

TP-LINK®

User Guide

TL-PA7020P

AV1000 2-port Gigabit Passthrough Powerline 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.



Продукт сертифіковано згідно з правилами системи УкрСЕПРО на відповідність вимогам нормативних документів та вимогам, що передбачені чинними законодавчими актами України.



Safety Information

- When product has power button, the power button is one of the way to shut off the product; when there is no power button, the only way to completely shut off power is to disconnect the product or the power adapter from the power source.
- Don't disassemble the product, or make repairs yourself. You run the risk of electric shock and voiding the limited warranty. If you need service, please contact us.
- Avoid water and wet locations.

This product can be used in the following countries:

AT	BG	BY	CA	CZ	DE	DK	EE
ES	FI	FR	GB	GR	HU	IE	IT
LT	LV	MT	NL	NO	PL	PT	RO
RU	SE	SK	TR	UA	US		

DECLARATION OF CONFORMITY

For the following equipment:

Product Description: **AV1000 2-port Gigabit Passthrough Powerline Adapter**

Model No.: **TL-PA7020P**

Trademark: **TP-LINK**

We declare under our own responsibility that the above products satisfy all the technical regulations applicable to the product within the scope of Council Directives:

Directives 2004/108/EC, Directives 2006/95/EC, Directives 2011/65/EU

The above product is in conformity with the following standards or other normative documents:

EN 55022: 2010 + AC: 2011

EN 61000-3-2: 2006 + A1: 2009 + A2: 2009

EN 61000-3-3: 2013

EN 60950-1: 2006 + A11: 2009 + A1: 2010 + A12: 2011

EN 50412-2-1: 2005

The product carries the CE Mark



Person responsible for making this declaration:

A handwritten signature in black ink, appearing to read 'Yang Hongliang', is written over a light gray rectangular background.

Yang Hongliang

Product Manager of International Business

Date of issue: **2014**

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Chapter 1 Introduction

This device is an AV1000 2-port Gigabit Passthrough Powerline Adapter which transforms your house's existing electrical wiring into a ubiquitous networking infrastructure. Simply plug this AV1000 2-port Gigabit Passthrough Powerline 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 adapter supports up to 1000Mbps data rate over the existing household power circuit. With data rates of 1000Mbps, full multimedia application can easily be supported throughout the whole house in addition to Internet access. This powerline 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 adapter supports built-in 128-bit AES encryption and Quality of Service (QoS) features.

The new powerline adapter TL-PA7020P from TP-LINK provides extra convenience and better performance for your home network with its integrated electrical socket and mains filter. The common problem of wasting an electrical outlet is solved and additional terminal devices or multiple sockets can be connected to the adapter just like to a normal wall socket. What's more, the data transmission in the network can be significantly improved by the integrated mains filter. With minimum setup, you can install and use this powerline adapter within minutes. The adapter has two useful functions.

1. Existing connection with a new unassociated device added via the **Pair Button**.
2. Reset to default setting via the **Management Utility** or the **Pair Button**.

1.1 System Requirement

- a) At least two AC power outlets (100–240V~, 50/60Hz) 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)

1.2 Important Safety Instructions

1. Do not open this product or attempt to service it; it may expose you to dangerous high voltage or other risks.
2. Do not operate this product near water.
3. Do not place or operate this product near a radiator or a heat register.
4. Do not expose this product to dampness, dust or corrosive liquids.
5. Do not connect this product or disconnect it from a wall socket during a lightning or a thunderstorm
6. Do not block the ventilation slots of this product, for insufficient airflow may harm it.
7. Do not put anything on this product.
8. Plug this product directly into a wall socket (100–240V~, 50/60Hz). Do not use an extension cord between this product and the AC power source.

9. When plugging this product into a wall socket, make sure that the electrical socket is not damaged, and that there is no gas leakage.
10. Place the connecting cables properly so that people won't stumble or walk on it.
11. This product 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 this product 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 this product from the wall socket before cleaning. Use a damp cloth for cleaning. Do not use liquid cleaners or aerosol cleaners.
14. The specification of the fuse is **T2.5AL250V**. To avoid damage, please do not change the fuse.
15. The Operating temperature is 0°C~40°C (32°F~104°F).
16. The Storage temperature is -40°C~70°C (-40°F~158°F).

1.3 Conventions

The powerline adapter or AV1000 2-port Gigabit Passthrough Powerline Adapter mentioned in this guide stands for TL-PA7020P AV1000 2-port Gigabit Passthrough Powerline Adapter without any explanation.

1.4 LED Indicator

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



Item	Status	Indication
 Power LED	On/Off	The powerline adapter is on or off.
	Blinking	Blinking every second: Pairing is in process.
		Blinking every 15 seconds: Power-Saving Mode is on.*

Item	Status	Indication
 Powerline LED	On	The powerline adapter is connected to a powerline network.
	Off	The powerline adapter is not connected to any powerline network or is in Power-Saving Mode.
 Ethernet LED	On	At least one Ethernet port is connected.
	Off	No Ethernet port is connected.

 **Note:**

Five minutes after the device connected to the powerline adapter is turned off, the powerline adapter will automatically switch to Power-Saving Mode.

1.5 Physical Interface

There are four types of physical interfaces on this powerline adapter.



Interface	Description
Ethernet Port	Two 10/100/1000 Mbps Ethernet ports for connecting the adapter to a PC or a broadband device with a network cable.
Power Plug*	A power plug for connecting the adapter to an AC power socket (100–240V~, 50/60Hz).
Pair Button	Press and hold for 1 second to set up or join a secure powerline network. Press and hold for 8 seconds to leave an existing powerline network. Press and hold for more than 15 seconds to reset the powerline adapter.
Integrated Electrical Socket	Use as an electrical outlet expansion for power strip or household appliances. It can remove some electrical noise that might affect powerline performance.

* The provided power plug may differ from the picture due to different regional power specifications. Here we take the EU version as an example.

 **Note:**

1. If the pair button is pressed for about 8 seconds, the powerline adapter will leave the network which it has joined and its new network name assumes a random value. The Powerline LED turns off when it disconnects from the powerline network.
2. For detailed information about the pair button, please refer to [Chapter 5 Advanced Feature: How to Use the Pair Button](#).

Chapter 2 Connecting Mechanism

2.1 Introduction

The powerline adapter supports up to 1000Mbps data rate. With this high speed connection rate, this powerline adapter allows you to set up a high speed house network by using your household existing electrical wiring. Simply plug this powerline adapter into an ordinary power outlet to extend your Cable/xDSL broadband connection or existing LAN network to any other electrical outlet in any room of your house.

