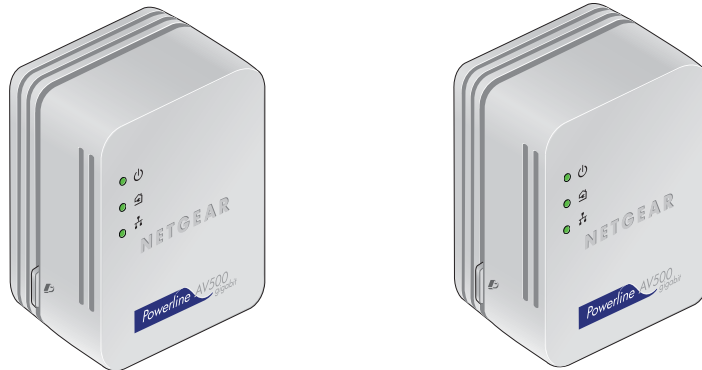


NETGEAR®

Powerline 500 Nano XAVB5101 User Manual



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February 2012
202-10961-02
v1.0

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Getting Started

1

This chapter describes your Powerline 500 Nano XAVB5101, and how your adapters can fit into a home network. For more information about the topics covered in this manual, visit the Support website at <http://support.netgear.com>.

Hardware Features

The package includes a Powerline 500 Nano XAVB5101 and an Ethernet cable.

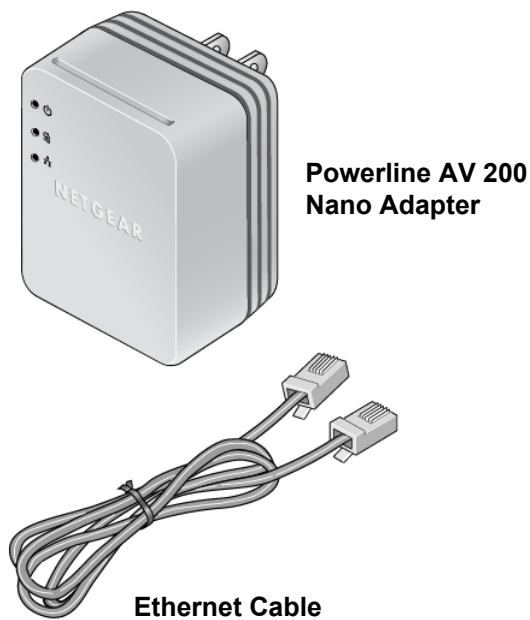


Figure 1. Package contents

Product Details

The following figure shows the adapter in detail:

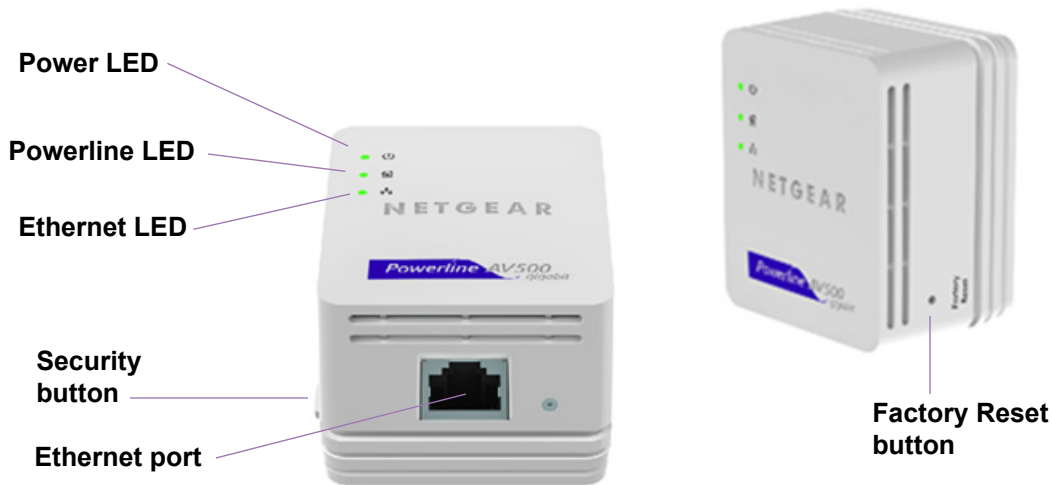







Figure 2. Adapter LEDs, buttons, and Ethernet port

Filtered AC Socket

The filtered AC socket can remove some electrical noise that can affect powerline performance. Plugging the power plugs of nearby devices into the filtered AC socket may improve performance.

