NETGEAR®

ProSafe Wireless-N Access Point WNAP320

Reference Manual

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Introduction

1

This chapter introduces the NETGEAR ProSafe Wireless-N Access Point WNAP320 and describes some of the key features.

This chapter includes the following:

- minimum prerequisites for installation
- package contents (*What Is In the Box?* on page 8),
- description of the front and back panels of the WNAP320

About the ProSafe™ Wireless-N Access Point WNAP320

The NETGEAR ProSafe Wireless-N Access Point WNAP320 is the basic building block of a wireless LAN infrastructure. It provides connectivity between Ethernet wired networks and radio-equipped wireless notebook systems, desktop systems, print servers, and other devices.

The access point provides wireless connectivity to multiple wireless network devices within a fixed range or area of coverage—interacting with a wireless network interface card (NIC) through an antenna. Typically, an individual in-building access point provides a maximum connectivity area of about a 500 foot radius. Consequently, the NETGEAR ProSafe Wireless-N Access Point WNAP320 can support a small group of users in a range of several hundred feet. Most access points can handle between 10 to 30 users simultaneously.

The NETGEAR ProSafe Wireless-N Access Point WNAP320 acts as a bridge between the wired LAN and wireless clients. Connecting multiple ProSafe Wireless Access Points through a wired Ethernet backbone can further increase the wireless network coverage. As a mobile computing device moves out of the range of one access point, it moves into the range of another. As a result, wireless clients can freely roam from one access point to another and still maintain seamless connection to the network.

The auto-sensing capability of the NETGEAR ProSafe Wireless-N Access Point WNAP320 allows packet transmission at up to 300 Mbps, or at reduced speeds to compensate for distance or electromagnetic interference.

What Is In the Box?

The product package should contain the following items:

- NETGEAR ProSafe Wireless-N Access Point WNAP320
- Power adapter and cord (12Vdc, 1.0A)
- Straight-through Category 5 Ethernet cable
- NETGEAR WNAP320 Wireless-N Access Point Installation Guide
- *Resource CD*, which includes this manual
- Vertical stand feet (2)
- Wall mount kit made up of brackets (2) and hardware

Contact your reseller or customer support in your area if there are any missing or damaged parts.

Refer to the for the the NETGEAR, Inc., website at *http://kbserver.netgear.com/main.asp* for the telephone number of customer support in your area. You should keep the *Installation Guide*, along with the original packing materials, and use the packing materials to repack the access point if you need to return it for repair.

To qualify for product updates and product warranty, NETGEAR encourages you to register on the NETGEAR Web site at *http://my.netgear.com/registration/login.aspx.*

System Requirements

Before installing the access point, make sure that your system meets these requirements:

- A 10/100/1000 Mbps local area network device such as a hub or switch
- The Category 5 UTP straight-through Ethernet cable with RJ-45 connector included in the package, or one like it
- A 100–120 V, 50–60 Hz AC power source
- A Web browser for configuration such as Microsoft Internet Explorer 5.0 or later, or Mozilla 3.0 or later
- At least one computer with the TCP/IP protocol installed
- 802.11b/g- or 802.11b/g-compliant devices, such as the NETGEAR WG511 Wireless Adapter

Key Features and Standards

The ProSafe Wireless Access Point is easy to use and provides solid wireless and networking support. It also offers a wide range of security options.

Supported Standards and Conventions

The following standards and conventions are supported:

- *Standards Compliance*. The wireless access point complies with the IEEE 802.11 b/g standards for wireless LANs, and is WiFi certified for 802.11n draft 2.0 standard.

- **Full WPA and WPA2 support**. The wireless access point provides WPA and WPA2 enterprise-class strong security with RADIUS and certificate authentication as well as dynamic encryption key generation. The WPA-PSK and WPA2-PSK preshared key authentication is without the overhead of RADIUS servers but with all of the strong security of WPA.

- **Multiple BSSIDs**. The access point supports multiple BSSIDs. When a product family is connected to a wired network and a set of wireless stations, it is called a Basic Service Set (BSS). The Basic Service Set Identifier (BSSID) is a unique identifier attached to the header of packets sent over a WLAN that differentiates one WLAN from another when a mobile device tries to connect to the network.

  The multiple BSSID feature allows you to configure up to eight SSIDs per radio mode on your access point and assign different configuration settings to each SSID. All the configured SSIDs are active, and the network devices can connect to the access point by using any of these SSIDs.

- *DHCP client support*. DHCP provides a dynamic IP address to PCs and other devices upon request. The access point can act as a client and obtain information from your DHCP server; it can also act as a DHCP server and provide network information for wireless clients.

- **SNMP** *Support*. Support for Simple Network Management Protocol (SNMP) Management Information Base (MIB) management.

- 802.1Q VLAN (virtual LAN) support. A network of computers that behave as if they are connected to the same network even though they might actually be physically located on different segments of a LAN. VLANs are configured through software rather than hardware, which makes them extremely flexible. VLANs are very useful for user and host management, bandwidth allocation, and resource optimization.

Key Features

The *WNAP320* Access Point provides solid functionality, including the following features:

- *Multiple operating modes:*
  - *Wireless Access Point. Operates as a standard 802.11b/g/n access point.*
  - *Point-to-Point Bridge. In this mode, the access point communicates only with another bridge-mode wireless station or access point. Network authentication should be used to protect this communication.*
  - *Point-to-Multi-Point Bridge. Select this only if this access point is the "master" for a group of bridge-mode wireless stations. The other bridge-mode wireless stations send all traffic to this master, and do not communicate directly with each other. Network authentication should be used to protect this traffic.*
  - *Wireless Repeater. In this mode, the access point* does not function as an access point. It communicates only with Repeater mode, Point-to-Point Bridge mode, and Point-to-Multi-point-bridge-mode wireless stations. *Network authentication should be used to protect this communication.*

- Hotspot settings. You can allow all HTTP (TCP, port 80) requests to be captured and redirected to the URL you specify.

- **Upgradeable firmware.** *Firmware is stored in a flash memory, you can upgrade it easily, using only your Web browser,* and you can upgrade it remotely. *You can also use the command-line interface.*

- **Rogue AP detection**. The Rogue AP filtering feature ensures that unknown APs are not given access to any part of the LAN.

- *Access Control.* The Access Control MAC address filtering feature can ensure that only trusted wireless stations can use the access point to gain access to your LAN.

- **Security profiles**. When using multiple BSSIDs, you can configure unique security settings (encryption, SSID, and so on) for each BSSID.

- **Hidden mode**. The SSID is not broadcast, assuring only clients configured with the correct SSID can connect.

- **Configuration backup**. Configuration settings can be backed up to a file and restored.

- **Secure and economical operation**. Adjustable power output allows more secure or economical operation.

- **Power over Ethernet**. Power can be supplied to the access point over the Ethernet port from any 802.3af-compliant mid-span or end-span source.

- **Autosensing Ethernet connection with Auto Uplink™ interface**. Connects to 10/100/1000 Mbps IEEE 802.3 Ethernet networks.

- **LED indicators**. Power, Test, LAN speed, LAN activity, and wireless activity for each radio mode are easily identified.

- Wireless Multimedia (WMM) support. WMM is a subset of the 802.11e standard. WMM allows wireless traffic to have a range of priorities, depending on the kind of data. Time-dependent information, like video or audio, has a higher priority than normal traffic. For WMM to function correctly, wireless clients must also support WMM.

- Quality of Service (QoS) Support. You can configure parameters that affect traffic flowing from the product family to the client station and traffic flowing from the client station to the product family. The QoS feature allows you to prioritize traffic, such as voice and video traffic, so that packets do not get dropped.

- VLAN security profiles. Each security profile is automatically allocated a VLAN ID when the security profile is modified.

802.11b/g/n Standards–based Wireless Networking

The NETGEAR ProSafe Wireless-N Access Point WNAP320 provides a bridge between Ethernet wired LANs and 802.11b/g and 802.11 draft n–compatible wireless LAN networks. It provides connectivity between Ethernet wired networks and radio-equipped wireless notebook systems, desktop systems, print servers, and other devices. Additionally, the access point supports the following wireless features:

- Aggregation support

- Reduced InterFrame spacing support

- Multiple input, multiple output (MIMO) support

- Distributed coordinated function (CSMA/CA, back-off procedure, ACK procedure, retransmission of unacknowledged frames)

- RTS/CTS handshake

- Beacon generation

- Packet fragmentation and reassembly

- Auto or long preamble

- Roaming among access points on the same subnet

Autosensing Ethernet Connections with Auto Uplink

The access point can connect to a standard Ethernet network. The LAN interface is autosensing and capable of full-duplex or half-duplex operation.

The product family incorporates Auto Uplink™ technology. The Ethernet port automatically senses whether the Ethernet cable plugged in to the port should have a "normal" connection such as to a computer or an "uplink" connection such as to a switch or hub. That port then configures itself correctly. This feature also eliminates any concerns about crossover cables, as Auto Uplink accommodates either type of cable to make the right connection.

Hardware Description

This section describes the front and rear hardware functions of the access point.

Front Panel

The WNAP320 hardware functions are described in the following figure and table.
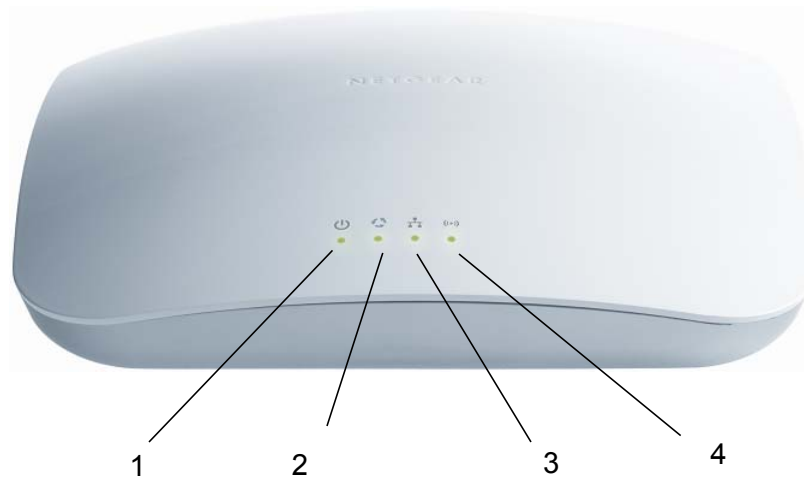
Figure 1.

The following table explains the LED:

Table 1. Front Panel LEDs

Item	LED	DESCRIPTION
1		Power Off. Power is off. On. Power is on.
2		Test Blinking. The device is running a self-test or is loading software. This LED may blink for a minute before going off. If it continues to blink, it indicates a system fault.
3		Ethernet LAN Speed Off. A 10 Mbps or no link detected. Amber. A 10/100 Mbps link detected. Green. A 1000 Mbps link detected.
4		WLAN Blinking (Blue). Indicates Wireless activity has been detected.

Rear Panel

Figure 2.

The access pointrear panel functions are described in the following list:

1. Power socket. This socket connects to the WNAP320 12V 1.0A power adapter.
2. RJ-45 Ethernet port. Use the WNAP320 Ethernet RJ-45 port to connect to an Ethernet LAN through a device such as a hub, switch, router, or PoE switch.
3. Restore factory settings button. The restore to settings button restores the access point to the factory default settings.

Installation and Configuration 2

This chapter describes how to set up your ProSafe Wireless-N Access Point WNAP320 for wireless connectivity to your LAN. This basic configuration will enable computers with 802.11b/g/n wireless adapters to connect to the Internet, or access printers and files on your LAN.

> **Note:** Indoors, computers can connect over 802.11b/g/n wireless networks at ranges of several hundred feet or more. This distance allows others outside your area to access your network. It is important to take appropriate steps to secure your network from unauthorized access. The access point provides highly effective security features, which are covered in detail in *Understanding WNAP320 Wireless Security Options* on page 17. Deploy the security features appropriate to your needs.

You need to prepare these three things before you can establish a connection through your wireless access point:

- A location for the WNAP320 that conforms to the guidelines in the following section, *Wireless Equipment Placement and Range Guidelines* on page 15.
- The wireless access point connected to your LAN through a device such as a hub, switch, router, or cable/DSL gateway.
- One or more computers with correctly configured 802.11b/g/n wireless adapters.

Wireless Equipment Placement and Range Guidelines

The operating distance or range of your wireless connection can vary significantly based on the physical placement of the product family. The latency, data throughput performance, and notebook power consumption of wireless adapters also vary depending on your configuration choices.

Note: Failure to follow these guidelines can result in significant performance degradation or inability to wirelessly connect to the access point. For complete performance specifications, see *Appendix A, Supplemental Information*.

For best results, place your product family:

- Near the center of the area in which your PCs will operate.
- In an elevated location such as a high shelf where the wirelessly connected PCs have line-of-sight access (even if through walls).
- Away from sources of interference, such as PCs, microwaves, and 2.4 GHz cordless phones.
- Away from large metal surfaces.
- Putting the antenna in a vertical position provides best side-to-side coverage. Putting the antenna in a horizontal position provides best up-and-down coverage.

A wall mount kit is provided with your product family. For installation instructions, see *Mounting the ProSafe Wireless Access Point Using the Wall Mount Kit (Optional)* on page 26.

If using multiple access points, it is better if adjacent access points use different radio frequency channels to reduce interference. The recommended channel spacing between adjacent access points is five channels (for example, use channels 1 and 6, or 6 and 11).

The time it takes to establish a wireless connection can vary depending on both your security settings and placement. Some types of security connections can take slightly longer to establish and can consume more battery power on a notebook computer.

Cabling Requirements

The ProSafe Wireless Access Point connects to your LAN via twisted-pair Category 5 Ethernet cable with RJ-45 connectors.

Default Factory Settings

When you first receive your WNAP320, the default factory settings will be set. You can restore these defaults with the Factory Default Restore switch on the rear panel .To restore

your default settings, see *Appendix A, Supplemental Information* for a list of default settings and instructions on the use of the restore switch.

Understanding WNAP320 Wireless Security Options

Anyone wih a compatible wireless adapter can recieve your wireless data transmissions well beyond your walls. For this reason, use the security features of your wireless equipment. The access point provides highly effective security features, which are covered in detail in this chapter. Deploy the security features appropriate to your needs.
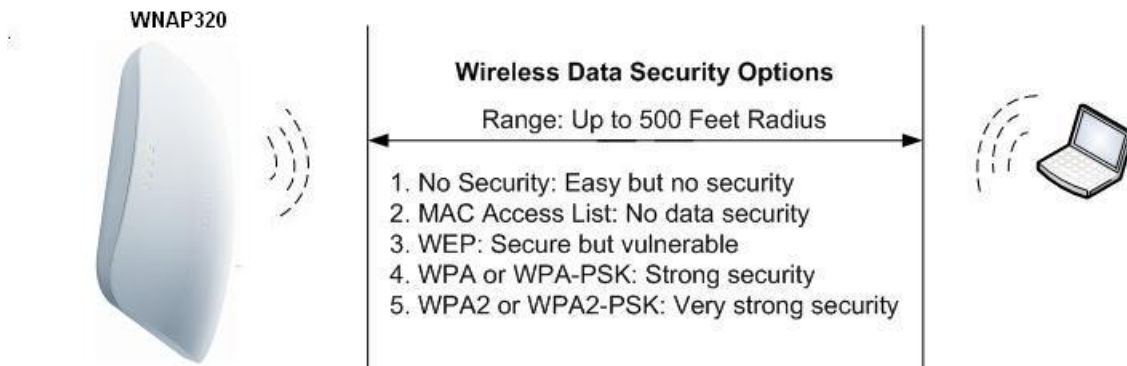
Figure 1.

There are several ways you can enhance the security of your wireless network:

- **Restrict access based on MAC address**. You can restrict access to only trusted PCs so that unknown PCs cannot wirelessly connect to the access point. MAC address filtering adds an obstacle against unwanted access to your network, but the data broadcast over the wireless link is fully exposed.

