



500Mbps Powerline Gigabit Ethernet Adapter

RPLC-500

*User Manual*



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# Package Contents

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The following items should be found in your package:

- 2x Rosewill **RPLC-500** 500Mbps Powerline Gigabit Ethernet Adapter
- 2x RJ45 Ethernet Cable
- 1x Quick Installation Guide
- 1x Resource CD for **RPLC-500**, including:
  - Rosewill Powerline Utility
  - Quick Installation Guide
  - User Guide

 **Note:**

Make sure that the package contains the above items. If any of the listed items are damaged or missing, please contact with your distributor.

# Chapter 1 Introduction to Hardware

Thank you for purchasing Rosewill's **RPLC-500** Homeplug AV compliant Powerline Adapter. The **RPLC-500** adapter can transmit data up to 500mbps via household's power outlet. **RPLC-500** can help you to establish a high-speed network that supports video, voice and data without wiring and drilling. It is suitable for using in a wide range of both residential (at home) and commercial (offices, apartments, hotels, warehouses) network applications.

## 1.1 Expanding your Network with RPLC-500

The RPLC-500 plugs into an power outlet to extend cable or DSL modem connection or your current Ethernet Network to almost any power outlet in your home with any new cabling.\* Devices can securely communicate with each other via the 128-bit Advanced Encryption Standard (AES) through RPLC-500 at a high speed transfer rate of 500Mbps and Gigabit LAN support.

### Note:

Powerline Technology has certain limitations.

1. The best performance for Powerline Data transmission will be under one power circuit
2. Performance may be decreased under different circuits but within one Electricity Meter due to the drop-off via hardware.

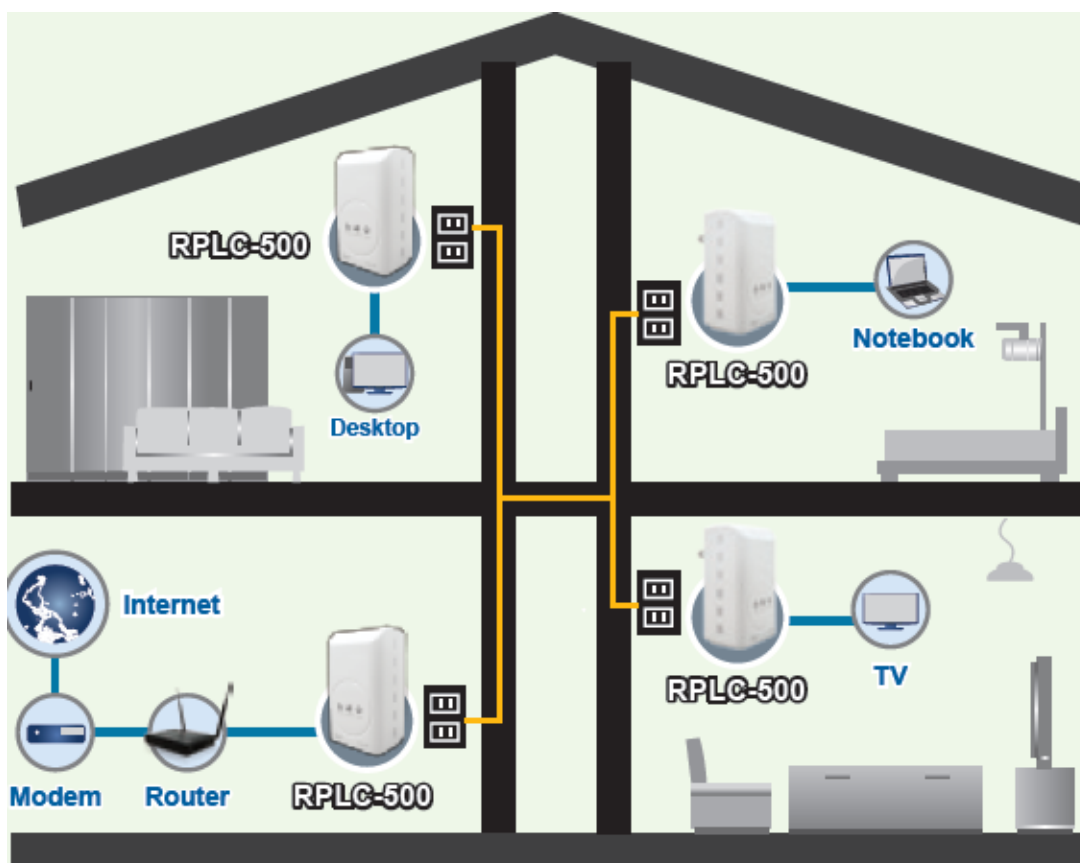
## 1.2 Key Features

- **Plug and Play with Quick and Easy Installation**
  - Installation requires no new wiring
  - Every power socket becomes a connection node in the household.  
RPLC-500 supports connection for a total of 8 nodes.
  - Plug-and-play to your routers, computers and other network devices.
- **Power up your Network with Ultra fast speed**
  - Physical data rate is up to 500Mbps.
  - Ethernet Speed is up to 1000Mbps
- **Enjoy Stable HD Videos and Gaming**

- With a pair of plug-and-play RPLC-500 installed, you can easily extend your home network through any electrical outlet for Internet access by HDTVs, Blu-ray™ players, DVRs, PCs and game consoles.
- **QoS Management Enhances Streaming Quality**
  - RPLC-500 supports 4-level type QoS and 8-level VLAN priority fields which automatically improves the streaming quality
- **Green Feature for Power saving mode**
  - RPLC-500 will detect signals when there is no signal transmit, it will automatically enters Power Saving mode which saves near 80% of the energy consumption.