LEDs

Item	Description			
Power LED 	<ul style="list-style-type: none"> • Solid green. The electrical power is on. • Blinking green. The adapter is restarting or setting up security. • Amber. Power saving mode. • Off. There is no electrical power. 			
Powerline LED   	<ul style="list-style-type: none"> • Solid. The adapter is connected to a Powerline network. • Blinking. The adapter is sending or receiving data. • Off. The adapter has not found any other compatible Powerline devices using the same encryption key. <p>The Pick A Plug feature lets you pick the electrical outlet with the strongest link rate, indicated by the color displayed by the LED:</p> <table border="1"> <tr> <td>Green: Link rate > 80 Mbps (best)</td> <td>Amber: Link rate > 50 and < 80 Mbps (better)</td> <td>Red: Link rate < 50 Mbps (good)</td> </tr> </table>	Green: Link rate > 80 Mbps (best)	Amber: Link rate > 50 and < 80 Mbps (better)	Red: Link rate < 50 Mbps (good)
Green: Link rate > 80 Mbps (best)	Amber: Link rate > 50 and < 80 Mbps (better)	Red: Link rate < 50 Mbps (good)		
Ethernet LED 	<ul style="list-style-type: none"> • Solid. The Ethernet port is linked, but there is no activity. • Blinking. There is traffic on the Ethernet port. • Off. There is no Ethernet connection. 			

Buttons

Two buttons are located on the side of the adapter:

- **Security.** After you plug in your new AV adapters, press the **Security** button for 2 seconds on both of the AV adapters. Both buttons must be pressed within 2 minutes.

***Note:** The Security button does not work in power saving mode. The unit enters power saving mode if the Ethernet port is idle (not linked) for more than 10 minutes.*

- **Reset.** Press the **Reset** button for 1 second, then release to return the Powerline adapter to its factory default settings.

Ethernet Port

Plug one end of the Ethernet cable that comes with the Powerline 500 Nano XAVB5101 into this port and the other end either into your router, or into the computer or other peripheral devices.

Powerline Adapter Label

The product label shows unique details specific to your adapter. The product label is located on the back of the adapter. The label contains the following information.

- Model number
- MAC address
- Device password
- Serial number

Powerline Adapter in a Home Network

You can use Powerline adapters to extend your Ethernet network anywhere in your home using your existing electrical power lines.

Here, an Ethernet cable connects the router to the Powerline network.

In another room, an Ethernet cable connects a gaming console to the Powerline network.

