User Guide

www.tendacn.com

Wireless N150 Long Range AP/Router

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Thanks for purchasing thisW1500A Wireless N150 Outdoor Long Range AP/Router.

The Tenda W1500A is an outdoor long range wireless AP/router with wireless speed up to 150M. Combining the function of a wireless router, wireless AP, WISP, Client+AP and WDS, etc. the device nicely stands out in outdoor long range wireless connections, P2P, P2MP networking, wireless monitoring applications and much more.The W1500A is housed in an IP64 water/dust-proof enclosure. Also, it is lightning proof and power tunable. In addition to internal antenna design, it comes with an optional external antenna connector for DIY or upgrade. Plus, it is PoE capable and can be reset remotely.

1.1 Features

- Compliant with IEEE802.11n and backward compatible with IEEE802.11g/b
- Up to 150Mbps over 2.4G
- 5 operating modes: Wireless Router, Wireless AP, Wireless WAN (WISP), Universal Repeater (Client+AP) and Bridge
- Internal 10dBi directional antenna; plus optional external RP-SMA antenna connector for DIY or upgrade (To use an external antenna, you must first shift antenna type from internal to external on wireless module)
- Power tunable at 3 levels: high, medium and low
- Able to be powered by a passive PoE injector; flexibly deploy your AP at ease
- 6000V lightning proof design (bidirectional)
- Provides encryption methods of 64-/128-bit WEP, WPA-PSK and WPA2-PSK, etc to secure your wireless network
- Provides 1 WAN/LAN/PoE interchangeable port and 1 separate LAN port

- Wireless Roaming technology to ensure high-efficiency wireless connectivity
- Access Control based on MAC address
- Provides logs to record device's usage status
- Watchdog helps to recover system upon network failure
- Able to reset AP using the Reset button on the PoE injector
- Allow/disallow specified PCs on LAN to access Internet while operating in Router Mode
- Support virtual server and DMZ host when operating in Router Mode
- Support internal firewall to block attacks from hackers when operating in Router Mode

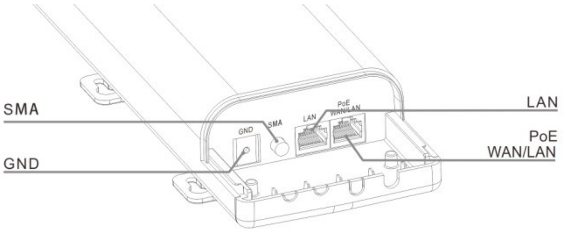
1.2 Package Content

Unpack the box and verify the following items:

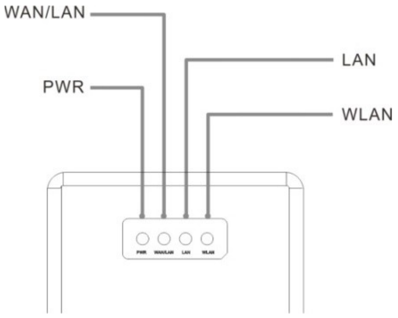
- W1500A x 1
- Screw x 2
- Nylon Ligature x 2
- Plastic Bag x 2
- Ethernet Cable x 1
- Power Adapter x 1
- Injector x 1
- Installation Guide x 1

If any of the above items are incorrect, missing, or damaged, please contact your Tenda reseller for immediate replacement.

1.3 Panel Overview



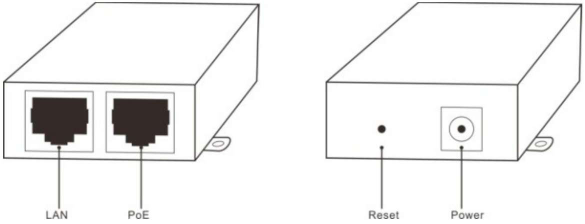
- **LAN/WAN/POE:** Provides 1 WAN/LAN/PoE interchangeable port, which functions as a WAN/PoE interchangeable port in router mode and a LAN/PoE port in AP mode
- **LAN:** Provides 1 10/100M LAN port
- **SMA interface**：RP-SMA connector for external antenna
- **GND**: Connect GND port on device to the ground using a copper wire for better lightning-proof



LEDs are described as below:

LED	Status	Description
PWR	A solid blue light	Device has electrical power
WAN/LAN	A solid blue light	Ethernet cable is connected
	A blinking blue light	Transferring data
LAN	A solid blue light	Ethernet cable is connected
	A blinking blue light	Transferring data
WLAN	Blue	Transmitting wireless signal at a high power level
	Pink	Transmitting wireless signal at a medium power level
	Red	Transmitting wireless signal at a low power level

Injector Overview



- **POE:** Power over Ethernet port.
- **LAN/WAN:** 100M Ethernet port.
- **Reset:** Pressing it for 8-10s restores device to factory default settings.
- **Power:** Power connector.

Chapter 2 Hardware Install

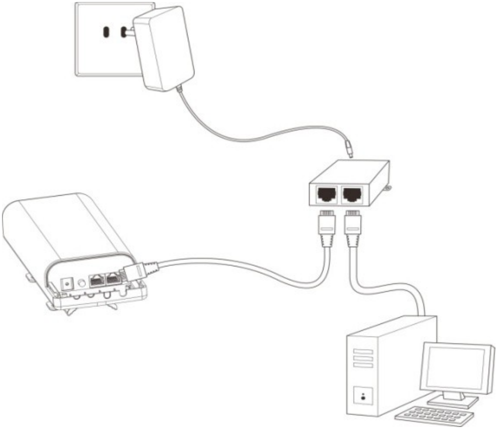
2.1 Hardware Install

Before you start configuring the device, follow below steps to install device. For extended wireless coverage, use an external omni-directional antenna and place device in the center of the area for better performance; to implement long range P2P or P2MP wireless bridge, use the internal directional antenna and position device properly for better performance.

2.1.1 Connect device to a power source

The device comes with a PoE injector. Please use it to power the device.

2.1.2 Network Connection



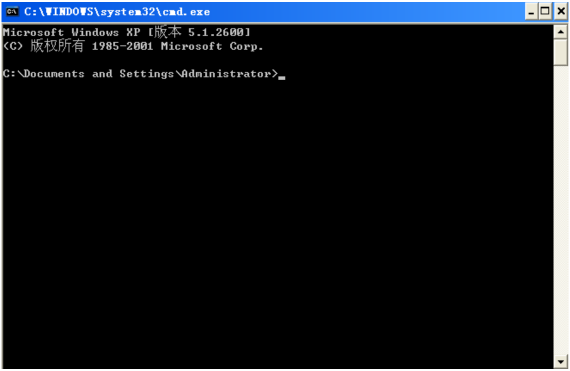
1. Connect the LAN/WAN/POE port on device to the PoE port on the injector using an Ethernet cable.

2. Connect PC to injector's LAN port using an Ethernet cable or wirelessly to the device via the SSID (The default SSID can be found on the label on the back of the device and is not encrypted by default).

Note:

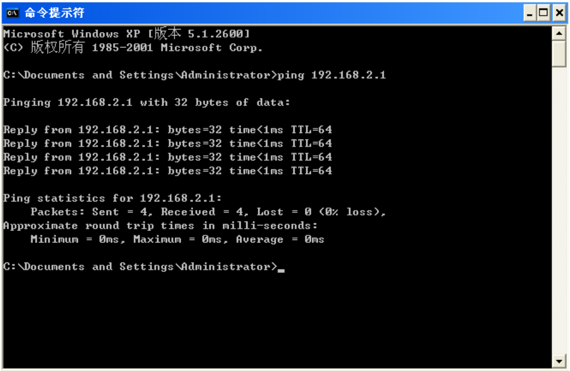
Device operates in AP mode by default. So you need to manually configure a static IP address for your PC. AP's LAN IP address is preset to 192.168.2.1 by default.So your PC's IP address should be 192.168.2.X (where X is any number between 2~254). For IP address configuration, see **Appendix 1**.

3. Use the Ping command to check the connectivity between your device and PC. Click Start -> Run, enter cmd and press Enter or click OK to enter interface below.



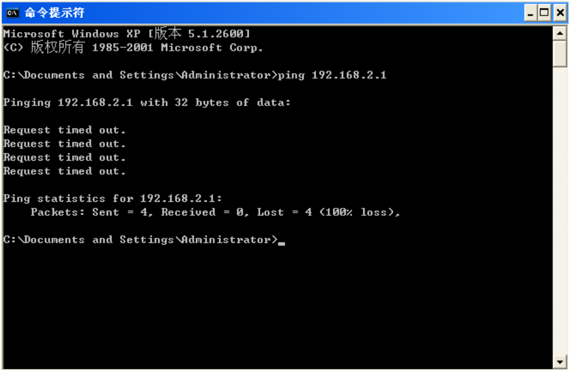
```
Microsoft Windows XP [版本 5.1.2600]
(C) 版权所有 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator>_
```

4. Input **ping 192.168.2.1** and press **Enter**.



```
Microsoft Windows XP [版本 5.1.2600]
(C) 版权所有 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time<1ms TTL=64
Reply from 192.168.2.1: bytes=32 time<1ms TTL=64
Reply from 192.168.2.1: bytes=32 time<1ms TTL=64
Reply from 192.168.2.1: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.2.1:
    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\Administrator>_
```

If you get a screen as shown in the screenshot above, your PC and device are interconnected.



```
Microsoft Windows XP [版本 5.1.2600]
(C) 版权所有 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Documents and Settings\Administrator>_
```

If you get a screen as shown in the screenshot above, your PC and device are not interconnected. Please follow below steps to troubleshoot the problem.

1) Verify Ethernet cable connection

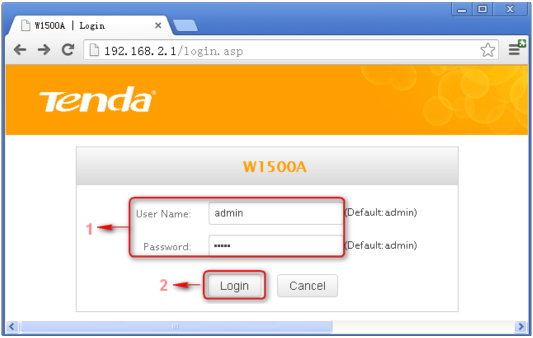
The LAN LED on the device and PC's adapter LED should be on.

2) Verify TCP/IP settings on your PC

To access device web utility while operating in AP mode or universal repeater mode, manually configure a static IP address for the PC. Just note that the IP address you configure must be on the same net segment as device LAN IP address. While in router mode, you can either manually specify an IP address for the PC or set it to **Obtain an IP address automatically**.

2.2 Quick Setup

The device is configurable and manageable through a web browser. Launch a web browser, in the address bar, input **192.168.2.1** and press **Enter**. Enter **admin** in both **User Name** and **Password** fields (Both default user name and password are admin).



W1500A | Login

192.168.2.1/login.asp

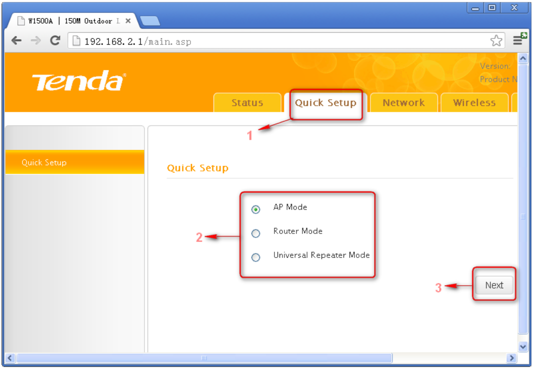
W1500A

User Name: admin (Default:admin)

Password: ••••• (Default:admin)

Click **Login** on the login window, and then click **Quick Setup**. Select a proper mode for device to operate on from **AP Mode**, **Router Mode** and **Universal**

Repeater Mode.



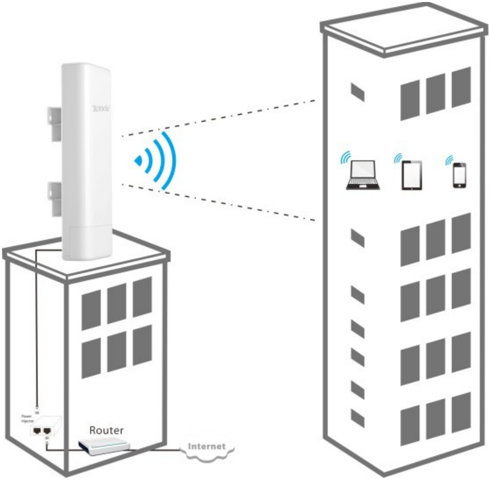
● AP Mode
○ Router Mode
○ Universal Repeater Mode

Operating Mode Overview:

- AP Mode: In this mode, the device converts the wired signal into wireless signals, extending existing network coverage. It works as a central access point for multiple wireless clients (generally, wireless adapters) concurrently.
- **Router Mode:** Operating in this mode, device functions as a regular wireless router. It supports PPPoE, dynamic IP (DHCP) , PPTP, L2TP and static IP Internet connection types and provide DHCP server feature that dynamically assigns IP addresses to DHCP-client-capable PCs for Internet connection sharing. Wireless WAN (WISP) and WDS features are available in this mode.
- **Universal Repeater Mode （Client+AP）：** Device wirelessly bridges an uplink device to repeat wireless and extend coverage.

2.2.1 AP Mode

See below for the typical network topology. Position device properly according to practical network environment.

