



# WIRELESS ACCESS POINT

P/N 364887-01 (In-Ceiling)

P/N 364891-01 (In-Wall)

OWNER'S MANUAL

1307877 REV.O



301 Fulling Mill Road, Suite G  
Middletown, PA 17057  
(800)-321-2343

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## Federal Communications Commission Statement

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

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

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Reprinted from the Code of Federal Regulations #47, part 15.193, 1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office.

## Canadian Department of Communications

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This Class B digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

## FCC Radio Frequency Exposure Caution Statement

In order to maintain compliance with the FCC RF exposure guidelines, this equipment should be installed and operated with minimum distance **20cm** between the radiator and your body. Use only with supplied antenna. Unauthorized antenna, modification, or attachments could damage the transmitter and may violate FCC regulations. Any changes of modifications not expressly approved by the grantee of this device could void the users authority to operate the equipment.

Installation and use of this Wireless LAN device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications (including the antennas) made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment. The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, or the substitution or attachment of connecting cables and equipment other than manufacturer specified. It is the responsibility of the user to correct any interference caused by such unauthorized modification, substitution or attachment. Manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines.

---

**This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.**

---

## Declaration of Conformity (R&TTE directive 1999/5/EC)

The following items were completed and are considered relevant and sufficient:

- Essential requirements as in [Article 3]
- Protection requirements for health and safety as in [Article 3.1a]
- Testing for electric safety according to [EN 60950]
- Protection requirements for electromagnetic compatibility in [Article 3.1b]



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- Testing for electromagnetic compatibility in [EN 301 489-1] & [EN 301]
- Testing according to [489-17]
- Effective use of the radio spectrum as in [Article 3.2]
- Testing for radio test suites according to [EN 300 328-2]

**WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE. THE UNIT MUST NOT BE EXPOSED TO DRIPPING OR SPLASHING WATER.**

**CAUTION: DO NOT OPEN THE UNIT. DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE INSTALLATION AND TROUBLESHOOTING INSTRUCTIONS. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.**

**CAUTION: THIS DEVICE MUST BE INSTALLED AND USED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AS DESCRIBED IN THE USER DOCUMENTATION THAT COMES WITH THE PRODUCT.**

**WARNING: POSTPONE INSTALLATION UNTIL THERE IS NO RISK OF THUNDERSTORM OR LIGHTNING ACTIVITY IN THE AREA.**

*When using this device, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:*

- Read all of the instructions {listed here and/or in the user manual} before you operate this equipment.
- Give particular attention to all safety precautions.
- Retain the instructions for future reference.
- Comply with all warning and caution statements in the instructions.
- Observe all warning and caution symbols that are affixed to this equipment.
- Comply with all instructions that accompany this equipment.
- Avoid using this product during an electrical storm. There may be a risk of electric shock from lightning. For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug the power supply, and disconnect the Cat 5e to the WAP at the Power Inserter. This will prevent damage to the product due to lightning and power surges. It is recommended that the customer install an AC surge protector in the AC outlet to which this device is connected. This is to avoid damaging the equipment by local lightning strikes and other electrical surges. A Data Surge Conditioning Unit is also available from On-Q/Legrand (364598-01) to help protect the data connection from the Power Injector to the WAP.
- Operate this product only from the type of power source indicated on the product's marking label.
- If you are not sure of the type of power supplied to your home, consult your dealer or local power company.
- Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in safe operating condition.

Installation of this product must be in accordance with national wiring codes and conform to local regulations.

Place Power Inserter to allow for easy access when disconnecting the power cord/adaptor of the device from the AC wall outlet.

Wipe the unit with a clean, dry cloth. Never use cleaning fluid or similar chemicals. Do not spray cleaners directly on the unit or use forced air to remove dust.

When not utilizing the recommended 3 gang plastic switch & outlet box, do not directly cover the device, or block the airflow to the device with insulation or any other objects.

Keep the device away from excessive heat and humidity and keep the device free from vibration and dust.



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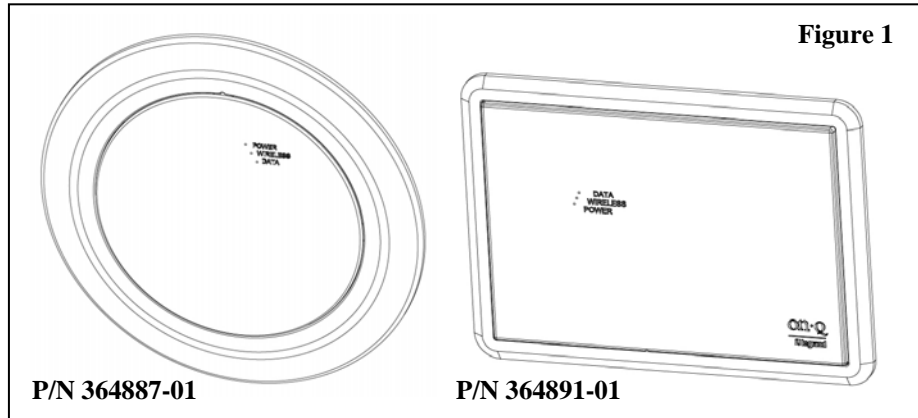


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## I. Introduction

The On-Q/Legrand Wireless Access Point (WAP) 802.11g In-Ceiling or In-Wall unit (shown in **Figure 1**) uses a radio transmission technology defined by the Institute of Electrical and Electronics Engineers (IEEE). This standard is subdivided into distinct categories of speed and the frequency spectrum used, designated by the lower case letter after the standard. Your On-Q WAP 802.11g supports both the 802.11b and 802.11g specifications.



The 802.11b specification transmits data rates up to 11 Mbps while the 802.11g specification transmits data rates up to 54 Mbps. These are theoretical speeds so your performance may vary. The radio waves radiate out in a donut-shaped pattern. The waves travel through walls and floors, but transmission power and distance are affected. The following chart shows how the wireless range is different for each data rate and also depends on the local conditions:

<b>Data Rate</b>	<b>Open Area</b>	<b>Closed Area</b>
54 Mbps	<u>Up to 100 ft.</u>	<u>Up to 60 ft.</u>
11 Mbps	<u>Up to 900 ft.</u>	<u>Up to 160 ft.</u>
5.5 Mbps	<u>Up to 1300 ft.</u>	<u>Up to 200 ft.</u>
2 or 1 Mbps	<u>Up to 1500 ft.</u>	<u>Up to 300 ft.</u>

Typically, the best performance can be expected by positioning it in the ceiling or wall at a central location on the top floor of the home or where a localized “hot spot” is desired.

The following recommendations help you achieve the best wireless performance environment:

- Placing the WAP in the physical center of your network is the premium location because the antenna radiates out the signal in all directions.
- Placing the WAP in a higher location helps to disperse the signal cleanly, especially to receiving locations on upper stories.
- Direct line of sight achieves better performance, but obviously is not always achievable.
- Try to avoid placing the WAP next to large solid or dense objects like walls, fireplaces, etc. This helps the signal penetrate more cleanly.
- Other wireless devices like televisions, radios, microwaves and 2.4 GHz cordless telephones can interfere with the signal. Keep devices away from the unit.
- Mirrors, especially silver-coated, negatively affect transmission performance.

Your On-Q WAP 802.11g is powered over the single Cat 5e cable that connects it to the service provider. A power supply inserts power onto the Cat 5e cable through an inserter module, and then this power is extracted for use at the WAP location. In this way, unsightly power cables are avoided at the WAP location.



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## II. Product Overview

### A. Features

- Compatibility with both 802.11g and 802.11b standards
- Wireless security via Wired Equivalent Privacy (WEP) and WiFi Protected Access (WPA) encryptions
- Firmware upgrades available to stay current with latest specification

### B. Components Included

The On-Q WAP 802.11g (either In-Ceiling or In-Wall version) includes the following components:

- WAP Assembly
- WAP Cover
- WAP 24VDC Power Supply with AC cord
- WAP Power Over Cat 5e Inserter Module
- Cat 5e Jumper Cable
- This WAP Owner's Manual on CD
- WAP IS Sheet and User Guide

### C. Replacement Parts

Replacement parts available for the On-Q WAP 802.11g include:

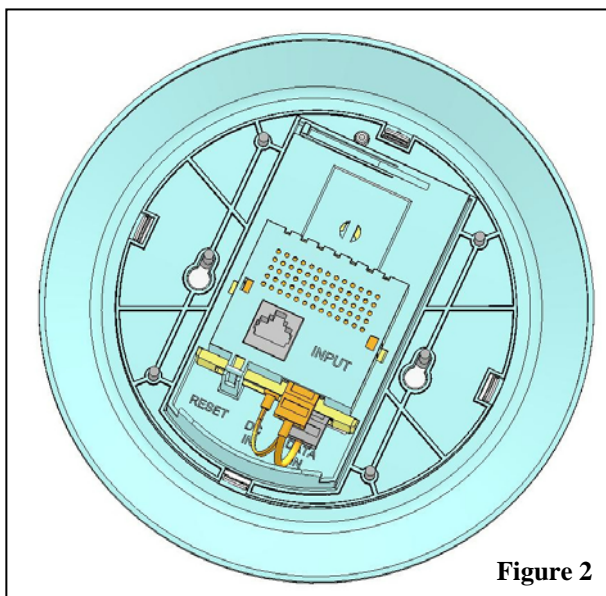
- WAP 24 VDC Power Supply with AC cord (P/N 364889-01)
- WAP Power Over Cat 5 Inserter Module (P/N 364888-01)

### D. On-Q WAP 802.11g Detailed Physical Description

The following information describes the physical characteristics of the WAP Assembly.