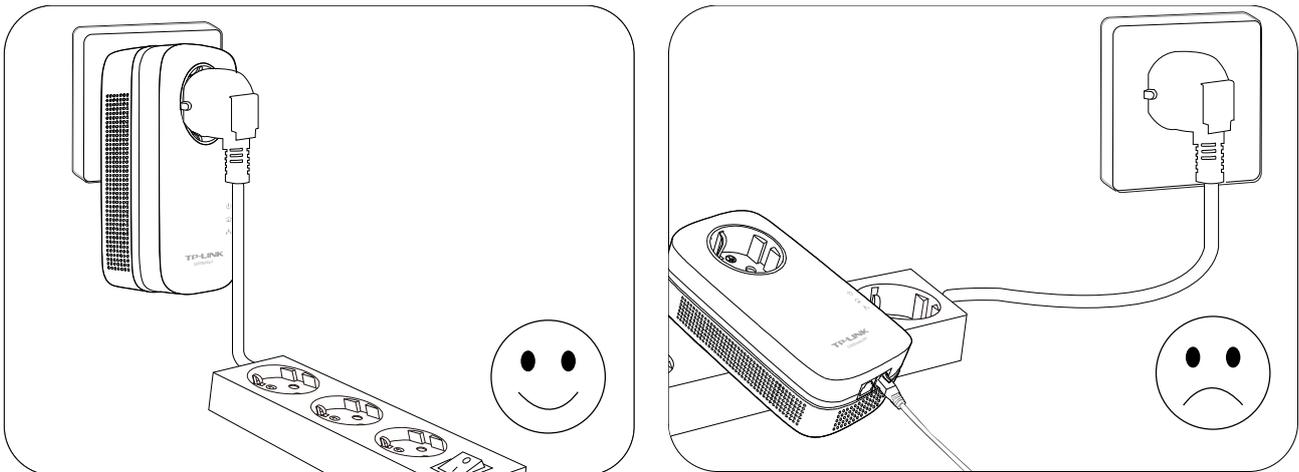
Note that powerline adapters work in pairs. One powerline adapter is connected to your Cable/xDSL broadband to extend broadband connection and Internet surfing. The other powerline adapter is connected to the computer for network access. With clean power line, the distance between two powerline adapters can reach up to 300 meters, but the actual distance may vary due to the environment.

Section below describes the connection instructions and hardware connection mechanism.

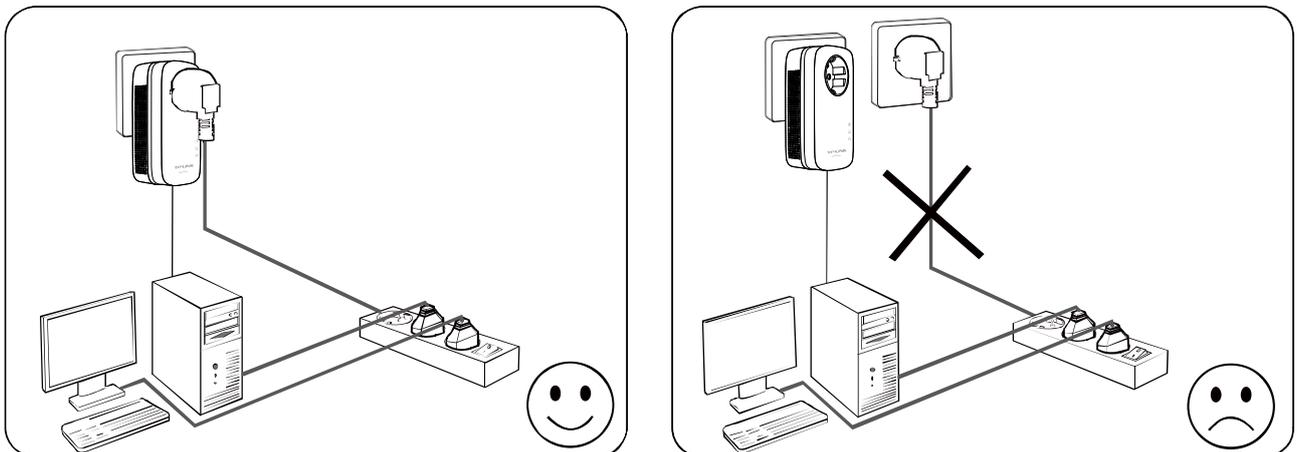
2.2 Connection Instruction

To ensure the optimum performance of the powerline adapter and significantly improve the transmission capacity of the network, we recommend that you comply with the following connection rules:

- Plug the powerline adapter directly into a wall socket but not the multiple sockets.



- To take full advantage of the filter function of the Powerline Adapter and to improve data transmission in the network, always plug the multiple sockets into the integrated electrical socket of the Powerline Adapter.



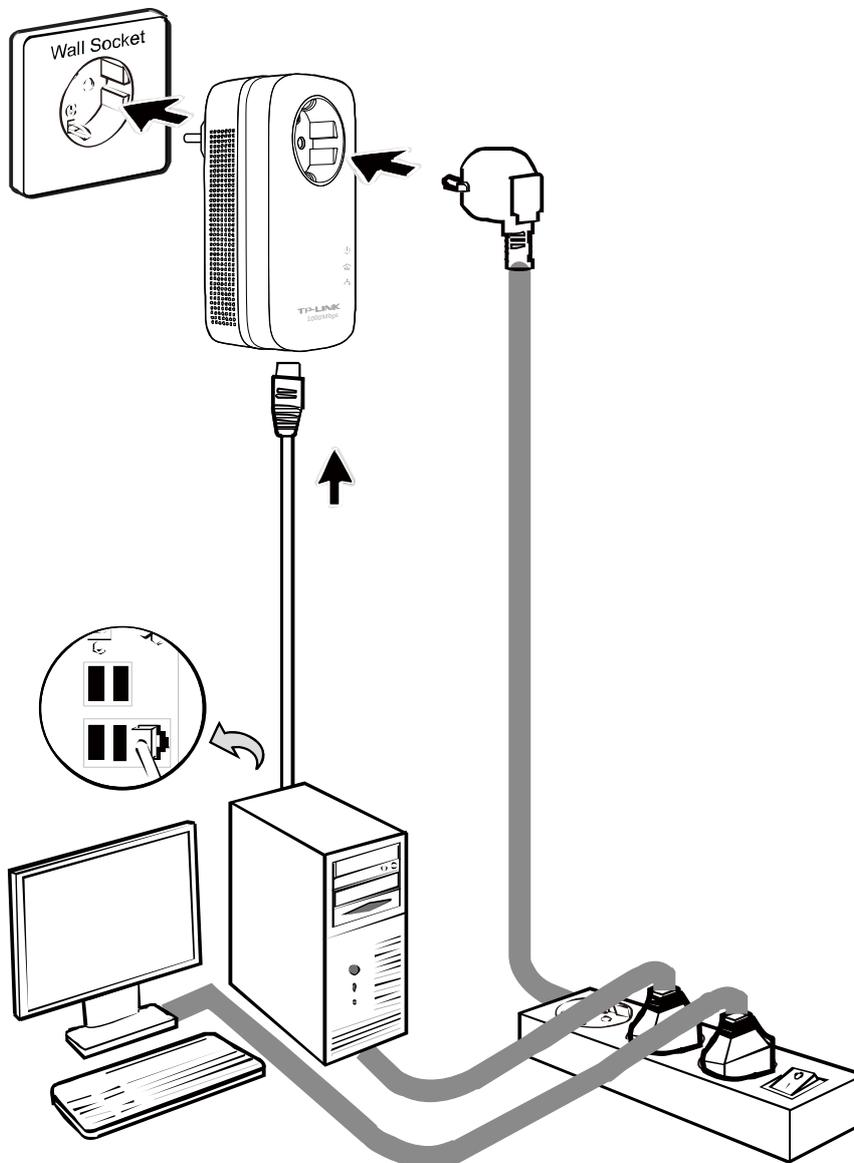
2.3 Hardware Connection – Computer

For those computers you wish to be networked by powerline adapters, each of the computers must be properly connected with a powerline adapter through an Ethernet (RJ45) cable.