- **Turn off the broadcast of the wireless network name (SSID)**. If you disable broadcast of the SSID, only devices that have the correct SSID can connect. This nullifies the wireless network "discovery" feature of some products such as Windows XP, but the data is still fully exposed to a determined snoop using specialized test equipment like wireless sniffers.

- **Use WEP**. Wired Equivalent Privacy (WEP) data encryption provides data security. WEP open authentication and WEP data encryption will block all but the most determined eavesdropper.

- **Use WPA or WPA-PSK, WPA2, or WPA2-PSK**. Wi-Fi Protected Access (WPA) data encryption provides data security. The very strong authentication along with dynamic per frame rekeying of WPA make it virtually impossible to compromise. Because this is a new standard, wireless device driver and software availability might be limited.

> **Note:** WEP and TKIP provide only legacy (slower) rates of operation. AES encryption is recommended in order to use the 11n rates and speed. See *Table 1* on page 36.

Installing theWireless Access Point

Before installing the ProSafe Wireless-N Access Point WNAP320, you should make sure that your Ethernet network is up and working. You will be connecting the access point to the Ethernet network so that computers with 802.11b/g/n wireless adapters will be able to communicate with computers on the Ethernet network. For this to work correctly, you should verify that you have met all of the system requirements.

Setting Up the ProSafe Wireless Access Point

> **Tip:** Before mounting the access point in a high location, set up and test the access point to verify wireless network connectivity.

To set up the access point:

1. Prepare a computer with an Ethernet adapter. If this computer is already part of your network, record its TCP/IP settings.
2. Turn on your computer and configure it with a static IP address of 192.168.0.210 and a subnet mask of 255.255.255.0.
3. Connect an Ethernet cable from the access point to the computer.
4. Connect the power adapter to the access point, and verify the following:
   - The Power LED goes on.
   - The Ethernet LAN LED is lit when connected to a powered-on computer.
   - The WLAN LED is blinking.

Configuring Lan and Wireless Settings

To configure the access point for LAN access:

1. Connect to the access point by opening a browser window on your PC and entering *http://192.168.0.100* in the address field. The access point login screen displays.
2. Enter **admin** for the user name and **password** for the password, both in lower case letters.

Figure 2.

3. **Login**. The general screen of the the access point displays as shown in *Figure 3,* . The default settings should be suitable for most users and environments.

   • When the product family is connected to the Internet, you can select the Documentation link under the Web Support menu to view the documentation for the product family.

   • Select **LOGOUT** to exit the access point setup screens. (You arel automatically logged out of the product family after 5 minutes of no activity.)

Figure 3.

4. Enter the access point name of the WNAP320.

   This unique name is the access point NetBIOS name. The access point name is printed on the rear label of the access point. The default is **netgearxxxxxx,** where **xxxxxxx** represents the last 6 digits of the access point MAC address. You can replace the default name with a unique name up to 15 characters long.

5. From the **Country/Region** drop-down menu, select the region where the access point will be used (the Country/Region is not Configurable in the United States; but is configurable in the rest of the world). Click **Apply**.

   Note: If your country or region is not listed, please check with NETGEAR Support.

1. Select **System** > **Basic > Time**.
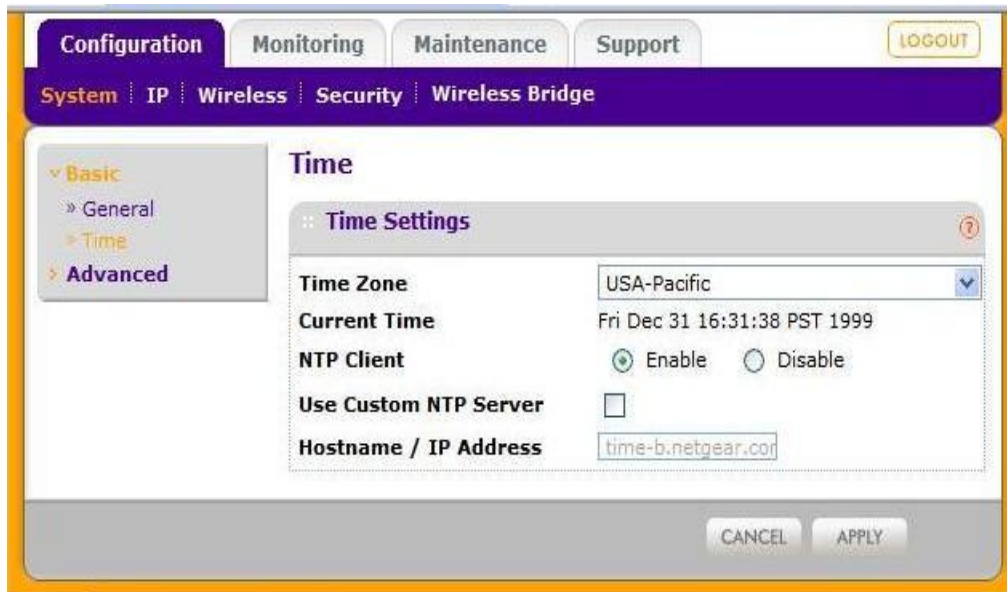
Figure 4.

- **Time Zone.** From the drop-down list, select the local time zone for your product family from a list of all available time zones. The default is **USA-Pacific**. The product family will get the current time from the connecting PC.

- **NTP Client.** Enable the NTP client to synchronize the time of the access point with an NTP server. The default is **Enable**.

Note: You must have an Internet connection to get the current time using an NTP client.

- **Use Custom NTP Server.** Select this check box if you have a custom NTP server. The default is not selected.

- **Hostname / IP Address.** Enter the host name or the IP address of the custom NTP server. The default is **time-b.netgear.com**.

2. Click **Apply.**

3. Select **Configuration > IP** to display IP Settings.
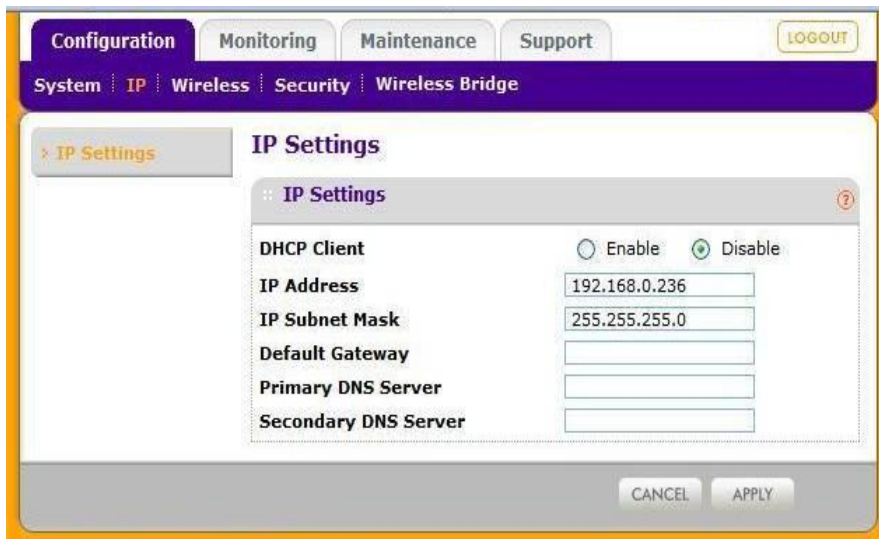
Figure 5.

4. Fill in the IP address fields of the access point. (See the online help for more information about how to specify the settings on this screen).

   • **DHCP Client**. By default, the Dynamic Host Configuration Protocol (DHCP) client is disabled. If you have a DHCP server on your LAN and you enable DHCP, the wireless access point will get its IP address, subnet mask, and default gateway settings automatically from the DHCP server on your network when you connect the access point to your LAN.

   • **IP Address.** Enter the IP Address of your product family.The default IP address is 192.168.0.100. To change it, enter an unused IP address from the address range used on your LAN; or enable DHCP.

   • **IP Subnet Mask**. The Access Point will automatically calculate the subnet mask based on the IP address that you assign. Otherwise, you can use 255.255.255.0 (the default) as the subnet mask.

   • **Default Gateway.** Enter the IP address of the gateway for your LAN. For more complex networks, enter the address of the router for the network segment to which the product family is connected. The default is 0.0.0.0.

   • **Primary DNS Servers.** The access point will use this IP address as the primary Domain Name Server used by stations on your LAN. The default is 0.0.0.0.

   • **Secondary DNS Servers.** The access point will use this IP address as the secondary Domain Name Server used by stations on your LAN. The default is 0.0.0.0.

5. Click **Apply** to save your Basic IP settings.

Note: If you change the default subnet of the LAN IP address, you will be disconnected from the access point user interface. To reconnect, reconfigure your computer with a static IP address within the new LAN IP subnet.

By default, the access point is set with the DHCP client disabled. If your network uses dynamic IP addresses, you must change this setting (see *Logging In to the ProSafe Wireless Access Point* on page 27),

Configuring Your Wireless Settings

The following sections describe how to configure the wireless settings for 802.11b/g/n operation.

To configure the access point wireless settings:

1. Select **Configuration** > **Wireless**.The Wireless Settings screen displays as shown in *Figure 6,* .
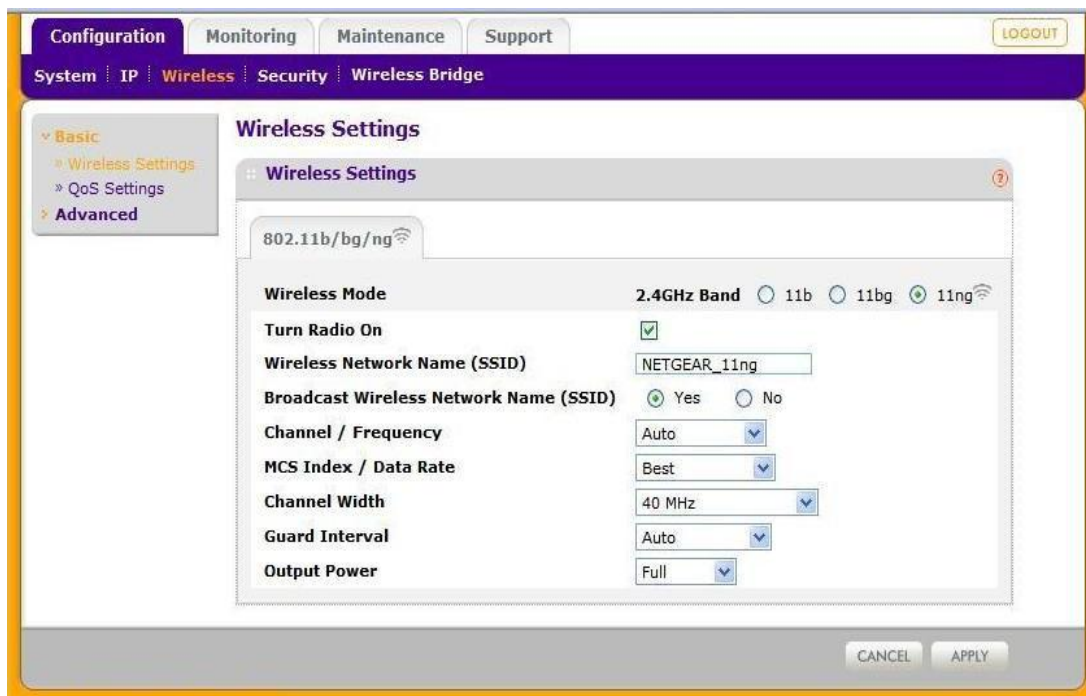

Figure 6.

2. Configure the Wireless LAN settings based on the following field descriptions:
   - **Wireless Mode**. Select the wireless operating mode you want to use:

-   11b. 802.11b wireless stations only.

-   11bg. Both 802.11b and 802.11g wireless stations can be used.

-   11ng. Both 802.11n, and 802.11g wireless stations can be used.

The default is 11ng.

- **Turn Radio On**. On by default, you can also turn off the radio to disable access through this device. This can be helpful for configuration, network tuning, or troubleshooting activities.

- **Wireless Network Name (SSID)**. Enter a 32-character (maximum) service set ID in this field; the characters are case-sensitive. When the product family is deployed in "infrastructure" mode, the SSID assigned to a wireless device must match the product family SSID for the wireless device to communicate with the access point. If they do not match, you will not get a wireless connection to the access point. The default is **NETGEAR**.

- **Broadcast Wireless Network Name (SSID)**. If **Yes**, the access point broadcasts its SSID allowing wireless stations which have a "null" (blank) SSID to adopt the correct SSID. If set to **No**, the SSID is not broadcast. The default is **Yes**.

- **Channel/Frequency**. From the drop-down list, select the channel you wish to use on your wireless LAN. The wireless channels to use in the United States. and Canada are 1 to 11; for Europe and Australia, 1 to 13. The default is **Auto**.

It should not be necessary to change the wireless channel unless you experience interference (shown by lost connections or slow data transfers). Should this happen, you might want to experiment with different channels to see which is the best. See the article "Wireless Networking Basics" available on the NETGEAR website. (A link to this article and other articles of interest can be found in *Related Documents* in Appendix A.

3. Click **Apply** to save your wireless settings.

Deploying the ProSafe Wireless Access Point

Now that you have completed the setup steps, you can deploy the access point in your network. If necessary, you can now reconfigure the computer you used in Step1 *Installing theWireless Access Point* on page 18.

> **Tip:** Before mounting the WNAP320 in a high location, first set up and test the WNAP320 to verify wireless network connectivity.

To deploy the access point:

1. Disconnect the access point from the PC, and position it where it will be deployed. The best location is elevated, such as on a wall or ceiling or on the top of a cubicle, at the center of your wireless coverage area, and within line of sight of all the mobile devices.

2. Connect an Ethernet cable from your access point to a LAN port on your router, switch, or hub.

> **Note:** By default, access point is set with the DHCP client disabled. If your network uses dynamic IP addresses, you must change this setting. To connect to the access point after the DHCP server on your network assigns it a new IP address, enter the product family name in your Web browser. The default product family name is **netgearxxxxxx**, where **xxxxxx** represents the last 6 bytes of the MAC address. The default name is printed on the bottom label of the access point.

3. If you are not using PoE, connect the power adapter to the wireless access point, and plug the power adapter into a power outlet. The Power and LAN LEDs should be on, and the WLAN LED should blink.

Verifying Wireless Connectivity

Follow the instructions in the next sections to set up and test basic wireless connectivity. Once you have established basic wireless connectivity, you can enable security settings appropriate to your needs (see *Understanding WNAP320 Wireless Security Options* on page 17).

The default SSID for the 802.11b/g/n is NETGEAR-11g. The SSID of any wireless access adapters must match the SSID configured in the ProSafe Wireless-N Access Point WNAP320. If they do not match, no wireless connection will be made.

> **Note:** If you are unable to connect, see *Chapter 5, Troubleshooting and Debugging*."

Logging In Using the Default IP Address

After you install the access point, log in to the product family to configure the basic settings and the wireless settings. The access point is set, by default, with the IP address of 192.168.0.100 with DHCP disabled.

> **Note:** The computer you are using to connect to the access point should be configured with an IP address that starts with 192.168.0.x and a subnet mask of 255.255.255.0.

To log in using the default IP Address:

1. Open a Web browser such as Internet Explorer, Mozilla Firefox, or Netscape Navigator.

    Connect to the access point by entering its default address of *http://***192.168.0.100** into your browser. Your Web browser should automatically find the access point and display the home screen.

2. Enter **admin** for the user name and **password** for the password, both in lower case letters or use a new LAN address and password if you have set them up.

3. Click **Login**.

4. Select **Configuration > Wireless**. Verify your operating mode, 11b, 11bg, or 11ng. Verify that the correct (default) channel has been selected for your network.

    It should not be necessary to change the wireless channel unless you notice interference problems or are near another wireless access point. Select a channel that is not being used by any other wireless networks within several hundred feet of your product family.

