class B

Appendix C: Troubleshooting

Diagnosing the Converter's Indicators

The Converter can be easily monitored through its comprehensive panel indicators. These indicators assist the network manager in identifying problems the 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.

2. Symptom: Link indicator does not light up (green) after making a connection.

Cause: Network interface (e.g, a network adapter card on the attached device), network cable, or switch port is defective.

Solution: 2.1 Verify that the switch and attached device are powered on.

1.2 Be sure the cable is plugged into both the switch and corresponding device.

1.3 Verify that the proper cable type is used and its length does not exceed specified limits.

1.4 Check the converter on the attached device and cable connections for possible defects.

1.5 Replace the defective converter or cable if necessary.

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, contact your 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.

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Transmission Mode

The default method of selecting the transmission mode for RJ-45 ports is 10/100 Mbps ETHERNET, for RJ-11 port are 1M HomePNA. 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 (i.e., 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 1M Home PNA.

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External HomePNA interface card

1. Make sure the network interface hardware and software drivers for the attached devices are functioning properly. Check the adapter cards and associated drivers used in any attached workstation or server.

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 D : FCC and CE Mark Warning

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 class B 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.

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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.

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.

Warranty

We warrant to 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. For the warranty to apply, you must register your purchase by returning the registration card indicating the date of 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 us.

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 ASSUMES NOR AUTHORIZES ANY PERSON TO ASSUME FOR IT ANY OTHER LIABILITY.