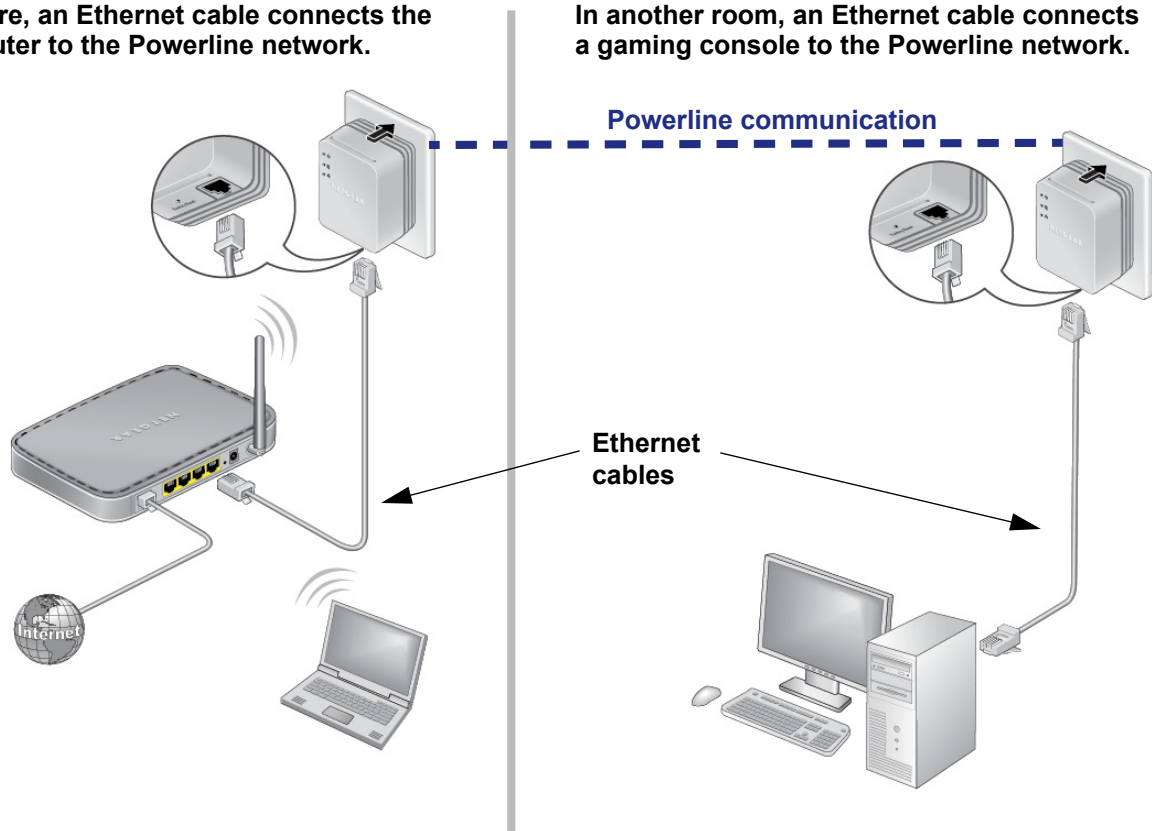


Figure 3. Powerline network with two Powerline adapters

For best performance, plan the location of your Powerline devices (to make a Powerline network, you need at least two Powerline devices):

- Use an electrical outlet that is not controlled by a wall switch to avoid someone unknowingly turning off the power to the outlet.
- Do not plug in Powerline products to a power strip, extension cord, or surge protector as this might prevent them from working correctly, or reduce the network performance.
- Avoid plugging Powerline products into electrical outlets located near an appliance that uses a lot of power, such as a washer or dryer, or a refrigerator. This could potentially prevent the adapters from working correctly, or reduce network performance.

Different Powerline adapter models can share the network. All Powerline NETGEAR AV products (models XAV101, XAV1004, XAV2001, XAV2501, and XAVN2001) are compatible.

To set up your Powerline network:

1. Make sure that your home router is up and running and that Ethernet wired connections are working.
2. Install the first Powerline adapter based on the installation instructions that came in the package.
3. Install the second Powerline adapter, which finds the adapter you just installed. The two Powerline devices form a Powerline network.
4. Install any additional Powerline adapters that you plan to use.
5. Test to make sure that the computer or peripheral can access the Powerline network.

For example, on a computer, use the Internet. Another way to test this is to install the Powerline Utility and use it to view all devices on the Powerline network.

6. NETGEAR recommends that you secure your Powerline network from unauthorized access, especially in settings such as apartment buildings. See [Powerline Network Security](#).

Powerline Network Security

A Powerline network consists of two or more Powerline adapters using the same network encryption key. Securing your network protects the information you send over the Powerline network from unwanted access. If you do not set up security on your network, anyone nearby with a Powerline network can potentially use his or her connection to gain access to your network and information you send over the Internet. This is especially relevant in settings such as apartment buildings, office buildings, dorm rooms, and other populated areas.

There are two ways to secure your Powerline network.

- Use the Security button to automatically generate a random encryption key.
- Use the Powerline Utility to specify an encryption key for your Powerline network. If you already have a Powerline network, you need to use the Powerline Utility, which is located on your *Resource CD*. See [Chapter 2, Powerline Utility](#).
- To return the Powerline adapter to its factory default settings, press its **Factory Reset** button for 1 second, then release.

Use the Security Button to Set the Encryption Key

Note: An adapter can generate a private key only once. If you want to replace a private key, first reset the adapters to their factory settings. To do this either press the **Reset** button for 1 second, then release; or use the Powerline Utility factory defaults feature (see [Reset a Device to Factory Settings](#) on page 15).

You can use the security button to change the default encryption key and set a private encryption key instead. The default encryption key is HomePlugAV.

1. Verify that all the Powerline adapters to be configured are plugged in.



WARNING!

Do not press the Security button on the Powerline adapter until installation is complete and all adapters on your network are plugged in and communicating with each other. Pressing the Security button too soon can temporarily disable Powerline communication. If this should occur, reset the Powerline adapter to its factory default settings (press the Reset button for 1 second, then release).

2. Press the Powerline adapter **Security** button for 2 seconds.
 - The Power LED starts blinking after you release the button.
 - The adapter automatically creates a new, randomly generated network encryption key that each Powerline adapter on the network will use.

At this point, the other adapters in your network cannot communicate with each other.

3. Within 2 minutes of pressing the Security button on the Powerline adapter, press the security button on the second adapter for 2 seconds.

In order to pair the devices, you need to press both buttons within 2 minutes.

This securely configures your Powerline network with the same network encryption key.

4. If your network has more than two adapters, press the **Security** button on the next adapter for 2 seconds, then push the **Security** button on any additional adapters in your network for 2 seconds. The adapters retain security settings even if they are unplugged.