5. Click **Apply** to save any changes.

Mounting the ProSafe Wireless Access Point Using the Wall Mount Kit (Optional)

Tip: Before mounting the access point in a high location, first set up and test the access point to verify wireless network connectivity.

To install the mounting bracket:

1. Disconnect the access point and position it where it will be deployed. The best location is elevated, such as on a wall or ceiling or the top of a cubicle, at the center of your wireless coverage area, and within line of sight of all the mobile devices (see *Figure 7* on page 26).
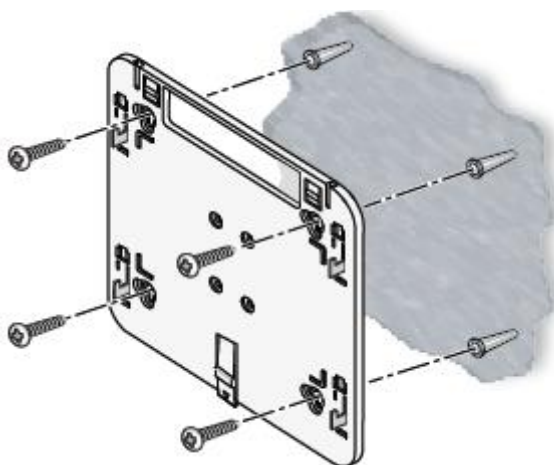
Figure 7.

2. Connect an Ethernet cable from your access point to a LAN port on your router, switch, or hub. If power is not provided by PoE, connect the power adapter to the wireless access point and plug the power adapter into a power outlet. The Power, LAN, and Wireless LAN LEDs should light up.

Configuring and Testing Your PCs for Wireless Connectivity

Program the wireless adapter of your PCs to have the same SSID and channel that you configured in the **Wireless Settings** for the access point. Check that they have a wireless link and are able to obtain an IP address by DHCP from the access point.

> **Note:** If you are configuring the access point from a wireless computer and you change the SSID, channel, or security profile settings, you will lose your wireless connection when you click **Apply**. You must then change the wireless settings of your computer to match the new settings.

Once your PCs have basic wireless connectivity to the access point, you can deploy the access point and configure the advanced wireless security functions.

Logging In to the ProSafe Wireless Access Point

The access pointis set by default with the IP address of 192.168.0.100 with DHCP disabled.

> **Note:** If you log in using the default IP address, the computer you are using to connect to the access point should be configured with an IP address in the range 192.168.0.0 to 192.168.0.255 and a subnet mask of 255.255.255.0.

If DHCP is enabled, there are two methods you can use to connect to the WNAP320 after the DHCP server on your network assigns it a new IP address.

- If your product family is to be deployed on a local network, you can enter the NetBIOS name in your Web browser. The default wireless access point name is **netgearxxxxxx**, where **xxxxxx** represents the last 6 bytes of the MAC address. The MAC address is printed on the rear label of the WNAP320. (Using the NetBIOS naming convention to access your router across several network segments is known to be unreliable.)

- Reserve an IP address (based on the access point's MAC address) on the DHCP server. That way, if your router is deployed across several segments, you can configure the product family with a static IP address, which you can always use to log in to make future configuration changes.

To log in using the default IP aAddress:

1. Open a Web browser such as Mozilla Firefox, Internet Explorer, or Netscape Navigator.
2. Connect to the access point by entering the default address of *http://***192.168.0.100** into your browser.

Figure 8.

3. The login screen displays. Enter **admin** for the user name and **password** for the password, both in lower case letters.

4. Click **Login**.

Your Web browser should automatically find the access point and display the home screen.

Setting Basic IP Options

The basic settings for your wireless access point are entered on this screen. With the exception of selecting the correct Country/Region, most of the other default settings will work in most cases. However, if your wireless access point is part of a more complex LAN network, then modify your settings to meet the requirements of your network based on the explanation of the various fields.

To configure the basic settings of your wireless access point:

1. Click Basic Settings under Setup in the main menu. The Basic Settings menu will appear as shown below:

Figure 9.

2. Enter the wireless access point name of the WNAP320:

   This unique name is the access point NetBIOS name. The default Access Point Name is located on the bottom label of WNAP320. The default is netgearxxxxxx, where xxxxxxx represents the last 6 digits of the WNAP320 MAC address. You may modify the default name with a unique name up to 15 characters long.

3. Enter the IP Address fields of the WNAP320:

   – **DHCP Client.** By default, the Dynamic Host Configuration Protocol (DHCP) client is disabled. If you have a DHCP server on your LAN and you enable DHCP, the wireless access point will get its IP address, subnet mask and default gateway settings automatically from the DHCP server on your network when you connect the WNAP320 to your LAN.

   – **IP Address**: The default IP address is 192.168.0.100. If you want to change it, enter an unused IP address from the address range used on your LAN; or enable DHCP.

- **IP Subnet Mask**: Enter the subnet mask value used on your LAN. The default is 255.255.255.0.

- **Default Gateway:** Enter the IP address of your LAN Gateway. For more complex networks, enter the address of the router for the network segment to which the wireless access point is connected. The default is 0.0.0.0.

- **Primary and Secondary DNS Servers**: Enter the IP address of the Domain Name Server (DNS) you wish to use. The default is 0.0.0.0.

4. **Spanning Tree Protocol**. Enable or disable spanning tree protocol. Spanning tree protocol provides network traffic optimization in settings with multiple ProSafe Wireless Access Points. The default is Enabled.

5. **Enable 802.1Q VLAN**. Check the radio box to accept 802.1Q VLAN to allow the WNAP320 to process VLAN membership. The default is disabled.

6. From the pull-down men, select the local **Time Zone** setting for your location.

7. Check the **Adjust for Daylight Saving Time** if your location uses daylight saving. The default is no adjustment.

Note: You must have an Internet connection to get the current time.

---

8. Click **Apply** so save your Basic IP settings.

Configuring Wireless Settings

To configure the wireless settings of your wireless access point:

1. Click Wireless Settings under Setup in the main menu of the browser interface. The Basic Wireless Settings menu will appear, as shown below.

Figure 10.

Enter

2. From the **Country/Region** menu, select the region where the WNAP320 can be used.

It may not be legal to operate the wireless features of the wireless access point in a region other than one of those identified in this field. Unless a country domain is selected, the channel cannot be changed (In the United States, the Country/Region is preset.)

3. The **Turn Radio On** radio box is checked and on by default.

You can also turn off the radio to disable access through this device. This can be helpful for configuration, network tuning, or troubleshooting activities.

4. From the **Operating Mode** pull-down menu, select the desired wireless operating mode. The options are:

– Auto (11g/11b): Both 802.11g and 802.11b wireless stations can be used (default setting).

– 11g Only: Only 802.11g wireless stations can be used.

– 11b Only: All 802.11b wireless stations can be used. 802.11g wireless stations can still be used if they can operate in 802.11b mode.

5. From the **Channel/Frequency** menu, select which operating frequency will be used. It should not be necessary to change the wireless channel unless you notice interference problems when setting up the WNAP320 near another access point. Some points to consider:

   - Access points use a fixed channel. You can select the channel used. This allows you to choose a channel which provides the least interference and best performance. In the USA and Canada, 11 channels are available.

   - If using multiple access points, it is better if adjacent access points use different channels to reduce interference. The recommended channel spacing between

adjacent access points is 5 channels (for example, use channels 1 and 6, or 6 and 11).

– In "Infrastructure" mode, wireless stations normally scan all channels, looking for an access point. If more than one access point can be used, the one with the strongest signal is used. This can only happen when the various access points are using the same SSID.

See *Related Documents* in Appendix A for links to more information on configuring wireless channels.

6. From the **Data Rate** pull-down menu, select the transmit data rate of the wireless network. The default is Best.

7. From the **Output Power** pull-down menu, set the transmit signal strength of the access point. The options are full, half, quarter, eighth, and min. Decrease the transmit power if more than one AP is collocated using the same channel frequency. The default is Full.

8. Click **Apply** to save your wireless settings.

9. From the main menu under Security, select Security Profile Settings.

Configuring QoS Settings

Wireless Multimedia (WMM) is a subset of the 802.11e standard. WMM allows wireless traffic to have a range of priorities, depending on the type of data.

Time-dependent information, such as video or audio, has a higher priority than normal traffic. For WMM to function correctly, wireless clients must also support WMM.

To configure your wireless QoS settings for 11b/g/n operation:

1. Select **Configuration > Wireless > Basic > QoS Settings**. The QoS Settings screen displays, as shown in *Figure 11,* .
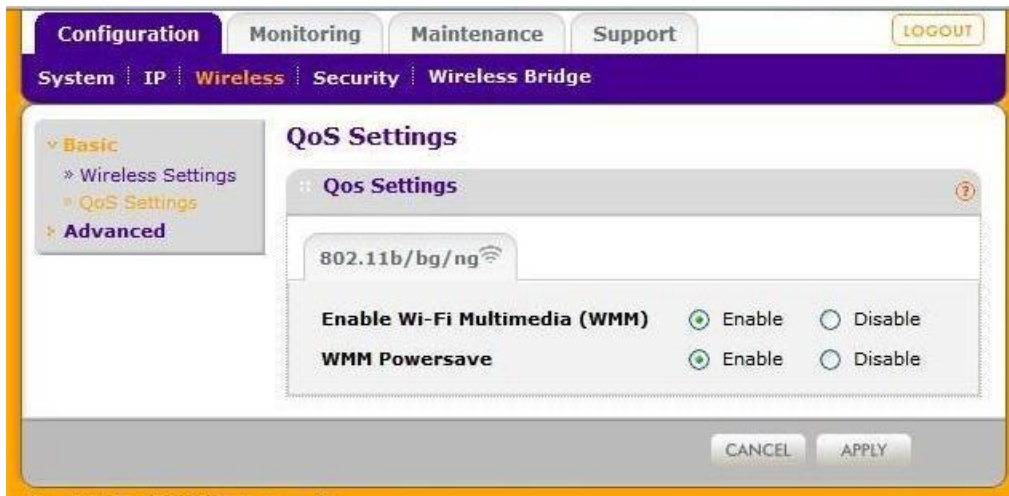

Figure 11.

2. Wi-FI Multimedia (WMM) is enabled by default. Select the **Disable** radio button to disable WMM support.
3. Click **Apply** to save your settings.

Setting Up and Testing Basic Wireless Connectivity

Follow the instructions in this section to set up and test basic wireless connectivity. Once you have established basic wireless connectivity, you can enable security settings appropriate to your needs.

1. From your Web browser, log in to the WNAP320 using its default address of **192.168.0.100**. Use the default user name of **admin** and default password of **password**, or use a new LAN address and password if you have set them up.

2. Select **Configuration > System**. Verify that the correct country/region in which the wireless interface will operate has been selected.

3. Click **Apply** to save any changes.

4. Select **Wireless**, and ensure that the auto channel (default) feature is selected for your network. This feature selects a channel that has the least interference.

   It should not be necessary to change the wireless channel unless you notice interference problems or are near another wireless access point. Select a channel that is not being used by any other wireless networks within several hundred feet of your product family.

5. Click **Apply** to save any changes.

6. Select **Security**. For initial configuration and testing, the security profile settings for Profile 1 (the default profile) are set to **Open System** and the SSID is set to **NETGEAR_11ng** (see *Understanding Security Profiles* on page 35 to configure a profile).

   The SSID of any product family must match the SSID you configured in the access point. If they do not match, you will not get a wireless connection to the WNAP320.

7. Click **Apply** to save any changes.

8. Configure and test your PCs for wireless connectivity.

   Program the wireless adapter of your PCs to have the same SSID that you configured in the WNAP320. Check that they have a wireless link and can obtain an IP address by DHCP from the WNAP320.

> **Note:** If you are configuring the WNAP320 from a wireless computer and you change the SSID, channel, or security profile settings, you will lose your wireless connection when you click **Apply**. You must then change the wireless settings of your computer to match the new settings.

Once your PCs have basic wireless connectivity to the WNAP320, you can configure the advanced wireless security functions.

Understanding Security Profiles

Security profiles let you configure unique security settings for each SSID. You can configure up to eight unique 802.11b/g/n wireless security profiles on the WNAP320. The Profile Settings screen is shown in *Figure 12,* .

Note: If you are using a RADIUS server, configure the RADIUS settings first, as described in the *Configuring WPA with RADIUS* on page 68.
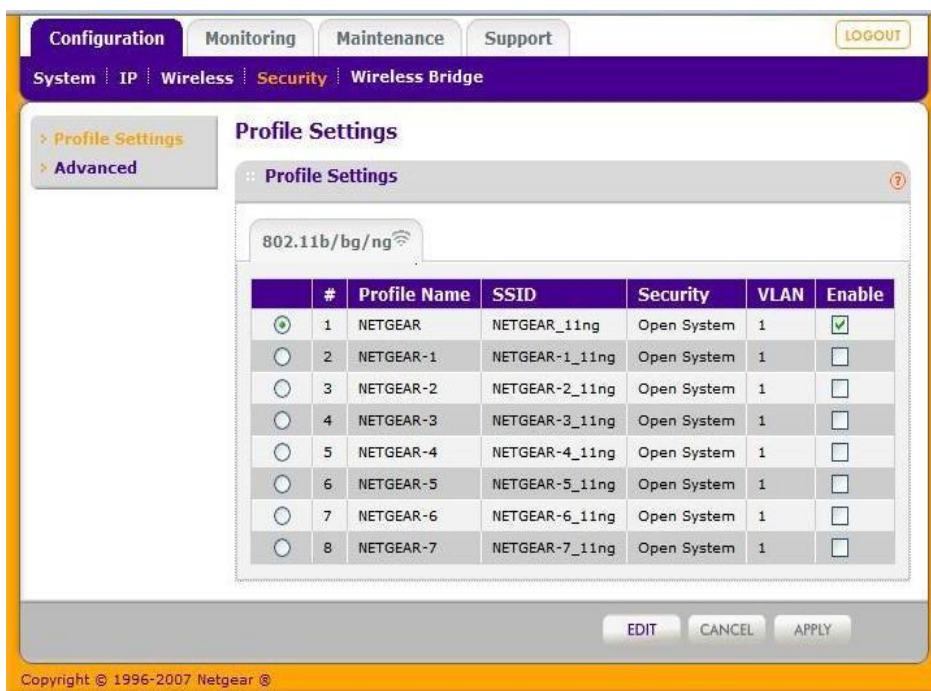

Figure 12.

An overview of the information that is required to set up a security profile follows—including a description of the network authentication choices that are available:

- **Profile definition**. Specify the following settings:
  - **Security Profile Name**. Use a name that makes it easy to recognize the profile—and to tell profiles apart. (The default names are NETGEAR_11ng, NETGEAR-1_11ng, NETGEAR-2_11ng, and so on.) You can enter a value of up to 32 alphanumeric characters.

> **Note:** Only the first profile is enabled by default. The rest of the profiles are disabled and must be enabled if configured.

- **Wireless Network Name (SSID)**. This is the name of your wireless network. It is set to the default name of NETGEAR_11ng for 802.11b/g/n.
- **Broadcast Wireless Network Name (SSID)**. If you disable broadcast of the SSID, only devices that have the correct SSID can connect. This nullifies the wireless network "discovery" feature of some products such as Windows XP, but the data is still fully exposed to a determined snoop using specialized test equipment like wireless sniffers. The default is enabled.

- **Authentication settings**. Specify the following settings:
  - **Network Authentication**. The WNAP320 access point is set by default as an open system with no authentication. When setting up network authentication, bear in mind the following:
    - If you are using Access Point mode, then all options are available. In other modes such as Repeater or Bridge, some options might be unavailable.
    - Not all wireless adapters support WPA or WPA2. Windows XP and Windows 2000 with Service Pack 3 do include the client software that supports WPA. However, client software is required on the client. Consult the product documentation for your wireless adapter and WPA or WPA2 client software for instructions on configuring WPA2 settings.

    You can configure the WNAP320 to use the types of network authentication shown in the table.

