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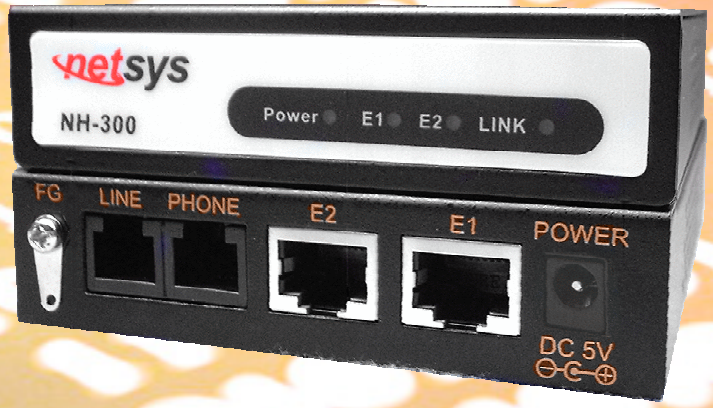

NH-300SP

2Ethernet HPNA Modem with splitter

USER'S MANUAL

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Maximum signal rate derived form IEEE Standard specifications. Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead lower actual data throughput rate.

Foreword

The HomePNA Modem is an Ethernet to Home PNA adapter that enables high speed internet access and long driver to building residents, campuses students and hotel guests by connecting Ehternet equipped computers, set-top box or any internet access device to the existing telephone wires.

The Home PNA Modem uses the phoneline networking technology endorsed by the Home PNA (Home Phoneline Networking Alliance), an association of industry-leading companies for in home networking focus on the existing telephone wire.

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

The Modem can also act as bridge between buildings by connecting with the Router, Connect to another building within 500 meters (1600 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 Modem 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.

There are two RJ-11 jack on the Modem to provide a phone extensions or to connect to a 2nd Modem for a second computer and to succeeding.

No software installation makes the Modem highly compatible with different operating system (Windows, Linux, Apple…. etc).

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

Safety Warnings

For your safety, be sure to read and follow all warning notices and instructions before device use.

- DO NOT open the device or unit. Opening or removing 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 adaptor to the right supply voltage (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, for example, 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 on 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, because the 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 cleansing it.
- This product is recyclable. Dispose of it properly.

Contents

1. Unpacking Information

Check List

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

- Ethernet to HomePNA Modem
- Four rubber 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 Modem

Hardware Installation

This chapter describes how to install the Modem and establishes network connections. You may install the Modem on any level surface (ex. 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.

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 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 sources or areas with a high amount of electromagnetic interference.

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

General Rules

Before making any connections to the Modem, 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.
- 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 Modem

The Modem 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.

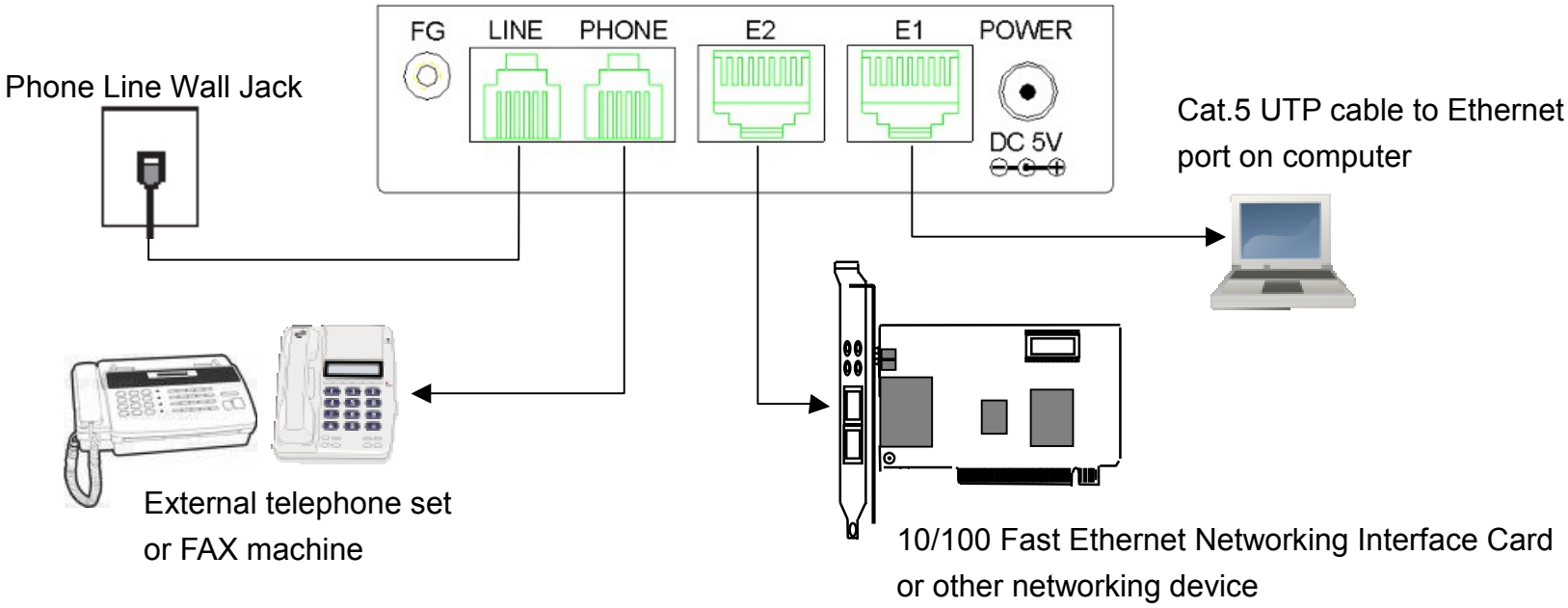
Use any of the Ethernet ports to connect to devices such as HUB, concentrator, bridge or router. You can also connect to another compatible Modem to one of the two RJ-45 ports on the other device.
The 2x RJ11 port are use to connect to the wall RJ-11 modular socket or to another Modem that is connected 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 Modem 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 Ports