#### 1. WAP Assembly Connections (P/N 364887-01 shown)

**Figure 2** shows the WAP Assembly connection area including:  
Cat 5e from Power Inserter in enclosure "INPUT" connection



**Figure 2**



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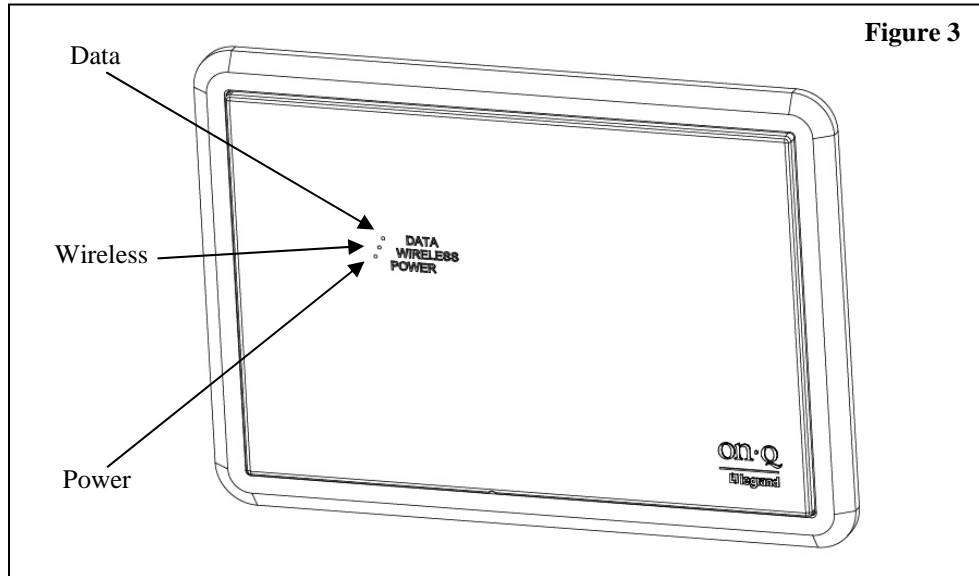
## 2. Connection Area Detailed Description

INPUT – This RJ-45 connector is where the Cat 5e cable from the Power Over Cat 5e Inserter Module in the On-Q Enclosure plugs in. There is an Extractor Module in the WAP Assembly that breaks out the required DC power from the data on the input Cat 5e cable connection.

**NOTE:** Notice in Figure 2 that there is also a small factory installed jumper cable that supplies the required DC power and data to the WAP assembly.

## 3. WAP Assembly Status Indications (P/N 364891-01 shown)

**Figure 3** shows the WAP 802.11g Assembly status indicators, which are visible when the WAP cover is properly installed:



## 4. Status Indicators Detailed Description:

### Data Indicator

- ON (Blue) – The device is connected to a data network.
- OFF – The device is powered off or not connected to a data network.

### Wireless Indicator

- ON (Blue) – The device is on and operating normally.
- OFF – The device is powered off.
- Blinking (Blue) – The device is transmitting or receiving data.

### Power Indicator

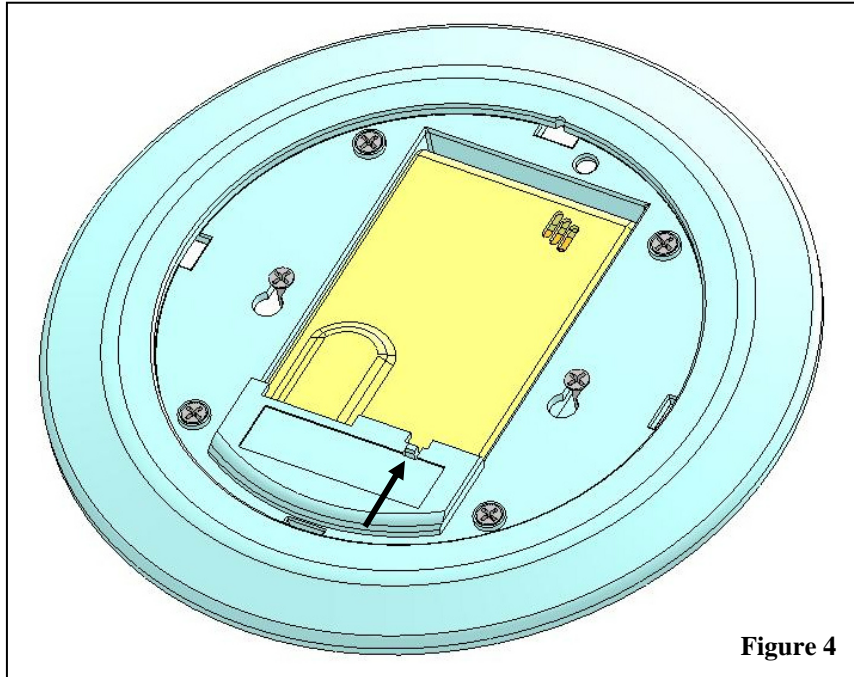
- ON (Blue) - The device is powered on and operating normally.
- OFF – The device is powered off or performing a boot sequence.
- Blinking (Blue) Firmware upgrade failed.

## 5. WAP 802.11g Reset Button Access

**Figure 4** shows the WAP 802.11g with the cover removed to gain access to the Reset Button. As shown, there is a tab that when pushed in the direction shown will activate the Reset Button. Pushing and holding this tab for five seconds or more will return the unit to

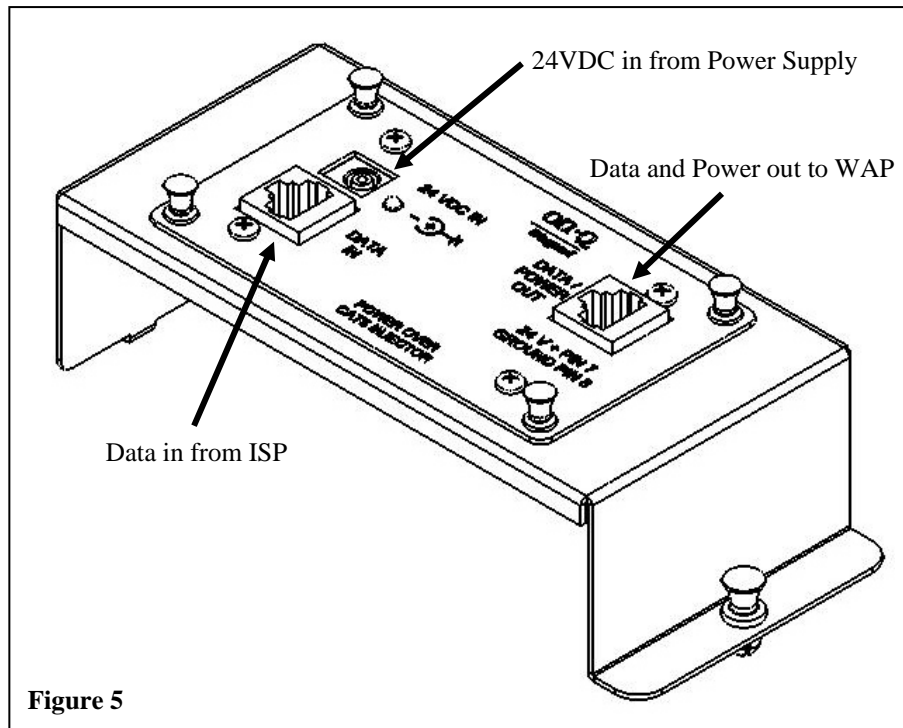


factory default condition. This is particularly handy if someone configured a security level or IP Address by mistake that prohibits you from gaining access to the unit.



#### 6. WAP 802.11g Power Over Cat 5e Inserter Module

Figure 5 shows the WAP Inserter Module components:





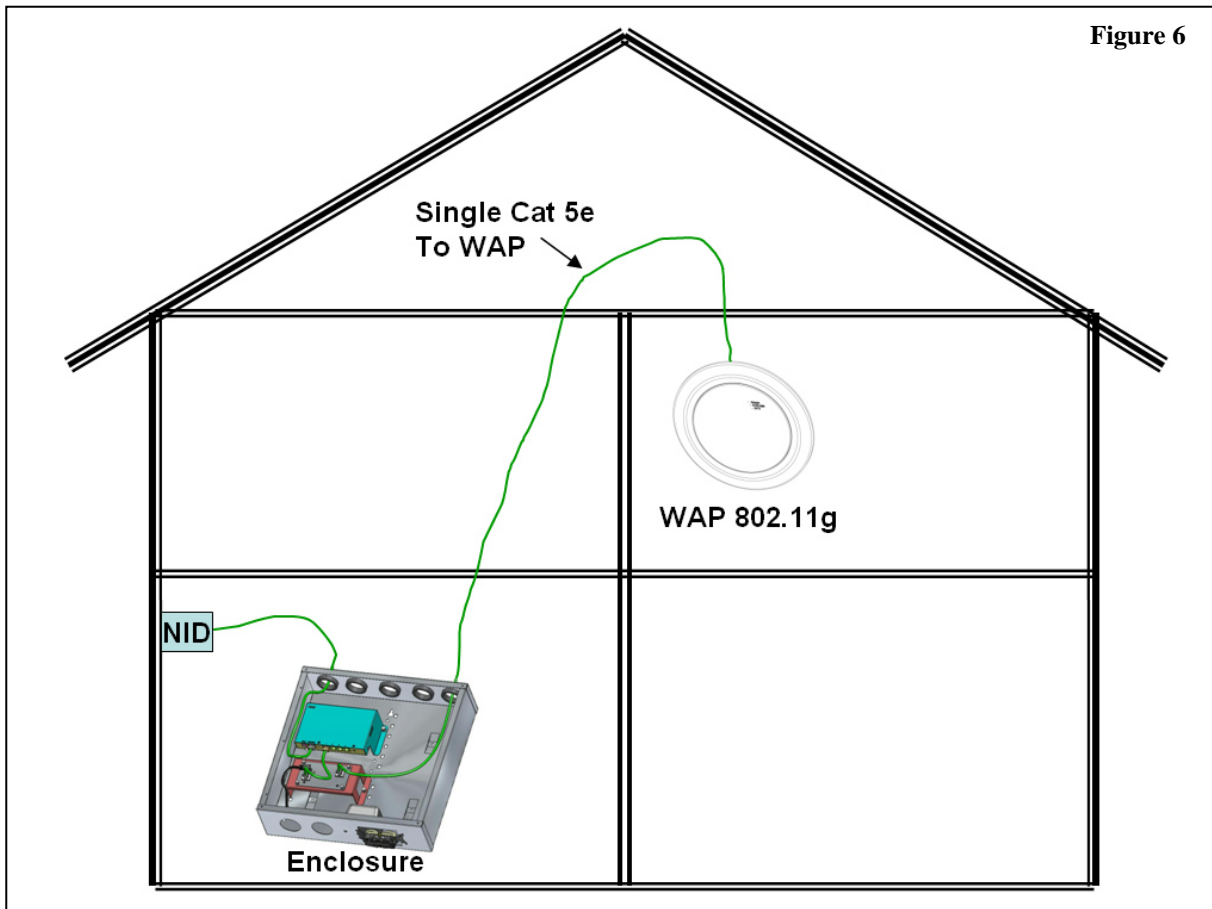
### III. Installation

The On-Q WAP 802.11g is best installed during new construction in two steps; at “rough-in” with the other low voltage cabling such as TV and Phone, but prior to drywall being installed, and at “trim-out” after the drywall is installed and painted. These steps are detailed below:

#### A. “Rough-in” steps:

1. A single Cat 5e should be run in the walls from a plastic triple gang box (not supplied) at the location in the home where the On-Q Wireless Access Point (WAP) will be installed to the location where the Power Inserter Module will be located (On-Q enclosure) leaving extra cable at both ends.