Table 1. Network Authentication Types

Type[a]	Description
Open System	Can be used with WEP encryption or no encryption.
Shared Key	You must use WEP encryption and enter at least one shared key.
Legacy 802.1x	You must configure the RADIUS Server Settings to use this option.
WPA with RADIUS	You must configure the RADIUS server settings to use this option.
WPA2 with RADIUS (WPA2 is a later version of WPA.)	Select this only if all clients support WPA2. If selected, you must use AES encryption and configure the RADIUS server settings.
WPA and WPA2 with RADIUS	This selection allows clients to use either WPA (with TKIP) or WPA2 (with AES). If selected, you must use TKIP + AES encryption and configure the RADIUS server settings.
WPA-PSK	You must use TKIP or TKIP + AES encryption and enter the WPA passphrase (network key).

Table 1. Network Authentication Types

Type[a]	Description
WPA2-PSK (WPA2 is a later version of WPA)	Select this only if all clients support WPA2. If selected, you must use AES and TKIP + AES encryption and enter the WPA passphrase (Network key).
WPA-PSK and WPA2-PSK	This selection allows clients to use either WPA (with TKIP) or WPA2 (with AES). If selected, you must use TKIP + AES encryption and enter the WPA passphrase (network key).

a All options are available if you are using Access Point mode. In other modes (for example, Repeater or Bridge) some options might be unavailable.

- **Data Encryption**. The available options depend on the network authentication setting selected (see **Table 1**); otherwise, the default is **None**. The Data Encryption settings are

- explained in the following table:

Table 2. Data Encryption Settings

Data Encryption Type	Description
None	No encryption is used.
Open WEP	Can be used with WEP encryption or no encryption.
64 bits WEP	Standard WEP encryption, using 40/64 bit encryption.
128 bits WEP	Standard WEP encryption, using 104/128 bit encryption.
152 bits WEP	Proprietary mode that will only work with other wireless devices that support this mode.
TKIP	This is the standard encryption method used with WPA and WPA2.
AES	This is the standard encryption method for WPA2.
TKIP + AES	This setting supports both WPA and WPA2. Broadcast packets use TKIP. For unicast (point-to-point) transmissions, WPA clients use TKIP, and WPA2 clients use AES.

Passphrases and Keys are used in the following ways:

- **Passphrase**. To use the passphrase to generate the WEP keys, enter a passphrase and click the **Generate Keys** button. You can also enter the keys directly. These keys must match the other wireless stations.
- **Key 1, Key 2, Key 3, Key 4**. If you are using WEP, select the key to be used as the default key. Data transmissions are always encrypted using the default key. The other keys be used only to decrypt received data.
- **WPA Preshared Key Passphrase**. If you are using WPA-PSK, enter the passphrase here. All wireless stations must use the same passphrase (network key). The network key must be from 8 to 64 characters in length.

- **Wireless Client Security Separation**. If this feature is enabled, the associated wireless clients will not be able to communicate with each other. (This feature is intended for hotspots and other public access situations.) The default is **No**.

- **VLAN ID**. If the hubs/switches on your LAN support the VLAN (802.1Q) standard and this feature has been enabled, the default VLAN ID for WNAP320 will be associated with each profile. The default profile VLAN ID must match the IDs used by other network devices.

SSID and WEP/WPA Settings Setup Form

For a new wireless network, print or copy this form and fill in the configuration parameters. For an existing wireless network, the person who set up or is responsible for the network can provide this information. Be sure to set the regulatory domain correctly as the first step.

• **SSID***:* The service set identification (SSID) identifies the wireless local area network. **NETGEAR_11ng** is the default WNAP320 SSID. However, you can customize it by using up to 32 alphanumeric characters. Write your customized SSID here.

_____

Note: The SSID in the product family is the SSID you configure in the wireless adapter card. All wireless nodes in the same network must be configured with the same SSID.

• Authentication.

 Circle one: Open System or Shared Key. (Choose Shared Key for more security.)

 Note: If you select Shared Key, the other devices in the network will not connect unless they are set to shared key as well and have the same keys in the same positions as those in the WNAP320.

• WEP Encryption Keys.

 Circle one: 64, 128, or 152 bits. (Enter all four 802.11b/g/n keys for the key size chosen.)

 Key 1: _____

 Key 2: _____

 Key 3: _____

 Key 4: _____

• WPA-PSK (Preshared Key)

 Record the WPA-PSK key _____

• WPA RADIUS Settings. For WPA, record the following settings for the primary and secondary RADIUS servers:

 Server Name/IP Address: Primary _____ Secondary

 _____

 Port: _____

 Shared Secret: _____

 _____

Use the procedures described in the following sections to configure the WNAP320. Store this information in a safe place.

Configuring the RADIUS Server Settings

You can set p or modify the RADIUS server settings to compliment network authentication security options. The RADIUS server must be used with Legacy 802.1x, and can be used with WPA and WPA2 network authentication. When using a RADIUS server, the RADIUS server settings before completing the network authentication security profile (see *Configuring WPA with RADIUS* on page 68, *Configuring WPA2 with RADIUS* on page 70, or *Configuring WPA and WPA2 with RADIUS* on page 73 for specifics on implementing these security options).

> **Note:** The RADIUS server settings apply to all profiles. They o need to be configured only once per product family.

To set up or modify the RADIUS server settings:

1. From your Web browser, log in to the WNAP320 using the default LAN address of **http://192.168.0.100**, user name **admin**, and password **password**, or use the LAN address and password that you set up.

2. Select **Configuration** > **Security > Advanced > RADIUS Server Settings**. The RADIUS Server Settings screen displays, as shown in *Figure 13,* .

Figure 13.

3. Enter the following RADIUS server settings:

   • **Authentication Server.** This configuration is required for authentication using a RADIUS server.The IP address, port number, and shared secret are required for communication with the primary RADIUS server. You can also configure a secondary RADIUS server to use, if the primary RADIUS server fails.

   - **IP Address.** The IP address of the RADIUS server. The default is 0.0.0.0.

Management 3

This chapter describes how to use the management and monitoring features of your ProSafe Wireless-N Access Point WNAP320. To access these features, connect to the WNAP320 access point as described in *Logging In Using the Default IP Address* on page 25. Then select the Maintenance or Monitoring in the main menu of the browser interface.

Remote Management

Both the SNMP and Remote Console are enabled by default, which allows for remote management of the WNAP320 from a client running SNMP management software, as well as from a secure Telnet console.

To set up an SNMP management interface:

1. Select **Maintenance > Remote Management > SNMP**. The SNMP screen displays, as shown in *Figure 1,* .
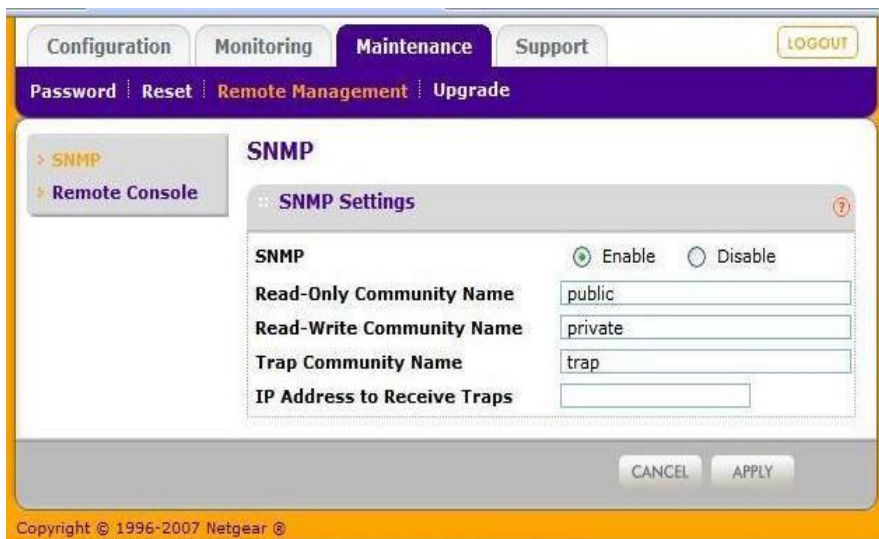

Figure 1.

2. Enter the following information in the SNMP fields:
   * SNMP. Enable SNMP to allow the SNMP network management software, such as HP OpenView, to manage the wireless access point through SNMPv1/v2 protocol.
   * **Read-Only Community Name**. The community string to allow the SNMP manager to read the wireless access point's MIB objects. The default is **Public**.
   * **Read-Write Community Name**. The community string to allow the SNMP manager to read and write the wireless access point's MIB objects. The default is **Private**.
   * **Trap Community Name**. The community string to allow the SNMP manager to send traps. The default is **Trap**.
   * **IP Address to Receive Traps**. The IP address of the SNMP manager to receive traps sent from the wireless access point. The default is **0.0.0.0**.
3. Click **Apply.**

Remote Console

Remote Console configuration features are located under the **Maintenance**, **Remote Management**, **Remote Console**. Enter the following information in the Remote Console screen, as shown in *Figure 2,* :

*   **Secure Shell (SSH)**. If set to **Enable**, the wireless access point will allow remote access only through Secure Shell and Secure Telnet. The default is **Enable**.

*   **Telnet**. If set to **Enable**, the wireless access point will allow remote access through Telnet. The default is **Disable**. If Telnet is enabled and the access point is accessed using a browser, the Telnet access will be disconnected.
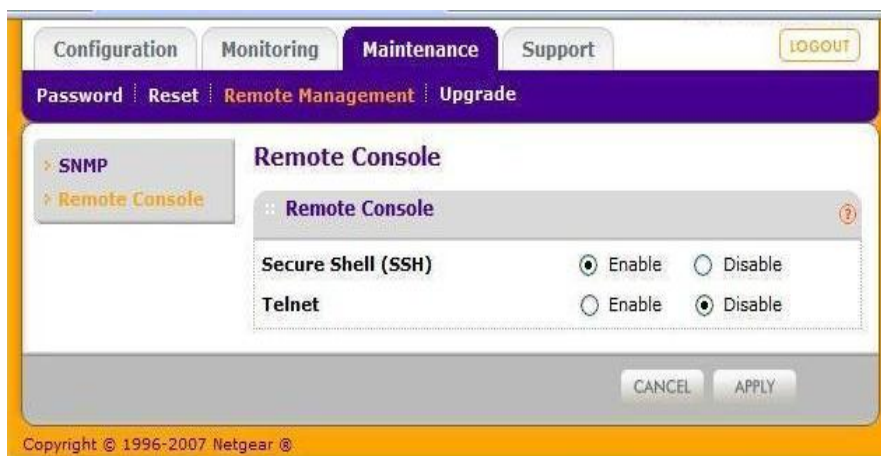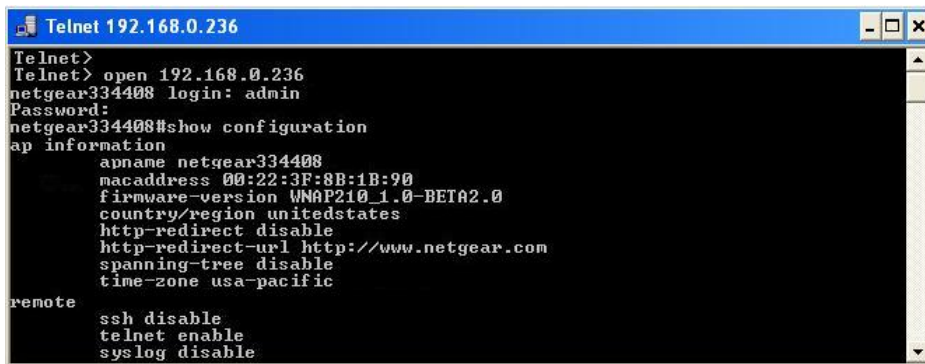

Figure 2.

4. Click **Apply**.

Management Using Telnet

1. Open a secure Telnet session from your computer to the access point. The screen shown in *Figure 3,* should display.

Figure 3.

2. Enter the login name and password (**admin** and **password** are the defaults).

After successful login, the `<Access Point Name>` prompt should appear. In this example, the prompt is ***netgear334408***.

3. Enter the desired CLI commands. You can enter `help` to display the CLI command help.

The CLI commands are listed in *Appendix B, Command Line Reference*."

Upgrading the Wireless Access Point Software

The software of the ProSafe Wireless Access Point is stored in flash memory, and can be upgraded as NETGEAR releases new software . You can download upgrade files from the Netgear website. If the upgrade file is compressed (**.zip** file), you must first extract the image (**.rmt**) file before sending it to the product family. You can send the upgrade file using your browser.

Note: The Web browser used to upload new firmware into the WNAP320 access point must support HTTP uploads, such as Microsoft Internet Explorer 6.0 or later, or Netscape Navigator 4.78 or later, or Mozilla 1.5 or later.

You cannot perform the software upgrade from a computer that is connected to the ProSafe Wireless Access Point with a wireless link. You must use a computer that is connected to the ProSafe Wireless Access Point with a Ethernet cable.

⚠️ **WARNING!**

When uploading software to the ProSafe Wireless Access Point, it is important not to interrupt the Web browser by closing the window, clicking a link, or loading a new page. If the browser is interrupted, the upload might fail, corrupt the software, and render the WNAP320 access point completely inoperable.

The Web browser used to upload new firmware into the WNAP320 must support HTTP uploads, such as Microsoft Internet Explorer 6.0 or above, or Netscape Navigator 4.78 or above.

Figure 4.

To upgrade the WNAP320 firmware:

1. Download the new software file from the NETGEAR website, save it to your hard disk, and unzip it.

2. Select **Maintenance > Upgrade > Firmware Upgrade**. The Firmware Upgrade screen displays as shown in *Figure 4,* .

3. Click **Browse** and browse to the location of the image (**.rmg**) upgrade file.

4. Click **Apply**.

   When the upload is completed, your product family automatically restarts. The upgrade process typically takes at least 3 minutes.

Configuration File Management

The ProSafe Wireless Access Point settings are stored in the product family in a configuration file. This file can be saved (backed up) to a user's computer, retrieved (restored) from the user's computer, or reset to factory default settings.

The Configuration Backup/Restore Settings menu allows you to save or retrieve a file containing your product family's configuration settings.

Saving the Configuration

To save your settings:

1. Select **Maintenance > Upgrade > Backup Settings** to back up your current settings. The Backup Settings screen displays. See *Figure 5,* .

Figure 5.

2. Click **Backup**. Your browser will extract the configuration file from the product family and prompt you for a location on your computer to store the file.

3. Give the file a meaningful name, such as WNAP320.cfg**,** and click **Save.**

Restoring the Configuration

To restore your settings from a saved configuration file:

1. Select **Maintenance > Reset > Restore Defaults** to restore your settings. The Restore Defaults screen displays. See *Figure 6,* .

2. Select **No** for **Restore to factory default settings** and then **Apply**. This displays a dialog allowing you to select a file where you have previously saved configuration settings.

3. Enter the full path to the file on your computer or click the **Browse** button to locate the file.

4. When you have located the file, click **Restore** to upload the file. After completing the upload, the WNAP320 will reboot automatically.
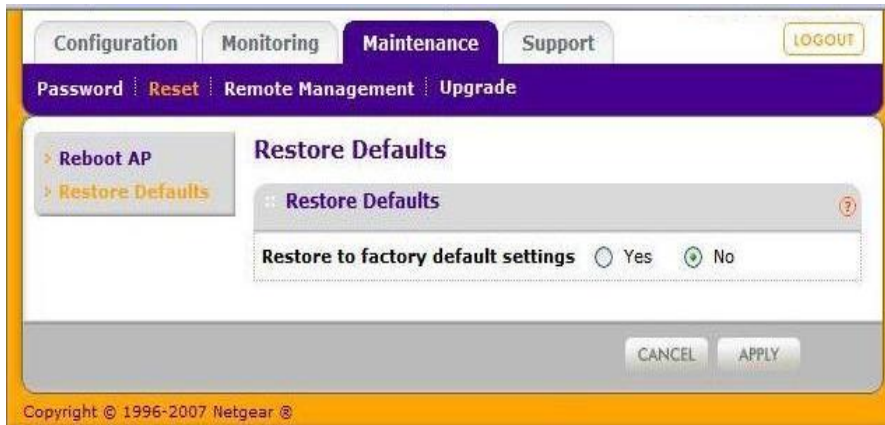
Figure 6.

