

TP-LINK®

User Guide

TL-PA101

85Mbps Powerline Ethernet Adapter



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FCC STATEMENT



This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1) This device may not cause harmful interference.
- 2) This device must accept any interference received, including interference that may cause undesired operation.

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

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.

Important Safety Instructions

1. Do Not open this product or attempt to service this product, it may expose you to dangerous high voltage and other risks.
2. Do Not operate this product near water.
3. Do Not place or operate near or over radiator or heat register.
4. Do Not expose this product to dampness, dust or corrosive liquids.
5. Do Not connect this product and Disconnect from wall socket during a lightning or thunderstorm.
6. Do Not obstruct this product ventilation slots, as insufficient airflow may harm this product.
7. Do Not put anything on this product.
8. Plug directly into wall socket (100Vac~240Vac). Do Not use an extension cord between this product and the AC power source.
9. When plugging this product into wall socket, make sure that electrical socket are not damaged, and no leakage for gas or water pipes to begin with.
10. Place the connecting cables carefully so people won't stumble or walk on it.
11. The Powerline Adapter should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult the qualified technician.
12. Unplug the Powerline Adapter from the mains and refer the product to qualified service personnel for the following conditions:
 - If liquid has been spilled on the product
 - If the product has been exposed to rain or water
13. Unplug from the wall socket before cleaning. Use a damp cloth for cleaning. Do not use liquid cleaners or aerosol cleaners.

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Chapter 1 Introduction

Congratulations on your purchase of this outstanding Powerline Ethernet Adapter. This device is an 85Mbps Powerline Ethernet Adapter which transforms your house's existing electrical wiring into an ubiquitous networking infrastructure. Simply plug this 85Mbps Powerline Ethernet Adapter into an ordinary AC power outlet which will easily extend your Cable/xDSL broadband connection or existing Ethernet (LAN) network to any other electrical outlet in any room of a house without the need of any new cabling.

This Powerline Ethernet Adapter supports up to 85Mbps data rate over the existing household power circuit. With data rates of 85Mbps, full multimedia application can easily be supported throughout the whole house in addition to Internet access. This Powerline Ethernet Adapter uses the existing power lines installed in a home as a path to transmit digital data, voice, audio and video between devices.

To ensure data communication's security and multimedia applications, this Powerline Ethernet Adapter support built-in 56-bit DES encryption and Quality of Service features. With minimum setup, you can install and use this Powerline Ethernet Adapter within minutes.

A. System Requirement

- a) At least two AC 100V ~ 240V power outlets with standard home power wiring
- b) A computer with the following:
 - Operating System with TCP/IP installed
 - Pentium III compatible processor and above
 - Ethernet LAN card installed with TCP/IP protocol
 - 64 MB RAM or more
 - 50 MB of free disk space (Minimum)
 - CD-ROM Drive

B. Package Contents

The 85Mbps Powerline Ethernet Adapter package contains the following items:

- One 85Mbps Powerline Ethernet Adapter (There are two 85Mbps Powerline Ethernet Adapters in Starter Kit)
- One Quick Installation Guide
- One CAT-5 Ethernet Cable (There are two CAT-5 Ethernet Cables in Starter Kit)
- One CD-ROM (Utility / Manual / Quick Installation Guide / Acrobat Reader)

If any of the above items are damaged or missing, please contact your dealer immediately.

Chapter 2 Connecting Mechanism

2.1 Introduction

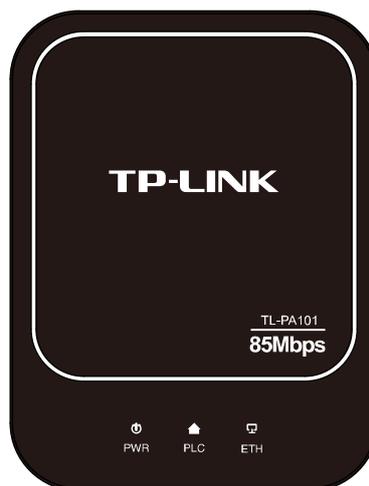
The Powerline Ethernet Adapter support up to 85Mbps data rate. With this high speed connection rate, this Powerline Ethernet Adapter allows you to setup a high speed home network by using your home existing electrical wiring. Simply plug this Powerline Ethernet Adapter into an ordinary power outlet to extend your Cable/xDSL broadband connection or existing LAN network to any other electrical outlet in any rooms of your house.

Take notes that this Powerline Ethernet Adapter works in pairs. You need to plug one Powerline Ethernet Adapter into a power outlet for each computer (Connect to the computer LAN card) you want to connect (Network access); you will also need another Powerline Ethernet Adapter connected to your Cable/xDSL broadband (Ethernet port) in order to extend your broadband connection or Internet surfing.

Section below describes the Powerline Ethernet Adapter's LED indicators, physical interface and hardware connection mechanism.

2.2 LED Indicator

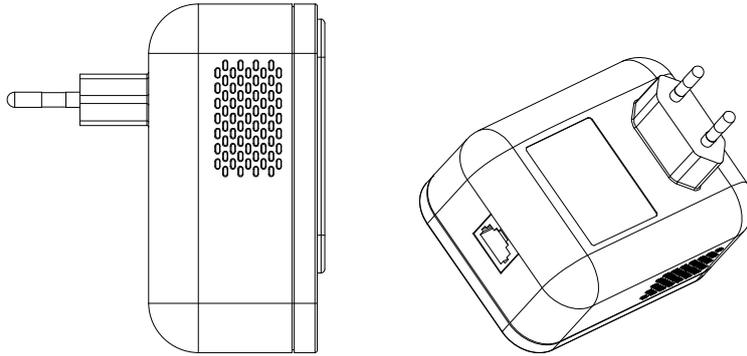
The LED indicator displays information about the device's status.



Label	Status	Description
PWR	ON	The Powerline Ethernet Adapter is powered on
	OFF	The Powerline Ethernet Adapter is not receiving power
PLC	ON	Another Powerline port is detected on the same Powerline network
	OFF	Did not detect any other Powerline port on the same powerline network
	Flashing	The Powerline port is transmitting/receiving data
ETH	ON	The Ethernet port is on and ready to receiving/transmitting data
	OFF	The Ethernet port is not connected or not powered on
	Flashing	The Ethernet port is receiving/transmitting data

2.3 Physical Interface

There are two physical interfaces on this Powerline Ethernet Adapter.



Interface	Description
Ethernet	One 10/100Mbps Ethernet port connected to PC LAN card or broadband device.
Power Plug	Power Plug connected to any 100V ~ 240V AC power socket.

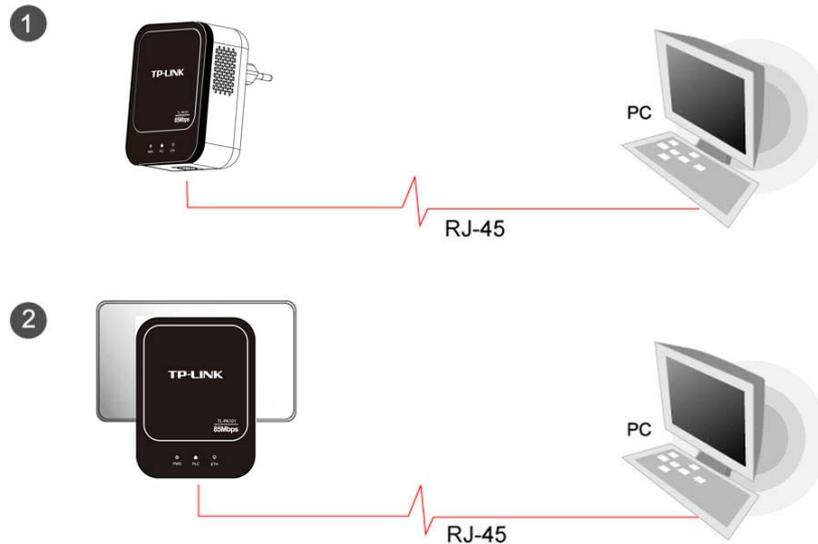
2.4 Hardware Connection – Computer

For those computers you wish to be networked by Powerline Ethernet Adapter, each of the computers must be properly connected with a Powerline Ethernet Adapter through an Ethernet (RJ-45) cable.

