

USER MANUAL

L7-N-R2000

VERSION 1.00



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Package Contents

- L7 Networks L7-N-R2000 Wireless Router
- Power Adapter
- Ethernet Cable
- Manual on CD
- Warranty Card

Note: Using a power supply with a different voltage than the one included with the L7-N-R2000 will cause damage and void the warranty for this product.

Note: Always attach the power cord plug to the power supply, before inserting the power cord and connected power supply to the wall outlet.



System Requirements

- Ethernet-based Cable or DSL Modem
- Computers with Windows®, Macintosh®, or Linux-based operating systems with an installed Ethernet adapter
- Internet Explorer 6 or Firefox 2.0 or above (for configuration)

Features

- **Faster Wireless Networking** - The L7-N-R2000 provides up to 300Mbps* wireless connection with other 802.11n wireless clients. This capability allows users to participate in real-time activities online, such as video streaming, online gaming, and real-time audio.
- **Compatible with 802.11b and 802.11g Devices** - The L7-N-R2000 is still fully compatible with the IEEE 802.11b and IEEE 802.11g standard, so it can connect with existing 802.11b and IEEE 802.11g PCI, USB and Cardbus adapters.
- **Advanced Firewall Features** - The Web-based user interface displays a number of advanced network management features including:
 - **Content Filtering** - Easily applied content filtering based on MAC Address, URL, and/or Domain Name.
 - **Filter Scheduling** - These filters can be scheduled to be active on certain days or for a duration of hours or minutes.
 - **Secure Multiple/Concurrent Sessions** - The L7-N-R2000 can pass through VPN sessions. It supports multiple and concurrent IPsec and PPTP sessions, so users behind the L7-N-R2000 can securely access corporate networks.
- **User-friendly Setup Wizard** - Through its easy-to-use Web-based user interface, the L7-N-R2000 lets you control what information is accessible to those on the wireless network, whether from the Internet or from your company's server. Configure your router to your specific settings within minutes.

* Maximum wireless signal rate derived from IEEE Standard 802.11g and Draft 802.11n specifications. Actual data 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. Environmental conditions will adversely affect wireless signal range.

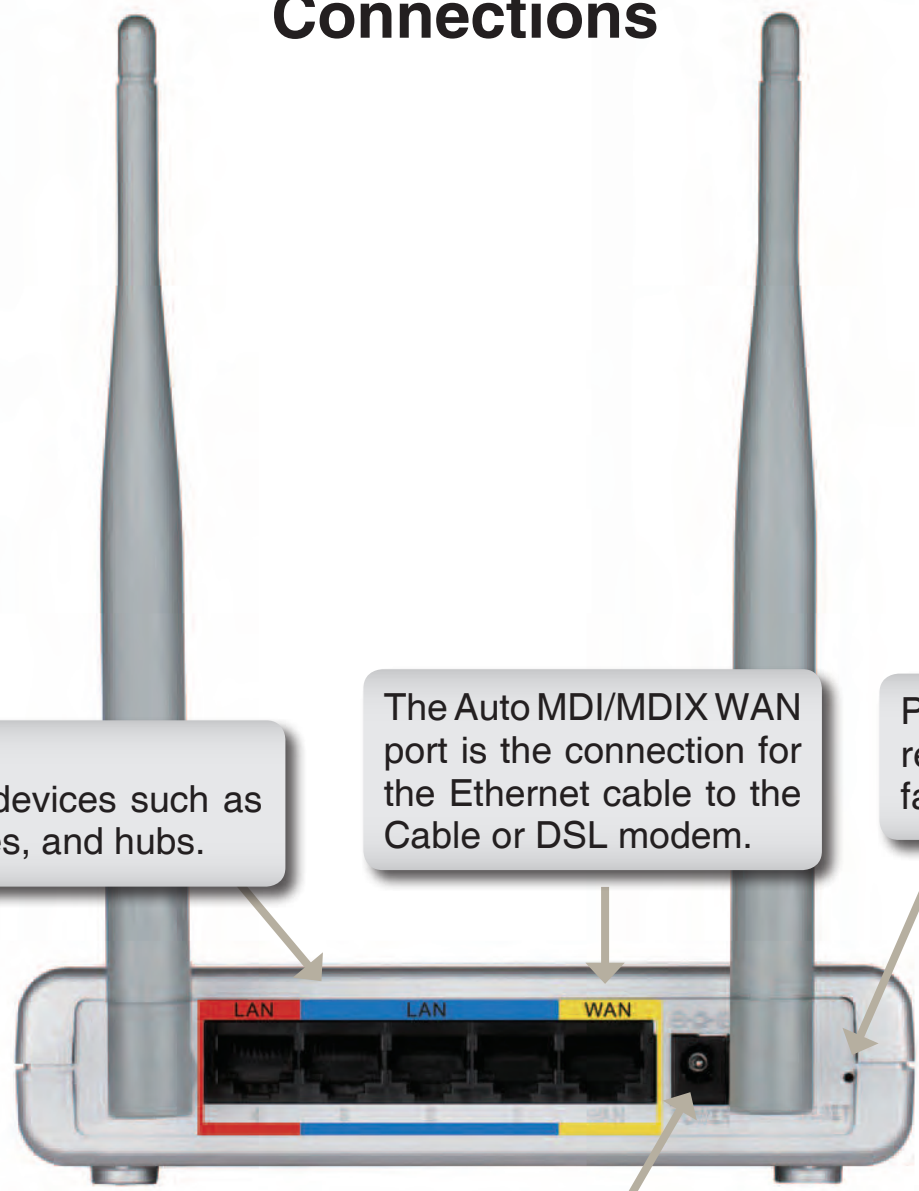
Hardware Overview

Connections

LAN Ports
Connect Ethernet devices such as computers, switches, and hubs.

The Auto MDI/MDIX WAN port is the connection for the Ethernet cable to the Cable or DSL modem.

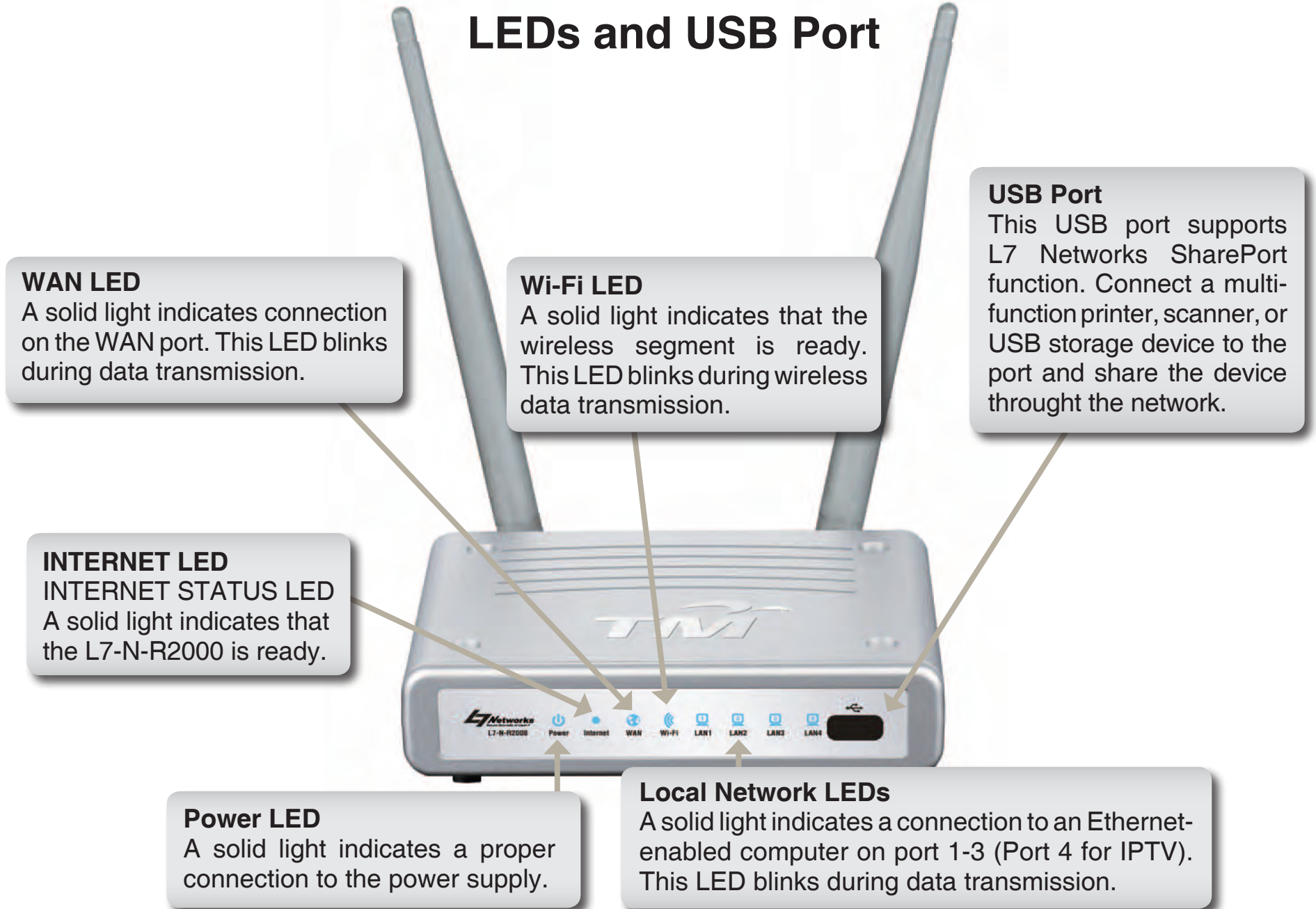
Pressing the Reset Button restores the router to its original factory default settings.



Receptor for the Power Adapter.

Hardware Overview

LEDs and USB Port



Installation

This section will walk you through the installation process. Placement of the router is very important. Do not place the router in an enclosed area such as a closet, cabinet, or in the attic or garage.

Wireless Installation Considerations

The L7 Networks wireless router lets you access your network using a wireless connection from virtually anywhere within the operating range of your wireless network. Keep in mind, however, that the number, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Typical ranges vary depending on the types of materials and background RF (radio frequency) noise in your home or business. The key to maximizing wireless range is to follow these basic guidelines:

1. Keep the number of walls and ceilings between the L7 Networks router and other network devices to a minimum - each wall or ceiling can reduce your adapter's range from 3-90 feet (1-30 meters.) Position your devices so that the number of walls or ceilings is minimized.
2. Be aware of the direct line between network devices. A wall that is 1.5 feet thick (.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick! Position devices so that the signal will travel straight through a wall or ceiling (instead of at an angle) for better reception.
3. Building Materials make a difference. A solid metal door or aluminum studs may have a negative effect on range. Try to position access points, wireless routers, and computers so that the signal passes through drywall or open doorways. Materials and objects such as glass, steel, metal, walls with insulation, water (fish tanks), mirrors, file cabinets, brick, and concrete will degrade your wireless signal.
4. Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate RF noise.
5. If you are using 2.4GHz cordless phones or X-10 (wireless products such as ceiling fans, lights, and home security systems), your wireless connection may degrade dramatically or drop completely. Make sure your 2.4GHz phone base is as far away from your wireless devices as possible. The base transmits a signal even if the phone is not in use.

Connect to BTU

If you are connecting the router to BTU, please follow the steps below:

1. Place the router in an open and central location. Do not plug the power adapter into the router.
2. Turn the power off on your modem. If there is no on/off switch, then unplug the modem's power adapter. Shut down your computer.
3. Unplug the Ethernet cable (that connects your computer to your modem) from your computer and place it into the WAN port on the router.
4. Plug an Ethernet cable LAN ports (1~3) on the router. Plug the other end into the Ethernet port on your computer.
5. Turn on or plug in your modem. Wait for the modem to boot (about 30 seconds).
6. Plug the power adapter to the router and connect to an outlet or power strip. Wait about 30 seconds for the router to boot.
7. Turn on your computer.
8. Verify the link lights on the router. The power light, Internet light, WAN light, and the LAN light (the port that your computer is plugged into) should be lit. If not, make sure your computer, modem, and router are powered on and verify the cable connections are correct.
9. Skip to page 16 to configure your router.

Connect to Another Router

If you are connecting the L7 Networks router to another router to use as a wireless access point and/or switch, you will have to do the following before connecting the router to your network:

- Disable UPnP™
- Disable DHCP
- Change the LAN IP address to an available address on your network. The LAN ports on the router cannot accept a DHCP address from your other router.

To connect to another router, please follow the steps below:

1. Plug the power into the router. Connect one of your computers to the router (LAN port) using an Ethernet cable. Make sure your IP address on the computer is 192.168.0.xxx (where xxx is between 2 and 254). Please see the **Networking Basics** section for more information. If you need to change the settings, write down your existing settings before making any changes. In most cases, your computer should be set to receive an IP address automatically in which case you will not have to do anything to your computer.
2. Open a web browser and enter **http://192.168.0.1** and press **Enter**. When the login window appears, set the user name to **admin** and leave the password box empty. Click **OK** to continue.
3. Click on **Advanced** and then click **Advanced Network**. Uncheck the Enable UPnP checkbox. Click **Save Settings** to continue.
4. Click **Setup** and then click **Network Settings**. Uncheck the Enable DHCP Server server checkbox. Click **Save Settings** to continue.
5. Under Router Settings, enter an available IP address and the subnet mask of your network. Click **Save Settings** to save your settings. Use this new IP address to access the configuration utility of the router in the future. Close the browser and change your computer's IP settings back to the original values as in Step 1.

6. Disconnect the Ethernet cable from the router and reconnect your computer to your network.
7. Connect an Ethernet cable in one of the LAN ports of the router and connect it to your other router. Do not plug anything into the WAN port of the L7 Networks router.
8. You may now use the other three LAN ports to connect other Ethernet devices and computers. To configure your wireless network, open a web browser and enter the IP address you assigned to the router. Refer to the **Configuration** and **Wireless Security** sections for more information on setting up your wireless network.

Configuration

This section will show you how to configure your new L7 Networks wireless router using the web-based configuration utility.

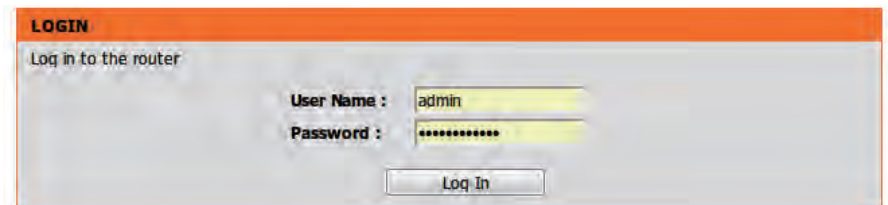
Web-based Configuration Utility

To access the configuration utility, open a web-browser such as Internet Explorer and enter the IP address of the router (192.168.0.1).



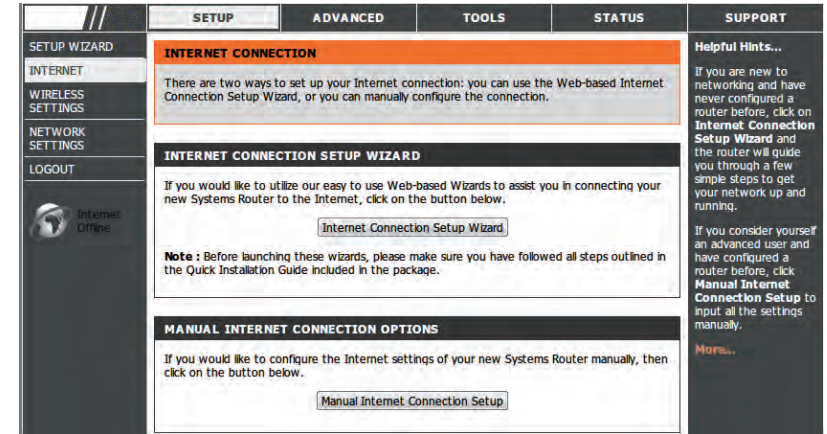
Type "admin" for the User Name and leave the password blank by default.

If you get a **Page Cannot be Displayed** error, please refer to the **Troubleshooting** section for assistance.



Setup Wizard

You may run the setup wizard from the opening Internet Setup window to quickly set up your router. Click **Internet Connection Setup Wizard**, and the first window of the wizard will open.



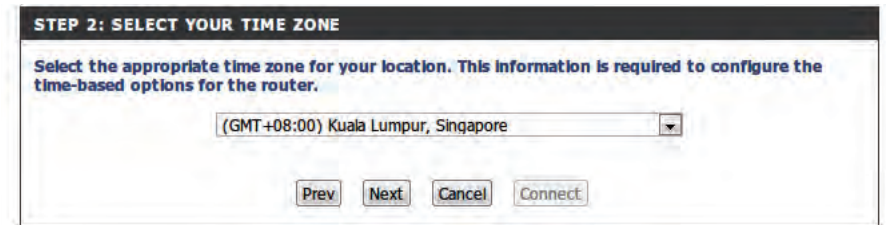
Click **Next** to continue.



Create a new password, and then click **Next** to continue.



Select your time zone NTP Server from the drop-down menus, and then click **Next** to continue.



If selecting **Username / Password Connection (PPPoE)**, enter VLAN ID provided by the ISP. If the ISP doesn't provide a specified IP address information, simply enter your PPPoE username and password.

Click the **Static IP** radio button if the ISP assigned you the IP address, subnet mask, and start/end LAN IP address. Enter the required information in **IP Unnumbered Address, IP Unnumbered Netmask, LAN Start IP** and **LAN End IP**.

Click **Next** to continue.

Note: Make sure to remove your PPPoE software from your computer. The software is no longer needed and will not work through a router.

SET USERNAME AND PASSWORD CONNECTION (PPPOE)

To set up this connection you will need to have a Username and Password from your Internet Service Provider. If you do not have this information, please contact your ISP.

Address Mode : Dynamic IP Static IP

IP Address : 0.0.0.0

User Name : test1x

Password :

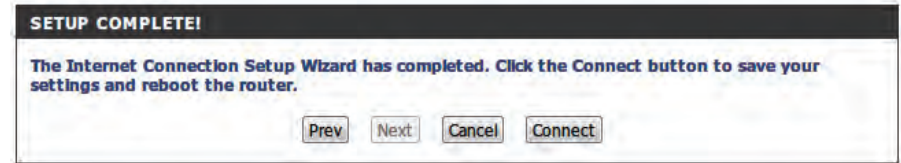
Verify Password :

Service Name : (optional)

Note: You may also need to provide a Service Name. If you do not have or know this information, please contact your ISP.

