

TP-LINK®

User Guide

TD-W8960N

Wireless N ADSL2+ Modem Router



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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 or more of the following measures:

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

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.
- 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 user's authority to operate the equipment.

FCC RF Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

“To comply with FCC RF exposure compliance requirements, this grant is applicable to only Mobile Configurations. The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.”

CE Mark Warning

CE 1588 ⚠

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.

National Restrictions

2400.0-2483.5 MHz

Country	Restriction	Reason/remark
Bulgaria		General authorization required for outdoor use and public service
France	Outdoor use limited to 10 mW e.i.r.p. within the band 2454-2483.5 MHz	Military Radiolocation use. Refarming of the 2.4 GHz band has been ongoing in recent years to allow current relaxed regulation. Full implementation planned 2012
Italy		If used outside of own premises, general authorization is required
Luxembourg	None	General authorization required for network and service supply(not for spectrum)
Norway	Implemented	This subsection does not apply for the geographical area within a radius of 20 km from the centre of Ny-Ålesund
Russian Federation		Only for indoor applications

Note: Please don't use the product outdoors in France.

DECLARATION OF CONFORMITY

For the following equipment:

Product Description: **Wireless N ADSL2+ Modem Router**

Model No.: **TD-W8960N**

Trademark: **TP-LINK**

We declare under our own responsibility that the above products satisfy all the technical regulations applicable to the product within the scope of Council Directives:

Directives 1999/5/EC

The above product is in conformity with the following standards or other normative documents:

ETSI EN 300 328 V1.7.1:2006

ETSI EN 301 489-1 V1.8.1:2008 & ETSI EN 301 489-17 V1.3.2:2008

EN60950-1:2006

EN62311:2008

Directives 2004/108/EC

The above product is in conformity with the following standards or other normative documents

EN 55022:2006+A1:2007

EN 55024:1998+A1:2001+A2:2003

EN 61000-3-2:2006

EN 61000-3-3:1995+A1:2001+A2:2005

Directives 2006/95/EC

The above product is in conformity with the following standards or other normative documents

EN60950-1:2006

Person is responsible for marking this declaration:



Zhao Jianjun

Director of International Business

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Package Contents

The following contents should be found in your package:

- One TD-W8960N Wireless N ADSL2+ Modem Router
- One DC power Adapter for TD-W8960N Wireless N ADSL2+ Modem Router
- Quick Installation Guide
- One RJ45 cable
- Two RJ11 cables
- One ADSL splitter
- One Resource CD for TD-W8960N Wireless N ADSL2+ Modem Router, including:
 - This User Guide
 - Other Helpful Information

 **Note:**

Make sure that the package contains the above items. If any of the listed items are damaged or missing, please contact with your distributor.

Chapter 1. Product Overview

Thank you for choosing the **TD-W8960N Wireless N ADSL2+ Modem Router**.

1.1 Overview of the Router

The TD-W8960N Wireless N ADSL2+ Modem Router integrates 4-port Switch, Firewall, NAT-Router and Wireless AP. Powered by 2x2 MIMO technology, the Wireless N Router delivers exceptional range and speed, which can fully meet the need of Small Office/Home Office (SOHO) networks and the users demanding higher networking performance.

The TD-W8960N Wireless N ADSL2+ Modem Router utilizes integrated ADSL2+ transceiver and high speed MIPS CPU. The Router supports full-rate ADSL2+ connectivity conforming to the ITU and ANSI specifications.

In addition to the basic DMT physical layer functions, the ADSL2+ PHY supports dual latency ADSL2+ framing (fast and interleaved) and the I.432 ATM Physical Layer.

Incredible Speed

The router provides up to 300Mbps wireless connection with other 802.11n wireless clients. The incredible speed makes it ideal for handling multiple data streams at the same time, which ensures your network stable and smooth. The performance of this 802.11n wireless Router will give you the unexpected networking experience at speed 650% faster than 802.11g. It is also compatible with all IEEE 802.11g and IEEE 802.11b products.

Multiple Security Protections

With multiple protection measures, including SSID broadcast control and wireless LAN 64/128 WEP encryption, Wi-Fi protected Access (WPA2-PSK, WPA-PSK), as well as advanced Firewall protections, the TD-W8960N Wireless N ADSL2+ Modem Router provides complete data privacy.

Flexible Access Control

The Router provides flexible access control, so that parents or network administrators can establish restricted access policies for children or staff. It also supports Virtual Server and DMZ host for Port Triggering, and then the network administrators can manage and monitor the network in real time with the remote management function.

Simple Installation

Since the Router is compatible with virtually all the major operating systems, it is very easy to manage. Quick Setup Wizard is supported and detailed instructions are provided step by step in this user guide. Before installing the Router, please look through this guide to know all the Router's functions.

1.2 Main Features

- Complies with IEEE 802.11n draft version 2.0 to provide a wireless data rate of up to 300Mbps.
- One RJ11 LINE port, four 10/100M Auto-Negotiation RJ45 LAN ports, supporting Auto MDI/MDIX.
- Quick response semi-conductive surge protect circuit, reliable surge-protect function.
- AFE to support Annex A/C//J/K/M, and L deployments.
- Provides external splitter.
- Multi-user sharing a high-speed Internet connection
- Connecting the internet on demand and disconnecting from the Internet when idle for PPPoE.
- Provides WPA/WPA2, WPA-PSK/WPA2-PSK data security, TKIP/AES encryption security.
- Provides 64/128-bit WEP encryption security and wireless LAN ACL (Access Control List).
- Adopts 2x to 3x eXtended Range™ wireless LAN transmission technology.
- Adopts Advanced DMT modulation and demodulation technology.
- Adopts 300M wireless LAN transmission technology.
- Supports access control, parents and network administrators can establish restricted access policies based on time of day for children or staff.
- Supports Virtual Server, Port Triggering and DMZ host.
- Supports UPnP, Dynamic DNS, Static Routing.
- Supports bridge mode and Router function.
- Supports Web management.
- Supports firmware upgrade.
- Supports Flow Statistics.
- Supports QSS (Quick Secure Setup).
- Built-in firewall supporting IP address filtering, MAC address filtering and parental control.
- Built-in DHCP server.

1.3 Panel Layout

1.3.1 The Front Panel

The Router's LEDs are located on the front panel.

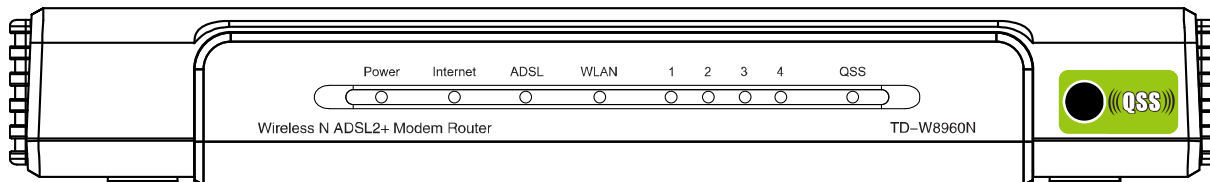


Figure 1-1

The Router's LEDs and the QSS button are located on the front panel (View from left to right).

Name	Status	Description
Power	On	Power is on
	Off	Power is off
Internet	On	A successful PPP connection has been built
	Flashing	Data is being transferred over the Internet
	Off	There is no successful PPP connection or the Router works on Bridge mode
ADSL	On	The LINE port has connected to ISP's network
	Flashing	The LINE port is connecting to the ISP's network
	Off	The LINE port is disconnected
WLAN	On	The Wireless function is enabled
	Flashing	Sending or receiving data over wireless network
	Off	The Wireless function is disabled
LAN 1-4	On	There is a device linked to the corresponding port but there is no activity
	Flashing	There is an active device linked to the corresponding port
	Off	There is no device linked to the corresponding port
QSS	On	A wireless device has been successfully added to the network by QSS function
	Flashing	A wireless device is connecting to the network by QSS function
	Off	The wireless device failed to be added to the network by QSS function. Or have no QSS connection

 **Note:**

After a device is successfully added to the network by QSS function, the QSS LED will keep on for about 2 minutes and then turn off.

1.3.2 The Back Panel

The Router's ports, where the cables are connected, and RESET button are located on the back panel.

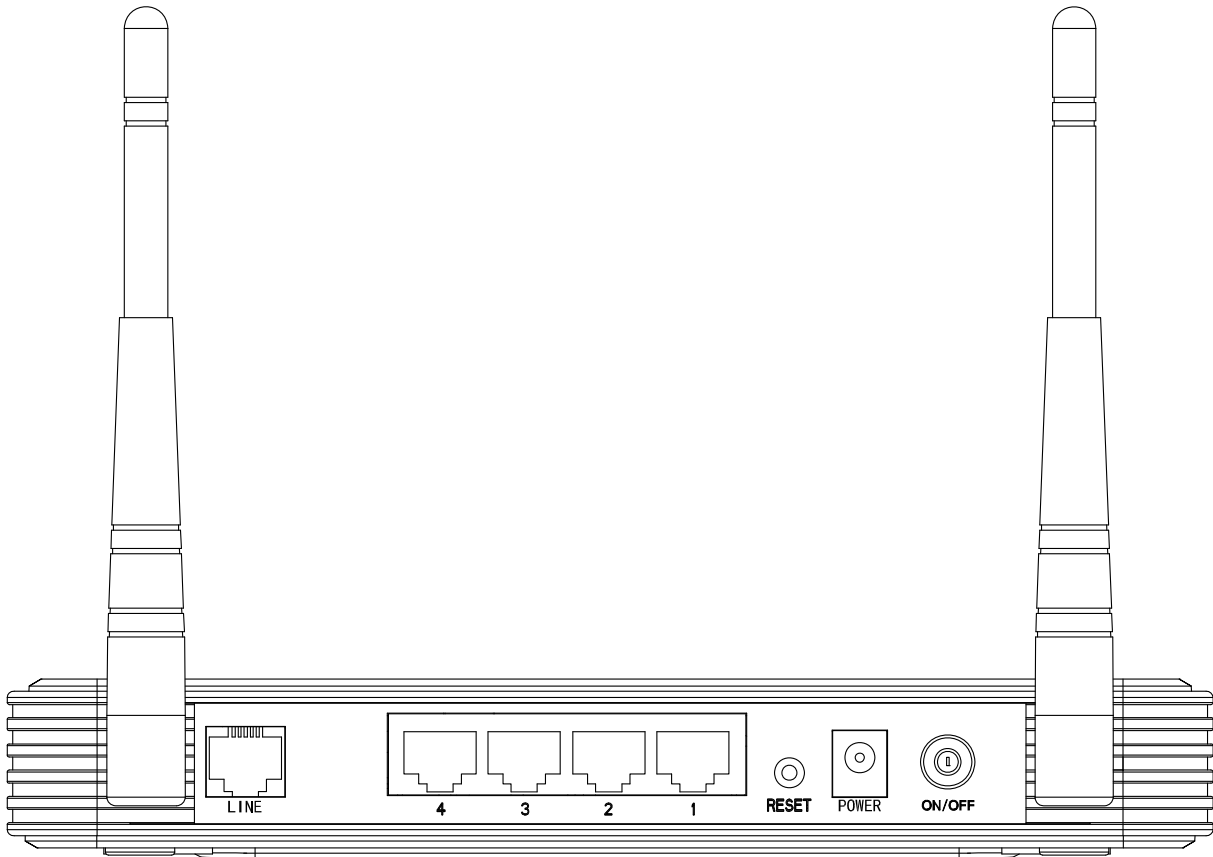


Figure 1-2

- **LINE:** Connect to the Modem Port of Splitter or to the telephone line.
- **1, 2, 3, 4 (LAN):** The ports (1, 2, 3, 4) connect the Router to the local PC(s).
- **Reset Button:** There are two ways to reset the Router's factory defaults.
 - 1) Use the **Restore Default** function on **Management** -> **settings** page in the router's Web-based Utility.
 - 2) Use the Factory Default **Reset** button: With the Router powered on, use a pin to press and hold the **Reset** button (more than 5 seconds) until the Internet LED becomes quick-flash from slow-flash. And then release the button and wait the Router to reboot to its factory default settings.
- **POWER:** The Power plug is where you will connect the power adapter.
- **ON/OFF:** The switch for the power.
- **Wireless antennas:** To receive and transmit the wireless data.

Chapter 2. Connecting the Router

2.1 System Requirements

- Broadband Internet Access Service (DSL/Cable/Ethernet).
- PCs with a working Ethernet Adapter and an Ethernet cable with RJ45 connectors.
- TCP/IP protocol on each PC.
- Web browser, such as Microsoft Internet Explorer, Mozilla Firefox or Apple Safari.

2.2 Installation Environment Requirements

- Place the Router in a well ventilated place far from any heater or heating vent.
- Avoid direct irradiation of any strong light (such as sunlight)
- Keep at least 2 inches (5 cm) of clear space around the Router
- Operating temperature: 0°C~40°C (32°F~104°F).
- Operating Humidity: 10% ~ 90% RH Non-congealing.

2.3 Connecting the Router

Before installing the Router, please make sure your broadband service provided by your ISP is available. If there is any problem, please contact your ISP. After that, please install the Router according to the following steps. Don't forget to pull out the power plug and keep your hands dry.

1. Locate an optimum location for the Router. The best place is usually at the center of your wireless network.
2. Adjust the direction of the antenna. Normally, upright is a good direction.
3. Connect your PC and Switch/Hub in your LAN to the LAN Ports of the Router. (If you have a wireless NIC and want to have wireless connection, please skip this step.)
4. Connect the telephone line to the Line port on the Router.

Or you can access the Internet and make calls at the same time by using a separate splitter to divide the data and voice. The external splitter has three ports:

- LINE: Connect to the wall jack
- PHONE: Connect to the phone sets
- MODEM: Connect to the ADSL LINE port of Device

Plug one end of the twisted-pair ADSL cable into the ADSL LINE port on the rear panel of Device. Connect the other end to the MODEM port of the external splitter.

5. Connect the power adapter to the power plug of the Router, and the other end into an electrical outlet.

- Turn on the ON/OFF switch to power the Device. It will start to work automatically.

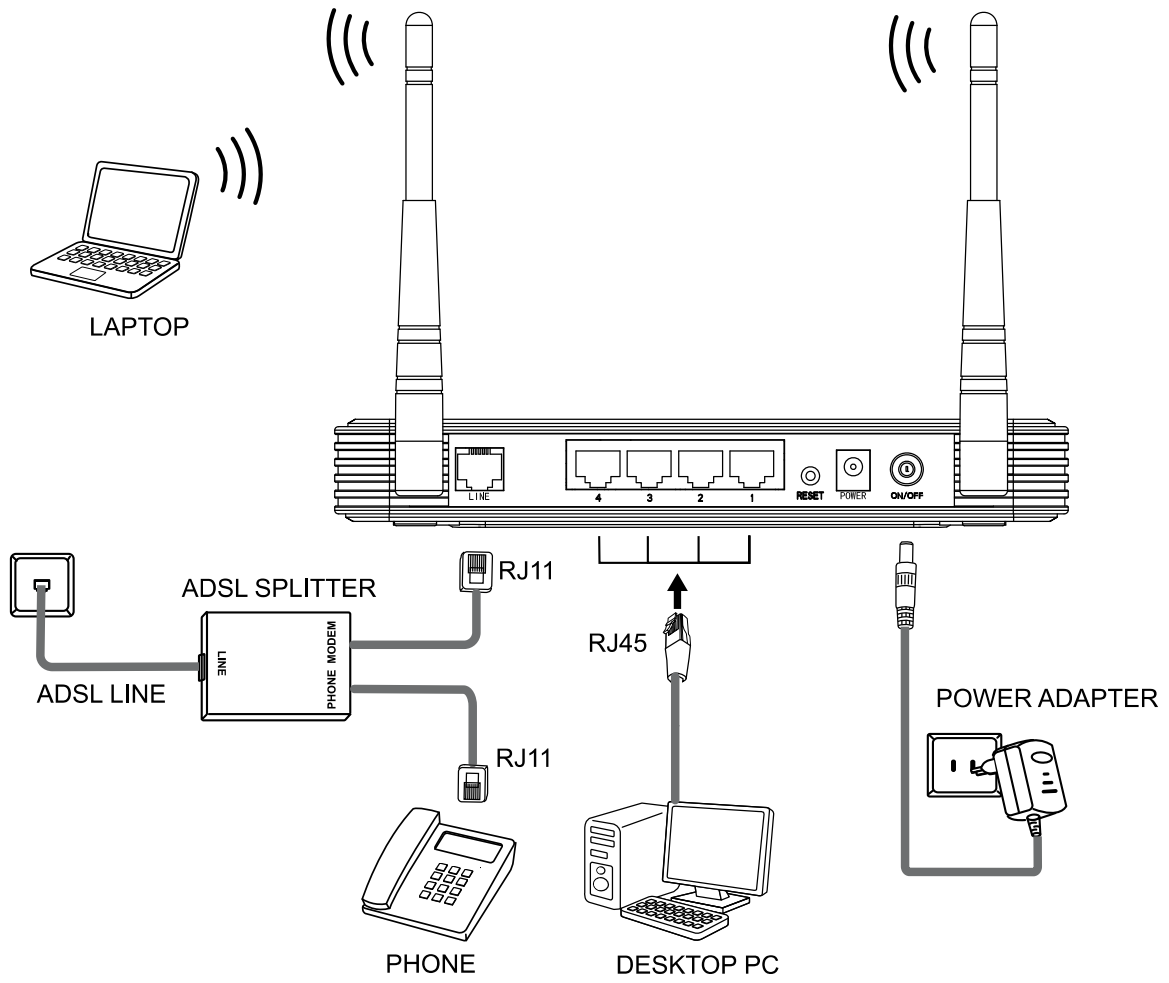


Figure 2-1

Chapter 3. Quick Installation Guide

This chapter will show you how to configure the basic functions of your **TD-W8960N Wireless N ADSL2+ Modem Router** using **Quick Setup Wizard** within minutes.

3.1 TCP/IP Configuration

The default IP address of the Router is 192.168.1.1. And the default Subnet Mask is 255.255.255.0. These values can be changed as you desire. In this guide, we use all the default values for description.

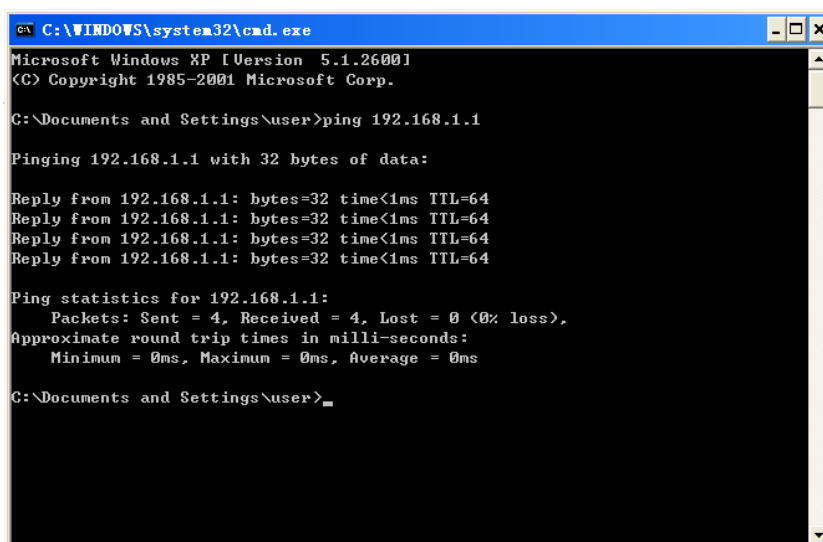
Connect the local PC to the LAN ports of the Router. And then you can configure the IP address for your PC in the following two ways.

1. Configure the IP address manually
 - 1) Set up the TCP/IP Protocol for your PC. If you need instructions as to how to do this, please refer to [Appendix B: "Configuring the PC"](#).
 - 2) Configure the network parameters. The IP address is 192.168.1.xxx ("xxx" is any number from 2 to 254), Subnet Mask is 255.255.255.0, and Gateway is 192.168.1.1 (The Router's default IP address)
2. Obtain an IP address automatically
 - 1) Set up the TCP/IP Protocol in "**Obtain an IP address automatically**" mode on your PC. If you need instructions as to how to do this, please refer to [Appendix B: "Configuring the PC"](#).
 - 2) Then the built-in DHCP server will assign IP address for the PC.

Now, you can run the Ping command in the **command prompt** to verify the network connection between your PC and the Router. The following example is in Windows XP OS.

Open a command prompt, and type *ping 192.168.1.1*, and then press **Enter**.

3. If the result displayed is similar to the Figure 3-1, it means the connection between your PC and the Router has been established well.



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

C:\Documents and Settings\user>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

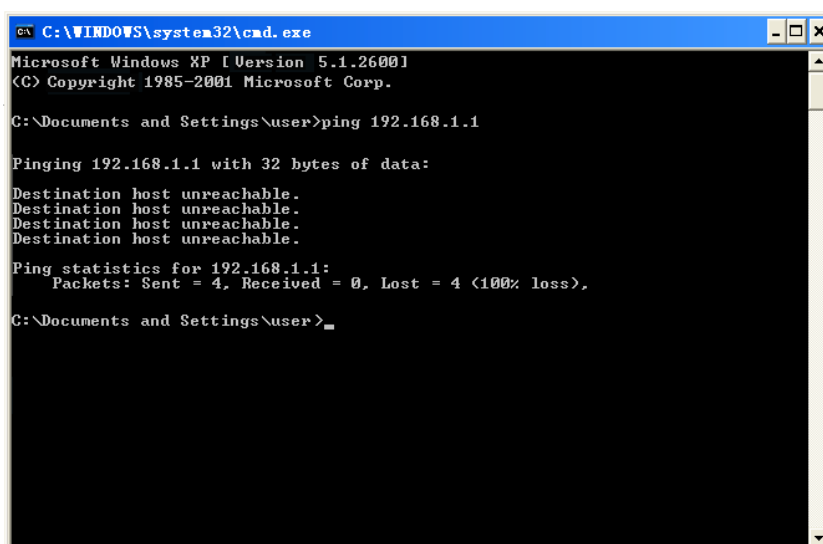
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64
Reply from 192.168.1.1: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Documents and Settings\user>
```

Figure 3-1 Success result of Ping command

- If the result displayed is similar to the Figure 3-2, it means the connection between your PC and the Router is failed.



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

C:\Documents and Settings\user>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Destination host unreachable.
Destination host unreachable.
Destination host unreachable.
Destination host unreachable.

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Documents and Settings\user>
```

Figure 3-2 Failure result of Ping command

Please check the connection following these steps:

1. Is the connection between your PC and the Router correct?

Note:

The 1/2/3/4 LEDs of LAN ports which you link to on the Router and LEDs on your PC's adapter should be lit.

2. Is the TCP/IP configuration for your PC correct?

Note:

If the Router's IP address is 192.168.1.1, your PC's IP address must be within the range of 192.168.1.2 ~ 192.168.1.254.

3.2 Quick Installation Guide

With a Web-based utility, it is easy to configure and manage the TD-W8960N Wireless N ADSL2+ Modem Router. The Web-based utility can be used on any Windows, Macintosh or UNIX OS with a Web browser, such as Microsoft Internet Explorer, Mozilla Firefox or Apple Safari.

1. To access the configuration utility, open a web-browser and type in the default address 192.168.1.1 in the address field of the browser.



Figure 3-3

After a moment, a login window will appear, similar to the Figure 3-4. Enter **admin** for the User Name and Password, both in lower case letters. Then click the **OK** button or press the **Enter** key.

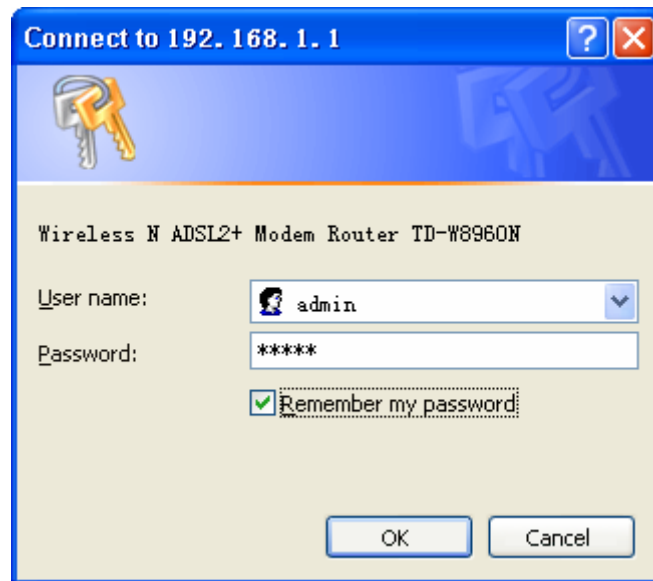


Figure 3-4

 **Note:**

Do not mix up the user name and password with your ADSL account user name and password which needed for PPP connections.