Following are the steps to properly connect the Powerline Ethernet Adapter to your computer:

1. Power off your PC or Notebook.
2. Connect the provided Ethernet (RJ-45) cable to the Powerline Ethernet Adapter's Ethernet port.
3. Connect the other end of the Ethernet (RJ-45) cable to you computer's LAN port.
4. Plug the Powerline Ethernet Adapter into a wall socket next to the computer.
5. Turn on your computer.
6. Check and confirm that the **Power** and **Ethernet** LEDs on the Powerline Ethernet Adapter are **ON**

The hardware connection mechanism is shown below:

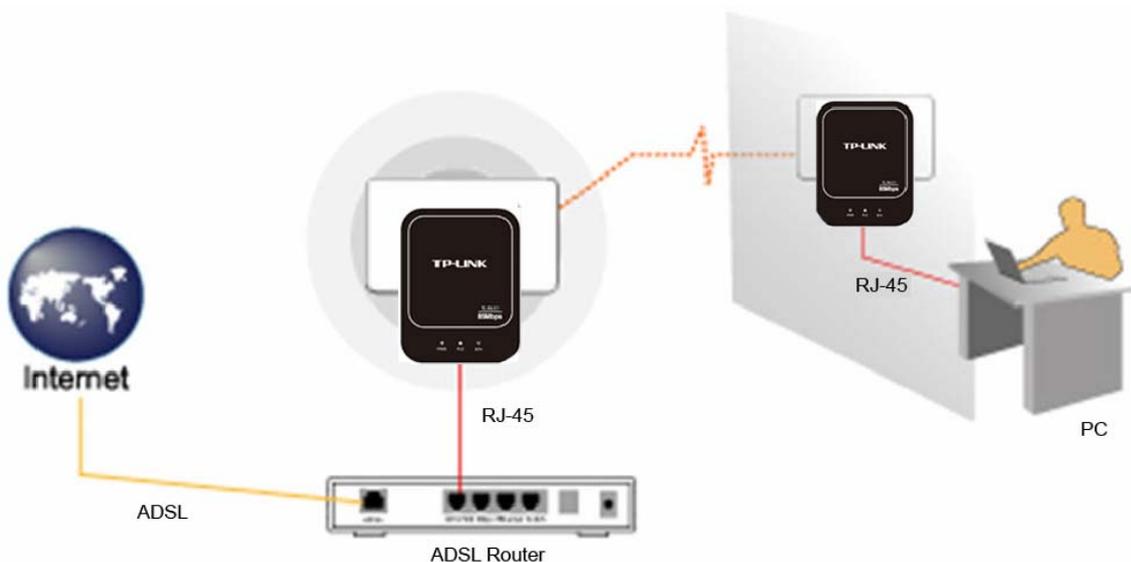


2.5 Hardware Connection – Internet

This section describes how to connect the Powerline Ethernet Adapter into your existing ADSL broadband connection via ADSL Ethernet port. Follow the procedures describe below to connect the Powerline Ethernet Adapter to your ADSL broadband connection:

1. Power off your PC or Notebook.
2. Connect the provided Ethernet (RJ-45) cable to the Powerline Ethernet Adapter's Ethernet port.
3. Connect the other end of the Ethernet (RJ-45) cable to an available Ethernet port of your ADSL broadband Router.
4. Plug the Powerline Ethernet Adapter into a wall socket next to the computer.
5. Turn on your computer.
6. Check and confirm that the **Power**, **Powerline** and **Ethernet** LEDs on the Powerline Ethernet Adapter are **ON**.

The hardware connection mechanism is shown below:



Chapter 3 Installing Management Utility

Please verify that no other Powerline Ethernet Adapter or any Encryption Management Utilities are installed before installing the provided software. If other Homeplug Utilities are installed, uninstall them and restart your personal computer before installing this provided software. The Management utility can be used on Operating System of Windows XP, Windows Vista or Windows 7.