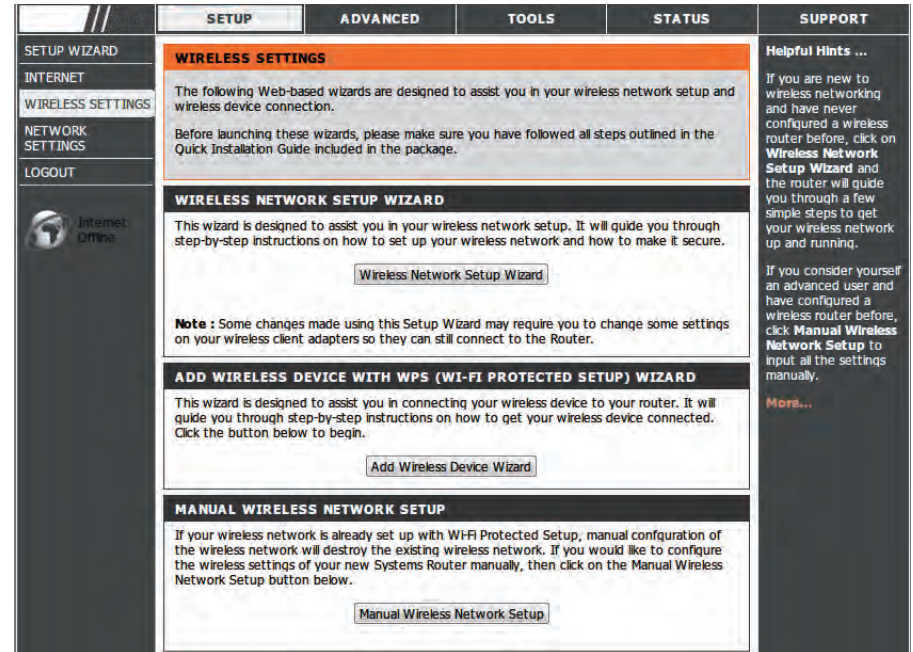
Prev Next Cancel Connect

Click **Connect** to go to the next page.



Click **Wireless Connection Setup Wizard** to open the wizard window of configuring wireless connection. Click **Reboot** to directly restart the Router.

If clicking **Wireless Connection Setup Wizard**, this window will open. Click **Next** to continue.



Enter a Wireless Network Name, also known as SSID, in the text box. Click **Automatically assign a network key (Recommended)** or **Manually assigning a network key** for the wireless security key, and use the check box to select the desired level of wireless security, WEP, WPA. and then click **Next** to continue.

STEP 1: WELCOME TO THE WIRELESS SECURITY SETUP WIZARD

Give your network a name, using up to 32 characters.

Network Name (SSID) :

Automatically assign a network key (Recommended)
To prevent outsiders from accessing your network, the router will automatically assign a security (also called WEP or WPA key) to your network.

Manually assign a network key
Use this options if you prefer to create our own key.

Use WPA encryption instead of WEP(WPA is stronger than WEP and all wireless client adapters support WPA)

Note: All wireless adapters currently support WPA.

If selecting Manually assign a network key in the previous window, this window will open. Enter a wireless security password in the Network Key box. Click **Next** to continue.

STEP 2: SET YOUR WIRELESS SECURITY PASSWORD

You have selected your security level - you will need to set a wireless security password.

The WPA (Wi-Fi Protected Access) key must meet one of following guidelines:

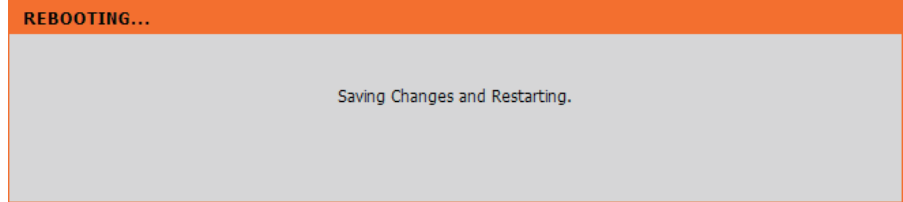
- Between 8 and 64 characters (A longer WPA key is more secure than a short one)
- Exactly 64 characters using 0-9 and A-F

Wireless Security Password :

Note: You will need to enter the same password as keys in this step into your wireless clients in order to enable proper wireless communication.

This window displays a summary of your wireless security settings. Please print this out or record this information in a safe place and then click **Save** to continue.

The Router will save the new settings and reboot. Please allow 1-2 minutes for rebooting. When the router has finished rebooting, the opening Wireless Setup window is displayed.



Internet Setup

If you want to configure the Router manually without using the wizard, click the **Manual Internet Connection Setup** button.

The screenshot shows the 'WIRELESS SETTINGS' page. The sidebar on the left contains the following menu items: SETUP WIZARD, INTERNET, WIRELESS SETTINGS (highlighted), NETWORK SETTINGS, and LOGOUT. The main content area is divided into three sections:

- WIRELESS SETTINGS**: A header section with introductory text about web-based wizards.
- WIRELESS NETWORK SETUP WIZARD**: A section with a description of the wizard and a button labeled 'Wireless Network Setup Wizard'.
- ADD WIRELESS DEVICE WITH WPS (WI-FI PROTECTED SETUP) WIZARD**: A section with a description and a button labeled 'Add Wireless Device Wizard'.
- MANUAL WIRELESS NETWORK SETUP**: A section with a description and a button labeled 'Manual Wireless Network Setup'.

On the right side, there is a 'Helpful Hints...' section with additional instructions and a 'More...' link.

This window will display for you configure the Internet connection manually.

The screenshot shows the 'WAN' page. The sidebar on the left contains the following menu items: SETUP WIZARD, INTERNET (highlighted), WIRELESS SETTINGS, NETWORK SETTINGS, and LOGOUT. The main content area is divided into two sections:

- WAN**: A header section with introductory text and two buttons: 'Save Settings' and 'Don't Save Settings'.
- PPPOE INTERNET CONNECTION TYPE**: A section titled 'Enter the information provided by your Internet Service Provider (ISP)'. It contains the following fields and options:
 - Address Mode**: Dynamic IP, Static IP
 - Dual LAN**:
 - IP Unnumbered Address**: 0.0.0.0
 - IP Unnumbered Netmask**: 0.0.0.0
 - LAN Start IP**: 0.0.0.0
 - LAN End IP**: 0.0.0.0
 - Username**: test1x
 - Password**: *****
 - Verify Password**: *****
 - Service Name**: (optional)
 - Reconnect Mode**: Always on, On demand, Manual
 - Maximum Idle Time**: 5 (minutes, 0=infinite)
 - Primary DNS Server**: 0.0.0.0 (optional)
 - Secondary DNS Server**: 0.0.0.0 (optional)
 - MTU**: 1492 (bytes) MTU default = 1492

On the right side, there is a 'Helpful Hints...' section with instructions on configuring the Internet connection type and a note about DNS Relay.

Internet Setup

PPPoE

Choose PPPoE (Point to Point Protocol over Ethernet) if your ISP uses a PPPoE connection. Your ISP will provide you with a username and password. This option is typically used for DSL services. Make sure to remove your PPPoE software from your computer. The software is no longer needed and will not work through a router.

PPPoE: Select **Dynamic** (most common) or **Static**. Select **Static** if your ISP assigned you the IP address, subnet mask, gateway, and DNS server addresses.

User Name: Enter your PPPoE user name.

Password: Enter your PPPoE password.

Confirm Password: Retype the new password.

Service Name: Enter the ISP Service Name (optional).

IP Unnumbered Address: Enter the IP address (Static PPPoE only).

IP Unnumbered Netmask: Enter the IP netmask (Static PPPoE only).

LAN IP: Enter Start and End LAN IP address.

DNS: Click **Recieve DNS from ISP** to get the DNS automatically. Click **Enter DNS Manually** to enter the DNS information below.

PPPOE INTERNET CONNECTION TYPE

Enter the information provided by your Internet Service Provider (ISP).

Address Mode Dynamic IP Static IP

Dual LAN :

IP Unnumbered Address : 0.0.0.0

IP Unnumbered Netmask : 0.0.0.0

LAN Start IP : 0.0.0.0

LAN End IP : 0.0.0.0

Username : test1x

Password :

Verify Password :

Service Name : (optional)

Reconnect Mode : Always on On demand Manual

Maximum Idle Time : 5 (minutes, 0=infinite)

Primary DNS Server : 0.0.0.0 (optional)

Secondary DNS Server : 0.0.0.0 (optional)

MTU : 1492 (bytes) MTU default = 1492

DNS Enter the Primary and Secondary DNS Server Addresses.

Addresses:


Maximum Idle Time: Enter a maximum idle time during which the Internet connection is maintained during inactivity. To disable this feature, enable Auto-reconnect.

MTU: Maximum Transmission Unit - You may need to change the MTU for optimal performance with your specific ISP. *1492* is the default MTU.

Connection Mode Select: Select either **Always-on**, **Manual**, or **Connect-on demand**.

Wireless Setup

Wireless settings for the router may be configured manually or by using a wizard. To use the wizard, click the **Wireless Connection Setup Wizard** button and then follow the steps that are described below. To configure the wireless settings manually, click the **Manual Wireless Connection Setup** button. The parameters for this window are described later in this section. The Wireless Security section that directly follows this Configuration section provides additional explanation for how to configure the WEP, WPA, WPA2, and WPA/WPA2 wireless security mode options. If you want to have more wireless network name, also known as SSID, click the **Multiple Wireless network Name Setup** button.

	SETUP	ADVANCED	TOOLS	STATUS	SUPPORT
SETUP WIZARD INTERNET WIRELESS SETTINGS NETWORK SETTINGS LOGOUT  Internet On/Off	<div style="background-color: #f4a460; padding: 5px;">WIRELESS SETTINGS</div> <p>The following Web-based wizards are designed to assist you in your wireless network setup and wireless device connection.</p> <p>Before launching these wizards, please make sure you have followed all steps outlined in the Quick Installation Guide included in the package.</p> <div style="background-color: #333; color: white; padding: 5px;">WIRELESS NETWORK SETUP WIZARD</div> <p>This wizard is designed to assist you in your wireless network setup. It will guide you through step-by-step instructions on how to set up your wireless network and how to make it secure.</p> <p style="text-align: center;">Wireless Network Setup Wizard</p> <p>Note : Some changes made using this Setup Wizard may require you to change some settings on your wireless client adapters so they can still connect to the Router.</p> <div style="background-color: #333; color: white; padding: 5px;">ADD WIRELESS DEVICE WITH WPS (WI-FI PROTECTED SETUP) WIZARD</div> <p>This wizard is designed to assist you in connecting your wireless device to your router. It will guide you through step-by-step instructions on how to get your wireless device connected. Click the button below to begin.</p> <p style="text-align: center;">Add Wireless Device Wizard</p> <div style="background-color: #333; color: white; padding: 5px;">MANUAL WIRELESS NETWORK SETUP</div> <p>If your wireless network is already set up with W-Fi Protected Setup, manual configuration of the wireless network will destroy the existing wireless network. If you would like to configure the wireless settings of your new Systems Router manually, then click on the Manual Wireless Network Setup button below.</p> <p style="text-align: center;">Manual Wireless Network Setup</p>				Helpful Hints ... If you are new to wireless networking and have never configured a wireless router before, click on Wireless Network Setup Wizard and the router will guide you through a few simple steps to get your wireless network up and running. If you consider yourself an advanced user and have configured a wireless router before, click Manual Wireless Network Setup to input all the settings manually. More...

Click **Wireless Connection Setup Wizard** to start wireless setup wizard.

Enter a Wireless Network Name, also known as SSID, in the text box. Click **Automatically assign a network key (Recommended)** or **Manually assigning a network key** for the wireless security key, and use the check box to select the desired level of wireless security, WEP, WPA. and then click **Next** to continue.

STEP 1: WELCOME TO THE WIRELESS SECURITY SETUP WIZARD

Give your network a name, using up to 32 characters.

Network Name (SSID) :

Automatically assign a network key (Recommended)
To prevent outsiders from accessing your network, the router will automatically assign a security (also called WEP or WPA key) to your network.

Manually assign a network key
Use this options if you prefer to create our own key.

Use WPA encryption instead of WEP(WPA is stronger than WEP and all wireless client adapters support WPA)

Note: All wireless adapters currently support WPA.

If selecting Manually assign a network key in the previous window, this window will open. Enter a wireless security password in the Network Key box. Click **Next** to continue.

STEP 2: SET YOUR WIRELESS SECURITY PASSWORD

You have selected your security level - you will need to set a wireless security password.

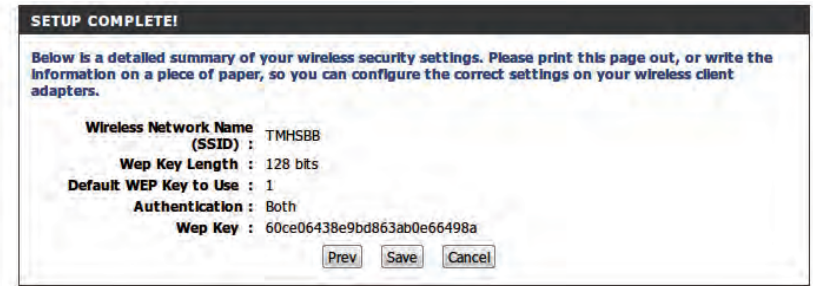
The WPA (Wi-Fi Protected Access) key must meet one of following guidelines:

- Between 8 and 64 characters (A longer WPA key is more secure than a short one)
- Exactly 64 characters using 0-9 and A-F

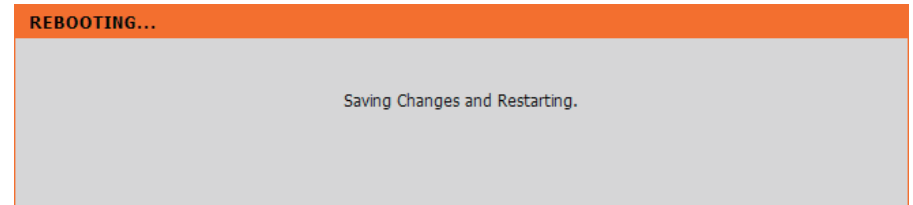
Wireless Security Password :

Note: You will need to enter the same password as keys in this step into your wireless clients in order to enable proper wireless communication.

This window displays a summary of your wireless security settings. Please print this out or record this information in a safe place and then click **Save** to continue.



The Router will save the new settings and reboot. Please allow 1-2 minutes for rebooting. When the router has finished rebooting, the opening Wireless Setup window is displayed.



Enable Wireless: Check the box to enable the wireless function. If you do not want to use wireless, uncheck the box to disable all the wireless functions.

Enable Wireless Channel: Indicates the channel setting for the L7-N-R2000. By default the channel is set to 6. The Channel can be changed to fit the channel setting for an existing wireless network or to customize the wireless network. The **Auto Channel Selection** setting can be selected to allow the L7-N-R2000 to choose the channel with the least amount of interference.

Transmission Rate: Use the drop-down menu to select the appropriate Transmission Rate in Mbits per second. Many users will want to use the default setting, *Best (automatic)*.

Wireless Network Name: Service Set Identifier (SSID) is the name of your wireless network. Once created and enabled a name in Multiple Wireless Network Name (SSIDs) window, you may select from the drop-down menu.

Visibility Status: Check this option if you would not like the SSID of your wireless network to be broadcasted by the L7-N-R2000. If this option is checked, the SSID of the L7-N-R2000 will not be seen by Site Survey utilities so your wireless clients will have to know the SSID of your L7-N-R2000 in order to connect to it.

WIRELESS

Use this section to configure the wireless settings for your Router. Please note that changes made on this section may also need to be duplicated on your Wireless Client.

Save Settings Don't Save Settings

WIRELESS NETWORK GLOBAL SETTINGS

802.11 Mode : Mixed 802.11n, 802.11g and 802.11b

Enable Auto Channel Scan :

Wireless Channel : 2.437 GHz - CH 6

Transmission Rate : Best (automatic)

Channel Width : Auto 20/40 MHz

WIRELESS NETWORK SETTINGS

Wireless Network : Wireless Network 1

Enable Wireless :

Wireless Network Name : TMHSBB (Also called the SSID)

Visibility Status : Visible Invisible

WIRELESS SECURITY MODE

To protect your privacy you can configure wireless security features. This device supports three wireless security modes, including WEP, WPA-Personal, and WPA-Enterprise. WEP is the original wireless encryption standard. WPA provides a higher level of security. WPA-Personal does not require an authentication server. The WPA-Enterprise option requires an external RADIUS server.

Security Mode : None

Helpful Hints ...

Changing your Wireless Network Name is the first step in securing your wireless network. Change it to a familiar name that does not contain any personal information.

Enable Auto Channel Scan so that the router can select the best possible channel for your wireless network to operate on.

Enabling Hidden Mode is another way to secure your network. With this option enabled, no wireless clients will be able to see your wireless network when they scan to see what's available. For your wireless devices to connect to your router, you will need to manually enter the Wireless Network Name on each device.

If you have enabled Wireless Security, make sure you write down the Key or Passphrase that you have configured. You will need to enter this information on any wireless device that you connect to your wireless network.

More...

1. To enable *Enable WPA/WPA2 Wireless Security (enhanced)*.
2. Next to **Cipher Type**, select *TKIP*, *AES*, or *AUTO(TKIP/AES)*.
3. Next to **PSK / EAP**, select *PSK*.
4. Next to **Network Key**, enter a passphrase. The key is an alpha-numeric password between 8 and 63 characters long. The password can include symbols (!?*&_) and spaces. Make sure you enter this key exactly the same on all other wireless clients.
5. Click **Save Settings** to save your settings. If you are configuring the router with a wireless adapter, you will lose connectivity until you enable WPA, WPA2, or WPA/WPA2 (whichever of the three options you have selected above) on your adapter and enter the same network key as you did on the router.

WIRELESS SECURITY MODE

Security Mode :

WPA ONLY

WPA Only requires stations to use high grade encryption and authentication.

Cipher Type :

PSK / EAP :

Network Key :

(8~63 ASCII or 64 HEX)

1. To enable *Enable WPA/WPA2 Wireless Security (enhanced)*.
2. Next to **Cipher Type**, select *TKIP*, *AES*, or *AUTO(TKIP/AES)*.
3. Next to **PSK / EAP**, select *EAP*.
4. Next to **RADIUS Server IP Address** enter the IP address of your RADIUS server.
5. Next to **Port**, enter the port you are using with your RADIUS server. *1812* is the default port.
6. Next to **Shared Secret**, enter the security key.
7. Click **Save Settings** to save your settings.

WIRELESS SECURITY MODE

Security Mode :

WPA ONLY

WPA Only requires stations to use high grade encryption and authentication.

Cipher Type :

PSK / EAP :

802.1X

RADIUS Server IP Address :

Port :

Shared Secret :

1. To enable WPA, WPA2, or WPA/WPA2 for a RADIUS server, next to **Security Mode**, select *Enable WPA Only Wireless Security (enhanced)*, *Enable WPA2 Only Wireless Security (enhanced)*, or *Enable WPA/WPA2 Wireless Security (enhanced)*.
2. Next to **Cipher Type**, select *TKIP*, *AES*, or *Auto*.
3. Next to **PSK/EAP**, select *EAP*.
4. Next to **RADIUS Server 1** enter the **IP Address** of your RADIUS server.
5. Next to **Port**, enter the port you are using with your RADIUS server. *1812* is the default port.
6. Next to **Shared Secret**, enter the security key.
7. If you have a secondary RADIUS server, enter its IP address, port, and secret key.
8. Click **Save Settings** to save your settings.

WIRELESS SECURITY MODE

Security Mode :

WPA ONLY

WPA Only requires stations to use high grade encryption and authentication.

Cipher Type :

PSK / EAP :

802.1X

RADIUS Server 1 IP Address :

Port :

Shared Secret :

RADIUS Server 2 IP Address :

Port :

Shared Secret :

Network Settings

This section will allow you to change the local network settings of the router and to configure the DHCP settings.

Router IP Address: Enter the IP address of the router. The default IP address is 192.168.0.1.