## 1.3 Application

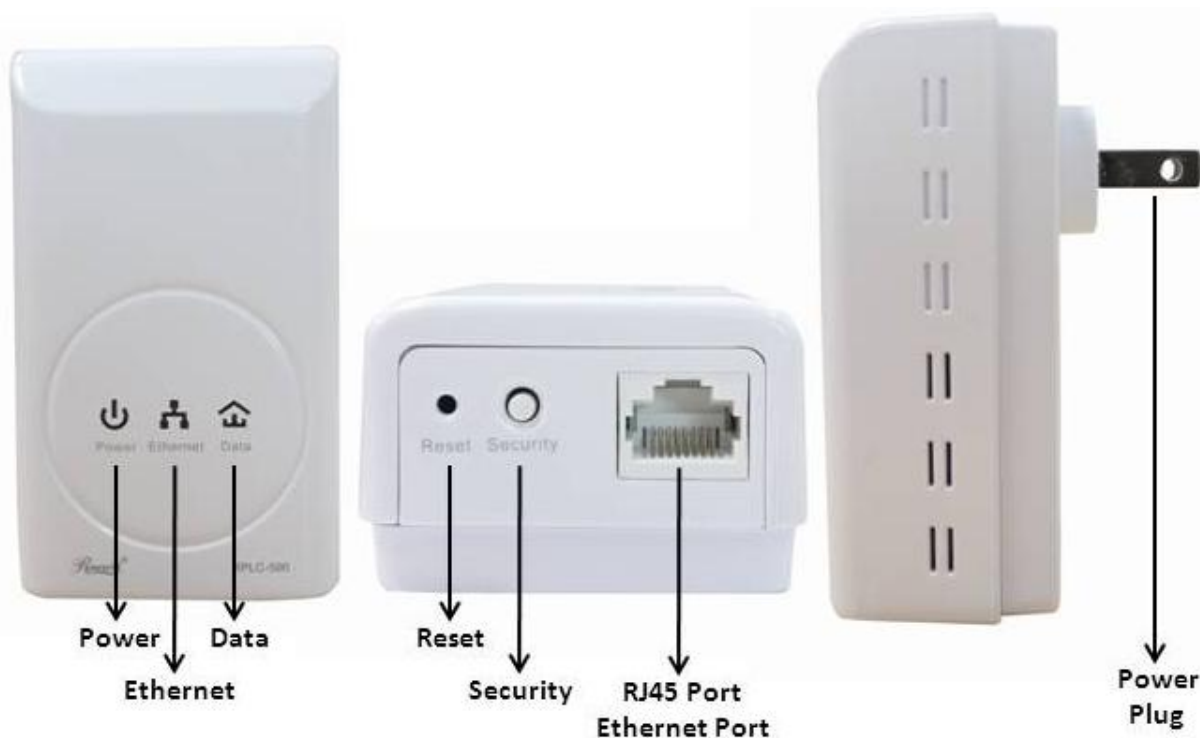
- High Definition (HD) and Standard Definition (SD) video distribution
- Higher data rate broadband sharing for Powerline LAN
- Shared broadband internet access
- TV over IP (IPTV) and Voice over Internet Protocol (VoIP)






## 1.4 System Requirement

- If need to use Powerline Utility: Operating system: Windows 98SE, 2000, ME, XP 32/64 bit and Vista 32/64bit, otherwise, no OS require
- CPU: Intel Pentium III or better, clock rate faster than 2.0GHz recommended
- RAM: At least 128MB
- Screen resolution: Any resolution
- Free disk space: At least 20MB
- Network interface: At least one Fast Ethernet (100 Mbps) network card, and a Ethernet Cord

## 1.5 Hardware Diagram of RPLC-500



## 1.5.1 LED

LED	Color	Behavior	Description
 (Power)	Green	On	System runs normally.
	Green	Blink	<ul style="list-style-type: none"> <li>● System is resetting.</li> <li>● System is in the process of password synchronization.</li> <li>● System is in Power Saving mode</li> </ul>
	-	Off	The PLC adapter is powered off.
 (Ethernet)	Green	On	Ethernet connection has established.
		Blink	Data is being transmitted.
	-	Off	No Ethernet connection.
 (Data)	Green/Orange/Red	On	<p>The PLC adapter has connected to the powerline network. The Data LED color may vary according to the Data Transmit Quality.</p> <p>Green: Data Transmit Quality Excellent</p> <p>Orange: Data Transmit Quality Average</p> <p>Red: Data Transmit Quality Poor</p>
	-	Off	The PLC adapter does not connect to the powerline network.

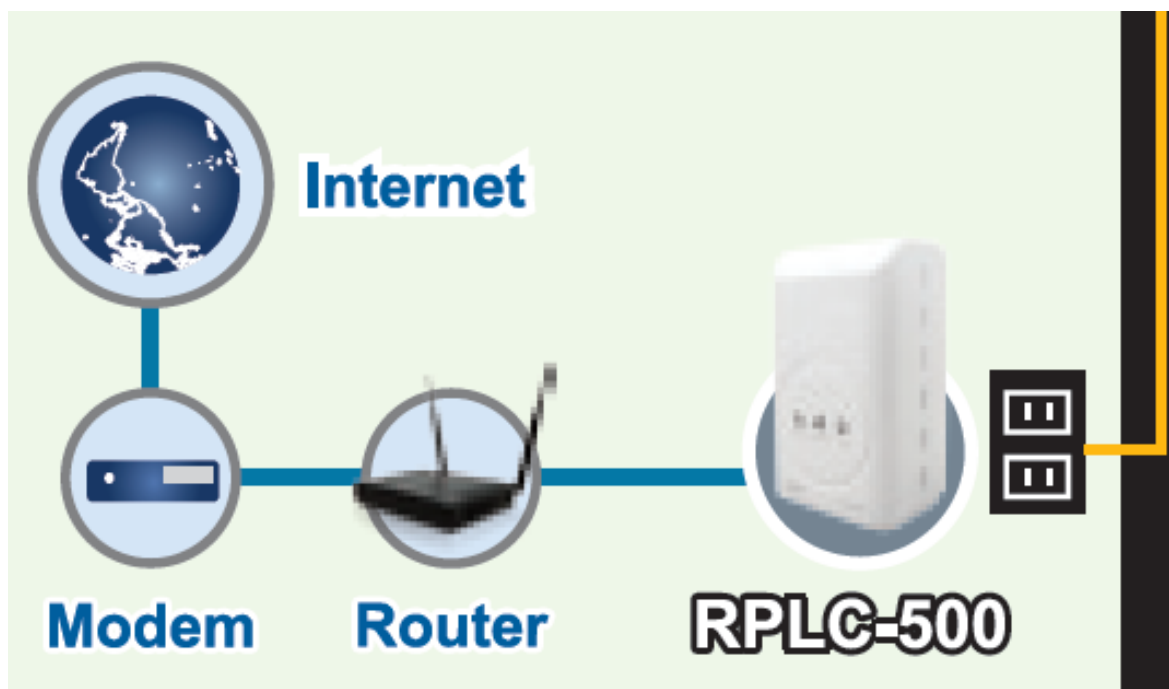
## 1.5.2 Powerline Adapter's Button and Connector

**Reset:** Pressing and holding the Button for between 10 seconds and 15 seconds makes the adapter restore the factory default settings.

**Security:** Pressing and holding the button for less than 3 seconds makes the adapter a member of the existing Powerline Network.

**Ethernet Port (RJ45 Port):** The Ethernet port connects to an Ethernet network cable. The other end of the cable connects to your computer or other Ethernet-enabled network device.

**Connecting to the router/modem:** Insert One end of the RJ45 Cable (Recommend using Cat 5E cable or above) to this port, and the other end to the router or modem. Then plug into the electrical outlet.



**Connecting to PC / Smart TV / NB / Blu-ray Player / Media Player / IP Phone:** Insert One end of the RJ45 Cable (Recommend using Cat 5E cable or above) to this port, and the other end to the other devices. Then plug into the electrical outlet.

## Chapter 2 Introduction to Utility

### Note:

Before installing the PLC utility software, make sure that there is no any other powerline utility installed on your computer. If there is another utility installed, please uninstall it and restart your computer.