Powerline Utility

2

This chapter explains how to install and use the Powerline Utility. The Powerline Utility works with many Powerline AV products. NETGEAR Powerline models XAV1004, XAV2001, XAV2101, and XAVN2001 are compatible and can share the same Powerline network.

You can use the Powerline Utility to access a local Powerline device that is connected to your computer with an Ethernet cable and also to access remote Powerline devices. Remote devices are on the Powerline network, but are not directly cabled to the computer on which you are using the Powerline Utility.

You can use the NETGEAR Powerline Utility to:

- Change the name of a Powerline device
- Turn LEDs on or off
- Set encryption keys
- Set up Quality of Service (QoS)
- Restore a device to default configuration settings

Install the Powerline Utility

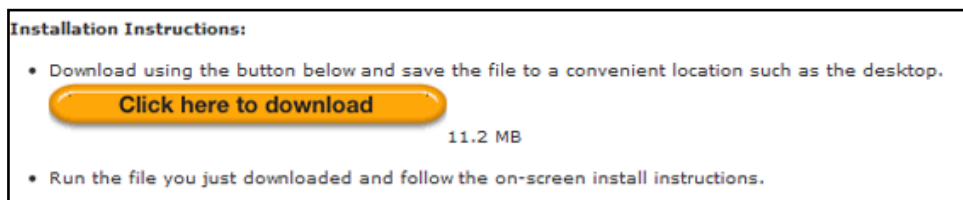
This utility allows you to set your own unique Powerline network encryption key, and prioritize traffic passing through your Powerline network.

All devices on a Powerline network can be managed from one computer. If you add another Powerline device to a Powerline network, you can install the Powerline Utility on the computer connected locally to the new adapter, or open the utility on the computer originally used to set up the Powerline network encryption key. You can use any computer to manage the network, but this procedure assumes that you are working from the computer that is connected to a Powerline adapter.

To install the Powerline Utility:

The Powerline utility is a free download available from the NETGEAR support website.

1. Launch an Internet browser and visit http://kb.netgear.com/app/answers/detail/a_id/18308
2. Scroll down to display the download instructions:



3. Click the **Click here to download** button and download the utility to your computer.
4. Run the file that you downloaded, and follow the wizard prompts to install the Powerline Utility. Click **Finish** to complete the wizard.

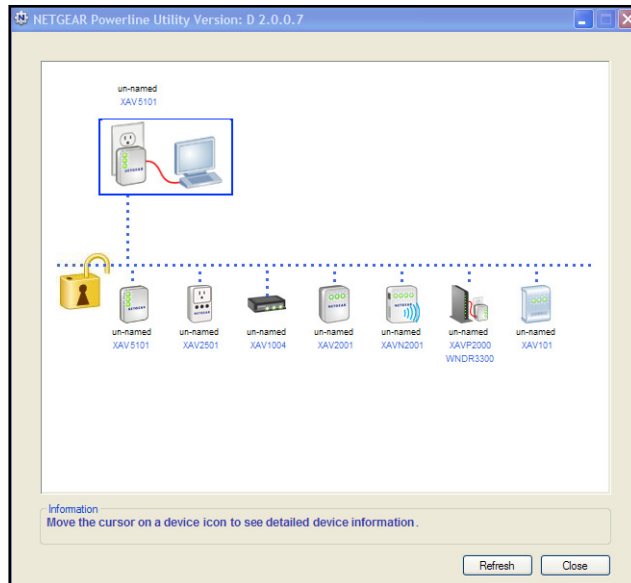
The Powerline Utility shortcut icon displays on your desktop.



5. There are two ways to launch the Powerline Utility:
 - Click this icon located on your desktop.
 - Select **Start > Programs > NETGEAR > NETGEAR Powerline Utility**.


Powerline Utility Screen

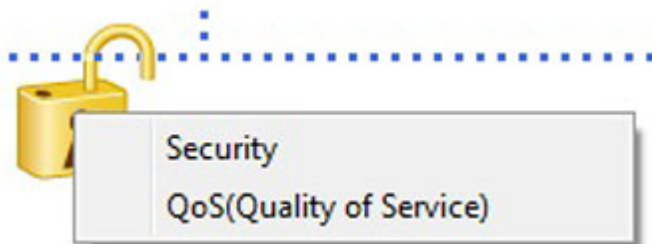
When launched, the Powerline Utility opens to a screen that shows all the devices in your Powerline network.



- Click the image of the device that you want to manage.
- If all devices are not shown, click the **Refresh** button to update the screen.
- The Information box at the bottom of the screen provides tips and information for using this utility screen.