If you change the IP address, once you click **Apply**, you will need to enter the new IP address in your browser to get back into the configuration utility.

Default Subnet Mask: Enter the Subnet Mask. The default subnet mask is 255.255.255.0.

Local Domain Name: Enter the Domain name (Optional).

Enable DNS Relay: Check the box to transfer the DNS server information from your ISP to your computers. If unchecked, your computers will use the router for a DNS server.

Refer to the next page for DHCP information.

The screenshot displays the 'NETWORK SETTINGS' page of a router's configuration utility. The page is organized into several sections:

- NETWORK SETTINGS:** This section provides instructions for configuring internal network settings and the built-in DHCP server. It includes a 'Save Settings' button and a 'Don't Save Settings' button.
- ROUTER SETTINGS:** This section allows for configuring the router's internal network settings. It includes fields for:
 - Router IP Address: 192.168.0.1
 - Subnet Mask: 255.255.255.0
 - Device Name: dlinkrouter
 - Local Domain Name: (empty field)
 - Enable DNS Relay:
- DHCP SERVER SETTINGS:** This section allows for configuring the built-in DHCP server. It includes:
 - Enable DHCP Server:
 - DHCP IP Address Range: 192.168.0.100 to 192.168.0.200
 - DHCP Lease Time: 1440 (minutes)
 - Always broadcast: (compatibility for some DHCP Clients)
 - Primary WINS IP Address: 0.0.0.0
 - Secondary WINS IP Address: 0.0.0.0
- ADD DHCP RESERVATION:** This section allows for adding a DHCP reservation. It includes:
 - Enable:
 - Computer Name: (empty field) << Computer Name
 - IP Address: (empty field)
 - MAC Address: (empty field)
 - Copy Your PC's MAC Address button
 - Save and Clear buttons
- DHCP RESERVATIONS LIST:** This section displays a table of DHCP reservations. The table has columns for Enable, Host Name, MAC Address, and IP Address.
- NUMBER OF DYNAMIC DHCP CLIENTS 1:** This section displays a table of dynamic DHCP clients. The table has columns for Hardware Address, Assigned IP, Hostname, and Expires. The first entry is:

Hardware Address	Assigned IP	Hostname	Expires
F0:DE:F1:1A:1A:D8	192.168.0.100	07018NBW1N7	0 Day, 23:58:35 Revoke Reserve

DHCP Server Settings

DHCP stands for Dynamic Host Control Protocol. The L7-N-R2000 has a built-in DHCP server. The DHCP Server will automatically assign an IP address to the computers on the LAN/private network. Be sure to set your computers to be DHCP clients by setting their TCP/IP settings to “Obtain an IP Address Automatically.” When you turn your computers on, they will automatically load the proper TCP/IP settings provided by the L7-N-R2000. The DHCP Server will automatically allocate an unused IP address from the IP address pool to the requesting computer. You must specify the starting and ending address of the IP address pool.

Enable DHCP Server: Check the box to enable the DHCP server on your router. Uncheck to disable this function.

DHCP IP Address Range: Enter the starting and ending IP addresses for the DHCP server’s IP assignment.

DHCP Lease Time: The length of time for the IP address lease. Enter the Lease time in minutes.

DHCP Reservation: Enter the name, IP address and MAC address of the device to ensure the device is always assigned to the same IP address on the network. Tick the check box to enable DHCP reservation for the device.

The screenshot displays the DHCP Server Settings web interface. The interface is divided into several sections:

- NETWORK SETTINGS:** Use this section to configure the internal network settings of your router and also to configure the built-in DHCP Server to assign IP addresses to the computers on your network. The IP Address that is configured here is the IP Address that you use to access the Web-based management interface. If you change the IP Address here, you may need to adjust your PC's network settings to access the network again. Includes "Save Settings" and "Don't Save Settings" buttons.
- ROUTER SETTINGS:** Use this section to configure the internal network settings of your router. The IP Address that is configured here is the IP Address that you use to access the Web-based management interface. If you change the IP Address here, you may need to adjust your PC's network settings to access the network again. Includes fields for Router IP Address (192.168.0.1), Subnet Mask (255.255.255.0), Device Name (dlinkrouter), Local Domain Name, and an "Enable DNS Relay" checkbox (checked).
- DHCP SERVER SETTINGS:** Use this section to configure the built-in DHCP Server to assign IP addresses to the computers on your network. Includes:
 - "Enable DHCP Server" checkbox (checked)
 - "DHCP IP Address Range" fields: 192.168.0.100 to 192.168.0.200
 - "DHCP Lease Time" field: 1440 (minutes)
 - "Always broadcast" checkbox (checked) (compatibility for some DHCP Clients)
 - "Primary WINS IP Address" field: 0.0.0.0
 - "Secondary WINS IP Address" field: 0.0.0.0
- ADD DHCP RESERVATION:** Includes an "Enable" checkbox (unchecked), "Computer Name" field, "IP Address" field, "MAC Address" field, and a "Copy Your PC's MAC Address" button. "Save" and "Clear" buttons are at the bottom.
- DHCP RESERVATIONS LIST:** A table with columns: Enable, Host Name, MAC Address, IP Address.
- NUMBER OF DYNAMIC DHCP CLIENTS 1:** A table with columns: Hardware Address, Assigned IP, Hostname, Expires. Example row: F0:DE:F1:1A:1A:D8, 192.168.0.100, 07018NBWIN7, 0 Day, 23:58:35. Includes "Revoke" and "Reserve" buttons.

Port Forwarding

This will allow you to open a single port or a range of ports.

Rule: Check the box to enabled the rule.

Name: Enter a name for the rule.

IP Address: Enter the IP address of the computer on your local network that you want to allow the incoming service to.

Ports to Open: Enter the port or ports that you want to open. If **Open:** you want to open one port, enter the same port in both boxes.

Traffic Type: Select *TCP*, *UDP*, or *Any*

The screenshot shows the 'PORT FORWARDING' configuration page. The left sidebar contains navigation options: VIRTUAL SERVER, PORT FORWARDING (selected), APPLICATION RULES, QOS ENGINE, NETWORK FILTER, ACCESS CONTROL, WEBSITE FILTER, INBOUND FILTER, FIREWALL SETTINGS, ROUTING, ADVANCED WIRELESS, WI-FI PROTECTED SETUP, ADVANCED NETWORK, IPV6, IPV6 FIREWALL, IPV6 ROUTING, and LOGOUT. The main content area has tabs for SETUP, ADVANCED (selected), TOOLS, STATUS, and SUPPORT. The 'PORT FORWARDING' section includes a description: 'This option is used to open multiple ports or a range of ports in your router and redirect data through those ports to a single PC on your network. This feature allows you to enter ports in various formats including, Port Ranges (100-150), Individual Ports (80, 68, 888), or Mixed (1020-5000, 689)'. Below this are 'Save Settings' and 'Don't Save Settings' buttons. The '24--PORT FORWARDING RULES' section contains a table with columns for Name, IP Address, Application Name, Computer Name, Ports to Open, and Schedule. The table has five rows, each with a checkbox, a name field, an IP address field (0.0.0.0), an application name dropdown, a computer name dropdown, a 'Ports to Open' section with two input boxes and a protocol dropdown (TCP or UDP), and a schedule dropdown (Always). The right sidebar, titled 'Helpful Hints ...', provides instructions on how to use the application name dropdown menu and how to select a schedule for the rule.

QoS Engine

The QoS Engine option helps improve your network gaming performance by prioritizing applications. By default the QoS Engine settings are disabled and application priority is not classified automatically.

Enable QoS Engine: This option is disabled by default. Enable this option for better performance and experience with online games and other interactive applications, such as VoIP.

Manual Uplink Speed: The speed at which data can be transferred from the router to your ISP. This is determined by your ISP. ISP's often speed as a download/upload pair. For example, 1.5Mbps/284Kbits. Using this example, you would enter 284. Alternatively you can test your uplink speed with a service such as www.dslreports.com.

By default, the router automatically determines whether the underlying connection is an xDSL/Frame-relay network or some other connection type (such as cable modem or Ethernet), and it displays the result as Detected xDSL or Frame Relay Network. If you have an unusual network connection in which you are actually connected via xDSL but for which you configure either "Static" or "DHCP" in the Internet settings, setting this option to **xDSL or Other Frame Relay Network** ensures that the router will recognize that it needs to shape traffic slightly differently in order to give the best performance. Choosing **xDSL or Other Frame Relay Network** causes the measured uplink speed to be reported slightly lower than before on such connections, but gives much better results.

When Connection Type is set to **Auto-detect**, the automatically detected connection type is displayed here.

The screenshot shows the QoS Engine configuration page. The left sidebar contains a navigation menu with items like VIRTUAL SERVER, PORT FORWARDING, APPLICATION RULES, QOS ENGINE (selected), NETWORK FILTER, ACCESS CONTROL, WEBSITE FILTER, INBOUND FILTER, FIREWALL SETTINGS, ROUTING, ADVANCED WIRELESS, WI-FI PROTECTED SETUP, ADVANCED NETWORK, IPV6, IPV6 FIREWALL, IPV6 ROUTING, and LOGOUT. The main content area is divided into sections: QOS ENGINE (instructions and Save/Don't Save buttons), WAN TRAFFIC SHAPING (checkboxes for Enable Traffic Shaping, Automatic Uplink Speed, Measured Uplink Speed, and a Manual Uplink Speed field set to 128 kbps), QOS ENGINE SETUP (checkboxes for Enable QoS Engine, Automatic Classification, and Dynamic Fragmentation), and 10 -- QOS ENGINE RULES (a table with columns for Name, Priority, Protocol, Local IP Range, Local Port Range, Remote IP Range, and Remote Port Range). The table has one row with a priority of 1 and protocol of TCP.

Network Filter

The Network Filter allows you to configure IP or MAC address of a network adapter and allow or deny its network access at certain time.

MAC/IP Address: Enter the MAC or IP address of a network adapter for a filter rule.

Action: Use the drop-down menu to select **Allow** or **Deny** the network access.

The screenshot displays the configuration interface for the Network Filter. The left sidebar contains a navigation menu with options like VIRTUAL SERVER, PORT FORWARDING, APPLICATION RULES, QOS ENGINE, NETWORK FILTER (selected), ACCESS CONTROL, WEBSITE FILTER, INBOUND FILTER, FIREWALL SETTINGS, ROUTING, ADVANCED WIRELESS, WI-FI PROTECTED SETUP, ADVANCED NETWORK, IPV6, IPV6 FIREWALL, IPV6 ROUTING, LOGOUT, and Internet Online. The main content area is titled 'MAC ADDRESS FILTER' and includes a description: 'The MAC (Media Access Controller) Address filter option is used to control network access based on the MAC Address of the network adapter. A MAC address is a unique ID assigned by the manufacturer of the network adapter. This feature can be configured to ALLOW or DENY network/Internet access.' Below the description are 'Save Settings' and 'Don't Save Settings' buttons. The '24 -- MAC FILTERING RULES' section features a 'Configure MAC Filtering below::' dropdown menu set to 'Turn MAC Filtering OFF'. A table with columns 'MAC Address' and 'DHCP Client List' contains eight rows, each with a MAC address input field, a '<<' button, a 'Computer Name' dropdown menu, and a 'Clear' button. A 'Helpful Hints...' section on the right explains that computers with IP addresses from the router's DHCP server will be in the DHCP Client List and provides instructions on how to add and remove MAC addresses from the list, including a 'More...' link.

Firewall & DMZ

This section will allow you to set up inside and outside firewall. The outside firewall can choose various which part you want to prevent from.

DMZ: Tick **DMZ Enable** check box to enable DMZ, and enter an IP address of a computer in the **IP** field to be accessible to Internet traffic.

The screenshot displays the configuration page for Firewall and DMZ. The interface includes a navigation menu on the left with options such as VIRTUAL SERVER, PORT FORWARDING, APPLICATION RULES, QOS ENGINE, NETWORK FILTER, ACCESS CONTROL, WEBSITE FILTER, INBOUND FILTER, FIREWALL SETTINGS (selected), ROUTING, ADVANCED WIRELESS, WI-FI PROTECTED SETUP, ADVANCED NETWORK, IPV6, IPV6 FIREWALL, IPV6 ROUTING, and LOGOUT. The main content area is titled 'FIREWALL SETTINGS' and contains several sections:

- FIREWALL SETTINGS:** Includes a description and buttons for 'Save Settings' and 'Don't Save Settings'.
- ENABLE SPI:** Features an 'Enable SPI' checkbox.
- NAT ENDPOINT FILTERING:** Contains settings for UDP and TCP endpoint filtering, with radio buttons for 'Endpoint Independent', 'Address Restricted', and 'Port And Address Restricted'.
- ANTI-SPOOF CHECKING:** Includes an 'Enable anti-spoof checking' checkbox.
- DMZ HOST:** Describes the DMZ option and includes a 'Note' about security risks. It features an 'Enable DMZ' checkbox, a 'DMZ IP Address' field (set to 0.0.0.0), and a 'Computer Name' dropdown menu.
- APPLICATION LEVEL GATEWAY (ALG) CONFIGURATION:** Lists several protocols with checked checkboxes: PPTP, L2TP, IPsec (VPN), RTSP, and SIP.

The right sidebar contains 'Helpful Hints...' for the DMZ option, advising users to try opening ports in the 'Virtual Server' or 'Port Forwarding' sections if they encounter issues. The bottom of the page is labeled 'WIRELESS'.

Advanced Wireless

This window allows you to change the behavior of the 802.11g wireless radio from the standard settings. Please be aware that any changes to the factory default settings may adversely affect the behavior of your network.

Transmit Power: Set the transmit power of the antennas.

Beacon interval: Beacons are packets sent by an Access Point to synchronize a wireless network. Specify a value. *100* is the default setting and is recommended.

RTS Threshold: This value should remain at its default setting of *2346*. If inconsistent data flow is a problem, only a minor modification should be made.

Fragmentation: The fragmentation threshold, which is specified in bytes, determines whether packets will be fragmented. Packets exceeding the *2346* byte setting will be fragmented before transmission. *2346* is the default setting.

DTIM Interval: (Delivery Traffic Indication Message) *1* is the default setting. A DTIM is a countdown informing clients of the next window for listening to broadcast and multicast messages.

Preamble Type: Select Short or Long Preamble. The Preamble defines the length of the CRC block (Cyclic Redundancy Check is a common technique for detecting data transmission errors) for communication between the wireless router and the roaming wireless network adapters. Note: High network traffic areas should use the shorter preamble type.

CTS Mode: CTS (Clear To Send) is a function used to minimize collisions among wireless devices on a wireless local area network (LAN). CTS will make sure the wireless network is clear before a wireless client attempts to send wireless data. Enabling CTS will add overhead and may lower wireless throughput. **Always:** CTS will always be used to make sure the wireless LAN is clear before sending data. **Auto:** CTS will monitor the wireless network and automatically decide whether to implement CTS based on the amount of traffic and collisions that occurs on the wireless network.

Short GI: Check this box to reduce the guard interval time therefore increasing the data capacity. However, it's less reliable and may create higher data loss.

MAC Address	DHCP Client List
00:00:00:00:00:00	Computer Name

Helpful Hints ...
It is recommended that you leave these parameters at their default values. Adjusting them could limit the performance of your wireless network.
Enabling WMM can help control latency and jitter when transmitting multimedia content over a wireless connection.
[More...](#)

Advanced Network

This window allows you to change the LAN settings. Please be aware that any changes to the factory default settings may affect the behavior of your network.

Enable UPnP: To use the Universal Plug and Play (UPnP™) feature tick this checkbox. UPnP provides compatibility with networking equipment, software and peripherals.

WAN Port Speed: You may set the port speed of the WAN port to *10Mbps, 100Mbps, or 10/100Mbps Auto*. Some older cable or DSL modems may require you to set the port speed to 10Mbps.

Enable Multicast Streams: Tick the check box to allow multicast traffic to pass through the router from the Internet.

Wireless Enhance Mode: Tick the check box to allow wireless multicast traffic to pass through the router.

	SETUP	ADVANCED	TOOLS	STATUS	SUPPORT
VIRTUAL SERVER	ADVANCED NETWORK				Helpful Hints ... UPnP helps other UPnP LAN hosts interoperate with the router. Leave the UPnP option enabled as long as the LAN has other UPnP applications. For added security, it is recommended that you disable the WAN Ping Respond option. Ping is often used by malicious Internet users to locate active networks or PCs. The WAN speed is usually detected automatically. If you are having problems connecting to the WAN, try selecting the speed manually. If you are having trouble receiving multicast streams from the Internet, make sure the Multicast Streams option is enabled.
PORT FORWARDING	If you are not familiar with these Advanced Network settings, please read the help section before attempting to modify these settings. <input type="button" value="Save Settings"/> <input type="button" value="Don't Save Settings"/>				
APPLICATION RULES	UPNP				
QOS ENGINE	Universal Plug and Play (UPnP) supports peer-to-peer Plug and Play functionality for network devices. Enable UPnP : <input checked="" type="checkbox"/>				
NETWORK FILTER	WAN PING				
ACCESS CONTROL	If you enable this feature, the WAN port of your router will respond to ping requests from the Internet that are sent to the WAN IP Address. Enable WAN Ping Respond : <input type="checkbox"/> WAN Ping Inbound Filter : <input type="text" value="Allow All"/> Details : <input type="text" value="Allow All"/>				
WEBSITE FILTER	WAN PORT SPEED				
INBOUND FILTER	WAN Port Speed : <input type="text" value="Auto 10/100Mbps"/>				
FIREWALL SETTINGS	MULTICAST STREAMS				
ROUTING	Enable Multicast Streams : <input type="checkbox"/>				
ADVANCED WIRELESS					
WI-FI PROTECTED SETUP					
ADVANCED NETWORK					
IPV6					
IPV6 FIREWALL					
IPV6 ROUTING					
LOGOUT					
Internet Online					

IPv6 Routing

This option allows you to define fixed routes to defined destinations.

Enable: Tick this checkbox to enable or disable fixed routes to defined destinations.

Interface: Use the drop-down menu to choose the *WAN or WAN (Physical Port)* Interface the IP packet must use to transit out of the Router.

Destination IPv6: The IP address of the packets that will take this route.

Gateway: Specifies the next hop to be taken if this route is used.

The screenshot shows the IPv6 Routing configuration page. The main content area is titled "ROUTING :" and contains a "ROUTE LIST" table. The table has the following columns: Name, Destination IPv6/Prefix Length, Metric, Interface, and Gateway. There are six rows in the table, each with a checkbox on the left. The "Interface" column has a dropdown menu with "NULL" selected. Below the table are "Save Settings" and "Don't Save Settings" buttons. The sidebar on the left contains a list of configuration options, with "IPV6 ROUTING" highlighted. The sidebar on the right contains "Helpful Hints ..." and "More..." links.

Device Administration

This window will allow you to change the Administrator password. You can also enable Remote Management.

ADMIN Password: Enter a new password for the Administrator Login Name and then retype the new password in the Confirm Password textbox. The administrator can make changes to the settings.

Enable Remote Management: Remote management allows the L7-N-R2000 to be configured from the Internet by a web browser. A username and password is still required to access the Web-Management interface. In general, only a member of your network can browse the built-in web pages to perform Administrator tasks. This feature enables you to perform Administrator tasks from the remote (Internet) host.