### 2.1 Utility Installation

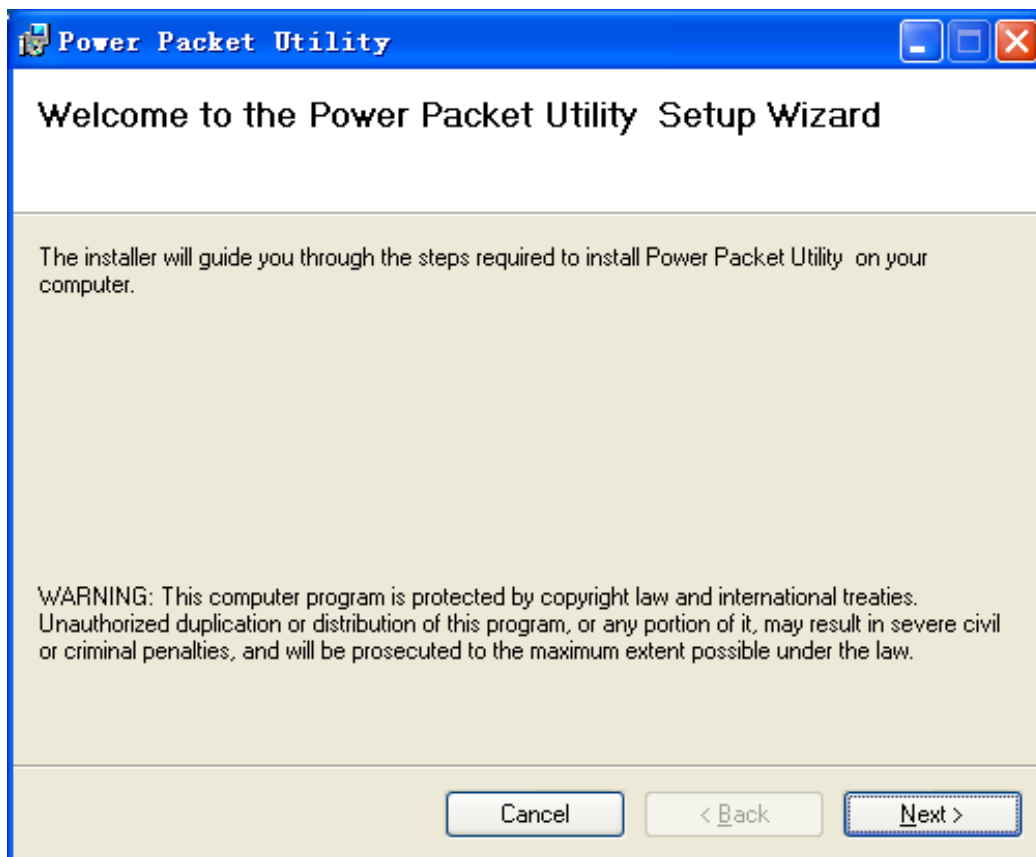
Please follow the steps below to install the utility.

1. Please insert the utility CD into the computer's CD-ROM drive. Select the Utility Installation from the Wizard Page.

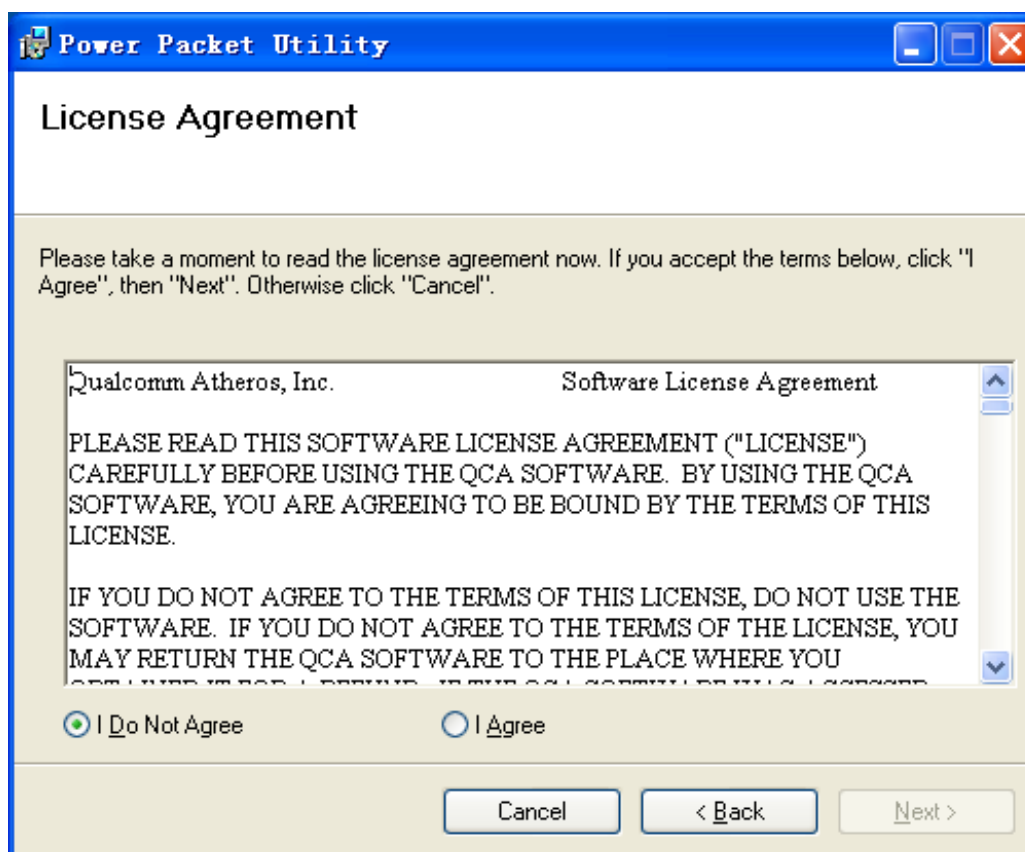




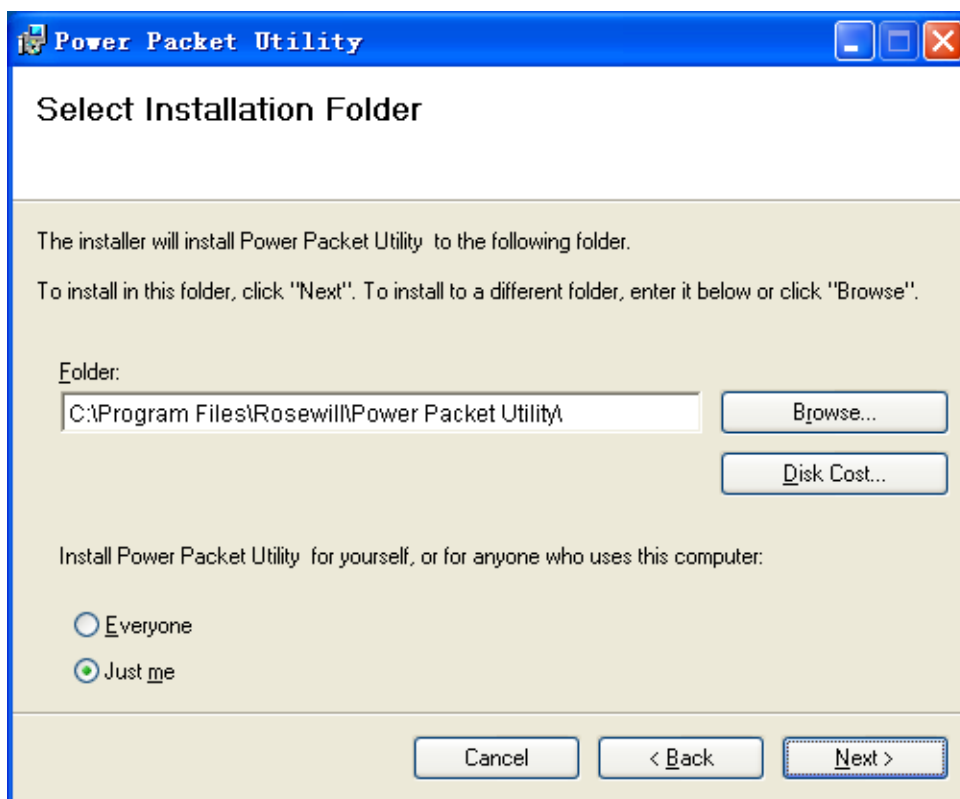
2. The window for installing the utility software will display. Click **Next** to continue.