 **Note:**

If the above screen does not pop-up, it means that your Web-browser has been set to a proxy. Go to Tools menu → Internet Options → Connections → LAN Settings, in the screen that appears, cancel the Using Proxy checkbox, and click OK to finish it.

2. After your successful login, you will see the Login screen as shown below. Click **Quick Setup** menu to access **Quick Setup Wizard**.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- +Device Info
- +Quick Setup
- +Advanced Setup
- +Wireless
- +Diagnostics
- +Management

Device Info

Firmware Version:	1.2.1 Build 090526 Rel.40836n
Hardware Version:	TD-W8960N v1 00000000

This information reflects the current status of your DSL connection.

Line Rate - Upstream (Kbps):	
Line Rate - Downstream (Kbps):	
LAN IP Address:	192.168.1.1
Default Gateway:	
Primary DNS Server:	
Secondary DNS Server:	

Figure 3-5

- Change the VPI or VCI values which are used to define a unique path for your connection. **If you have been given specific settings for this to configuration, type in the correct values assigned by your ISP.** We select PPPoE WAN Link Type (For example), enter the **Username** and **Password** given by your ISP, and then click “Next”.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- +Device Info
- +Quick Setup
- +Advanced Setup
- +Wireless
- +Diagnostics
- +Management

Quick Setup - WAN Configurations

You can configure an ATM PVC identifier (VPI and VCI), select your WAN Link Type.

VPI: [0-255]

VCI: [32-65535]

WAN Link Type:

Encapsulation Mode:

PPP Username:

PPP Password:

PPPoE Service Name: (optional)

Dial on demand (with idle timeout timer)

Use Static IPv4 Address

DNS Settings: Obtain Automatically Set DNS Manually

Primary DNS:

Secondary DNS: (optional)

Figure 3-6

Note:

The Quick Setup Wizard will guide you to configure the WAN Service over ATM interface.

- On the **Wireless Configurations** screen, we use the default SSID, select Network Authentication (take **WPA-PSK/WPA2-PSK** for example), set a Pre-Shared Key, and then click “Save” to continue.

Quick Setup - Wireless Configurations

Note: The all existed ATM & WAN Service will be clean after you click the "Save" button on this Quick Setup page.

You can configure SSID and your WLAN Authentication type.

SSID:

Network Authentication:

WPA Pre-Shared Key:

Back

Save

Figure 3-7

Note:

All the existed **ATM&WAN** service will be clean after click the "**Save**" button on this Quick Setup page.

- You will see the **Finish** screen below, click "**Reboot**" to save these settings.

Quick Setup - Finish

Congratulations! The Router is now connecting you to the Internet. For detail settings, please click other menus if necessary.

The change of wireless config will not take effect until the Router reboot.
Click the button below to reboot the router.

Finish

Reboot

Figure 3-8

- Now, your ADSL Modem Router has been configured and is rebooting. Please do not power off the Router while it's rebooting.

Restart

The DSL Router has been configured and is rebooting.

Restarting...

7% 

- You will see the current configuration has been added to ATM Interface list ([4.4.2 WAN Service](#)) and Layer2 Interface list ([4.4.1 Layer2 Interface](#)).

DSL ATM Interface Configuration

Choose Add, or Remove to configure DSL ATM interfaces.

Interface	VPI	VCI	DSL Latency	Category	Link Type	Connection Mode	QoS	Remove
atm0	0	35	Path0	UBR	EoA	DefaultMode	Disabled	<input type="checkbox"/>

Figure 3-9

Wide Area Network (WAN) Service Setup

Choose Add, or Remove to configure a WAN service over a selected interface.
ETH and PTM/ATM service can not coexist.

Interface	Description	Type	Vlan8021p	VlanMuxId	ConnId	Igmp	NAT	SPI Firewall	Remove
ppp0	pvc_quick_setup	PPPoE	N/A	N/A	N/A	Enabled	Enabled	Enabled	<input type="checkbox"/>

Figure 3-10

 **Note:**

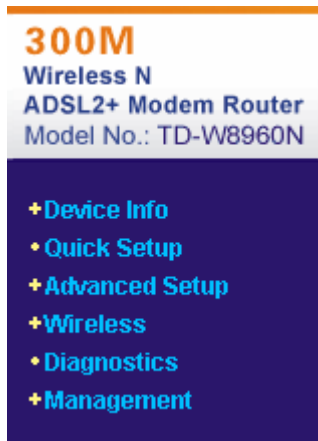
More detailed configurations please refer to [4.4.1 Layer2 Interface](#) and [4.4.2 WAN Service](#).

Chapter 4. Configuring the Router

This chapter will show each Web page's key functions and the configuration way.

4.1 Login

After your successful login, you will see the fifteen main menus on the left of the Web-based utility. On the right, there are the corresponding explanations and instructions.



The detailed explanations for each Web page's key function are listed below.

4.2 Device Info

Choose “**Device Info**” menu, there are six submenus under the main menu: **Summary**, **WAN**, **Statistics**, **Route**, **ARP** and **DHCP**. This Device Info section mainly introduces the elementary information about the Router and its current settings in use. Click any of them, and you will be able to view the corresponding information.

Choose “Device Info”→“Summary”, you will see the Summary screen (shown in Figure 4-1)

The first table indicates the information about the version including Software and Hardware, the second table displays the current status of the TD-W8960N connection, this information will vary depending on the settings of the Router configured on the Advanced Setup screen.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

Device Info

Firmware Version: 1.1.0 Build 090508 Rel.40772n
Hardware Version: TD-W8960N v1 00000000

This information reflects the current status of your DSL connection.

Line Rate - Upstream (Kbps):	
Line Rate - Downstream (Kbps):	
LAN IP Address:	192.168.1.1
Default Gateway:	ppp0
Primary DNS Server:	
Secondary DNS Server:	

Figure 4-2

Note:

Click the other submenus under the main menu **Device Info**, and you will be able to view the corresponding information about **WAN**, **Statistics**, **Route**, **ARP** and **DHCP**.

4.3 Quick Setup

Please refer to Section [3.2 Quick Installation Guide](#).

4.4 Advanced Setup

Choose “**Advanced Setup**”, there are many submenus under the main menu. Among the submenus, **Layer2 Interface**, **WAN Service**, **LAN** etc. are default menus, while **NAT**, IP/MAC filtering of the **Security**, **Quality of Service** and **DNS** will appear only when you select some corresponding functions, click any one of them, and you will be able to configure the corresponding function.

- Advanced Setup

- + Layer2 Interface
- + WAN Service
- + LAN
- + NAT
- + Security
- + Parental Control
- + Quality of Service
- + Routing
- + DNS
- + DSL
- + Upnp
- + Dns Proxy
- + Interface Grouping
- + LAN Ports
- + IPSec

This Advanced Setup section mainly introduces how to configure the Router for adequate use. The detailed explanations for each subsection are provided below.

 **Note:**

To completely configure the WAN Interface, you need to first select the Layer2 Interface ([4.4.1 Layer2 Interface](#)) according to the connection ISP provides you, and then to select the type of the connection ([4.4.2 WAN Service](#)) for the further configuration.

4.4.1 Layer2 Interface

Choose “**Advanced Setup**”→“**Layer2 Interface**”, and you can select WAN Service Interface (layer2 interface) over **ATM interfaces** or **ETH interface**.

- **ATM Interface:** Configure the Router to access Internet as an ADSL user. ISP provides you VPI (Virtual Path Identifier), VCI (Virtual Channel Identifier) settings and the DSL Interface with RJ11 connector. (Figure 2-1)
- **ETH Interface:** Configure the Router to access Internet as an Ethernet user. ISP provides you Broadband Internet Service and the Ethernet Interface with RJ45 connector.

 **Note:**

If the interface is used by the configuration of the [4.4.2 WAN Service](#), you need to remove the corresponding WAN Service entry before you can remove it.

4.4.1.1 ATM interfaces

Choose “**Advanced Setup**”→“**Layer2 Interface**→**ATM interface**”, you can Configure ATM interfaces on the screen below.

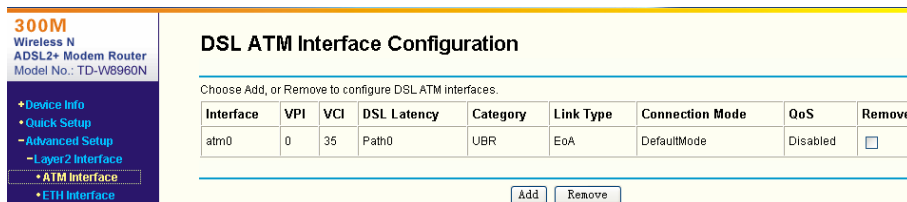


Figure 4-3

- **Remove:** Select the check box in the table on the screen above and then click the Remove tab, the corresponding interface will be deleted in the table.
- **Add:** Click the button, and you can add a new interface in the next screen.

ATM PVC Configuration

This screen allows you to configure an ATM PVC identifier (VPI and VCI), select DSL latency, select a service category. Otherwise choose an existing interface by selecting the checkbox to enable it.

VPI: [0-255]

VCI: [32-65535]

Select DSL Link Type (EoA is for PPPoE, IPoE, and Bridge.)

- EoA
 PPPoA
 IPoA

Encapsulation Mode:

Service Category:

Select Connection Mode

- Default Mode - Single service over one connection
 VLAN MUX Mode - Multiple Vlan service over one connection
 MSC Mode - Multiple Service over one Connection

Enable Quality Of Service

Enabling packet level QoS for a PVC improves performance for selected classes of applications. QoS cannot be set for CBR and Realtime VBR. QoS consumes system resources; therefore the number of PVCs will be reduced. Use **Advanced Setup/Quality of Service** to assign priorities for the applications.

Enable Quality Of Service.

Back

Apply/Save

Figure 4-4

- **VPI/VCI:** the VPI and VCI values provided by your ISP. Do not change them unless it was required by your ISP.
- **DSL Link Type:** Select a DSL Link Type which is provided by your ISP. The options include **EoA** (it is for PPPoE, IPoE, and Bridge), **PPPoA** (PPP over ATM) and **IPoA** (IP over ATM).
- **Encapsulation Mode:** The mode of the data processing over the Link Type you have selected. Uses the default setting, if you are not sure.
- **Service Category:** Select the type of the service assigned by your ISP in the drop-down list. The default type is **UBR Without PCR**.
- **Connection Mode:** Select the connection mode for **EoA** option of DSL Link Type. The options include Default mode for single service over one connection, VLAN MUX Mode for multiple Vlan service over one connection, and MSC Mode for Multiple Service over one connection.
- **Enable Quality of Service:** If you want to adopt **QoS** (Quality of Service) for the connection, please select check box.

 **Note:**

Enabling packet level QoS for PVC improves performance for selected classes of applications. While QoS consumes system resources; therefore the number of PVC(s) will be reduced. Besides this, it cannot be set for the connection type of CBR and Real-time VBR. If you select the QoS service, the Quality of Service menu will be added to the Web-based Utility, the detailed configuration will be described in **4.4.8 Quality of Service**.

4.4.1.2 ETH interfaces

Choose “**Advanced Setup**”→“**Layer2 Interface**→**ETH Interface**”, you can Configure ETH WAN interfaces on the screen below.

 **Note:**

Make sure the ETH port available, you should choose “**Advanced Setup**”→“**LAN Ports**” to enable the Virtual LAN Ports feature first.

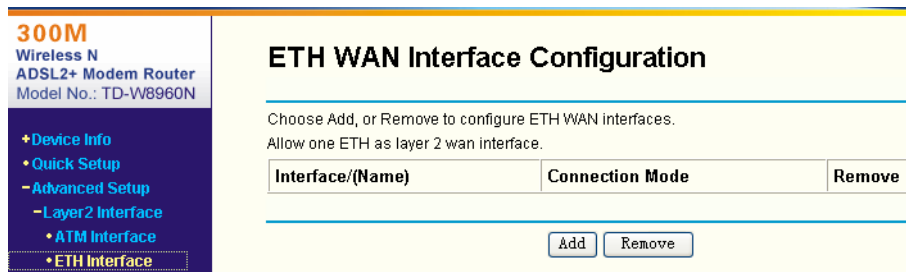


Figure 4-5

- **Add:** Click the **Add** button, and you can add a new interface in the next screen.

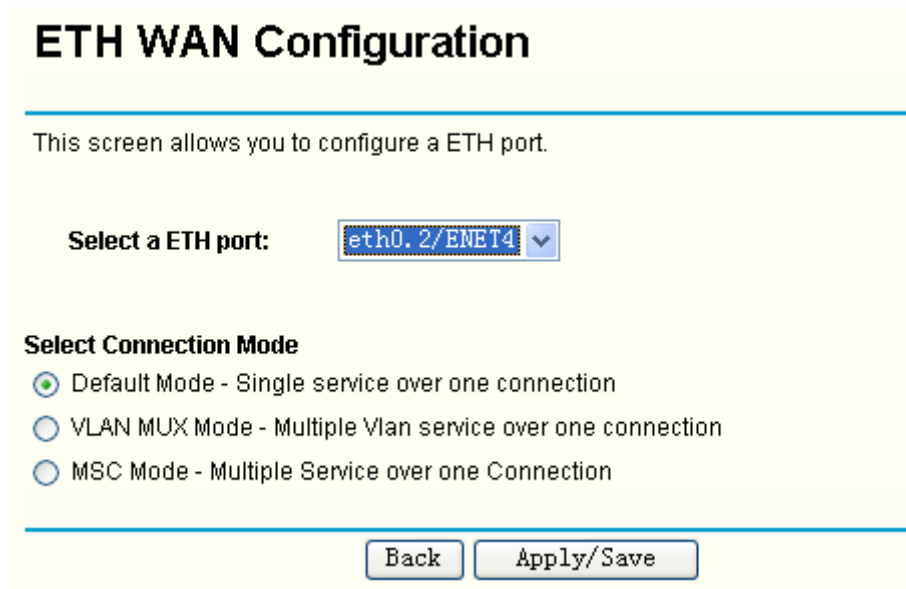


Figure 4-6

- **ETH port:** Select an ETH port to configure as the WAN port.

ETH WAN Interface Configuration

Choose Add, or Remove to configure ETH WAN interfaces.

Allow one ETH as layer 2 wan interface.

Interface/(Name)	Connection Mode	Remove
eth0.2/ENET4	DefaultMode	<input type="checkbox"/>

Remove

Figure 4-7

- **Remove:** Select the check box in the table on the screen above and then click the **Remove** tab, the corresponding interface will be deleted in the table.

 **Note:**

One ETH is allowed to configure as the layer 2 WAN Interface.

4.4.2 WAN Service

Choose “**Advanced Setup**”→“**WAN Service**”, and you will see the WAN Port Information Table in the screen as shown below, which describes the WAN port settings and the relevant manipulation to each interface.

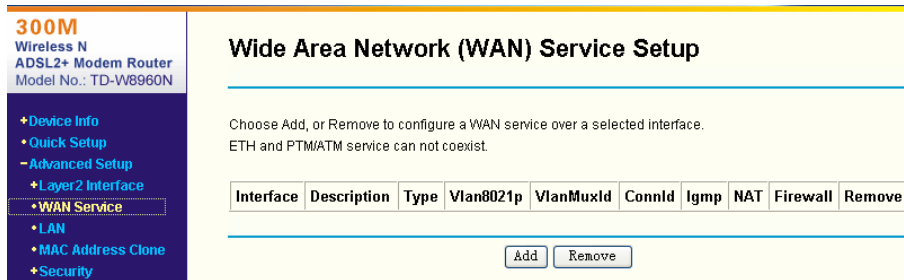


Figure 4-8

After you select the Lay2 Interface, please follow the instructions below to complete the further configuration of WAN Interface. There are five different configurations for the connection types, which are PPPoE, IPoE, Bridge, PPPoA, and IPoA. You can select the corresponding types according to your needs.

 **Note:**

The following section adopts different VPI, VCI to introduce further configuration for the different connection types, if you need to change the configuration of ATM PVC (VPI/VCI), you should go to the previous section ([4.4.1 Layer2 Interface](#)) to configure them again.

 **Note:**

ETH and ATM service can not coexist. If the ETH Interface had configured, you cannot configure any other WAN service over the ATM Interface until the ETH Interface is deleted.

4.4.2.1 ATM-EoA-PPPoE

If your ISP provides a **PPPoE** connection and you need to use an ATM Interface, follow the steps below to add a WAN service over a selected ATM interface:

1. Add a new ATM interface and select **EoA** option for DSL Link Type ([4.4.1.1 ATM interfaces](#)).
2. Click the **Add** button on the screen Figure 4-8 and select WAN Service Interface over ATM PVC on the next screen.

Figure 4-9

3. Select the **WAN Service type** on the screen as follows. You can enter the **service Description** to be service name in the text box or leave the default name.

Figure 4-10

4. If your ISP provides a PPPoE connection, select **PPPoE** option. And you should enter the following parameters.

PPP Username and Password

PPP usually requires that you have a user name and password to establish your connection. In the boxes below, enter the user name and password that your ISP has provided to you.

PPP Username:
PPP Password:
PPPoE Service Name:
Authentication Method:

Enable Fullcone NAT
 Dial on demand (with idle timeout timer)
 PPP IP extension
 Use Static IPv4 Address
 Enable PPP Debug Mode
 Bridge PPPoE Frames Between WAN and Local Ports

Multicast Proxy

Enable IGMP Multicast Proxy

Figure 4-11

- **PPP Username/Password:** Enter the User Name and Password provided by your ISP. These fields are case-sensitive.
- **PPPoE Service Name:** Enter the Service Name if it was provided by your ISP. If you leave it blank, the default name will be the same as the **service Description** on the previous screen.
- **Authentication Method:** Select the **Authentication Method** in the drop-down list, the default method is **AUTO**, and you can leave it as a default setting.

 **Note:**

If you are not sure about the **PPP IP extension** and **PPP Debug Mode** etc. below, please don't select these options.

- **Enable Fullcone NAT:** It is a type of NAT, if not enabled, the default NAT will act.
- **Dial on demand (with idle timeout timer):** The Router will cut off the Internet connection after it has been inactive for a specific period of time (idle timeout), and it will automatically re-establish the connection as soon as you attempt to access the Internet again. If your Internet is charged by time you may want to select this option in order to save money.
- **PPP IP extension:** Select this option to get the public IP address from the PPP server to your PC, and the NAT and SPI Firewall will be closed. Sometimes you can think it as bridge while PPP dialing in the router. It's a special feature deployed by some ISP. Unless your ISP specifically requires this setup, do not select it.
- **Use Static IPv4 Address:** If your ISP gives you a static **WAN**, **Gateway** and **DNS** IP address, select this option to enter them manually.
- **Enable PPP Debug Mode:** Select this option to debug the PPP function and you can see many PPP log information in the System Log. Only PPP has this debug Mode.
- **Bridge PPPoE Frames Between WAN and Local Ports:** Select this option to start PPP connection in your local PC.

- **Enable IGMP Multicast Proxy:** IGMP (Internet Group Management Protocol) is used to manage multicasting on TCP/IP networks. Some ISPs use IGMP to perform remote configuration for client devices, such as the Router. The default value is disabled, and if you are not sure, please contact your ISP or just leave it.
5. Select a preferred wan interface as the system default gateway.

Routing -- Default Gateway

Select a preferred wan interface as the system default gateway.

Selected WAN Interface: pppoe_0_0_35/ppp0

Back Next

Figure 4-12

6. Configure the DNS Server Addresses on the screen as follows.

DNS Server Configuration

Get DNS server information from the selected WAN interface OR enter static DNS server IP addresses. If only a single PVC with IPoA or static MER protocol is configured, you must enter static DNS server IP addresses.

Obtain DNS info from a WAN interface:
WAN Interface selected: pppoe_0_0_35/ppp0

Use the following Static DNS IP address:
Primary DNS server:
Secondary DNS server:

Back Next

Figure 4-13

- **Obtain DNS info from a WAN Interface:** You can select this option to automatically get DNS server information from the selected WAN interface.
- **Use the following Static DNS IP Address:** You can select this option to manually enter the primary and /or optional secondary DNS server IP addresses provided by your ISP.

Note:

If only single PVC with IPoA is configured, you must enter static DNS server IP addresses.

7. On the next screen you will see the detailed settings you've made. Please click the **Apply/Save** button to save these settings.

WAN Setup - Summary

Make sure that the settings below match the settings provided by your ISP.

PORT / VPI / VCI:	0 / 0 / 35
Connection Type:	PPPoE
Service Name:	pppoe_0_0_35
Service Category:	UBR
IP Address:	Automatically Assigned
Service State:	Enabled
NAT:	Enabled
Full Cone NAT:	Disabled
SPI Firewall:	Enabled
IGMP Multicast:	Disabled
Quality Of Service:	Disabled

Click "Save/Apply" to have this interface to be effective. Click "Back" to make any modifications.

Back

Apply/Save

Figure 4-14

- On the next screen you will see the WAN Port Information Table with the new configuration.

Wide Area Network (WAN) Service Setup

Choose Add, or Remove to configure a WAN service over a selected interface.
ETH and PTM/ATM service can not coexist.

Interface	Description	Type	Vlan8021p	VlanMuxId	ConnId	Igmp	NAT	SPI Firewall	Remove
ppp0	pppoe_0_0_35	PPPoE	N/A	N/A	N/A	Disabled	Enabled	Enabled	<input type="checkbox"/>

Add

Remove

Figure 4-15

- **Remove:** Select the check box in the table above and then click **Remove**, the corresponding interface will be deleted in the table.
- **Add:** Click the **Add** button, and you can add a new interface in the next screen.

4.4.2.2 ATM-EoA-IPoE

If your ISP provides an **IPoE** connection and you need to use an ATM Interface, follow the steps below to add a WAN service over a selected ATM interface:

- Add a new ATM interface and select **EoA** option for DSL Link Type ([4.4.1.1 ATM interfaces](#)).

2. Click the **Add** button on the screen (as shown Figure 4-8). Select WAN Service Interface over ATM PVC on the next screen (as shown Figure 4-9).
3. If your ISP provides an IPoE connection, select **IPoE** option for the **WAN Service type** on the screen (as shown Figure 4-10), and click **Next** button to continue.
4. You should enter the following parameters to configure the WAN IP Address.

WAN IP Settings

Enter information provided to you by your ISP to configure the WAN IP settings.
 Notice: If "Obtain an IP address automatically" is chosen, DHCP will be enabled for PVC in MER mode.
 If "Use the following Static IP address" is chosen, enter the WAN IP address, subnet mask and interface gateway.

Obtain an IP address automatically

Option 60 Vendor ID:

Option 61 IAID: (8 hexadecimal digits)

Option 61 DUID: (hexadecimal digit)

Option 125: Disable Enable

Use the following Static IP address:

WAN IP Address:

WAN Subnet Mask:

WAN gateway IP Address:

Figure 4-16

- **Obtain an IP address automatically:** Select this option, the Router will be able to obtain IP network information dynamically from a DHCP server provided by your ISP.

 **Note:**

- 1) The response message from a DHCP server typically contains a number of configuration parameters (DHCP options) for the Router. The DHCP options include IP network information, and also the vendor-specific options. In some cases, the Router is implemented to perform user-defined operations (as shown below). You can implement your own treatment of all such options.
- 2) If the Router is functioning as a DHCP client, it must identify itself in option 61 (client-identifier) in every DHCP message. DUID/IAID is portion of option 61.
 - **Option 60 Vendor ID:** The option code 60 used to identify Vendor class.
 - **Option 61 IAID:** IAID (Identity Association ID) assigns an Identity Association ID to individual interfaces. In cases where the device is functioning with a single DHCP client identity, it must use value 1 for IAID for all DHCP interactions. In cases where the device is functioning with multiple DHCP client identities, the values of IAID have to start at 1 for the first identity and be incremented for each subsequent identity. For example, the device may use IAID value 1 for the first physical interface and value 2 for the second. Alternatively, the

device may use IAID value 1 for the virtual circuit corresponding to the first connection object in the data model and value 2 for the second connection object in the data model.

- **Option 61 DUID:** Specifies the name of the interface whose link-layer address the server is to use as its DUID (DHCP Unique Identifier). You must enter a value for this parameter or the server will not start. When the server starts, the DUID is written to the system log.
 - **Option 125:** The option 125 allows DHCP server to be pre-configured with policy for handling classes of devices in a certain way without requiring DHCP server to be able to parse the unique format used in client-identifier option.
- **Use the following IP Address:** If you are provided with a static IP/gateway Address, please select this option, and then enter the **WAN IP Address**, **WAN Subnet Mask** and **WAN gateway IP Address** manually.
5. Click the **Next** button, and you will see the next screen as below. You can Enable the **NAT**, **SPI Firewall**, and **IGMP Multicast**, if you are not sure about the settings, just leave the default settings.