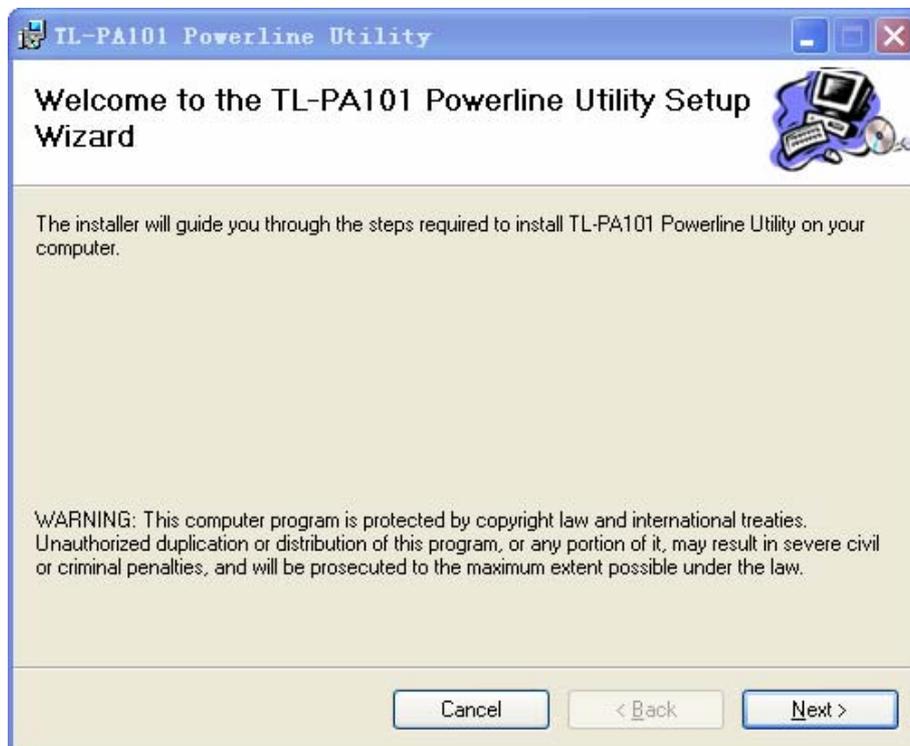
 **Note:**

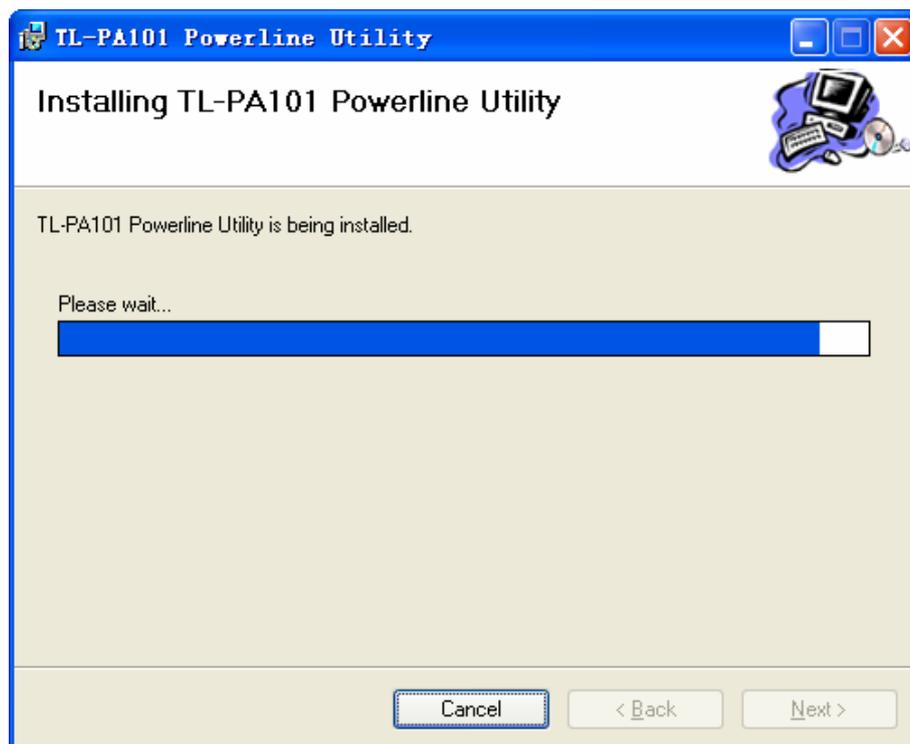
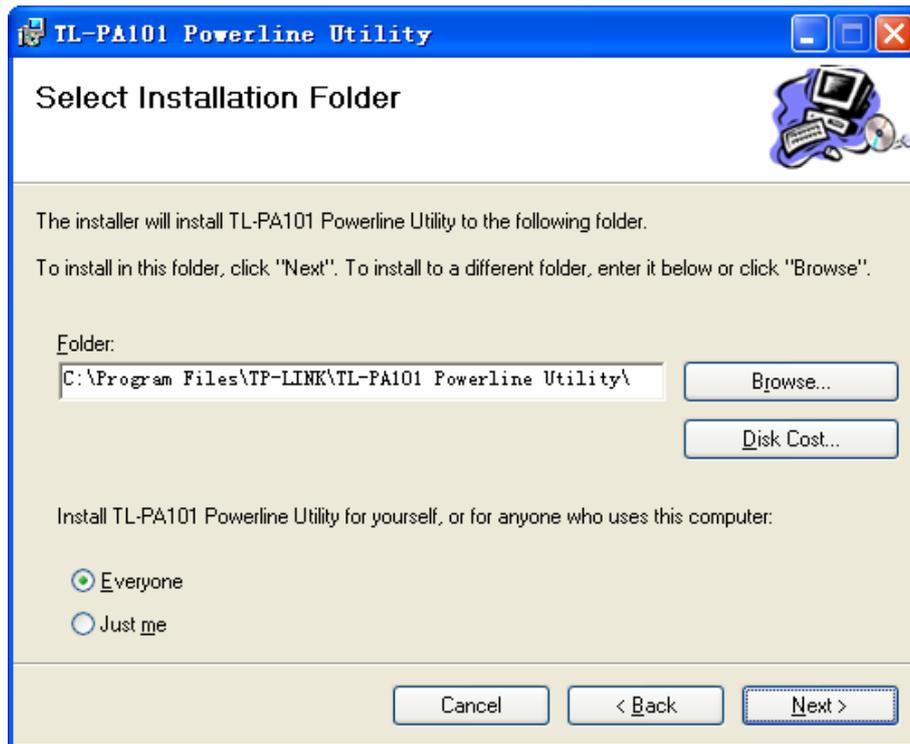
Please make sure that you have installed the **WinPcap** (the version of which should be beyond 4.1.1 inclusive) on your computer before installing the Management Utility. The **WinPcap** can be found on the provided resource CD.

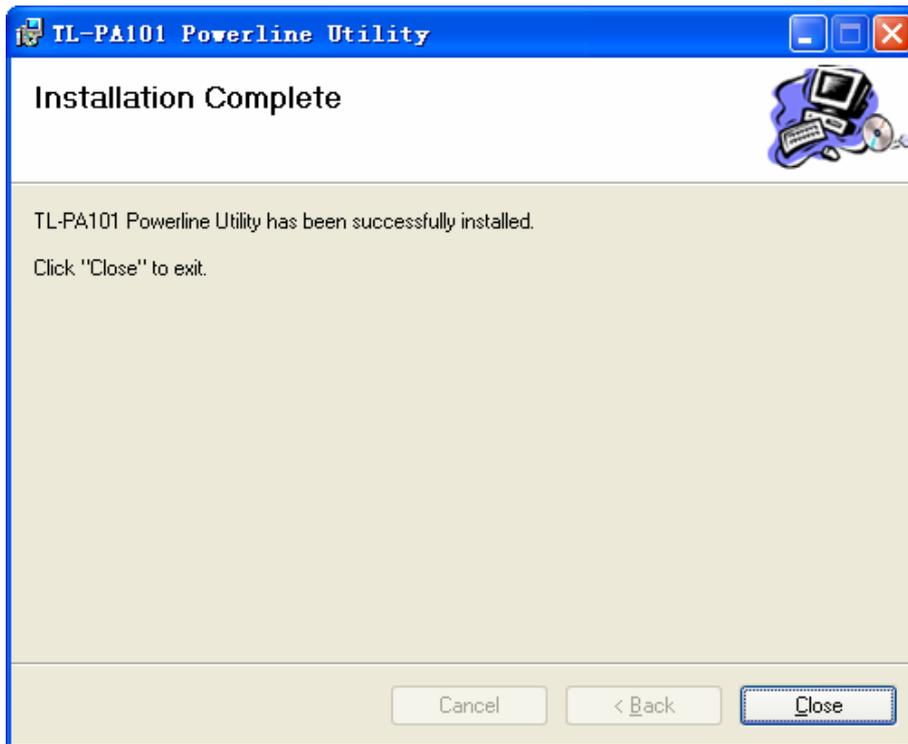
3.1 For Windows XP

Follow the following procedures to properly installing the provided Management Utility:

Step 1: The program installation process will carry out and copy all the necessary files to your system.







Step 2: After the installation, a shortcut to the “TL-PA101 Powerline Utility” application icon is provided on the windows desktop.

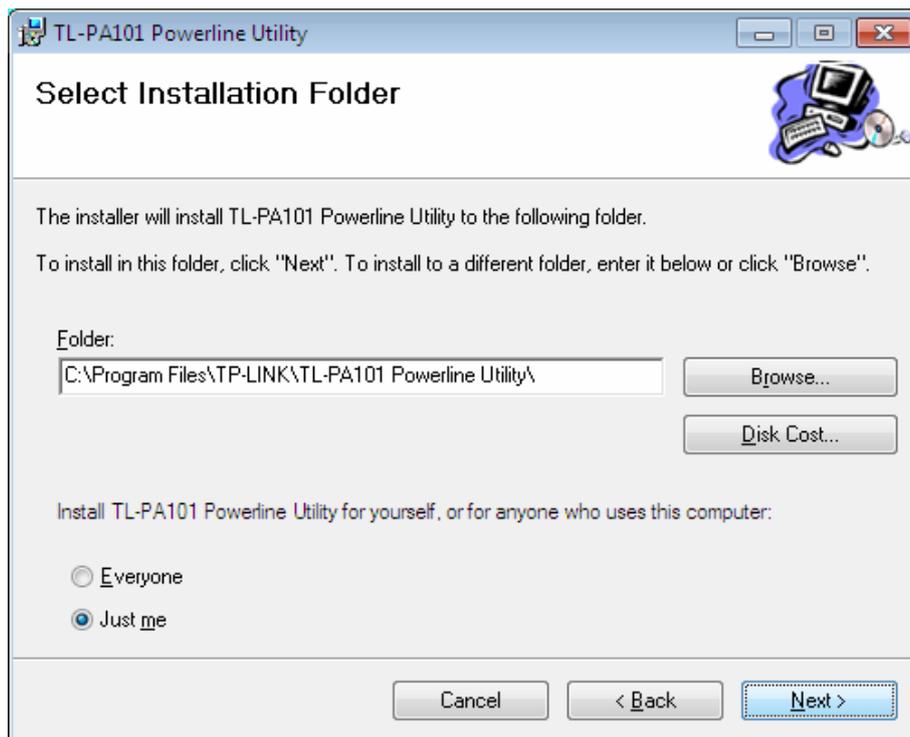
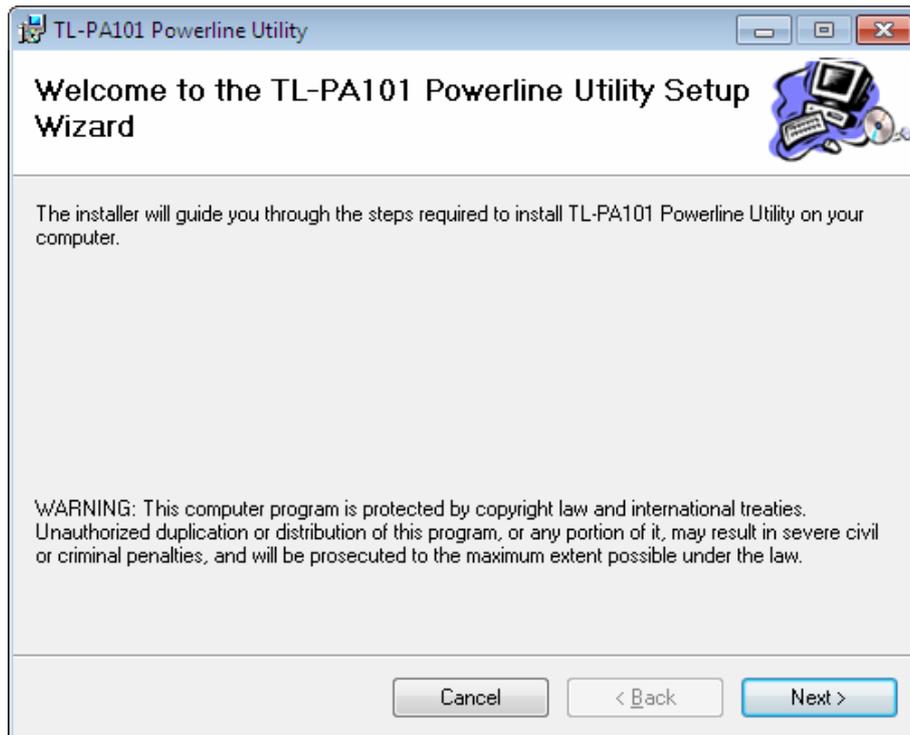