Following are the steps to properly connect the powerline adapter to your computer:

1. Connect one end of the provided Ethernet (RJ45) cable to the Ethernet port of the powerline adapter.
2. Connect the other end of the Ethernet (RJ45) cable to your computer's LAN port.
3. Plug the powerline adapter into a wall socket next to the computer.
4. Turn on your computer.
5. Check and confirm that the Power LED  and Ethernet LED  on the powerline adapter are **ON**.

The hardware connection mechanism is shown below:



 **Note:**

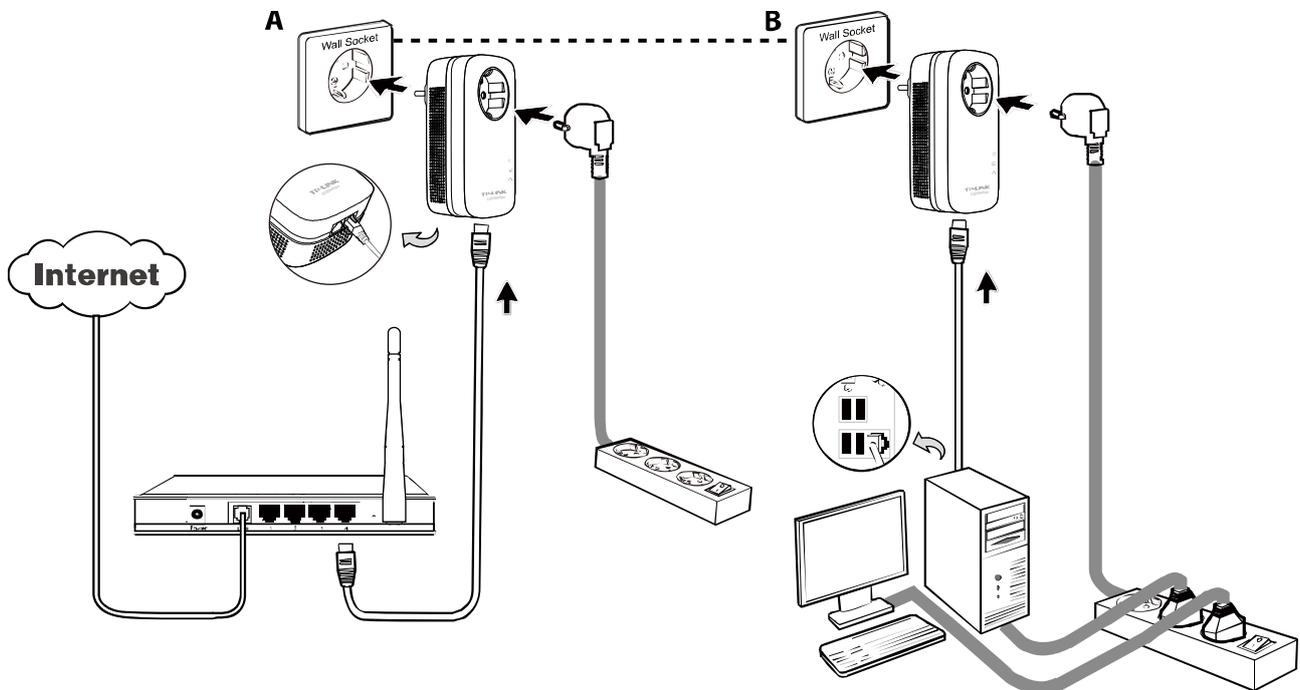
Do not connect the powerline adapter to any extension lead, power strip, extension cord or surge protector, as this may degrade the network performance.

2.4 Hardware Connection – Internet

This section describes how to connect the powerline adapter into your existing ADSL broadband connection via ADSL Ethernet port. Follow the procedures described below to connect the powerline adapter to your ADSL broadband connection:

1. Connect one end of the provided Ethernet (RJ45) cable to the Ethernet port of the powerline adapter.
2. Connect the other end of the Ethernet (RJ45) cable to an available Ethernet port of your ADSL broadband Router.
3. Plug the powerline adapter into a wall socket next to the computer.
4. Turn on your computer.
5. Check and confirm that the Power LED , Powerline LED , and Ethernet LED  on the powerline adapter are **ON**.

The hardware connection mechanism is shown below:



 **Note:**

Where the MAINS plug or an appliance coupler is used as the disconnected device, the disconnect device shall remain readily operable. The idle wall sockets or electrical outlets in your household electrical circuit can be used normally without interference from the network.

Chapter 3 Installing Management Utility

Please verify that no other powerline adapter or any Encryption Management Utilities are installed before installing the provided software. If other Powerline Utilities are installed, uninstall them and restart your personal computer before installing this provided software.

 **Note:**

To install PowerLine Utility, please make sure WinPcap (version 4.1.2 or higher) has been installed in your computer. Otherwise, a window will pop up for you to install WinPcap 4.1.3.

Take the following procedures to properly install the provided Management Utility:

