WIRELESS ADSL2+ BROADBAND MODEM ROUTER
USER MANUAL

MODELS 523455 (ANNEX A)
& 523950 (ANNEX B)

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FCC REGULATORY STATEMENTS

FCC Part 68

This equipment complies with Part 68 of FCC Rules. On the bottom of this device is a label with the FCC registration number and ringer equivalence number (REN) for this equipment. You must provide this information to the telephone company upon request. The REN is useful to determine the quantity of devices you may connect to the telephone line and still have all of those devices ring when your number is called. In most areas, the total of the REN of all devices connected to one line should not exceed five. To be certain of the number of devices you may connect to your line, as determined by the REN, contact your local telephone company.

If the modem causes harm to the telephone network, the telephone company may discontinue your service temporarily, notifying you in advance (if feasible) or as soon as possible. You will be advised of your right to file a complaint with the FCC. Also, the telephone company may make changes in its facilities, equipment, operations or procedures that could affect the proper operation of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this device, contact your INTELLINET NETWORK SOLUTIONS™ dealer for repair/warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected or until you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

Installation
This device is equipped with a USOC RJ-11C connector.

FCC Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
4. Consult the dealer or an experienced radio technician for help.

FCC Caution

This equipment must be installed and operated in accordance with provided instructions, and a minimum of 20 cm spacing must be provided between computer-mounted antenna and a person's body (excluding extremities of hands, wrists and feet) during wireless modes of operation.

This device complies with Part 15 of 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. Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

Federal Communications Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm (8 inches) during normal operation. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

R&TTE Compliance Statement

This equipment complies with all the requirements of Directive 1999/5/EC of the European Parliament and the Council of March 9, 1999, on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE). The R&TTE Directive repeals and replaces Directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) as of April 8, 2000.

Safety

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of the FCC and of the computer manufacturer must therefore be followed at all times to ensure the safe use of the equipment.

EU Countries Intended for Use

The ETSI version of this device is intended for home and office use in Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

The ETSI version of this device is also authorized for use in EFTA member states Iceland, Liechtenstein, Norway and Switzerland.

EU Countries Not Intended for Use

None.

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1. INTRODUCTION

Thank you for purchasing this INTELLINET NETWORK SOLUTIONS™ Wireless ADSL2+ Broadband Modem Router, Model 523455 (Annex A) or Model 523950 (Annex B). An all-in-one modem, router, wireless access point, firewall and Fast Ethernet 4-port switch, it allows you to access the Internet and download music, play interactive games online or surf the Web at double the speed previously available through ADSL2.

Improved modulation efficiency reduces framing overhead, achieves higher coding gain, improves the initialization time and provides enhanced signal-processing algorithms. ADSL2 increases downstream data rates to more than 12 Mbps (as compared to between 8 and 10 Mbps for original ADSL) and can extend reach by approximately 600 feet.

With the ADSL2+ standard doubling the maximum frequency used for downstream data transmission (from 1.1 MHz to 2.2 MHz), the Wireless ADSL2+ Broadband Modem Router effectively provides downstream data rates of 24 Mbps on standard copper phone lines as long as 5,000 feet.

Real-time performance-monitoring capabilities provide information regarding line quality and noise conditions at both ends of the line. Service providers can use the data to monitor the quality of your ADSL connection to prevent service failures and keep your connection up and running without disruption. They can also use the data to determine if you qualify for higher data-rate services.

All these popular features — as listed below — provide you with improved interoperability, fast startup and enhanced voice support.
• 802.11g router with integrated ADSL2+ modem
• Supports 24 Mbps ADSL2+ downstream data rate
• Supports ADSL standards G.992.1 (G.dmt), G.992.2 (G.lite), G.992.3 (ADSL2), G.992.4 (splitterless ADSL2) and G.992.5 (ADSL2+) for Annex A/B
• Up to 54 Mbps wireless network data transfer rate
• Compatible with all 802.11b & g wireless products
• Supports WEP and WPA/WPA2 (TKIP and AES) data encryption
• Supports MAC filtering for wireless clients
• Integrated 10/100 Mbps LAN switch with Auto MDI/MDI-X support
• DHCP server assigns IP addresses for all LAN users
• Supports virtual server, port forwarding and DMZ (demilitarized zone)
• Supports DDNS (dynamic DNS) and SNMP management
• Supports VPN pass-through (IPSec, PPTP, L2TP)
• Integrated anti-DOS firewall
• Content control through URL and domain filter
• Web-based user interface for firmware updates, plus remote management function
• Supports UPNP (Universal Plug and Play)
• Lifetime Warranty

# 2. HARDWARE

COMPONENT DESCRIPTIONS

Front Panel

As listed below, the LEDs indicate the current status of the router.

LED	Mode	Status
PWR (green)	On	Ready for operation.
WLAN (yellow)	Off	The wireless LAN is disabled.
	Blinking	Wireless traffic is being transmitted/received.
ADSL (green)	On	Successful connection to an ADSL DSLAN.
	Blinking	No connection.
LAN (Ports 1-4)	On	The LAN cable is connected to the router.
	Off	No network connection.
	Blinking	Network traffic is being transmitted/received through the LAN port.

Rear Panel

Antenna Connector: This is a reverse SMA connector, allowing easy connection to an external antenna.
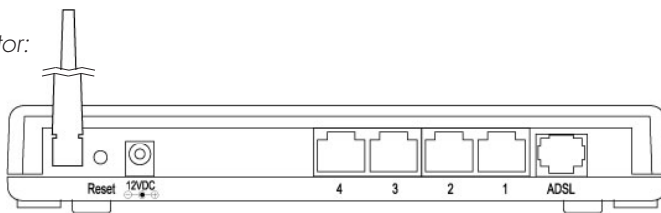
Reset button: This can be used to reset the router or to restore the factory default settings. Press the button (using a pencil tip can help) for less than five seconds to re-boot the router and save any configurations that have been set up.

If problems persist after the simple re-boot — or if you've forgotten your password — hold the button in for longer than five seconds to reset the router to its factory default settings. *NOTE:* The factory default settings will replace any others that have been configured.

Power outlet: The 12 V DC power adapter included with the device is connected here.

LAN ports: The four local area network (LAN) ports are for connections to PCs, LANs, printers, servers, hubs and so forth.

ADSL: The enclosed RJ-11 phone line connects this outlet to an ADSL/telephone network.

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SETUP/INSTALLATION

Once you're familiar with the front and rear panels of the Wireless ADSL2+ Broadband Modem Router, the setup and installation of the device is easy.

1. From the ADSL port, connect the router to your ADSL network using the RJ-11 telephone cable provided.

2. From any of the LAN ports, connect the router to your PC, hub, switch or other component using the Ethernet Cat5 RJ-45 cable provided.

3. Connect the router's power outlet to a power source using the power adapter provided. *NOTE:* Use only the power adapter included with this device.

4. Check that the green ADSL LED is on, indicating a successful connection. If the ADSL LED is blinking — indicating that no connection has been made — contact your Internet service provider.

3. SOFTWARE/SETUP WIZARD
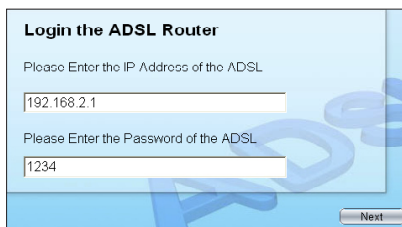
This router provides a setup wizard used to configure the ADSL settings. This wizard collects and enters ADSL settings from some Internet service providers (ISPs) simply by selecting the ISP when prompted. If you can't find your particular ISP listed in the wizard, refer to the Quick Start instructions in the Web Management Configuration section.