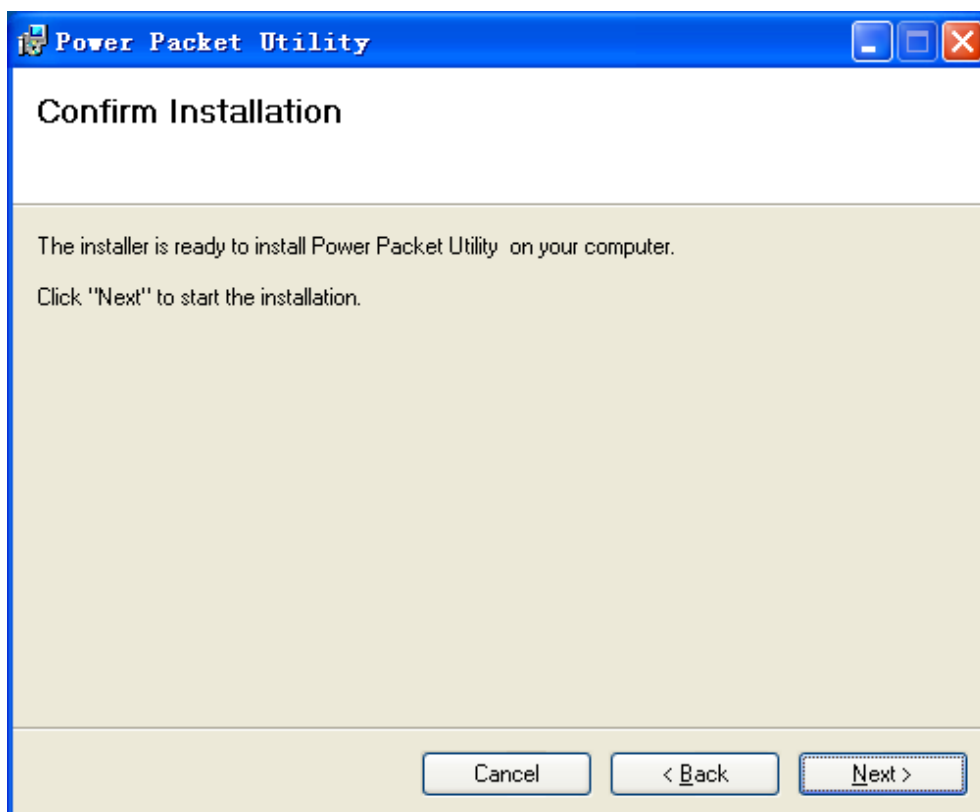
3. Select **I Agree**, and then **Next** to continue.



4. You can choose your own destination folder to install or click **Browse...** to select the installation folder, and then click **Next** to continue..

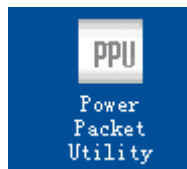


- 5. You can choose your own destination folder to install or click **Browse...** to select the installation folder, and then click **Next** to continue.



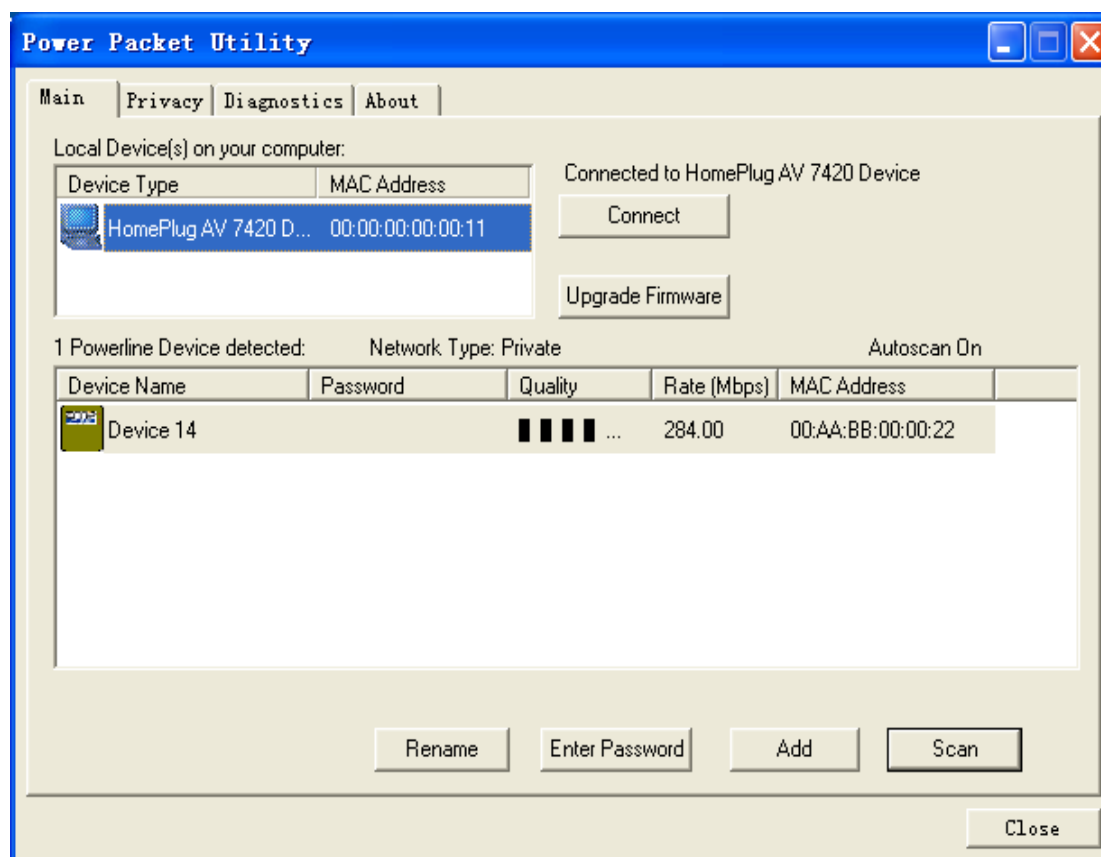
## 2.2 Utility Introduction

Click the desktop icon below to enter the configuration page.



### 2.2.1 Main Tab

The **Main** screen provides a list of all powerline devices logically connected to the computer when the utility is running. The top panel shows the local HomePlugAV devices connected to the network interface card (NIC) of the computer. Click **Connect**. The utility automatically scans the powerline periodically for other HomePlugAV devices connected to it. If no local HomePlugAV device is discovered, the status bar displays **NO HOMEPLUG ADAPTERS DETECTED**.