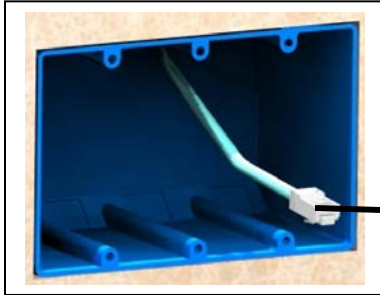
**NOTE:** The preferred location for the WAP 802.11g is in the ceiling or wall of the top floor, centrally located in the home (see *Figure 6*). If multiple WAPs are used, they should be located in overlapping wireless zones.



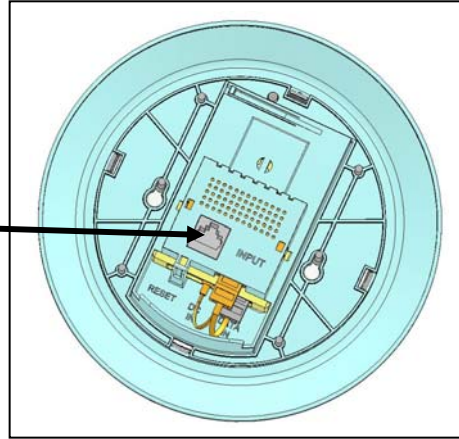
**B. “Trim-out” steps:**

1. The Cat 5e cable that was run from the triple gang plastic box to the enclosure should be pulled out of the box and terminated with an RJ-45 plug as shown in **Figure 7**.

**NOTE: Use proper tools and standard TIA 568A rules to prep and terminate the Cat 5e cable, such as the On-Q Cat 5 Cable Stripper (P/N 363292-01) and the On-Q EZ RJ45 Crimp Tool (P/N 364555-01).**

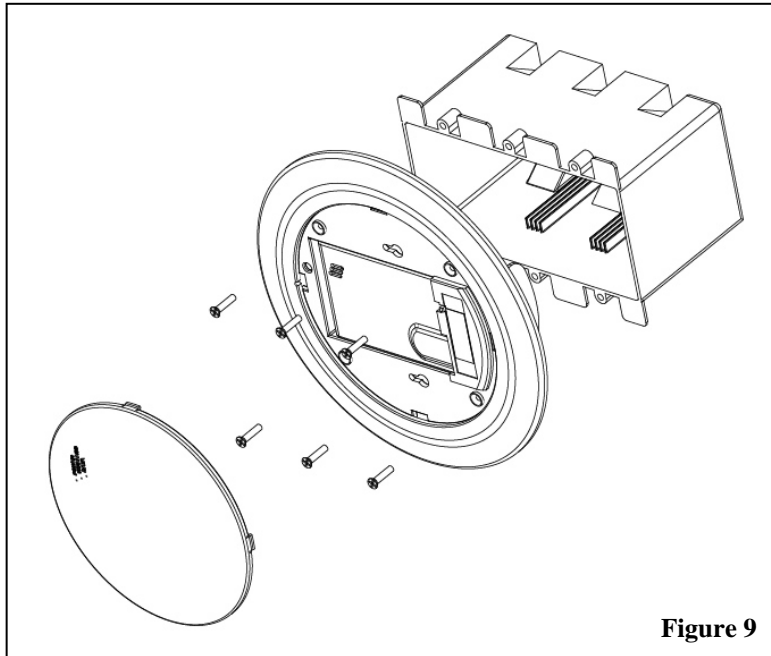


**Figure 7**



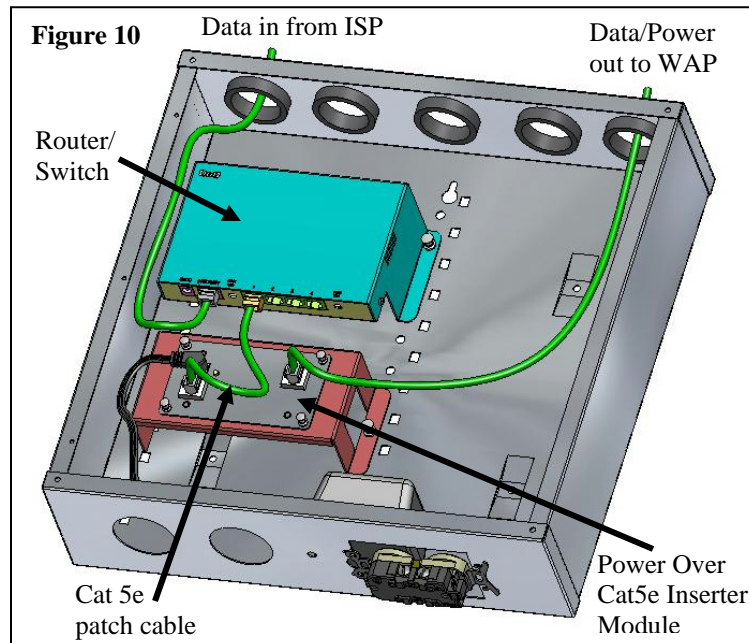
**Figure 8**

2. It should then be plugged into the “INPUT” connector on the rear of the WAP Assembly as shown in Figure 8.
3. The On-Q WAP 802.11g Assembly can then be screwed into the triple gang box and the cover inserted, insuring that the LEDs on the WAP line up with the holes in the cover (see **Figure 9**).



**Figure 9**

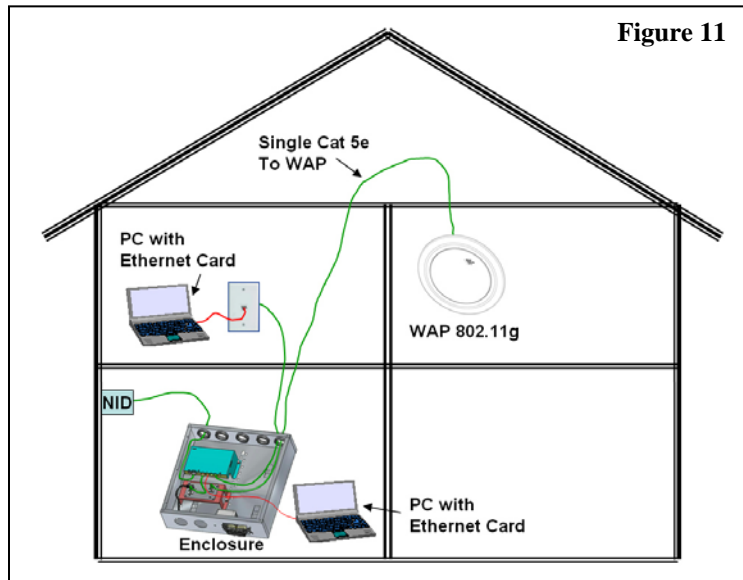
4. In the structured wiring enclosure (see **Figure 10**) the Cat 5e from the WAP 802.11g can be terminated with an RJ45 plug which is then connected directly to the output of the Power over Cat 5e Inserter Module (P/N 36488-01).



5. A supplied Cat 5e patch cable is then connected from the input RJ-45 jack of the Power over Cat 5e Inserter Module to one of the LAN ports on the On-Q or third party Router, or directly to a Broadband Modem.
6. The Power over Cat 5e Inserter Module is powered with a 24 Volt DC power supply which needs to be plugged in to an AC source.
7. When the 24 VDC Power Supply is plugged in to an active AC Source, verify that the Power LED is lit on the Power Inserter.
8. Next, verify that the Power LED is lit on the WAP.
9. If you connected to an active network, verify that the Network Activity LED is lit on the network access device and on the WAP.
10. Then, verify the Wireless LED is lit on the WAP.

## IV. Configuration Steps

The On-Q WAP 802.11g is typically configured in one of two ways; (1) From a portable PC connected through the "Data In" port of the Power Inserter Module in the enclosure which is then connected through its "Data/Power Out" port to a Cat 5e cable to the WAP, or (2) From a PC in one of the rooms of the house, connected through an outlet in the room to the enclosure where it is patched to the "Data In" port of the Power Inserter Module in the enclosure which is then connected through its "Data/Power Out" port to a Cat 5e cable to the WAP (see **Figure 11**). In either case, the PC must have an Ethernet Network Interface Card to communicate with the WAP.



**NOTE:** The On-Q WAP 802.11g can also be configured from a PC containing a Wireless Network Interface Card for your desktop PC, or wireless PCMCIA card for your laptop PC, but this is not recommended because it is not secure until you have configured security levels on the WAP

**NOTE:** Before configuring the On-Q WAP 802.11g, you must first temporarily configure your computer (with installed Ethernet Network Interface Card) to talk to the WAP. The WAP comes configured to a specific IP subnetwork (192.168.1.xxx) and its default IP address in that subnetwork is 192.168.1.1, so your PC's Ethernet Card must be assigned an IP address, (like 192.168.1.10), on that same subnetwork to talk to and configure the WAP. Giving the PC a specific IP address is also called assigning it a Static IP address, as compared to a Dynamic IP address that is typically assigned by a service provider through a process called Dynamic Host Configuration Protocol (DHCP).

**NOTE:** Before doing any PC IP Address re-configuration, make sure you first write down all of the current IP settings. If your PC is running XP, you may want to first create a manual system restore point (under Accessories/System Tools/System Restore).

**NOTE:** After initially configuring the WAP, using that Static IP Address that you assign, you may need to return the PC's IP Address setting to be dynamically assigned by DHCP, if that is what the service provider requires. If you are using a router, you will also want to change your WAP's IP address and Gateway settings to be compatible with the router. These steps are covered at the end of this section.



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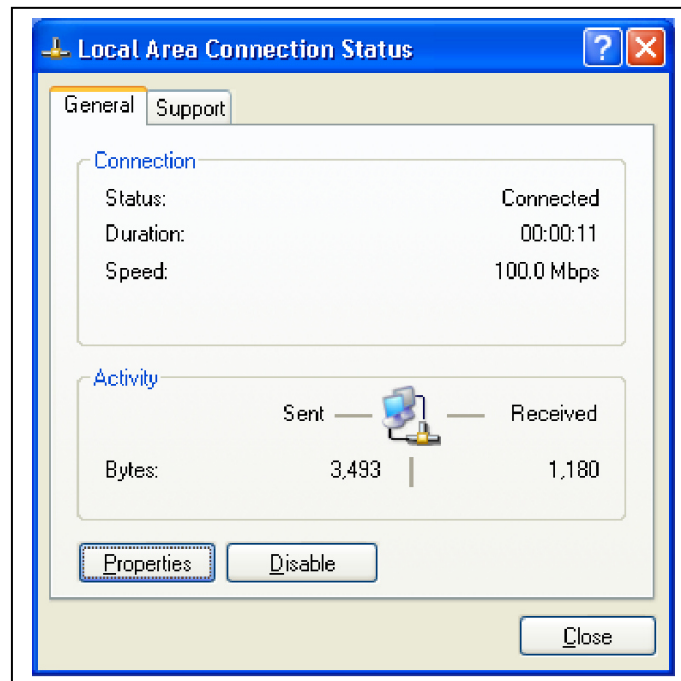
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**A. Configuring a Windows XP Ethernet Network Interface Card to talk to the WAP**

This section includes information on configuring computers with the Windows XP operating system (differences for 98SE, ME and 2000 will be sited).