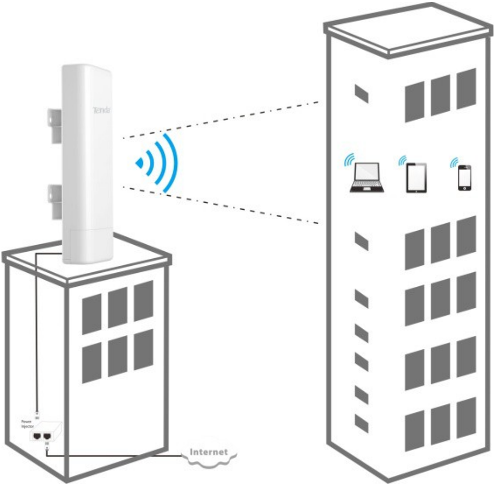


1. Connect the LAN/WAN/POE port on device to the POE port on the injector.
2. Connect the LAN port on the PoE injector to an uplink switch or router.
3. All PCs in the range will then be able to connect to this SSID wirelessly for Internet access.

Device operates in AP mode by default, so simply follow the topology above to establish th network. To configure other features like wireless, simply access the device web management utility. For details, see **Chapter**

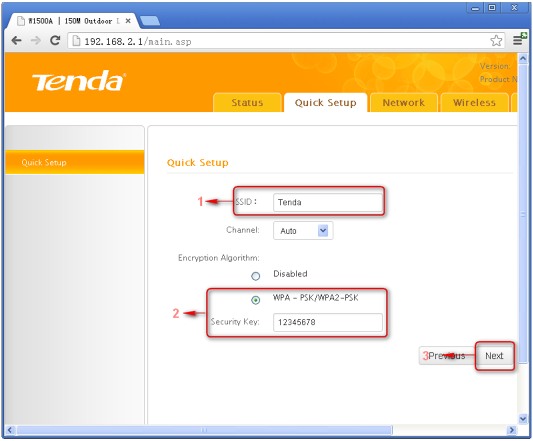
2.2.2 Router Mode

Typical Topology:



1. Connect the LAN/WAN/POE port on device to the POE port on the injector.
2. Connect the LAN port on PoE injector to ISP.
3. All PCs in the range will then be able to connect to this SSID wirelessly for Internet access.

1. Select **Router Mode**, click **Next** and then configure basic wireless settings including SSID, channel and security.



192.168.2.1/main.asp

Quick Setup

SSID : Tenda

Channel: Auto

Encryption Algorithm:

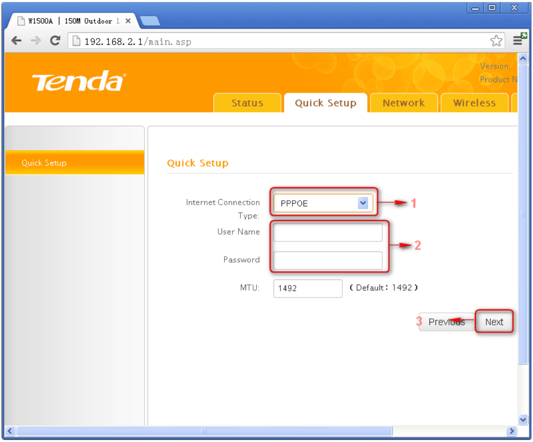
○ Disabled

● WPA – PSK/WPA2-PSK

Security Key: 12345678

- **SSID:** A SSID (Service Set Identifier) is the public name of a wireless network.
- **Channel:** For an optimal wireless performance, you may select the least interferential channel. It is advisable that you select an unused channel or **Auto** to let device detect and select the best possible channel for your wireless network to operate on from the drop-down list. The default is **Auto**.
- **Security Mode (Encryption Algorithm):** Select a proper encryption algorithm: WEP, WPA-PSK or WPA/WPA2-PSK. For more information, see **Chapter 4.**

2. Click **Next** and select a proper Internet connection type, say, **PPPoE**, **Static IP** or **DHCP**.



Quick Setup

Internet Connection Type: PPPOE

User Name:

Password:

MTU: 1492 (Default: 1492)

PPPoE: Select PPPoE (Point to Point Protocol over Ethernet) if you used to connect to the Internet using a broadband connection that requires a PPPoE user name and a PPPoE password. Simply enter the user name and password provided by your ISP in corresponding fields. If your ISP (Internet Service Providers) requires end-user's MAC address to access their network, you will then need to copy the registered MAC address to the device using the MAC Clone feature. Contact your ISP for help if you have any questions about these parameters.

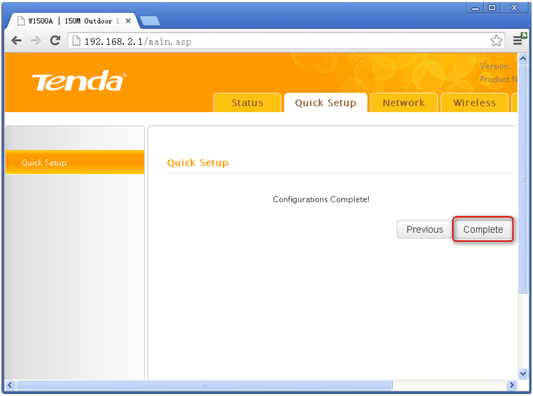
Static IP: Select Static IP if your ISP provides all the needed IP info. You will need to enter the provided IP address, subnet mask, gateway address, and DNS address(es) in corresponding fields. If your ISP (Internet Service Providers) requires end-user's MAC address to access their network, you will then need to copy the registered MAC address to the device using the MAC Clone feature. Contact your ISP for help if you have any questions about these parameters.

DHCP: Select DHCP (Dynamic IP) if you can access Internet as soon as your computer directly connects to an Internet-enabled ADSL/Cable modem. For this type, no configurations are required.

PPTP: Select PPTP (Point-to-Point-Tunneling Protocol) if your ISP uses a PPTP connection. The PPTP connects a router to a VPN server

L2TP: Select L2TP (Layer 2 Tunneling Protocol) if your ISP uses an L2TP connection. The L2TP connects your router to a L2TP server

Click **Next** and then **Finish**. Click **OK** and device will restart and will then operate in **Router Mode**. Now set your local PCs to **Obtain an IP address automatically**.



Configurations Complete!

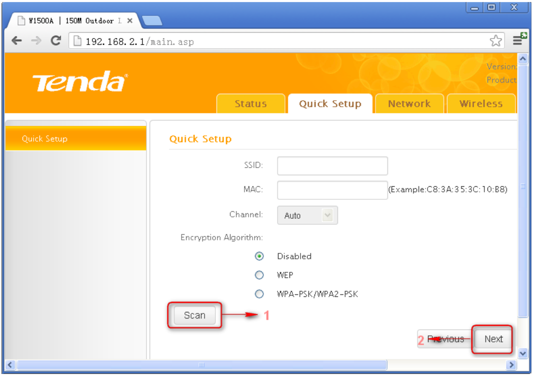
2.2.3 Universal Repeater Mode

Typical Topology:

AP1 that operates in **Router Mode** has connected to Internet. AP2 connects to AP1 using the **Universal Repeater Mode**. So, clients that connect to AP2 can also access Internet.

1. Select **Universal Repeater Mode** on **Quick Setup** screen and then click **Next**.

2. Click **Scan** and all wireless networks in the area will be displayed. Select the SSID (the name of a wireless network) you wish to connect, say, **Tenda_2**, and then click **Next.**



Quick Setup

SSID:

MAC: (Example:C8:3A:35:3C:10:B8)

Channel: Auto

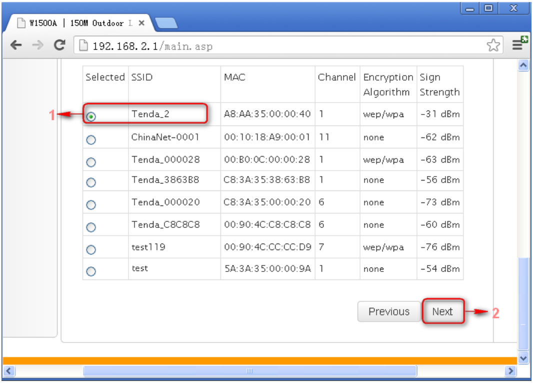
Encryption Algorithm:

● Disabled

○ WEP

○ WPA-PSK/WPA2-PSK

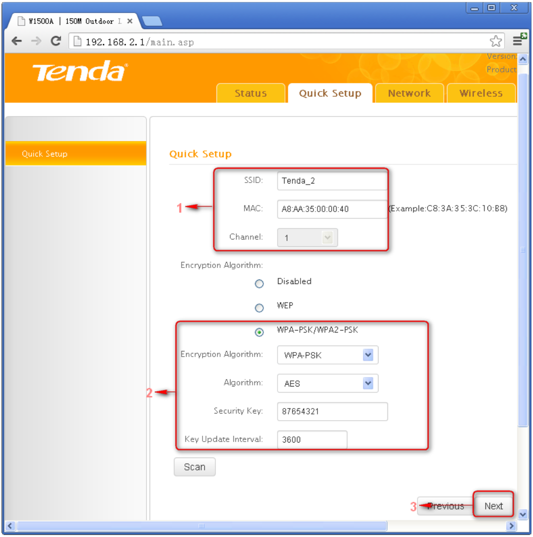
SSID, MAC address and channel fields will be populated automatically.



Selected	SSID	MAC	Channel	Encryption Algorithm	Sign Strength
●	Tenda_2	A8:AA:35:00:00:40	1	wep/wpa	-31 dBm
○	ChinaNet-0001	00:10:18:A9:00:01	11	none	-62 dBm
○	Tenda_000028	00:B0:0C:00:00:28	1	wep/wpa	-63 dBm
○	Tenda_3863B8	C8:3A:35:38:63:B8	1	none	-56 dBm
○	Tenda_000020	C8:3A:35:00:00:20	6	none	-73 dBm
○	Tenda_C8C8C8	00:90:4C:C8:C8:C8	6	none	-60 dBm
○	test119	00:90:4C:CC:CC:D9	7	wep/wpa	-76 dBm
○	test	5A:3A:35:00:00:9A	1	none	-54 dBm

3. What you need to do is to configure the security settings. For example, the **Security Mode**, **Security Key** and **Key Update Interval** for the SSID **Tenda_2**is

WPA-PSK, **87654321** and **3600s,** simply enter them.



Quick Setup

SSID: Tenda_2

MAC: A8:AA:35:00:00:40 (Example:C8:3A:35:3C:10:B8)

Channel: 1

Encryption Algorithm:

○ Disabled

○ WEP

● WPA-PSK/WPA2-PSK

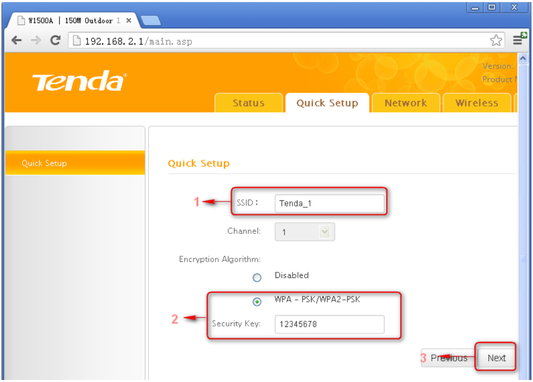
Encryption Algorithm: WPA-PSK

Algorithm: AES

Security Key: 87654321

Key Update Interval: 3600

4. Click **Next** and configure wireless settings for the device. Device MUST operate on the same channel as the uplink AP for successful implementation of the feature. The channel field on device greyed out in this mode. SSID and security settings are configurable (both can be different from the uplink device).



Quick Setup

SSID : Tenda_1

Channel: 1

Encryption Algorithm:

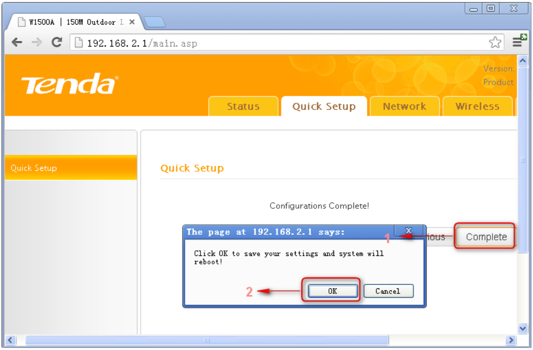
○ Disabled

● WPA - PSK/WPA2-PSK

Security Key: 12345678

5. Click **Next** and then **Finish**. Click **OK** and device will restart and will then operate in **Universal Repeater Mode**.

Now set your local PCs to **Obtain an IP address automatically** and these PCs will then use IP/gateway/DNS addresses assigned by the uplink device to access Internet.



Quick Setup

Configurations Complete!

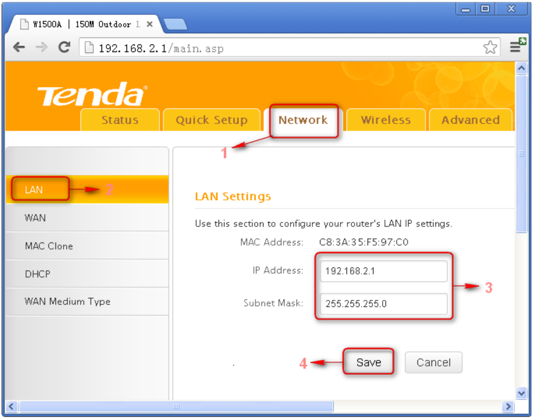
The page at 192.168.2.1 says:

Click OK to save your settings and system will reboot!

Chapter 3 Network Setup

This chapter mainly explains LAN settings in AP Mode, Universal Repeater Mode and Router Mode, as well as WAN settings, MAC Clone, DHCP server and WAN Medium Type (Wired or Wireless WAN).

