

Powerline Communication

Powerline to Ethernet Converter – PL-101E

USB to Powerline Network Adapter - PL-101U



USER'S MANUAL

Copyright

Copyright (C) 2002 PLANET Technology Corp. All rights reserved.

The products and programs described in this User's Manual are licensed products of PLANET Technology. This User's Manual contains proprietary information protected by copyright, and this User's Manual and all accompanying hardware, software, and documentation are copyrighted.

No part of this User's Manual may be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form by any means by electronic or mechanical. Including photocopying, recording, or information storage and retrieval systems, for any purpose other than the purchaser's personal use, and without the prior express written permission of PLANET Technology.

Disclaimer

PLANET Technology does not warrant that the hardware will work properly in all environments and applications, and makes no warranty and representation, either implied or expressed, with respect to the quality, performance, merchantability, or fitness for a particular purpose.

PLANET has made every effort to ensure that this User's Manual is accurate; PLANET disclaims liability for any inaccuracies or omissions that may have occurred.

Information in this User's Manual is subject to change without notice and does not represent a commitment on the part of PLANET. PLANET assumes no responsibility for any inaccuracies that may be contained in this User's Manual. PLANET makes no commitment to update or keep current the information in this User's Manual, and reserves the right to make improvements to this User's Manual and/or to the products described in this User's Manual, at any time without notice.

If you find information in this manual that is incorrect, misleading, or incomplete, we would appreciate your comments and suggestions.

CE mark Warning

The is a class A device, in a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Trademarks

The PLANET logo is a trademark of PLANET Technology. This documentation may refer to numerous hardware and software products by their trade names. In most, if not all cases, these designations are claimed as trademarks or registered trademarks by their respective companies.

Revision

User's Manual for Powerline Communication product

Model: PL-101E, PL-101U

Rev: 1.0 (Jul. 2002)

Part No. EM-PL101v1

Table of Content

Chapter 1	Introduction.....	1
1.1	Powerline to Ethernet Converter – PL-101E.....	1
1.1.1	Features.....	2
1.1.2	Package Content.....	2
1.1.3	Hardware Description.....	2
1.1.4	Specification.....	3
1.1.5	System Requirements.....	4
1.2	USB to Powerline Network Adapter – PL-101U.....	4
1.2.1	Features.....	5
1.2.2	Package Contents.....	5
1.2.3	Hardware Description.....	5
1.2.4	Specification.....	6
1.2.5	System Requirements.....	7
Chapter 2	Planning your Powerline Network.....	8
Chapter 3	Powerline to Ethernet Converter Installation.....	9
Chapter 4	USB to Powerline Network Adapter Installation.....	10
4.1	Connecting USB to Powerline Network Adapter.....	10
4.2	USB to Powerline Network Adapter Driver Installation.....	10
Chapter 5	Encrypting Your Powerline Network.....	14
5.1	Install the PowerPacket Encryption Utility.....	14
5.2	Run the PowerPacket Encryption Utility.....	18
Chapter 6	Troubleshooting.....	21

1. Introduction

Powerline communication is revolution in home and small office networking, greatly simplifying the task of installing a high-speed local area network. With PLANET's powerline communication products, you can utilize existing AC power outlets and wires to connect your computers, servers and other devices safely, securely and at true LAN speeds of up to 14Mbit/second. No complex and expensive specialized wiring usually associated with LAN's is required, or management, security and interference problems associated with 802.11x wireless technologies – just convenient, reliable, secure and simple networking where you need it most. PLANET's Powerline products allow you to place a computer anywhere in your home or small office with flawless, uninterrupted high-speed network connection, simply by plugging your computer's Ethernet or USB interface into PL-101E/U equipped power outlet – and you're almost guaranteed to have one of these wherever you need it.

The PL-101E is a Powerline to Ethernet bridge with a 10base-T RJ-45 Ethernet interface for directly connecting to a computer's Ethernet card or existing Ethernet switch, hub or broadband router. The PL-101U is an USB to Powerline network adapter with an USB type B connector for directly connecting to computer's USB port. Both of them provide a power socket for connecting to wall outlet.

Security of PLANET's Powerline communication technology is assured by the use of 56-bit DES encryption – the same system used to protect banking systems all over the world, and is interference free, avoiding the problems of wireless systems.

1.1 Powerline to Ethernet Converter – PL-101E

The PLANET Powerline to Ethernet Converter PL-101E offers a complete Internet connection solution for your home powerline network. The PL-101E makes sharing your high-speed broadband Internet access easier than ever. Build a strong and simple-to-use home network by taking advantage of the most pervasive medium - powerline.

The PL-101E is ideal for users who already have a router. It can be plugged into an Ethernet port on a router to equip a network with powerline capabilities and take

advantage of the router's features. The PL-101E can also be plugged directly into a cable or DSL modem to allow Internet access and data transfer rates up to 14Mbps over powerlines.

1.1.1 Features

- ◆ HomePlug Powerline Alliance Specification 1.0 compliant
- ◆ One 2-pin power inlet for both powerline network and power supply
- ◆ Connects 10/100 Ethernet network to powerline Network for seamless integration
- ◆ 56-bit data encryption to ensure data security and reliability
- ◆ Easy to use Windows-based security key configuration utility
- ◆ Easy to read LED indicators
- ◆ Support CSMA/CA protocol on power line interface
- ◆ Up to 90m between powerline nodes
- ◆ Plug-and-play operation provides easy setup
- ◆ Shares internet access across your entire home powerline network
- ◆ Up to 14 Mbps data transfer over powerline

1.1.2 Package Content

Check the contents of your package for following parts:

- One Powerline to Ethernet Converter
- One Power Cord
- One Manual and Utility CD-ROM
- One Quick Installation Guide

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.

1.1.3 Hardware Description

PL-101E front panel:



LEDs status

LED definition	Color	Description
Power	Green	The power LED will light up when PL-101E is powered on.
Col	Green	The collision LED flashes when there is a collision.
Link	Green	The link LED will light up when PL-101E is ready for use.
Act	Green	The activity LED flashes when there is powerline network traffic.
Ethernet port	Green	The LED will be lit steadily when there is a physical Ethernet connections and flashes when there is Ethernet network traffic.
Ethernet port	Amber	The LED is reserved for future use.