**NOTE: This configuration assumes you have retained the default interface for Windows XP. If you are running the .Classic. interface, please note any sited differences for Windows 2000.**

1. Click **Start**.
2. Select **Control Panel**.  
*(For Windows 98SE, ME and 2000, select Settings first)*
3. Double-click **Network and Dial-Up Connections**.  
*(Double Click Network for Windows 98SE and ME and the Network Window is displayed)*
4. Double-click **Local Area Connection**. The Local Area Connection Status window appears (see **Figure 12**).  
*(Step 5 is not applicable for Windows 98SE or ME)*



**Figure 12**

5. Click the **Properties** button to go to the *Local Area Connection Properties* screen. **(Step 6 is not applicable for Windows 98SE or ME)**

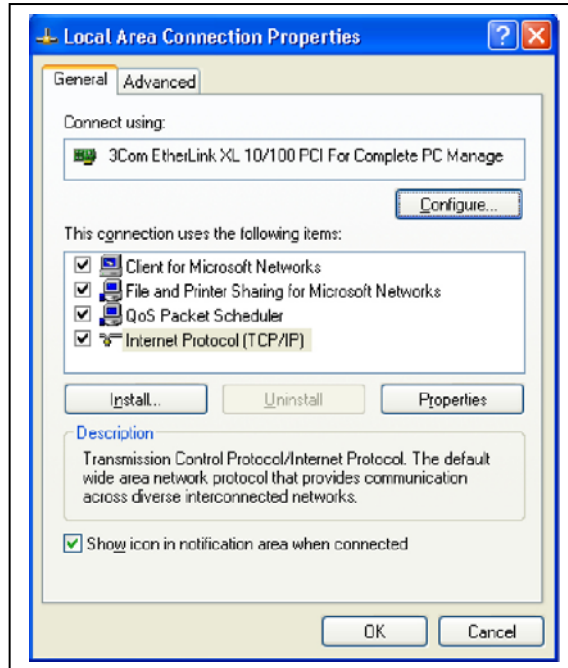


Figure 13

6. Ensure the box next to *Internet Protocol (TCP/IP)* is selected (see **Figure 13**).
7. Click to highlight **Internet Protocol (TCP/IP)** and click the **Properties** button to go to the *Internet Protocol (TCP/IP) Properties* screen. **(For Windows 98SE or ME, from the Network Window's configuration tab, select the TCP/IP line the for the appropriate Ethernet adapter and Click Properties. From the TCP/IP Properties Window, Click on the IP Address tab.)**

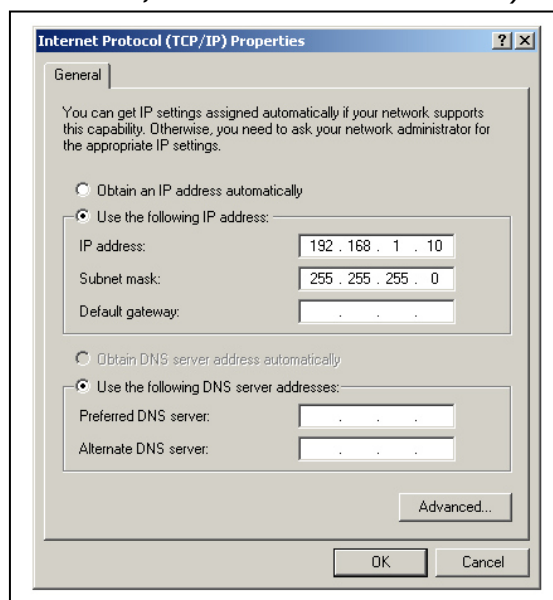


Figure 14

8. Click on **“Use the following IP Address:”** so that the circle is filled (see **Figure 14**).
9. Enter **192.168.1.10** into the IP Address field.
10. Enter **255.255.255.0** into the Subnet Mask field.
11. Click **OK** twice to exit and save your settings.  
**(For Windows 98SE, ME, or 2000 you will have to restart the computer to save these settings).**
12. After the reboot (if appropriate), proceed to the next section to set up the WAP security settings.

## B. Logging on to the WAP

1. Once the PC's Ethernet Interface Card is configured on the WAP's subnetwork, open your web browser and Enter into the URL field **http://192.168.1.1** (the WAP's default IP address) and press **Enter** (see **Figure 15**).



Figure 15

The login screen will appear (see **Figure 16**).

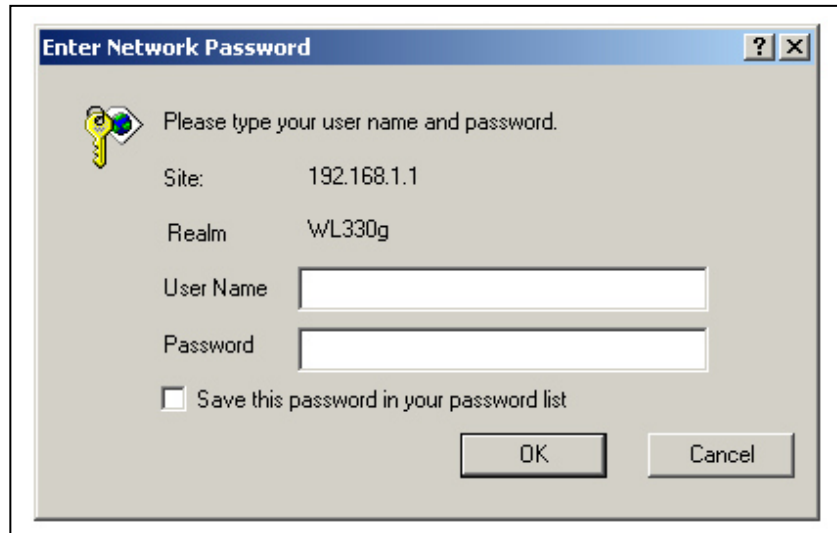


Figure 16

2. Enter the **User ID**. The default factory setting is "admin", without the quotation marks.
3. Enter the **Password**. The default factory setting is "admin", without the quotation marks.



**NOTE: Once you have logged in, for security reasons, you should change the Password. Be sure to document the new Password. For details on changing your Password see the Firmware Upgrade section.**

### C. Wireless Security Setup

Follow these procedures to setup the correct security protocols for your WAP.

1. Select **Simple Setup** (see *Figure 17*).

The screenshot shows the 'Simple Setup' configuration page for a wireless interface. The page has three tabs: 'Simple Setup', 'Access Control', and 'Firmware Upgrade'. The 'Simple Setup' tab is active. Below the tabs, there are two sections: 'Wireless Interface' and 'Ethernet Interface'. The 'Wireless Interface' section includes fields for SSID (AP\_324cb7), a checked box for 'Response to Broadcast SSID requests', Channel (Channel 1), Operation Mode (mixed), Transmit Rate (Auto), Preamble (Long), Authentication Method (Open System or Shared Key), Encryption (None), Passphrase, WEP Key 1-4, Default Key (Key 1), and WPA Re-key Timer (86400). The 'Ethernet Interface' section includes radio buttons for 'Enable DHCP' and 'Use the following IP Setting', with the latter selected. Below these are fields for Ip Address (192.168.1.1), Subnet Mask (255.255.255.0), and Default Gateway. At the bottom, there are 'Apply' and 'Restore' buttons.

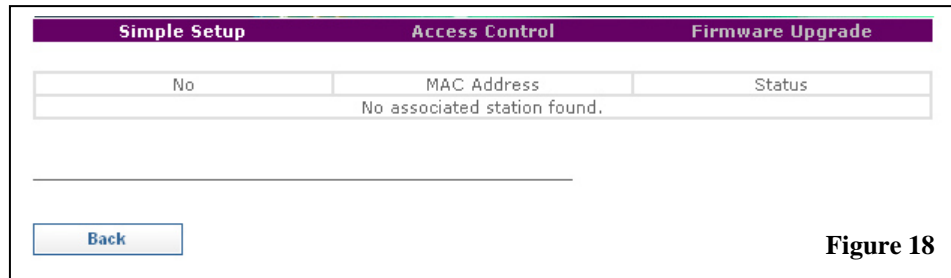
**Figure 17**

8. The **SSID (Service Set Identifier)** field displays the SSID of this device. You can change it to a more user friendly name and click on **Apply** at the bottom of the screen to make the change.

**NOTE: The SSID you choose will remain as selected, unless the reset button is pressed, which brings the unit back to its factory default settings.**

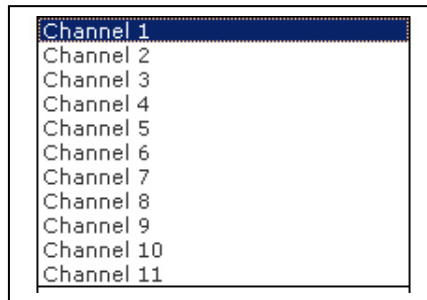
9. Enabling the **Response to Broadcast SSID requests** option allows the device to broadcast its SSID in a wireless network, which allows other wireless devices to scan and establish communication with the device. Unchecking this option (**what we recommend**) hides the SSID to prevent other wireless devices from recognizing and connecting to the device.

10. Click on the **Associated Stations** link (beside the SSID) to display a list of wireless devices associated with this WAP. The list includes the wireless device MAC address and connection status (see **Figure 18**).



**Figure 18**

11. The Channel field allows you to select which channel this device will use to communicate with other wireless devices in the network. Click on the down arrow at the right of the field to see the selections (as shown in **Figure 19**). The default channel is Channel #1.



**Figure 19**

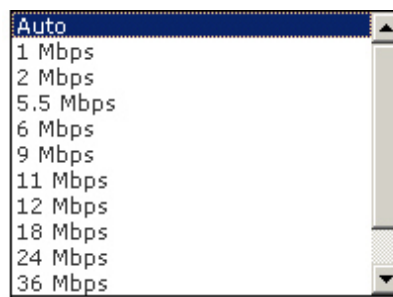
**NOTE: The IEEE 802.11g standard supports up to 13 channels worldwide. Each channel is assigned a center frequency 5 MHz higher or lower than the adjacent channel. A 30 MHz separation may be required to avoid interference between two wireless networks operating in close proximity. Each associated wireless client must use the same channel number in order to communicate.**

12. The WAP 802.11g can have its **Operation Mode** set to operate in either an 802.11b client only mode, an 802.11g client only mode, or a mixed mode as shown in **Figure 20**.



