

TP-LINK®

User Guide

TL-PA4020P

AV500 2-port Powerline Adapter with AC Pass Through



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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.



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	SG	SK	TR	UA	US	

Explanation of the symbols on the product label

Symbol	Explanation
	Indoor use only
	RECYCLING This product bears the selective sorting symbol for Waste electrical and electronic equipment (WEEE). This means that this product must be handled pursuant to European directive 2012/19/EU in order to be recycled or dismantled to minimize its impact on the environment. User has the choice to give his product to a competent recycling organization or to the retailer when he buys a new electrical or electronic equipment.

DECLARATION OF CONFORMITY

For the following equipment:

Product Description: **AV500 2-port Powerline Adapter with AC Pass Through**

Model No.: **TL-PA4020P**

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 60950-1: 2006 + A11: 2009 + A1: 2010 + A12: 2011 +A2: 2013

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: 2016-01-18

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Conventions

The powerline adapter or AV500 2-port Powerline Adapter with AC Pass Through mentioned in this guide stands for TL-PA4020P AV500 2-port Powerline Adapter with AC Pass Through without any explanation.

Parameters provided in the pictures are just references for setting up the product. They may differ from the actual situation.

You can set the parameters according to your demand.

Chapter 1 Introduction

This device is an AV500 2-port Powerline Adapter with AC Pass Through which transforms your house's existing electrical wiring into a ubiquitous networking infrastructure. Simply plug this AV500 2-port Powerline Adapter with AC Pass Through 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 on the same electrical circuit of a house without the need of any new cabling.

This Powerline Adapter supports up to 500Mbps data rate over the existing household power circuit. With data rates of 500Mbps, 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 support built-in 128-bit AES encryption.

The new Powerline Adapter TL-PA4020P 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 adds 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**.

1.1 System Requirement

- a) At least two power outlets (100V–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)

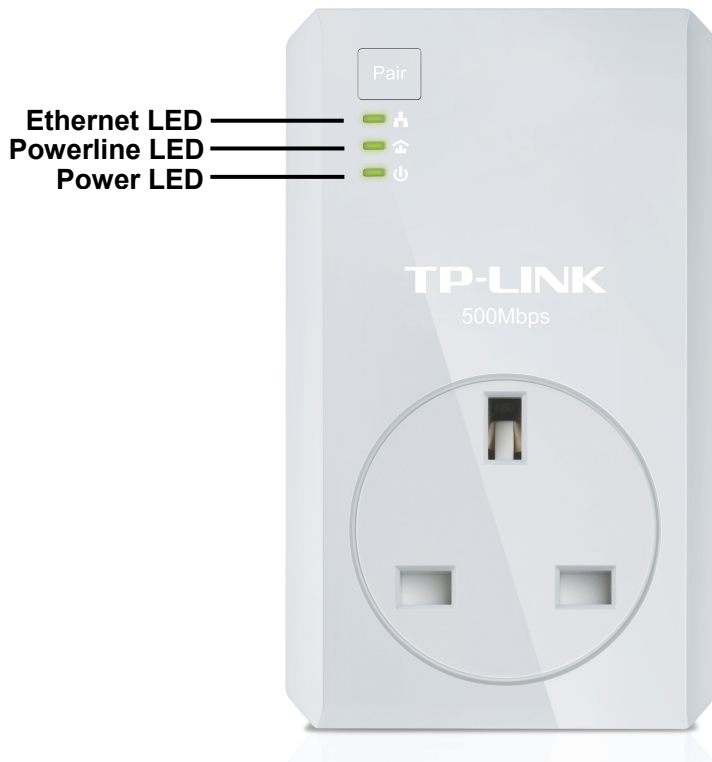
1.2 Important Safety Instructions


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 (100V–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 **T4AL250V**. 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 LED Indicator

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



Item	Status	Indication
 Power LED	Solid	The adapter is on.
	Blinking	The adapter is in power-saving mode or in pairing procedure.
	Off	The adapter is off.

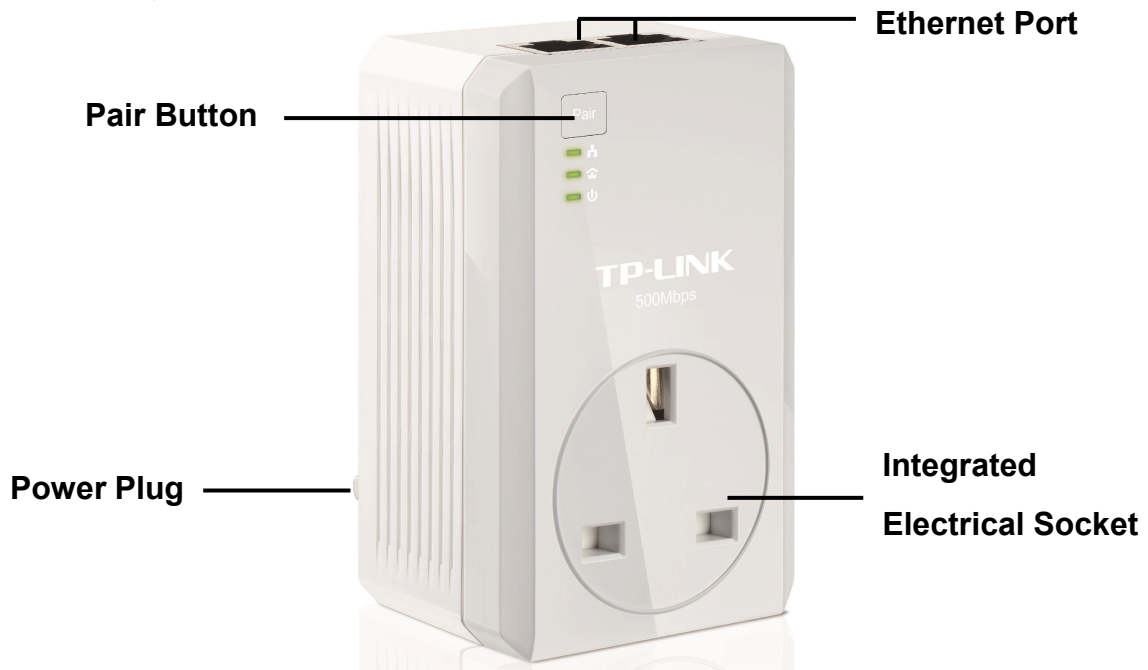
Item	Status	Indication
 Powerline LED	Solid	The adapter is connected to a powerline network.
	Blinking	The adapter is transferring data.
	Off	The adapter isn't connected to any powerline network or is in power-saving mode.*
 Ethernet LED	Solid	At least one Ethernet port is connected, but there is no data being transferred.
	Blinking	At least one Ethernet port is transferring data.
	Off	No Ethernet port is connected.

Note:

5 minutes after all the devices connected to the adapter's Ethernet ports are turned off, the adapter will automatically switch to the power-saving Mode. In power-saving mode, the Homeplug cannot be accessed via the electrical wiring, but its integrated electrical socket can supply the power normally. After the device connected to the Homeplug is switched on again, your Homeplug will leave the power-saving mode and the three LEDs will flash simultaneously.

1.4 Physical Interface

There are four physical interfaces on this Powerline Adapter.



Interface	Description
Pair Button	Pair buttons are used to secure a powerline network. To secure your network, please follow the steps below. Firstly, plug in a new adapter, and press its pair button for 1 second; then plug in another adapter and press its pair button for 1 second as well. The two buttons should be pressed within 2 minutes of each other. After that, wait until the Power LED on both adapters stops flashing and becomes solid on, and the pairing is completed.