1. The Modem'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 two farthest points. (Figure 1)

Figure 1 Modem use as adapter to connect RJ-11 and the LAN card



2. The RJ-11 port supports 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.

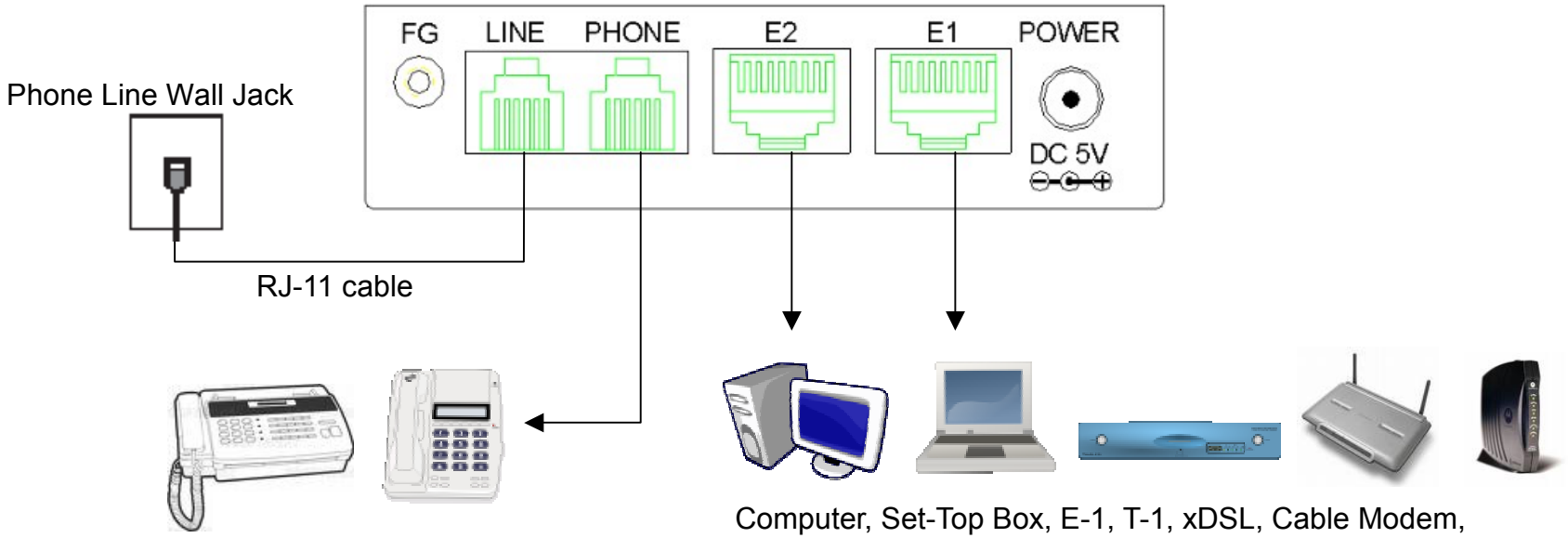
3. Do not plug a RJ-11 phone jack connector into the Ethernet port (RJ-45 port). This may damage the Modem instead, use only twisted-pair cables with RJ-45 connectors that conform to FCC standard.

Notes:

1. Be sure each twisted-pair cable (RJ-45) does not exceed 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 bandwidth devices.
4. Phone port must be connecting by telephone set or FAX machine, which bound a POTS/ISDN splitter.