Network Address Translation Settings

Network Address Translation (NAT) allows you to share one Wide Area Network (WAN) IP address for multiple computers on your Local Area Network (LAN).

Enable NAT

Enable SPI Firewall

IGMP Multicast

Enable IGMP Multicast

Figure 4-17

- **Enable NAT:** This technology translates the IP addresses of a local area network to a different IP address for the Internet. If this Router is hosting your network's connection to the Internet, please select the check box. If another Router exists in your network, you don't need to select the option.
- **Enable SPI Firewall:** A SPI firewall enhances network's security. Select the option to use a firewall, or else without a firewall.
- **Enable IGMP Multicast:** This is disabled by default. This setting will not allow IGMP (Internet Group Management Protocol) packets to be forwarded to the LAN. IGMP is used to manage multicasting on TCP/IP networks. Most users will not need to enable this. Some ISPs use IGMP to perform remote configuration for client devices, such as the Router. If you are unsure, check with your ISP.

 **Note:**

If you select the **Enable NAT** checkbox, the **NAT** menu will be added to the Web-based Utility. We will describe the detailed configuration in [4.4.5 NAT](#).

- Click the **Next** button, and select a preferred wan interface as the system default gateway.

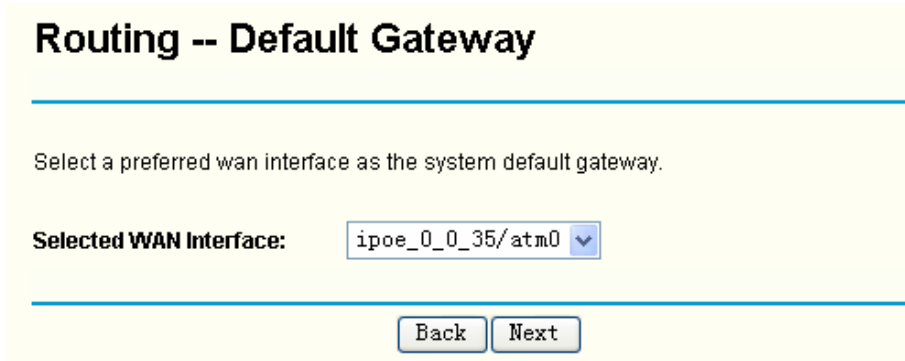


Figure 4-18

- Configure the DNS Server Addresses on the screen as follows.

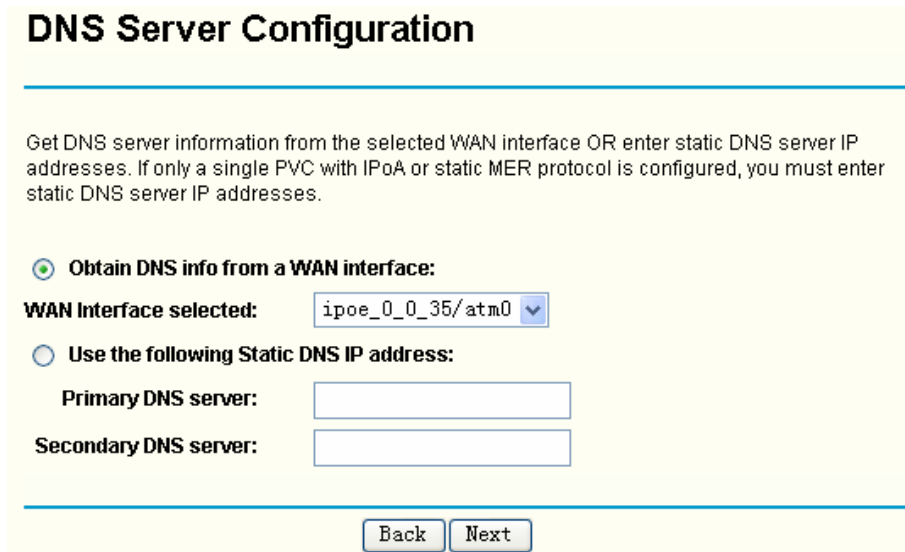


Figure 4-19

 **Note:**

If only single PVC with IPoA is configured, you must enter static DNS server IP addresses.

- On the next screen (as shown Figure 4-14) you will see the detailed settings you've made. Please click the **Apply/Save** button to save these settings.

4.4.2.3 ATM-EoA-Bridge

If you want to adopt the **Bridge** service and you need to use an ATM Interface, follow the steps below to add a WAN service over a selected ATM interface:

1. Add a new ATM interface and select **EoA** option for DSL Link Type (see [4.4.1.1 ATM interfaces](#)).
2. Click the **Add** button on the screen Figure 4-8. Select WAN Service Interface over ATM PVC on the next screen (as shown Figure 4-9).
3. Select **Bridge** option for the **WAN Service type** on the screen (as shown Figure 4-10), and click **Next** button to continue.
4. On the next screen (as shown Figure 4-14) you will see the detailed settings you've made. Please click the **Apply/Save** button to save these settings.

4.4.2.4 ATM-PPPoA

If your ISP provides a **PPPoA** connection and you need to use an ATM Interface, follow the steps below to add a WAN service over a selected ATM interface:

1. Add a new ATM interface and select **PPPoA** option for DSL Link Type (see [4.4.1.1 ATM interfaces](#)).
2. Click the **Add** button on the screen Figure 4-8 and the next configuration is similar to **PPPoE**, (see section [4.4.2.1 ATM-EoA-PPPoE](#)). The difference is that you don't need to set the **PPPoE Service Name** and **Bridge PPPoE Frames Between WAN and Local Ports** on the screen of Figure 4-11.

4.4.2.5 ATM-IPoA

If your ISP provides an **IPoA** connection and you need to use an ATM Interface, follow the steps below to add a WAN service over a selected ATM interface

1. Add a new ATM interface and select **IPoA** option for DSL Link Type (see [4.4.1.1 ATM interfaces](#)).
2. Click the **Add** button on the screen Figure 4-8 and the next configuration is similar to **IPoE** (see section [4.4.2.2 ATM-EoA-IPoE](#)). The difference is that you have to manually set the Static IP Address on the screen of Figure 4-16, and the Static IP Address for DNS Server on the screen of Figure 4-19.

4.4.2.6 ETH-PPPoE

If your ISP provides a **PPPoE** connection and you need to use an **ETH** Interface, follow the steps below to add a WAN service over a selected ETH interface:

1. Add a new **ETH** interface on the screen of [4.4.1.2 ETH interfaces](#).
2. Click the **Add** button on the screen Figure 4-8 and the next configuration is similar to **PPPoE** over ATM interface (see section [4.4.2.1 ATM-EoA-PPPoE](#)). The difference is that you have to set the **802.1P Priority** and **802.1Q VLAN ID** on the screen as shown below (corresponding screen see Figure 4-10).

WAN Service Configuration

Select WAN service type:

PPP over Ethernet (PPPoE)
 IP over Ethernet
 Bridging

Enter Service Description:

Enter 802.1P Priority [0-7]:

Enter 802.1Q VLAN ID [0-4094]:

Figure 4-20

4.4.2.7 ETH-IPoE

If your ISP provides an **IPoE** connection and you want to use an **ETH** Interface, follow the steps below to add a WAN service over a selected ETH interface:

1. Add a new **ETH** interface on the screen of [4.4.1.2 ETH interfaces](#).
2. Click the **Add** button on the screen Figure 4-8 and the next configuration is similar to **IPoE** over ATM interface (see section [4.4.2.2 ATM-EoA-IPoE](#)). The difference is that you have to set the **802.1P Priority** and **802.1Q VLAN ID** on the screen of Figure 4-20 (corresponding screen see Figure 4-10).

4.4.2.8 ETH-Bridge

If you want to adopt the **Bridge** service and you need to use an **ETH** Interface, follow the steps below to add a WAN service over a selected ETH interface:

1. Add a new **ETH** interface on the screen of [4.4.1.2 ETH interfaces](#).
2. Click the **Add** button on the screen Figure 4-8 and the next configuration is similar to **Bridge** over ATM interface (see section [4.4.2.3 ATM-EoA-Bridge](#)). The difference is that you have to set the **802.1P Priority** and **802.1Q VLAN ID** on the screen of Figure 4-20 (corresponding screen see Figure 4-10).

Note:

The Bridge option only display on the screen of Figure 4-20 when VLAN MUX Mode is selected for Connection Mode on the screen of Figure 4-6.

4.4.3 LAN

Choose “**Advanced Setup**”→“**LAN**”, and you will see the LAN screen (shown in Figure 4-21), the section allows you to configure the Router’s LAN ports settings.

300M
Wireless N ADSL2+ Router
Model No.: TD-W8960N

Local Area Network (LAN) Setup

Configure the DSL Router IP Address and Subnet Mask for LAN interface.
GroupName

IP Address:
Subnet Mask:

Enable IGMP Snooping
 Standard Mode
 Blocking Mode

NOTE: If "LAN side firewall" is enabled, all PCs in the LAN will not able to manage the Router. Please make sure you have set a PC allowed to manage the Router on "Security->IP Filtering->Incoming" page.

Enable LAN side firewall

Disable DHCP Server
 Enable DHCP Server

Start IP Address:
End IP Address:
Leased Time (hour):

Static IP Lease List: (A maximum 32 entries can be configured)

MAC Address	IP Address	Remove

Configure the second IP Address and Subnet Mask for LAN interface

Figure 4-21

- **IP Address:** You can configure the Router's IP Address and Subnet Mask for LAN Interface.
 - **IP Address:** Enter the Router's local IP Address, then you can access to the Web-based Utility via the IP Address, the default value is 192.168.1.1.
 - **Subnet Mask:** Enter the Router's Subnet Mask, the default value is 255.255.255.0.
- **Enable IGMP Snooping:** If you select the option, please choose the IGMP Mode: Standard Mode or Blocking Mode.
- **DHCP Server:** These settings allow you to configure the Router's Dynamic Host Configuration Protocol (DHCP) server function. The DHCP server is enabled by default for the Router's Ethernet LAN interface. DHCP service will supply IP settings to computers which are configured to automatically obtain IP settings that are connected to the Router though the Ethernet port. When the Router is set for DHCP, it becomes the default gateway for DHCP client connected to it. Keep in mind that if you change the IP address of the Router, you must change the range of IP addresses in the pool used for DHCP on the LAN.
 - **Start IP Address:** Enter a value for the DHCP server to start with when issuing IP addresses. Because the default IP address for the Router is 192.168.1.1, the default Start IP Address is **192.168.1.2**, and the Start IP Address must be 192.168.1.2 or greater, but smaller than 192.168.1.254.

- **End IP Address:** Enter a value for the DHCP server to end with when issuing IP addresses. The End IP Address must be smaller than 192.168.1.254. The default End IP Address is **192.168.1.254**.
 - **Leased Time (hour):** The Leased Time is the amount of time in which a network user will be allowed connection to the Router with their current dynamic IP address. Enter the amount of time, in hours, then the user will be “leased” this dynamic IP address. After the dynamic IP address has expired, the user will be automatically assigned a new dynamic IP address. The default is **24** hours.
- **Static IP Lease List:** The function allows you to specify a reserved IP address for a PC on the LAN, that PC will always obtain the assigned IP address each time when it accesses the DHCP server. Reserved IP addresses should be assigned to servers that require permanent IP settings. Click the **Add Entries** button, and then you will set the rule in the screen as below.

DHCP Static IP Lease

Enter the Mac address and Static IP address then click "Save/Apply" .

MAC Address:

IP Address:

- **MAC Address:** The MAC address of the computer on the LAN which you want to reserve an IP.
 - **IP Address:** The IP address you want reserved to the computer.
- **Configure the second IP Address and Subnet Mask:** You can configure the Router’s second IP Address and Subnet Mask for LAN Interface though which you can also access to the Web-based Utility as the default IP Address and Subnet Mask.

 **Note:**

UPnP, DHCP Server and the second IP Address are not available for the connection type of **Bridge** here, they won’t display on the preceding screen since only Bridge is selected.

4.4.4 MAC Address Clone

Choose menu “**Advanced Setup**”→“**MAC Address Clone**”, you can configure the MAC address of the WAN Interface as shown below.

The WAN Interface List displays the Lay2 Interfaces you have configured on the section [4.4.1 Layer2 Interface](#) and its default MAC Address. If you have not configured corresponding WAN Service for the interface on the section [4.4.2 WAN Service](#), the blank for MAC Address will display “Need a corresponding WAN Service”.

The last one of WAN Interface List displays your PC’s current address.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

• Device Info
• Quick Setup
- Advanced Setup
 • Layer2 Interface
 • WAN Service
 • LAN
• **MAC Address Clone**
• NAT
• Security
• Parental Control
• Quality of Service
• Routing
• DNS
 • DSL
 • Upnp
 • Dns Proxy
 • Interface Grouping
• LAN Ports

Setting MAC Address Clone

Set the special MAC Address to the selected WAN interface.

atm0 MAC Address:	<input type="text" value="02:10:18:01:00:02"/>	<input type="button" value="Restore Default"/>
atm1 MAC Address:	<input type="text" value="02:10:18:01:00:03"/>	<input type="button" value="Restore Default"/>
atm2 MAC Address:	<input type="text" value="02:10:18:01:00:00"/>	<input type="button" value="Restore Default"/>
atm3 MAC Address:	<input type="text" value="Need a corresponding WAN interface"/>	<input type="button" value="Restore Default"/>
ipoa0 MAC Address:	<input type="text" value="Need a corresponding WAN interface"/>	<input type="button" value="Restore Default"/>
atm4 MAC Address:	<input type="text" value="Need a corresponding WAN interface"/>	<input type="button" value="Restore Default"/>
Current PC MAC	<input type="text" value="00:19:66:1B:91:92"/>	<input type="button" value="Clone"/> to <input type="text" value="atm0"/>

Note: Only the WAN ports can using MAC Address Clone. All the clone MAC Address **MUST NOT** be the same with each other.

Figure 4-22

Type the new value for the WAN Interface who's MAC Address you want to change, and click **Save/Apply**.

You can select corresponding WAN Interface from the drop-down list and click **Clone** button to clone your current PC MAC, and then click **Save/Apply**.

Click **Restore Default** button to restore the WAN Interface's default MAC Address.

Note:

Only the WAN Ports can using MAC Address Clone function. All the clone MAC Address must not be the same with each other.

4.4.5 NAT

NAT (Network Address Translation) allows you to share one WAN (Wide Area Network) IP address for multiple computers on your LAN (Local Area Network).

Choose "**Advanced Setup**" → "**NAT**", there are four submenus under the main menu: **Virtual Servers**, **Port Triggering** and **DMZ Host**. Click any of them, and you will be able to configure the corresponding function.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

• Device Info
• Quick Setup
- Advanced Setup
 • Layer2 Interface
 • WAN Service
 • LAN
• **MAC Address Clone**
• **NAT**
 • Virtual Servers

NAT -- Virtual Servers Setup

Virtual Server allows you to direct incoming traffic from WAN side (identified by Protocol and External port) to the Internal server with private IP address on the LAN side. The Internal port is required only if the external port needs to be converted to a different port number used by the server on the LAN side. A maximum 32 entries can be configured.

Server Name	External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End	Server IP Address	WAN Interface	Remove
-------------	---------------------	-------------------	----------	---------------------	-------------------	-------------------	---------------	--------

Figure 4-23

Note:

When you select **PPPoA** or **PPPoE** for the WAN Setup, or when you select **Enable NAT** for the type of **IPoA** and **IPoE** connection ([4.4.2 WAN Service](#)), you will see the **NAT** menu in the Web-based Utility (shown in Figure 4-23).

4.4.5.1 Virtual Servers

Choose “**Advanced Setup**” → “**NAT**” → “**Virtual Servers**”, you can set up virtual servers on the screen below (shown in Figure 4-24).

Virtual servers can be used for setting up public services on your LAN, such as DNS, Email and FTP. A virtual server is defined as a service port, and all requests from the Internet to this service port will be redirected to the computer specified by the server IP. Any PC that was used for a virtual server must have a static or reserved IP Address because its IP Address may change when using the DHCP function.

NAT -- Virtual Servers Setup

Virtual Server allows you to direct incoming traffic from WAN side (identified by Protocol and External port) to the Internal server with private IP address on the LAN side. The Internal port is required only if the external port needs to be converted to a different port number used by the server on the LAN side. A maximum 32 entries can be configured.

Server Name	External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End	Server IP Address	WAN Interface	Remove
Mail (SMTP)	25	25	TCP	25	25	192.168.1.222	ppp0	<input type="checkbox"/>
NetMech	21154	21156	UDP	21154	21156	192.168.1.210	ppp0	<input type="checkbox"/>

Figure 4-24

- **Virtual Server Table:** The table indicates the information about the Virtual Server entries.
 - **Server Name:** This is the name of the **Virtual Server**. It is exclusive and must be filled in.
 - **External Port Start:** The base number of External Ports. You can type a service port or leave it blank.
 - **External Port End:** The end number of External Ports. You can type a service port or leave it blank.
 - **Protocol:** The protocol used for this application, **TCP**, **UDP**, or **TCP/UDP**.
 - **Internal Port Start:** The base number of Internal Ports. You can type a service port or leave it blank.
 - **Internal Port End:** The end number of Internal Ports. You can type a service port or leave it blank.
 - **Server IP Address:** The IP Address of the PC providing the service application.
 - **WAN Interface:** The WAN Service Interface providing the service application.
- **Add:** Click the **Add** button to add a new entry.
- **Remove:** Select the check box in the table (shown in Figure 4-24) and then click the **Remove** button, then the corresponding entry will be deleted in the table.

To add a virtual server entry:

1. Click the **Add** button on the preceding screen (pop-up Figure 4-24), and then you will set the new Virtual Server in the next screen (shown in Figure 4-25).

NAT -- Virtual Servers

Select the service name, and enter the server IP address and click "Apply/Save" to forward IP packets for this service to the specified server.

NOTE: The "Internal Port End" cannot be modified directly. Normally, it is set to the same value as "External Port End". However, if you modify "Internal Port Start", then "Internal Port End" will be set to the same value as "Internal Port Start".

Remaining number of entries that can be configured: 32

Use Interface:

Service Name:

Select a Service:

Custom Service:

Server IP Address:

External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End
<input type="text" value="25"/>	<input type="text" value="25"/>	TCP	<input type="text" value="25"/>	<input type="text" value="25"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>

Figure 4-25

2. Select the Interface which you want to use from the drop-down list.
3. Select the service which you want to use from the drop-down list. If the list does not have the service you need, type the name of the custom service in the text box.
4. Type the IP Address of the computer in the **Server IP Address** text box.
5. Enter the External Port Start, External Port End, Internal Port Start and Internal Port End in the table, and then select the protocol used for this Virtual Server, **TCP**, **UDP** or **All**.
6. Click Save/Apply to enable virtual server.

 **Note:**

If you select the service from the drop-down list, the External Port Start, External Port End, Internal Port Start, Internal Port End and the Protocol will be added in the table automatically. You only need to enter the Server IP Address for the Virtual Server.

4.4.5.2 Port Triggering

Choose “**Advanced Setup**”→“**NAT**”→“**Port Triggering**”, you can set Port Triggering on the screen (shown in Figure 4-26).

Some applications require that specific ports in the Router's firewall should be opened for access by remote devices. Port Trigger dynamically opens up the 'Open Ports' in the firewall when an application on the LAN initiates a TCP/UDP connection to a remote device using the triggering ports. The Router allows the remote party from the WAN side to establish new connections back to the application on the LAN side using the open ports. A maximum 32 entries can be configured.

NAT -- Port Triggering Setup

Some applications require that specific ports in the Router's firewall be opened for access by the remote parties. Port Trigger dynamically opens up the 'Open Ports' in the firewall when an application on the LAN initiates a TCP/UDP connection to a remote party using the 'Triggering Ports'. The Router allows the remote party from the WAN side to establish new connections back to the application on the LAN side using the 'Open Ports'. A maximum 32 entries can be configured.

Add Remove

Application Name	Trigger			Open			WAN Interface	Remove
	Protocol	Port Range		Protocol	Port Range			
		Start	End		Start	End		
ICQ	UDP	4000	4000	TCP	20000	20059	ppp0	<input type="checkbox"/>
Aim Talk	TCP	4099	4099	TCP	5191	5191	ppp0	<input type="checkbox"/>

Figure 4-26

- **Port Triggering Table:** The table indicates the information about the Port Triggering entries.
 - **Application (Name):** This is the name of the **Port Triggering**. It is exclusive and must be filled.
 - **Trigger:** It includes the Protocol and the Start and End value of the Trigger Ports.
 - **Open:** It includes the Protocol and the Start and End value of the Open Ports
 - **WAN Interface:** The WAN Service Interface setting the Port Triggering.
- **Add:** Click the button to add a new entry.
- **Remove:** Select the check box in the table (shown in Figure 4-26) and then click the **Remove** button, then the corresponding entry will be deleted in the table.

To add a new Port Triggering:

1. Click the **Add** button (pop-up Figure 4-26), and then you will set the new Port Triggering in the next screen (shown in Figure 4-27).

NAT -- Port Triggering

Some applications such as games, video conferencing, remote access applications and others require that specific ports in the Router's firewall be opened for access by the applications. You can configure the port settings from this screen by selecting an existing application or creating your own (Custom application) and click "Save/Apply" to add it.

Remaining number of entries that can be configured: 32

Use Interface:

Application Name:

Select an application:

Custom application:

Trigger Port Start	Trigger Port End	Trigger Protocol	Open Port Start	Open Port End	Open Protocol
<input type="text" value="4000"/>	<input type="text" value="4000"/>	<input type="text" value="UDP"/>	<input type="text" value="20000"/>	<input type="text" value="20059"/>	<input type="text" value="TCP"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>	<input type="text"/>	<input type="text"/>	<input type="text" value="TCP"/>

Figure 4-27

2. Select the application from the drop-down list. If the list does not have the application that you want, select the **Custom application** radio-button, and type the name of the custom application in the text box.
3. Enter the **Trigger Port Start**, **Trigger Port End**, **Open Port Start** and **Open Port End** in the table, and then select the **Trigger protocol** and **Open protocol**, **TCP**, **UDP** or **All**.
4. Click Save/Apply to enable the settings.

Note:

If you select the application from the drop-down list, the External Port Start, External Port End, Internal Port Start, Internal Port End and the Protocol will be added in the table automatically.

4.4.5.3 DMZ Host

Choose "**Advanced Setup**"→"**NAT**"→"**DMZ Host**", you can set up DMZ Host on the screen (shown in Figure 4-28).

The DMZ host feature can make a local host be exposed to the Internet for a special-purpose service, such as online gaming or video conferencing.

NAT -- DMZ Host

The DSL router will forward IP packets from the WAN that do not belong to any of the applications configured in the Virtual Servers table to the DMZ host computer.

Enter the computer's IP address and click "Save/Apply" to activate the DMZ host.

Clear the IP address field and click "Apply" to deactivate the DMZ host.

DMZ Host IP Address:

Save/Apply

Figure 4-28

To add a new DMZ Host:

You can enter the computer's IP address and then click **Save/Apply** to activate the DMZ host you set on this page.

Note:

DMZ host forwards all the ports at the same time. Any PC whose port is being forwarded must have its DHCP client function disabled and should have a new static IP Address assigned to it because its IP Address may change while using the DHCP function.

4.4.6 Security

Choose "Advanced Setup" → "Security", and you will see the security screen including **IP Filtering** and **MAC Filtering** (only effective in Bridge mode) submenus.



Figure 4-29

4.4.6.1 IP Filtering

The IP address filtering feature makes it possible for administrators to control user's access to the Internet, which is based on user's IP. The IP address filtering includes **Outgoing** and **Incoming**, the detailed descriptions are provided below.

IP Filtering - Outgoing

Choose "Advanced Setup" → "Security" → "IP Filtering" → "Outgoing", you can configure Outgoing Filtering rules on the screen (shown in Figure 4-30).

The Outgoing IP Filtering feature allows you to control some IP traffic from LAN to access to some specifically addresses. By default, all outgoing IP traffic from LAN is allowed, but some IP traffic can be **BLOCKED** by setting up filters.

Outgoing IP Filtering Setup

By default, all outgoing IP traffic from LAN is allowed, but some IP traffic can be **BLOCKED** by setting up filters.

Choose Add or Remove to configure outgoing IP filters.

Filter Name	Protocol	Source Address / Mask	Source Port	Dest. Address / Mask	Dest. Port	Remove
sendmail-filter	TCP or UDP	192.168.1.222 / 255.255.255.255		210.17.188.204 / 255.255.255.255	25	<input type="checkbox"/>

Figure 4-30

Setup an Outgoing IP Filtering rule:

1. Click the **Add** button (pop-up Figure 4-30), and you will set the new rule in the next screen (shown in Figure 4-31).