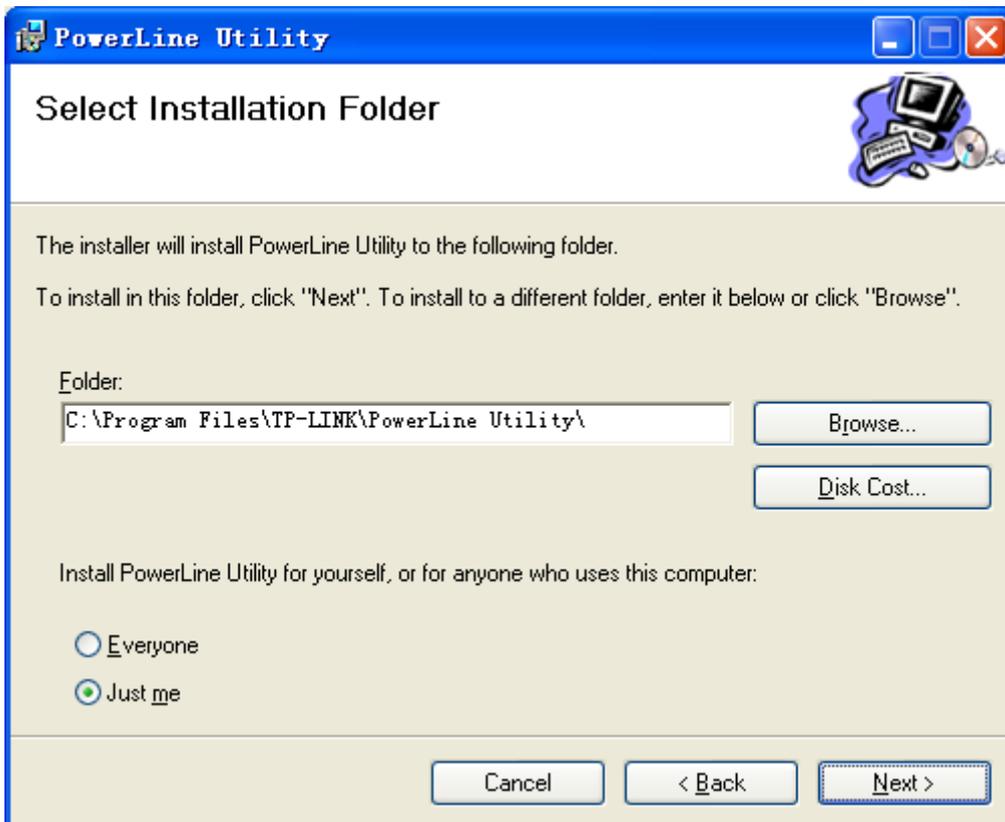
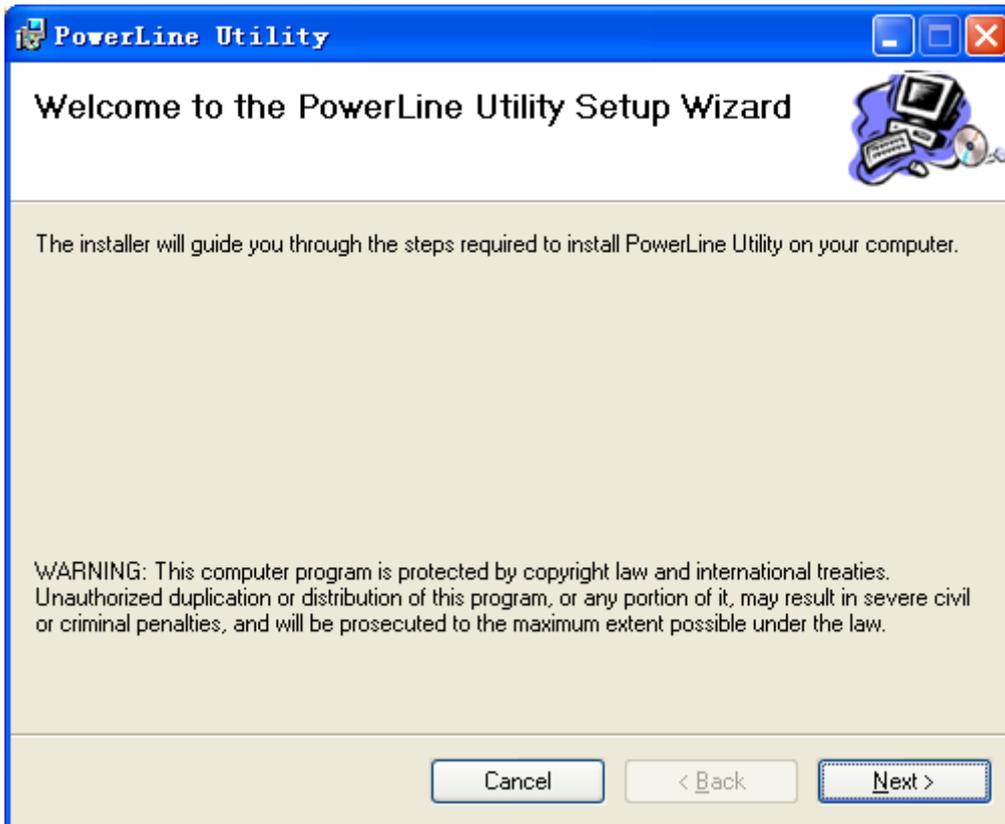
Step 1: Insert the Resource CD (for Windows only) into your CD-ROM drive, and then the following Setup Wizard will automatically pop up on your computer's screen.

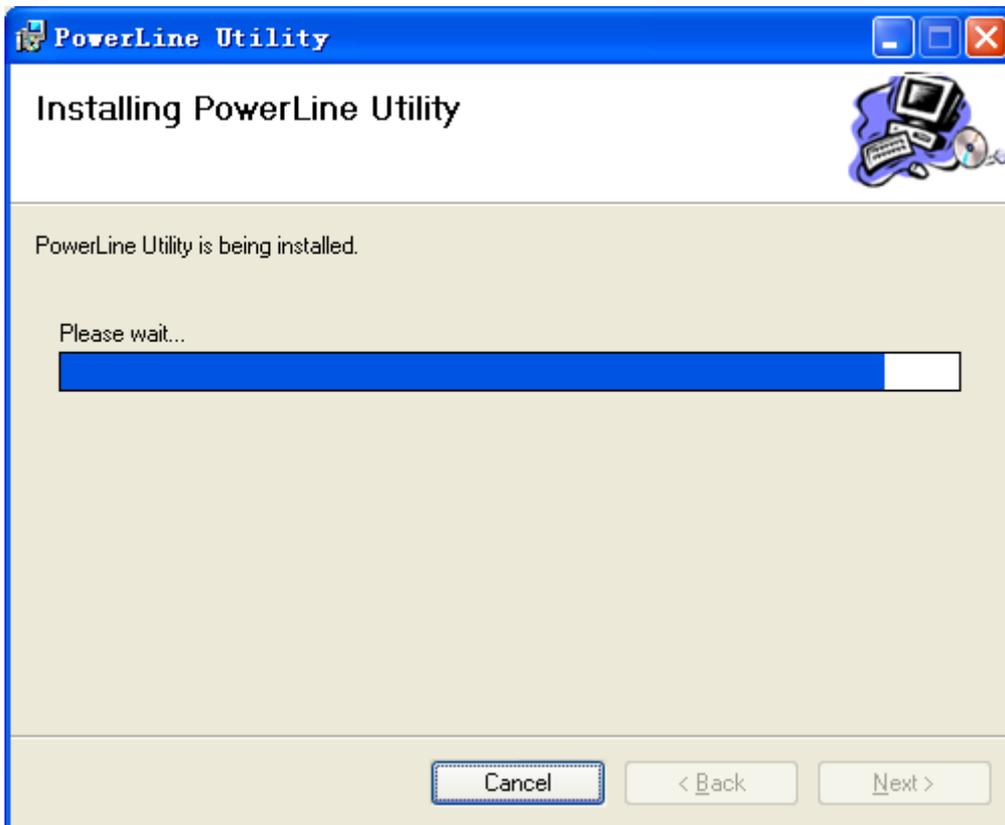
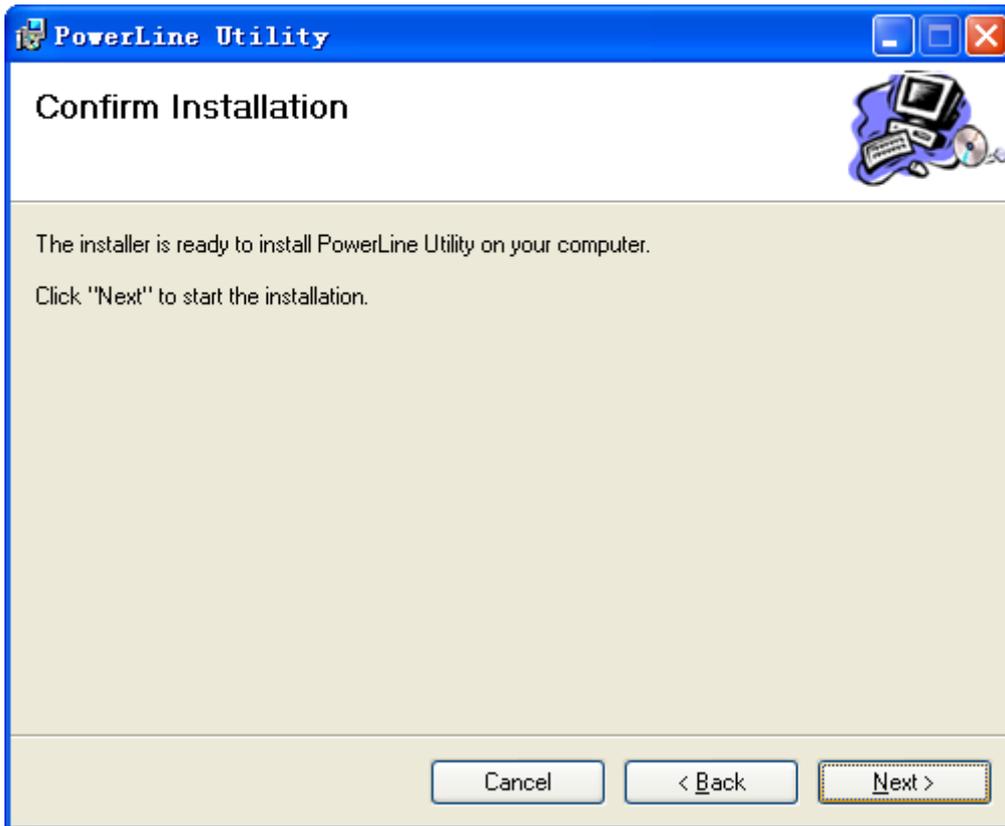
 **Note:**