Restoring the WNAP320 to the Factory Default Settings

You can restore the product family to the factory default settings using the Restore function..

To restore the factory settings:

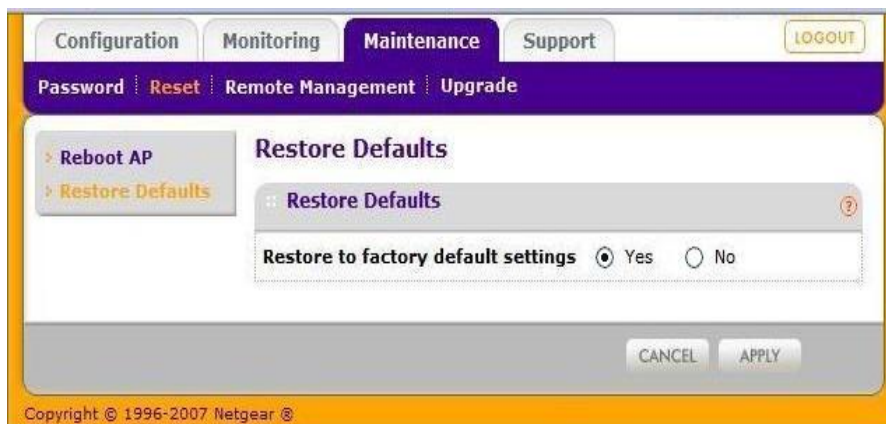1. Select **Maintenance > Reset > Restore Defaults**. The Restore Defaults screen displays.

Figure 7.

2. On the Restore Defaults screen, select the Yes radio button, as shown in *Figure 7,* .

3. Click **Apply** to reset to the factory default settings.

After a restore, the product family password will be **password**, the WNAP320 DHCP client will be disabled, the default LAN IP address will be **192.168.0.100**, and the access point name will reset to the name printed on the label on the bottom of the unit.

To restore the factory default configuration settings when you do not know the login password or IP address, you must use the reset button on the rear panel of the product family (see *Figure 2* on page 14). The reset button has two functions:

*   **Reboot.** When this button is pressed and released, the wireless access point reboots (restarts).

*   **Reset to factory defaults.** This button can also be used to clear all data and restore all settings to the factory default values.

To clear all data and restore the factory default values:

1. Power off the WNAP320.

2. Using something with a small point, such as a pen, hold the restore settings button for 5 seconds while you power on the WNAP320.

3. Continue holding the restore settings button until the LEDs blink twice.

4. Release the restore settings button.

    The factory default configuration has now been restored, and the WNAP320 is ready for use.

Changing the Administrator Password

The default password is **password**. You should change this password to a more secure password, since you cannot change the administrator login name.

To change the administrator password:

1. Select **Maintenance > Password > Change Password**. The Change Password screen displays as shown in *Figure 8,* .

Figure 8.

2. First enter the old password in the **Current Password** field.
3. Then enter the new password twice—once in the **New Password** field and again in the **Repeat New Password** field.
4. Click **Apply** to save your change.

Enabling the Syslog Server

The Syslog screen allows you to enable the syslog option if you have a syslog server on your LAN.

To enable a syslog server:

1. Select **Configuration > System > Advanced > SysLog** to display the Syslog screen. See *Figure 9,* .
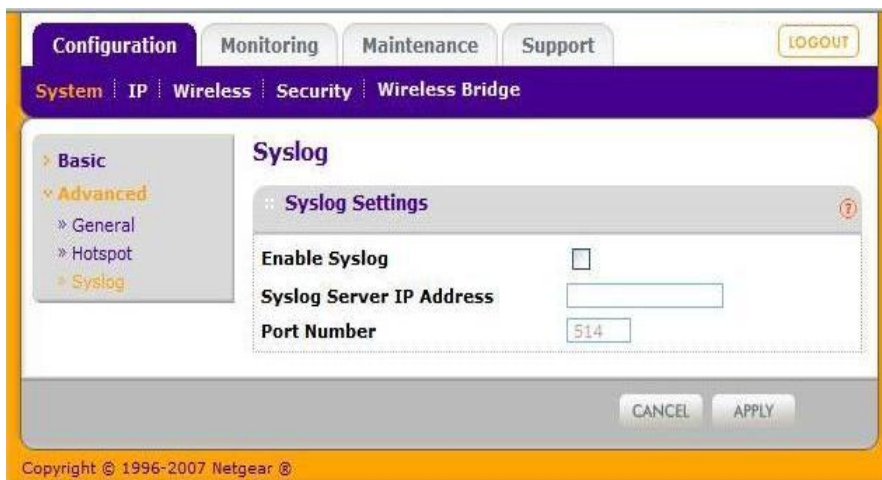
Figure 9.

2. **Enable Syslog**. Enable this option if you have a syslog server on your LAN. If this feature is enabled, you must enter the IP address of your syslog server and the port number your SysLog server is configured to use. The default is disabled.
3. **Syslog Server IP Address**.The access point will send all the syslog file to the specified IP address if syslog option is enabled. The default is 0.0.0.0.
4. **Port Number**. The port number configured in the syslog server on your LAN. The default is 514.
5. Click **Apply** to save your syslog settings.

Using Activity Log Information

The Activity Log screen displays the access point system activity.

1. Select **Monitoring > Logs**. The Logs screen displays as shown in *Figure 10,* .

Figure 10.

2. Click **Refresh** to update the display, click **Clear** to clear the log content, or click **Save As** to save the log contents into a file on your PC or to save the file to a disk drive.

Viewing General Summary Information
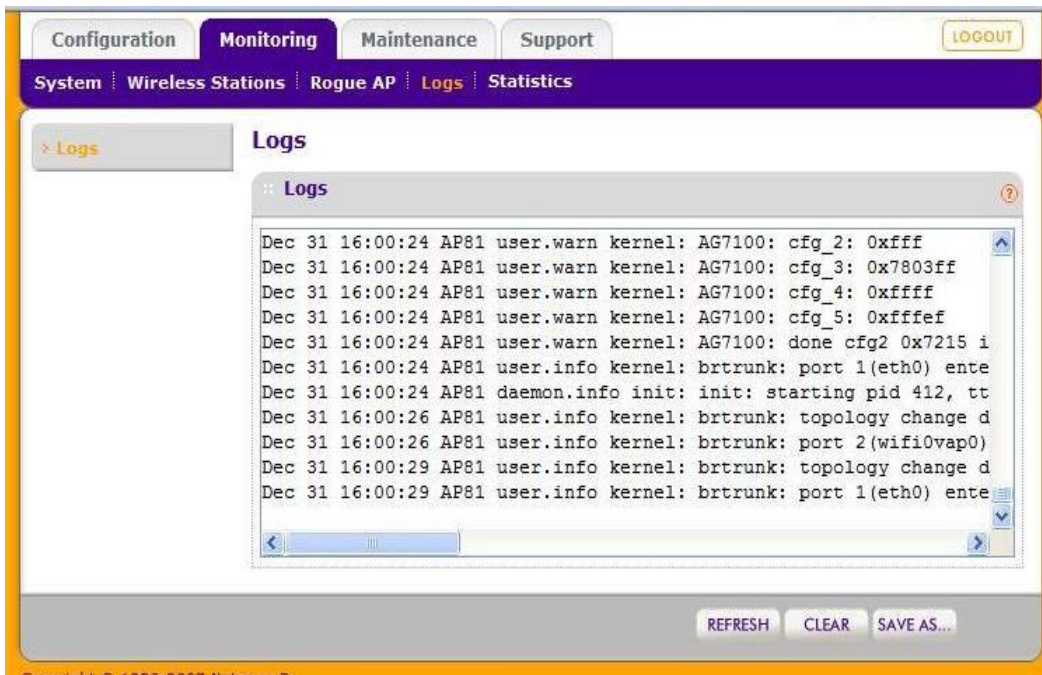
The System screen, under the Monitoring tab provides a summary of the current WNAP320 configuration settings, including current IP settings and current wireless settings. This information is read only, so any changes must be made on other screens.

To access the System screen:

1. Select **Monitoring > System** view the System screen, shown in *Figure 11,* . This screen shows the parameters listed in **Table 1**:

Table 1. System Information Fields

Field	Description
Access Point Information	
Access Point Name	Indicates the NetBIOS name. The default name can be changed, if you wish.
MAC Address	Displays the Media Access Control address (MAC address) of the product family's Ethernet port.
Country/Region	Displays the domain or region for which the product family is licensed for use. It might not be legal to operate this product family in a region other than one of those identified in this field.
Firmware Version	The version of the firmware currently installed.
Access Point Mode	Identifies the operating mode of the WNAP320: Access Point, Point-to-point bridge, Point-to-point bridge with Access Point, Multi-point bridge, or Repeater.
Current IP Settings	
IP Address	The IP address of the product family.
Subnet Mask	The subnet mask for the product family.
Default Gateway	The default gateway for the product family communication.
DHCP Client	Enabled indicates that the current IP address was obtained from a DHCP server on your network. Disabled indicated a static IP configuration.
Current Wireless Settings for 802.11n/g	
Operating Mode	Identifies the 802.11 operating mode of the WNAP320.
Channel/Frequency	Identifies the channel the wireless port is using. 11 is the default channel setting. Channel frequencies used on each channel can be found in the article, *Wireless Networking Basics* located in *Related Documents* in Appendix A.
Rogue AP Detection	Identifies whether the Rogue AP detection feature is enabled or disabled.

Figure 11.

Viewing Network Traffic Statistics

The Statistics screen displays information for both wired (LAN) and wireless (WLAN) interface network traffic.

To access statistics information:

1. Select **Monitoring > Statistics**. The Statistics screen displays, as shown in *Figure 12, .*

Figure 12.

2. Click **Refresh** to update the statistics information for each interface. .

Table 2 describes the information fields detailed on the Statistics screen.

Table 2. Statistics Fields

Field	Description
Wired Ethernet	
Packets	The number of packets sent and received since the WNAP320 was restarted.
Bytes	The number of bytes sent and received since the WNAP320 was restarted.
Wireless 11n/g	

Table 2. Statistics Fields

Field	Description
Unicast Packets	The unicast packets sent and received since the WNAP320 was restarted.
Broadcast Packets	The broadcast packets sent and received since the WNAP320 was restarted.
Multicast Packets	Themulticast packets sent and received since the WNAP320 was restarted.
Total Packets	The wireless packets sent and received since the WNAP320 was restarted.
Total Bytes	The wireless bytes sent and received since the WNAP320 was restarted.

Viewing Available Wireless Station Statistics

The **Available Wireless Stations** list contains a table of all IP devices associated with this product family in the wireless network defined by the wireless network name (SSID). For each device, the table shows the station ID, MAC address, IP address, BSSID, SSID, AID, channel rate, Status (whether the device is allowed to communicate with the product family or not), type, mode, and state.

> **Note:** A wireless network can include multiple wireless access points, all using the same network name (SSID). This extends the reach of the wireless network and allows users to roam from one access point to another, providing seamless network connectivity. Under these circumstances, be aware that the **Available Wireless Stations** list includes only the stations associated with this access point.

To view the Wireless Stations list:

1. Select **Monitoring > Wireless Stations**. The Wireless Stations list displays, as shown in *Figure 13,* .

Figure 13.

2. Click **Refresh** to update the list.

> **Tip:** If the product family is rebooted, the table data is lost until the product family rediscovers the devices. To force the product family to look for associated devices, click the **Refresh** button.

Enabling Rogue AP Detection

The WNAP320 can detect rogue APs and wireless stations and can prevent them from connecting to the WNAP320. The WNAP320 maintains a list of access points and wireless stations that it detects in the area. Initially all detected access points are displayed in the **Unknown AP List**. You restrict communication to approved access points by adding them to the **Known AP List** and enabling rogue AP detection.

To enable rogue AP detection:

1. Select **Configuration > Security** > **Advanced > Rogue AP**. The Rogue AP screen displays, as shown in *Figure 8,* below.
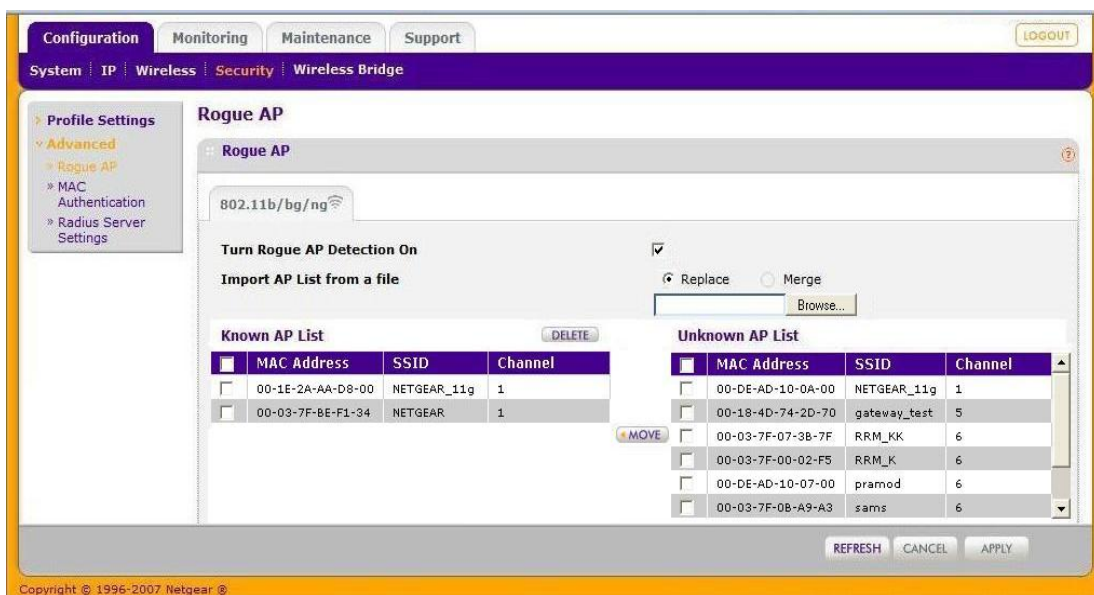
Figure 14.

2. Click **Refresh** to discover the APs. See *Importing a Rogue AP List from a File* on page 38 for more information.

3. Click **Move** to add APs in the **Unknown AP List** to the **Known AP List**.

4. Click **Delete** to remove APs from the **Known AP List** back to the **Unknown AP List**.

5. Select the **Turn Rogue AP Detection On** check box to enable rogue AP detection, and click **Apply.**

   If you enable rogue AP detection, the AP continuously scans the wireless network and collects information about all APs heard on its channel.

Importing a Rogue AP List from a File

You can import the **Known AP List** from a file.

To replace the existing AP list:

1. Select the **Replace** radio button to replace the existing list of known APs, or select **Merge** to add the new MAC addresses to the existing list.
2. Click **Browse,** and navigate to the location of the file containing the device list.
3. Select the file, and click **Open.**
4. Click **Import** to upload the list to the AP.

To merge a file with an existing AP list:

1. Select the **Merge** radio button to add the new MAC addresses to the existing list.
2. Click **Browse,** and navigate to the location of the file containing the device list.
3. Select the file, and click **Open.**
4. Click **Import** to upload the list to the AP.

Viewing and Saving AP Lists

The WNAP320 detects nearby APs and wireless stations and maintains them in a list. You can use this list to prevent them from connecting to the WNAP320 Wireless Access Point.

Viewing AP Lists

To view AP lists:

1. Select **Monitoring** > **Rogue AP**. Select **Unknown AP List** or **Known AP List** as required. The respective screens display, as shown in *Figure 15,* and *Figure 16,* .