Add IP Filter -- Outgoing

The screen allows you to create a filter rule to identify outgoing IP traffic by specifying a new filter name and at least one condition below. All of the specified conditions in this filter rule must be satisfied for the rule to take effect. Click 'Save/Apply' to save and activate the filter.

Filter Name:

Protocol:

Source IP address:

Source Subnet Mask:

Source Port (port or port:port):

Destination IP address:

Destination Subnet Mask:

Destination Port (port or port:port):

Figure 4-31

2. Enter the **Filter name** for the rule, it is exclusive and must be filled.
3. Select the **protocol: TCP/UDP, TCP, UDP or ICMP** in the drop-down list for the connection between the Source IP address and Destination IP address.
4. Enter a **Source IP Address** in dotted-decimal notation format and then type the **Source Subnet Mask** and **Source Port** (port or port: port) in the text boxes separately.
5. Enter a **Destination IP Address** in dotted-decimal notation format and then type the **Destination Subnet Mask** and **Destination Port** (port or port: port) in the text boxes separately.
6. Click Save/Apply to save this entry.

Note:

When you add an Outgoing IP Filtering entry, you must configure at least one condition on the preceding screen except the Filter name. If you leave the Protocol blank, it means that the rule is effective to all protocols, if you leave the Source IP Address and/or Destination IP Address blank, it suggests that all Source IP Addresses and/or Destination IP Addresses are controlled by the rule, if you leave the Source Port and/or Destination Port blank, it suggests that all Source Ports and/or Destination Ports are controlled by the rule.

IP Filtering - Incoming

Choose “**Advanced Setup**”→“**Security**”→“**IP Filtering**”→“**Incoming**”, you can configure Incoming Filtering rules on the screen (shown in Figure 4-32).

The Incoming IP Filtering feature allows some IP traffic from WAN to access some local addresses. By default, all incoming IP traffic from the WAN is blocked when the firewall is enabled. However, some IP traffic can be **ACCEPTED** by setting up filters.

Incoming IP Filtering Setup

When the firewall is enabled on a WAN or LAN interface, all incoming IP traffic is BLOCKED. However, some IP traffic can be **ACCEPTED** by setting up filters.

Choose Add or Remove to configure incoming IP filters.

Filter Name	Interfaces	Protocol	Source Address / Mask	Source Port	Dest. Address / Mask	Dest. Port	Remove
recvmail-filter	ppp0,ppp0a1,br0	TCP or UDP	210.17.188.204 / 255.255.255.0			110	<input type="checkbox"/>

Figure 4-32

Setup an Incoming IP Filtering rule:

1. Click the **Add** button (pop-up Figure 4-32), and then you will set the new rule in the next screen (shown in Figure 4-33).

Add IP Filter -- Incoming

The screen allows you to create a filter rule to identify incoming IP traffic by specifying a new filter name and at least one condition below. All of the specified conditions in this filter rule must be satisfied for the rule to take effect. Click 'Save/Apply' to save and activate the filter.

Filter Name:	<input type="text" value="recvmail-filter"/>
Protocol:	<input type="text" value="TCP/UDP"/>
Source IP address:	<input type="text" value="210.17.188.204"/>
Source Subnet Mask:	<input type="text" value="255.255.255.0"/>
Source Port (port or port:port):	<input type="text"/>
Destination IP address:	<input type="text"/>
Destination Subnet Mask:	<input type="text"/>
Destination Port (port or port:port):	<input type="text" value="110"/>

WAN Interfaces (Configured in Routing mode and with firewall enabled only)
Select one or more WAN/LAN interfaces displayed below to apply this rule.

Select All

pppoe_0_0_35/ppp0

pppoa_0_8_35/pppoa1

br0/br0

Figure 4-33

2. Enter the **Filter name** for the rule, it is exclusive and must be filled in.
3. Select **Protocol** in the drop-down list, enter **Source IP address**, **Source Subnet Mask**, **Source Port**, **Destination IP address**, **Destination Subnet Mask**, and **Destination Port** for the rule.
4. Select at least one WAN interfaces displayed below to apply this rule.
5. Click Save/Apply to save this entry.

Note:

When you add an Incoming IP Filtering entry, you must configure at least one condition on the preceding screen except the Filter name. If you leave **Protocol** blank, it means that the rule is effective to all protocols, if you leave the Source IP address and/or Destination IP address blank, it suggests that all Source IP addresses and/or Destination IP addresses are controlled by the rule, if you leave the Source Port and/or Destination Port blank, it suggests that all Source Ports and/or Destination Ports are controlled by the rule.

4.4.6.2 MAC Filtering

Choose “**Advanced Setup**”→“**Security**”→“**MAC Filtering**”, you can configure MAC Filtering rules on the screen (shown in Figure 4-34). The section allows you to control access to the Internet by users on your local network based on their MAC Address.

 **Note:**

MAC Filtering is only effective on ATM PVC(s) configured in Bridge mode.

MAC Filtering Setup

MAC Filtering is only effective on ATM PVCs configured in Bridge mode. **FORWARDED** means that all MAC layer frames will be **FORWARDED** except those matching with any of the specified rules in the following table. **BLOCKED** means that all MAC layer frames will be **BLOCKED** except those matching with any of the specified rules in the following table.

MAC Filtering Policy For Each Interface:

WARNING: Changing from one policy to another of an interface will cause all defined rules for that interface to be REMOVED AUTOMATICALLY! You will need to create new rules for the new policy.

Interface	Policy	Change
atm1	FORWARD	<input type="checkbox"/>
atm3	FORWARD	<input type="checkbox"/>

Choose Add or Remove to configure MAC filtering rules.

Interface	Protocol	Destination MAC	Source MAC	Frame Direction	Remove
atm1	IGMP	00:13:8F:A9:E6:CA	00:13:8F:A9:E6:C6	BOTH	<input type="checkbox"/>

Figure 4-34

- **Change Policy:** There are two policies for the MAC filters: **FORWARDED** and **BLOCKED**. Select the **Change** checkbox and click the **Change Policy** button to change from one policy to another. When you set **FORWARDED**, it means that all MAC layer frames will be **forwarded** except those matching with any of the specified rules in the table (shown in Figure 4-34). While **BLOCKED** means that all MAC layer frames will be **blocked** except those matching with any of the specified rules in the preceding table.
- **Add:** Click the **Add** button, and then you can add a new MAC Filter in the next screen (shown in Figure 4-34).
- **Remove:** Select the check box in the table (shown in Figure 4-34) and then click the **Remove** button, and then the corresponding entry will be deleted in the table.

To add a MAC Filtering rule:

1. Click the **Add** button (pop-up Figure 4-34), and you will set the new rule in the next screen (shown in Figure 4-35).

Add MAC Filter

Create a filter to identify the MAC layer frames by specifying at least one condition below. If multiple conditions are specified, all of them take effect. Click "Apply" to save and activate the filter.

Protocol Type:	IGMP
Destination MAC Address:	00:13:8F:A9:E6:CA
Source MAC Address:	00:13:8F:A9:E6:C6
Frame Direction:	LAN<=>WAN
WAN Interfaces (Configured in Bridge mode only)	br_0_8_35/atm1

Figure 4-35

2. Select **Protocol Type** in the drop-down list for the rule.
3. Enter **Destination MAC Address** and **Source MAC Address** in the text box.
4. Select **Frame Direction** in the drop-down list for the rule.
5. Select the **WAN interfaces** from the drop-down list.
6. Click Save/Apply to save this entry.

4.4.7 Parental Control

Choose “**Advanced Setup**”→“**Parental Control**”. You can configure the Parental Control rules on the screen (shown in Figure 4-37). This function allows you control the internet activities of the child, limit the child to access certain websites and restrict the time of surfing.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- Device Info
- Quick Setup
- Advanced Setup
 - + Layer2 Interface
 - WAN Service
 - LAN
 - MAC Address Clone
 - + NAT
 - + Security
 - Parental Control

Access Time Restriction -- A maximum 16 entries can be configured.

Username	MAC	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start	Stop	Remove
<input type="button" value="Add"/> <input type="button" value="Remove"/>											

Figure 4-36

4.4.7.1 Time Restriction

This section allows you add time of day restriction to a special LAN device connected to the Router.

Access Time Restriction -- A maximum 16 entries can be configured.

Username	MAC	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Start	Stop	Remove
child	00:13:8F:A9:E6:CA	x	x	x	x	x			0:0	0:24	<input type="checkbox"/>

Figure 4-37

To add a Time Restriction entry for Parental Control rule:

1. Click the **Add** button (pop-up Figure 4-37), and then you will set the new rule in the next screen (shown in Figure 4-38).

Time of Day Restriction

This page adds time of day restriction to a special LAN device connected to the Router. The 'Browser's MAC Address' automatically displays the MAC address of the LAN device where the browser is running. To restrict other LAN device, click the "Other MAC Address" button and enter the MAC address of the other LAN device. To find out the MAC address of a Windows based PC, go to command window and type "ipconfig /all".

User Name:

Browser's MAC Address
MAC Address:

Other MAC Address (xxxxxxxxxxxx)
Other MAC Address
(xx:xx:xx:xx:xx:xx):

Days of the week:	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Click to select:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Start Blocking Time (hh:mm):

End Blocking Time (hh:mm):

Figure 4-38

2. Enter the **User Name** of the LAN device connected to the Router.
3. To restrict the device where the browser is running, select the **Browser's MAC Address** radio-button, its MAC Address has automatically displayed in the text box. To restrict other LAN devices, click the **Other MAC Address** radio-button and enter the MAC address of the other LAN device.
4. Select the day when the rule will take effect in the table.
5. Enter the **Start Blocking Time** and **End Blocking Time** in the text box separately, and then the device controlled will then be unable to connect to the internet during that time.
6. Click Save/Apply to save this entry.

4.4.7.2 URL Filter

This section allows you to configure the filter rules based on URL to control the computers in the LAN to access the specified port.

URL Filter -- Maximum 100 entries can be configured.

Please select the list type first then configure the list entries.

URL List Type: Exclude Include

Address	Port	Remove

Figure 4-39

There are two policies for the URL Filter.

- **Exclude:** Block the PCs to access the specified URL.
- **Include:** Only allow the PCs to access the specified URL.

To add a URL Filter entry for Parental Control rule:

1. Click the **Add** button and then you will set the new rule in the next screen.

Parental Control -- URL Filter Add

Enter the URL address and port number then click "Save/Apply" to add the entry to the URL filter.

URL Address:

Port Number: (Default 80 will be applied if leave blank.)

Figure 4-40

2. Click Save/Apply to save this entry.

URL Filter -- Maximum 100 entries can be configured.

Please select the list type first then configure the list entries.

URL List Type: Exclude Include

Address	Port	Remove
00:13:8F:A9:E6:CA	23	<input type="checkbox"/>

Figure 4-41

4.4.8 Quality of Service

Choose “**Advanced Setup**”→“**Quality of Service**”, you can enable QoS (Quality of Service) on the screen (shown in Figure 4-42). QoS helps to prioritize data as it enters your router. By attaching special identification marks or headers to incoming packets, QoS determines which queue the packets enter, based priority. This is useful when there are certain types of data you want to give higher priority, such as voice data packets give higher priority than Web data packets. This option will provide better service of selected network traffic over various technologies.

Figure 4-42

Select the **Enable QoS** checkbox to enable all QoS for all interfaces.

Select a **default DSCP make** from drop-down list to automatically mark incoming traffic without reference to a particular classifier.

Click Save/Apply to save the current configuration.

Note:

The default DSCP mark is used to mark all egress packets that do not match any classification rules.

4.4.8.1 Queue Config

Choose “**Advanced Setup**”→“**Quality of Service**”→“**Queue Config**”, you can set up virtual servers on the screen below.

QoS Queue Setup -- A maximum 16 entries can be configured.

If you disable WMM function in Wireless Page, queues related to wireless will not take effects

Name	Key	Interface	Precedence	DSL Latency	PTM Priority	Enable	Remove
WMM Voice Priority	1	wl0	1			Enabled	
WMM Voice Priority	2	wl0	2			Enabled	
WMM Video Priority	3	wl0	3			Enabled	
WMM Video Priority	4	wl0	4			Enabled	
WMM Best Effort	5	wl0	5			Enabled	
WMM Background	6	wl0	6			Enabled	
WMM Background	7	wl0	7			Enabled	
WMM Best Effort	8	wl0	8			Enabled	
queue1	38	ppp1	3	Path0		<input checked="" type="checkbox"/>	<input type="checkbox"/>

Figure 4-43

Click the **Add** button, and you can configure the QoS queue entry on the next screen (shown in Figure 4-44).

QoS Queue Configuration

The screen allows you to configure a QoS queue entry and assign it to a specific network interface. Each of the queues can be configured for a specific precedence. The queue entry configured here will be used by the classifier to place ingress packets appropriately.

Note: Lower integer values for precedence imply higher priority for this queue relative to others.
Click 'Apply/Save' to save and activate the queue.

Name:	<input type="text" value="queue1"/>
Enable:	<input type="button" value="Enable"/>
Interface:	<input type="button" value="ppp1 (0_0_35)"/>
Precedence:	<input type="button" value="3"/>
DSL Latency:	<input type="button" value="Path0"/>

Figure 4-44

- **Name:** Set a name for the entry.
- **Enable:** Select Enable option to take this entry effect.
- **Interface:** Assigned a specific Wan Service for this QoS queue entry.
- **Precedence:** Specify precedence for this QoS queue entry.
- **DSL Latency:** Select latency path for the type of data transmission, only Path0 is available for this Router.

After you specify the condition, click **Save/Apply** to save the entry.

 **Note:**

- 1) Lower integer values for precedence imply higher priority for this queue relative to others.
- 2) The queue entry configured here will be used by the classifier to place ingress packets appropriately.

4.4.8.2 QoS Classification

This section will guide you to create a traffic class rule to classify the upstream traffic, assign queue which defines the precedence and the interface and optionally overwrite the IP header DSCP byte.

A rule consists of a class name and at least one condition below. All of the specified conditions in this classification rule must be satisfied for the rule to take effect.

QoS Classification Setup -- A maximum 32 entries can be configured.

Choose Add or Remove to configure network traffic classes.
If you disable WMM function in Wireless Page, classification related to wireless will not take effects

CLASSIFICATION CRITERIA													CLASSIFICATION RESULTS					
Class Name	Order	Class Infr	Ether Type	SrcMAC/ Mask	DstMAC/ Mask	SrcIP/ Mask	DstIP/ Mask	Proto	Src Port	Dst Port	DSCP Check	802.1P Check	Queue Key	DSCP Mark	802.1P Mark	VlanID Tag	Enable	Remove
ftp-class	1				00:13:0A:55:FF:09								37	AF12			<input checked="" type="checkbox"/>	<input type="checkbox"/>

Add Enable Remove

Figure 4-45

Click the **Add** button, and you can configure the QoS on the next screen.

Add Network Traffic Class Rule

The screen creates a traffic class rule to classify the upstream traffic, assign queue which defines the precedence and the interface and optionally overwrite the IP header DSCP byte. A rule consists of a class name and at least one condition below. All of the specified conditions in this classification rule must be satisfied for the rule to take effect. Click 'Save/Apply' to save and activate the rule.

Traffic Class Name:

Rule Order:

Rule Status:

Specify Classification Criteria

A blank criterion indicates it is not used for classification.

Class Interface:

Ether Type:

Source MAC Address:

Source MAC Mask:

Destination MAC Address:

Destination MAC Mask:

Specify Classification Results

Must select a classification queue. A blank mark or tag value means no change.

Assign Classification Queue:

Mark Differentiated Service Code Point (DSCP):

Mark 802.1p priority:

Tag VLAN ID [0-4094]:

Save/Apply

Figure 4-46

After you specify the condition, click Save/Apply to save the entry.

4.4.9 Routing

Choose “Advanced Setup”→“Routing”, it includes three menus: **Default Gateway, Static Route and RIP** (shown in Figure 4-47). The detailed descriptions are provided below.

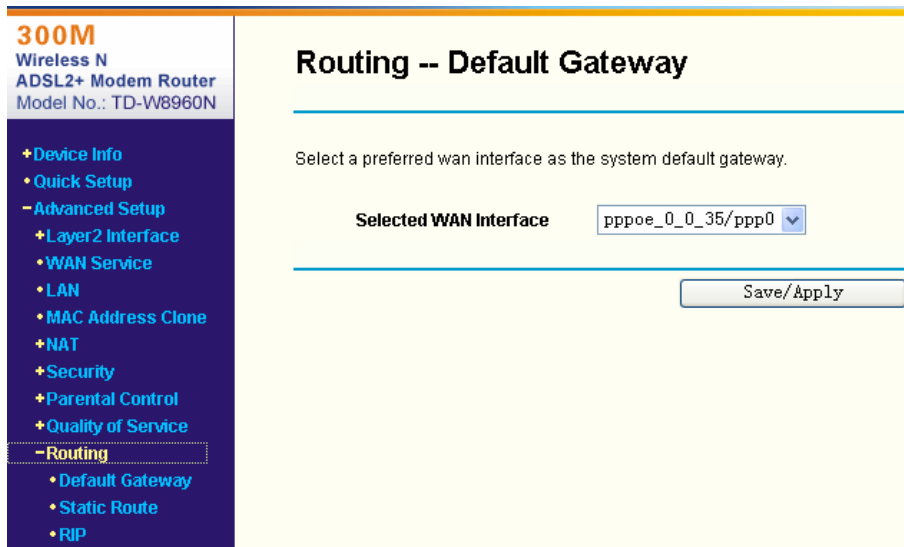


Figure 4-47

4.4.9.1 Default Gateway

Choose “**Advanced Setup**”→“**Routing**”→“**Default Gateway**”, you can see the Default Gateway screen, this screen allows you to select a WAN Interface from the drop-down list as the system default gateway.

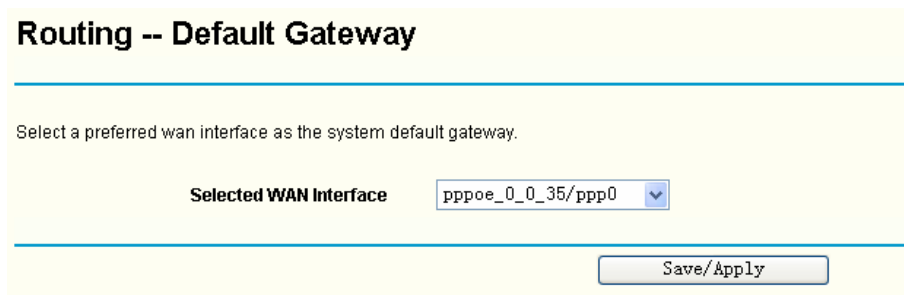


Figure 4-48

Note:

If changing the Automatic Assigned Default Gateway from unselected to selected, you have to reboot the Router to get the automatically assigned default gateway.

Default Gateway IP address should be specified since MER Interface is selected when you select the **Enable automatic Assigned Default Gateway** check box.

4.4.9.2 Static Route

Choose “**Advanced Setup**”→“**Routing**”→“**Static Route**”. You can see the Static Route screen, this screen allows you to configure the static routes (shown in Figure 4-49). A static route is a pre-determined path that network information must travel to reach a specific host or network.

Routing -- Static Route (A maximum 32 entries can be configured)

Destination	Subnet Mask	Gateway	Interface	Remove
210.17.188.203	255.255.255.0	172.31.70.1	atm0	<input type="checkbox"/>

Figure 4-49

To add static routing entries:

1. Click the **Add** button (pop-up Figure 4-50), and you will see the screen below (shown in Figure 4-50).

Routing -- Static Route Add

Enter the destination network address, subnet mask, gateway AND/OR available WAN interface then click "Save/Apply" to add the entry to the routing table.

Destination Network Address:
Subnet Mask:
Use Interface:
Use Gateway IP Address:

Figure 4-50

2. Enter the following data:
 - **Destination Network Address:** The **Destination Network Address** is the address of the network or host that you want to assign to a static route.
 - **Subnet Mask:** The **Subnet Mask** determines which portion of an IP Address is the network portion, and which portion is the host portion.
 - **Use Interface:** Select the Interface name in the text box, or else, the default Use Interface will be adopted for the Static Route.
 - **Use Gateway IP Address:** If you select the IPoE or IPoA mode for **Use Interface**, the screen above will display this item, you should type the Gateway address correctly, and the other option for **Use Interface** will adopt the default Gateway address for the Static Route.
3. Click Save/Apply to save it.

To remove a static routing entry:

1. Select the **Remove** check box according to the entry in the Figure 4-49.
2. Click the **Remove** button, and the entry will be deleted.

Note:

Gateway IP address should be correctly configured if IP based Interface (IPoE, IPoA) is selected.

4.4.9.3 RIP

Choose “**Advanced Setup**”→“**Routing**”→“**RIP**”, you can see the RIP (Routing Information Protocol) screen which allows you to configure the RIP (shown in Figure 4-51).

Routing -- RIP Configuration

NOTE: RIP CANNOT BE CONFIGURED on the WAN interface which has NAT enabled (such as PPPoE).

To activate RIP for the WAN Interface, select the desired RIP version and operation and place a check in the 'Enabled' checkbox. To stop RIP on the WAN Interface, uncheck the 'Enabled' checkbox. Click the 'Save/Apply' button to start/stop RIP and save the configuration.

Interface	Version	Operation	Enabled
ipoa0	2	Active	<input checked="" type="checkbox"/>
atm2	2	Passive	<input type="checkbox"/>

Figure 4-51

 **Note:**

RIP cannot be configured on the WAN Interface which has NAT enabled (such as PPPoE).

To activate RIP for the device, configure an individual interface, select the desired RIP version and operation, and select **Enabled** checkbox for the interface.

Click Save/Apply to save the configuration.

4.4.10 DNS

When you select the connection type **PPPoE**, **PPPoA** or **IPoA** for WAN configuration, you will see the **DNS** menu in the Web-based Utility (shown in Figure 4-52). It includes **DNS Server** and **Dynamic DNS** submenus.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- Device Info
- Quick Setup
- Advanced Setup
 - Layer2 Interface
 - WAN Service
 - LAN
 - MAC Address Clone
 - NAT
 - Security
 - Parental Control
 - Quality of Service
 - Routing
 - **DNS**
 - DNS Server
 - Dynamic DNS

DNS Server Configuration

Select the configured WAN interface for DNS server information OR enter the static DNS server IP Addresses for single PVC with IPoA, static IPoE protocol.

Obtain DNS info from a WAN interface:

WAN interface selected:

Use the following Static DNS IP address:

Primary DNS server:

Secondary DNS server:

Figure 4-52

4.4.10.1 DNS Server

Choose “**Advanced Setup**”→“**DNS**”→“**DNS Server**”. You can see the **DNS Server Configuration** screen, this screen allows you to configure the DNS Server Addresses (shown in Figure 4-53).

DNS Server Configuration

Select the configured WAN interface for DNS server information OR enter the static DNS server IP Addresses for single PVC with IPoA, static IPoE protocol.

Obtain DNS info from a WAN interface:

WAN Interface selected:

Use the following Static DNS IP address:

Primary DNS server:

Secondary DNS server:

Figure 4-53

For PPPoA, PPPoE enabled PVC(s), please select the **Obtain DNS info from a WAN interface** checkbox, this Router will accept automatically the first received DNS assignment from the selected configured WAN interface during the connection establishment.

For single PVC with IPoA, static IPoE protocol, please select the **Use the following Static DNS IP address** checkbox, and enter the primary and /or optional secondary DNS server IP addresses provided by your ISP.

Click the **Apply/Save** button to save the new configuration.

4.4.10.2 Dynamic DNS

Choose “**Advanced Setup**”→“**DNS**”→“**Dynamic DNS**”, you can see the **Dynamic DNS** screen, this screen allows you to configure the Dynamic DNS (shown in Figure 4-54).

The Router offers a Dynamic Domain Name System (**DDNS**) feature. DDNS lets you assign a fixed host and domain name to a dynamic Internet IP Address. The Dynamic DNS service allows you to alias a dynamic IP address to a static hostname in any of the many domains, allowing your Router to be more easily accessed from various locations on the Internet.

Dynamic DNS

The Dynamic DNS service allows you to alias a dynamic IP address to a static hostname in any of the many domains, allowing your DSL router to be more easily accessed from various locations on the Internet.

Choose Add or Remove to configure Dynamic DNS.

Hostname	Username	Service	Interface	Remove
Alsbot.homeunix.net	ailisa	dyndns	ppp0	<input type="checkbox"/>

Figure 4-54

To add a DDNS entry:

1. Click the **Add** button (pop-up Figure 4-54), and then you will set the DDNS in the next screen (shown in Figure 4-55).

Add dynamic DNS

This page allows you to add a Dynamic DNS address from DynDNS.org or TZO.