Before starting:
• Make sure the ADSL cable is connected to the router correctly. When the ADSL cable is working normally, the ADSL LED will be on.
• Uninstall all dial-up programs previously installed for the USB modem or other dial-up devices.
• It is recommended that the router first be configured with the Ethernet cable connected prior to setting the wireless functions.

NOTE: This setup wizard can be run in Windows 98SE, Me, 2000 or XP. The following procedures represent Windows XP, but are similar for 98SE/Me/2000.

1. Insert the enclosed setup CD (featuring the setup wizard) into your CD-ROM drive. The Autorun.exe program should be executed automatically. If not, run Autorun.exe manually from the "Autorun" folder on the CD.

2. Click on "Setup Wizard" when the initial menu appears on screen. The wizard will search for the router. If the router can't be found, enter the IP address and the password of the router, then click "Next" to search again.

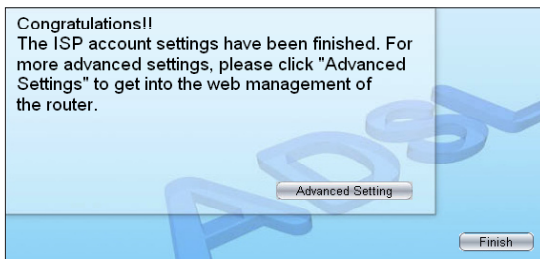**Login the ADSL Router**

Please Enter the IP Address of the ADSL

192.168.2.1

Please Enter the Password of the ADSL

1234

Next

3. The following instructions are based on the successive prompts that will appear. First, select the country in which the router is being installed, then click "Next."

4. Select your ISP.

5. If needed, enter the username and password provided by your ISP, then click "Next."

6. When the Settings Overview screen appears, click "Save," which will reboot the router.

After saving and rebooting, the ISP settings are complete. Click "Finish" to close the setup wizard.

To configure additional settings, click "Advanced Settings" and proceed to the next section.

Congratulations!!
The ISP account settings have been finished. For more advanced settings, please click "Advanced Settings" to get into the web management of the router.

Advanced Setting

Finish

NOTE: To use the router to access the Internet, the IP address of each PC has to be set in the same subnet as the router. This wizard will help to set the proper IP address(es).

NOTE: By default, the router's DHCP server is enabled. If it is disabled before running the setup wizard, the wizard will automatically enable it.

4. IP ADDRESS SETTINGS

As noted above, to use the router to access the Internet, the PCs in the network must have an Ethernet adapter installed and be connected to the router either directly or through a hub or switch. The TCP/IP protocol of each PC has to be installed, and the IP address of each PC has to be set in the same subnet as the router.

The router's default IP address is 192.168.2.1; the subnet mask is 255.255.255.0. PCs can be configured to obtain an IP address automatically through the DHCP server of the router or a fixed IP address in order to be in the same subnet as the router. By default, the DHCP server of the router is enabled and will dispatch an IP address to the PC from between 192.168.2.100 and 192.168.2.200. It is strongly recommended that IP addresses be obtained automatically.

This section explains how to configure a PC so that it can obtain an IP address automatically for Windows 95/98/Me, 2000 or NT operating systems. For other operating systems (Macintosh, Sun, etc.), follow the manual of the operating system.

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Windows XP

1. Click "Start," open the control panel and then double-click "Network Connections." The Network Connections window will appear.

2. Right-click on the Local Area Connection icon and select Properties. The Local Area Connection window will appear.

3. Check the list of Network Components. You should see Internet Protocol (TCP/IP) on your list. Select it and click "Properties."

4. In the Internet Protocol (TCP/IP) Properties window, select "Obtain an IP address automatically" and "Obtain DNS server address automatically."

5. Click "OK" to confirm the setting. Your PC will now obtain an IP address automatically from the router's DHCP server.

NOTE: Make sure the router's DHCP server is the only one available on your LAN.
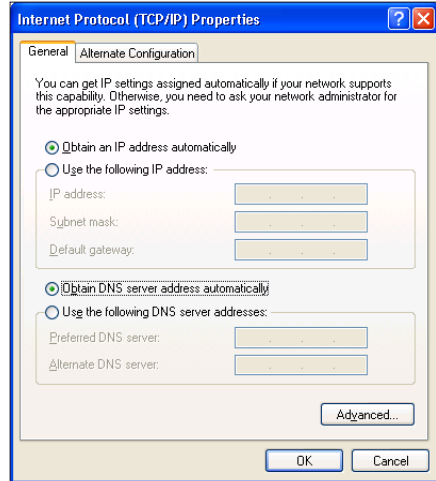
Windows 2000

1. Click "Start" and select Settings, then click "Control Panel." The Control Panel window will appear.

2. Double-click on the Network and Dial-up Connection icon. In the Network and Dial-up Connection window, double-click on the Local Area Connection icon. The Local Area Connection window will appear.

3. In the Local Area Connection window, click "Properties."

4. Check your list of Network Components. You should see Internet Protocol (TCP/IP) on your list. Select it and click "Properties."

5. In the Internet Protocol (TCP/IP) Properties window, select "Obtain an IP address automatically" and "Obtain DNS server address automatically."

6. Click "OK" to confirm the setting.
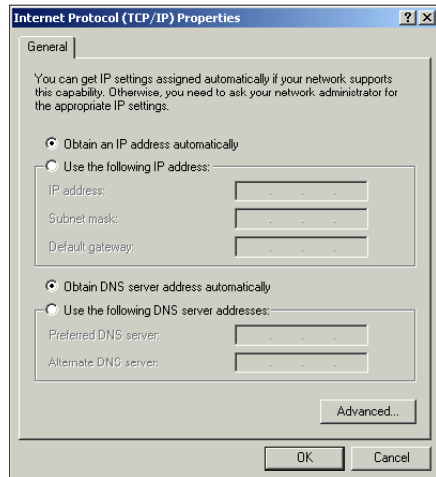
Your PC will now obtain an IP address automatically from your router's DHCP server.

NOTE: Make sure the router's DHCP server is the only one available on your LAN.

Windows 95/98/Me

1. Click "Start" and select Settings, then click "Control Panel." The Control Panel window will appear.

2. Double-click on the Network icon. The Network window will appear.

3. Check your list of Network Components. If TCP/IP is not installed, click "Add" to install it now. If TCP/IP is installed, go to Step 6.

4. In the Network Component Type dialog box, select "Protocol" and click "Add."

5. In the Select Network Protocol dialog box, select "Microsoft and TCP/IP," then click "OK" to start installing the TCP/IP protocol. You may need your Windows CD to complete the installation.

6. After installing TCP/IP, go back to the Network dialog box. Select TCP/IP from the list of Network Components and then click "Properties."

7. Click on each of the tabs and verify the following settings:
   Bindings: Check "Client for Microsoft Networks" and "File and printer sharing for Microsoft Networks."
   Gateway: Leave all fields blank.
   DNS Configuration: Select "Disable DNS."
   WINS Configuration: Select "Disable WINS Resolution."
   IP Address: Select "Obtain IP address automatically."
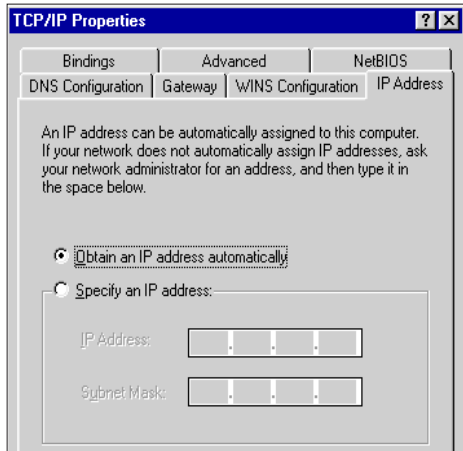
8. Reboot the PC. The PC will now obtain an IP address automatically from your router's DHCP server.