Remote Admin Port: The port number used to access the L7-N-R2000. For example: `http://x.x.x.x:8080` whereas `x.x.x.x` is the WAN IP address of the L7-N-R2000 and `8080` is the port used for the Web-Management interface.

	SETUP	ADVANCED	TOOLS	STATUS	SUPPORT
ADMIN	ADMINISTRATOR SETTINGS				Helpful Hints...
TIME	The 'admin' and 'user' accounts can access the management interface. The admin has read/write access and can change passwords, while the user has read-only access.				For security reasons, it is recommended that you change the password for the Admin and User accounts. Be sure to write down the new and passwords to avoid having to reset the router in case they are forgotten.
SYSLOG	By default there is no password configured. It is highly recommended that you create a password to keep your router secure.				
EMAIL SETTINGS	<input type="button" value="Save Settings"/> <input type="button" value="Don't Save Settings"/>				Enabling Remote Management, allows you or others to change the router configuration from a computer on the Internet.
SYSTEM	ADMIN PASSWORD				
DYNAMIC DNS	Please enter the same password into both boxes, for confirmation.				
SYSTEM CHECK	Password : <input type="password" value="*****"/> Verify Password : <input type="password" value="*****"/>				Choose a port to open for remote management.
SCHEDULES	SYSTEM NAME				
LOGOUT	Gateway Name : <input type="text"/>				
Internet Offline	ADMINISTRATION				
	Enable Graphical Authentication : <input type="checkbox"/> Enable Remote Management : <input type="checkbox"/> Remote Admin Port : <input type="text" value="8080"/> Enable HTTPS Server : <input type="checkbox"/> Remote Admin Inbound Filter : <input type="text" value="Allow All"/>				Select a filter that controls access as needed for this admin port. If you do not see the filter you need in the list of filters, go to the Advanced Inbound Filter screen and create a new filter.
	Details : <input type="text" value="Allow All"/>				
					More ...

Save and Restore

This window allows you to save your configuration file to a hard drive, load configuration settings from a hard drive, and restore the Router's factory default settings.

Save Settings to Local Hard Drive: Use this option to save the current router configuration settings to a file on the hard disk of the computer you are using. First, click the **Save** button. You will then see a file dialog, where you can select a location and file name for the settings.

Load Settings from Local Hard Drive: Use this option to load previously saved router configuration settings. First, use the **Browse** control to find a previously save file of configuration settings. Then, click the **Upload Settings** button to transfer those settings to the Router.

Restore to Factory Default Settings: This option will restore all configuration settings back to the settings that were in effect at the time the router was shipped from the factory. Any settings that have not been saved will be lost, including any rules that you have created. If you want to save the current router configuration settings, use the **Save** button above.

Reboots the device: Click the **Reboot** button on the left side of the window to restart the Router.

The screenshot shows the router's web interface. The top navigation bar includes tabs for SETUP, ADVANCED, TOOLS, STATUS, and SUPPORT. The left sidebar contains a menu with the following items: ADMIN, TIME, SYSLOG, EMAIL SETTINGS, SYSTEM (highlighted), DYNAMIC DNS, SYSTEM CHECK, SCHEDULES, and LOGOUT. Below the menu is a status indicator for 'Internet Online'. The main content area is titled 'SYSTEM SETTINGS' and contains the following text and buttons:

SYSTEM SETTINGS

The System Settings section allows you to reboot the device, or restore the router to the factory default settings. Restoring the unit to the factory default settings will erase all settings, including any rules that you have created.

The current system settings can be saved as a file onto the local hard drive. The saved file or any other saved setting file created by device can be uploaded into the unit.

Save To Local Hard Drive:

Load From Local Hard Drive:

Restore To Factory Default:
Restore all settings to the factory defaults.

Reboot The Device:

Helpful Hints ...

Once your router is configured the way you want it, you can save the configuration settings to a configuration file.

You might need this file so that you can load your configuration later in the event that the router's default settings are restored.

To save the configuration, click the **Save Configuration** button.

[More...](#)

System Check

The Ping Test can be used to test the status of the Internet.

Ping Test: The Ping Test is used to send Ping packets to test if a computer is on the Internet. Enter the IP Address that you wish to Ping, and click **Ping**.

	SETUP	ADVANCED	TOOLS	STATUS	SUPPORT
ADMIN	PING TEST				Helpful Hints ... "Ping" checks whether a computer on the Internet is running and responding. Enter either the IP address of the target computer or enter its fully qualified domain name. More...
TIME	Ping Test sends "ping" packets to test a computer on the Internet.				
SYSLOG	PING TEST				
EMAIL SETTINGS	Host Name or IP Address : <input type="text"/> <input type="button" value="Ping"/>				
SYSTEM	PING RESULT				
DYNAMIC DNS					
SYSTEM CHECK					
SCHEDULES					
LOGOUT					
 Internet Online					

Schedules

The Router allows the user the ability to manage schedule rules for various firewall and parental control features on this window. Once you have finished configuring the new schedule rule, click the **Save Settings** button at the top of the window.

Name: Enter a name for the new schedule rule.

Day(s): Choose the desired day(s), either All Week or Select Days. If the latter is selected, please use the checkboxes directly below to specify the individual days.

All Day - 24 hrs: Tick this check box if the new schedule rule applies to the full 24-hour period.

Start Time/ End Time: If the new schedule rule does not apply to the full 24-hour period, untick the previous checkbox and then enter a specific beginning and ending time.

The screenshot shows the router's configuration interface for SCHEDULES. The main content area is titled "10 - ADD SCHEDULE RULE" and contains the following fields and options:

- Name:** A text input field.
- Day(s):** Radio buttons for "All Week" (selected) and "Select Day(s)".
- Day Selection:** Checkboxes for Sun, Mon, Tue, Wed, Thu, Fri, and Sat.
- All Day - 24 hrs:** A checkbox.
- Time format:** A dropdown menu set to "12-hour".
- Start Time:** A time selection field set to "12:00 PM".
- End Time:** A time selection field set to "12:00 PM".

Below the form is a "SCHEDULE RULES LIST" table with columns for Name, Day(s), and Time Frame. On the right side, there is a "Helpful Hints ..." section with text explaining the purpose of schedules and instructions on how to use the "Save", "Edit", and "Delete" buttons.

Syslog

The system log displays chronological event log data specified by the router user.

Syslog Server: click the checkbox to save the log in the log server in the LAN side.

The screenshot shows the Syslog configuration page in a router's web interface. The page is divided into several sections:

- Navigation Menu (Left):** Includes links for ADMIN, TIME, SYSLOG (highlighted), EMAIL SETTINGS, SYSTEM, DYNAMIC DNS, SYSTEM CHECK, SCHEDULES, and LOGOUT. There is also an "Internet Online" status indicator.
- Page Header (Top):** Includes tabs for SETUP, ADVANCED, TOOLS, STATUS, and SUPPORT.
- SYSLOG Section:** Contains the text "The SysLog options allow you to send log information to a SysLog Server." and two buttons: "Save Settings" and "Don't Save Settings".
- SYSLOG SETTINGS Section:** Contains the following configuration options:
 - Enable Logging To Syslog Server:** A checkbox that is checked.
 - Syslog Server IP Address:** A text input field containing "0.0.0.0" and a "<<" button.
 - Computer Name:** A dropdown menu currently showing "Computer Name".
- Helpful Hints (Right):** A section titled "Helpful Hints ..." with the text: "A System Logger (syslog) is a server that collects in one place the logs from different sources. If the LAN includes a syslog server, you can use this option to send the router's logs to that server." and a "More..." link.

Device Info

This window displays the current information for the L7-N-R2000. It will display the LAN, WAN, and Wireless information.

If your WAN connection is set up for PPPoE, a **Connect** button and a **Disconnect** button will be displayed. Use **Disconnect** to drop the PPPoE connection and use **Connect** to establish the PPPoE connection.

LAN: Displays the MAC address and the private (local) IP settings for the router.

WAN: Displays the MAC address and the public IP settings for the router.

Wireless Displays the wireless MAC address and your **802.11N:** wireless settings such as SSID, Channel, and Encryption status.

The screenshot displays the 'DEVICE INFORMATION' page of the L7-N-R2000 router. The page is organized into several sections:

- GENERAL:** Shows the current time (Sat Jan 01 2011 00:39:44 GMT+0800) and the firmware version (1.01TM, 30, Dec, 2011).
- WAN:** Displays WAN Connection 1 (PPPoE) which is currently disconnected. It includes fields for MAC Address (00:18:E7:6A:3C:39), IP Address (0.0.0.0), Subnet Mask (0.0.0.0), Default Gateway (0.0.0.0), Primary DNS Server (0.0.0.0), Secondary DNS Server (0.0.0.0), and Advanced DNS (Disabled). There are 'Connect' and 'Disconnect' buttons.
- LAN:** Shows LAN settings: MAC Address (00:18:E7:6A:3C:38), IP Address (192.168.0.1), Subnet Mask (255.255.255.0), and DHCP Server (Enabled).
- WIRELESS LAN:** Shows 802.11 Mode (802.11bgn), Channel Width (20/40 Mhz), and Channel (1). It also indicates Wi-Fi Protected Setup is Enabled/Not Configured. Below is a table of SSIDs:

Network Name (SSID)	Wireless Radio	MAC Address	Security Mode
TMH5BB	On	00:18:E7:6A:3C:38	Off
dlink_quest	Off	00:18:E7:6B:3C:38	Off
dlink	Off	00:18:E7:6C:3C:38	Off
dlink	Off	00:18:E7:6D:3C:38	Off

- LAN COMPUTERS:** Shows a table of connected LAN computers:

IP Address	Name (if any)	MAC
192.168.0.100	07018NBWIN7	F0:DE:F1:1A:1A:D8

- IGMP MULTICAST MEMBERSHIPS:** Shows a field for Multicast Group Address.

Log

This window allows you to view a log of activities on the Router. This is especially helpful detecting unauthorized network usage.

First Page: View the first page of the log.

Last Page: View the last page of the log.

Previous: View the previous page.

Next: View the next page.

Clear: Clear the log.

Link to Log Settings: Click this button to go directly to the Log Settings window (**Maintenance > Log Settings**).

Time	Message
Jan 1 00:40:58	user.info: syslog: Log has been cleared.

Statistics

The window below displays the Traffic Statistics. Here you can view the amount of packets that pass through the L7-N-R2000 on both the WAN and the LAN ports. The traffic counter will reset if the device is rebooted.

The screenshot shows the 'STATISTICS' page with the following data:

Category	Sent	Received	TX Packets	RX Packets	Dropped	Collisions	Errors
LAN STATISTICS	47570	40680	0	0	0	0	0
WAN STATISTICS	0	0	0	0	0	0	0
WIRELESS STATISTICS	13	110	0	0	0	0	0

Internet Sessions

The NAPT Internet Sessions table displays a list of all active conversations between WAN computers and LAN computers.

The screenshot shows the 'INTERNET SESSIONS' page with a table header and a 'Helpful Hints...' section:

Local	NAT	Internet	Protocol	State	Dir	Time Out
[Empty table body]						

Helpful Hints... This is a list of all active conversations between WAN computers and LAN computers.

Wireless

The wireless client table displays a list of current connected wireless clients. This table also displays the connection time and MAC address of the connected wireless client.

	SETUP	ADVANCED	TOOLS	STATUS	SUPPORT										
DEVICE INFO	WIRELESS				Helpful Hints... This is a list of all wireless clients that are currently connected to your wireless router. More...										
LOGS	Use this option to view the wireless clients that are connected to your wireless router.														
STATISTICS	NUMBER OF WIRELESS CLIENTS :														
INTERNET SESSIONS	<table border="1"> <thead> <tr> <th>MAC Address</th> <th>IP Address</th> <th>Mode</th> <th>Rate</th> <th>Signal</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>					MAC Address	IP Address	Mode	Rate	Signal					
MAC Address	IP Address	Mode	Rate	Signal											
WIRELESS															
IPV6															
LOGOUT															
 Internet Offline															

Help

Click the desired hyperlink to get more information about how to use the Router.

	SETUP	ADVANCED	TOOLS	STATUS	SUPPORT
MENU	SUPPORT MENU				
SETUP	<ul style="list-style-type: none">SetupAdvancedToolsStatus				
ADVANCED	SETUP HELP				
TOOLS	<ul style="list-style-type: none">Internet ConnectionWANWirelessNetwork Settings				
STATUS	ADVANCED HELP				
LOGOUT	<ul style="list-style-type: none">Virtual ServerPort ForwardingApplication RulesQoS EngineNetwork FilterAccess ControlWebsite FilterInbound FilterFirewall SettingsRoutingAdvanced WirelessW-Fi Protected SetupAdvanced NetworkGUEST_ZONE				
Internet Offline					

Wireless Security

This section will show you the different levels of security you can use to protect your data from intruders. The L7-N-R2000 offers the following types of security:

- WPA2 (Wi-Fi Protected Access 2)
- WPA (Wi-Fi Protected Access)
- WEP (Wired Equivalent Privacy)
- WPA2-PSK (Pre-Shared Key)
- WPA-PSK (Pre-Shared Key)

What is WEP?

WEP stands for Wired Equivalent Privacy. It is based on the IEEE 802.11 standard and uses the RC4 encryption algorithm. WEP provides security by encrypting data over your wireless network so that it is protected as it is transmitted from one wireless device to another.

To gain access to a WEP network, you must know the key. The key is a string of characters that you create. When using WEP, you must determine the level of encryption. The type of encryption determines the key length. 128-bit encryption requires a longer key than 64-bit encryption. Keys are defined by entering in a string in HEX (hexadecimal - using characters 0-9, A-F) or ASCII (American Standard Code for Information Interchange – alphanumeric characters) format. ASCII format is provided so you can enter a string that is easier to remember. The ASCII string is converted to HEX for use over the network. Four keys can be defined so that you can change keys easily.

Configure WEP

It is recommended to enable encryption on your wireless router before your wireless network adapters. Please establish wireless connectivity before enabling encryption. Your wireless signal may degrade when enabling encryption due to the added overhead.

1. Log into the web-based configuration by opening a web browser and entering the IP address of the router (192.168.0.1). Click on **Wireless Setup** on the left side.
2. Next to **Security Mode**, select *Enable WEP Wireless Security (basic)*.
3. Next to **Authentication**, select either *Shared Key* or *Open*. *Shared Key* is recommended as it provides greater security when WEP is enabled.
4. Select either *64Bit* or *128Bit* encryption from the drop-down menu next to **WEP Encryption**.
5. Next to **Default Key Type**, select *WEP Key 1* and enter a WEP key that you create. Make sure you enter this key exactly on all your wireless devices. You may enter up to four different keys either using *Hex* or *ASCII*. *Hex* is recommended (letters A-F and numbers 0-9 are valid). In *ASCII* all numbers and letters are valid.
6. Click **Save Settings** to save your settings. If you are configuring the router with a wireless adapter, you will lose connectivity until you enable WEP on your adapter and enter the same WEP key as you did on the router.

WIRELESS SECURITY MODE

Security Mode :

WEP

WEP is the wireless encryption standard. To use it you must enter the same key(s) into the router and the wireless stations. For 64 bit keys you must enter 10 hex digits into each key box. For 128 bit keys you must enter 26 hex digits into each key box. A hex digit is either a number from 0 to 9 or a letter from A to F. For the most secure use of WEP set the authentication type to "Shared Key" when WEP is enabled.

You may also enter any text string into a WEP key box, in which case it will be converted into a hexadecimal key using the ASCII values of the characters. A maximum of 5 text characters can be entered for 64 bit keys, and a maximum of 13 characters for 128 bit keys.

Authentication :

WEP Encryption :

Default WEP Key :

WEP Key : (5 ASCII or 10 HEX)

What is WPA?

WPA, or Wi-Fi Protected Access, is a Wi-Fi standard that was designed to improve the security features of WEP (Wired Equivalent Privacy).

The two major improvements over WEP:

- Improved data encryption through the Temporal Key Integrity Protocol (TKIP). TKIP scrambles the keys using a hashing algorithm and, by adding an integrity-checking feature, ensures that the keys haven't been tampered with. WPA2 is based on 802.11i and uses Advanced Encryption Standard (AES) instead of TKIP.
- User authentication, which is generally missing in WEP, through the extensible authentication protocol (EAP). WEP regulates access to a wireless network based on a computer's hardware-specific MAC address, which is relatively simple to be sniffed out and stolen. EAP is built on a more secure public-key encryption system to ensure that only authorized network users can access the network.

WPA-PSK/WPA2-PSK uses a passphrase or key to authenticate your wireless connection. The key is an alpha-numeric password between 8 and 63 characters long. The password can include symbols (!?*&_) and spaces. This key must be the exact same key entered on your wireless router or access point.

WPA/WPA2 incorporates user authentication through the Extensible Authentication Protocol (EAP). EAP is built on a more secure public key encryption system to ensure that only authorized network users can access the network.

Configure WPA-PSK and WPA2-PSK

It is recommended to enable encryption on your wireless Router before your wireless network adapters. Please establish wireless connectivity before enabling encryption. Your wireless signal may degrade when enabling encryption due to the added overhead.

1. Log into the web-based configuration by opening a web browser and entering the IP address of the router (192.168.0.1). Click on **Wireless Setup** on the left side.
2. Next to **Security Mode**, select *Enable WPA Only Wireless Security (enhanced)* or *Enable WPA2 Only Wireless Security (enhanced)*.
3. Next to **Cipher Mode**, select *TKIP*, *AES*, or *Both*.
4. Next to **PSK/EAP**, select *PSK*.
5. Next to **Network Key**, enter a key (passphrase). The key is an alpha-numeric password between 8 and 63 characters long. The password can include symbols (!?*&_) and spaces. Make sure you enter this key exactly the same on all other wireless clients.
6. Click **Save Settings** to save your settings. If you are configuring the Router with a wireless adapter, you will lose connectivity until you enable WPA-PSK or WPA2-PSK on your adapter and enter the same passphrase as you did on the Router.

The screenshot shows the 'WIRELESS SECURITY MODE' section of a router's configuration page. The 'Security Mode' dropdown is set to 'Enable WPA Only Wireless Security (enhanced)'. Below this, the 'WPA ONLY' section contains the text 'WPA Only requires stations to use high grade encryption and authentication.' The 'Cipher Type' dropdown is set to 'TKIP', and the 'PSK / EAP' dropdown is set to 'PSK'. There is an empty text input field for the 'Network Key' with a note '(8~63 ASCII or 64 HEX)'. At the bottom, there are two buttons: 'Save Settings' and 'Don't Save Settings'.

The screenshot shows the 'WIRELESS SECURITY MODE' section of a router's configuration page. The 'Security Mode' dropdown is set to 'Enable WPA2 Only Wireless Security (enhanced)'. Below this, the 'WPA2 ONLY' section contains the text 'WPA2 Only requires stations to use high grade encryption and authentication.' The 'Cipher Type' dropdown is set to 'TKIP', and the 'PSK / EAP' dropdown is set to 'PSK'. There is an empty text input field for the 'Network Key' with a note '(8~63 ASCII or 64 HEX)'. At the bottom, there are two buttons: 'Save Settings' and 'Don't Save Settings'.

Configure WPA/WPA2-PSK

It is recommended to enable encryption on your wireless Router before your wireless network adapters. Please establish wireless connectivity before enabling encryption. Your wireless signal may degrade when enabling encryption due to the added overhead.