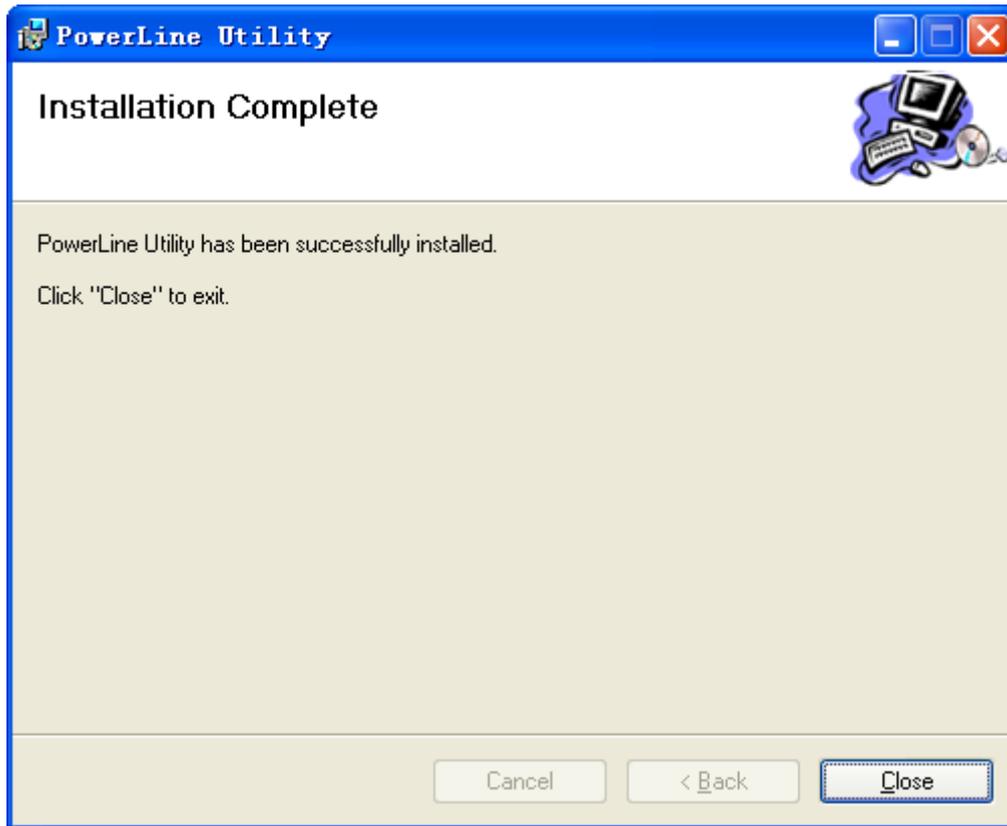
You can also download the utility at <http://www.tp-link.com/en/support/download/>.



Step 2: Select **TL-PA7020P** and click **Management Utility**, and then the program installation process will carry out and copy all the necessary files to your system.







Step 3: After the installation, a shortcut to the “**PowerLine Utility**” application icon is provided on the windows desktop.



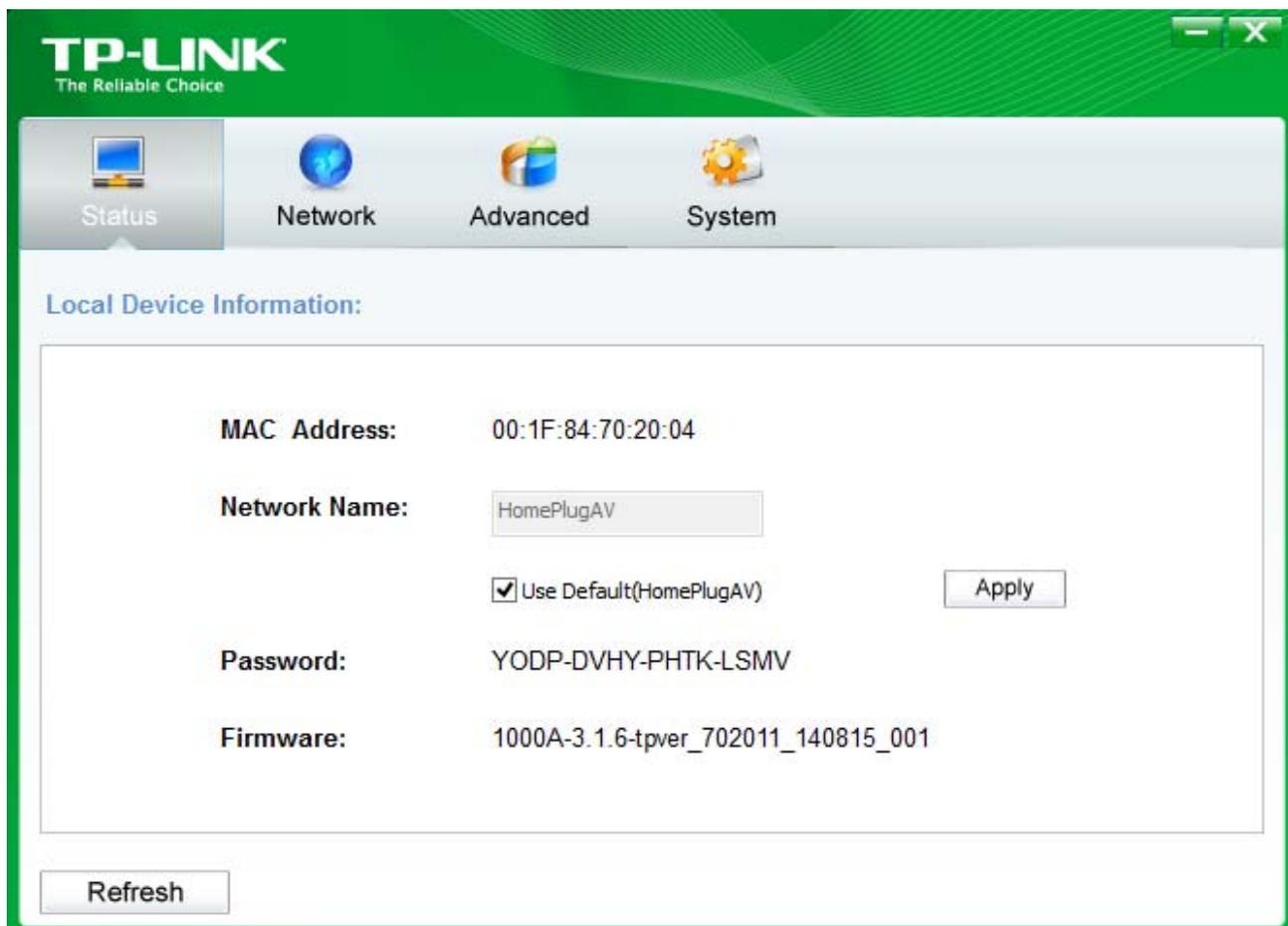
Chapter 4 Using the Management Utility

After you had successfully installed the powerline adapter hardware and Management Utility software, you can set up or configure the devices according to your need.