Uplink button: If connecting directly to a PC via Ethernet, this button should be UP. For connecting to a hub, depress this button.

PL-101E rear panel

One 2-pin power inlet for both powerline network and power supply



1.1.4 Specification

Model / Hardware Specification	PL-101E
Standards	IEEE 802.3 10Base-T

	HomePlug 1.0
Ports	One Powerline Port One 10Base-T RJ-45 port
Cabling Type	Powerline: Power Cord LAN: UTP Cat 3 or better
Speed	Powerline: 14Mbps (actual throughput is about 6Mbps) LAN: 10Mbps
Powerline Frequency Band	4.3MHz to 20.9MHz
Encryption	56-bit DES with Key configuration software
LEDs:	Power Powerline: Link, ACT, Col LAN: LNK/ACT
Dimension	146 x 101 x 34 mm
Weight	0.47 kg
Certifications	FCC Class B, CE
Operating Temp.	0 ~ 50 degree C
Storage Temp.	-20 ~ 70 degree C
Operating Humidity	10~90% non-condensing
Storage Humidity	5~95% non-condensing
OS support	Windows 98, 2000, Me and XP

1.1.5 System Requirements

- Existing Ethernet/fast Ethernet network or an existing Ethernet/fast Ethernet network adapter and network cable
- TCP/IP protocol
- CD-ROM Drive (for installing Encryption Utility)

1.2 USB to Powerline Network Adapter – PL-101U

The newest and fastest way to network your PCs is through powerline networking, which allows you to turn the powerline in your home into your network cable. The easiest way to integrate any PC or laptop into such a powerline network is with PLANET USB to Powerline Network Adapter. Use your existing USB port with your existing powerline. The Plug-and-Play USB Adapter connects directly to virtually any USB-ready PC – just plug it in and you are ready to share data, printers, or high-speed Internet access over your existing powerline network. For desktop installation, you do not have to open your PC case. With user-friendly software, it is simple to set up.

Not only is PL-101U easy to install and use, but it also powerful. You can send and receive data at speeds of up to 12Mbps. Plug it into the USB port; set it up, and you are ready to go. So for full desktop and notebook PC flexibility and powerline convenience, the PL-101U provides the perfect solution.

1.2.1 Features

- ◆ HomePlug Powerline Alliance Specification 1.0 compliant
- ◆ One 2-pin power inlet for both powerline network and power supply
- ◆ Shares internet access across your entire home powerline network
- ◆ Provides powerline connectivity through Your USB port
- ◆ 56-bit data encryption to ensure data security and reliability
- ◆ Easy to use Windows-based security key configuration utility
- ◆ Easy to read LED indicators
- ◆ Support CSMA/CA protocol on power line interface
- ◆ Plug-and-play operation provides easy setup
- ◆ Up to 14 Mbps data transfer rate
- ◆ Compatible with Windows 98, ME, 2000 and XP

1.2.2 Package Contents

Check the contents of your package for following parts:

- One USB to powerline network adapter
- One Power Cord
- One USB cable
- One Manual and Utility CD-ROM
- One Quick Installation Guide

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.

1.2.3 Hardware Description

PL-101U front panel



LEDs status

LED definition	Color	Description
Power	Green	The power LED will light up when PL-101U is powered on.
Col	Green	The collision LED flashes when there is a collision.
Link	Green	The link LED will light up when PL-101U is ready for use.
Act	Green	The activity LED flashes when there is powerline network traffic.

USB port

The USB port is where you will connect your USB cable. To work with USB ports, your computer must be running Windows98, ME, 2000 and XP.

PL-101U rear panel

One 2-pin power inlet for both powerline network and power supply



1.2.4 Specification

Model / Hardware Specification	PL-101U
Standards	HomePlug 1.0 USB 1.1
Ports	One Powerline Port One USB Port
Cabling Type	Powerline: Power Cord USB: USB cable
Speed	Powerline: 14Mbps (actual throughput is about 6Mbps) USB : 12 Mbps

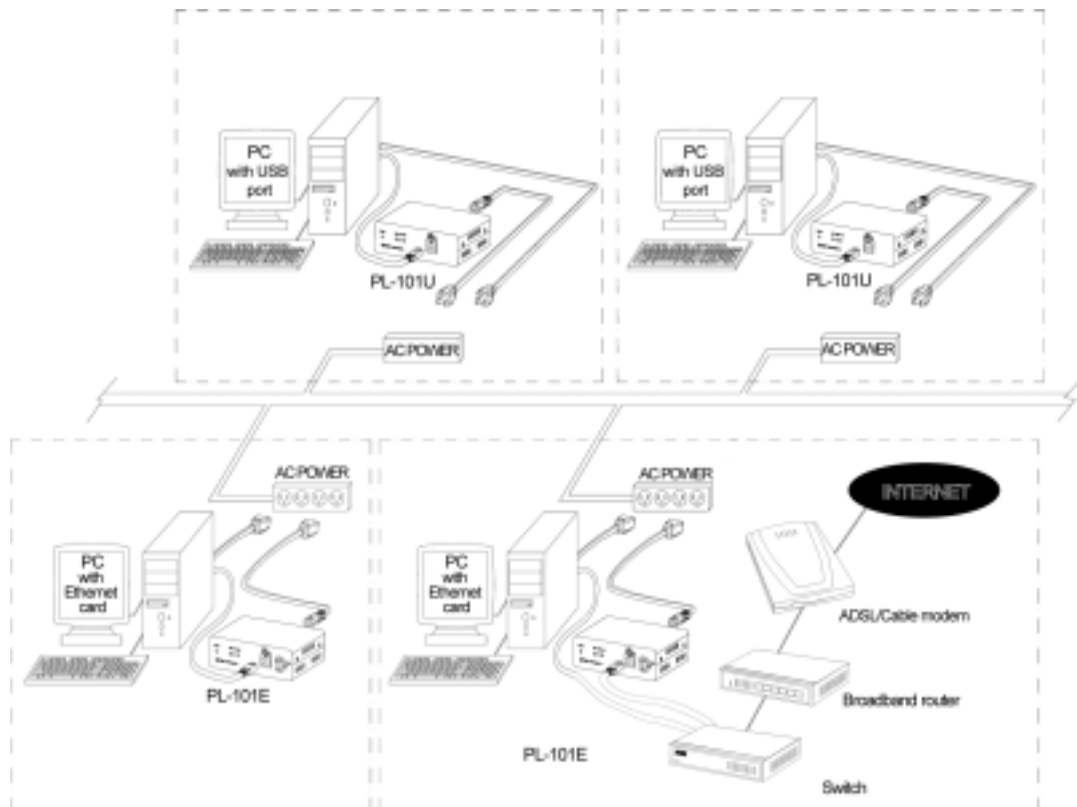
Powerline Frequency Band	4.3MHz to 20.9MHz
Encryption	56-bit DES with Key configuration software
LEDs:	Power Powerline: Link, ACT, Col
Dimension	146 x 101 x 34 mm
Weight	0.47 kg
Certifications	FCC Class B, CE
Operating Temp.	0 ~ 50 degree C
Storage Temp.	-20 ~ 70 degree C
Operating Humidity	10~90% non-condensing
Storage Humidity	5~95% non-condensing
OS support	Windows 98, 2000, Me and XP