Interface	Description
Ethernet Port	It is a 10/100Mbps Ethernet port on the adapter for connecting it to the PC or the broadband device with the network cable.
Power Plug*	A Power Plug connected to any (100V–240V~, 50/60Hz) power socket
Integrated Electrical Socket	The integrated electrical socket allows additional devices or multiple sockets to be connected to the adapter just like to a normal wall socket. No electrical socket is lost.

 **Note:**

1. If the pair button is pressed about 7 to 10 seconds, the powerline adapter will leave the network which it has joined and its new network name assumes a random value. The Powerline LED becomes off when the powerline adapter 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 Buttons](#).

Chapter 2 Connecting Mechanism

2.1 Introduction

The Powerline Adapter supports up to 500Mbps data rate. With this high speed connection rate, this Powerline Adapter allows you to set up a high speed home network by using your home 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.

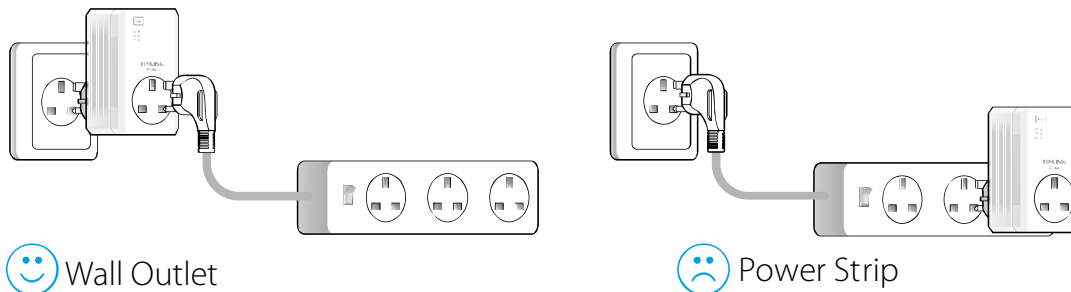
Note that this Powerline Adapter works in pairs. You need to plug one Powerline Adapter into a power outlet for client devices; you also need another Powerline Adapter connected to your Cable/xDSL broadband so as to extend your broadband connection or Internet surfing. With clean power line, the distance between two Powerline Adapters can reach 300 meters at most, but the actual distance may vary due to the environment.

Section below describes the connection instructions and hardware connection mechanism.

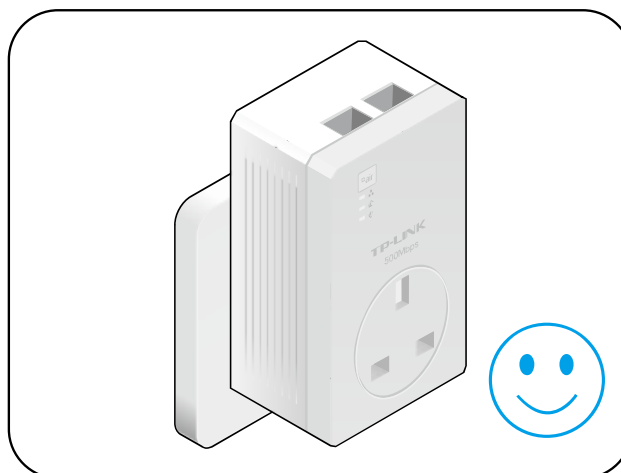
2.2 Connection Instruction

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.



- Use the powerline adapter only in the below direction.





- All powerline adapters and extenders should be on the same electrical circuit.

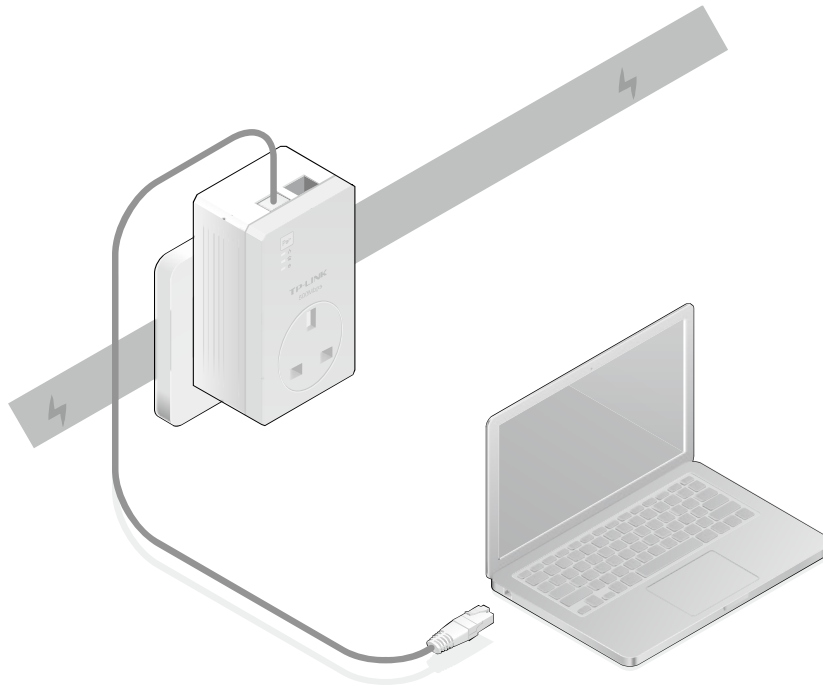
2.3 Hardware Connection – Computer

For those computers you wish to be networked by Powerline Adapter, 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 Powerline Adapter's Ethernet port.
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 these may degrade the network performance.