3.1 LAN Settings



LAN Settings

Use this section to configure your router's LAN IP settings.

MAC Address: C8:3A:35:F5:97:C0

IP Address: 192.168.2.1

Subnet Mask: 255.255.255.0

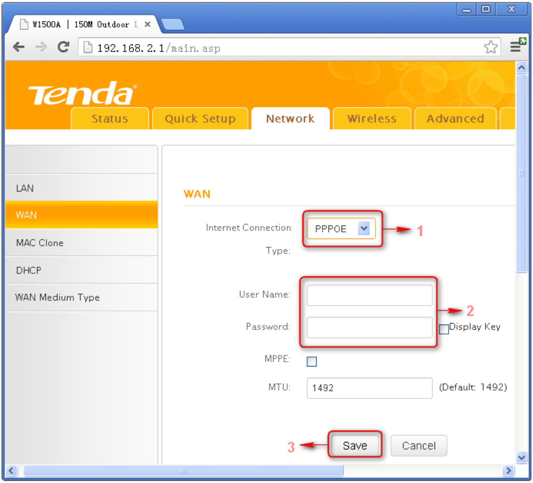
- **IP Address:** Device's LAN IP address, 192.168.2.1 by default. You can change it according to your needs; just remember to use the new one to log on to the device's web utility if you changed it
- **Subnet Mask:** Device's LAN subnet mask, 255.255.255.0 by default
- **Note:** If you change the device's LAN IP address, you must use the new one to log on to the web-based configuration utility. To synchronize system time in AP Mode and Universal Repeater Mode, make sure your device's LAN IP address is on the same net segment as the uplink device, and set gateway and

DNS addresses the same as uplink device's IP address

3.2. WAN Settings

WAN settings are only available in Router Mode.

PPPoE



WAN

Internet Connection Type: PPPOE

User Name:

Password: □Display Key

MPPE: □

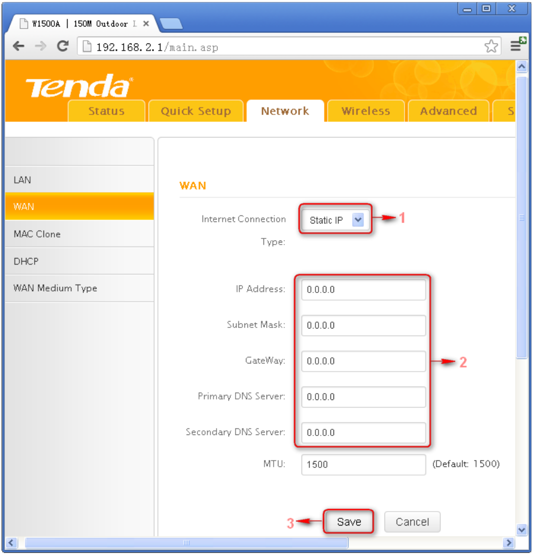
MTU: 1492 (Default: 1492)

- **Internet connection Type:** Displays the current Internet connection type
- **User Name:** Enter the User Name provided by your ISP
- **Password:** Enter the password provided by your ISP
- **MPPE:** Microsoft Point-to-Point Encryption (MPPE) is a protocol for encrypting data across Point-to-Point Protocol (PPP) and virtual private network (VPN) links.By default it is disabled. However if ISP enables MPPE on

his PPPoE server, you must also enable it on the device. Consult your ISP, if you don't know whether he has enabled the MPPE or not

- **MTU:** Maximum Transmission Unit. DO NOT change it from the factory default of 1492 unless necessary. You may need to change it for optimal performance with some specific websites or application software that cannot be opened or enabled; in this case, try 1450, 1400, etc

Static IP



Internet Connection Type: Static IP

IP Address: 0.0.0.0

Subnet Mask: 0.0.0.0

GateWay: 0.0.0.0

Primary DNS Server: 0.0.0.0

Secondary DNS Server: 0.0.0.0

MTU: 1500 (Default: 1500)

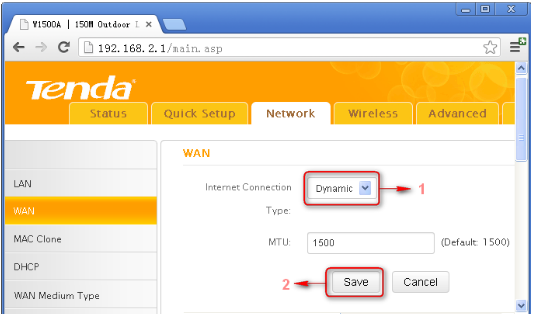
If your ISP assigns a fixed IP address to you, then select Static IP, and enter the IP address, subnet mask, primary DNS and secondary DNS (optional) info provided by your ISP in corresponding fields.

- **IP Address:** Enter the WAN IP address provided by your ISP. Consult your ISP if you are not clear

- **Subnet Mask:** Enter WAN Subnet Mask provided by your ISP. The default is 255.255.255.0
- **Gateway:** Enter the WAN Gateway provided by your ISP. Consult your ISP if you are not clear
- **Primary DNS Server:** Enter the DNS address provided by your ISP
- **Secondary DNS Server:** Enter the other DNS address if your ISP provides 2 such addresses (optional)
- **MTU**: Maximum Transmission Unit. DO NOT change it from the factory default of 1500 unless necessary. You may need to change it for optimal performance with some specific websites or application software that cannot be opened or enabled; in this case, try 1450, 1400, etc

DHCP (Dynamic IP)

Select DHCP (Dynamic IP) if you can access Internet as soon as your computer directly connects to an Internet-enabled ADSL/Cable modem. Device will automatically obtain an IP address from ISP.

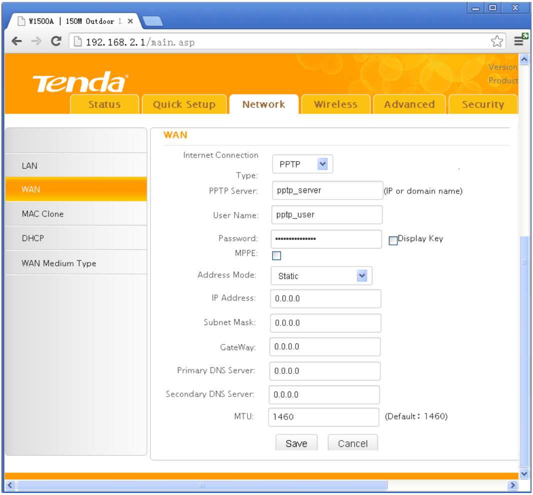


Internet Connection Type: Dynamic

MTU: 1500 (Default: 1500)

PPTP

Select PPTP (Point-to-Point-Tunneling Protocol) if your ISP uses a PPTP connection. The PPTP connects a router to a VPN server. For example ：A corporate branch and headquarter can use this connection type to implement mutual and secure access to each other's resources.



WAN

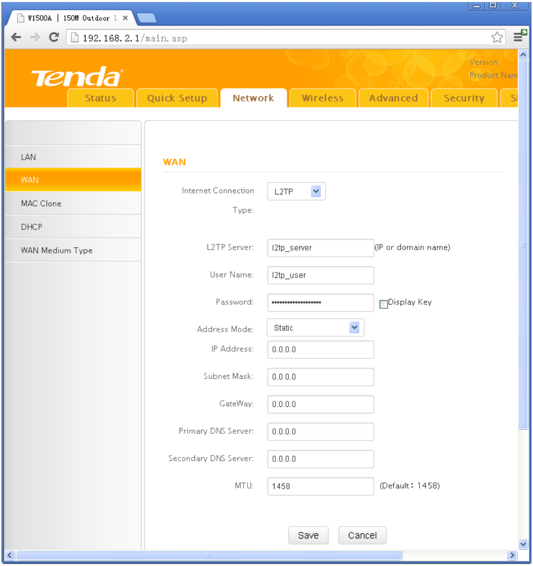
Internet Connection Type:	PPTP
PPTP Server:	pptp_server (IP or domain name)
User Name:	pptp_user
Password:	•••••••••••••• □Display Key
MPPE:	□
Address Mode:	Static
IP Address:	0.0.0.0
Subnet Mask:	0.0.0.0
GateWay:	0.0.0.0
Primary DNS Server:	0.0.0.0
Secondary DNS Server:	0.0.0.0
MTU:	1460 (Default：1460)

- **Internet connection Type**: Displays a list of available Internet connection types
- **PPTP Server**: Enter the IP address of a PPTP server
- **User Name**: Enter your PPTP User Name
- **Password**: Enter your Password
- **MPPE:** Microsoft Point-to-Point Encryption (MPPE) is a protocol for encrypting data across Point-to-Point Protocol (PPP) and virtual private network (VPN) links. By default it is disabled. However if ISP enables MPPE on his PPPoE server, you must also enable it on the device. Consult your ISP, if you don't know whether he has enabled the MPPE or not

- **Address mode**: Select “Dynamic” if you don’t get any IP info from your ISP, otherwise select “Static”. Consult your ISP if you are not clear
- **IP Address**: Enter the IP address provided by your ISP. Consult your local ISP if you are not clear
- **Subnet Mask**: Enter the subnet mask provided by your ISP. Consult your ISP if you are not clear
- **Gateway**: Enter the gateway provided by your ISP. Consult your local ISP if you are not clear
- **Primary/Secondary DNS Server**: Enter the Primary and Secondary DNS Server Addresses. Consult your local ISP if you are not clear
- **MTU**: Maximum Transmission Unit. The factory default is 1460

L2TP

Select L2TP (Layer 2 Tunneling Protocol) if your ISP uses an L2TP connection. The L2TP connects your router to a L2TP server. For example: A corporate branch and headquarter can use this connection type to implement mutual and secure access to each other’s resources.



WAN

Internet Connection Type: L2TP

L2TP Server: l2tp_server (IP or domain name)

User Name: l2tp_user

Password: •••••••••••••••••••• □Display Key

Address Mode: Static

IP Address: 0.0.0.0

Subnet Mask: 0.0.0.0

GateWay: 0.0.0.0

Primary DNS Server: 0.0.0.0

Secondary DNS Server: 0.0.0.0

MTU: 1458 (Default：1458)

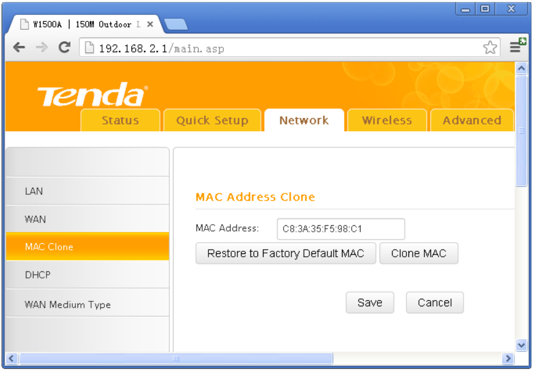
- **Internet connection Type**: Displays a list of available Internet connection types
- **L2TP Server**: Enter the L2TP IP address provided by your ISP
- **User Name**: Enter your L2TP User Name
- **Password**: Enter your Password
- **Address Mode**: Select **Dynamic** if you don't get any IP info from your ISP, otherwise select "Static". Consult your ISP if you are not clear
- **IP Address**: Enter the IP address provided by your ISP. Consult your local ISP if you are not clear
- **Gateway**: Enter the gateway provided by your ISP. Consult your local ISP if you are not clear
- **Primary/Secondary DNS Server**: Enter the Primary and Secondary DNS

Server Addresses. Consult your local ISP if you are not clear

- **MTU**: Maximum Transmission Unit. The factory default is 1458

3.3 MAC Clone

This section allows you to configure Device’s WAN MAC address. This feature is only available in Router Mode.



MAC Address Clone

MAC Address: C8:3A:35:F5:98:C1

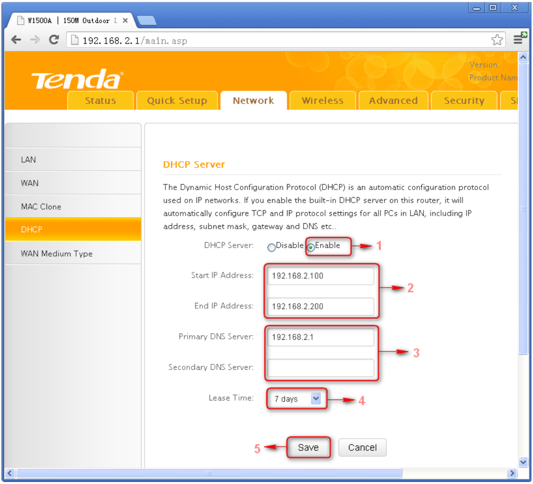
Normally you don't need to change device's default WAN MAC address. However, some ISPs may bind client PC's MAC address for Internet connection authentication. In this case, simply enter the bound MAC in the WAN MAC Address field or click "Copy My PC's MAC" (or Clone MAC) to copy your PC's MAC to the device.

- **MAC Address:** Config device’s WAN MAC address and click **Save** to save your settings
- **Clone MAC**: Click to automatically copy your local PC's MAC address to the device as device's new WAN MAC address

- **Restore to Factory Default MAC:** Reset Device's WAN MAC to factory default

3.4. DHCP

The Dynamic Host Configuration Protocol (DHCP) is an automatic configuration protocol used on IP networks. If you enable the built-in DHCP server on this device, it will automatically configure TCP/IP protocol settings for all DHCP-Client-enabled PCs in your LAN (Namely, PCs are set to "Obtain an IP address automatically" and "Obtain DNS server address automatically"), including IP address, subnet mask, gateway and DNS etc, eliminating the need for manual intervention.