1.2.5 System Requirements

- Pentium-class 90 MHz or higher
- Minimum 32 MB RAM
- USB-ready PC
- Windows 98, ME, 2000 and XP
- CD-ROM Drive (for installing Encryption Utility)

2. Planning your Powerline Network

With PLANET PowerLine products, a network can be created using home powerline. Computers can be networked over powerline using a USB Adapter or an Ethernet converter. Use PL-101U for a USB-enabled computer or use PL-101E for an Ethernet-enabled computer. The PL-101E is also ideal for any user who already has a router and wants to share high-speed Internet access across the powerline network. Connect PL-101E to the router after you have configured it using the Security Configuration Utility. Connect a straight-through UTP Category 5 cable to the uplink port of the router, or connect crossover UTP Category 5 cable to a LAN port on the router.



All the powerline devices on the network must use the same password to communicate each other. This password can be configured through the **PowerPacket** encryption utility. The default password of PLANET powerline devices is “**HomePlug**”. Thus, all the PLANET powerline devices can communicate each other without prior password configuration. Please refer to 5. Encrypting Your Powerline Network on detail of installing and using **PowerPacket** encryption utility.

3. Powerline to Ethernet Converter Installation

1. Plug the other end of the UTP category 5 cable into the computer's LAN port.
2. Plug the UTP category 5 cable into the 10/100 RJ45 Ethernet port on PL-101E.
3. Plug the power cord into the powerline port on PL-101E.
4. Plug the other end of the power cord into a power outlet.

Note!

- ◆ Use only the supplied power cord to connect PL-101E to the power outlet.
- ◆ Because PL-101E sends data over the powerline of your house, it is best to plug PL-101E's power cord directly into a power outlet. Do not plug PL-101E into a UPS power strip with surge protection. PL-101E has its own power filter for protection against surges.
- ◆ All the Powerline devices must on the same electrical phase.

4. USB to Powerline Network Adapter Installation

4.1 Connecting USB to Powerline Network Adapter

1. Plug the other end of the USB cable into the computer's USB port.
2. Plug the USB cable into the USB port on PL-101U.
3. Plug the power cord into the powerline port on PL-101U.
4. Plug the other end of the power cord into a power outlet.

Note!

- ◆ Use only the supplied power cord to connect PL-101U to the power outlet.
- ◆ Windows 95 and NT do not support the USB adapter.
- ◆ Because PL-101U sends data over the powerline of your house, it is best to plug PL-101U's power cord directly into a power outlet. Do not plug PL-101U into a UPS power strip with surge protection. PL-101U has its own power filter for protection against surges.
- ◆ All the Powerline devices must on the same electrical phase.

4.2 USB to Powerline Network Adapter Driver Installation

The installation procedure for the network driver will vary depending on which operating system you are using on your computer. The following procedure is for installation under Windows 98. Installation on other operation system is similar.

1. Windows will automatically detect the presence of the USB Adapter hardware in your computer once you have completed the hardware installation. Click the **Next** button.



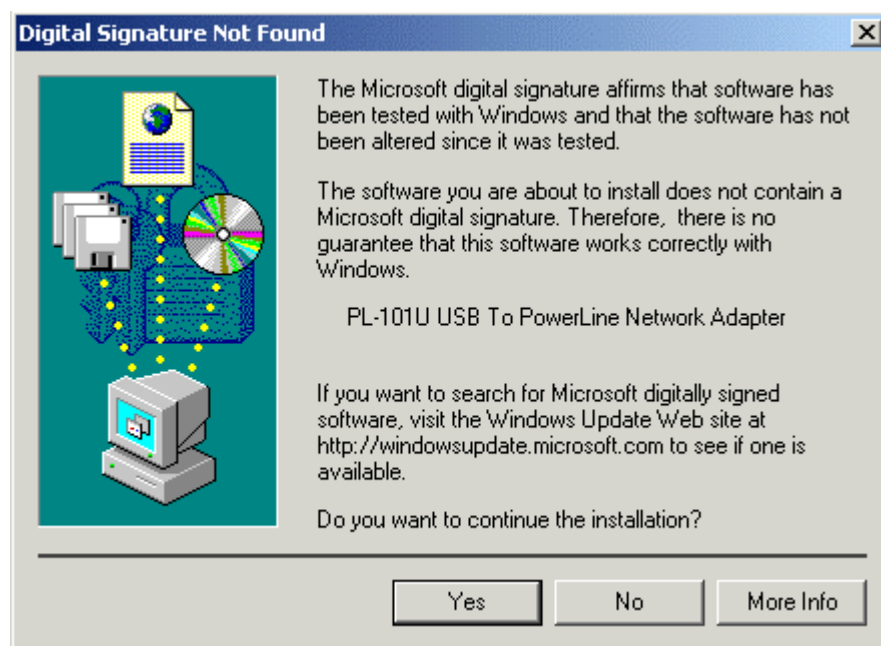
2. Select “Search for the best driver for your device. (Recommended)” and click the **Next** button.