This PowerLine Utility enables you to identify powerline devices on the powerline network, measures data rate performance and ensures privacy by setting user defined secure powerline networks.



Double click on the icon “PowerLine Utility” from your windows desktop, the following screen will display. This Management Utility consists of four property tabs, “**Status**”, “**Network**”, “**Advanced**” and “**System**”.



4.1 Status

The **Status** tab shows information of the powerline adapter connected to the current computer where the Management Utility is running. On this page, you can also set its network name.

The screenshot shows the TP-LINK Management Utility interface. At the top, there is a navigation bar with four tabs: Status (selected), Network, Advanced, and System. Below the navigation bar, the 'Local Device Information' section is displayed. It contains the following fields:

- MAC Address:** 00:1F:84:70:20:04
- Network Name:** HomePlugAV (with a text input field containing 'HomePlugAV')
- Use Default(HomePlugAV)** (with an 'Apply' button to the right)
- Password:** YODP-DVHY-PHTK-LSMV
- Firmware:** 1000A-3.1.6-tpver_702011_140815_001

At the bottom left of the information box, there is a 'Refresh' button.

- **MAC Address:** Displays the MAC address of the powerline adapter connected to the current computer where this management utility is running.
- **Network Name:** Displays the network name of the current network or you can give a name for the network in which the powerline adapter is. By default, the network name is HomePlugAV.
- **Use Default (HomePlugAV):** Check the box before this item to use the default network name.
- **Apply:** Click the **Apply** button to make the setting effective.
- **Password:** Displays the password of the current powerline adapter. Every powerline adapter has its own password by default, which can be also found on the back of the adapter.
- **Firmware:** Displays the current firmware version used by the adapter.
- **Refresh:** Click the **Refresh** button to update the information.

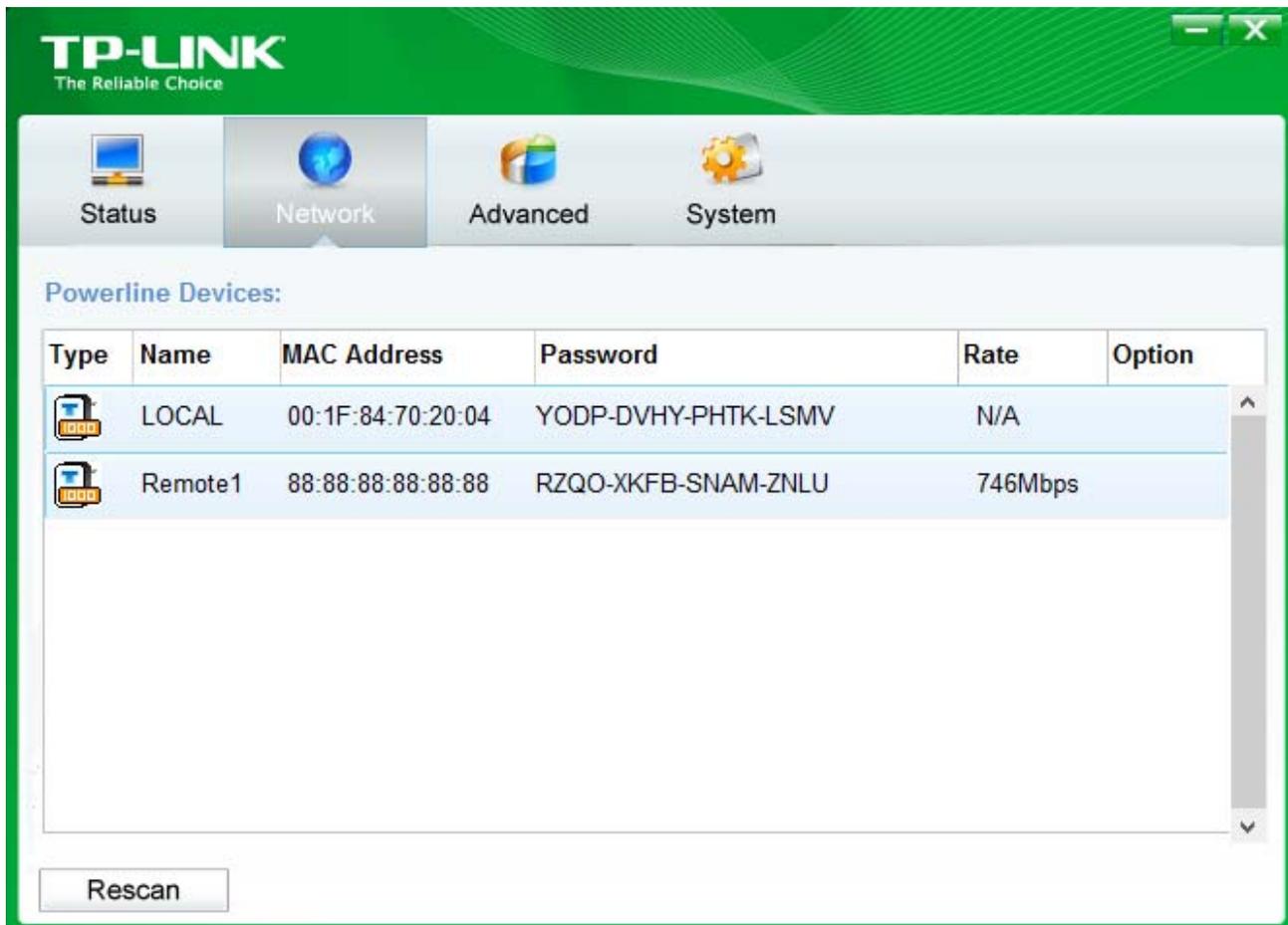
4.1.1 Set Local Device's Network Name

To set the local device's network name, please take the following steps:

- (1) Click **Status** tab to display the **Status** tab window.
- (2) Enter a name for the current network using 4 to 23 characters. Or you can check the **Use Default (HomePlugAV)** to use the default name as the network name. By default, the network name is HomePlugAV.
- (3) Click the **Apply** button to make the settings effective.