DHCP Server

The Dynamic Host Configuration Protocol (DHCP) is an automatic configuration protocol used on IP networks. If you enable the built-in DHCP server on this router, it will automatically configure TCP and IP protocol settings for all PCs in LAN, including IP address, subnet mask, gateway and DNS etc..

DHCP Server: ○Disable ●Enable

Start IP Address: 192.168.2.100

End IP Address: 192.168.2.200

Primary DNS Server: 192.168.2.1

Secondary DNS Server:

Lease Time: 7 days

- **DHCP Server:** enable or disable the device's DHCP server feature. If enabled, the DHCP server will assign IP addresses to requesting clients

- **Start IP Address:** Specify the starting IP address for the DHCP server IP assignment
- **End IP Address:** Specify the ending IP address for the DHCP server IP assignment
- **Primary DNS Server:** Specify a primary DNS address for requesting clients
- **Secondary DNS Server:** Specify a secondary DNS address for requesting clients. This field is optional
- **Lease Time:** The length of time for the IP address lease. Configuring a proper lease time improves the efficiency for the DHCP server to reclaim disused IP addresses
- **For example:** If the lease time is set to one hour, then the DHCP server will reclaim disused IP addresses every hour

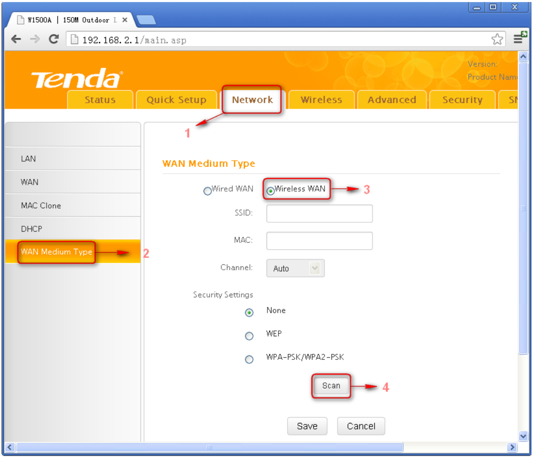
3.5 WAN Medium Type

Here you can select a proper WAN medium type to use: Wireless WAN (WISP) or Wired WAN to connect to the uplink device. Internet connection types are the same for the two medium types.

- **Wired WAN:** Connect to uplink device via an Ethernet cable
- **Wireless WAN:** Connect to uplink device (WISP AP) wirelessly

Please do following the steps as below if you connect to the Internet wirelessly.

1. Select **Wireless WAN** (**WISP**) **and click Scan**. Currently available wireless networks will then be displayed.



WAN Medium Type

○ Wired WAN ● Wireless WAN

SSID:

MAC:

Channel: Auto

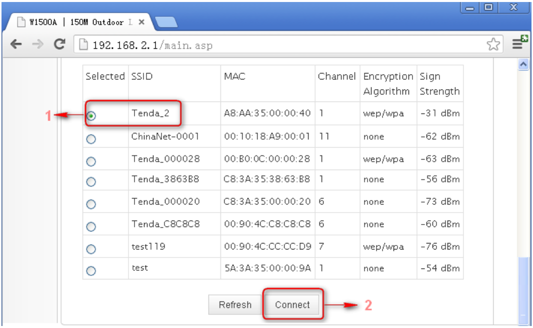
Security Settings

● None

○ WEP

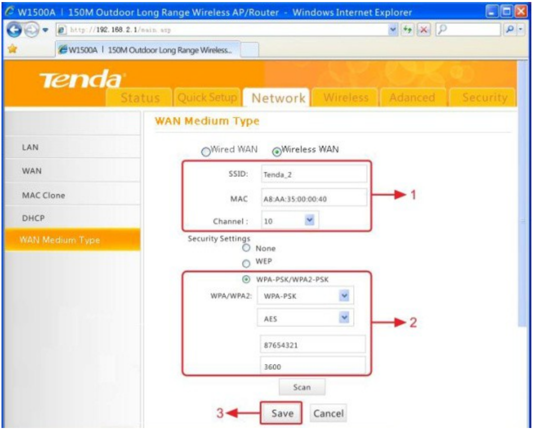
○ WPA-PSK/WPA2-PSK

2. Select the SSID you wish to connect and SSID, MAC address and channel fields will then be automatically populated. For example, the security mode (encryption algorithm) and security key for the SSID Tenda_2 is WPA-PSK, and 87654321 3600s, simply enter them and click **Save**.



Selected	SSID	MAC	Channel	Encryption Algorithm	Sign Strength
●	Tenda_2	A8:AA:35:00:00:40	1	wep/wpa	-31 dBm
○	ChinaNet-0001	00:10:18:A9:00:01	11	none	-62 dBm
○	Tenda_000028	00:B0:0C:00:00:28	1	wep/wpa	-63 dBm
○	Tenda_3863B8	C8:3A:35:38:63:B8	1	none	-56 dBm
○	Tenda_000020	C8:3A:35:00:00:20	6	none	-73 dBm
○	Tenda_C8C8C8	00:90:4C:C8:C8:C8	6	none	-60 dBm
○	test119	00:90:4C:CC:CC:D9	7	wep/wpa	-76 dBm
○	test	5A:3A:35:00:00:9A	1	none	-54 dBm

Figure 1


W1500A | 150M Outdoor Long Range Wireless AP/Router - Windows Internet Explorer
http://192.168.2.1/main.asp
W1500A | 150M Outdoor Long Range Wireless...
Tenda
Status
Quick Setup
Network
Wireless
Adanced
Security
LAN
WAN
MAC Clone
DHCP
WAN Medium Type
1
2
3
Scan
Save
Cancel

WAN Medium Type

○ Wired WAN ● Wireless WAN

SSID: Tenda_2

MAC A8:AA:35:00:00:40

Channel : 10

Security Settings

○ None

○ WEP

● WPA-PSK/WPA2-PSK

WPA/WPA2: WPA-PSK

AES

87654321

3600

Figure 2

3. Click **OK** and device will restart and will then operate in Wireless WAN (also

known as WISP Mode).

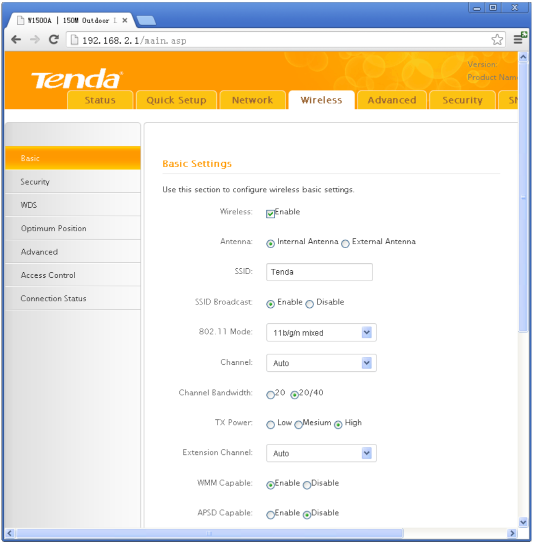
Note:

When operating in **Wireless WAN (WISP Mode)**, make sure device is operating on the same channel as the uplink device (WISP AP). While SSID and security settings on device are not required so.

Chapter 4 Wireless Settings

This chapter mainly presents wireless settings, including basic wireless settings, security, WDS, access control settings and connection status.

4.1 Basic



Basic Settings

Use this section to configure wireless basic settings.

Wireless: ☑Enable

Antenna: ● Internal Antenna ○ External Antenna

SSID: Tenda

SSID Broadcast: ● Enable ○ Disable

802.11 Mode: 11b/g/n mixed

Channel: Auto

Channel Bandwidth: ○20 ●20/40

TX Power: ○ Low ○Mesium ● High

Extension Channel: Auto

WMM Capable: ●Enable ○Disable

APSD Capable: ○Enable ●Disable

- **Wireless:** Check to enable the wireless feature.
- **Antenna:** Select to use internal antenna or external antenna
- **SSID:** This is the public name of your wireless network. This field does not allow Chinese characters and special characters

- **SSID Broadcast:** Select "Enable"/"Disable" to make your wireless network visible/ invisible to any wireless clients within coverage when they perform a scan to see what's available. When disabled, this SSID becomes invisible to any wireless clients within the coverage. Manually enter the SSID if you want to connect to it
- **802.11 Mode:** Select a wireless network mode.

  11b mode: Select it if you have only Wireless-B clients in your wireless network.

  11g mode: Select it if you have only Wireless-G clients in your wireless network
- **11b/g mixed mode:** Select it if you have only Wireless-B and Wireless-G clients in your wireless network
- **11b/g/n mixed mode:** Select it if you have Wireless-b/g/n clients in your wireless network
- **Channel:** For an optimal wireless performance, you may select the least interferential channel. It is advisable that you select an unused channel or **Auto** to let device detect and select the best possible channel for your wireless network to operate on from the drop-down list
- **Channel Bandwidth:** Select a proper channel bandwidth to enhance wireless performance. When there are 11b/g and 11n wireless clients, please select the 802.11n mode of 40M frequency band; when there are only non-11n wireless clients, select 20M frequency band mode; when the wireless network mode is 11n mode, please select 20/40 frequency band to boost its throughput
- **TX Power:** Select a proper transmission power level for device (Low power: 100mW, medium power: 300mW, high power: 500mW). The default TX power level is **High**
- Extension Channel: It is used to ensure N speed for 802.11n devices on the network
- **WMM-Capable:** WMM is QoS for your wireless network. Enabling this option may better stream wireless multimedia data (such as video or audio)

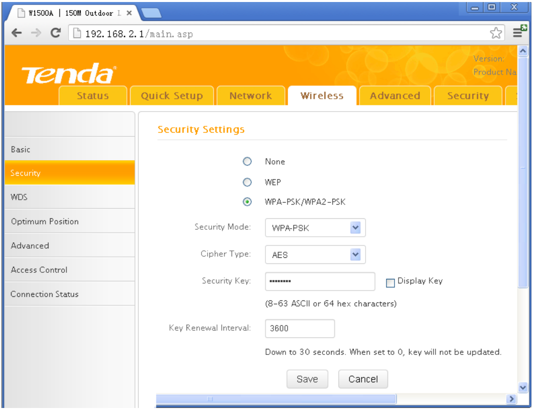
- **ASPD Capable**: Select to enable/disable the auto power saving mode

4.2 Security

This section allows you to secure your wireless network to block unauthorized accesses and malicious packet sniffing. For better security, it is advisable to use the WPA-AES encryption.

4.2.1 WPA-PSK

The WPA protocol implements the majority of the IEEE 802.11i standard. It enhances data encryption through the Temporal Key Integrity Protocol (TKIP) which is a 128-bit per-packet key, meaning that it dynamically generates a new key for each packet. WPA also includes a message integrity check feature to prevent data packets from being hampered with. Only authorized network users can access the wireless network. WPA adopts enhanced encryption algorithm over WEP.



Security Settings

○ None
○ WEP
● WPA-PSK/WPA2-PSK

Security Mode: WPA-PSK

Cipher Type: AES

Security Key: •••••••• □ Display Key

(8-63 ASCII or 64 hex characters)

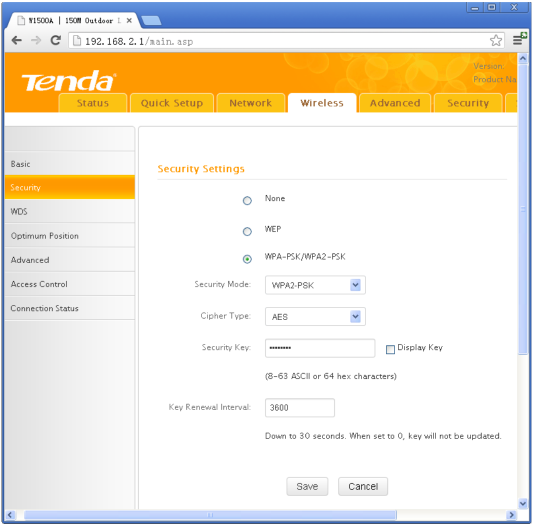
Key Renewal Interval: 3600

Down to 30 seconds. When set to 0, key will not be updated.

- **Cipher Type**: Select AES (advanced encryption standard), or TKIP (temporary key integrity protocol)
- **Security Key:** Enter a security key, which must be between 8-63 ASCII characters long or 64 HEX characters long
- **Key Renewal Interval**: Specify a valid time interval for the key to be updated

4.2.2 WPA2-PSK

The later WPA2 protocol features compliance with the full IEEE 802.11i standard and uses Advanced Encryption Standard (AES) in addition to TKIP encryption protocol to guarantee better security than that provided by WEP or WPA.



Security Settings

○ None

○ WEP

● WPA-PSK/WPA2-PSK

Security Mode: WPA2-PSK

Cipher Type: AES

Security Key: •••••••• □ Display Key

(8-63 ASCII or 64 hex characters)

Key Renewal Interval: 3600

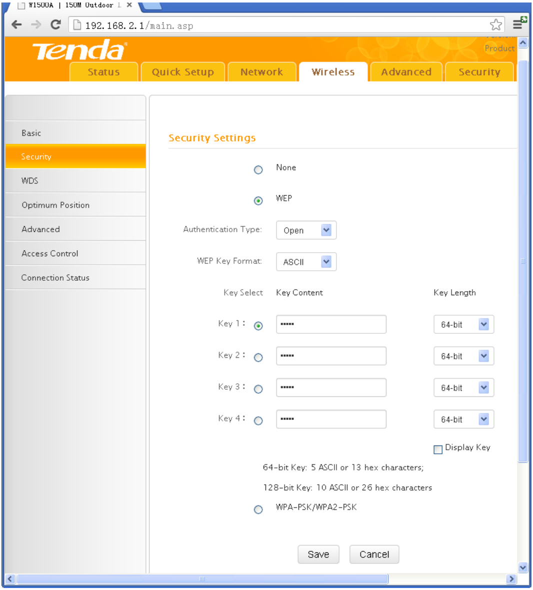
Down to 30 seconds. When set to 0, key will not be updated.