3. Windows will look for new drivers and ask you which locations you want to search. Select **Specify a location** and choose the path as **D:\Driver\PL-101U** (if “D” is the letter of your CD-ROM drive). Click the **Next** button to continue.



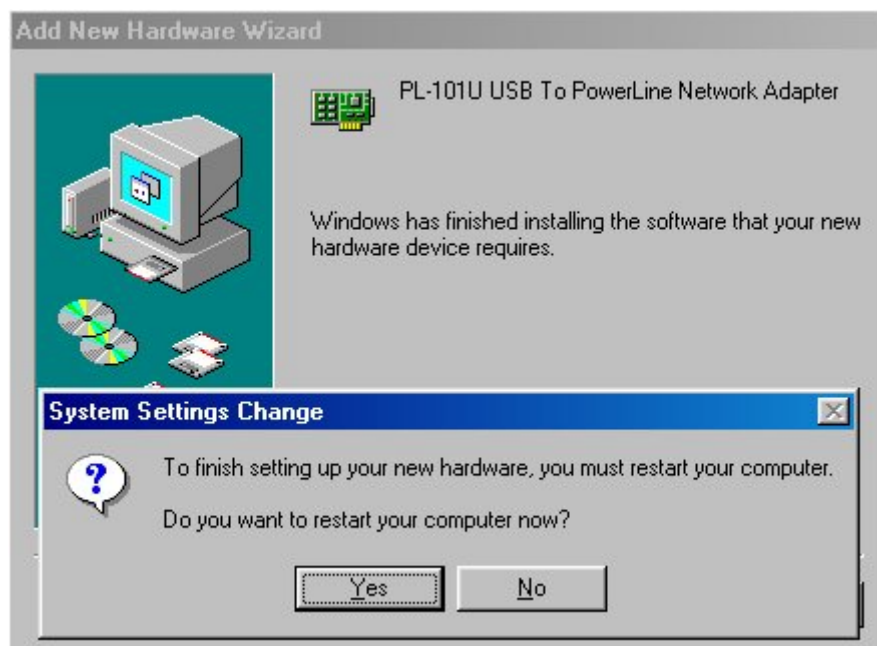
NOTE: Windows 2000 and XP will inform you that there is no digital signature found. Click the **Yes** button to continue the installation.



4. Windows will tell you when it has finished installing the new driver. Click the **Finish** button.



5. Click the **Yes** button to restart your computer, or click the No button to restart later.

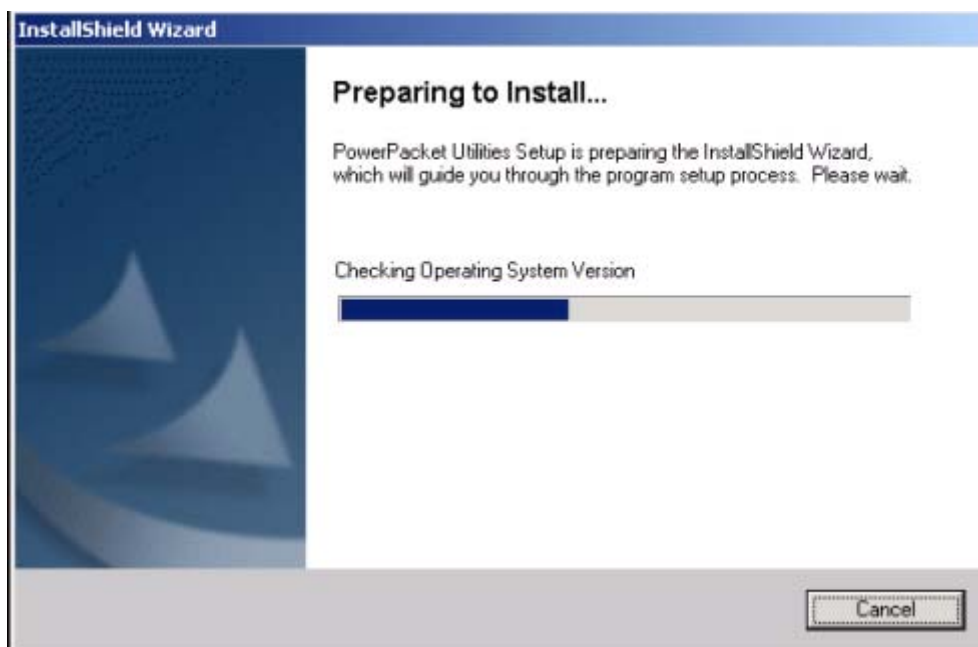


5. Encrypting Your Powerline Network

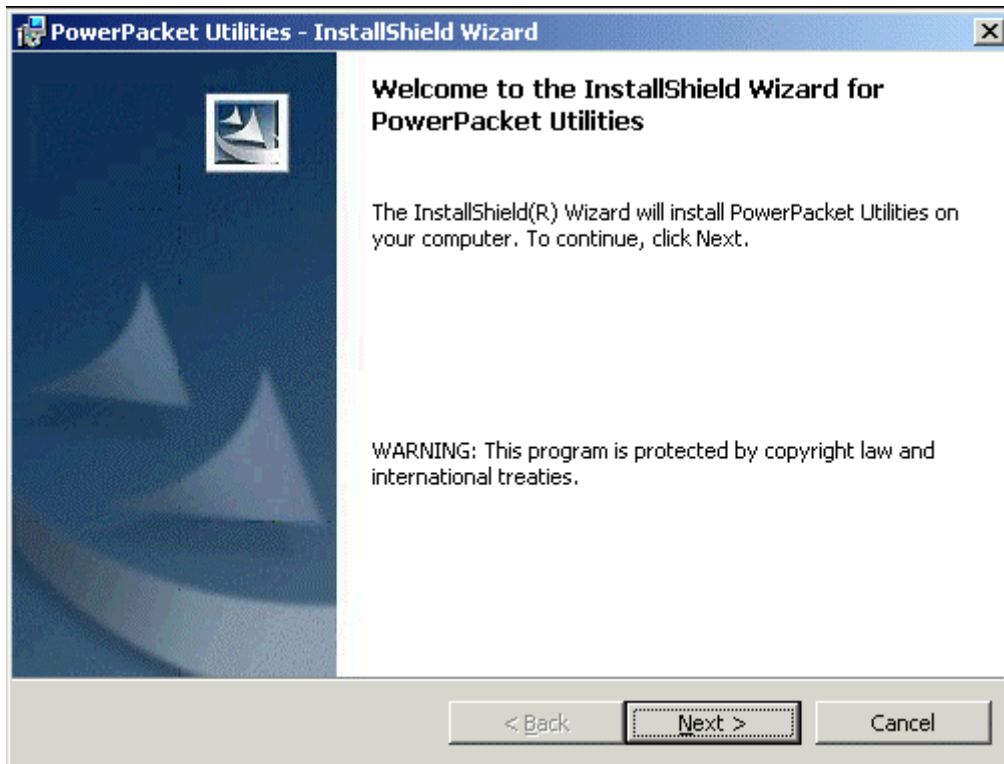
5.1 Install the PowerPacket Encryption Utility