1. Log into the web-based configuration by opening a web browser and entering the IP address of the router (192.168.0.1). Click on **Wireless Setup** on the left side.
2. Next to **Security Mode**, select *Enable WPA/WPA2 Wireless Security (enhanced)*.
3. Next to **Cipher Mode**, select *TKIP*, *AES*, or *Both*.
4. Next to **PSK/EAP**, select *PSK*.
5. Next to **Network Key**, enter a key (passphrase). The key is an alpha-numeric password between 8 and 63 characters long. The password can include symbols (!?*&_) and spaces. Make sure you enter this key exactly the same on all other wireless clients.
6. Click **Save Settings** to save your settings. If you are configuring the Router with a wireless adapter, you will lose connectivity until you enable WPA/WPA2-PSK on your adapter and enter the same passphrase as you did on the Router.

The screenshot shows the 'WIRELESS SECURITY MODE' section of a router's web interface. The 'Security Mode' dropdown is set to 'Enable WPA/WPA2 Wireless Security (enhanced)'. Below this is the 'WPA/WPA2' section, which includes a note: 'WPA/WPA2 requires stations to use high grade encryption and authentication.' The 'Cipher Type' dropdown is set to 'TKIP', and the 'PSK / EAP' dropdown is set to 'PSK'. The 'Network Key' field is empty, with a note '(8~63 ASCII or 64 HEX)' to its right. At the bottom of the form are two buttons: 'Save Settings' and 'Don't Save Settings'.

Configure WPA, WPA2, and WPA/WPA2 (RADIUS)

It is recommended to enable encryption on your wireless router before your wireless network adapters. Please establish wireless connectivity before enabling encryption. Your wireless signal may degrade when enabling encryption due to the added overhead.

1. Log into the web-based configuration by opening a web browser and entering the IP address of the router (192.168.0.1). Click on **Wireless Settings** on the left side.
2. Next to **Security Mode**, select *Enable WPA Only Wireless Security (enhanced)*, *Enable WPA2 Only Wireless Security (enhanced)*, or *Enable WPA/WPA2 Wireless Security (enhanced)*.
3. Next to **Cipher Type**, select *TKIP*, *AES*, or *Auto*.
4. Next to **PSK/EAP**, select *EAP*.
5. Next to **RADIUS Server 1** enter the **IP Address** of your RADIUS server.
6. Next to **Port**, enter the port you are using with your RADIUS server. *1812* is the default port.
7. Next to **Shared Secret**, enter the security key.
8. If you have a secondary RADIUS server, enter its IP address, port, and secret key.
9. Click **Save Settings** to save your settings.

WIRELESS SECURITY MODE

Security Mode : Enable WPA Only Wireless Security (enhanced) ▼

WPA ONLY

WPA Only requires stations to use high grade encryption and authentication.

Cipher Type : TKIP ▼

PSK / EAP : EAP ▼

802.1X

RADIUS Server 1 IP Address :

Port :

Shared Secret :

RADIUS Server 2 IP Address :

Port :

Shared Secret :

Connect to a Wireless Network Using Windows® XP

Windows® XP users may use the built-in wireless utility (Zero Configuration Utility). The following instructions are for Service Pack 2 users. If you are using another company's utility or Windows® 2000, please refer to the user manual of your wireless adapter for help with connecting to a wireless network. Most utilities will have a "site survey" option similar to the Windows® XP utility as seen below.

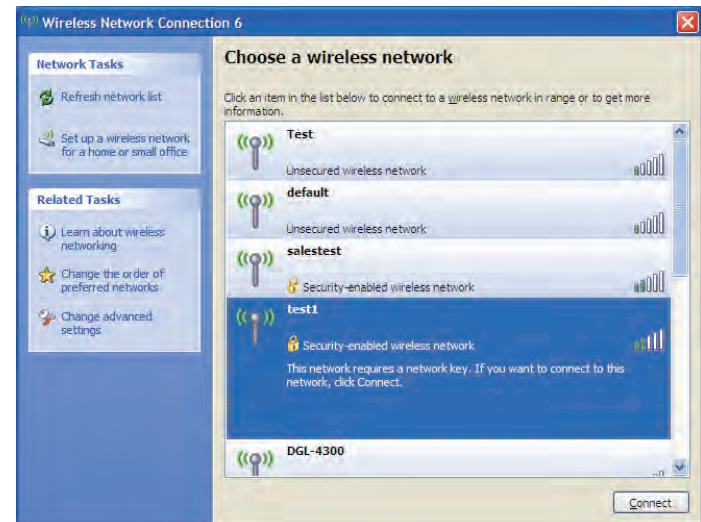
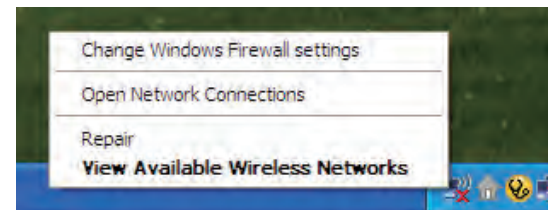
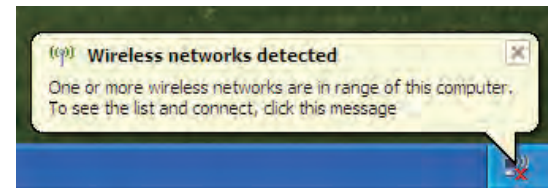
If you receive the **Wireless Networks Detected** bubble, click on the center of the bubble to access the utility.

or

Right-click on the wireless computer icon in your system tray (lower-right corner next to the time). Select **View Available Wireless Networks**.

The utility will display any available wireless networks in your area. Click on a network (displayed using the SSID) and click the **Connect** button.

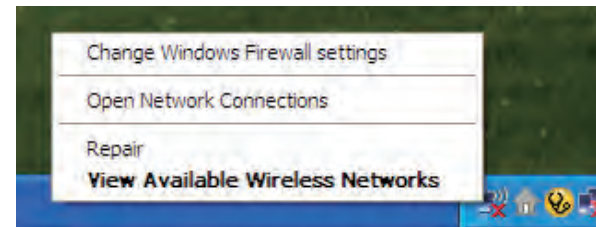
If you get a good signal but cannot access the Internet, check you TCP/IP settings for your wireless adapter. Refer to the **Networking Basics** section in this manual for more information.



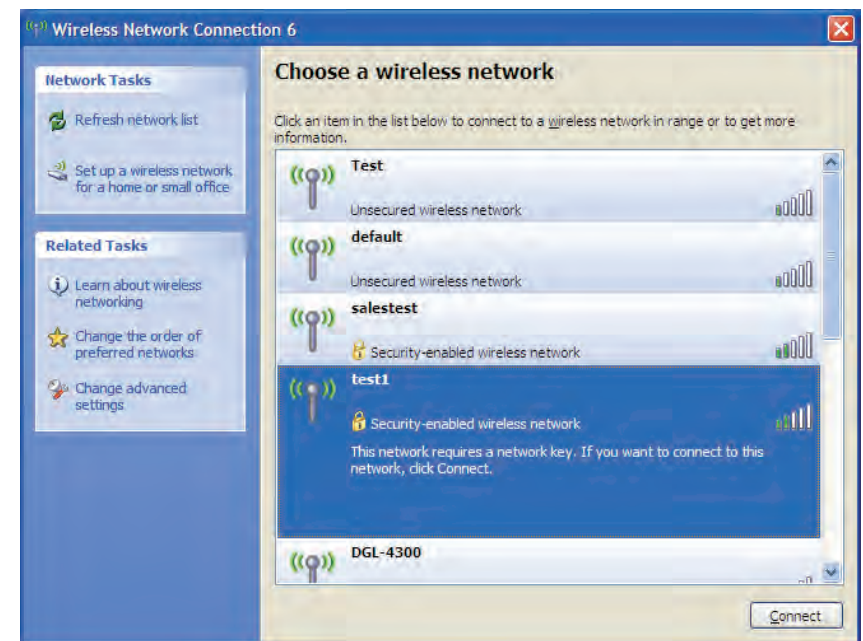
Configure WEP

It is recommended to enable WEP on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the WEP key being used.

1. Open the Windows® XP Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower-right corner of screen). Select **View Available Wireless Networks**.

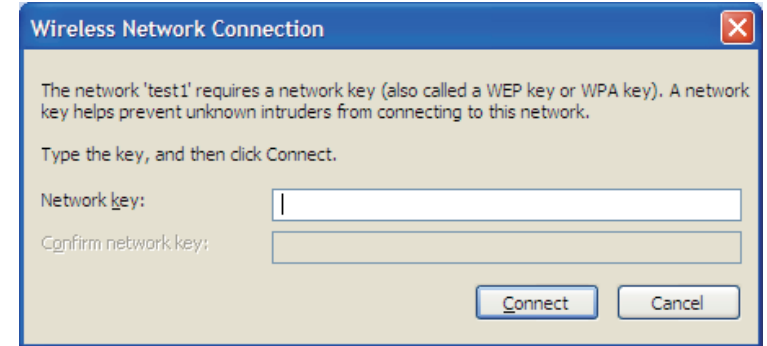


2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**.



3. The **Wireless Network Connection** box will appear. Enter the same WEP key that is on your router and click **Connect**.

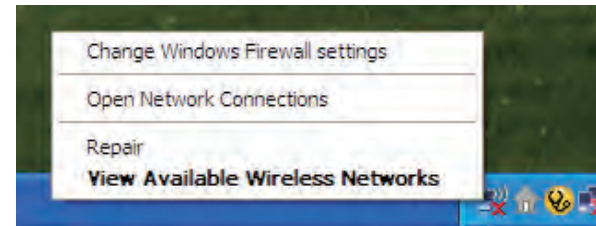
It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the WEP settings are correct. The WEP key must be exactly the same as on the wireless router.



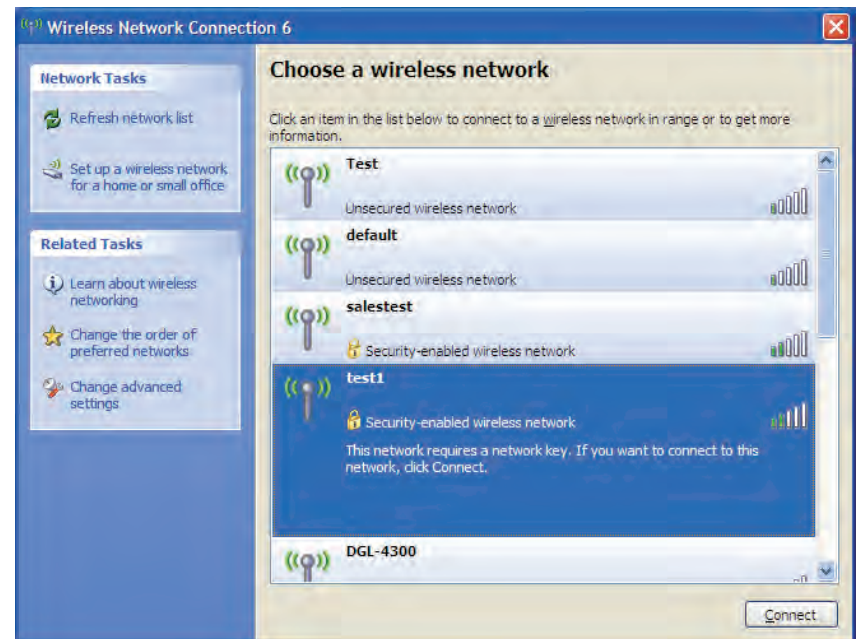
Configure WPA-PSK

It is recommended to enable WEP on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the WEP key being used.

1. Open the Windows® XP Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower-right corner of screen). Select **View Available Wireless Networks**.

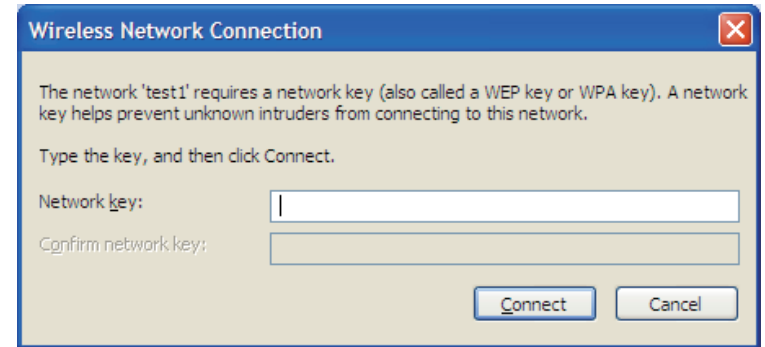


2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**.



3. The **Wireless Network Connection** box will appear. Enter the WPA-PSK passphrase and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the WPA-PSK settings are correct. The WPA-PSK passphrase must be exactly the same as on the wireless router.



Setting Up Wi-Fi Protection (WCN 2.0 in Windows Vista)

The L7-N-R2000 supports Wi-Fi protection, referred to as WCN 2.0 in Windows Vista. The instructions for setting this up depend on whether you are using Windows Vista to configure the Router or third party software.

Initial Router Configuration for Wi-Fi Protection

When you first set up the Router, Wi-Fi protection is disabled and unconfigured. To enjoy the benefits of Wi-Fi protection, the Router must be both enabled and configured. There are three basic methods to accomplish this: use Windows Vista's built-in support for WCN 2.0, use software provided by a third party, or use the traditional Ethernet approach.

If you are running Windows Vista, tick the Enable checkbox on the **Wireless Network** window. Use the Current PIN that is displayed on the **Wireless Network** window or choose to click the **Generate New PIN** button or **Reset PIN to Default** button.



If you are using third party software to set up Wi-Fi Protection, carefully follow the directions. When you are finished, proceed to the next section to set up the newly-configured Router.

Setting Up a Configured Router

Once the Router has been configured, you can use the push button on the Router or third party software to invite a newcomer to join your Wi-Fi protected network. For maximum security, the software method is recommended. However, the push button method is ideal if there is no access to a GUI.

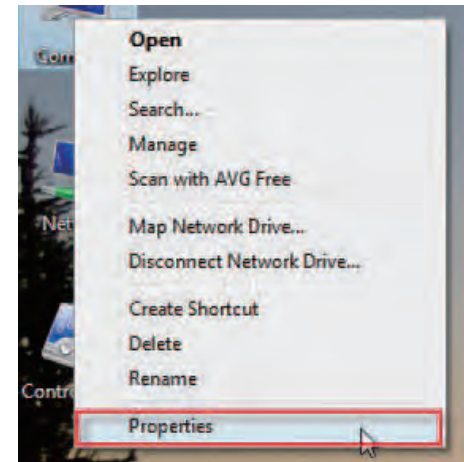
If you are using the Router's Wi-Fi Security push button option, simultaneously depress the push button located on the side of the Router and the button on the client (or virtual button on the client's GUI). Next click **Finish**. The Client's software will then allow a newcomer to join your secure, Wi-Fi protected network.

If you are using third party software, run the appropriate Wi-Fi Protected System utility. You will be asked to either use the push button method or to manually enter the PIN. Follow the on-screen instructions.

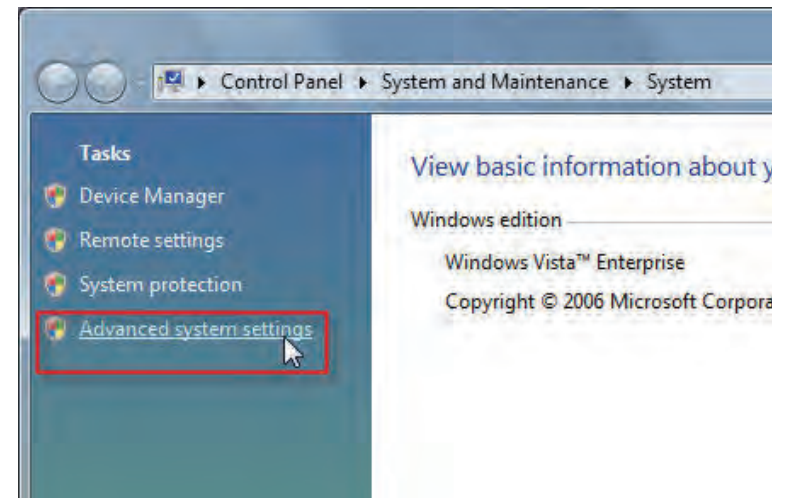
Changing the Computer Name and Joining a Workgroup

The following are step-by-step directions to change the computer name and join a workgroup.

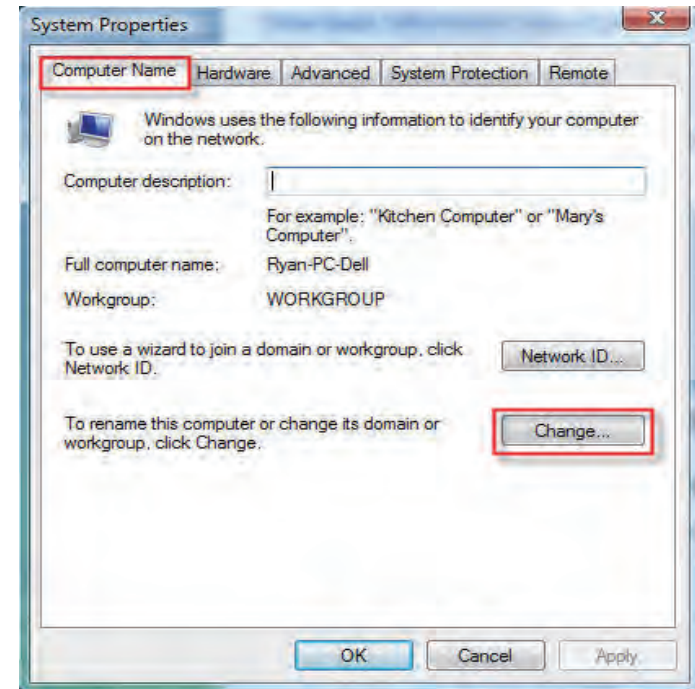
1. Click on **Properties**.



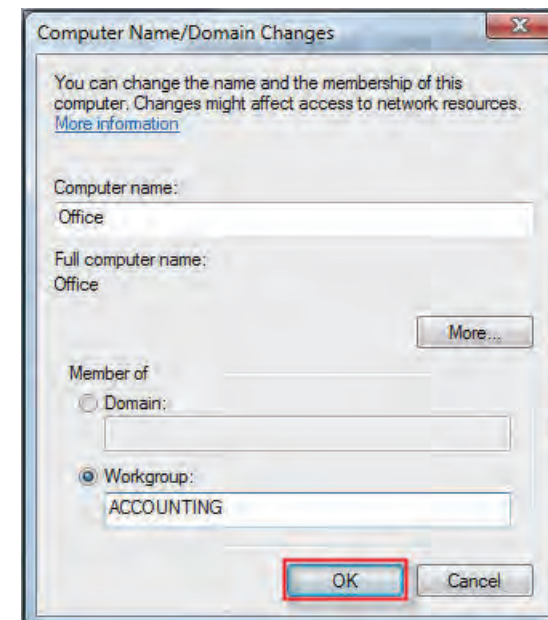
2. Click on the **Advanced system settings** link.



3. Click the **Computer Name** tab in the **System Properties** window and enter a description of your computer in the textbox. When you are finished, click the **Change** button.