NOTE: Make sure the router's DHCP server is the only one available on your LAN.

Windows NT

1. Click "Start" and select Settings, then click "Control Panel." The Control Panel window will appear.

2. Double-click on the Network icon. The Network window will appear.

3. Check your list of Network Components. If TCP/IP is not installed, click "Add" to install it now. If TCP/IP is installed, go to Step 5.

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4. In the Select Network Protocol window, select the TCP/IP Protocol and click "OK" to install the TCP/IP protocol. You may need your Windows CD to complete the installation.

5. After you install TCP/IP, go back to the Network window. Select TCP/IP from the list of Network Protocols, then click "Properties."

6. Click on each of the tabs and verify the following settings:
   IP Address: Select "Obtain an IP address from a DHCP server."
   DNS: Leave all fields blank.
   WINS: Leave all fields blank.
   Routing: Leave all fields blank.

7. Click "OK" to confirm the setting. Your PC will now obtain an IP address automatically from your router's DHCP server.

NOTE: Make sure the router's DHCP server is the only one available on your LAN.
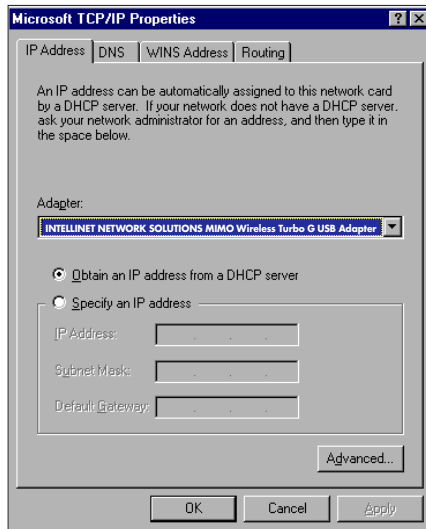
5. WEB MANAGEMENT CONFIGURATION

After configuring the PC(s) to obtain the IP address(es) automatically, the router's DHCP server will automatically give LAN clients an IP address. By default, the router's DHCP server is enabled so that an IP address can be obtained automatically.

Once the PC has obtained an IP address from the router, enter the default IP address 192.168.2.1 (the router's IP address) into the PC's Web browser and press "Enter."

The login screen will appear. Enter the username and password, then click "OK" to login. By default, the username is "admin" and the password is "1234."

NOTE: For security reasons, it is recommended that the password be changed as soon as possible.

Click "OK" to continue.
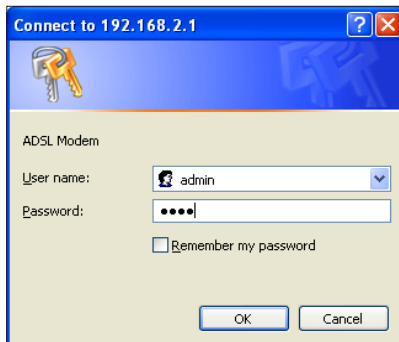
The Home Page screen appears, displaying seven instructional options: Quick Start, Interface Setup, Advanced Setup, Access Management, Maintenance, Status and Help.
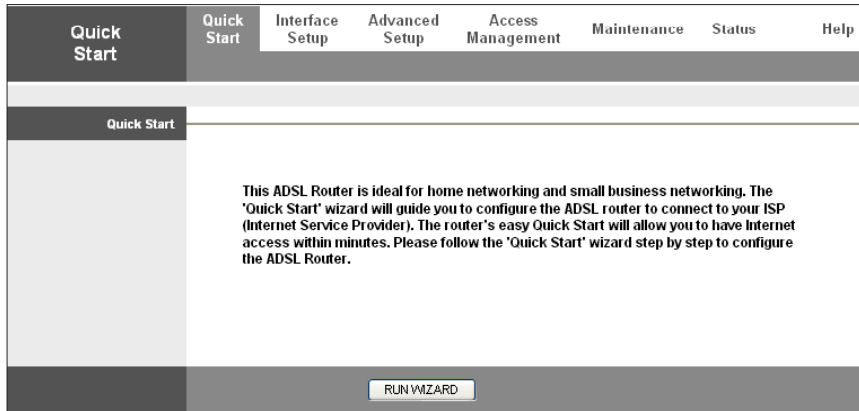
QUICK START

The Quick Start section is designed to get you using the router as quickly as possible. Before configuring the router, check with your ISP (Internet service provider) as to what kind of service is provided (examples shown below).

PPPoE	VPI/VCI, VC-based/LLC-based multiplexing, Username, Password (and Service Name).
PPPoA	VPI/VCI, VC-based/LLC-based multiplexing, Username, Password.
RFC1483 Bridged	VPI/VCI, VC-based/LLC-based multiplexing to use Bridged Mode.
RFC1483 Routed	VPI/VCI, VC-based/LLC-based multiplexing, IP Address, Subnet Mask, Gateway Address and Domain Name System (DNS) IP Address (a fixed IP Address).

1. Click "Run Wizard" to start the configuration; click "Next" to continue.

2. Set and confirm the new password; click "Next" to continue.

3. Select the time zone; click "Next" to continue.

4. Select your Internet connection type (as directed by your ISP); click "Next" to continue.

5. Enter the data provided by your ISP. For details on each setting, see the Interface Setup section below. Click "Next" to continue.

6. Restart your ADSL router. Click "Next" to save the settings and restart the router.

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INTERFACE SETUP

Internet

ATM VC

Virtual Circuit: This is defined either as VPI (Virtual Path Identifier) or VCI (Virtual Channel Identifier).

VPI: This is a virtual path that determines the way an ATM cell should be routed. The VPI is an 8-bit (in UNI) or 12-bit (in NNI) number that is included in the header of an ATM cell. The valid range for the VPI is 0 to 255. Enter the VPI assigned by the ISP.

VCI: This is the label given to an ATM VC to identify it and determine its destination. The VCI is a 16-bit number that is included in the header of an ATM cell. The valid range for the VCI is 32 to 65535. Enter the VCI assigned by the ISP.

ATM QoS: There are four options here.
- CBR (Constant Bit Rate) – This class is used for emulating circuit switching. The cell rate is constant with time. Select CBR to specify fixed (always on) bandwidth for voice or data traffic.
- UBR (Unspecified Bit Rate) – Select UBR for applications that are non-time sensitive, such as email.
- rtVBR (real-time Variable Bit Rate) – This class is similar to nrtVBR, but is designed for applications that are sensitive to cell-delay variation. Examples

for real-time VBR are voice with speech activity detection (SAD) and interactive compressed video.

- nrtVBR (non-real-time Variable Bit Rate) – This class allows users to send traffic at a rate that varies with time depending on the availability of user information. Statistical multiplexing is provided to make optimum use of network resources. Multimedia email is an example of nrtVBR.

PCR: This is the maximum rate at which the sender can send cells. Divide the DSL line rate (bps) by 424 (the size of an ATM cell) to find the PCR (Peak Cell Rate).

SCR (Sustain Cell Rate): This is the average rate, as measured over a long interval, in the order of the connection lifetime.

MBS (Maximum Burst Size): This refers to the maximum number of cells that can be sent at the peak rate. Enter the MBS value, which must be less than 65535.

ENCAPSULATION — The router can be connected to your Internet service provider in the following ways.

Dynamic IP Address: This automatically obtains an IP address from your ISP.

Static IP Address: This uses a static IP address. Your ISP provides a static IP address to access Internet services.

PPPoE/PPPoA: PPPoE (PPP over Ethernet) and PPPoA (PPP over ATM) are common connection methods used for xDSL.

Bridged Mode: This is a common connection method used for xDSL modem.