Security Icon

You can click the Security icon  on the Powerline Utility main screen to go to the Security screen or the QoS (Quality of Service) screen:

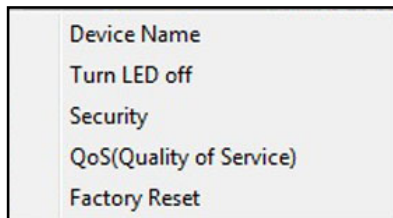


Change the Name of a Powerline Device

Powerline devices are identified by their model number and name. Any Powerline devices that are plugged in and connected are detected by the Powerline Utility, and are shown on the Powerline Utility main screen. If no name has been assigned to a Powerline device, it is shown as un-named.

To name a Powerline device in your Powerline network:

1. From the Powerline Utility main screen, click the device you want to name, and the following pop-up menu displays:



2. Select **Device Name**. The utility responds that connectivity will be temporarily lost if you continue.
3. Click **OK**. The following screen displays:



4. Enter a new name for the Powerline device, and click **OK**.

Turn LEDs Off or On

For each device in your Powerline network, you can turn the LEDs off or on. To do this, follow these steps:

1. Click the Powerline device icon on the Powerline Utility main screen.
2. On the pop-up menu, select **Turn LED off**.

Note: This feature is a toggle. You can turn off LEDs if they are turned on, or turn them on if they are currently turned off.

A screen displays advising you that connectivity will be temporarily lost while the LEDs are being reset.


Set the Powerline Encryption Key

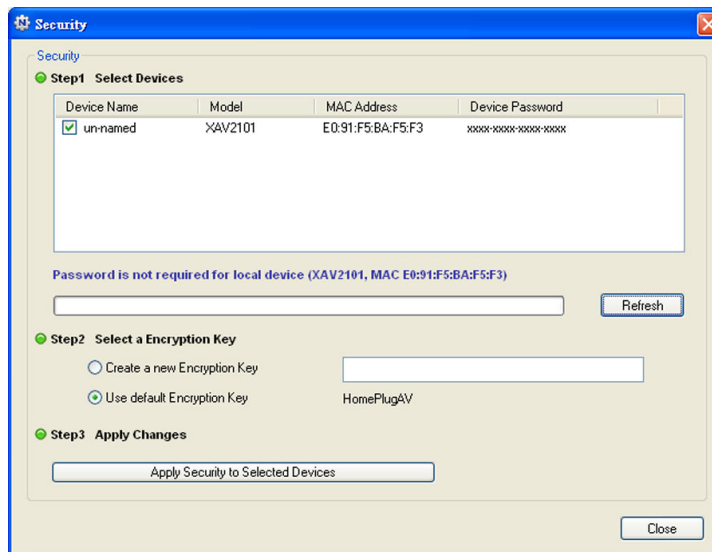
Powerline devices that share the same Powerline network have to use the same encryption key. The factory default encryption key is HomePlugAV.

In locations such as apartment buildings or office buildings, others might share the same electrical power lines that you use for your Powerline network. To protect your Powerline network from unwanted access, you can customize the encryption key for your Powerline devices. Make sure that you set up exactly the same encryption key for all of your Powerline devices so that they can communicate with each other.

You use the Security screen in the Powerline Utility to set encryption keys. If you customize the encryption key and then forget what it is, you can return your Powerline devices to their factory default Powerline encryption key of HomePlugAV.

To set the encryption key:

1. Click the Powerline device icon or the Security icon  on the Powerline Utility main screen.



The top section of the Security screen shows information about each device that the Powerline Utility detects.

- **Device Name.** This lists the Powerline devices detected on the network after the utility completes a scan for devices. The device name is initially set by the utility, but you can change it to a descriptive name such as Office or Master Bedroom.
- **Model.** This identifies the model number of the Powerline adapter.
- **MAC Address.** The MAC address for the Powerline device. This is also on the product label, which might not be visible when the device is plugged in.
- **Device Password.** To change settings for a remote Powerline device you have to enter its password. The device password is located on the product label.

2. Select the check box for each device for which you want to set the encryption key.
3. In Step 2 on your screen, select the option that you want:
 - **Create a new Encryption Key.** To set your own network encryption key, type your network encryption key in the field.
 - **Use default Encryption Key.** When you click this button, the factory default encryption key automatically displays in the field. The default network encryption key is HomePlugAV.

***Note:** Before you can reset the encryption key for a remote device, you have to enter its password. The password is printed on the product label located on the back of the adapter.*

4. Click the **Apply Security to Selected Devices** button.

When you are finished setting the encryption key, the utility displays a message indicating that the operation was successful.