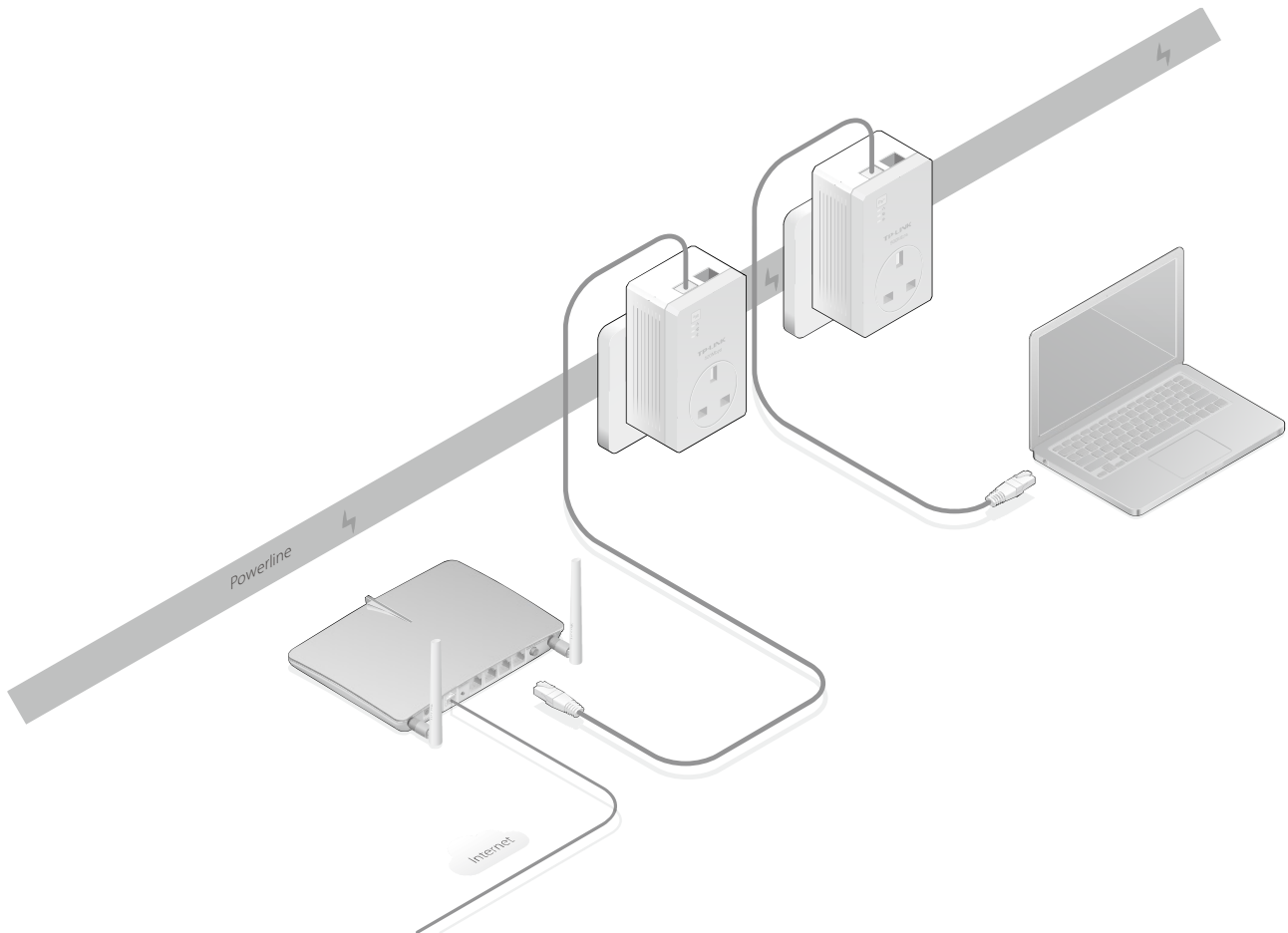
2.4 Hardware Connection – Internet

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 Powerline Adapter's Ethernet port.
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 router.
4. Turn on your computer.

5. Check and confirm that the Power LED , Ethernet LED , and Powerline 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.

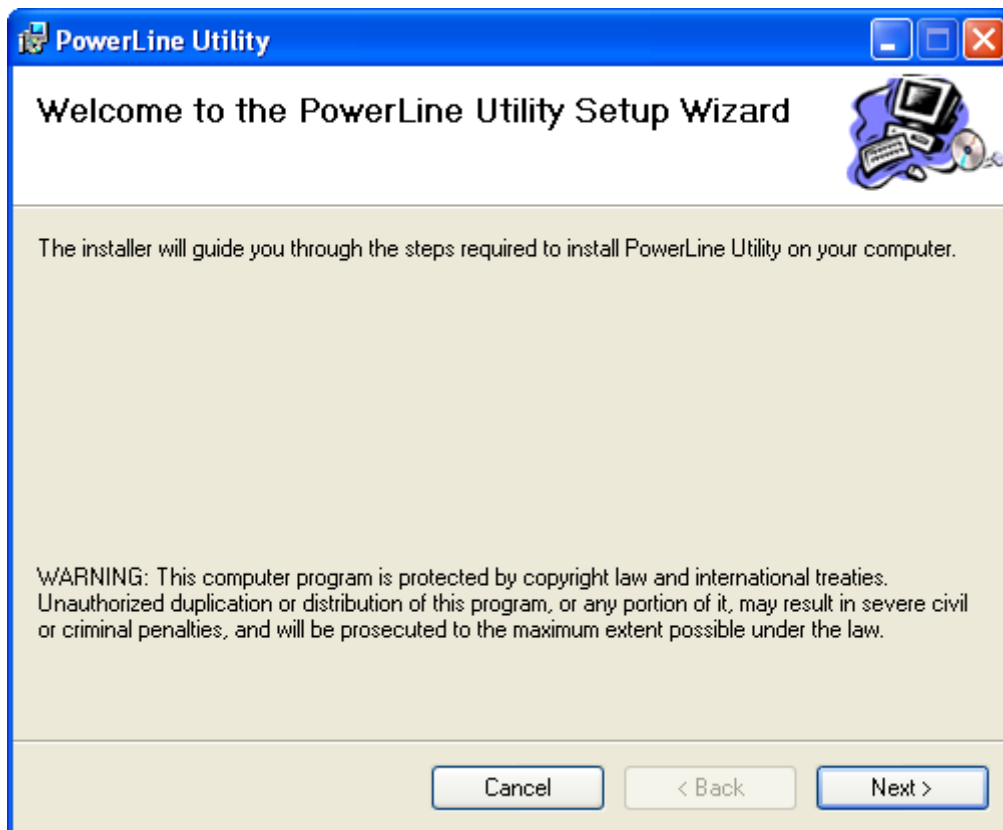
 **Note:**

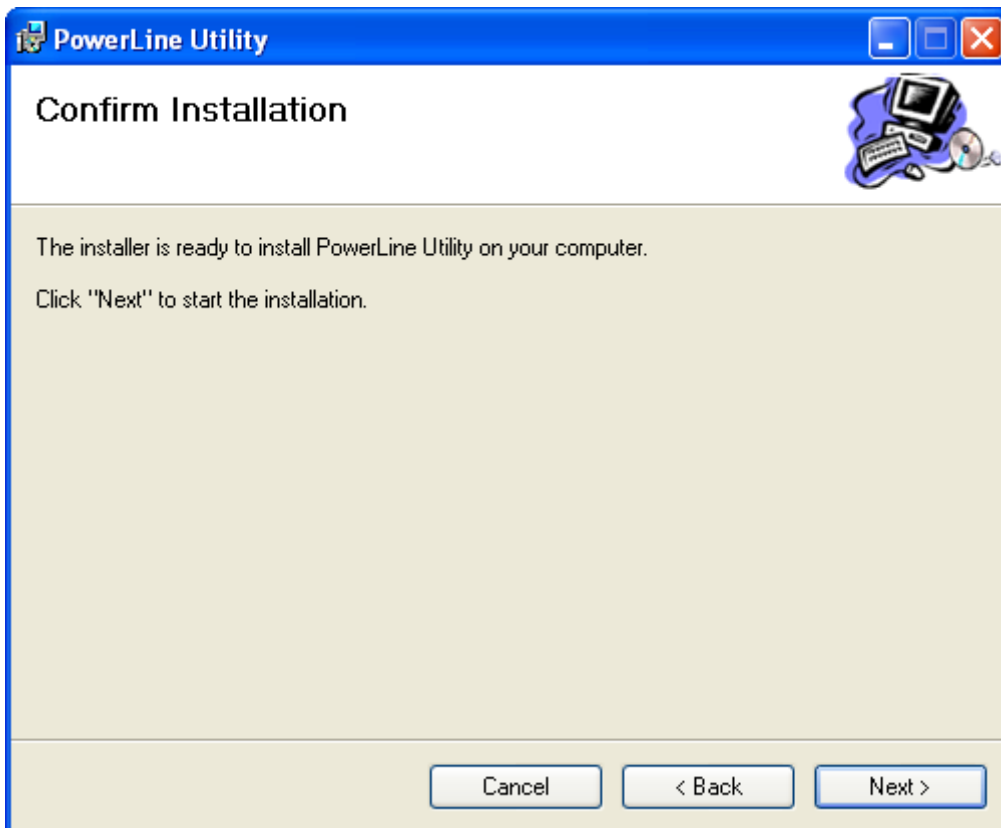
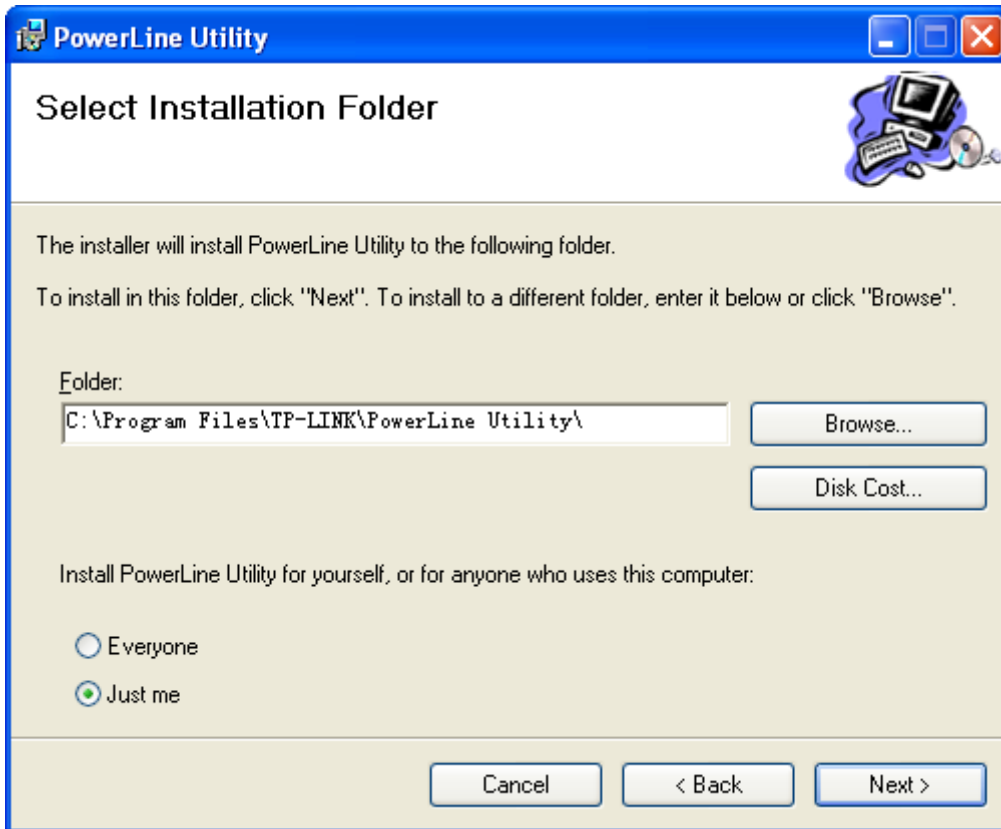
To install Management Utility, please make sure that WinPcap 4.1.2 has been installed in your computer. Otherwise, a window will pop up for you to install WinPcap 4.1.2.