DYNAMIC IP ADDRESS/STATIC IP ADDRESS/PPPoE-PPPoA/BRIDGED MODE — Based on the ISP type selected above, the Web page will present fields to be filled in from among the following parameters.

User Name: Enter the username exactly as assigned by your ISP.

Password: Enter the password that your ISP has assigned to you.

Encapsulation: Check with your ISP for the method of multiplexing. In Bridged Mode, select "1483 Bridged IP LLC" or "1483 Bridged IP VC-Mux." In PPPoE/PPPoA mode, select "PPPoE LLC," "PPPoE VC-Mux," "PPPoA LLC" or "PPPoA VC-Mux."

Connection: There are two options here.
- Always On – The connection will always be kept on. If the connection is interrupted, the router will re-connect automatically.
- Connect On-Demand – Only connect when you want to surf the Internet. "Close if idle for xx minutes" is set to stop the connection when the network traffic is not sending or receiving after an idle time.

TCP MSS Option: This enables the configuration of the maximum segment size (MSS) for transient packets that traverse a router, specifically TCP segments in the SYN bit set when PPPoE is being used in the network. Specify the MSS range from 100 to 1452 bytes, or 0 bytes as the default value.

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Get IP Address: Choose "Static" or "Dynamic IP Address." If "Static IP" is selected, set the IP address, subnet mask and gateway obtained from your ISP.

Static IP Address: Enter the IP address assigned by your ISP.

IP Subnet Mask: Enter the subnet mask assigned by your ISP.

Gateway: Enter the gateway assigned by your ISP.

NAT: Network Address Translation (NAT) is an Internet standard that enables a local-area network (LAN) to use one set of IP addresses for internal traffic and a second set of addresses for external traffic. When NAT is enabled, the router will help to make all the necessary IP address translations in order for the PC connected to the router to access the Internet.

Default Route: When this is enabled, all the packets for destinations not known by the router's routing table are sent to the default route. By default, it is enabled.

TCP MTU Option: The Maximum Transmission Unit (MTU) is the maximum size of each packet in any transmission within the network. Specify the MTU range from 100 to 1500 bytes, or 0 bytes as the default value.

Dynamic Route: Dynamic routing allows routing tables in routers to change as the possible routes change. This router supports RIP1, RIP2-B and RIP2-M protocols for dynamic routing. After the RIP protocol is selected, choose the RIP direction from among "None," "Both," "IN Only" or "OUT Only."

Multicast: To specify the method of transmitting data simultaneously to many receivers, select "IGMP v1" or "IGMP v2" as the multicast protocol. Or, select "Disabled" to disable the function.

LAN

WEB MANAGEMENT CONFIGURATION

ROUTER LOCAL IP

IP Address: Enter the IP address of the ADSL router for local access to the router's Web page. By default, the IP address is 192.168.2.1.

IP Subnet Mask: Enter the subnet mask of the ADSL router. By default, the subnet mask is 255.255.255.0.

Dynamic Route: Dynamic routing allows routing tables in routers to change as the possible routes change. This router supports RIP1, RIP2-B and RIP2-M protocols for dynamic routing. After the RIP protocol is selected, choose the RIP direction from among "None," "Both," "IN Only" or "OUT Only."

Multicast: To specify the method of transmitting data simultaneously to many receivers, select "IGMP v1" or "IGMP v2" as the multicast protocol. Or, select "Disabled" to disable the function.

DHCP

DHCP: The DHCP server can be enabled or disabled. By enabling the DHCP server, the router will automatically assign your LAN clients an IP address. If the DHCP is not enabled, LAN clients' IP addresses need to be manually set.

Starting IP Address: If the DHCP server is enabled, set the "Starting IP Address," which will be the first IP address assigned to the LAN client. By default, the starting IP address is 192.168.2.100.

IP Pool Count: A particular IP address range can be selected for your DHCP server to issue IP addresses to your LAN clients. By default, the IP pool count is 100. The IP range is from 192.168.2.100 to 192.168.2.199.

Lease Time: In this setting, the time period during which the DHCP server lends IP addresses to your LAN clients can be specified. The DHCP will change your LAN clients' IP addresses when this time threshold period is terminated.

DNS Relay: A Domain Name System (DNS) server is like an index of IP and Web addresses. If you type a Web address into your browser, such as "www.router.com," a DNS server will find that name in its index and the matching IP address. Select "Use Auto Discovered DNS Server Only" to auto-set the DNS server. If there is a DNS server that you would rather use, select "Use Discovered DNS Server Only" and specify the IP address of that DNS server.

Primary DNS Server: Enter the ISP's DNS server IP address or specify your own preferred DNS server IP address.

Secondary DNS Server: This is optional. You can enter another DNS server's IP address as a backup. The secondary DNS will be used should the primary DNS fail.

Wireless

WIRELESS LAN

Access Point: Activate or deactivate the wireless function of the router. When activated, the router will be an access point for other wireless clients to connect.

SSID: The SSID (up to 32 printable ASCII characters) is the unique name identified in a WLAN. The ID prevents the unintentional merging of two co-located WLANs. The default SSID of the router is "default."

Broadcast SSID: Select "Yes" to make the SSID visible so wireless clients can scan the router within the network. Select "No" to hide the SSID of the router. Wireless clients need to set the same SSID of the router in order to access the network.

Channel ID: This the radio channel used by the wireless LAN. All devices in the same wireless LAN should use the same channel.

Authentication Type: To prevent unauthorized wireless clients from accessing the router, this router supports WEP, WPA-PSK and WPA2-PSK authentication types. If the router has enabled the authentication, all the wireless clients' settings need to be consistent with the router for building the connection.

WEP/WPA-PSK/WPA2-PSK

WEP-64Bits: A lower level of security than WPA, WEP supports 64-bit and 128-bit key lengths to encrypt the wireless data. The longer key length will provide higher security. When "WEP-64Bits" is selected, you need to enter

exactly 5 ASCII characters (a-z and 0-9) or 10 hexadecimal digits (0-9, a-f) for each Key (1-4).

WEP-128Bits: When "WEP-128Bits" is selected, you need to enter exactly 13 ASCII characters (a-z and 0-9) or 26 hexadecimal digits (0-9, a-f) for each Key (1-4).

WPA-PSK: This option is suitable for homes and small businesses. It uses TKIP for data encryption. When "WPA-PSK" is selected, enter 8 to 64 characters as the "Pre-Shared Key."

WPA2-PSK: This option is also for homes and small businesses. The difference between WPA-PSK and WPA2-PSK is that WPA2-PSK provides data encryption via the AES. In contrast, WPA-PSK uses Temporal Key Integrity Protocol (TKIP). WPA2-PSK offers the highest level of security available. When "WPA2-PSK" is selected, enter 8 to 64 characters as the "Pre-Shared Key."

ADVANCED SETTING

Beacon Interval: This is the interval of time that the router broadcasts a beacon used to synchronize the wireless network. The range for the beacon period is between 20 and 1000 milliseconds, with a typical value of 100.

RTS/CTS Threshold: When the packet size is smaller than the RTS threshold, the wireless router will not use the RTS/CTS mechanism to send this packet. The range is from 1500 to 2347.

Fragmentation Threshold: This specifies the maximum size of a packet during the fragmentation of data to be transmitted. If this value is set too low, it will result in bad performance. Enter a value from 256 to 2346.

DTIM: The Delivery Traffic Indication Message (DTIM) determines the interval in which the access point will send its broadcast traffic. The range is from 1 to 255, and the default value is 3 beacons.

802.11b/g: There are three options here.
- 802.11 b – The router will only work in 802.11b mode. If there are only 802.11b wireless clients in the network, you can set the router to this mode.
- 802.11 g – The router will only work in 802.11g mode. If there are only 802.11g wireless clients in the network, you can set the router to this mode.
- 802.11 b+g – The router will support 802.11b and 802.11g communications simultaneously. This is the recommended setting.