- **Cipher Type:** Select AES (advanced encryption standard) or TKIP (temporary key integrity protocol) &AES
- **Security Key:** Enter a security key, which must be between 8-63 ASCII characters long or 64 HEX characters long

- **Key Renewal (Update) Interval**: Specify a valid time interval for the key to be updated

4.2.3 WEP

WEP is intended to provide data confidentiality comparable to that of a traditional wired network.



Security Settings

○ None

● WEP

Authentication Type: Open

WEP Key Format: ASCII

Key Select	Key Content	Key Length
Key 1: ●	•••••	64-bit
Key 2: ○	•••••	64-bit
Key 3: ○	•••••	64-bit
Key 4: ○	•••••	64-bit

□ Display Key

64-bit Key: 5 ASCII or 13 hex characters;

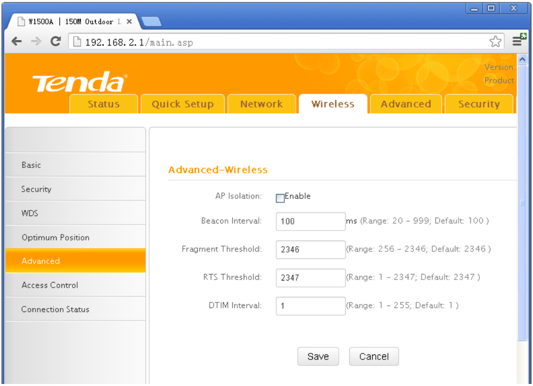
128-bit Key: 10 ASCII or 26 hex characters

○ WPA-PSK/WPA2-PSK

- **Authentication Type:** Select a proper authentication type
- **WEP Key Format:** Select a proper key format: HEX or ASCII
- **Key Select:** Select a key from the preset keys 1-4 for current use

4.3 Advanced Settings

This section allows you to config advanced settings, including AP Isolation, Beacon interval, Fragment threshold, RTS threshold and DTIM interval, etc, for your wireless networks.



Advanced-Wireless

AP Isolation: □Enable

Beacon Interval: 100 ms (Range: 20 - 999; Default: 100)

Fragment Threshold: 2346 (Range: 256 - 2346; Default: 2346)

RTS Threshold: 2347 (Range: 1 - 2347; Default: 2347)

DTIM Interval: 1 (Range: 1 - 255; Default: 1)

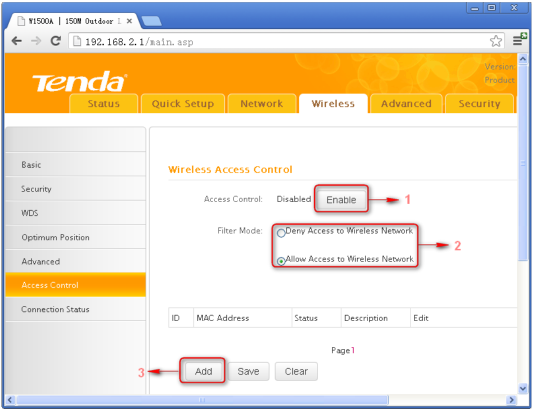
- **AP Isolation:** Isolates clients connecting to master SSID
- **Beacon Interval:** A time interval between any 2 consecutive Beacon packets sent by an Access Point to synchronize a wireless network. Do NOT change the default value of 100 unless necessary
- **Fragment Threshold:** Specify a Fragment Threshold value. Any wireless packet exceeding the preset value will be divided into several fragments before transmission. DO NOT change the default value of 2346 unless necessary
- **RTS Threshold:** If a packet exceeds such set value, RTS/CTS scheme will be used to reduce collisions. Set it to a smaller value provided that there are

distant clients and interference. For normal SOHO, it is recommended to keep the default value unchanged; otherwise, device performance may be degraded

- **DTIM Interval:** A DTIM (Delivery Traffic Indication Message) Interval is a countdown informing clients of the next window for listening to broadcast and multicast messages. When such packets arrive at device's buffer, the device will send DTIM (delivery traffic indication message) and DTIM interval to wake clients up for receiving these packets

4.4 Access Control

The MAC-based Wireless Access Control feature can be used to allow or disallow clients to connect to your wireless network.



Wireless Access Control

Access Control: Disabled

Filter Mode: ○ Deny Access to Wireless Network ● Allow Access to Wireless Network

ID	MAC Address	Status	Description	Edit

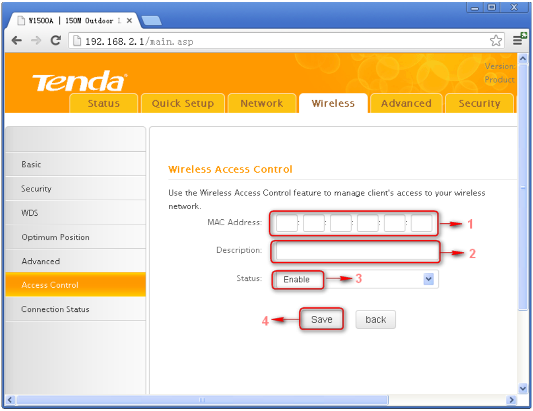
Page 1

- **Access Control:** Disabled by default. Click Enable to enable the feature
- **Deny Access to Wireless Network:** Block only PCs at specified MAC

addresses from connecting to your wireless network

- **Allow Access to Wireless Network:** Allow only PCs at specified MAC addresses to connect to your wireless network

Click **Add** and below screen appears:



Wireless Access Control

Use the Wireless Access Control feature to manage client's access to your wireless network.

MAC Address: __ : __ : __ : __ : __ : __

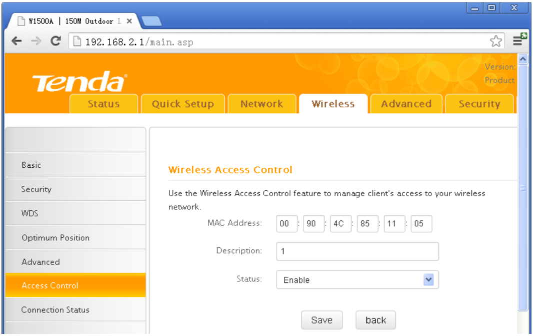
Description:

Status: Enable

- **MAC Address:** Enter the MAC address of a wireless client
- **Description:** Briefly describe the current entry/rule
- **Status:** Select **Enable** or **Disable**
- Up to 6 rules can be added

Example: To allow only the PC at the MAC address of 00:90:4C:85:11:05 to connect to your wireless network, do as follows:

1. Click **Add**, enter **00:90:4C:85:11:05** in the **MAC Address** field, select **Enable** and then click **Save** as seen in the screenshot below.



Wireless Access Control

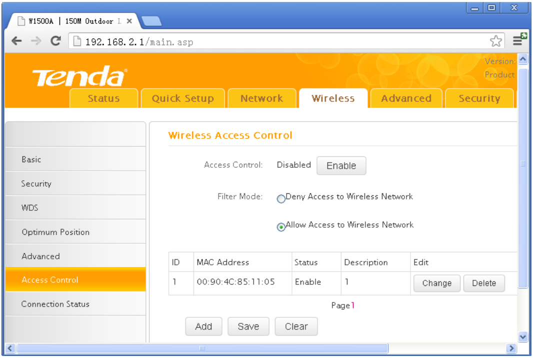
Use the Wireless Access Control feature to manage client's access to your wireless network.

MAC Address: 00 : 90 : 4C : 85 : 11 : 05

Description: 1

Status: Enable

2. You will be redirected to the initial page of this feature. The rule you just added will be displayed there. Select **Allow Access to Wireless Network** and **Enable** as seen in the screenshot below:



Wireless Access Control

Access Control: Disabled

Filter Mode: ○ Deny Access to Wireless Network

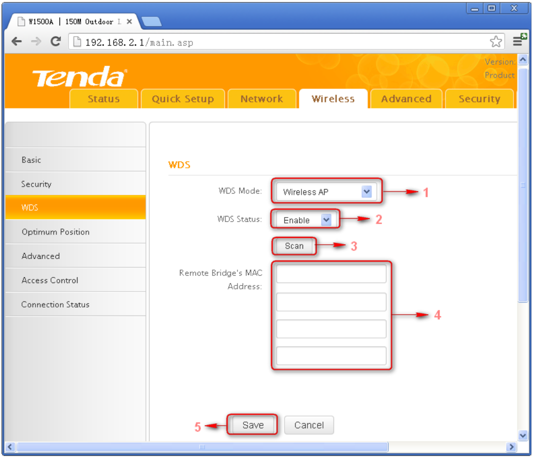
● Allow Access to Wireless Network

ID	MAC Address	Status	Description	Edit
1	00:90:4C:85:11:05	Enable	1	Change Delete

Page 1

4.5 WDS Settings

WDS Bridge Mode: wireless distribution system (WDS) is a system enabling the wireless interconnection of access points in an IEEE 802.11 network. It allows a wireless network to be expanded using multiple access points without the traditional requirement for a wired backbone to link them.Note: The Access Points you select MUST support WDS. Select **Wireless AP** from **WDS Mode** and **Enable** from **WDS Status** to enter screen below:



WDS Mode: Wireless AP

WDS Status: Enable

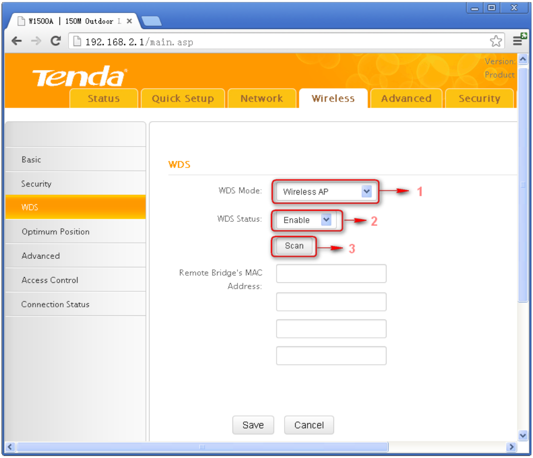
Remote Bridge's MAC Address:

- ➢ **WDS Mode**: Select Wireless AP or Bridge. When operating in Bridge mode, other wireless clients (excluding bridge participants) will not be able to connect to the device; when operating in Wireless AP mode, other wireless clients will still be able to connect to the device via SSID.
- ➢ **WDS Status:** Select Enable or Disable.
- ➢ **Scan:** Click to scan wireless networks (SSIDs and BSSID) in the area after you enable the WDS feature.
- ➢ **Remote Bridge's MAC Address:** Enter the MAC address of the wireless device

you want to connect (link partner).

Take two W1500As as an example to illustrate WDS implementation.

Select **Wireless AP** from **WDS Mode** and **Enable** from **WDS Status**.



WDS Mode: Wireless AP

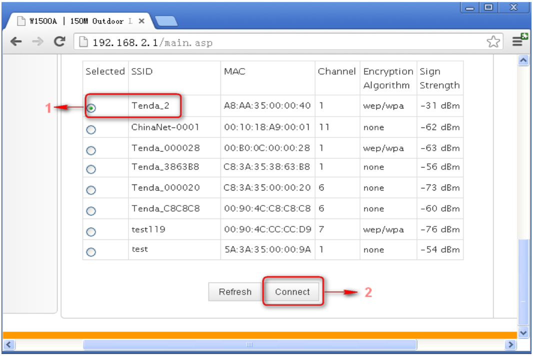
WDS Status: Enable

Remote Bridge's MAC Address:

1. Directly enter the MAC address of the link partner if you already know it and then click **OK**.

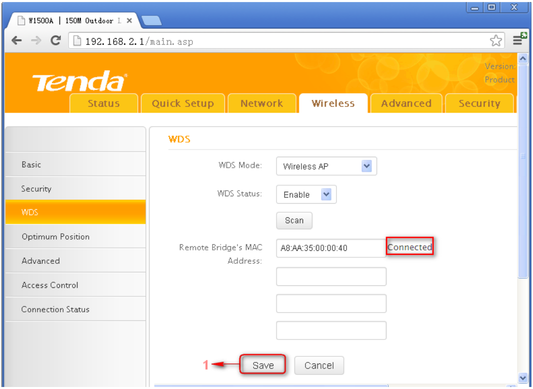
2. Enable scan on one associated device to search for the link partner.

1) Click **Scan**.



Selected	SSID	MAC	Channel	Encryption Algorithm	Sign Strength
●	Tenda_2	A8:AA:35:00:00:40	1	wep/wpa	-31 dBm
○	ChinaNet-0001	00:10:18:A9:00:01	11	none	-62 dBm
○	Tenda_000028	00:B0:0C:00:00:28	1	wep/wpa	-63 dBm
○	Tenda_3863B8	C8:3A:35:38:63:B8	1	none	-56 dBm
○	Tenda_000020	C8:3A:35:00:00:20	6	none	-73 dBm
○	Tenda_C8C8C8	00:90:4C:C8:C8:C8	6	none	-60 dBm
○	test119	00:90:4C:CC:CC:D9	7	wep/wpa	-76 dBm
○	test	5A:3A:35:00:00:9A	1	none	-54 dBm

2) Select the SSID you wish to connect, click **Connect** and its MAC address will then be added automatically to device.