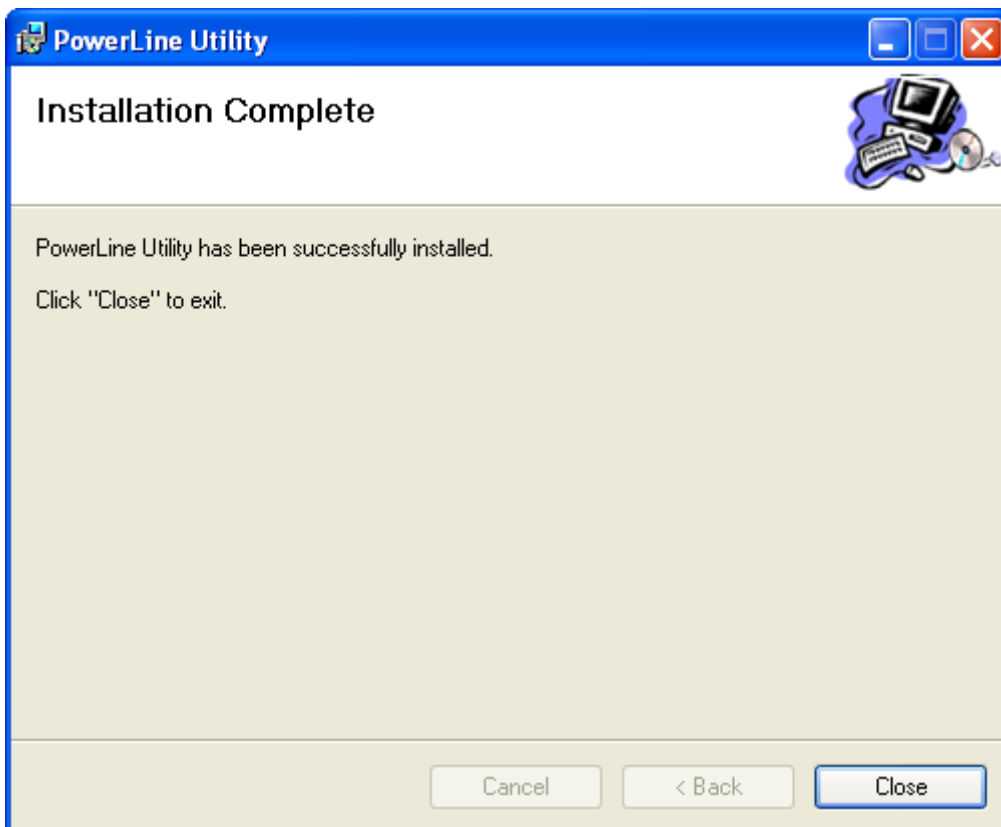
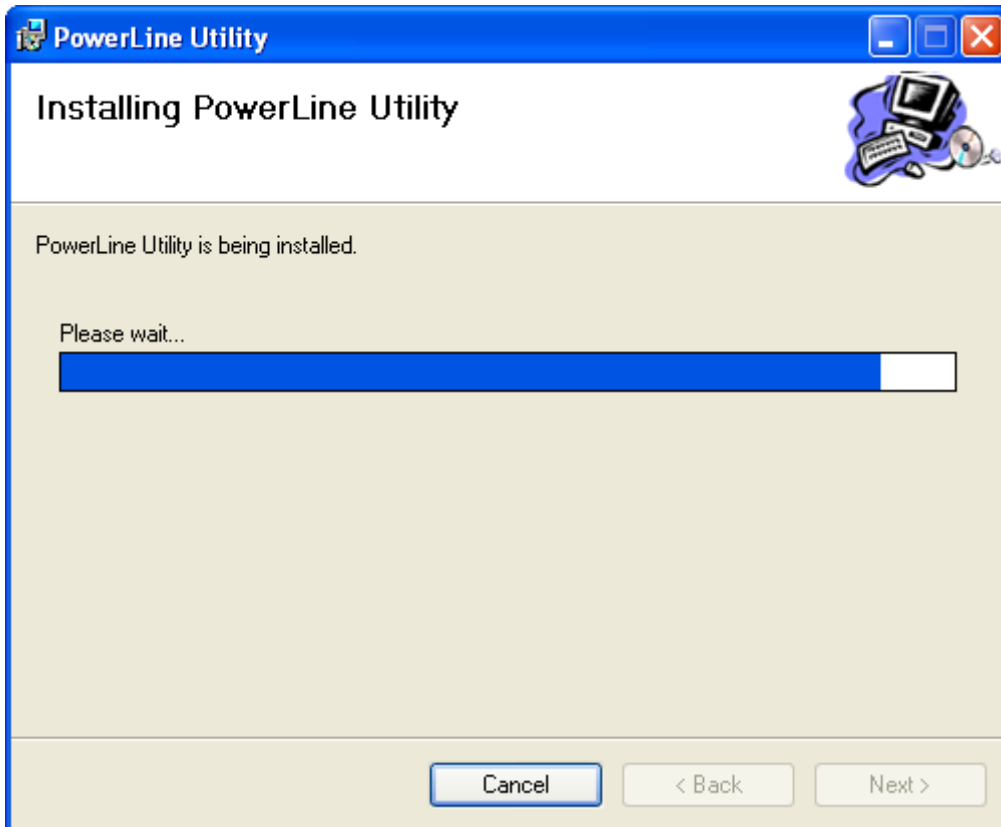
Take the following procedures to properly install the provided Management Utility:

Step 1: Obtain the Management Utility setup file from the product support page at <http://www.tp-link.com>.

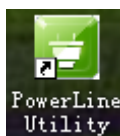
Step 2: Open the setup file and finish the setup by following the Setup Wizard.