**Figure 20**

13. The **Transmit Rate** allows you to select the data transmission rate from 1 Mbps to 54 Mbps for devices as shown in **Figure 21**. The default is **Auto**.



**Figure 21**

14. The **Preamble** (see **Figure 22**) allows you to adjust the preamble mode for a 2.4GHz/11Mb network to Long, Short, or Auto. The default preamble mode is **Long**.



Figure 22

15. There are three different security **Authentication Methods** that may be selected as shown in **Figure 23**. **Open System or Shared Key** (the default selection) allows the device to accept connection requests from any wireless device in its operating range, while **Shared Key** allows only devices with the same 64-bit **WEP (Wired Equivalent Privacy)** or 128-bit **WEP** encryption key access to the device, and **WPA-PSK (Wi-Fi Protected Access-Pre-Shared Key)** allows only devices with the same **TKIP (Temporal Key Integrity Protocol)** encryption key access to the device.

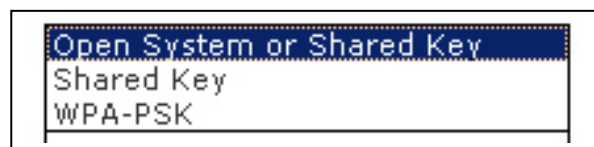


Figure 23

16. The **Encryption** field can be None, 64-bit WEP, 128-bit WEP or TKIP, depending on which **Authentication Method** was chosen. If **Shared Key** was chosen, 64-bit and 128-bit WEP encryption keys may be manually assigned (by entering digits in the four **WEP Key** fields) or automatically generated (by entering 8 to 64 letters, numbers or symbols in the **Passphrase** field). In this case, the four WEP Keys will be generated when you click on the Apply button.

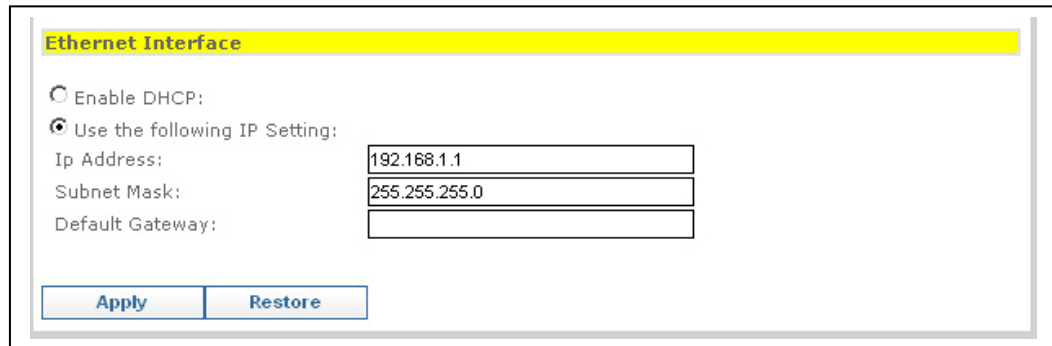
**NOTE: You must specify which of the generated WEP Keys you want to be the default WEP Encryption Key in the Default Key field.**

17. If **WPA-PSK** was chosen as the **Authentication Method**, you must enter a **Passphrase** in that field, and set the **WPA Re-key Timer** value (1-2,147,483,647 seconds). This will determine the time interval before the WPA group key is changed. A shorter time interval will make for a more secure wireless network.

#### D. Configuring the WAP 802.11g to work with a Router

If you are connected to the Internet through a Router, you will want to change the IP Address of the WAP to also be a member of the Router's subnetwork. This will allow you to access the WAP at a future date, if you need to re-configure its security or login settings.

1. Use the **Ethernet Interface** area at the bottom of the Simple Setup Screen to accomplish these tasks (see **Figure 24**).



**Ethernet Interface**

Enable DHCP:

Use the following IP Setting:

Ip Address:

Subnet Mask:

Default Gateway:

**Figure 24**

2. The **Enable DHCP** button is selected when you want the server to automatically assign the IP Address, Subnet Mask and Default Gateway of the WAP. If you are going to make the WAP part of the Router's subnetwork, you would instead click on the **Use the following IP Setting** button.
3. If the router is using the 192.168.10 subnetwork, enter **192.168.10.100** into the **IP Address** field. Use an address (like **100**) that is higher than the number of PCs you are likely to attach to this router.
4. Enter **255.255.255.0** into the **Subnet Mask** field.
5. Enter **192.168.10.254** into the **Default Gateway** field and click **Apply**.
6. To verify that you can access the WAP 802.11g at its new IP address, run the Ping command (**ping 192.168.10.100**) from any router attached PC.

## E. Allowing Client Access with MAC Addresses

1. Another form of "security" (and the one that we recommend) is to specify in a list which wireless clients can gain access to your On-Q WAP 802.11g device. Every potential wireless client (PC for example) contains an address that uniquely identifies it. This address is called the Media Access Control, or MAC address. Click on the words Access Control at the top center of the setup screen to go to the MAC Access Control page as shown in **Figure 25**.
2. Select either **Accept association requests from any station** or **Only allow Stations with MAC listed below to access this device** in the **MAC Filter Mode** area (see **Figure 25**).

Number	MAC Address
1	00:00:00:00:00:00
2	00:00:00:00:00:00
3	00:00:00:00:00:00
4	00:00:00:00:00:00
5	00:00:00:00:00:00
6	00:00:00:00:00:00
7	00:00:00:00:00:00
8	00:00:00:00:00:00
9	00:00:00:00:00:00
10	00:00:00:00:00:00
11	00:00:00:00:00:00
12	00:00:00:00:00:00

Figure 25

3. Enter the MAC addresses of the clients you wish to be able to gain access to your On-Q WAP 802.11g in the provided list and click on **Apply**.

**NOTE: The MAC address should be printed on the label on each wireless network adapter card that will be used to access the On-Q WAP 802.11g.**

## F. Returning the PC used to configure the WAP 802.11g to DHCP control

1. Click **Start**.
2. Select **Control Panel**.  
(For Windows 98SE, ME and 2000, select **Settings first**)
3. Double-click **Network and Dial-Up Connections**.

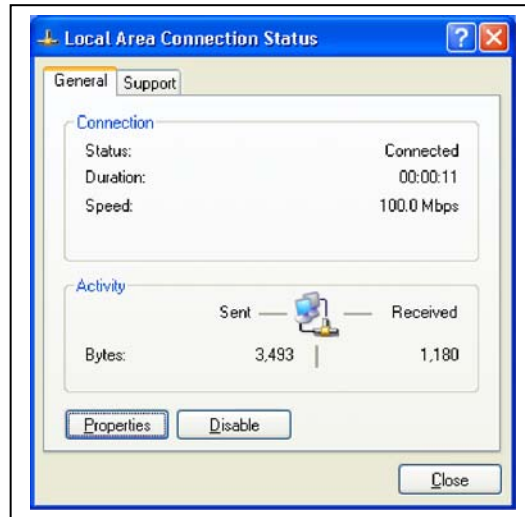


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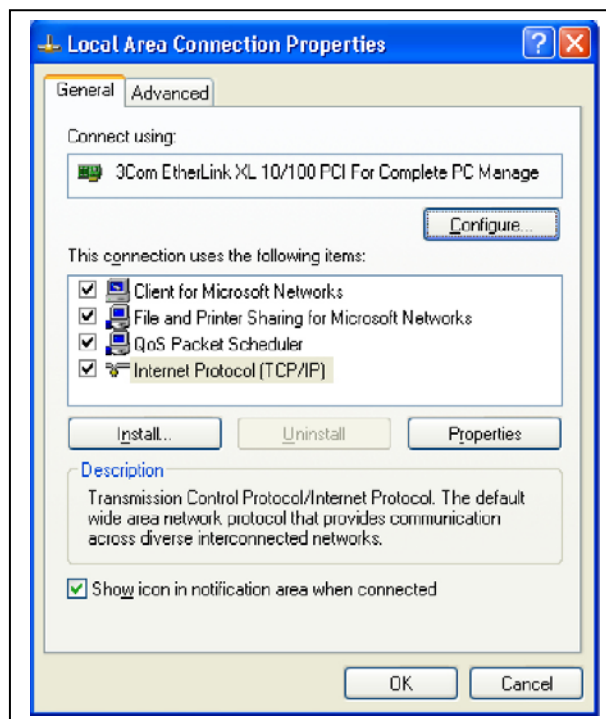
**(Double Click Network for Windows 98SE and ME and the Network Window is displayed)**

4. Double-click **Local Area Connection**. The Local Area Connection Status window appears (see **Figure 26**).  
**(Step 5 is not applicable for Windows 98SE or ME)**



**Figure 26**

5. Click the **Properties** button to go to the *Local Area Connection Properties* screen (see **Figure 27**). **(Step 6 is not applicable for Windows 98SE or ME)**

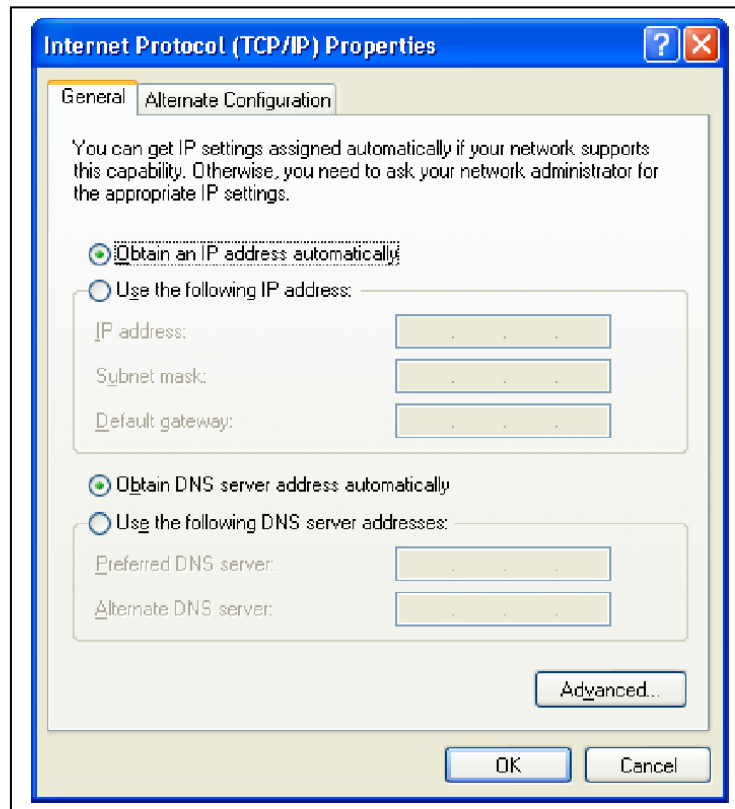


**Figure 27**

6. Ensure the box next to *Internet Protocol (TCP/IP)* is selected (see **Figure 27**).

**NOTE: Although this series of steps is used to re-configure the PC from direct WAP configuration back to its previous use as a DHCP controlled PC on the Router network, they can also be used to configure the WAP Network Interface Card for DHCP control by selecting the WAP NIC at the top of this screen.**

7. Click to highlight **Internet Protocol (TCP/IP)** and click the **Properties** button to go to the *Internet Protocol (TCP/IP) Properties* screen.  
**(For Windows 98SE or ME, from the Network Window's configuration tab, select the TCP/IP line for the appropriate Ethernet adapter and Click Properties. From the TCP/IP Properties Window, Click on the IP Address tab.)**



**Figure 28**

8. Select Obtain an IP address automatically (see **Figure 28**).
9. Click **OK** twice to exit and save your settings.  
**(For Windows 98SE, ME, or 2000 you will have to restart the computer to save these settings).**
10. After the reboot (if appropriate), your PC should be now be ready for operation as before, directly through the Router, or through the WAP (if a Wireless NIC card was installed).