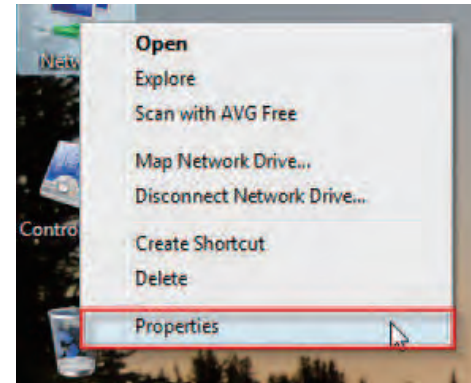
4. Go to the **Computer Name/Domain Changes** window and click the radio button next to the Workgroup you want to join. When you are finished, click the **OK** button.



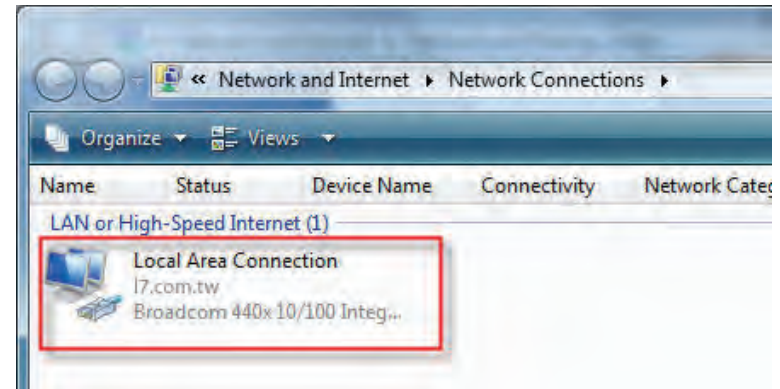
Configuring the IP Address in Vista

The following are step-by-step directions to configure the IP address in Windows Vista.

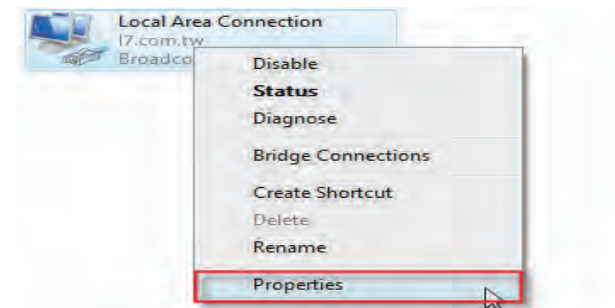
1. Click on **Properties**.



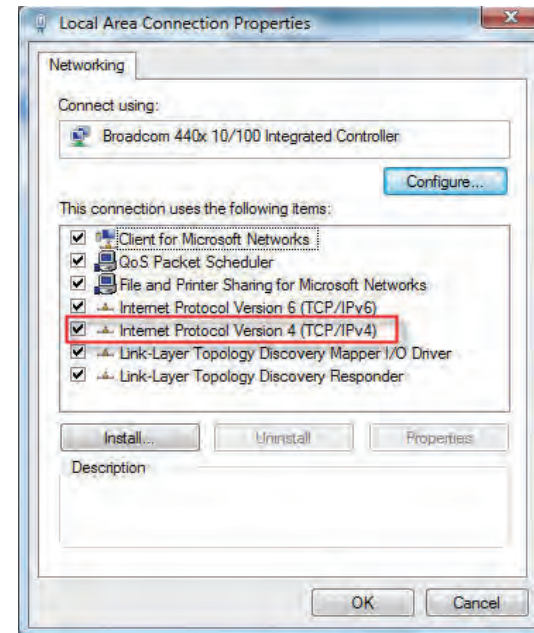
2. Go to the **Network and Internet** window and click the appropriate **Local Area Connection** icon.



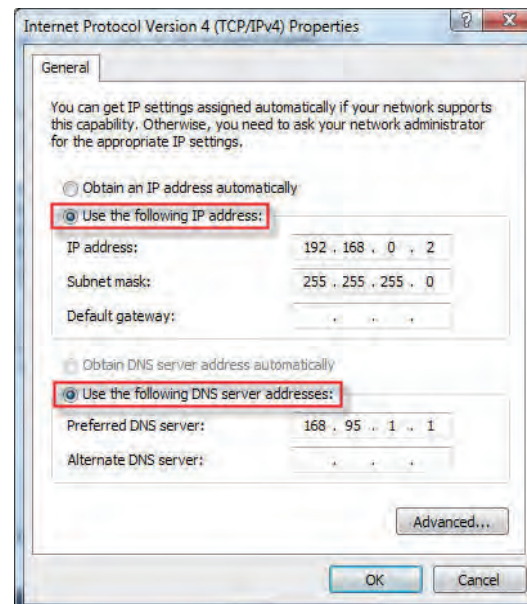
3. Right-click the **Local Area Connection** icon and then select **Properties** from the drop-down menu.



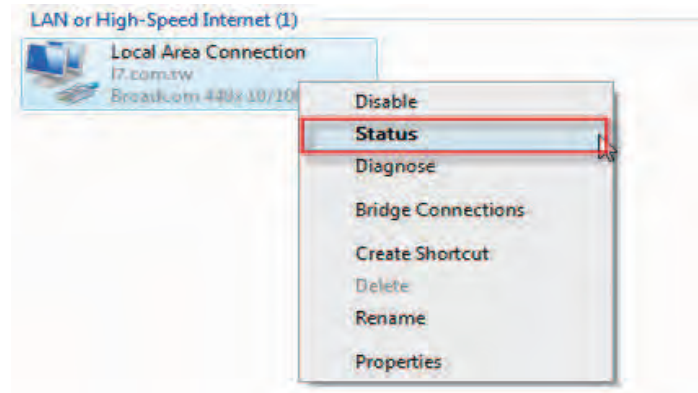
4. Tick the **Internet Protocol Version 4 (TCP/IPv4)** checkbox in the **Networking** tab in the **Local Area Connection Properties** window.



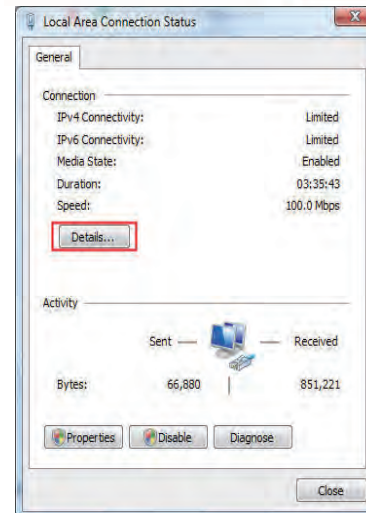
5. Click the “Use the following IP address” option in the **General** tab in the **Local Area Connections Properties** window and enter the desired IP address in the space offered. Then click the “Use the following DNS server addresses” option on the same tab and enter the desired DNS server information.



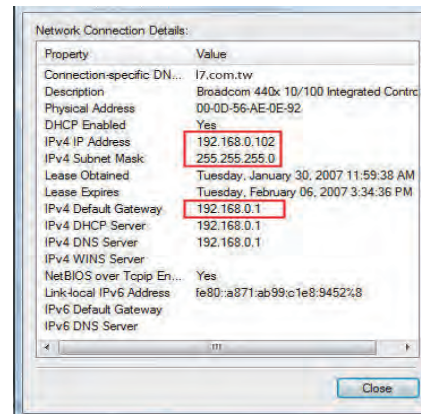
6. Right-click the **Local Area Connection** icon and then select **Status** from the drop-down menu.



7. Go to the **Local Area Connection Status** window and click the **Details** button.



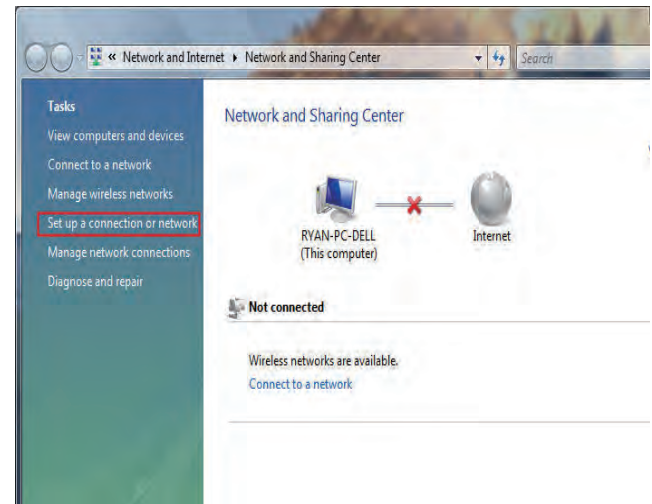
8. Confirm your new settings on the **Network Connection Status** window. When you are finished, click the **Done** button.



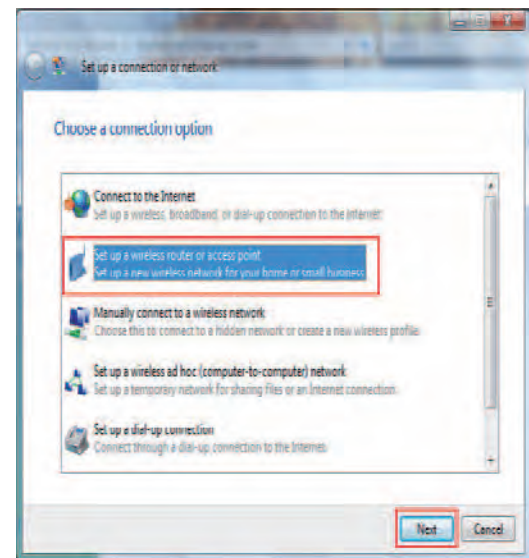
Setting Up a Connection or Network Wirelessly

The following are step-by-step directions to set up a wireless connection.

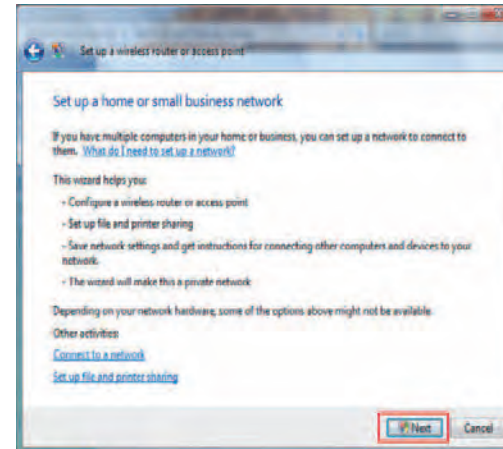
1. Click on **Set up a connection or network** in the **Network and Sharing Center** section.



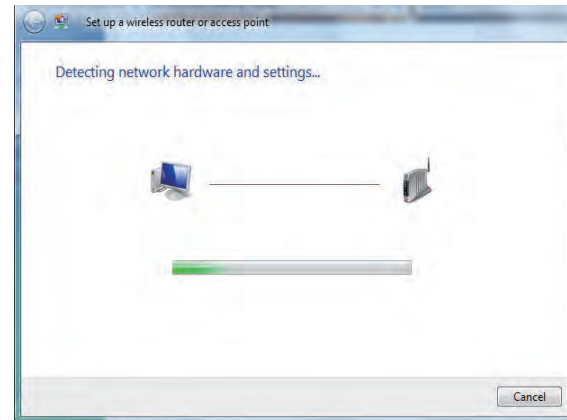
2. Go to the **Set up a connection or network** window and choose the **Set up a wireless router or access point** **Set up a new wireless network for your home or business** option. Click the **Next** button.



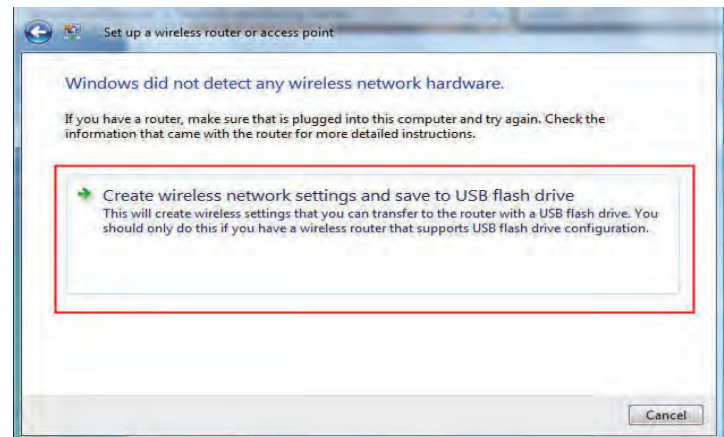
3. Click the **Next** button on the **Set up a wireless router or access point** window.



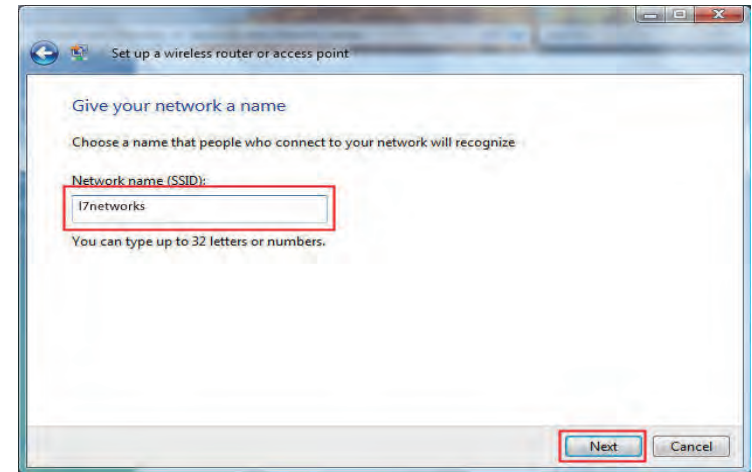
4. The following window displays the system progress.



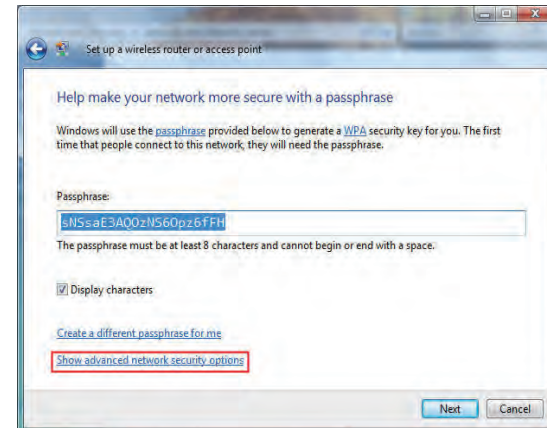
5. This window confirms that you want to create wireless network settings that are savable to a USB flash drive.



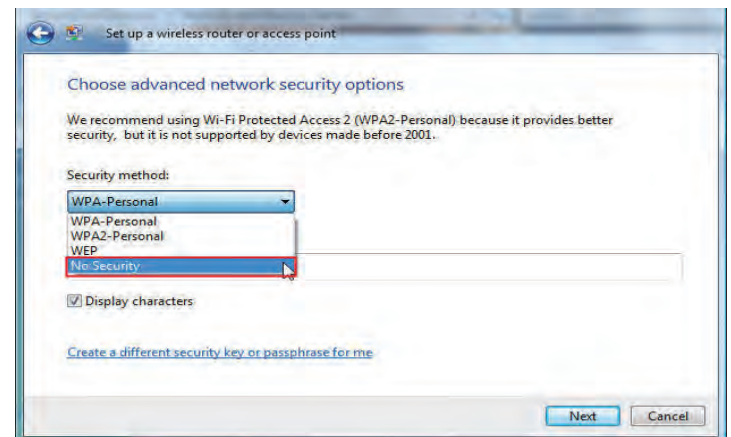
6. Enter a network name on the **Give your network a name** window in the **Set up a wireless router or access point** wizard. Click the **Next** button.



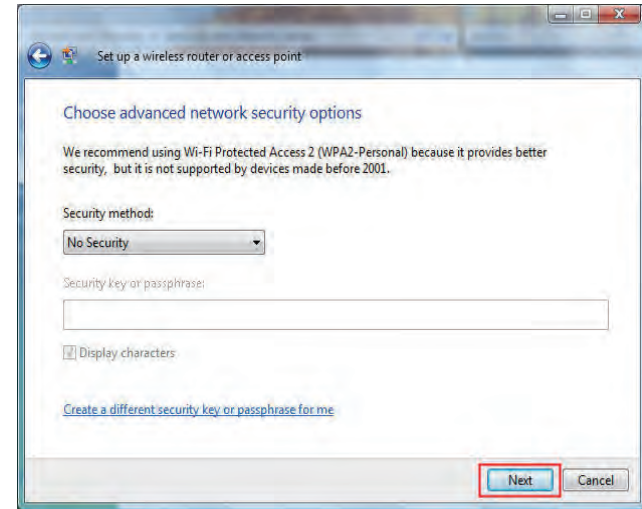
7. Enter a passphrase on the **Help make your network more secure with a passphrase** window in the **Set up a wireless router or access point** wizard. Click the **Show advanced network security options** link.



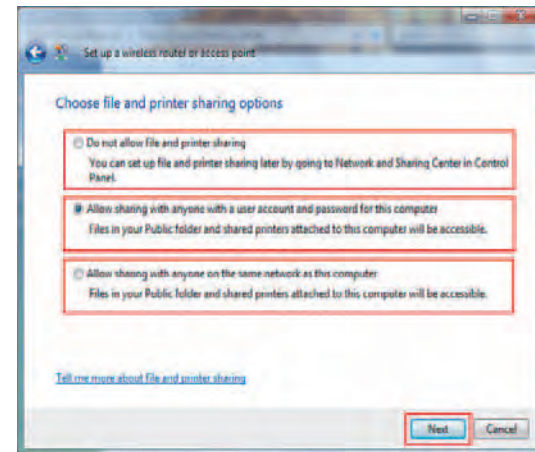
8. Select security method on the **Choose advanced network security options** window in the **Set up a wireless router or access point** wizard. Click the **Next** button.



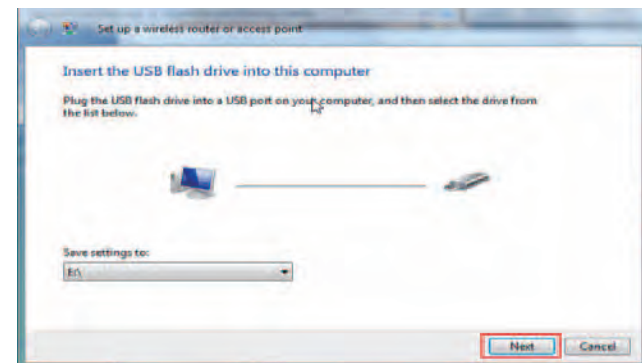
9. Once you have selected the desired security method on the **Choose advanced network security options** window in the **Set up a wireless router or access point** wizard, click the **Next** button.



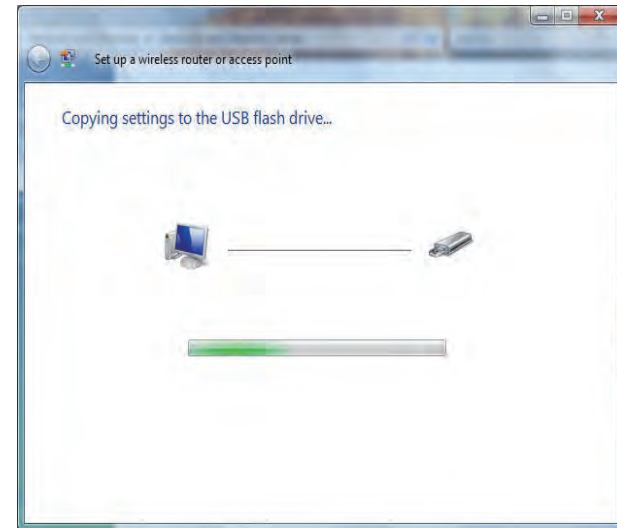
10. Select the desired file and printer sharing option on the **Choose file and printer sharing options** window in the **Set up a wireless router or access point** wizard. Click the **Next** button.