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



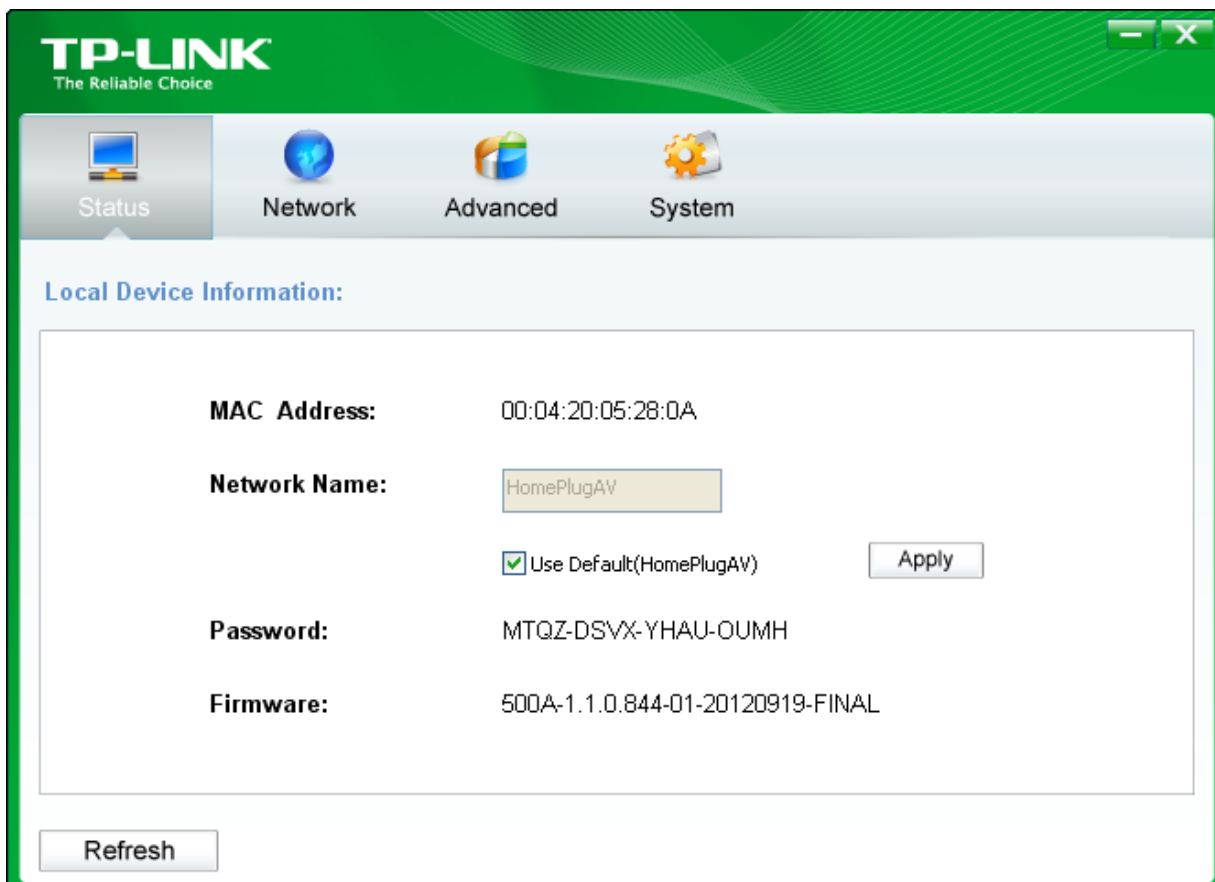
Chapter 4 Using the Management Utility

After you'd 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 the users to identify powerline devices on the powerline network, measures data rate performance and ensures privacy by setting user-defined secure powerline networks.

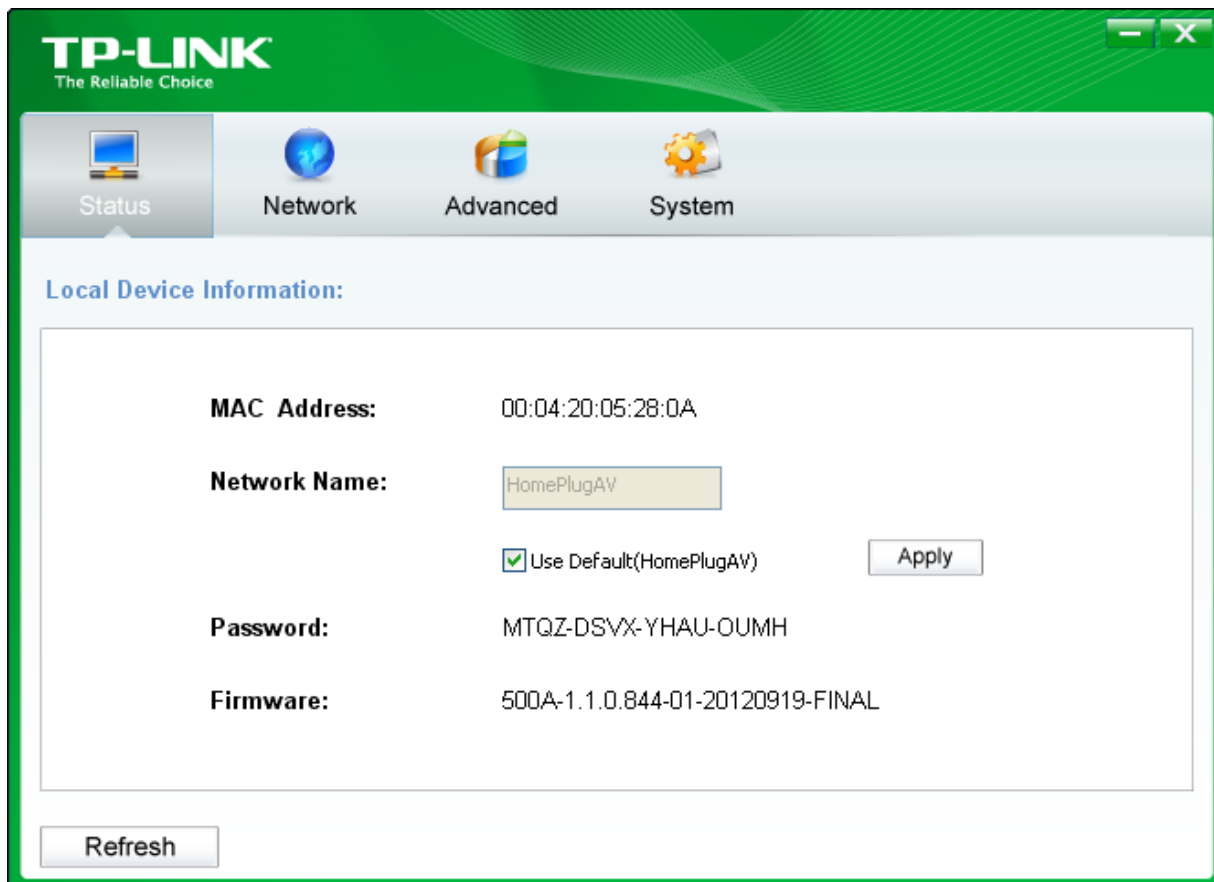


Double click on the icon “PowerLine Utility” from your windows desktop, the following screen will display. This Management Utility consists of four property tabs, “**Status**”, “**Network**”, “**Advanced**” and “**System**”.



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.



- **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.