D-DNS provider:

Hostname:

Interface:

DynDNS Settings

Username:

Password:

Figure 4-55

2. Select **D-DNS provider** in the drop-down list.
3. Enter the **Hostname** of the DNS Server, and select the corresponding **Interface** for the DDNS, you can leave it default.
4. Type the **User Name** and **Password** for your DDNS account.
5. Click Save/Apply to save the entry.

4.4.11 DSL

Choose “**Advanced Setup**”→“**DSL**”, you can see the DSL Settings screen, this screen allows you to configure the DSL (shown in Figure 4-56).

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- +Device Info
- +Quick Setup
- Advanced Setup
- +Layer2 Interface
- +WAN Service
- +LAN
- +MAC Address Clone
- +NAT
- +Security
- +Parental Control
- +Quality of Service
- +Routing
- +DNS
- +DSL**
- +Upnp
- +Dns Proxy
- +Interface Grouping
- +LAN Ports
- +IPSec
- +Wireless
- +Diagnostics
- +Management

DSL Settings

Select the modulation below

- G.Dmt Enabled
- G.lite Enabled
- T1.413 Enabled
- ADSL2 Enabled
- AnnexL Enabled
- ADSL2+ Enabled
- AnnexM Enabled

Select the phone line pair below

- Inner pair
- Outer pair

Capability

- Bitswap Enable
- SRA Enable

Save/Apply Advanced Settings

Figure 4-56

You can select the modulation type, phone line pair and the capability of Bitswap or SRA. After you set them up, click Save/Apply to save the configurations.

4.4.12 UPNP

Choose “**Advanced Setup**”→“**Upnp**”, you can Enable or Disable the UPnP (Universal Plug and Play) protocol on the screen.

UPnP (Universal Plug and Play) is a distributed, open networking standard that uses TCP/IP for simple peer-to-peer network connectivity between devices. An UPnP device can dynamically join a network, obtain an IP address, convey its capabilities and learn about other devices on the network. In turn, a device can leave a network smoothly and automatically when it is no longer in use. UPnP broadcasts are only allowed on the LAN.

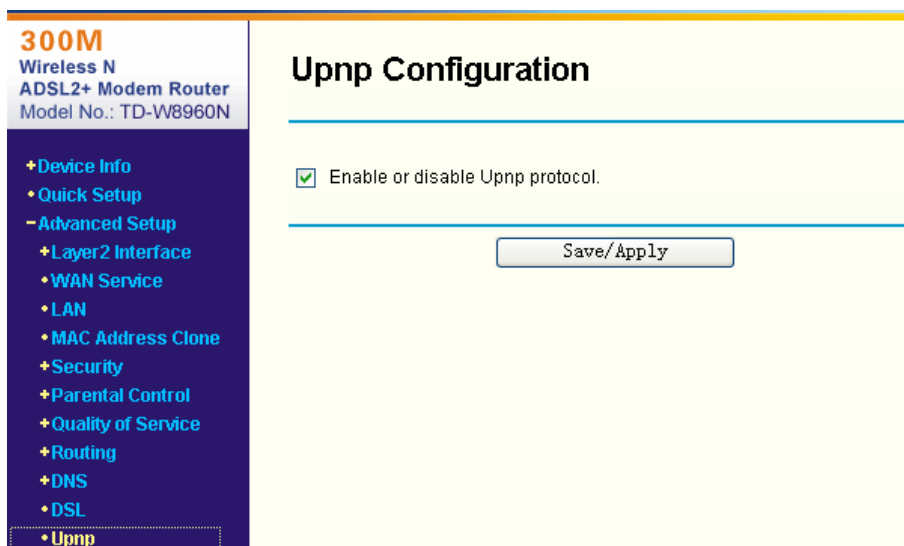


Figure 4-57

Select the checkbox and click Save/Apply to enable the UPnP function.

4.4.13 Dns Proxy

Choose “Advanced Setup”→“Dns Proxy”, you can Enable or Disable DNS proxy application on the screen.

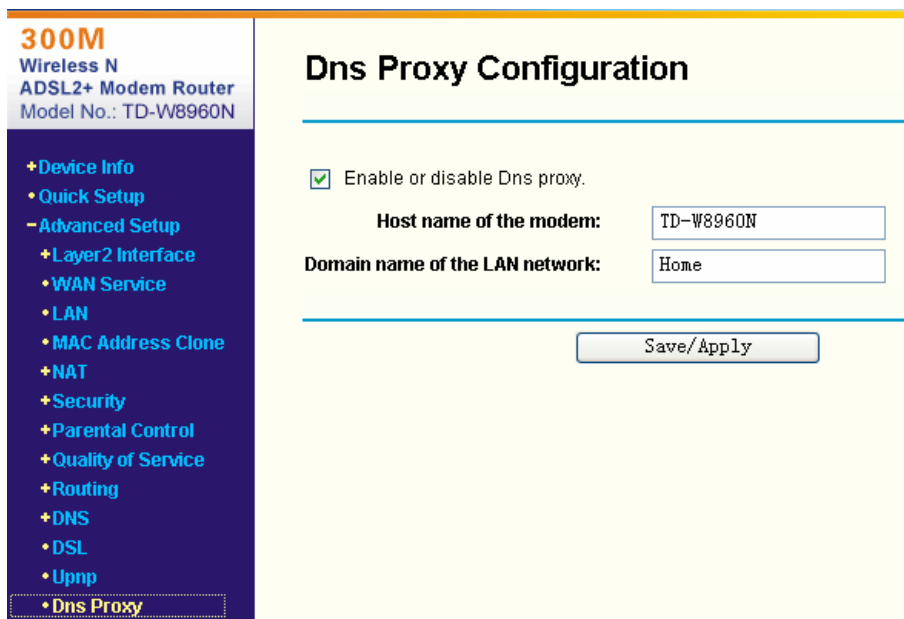


Figure 4-58

4.4.14 Interface Grouping

Choose “Advanced Setup”→“Interface Grouping”, you can configure multiple ports to PVC and bridging groups to perform as an independent network.

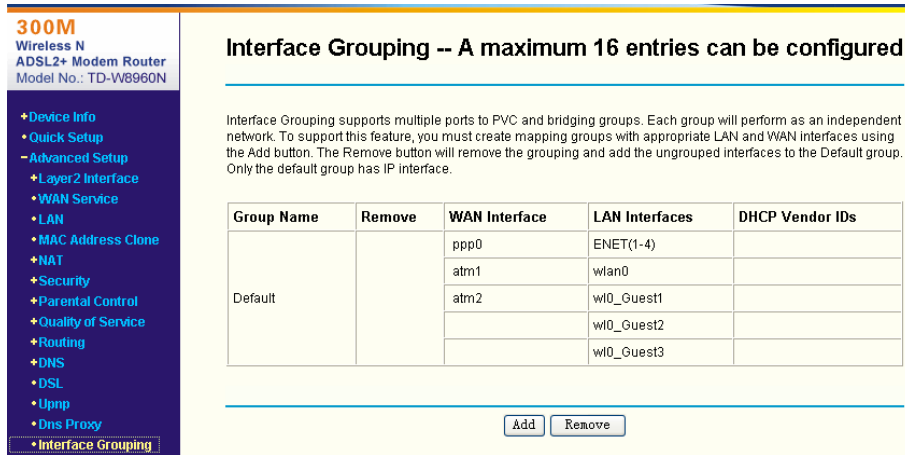


Figure 4-59

To support this feature, you must create mapping groups with appropriate LAN and WAN interfaces using the **Add** button. The **Remove** button will remove the grouping and add the ungrouped interfaces to the Default group. Only the default group has IP interface.

To create a new interface group:

1. Click the **Add** button. You can add a new interface group in the next screen.

Interface grouping Configuration

To create a new interface group:

1. Enter the Group name and the group name must be unique and select either 2. (dynamic) or 3. (static) below:

2. If you like to automatically add LAN clients to a WAN Interface in the new group add the DHCP vendor ID string. By configuring a DHCP vendor ID string any DHCP client request with the specified vendor ID (DHCP option 60) will be denied an IP address from the local DHCP server.

3. Select interfaces from the available interface list and add it to the grouped interface list using the arrow buttons to create the required mapping of the ports.

Note that these clients may obtain public IP addresses

4. Click Save/Apply button to make the changes effective immediately

IMPORTANT If a vendor ID is configured for a specific client device, please REBOOT the client device attached to the modem to allow it to obtain an appropriate IP address.

Group Name:

WAN Interface used in the grouping:

Grouped LAN Interfaces:

Available LAN Interfaces:

->

<-

Automatically Add Clients With the following DHCP Vendor IDs:

Save/Apply

Figure 4-60

2. Enter a unique name for Group.
3. Select the Interface which you want to use from the drop-down list.

Note:

If you like to automatically add LAN clients to a WAN Interface in the new group add the DHCP vendor ID string. By configuring a DHCP vendor ID string any DHCP client request with the specified vendor ID (DHCP option 60) will be denied an IP address from the local DHCP server.

4. Select interfaces from the available interface list and add it to the grouped interface list using the arrow buttons to create the required mapping of the ports.

Note:

These clients may obtain public IP addresses.

5. Click Save/Apply to make the entry effective immediately.

Note:

If a vendor ID is configured for a specific client device, please REBOOT the client device attached to the modem to allow it to obtain an appropriate IP address.

Interface Grouping -- A maximum 16 entries can be configured

Interface Grouping supports multiple ports to PVC and bridging groups. Each group will perform as an independent network. To support this feature, you must create mapping groups with appropriate LAN and WAN interfaces using the Add button. The Remove button will remove the grouping and add the ungrouped interfaces to the Default group. Only the default group has IP interface.

Group Name	Remove	WAN Interface	LAN Interfaces	DHCP Vendor IDs
Default		atm1	ENET(1-4)	
		atm2	wl0_Guest2	
			wl0_Guest3	
software	<input type="checkbox"/>	ppp0	wlan0 wl0_Guest1	53

Figure 4-61

4.4.15 LAN Ports

Choose “**Advanced Setup**”→“**LAN Ports**”, you can Enable/Disable the Virtual LAN Ports feature by selecting the checkbox on the screen.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- +Device Info
- +Quick Setup
- Advanced Setup
 - +Layer2 Interface
 - +WAN Service
 - +LAN
 - +MAC Address Clone
 - +NAT
 - +Security
 - +Parental Control
 - +Quality of Service
 - +Routing
 - +DNS
 - +DSL
 - +Upnp
 - +Dns Proxy
 - +Interface Grouping
 - +LAN Ports

LAN Ports Configuration

Use this page to enable/disable the Virtual LAN Ports feature.

ENET (1-4)

LAN Port
ENET4
ENET3
ENET2
ENET1
wlan0

Figure 4-62

4.4.16 IPSec

Choose “**Advanced Setup**”→“**IPSec**”, you can Add/Remove or Enable/Disable the IPSec tunnel connections on the screen.

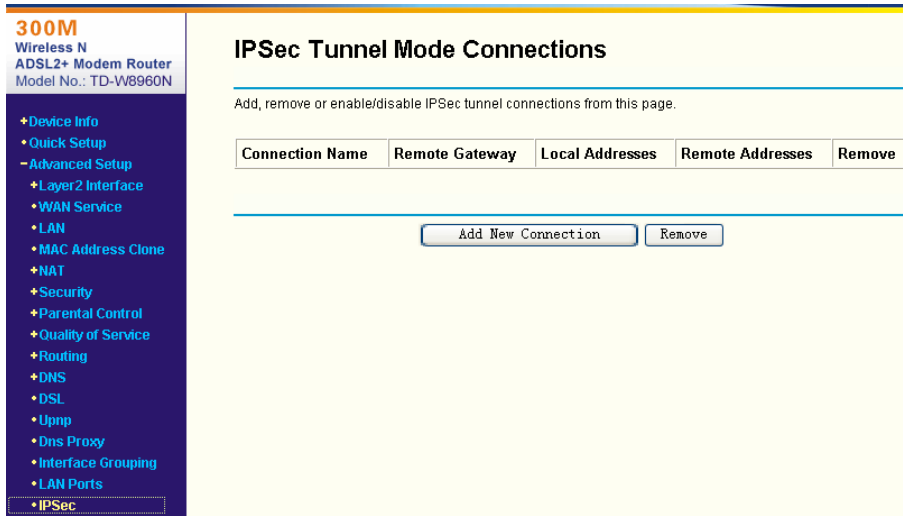


Figure 4-63

Click **Add New Connection** to configure the IPSec tunnel connections.

IPSec Settings

IPSec Connection Name:
Remote IPSec Gateway Address (IP or Domain Name):
Tunnel access from local IP addresses:
IP Address for VPN:
IP Subnetmask:
Tunnel access from remote IP addresses:
IP Address for VPN:
IP Subnetmask:
Key Exchange Method:
Authentication Method:
Pre-Shared Key:
Perfect Forward Secrecy:
Advanced IKE Settings:

Phase 1

Mode:
Encryption Algorithm:
Integrity Algorithm:
Select Diffie-Hellman Group for Key Exchange:
Key Life Time: Seconds

Phase 2

Encryption Algorithm:
Integrity Algorithm:
Select Diffie-Hellman Group for Key Exchange:
Key Life Time: Seconds

Figure 4-64

Click Save/Apply to save this entry.

IPSec Tunnel Mode Connections

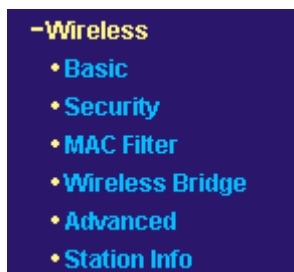
Add, remove or enable/disable IPSec tunnel connections from this page.

Connection Name	Remote Gateway	Local Addresses	Remote Addresses	Remove
new connection	210.17.188.204	192.168.1.20	210.17.188.10	<input type="checkbox"/>

Figure 4-65

4.5 Wireless

Choose “**Wireless**”, there are six submenus to configure Wireless LAN settings. Click any of them, and you will be able to configure the corresponding function. The detailed explanations for each submenu are provided below.



4.5.1 Basic

Choose “**Wireless**”→”**Basic**”, you will see the screen of **Wireless-Basic** settings shown as below. The basic settings for wireless networking are set on this screen.

 A screenshot of a web configuration page titled "Wireless -- Basic". The page has a light yellow background. On the left is a dark blue sidebar with a menu. The main content area contains a heading "Wireless -- Basic" and a paragraph of text explaining the page's purpose. Below the text are three checkboxes: "Enable Wireless" (checked), "Hide Access Point" (unchecked), and "Clients Isolation" (unchecked). There are three input fields: "SSID" with the value "TP-LINK_010001", "BSSID" with the value "02:10:18:01:00:01", and "Country" with a dropdown menu set to "UNITED STATES". At the bottom right is an "Apply/Save" button.

Figure 4-66

This page allows you to configure basic features of the wireless LAN interface. You can enable or disable the wireless LAN interface, hide the network from active scans, set the wireless network name (also known as SSID) and restrict the channel set based on Region requirements.

- **Enable Wireless:** If you want to use wireless features, you must select “Enable Wireless”. If you deselect “Enable Wireless” option, all the Wireless settings below will be disabled.
- **Hide Access Point:** When wireless clients survey the local area for wireless networks to associate with, you can select this option to avoid being surveyed.
- **Clients Isolation:** Select this option to enable AP isolation function that stations associated to the AP will not be able to communicate with each other.
- **SSID:** Wireless network name shared among all points in a wireless network. The SSID must be identical for all devices in the wireless network. It is case-sensitive and must not exceed 32 characters (use any of the characters on the keyboard). Make sure this setting is the same for all stations in your wireless network. Type the desired SSID in the space provided.
- **BSSID:** Show the MAC address of the Router.

- **Country:** Restrict the channel set and transmit power.

Click **Apply/Save** to configure the basic wireless options.

4.5.2 Security

Choose “**Wireless**”→“**Security**”, you will see the screen of **Wireless-Security** settings shown as below. You can configure security features of the wireless LAN interface by manually setting the network authentication or through WSC (Wireless Security Corporation) method.

The screenshot shows the 'Wireless -- Security' configuration page. On the left is a navigation menu with 'Security' selected. The main content area has the following sections:

- Wireless -- Security**: This page allows you to configure security features of the wireless LAN interface. You may setup configuration manually or through WiFi Protected Setup(WPS).
- WSC Setup**: Enable WSC: Disabled (dropdown menu).
- Manual Setup AP**: You can set the network authentication method, selecting data encryption, specify whether a network key is required to authenticate to this wireless network and specify the encryption strength.
 - Warning: we suggest you not to set WEP encryption to "Enabled" or WPA Encryption to "TKIP" when the device runs in 11n mode. The device's wireless highest speed is 54Mbps in these two encryption types.
 - Tips: 11n only mode are not supported when WEP encryption is "Enabled" or WPA Encryption type is "TKIP".
 - Click "Apply/Save" when done.
- Network Authentication**: Open (dropdown menu).
- WEP Encryption**: Disabled (dropdown menu).
- Apply/Save** button.

Figure 4-67

4.5.2.1 WSC Setup

This section will guide you to add a new wireless device to an existing network quickly by **WSC** (Wireless Security Corporation) method. Select **Enabled** option from the **Enable WSC** drop-down list, the following screen will then appear.

The screenshot shows the 'Wireless -- Security' configuration page with WSC enabled. The main content area has the following sections:

- Wireless -- Security**: This page allows you to configure security features of the wireless LAN interface. You may setup configuration manually or through WiFi Protected Setup(WPS).
- WSC Setup**: Enable WSC: Enabled (dropdown menu).
- Add Client** (This feature is available only when WPA-PSK, WPA2-PSK or OPEN mode is configured):
 - Radio buttons: Push-Button (unselected), PIN (selected).
 - Add Enrollee** button.
 - Input field for Device PIN: 19789392.
 - Gen new PIN** button.
 - [Help](#) link.

Figure 4-68

Note:

This feature is available only when OPEN, WPA-PSK, WPA2-PSK or Mixed WPA2/WPA-PSK mode is configured.

Note:

- 1) To build a successful connection by WSC, you should also do the corresponding configuration of the new device for WSC function meanwhile.
- 2) WSC (Wireless Security Corporation) is one kind of WPS (Wi-Fi Protected Setup) method.

I. By PBC

If the wireless adapter supports Wi-Fi Protected Setup and the Push Button Configuration (PBC) method, you can add it to the network by PBC with the following two methods. Click **Push-Button**, you will see the screen as shown below.

Wireless -- Security

This page allows you to configure security features of the wireless LAN interface.
You may setup configuration manually or through WiFi Protected Setup(WPS)

WSC Setup

Enable WSC: Enabled

Add **Client** (This feature is available only when WPA-PSK, WPA2-PSK or OPEN mode is configured)

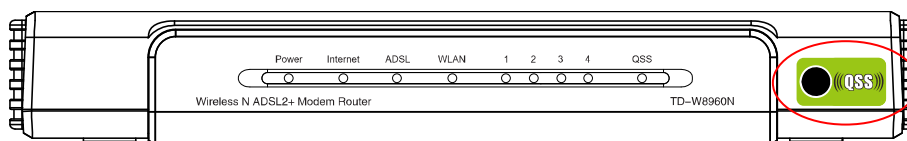
Push-Button PIN Add Enrollee

Device PIN: 19789392 Gen new PIN [Help](#)

Figure 4-69

Method One: Hardware push button.

Step 1: Press the QSS button on the front panel of the Router.



Step 2: Press and hold the QSS button of the adapter directly for 2 or 3 seconds.



Step 3: Wait for a while until the next screen of adapter appears. Click **Finish** to complete the QSS configuration.

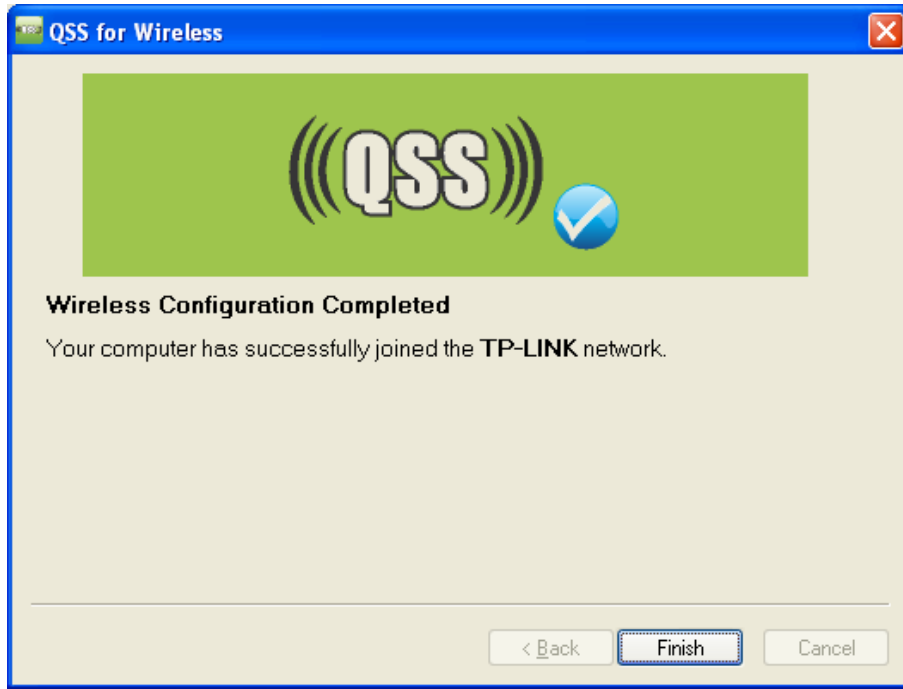
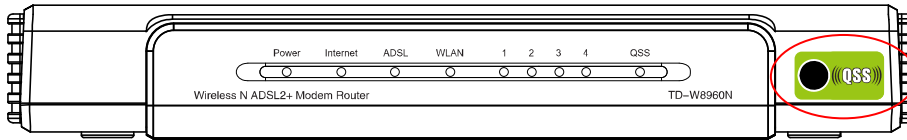


Figure 4-70

Method Two:

Step 1: Press the QSS button on the front panel of the Router.



Step 2: For the configuration of the wireless adapter, please choose "Push the button on my access point" in the configuration utility of the QSS as below, and click **Next**.

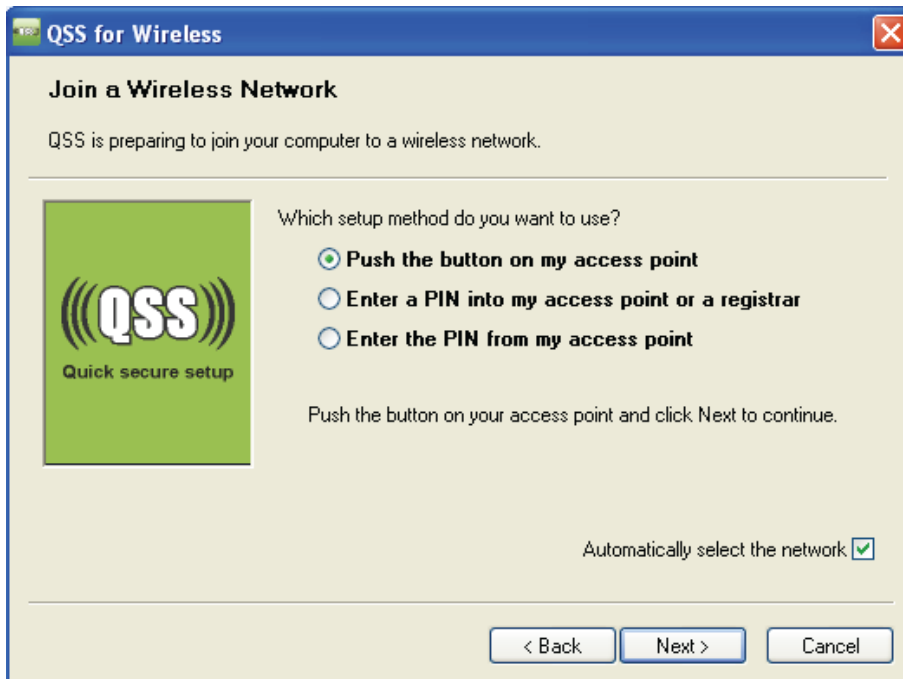


Figure 4-71

Step 3: Wait for a while until the next screen appears. Click **Finish** to complete the QSS configuration.



Figure 4-72

II. By PIN

If the new device supports Wi-Fi Protected Setup and the PIN method, you can add it to the network by PIN with the following two methods.

Method One: Enter the PIN of wireless adapter into my Router.

Step 1: Select the **PIN** checkbox and enter the PIN code of the wireless adapter in the field under as shown below. Then click **Add Enrollee**.