WIRELESS MAC ADDRESS FILTER

Active: When "Activated" is selected, this function prevents wireless clients from accessing the wireless network by blocking their MAC address(es). The MAC address(es) of the wireless client(s) to be filtered need to be entered.

Action: There are two options here.
- Allow Association – Only wireless clients with the MAC address(es) you

have specified can access the router.

- Deny Association – The wireless clients with the MAC address(es) you have specified will be denied access to the router.

Mac Address #1-8: Enter the MAC address(es) of the wireless client(s) to be filtered.

ADVANCED SETUP

Firewall

Advanced	Quick Start	Interface Setup	Advanced Setup	Access Management	Maintenance	Status	Help
	Firewall	Routing	NAT	ADSL			

Firewall

Firewall : ○ Enabled ⦿ Disabled
SPI : ○ Enabled ⦿ Disabled
(WARNING: If You enabled SPI, all traffics initiated from WAN would be blocked, including DMZ, Virtual Server, and ACL WAN side.)

SAVE CANCEL

Firewall: Selecting "Enabled" protects against SYN flooding attack, Ping of Death, Teardrop and Land attack.

SPI: Selecting "Enabled" means that all traffic initiated from a WAN site will be blocked, including DMZ, Virtual Server, etc.

Routing

Advanced	Quick Start	Interface Setup	Advanced Setup	Access Management	Maintenance	Status	Help
	Firewall	Routing	NAT	ADSL			

Routing Table List

#	Dest IP	Mask	Gateway IP	Metric	Device	Use	Edit	Drop
1	192.168.2.0	24	192.168.2.1	1	enet0	145		

ADD ROUTE

ROUTING TABLE LIST — The current routing table of the router can be viewed here. To add another routing rule, click "ADD ROUTE."

Dest IP: Show the IP address of the destination LAN.

Mask: Show the subnet mask of the destination LAN. If it shows "8," the subnet mask is "255.0.0.0"; "16" means the subnet mask is "255.255.0.0"; "24" means the subnet mask is "255.255.255.0."

Gateway IP: This is the IP of the neighbor router that this router should communicate with on the path to the destination LAN.

Metric: This is the number of hops (routers) to pass through to reach the destination LAN. It must be between 1 and 15.

Device: Show the interface that goes to the next hop (router), such as a LAN port.

Use: This is the counter for access time.

Edit: This is for editing the route, and is not shown for the system default route.

Drop: This is for dropping the route, and is not shown for the system default route.

ADD ROUTE — If another router with a LAN-to-LAN connection is part of the configuration, it may be necessary to create a static routing on the router that is the gateway to the Internet.

Destination IP Address: Enter the IP address of the destination LAN.

IP Subnet Mask: Enter the subnet mask address of the destination LAN.

Gateway IP Address: This is the gateway IP address where packets are sent.

Metric: This is the number of hops (routers) to pass through to reach the destination LAN. It must be between 1 and 15.

Announced in RIP: Select "Yes" and this routing path will be propagated to other hosts through RIP (routing information protocol) broadcasts. Select "No" and this routing path will be kept private, not to be included in RIP broadcasts.

NAT

NAT — Network Address Translation (NAT) allows multiple users at your local site to access the Internet through a single public IP address or multiple public IP addresses. NAT provides firewall protection from hacker attacks and has the flexibility to allow you to map private IP addresses to public IP addresses for key services such as Web sites and FTP.

Virtual Circuit: VPI (virtual path identifier) and VCI (virtual channel identifier) define a virtual circuit.

NAT Status: The activated or deactivated status for the NAT function will be shown here.

Number of IPs: Select "Single" if you only have a public IP address. Select "Multiple" if you have multiple IP addresses.

DMZ — The DMZ host is a local computer exposed to the Internet. When setting a particular internal IP address as the DMZ host, all incoming packets will be checked by the firewall and NAT algorithms, then passed to the DMZ host. For example, if you have a local client PC that cannot run an Internet application (e.g., games) properly from behind the NAT firewall, then you can open the client up to unrestricted two-way Internet access by defining a DMZ host.

Advanced	Quick Start	Interface Setup	Advanced Setup	Access Management	Maintenance	Status	Help
	Firewall	Routing	NAT	ADSL			

DMZ

DMZ setting for : Single IP Account
DMZ : ○ Enabled ⊙ Disabled
DMZ Host IP Address : 0.0.0.0

[SAVE] [BACK]

DMZ setting for: Shows the DMZ setting is for single or multiple IP addresses.

DMZ: Enable or disable the DMZ function.

DMZ Host IP Address: Enter a static IP address to the DMZ host. This IP address will be exposed to the Internet.

VIRTUAL SERVER — Use the Virtual Server function when you want different servers/clients in your LAN to handle different service/Internet application types (e.g., email, FTP, Web server, etc.) from the Internet. Computers use numbers called port numbers to recognize a particular service/Internet application type. The Virtual Server allows you to re-direct a particular service port number (from the Internet/WAN) to a particular LAN private IP address and its service port number.

Virtual Server for: Shows the Virtual Server setting is for single or multiple IP addresses.

Rule Index: Choose the rule number.

Start Port Number: Enter the start port number.

End Port Number: Enter the end port number.

Local IP Address: It is recommended that a static IP address for the server be entered here. If the server's IP address is obtained from the DHCP server, the IP address may be changed dynamically, causing a problem on this feature. Assign a static IP address to the server and make sure that the IP address is not in the range of IP addresses that the DHCP server will assign.

ADSL

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ADSL Mode: The default setting is "Auto Sync-Up." This mode automatically detects the ADSL mode, including ADSL2+, ADSL2, G.DMT, T1.413 and G.lite. If you are not sure how to select the ADSL mode, contact your ISP.

ADSL Type: Check with your ISP about the ADSL type of the DSLAM device they use. (The Digital Subscriber Line Access Multiplexer, or DSLAM, links many of a phone company's customer DSL connections to a single high-speed ATM line.)

ACCESS MANAGEMENT

ACL

To restrict users from accessing certain Internet applications/services, such as Internet Web sites, email, FTP, etc., configure those settings here. The access control list (ACL) allows you to define the traffic type permitted in your LAN or WAN. You can control which computer can have access to these services by entering the IP address of the computer.

ACL: When this is "Activated," make sure that the available applications/ services are designated or access to all the services will be denied.

ACL Rule Index: This is the item number to record the setting rule.

Secure IP Address: The default 0.0.0.0 allows any user to use this service to remotely manage the router. Type an IP address to restrict access to a user with a matching IP address.

Application: Choose the services that you permit to be used in your LAN or WAN interface. These services include Web, Telnet, Ping, FTP and SNMP.

Interface: Select the interface that will allow use of the services above. Options are "LAN," "WAN" or "Both."

IP Filter

To deny some users access to the router's Web management, enter the IP addresses here. The default IP 0.0.0.0 allows any user to use the service to remotely manage the router.

IP FILTER SET EDITING

IP Filter Set Index: This is the item number to record the setting.

Interface: Select which channel (PVC) to configure.

Direction: Select the access to the Internet ("Outgoing") or from the Internet ("Incoming") or "Both."

IP FILTER RULE EDITING

IP Filter Rule Index: This is the item number to record the setting rule.

Active: Select "Yes" to enable the current rule; "No" to cancel the current rule.

Source IP Address: Enter the start IP address that will be monitored.

Subnet Mask: Enter the subnet mask based on the source IP address.

Port Number: LAN users employ port numbers to differentiate network applications (e.g., "21" is for FTP service). The port number range is from 0 to 65535. It is recommended that this option be configured by an advanced user.