Figure 15.

Figure 16.

2. In the **Unknown AP List** or the **Known AP List** sections, click **Refresh** to update the corresponding list.

3. Click **S**AVE to export the list of unknown or known APs to a file. A window opens so you can browse to the location where you want to save the file. The default file name is WNAP320Rogue.cfg.

You can now import the saved lists into the Rogue AP screen.

Creating AP Lists Manually

You can create and save lists of devices manually:

Create a text file that contains the MAC address of each known AP, separated by a space. The following example shows a list of six known APs that an administrator might upload to the AP:

00:0c:41:d7:ee:a5 00:0f:b5:92:cd:49 00:12:17:70:85:3d

00:14:bf:ae:b1:e4 00:40:f4:f8:47:03 00:0c:41:d7:ee:b4

1. Select **Configure > Security > Advanced > Rogue AP,** and import the file.

Advanced Configuration 4

This chapter describes how to configure the advanced features of your ProSafe Wireless-N Access Point WNAP320. The advanced configuration features are located under various sub-menus under Configuration and provide the following functions:

- 802.1Q VLAN. Enabling untagged VLAN operation
- **Hotspot settings**. Enabling HTTP redirect
- **Wireless settings**. Configuring advanced wireless LAN parameters.
- **Access point settings**. Enabling wireless bridge and repeater modes.

802.1Q VLAN

The 802.1Q VLAN protocol on the access point logically separates traffic on the same physical network. See *Figure , *.

- **Untagged VLAN**. When this check box is selected, one VLAN can be configured as an untagged VLAN. When the access point sends frames associated with the untagged VLAN out the LAN (Ethernet) interface, those frames will be untagged. When the access point receives untagged traffic from the LAN (Ethernet) interface, those frames are assigned to the untagged VLAN.

  If this check box is not selected, the access point tags all outgoing LAN (Ethernet) frames. Only incoming frames tagged with known VLAN IDs will be accepted.

  > **Note:** The **Untagged VLAN** check box should not be selected only if the hubs or switches on your LAN support the VLAN (802.1Q) standard. Likewise, the Untagged VLAN value should be changed only if the hubs and switches on your LAN support the VLAN (802.1Q) standard. Changing either of these values will result in a loss of IP connectivity if the hubs and switches on your network have not yet been configured with the corresponding VLANs.

- Management VLAN. Management VLANs are used for managing traffic (Telnet, SNMP, and HTTP) to and from the access point.

  Frames belonging to the management VLAN are not given any 802.1Q header when sent over the trunk. If a port is in a single VLAN, it can be untagged. But if the port needs to be a member of multiple VLANs, it must be tagged.
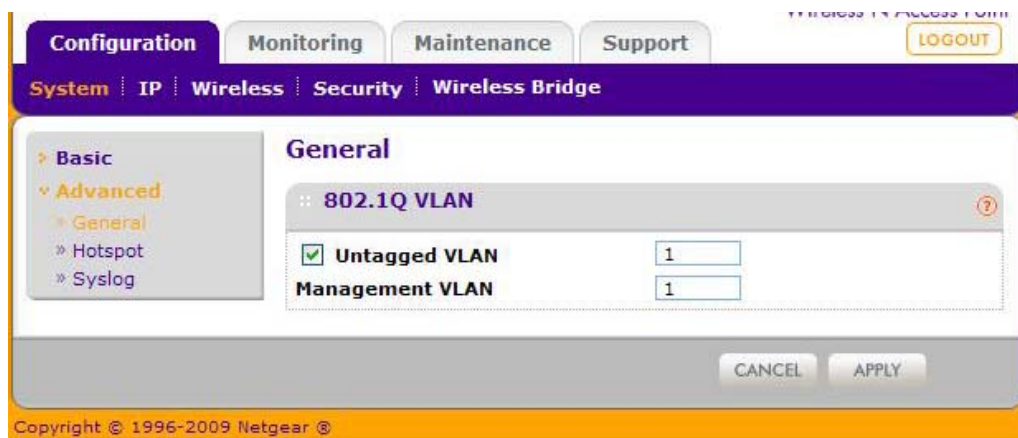
Figure 1.

Hotspot Settings

If you want the product family to capture and redirect all HTTP (TCP, port 80) requests, use this feature to redirect the requests to the specified URL. For example, a hotel might want all wireless connections to go to its server to start a billing transaction.

Figure 2.

> **Note:** The redirection will occur only the first time a wireless client opens a web browser.

To set up a hotspot server:

1. Select **Configuration > System > Advanced**. The Hotspot screen displays, as shown in *Figure 2,* .
2. For **HTTP Redirect**, enter the URL of the Web server to which you wish to redirect HTTP (port 80) requests.
3. Click **Apply**. All port 80 requests will now be redirected to the specified URL.

Configuring Advanced Wireless Settings

The Wireless Settings screen are used to configure and enable various wireless LAN parameters for 11b/g/n mode. The default wireless LAN parameters usually work well. However, you can use these settings to fine-tune the overall performance of your product family for your environment.

To configure advanced wireless settings:

1. Select **Configuration > Wireless > Advanced > Wireless Settings**. The Wireless Settings screen displays, as shown in *Figure 3,* .
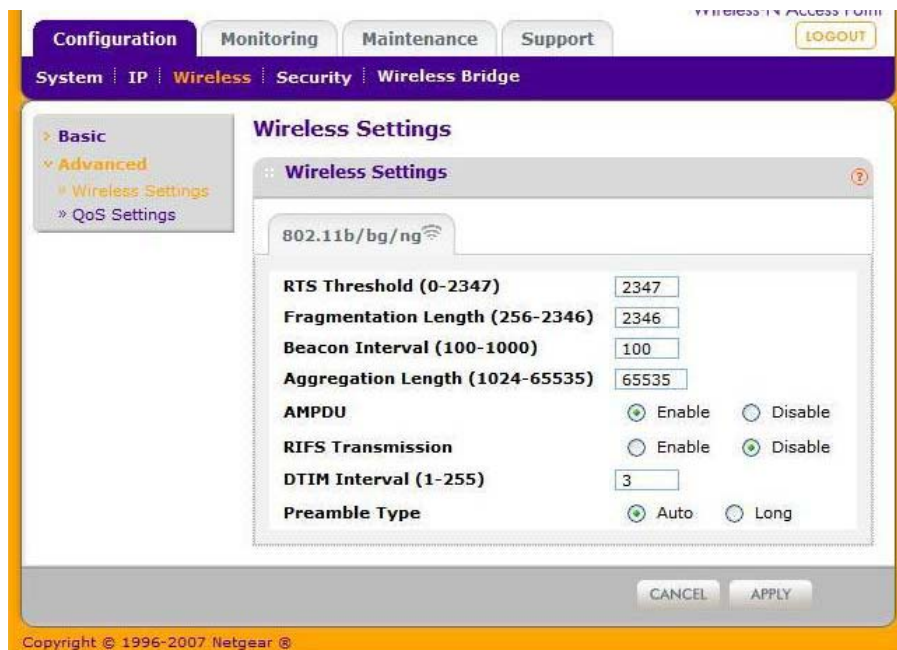
Figure 3.

2. Enter the appropriate information in the following fields:

   - **RTS Threshold (0 - 2347)**. Request to Send Threshold. The packet size that is used to determine if it should use the CSMA/CD (Carrier Sense Multiple Access with Collision Detection) mechanism or the CSMA/CA mechanism for packet transmission. With the CSMA/CD transmission mechanism, the transmitting station sends out the actual packet as soon as it has waited for the silence period. With the CSMA/CA transmission mechanism, the transmitting station sends out an RTS packet to the receiving station, and waits for the receiving station to send back a CTS (Clear to Send) packet before sending the actual packet data. The default is 2347.

- **Fragmentation Length (256 – 2346)**. This is the maximum packet size. Packets larger than the size specified in this field will be fragmented. The Fragment length value must be larger than the RTS Threshold value. The default is 2346.

- **Beacon Interval (100 – 1000)**. The time interval between 100 ms and 1000 ms for each beacon transmission, which allows the access point to synchronize the wireless network. The default is 100.

- **Aggregation Length (1024 – 65535)**. The aggregation length defines the size of aggregated packets. Larger aggregation lengths can sometimes lead to better network performance. The default is 65535.

- **AMPDU**. Aggregated MAC Protocol Data Unit. Aggregates several MAC frames into a single large frame to achieve higher throughput. The default is enabled.

- **RIFS Transmission.** Reduced Interframe Space. RIFS transmissions are shorter than other interframe spaces, and if this feature is enabled the access point will allow transmission of successive frames at different transmit powers. The default is disabled.

- **DTIM Interval**. The Delivery Traffic Indication Message. Specifies the data beacon rate between 1 and 255. The default is 3.

- **Preamble Type.** A long transmit preamble can provide a more reliable connection or a slightly longer range. A short transmit preamble gives better performance. The Auto settings automatically handles both long and short preambles. The default is Auto.

3. Click **Apply** to enable the wireless settings.

Configuring Advanced QoS Settings

Wireless Multimedia (WMM) is a subset of the 802.11e standard. WMM allows wireless traffic to have a range of priorities, depending on the type of data. Time-dependent information, such as video or audio, has a higher priority than normal traffic. For WMM to function correctly, Wireless clients must also support WMM.

For most networks, the default QoS (Quality of Service) queue parameter settings work well.You can specify parameters on multiple queues for increased throughput and better performance of differentiated wireless traffic, like V oice-over-IP (VoIP), other types of audio, video, and streaming media, as well as traditional IP data.*Figure 4,* shows the QoS screen.

Figure 4.

The QoS options on the WNAP320 are as follows:

- **AP EDCA parameters.** Specify the AP EDCA parameters for different types of data transmitted from the access point to the wireless client.
- **Station EDCA parameters.** Specify the Station EDCA parameters for different types of data transmitted from the wireless client to the access point. If WMM is disabled, you cannot configure Station EDCA parameters.

Table 1 describes the settings for QoS queues.

Table 1. QoS Queues and Parameters

QoS Queue	Description
Data 0 (Voice)	High-priority queue, minimum delay. Time-sensitive data such as VoIP and streaming media are automatically sent to this queue.
Data 1 (Video)	High-priority queue, minimum delay. Time-sensitive video data is automatically sent to this queue.
Data 2 (Best Effort)	Medium-priority queue, medium throughput and delay. Most traditional IP data is sent to this queue.
Data 3 (Background)	Lowest-priority queue, high throughput. Bulk data that requires maximum throughput and is not time-sensitive is sent to this queue (FTP data, for example).
AIFS (Arbitration Inter-Frame Space)	Specifies a wait time (in milliseconds) for data frames. Valid values for AIFS are 1 through 255.
cwMin (Minimum Contention Window)	Upper limit (in milliseconds) of a range from which the initial random backoff wait time is determined. Valid values for the cwMin are 1, 3, 7, 15, 31, 63, 127, 255, 511, and 1024. The value for cwMin must be lower than the value for cwMax.
cwMax (Maximum Contention Window)	Upper limit (in milliseconds) for the doubling of the random backoff value. Valid values for the cwMax are 1, 3, 7, 15, 31, 63, 127, 255, 511, and 1024. The value for cwMax must be higher than the value for cwMin.
Max. Burst Length	Specifies (in milliseconds) the maximum burst length allowed for packet bursts on the wireless network. A packet burst is a collection of multiple frames transmitted without header information. Valid values for maximum burst length are 0.0 through 999.9.

Enabling Wireless Bridging and Repeating

The ProSafe Wireless-N Access Point WNAP320 lets you build large bridged wireless networks. Select the product family mode you want to use for your environment:

- **Wireless Point-to-Point Bridge**. In this mode, the WNAP320 can communicate with another bridge-mode wireless station and with wireless clients if you select the **Enable Wireless Client Association** check box. To associate wireless clients with this access point, select clients from the list in the Enable Wireless Clients Association table, and select the corresponding check box in the Enable column.

  When you click the **Edit** button, you must enter the profile name and the MAC address (physical address) of the other bridge-mode wireless station in the fields provided. WEP, WPA-PSK, or WPA2-PSK are supported. WPA2-PSK can (and should) be used to protect this communication.

- **Wireless Point-to-Multi-Point Bridge**. Select this only if this WNAP320 access point is the master for a group of bridge-mode wireless stations. This mode supports default association with wireless clients. To associate wireless clients with this Access Point, choose clients from the list in the Enable Wireless Clients Association table, and select the corresponding check box in the Enable column.

  The other bridge-mode wireless stations must be set to point-to-point bridge mode, using the MAC address of this WNAP320 access point. They then send all traffic to this master, rather than communicate directly with each other.

  When you click the **Edit** button, you must enter the profile name and the MAC address (physical address) of the other bridge-mode wireless stations in the fields provided. WEP, WPA-PSK, or WPA2-PSK are supported. WPA2-PSK can (and should) be used to protect this communication.

  These features are accessed by selecting **Configuration > Wireless Bridge** (see *Figure 5,* below).

- **Repeater**. If this option is selected, this product family will operate as a repeater only, and send all traffic to the remote access point.

  Note: This option does not support communication with wireless clients, that is, the client cannot associate with the access point when it is operating as a repeater.

  When you click the **Edit** button, you must enter the profile name and the MAC address (physical address) of the other bridge-mode wireless station in the fields provided. WEP, WPA-PSK, or WPA2-PSK are supported. WPA2-PSK can (and should) be used to protect this communication.

- **Client Mode**. If selected, this product family will operate as a client bridge only, and send all traffic to the remote access point or peer device. MAC Cloning can also be enabled in Client Mode.
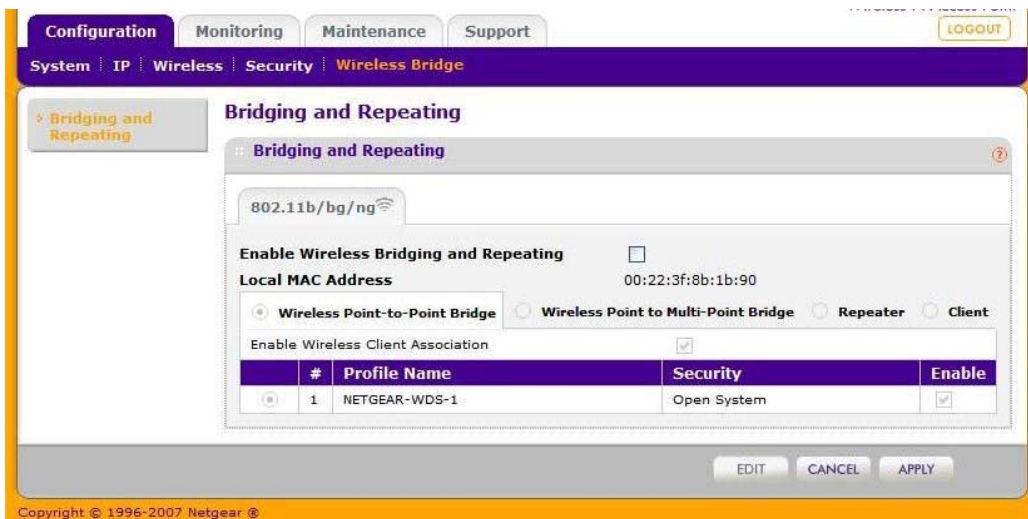
Figure 5.