To start installation of all the powerline devices, you will use the bundled CD-ROM to run the PowerPacket installshield wizard:

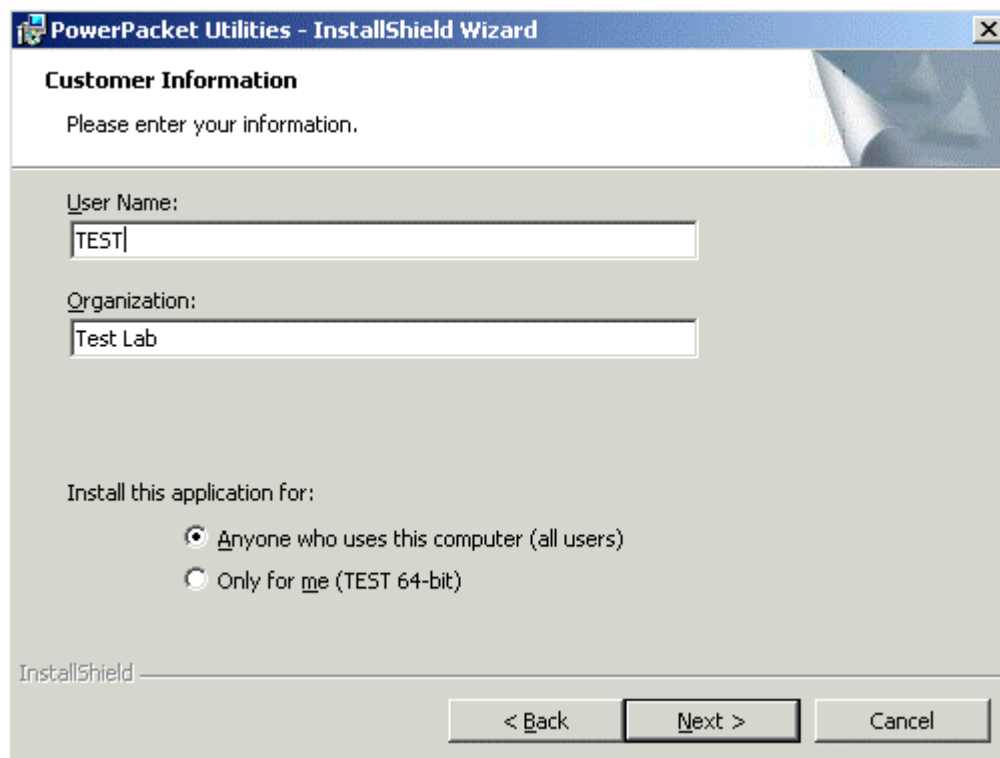
1. Insert the CD into the computer's CD-ROM drive. Click My Computer on desktop and double-click on your CD-ROM icon. Double clicks "**setup.exe**" in **D:\Utility\PL-101E** (if "D" is the letter of your CD-ROM drive) or **D:\Utility\PL-101U**.



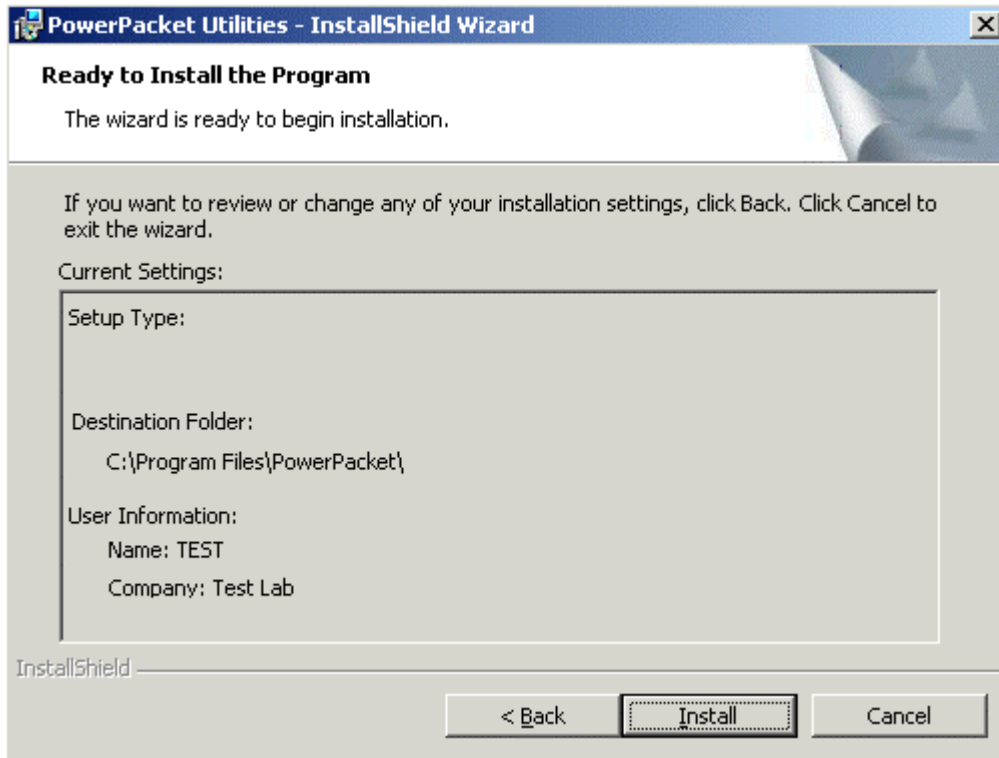
2. Click the **Next** button to continue.