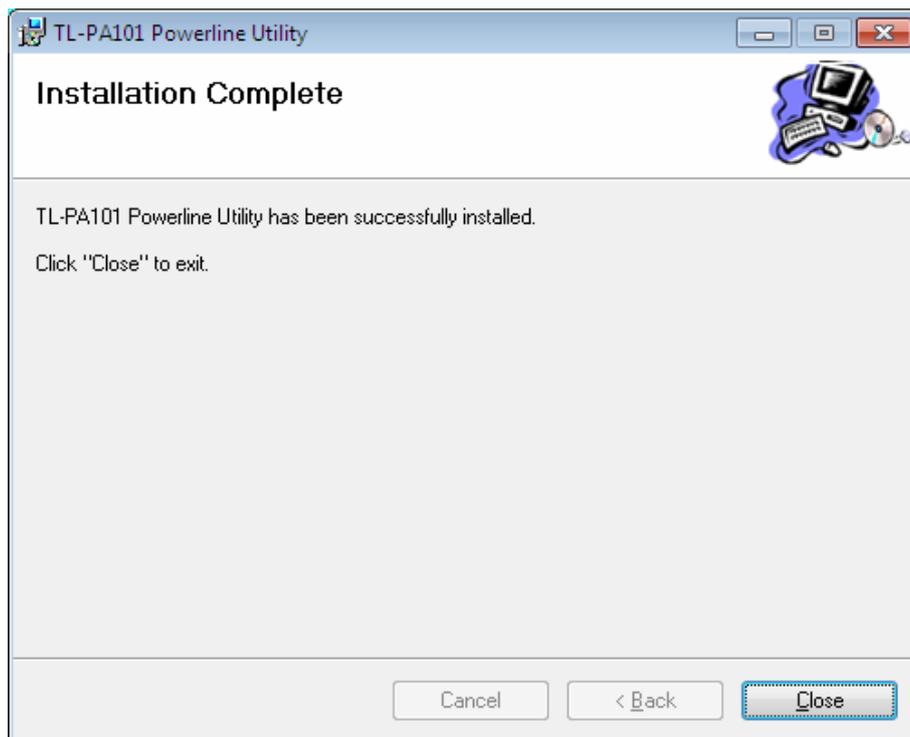
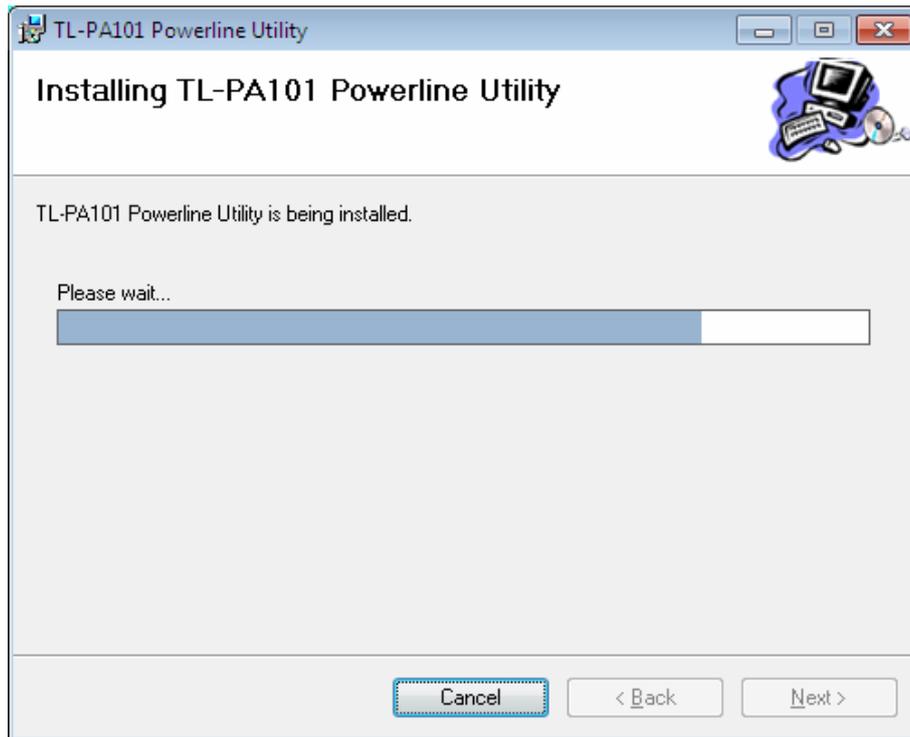
Step 3: Finally, there is an “Auto install Finish” icon on the windows desktop.

3.2 For Windows Vista

Follow the following procedures to properly installing the provided Management Utility:

Step 1: The program installation process will carry out and copy all the necessary files to your system.





Step 2: After the installation, a shortcut to the “TL-PA101 Powerline Utility” application icon is provided on the windows desktop.