Wireless -- Security

This page allows you to configure security features of the wireless LAN interface.
You may setup configuration manually or through WiFi Protected Setup(WPS)

WSC Setup

Enable WSC:

Add Client (This feature is available only when WPA-PSK, WPA2-PSK or OPEN mode is configured)

Push-Button
 PIN

Device PIN:

Figure 4-73

Note:

The PIN code of the adapter is always displayed on the QSS configuration screen.

Step 2: For the configuration of the wireless adapter, please choose “**Enter a PIN into my access point or a registrar**” in the configuration utility of the QSS as below, and click **Next**.

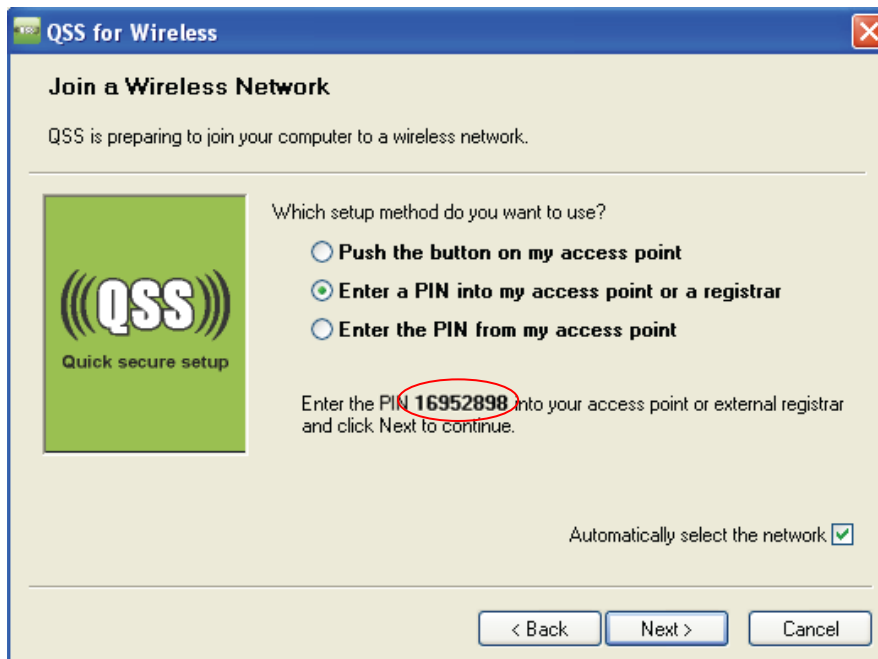


Figure 4-74

Note:

In this example, the default PIN code of this adapter is 16952898 as the preceding figure shown.

Method Two: Enter the PIN of my Router into the wireless adapter.

Step 1: Get the Current PIN code generated by the Router as shown below. You can click **Gen New PIN** to get a new PIN code for Router.

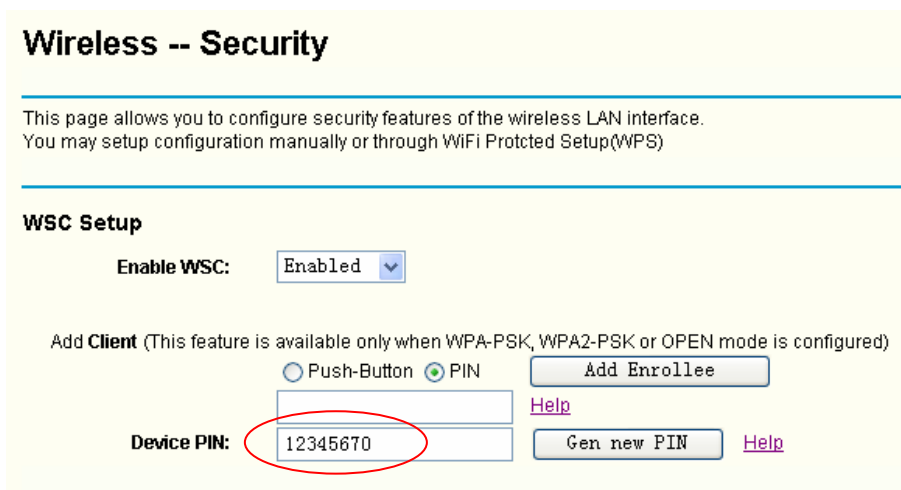


Figure 4-75

Step 2: For the configuration of the wireless adapter, please choose “**Enter a PIN from my access point**” in the configuration utility of the QSS as below, and enter the PIN code of the Router into the field after “**Access Point PIN**”. Then click **Next**.

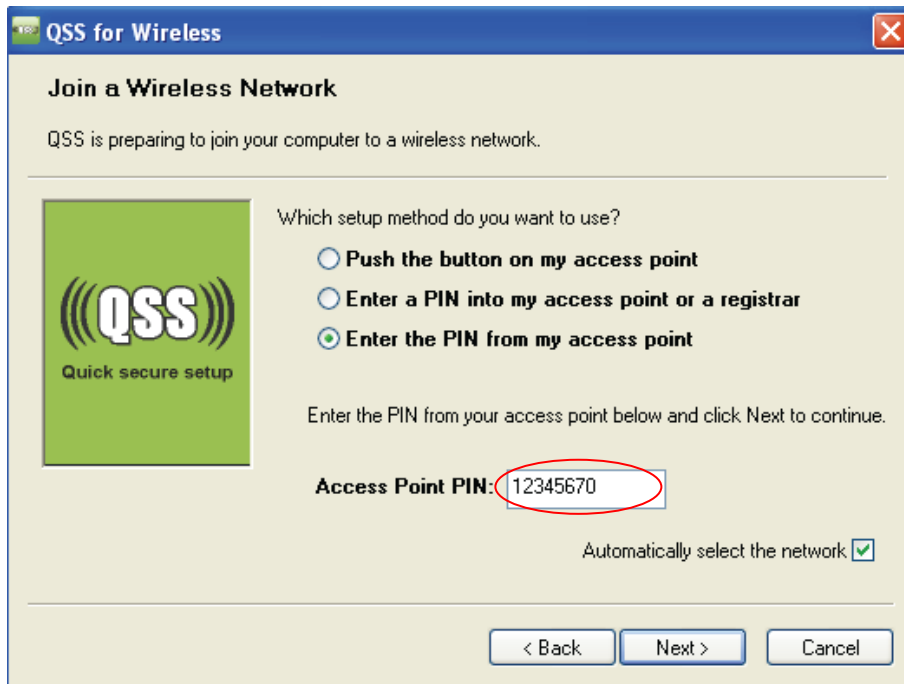


Figure 4-76

4.5.2.2 Manual Setup AP

Follow the instructions below to configure security features of the wireless LAN interface manually. You can set the network authentication method, select data encryption, specify whether a network key is required to authenticate to this wireless network and specify the encryption strength.

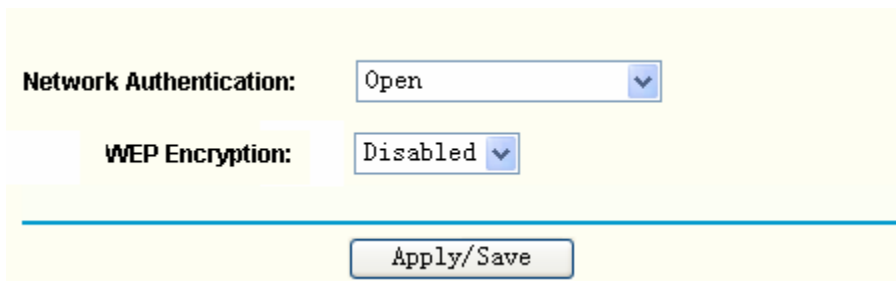


Figure 4-77

- **Network Authentication:** Select an authentication type from the drop-down list. Options available are: Open, Shared, WPA, WPA-PSK, WPA2, WPA2-PSK, Mixed WPA2/WPA, and Mixed WPA2/WPA-PSK.

Note:

For most users, it is recommended to use the default Wireless LAN Performance settings. Any changes made to these settings may adversely affect your wireless network. Under certain circumstances, changes may benefit performance. Carefully consider and evaluate any changes to these wireless settings.

1. WEP

WEP is a basic encryption method offering two levels of encryption, 64-bit and 128-bit encryption. If you select enable from the drop-down list of **WEP Encryption**, you will see the screen shown as below.

Network Authentication: Open

WEP Encryption: Enabled

Encryption Strength: 64-bit

Current Network Key: 1

Network Key 1:

Network Key 2:

Network Key 3:

Network Key 4:

Enter 13 ASCII characters or 26 hexadecimal digits for 128-bit encryption keys
Enter 5 ASCII characters or 10 hexadecimal digits for 64-bit encryption keys

Apply/Save

Figure 4-78

- **Encryption strength:** Select the appropriate level of encryption, 64-bit or 128-bit.
- **Current Network Key:** To indicate which WEP key to use, select a transmission key number.
- **Network Key 1-4:** If you want to manually enter the WEP keys, then enter them in the network Key 1-4 fields.

Configure WEP Encryption

WEP can use different methods of Authentication. Choose the Authentication Type from drop-down list Open or Shared.

- Select **Open** to allow any wireless station to associate with the access point.
- Select **Shared** to only allow stations using a shared key encryption to associate with it. Shared key requires additional configuration of the keys to be used. Follow the instructions below to configure the Shared Keys.

WEP Encryption is disabled by default. To enable WEP, select the Enable option. Configure the Encryption Keys as below:

- 1) Encryption strength: Select 64-bit (enter 5 ASCII characters or 10 hexadecimal digits in the Network Key list), 128-bit (enter 13 ASCII characters or 26 hexadecimal digits in the Network Key list).
- 2) Current Network Key: Select 1.
- 3) In Network key 1 list, enter 5 ASCII characters or 10 hexadecimal digits for 64-bit encryption keys; enter 13 ASCII characters or 26 hexadecimal digits for 128-bit encryption keys.
- 4) Click Save/Apply to save the new configuration.

Network Authentication: Open

WEP Encryption: Enabled

Encryption Strength: 64-bit

Current Network Key: 1

Network Key 1: 1908300919

Network Key 2:

Network Key 3:

Network Key 4:

Enter 13 ASCII characters or 26 hexadecimal digits for 128-bit encryption keys
Enter 5 ASCII characters or 10 hexadecimal digits for 64-bit encryption keys

Apply/Save

Figure 4-79

Note:

We use **Encryption Strength** 64-bit, **Current Network Key** selected “1” and enter 10 hexadecimal digits “1908300919” in the **Network Key 1** for example, Configure the settings as Figure 4-79 shown above.

2. WPA

WPA security for wireless communication has been developed to overcome some of the shortcomings of WEP. WPA combines the key generation with the authentication services of a RADIUS server.

Network Authentication: WPA

WPA Group Rekey Interval: 0

RADIUS Server IP Address: 0.0.0.0

RADIUS Port: 1812

RADIUS Key:

WPA Encryption: TKIP

WEP Encryption: Disabled

Apply/Save

Figure 4-80

- **WPA Group ReKey Interval:** Enter the Key Renewal period, which tells the Router how often it should change encryption keys.
- **RADIUS Server IP Address:** The IP address of the RADIUS server.
- **RADIUS Port:** The port of the RADIUS server. The default number is 1812.
- **RADIUS key:** The password of the RADIUS Server.

- **WPA Encryption:** Select the encryption you want to use: TKIP or AES (AES is an encryption method stronger than TKIP).

Configure WPA settings

1. Select the WPA option from the Network Authentication drop-down list. The menu will change to offer the appropriate settings.
2. Change the WPA Group Rekey Interval as desired.
3. Type in the IP address of the RADIUS server used in the RADIUS Server IP Address field.
4. Change the RADIUS Port if necessary.
5. Type in the password in the RADIUS Key field.
6. Use the default setting TKIP of WPA Encryption.
7. Click Save/Apply to save the new configuration.

The screenshot shows a configuration form for WPA settings. The fields are as follows:

- Network Authentication:** WPA (selected in a dropdown menu)
- WPA Group Rekey Interval:** 30
- RADIUS Server IP Address:** 192.168.1.10
- RADIUS Port:** 1812
- RADIUS Key:** A field containing ten black dots representing a masked password.
- WPA Encryption:** TKIP (selected in a dropdown menu)
- WEP Encryption:** Disabled (selected in a dropdown menu)

At the bottom of the form is a button labeled "Apply/Save".

Figure 4-81

3. WPA-PSK

WPA-PSK requires a shared key and does not use a separate server for authentication. PSK keys can be ASCII or Hex type.

The screenshot shows a configuration form for WPA-PSK settings. The fields are as follows:

- Network Authentication:** WPA-PSK (selected in a dropdown menu)
- WPA Pre-Shared Key:** An empty text input field with a blue link "Click here to display" to its right.
- WPA Group Rekey Interval:** 30
- WPA Encryption:** AES (selected in a dropdown menu)
- WEP Encryption:** Disabled (selected in a dropdown menu)

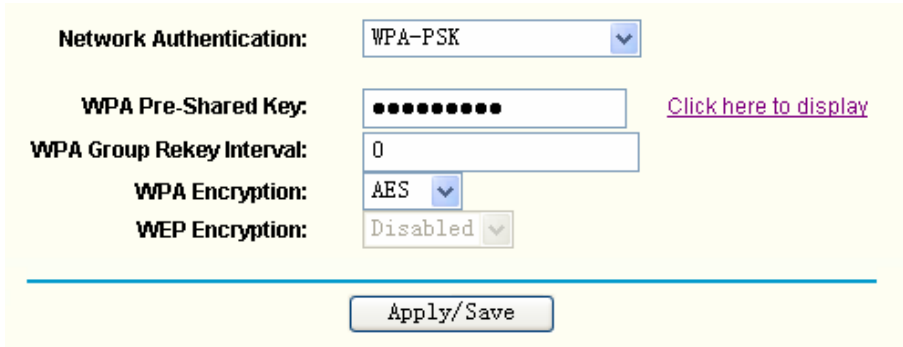
At the bottom of the form is a button labeled "Apply/Save".

Figure 4-82

- **WPA Pre-Shared Key:** Enter the key shared by the Router and your other network devices. It must have 8-63 ASCII characters or 64 Hexadecimal digits.
- **Click here to display:** Click it to show you the WPA Pre-Shared Key.

Configure WPA-PSK settings

1. Select the WPA-PSK option. The menu will change to offer the appropriate settings as the picture show above.
2. WPA-PSK requires a shared key. Type the key in the space provided. PSK keys can be ASCII or Hex type.
3. Change the Group Key Interval as desired or use the default setting.
4. Click Save/Apply to save the new configuration.



Network Authentication: WPA-PSK

WPA Pre-Shared Key: ●●●●●●●● [Click here to display](#)

WPA Group Rekey Interval: 0

WPA Encryption: AES

WEP Encryption: Disabled

Apply/Save

Figure 4-83

Note:

If you click the option [“Click here to display”](#), the Figure 4-84 will pop-up, and it shows the password you have set.



Figure 4-84

4. WPA2

To configure WPA2 settings, select the WPA2 option from the drop-down list. The menu will change to offer the appropriate settings. The steps of these settings are similar to WPA settings.

Network Authentication: WPA2

WPA2 Preauthentication: Disabled

Network Re-auth Interval: 36000

WPA Group Rekey Interval: 0

RADIUS Server IP Address: 0.0.0.0

RADIUS Port: 1812

RADIUS Key:

WPA Encryption: AES

WEP Encryption: Disabled

Apply/Save

Figure 4-85

- **WPA2 Preauthentication:** Select Enable from the drop-down list, Stations will authenticate with the AP during the scanning process, and once association is required, the station has been already authenticated.
- **Network Re-auth Interval:** Enter a value in seconds as the frequency interval to enable periodic Network Re-authentication function, while leave it blank or enter “0” to disable it.

5. WPA2-PSK

To configure WPA2-PSK settings, select the WPA2-PSK option from the drop-down list. The menu will change to offer the appropriate settings. WPA2-PSK requires a shared key and does not use a separate server for authentication. PSK keys can be ASCII or Hex type.

Network Authentication: WPA2-PSK

WPA Pre-Shared Key: ●●●●●●●● [Click here to display](#)

WPA Group Rekey Interval: 0

WPA Encryption: AES

WEP Encryption: Disabled

Apply/Save

Figure 4-86

6. Mixed WPA2/WPA

To configure Mixed WPA2/WPA settings, select the Mixed WPA2/WPA option from the drop-down list. The menu will change to offer the appropriate settings. The steps to these settings are similar to those for WPA-PSK.

Network Authentication:

WPA2 Preauthentication:

Network Re-auth Interval:

WPA Group Rekey Interval:

RADIUS Server IP Address:

RADIUS Port:

RADIUS Key:

WPA Encryption:

WEP Encryption:

Figure 4-87

7. Mixed WPA2/WPA-PSK

To configure Mixed WPA2/WPA-PSK settings, select the Mixed WPA2/WPA-PSK option from the drop-down list. The menu will change to offer the appropriate settings. The steps of this setting are the same with WPA-PSK.

Network Authentication:

WPA Pre-Shared Key: [Click here to display](#)

WPA Group Rekey Interval:

WPA Encryption:

WEP Encryption:

Figure 4-88

4.5.3 MAC Filter

Choose “Wireless”→”MAC Filter”, you will see the screen of Wireless-MAC Filter settings shown as below.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- +Device Info
- +Quick Setup
- +Advanced Setup
- Wireless
 - Basic
 - Security
 - MAC Filter

Wireless -- MAC Filter

MAC Restrict Mode: Disabled Allow Deny

MAC Address	Remove
00:13:0A:55:FF:09	<input type="checkbox"/>

Figure 4-89

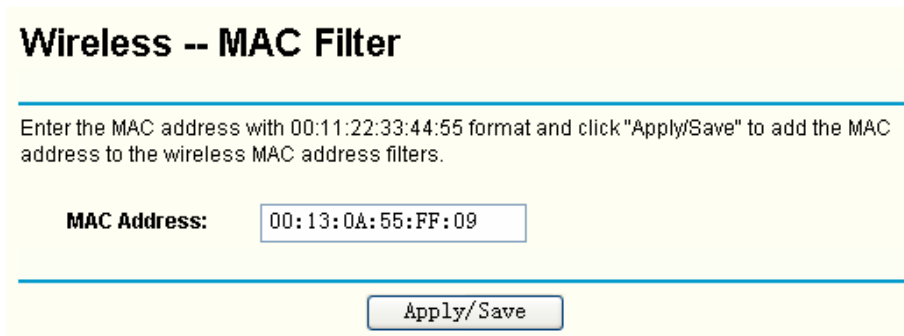
Wireless access can be filtered by using the MAC addresses of the wireless devices transmitting within your network's RADIUS. To filter wireless users by MAC Address, either permitting or blocking access. If you do not wish to filter users by MAC Address, select Disabled.

- **Disabled:** Select this option to disable MAC Filter function.
- **Allow:** Select this option to enable MAC Filter function that allow wireless access by the devices listed on this screen.
- **Deny:** Select this option to enable MAC Filter function that block wireless access from the devices listed on this screen.
- **Add:** Click this button to add the MAC Address.
- **Remove:** Select the item of the MAC Address and click this button to remove it.

When you click the **Add** button, the pop-up picture shown below, and then you can type the MAC Address in the **MAC Address** field.

 **Note:**

The form of MAC Address must be "xx:xx:xx:xx:xx:xx", like "00:13:0A:55:FF:09".



Wireless -- MAC Filter

Enter the MAC address with 00:11:22:33:44:55 format and click "Apply/Save" to add the MAC address to the wireless MAC address filters.

MAC Address:

Figure 4-90

When you finished making changes to the MAC Filter List screen, click Save/Apply to save the changes.

4.5.4 Wireless Bridge

Choose "Wireless" → "Wireless Bridge", you will see the screen of **Wireless-Bridge** settings shown as below. You can configure wireless bridge features of the wireless LAN interface and click **Apply/Save** button to save the current configuration.

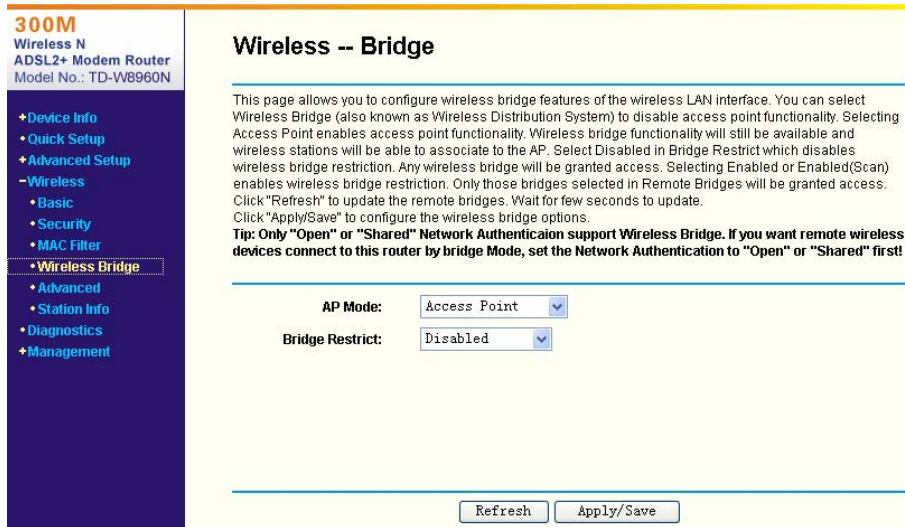


Figure 4-91

- **AP Mode:** Select an AP Mode from the drop-down list. Options available are: Access Point and Wireless Bridge.
 - **Access Point:** Select this option to allow wireless stations including AP clients to access.
 - **Wireless Bridge:** Also known as WDS (Wireless Distribution System), it will bridges the wireless stations which also in bridge mode to connect two or more remote LANs.
- **Bridge Restrict:**
 - **Disabled:** Select this option to disables wireless bridge restriction, that any wireless bridge will be granted access.
 - **Enabled:** Select this option (as shown below) to enables wireless bridge restriction, please enter the MAC address of the Remote Bridges that you want to connect with, and only these Remote Bridges are granted access.

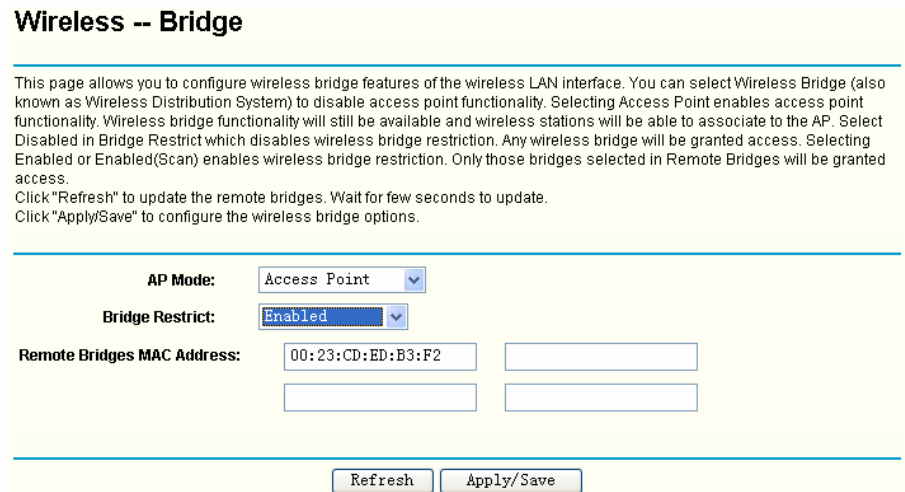


Figure 4-92

- **Enabled (Scan):** Select this option to enables wireless bridge restriction, and it will scan the environment for APs that exist around the device. Only those selected AP will be granted access.
- **Refresh:** Click this button to scan and display the APs.

Wireless -- Bridge

This page allows you to configure wireless bridge features of the wireless LAN interface. You can select Wireless Bridge (also known as Wireless Distribution System) to disable access point functionality. Selecting Access Point enables access point functionality. Wireless bridge functionality will still be available and wireless stations will be able to associate to the AP. Select Disabled in Bridge Restrict which disables wireless bridge restriction. Any wireless bridge will be granted access. Selecting Enabled or Enabled(Scan) enables wireless bridge restriction. Only those bridges selected in Remote Bridges will be granted access. Click "Refresh" to update the remote bridges. Wait for few seconds to update. Click "Apply/Save" to configure the wireless bridge options.

AP Mode:

Bridge Restrict:

Remote Bridges MAC Address:

	SSID	BSSID
<input checked="" type="checkbox"/>	TP-LINK_EDB3F0	00:23:CD:ED:B3:F2
<input type="checkbox"/>	TP-LINK_5110_1	00:0A:EB:88:34:73
<input type="checkbox"/>	TP-LINK_010614	00:1D:0F:01:06:14
<input type="checkbox"/>	TP-LINK_88889C	00:1D:0F:88:88:9C
<input type="checkbox"/>	TP-LINK_130919	00:0A:EB:13:09:1B
<input type="checkbox"/>	WLAN_AP	00:19:E0:8F:4A:3F

Refresh Apply/Save

Figure 4-93

 **Note:**

Only Open or Shared authentication method support wireless bridge, you should choose "Wireless"→"Security" to change authentication method to "open" or "shared" mode first.