## G. Firmware Upgrades

1. Click on **Firmware Upgrade** at the top right of the Setup Screen (see **Figure 29**).

The screenshot shows the Firmware Upgrade screen in the goahead WEB SERVER interface. The screen has a purple header with three tabs: "Simple Setup", "Access Control", and "Firmware Upgrade". The "Firmware Upgrade" tab is highlighted in yellow. Below the header, there are several input fields: "Product ID" (WL330g), "Firmware Version" (1.12.38.37), "Regulation Domain" (0x10 FCC(U.S.)), "New Firmware File" (with a "Browse..." button), "New Password", and "Retype New Password". To the right of the "New Firmware File" field is an "Upgrade" button. At the bottom left, there are "Apply" and "Restore" buttons. The goahead WEB SERVER logo is at the bottom left of the screen.

Figure 29

2. This screen shows you the **Product ID**, current **Firmware Version** and **Regulation Domain**.
3. Access the On-Q/Legrand website at [www.onqlegrand.com](http://www.onqlegrand.com) to download the latest firmware from Technical Support.
  - a. Download the latest file to your computer.
  - b. To locate the file you downloaded, type the path to the file or click **Browse** and navigate to it.
  - c. Click **Upgrade** to update the WAP 802.11g with the selected firmware file. The WAP will inform you that it is upgrading and the browser will refresh when it is complete.

## H. Login Password Change

1. To change your login password, simply type in a new password in the **New Password** field and re-type it in the **Retype New Password** field.
2. Click on **Apply** to make the new password active.
3. As on other screens, click on the **Restore** button only if you want to return to factory defaults.

## VI. Troubleshooting

This section will detail possible solutions to common problems that might occur in using the On-Q Wireless Access Point (WAP) 802.11g.

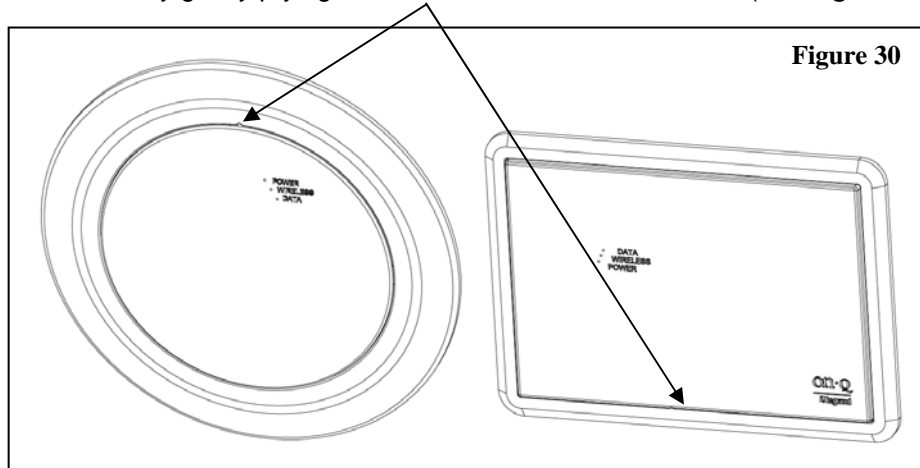
### A. Contact Information

If you are unable to locate a solution here, please access our website at [www.onqlegrand.com](http://www.onqlegrand.com) for the latest information. You can also reach us at 1-800-321-2343.

### B. Hardware Situations

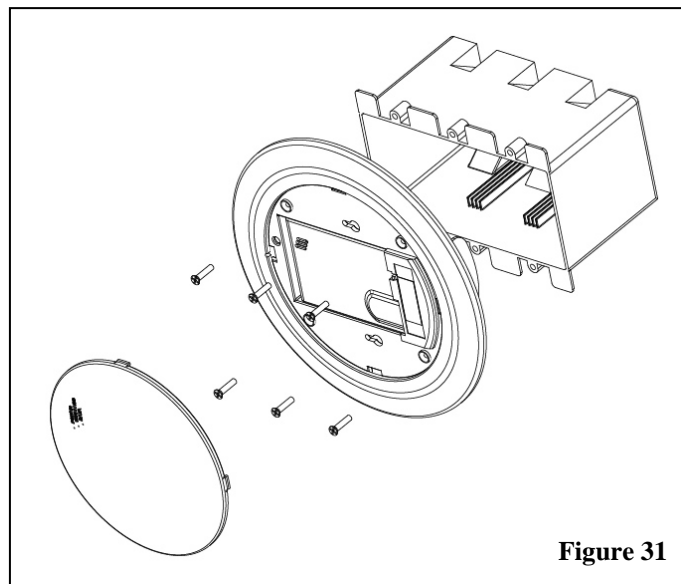
#### 1. WAP 802.11g Cover Removal

Some of the steps in this section may require removal of the WAP 802.11g cover, or the WAP Assembly unit to verify cabling. Use a small pointed object, like a paper clip to remove the WAP cover by gently prying in the slot at the location indicated (see **Figure 30**).



#### 2. WAP 802.11g Assembly Removal

The WAP 802.11g Assembly itself is removed by unscrewing the six screws that hold it to the 3 gang box it is mounted in (see **Figure 31**).



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### 3. Restoring Factory Defaults

If you need to reset the WAP 802.11g to factory default settings, there are two methods that can be used. You can login to the device and click on the **Restore** button at the bottom of each screen, or, once the cover has been removed, you can simply push and hold the **Reset** tab in the direction shown for at least 5 seconds (see **Figure 32**). This action will restore the WAP 802.11g to factory defaults as follows:

**Factory SSID**  
**Responds to broadcast SSID requests**  
**Channel 1 operation**  
**Mixed Operation Mode**  
**Automatic Transmit Rate**  
**Long Preamble**  
**Open System Authentication Method**  
**No Encryption**  
**Accept requests from any stations**  
**Default IP Address (192.168.1.1)**

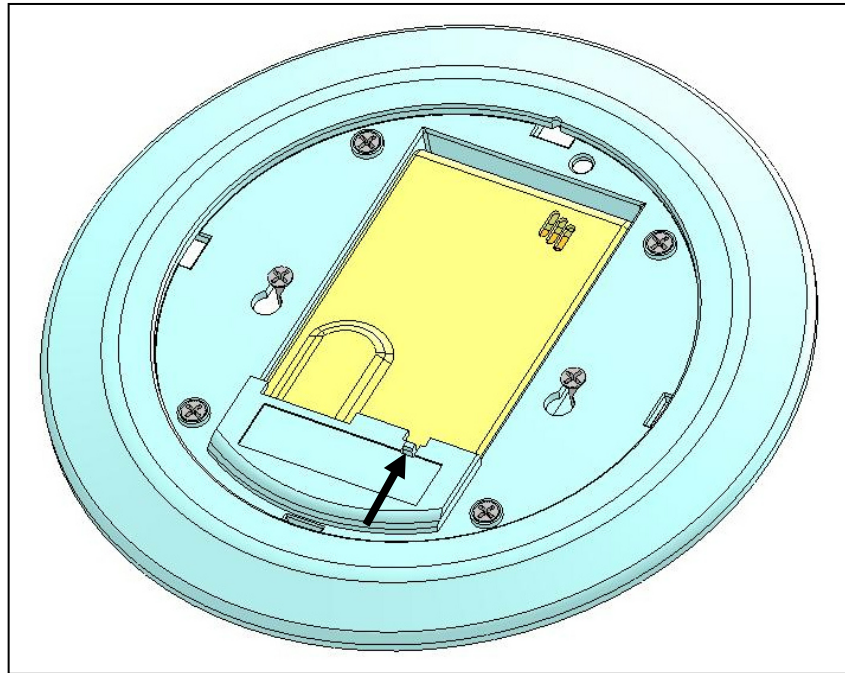


Figure 32

**NOTE:** Prior to performing Step 4 below, remove AC power from the Power Inserter in the On-Q Enclosure.

### 4. WAP 802.11g Cabling Verification

Once the WAP 802.11g Assembly has been removed from the 3 gang box as shown in **Figure 31**, look at the back of the assembly to insure the Cat 5e cable from the enclosure is properly terminated (see **Figure 33**) and plugged into the Input jack as shown in **Figure 34**. Also insure the rest of the factory cabling is plugged in as shown. Then replace the assembly back in the 3 gang box and replace the cover.