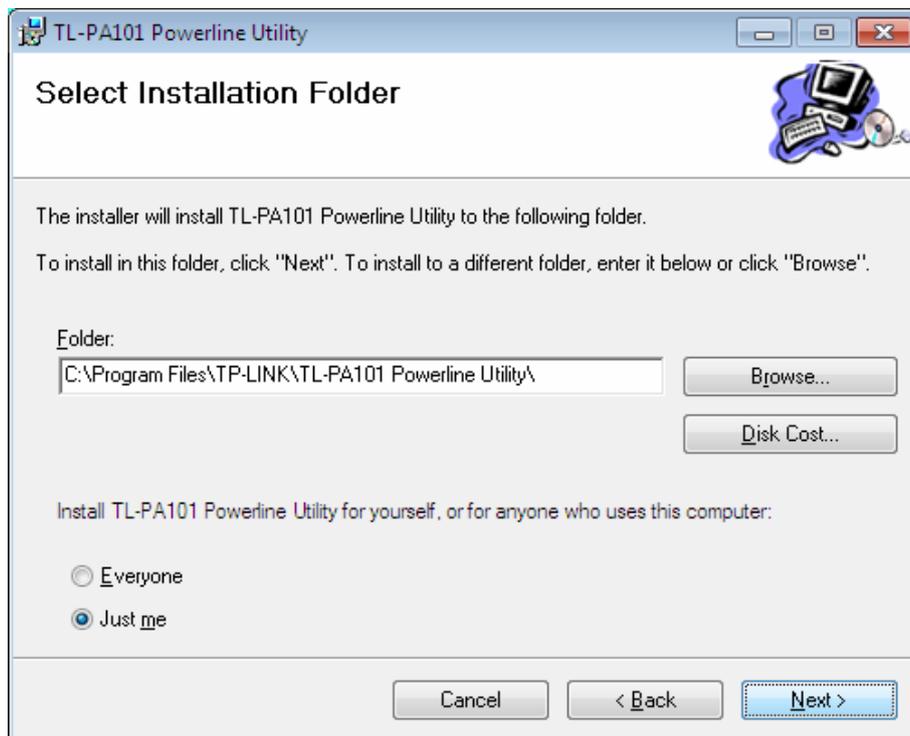
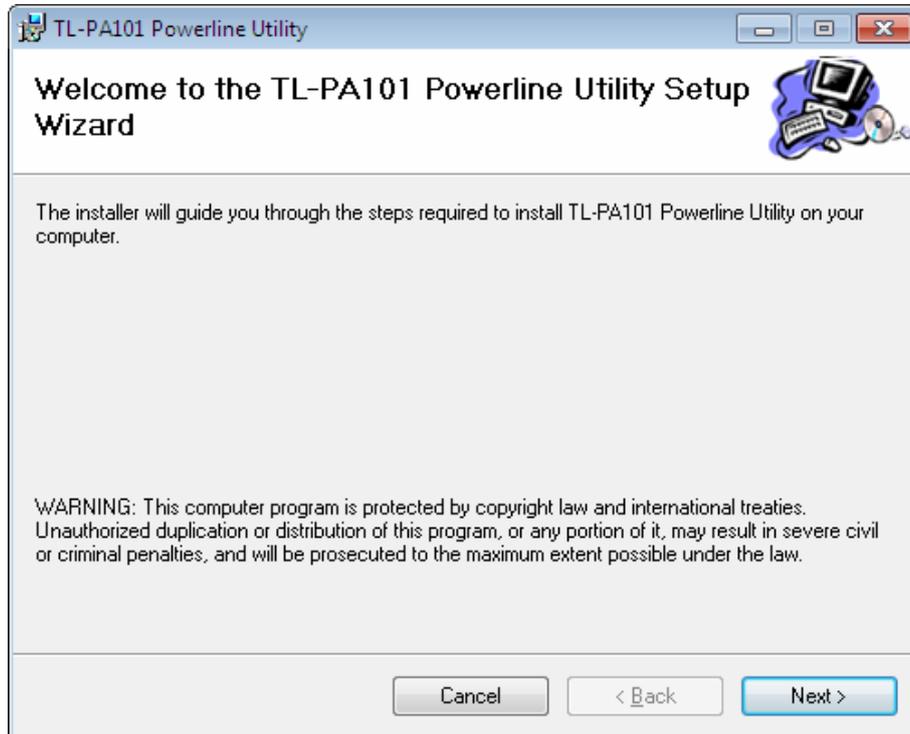


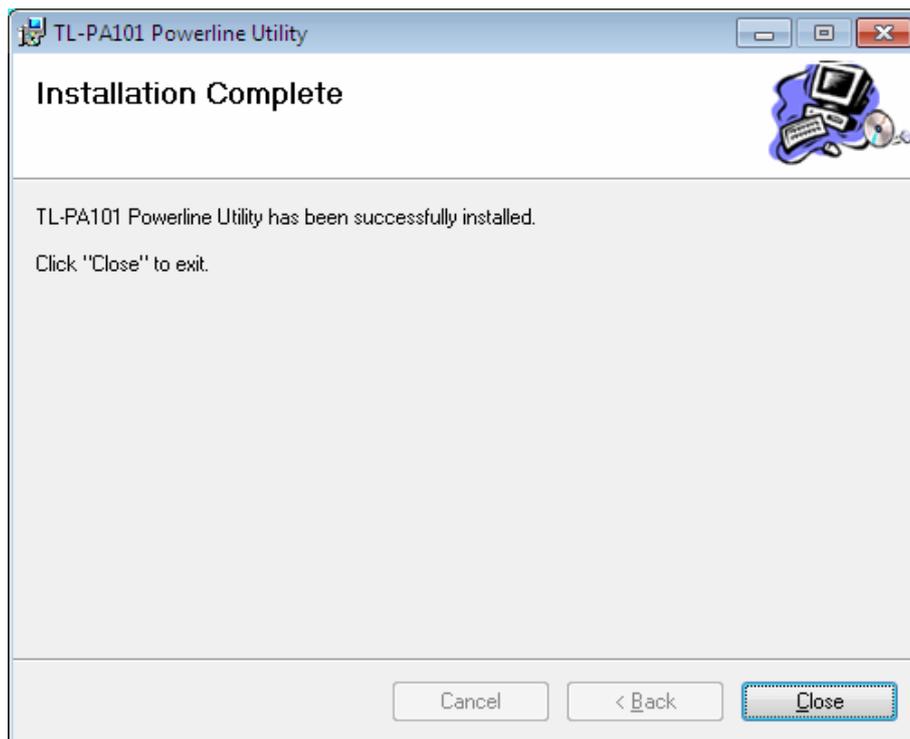
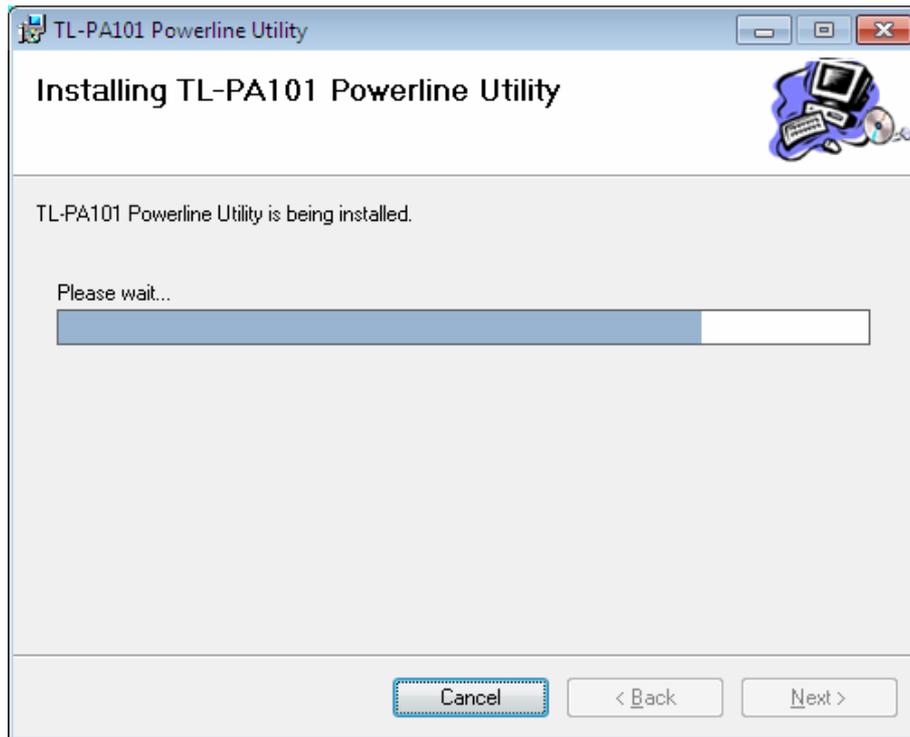
Step 3: Finally, there is an “Auto install Finish” icon on the windows desktop.

3.3 For Windows 7

Follow the following procedures to properly installing the provided Management Utility:

Step 1: The program installation process will carry out and copy all the necessary files to your system.





Step 2: After the installation, a shortcut to the "TL-PA101 Powerline Utility" application icon is provided on the windows desktop.