4.5.5 Advanced

Choose "Wireless"→"Advanced", you will see the screen of **Wireless-Advanced** settings shown as below.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- Device Info
- Quick Setup
- Advanced Setup
- Wireless
 - Basic
 - Security
 - MAC Filter
 - Wireless Bridge
 - **Advanced**
 - Station Info
- Diagnostics
- Management

Wireless -- Advanced

This page allows you to configure advanced features of the wireless LAN interface. You can select a particular channel on which to operate, set the fragmentation threshold, set the RTS threshold, set the wakeup interval for clients in power-save mode, set the beacon interval for the access point.
Tips: If you set Mode to "11n only", you couldn't set Wireless encryption type to "WEP" or "TKIP". Click "Apply/Save" to configure the advanced wireless options.

Channel:	6
Mode:	11bgn
Bandwidth:	40MHz
Control Sideband:	Lower
Fragmentation Threshold:	2346
RTS Threshold:	2347
DTIM Interval:	1
Beacon Interval:	100
Transmit Power:	100%
WMM(Wi-Fi Multimedia):	Enabled

Apply/Save

Figure 4-94

- **Channel:** Select the channel you want to use from the drop-down List. This field determines which operating frequency will be used. It is not necessary to change the wireless channel unless you notice interference problems with another nearby access point.
- **Mode:** In the drop-down list you can select "11b", "11bg", "11bgn" and "11n only". "11bgn" allows both 802.11b, 802.11g and 802.11n wireless stations to connect to the Router,
- **Bandwidth:** Select the Bandwidth you want to use from the drop-down List. If bigger bandwidth is selected, device could transmit and receive data with higher speed.
- **Control Sideband:** If bigger bandwidth is selected, this option will allow you select the Control Sideband you want.
- **Fragmentation Threshold:** This value specifies the maximum size for a packet before data is fragmented into multiple packets. If you experience a high packet error rate, you may slightly increase the Fragmentation Threshold. Setting the Fragmentation Threshold too low may result in poor network performance. Only minor reduction of the default value is recommended. In most cases, it should remain at its default value of 2346.
- **RTS Threshold:** Should you encounter inconsistent data flow, only minor reduction of the default value 2347 is recommended. If a network packet is smaller than the preset RTS threshold size, the RTS/CTS mechanism will not be enabled. The Router sends Request to Send (RTS) frames to a particular receiving station and negotiates the sending of a data frame. After receiving an RTS, the wireless station responds with a Clear to Send (CTS) frame to acknowledge the right to begin transmission. In most cases, keep its default value of 2347.
- **DTIM Interval:** This value, between 1 and 255, indicates the interval of the Delivery Traffic Indication Message (DTIM). A DTIM field is a countdown field informing clients of the next window for listening to broadcast and multicast messages. When the Router has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. Its clients hear the beacons and awaken to receive the broadcast and multicast messages. The default value is 1.

- **Beacon Interval:** Enter a value between 20-1000 milliseconds. The Beacon Interval value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the Router to synchronize the wireless network. The default value is 100.
- **Transmit Power:** This option will allow you to configure the wireless transmit power. High transmit power will extend the wireless signal range of the device and make the signal transmit more legible. Low transmit power with the smaller wireless signal range that will decrease the probability of interrupt by other Wi-Fi device.
- **WMM (Wi-Fi Multimedia):** This function can guarantee the packets with high-priority messages being transmitted preferentially. It is strongly recommended.

4.5.6 Station info

Choose “Wireless”→” Station info”, you will see the screen of **Wireless-Authenticated Stations** setting shown as below.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

Wireless -- Authenticated Stations

This page shows authenticated wireless stations and their status.

MAC	Associated	Authorized	SSID	Interface
00:23:CD:A9:86:95	Yes		TP-LINK_010001	wl0
00:0C:43:28:70:00	Yes		TP-LINK_317089	wl0

Refresh

Figure 4-95

This page shows authenticated wireless stations and their status.

- **MAC:** Displays the connected wireless station's MAC address.
- **Associated:** Displays whether the wireless station has associated with the access point.
- **Authorized:** Displays the information of Authentication.
- **SSID:** Displays the connected wireless station's SSID.
- **Interface:** Displays the connected wireless station's Interface mode.

4.6 Diagnostics

Choose “Diagnostics”, you will see the Diagnostics screen. This section describes the result of the test for the ENET (Ethernet) Connection, Wireless Connection and ADSL Synchronization. You can refer to the **Help** menu to get more information about the corresponding test.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- + Device Info
- + Quick Setup
- + Advanced Setup
- + Wireless
- + **Diagnostics**
- + Management

pppoe_0_0_35 Diagnostics

Your modem is capable of testing your DSL connection. The individual tests are listed below. If a test displays a fail status, click "Rerun Diagnostic Tests" at the bottom of this page to make sure the fail status is consistent. If the test continues to fail, click "Help" and follow the troubleshooting procedures.

Test the connection to your local network

Test your ENET(1-4) Connection:	PASS	Help
Test your ENET4 Connection:	FAIL	Help
Test your ENET3 Connection:	FAIL	Help
Test your ENET2 Connection:	FAIL	Help
Test your ENET1 Connection:	PASS	Help
Test your Wireless Connection:	PASS	Help

Test the connection to your DSL service provider

Test xDSL Synchronization:	FAIL	Help
Test ATM OAM F5 segment ping:	DISABLED	Help
Test ATM OAM F5 end-to-end ping:	DISABLED	Help

Test the connection to your Internet service provider

Test PPP server connection:	DISABLED	Help
Test authentication with ISP:	DISABLED	Help
Test the assigned IP address:	DISABLED	Help
Ping default gateway:	FAIL	Help
Ping primary Domain Name Server:	FAIL	Help

Next Connection Test Test With OAM F4

Figure 4-96

4.7 Management

Choose "Management", there are six submenus under the main menu. They are **Settings**, **System Log**, **TR-069 client**, **Internet Time**, **Access Control**, **Update Software** and **Reboot**. Click any of them, and you will be able to configure the corresponding function.

- Management
- + Settings
- + System Log
- + SNMP Agent
- + TR-069 Client
- + Internet Time
- + Access Control
- + Update Software
- + Reboot

4.7.1 Settings

This section provides three important functions for managing the Router; they are **Backup**, **Update** and **Restore Default** (shown in Figure 4-97). The detailed manipulations are described below.

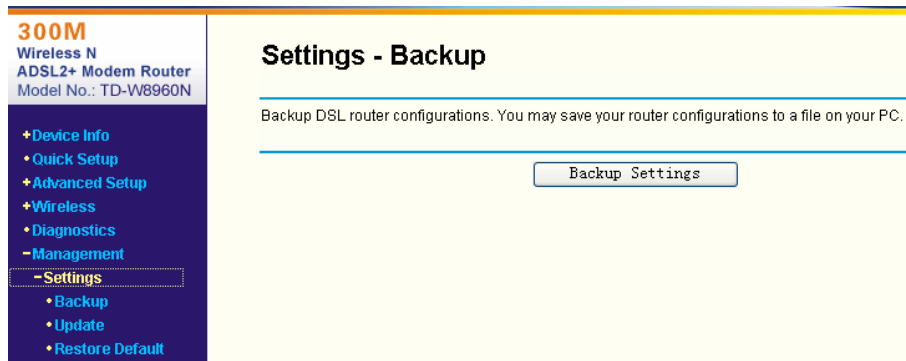


Figure 4-97

4.7.1.1 Backup

Choose “**Management**”→“**Settings**”→“**Backup**”, you can see the **Backup** screen, this screen (shown in Figure 4-98) allows you to save the current configuration of the Router as a backup file.

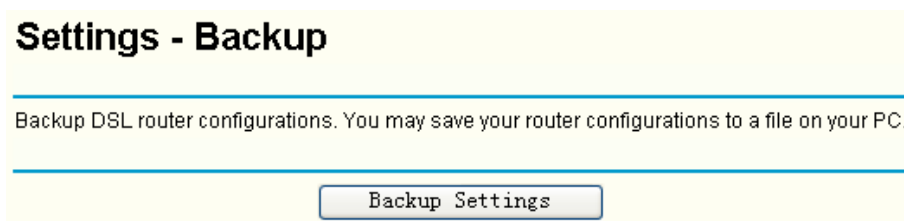


Figure 4-98

To back up the Router’s current settings:

1. Click the **Backup Settings** button on the preceding screen (pop-up Figure 4-98), the following screen will then appear (shown in Figure 4-99).

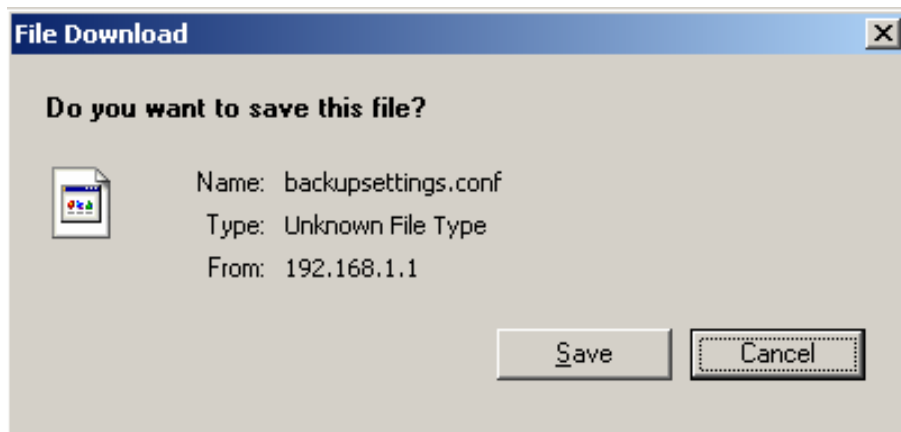


Figure 4-99

2. Click the **Save** button, and save the file as the appointed file (shown in Figure 4-100).

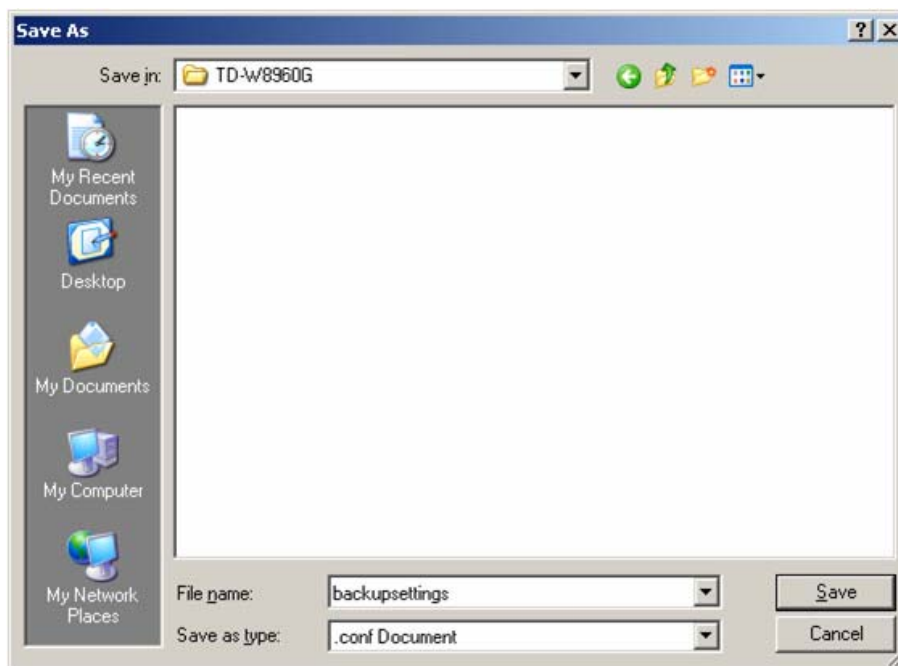


Figure 4-100

4.7.1.2 Update

Choose “**Management**”→“**Settings**”→“**Update**”, you can see the **Update** screen, this screen (shown in Figure 4-101) allows you to update the Router’s settings.

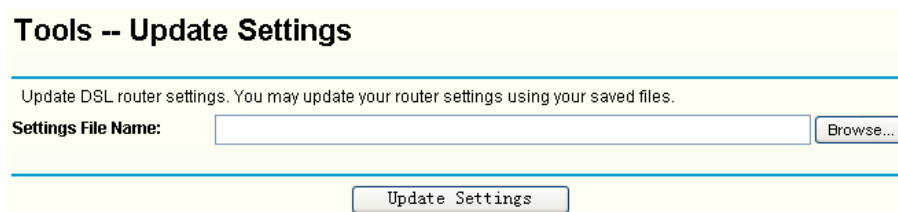


Figure 4-101

To update the Router’s settings:

1. Click the **Browse** button to locate the update file for the device, and you can also enter the exact path to the Setting file in the text box.
2. After you have selected the file for updating the settings, click the **Update Settings** button.

Note:

The Router will reboot upon completion. This process will take a while, don’t turn off the Router or press the **Reset** button while processing.

4.7.1.3 Restore Default

Choose “**Management**”→“**Settings**”→“**Restore Default**”, you can see the **Restore Default** screen, this screen (shown in Figure 4-102) allows you to restore the Router’s configuration to the factory defaults on the screen.

Tools -- Restore Default Settings

Restore DSL router settings to the factory defaults.

Restore Default Settings

Figure 4-102

- **Restore Default Settings:** Click this button to restore the Router's configuration to the factory defaults, and then follow the on-screen instructions to complete it.
- **Account and Password:** The default **account name** and its **password** are both admin.
- The default **IP Address:** 192.168.1.1.
- The default **Subnet Mask:** 255.255.255.0.

4.7.2 System Log

Choose "**Management**"→"**System Log**", you can see the **System Log** screen, this screen (shown in Figure 4-103) allows you to view the system log and configure the system log options.

System Log

The System Log dialog allows you to view the System Log and configure the System Log options.

Click "View System Log" to view the System Log.

Click "Configure System Log" to configure the System Log options.

View System Log

Configure System Log

Figure 4-103

To View the System Log:

Click the **View System Log** button, you will see the screen (shown in Figure 4-104) which displays the Router's recent logs.

System Log

Date/Time	Facility	Severity	Message
Apr24 00:48:13	syslog	emerg	TD-W8960G started: BusyBox v1.00 (2009.04.24-00:42+0000)

Refresh

Close

Figure 4-104

- **Refresh:** Click the button, the information in the table will be updated.
- **Close:** Click the button, the screen will be closed.

To Configure the System Log Settings:

Click the **Configure System Log** button (shown in Figure 4-103), you will see the screen below (shown in Figure 4-105).

System Log -- Configuration

If the log mode is enabled, the system will begin to log all the selected events. For the Log Level, all events above or equal to the selected level will be logged. For the Display Level, all logged events above or equal to the selected level will be displayed. If the selected mode is 'Remote' or 'Both,' events will be sent to the specified IP address and UDP port of the remote syslog server. If the selected mode is 'Local' or 'Both,' events will be recorded in the local memory.

Select the desired values and click 'Save/Apply' to configure the system log options.

Log:	<input type="radio"/> Disable <input checked="" type="radio"/> Enable
Log Level:	Debugging ▼
Display Level:	Error ▼
Mode:	Local ▼
Server IP Address:	<input type="text"/>
Server UDP Port:	<input type="text"/>

Figure 4-105

- **Disable/Enable:** Select the **Enable** to log the events, if you don't want to log these events, please select **Disable**.
- **Log Level:** Select the Log level in the drop-down list, for the Log level, all events above or equal to the selected level will be logged.
- **Display Level:** Select the Display level in the drop-down list, for the Display Level, all logged events above or equal to the selected level will be displayed.
- **Mode:** Select the mode to record the events. If the selected mode is **Local**, events will be recorded in the local memory. If the selected mode is **Remote**, events will be sent to the specified IP address and UDP port of the remote system log server. If the selected mode is **Both**, events will be sent to the local memory and the remote system log server.
- **Server IP Address:** Type the address of the server you want to record the events.
- **Server UDP Port:** Type the UDP Port of the server.

4.7.3 SNMP Agent

Choose "**Management**" → "**SNMP Agent**", you can see the SNMP-Configuration screen as shown below.

SNMP (Simple Network Management Protocol) has been widely applied in the computer networks currently, which is used for ensuring the transmission of the management information between any two nodes. In this way, network administrators can easily search and modify the information on any node on the network. Meanwhile, they can locate faults promptly and implement the fault diagnosis, capacity planning and report generating.

An **SNMP Agent** is an application running on the Router that performs the operational role of receiving and processing SNMP messages, sending responses to the SNMP manager, and sending traps when an event occurs. So a Router contains SNMP "agent" software can be monitored and/or controlled by SNMP Manager using SNMP messages.

An **SNMP Manager** or SNMP Service is an application that performs the operational roles of generating SNMP messages/requests to modify and retrieve management information, and receiving the requested information and trap-event reports that are generated by the SNMP agent. SNMP Manager is the third-party management system. Monitor one is an SNMP Manager.

300M
Wireless N
ADSL2+ Modem Router
Model No.: TD-W8960N

- Device Info
- Quick Setup
- Advanced Setup
- Wireless
- Diagnostics
- Management
 - Settings
 - System Log
 - **SNMP Agent**
 - TR-069 Client
 - Internet Time
 - Access Control
 - Update Software
 - Reboot

SNMP - Configuration

Simple Network Management Protocol (SNMP) allows a management application to retrieve statistics and status from the SNMP agent in this device.

Select the desired values and click "Apply" to configure the SNMP options.

SNMP Agent: Disable Enable

Read Community:

Set Community:

System Name:

System Location:

System Contact:

Trap Manager IP:

Figure 4-106

- **SNMP Agent:** You can select the checkbox to disable or enable the function.

Note:

SNMP Community string provides a simple method of authentication between the Router (SNMP Agent) and a remote network manager (SNMP Manager). You can specify the community string as the password to authenticate the management station to the Router.

- **Read Community:** This field allows you to specify the SNMP Community string which provides read-only access to the Router that the community is only permitted to read the device configuration. The default value is "public".
- **Set Community:** This field allows you to specify the SNMP Community string which provides read and write access to the Router that the community has the authority to read and change the device configuration. The default value is "public".
- **System Name:** Enter alphanumeric string to specify an SNMP community string name. Your Router (SNMP agents) will expose management data on the managed systems as this "system name".
- **System Location:** The person to notify when problems occur.
- **System contact:** The location of the person that is identified as the system contact.
- **Trap Manager IP:** Enter the IP address of the SNMP Manager, where the SNMP Agent forwards trap notifications.

Select the desired values and click **Save/Apply** to configure the SNMP options.

4.7.4 TR-069 client

Choose "**Management**" → "**TR-069 client**", you can see the TR-069 client - Configuration screen as shown below.

TR-069 (WAN Management Protocol) allows a Auto-Configuration Server (ACS) to perform auto-configuration, provision, collection, and diagnostics to this device.

TR-069 client - Configuration

WAN Management Protocol (TR-069) allows a Auto-Configuration Server (ACS) to perform auto-configuration, provision, collection, and diagnostics to this device.

Select the desired values and click "Save/Apply" to configure the TR-069 client options.

Inform: Disable Enable

Inform Interval:

ACS URL:

ACS User Name:

ACS Password:

WAN Interface used by TR-069 client: ▾

Display SOAP messages on serial console: Disable Enable

Connection Request Authentication

Connection Request User Name:

Connection Request Password:

Connection Request URL:

Figure 4-107

- **Inform:** You can select the checkbox to disable or enable the **Inform Interval**.
- **Inform Interval:** Type the interval time of your Router contact with the **ACS**.
- **ACS URL:** Please accept this information from your ISP. And through **ACS** (Auto-Configuration Server) you can perform auto-configuration, provision, collection, and diagnostics to this router.
- **ACS User Name:** Please accept this User Name information from your ISP.
- **ACS Password:** Please accept the Password information from your ISP.

 **Note:**

If you want to log on the **ACS**, you must own the **ACS User Name** and **ACS Password**.

- **WAN Interface used by TR-069 Client:** Please select the WAN Interface from the drop-down list to perform this function.
- **Connection Request User Name:** Type the Connection Request User Name, set it yourself.
- **Connection Request Password:** Type the Connection Request Password, set it yourself.

 **Note:**

The Connection Request User Name and Connection Request Password used for **ACS** log on the Router and manage it.

Select the desired values and click Save/Apply to configure the TR-069 client options.

4.7.5 Internet Time

Choose “**Management**”→“**Internet Time**”, you can see the Time settings screen, this screen (shown in Figure 4-108) allows you to set the time for the Router.

Time settings

This page allows you to the modem's time configuration.

Automatically synchronize with Internet time servers

First NTP time server: time.nist.gov

Second NTP time server: ntp1.tummy.com

Third NTP time server: None

Fourth NTP time server: None

Fifth NTP time server: None

Time zone offset: (GMT-00:00) Greenwich Mean Time: Dub.

Save/Apply

Figure 4-108

To set the Router's time:

1. Select automatically synchronize with Internet time servers.
2. Select the First NTP time server and/or the Second NTP time server in the drop-down list severally.
3. Select your local time zone.
4. Click the **Save/Apply** button.

Note:

- 1) This setting will be used for some time-based functions such as firewall. You must specify your time zone once you login to the Router successfully, if not, the time limited on these functions will not take effect.
- 2) The time will be lost if the Router is turned off.
- 3) The Router will obtain the time automatically from Internet if it has already connected to Internet.

4.7.6 Access Control- Passwords

Choose “**Management**”→“**Access Control**”→“**Password**”, you can see the screen (shown in Figure 4-109) which allows you to change the factory default password of the Router.

Access Control -- Password

Access to your DSL router is controlled through three user accounts: admin, support, and user.

The user name "admin" has unrestricted access to change and view configuration of your DSL Router.

The user name "support" is used to allow an ISP technician to access your DSL Router for maintenance and to run diagnostics.

The user name "user" can access the DSL Router, view configuration settings and statistics, as well as, update the router's software.

Use the fields below to enter up to 16 characters and click "Apply" to change or create passwords. Note: Password cannot contain a space.

Username:	<input type="text"/>
Old Password:	<input type="text"/>
New Password:	<input type="text"/>
Confirm Password:	<input type="text"/>

The Username dropdown menu is open, showing the following options: admin, support, user.

Save/Apply

Figure 4-109

To change the password:

1. Select the **Username** whose password you want to change.
2. Enter the **Old Password** in the text box.
3. Enter the **New Password** and **Confirm Password**. The Confirm Password should be the same as the New Password.
4. Click Save/Apply to make your change take effect.

Note:

Access to your DSL router is controlled through three user accounts: admin, support, and user. The user name "admin" has unrestricted access to change and view configuration of your DSL Router. The user name "support" is used to allow an ISP technician to access your DSL Router for maintenance and to run diagnostics. The user name "user" can access the DSL Router, view configuration settings and statistics, as well as, update the router's software.

Note:

The password cannot contain a space, and its maximum length is 16 characters.

4.7.7 Update Software

Choose **"Management"** → **"Update Software"**, you can see the screen (shown in Figure 4-110) which allows you to upgrade the latest version software to keep the Router up to date.

Tools -- Update Firmware

Step 1: Obtain an updated firmware image file from our website (www.tp-link.com).

Step 2: Enter the path to the image file location in the box below or click the "Browse" button to locate the image file.

Step 3: Click the "Update Firmware" button once to upload the new image file.

NOTE: The update process takes about 2 minutes to complete, and your DSL Router will reboot.

Firmware File Name:

Figure 4-110

- **Browse:** Click the button to locate the latest software for the device.
- **Update Firmware:** After you have selected the latest software, click the button.

To update the Router's software:

1. Download the latest software upgrade file from the TP-LINK website (www.tp-link.com).
2. Click **Browse** to view the folders and select the image file or enter the exact path to the image file location in the text box.
3. Click the **Update Firmware** button.

Note:

- 1) Do not turn off the Router or press the **Reset** button while the software is being updated.
- 2) The Router will reboot after the Upgrading is finished.

4.7.8 Reboot

Choose "**Management**" → "**Reboot**", you can see the screen (shown in Figure 4-111) which allows you to reboot the Router.

Reboot router

Click the button below to reboot the router.

Figure 4-111

Note:

- 1) After you clicked the **Reboot** button, please wait for a while before reopening your web browser.
- 2) Do not turn off the Router or press the **Reset** button while the Router is rebooting.
- 3) If necessary, reconfigure your PC's IP address to match your new configuration.