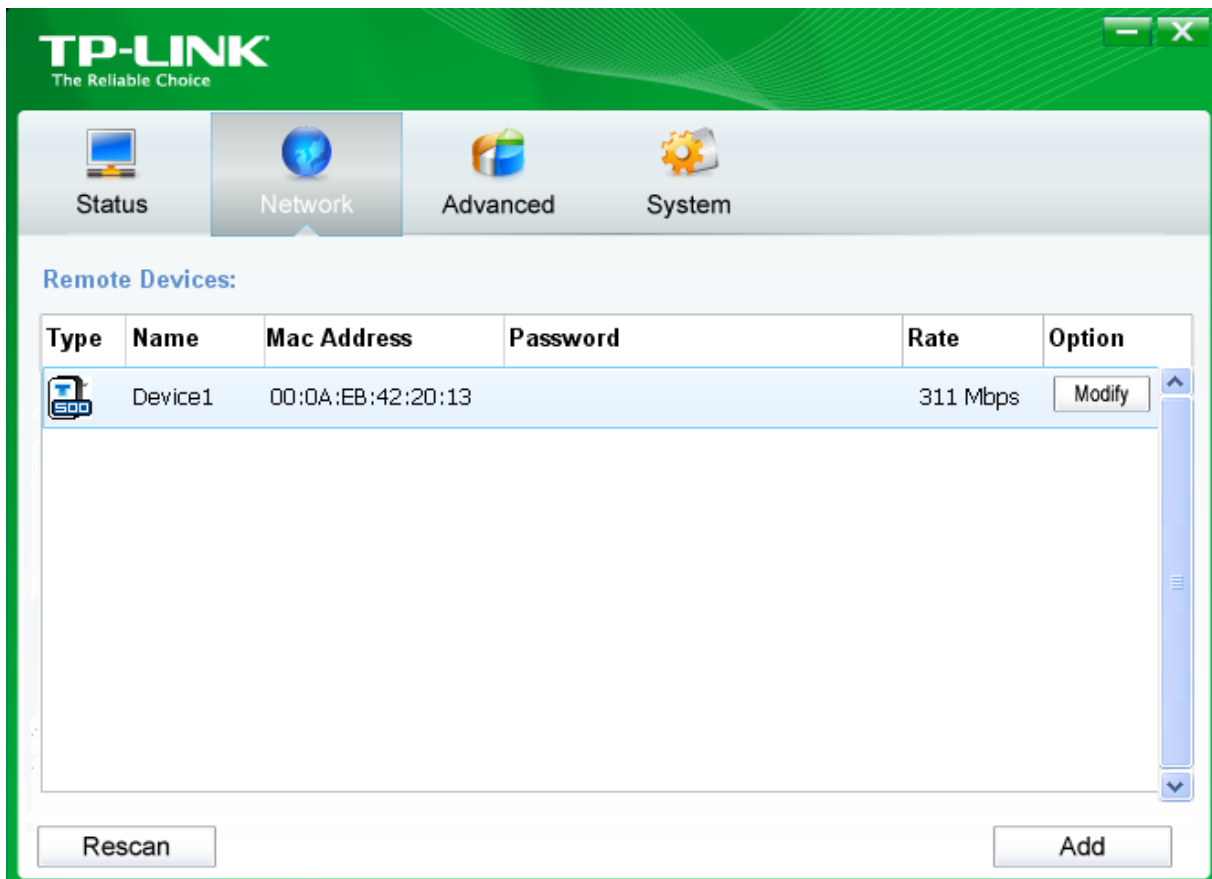
4.1.1 Set Local Device's Network Name

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 4~23 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 take effect.

4.2 Network

The **Network** tab window shows information of all the powerline adapters found on the current logical network. Furthermore, here you can change the Name of the listed powerline adapters as well as add another device to the current network.

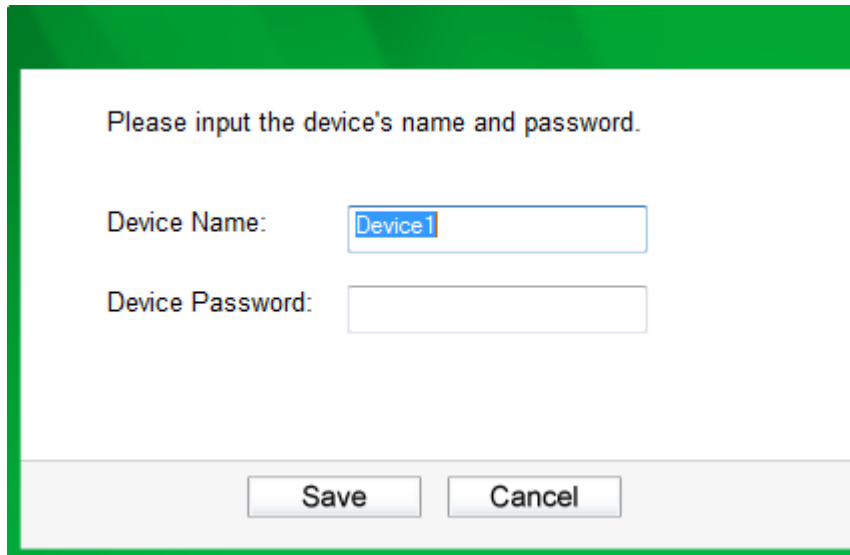


- **Type:** Displays the type of the remote device found in the network.
- **Name:** Displays the name of the remote device found in the network. You can change its name following two steps: select the desired adapter and click the **Modify** button.
- **MAC Address:** Displays the MAC address of the remote device found in the network.
- **Password:** Displays the supplied Powerline Adapter's password (Initially left blank). To set the Powerline Adapter password (Which is required when creating a private network or managing all the devices), select the device shown in the figure and click the **Modify** button. Follow the pop-up dialog box to complete your password setting.
- **Rate:** Shows the current transmission rate of the Powerline Adapter.
- **Rescan:** Click the **Rescan** button to perform an immediate search of the remote Powerline Adapter. The Management Utility will automatically perform the scanning process and update the display every few seconds by default.
- **Option:** Select the device and click the **Modify** button to display a configuration dialog. There you can change the corresponding adapter's name and enter its password for future configuration.

4.2.1 Rename the Remote Device/Enter Password

You can change the name of the remote adapter to an easy-to-remember one. Additionally, you can select the desired adapter and enter its password (Take note of the password format) so as to set the network name of this device on **System** configuration homepage. To change the name of the remote adapter or enter its password, please follow the steps below:

- (1) Select the desired device and click the **Modify** button to display the following dialog.



Please input the device's name and password.

Device Name:

Device Password:

- (2) Enter a new name for the selected adapter and enter its password (Take note of the password format). The password can be found on the back of the adapter.
- (3) Click the **Save** button to make the settings effective.

 **Note:**

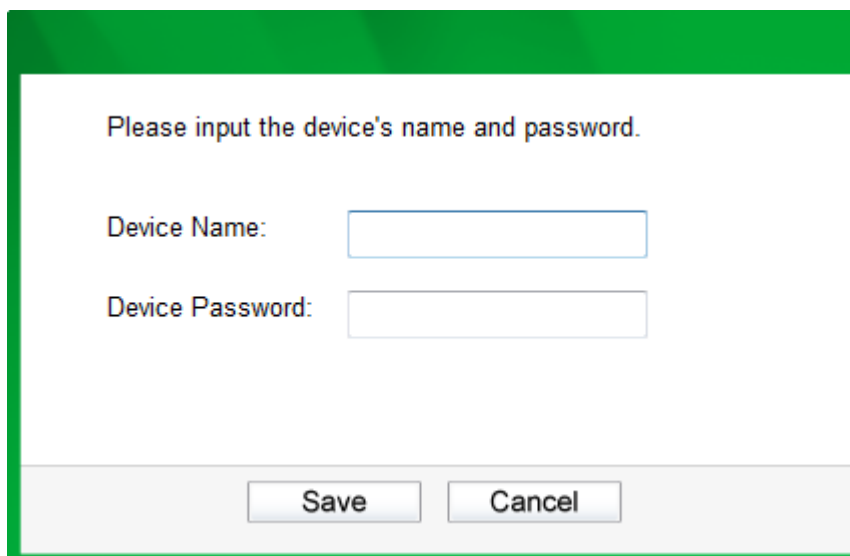
Password is unnecessary to enter for renaming.