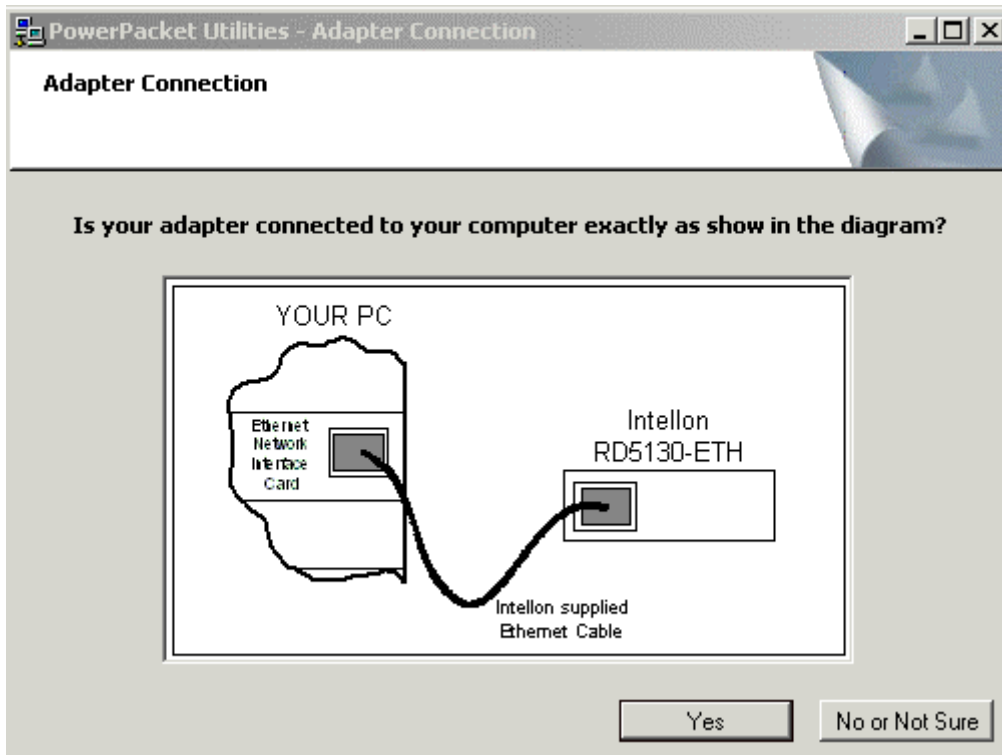
3. Enter your User Name and Company Name. Select Anyone who uses this computer (all users) to install a shortcut to the security configuration utility on every user's desktop (The selection is not available for Windows 98 and ME users). Then click the **Next** button to continue.



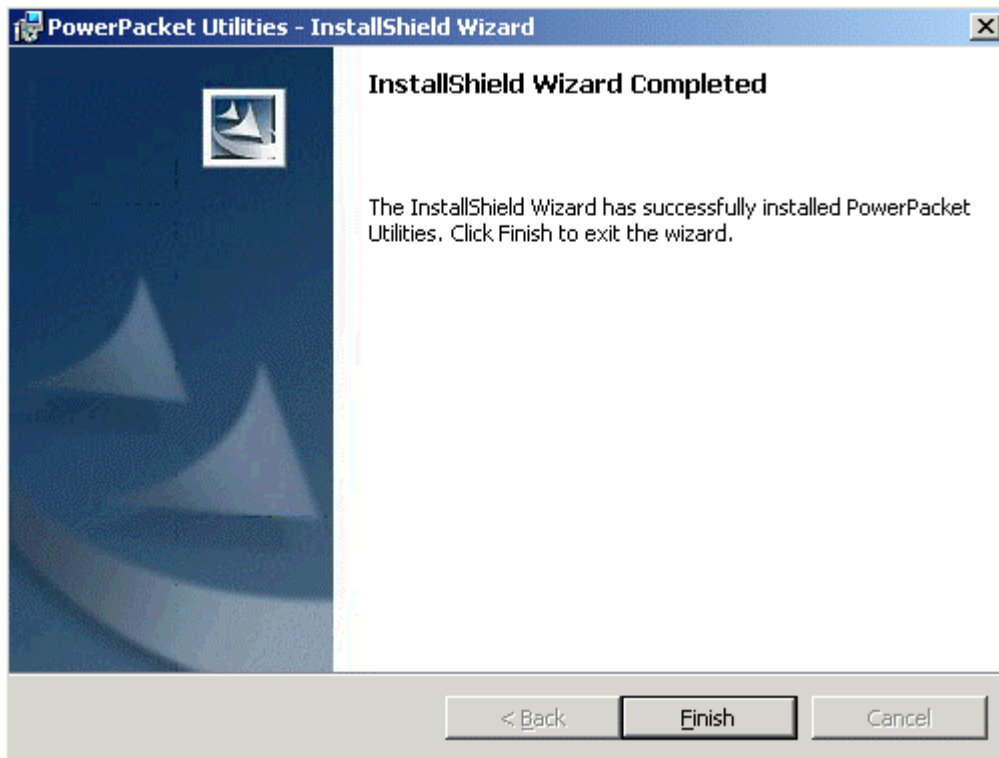
4. Click the **Install** button to begin installation of the security configuration utility.