The lower panel displays all the HomePlugAV remote devices, which are

discovered in the current logical network. The total number of remote devices connected in the same network is displayed above the remote device panel. **Network type (Public or Private)** depends on the network status of the local device. **Autoscan** shows whether the autoscan function is on. The following information is displayed for all the devices that appear in the lower panel.

### Device Name

This column shows the default device name, which may be modified. To change the name, click **Rename**, or click the name and edit it in the list.

### MAC Address

This column shows the MAC addresses of the remote devices.

### Password

By default, this column is blank. You can click **Enter Password** to change it. The steps for setting the password of the device (required when creating a private network) are as follows:

- Click the device name to select the device in the lower panel.
- Click **Enter Password**. A dialog box appears, showing the device name and password.



- Click **OK** to verify the password. The password field accepts the device

password in any case formats, with or without dash.

A confirmation box appears if the password is entered correctly. If a device is not found, a message appears, providing suggestions to solve the common problems. This process might take a few seconds to get completed.

### Add

This button is used to add a remote device to the existing network by entering the device password of the device. A dialog box will appear. You can enter a device name and the password. (Also refers as **DEK** on the back Label, this **DEK** is generated via MAC address)

If the device is found and the password is entered correctly, a confirmation box appears. If a device is not found, a message appears, providing suggestions to solve the common problems.



### Note:

The device must be in the powerline (plugged in), so that you can confirm the password and add the device to the network. If the device is not located, a warning message appears.

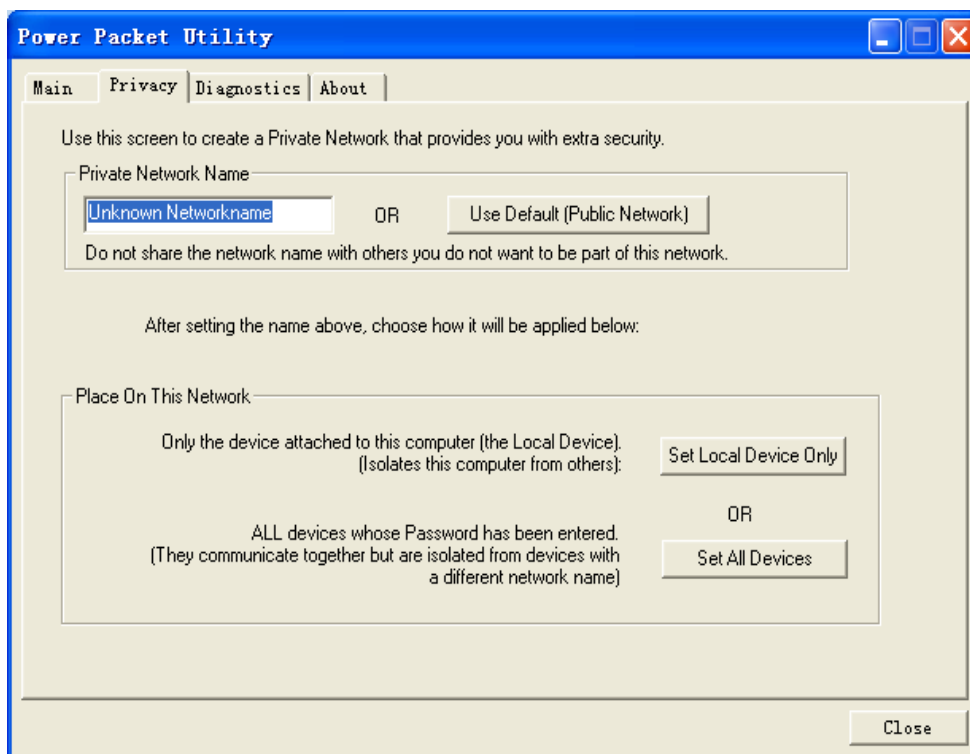
### Scan

This button is used to perform an immediate search for HomePlugAV

devices connected to the powerline network. By default, the utility automatically scans every a few seconds and updates the displayed information.

## 2.2.2 Privacy Tab

In the **Privacy** screen, you can maintain security for the logical network and select the device included in the network.



All HomePlugAV devices are loaded using a default logical network (network name), which is normally “**HomePlugAV**”. In the **Privacy** screen, you can modify a private network by changing the network names and the passwords of the devices.

You can always reset to the HomePlugAV network (Public) by entering “HomePlugAV” as the network name or by clicking on the **Use Default** button.

### **Note:**

If the network name changes to anything other than HomePlugAV, the network type in the main screen is displayed as Private.

### **Set Local Device Only**

This button is used to change the network name and password of the local device. If a new network password is entered, all the devices appeared in the main panel prior to this are no longer present in the new network, effectively making the local devices not to communicate to the devices which are in the old logical network. Click **Set Local Device Only**, the devices previously set up with the same logical network (same network name) appears in the device list.

### Set All Devices

This button is used to change the logical network of all devices that appear in the main panel. If these devices whose passwords have been entered for the same logical network, a dialog box appears, indicating the success of this operation. For the devices whose passwords are not entered, this operation will fail and it will report a failure message.