Step 3: Finally, there is an "Auto install Finish" icon on the windows desktop.

Chapter 4 Using The Management Utility

After you'd successfully installed the Powerline Ethernet Adapter hardware and Management Utility software, you can setup or configure the devices according to your need.

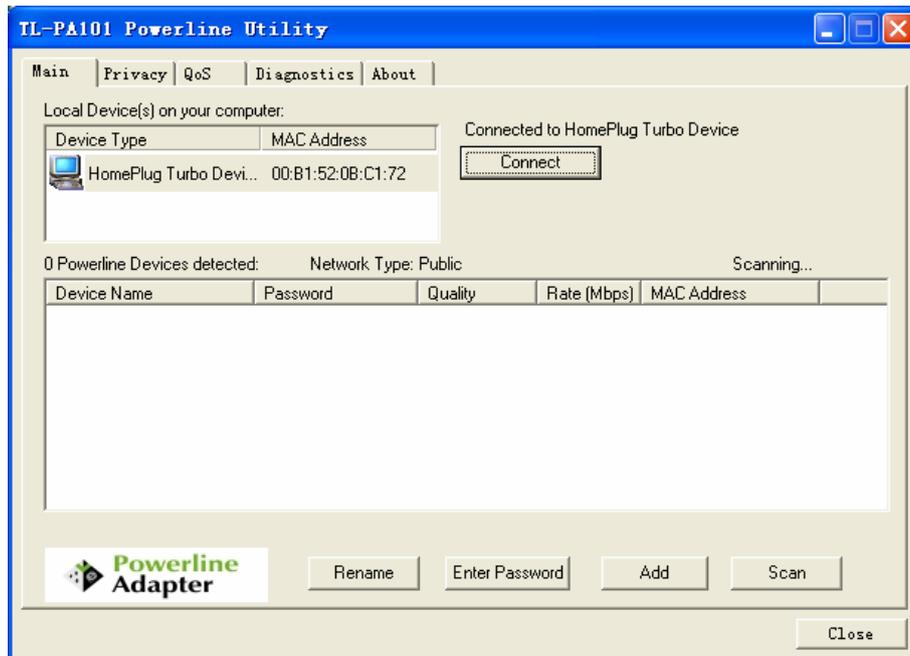
This Powerline Ethernet Adapter Configuration Utility enables the users to identify HomePlug devices on the powerline network, measures data rate performance, ensures privacy and performs diagnostics by setting user defined secure powerline networks.

Here, we take the operation system Windows XP for example, as the configuration for the other two systems is similar.

Double click on the “**TL-PA101 Powerline Utility**” from your windows desktop, the following screen display. This Management Utility consists of a set of four property sheets, viz., “**Main**”, “**Privacy**”, “**QoS**”, “**Diagnostics**” and “**About**”.

4.1 Main

The **Main** tab shows all the Powerline Ethernet Adapter that are logically connected to the current computer where the Management Utility is running.

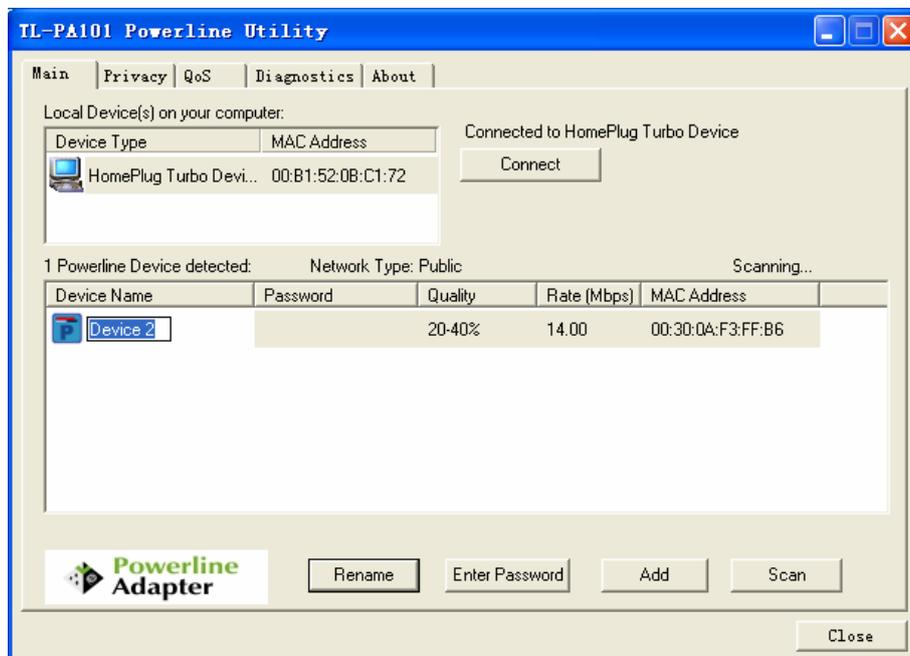


- **Local Device(s) on your computer:** This shows all local Powerline Ethernet Adapter found connected to the computer's LAN card. In most cases, only one device will display in this panel. Click and select the local device shown on the screen then click “**Connect**” tab to manage the Powerline Ethernet Adapter. The status message will be shown above the “**Connect**” button indicates that your PC is connected to the same device. Once the chosen Powerline Ethernet Adapter is properly connected, this Management Utility will automatically scan the power line periodically for any other existing powerline devices.
- “**x**” **Powerline Devices detected:** This display all the Powerline Ethernet Adapter found on the current logical network. “**x**” shows the number of remote Powerline Ethernet Adapter discovered by this Management Utility.
- **Network Type:** Displayed the type of logical network: “**Public**” or “**Private**”.
- **Autoscan:** Shows the scanning status (Default is “**ON**”).

- **Device Name:** Shows the default device name. One may redefine or change the name by clicking on the name and editing in place or by clicking the “**Rename**” button.
 - **Password:** Shows the current password of the Powerline Ethernet Adapter.
 - **Quality:** Shows the quality of the Powerline Ethernet Adapter connection.
 - **Rate (Mbps):** Shows the current transmission rate of the selected Powerline Ethernet Adapter.
 - **MAC Address:** Shows the Powerline Ethernet Adapter’s MAC address.
- **Rename:** Click to change the name of the selected Powerline Ethernet Adapter.
- **Enter Password:** Shows the supplied Powerline Ethernet Adapter’s password (Initially left blank). To set the Powerline Ethernet Adapter password (Which is required when creating a private network), click and select the device shown in the lower panel and click on the “**Enter Password**” button. Follow the pop-up dialog box to complete your password setting.
- **Add:** Click this button to add a remote Powerline Ethernet Adapter to your network that is not on the lower panel displayed list. You will advice to locate the passwords for all Powerline Ethernet Adapter you wish to manage and add them to the local logical network by clicking the “**Add**” button. Follow the pop-up dialog box to complete your setting.
- **Scan:** Click the “**Scan**” button to perform an immediate search of the Powerline Ethernet Adapter connected to the computer. The Management Utility will automatically perform the scanning process and update the display every few seconds by default.

4.1.1 Rename

This Management Utility allows you to change the name of the listed Powerline Ethernet Adapter. Click and select the Powerline Ethernet Adapter you wish to change from the list, then click on the “**Rename**” tab and editing-in-place to change the name.



4.1.2 Enter Password

To set or change your Powerline Ethernet Adapter’s password, click and select the Powerline Ethernet Adapter you wish to change from the list, then click on the “**Enter Password**” tab, the following screen display

Enter your **Password** (Take note to the password format) and click “**OK**” after setup.



 **Note:**

The Powerline Ethernet Adapter device must be present on the power line (plugged in) in order for the password to be confirmed and added to the network. If the Powerline Ethernet Adapter device could not be located, a warning message will be shown.