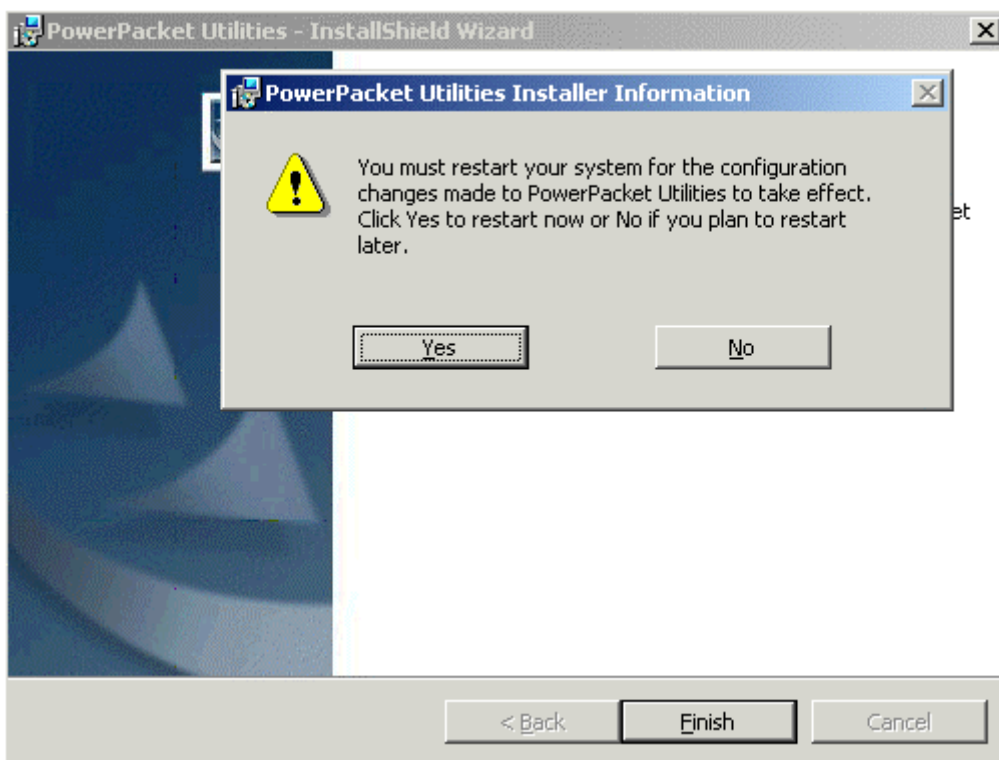
5. If you are running the utility of PL-101E, it may show the following window. Click **Yes** button if PL-101E has connected to your computer and the outlet properly.



6. Click **Finish** button to finish the PowerPacket InstallShield wizard.



7. You will be asked to restart your computer. After you click **Yes** button to restart, the entire installation is complete.



5.2 Run the PowerPacket Encryption Utility

After installing the **PowerPacket** encryption utility for your PL-101E/U, your computer desktop will display this icon, Powerline Network Configuration Utility.



Note: Make sure your TCP/IP protocol is set up appropriately on your computer before running security configuration utility.

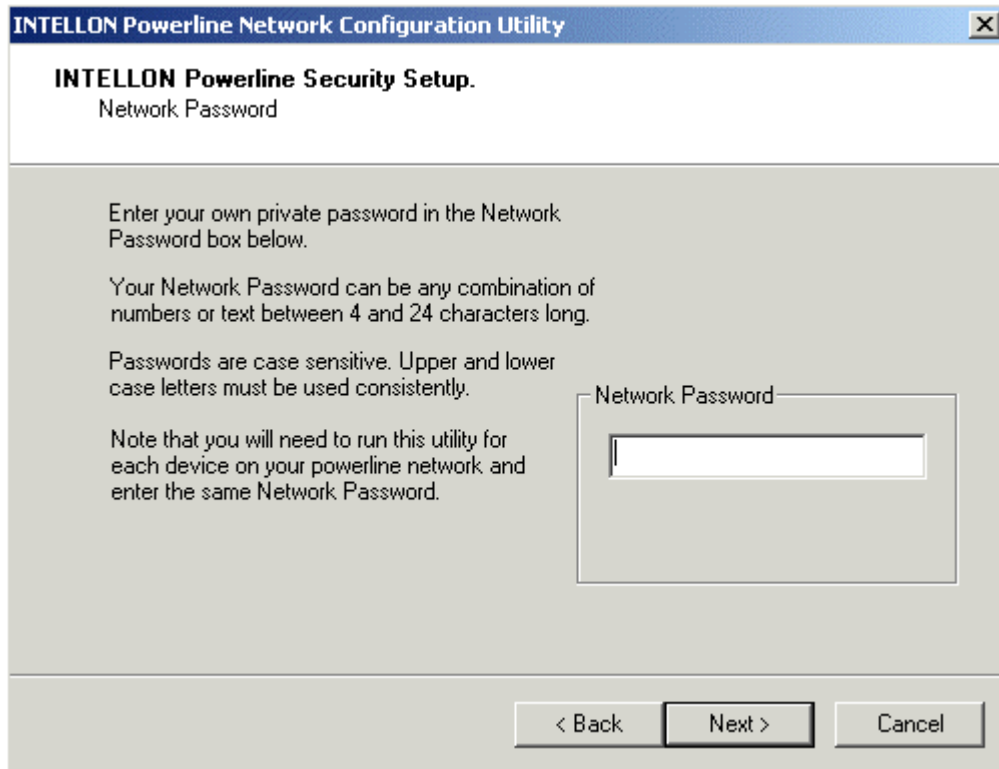
Double-click the icon, “**Powerline Network Configuration Utility**”, on your desktop.