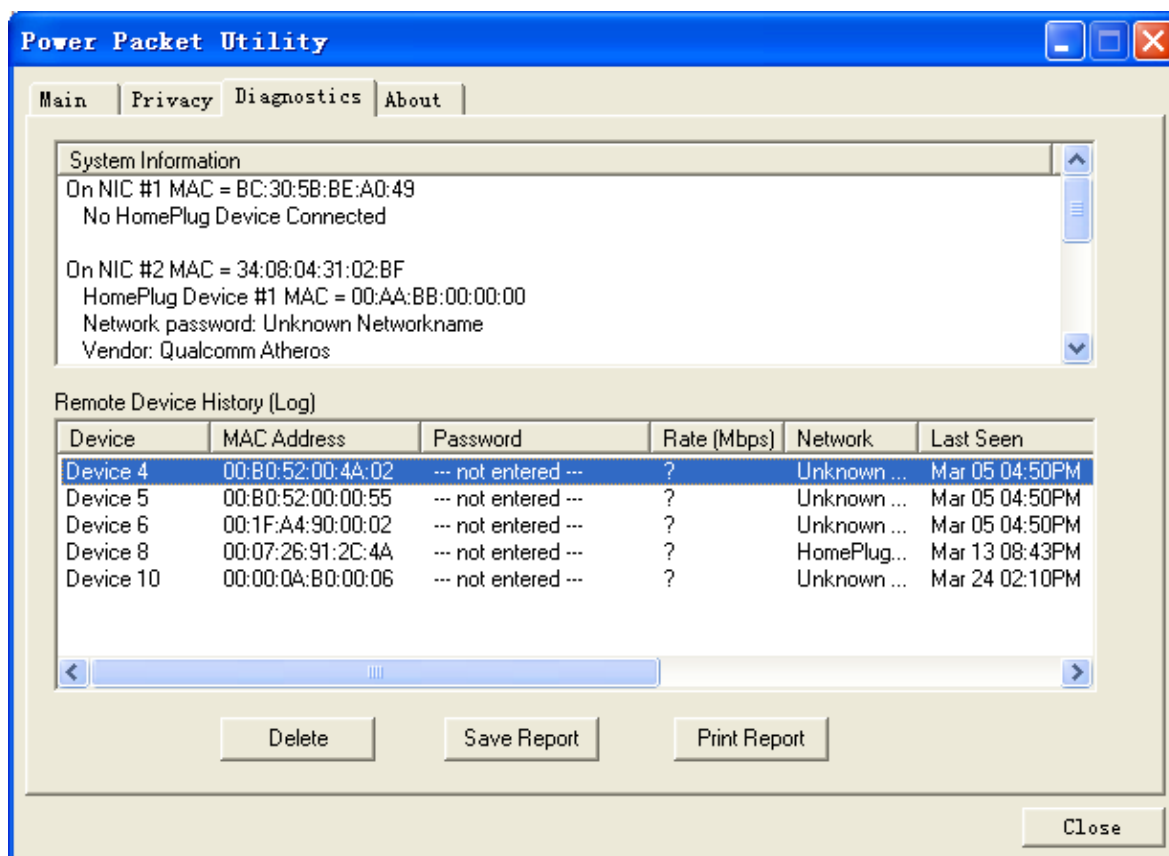
## 2.2.3 Diagnostics Tab

The **Diagnostics** screen shows the system information and history of all remote devices appeared over a period of time.

The **Upper panel** shows technical data concerning software and hardware on the host computer that are used to communicate through HomePlug on the powerline network. It includes the following:

- Operating system platform/version
- Host network name
- User name
- MAC address of all NICs (Network interface card) connected to the host
- Identify versions of all driver DLLs and libraries used (NDIS) and optionally
- HomePlug chipset manufacturer name (Turbo Only devices)
- MAC firmware version (Turbo Only devices)
- MAC addresses of all devices connected locally to the host
- Version of the configuration utility
- Vendor name





The **Lower panel** displays the history of all remote devices appeared on the computer over a certain period of time. All the devices and the parameters of the devices on the powerline network are listed. Devices that are active on the current logical network show a transfer rate in the rate column. Devices on other networks, or devices that no longer exist are shown with a “?” in the rate column. The following remote device information is available from the diagnostics screen:

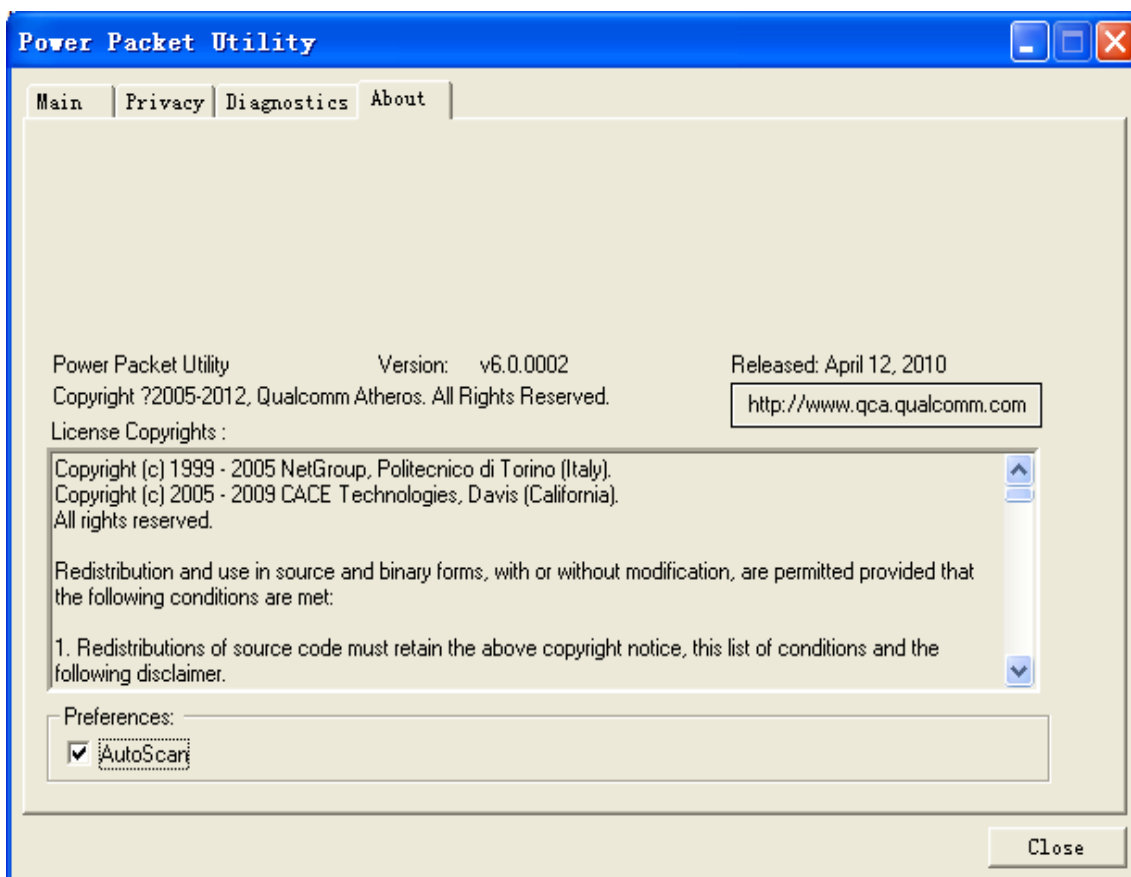
- Device alias name
- MAC address
- Password
- Device last known rate
- Device last known network name
- HomePlug chipset manufacturer name
- Date device last seen on the network
- MAC firmware version

The diagnostics information displayed can be saved to a text file for later use, or be printed for reference for a technical support call. Click **Delete** to delete the devices which are no longer part of the network. A dialog window pops up with a

confirmation message if the user wants to delete a device whose password has been entered.

## 2.2.4 About Tab

The **About** screen shows the software version and provides a html link to a website, such as <http://www.qca.qualcomm.com>. Clicking the web address, you can visit the web site.



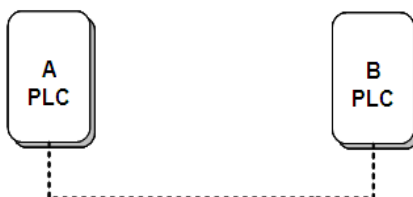
## Chapter 3 Forming a Powerline (HomePlug AV) Network

This chapter describes how to form a HomePlug AV logical network (AVLN) using the Security pushbutton and using the Utility. Operation progress and outcome can be monitored by observing the behavior of the power LED.

## 3.1 Using the Security Pushbutton

### Scenario:

Devices A and B with different NMK (Network Membership Key used to authenticate/access) values are connected to the same powerline. Users want to use them to form a logical network.



### Forming a HomePlug AV logical network

Please follow below steps to form a logical network using the Security button:

1. Press the **Security** button on Device A for less than 3 seconds.
2. Press the **Security** button on Device B for less than 3 seconds. The button on B must be pressed within 2 minutes
3. Wait for connection to complete.