WDS

WDS Mode: Wireless AP

WDS Status: Enable

Scan

Remote Bridge's MAC Address: A8:AA:35:00:00:40 Connected

Click **Save** to save your settings. And then configure same settings on the bridge partner device. When **Connected** appears, you have successfully connected to it.

Note:

WDS feature can only be implemented between 2 WDS-capable wireless devices. Plus, SSID, channel, security settings and security key must be exactly the same on both such devices.

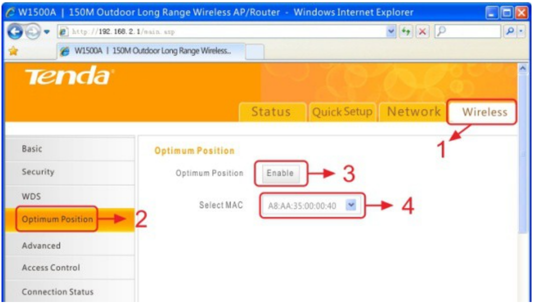
To authenticate on wireless client access, go to Wireless -> Security. After you finish the configurations, remember to reboot the device for proper WDS communication.

3. Each device can bridge up to 4 wireless devices.

4.6 Optimum Position Setup

Optimum Position: Enable this option for a best reference position of device for optimum performance.

1. Click **Wireless** -> **Optimum Position** to enter the configuration interface.

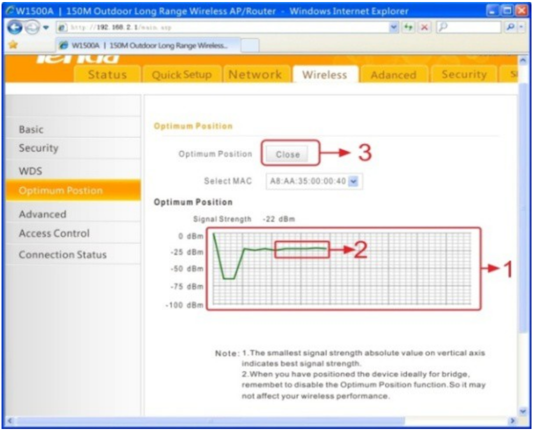

W1500A | 150M Outdoor Long Range Wireless AP/Router - Windows Internet Explorer
http://192.168.2.1/main.asp
W1500A | 150M Outdoor Long Range Wireless...
Tenda
Status
Quick Setup
Network
Wireless
1
Basic
Security
WDS
Optimum Position
2
Advanced
Access Control
Connection Status
Optimum Position
3
4

Optimum Position: Enable

Select MAC: A8:AA:35:00:00:40

2. Select **Enable** to enable the **Optimum Position** function.

Select MAC: Select the MAC address of the remote device to bridge . (Before performing this action, make sure you have added it on **WDS** or **Universal Repeater** section)



Optimum Position

Optimum Position: Close

Select MAC: A8:AA:35:00:00:40

Optimum Position

Signal Strength -22 dBm

Note: 1.The smallest signal strength absolute value on vertical axis indicates best signal strength.
2.When you have positioned the device ideally for bridge, remembet to disable the Optimum Position function.So it may not affect your wireless performance.

Place and hold the device in different places for a certain period of time (5 seconds is recommended), observe signal strength change from the graph. Position device exactly where as it is when strongest signal appears on the graph.

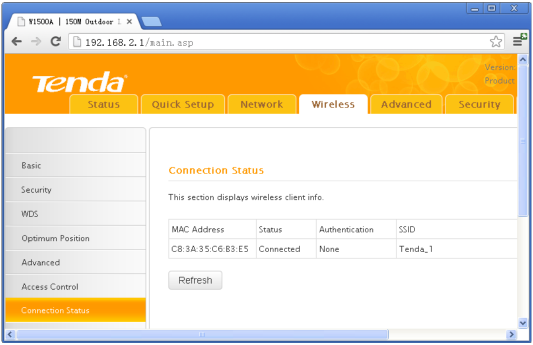
Note:

1. The smallest signal strength absolute value on vertical axis indicates best signal strength.

2. When you have positioned the device ideally for bridge, remember to disable the **Optimum WDS Position** function. So it may not affect your wireless performance.

4.7 ConnectionStatus

This section displays the info of connected wireless clients including MAC addresses and encryption info, etc.



Connection Status

This section displays wireless client info.

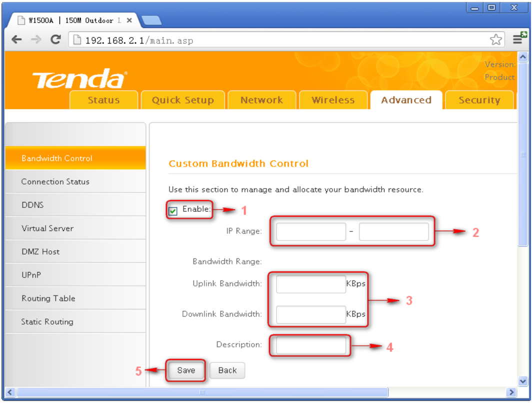
MAC Address	Status	Authentication	SSID
C8:3A:35:C6:B3:E5	Connected	None	Tenda_1

Chapter5 Advanced Applications

The **Advanced** tab only works on router mode, it has the following 7 submenus: Bandwidth Settings, Connection Status, DDNS, Virtual Server, DMZ Host, UPnP, Routing Table and Static Routing.

5.1 Bandwidth Settings

Bandwidth control is used for limit internal network speed. It supports IP address range configuration. Click Add and below screen will appear.



Custom Bandwidth Control

Use this section to manage and allocate your bandwidth resource.

☑ Enable:

IP Range: -

Bandwidth Range:

Uplink Bandwidth: KBps

Downlink Bandwidth: KBps

Description:

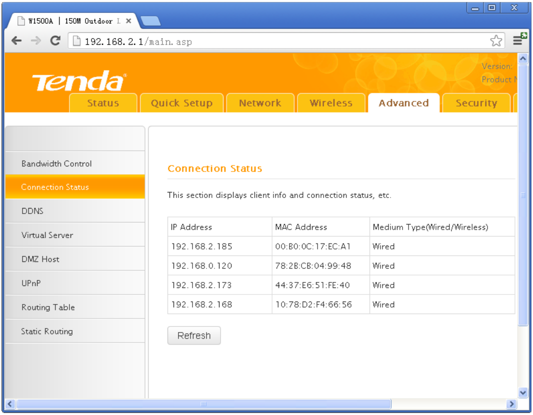
\

- **Enable:** Check/uncheck to enable/disable current entry.
- When disabled, corresponding entry will not take effect though existing in fact.
- **IP Range:** Enter a single IP or an IP range.

- **Uplink Bandwidth:** Max uplink traffic.
- **Downlink Bandwidth:** Max downlink traffic.
- **Description:** Briefly describe the current rule, the Max number of rule is 10.

5.2 Connection status

Showing the current connection information, which is client IP address, MAC address and connection mode.



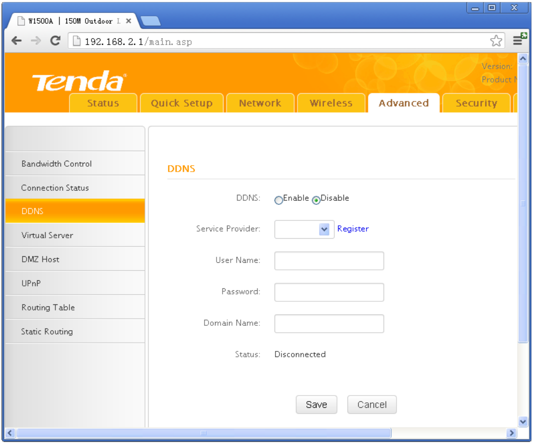
Connection Status

This section displays client info and connection status, etc.

IP Address	MAC Address	Medium Type(Wired/Wireless)
192.168.2.185	00:B0:0C:17:EC:A1	Wired
192.168.0.120	78:2B:CB:04:99:48	Wired
192.168.2.173	44:37:E6:51:FE:40	Wired
192.168.2.168	10:78:D2:F4:66:56	Wired

5.3 DDNS

Dynamic DNS or DDNS is a method of updating, in real time, a Domain Name System (DNS) to point to a changing IP address on the Internet. This is used to provide a persistent domain name for a resource that may change location on the network.



DDNS

DDNS: ○Enable ●Disable

Service Provider: Register

User Name:

Password:

Domain Name:

Status: Disconnected

Save Cancel

1、 Mostly, broadband ISP (Internet service provider) only provide client with Dynamic IP address. While DDNS knows every change on IP address and Banding it with well-known name, so others users can use well-known name to communicate with the client.

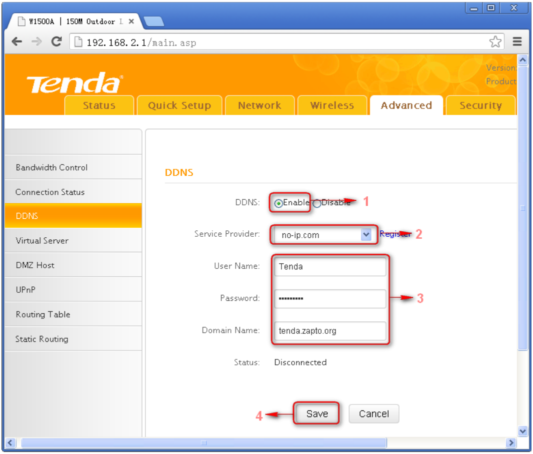
2、 DDNS can help you setup virtual server in your company or home.

- Service Provider: Select the DDNS service provider you are using, support no-ip.com, dyndns.com
- User Name: Enter the DDNS user name registered with your DDNS service provider.
- Password: Enter the DDNS Password registered with your DDNS service provider.
- Domain Name: Enter the DDNS domain name with your DDNS service provider.

For example: If you have registered a DDNS service from no-ip.com for a web server on the host at 192.168.2.10 and get below info:

User Name	Tenda
Password	123456
Domain Name	tenda.zapto.org

First set a mapping rule on Virtual Server interface (For details, see Virtual Server section) and then enter the registered user name, password and domain name as shown below:



DDNS

DDNS: ● Enable ○ Disable

Service Provider: no-ip.com

User Name: Tenda

Password: •••••••••

Domain Name: tenda.zapto.org

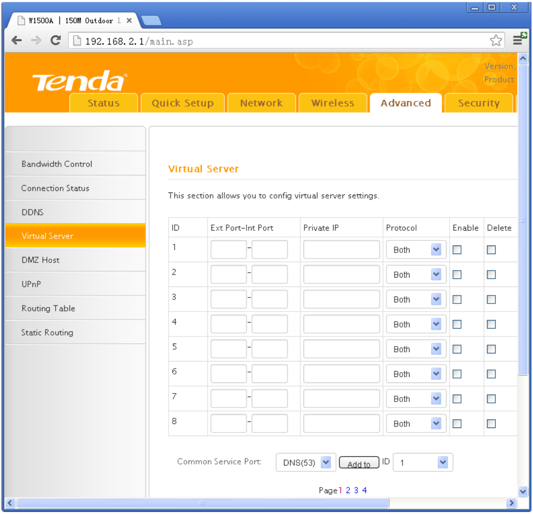
Status: Disconnected

Then Click Save to save the settings.

Simply input "http://tenda.zapto.org" in a launched web browser and your web server will be accessible.

5.4 Virtual Server

Defines the mapping between the service port range of WAN access and LAN server, all of the WAN ports used within the scope of access will be re-positioned to the LAN network server specified by IP address.



Virtual Server

This section allows you to config virtual server settings.

ID	Ext Port-Int Port	Private IP	Protocol	Enable	Delete
1	-		Both	□	□
2	-		Both	□	□
3	-		Both	□	□
4	-		Both	□	□
5	-		Both	□	□
6	-		Both	□	□
7	-		Both	□	□
8	-		Both	□	□

Common Service Port: DNS(53) Add to ID 1

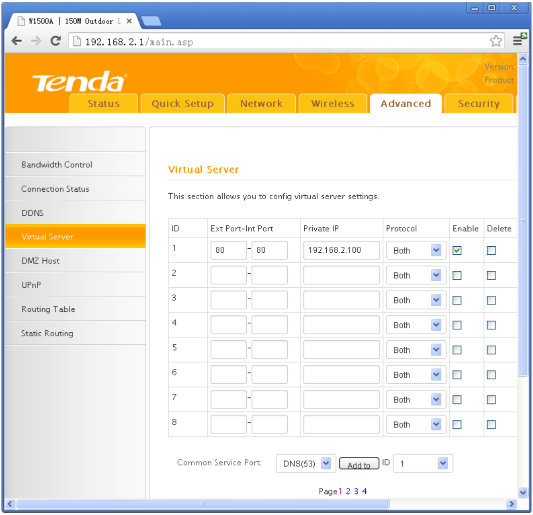
Page1 2 3 4

- **Ext Port-Int Port:** WAN service port. Internal LAN PC port corresponding mapped to an external port
- **Private IP:** The IP address of a computer used as a server in LAN
- **Protocol:** Includes TCP, UDP and Both. Select "Both" if you are not sure about which protocol to use
- **Enable:** The corresponding entry takes effect only if you.
- checked this option
- **Delete:** Clear all settings of this item
- **Common Service Port:** The well-known protocol ports are listed in the drop-

down list. Select one and select a sequence number in the ID drop-down list and then click “Add”, this port will be added automatically to the ID list. For other well-known service ports that are not listed, you can manually add them to the list

- **Add to:** Add the selected well-known port to the policy ID

For Example: you can build a WEB server on your computer and set the router’s port range forwarding to enable your friends to access to your computer. Suppose that your WEB server or your computer’s static IP address is 192.168.2.100, and you wish your friends can access the server through the default port 80 and adopts TCP protocol.