4.2.2 Add Device

You can add a remote Powerline Adapter to your network that is not in the displayed list. You are suggested to locate the passwords for all Powerline Adapters you wish to manage and add them to the local logical network by clicking the **Add** button.

Click the **Add** button to display the following dialog box. This dialog box allows you to enter both the selected device's name and password. Note that the Powerline Adapter must be present on the power grid in order to activate the set password and be added to the local network.

Enter your **Device Name** and **Password** (Take note to the password format) and click the **Save** button after setup.



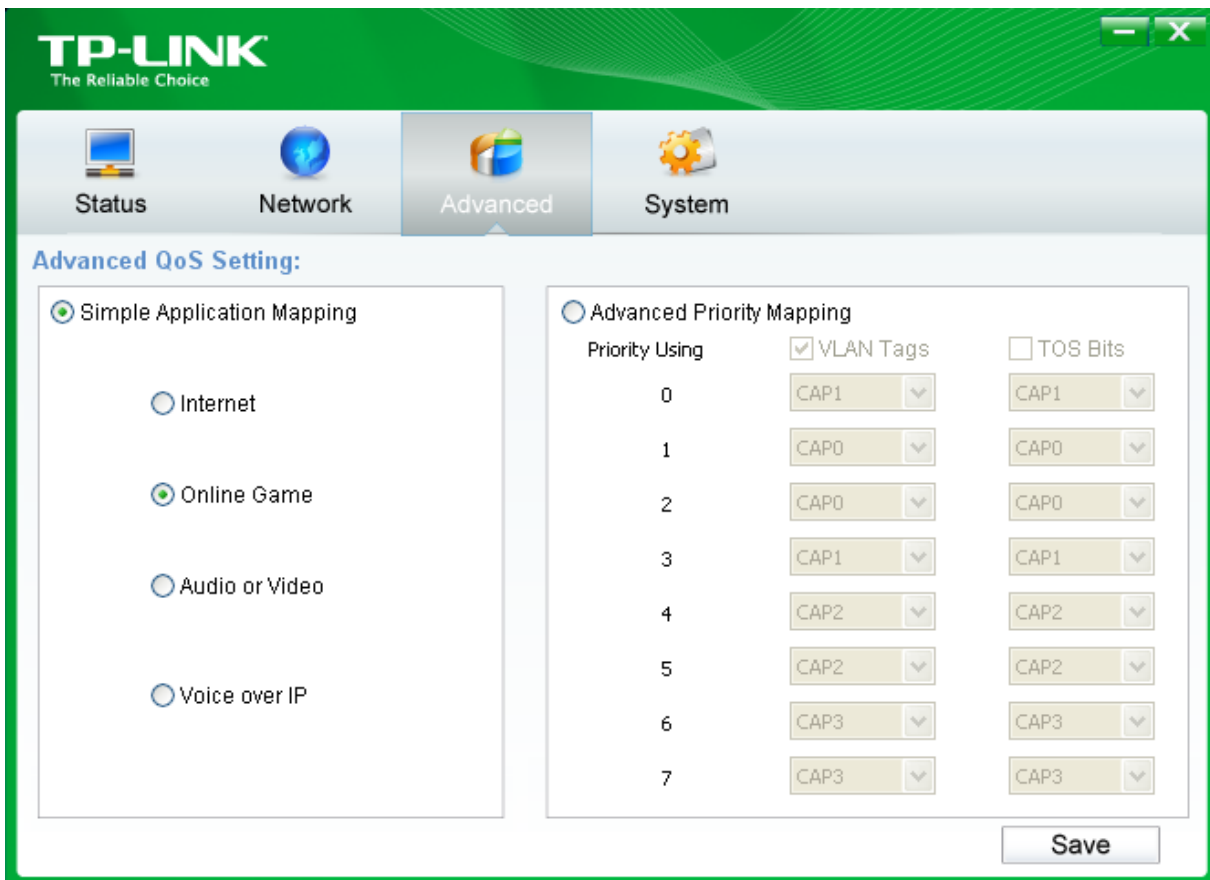
Please input the device's name and password.

Device Name:

Device Password:

4.3 Advanced

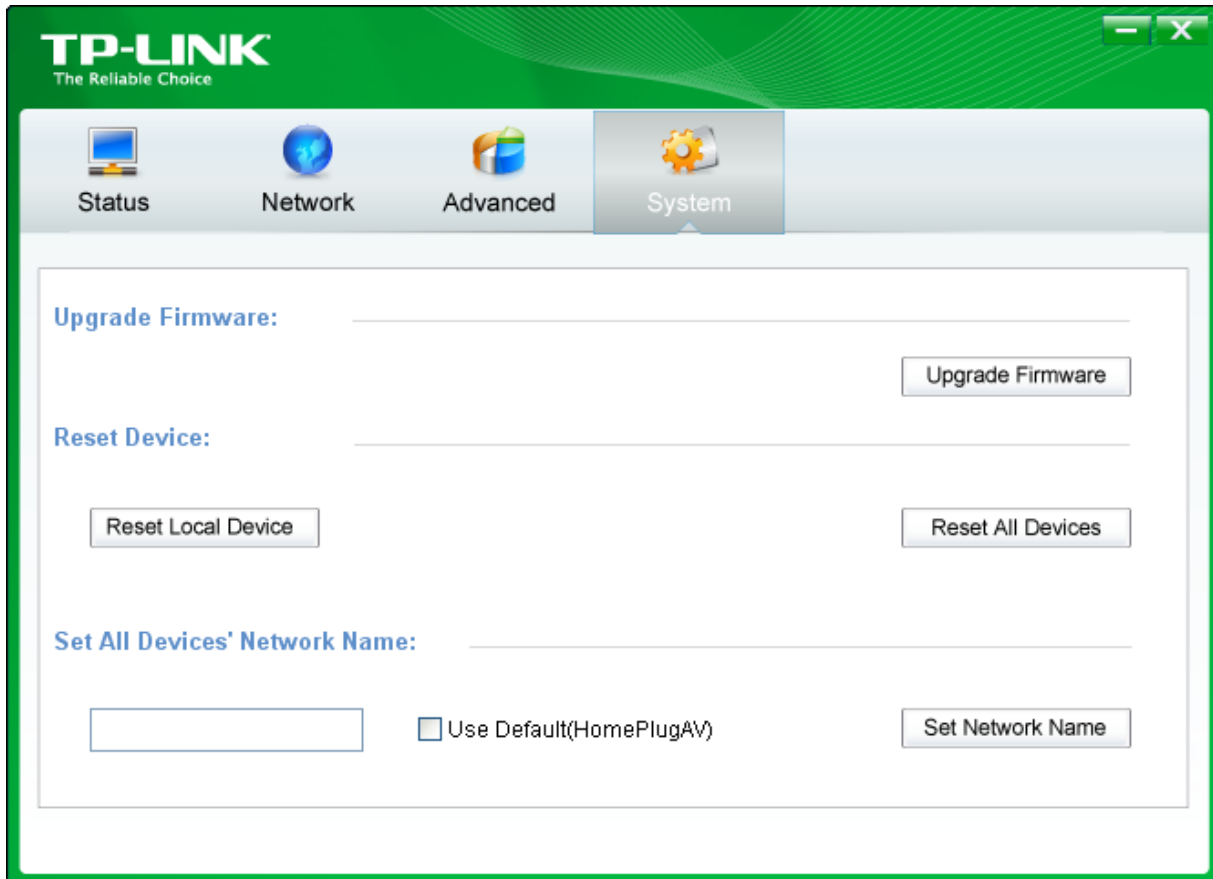
The third tab window labeled “**Advanced**” is for Quality of Service. With the proper configuration, the limit bandwidth can be taken full advantage. QoS requirements are different for various data types such as streaming video or music, voice and raw data. To provide higher QoS for streaming data, 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.