On the screen shown in *Figure 5,* , when you select the radio button for any option, an **Edit** button displays. Click this button to edit the security profile of the wireless bridge settings, as shown in *Figure 6,* .
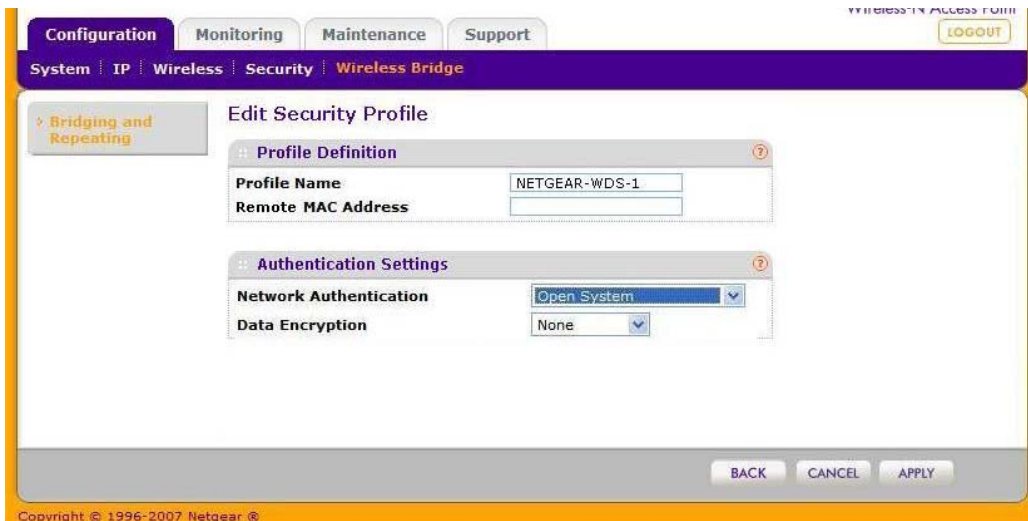
Figure 6.

Configuring a WNAP320 as a Point-to-Point Bridge

To configure a point-to-point bridge as shown in *Figure 7,* :

1. Select **Configuration > Wireless Bridge > Bridging and Repeating**. The Bridging and Repeating screen displays.

2. Configure the WNAP320 access point (AP1) on LAN Segment 1 in Point-to-Point Bridge mode.
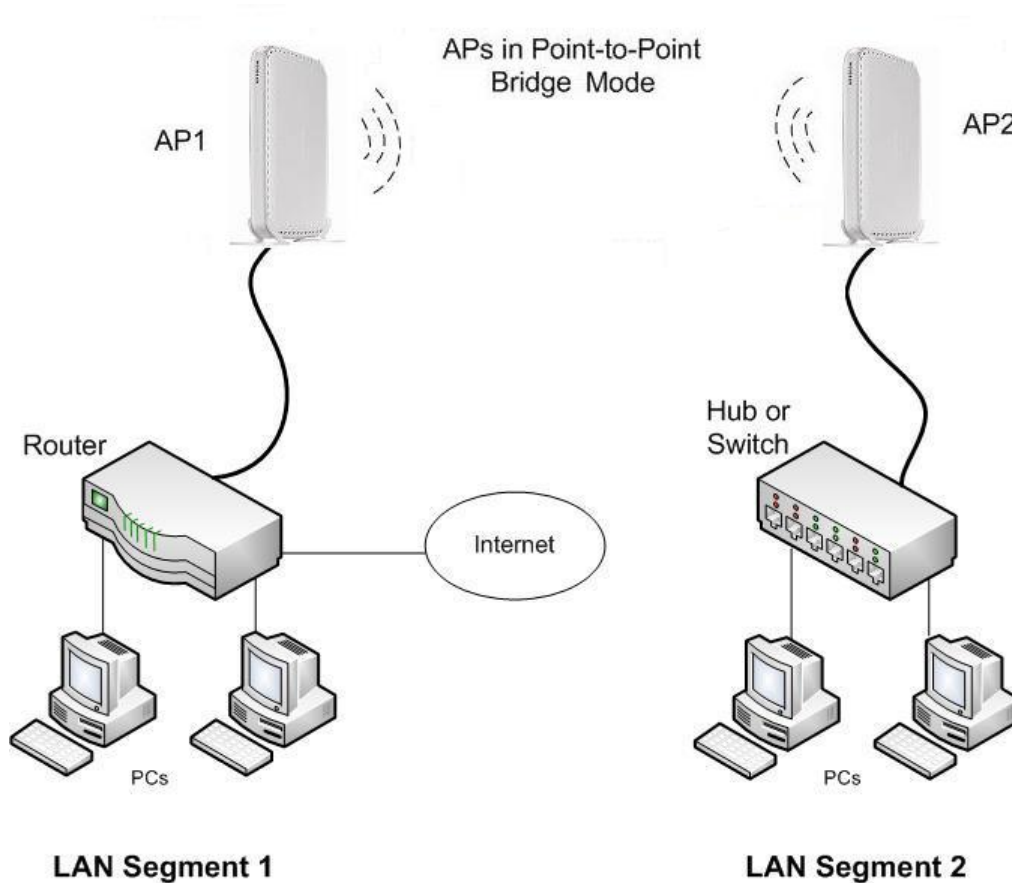
Figure 7.

3. Configure the WNAP320 access point (AP2) on LAN Segment 2 in Point-to-Point Bridge mode.

   AP1 must have AP2's MAC address in its Remote MAC Address field, and AP2 must have AP1's MAC address in its Remote MAC Address field.

4. Configure and verify the following parameters for both access points:
   • Verify that both access points are configured to operate in the same LAN network address range as the LAN devices.
   • Both use the same ESSID (Extended Service Set Identification), channel, authentication mode, if any, and security settings if security is in use.

5. Verify connectivity across the LAN 1 and LAN 2.

A computer on either LAN segment should be able to connect to the Internet or share files and printers of any other PCs or servers connected to LAN Segment 1 or LAN Segment 2.

6. Click **Apply** to save your settings.

Configuring a Point-to-Multi-Point Wireless Bridge

Figure 8. To configure a point-to-multi-point wireless bridge as shown in *Figure 9,* :

1. Select **Configuration > Wireless Bridge > Bridging and Repeating**. The Bridging and Repeating screen displays.

Figure 9.

2. Configure the operating mode of the access points:
   - Configure WNAP320 (AP1) on LAN Segment 1 in point-to-point bridge mode with the remote MAC address of AP2.
   - Because it is in the central location, configure WNAP320 (AP2) on LAN Segment 2 in Point-to-Multi-Point Bridge mode. The MAC addresses of the adjacent APs are required in AP2.
   - Configure the WNAP320 (AP3) on LAN 3 in Point-to-Point Bridge mode with the Remote MAC Address of AP2.
3. Verify the following parameters for all access points:
   - Verify that both access points are configured to operate in the same LAN network address range as the LAN devices.
   - Only one access point is configured in Point-to-Multi-Point Bridge mode, and all the others are in Point-to-Point Bridge mode.

- All access points must be on the same LAN. That is, all the APs LAN IP addresses must be in the same network.
- If you are using DHCP, all of the access points should be set to **Obtain an IP address automatically (DHCP Client)** in the IP address source portion of the Basic Settings screen.
- All ProSafe Wireless Access Points use the same SSID, channel, authentication mode, if any, and encryption.
- All point-to-point access points must have the AP2 MAC address in their Remote AP MAC Address fields.

4. Verify connectivity across the LANs.
   - A computer on any LAN segment should be able to connect to the Internet or share files and printers with any other PCs or servers connected to any of the three LAN segments.
   - Wireless stations will be able to connect to the ProSafe Wireless Access Points in the previous illustration. If you require wireless stations to access any LAN segment, you can add additional access points configured in wireless bridge mode to any LAN segment.

5. Click **Apply** to save your settings.

> **Note:** You can extend this multi-point bridging by adding additional WNAP320s configured in Point-to-Point Bridge mode for each additional LAN segment. Furthermore, you can extend the range of Configuring the WNAP320 as a Wireless Repeater

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To configure the WNAP320 as a wireless repeater as shown in *Figure 10,* :

1. Select **Configuration > Wireless Bridge > Bridging and Repeating**. The **Bridging and Repeating** screen displays.
2. Configure the operating mode of the access points.
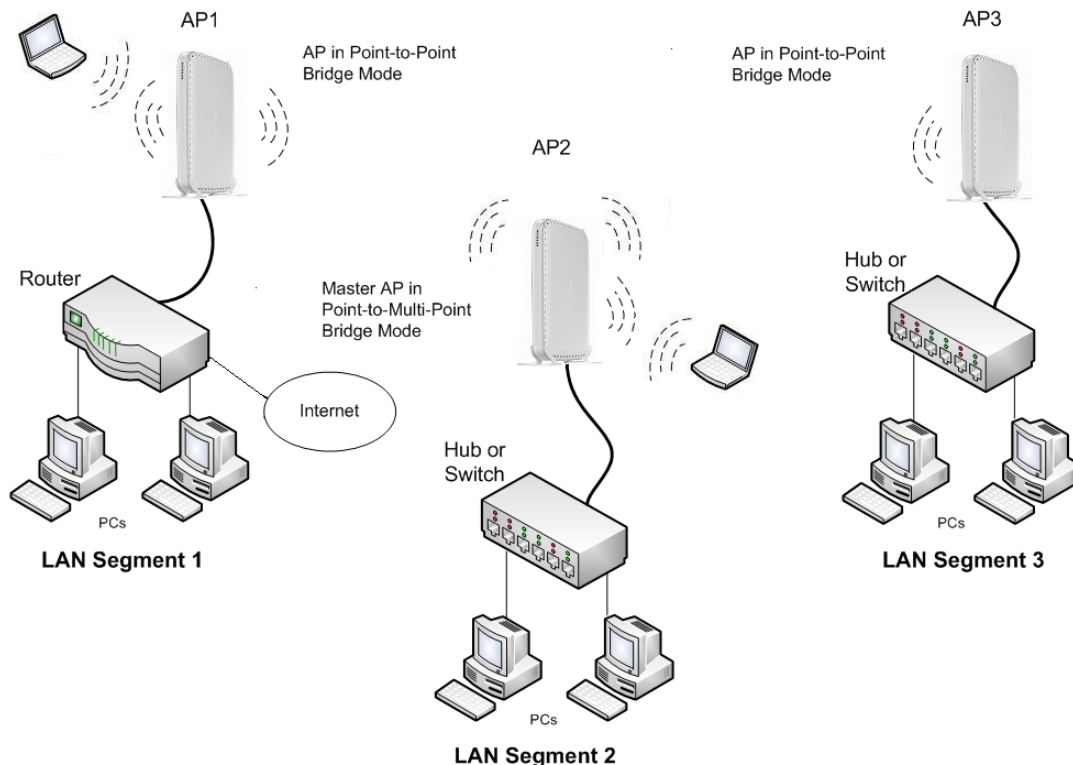   - Configure WNAP320 (AP1) on LAN Segment 1 in Repeater mode with the remote MAC address of AP2.
   - Configure WNAP320 (AP2) in Repeater mode with MAC addresses of AP1 and AP3.
   - Configure the WNAP320 (AP3) in Repeater mode with the remote MAC address of AP2.
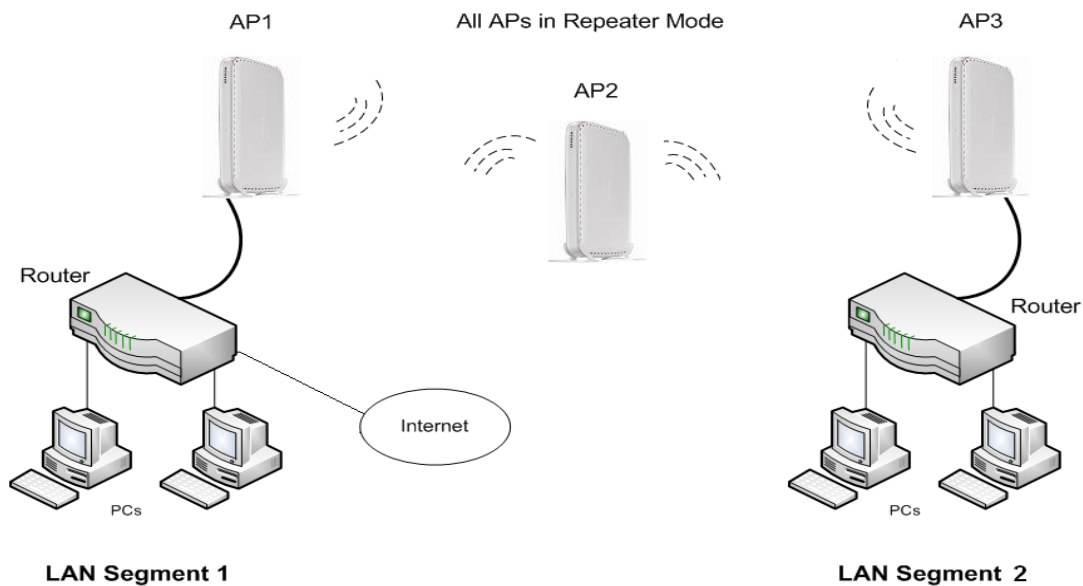
Figure 10.

3. Verify the following parameters for all access points:
   - The access points are configured to operate in the same LAN network address range as the LAN devices.
   - All access points must be on the same LAN. That is, all the LAN IP addresses of the access points must be in the same network.
   - If you are using DHCP, all access points should be set to Obtain an IP address automatically (DHCP Client) in the IP Address Source portion of the Basic Settings screen.
   - All ProSafe Wireless Access Points use the same SSID, channel, authentication mode, if any, and encryption.

4. Verify connectivity across the LANs.

   A computer on any LAN segment should be able to connect to the Internet or share files and printers with any other PCs or servers connected to any of the three WLAN segments.

5. Click **Apply** to save your settings.

Note: You can extend repeating by adding up to two additional WNAP320s configured in Repeater mode. However, since repeater configurations communicate in half-duplex mode, the bandwidth

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Configuring the WNAP320 for Client Mode

In Client mode the WNAP320 operates as a client bridge only and sends traffic to the selected remote AP or peer device. To configure the WNAP320 for Client mode:

1. Select **Configuration > Wireless Bridge > Bridging and Repeating**. The Bridging and Repeating screen displays. See *Appendix 4*
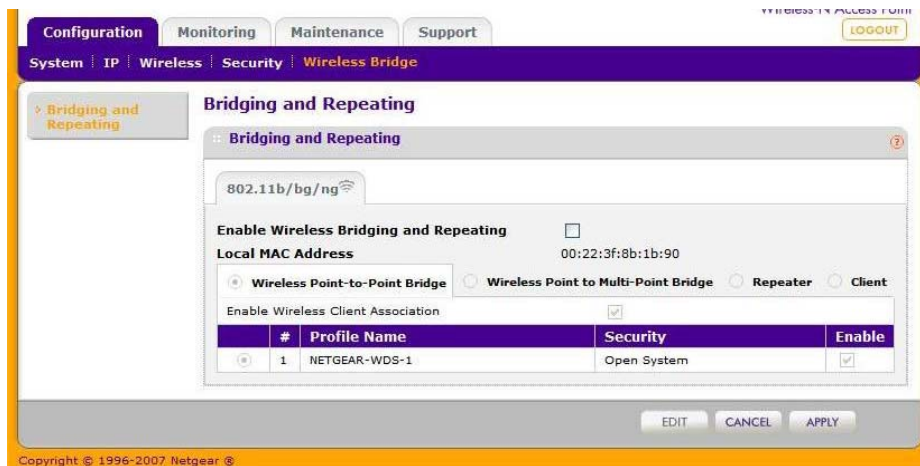
Figure 11.

Select the **Enable Wireless Bridgeing and Repeating** check box. This allows you to select a bridging mode.

2. Select **Client**. You can now enable the MAC Clone feature. The default is **Disable**. If you enable the MAC Clone feature, enter the MAC Clone address. See *Figure 12,* .