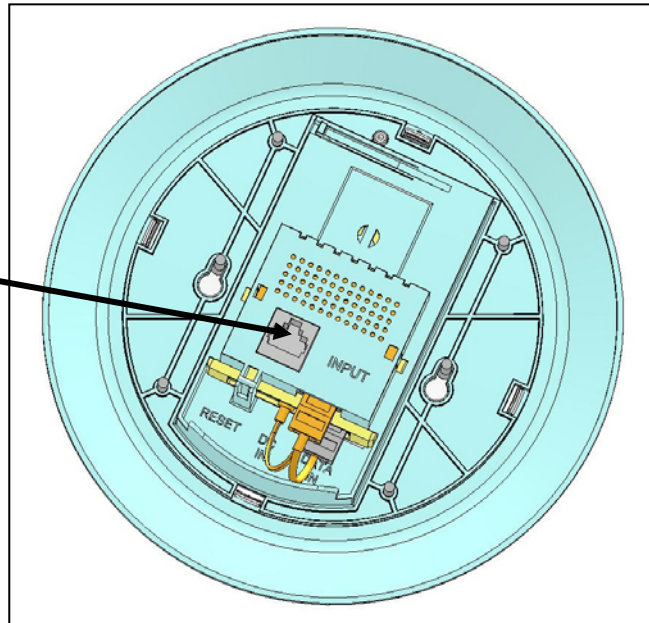


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**Figure 33**



**Figure 34**

5. **My computer is experiencing difficulty connecting to the wireless network.**
  - a. Ensure that your On-Q WAP 802.11g is powered on and that the Wireless LED is lit (see **Figure 30**).
  - b. Ensure that your wireless adapter (PCI card, Notebook or Ethernet adapter) is installed correctly and is active.
  - c. Ensure that your wireless adapter's radio signal is enabled and set to the same channel on which the WAP is communicating. Review your adapter's documentation for further instructions.
  - d. Ensure that your wireless adapter for your PC and the WAP 802.11g have the same security settings that will allow your computer to access the wireless network.
  - e. Ensure that your WAP is within range of your router or is not behind an obstruction, for example metal structures will interfere with the signal, as will 2.4 GHz cordless phones, and microwaves.
  
6. **My computer is experiencing difficulty in connecting to the WAP 802.11g.**
  - a. Check that all of your cable connections are tight and secured. This includes the cables to your modem, the router, the WAP 802.11g and to your PC.
  - b. Ensure that your LEDs are lit. For further information about LED descriptions, see **Section II: Product Overview**.
  - c. Ensure that you are using Ethernet cables and not telephone cables (see **Figure 35**). Ethernet cables use a wider RJ-45 style plug using 8 wires where telephone style plugs use the smaller RJ-11 (4 pin) or RJ-25 (6 pin) style plugs.

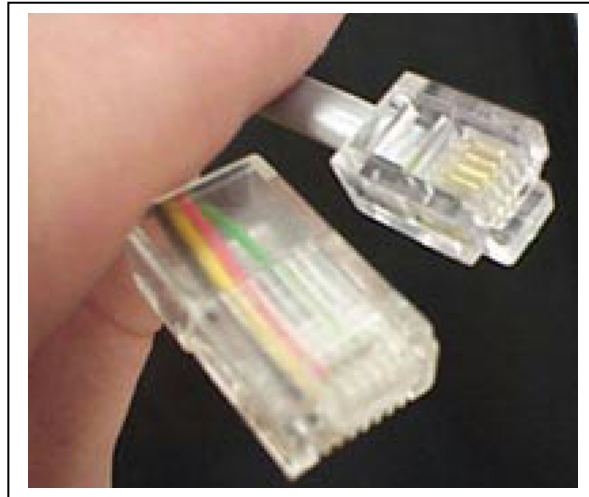


Figure 35

**NOTE: The plug on the left is RJ-45; the plug on the right is RJ-11. Use only RJ-45.**

- d. Ensure that your Ethernet adapter is enabled. Check the System Tray at the bottom right of your display to see an icon that looks like a monitor. You can click on this to see the status of your Ethernet adaptor. Also in Control Panel > Network and Dial-Up Connections, you can examine the state of your Ethernet adaptor.

### C. Software Situations

#### 1. I would like to see if my Internet connection is alive.

- a. For this, you will use the *ping* command to test the connection. Before attempting, ensure that **Obtain an IP address automatically** has been selected in the computer's settings and that you have an IP address assigned. Refer to **Section IV: Configuration** for further details.
- b. Open a command prompt by clicking **Start** and **Run**.  
(For Windows 98 and ME, in the *Open* field, type **command** and press **Enter** or **OK**.)  
(For Windows 2000 and XP, type **cmd** or, navigate using your **Start** button to **Programs>Accessories>Command Prompt**.)
- c. In the Command window, type **ipconfig**.  
You should see an IP address for your network adapter similar to the following example:  
IP Address . . . . . : 192.168.1.3  
Subnet Mask . . . . . : 255.255.255.0  
Default Gateway . . . . . : 192.168.1.1
- d. In the *Command* window, type **ping** followed by the WAP's **IP address** and press **Enter**.  
For example type: **ping 192.168.1.3**.  
There is a good possibility that the Default Gateway's IP address is the WAP's IP address. You can verify the WAP's IP address on the Control Panel > Network Access screen.  
If you receive a reply (the first word will be *Reply*), then your computer is connected to the WAP. Proceed to *Step e*.

- If you do NOT receive a reply, try from a different computer to verify that the first PC is not the cause of the problem.
- e. In the *Command* window, type **ping** and your **ISP's default gateway** and press **Enter**. For example type: **ping 192.168.1.1**.  
If you receive a reply (It might look something like this: *Reply from 216.109.125.72.*), then your connection to the Internet is alive and well. You can verify the ISP's IP address at the Gateway IP field on the Control Panel > Network Access screen.  
If you do NOT receive a reply, try from a different computer to verify that the first PC is not the cause of the problem.
  - f. If you cannot determine your ISP's default gateway, ping [www.yahoo.com](http://www.yahoo.com) or another known web location.

## 2. I cannot configure the WAP 802.11g over the network.

- a. Verify your Ethernet connection to the WAP.
- b. Verify that the IP address of the PC being used to configure the WAP is on the same network as the WAP's configuration IP address.
- c. The IP address of your network adapter must be on the same network and not a duplicate of any others on the network (for example: 192.168.1.3 and using a subnet mask of 255.255.255.0 can be used to login to the WAP's default IP address of 192.168.1.1). Refer to Section III: Configuration > Configure Your Computers on how to adjust the IP address for your PC.
- d. Verify that you can ping the WAP on this IP address. In the *Command* window, type **ping** and your WAP's default **IP address** and press **Enter**. For example type: **ping 192.168.1.3**.
- e. If you have changed the factory configured default IP address of the WAP, you will need to set your network adapter accordingly.
- f. Verify you are entering the correct URL in the browser. The default is <http://192.168.1.1>.
- g. If you think you have changed the IP address used to configure the WAP and cannot remember it, you must reset the unit back to factory defaults. To do this, press and hold the reset button under the cover for more the 5 seconds. This clears the WAP's user settings, including SSID, Password, IP Address, and Subnet mask.
- h. Once the WAP 802.11g is reset to factory default, re-verify the Ethernet connectivity and IP address issues.
- i. Verify you are using the latest version of IE or Netscape. IE 5.2 and below are not supported.



## VII. Glossary

### A

#### **Access Point (AP)**

A device that provides wireless LAN connectivity to wireless clients (stations).

#### **Adapter**

A device or card that connects a computer, printer, or other peripheral device to the network or to some other device. A wireless adapter connects a computer to the wireless LAN.

#### **Address translation**

See *NAT*.

#### **Ad-Hoc Network**

A temporary local area network connecting WAP clients together, usually just for the duration of the communication session. The clients communicate directly to each other and not through an established link, such as through a router.

Also known as: IBSS (Independent Basic Service Set).

#### **ANSI**

The American National Standards Institute is a private organization that coordinates the setting and approval of some U.S. standards. It also represents the United States to the International Standards Organization.

#### **ASCII**

The American Standard Code for Information Interchange refers to alphanumeric data for processing and communication compatibility among various devices; normally used for asynchronous transmission.

### B

#### **Bandwidth**

The transmission capacity of a medium in terms of a range of frequencies. Greater bandwidth indicates the ability to transmit more data over a given period of time.

#### **bps**

Bits Per Second

#### **Broadband**

A communications medium that can transmit a relatively large amount of data in a given time period.

#### **Broadcast**

Data transmission to all addresses or functions.

#### **BSS**

Basic Service Set. A configuration of Wireless Access Points that communicate with each other without resorting any infrastructure. Also known as Ad-Hoc networks. Also see *ESS*.



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## C

### Client

In a client/server architecture, a client is a computer that requests files or services such as file transfer, remote login, or printing from the server. On an IEEE 802.11b/g wireless LAN, a client is any host that can communicate with the wireless access point. Also called a CPE. A wireless client is also called a .station.. Also see *server*.

### Coaxial Cable

A type of cable consisting of a center wire surrounded by insulation and a grounded shield of braided wire. The shield minimizes electrical and radio frequency interference. Coaxial cable has high bandwidth and can support transmission over long distances.

### CPE

Customer Premise Equipment: typically computers, printers, etc, that are connected to the gateway at the subscriber location. CPE can be provided by the subscriber or the cable service provider. Also called a client.

### Crossover Cable

A crossover cable is a cable that is used to interconnect two computers by "crossing over" (reversing) their respective pin contacts. A crossover cable is sometimes known as a null modem.

## D

### Default Gateway

A routing device that forwards traffic not destined to a station within the local subnet.

### DHCP

A Dynamic Host Configuration Protocol server dynamically assigns IP addresses to client hosts on an IP network. DHCP eliminates the need to manually assign static IP addresses by "leasing" an IP address and subnet mask to each client. It enables the automatic reuse of unused IP addresses.

### DMZ

**DeMilitarized Zone.** This service opens one IP address to the Internet, usually for online gaming, and acts as a buffer between the Internet and your network.

### DNS

The Domain Name System is the Internet system for converting domain names (like [www.onqlegrand.com](http://www.onqlegrand.com)) to IP addresses. A DNS server contains a table matching domain names such as [Internetname.com](http://Internetname.com) to IP addresses such as 192.169.9.1. When you access the world-wide web, a DNS server translates the URL displayed on the browser to the destination website IP address. The DNS lookup table is a distributed Internet database; no one DNS server lists all domain name to IP address matches.

### Domain Name

A unique name, such as [onqhome.com](http://onqhome.com), that maps to an IP address. Domain names are typically much easier to remember than are IP addresses. See *DNS*.

### Download

To copy a file from one computer to another. You can use the Internet to download files from a server to a computer.



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**Driver**

Software that enables a computer to interact with a network or other device. For example, there are drivers for printers, monitors, graphics adapters, modems, Ethernet, USB, and many others.

**DSL**

Digital Subscriber Line

**DSSS**

Direct-Sequence Spread Spectrum. DSSS is a transmission technology used in WLAN transmissions where a data signal at the sending station is combined with a higher data rate bit sequence, or chipping code, that divides the user data according to a spreading ratio. The chipping code is a redundant bit pattern for each bit that is transmitted, which increases the signal's resistance to interference. If one or more bits in the pattern are damaged during transmission, the original data can be recovered due to the redundancy of the transmission.

**Dynamic IP Address**

An IP address that is temporarily leased to a host by a DHCP server. The opposite of *Static IP Address*.

**E****ESS**

An Extended Service Set (ESS) is a set of two or more BSSs that form a single subnetwork. See also *BSS*.