Virtual Server

This section allows you to config virtual server settings.

ID	Ext Port-Int Port	Private IP	Protocol	Enable	Delete
1	80 - 80	192.168.2.100	Both	☑	□
2	-		Both	□	□
3	-		Both	□	□
4	-		Both	□	□
5	-		Both	□	□
6	-		Both	□	□
7	-		Both	□	□
8	-		Both	□	□

Common Service Port: DNS(53) Add to ID 1

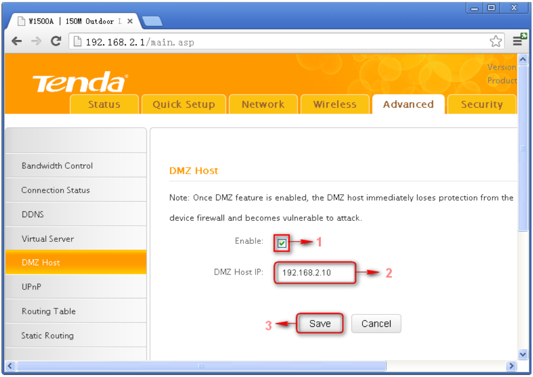
Page 1 2 3 4

Notice: If you set the service port of the virtual server as 80, you must set the Web

Management port on Remote Web Management screen to be any value except 80 such as 8080. Otherwise, there will be a conflict to disable the virtual server.

5.5 DMZ Host

The DMZ Settings screen allows one local computer to be exposed to the Internet for use of a special-purpose service such as Internet gaming or videoconferencing. DMZ hosting forwards all the ports at the same time to one PC.



DMZ Host

Note: Once DMZ feature is enabled, the DMZ host immediately loses protection from the device firewall and becomes vulnerable to attack.

Enable: ☑

DMZ Host IP: 192.168.2.10

- **DMZ Host IP**: The IP address of the LAN computer you want to set as DMZ host
- **Enable**: Check to enable the DMZ host

For example:

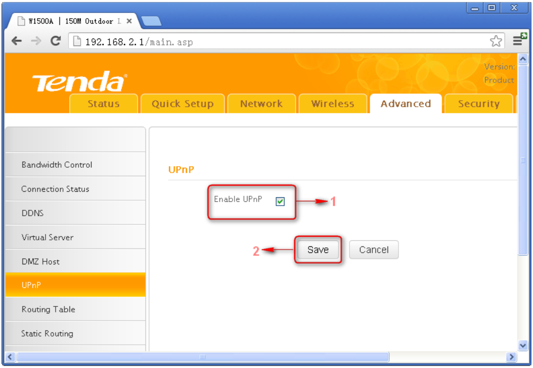
Set the computer at the IP address of 192.168.2.10 as DMZ host to connect another host on the Internet for intercommunication.

Notice: When the DMZ host is enabled, the firewall settings of the DMZ host will not function.

5.6 UPnP

With the UPnP (Universal Plug and Play) function, the internal host can request the router to process some special port switching so as to enable the external host to visit the resources of the internal host.

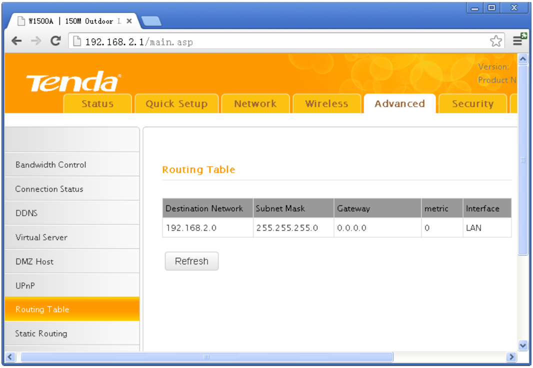
UPnP works in Windows XP, Windows ME or later (Note: Operational system needs to be integrated with or installed with DirectX 9.0) or in an environment with installed application software that supports UPnP.



Enable UPnP: Click the checkbox to enable the UPnP.

5.7 Routing Table

This page shows the router's core routing table.



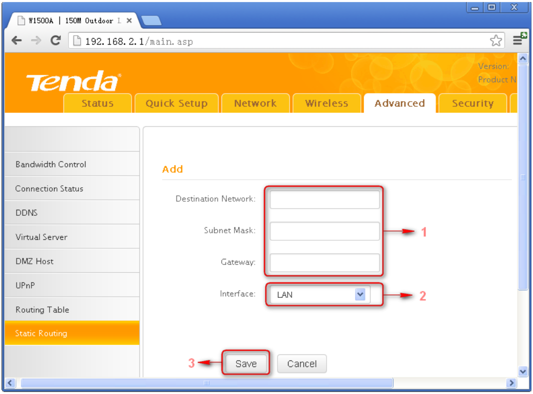
Routing Table

Destination Network	Subnet Mask	Gateway	metric	Interface
192.168.2.0	255.255.255.0	0.0.0.0	0	LAN

The main duty for a router is to look for a best path for every data packet, and transfer this data packet to a destination station. In order to fulfill this function, many transferring paths, i.e. routing table, are saved in the router, for choosing when needed.

5.8 Static Routing

This page is used to set the router's static routing under router mode. Click Add, the following page you will see.



Add

Destination Network:

Subnet Mask:

Gateway:

Interface: LAN

- **Destination Network:** The destination host or IP segment you visit
- **Subnet Mask:** Enter the subnet mask, generally it is 255.255.255.0
- **Getaway:** The entry IP address of the next router
- **Interface:** If destination need go through WAN port, then set it as WAN. Otherwise, set it as LAN

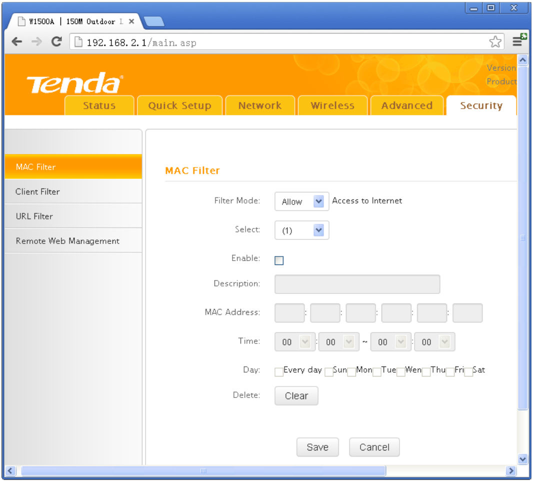
Chapter 6. Security Settings

6.1 Mac Address Filter

Security Settings only fits for Wireless Router Mode.

To better manage PCs in LAN, you can use the MAC Address Filter function to allow/disallow such PCs to access to Internet. In Filter Mode, you can choose Disable, Allow Access to Internet, and Deny Access to Internet.

If you choose Allow Access to Internet, you will see the following configuration page.



MAC Filter

Filter Mode: Allow Access to Internet

Select: (1)

Enable: □

Description:

MAC Address: : : : : :

Time: 00 : 00 ~ 00 : 00

Day: □Every day □Sun □Mon □Tue □Wen □Thu □Fri □Sat

Delete: Clear

Filter Mode: Select Deny or Allow according to your own needs.

Deny Access to Internet: Disallow only PCs at specified MAC addresses to access Internet. Other PCs are allowed.

Allow Access to Internet: Allow only PCs at specified MAC addresses to access Internet. Other PCs are denied

Select: Select a number (indicating a corresponding entry) from the drop-down menu. Up to 10 rules can be set.

Enable: Check/uncheck to enable/disable the corresponding entry.

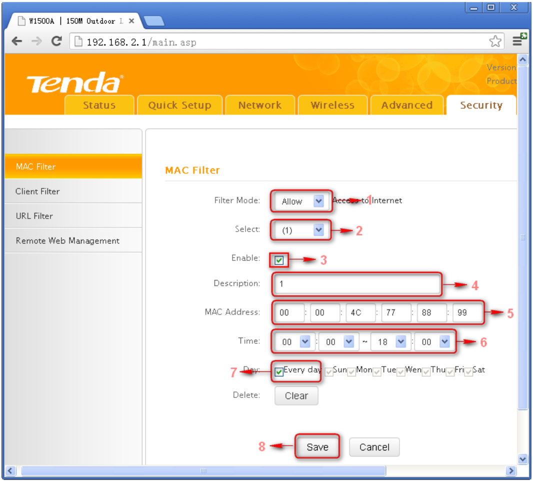
Description: Enter a meaningful name to you for corresponding entry.

MAC Address: Enter the PC's MAC address that you want to filter out.

Time: Select a time range for the corresponding entry to take effect, or else the default time is 00:00~00:00, which means the entry will be effective all the day.

Day: select a day or several days for the corresponding entry to take effect.

Example：To allow a PC at the MAC address of 00:00:4C:77:88:99 to access Internet from 00:00 to18：00 everyday, configure same settings on the screenshot below on your device:



MAC Filter

Filter Mode: Allow Access to Internet 1

Select: (1) 2

Enable: ☑ 3

Description: 1 4

MAC Address: 00 : 00 : 4C : 77 : 88 : 99 5

Time: 00 : 00 ~ 18 : 00 6

7 Day: ☑ Every day ☑ Sun ☑ Mon ☑ Tue ☑ Wen ☑ Thu ☑ Fri ☑ Sat

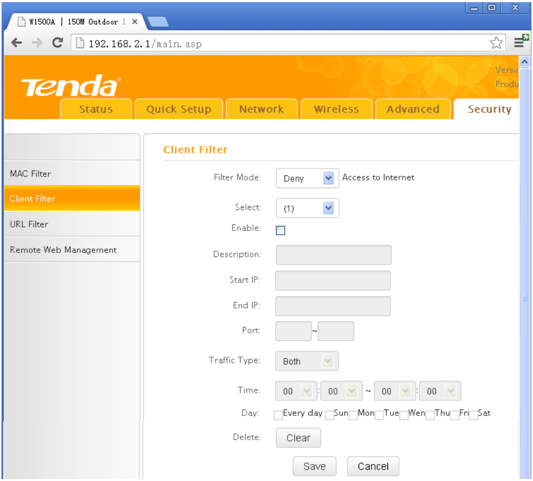
Delete: Clear

8 Save Cancel

Click **Save** to save the settings.

6.2 Client Filter

To better manage PCs in LAN, you can allow or disallow such PCs to access certain ports on Internet using the Client Filter functionality.



Client Filter

Filter Mode: Deny Access to Internet

Select: (1)

Enable: □

Description:

Start IP:

End IP:

Port: ~

Traffic Type: Both

Time: 00 : 00 ~ 00 : 00

Day: □Every day □Sun □Mon □Tue □Wen □Thu □Fri □Sat

Delete: Clear

Filter Mode: Select Deny or Allow according to your own needs.

Disable: disable the corresponding entry.

Deny Access to Internet: Disallow PCs at specified IP addresses to access certain ports on Internet.

Allow Access to Internet: Allow only PCs at specified IP addresses to access certain ports on Internet.

Select: Select a number (indicating a filter rule) from the drop-down menu. Up to 10 rules can be set.

Enable: Check/uncheck to enable/disable the corresponding entry.

Description: Enter a meaningful name to yourself for a new filter rule.

Start IP: Enter a starting IP address.

End IP: Enter an ending IP address.

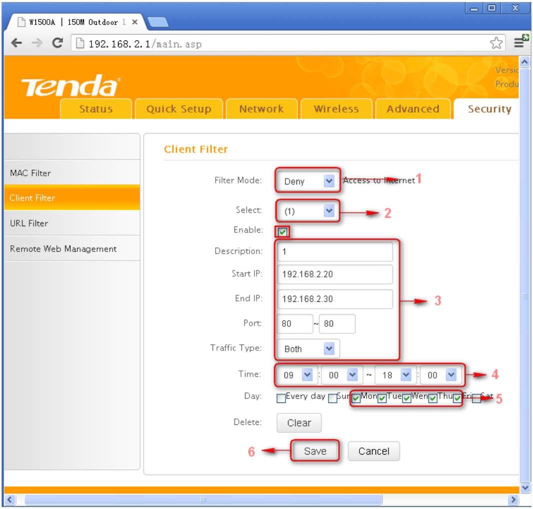
Port: Enter TCP/UDP protocol port number (s); it can be a range of ports or a single port from 1 to 65534.

Traffic Type: Select a protocol or protocols for the traffic (TCP/UDP/Both).

Time: Select a time range for the rule to take effect.

Day: Select a day or several days for the rule to take effect.

Example: To forbid PCs within the IP address range of 192.168.2.20--192.168.2.30 to visit websites from 9:00 to 18:00, do as follows:



Filter Mode: Deny Access to Internet

Select: (1)

Enable: ☑

Description: 1

Start IP: 192.168.2.20

End IP: 192.168.2.30

Port: 80 ~ 80

Traffic Type: Both

Time: 09 : 00 ~ 18 : 00

Day: □Every day □Sun ☑Mon ☑Tue ☑Wen ☑Thu ☑Fri □Sat

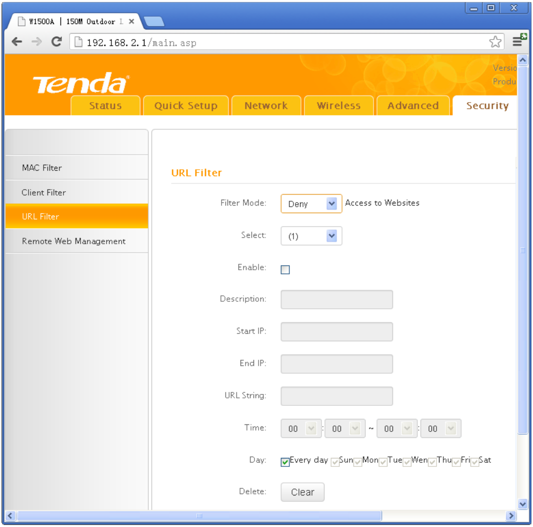
Delete: Clear

Click Save to save the settings.