Destination IP Address: Enter the start IP address that will be monitored.

Subnet Mask: Enter the subnet mask based on the destination IP address.

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Port Number: This is the port or port ranges that define the application.

Protocol: This is the packet protocol type used by the application. Select "TCP," "UDP" or "ICMP." (For FTP service, for example, select "TCP.")

Rule Unmatched: Select action for traffic not matching the current rule. "Forward" is to let it pass through; "Next" is to check it by the next rule.

IP FILTER LISTING — This lists the IP filter rules that have been configured. The settings can be reviewed here.

SNMP

Simple Network Management Protocol (SNMP) is a popular protocol for network management. It is used for collecting information and configuring the network devices. This router supports an SNMP agent function, which allows a manager station to manage and monitor the router through the network.

Get Community: Enter the password for the incoming Get and GetNext requests from the management station.

Set Community: Enter the password for a Set request to configure the router.

UPnP

When the Universal Plug and Play (UPnP) function is enabled, the router can be detected by a UPnP-compliant system such as Windows XP. The router will be displayed in the Neighborhood of Windows XP, so you can directly double-click or right-click the router and select "Invoke" to configure the router through a Web browser.

UPnP: Select "Activated" or "Deactivated."

Auto-configured: This allows UPnP-enabled applications to automatically configure the router so that they can communicate through the router. For example, by using a NAT traversal, UPnP applications automatically reserve a NAT forwarding port in order to communicate with another UPnP-enabled device, eliminating the need to manually configure port forwarding for the UPnP-enabled application.

DDNS

DDNS allows mapping of the static domain name to a dynamic IP address. Obtain an account, password and static domain name from the DDNS service providers.

Access Management	Quick Start	Interface Setup	Advanced Setup	Access Management	Maintenance	Status	Help
	ACL	IP Filter	SNMP	UPnP	DDNS		

Dynamic DNS

Dynamic DNS : ○ Activated ● Deactivated
Service Provider : www.dyndns.org
My Host Name :
E-mail Address :
Username :
Password :
Wildcard support : ○ Yes ● No

[SAVE]

Dynamic DNS: Activate or deactivate the DDNS function.

Service Provider: This router supports DynDNS service provider.

My Host Name: Enter the domain name assigned to your router by the ISP.

E-mail Address: Enter the email address assigned by DDNS service provider.

Username: Enter your username.

Password: Enter the password set for the DDNS service.

Wildcard Support: Enable or disable the wildcard to stand for some characters.

MAINTENANCE

ADMINISTRATOR

Maintenance	Quick Start	Interface Setup	Advanced Setup	Access Management	Maintenance	Status	Help
	Administration	Time Zone	Firmware	SysRestart	Diagnostics		

Administrator

Username : **admin**
New Password :
Confirm Password :

[SAVE] [CANCEL]

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Username: The username of the router is "admin" by default.

New Password: Enter up to 30 characters for the new password.

Confirm Password: Enter the new password again to confirm the setting.

TIME ZONE

Time Zone allows the router to set its time (affecting functions like System Log).

Current Date/Time: Show the current date/time of the router.

Synchronize time with: There are three options here.
• NTP Server Automatically – Synchronize the time with an NTP server.
• PC's Clock – Set the time the same as your computer.
• Manually – Set the time manually.

Time Zone: Select the time zone of the country and/or region you are in. The router will set its time based on your selection.

Daylight Saving: Enable this option if it is currently daylight saving time.

NTP Server Address: Enter the IP address of your time server.

FIRMWARE

If new firmware is available to update some features, perform the upgrade here.

New Firmware Location: Type in the location of the new firmware or click "Browse" to find it.

Browse: Click "Browse" to find the new firmware.

Upgrade: Click "Upgrade" to begin the upgrade process. After the router is restarted, the process is completed. It might take several minutes — don't turn off power to the router during upgrading.

SYSTEM RESTART

Restart the router or restore the factory defaults here. To restart the router using the factory default settings, select "Factory Default Settings." Pressing the reset button for five seconds or more will also reset the default settings.

DIAGNOSTICS

Diagnose the connectivity of the LAN and WAN networks here.

STATUS

DEVICE INFORMATION

Check or confirm device information here, including firmware versions, MAC addresses, LAN and WAN settings, and the ADSL line status.

| Device Info | System Log | Statistics |

Device Information

Firmware Version : 2.7.0.28(RUE0.C2)3.5.18.0
MAC Address : 00:0e:2e:43:3c:7a

LAN

IP Address : 192.168.2.1
Subnet Mask : 255.255.255.0
DHCP Server : Enabled

WAN

Virtual Circuit : PVC0
Status : Not Connected
Connection Type : Dynamic IP
IP Address : 0.0.0.0   [Renew] [Release]
Subnet Mask : 0.0.0.0
Default Gateway : 0.0.0.0
DNS Server : 0.0.0.0

ADSL

ADSL Firmware Ver : FwVer:3.5.10.6_B_TC3085 HwVer:T14.F7_1.0
Line State : Down
Modulation : Multi-Mode
Annex Mode : ANNEX_B

	Downstream	Upstream	
SNR Margin :	N/A	N/A	db
Line Attenuation :	N/A	N/A	db

SYSTEM LOG

On this page, display system logs accumulated up to the present time. The logs can also be saved for future review.

Status

| Quick Start | Interface Setup | Advanced Setup | Access Management | Maintenance | **Status** | Help |

| Device Info | System Log | Statistics |

System Log

```
1/1/2000 0:0:1> MPOA Link Down
1/1/2000 0:0:1> LAN promiscuous mode <1>
1/1/2000 0:0:1> Last errorlog repeat 2 Times
1/1/2000 0:0:1> sp_ip_route_add: ip_addr=0 gw=0
1/1/2000 0:0:1>    mask=0 metric=2 pri=2 ret_code=65531
1/1/2000 0:0:1> sp_ip_route_add: ip_addr=0 gw=0
1/1/2000 0:0:1>    mask=0 metric=2 pri=2 ret_code=65531
1/1/2000 0:0:1> SNMP TRAP 1: warm start
1/1/2000 0:0:1> main: init completed
1/1/2000 0:0:2> SNMP TRAP 3: link up
1/1/2000 0:0:2> Last errorlog repeat 1 Times
1/1/2000 0:0:2> sending request to NTP server(5)
1/1/2000 0:1:2> Connect() to NTP server fail
1/1/2000 0:1:2> adjTimeTask fail: id = 11, ip =
c02bf412
1/1/2000 0:1:2> No DNS server available
1/1/2000 0:1:2> Last errorlog repeat 10 Times
1/1/2000 0:1:2> adjTimeTask fail: no server available
1/1/2000 0:1:2> adjtime task pause 60 seconds
1/1/2000 0:2:2> sending request to NTP server(7d)
1/1/2000 0:3:2> Connect() to NTP server fail
1/1/2000 0:3:2> adjTimeTask fail: id = 11, ip =
c02bf412
1/1/2000 0:3:2> No DNS server available
1/1/2000 0:3:2> Last errorlog repeat 10 Times
```

STATISTICS

This screen show the statistics of transmit and receive packets on the LAN port and the ADSL line.

Status	Quick Start	Interface Setup	Advanced Setup	Access Management	Maintenance	Status	Help
	Device Info	System Log	Statistics				

Traffic Statistics

Interface : ● Ethernet ○ ADSL

Transmit Statistics		Receive Statistics	
Transmit Frames	916	Receive Frames	812
Transmit Multicast Frames	20	Receive Multicast Frames	1318
Transmit total Bytes	575203	Receive total Bytes	173037
Transmit Collision	0	Receive CRC Errors	0
Transmit Error Frames	0	Receive Under-size Frames	0

[REFRESH]

6. TROUBLESHOOTING

Problem: The LAN LED on the front panel does not light up.
1. Check the Ethernet cable connections between the router and PC or hub.
2. Check for faulty Ethernet cables.
3. Make sure your computer's Ethernet card is working properly.