3. Click **Apply**.
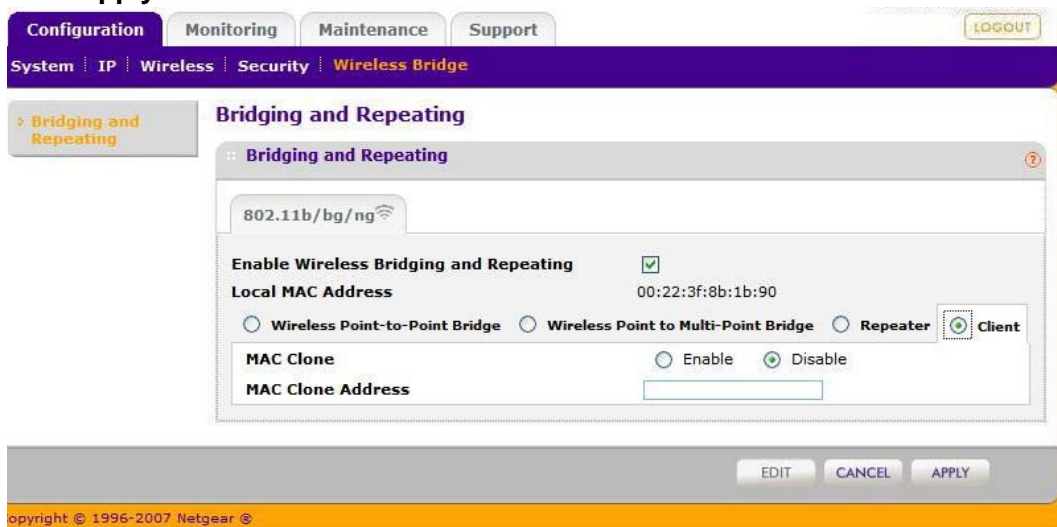
Figure 12.

Troubleshooting and Debugging
5

This chapter provides information about troubleshooting your ProSafe Wireless-N Access Point WNAP320. After each problem description, instructions are given to help you diagnose and solve the problem. For the common problems listed, go to the section indicated.

- Is the WNAP320 on?
- Have I connected the product family correctly?
- I cannot remember the product family's configuration password.

    Go to *Changing the Administrator Password* on page 29.

Note: For up-to-date WNAP320 installation details and troubleshooting guidance visit *http://kbserver.netgear.com/products*.

If you have trouble setting up your WNAP320, check the tips below.

No lights are lit on the product family.

It takes a few seconds for the Power LED to light. Wait a minute and check the Power LED on the access point. If the access point has no power:

• Make sure that the power cord is connected to the access point.

• Make sure that the power adapter is connected to a functioning power outlet. If it is in a power strip, make sure that the power strip is turned on. If it is plugged directly into the wall, verify that it is not a switched outlet.

• Make sure that you are using the correct NETGEAR power adapter supplied with your access point.

No lights are lit on the access point.

It takes a few seconds for the power indicator to light up. Wait a minute and check the power light status on the access point. If the access point has no power.

• Make sure the power cord is connected to the access point.

• Make sure the power adapter is connected to a functioning power outlet. If it is in a power strip, make sure the power strip is turned on. If it is plugged directly into the wall, verify that it is not a switched outlet.

• Make sure you are using the correct NETGEAR power adapter supplied with your access point.

The Wireless LAN LED does not light up.

The access point antennas are not working.

• If the Wireless LAN LED stays off, disconnect the adapter from its power source, and then plug it in again.

• Make sure that the antennas are securely connected to the WNAP320.

• Contact NETGEAR Technical Support if the Wireless LAN LED remains off.

The Wireless LAN activity light does not light up.

The access point's antenna is not working.

• If the Wireless LAN activity light stays off, disconnect the adapter from its power source and then plug it in again.

• Make sure the antennas are tightly connected to the access point.

• Contact NETGEAR technical support if the Wireless LAN activity light remains off.

The Ethernet LAN LED is not lit.

There is a hardware connection problem.Check these items:

- Make sure that the cable connectors are securely plugged in at the access point and the network device (hub, switch, or router). A switch, hub, or router must be installed between the access point and the Ethernet LAN or broadband modem.

- The LAN LED does not light if the link is 10 Mbps. In such cases, the LAN LED will still blink if there is activity.

- Make sure that the connected device is turned on.

- Make sure that the correct cable is used. Use a standard Category 5 Ethernet patch cable. If the network device has Auto Uplink™ (MDI/MDIX) ports, you can use either a crossover cable or a normal patch cable.

I cannot access the Internet or the LAN with a wireless-capable computer.

There is a configuration problem. Check these items:

- You might not have restarted the computer with the wireless adapter to have TCP/IP changes take effect. Restart the computer.

- The computer with the wireless adapter might not have the correct TCP/IP settings to communicate with the network. Restart the computer, and check that TCP/IP is set up correctly for that network. In Windows, the usual setting for Network Properties is "Obtain an IP address automatically (DHCP client)."

- The access point's default values might not work with your network. Check the access point default configuration against the configuration of other devices in your network.

I cannot connect to the WNAP320 to configure it.

Check these items:

- The WNAP320 is installed correctly, LAN connections are OK, and it is powered on. Check that the LAN port LED is green to verify that the Ethernet connection is OK.

- The default configuration of the WNAP320 is for a static IP address of 192.168.0.100 and a subnet mask of 255.255.255.0 with DHCP disabled. Make sure that your network configuration settings are correct.

- If you are using the NetBIOS name of the WNAP320 to connect, ensure that your computer and the WNAP320 are on the same network segment or that there is a WINS server on your network.

- If your computer is set to "Obtain an IP address automatically" (DHCP client), restart it.

- If your computer uses a fixed (static) IP address, ensure that it is using an IP address in the range of the WNAP320. The default IP address is 192.168.0.100, and the default subnet mask is 255.255.255.0.

When I enter a URL or IP address, I get a time-out error.

A number of things could be causing this. Try the following troubleshooting steps.

- Check whether other PCs work. If they do, ensure that your PCs TCP/IP settings are correct. If using a fixed (static) IP address, check the subnet mask, default gateway, DNS, and IP addresses.

- If the PCs are configured correctly, but still not working, ensure that the WNAP320 is connected and turned on. Connect to it, and check its settings. If you cannot connect to it, check the LAN and power connections.

- If the WNAP320 is configured correctly, check your Internet connection (DSL/cable modem, and so on.) to make sure that it is working correctly.

- Try again.

Using the Restore Factory Settings Button to Restore Default Settings

The Restore factory settings button (see *Rear Panel* on page 14) has two functions:

- **Reboot.** When this button is pressed and released quickly, the WNAP320 reboots (restarts).
- **Reset to factory defaults.** This button can also be used to clear *all* data and restore *all* settings to the factory default values.

To clear all data and restore the factory default values:

1. Power off the WNAP320, and power it back on.
2. Use something with a small point, such as a pen, to press the restore settings button in and hold it in for at least 5 seconds.
3. Release the restore settings button.

The factory default configuration has now been restored, and the WNAP320 is ready for use.

Supplemental Information

A

This appendix provides related documentation, factory default settings, and technical specifications for the ProSafe Wireless-N Access Point WNAP320.

- **Related Documents**
- **Technical Specifications**
- **Factory Default Settings**

Related Documents

This appendix provides links to reference documents you can use to gain a more complete understanding of the technologies used in your NETGEAR product.

Table 1.

Document	Link
ITCP/IP Networking Basics	*http://documentation.netgear.com/reference/enu/tcpip/index.htm*
Wireless Networking Basics	*http://documentation.netgear.com/reference/enu/wireless/index.htm*
Preparing your Network	*http://documentation.netgear.com/reference/enu/wsdhcp/index.htm*
Glossary	*http://documentation.netgear.com/reference/enu/glossary/index.htm*

Technical Specifications

Table 2. WNAP320 Technical Specifications

Parameter	ProSafe Wireless-N Access Point WNAP320
802.11g Data Rates	1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, & 54 Mbps (Auto-rate capable)
802.11ng Data Rates	Data Rates for Channel Width=20MHz and Guard Interval=short (400ms): Best, 7.2 Mbps, 14.4 Mbps, 21.7 Mbps, 28.9 Mbps, 43.3 Mbps, 57.8 Mbps, 65 Mbps, 72.2 Mbps, 14.44 Mbps, 28.88 Mbps, 43.33 Mbps, 57.77 Mbps, 86.66 Mbps, 115.56 Mbps, 130 Mbps, 144.44 Mbps
	Data Rates for Channel Width=40MHz and Guard Interval=short: Best, 15 Mbps, 30 Mbps, 45 Mbps, 60 Mbps, 90 Mbps, 120 Mbps, 135 Mbps, 150 Mbps, 30 Mbps, 60 Mbps, 90 Mbps, 120 Mbps, 180 Mbps, 240 Mbps, 270 Mbps, 300 Mbps
802.11b/bg/ng Operating Frequencies	2.412 – 2.462 GHz (US), 2.457 – 2.462 GHz (Spain), 2.412 – 2.484 GHz (Japan), 2.457 – 2.472 GHz (France), 2.412 – 2.472 GHz (Europe ETSI)
802.11 b/bg/ng Encryption	64 bits, 128 and 152 bits WEP, AES, TKIP data encryption
Network Management	Web-based configuration and status monitoring
Maximum Clients	Limited by the amount of wireless network traffic generated by each node; maximum 64 supported.
Status LEDs	Power/Test/Ethernet LAN/Wireless LAN
Power Adapter	12V DC, 1.0 A
Electromagnetic Compliance	FCC Part 15 Class B and Class E, CE, and C-TICK
Environmental Specifications	Operating temperature: 0 to 50° C
Operating humidity: 5-95%, non-condensing

Factory Default Settings

You can use the restore settings button located on the rear of your device to reset all settings to their factory defaults. This is called a hard reset.

• To perform a hard reset, push and hold the restore settings button for approximately 5 seconds (until the Test LED blinks rapidly). Your device will return to the factory configuration settings shown in **Table 3**.

• Pressing the restoresettings button for a shorter period of time simply causes your device to reboot.

Table 3. Access Point Default Configuration Settings

Feature	Description
AP Login	
User Login URL	192.168.0.100
User Name (case-sensitive)	admin
Login Password (case-sensitive)	password
Ethernet Connection	
Static IP Address	192.168.0.210
Ethernet MAC Address	See bottom label.
Port Speed	10/100/1000
Local Network (LAN)	
Lan IP	192.168.0.100
Subnet Mask	255.255.255.0
Gateway Address	0.0.0.0
DHCP Server	Disabled
DHCP Client	Disabled
Time Zone	USA-Pacific
Time Zone Adjusted for Daylight Saving Time	Disabled
SNMP	Enabled, but trap forwarding disabled
Spanning Tree Protocol	Disabled
Secure Telnet	Enabled
Wireless	

Table 3. Access Point Default Configuration Settings (Continued)

Feature		Description
	Operating Mode	Access Point
	Access Point Name	netgearxxxxxx where xxxxxx are the last 6 digits of the wireless access point MAC address.
	Wireless Communication	Enabled
	11 b/g/n Wireless Network Name (SSID)	NETGEAR_11ng
	Broadcast Network Name SSID	Enabled
	Security	Disabled
	Transmission Speed	Best[a]
	Country/Region	Varies by region
	802.11gn Radio Frequency Channel	Auto
	Output Power	Full
	Wireless Card Access List	All wireless stations allowed
	WMM Support	Enabled

a Maximum Wireless signal rate derived from IEEE Standard 802.11 specifications. Actual throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead, lower actual data throughput rate.

Compliance Notification

C

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.

Note: 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

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 ProSafe Wireless-N Access Point WNAP320 complies with Part 15 Subpart B of FCC CFR47 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.

FCC Caution

- Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- 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.
- For product available in the USA market, only channel 1~11 can be operated. Selection of other channels is not possible.
- This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

IMPORTANT NOTE:

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

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

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

Industry Canada statement:

This device complies with RSS-210 of the Industry Canada 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.

IMPORTANT NOTE:

Radiation Exposure Statement:

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

This device has been designed to operate with an antenna having a maximum gain of 5.59 dB. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

Canadian Department of Communications Radio Interference Regulations

This digital apparatus, ProSafe Wireless-N Access Point WNAP320, 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.

Europe – EU Declaration of Conformity

Marking with the above symbol indicates compliance with the Essential Requirements of the R&TTE Directive of the European Union (1999/5/EC).

This equipment meets the following conformance standards:

- EN300 328 (2.4Ghz), EN301 489-17, EN301 893 (5Ghz), EN60950-1
- This device is a 2.4 GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except in France and Italy where restrictive use applies.

- In Italy, the end-user should apply for a license at the national spectrum authorities in order to obtain authorization to use the device for setting up outdoor radio links and/or for supplying public access to telecommunications and/or network services.
- This device may not be used for setting up outdoor radio links in France, and in some areas the RF output power may be limited to 10 mW EIRP in the frequency range of 2454 – 2483.5 MHz. For detailed information contact the national spectrum authority in France.

For complete DoC, visit the NETGEAR EU Declarations of Conformity website at::
http://kb.netgear.com/app/answers/detail/a_id/11621/

Table 1. EDOC in Languages of the European Community

Language	Statement
Cesky [Czech]	*NETGEAR* Inc. tímto prohlašuje, že tento Radiolan je ve shode se základními požadavky a dalšími príslušnými ustanoveními smernice 1999/5/ES.
Dansk [Danish]	Undertegnede *NETGEAR Inc.* erklærer herved, at følgende udstyr Radiolan overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.
Deutsch [German]	Hiermit erklärt *NETGEAR Inc.*, dass sich das Gerät Radiolan in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet.
Eesti [Estonian]	Käesolevaga kinnitab *NETGEAR Inc.* seadme Radiolan vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
English	Hereby, *NETGEAR Inc.*, declares that this Radiolan is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Español [Spanish]	Por medio de la presente *NETGEAR Inc.* declara que el Radiolan cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.
Ελληνική [Greek]	ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ *NETGEAR Inc.* ΔΗΛΩΝΕΙ ΟΤΙ Radiolan ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/ΕΚ.
Français [French]	Par la présente *NETGEAR Inc.* déclare que l'appareil Radiolan est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.
Italiano [Italian]	Con la presente *NETGEAR Inc.* dichiara che questo Radiolan è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latviski [Latvian]	Ar šo *NETGEAR Inc.* deklarē, ka Radiolan atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]	Šiuo *NETGEAR Inc.* deklaruoja, kad šis Radiolan atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.

Table 1. EDOC in Languages of the European Community

Language	Statement
Nederlands [Dutch]	Hierbij verklaart *NETGEAR Inc.* dat het toestel Radiolan in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.
Malti [Maltese]	Hawnhekk, *NETGEAR Inc.*, jiddikjara li dan Radiolan jikkonforma mal-htigijiet essenzjali u ma provvedimenti ohrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
Magyar [Hungarian	Alulírott, *NETGEAR Inc.* nyilatkozom, hogy a Radiolan megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
Polski [Polish]	Niniejszym NETGEAR Inc. oświadcza, że Radiolan jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Português [Portuguese]	*NETGEAR Inc.* declara que este Radiolan está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Slovensko [Slovenian]	NETGEAR Inc. izjavlja, da je ta Radiolan v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Slovensky [Slovak]	*NETGEAR Inc.* týmto vyhlasuje, že Radiolan spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Suomi [Finnish]	*NETGEAR Inc.* vakuuttaa täten että Radiolan tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
Svenska [Swedish]	Härmed intygar *NETGEAR Inc.* att denna Radiolan står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Íslenska [Icelandic]	Hér með lýsir *NETGEAR Inc.* yfir því að Radiolan er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 1999/5/EC.
Norsk [Norwegian]	*NETGEAR Inc.* erklærer herved at utstyret *Radiolan* er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 1999/5/EF.

Interference Reduction Table

The table below shows the Recommended Minimum Distance between NETGEAR equipment and household appliances to reduce interference (in feet and meters).

Table 2. Interference Reduction Table

Household Appliance	Recommended Minimum Distance (in feet and meters)
Microwave ovens	30 feet / 9 meters
Baby Monitor - Analog	20 feet / 6 meters
Baby Monitor - Digital	40 feet / 12 meters
Cordless phone - Analog	20 feet / 6 meters

Table 2. Interference Reduction Table

Household Appliance	Recommended Minimum Distance (in feet and meters)
Cordless phone - Digital	30 feet / 9 meters
Bluetooth devices	20 feet / 6 meters
ZigBee	20 feet / 6 meters