The Power indicator on both devices will flash evenly at 1 second interval until the operation succeeds or fails. The Power indicator will illuminate steadily on successful completion. If an error occurs, the Power indicator on both devices will flash unevenly for 2 minutes.

## 3.2 Using the Utility

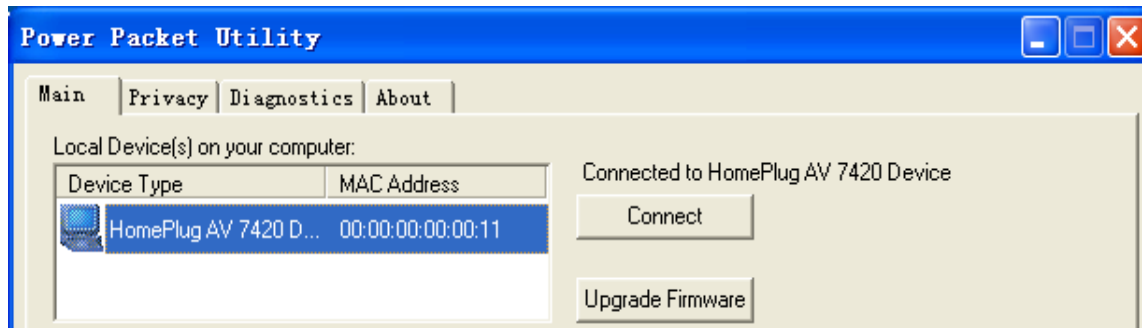
### Scenario:

Devices A and B are located in different networks. Users want to use them to form a logical network.

In this case, using the Security pushbutton cannot pair Devices A and B. Users can only use the Utility to form a logical network.

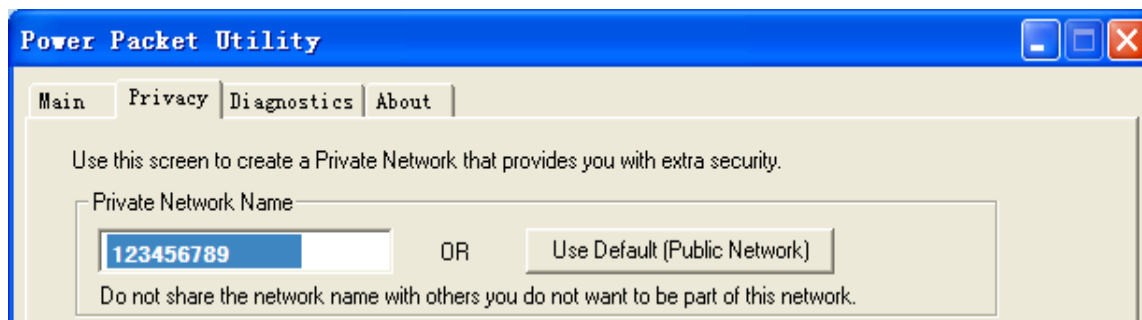
Please follow below to form a logical network using the Utility:

1. Connect Device A to the network card of a PC.
2. Open the Utility. The Main tab page displays information about Device A after connection succeeds.



### Search for Local device on your computer

3. Click the Privacy tab page. Enter a name in the Private Network Name field.



### Setting the network name for your PLC

4. Click **Set Local Device Only**. When the following page is displayed, the setting succeeds. Now Device A has been removed from its logical network.



### Network name setting success

5. Repeat the procedures above to configure Device B. Configure Device

B with the same **Private Network Name** as Device A. After the operation success, Devices A and B form a new logical network.

## Chapter 4 Joining a Network

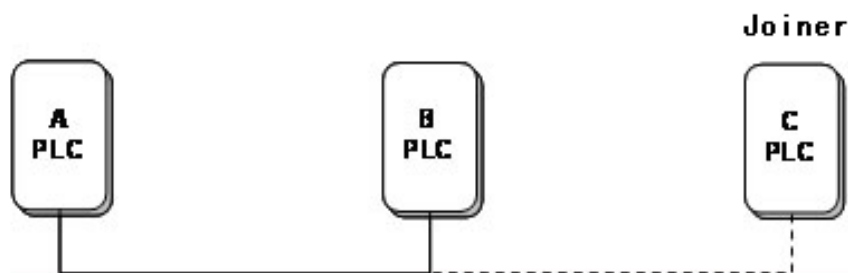
This chapter describes how to add a device to an existing HomePlug AV logical network (AVLN) using the Security/Reset pushbutton and using the Utility.

Operation progress and outcome can be monitored by observing the behavior of the power LED.

### 4.1 Using the Security Pushbutton

#### Scenario:

Devices A and B are located in network N. Device C (the joiner) that is not located in any networks attempts to join Network N. Any devices on Network N can become the 'adder'.



**Joining a network**

Please follow below to add Device C to Network N using the Security button:

1. Press the **Security** button on Device A (or Device B) for less than 3 seconds, making it the 'adder'.
2. Within 2 minutes, press the **Security** button Device C (the 'joiner') for less than 3 seconds.
3. Wait for connection to complete.

The Power indicator on Device A (or Device B) and Device C will flash at 1 second intervals until the process succeeds or fails. It will illuminate steadily on success. If an error occurs, the Power indicator on Device A (or Device B)

and Device C will flash unevenly for 2 minutes.

## 4.2 Using the Utility

### Scenario:

Devices A and B are located in Network N. Device C (the joiner) that is located in another network attempts to join Network N. See

Do as follows to add Device C to Network N using the Utility:

1. Connect Device C to the network card of a PC.
2. Open the Utility. The **Main** tab page displays information about Device C after connection succeeds.
3. Click the **Privacy** tab page. Enter a name in the **Private Network Name** field.
4. Click **Set Local Device Only**. When the page shown as below displayed, the setting success. Now Device C has been removed from its logical network.



5. Press the pushbutton on Device A or B for less than 3 seconds, making it the 'adder'.
6. Within 2 minutes, press the pushbutton on Device C (the 'joiner') for less than 3 seconds.
7. Wait for connection to complete.