The Modem 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 Modem Ethernet port. (Figure 2)

Figure 2 Ethernet Connecting Application Diagram



3. Hardware Description

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

Front Panel

The following figure shows the front panel. (Figure 3)

Figure 3 Front Panel

LED indicators.

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

Front Indicators

The Modem has Four LED indicators. The following Table shows the description. (Table 1)

Table 1 LED Indicators Description and Operation

LEDs	Color	Status	Descriptions
Power	Green	On	The device is receiving the power and functioning properly.
		Off	The device is not ready or has malfunctioned.
E1 (Ethernet LED)	Green	On	The device has a good Ethernet connection.
		Blinking	The device is sending or receiving data.
		Off	The LAN is not connected.
E2 (Ethernet LED)	Green	On	The device has a good Ethernet connection.
		Blinking	The device is sending or receiving data.
		Off	The LAN is not connected.
HPNA (HPNA LED)	Green	On	The device has a good HPNA connection.
		Blinking	The device is sending or receiving data.
		Off	The HPNA is not connected.

Rear Panel

The following figure shows the rear side of the Modem. (Figure 4)

And the table shows the description. (Table 2)

Figure 4 Rear side of the Modem

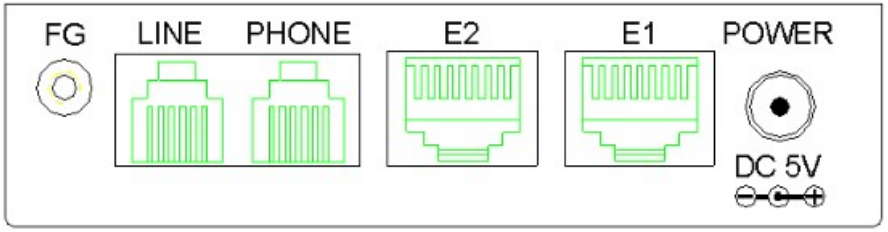


Table 2 Connectors shown on the rear side of the Modem

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

Note: The RJ-11 is wired identically and therefore is interchangeable.

4. Applications

Application for home networking

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

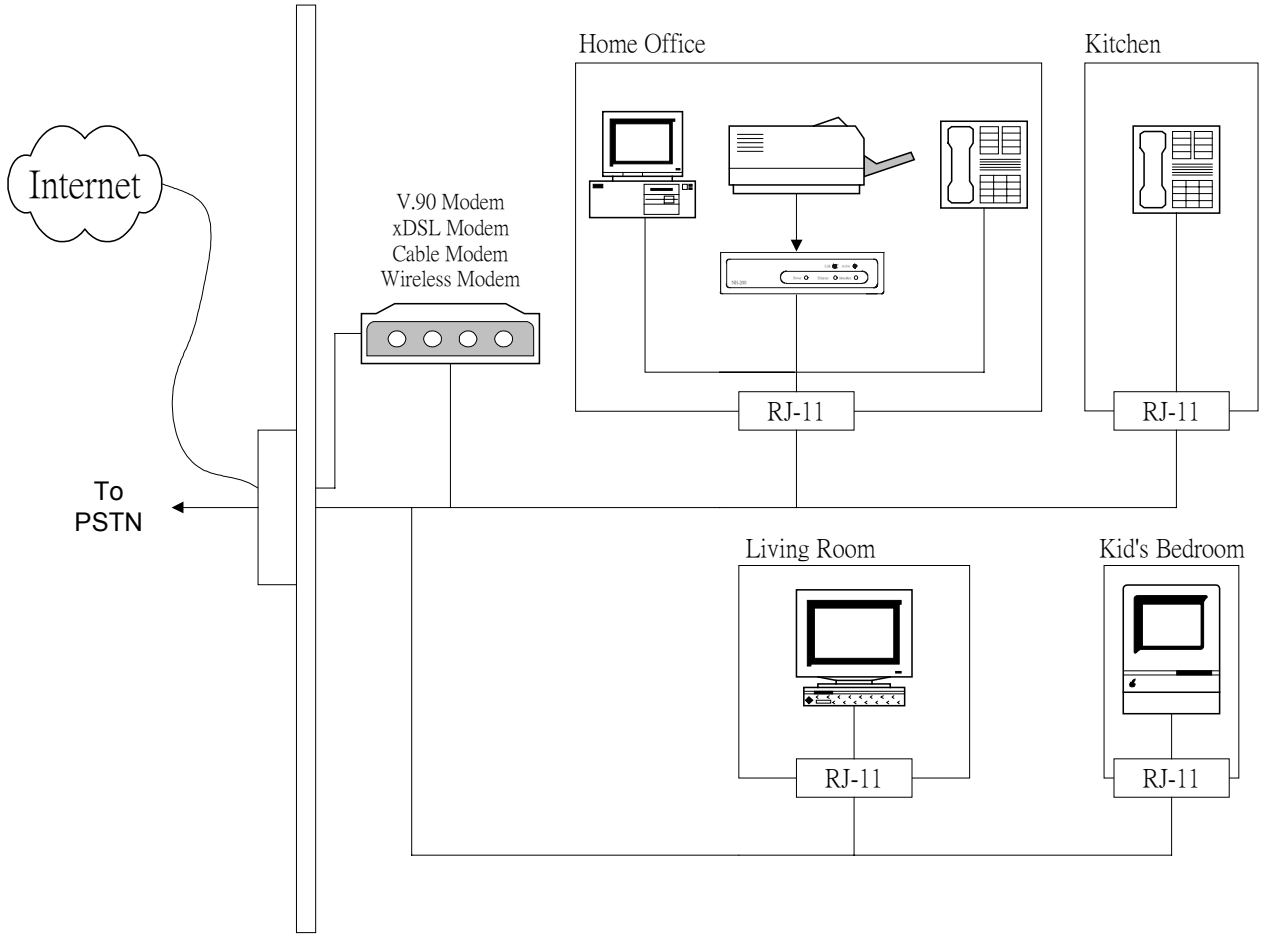
The Modem has been designed to operate on the telephone wire installed in homes throughout the world. They utilize the same modular patch cords and connectors commonly used for telephones.