4.2 Network

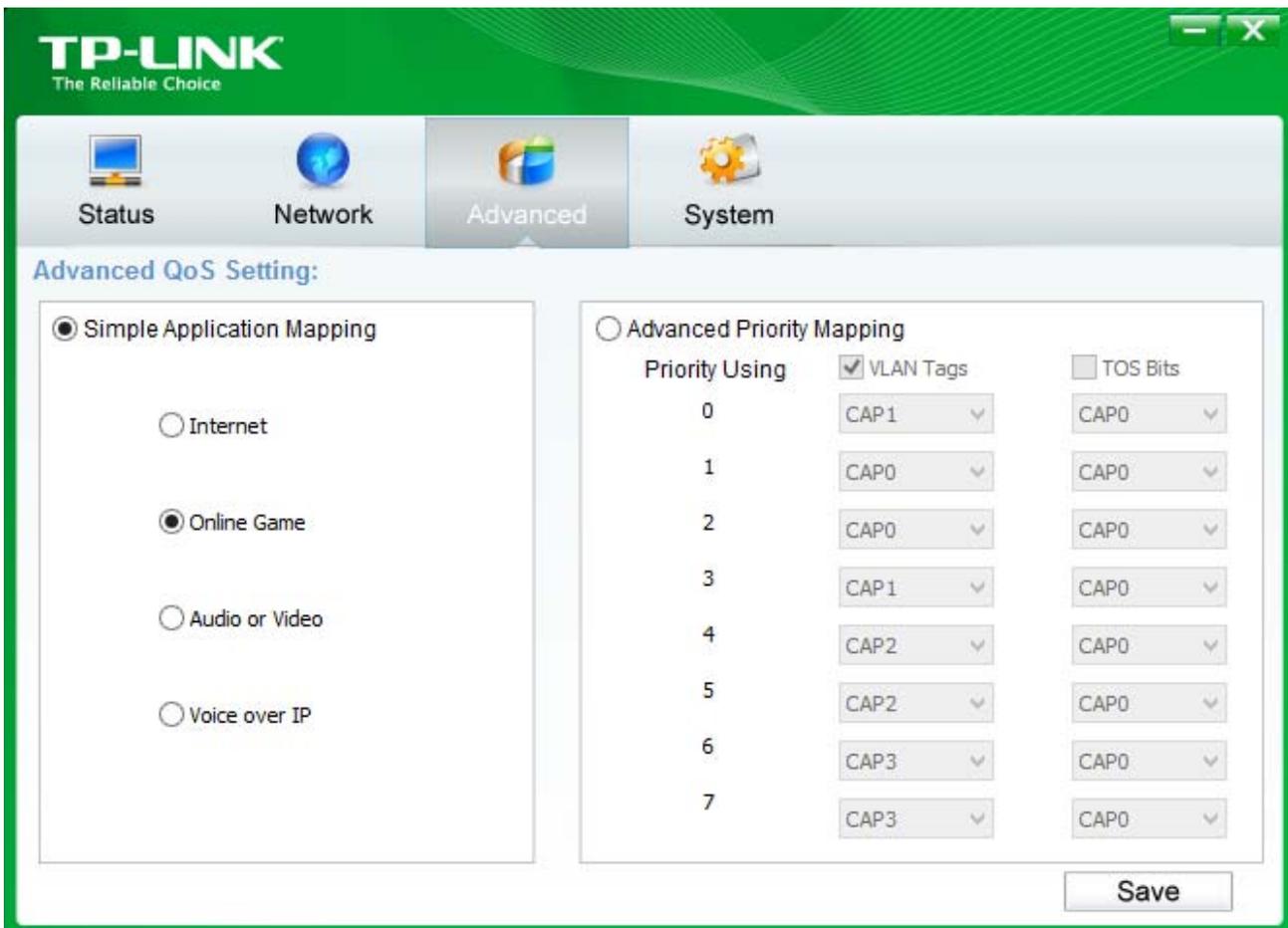
The **Network** tab window shows information of all the powerline devices found on the current logical network.



- **Type:** Displays the type of the powerline device found in the network.
- **Name:** Displays the name of the powerline device found in the network.
- **MAC Address:** Displays the MAC address of the powerline device found in the network.
- **Password:** Displays the supplied powerline device's password.
- **Rate:** Shows the current transmission rate of the powerline device.
- **Rescan:** Click the “Rescan” button to perform an immediate search of powerline devices. The Management Utility will automatically perform the scanning process and update the display every few seconds by default.

4.3 Advanced

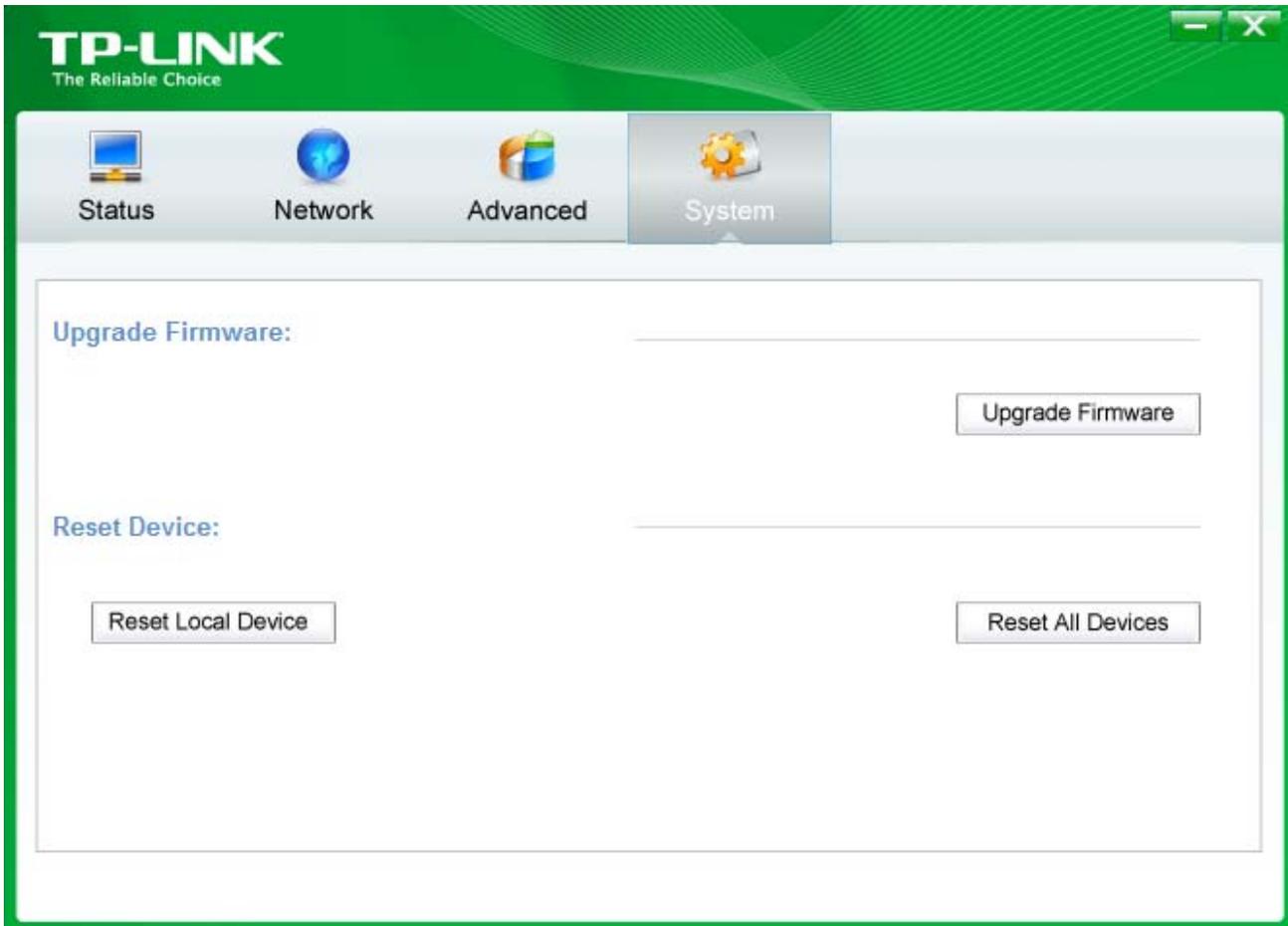
The third tab window labeled “**Advanced**” is for Quality of Service. With the proper configuration, the limit bandwidth can be taken full advantage of. QoS requirements are different for various data types such as streaming video or music, voice and raw data. To provide higher QoS for streaming data, 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”. Homeplug 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 while CAP 1 and CAP 0 are used for data. Mapping VLAN tags to CAP levels is easily done using the VLAN Priority Mapping function on the QoS tab window.