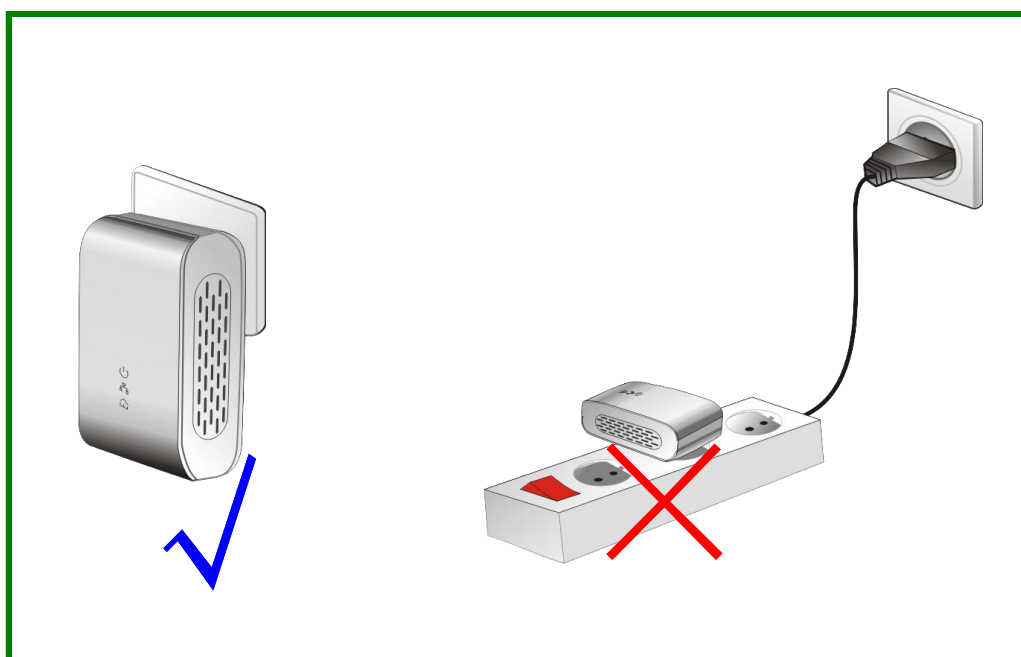
The Power indicator on Device A (or Device B) and Device C will flash at 1 second intervals until the process succeeds or fails. It will illuminate steadily on success. If an error occurs, the Power indicator on Device A (or Device B) and Device C will flash unevenly for 2 minutes.

## Appendix A: Improving the Transmission

### Quality

It is important to use the PLC product complying with the following "correct rules", because it can significantly improve the transmission capacity of the network.

For the PLC device without female socket, it is recommended to plug the device directly into a wall socket, not to power stripe.



## Appendix B: Specifications

Spec	
Chipset	Atheros AR7400
Standards	Compliant with IEEE 1901 Compatible with HomePlug AV standard IEEE802.3, IEEE802.3u, IEEE802.3ab
Encryption	128-bit AES Encryption

<b>Ports</b>	10/100/1000Mbps Ethernet port
<b>LEDs</b>	Power, Ethernet, Data
<b>Powerline Speeds</b>	Up to 500Mbps
<b>Powerline Range</b>	Up to 300 meters over Electricity line
<b>Maximum PLC support</b>	Capable of extending up to total of 8 Powerline adapters in one environment
<b>Connection Type</b>	RJ45
<b>Connection Speeds</b>	10/100/1000M
<b>Kit Type</b>	Double
<b>Frequency Band</b>	2 MHz ~ 67.5 MHz
<b>Power Consumption</b>	<4.0W Operation Mode 2.78W Idle Mode 0.97W Standby Mode
<b>QoS Support</b>	ToS Support up to 4-level type QoS Support up to 8-level VLAN priority field IGMP snooping for multicast to multiple unicast mapping
<b>System Requirement</b>	Deployment requirements: Devices with 10/100 or 10/100/1000 Mbps Ethernet port Operates system not require. Utility software OS support: Microsoft Windows 2000/XP/Vista/7
<b>Dimensions</b>	3.54 x 2.17 x 1.41 in (90 x 55 x 36 mm) (1 Powerline adapter)
<b>Weight</b>	0.24 lbs. (108 g) (1 Powerline adapter)
<b>Temperature</b>	0°C ~ 40°C
<b>Humidity</b>	10% ~ 90% Non-condensing



## Appendix C: Acronyms and Abbreviations

<b>AVLN</b>	AV In-home Logical Network, the AVLAN is the set of STAs that possess the same network membership key. Every AVLN is managed by a single CCo.
<b>CCo</b>	Central Coordinator
<b>CSMA/CA</b>	Carrier Sense Multiple Access / Collision Avoidance
<b>DAK</b>	Device Access Key
<b>DM</b>	Device Manager
<b>IGMP</b>	Internet Group Management Protocol
<b>NEK</b>	Network Encryption Key
<b>NID</b>	Network ID (Identification)
<b>NMK</b>	Network Membership Key
<b>PLC</b>	Powerline Communication
<b>PIB</b>	Parameter Information Block
<b>STA</b>	Station, a STA in the network with a connection to the powerline and being able to source or sink traffic
<b>TDMA</b>	Time Division Multiple Access
<b>TEI</b>	Terminal Equipment Identifier
<b>TOS</b>	Type Of Service
<b>VLAN</b>	Virtual Local Area Network

## Appendix D: RPLC-500 QoS Support

RPLC-500 allows for 4 levels of Channel Access Priority (CAP (0 – 3)). The 8 levels of VLAN Ethernet tags must be mapped to the 4 levels of CAP priority, where CAP 3 is the highest priority and CAP 0 is the lowest. CAP 3 priority might be used for voice and network management frames, and CAP 2 is used for

streaming video and music while CAP 1 and CAP 0 are used for data.

## Default CAP

The 'Default CAP' group allows for default priority mapping of packets that do not have a VLAN TAG. The settings are available for Unicast (directed to a host).

- Unicast - (default CAP 1) - sets the default channel access priority for unicast frames not matching any other classification or mapping.
- IGMP managed Multicast Stream (Fixed to CAP 2) - sets the default channel access priority for stream data belonging to a snooped IGMP multicast group.
- IGMP - (default CAP 3) - sets the channel access priority for IGMP frames - these are the group management frames, not the stream data.
- Multicast/Broadcast - sets the default CAP for multicast frames not in a snooped group and for broadcast frames.

The following are the factory default settings for VLAN Tags and TOS Bits:

VLAN Tag User Priority	Default CAP Priority	TOS Bit User Priority	Default CAP Priority
0	CAP1	0	CAP1
1	CAP0	1	CAP0
2	CAP0	2	CAP0
3	CAP1	3	CAP1
4	CAP2	4	CAP2
5	CAP2	5	CAP2
6	CAP3	6	CAP3
7	CAP3	7	CAP3

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<http://www.rosewill.com>

## Safety Warning

This device is intended for connection to the AC powerline. For installation instructions, please refer to the installation section of this guide. The following precautions should be taken when using this product.

- Read all instructions before installing and operating this product.
- Follow all warnings and instructions marked on the product.
- Unplug the device from the wall outlet before cleaning. Use a damp cloth for cleaning. Do not use liquid cleaners or aerosol cleaners.
- Do not operate this product near water.
- This product should never be placed near or over a radiator or heat register.
- Do not use an extension cord between the device and the AC power source.
- Only a qualified technician should service this product. Opening or removing covers may result in exposure to dangerous voltage points or other risks.
- Do not plug the device into a power strip or surge protector because these devices may consist of filter and impair signal.
- Avoid plugging the device right next to noisy sources such as cell phone charger, Halogen light, noisy desktop computer, vacuum cleaner, etc. These cases result in poor transmission speed.
- Unplug the device from the wall outlet and refer the product to qualified service personnel for the following conditions:
  - If liquid has been spilled into the product
  - If the product has been exposed to rain or water
  - If the product does not operate normally when the operating instructions are followed
  - If the product exhibits a distinct change in performance

Your product is marked with this symbol, which is known as the WEEE mark. WEEE stands for Waste Electronics and Electrical Equipment. It means that used electrical and electronic products should not be mixed with general waste. Used electrical and electronic equipment should be treated separately.



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