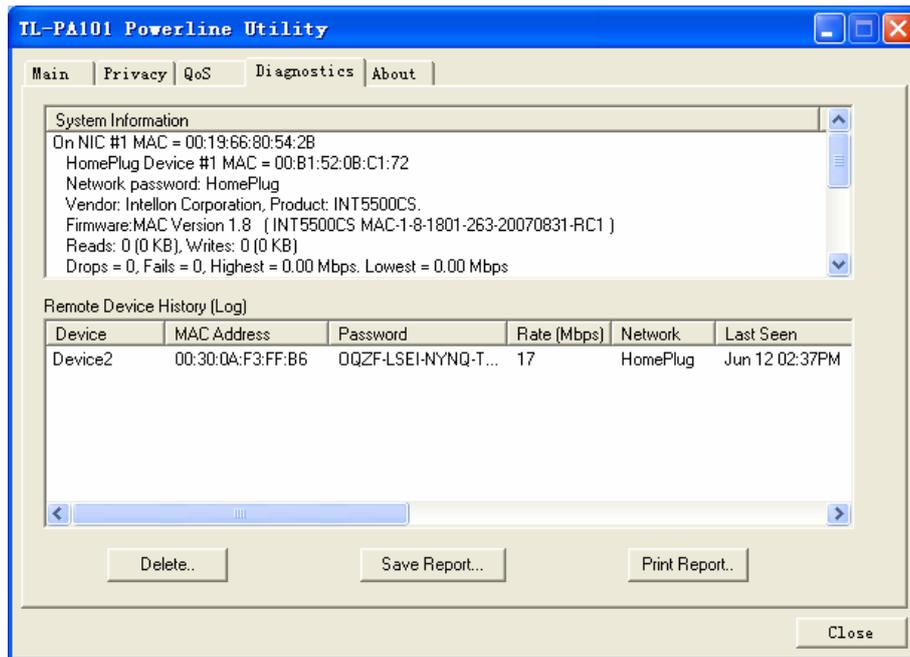
4.1.3 Add Device

The following dialog box pop-up when clicking the “**Add**” button under **Main** configuration homepage. The dialog box allows you to enter both the selected device's name and password. Noted that the Powerline Ethernet Adapter must be present on the power grid in order to activate the set password and added to the local network.

Enter your **Device Name** and **Password** (Take note to the password format) and click “**OK**” after setup.



The following screen display after the naming and password setting process, which is also the **Diagnostics** configuration homepage.



4.2 Privacy

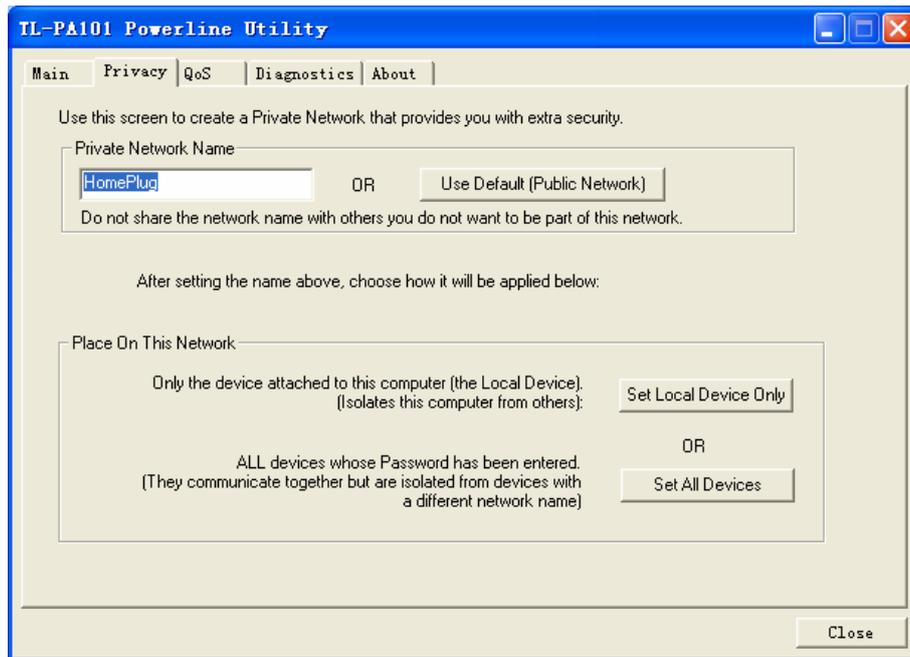
The **Privacy** configuration page provides a means for managing the local network and providing additional security for the logical network and also to select the devices that has to be included in the network. All HomePlug devices are shipped using a default logical network (network name), which is normally “**HomePlug**”

The **Privacy** configuration homepage allows you to change the **Network Name** of the Powerline Ethernet Adapter that is currently connected to this computer into a private network. Reset the private network to universal public network by clicking on the “**Use Default (Public Network)**” or entering/editing “**HomePlug**” under column of “**Private Network Name**” is always available.

Note that every Powerline Ethernet Adapter on your home network **MUST** have the same **Network Password** for connectivity to be established throughout your home

Note:

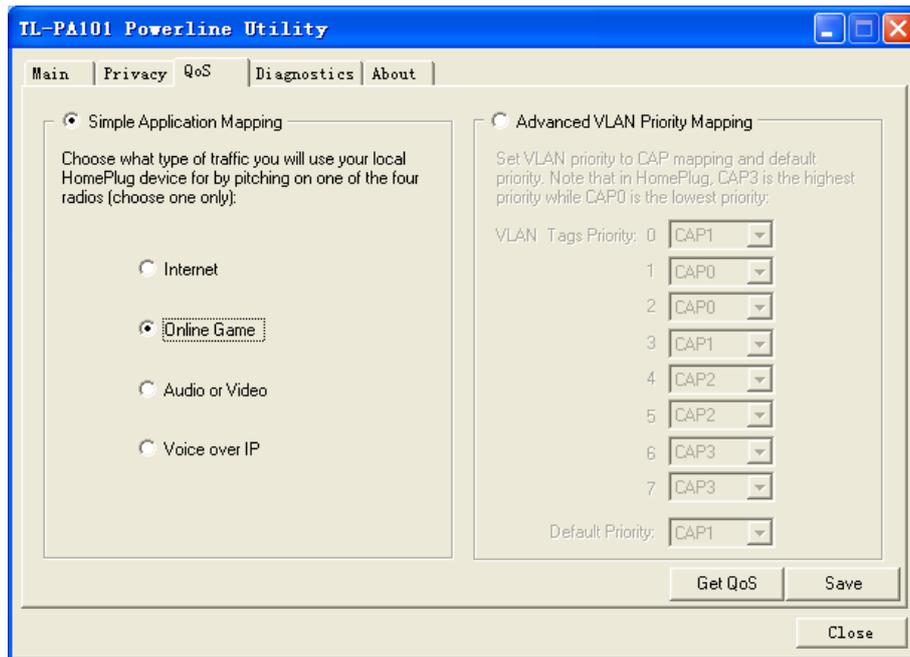
Changing the network name to anything other than “HomePlug” will show the network type on the Main configuration screen as “Private”.



- **Set Local Device Only:** Click this tab to change the network name of the local Powerline Ethernet Adapter device only. All Powerline Ethernet Adapter devices seen on the **Main** configuration homepage prior to this will be no longer present in the new network, effectively making the local devices not to communicate to the devices who were in the old logical network. Devices previously set up with the same logical network (same network name) will appear in the device list afterward selecting this option.
- **Set All Devices:** The **Set All Devices** button is used to change the logical network of all devices that appear on the **Main** configuration homepage whose Device's Password had been entered for the same logical network. A dialog window will appear to report the success of this operation. For devices whose device passwords were not entered, this operation will fail and will report a failure message.

4.3 QoS

The third tabbed window, labeled 'QoS' for Quality of Service, is shown in Figure.



QoS requirements are different for various data types such as streaming video or music, voice and raw data. To provide higher QoS for streaming data, priority levels can be set using tags at the beginning of data frames. Virtual Local Area Network (Vlan) 802.1p priority tags on Ethernet frames are used to specify 8 (0~7) levels of 'user priority'. Powerline AV powerline allows for 4 levels of Channel Access Priority (CAP(0-3)). Therefore, 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, CAP 2 is used for streaming video-and must while CAP 1 can CAP 0 are used for data. Mapping VLAN tags to CAP levels is easily done using the VLAM Priority Mapping function on the QoS tab window.