Appendix A: FAQ

1. How do I configure the Router to access Internet by ADSL users?

- 1) First, configure the ADSL Modem configured in RFC1483 bridge model.
- 2) Connect the Ethernet cable from your ADSL Modem to the WAN port on the Router. The telephone cord plugs into the Line port of the ADSL Modem.
- 3) Log in to the Router, and configure the WAN connection type as PPPoE connection mode. The detailed steps please refer to section 4.4.2.1 ATM-EoA-PPPoE.
- 4) If your ADSL lease is in "pay-according-time" mode, select "Dial on Demand" for Internet connection mode on the screen of Figure 4-11.

 **Note:**

If you are a Cable user, please configure the Router following the above steps.

2. How do I configure the Router to access Internet by Ethernet users?

Log in to the Router, and configure the WAN connection type as IPoE connection mode. The detailed steps please refer to section 4.4.2.2 ATM-EoA-IPoE.

3. I want to use NetMeeting, what do I need to do?

- 1) If you start NetMeeting as a sponsor, you don't need to do anything with the Router.
- 2) If you start as a response, you need to configure Virtual Server or DMZ Host.
- 3) How to configure Virtual Server: Log in to the Router, click the "Advanced Setup-NAT" menu on the left of your browser, and click "Virtual Servers" submenu. On the "Virtual Servers" page, click **Add**, and enter "1720" for the service port, using 192.168.1.222 for Server IP Address, remember to click the **Save/Apply** button.

NAT -- Virtual Servers

Select the service name, and enter the server IP address and click "Apply/Save" to forward IP packets for this service to the specified server.

NOTE: The "Internal Port End" cannot be modified directly. Normally, it is set to the same value as "External Port End". However, if you modify "Internal Port Start", then "Internal Port End" will be set to the same value as "Internal Port Start".

Remaining number of entries that can be configured: 32

Use Interface:

Service Name:
 Select a Service:
 Custom Service:
 Server IP Address:

External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End
<input type="text" value="1720"/>	<input type="text" value="1720"/>	TCP/UDP	<input type="text" value="1720"/>	<input type="text" value="1720"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP	<input type="text"/>	<input type="text"/>

 **Note:**

Your opposite side should call your WAN IP, which is displayed on the "Status" page.

- How to enable DMZ Host: Log in to the Router, click the "Advanced Setup-NAT" menu on the left of your browser, and click "DMZ Host" submenu. On the "DMZ" page, type your IP address into the "DMZ Host IP Address" field, using 192.168.1.222 as an example, remember to click the **Save/Apply** button.

NAT -- DMZ Host

The DSL router will forward IP packets from the WAN that do not belong to any of the applications configured in the Virtual Servers table to the DMZ host computer.

Enter the computer's IP address and click "Save/Apply" to activate the DMZ host.

Clear the IP address field and click "Apply" to deactivate the DMZ host.

DMZ Host IP Address:

4. I want to build a WEB Server on the LAN, what should I do?

Log in to the Router, click the "Advanced Setup-NAT" menu on the left of your browser, and click the "Virtual Servers" submenu. On the "Virtual Servers" page, click **Add New**, then on

the “**Add or Modify a Virtual Server**” page, enter “80” into the blank next to the “**Service Port**”, and your IP address next to the “**IP Address**”, assuming 192.168.1.188 for an example, remember to click the **Save/Apply** button.

NAT -- Virtual Servers

Select the service name, and enter the server IP address and click "Apply/Save" to forward IP packets for this service to the specified server.

NOTE: The "Internal Port End" cannot be modified directly. Normally, it is set to the same value as "External Port End". However, if you modify "Internal Port Start", then "Internal Port End" will be set to the same value as "Internal Port Start".

Remaining number of entries that can be configured: 32

Use Interface:

Service Name:

Select a Service:

Custom Service:

Server IP Address:

External Port Start	External Port End	Protocol	Internal Port Start	Internal Port End
<input type="text" value="80"/>	<input type="text" value="80"/>	TCP <input type="text" value="v"/>	<input type="text" value="80"/>	<input type="text" value="80"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	TCP <input type="text" value="v"/>	<input type="text"/>	<input type="text"/>

Note:

Because the WEB Server port 80 will interfere with the WEB management port 80 on the Router, you will be prompted to change the WEB management port number to avoid interference.



5. The wireless stations cannot connect to the Router.

- 1) Make sure the "Enable Wireless Router Radio" is checked.
- 2) Make sure that the wireless stations' SSID accord with the Router's SSID.
- 3) Make sure the wireless stations have right KEY for encryption when the Router is encrypted.
- 4) If the wireless connection is ready, but you can't access the Router, check the IP Address of your wireless stations.

Appendix B: Configuring the PC

In this section, we'll introduce how to install and configure the TCP/IP correctly in Windows XP. First make sure your Ethernet Adapter is working, refer to the adapter's manual if necessary.

1. Configure TCP/IP component

- 1) On the Windows taskbar, click the **Start** button, and then click **Control Panel**.
- 2) Click the **Network and Internet Connections** icon, and then click on the **Network Connections** tab in the appearing window.
- 3) Right click the icon that showed below, select Properties on the prompt page.

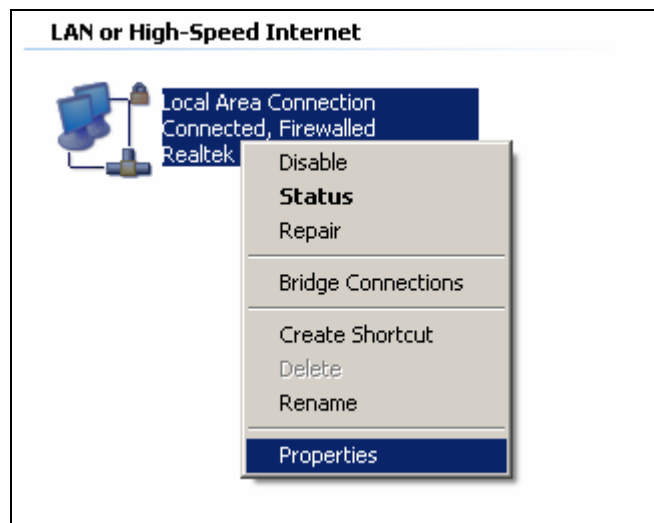


Figure 0-1

- 4) In the prompt page that showed below, double click on the **Internet Protocol (TCP/IP)**.

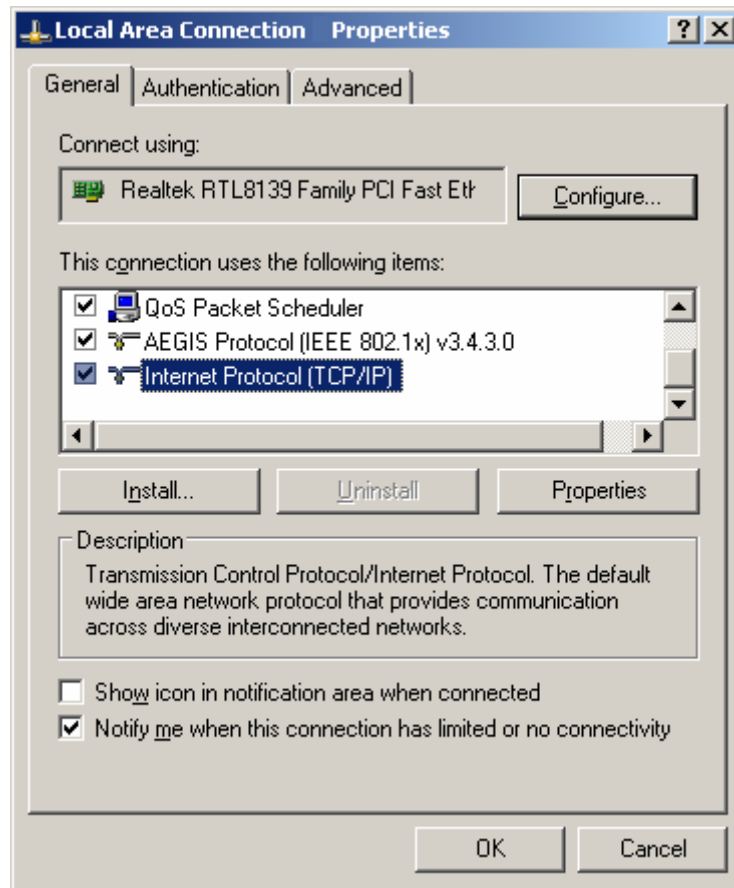


Figure 0-2

- 5) The following **TCP/IP Properties** window will display and the **IP Address** tab is open on this window by default.

Now you have two ways to configure the **TCP/IP** protocol below:

➤ **Setting IP address automatically**

Select **Obtain an IP address automatically**, Choose **Obtain DNS server automatically**, as shown in the Figure below:

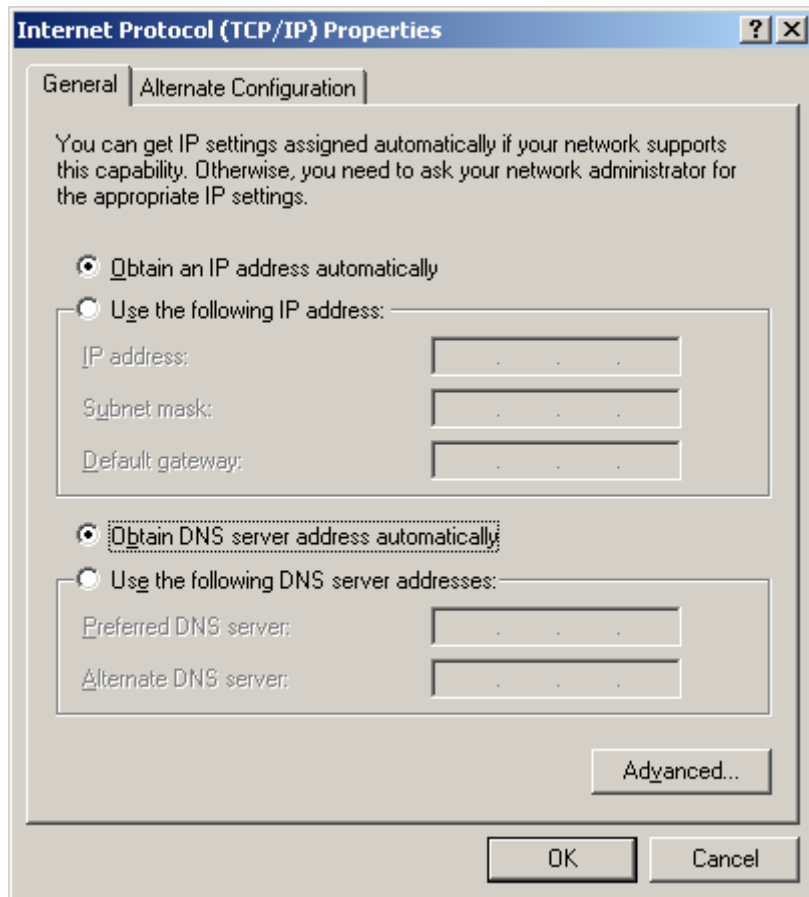


Figure 0-3

 **Note:** For Windows 98 OS or before, the PC and Router may need to be restarted.

➤ **Setting IP address manually**

- 1 Select **Use the following IP address** radio button. And the following items available
- 2 If the Router's LAN IP address is 192.168.1.1, specify the **IP address** as 192.168.1.x (x is from 2 to 254), and the **Subnet mask** as 255.255.255.0.
- 3 Type the Router's LAN IP address (the default IP is 192.168.1.1) into the **Default gateway** field.
- 4 Select **Use the following DNS server addresses**. In the **Preferred DNS Server** field you can enter the same value as the **Default gateway** or type the local DNS server IP address.

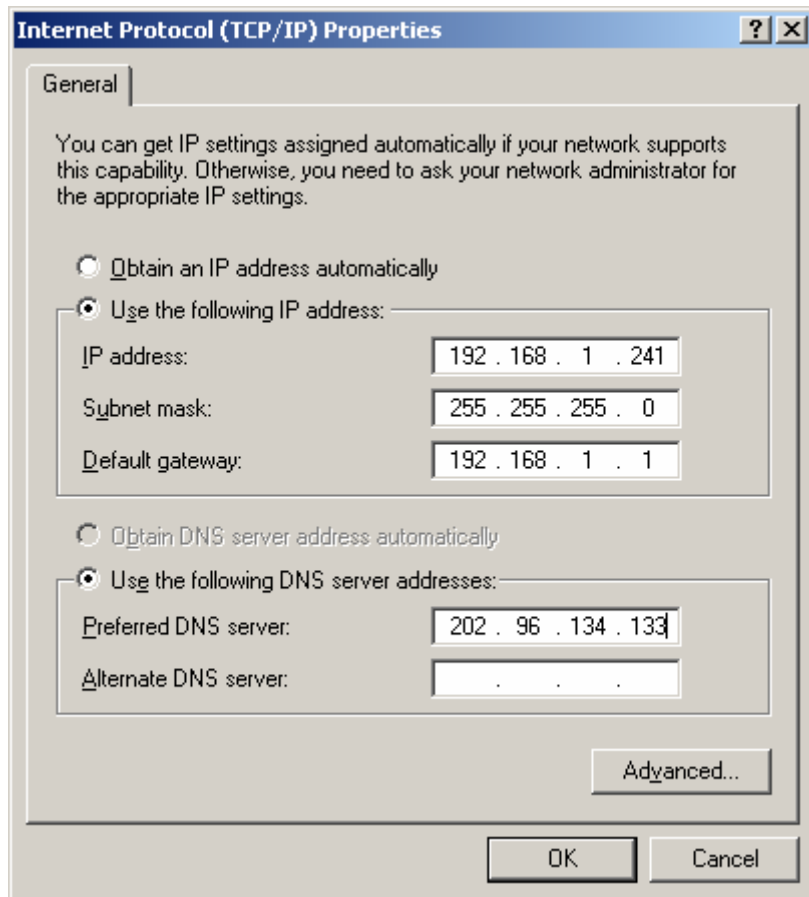


Figure 0-4

Now:

Click **OK** to keep your settings.

Appendix C: Specifications

General	
Standards	ANSI T1.413, ITU G.992.1, ITU G.992.2, ITU G.992.3, ITU G.992.5, IEEE 802.3, IEEE 802.3u, IEEE 802.11b , IEEE 802.11g , 802.11n (draft 2.0)
Protocols	TCP/IP, IPoA , PPPoA , PPPoE, SNTP, HTTP, DHCP, ICMP, NAT
Ports	LAN Ports: Four 10/100M Auto-Negotiation RJ45 ports (Auto MDI/MDIX)
	Line Ports: One RJ11 port
Cabling Type	10BASE-T: UTP category 3, 4, 5 cable (maximum 100m) EIA/TIA-568 100Ω STP (maximum 100m)
	100BASE-TX: UTP category 5, 5e cable (maximum 100m) EIA/TIA-568 100Ω STP (maximum 100m)
LED	1,2,3,4(LAN), WLAN, ADSL
	Power, Internet, QSS
Safety & Emissions	FCC, CE

Wireless	
Frequency Band	2.4~2.4835GHz
Radio Data Rate	11n: up to 300Mbps (Automatic) 11g: 54/48/36/24/18/12/9/6Mbps (Automatic) 11b: 11/5.5/2/1Mbps (Automatic)
Channels	13
Frequency Expansion	DSSS(Direct Sequence Spread Spectrum)
Modulation	DBPSK, DQPSK, CCK, OFDM, 16-QAM, 64-QAM
Security	WEP/WPA/WPA2/WPA2-PSK/WPA-PSK
Sensitivity @PER	270M: -62dBm@10% PER 130M: -64dBm@10% PER 54M: -68dBm@10% PER 11M: -85dBm@8% PER 6M: -88dBm@10% PER 1M: -90dBm@8% PER

Environmental and Physical	
Temperature.	Operating: 0°C~40°C (32°F~104°F)
	Storage: -40°C~70°C(-40°F~158°F)
Humidity	Operating: 10% - 90% RH, Non-condensing
	Storage: 5% - 90% RH, Non-condensing

Appendix D: Glossary

- **802.11n** - 802.11n builds upon previous 802.11 standards by adding MIMO (multiple-input multiple-output). MIMO uses multiple transmitter and receiver antennas to allow for increased data throughput via spatial multiplexing and increased range by exploiting the spatial diversity, perhaps through coding schemes like Alamouti coding. The Enhanced Wireless Consortium (EWC) [3] was formed to help accelerate the IEEE 802.11n development process and promote a technology specification for interoperability of next-generation wireless local area networking (WLAN) products.
- **802.11b** - The 802.11b standard specifies a wireless networking at 11 Mbps using direct-sequence spread-spectrum (DSSS) technology and operating in the unlicensed radio spectrum at 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks.
- **802.11g** - specification for wireless networking at 54 Mbps using direct-sequence spread-spectrum (DSSS) technology, using OFDM modulation and operating in the unlicensed radio spectrum at 2.4GHz, and backward compatibility with IEEE 802.11b devices, and WEP encryption for security.
- **2x to 3x eXtended Range™ WLAN Transmission Technology** - The WLAN device with 2x to 3x eXtended Range™ WLAN transmission technology make its sensitivity up to 105 dB, which gives users the ability to have robust, longer-range wireless connections. With this range-enhancing technology, a 2x to 3x eXtended Range™ based client and access point can maintain a connection at as much as three times the transmission distance of traditional 802.11b and 802.11g products, for a coverage area that is up to nine times greater. A traditional 802.11b and 802.11g product transmission distance is about 300m, a 2x to 3x eXtended Range™ based client and access point can maintain a connection transmission distance may be up to 830m.
- **Access Point** - A device that allows wireless-equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network.
- **Ad-hoc Network** - An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent IEEE 802.11 wireless LAN. Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation.
- **AES (Advanced Encryption Standard)** - A security method that uses symmetric 128-bit block data encryption.
- **ACS (Auto-Configuration Server)** - Through **ACS** (Auto-Configuration Server) you can perform auto-configuration, provision, collection, and diagnostics to the device.
- **ATM (Asynchronous Transfer Mode)** - ATM is a cell based transfer mode that requires variable length user information to be segmented and reassembled to/from short, fixed length cells. It uses two different methods for carrying connectionless network interconnect traffic, routed and bridged Protocol Data Units (PDUs), over an ATM network.
- **Bridging** - A device that connects different networks.

- **Browser** - An application program that provides a way to look at and interact with all the information on the World Wide Web.
- **DDNS (Dynamic Domain Name System)** - Allows the hosting of a website, FTP server, or e-mail server with a fixed domain name (e.g., www.xyz.com) and a dynamic IP address.
- **Default Gateway** - A device that forwards Internet traffic from your local area network.
- **DHCP** - A networking protocol that allows administrators to assign temporary IP addresses to network computers by “leasing” an IP address to a user for a limited amount of time, instead of assigning permanent IP addresses.
- **DMZ (Demilitarized Zone)** - Removes the Router's firewall protection from one PC, allowing it to be “seen” from the Internet.
- **DNS (Domain Name Server)** - The IP address of your ISP's server, which translates the names of websites into IP addresses.
- **Domain** - A specific name for a network of computers.
- **DSL (Digital Subscriber Line)** - An always-on broadband connection over traditional phone lines.
- **Dynamic IP Address** - A temporary IP address assigned by a DHCP server.
- **EAP (Extensible Authentication Protocol)** - A general authentication protocol used to control network access. Many specific authentication methods work within this framework.
- **Encryption** - Encoding data transmitted in a network.
- **Ethernet** - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium.
- **Firewall** - A set of related programs located at a network gateway server that protects the resources of a network from users from other networks.
- **Gateway** - A device that interconnects networks with different, incompatible communications protocols.
- **IEEE 802.11b** - The IEEE 802.11b standard specifies a wireless networking at 11 Mbps using direct-sequence spread-spectrum (DSSS) technology and operating in the unlicensed radio spectrum at 2.4GHz, and WEP encryption for security. IEEE 802.11b networks are also referred to as Wi-Fi networks.
- **IEEE 802.11g** - Specification for wireless networking at 54 Mbps using direct-sequence spread-spectrum (DSSS) technology, using OFDM modulation and operating in the unlicensed radio spectrum at 2.4GHz, and backward compatibility with IEEE 802.11b devices, and WEP encryption for security.
- **Infrastructure Network** - An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an IEEE 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.
- **IP Address** - The address used to identify a computer or device on a network.

- **IPoA (IP and ARP over ATM)** - A protocol that provides extensions to the IP Group for handling IP over ATM flows.
- **ISP (Internet Service Provider)** - A company that provides access to the Internet.
- **LAN** - The computers and networking products that make up your local network.
- **MAC (Media Access Control) Address** - The unique address that a manufacturer assigns to each networking device.
- **NAT (Network Address Translation)** - NAT technology translates IP addresses of a local area network to a different IP address for the Internet.
- **MER (MAC Encapsulation Routing)** - MER allows IP packet to be carried as bridged frames. There are many applications, such as IPoA, DSL networks and other frame-based network. Depending on your equipment, they can be either bridged or routed within the network.
- **Network** - A series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.
- **Ping (Packet Internet Groper)** - An Internet utility used to determine whether a particular IP address is online.
- **Port** - The connection point on a computer or networking device used for plugging in cables or adapters.
- **PPPoE (Point to Point Protocol over Ethernet)** - PPPoE stands for Point to Point protocol over Ethernet, this protocol is used as a type of broadband connection that provides authentication (username and password) in addition to data transport.
- **PPPoA (Point to Point Protocol over ATM)** - PPPoA stands for Point to Point protocol over ATM, this protocol is also used as a type of broadband connection that provides authentication (username and password) in addition to data transport.
- **RADIUS (Remote Authentication Dial-In User Service)** - A protocol that uses an authentication server to control network access.
- **RJ45 (Registered Jack-45)** - An Ethernet connector that holds up to eight wires.
- **Router** - A networking device that connects multiple networks together.
- **RPC (Remote Procedure Calls)** - RPC is a powerful technique for constructing distributed, client-server based applications. It is based on extending the notion of convention, or local procedure calling, so that the called procedure need not exist in the same address space as the calling procedure. The two processes may be on the same system, or they may be on different systems with a network connecting them. By using RPC, programmers of distributed applications avoid the details of the interface with the network. The transport independence of RPC isolates the application from the physical and logical elements of the data communications mechanism and allows the application to use a variety of transports.
- **Server** - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.
- **SOHO (Small Office/Home Office)** - Market segment of professionals who work at home or in small offices.
- **SSID** - A Service Set Identification is a thirty-two character (maximum) alphanumeric key identifying a wireless local area network. For the wireless devices in a network to communicate with each other, all devices must be configured with the same SSID. This is

typically the configuration parameter for a wireless PC card. It corresponds to the ESSID in the wireless Access Point and to the wireless network name.

- **Static IP Address** - A fixed address assigned to a computer or device that is connected to a network.
- **Static Routing** - Forwarding data in a network via a fixed path.
- **Subnet Mask** - An address code that determines the size of the network.
- **TCP (Transmission Control Protocol)** - A network protocol for transmitting data that requires acknowledgement from the recipient of data sent.
- **TCP/IP (Transmission Control Protocol/Internet Protocol)** - A set of instructions PCs use to communicate over a network.
- **TKIP (Temporal Key Integrity Protocol)** - a wireless encryption protocol that provides dynamic encryption keys for each packet transmitted.
- **UDP (User Datagram Protocol)** - A network protocol for transmitting data that does not require acknowledgement from the recipient of the data that is sent.
- **VCI (Virtual Channel Identifier)** - The identifier of the VC contained in the ATM cell header.
- **VPI (Virtual Path Identifier)** - The identifier of the VP contained in the ATM cell header.
- **Update** - To replace existing software or firmware with a newer version.
- **VLAN (Virtual Local Air Network)** - Logical subgroups that constitute a Local Area Network (LAN). This is done in software rather than defining a hardware solution.
- **VLAN ID (0-4095)** - Indicates the ID number of the VLAN being configured. Up to 256 VLANs can be created.
- **WAN (Wide Area Network)** - Networks that cover a large geographical area.
- **Web-based Utility** - The web page that allows you to manage the Router.
- **WEP (Wired Equivalent Privacy)** - A data privacy mechanism based on a 64-bit or 128-bit or 152-bit shared key algorithm, as described in the IEEE 802.11g standard.
- **Wi-Fi** - A trade name for the IEEE 802.11b wireless networking standard, given by the Wireless Ethernet Compatibility Alliance (WECA, see <http://www.wi-fi.net>), an industry standards group promoting interoperability among IEEE 802.11b devices.
- **WLAN (Wireless Local Area Network)** - A group of computers and associated devices communicate with each other wirelessly, which network serving users are limited in a local area.
- **WPA (Wi-Fi Protected Access)** - A wireless security protocol use TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.