5. Click **OK**.

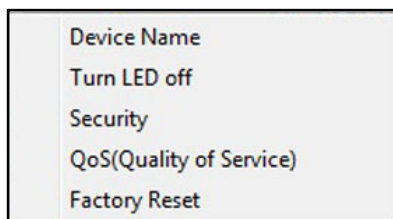
Reset a Device to Factory Settings

This option returns the network encryption key to its factory default of HomePlugAV.

Note: If you customized your network encryption key, the local Powerline device is disconnected from the network when you reset it to the factory default. To avoid this problem, reset all remote devices before you reset the local device.

To reset a device to its factory settings:

1. On the Powerline Utility main screen, click the Powerline device icon. The pop-up menu displays:



2. Select **Factory Reset**. A message displays asking you to confirm the reset.
3. Click **OK** to reset the device. A message indicates whether or not the operation succeeded.

Add a Device to a Powerline Network

If you are adding a device to a Powerline network, and the network encryption key has been left at its default setting, all you need to do is plug the new device into a power outlet.

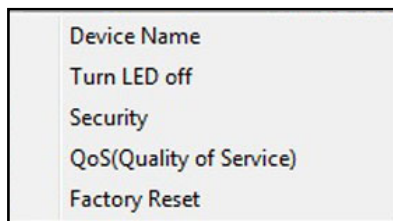
If the network encryption key has been customized, there are two ways to set the security:

- You can use the Security button to add the new device to your network. See [Use the Security Button to Set the Encryption Key](#) on page 8.
- You can use the Powerline Utility to add the new device to the network, as described in the following sections.

The procedure for setting the network encryption key depends on whether you use the Powerline Utility on a computer connected directly to the new Powerline adapter (local) or a different Powerline adapter (remote).

To add a Powerline device from a local computer:

1. Plug the Powerline adapter into an available AC power outlet.
2. Use the provided cable to connect the Powerline device to an Ethernet port on the computer.
3. Start the Powerline Utility, click the **Refresh** button, and wait for the utility to detect the new device.
4. Click the device, and select **Security** from the drop-down list.



5. Set the encryption key for the device (see [Set the Powerline Encryption Key](#) on page 14).

Verify that the devices in the Powerline network are in the device list by clicking the **Refresh** button. It might take a minute or two for all devices in the network to be detected.

Set Up Quality of Service (QoS)

The Quality of Service (QoS) feature helps you prioritize your Powerline network traffic. By default, all types of traffic on the Powerline network are assigned the same priority. For most applications, this works fine. However, there are situations where performance improves if you assign a higher priority to certain types of traffic, such as multimedia files.

If your network traffic is a mix of multimedia traffic and document and database traffic you might want to give priority to a particular traffic type. If it is important that your multimedia playback is smooth, even while document files are being transferred over the network, then give priority to multimedia traffic. Conversely, if it is more important for your network to be


responsive to database applications, give priority to this type of application over multimedia applications.

The Powerline AV Ethernet Adapter supports the following:

- MAC address
- IP port
- VLAN tags
- ToS bits (Type of Service routing)

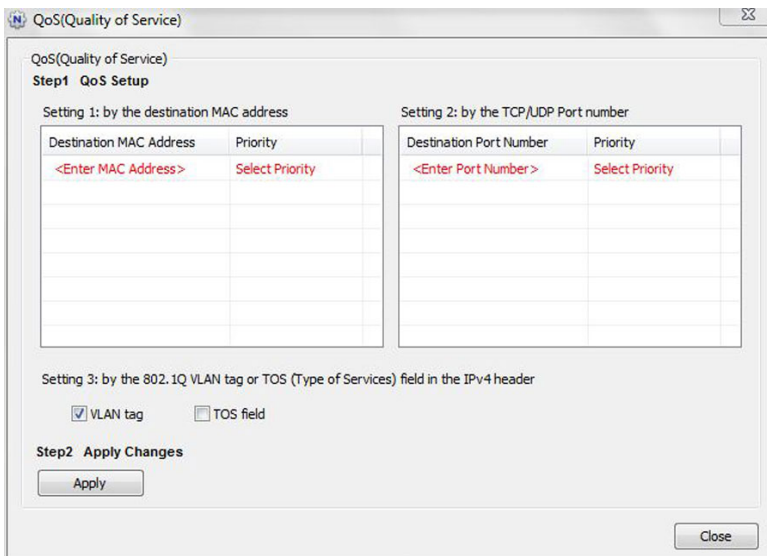
QoS settings are applied the Powerline devices on the Powerline network.

To set up Quality of Service for Powerline devices:

1. Start the Powerline Utility and wait for the utility to detect the Powerline AV Ethernet adapters connected to the network.
2. Either click the device, or click the Security icon .