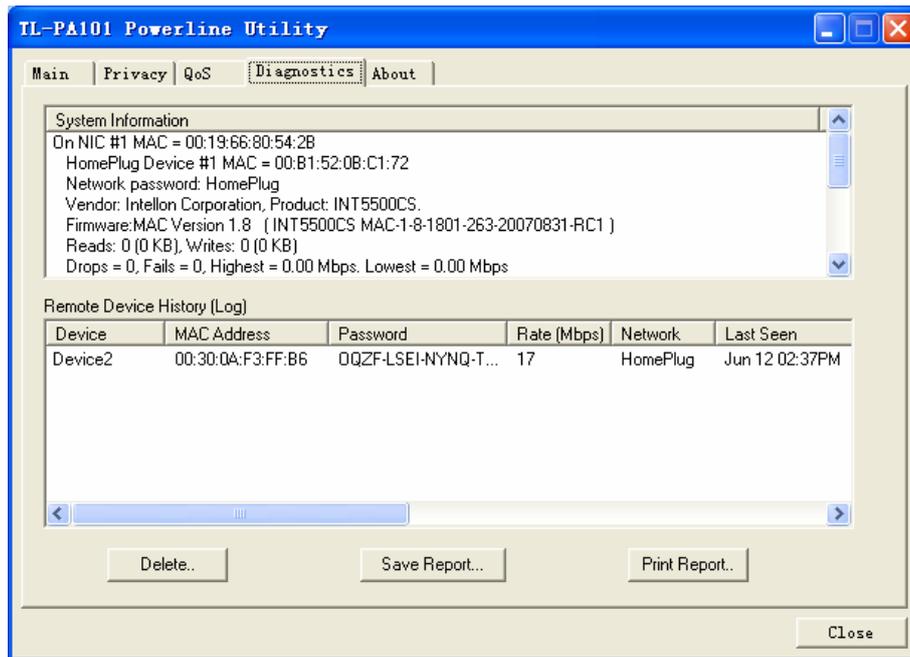
Simple Application Mapping: The group allows you to choose the type of traffic you will use your local HomePlug device for by pitching on one of the following four radios. Please select the radio type according to your demand.

Advanced VLAN Priority Mapping: The group sets VLAN priority to CAP mapping and default priority. Note that in HomePlug, CAP 3 is the highest priority while CAP 0 is the lowest priority. The values shown in VLAN Tags Priority are the default settings for the first running.

Get QoS: Click this button and you will see the current QoS information showed below **Advanced VLAN Priority Mapping**.

4.4 Diagnostics

The **Diagnostics** homepage shows the **System Information** and **Remote Device History** of all remote devices seen over a period of time which are only readable. Click on the "**Diagnostics**" tab and the following screen display.



The **Diagnostics** information displayed can be saved to a text file. One can email the saved text file to the local supplier when there's technical support require or print the saved text file as reference during a technical support conference.

The **Upper Panel** shows technical data concerning software and hardware present on the host computer which were used to communicate over Powerline Ethernet Adapter on the Powerline network. It may include 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
- MAC addresses of all devices connected locally to the host

Click the "**Delete**" tab when there's Powerline Ethernet Adapter devices no longer part of the network.

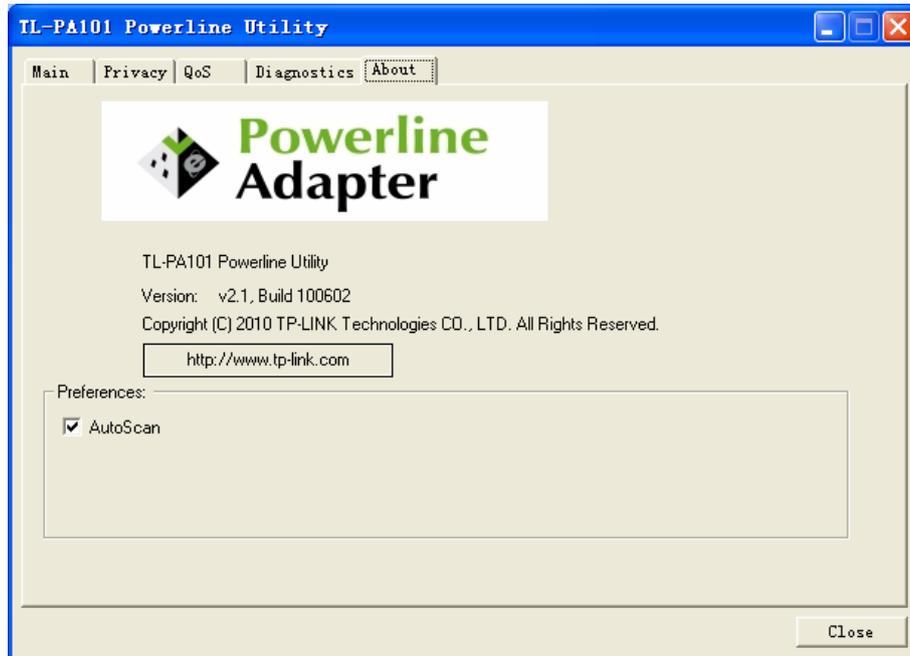
The **Lower Panel** contains a history of all remote Powerline Ethernet Adapter devices seen on the computer over a certain period of time. All devices that were on the powerline network are listed here along with a few other parameters. Powerline Ethernet Adapter devices that are active on the current logical network will show a transfer rate in the Rate column; devices on other networks, or devices that may no longer exist are shown with a "?" in the Rate column. The following remote Powerline Ethernet Adapter devices information is available from the diagnostics screen:

- Device Alias Name
- Device MAC Address
- Device Password
- Device Last known rate
- Device Last Known Network name
- Date device last seen on the network

The diagnostics information displayed may be saved to a text file for later use, or can be printed for reference for a technical support call. Powerline Ethernet Adapter devices, which are not part of the network anymore, can be deleted using the delete button. A dialog window pops up with a confirmation message if we try to delete a device whose password has been entered.

4.5 About

The **About** homepage show the Management Utility software version.



- **AutoScan:** When enabled (Place a check), the Management Utility will automatically scan for Powerline Ethernet Adapter devices on the local network every few seconds and updated the scanning information on the **Main** configuration homepage.

Appendix A: Troubleshooting Guide

The Troubleshooting Guide provides answers to common problems regarding the Powerline Ethernet Adapter.

1. The Power LED does not light up.

Ans. Check the following:

1. Make sure that the Powerline Ethernet Adapter is properly plugged into a power outlet.
2. Make sure the power outlet is active (working) by plugging another electric device into it.
3. Re-plug the Powerline Ethernet Adapter to the power outlet again. If the Power LED still failed to light up, contact your local dealer for technical support.

2. The Ethernet LED does not light up.

Ans. Check the following:

1. Make sure that the Ethernet cable (RJ-45) is properly connected to the Powerline Ethernet Adapter's Ethernet port.
2. Make sure that the other end of the Ethernet cable (RJ-45) is properly connected to the computer LAN card or to your Cable/xDSL Ethernet port.
3. Make sure your computer LAN card is properly installed and configured.
4. Make sure your Cable/xDSL broadband access is working and configured correctly.
5. Contact your local dealer for technical support if the Ethernet LED still failed to light up after the above procedures.

3. Powerline LED does not light up.

Ans. Check the following:

1. Double click to enable the Management Utility and click the “**Scan**” tab under the **Main** configuration homepage. The Management Utility will automatically detect all other Powerline Ethernet Adapter on your power line network.
2. Try to plug a second Powerline Ethernet Adapter into a near by power outlet and check whether the Powerline LED lights up or not.
3. Contact your local dealer for technical support if the Powerline LED still failed to light up after the above procedures.