**Ethernet**

The most widely used LAN type, also known as IEEE 802.3. The most common Ethernet networks are 10Base-T, which provide transmission speeds up to 10 Mbps, usually over unshielded, twisted-pair wire terminated with RJ-45 connectors. Fast Ethernet (100Base-T) provides speeds up to 100 Mbps. .Base. means .baseband technology. and .T. means .twisted pair cable. Each Ethernet port has a physical address called the MAC address. Also see *MAC address*.

**Event**

A message generated by a device to inform an operator or the network management system that something has occurred.

**F****Firmware**

Code written onto read-only memory (ROM) or programmable read-only memory (PROM). Once firmware has been written onto the ROM or PROM, it is retained even when the device is turned off. Firmware is typically upgradeable.

**FTP**

File Transfer Protocol is a standard Internet protocol for exchanging files between computers. FTP is commonly used to download programs and other files to a computer from web pages on Internet servers.

**G****Gateway**

A device that enables communication between networks using different protocols. See also *router*.

**GUI**

Graphical User Interface



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## H

### Hexadecimal

A base-sixteen numbering system that uses sixteen sequential numbers (0 to 9 and the letters A to F) as base units before adding a new position. On computers, hexadecimal is a convenient way to express binary numbers.

### Host

In IP, a host is any computer supporting end-user applications or services with full two-way network access. Each host has a unique host number that combined with the network number forms its IP address. Host also can mean: A computer running a web server that serves pages for one or more web sites belonging to organization(s) or individuals; A company that provides this service; or In IBM environments, a mainframe computer

## I

### ICMP

Internet Control Message Protocol is a protocol used for error, problem, and informational messages sent between IP hosts and gateways. ICMP messages are processed by the IP software and are not usually apparent to the end-user.

### IEEE

The Institute of Electrical and Electronics Engineers, Inc. (<http://www.ieee.org>) is an organization that produces standards, technical papers, and symposiums for the electrical and electronic industries and is accredited by ANSI. 802.11b and 802.11g are examples of standards they have produced.

### Internet

A worldwide collection of interconnected networks using TCP/IP.

### IP

Internet Protocol is a set of standards that enable different types of computers to communicate with one another and exchange data through the Internet. IP provides the appearance of a single, seamless communication system and makes the Internet a virtual network.

### IP Address

A unique 32-bit value that identifies each host on a TCP/IP network. TCP/IP networks route messages based on the destination IP address. For a Class C network, the first 24 bits are the network address and the final 8 bits are the host address; in dotted-decimal format it appears .network.network.network.host.

### ISDN

Integrated Services Digital Network

### ISP

Internet Service Provider

## L

### LAN

Local Area Network. A local area network provides a full-time, high-bandwidth connection over a limited area such as a home, building, or campus. Ethernet is the most widely used LAN standard.



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## **M**

### **MAC Address**

The Media Access Control address is a unique, 48-bit value permanently saved in the ROM at the factory to identify each Ethernet network device. It is expressed as a sequence of 12 hexadecimal digits printed on the unit's label. You need to provide the MAC Address to the cable service provider. Also called an Ethernet address, physical address, hardware address, or NIC address.

### **MB**

One megabyte; equals 1,024 x 1,024 bytes, 1,024 kilobytes, or about 8 million bits.

### **Mbps**

Million bits per second (megabits per second). A rate of data transfer.

### **MTU**

The Maximum Transmission Unit is the largest amount of data that can be transmitted in one discrete message on a given physical network. The MTU places an upper bound on the size of a message that can be transferred by the network in a single frame. Messages exceeding the MTU must be fragmented before transmission, and reassembled at the destination.

### **Multicast**

A data transmission sent from one sender to multiple receivers. See also broadcast and unicast.

## **N**

### **NAT**

Network Address Translation is an Internet standard for a LAN to use one set of IP addresses for internal traffic and a second set of IP addresses for external traffic. NAT provides some security because the IP addresses of LAN computers are invisible on the Internet.

### **Network**

Two or more computers connected to communicate with each other. Networks have traditionally been connected using some kind of wiring.

### **NIC**

A Network Interface Card converts computer data to serial data in a packet format that it sends over the LAN. A NIC is installed in an expansion slot or can be built-in. Every Ethernet NIC has a MAC address permanently saved in its ROM.

## **O**

### **OSI**

Open Systems Interconnection is the seven layer suite of protocols designed by the International Standards Organization (ISO) to be the international standard computer network architecture.

## **P**

### **Packet**

The unit of data that is routed between the sender and destination on the Internet or other packet-switched network.



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## **PCMCIA**

The Personal Computer Memory Card International Association sets international standards for connecting peripherals to portable computers. Laptop computers typically have a PCMCIA slot that can hold one or two PC Cards to provide features such as Ethernet connectivity.

## **PING**

A network utility that tests host reachability by sending a small packet to the host and waiting for a reply. If you PING a computer IP address and receive a reply, you know the computer is reachable over the network. It also stands for .Packet Inter-Net Groper.

## **POE**

Power Over Ethernet is a technique used to supply low voltage operating power to devices connected with a twisted pair Cat 5e Ethernet interface cable.

## **Port Triggering**

A mechanism that allows incoming communication with specified applications.

## **PPP**

Point-to-Point Protocol is used to transport other protocols, typically for simple links over serial lines. It is most commonly used to access the Internet with a dial-up modem.

## **PPPoE**

Point-to-Point Protocol over Ethernet. Used by many DSL Internet Service Providers for broadband connection.

## **PPTP**

Point-to-Point Tunneling Protocol encapsulates other protocols. It is a new technology to create VPNs developed jointly by several vendors.

## **Private IP Address**

An IP address assigned to a computer on a LAN by the DHCP server for a specified lease time. Private IP addresses are invisible to devices on the Internet. See also *Public IP Address*.

## **Protocol**

A formal set of rules and conventions for exchanging data. Different computer types (for example PC, UNIX, or mainframe) can communicate if they support common protocols.

## **Public IP Address**

The IP address assigned to the router or WAP by the service provider. A public IP address is visible to devices on the Internet. See also *Private IP Address*.

## **R**

### **RJ-11**

The most common type of connector for household or office phones.

### **RJ-45**

An 8-pin modular connector; the most common connector type for 10Base-T or 100Base-T Ethernet networks.

## **Roaming**

In wireless networking, *roaming* refers to the ability to move from one AP coverage area to another without interruption in service or loss in connectivity.



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**ROM**

Read-Only Memory.

**Router**

On IP networks, a device connecting at least two networks, which may or may not be similar. A router is typically located at a gateway between networks. A router operates on OSI network layer 3. It filters packets based on the IP address, examining the source and destination IP addresses to determine the best route on which to forward them. A router is often included as part of a network switch. A router can also be implemented as software on a computer.

**Routing Table**

A table listing available routes that is used by a router to determine the best route for a packet.

**RTS**

Request To Send.

**S****Server**

In a client/server architecture, a dedicated computer that supplies files or services such as file transfer, remote login, or printing to clients. Also see *client*.

**Service Provider**

A company providing Internet connection services to subscribers.

**SMTP**

Simple Mail Transfer Protocol is a standard Internet protocol for transferring e-mail.

**Static IP Address**

An IP address that is permanently assigned to a host. Normally, a static IP address must be assigned manually. The opposite of *Dynamic IP Address*.

**Station**

IEEE 802.11b term for wireless client.

**Subscriber**

A user who accesses television, data, or other services from a service provider.

**Subnet Mask**

A methodology that determines what the router will examine for the destination of an IP address. A router delivers packets using the network address.

**Switch**

On an Ethernet network, a switch filters frames based on the MAC address, in a manner similar to a bridge. A switch is more advanced because it can connect more than two segments.



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## T

### TCP

Transmission Control Protocol on OSI transport layer four, provides reliable transport over the network for data transmitted using IP (network layer three). It is an end-to-end protocol defining rules and procedures for data exchange between hosts on top of connectionless IP. TCP uses a timer to track outstanding packets, checks error in incoming packets, and retransmits packets if requested.

### TCP/IP

The Transmission Control Protocol/Internet Protocol suite provides standards and rules for data communication between networks on the Internet. It is the worldwide Internetworking standard and the basic communications protocol of the Internet.

### Tunnel

To place packets inside other packets to send over a network. The protocol of the enclosing packet is understood by each endpoint, or tunnel interface, where the packet enters and exits the network. VPNs rely on tunneling to create a secure network. Tunneling requires the following protocol types: A carrier protocol, such as TCP, used by the network that the data travels over; An encapsulating protocol, such as IPSec, L2F, L2TP, or PPTP, that is wrapped around the original data; and A passenger protocol, such as IP, for the original data

## U

### UDP

User Datagram Protocol. A method used along with the IP to send data in the form of message units (datagram) between network devices over a LAN or WAN.

### Unicast

A point-to-point data transmission sent from one sender to one receiver. This the normal way you access websites. See also *multicast*.

### USB

Universal Serial Bus is a computer interface for add-on devices such as printers, scanners, mice, modems, or keyboards.

USB 1.1 supports data transfer rates of 12 Mbps and plug-and-play installation. You can connect up to 127 devices to a single USB port. USB 2.0 supports data rates of 480 Mbps.

## V

### VoIP

Voice over Internet Protocol is a method to exchange voice, fax, and other information over the Internet. Voice and fax have traditionally been carried over traditional telephone lines of the Public Switched Telephone Network (PSTN) using a dedicated circuit for each line. VoIP enables calls to travel as discrete data packets on shared lines. VoIP is an important part of the convergence of computers, telephones, and television into a single integrated information network.

### VPN

A virtual private network is a private network that uses "virtual" connections (tunnels) routed over a public network (usually the Internet) to provide a secure and fast connection; usually to users working remotely at home or in small branch offices. A VPN connection provides security and performance similar to a dedicated link (for example, a leased line), but at much lower cost.



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## **W**

### **WAN**

A wide-area network provides a connection over a large geographic area, such as a country or the whole world. The bandwidth depends on need and cost, but is usually much lower than for a LAN.

### **WAP**

Wireless Access Point or Wireless Access Protocol. See also *Access Point*.

### **WEP**

Wired Equivalent Privacy encryption protects the privacy of data transmitted over a wireless LAN. WEP uses keys to encrypt and decrypt transmitted data. The access point must authenticate a client before it can transfer data to another client. WEP is part of IEEE 802.11b.

### **Wi-Fi®**

Wireless fidelity (pronounced why'-fy) brand name applied to products supporting IEEE 802.11b/g.

### **WLAN**

Wireless LAN.

### **WPA**

Wi-Fi Protected Access. A security regimen developed by IEEE for protection of data on a WLAN.

### **WWW**

World Wide Web. An interface to the Internet that you use to navigate and hyperlink to information.



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