- **Simple Application Mapping:** The group allows you to choose what type of traffic with the highest user priority you will use your local HomePlug device for by pitching one of the following radios. Please select the radio type according to your demand.
- **Advanced 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.

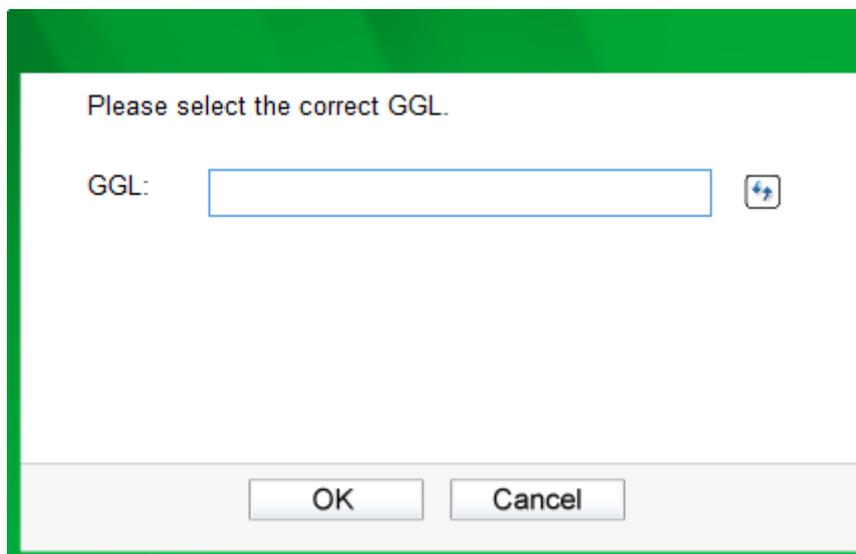
4.4 System

The **System** tab window is for some basic settings of the adapter. On this tab window, you can upgrade the firmware to the latest version and reset the adapter's settings to the factory defaults.



4.4.1 Upgrade Firmware

Click the **Upgrade Firmware** button to upgrade the version of the firmware for the adapter and the following dialog will pop up.



- **GGL**: TAR formatted file that is used for upgrading powerline devices' firmware.

If you want to upgrade the version of firmware for the device, please select appropriate GGL file. The GGL file is posted at www.tp-link.com and can be downloaded for free.

 **Note:**

The parameter information of GGL will restore to the factory defaults after resetting the powerline adapter.

To upgrade the device's firmware, follow these instructions:

1. Download GGL file from the TP-LINK website (www.tp-link.com).
2. Enter the path name or click  to select the downloaded file on the computer into the corresponding blank.
3. Click the **OK** button.

 **Note:**

Do not turn off the device while the firmware is being upgraded. The device will reboot after the upgrading is finished.

4.4.2 Reset Device

This Management Utility allows you to reset the powerline adapter to its default settings.

- **Reset Local Device:** Click this button to reset the settings of the local powerline adapter device only.
- **Reset All Devices:** Click this button to reset the settings of all devices that appear on the **Network** configuration homepage.

Chapter 5 Advanced Feature: How to Use the Pair Button

5.1 Set Up a Secure Powerline Network

The Homeplug AV standard uses 128-bit AES (Advanced Encryption Standard) to safely transmit data between powerline adapters. For the powerline adapters to communicate with each other they all need to use the same Network Membership Key (NMK). Otherwise, they cannot unscramble the encrypted data sent in the powerline network.

The **Pair** button allows you to set up a secure powerline connection with another HomePlugAV compliant powerline devices which also support the **Pair** feature.

You can connect a number of devices on a powerline network, but you can only use the Pair button on two devices at a time.

Create a secure powerline network using the Pair button:

- Step 1.** Press the **Pair** button of powerline adapter A for one second. The Power LED will start flashing.
- Step 2.** Within 2 minutes, press the **Pair** button of powerline adapter B for one second. The Power LED will start flashing.
- Step 3.** Wait for about 60 seconds while your powerline adapters A and B are connecting. The Power LEDs on both adapters will stop flashing and become solid light when the connection is made.

Join an existing secure powerline network:

Powerline adapter A and powerline adapter B form a HomeplugAV network. Powerline adapter C wants to join this network.

- Step 1.** Press and hold the **Pair** button on powerline adapter C for one second.
- Step 2.** Within 2 minutes, press and hold the **Pair** button on powerline adapter A/B for one second.
- Step 3.** Wait for about 60 seconds while your powerline adapters are connecting. The Power LEDs on powerline adapters A/B and C will stop flashing and become solid light when the connection is made.

 **Note:**

The sequence of Step 1 and Step 2 can be exchanged.

Leave an existing secure powerline network:

Powerline adapters A, B and C have formed a HomeplugAV network. The user wants to remove one device (powerline adapter A) from this network.

- Step 1.** Press and hold the Pair button on powerline adapter A for about 8 seconds, and then release the button. (All LEDs of powerline adapter A will momentarily go off.)
- Step 2.** Wait until the Power LED of powerline adapter A lights up steadily, indicating that it has already left the powerline network.

5.2 Reset

To reset the powerline adapter:

Press and hold the Pair button for more than 15 seconds, and then release the button. You will see all LEDs go off momentarily, and then begin to flash. When the Power LED turn solid, the reset process is completed.

Be careful, don't power off the powerline adapter when it is in reset process.

Appendix A: Troubleshooting

The Troubleshooting provides answers to common problems regarding the powerline adapter.

1. The Power LED does not light up.

Ans. Check the following:

1. Make sure that the powerline 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 adapter to the power outlet. If the Power LED still fails to light up, contact your local dealer for technical support.

2. The Powerline LED does not light up.

Ans. Check the following:

1. Double click to enable the Management Utility and click the “**Rescan**” button under the **Network** configuration homepage. The Management Utility will automatically detect all other powerline adapters on your powerline network.
2. Try to plug a second powerline adapter into a nearby 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 fails to light up after the above procedures.

3. The Ethernet LED does not light up.

Ans. Check the following:

1. Make sure that the Ethernet cable (RJ45) is properly connected to the Ethernet port of the power line adapter.
2. Make sure that the other end of the Ethernet cable (RJ45) 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 fails to light up after the above procedures.