If these steps fail to correct the problem, contact your local distributor for assistance.

Problem: The ADSL LED on the router's front panel does not light up.
1. Check the phone wire and connections between the DSL port and wall jack.
2. Make sure that the telephone company has checked your phone line and has set it up for DSL service.
3. Reset your ADSL line to re-initialize your link to the DSLAM.

If these steps fail to correct the problem, contact your local distributor for assistance.

Problem: Unable to access the router's Web management.
1. Make sure you are using the correct IP address for the router (see below).
2. Ensure the PC and router's IP addresses are on the same subnet for LAN access.
3. If the router's LAN IP address was changed, enter the new one as the URL.

NOTE: To check that the current IP addresses of your PC and the router are in the same subnet, follow these steps:

1. Click "Start" and select "Run."
2. Type in "cmd" and click "OK."
3. Type in "ipconfig /all" and click "Enter."

Run ? ✕

Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.

Open: cmd

[OK]   [Cancel]   [Browse...]

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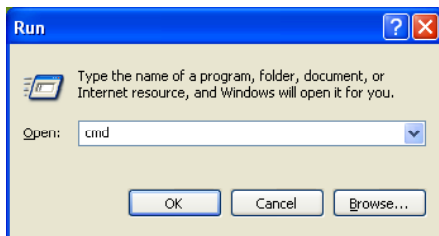
```
C:\Documents and Settings\Test>ipconfig/all

Windows IP Configuration

        Host Name . . . . . . . . . . . . : test-b6663a0cd4
        Primary Dns Suffix  . . . . . . . :
        Node Type . . . . . . . . . . . . : Unknown
        IP Routing Enabled. . . . . . . . : No
        WINS Proxy Enabled. . . . . . . . : No

Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . :
        Description . . . . . . . . . . . : Intel(R) PRO/100 VE Network Connecti
on
        Physical Address. . . . . . . . . : 00-00-E2-82-C3-AD
        Dhcp Enabled. . . . . . . . . . . : No
        IP Address. . . . . . . . . . . . : 192.168.2.111
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        Default Gateway . . . . . . . . . :
```

As shown above, the PC's IP address is 192.168.2.111; its subnet mask is 255.255.255.0; and its MAC address is Physical Address...: 00-00-E2-82-C3-AD.

Problem: The login username or password is forgotten.
1. If the password has been changed, then forgotten, the default configuration file needs to be uploaded. This will erase all custom configurations and restore all of the factory defaults, including the password.
2. Press the Reset button for five seconds, then release it. When the LAN LED begins to blink, the defaults have been restored.
3. Make sure the computer's Ethernet card is working properly.

Problem: Unable to access the router's Web management after activating ACL.
1. When ACL is activated, the ACL rule needs to be set to allow some users to use some services. Check that the rules have been set. If not, all the users are denied use of any of the services from the LAN or WAN.
2. If still unable to access, reset the router to restore to defaults.
3. After restarting the router, login with the default IP address 192.168.2.1.

Problem: Initialization of the ADSL connection failed.
1. Check the cable connections between the ADSL port and the wall jack. The ADSL LED on the rear panel of the router should be on.
2. Check that the VPI, VCI, type of encapsulation and type of multiplexing settings are the same as those received from the ISP.
3. Restart the router. If the problem persists, it may be necessary to verify the VPI, VCI, type of encapsulation and type of multiplexing settings with the ISP.

Problem: Unable to obtain a WAN IP address from the ISP.
1. The ISP provides the WAN IP address after authenticating you, which may be through the username and password, the MAC address or the hostname.
2. The username and password apply to PPPoE and PPoA encapsulation only. Make sure the correct service type, username and password have been entered.

Problem: The Internet connection disconnects.
1. Check the schedule rules.
2. If PPPoA or PPPoE encapsulation is being used, check the idle time-out setting.
3. Contact the ISP.

7. GLOSSARY

10Base-T: An Ethernet standard for Local Area Network (LAN). 10Base-T uses a twisted-pair cable with a maximum length of 100 meters.

AAL: ATM Adaptation Layer defines the rules governing segmentation and reassembly of data into cells. Different AAL types are suited to different traffic classes.

ADSL: An Asymmetric Digital Subscriber Line is an asymmetrical data transmission technology with a high traffic rate downstream and a low traffic rate upstream. ADSL technology satisfies the bandwidth requirement of applications that demand "asymmetric" traffic; e.g., Web surfing, file downloading and video-on-demand.

ATM: Asynchronous Transfer Mode is a Layer 2 protocol supporting high-speed asynchronous data with advanced traffic management and quality-of-service features.

bps: Bits per second, a standard measurement of digital transmission speeds.

Bridge: A device that connects two or more physical networks and forwards packets between them. Bridges can usually be made to filter packets; that is, to forward only certain traffic. Related devices are repeaters, which simply forward electrical signals from one cable to another, and full-fledged routers that make routing decisions based on several criteria.

CPE: Customer Premises Equipment, such as an ADSL router or USB modem.

Default Gateway (Router): Every non-router IP device needs to configure a default gateway's IP address. When the device sends out an IP packet, if the destination is not on the same network, the device has to send the packet to its default gateway, which will then send it out toward the destination.

DHCP: A Dynamic Host Configuration Protocol automatically gives every computer on your home network an IP address.

DNS Server IP Address: The Domain Name System (DNS) allows Internet servers to have a domain name (e.g., www.Broadbandrouter.com) and one or more IP addresses (e.g., 192.34.45.8). A DNS server keeps a database of Internet servers and their respective domain names and IP addresses so that when a domain name is requested (as in typing "Broadbandrouter.com" into an Internet browser) the user is sent to the proper IP address. The DNS server IP address used by the computers on a home network is the location of the DNS server the ISP has assigned.

DSL: Digital Line Subscriber (DSL) technology provides high-speed access over twisted-pair cable for connection to the Internet and LAN interfaces, and to broadband services such as video-on-demand, distance learning and video conferencing.

Ethernet: A standard for computer networks, Ethernet networks are connected by special cables and hubs or switches, and move data around at up to 10/100 Mbps.

FTP: File Transfer Protocol is the Internet protocol (and program) used to transfer files between hosts.

Idle Timeout: After there is no traffic to the Internet for a pre-configured amount of time, Idle Timeout automatically disconnects from it.

ISP: The Internet Service Provider is a business that provides connectivity to the Internet for individuals, businesses and organizations.

ISP Gateway Address: This is an IP address for the Internet router located at the ISP's office.

LAN: A Local Area Network is a group of computers and devices connected in a relatively small area (e.g., a house or office). A home network is considered a LAN.

MAC Address: A Media Access Control (MAC) address is the hardware address of a device connected to a network. It's a unique identifier for a device with an Ethernet interface. It is composed of two parts: 3 bytes of data that correspond to the manufacturer ID (unique for each manufacturer), plus 3 bytes that are often used as the product's serial number.

MTU: Maximum Transmission Unit.

NAT: A Network Address Translator, as defined by RFC 1631 (see *RFC* below), enables a LAN network to use one set of IP addresses for internal traffic. A NAT box, located where the LAN meets the Internet, provides the necessary IP address translation. This helps provide a sort of firewall and allows for a wider address range to be used internally without danger of conflict. Using the router's NAT capability, the Internet can be accessed from any computer on a home network without having to purchase more IP addresses from the ISP.