1. Click **Next** button to continue.

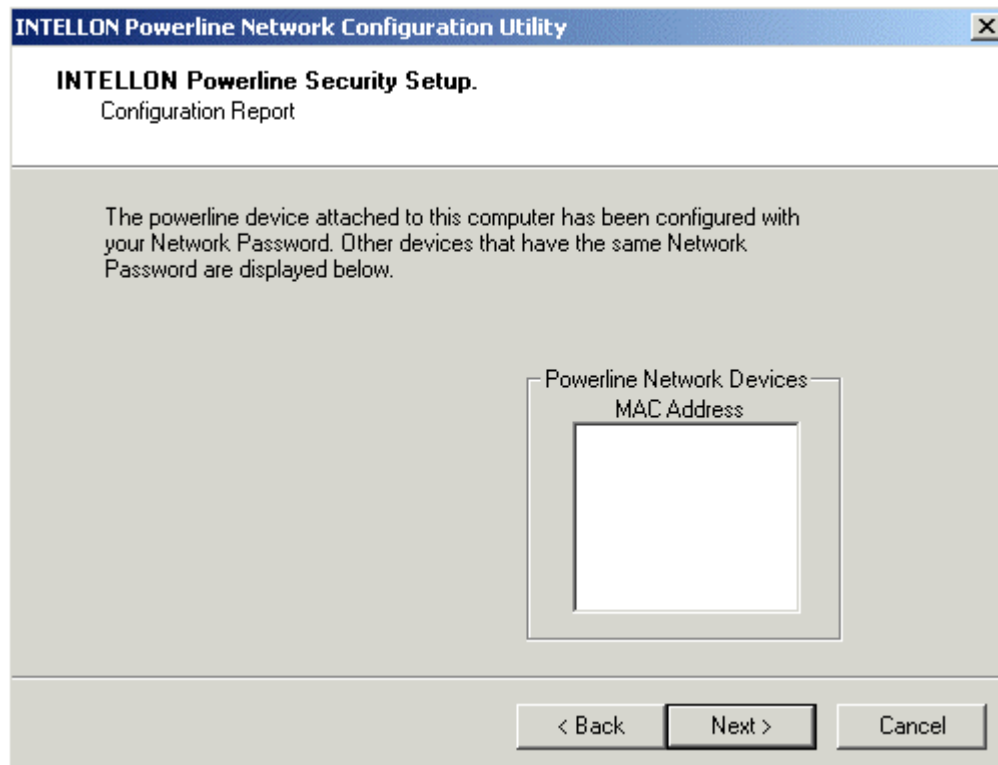


2. All of your PL-101E/U devices on your powerline network must share the same network password. The password must have between 4 and 24 characters. The password is case-sensitive. Upper and lower case letters must be used consistently.

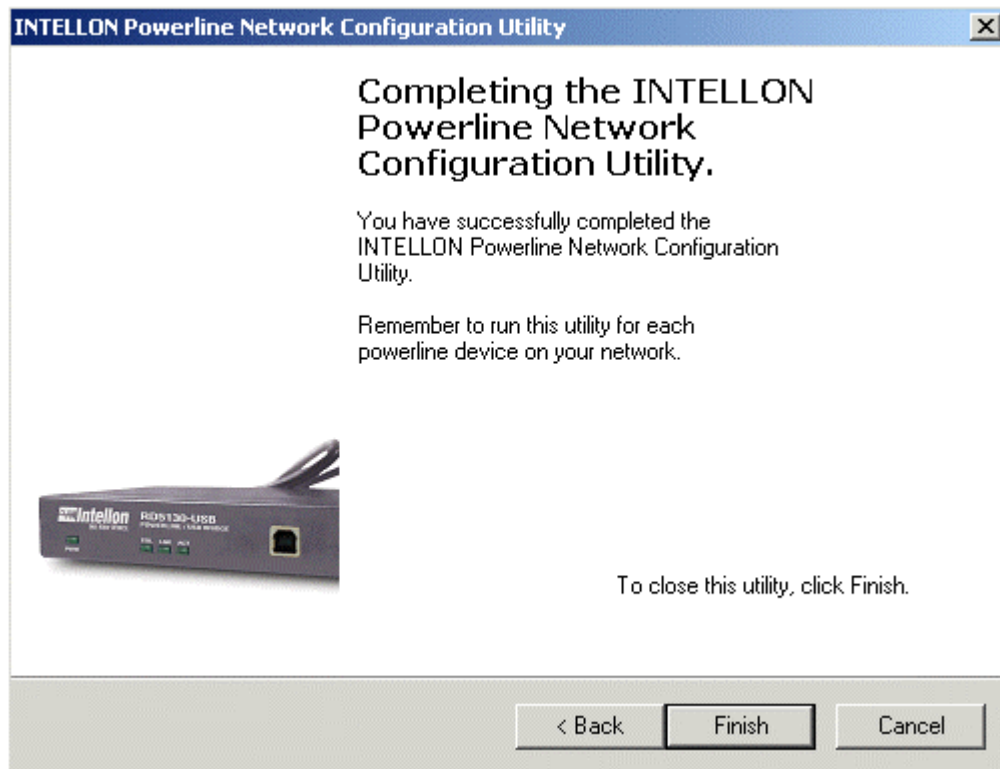
Note: Remember this password. You will need to set this password on each PL-101E or PL-101U devices on your powerline network.



3. The security configuration utility will search your powerline network for other PL-101E or PL-101U devices configured with the same network password. These devices will be listed in the powerline network devices MAC address box. Then click the **Next** button.



4. The security configuration utility will tell you when the PL-101E/U device has been configured with the network password. Click **Finish** button.



6. Troubleshooting

- ◆ The power LED does not light up after I installed the PL101E/U device?

A: Unplug the UTP category 5 from the computer. Unplug the power cord from the power outlet. Then repeat the hardware installation process. Make sure the power outlet is working properly.

- ◆ The Link LED does not light up on PL-101E/U.

A: When the Ethernet port detects a LAN connection, the Link LED will light up. Check the Ethernet adapter on your computer to see if the connection and adapter are working properly. If you connect PL-101E/U to your computer with crossover UTP category 5 cable, depress the Uplink button.

- ◆ I cannot connect to other computers on my powerline network or to the Internet.

A: Make sure the IP address and TCP/IP protocol are set up correctly for all the powerline networked computers.

- ◆ Do the PL-101E/U device cause interference with other home networking or products?

A: No. PL-101E/U can co-exist with phoneline and wireless networking technologies. PL-101E/U operates in a different frequency band than powerline control and co-exists with technologies such as X-10, CEBus and LONworks.

- ◆ How do the PL-101E/U devices handle signal interference between two adjacent homes? How is eavesdropping prevented?

A: PL-101E/U 56-bit DES security encryption to ensure network separation between homes. To enable 56-bit DES security encryption on PL-101E/U, you must run the security configuration utility on each and every PL-101E/U.

- ◆ How does PL-101E/U handle node address on the network?

A: PL-101E/U adheres to standard Ethernet addressing protocols using destination and source MAC address.