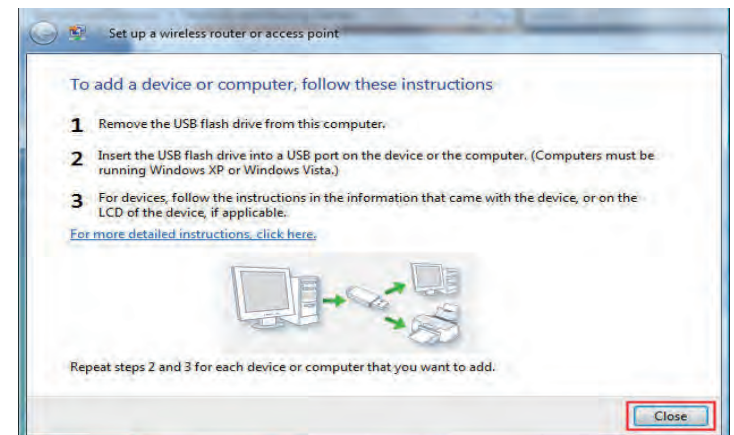
11. Once you have saved your network settings to USB, use the pull-down menu on the **Insert the USB flash drive into this computer** window in the **Set up a wireless router or access point** wizard to select a destination for your network settings. Click the **Next** button.



12. Once you have saved your network settings to USB, the **Copying settings to the USB drive** window in the **Set up a wireless router or access point** wizard opens to indicate the system progress.



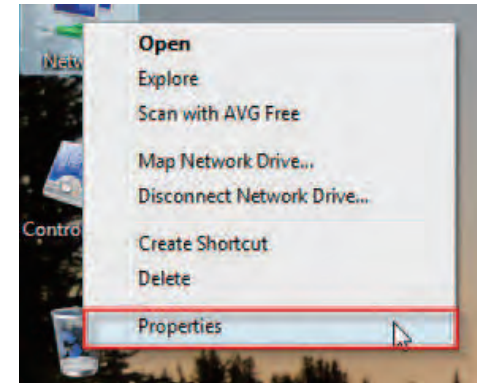
13. Once you are finished, the **To add a device or computer, follow these instructions** window in the **Set up a wireless router or access point** wizard opens. When you are finished, click the **Close** button.



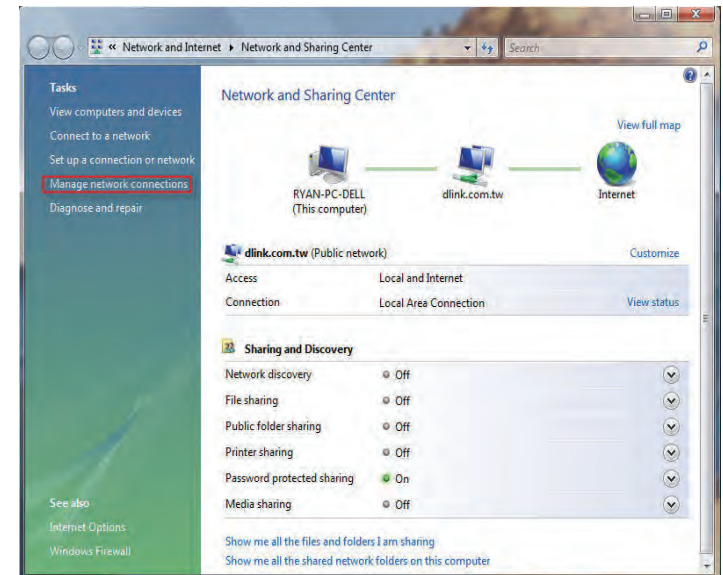
Connecting to a Secured Wireless Network (WEP, WPA-PSK & WPA2-PSK)

The following are step-by-step directions to set up a wireless connection.

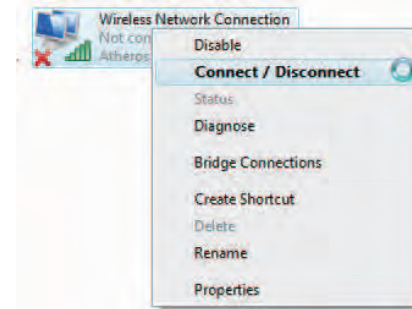
1. Click on **Properties**.



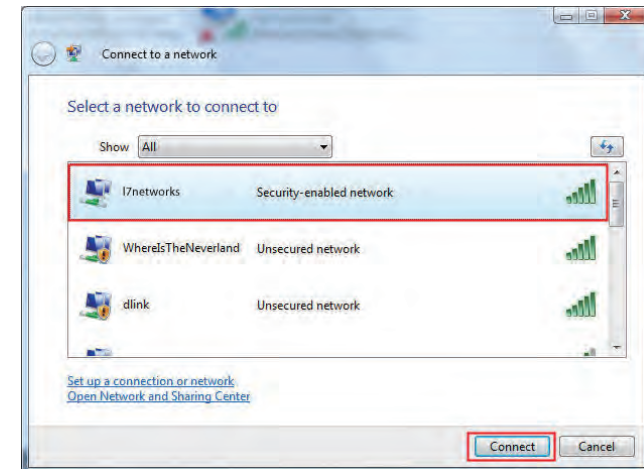
2. Click the **Manage network connections** link in the **Network and Sharing Center** window.



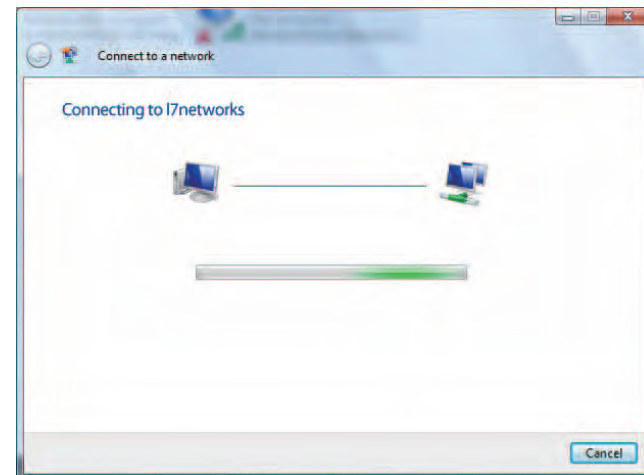
3. Right-click the **Wireless Network Connection** entry and then select **Connect/Disconnect** from the drop-down menu.



4. Select a network to connect to in the **Select a network to connect to** window in the **Connect to a network** wizard and then click the **Connect** button.



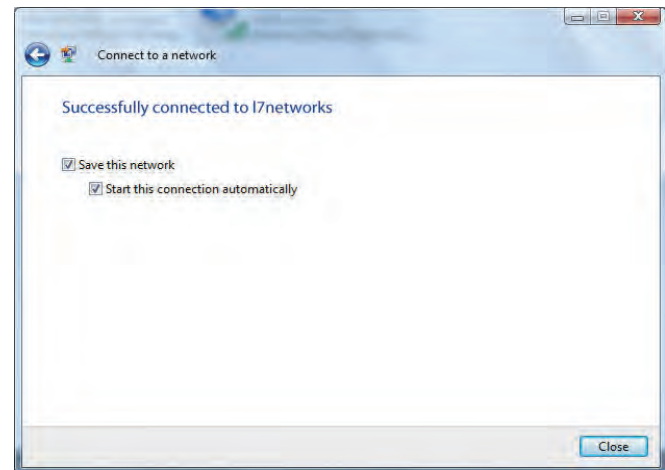
5. The following **Connect to a network** wizard window displays the system progress.



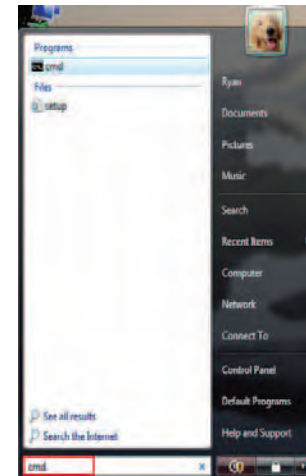
6. Enter the network security key or passphrase for the Router in the textbox provided in the **Type the network security key or passphrase for I7networks** window in the **Connect a network** wizard. When you are finished, click the **Connect** button.



7. The following **Successfully connected to I7networks** window in the **Connect to a network** wizard is displayed. Choose to save to the network and/or start the new connection automatically. When you are finished, click the **Close** button.



8. The successful connection is displayed at the bottom of the Windows start up menu.



9. Confirm your new settings by calling up the command prompt and then entering the ipconfig command.

```
Microsoft Windows [Version 6.0.6000]
Copyright (c) 2006 Microsoft Corporation. All rights reserved.

C:\Users\Ryan>ipconfig

Windows IP Configuration

Wireless LAN adapter Wireless Network Connection:

    Connection-specific DNS Suffix . . . . . : l7.com.tw
    Link-local IPv6 Address . . . . . : fe80::cdf2:c28:90
    IPv4 Address. . . . . : 192.168.0.103
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.0.1

Ethernet adapter Local Area Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . . . . : l7.com.tw

Tunnel adapter Local Area Connection* 6:

    Connection-specific DNS Suffix . . . . . :
    IPv6 Address. . . . . : 2001:0:4136:e38a:
```

10. To test the new IP address, use the Ping feature of the command prompt.

```
C:\Windows\system32\cmd.exe - ping 192.168.0.1 -t

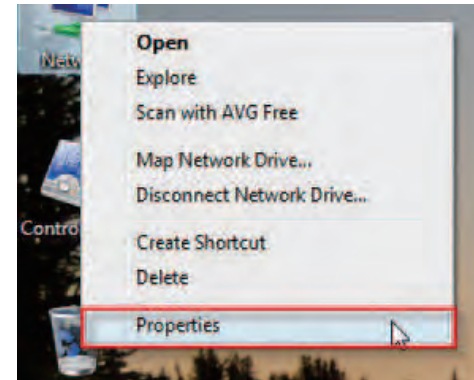
C:\Users\Ryan>ping 192.168.0.1 -t

Pinging 192.168.0.1 with 32 bytes of data:
Reply from 192.168.0.1: bytes=32 time=3ms TTL=64
Reply from 192.168.0.1: bytes=32 time=2ms TTL=64
Reply from 192.168.0.1: bytes=32 time=2ms TTL=64
Reply from 192.168.0.1: bytes=32 time=1ms TTL=64
Reply from 192.168.0.1: bytes=32 time=5ms TTL=64
```

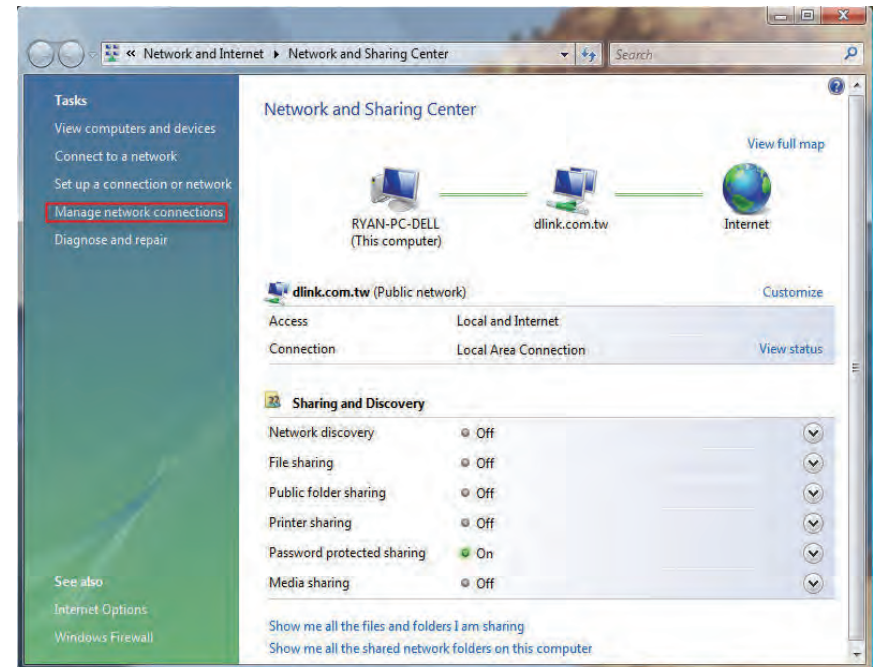

Connecting to an Unsecured Wireless Network

The following are step-by-step directions to set up an unsecured wireless connection.

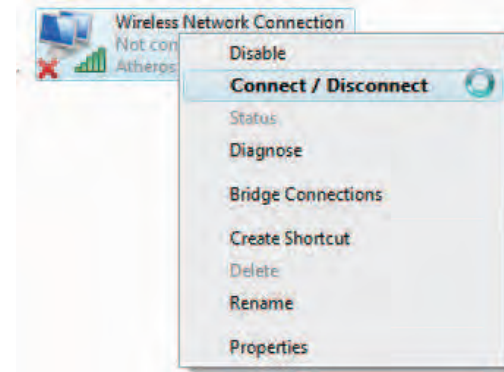
1. Click on **Properties**.



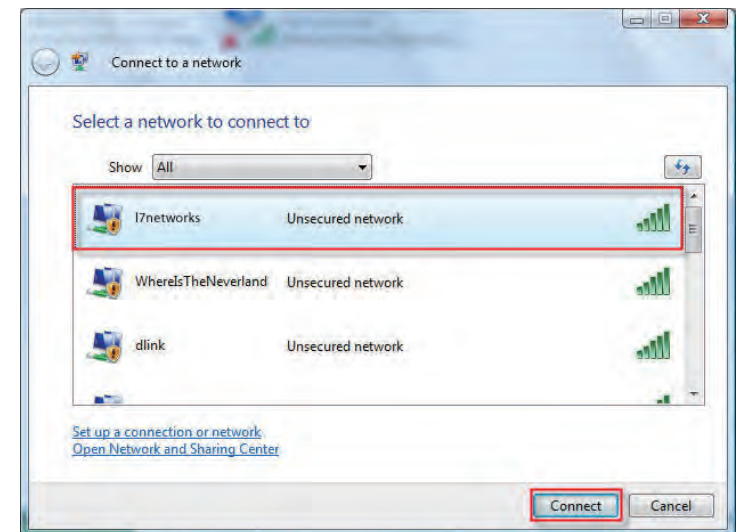
2. Go to the **Network and Sharing Center** window and click the **Manage Network Connections** link.



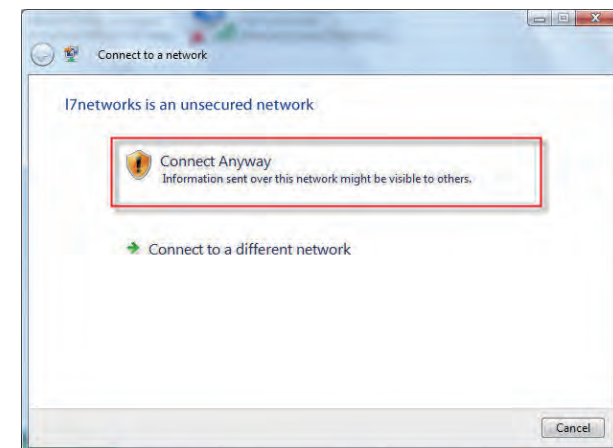
3. Right-click the **Wireless Network Connection** entry and then select **Connect/Disconnect** from the drop-down menu.



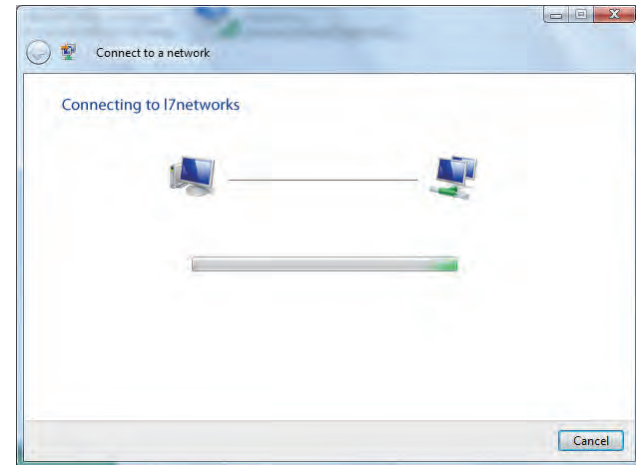
4. Select a network to connect to in the **Select a network to connect to** window in the **Connect to a network** wizard and then click the **Connect** button.



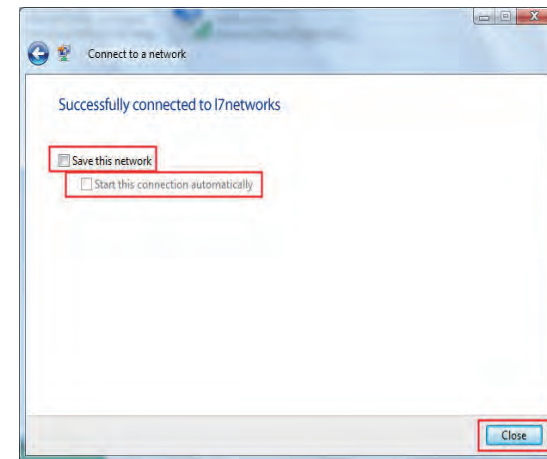
5. Confirm your desire to connect anyway on the following **Network Connection Status** window.



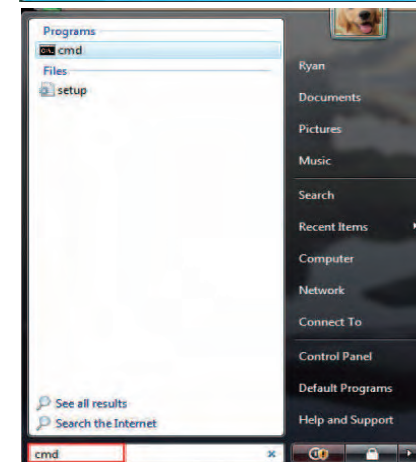
6. The following **Connect to a network** wizard window displays the system progress.



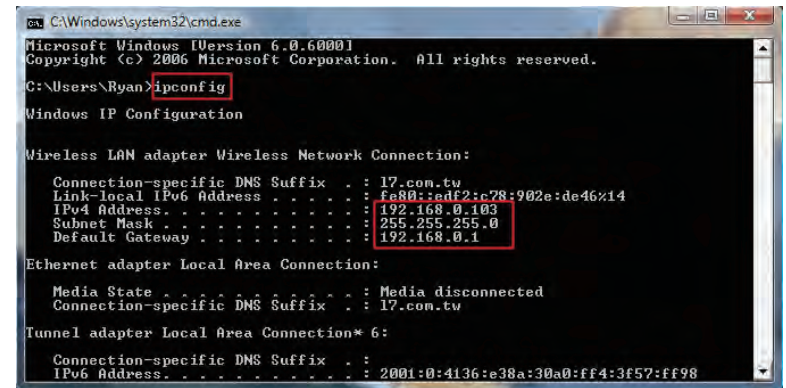
7. The following **Successfully connected to l7networks** window in the **Connect to a network** wizard is displayed. Choose to save to the network and/or start the new connection automatically. When you are finished, click the **Close** button.