Port: Network clients (LAN PC) use port numbers to distinguish one network application/protocol from another. Common examples:

Application	Protocol	Port No.	Application	Protocol	Port No.
Telnet	TCP	23	SNMP Trap	UDP	162
FTP	TCP	21	HTTP	TCP	80
SMTP	TCP	25	PPTP	TCP	1723
POP3	TCP	110	PC Anywhere	TCP	5631
H.323	TCP	1720	PC Anywhere	UDP	5632
SNMP	UCP	161			

PPP: Point-to-Point-Protocol is the successor to SLIP. It provides router-to-router and host-to-network connections over both synchronous and asynchronous circuits.

PPPoA (RFC 2364): The Point-to-Point Protocol (PPP) provides a standard method for transporting multi-protocol data grams over point-to-point links. This document describes the use of ATM Adaptation Layer 5 (AAL5) for framing PPP-encapsulated packets.

PPPoE (RFC 2516): This document describes how to build PPP sessions and encapsulate PPP packets over the Ethernet. PPP over Ethernet (PPPoE) provides the ability to connect a network of hosts over a simple bridging access device to a remote access concentrator.

Protocol: A protocol is a set of rules for interaction agreed upon between multiple parties so that when they interface with each other based on such a

protocol, the interpretation of their behavior is well-defined and can be made objectively, without confusion or misunderstanding.

PVC: A Permanent Virtual Circuit is a connection-oriented, permanent leased-line circuit between end stations on a network over a separate ATM circuit.

RFC: Request for Comments is a document series, begun in 1969, that describes the Internet suite of protocols and related experiments. Not all RFCs describe Internet standards, but all Internet standards are initially written up as RFCs.

RFC 1483: This refers to multi-protocol encapsulation over AAL-5. There are two encapsulation methods for carrying network interconnect traffic over ATM AAL5: 1) LLC Encapsulation allows multiplexing of multiple protocols over a single ATM virtual circuit. The protocol of a carried PDU is identified by prefixing the PDU by an IEEE 802.2 Logical Link Control (LLC) header; 2) VC Based Multiplexing does higher-layer protocol multiplexing implicitly by ATM virtual circuits (VCs).

Router: This is a device responsible for making decisions about which of several paths network (or Internet) traffic will follow. To do this, it uses a routing protocol to gain information about the network and algorithms to choose the best route based on several criteria known as "routing metrics."

Subnet Mask: A subnet mask, which may be a part of the TCP/IP information provided by your ISP, is a set of four numbers (e.g., 255.255.255.0) configured like an IP address. It is used to create IP address numbers used only within a particular network (as opposed to valid IP address numbers recognized by the Internet, which must be assigned by InterNIC).

TCP/IP, UDP: Transmission Control Protocol/Internet Protocol is the standard protocol for data transmission over the Internet. Both TCP and UDP (Unreliable Datagram Protocol) are transport-layer protocols. TCP performs proper error detection and error recovery, and thus is reliable. UDP, on the other hand, is not reliable. They both run on top of the IP (Internet Protocol), a network-layer protocol.

TELNET: This is the virtual terminal protocol in the Internet suite of protocols. It allows users of one host to log into a remote host and act as normal terminal users of that host.

VCI: A Virtual Circuit Identifier is part of the ATM cell header. A VCI is a tag indicating the channel over which a cell will travel. The VCI of a cell can be changed as it moves between switches via signaling.

VPI: A Virtual Path Identifier is part of the ATM cell header. A VPI is a pipe for a number of virtual circuits.

WAN: A Wide Area Network connects computers located in separate areas (e.g., different buildings, cities, countries). The Internet is a wide area network.

Web-Based Management Graphical User Interface (GUI): Many devices support a graphical user interface that is based on the Web browser. This means the user can use the familiar Netscape or Microsoft Internet Explorer to control/configure or monitor the device being managed.

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8. SPECIFICATIONS

Standards
- IEEE 802.3 (10Base-T Ethernet)
- IEEE 802.3u (100Base-TX Fast Ethernet)
- IEEE 802.11b (11 Mbps Wireless LAN)
- IEEE 802.11g (54 Mbps Wireless LAN)
- ADSL2+ (ITU G.992.5) up to 24 Mbps
- ADSL2 (ITU G.992.4) splitter-less ADSL, up to 12 Mbps
- ADSL2 (ITU G.992.3) up to 12 Mbps
- ADSL (ITU G.992.2/G.Lite) up to 1.5 Mbps
- ADSL (ITU G.992.1/G.DMT) up to 8 Mbps
- ANSI T1.413, Issue 2 (Asymmetric DSL)

General
- LAN ports: 4 RJ-45 10/100 Mbps data ports
- LAN ports with Auto MDI/MDI-X
- Flash: 2 MB
- Memory: 8 MB SDRAM
- Throughput max.: 24 Mbps downstream, 1 Mbps upstream
- Certifications: FCC Class B, CE Mark, RoHS

Router
- Chipset: Trendchip
- Supported WAN connection types:
  - PPP over Ethernet (RFC 2516)
  - PPP over AAL5 (RFC 2364)
  - Multiple Protocols over AAL5 (RFC 1483/2684)
- NAT:
  - Virtual server
  - Port forwarding
  - DMZ (demilitarized zone)
- Firewall:
  - Access control based on MAC address
  - Domain blocking
  - URL filter
- Supports UPNP (Universal Plug and Play)
- Supports DHCP (client/server)
- Supports VPN pass-through (IPSec, PPTP, L2TP)
- Certifications: FCC Class B, CE Mark, RoHS

Environmental
- Dimensions: 187 (W) x 100 (D) x 30 (H) mm (7.3 x 3.9 x 1.2 in.)
- Weight: 1.0 kg (2.2 lbs.)
- Operating temperature: 0 – 40°C (32 – 104°F)
- Operating humidity: 10 – 90% RH, non-condensing
- Storage temperature: 0 – 60°C (0 – 149°F)

Wireless
- Chipset: Ralink 2561ST
- Wireless frequency range: 2.4 – 2.484 GHz
- Modulation technologies:
  - 802.11b: Direct Sequence Spread Spectrum (DSSS): DBPSK, DQPSK, CCK
  - 802.11g: Orthogonal Frequency Division Multiplexing: BPSK, QPSK, 16QAM, 64QAM
- Channels: USA & Canada, 11; Europe, 13; Japan, 14
- Data rates:
  - IEEE 802.11b (11 Mbps, 5.5 Mbps, 2 Mbps, 1 Mbps)
  - IEEE 802.11g (54 Mbps, 48 Mbps, 36 Mbps, 24 Mbps, 18 Mbps, 12 Mbps, 9 Mbps, 6 Mbps)
- Output power:
  - OFDM: 15 dBm +/- 1 dBm (54 Mbps, 40 mW max.)
  - CCK: 18 dBm +/- 1 dBm (11 Mbps, 63 mW max.)
- Receiver sensitivity: -65 dBm (54 Mbps); -83 dBm (11 Mbps)
- Maximum coverage distance: 100 m / 300 ft. (indoor), 300 m / 900 ft. (outdoor)
- Wireless security:
  - WEP encryption (64/128 bit)
  - WPA -PSK
  - WPA2-PSK
  - Client access control through media access control (MAC) filter
- Antenna: single detachable dipole antenna with RP-SMA connector, 2 dBi gain

LEDs
- Power
- ADSL Link/Act
- LAN 1-4 Link/Act

Power
- External power adapter: 12 V DC; 1 A

Package Contents
- Wireless ADSL2+ Broadband Modem Router
- Quick start guide
- Setup CD with user manual and setup wizard
- Power adapter
- Ethernet Cat5 RJ-45 cable, 1.0 m (3 ft.)
- RJ-11 telephone cable, 1.8 m (6 ft.)

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