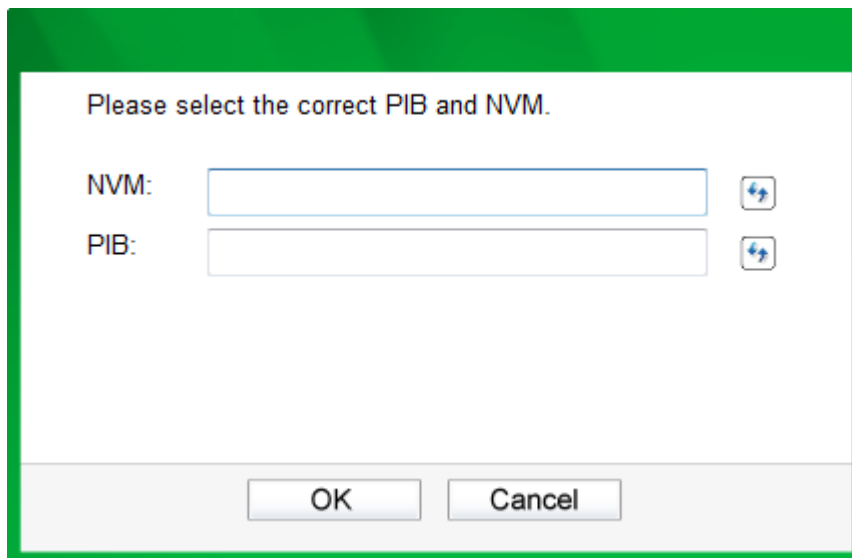
4.4 System

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, reset the adapter’s settings to the factory defaults and configure all adapters’ network names.



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.




- **NVM:** None-volatile memory. It is used for upgrading the firmware.
- **PIB:** Parameter Information Block. It contains configuration values that establish device network identity, general capabilities and operational modes.

 **Note:**

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

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

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

 **Note:**

Do not turn off the device while the firmware is being upgraded. The device will reboot after the upgrade has been 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 whose Device's Password had been entered for the same logical network.

4.4.3 Set All Devices' Network Name

The **Set All Devices' Network Name** function allows you to change the logical network of all devices that appear on the **Network** configuration homepage whose Device's Password has been entered for the same logical network. A dialog window will appear to report the success of this operation.

All Powerline devices are shipped using a default logical network (network name), which is normally "**HomePlugAV**".

To set all devices' network name, please enter the name in the field and click the **Set Network Name** to apply the setting.

 **Note:**

Every Powerline Adapter on your home network **MUST** have the same **Network Name** for connectivity to be established throughout your home.

Chapter 5 Advanced Feature: How to Use the Pair Buttons

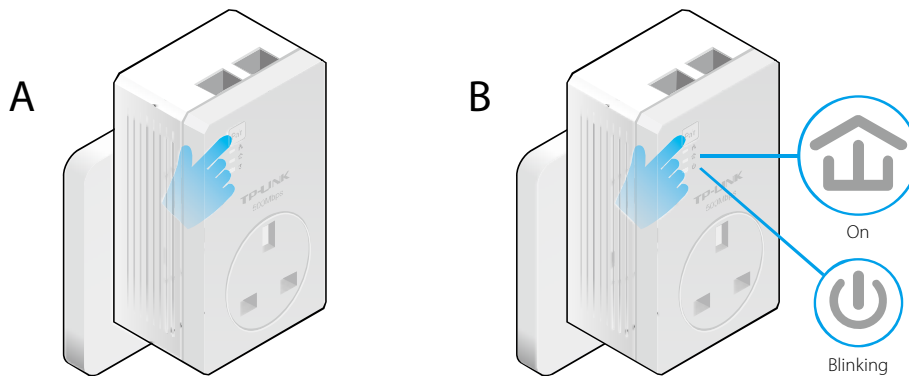
5.1 Pair (Secure with 128 bits-AES)

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 HomePlug AV compliant powerline devices which also support the **Pair** feature.

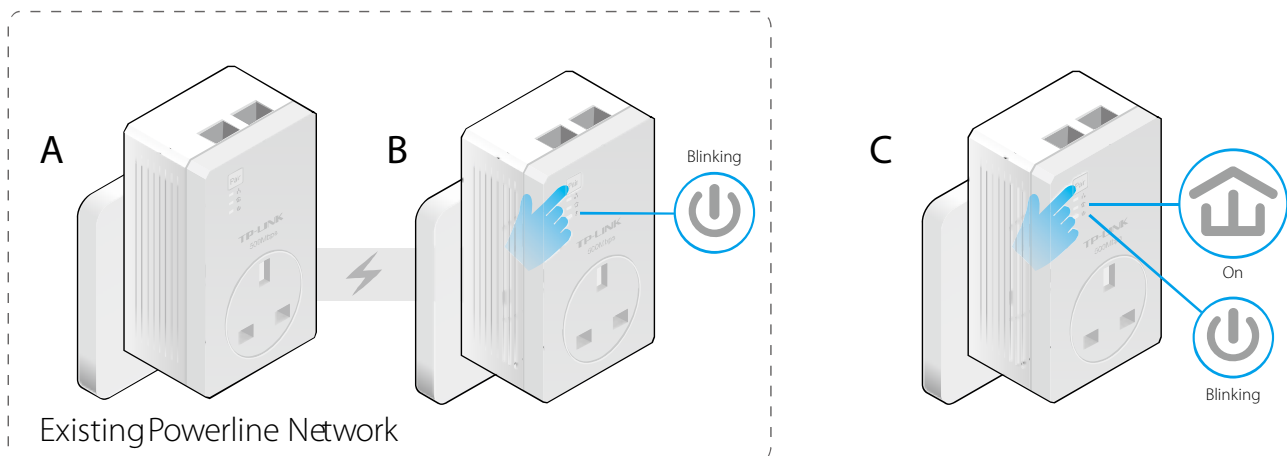
5.2 Set Up a Secured Powerline AV Network with the Pair Button

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 secured 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.** Press the Pair button of Powerline adapter B for one second, the Power LED will start flashing. (This must be done within 2 minutes after pressing the pair button of powerline adapter A.)
- Step 3.** Wait until the Power LED on both adapters stops flashing and becomes solid on, and the pairing is completed.



Join an existing secured Powerline AV 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.** Press and hold the Pair button on Powerline adapter A/B for one second.
(This step must be taken within 2 minutes after step 1 is finished.)
- Step 3.** Wait until the Power LED on both adapters stops flashing and becomes solid on, and the pairing is completed.

 **Note:**

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

Leave an existing secured Powerline AV Network:

As the figure above shown, Powerline adapter 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 at least 7 seconds. Powerline adapter A will reset and restart. (The Power LED of Powerline adapter A will momentarily extinguish during resetting, flash during restarting then illuminate steadily.)
- Step 2.** Wait for the reset to complete.

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 again. If the Power LED still fails 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 (RJ45) is properly connected to the Powerline Adapter's Ethernet port.
- 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.

3. The Powerline LED does not light up.

Ans. Check the following:

- 1) Double click to enable the Management Utility and click the “**Rescan**” tab under the **Network** configuration homepage. The Management Utility will automatically detect all other Powerline Adapters on your powerline network.
- 2) Try to add a second Powerline Adapter to the existing powerline network by plugging a Powerline Adapter into a nearby power outlet or by following “[5.2 Set Up a Secured Powerline AV Network with the Pair Button](#)” 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.