3. Select **QoS (Quality of Service)**. The following screen displays:



You can use these methods to set up QoS:

- Destination MAC address
- TCP/UPP port number
- 802.1Q VLAN tag or ToS

4. To set the traffic prioritization rule for the selected Powerline AV Ethernet Adapter device, click **Priority** and specify the priority in the QoS Setup section of the screen.
5. If applicable, select the **VLAN tag** or **TOS field** check box.

These options apply only to QoS-configured networks. IEEE 802.1p uses prioritization bits in Layer-2 frames. Type of Service (ToS) routing uses prioritization bits in Layer-3 IP packets. The deprecated ToS values range from 0 to 7.

6. Click **Apply**.

Basic Functioning

After you plug in the Powerline adapter, the following sequence of events should occur:

1. The Power LED lights up.
2. After approximately 10 seconds, verify that:
 - a. The Power LED is solid green.
 - b. The Powerline LED is lit.
 - c. The Ethernet LED lights or blinks.

Troubleshooting Tips

The Reset and Security buttons are located on the side panel of the adapter.

- Pressing the Reset button longer than 2 seconds does not reset the device.
- Pressing the Security button longer than 2 seconds does not activate security.

LEDs

The LEDs indicate activity, and can be used for troubleshooting.

LEDs Are Off When the Adapter Is Plugged In

- First check to make sure that the electrical outlet has power.
- If power is supplied and the LEDs stay off, someone might have used the Powerline Utility to turn off the LEDs. Use the Powerline Utility to see if that is the case. If so, then use the Powerline Utility to turn them back on.

Power LED

- **Off.** Make sure that power is supplied to the electrical outlet, and that the Powerline devices are not plugged into an extension cord, power strip, or surge protector.

- **Amber.** Power saving mode occurs when the Ethernet LED is off. This can occur when:
 - The Ethernet cable is unplugged.
 - The device connected through the Ethernet cable is turned off.
 - The adapter is idle for 10 minutes.

The adapter returns to normal mode within 2 seconds once the Ethernet link is up.

Powerline LED

- **Off.** The Powerline devices cannot find each other. Make sure that the Powerline devices are plugged into outlets with power, and that they use the same network encryption key.
 - Move the Powerline device to a location closer to the computer or devices.
 - If you have set up network security, make sure that all Powerline devices are using the same encryption key.
 - If the problem occurred after you changed the network encryption key, reset each device to its factory default settings. Then you can customize the encryption key.
- **Amber or red.** Move the Powerline device to a closer location.

Ethernet LED Does Not Blink

There is no data traffic. Make sure that:

- Your router and modem are switched on.
- The adapter's cable is securely connected to a router LAN port.
- The PC connected directly to the router can access the Internet.
- Press the **Reset** button on each Powerline device for 1 second to return the Powerline adapter to its factory default settings.

If You Do Not See All Your Devices with the Powerline Utility

If you click **Refresh** on the main screen of the Powerline Utility, and do not see all the devices you expect, it could be that a Powerline adapter is in power saving mode or is set to use a different encryption key.

- **Power saving mode.** You might see a message at the bottom of the screen regarding the power saving feature. If a unit goes into power saving mode, the Powerline Utility does not find it. Keeping a connected Ethernet cable plugged into the device keeps it active so that it does not go in to power saving mode.
- **Encryption keys are different.** To fix this, you can do one of the following:
 - Reset your Powerline adapters to their factory settings and default encryption key. Then set the encryption for all of your Powerline adapters.
 - Connect your computer to each Powerline device and set up the network encryption key for one adapter at a time.

Supplementary Information



Technical Specifications

Feature	Specification
Data and routing protocols	IEEE 802.3 (10BASE-T), IEEE 802.3u (100BASE-Tx), IEEE 802.3ab (1000BASE-Tx)
AC input	100-240V~, 0.2A (Max)
Power consumption	Normal: 4W, Power saving mode: <1W
Dimensions	Height: 67 mm Width: 55 mm Depth: 34 mm
Weight	0.22 lbs (0.1kg)
Operating temperature	0° to 40° C (32° to 104° F)
Operating humidity	10–90% maximum relative humidity, noncondensing
Storage humidity	5–95% maximum relative humidity, noncondensing
Security encryption type	128-bit AES
MAC addresses	64: number of nodes that can be added to a single network
Bandwidth	500 Mbps
Compatibility	Not HomePlug v1.0 or HomePlug v1.0 Turbo compatible
Data transfer rate	Up to 240 Mbps
Frequency band:	2-80 Mbps
Modulation type:	OFDM symbol modulation
Electromagnetic emissions:	FCC Part 15 Class B; CE-EMC Class B; 3-home FCC Certificate
Safety agency approvals:	UL Listed (UL 1950) /cUL IEC950; CE LVD; TUV CB, TUV GS

Safety Information

Follow these safety guidelines to ensure your own personal safety and to help protect your system from potential damage.