8. The successful connection is displayed at the bottom of the Windows start up menu.



9. Confirm your new settings by calling up the command prompt and then entering the ipconfig command.



```
ca C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.0.6000.1]
Copyright (c) 2006 Microsoft Corporation. All rights reserved.

C:\Users\Ryan>ipconfig

Windows IP Configuration

Wireless LAN adapter Wireless Network Connection:

    Connection-specific DNS Suffix . . . : 17.com.tw
    Link-local IPv6 Address . . . . . : fe80::edf2:c78:902e:de46%14
    IPv4 Address. . . . . : 192.168.0.103
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.0.1

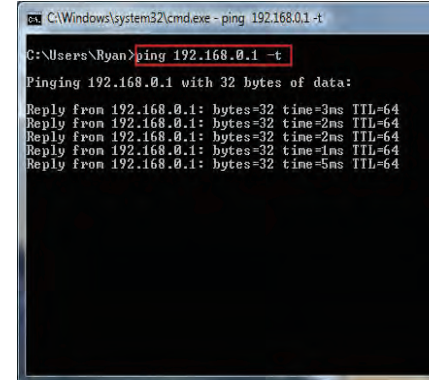
Ethernet adapter Local Area Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix . . : 17.com.tw

Tunnel adapter Local Area Connection* 6:

    Connection-specific DNS Suffix . . :
    IPv6 Address. . . . . : 2001:0:4136:e38a:30a0:ff4:3f57:ff98
```

10. To test the new IP address, use the Ping feature of the command prompt.



```
ca C:\Windows\system32\cmd.exe - ping 192.168.0.1 -t

C:\Users\Ryan>ping 192.168.0.1 -t

Pinging 192.168.0.1 with 32 bytes of data:

Reply from 192.168.0.1: bytes=32 time=3ms TTL=64
Reply from 192.168.0.1: bytes=32 time=2ms TTL=64
Reply from 192.168.0.1: bytes=32 time=2ms TTL=64
Reply from 192.168.0.1: bytes=32 time=1ms TTL=64
Reply from 192.168.0.1: bytes=32 time=5ms TTL=64
```

Troubleshooting

This chapter provides solutions to problems that can occur during the installation and operation of the L7-N-R2000. Read the following descriptions if you are having problems. (The examples below are illustrated in Windows® XP. If you have a different operating system, the screenshots on your computer will look similar to the following examples.)

1. Why can't I access the web-based configuration utility?

When entering the IP address of the L7 Networks router (192.168.0.1 for example), you are not connecting to a website on the Internet or have to be connected to the Internet. The device has the utility built-in to a ROM chip in the device itself. Your computer must be on the same IP subnet to connect to the web-based utility.

- Make sure you have an updated Java-enabled web browser. We recommend the following:
 - Internet Explorer 6.0 or higher
 - Netscape 8 or higher
 - Mozilla 1.7.12 (5.0) or higher
 - Opera 8.5 or higher
 - Safari 1.2 or higher (with Java 1.3.1 or higher)
 - Camino 0.8.4 or higher
 - Firefox 1.5 or higher
- Verify physical connectivity by checking for solid link lights on the device. If you do not get a solid link light, try using a different cable or connect to a different port on the device if possible. If the computer is turned off, the link light may not be on.
- Disable any internet security software running on the computer. Software firewalls such as Zone Alarm, Black Ice, Sygate, Norton Personal Firewall, and Windows® XP firewall may block access to the configuration pages. Check the help files included with your firewall software for more information on disabling or configuring it.

- Configure your Internet settings:
 - Go to **Start > Settings > Control Panel**. Double-click the **Internet Options** icon. From the **Security** tab, click the button to restore the settings to their defaults.
 - Click the **Connection** tab and set the dial-up option to Never Dial a Connection. Click the **LAN Settings** button. Make sure nothing is checked. Click **OK**.
 - Go to the **Advanced** tab and click the button to restore these settings to their defaults. Click **OK** three times.
 - Close your web browser (if open) and open it.
- Access the web management. Open your web browser and enter the IP address of your L7 Networks router in the address bar. This should open the login page for your the web management.
- If you still cannot access the configuration, unplug the power to the router for 10 seconds and plug back in. Wait about 30 seconds and try accessing the configuration. If you have multiple computers, try connecting using a different computer.

2. What can I do if I forgot my password?

If you forgot your password, you must reset your router. Unfortunately this process will change all your settings back to the factory defaults.

To reset the router, locate the reset button (hole) on the rear panel of the unit. With the router powered on, use a paperclip to hold the button down for 10 seconds. Release the button and the router will go through its reboot process. Wait about 30 seconds to access the router. The default IP address is 192.168.0.1. When logging in, the username is **admin** and leave the password box empty.

3. Why can't I connect to certain sites or send and receive emails when connecting through my router?

If you are having a problem sending or receiving email, or connecting to secure sites such as eBay, banking sites, and Hotmail, we suggest lowering the MTU in increments of ten (Ex. 1492, 1482, 1472, etc).

Note: AOL DSL+ users must use MTU of 1400.

To find the proper MTU Size, you'll have to do a special ping of the destination you're trying to go to. A destination could be another computer, or a URL.

- Click on **Start** and then click **Run**.
- Windows® 95, 98, and Me users type in **command** (Windows® NT, 2000, and XP users type in **cmd**) and press **Enter** (or click **OK**).
- Once the window opens, you'll need to do a special ping. Use the following syntax:

ping [url] [-f] [-l] [MTU value]

Example: **ping yahoo.com -f -l 1472**

```
C:\>ping yahoo.com -f -l 1482
Pinging yahoo.com [66.94.234.13] with 1482 bytes of data:
Packet needs to be fragmented but DF set.
Packet needs to be fragmented but DF set.
Packet needs to be fragmented but DF set.
Packet needs to be fragmented but DF set.

Ping statistics for 66.94.234.13:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping yahoo.com -f -l 1472
Pinging yahoo.com [66.94.234.13] with 1472 bytes of data:
Reply from 66.94.234.13: bytes=1472 time=93ms TTL=52
Reply from 66.94.234.13: bytes=1472 time=109ms TTL=52
Reply from 66.94.234.13: bytes=1472 time=125ms TTL=52
Reply from 66.94.234.13: bytes=1472 time=203ms TTL=52

Ping statistics for 66.94.234.13:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 93ms, Maximum = 203ms, Average = 132ms

C:\>
```

You should start at 1472 and work your way down by 10 each time. Once you get a reply, go up by 2 until you get a fragmented packet. Take that value and add 28 to the value to account for the various TCP/IP headers. For example, lets say that 1452 was the proper value, the actual MTU size would be 1480, which is the optimum for the network we're working with ($1452+28=1480$).

Once you find your MTU, you can now configure your router with the proper MTU size.

To change the MTU rate on your router follow the steps below:

- Open your browser, enter the IP address of your router (192.168.0.1) and click **OK**.
- Enter your username (admin) and password (blank by default). Click **OK** to enter the web configuration page for the device.
- Click on **Setup** and then click **Manual Configure**.
- To change the MTU enter the number in the MTU field and click the **Save Settings** button to save your settings.
- Test your email. If changing the MTU does not resolve the problem, continue changing the MTU in increments of ten.

Wireless Basics

L7 Networks wireless products are based on industry standards to provide easy-to-use and compatible high-speed wireless connectivity within your home, business or public access wireless networks. Strictly adhering to the IEEE standard, the L7 Networks wireless family of products will allow you to securely access the data you want, when and where you want it. You will be able to enjoy the freedom that wireless networking delivers.

A wireless local area network (WLAN) is a cellular computer network that transmits and receives data with radio signals instead of wires. Wireless LANs are used increasingly in both home and office environments, and public areas such as airports, coffee shops and universities. Innovative ways to utilize WLAN technology are helping people to work and communicate more efficiently. Increased mobility and the absence of cabling and other fixed infrastructure have proven to be beneficial for many users.

Wireless users can use the same applications they use on a wired network. Wireless adapter cards used on laptop and desktop systems support the same protocols as Ethernet adapter cards.

Under many circumstances, it may be desirable for mobile network devices to link to a conventional Ethernet LAN in order to use servers, printers or an Internet connection supplied through the wired LAN. A Wireless Router is a device used to provide this link.

What is Wireless?

Wireless or Wi-Fi technology is another way of connecting your computer to the network without using wires. Wi-Fi uses radio frequency to connect wirelessly, so you have the freedom to connect computers anywhere in your home or office network.

Why L7 Networks Wireless?

L7 Networks is the worldwide leader and award winning designer, developer, and manufacturer of networking products. L7 Networks delivers the performance you need at a price you can afford. L7 Networks has all the products you need to build your network.

How does wireless work?

Wireless works similar to how cordless phone work, through radio signals to transmit data from one point A to point B. But wireless technology has restrictions as to how you can access the network. You must be within the wireless network range area to be able to connect your computer. There are two different types of wireless networks Wireless Local Area Network (WLAN), and Wireless Personal Area Network (WPAN).

Wireless Local Area Network (WLAN)

In a wireless local area network, a device called an Access Point (AP) connects computers to the network. The access point has a small antenna attached to it, which allows it to transmit data back and forth over radio signals. With an indoor access point as seen in the picture, the signal can travel up to 300 feet. With an outdoor access point the signal can reach out up to 30 miles to serve places like manufacturing plants, industrial locations, college and high school campuses, airports, golf courses, and many other outdoor venues.

Wireless Personal Area Network (WPAN)

Bluetooth is the industry standard wireless technology used for WPAN. Bluetooth devices in WPAN operate in a range up to 30 feet away.

Compared to WLAN the speed and wireless operation range are both less than WLAN, but in return it doesn't use nearly as much power which makes it ideal for personal devices, such as mobile phones, PDAs, headphones, laptops, speakers, and other devices that operate on batteries.

Who uses wireless?

Wireless technology has become so popular in recent years that almost everyone is using it, whether it's for home, office, business, L7 Networks has a wireless solution for it.

Home

- Gives everyone at home broadband access
- Surf the web, check e-mail, instant message, and etc
- Gets rid of the cables around the house
- Simple and easy to use

Small Office and Home Office

- Stay on top of everything at home as you would at office
- Remotely access your office network from home
- Share Internet connection and printer with multiple computers
- No need to dedicate office space

Where is wireless used?

Wireless technology is expanding everywhere not just at home or office. People like the freedom of mobility and it's becoming so popular that more and more public facilities now provide wireless access to attract people. The wireless connection in public places is usually called "hotspots".

Using a L7 Networks Cardbus Adapter with your laptop, you can access the hotspot to connect to Internet from remote locations like airports, hotels, coffee shops, libraries, restaurants, and convention centers.

Wireless network is easy to setup, but if you're installing it for the first time it could be quite a task not knowing where to start. That's why we've put together a few setup steps and tips to help you through the process of setting up a wireless network.

Tips

Here are a few things to keep in mind, when you install a wireless network.

Centralize your router or Access Point

Make sure you place the router/access point in a centralized location within your network for the best performance. Try to place the router/access point as high as possible in the room, so the signal gets dispersed throughout your home. If you have a two-story home, you may need a repeater to boost the signal to extend the range.

For the wireless repeater, there are two types of repeater in L7 Networks for user to select:

- Universal repeater: It acts as an AP and a wireless STA at the same time. It can support all AP and wireless STA if they work in the same wireless channel.
- AP-repeater (AP with WDS): only repeat same model or limited models which base on the same proprietary protocol.

Please choose a universal repeater to boost the signal to extend the range.

Wireless Modes

Eliminate Interference

Place home appliances such as cordless telephones, microwaves, and televisions as far away as possible from the router/access point. This would significantly reduce any interference that the appliances might cause since they operate on same frequency.

Security

Don't let you next-door neighbors or intruders connect to your wireless network. Secure your wireless network by turning on the WPA or WEP security feature on the router. Refer to product manual for detail information on how to set it up.

There are basically two modes of networking:

- **Infrastructure** – All wireless clients will connect to an access point or wireless router.
- **Ad-Hoc** – Directly connecting to another computer, for peer-to-peer communication, using wireless network adapters on each computer, such as two or more WNA-2330 wireless network Cardbus adapters.

An Infrastructure network contains an Access Point or wireless router. All the wireless devices, or clients, will connect to the wireless router or access point.

An Ad-Hoc network contains only clients, such as laptops with wireless cardbus adapters. All the adapters must be in Ad-Hoc mode to communicate.

Networking Basics

Check your IP address

After you install your new L7 Networks adapter, by default, the TCP/IP settings should be set to obtain an IP address from a DHCP server (i.e. wireless router) automatically. To verify your IP address, please follow the steps below.

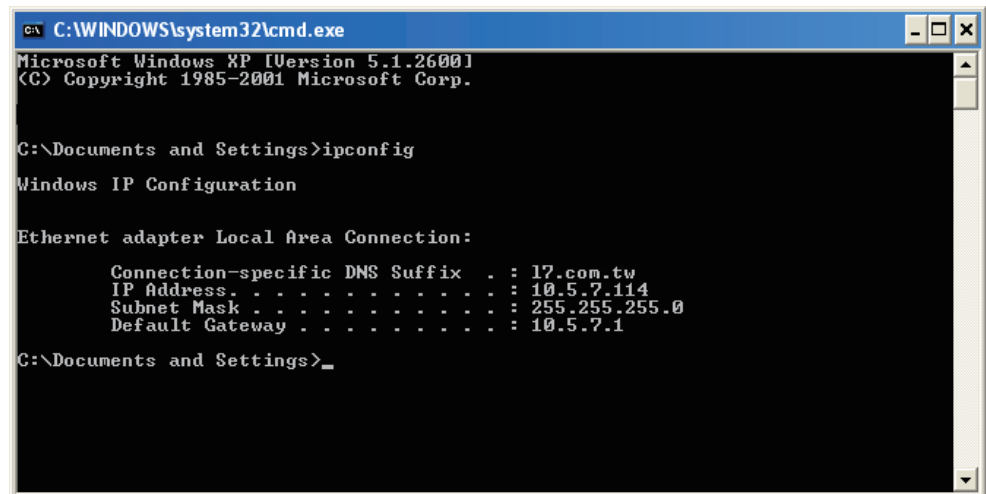
Click on **Start > Run**. In the run box type **cmd** and click **OK**.

At the prompt, type **ipconfig** and press **Enter**.

This will display the IP address, subnet mask, and the default gateway of your adapter.

If the address is 0.0.0.0, check your adapter installation, security settings, and the settings on your router. Some firewall software programs may block a DHCP request on newly installed adapters.

If you are connecting to a wireless network at a hotspot (e.g. hotel, coffee shop, airport), please contact an employee or administrator to verify their wireless network settings.



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings>ipconfig

Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : 17.com.tw
    IP Address. . . . .               : 10.5.7.114
    Subnet Mask . . . . .             : 255.255.255.0
    Default Gateway . . . . .         : 10.5.7.1

C:\Documents and Settings>_
```

Statically Assign an IP address

If you are not using a DHCP capable gateway/router, or you need to assign a static IP address, please follow the steps below:

Step 1

Windows® XP - Click on **Start > Control Panel > Network Connections**.

Windows® 2000 - From the desktop, right-click **My Network Places > Properties**.

Step 2

Right-click on the **Local Area Connection** which represents your L7 Networks network adapter and select **Properties**.

Step 3

Highlight **Internet Protocol (TCP/IP)** and click **Properties**.

Step 4

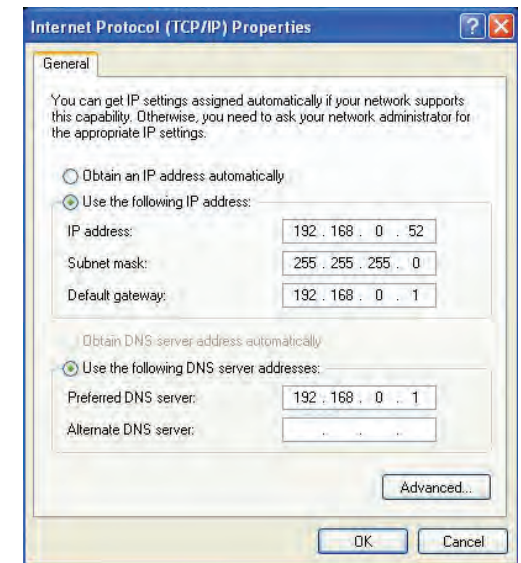
Click **Use the following IP address** and enter an IP address that is on the same subnet as your network or the LAN IP address on your router.

Example: If the router's LAN IP address is 192.168.0.1, make your IP address 192.168.0.X where X is a number between 2 and 99. Make sure that the number you choose is not in use on the network. Set Default Gateway the same as the LAN IP address of your router (192.168.0.1).

Set Primary DNS the same as the LAN IP address of your router (192.168.0.1). The Secondary DNS is not needed or you may enter a DNS server from your ISP.

Step 5

Click **OK** twice to save your settings.



Technical Specifications

Standards

- IEEE 802.11g
- IEEE 802.11b
- IEEE 802.11n draft 2.0
- IEEE 802.3
- IEEE 802.3u
-

Wireless Signal Rates*

- 300Mbps
- 48Mbps
- 24Mbps
- 12Mbps
- 9Mbps
- 5.5Mbps
- 1Mbps
- 54Mbps
- 36Mbps
- 18Mbps
- 11Mbps
- 6Mbps
- 2Mbps

Security

- WPA - Wi-Fi Protected Access (TKIP, MIC, IV Expansion, Shared Key Authentication)
- 802.1x
- 64/128-bit WEP
- PIN/PBC WPS

Modulation Technology

- 802.11 b : DSSS / DBPSK / DQPSK / CCK
- 802.11 g : 16QAM / 64QAM / BPSK / QPSK with OFDM
- 802.11 n : 16QAM / 64QAM / BPSK / QPSK with OFDM

VPN Pass Through/ Multi-Sessions

- PPTP
- IPSec

Device Management

- Web-based Internet Explorer v6 or later; Netscape Navigator v6 or later; or other Java-enabled browsers
- DHCP Server and Client

Wireless Frequency Range

- 2.4GHz to 2.497GHz (802.11b)
- 2.4GHz to 2.4835GHZ (802.11g and 802.11n)

Wireless Operating Range²

- Indoors - up to 328 ft. (100 meters)
- Outdoors- up to 1312 ft. (400 meters)

Advanced Firewall Features

- NAT with VPN Pass-through (Network Address Translation)
- MAC Filtering
- IP Filtering
- URL Filtering
- Domain Blocking
- Scheduling

Operating Temperature

32°F to 129 °F (0°C to 40°C)

Humidity

95% maximum (non-condensing)

Safety and Emissions

FCC Part 15B/ 15C/ MPE
CE

LEDs

- Power
- WPS
- Internet
- WLAN (Wireless Connection)
- LAN (10/100)

Dimensions

146 x 109 x 35mm

Weight

285g

* Maximum wireless signal rate derived from IEEE Standard 802.11b, 802.11g and 802.11n specifications. Actual data 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. Environmental factors will adversely affect wireless signal range.

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CE Mark Warning:

This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

FCC Statement:

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

For detailed warranty information applicable to products purchased outside the United States, please contact the corresponding local L7 Networks office.

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.

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.