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 Modem 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.

The 1Mbps Modem 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 Modem 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. (Figure 5)

Figure 5 Application for home networking diagram



Appendix A: Cable Requirements

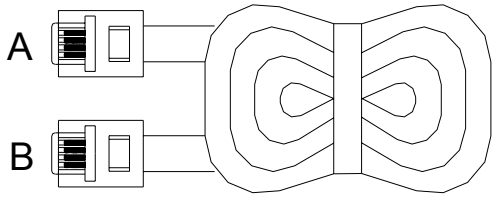
A CAT 3, 4 or 5 UTP (unshielded twisted pair) cable is typically used to connect the Ethernet device to the Modem. A 10Base-T cable often consists of four pairs of wires, two of which are used for transmission. The connector at the end of the 10Base-T cable is referred to as an RJ-45 connector and it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

Table 3 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

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 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 6)

Figure 6 Telephone cable



The A and B connectors on the rear of the Modem are RJ-11 connectors. These connectors are wired identically. The RJ-11 connectors have six positions, two of which are wired. The Modem uses the center two pins. The pin out assignment for these connectors is presented below. (Table 4)

Table 4 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

Key Features & Benefits

- Compliant with 1M Home PNA V1.0 / 1.1 Specifications
- Compliant with IEEE 802.3 & 802.3u Standard
- Support 802.1x and back pressure flow control
- Driver power up to 500 meters with 24 gauge phone wire
- Build in POTS / ISDN filter (splitter)
- Connects 10/100Base-T to HomePNA
- Provides two RJ-11 for HomePNA & Line port and two RJ-45 for 10/100Base-T port
- 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
- Safety by FCC & CE Class B

Product Specification

Ethernet Ports:	2 * RJ-45 (Auto MDIX)
1Mbps HomePNA Port:	2 * RJ-11 (one for splitter)
Status LEDs:	Power / Link / ACT
Flow Control:	Back-pressure
Filter/Forward Rate:	148,800 packets/second for 100Mbps 1,488 packets/second for 1Mbps
Band Pass Spectrum:	5.5Mhz ~ 9.5Mhz
Splitter Spectrum:	0 ~ 1.1Mhz
MAC Address Table:	2K
Queue Buffer:	2k bits per block
Switching Methods:	Store-and-Forward
Dimension:	95 x 110 x 24 mm (L x W x H)
Temperature:	Operating: 0ºC ~ 50ºC (32ºF ~ 122ºF) Storage: -20ºC ~ 70ºC (-4ºF ~ 158ºF)
Humidity:	10% ~ 90% non-condensing
External Power Adapter:	Input: AC 100-240 volts / 50-60Hz Output: DC 5V / 1A

Appendix C: 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 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 (ex. 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.
   2.2 Be sure the cable is plugged into both the switch and corresponding device.
   2.3 Verify that the proper cable type is used and its length does not exceed specified limits.
   2.4 Check the Modem on the attached device and cable connections for possible defects.
   2.5 Replace the defective Modem or cable if necessary.
   2.6 Check CO side must support long driver TYPE.

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 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.

External HomePNA interface card

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.

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

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. Shall not be liable for incidental or consequential damages. We neither assume nor authorize any person to assume for it any other liability.