- Do not service any product except as explained in your system documentation.
- Opening or removing covers that are marked with the triangular symbol with a lightning bolt may expose you to electrical shock. Only a trained service technician should service components inside these compartments.
- To help avoid damaging your system, be sure that the voltage selection switch (if provided) on the power supply is set to match the power available at your location:
 - 110 volts (V), 60 hertz (Hz) in most of North and South America and some Far Eastern countries such as South Korea and Taiwan
 - 100 V, 50 Hz in eastern Japan and 100 V, 60 Hz in western Japan
 - 230 V, 50 Hz in most of Europe, the Middle East, and the Far East
- Be sure that attached devices are electrically rated to operate with the power available in your location.

Additional safety information is included in [Appendix B, Notification of Compliance](#).

Notification of Compliance

B

NETGEAR Powerline Products

Safety Instructions and Precautions



WARNING!

Use the following safety guidelines to ensure your own personal safety and to help protect your product from potential damage. To reduce the risk of bodily injury, electrical shock, fire, and damage to the equipment, observe the following precautions.

- The socket-outlet shall be installed near the equipment and shall be easily accessible
- Observe and follow service markings.
- If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your service provider/retailer:
 - The power cable, extension cable, or plug is damaged.
 - An object has fallen into the product.
 - The product has been exposed to water.
 - The product has been dropped or damaged.
 - The product does not operate correctly when you follow the operating instructions.
- Keep your system away from radiators and heat sources. Also, do not block cooling vents.
- Do not spill food or liquids on your system components, and never operate the product in a wet environment.
- Do not push any objects into the openings of your system. Doing so can cause fire or electric shock by shorting out interior components.
- Operate the product only from the type of external power source indicated on the electrical ratings label.
- Also, be sure that attached devices are electrically rated to operate with the power available in your location.
- Use only approved power cables. If you have not been provided with a power cable for your system or for any AC powered option intended for your system, purchase a power cable that is approved for use in your country. The power cable must be rated for the product and for the voltage and current marked on the product's electrical ratings label.

The voltage and current rating of the cable should be greater than the ratings marked on the product.

- To help prevent electric shock, plug the system and peripheral power cables into properly grounded electrical outlets.
- Do not use adapter plugs. If you must use an extension cable, use a three-wire cable with properly grounded plugs.
- Observe extension cable and power strip ratings. Make sure that the total ampere rating of all products plugged into the extension cable or power strip does not exceed 80 percent of the ampere ratings limit for the extension cable or power strip.
- To help protect your system from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Position system cables and power cables carefully; route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cables.
- Do not modify power cables or plugs.
- Always follow your local and national wiring rules.

Regulatory Compliance Information

This section includes user requirements for operating this product in accordance with National laws for usage of radio spectrum and operation of radio devices. Failure of the end-user to comply with the applicable requirements may result in unlawful operation and adverse action against the end-user by the applicable National regulatory authority.

This product's firmware limits operation to only the channels allowed in a particular Region or Country. Therefore, all options described in this user's guide may not be available in your version of the product.

FCC Requirements for Operation in the United States

FCC Information to User

This product does not contain any user serviceable components and is to be used with approved antennas only. Any product changes or modifications will invalidate all applicable regulatory certifications and approvals.

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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Guidelines for Human Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Declaration Of Conformity

We, NETGEAR, Inc., 350 East Plumeria Drive, San Jose, CA 95134, declare under our sole responsibility that the Powerline Nano500 Set XAVB5101 complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

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

FCC Radio Frequency Interference Warnings & Instructions

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 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 methods:

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

Modifications made to the product, unless expressly approved by NETGEAR, Inc., could void the user's right to operate the equipment.

Canadian Department of Communications Radio Interference Regulations

This digital apparatus, the Powerline Nano500 Set XAVB5101, does not exceed the Class B limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

European Union

The Powerline Nano500 Set XAVB5101 complies with essential requirements of EU EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC as supported by applying the following test methods and standards:

- EN 60950-1: 2006 +A11:2009
- EN 55022:2006 w/A1:2007*
- EN 55024:1998 w/A1: 2001 and A2:2003
- EN 61000-3-2:2006
- EN 61000-3-3:2008
- CISPR/II/257/CDV Opt B and EN 50412-2-1:2005

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