6.3 URL Filter

To better control LAN PCs, you can use the URL filter functionality to allow or disallow such PC to access certain websites within a specified time range.

In Filter Mode, you can choose Disable, Allow Access to Websites, and Deny Access to Websites. You will see the page below.



URL Filter

Filter Mode: Deny Access to Websites

Select: (1)

Enable: □

Description:

Start IP:

End IP:

URL String:

Time: 00 : 00 ~ 00 : 00

Day: ☑Every day ☑Sun ☑Mon ☑Tue ☑Wen ☑Thu ☑Fri ☑Sat

Delete: Clear

Filter Mode: Select Deny or Allow according to your own needs.

Deny Access to Websites: Disallow PCs at specified IP addresses to access websites with certain URL string.

Allow Access to Websites: Allow PCs at specified IP addresses to access websites with certain URL string.

Select: Select a number (indicating a filter rule) from the drop-down menu. Up to 10 rules can be set.

Description: Enter a meaningful name to yourself for a new filter rule.

Start IP: Enter a starting IP address.

End IP: Enter an ending IP address.

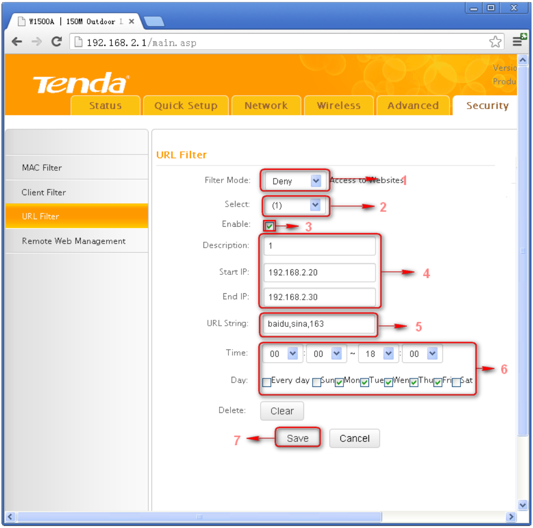
URL String: Enter domain names or a part of a domain name that needs to be filtered out.

Time: Select a time range for the corresponding entry to take effect.

Day: select a day or several days for the corresponding entry to take effect.

Example:

To forbid PCs within the IP addresses range of 192.168.2.20--192.168.2.30 on your LAN to visit websites whose URL contains “sina”, “baidu” and “163” from 00 ：00 to 18 ：00 on working days: Monday- Friday, then do as follows:



URL Filter

Filter Mode: Deny Access to Websites

Select: (1)

Enable: ☑

Description: 1

Start IP: 192.168.2.20

End IP: 192.168.2.30

URL String: baidu,sina,163

Time: 00 : 00 ~ 18 : 00

Day: □Every day □Sun ☑Mon ☑Tue ☑Wen ☑Thu ☑Fri □Sat

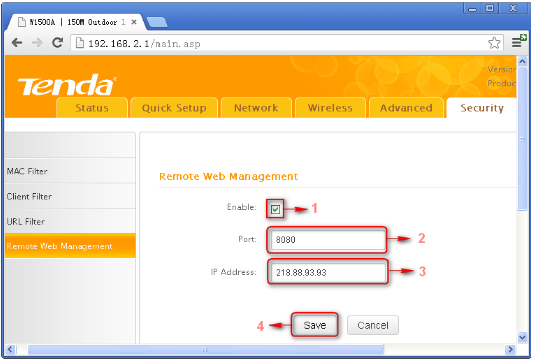
Delete: Clear

Save Cancel

Click Save to save the settings.

6.4 Remote Web Management

The Remote Web management allows the Router to be configured from the Internet by a web browser.



Remote Web Management

Enable: ☑

Port: 8080

IP Address: 218.88.93.93

- ➢ **Enable:** Select whether to enable the Remote Web-based Management feature
- ➢ **Port:** Remote admin port; the port used by trusted hosts from
- ➢ Internet or other external networks to access and manage the device remotely via a web browser
- ➢ **IP address**：Enter a trusted IP address of a PC from Internet or other external networks which you want to authorize to manage the device remotely via a web browser

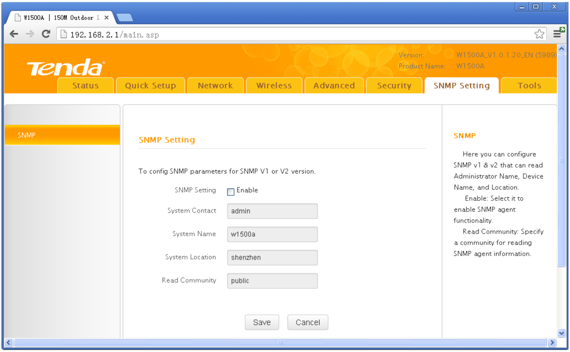
Notice:

1. To access the device via port 8080, enter http://x.x.x.x:8080 where "x.x.x.x" represents the the device's Internet IP address and 8080 is the remote admin port. Assuming the device's Internet IP address is 220.135.211.56, then, simply replace the "x.x.x.x" with "220.135.211.56" (namely, http://220.135.211.56:8080).

2. Leaving the IP address field at "0.0.0.0" makes the device remotely accessible to all the PCs on Internet or other external networks; populating it with a specific IP address, say, 218.88.93.33, makes the device only remotely accessible to the PC at the specified IP address.

Chapter 7 SNMP

Simple Network Management Protocol (SNMP) is a popular protocol for network management. It is widely used in local area networks (LAN) for collecting information, and managing and monitoring, network devices. For using this function, please enable it and provide the information which the following page need.



SNMP Setting

To config SNMP parameters for SNMP V1 or V2 version.

SNMP Setting ☐ Enable

System Contact: admin

System Name: w1500a

System Location: shenzhen

Read Community: public

SNMP

Here you can configure SNMP v1 & v2 that can read Administrator Name, Device Name, and Location.

Enable: Select it to enable SNMP agent functionality.

Read Community: Specify a community for reading SNMP agent information.

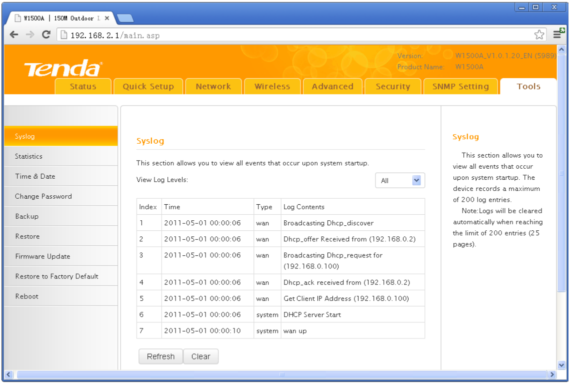
- **System contact** ：Set the name to access the AP. Usually set the administrator’s name
- **Device Name** ：Set the AP’s name, such as Tenda_W1500A
- **Location** ：Set the AP’s network location
- **Read Community** ：Indicates the community read access string to permit reading this AP’s SNMP information. The default is Public

Chapter 8 System tools

This section focuses on how to maintain AP, including Syslog, Statistics, Time & Date, Change Password, Backup, Restore, Firmware Update, Restore to Factory Default, Reboot.

8.1 Syslog

The section is to view the system log. You can view the various statuses after system startup and check whether there's network attack. If the log is over 200 records, it will clear them automatically.



Syslog

This section allows you to view all events that occur upon system startup.

View Log Levels: All

Index	Time	Type	Log Contents
1	2011-05-01 00:00:06	wan	Broadcasting Dhcp_discover
2	2011-05-01 00:00:06	wan	Dhcp_offer Received from (192.168.0.2)
3	2011-05-01 00:00:06	wan	Broadcasting Dhcp_request for (192.168.0.100)
4	2011-05-01 00:00:06	wan	Dhcp_ack received from (192.168.0.2)
5	2011-05-01 00:00:06	wan	Get Client IP Address (192.168.0.100)
6	2011-05-01 00:00:06	system	DHCP Server Start
7	2011-05-01 00:00:10	system	wan up

Syslog

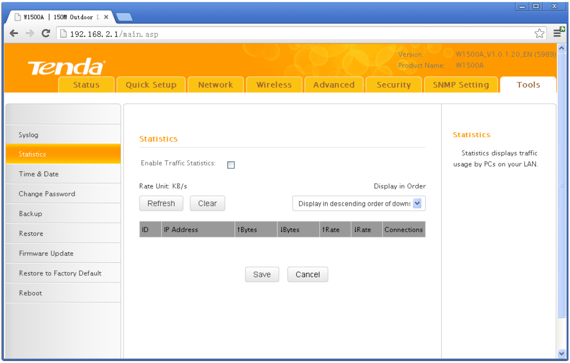
This section allows you to view all events that occur upon system startup. The device records a maximum of 200 log entries.

Note:Logs will be cleared automatically when reaching the limit of 200 entries (25 pages).

- **Refresh:** Click this button to update the log
- **Clear:** Click this button to clear the current log

8.2 Statistics

Statistics is only for routing mode. This section will display the LAN IP addresses and the corresponding packet traffic status of the local network.



Version: W1500A_V1.0.1.20_EN (5989)

Product Name: W1500A

Statistics

Enable Traffic Statistics: □

Rate Unit: KB/s

Display in Order: Display in descending order of downs

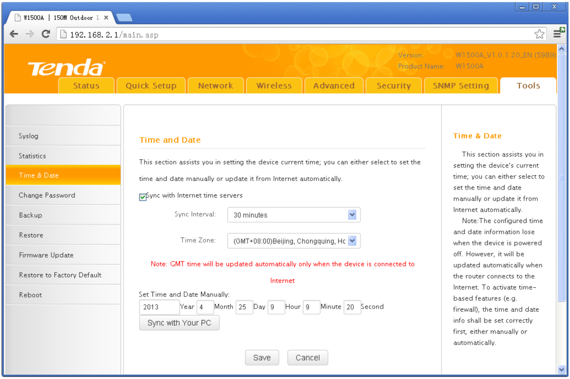
ID	IP Address	↑Bytes	↓Bytes	↑Rate	↓Rate	Connections

Statistics

Statistics displays traffic usage by PCs on your LAN.

- ➢ **Enable Traffic Statistics:** Tick this box to enable the network user traffic statistics. If there is no need to, we suggest turn off this function.
- ➢ **Refresh:** Click this button to update the statistic list.

8.3 Time & Date



Time and Date

This section assists you in setting the device current time; you can either select to set the time and date manually or update it from Internet automatically.

☑ Sync with Internet time servers

Sync Interval: 30 minutes

Time Zone: (GMT+08:00)Beijing, Chongquing, Hc

Note: GMT time will be updated automatically only when the device is connected to Internet

Set Time and Date Manually:

2013 Year 4 Month 25 Day 9 Hour 9 Minute 20 Second

Time & Date

This section assists you in setting the device's current time; you can either select to set the time and date manually or update it from Internet automatically.

Note:The configured time and date information lose when the device is powered off. However, it will be updated automatically when the router connects to the Internet. To activate time-based features (e.g. firewall), the time and date info shall be set correctly first, either manually or automatically.

This section is to select the time zone for your location. You can select your own time or obtain the standard GMT time from Internet.

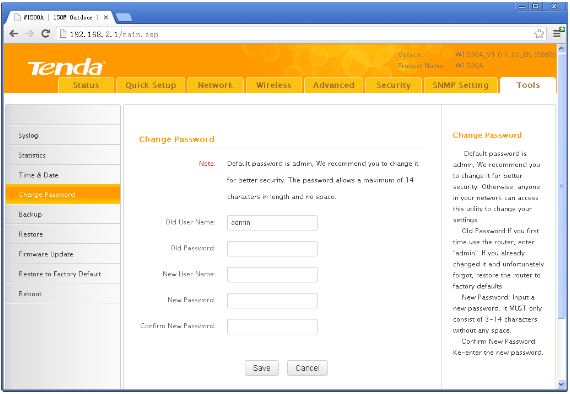
➢ **Sync with Internet time servers**：Obtain the standard GMT time from Internet automatically.

➢ **Sync Interval**：System time synchronization interval. Please choose according to your need, the system default cycle time is half an hour.

➢ **Time Zone**：Select your time zone from the drop-down menu.

➢ **Sync with Your PC**：Customize the time of the device the same with your PC.

8.4 Change Password



Version: W1500A_V1.0.1.20_EN (5989)
Product Name: W1500A

Change Password

Note: Default password is admin, We recommend you to change it for better security. The password allows a maximum of 14 characters in length and no space.

Old User Name: admin

Old Password:

New User Name:

New Password:

Confirm New Password:

Change Password

Default password is admin, We recommend you to change it for better security. Otherwise: anyone in your network can access this utility to change your settings.

Old Password:If you first time use the router, enter "admin". If you already changed it and unfortunately forgot, restore the router to factory defaults.

New Password: Input a new password. It MUST only consist of 3-14 characters without any space.

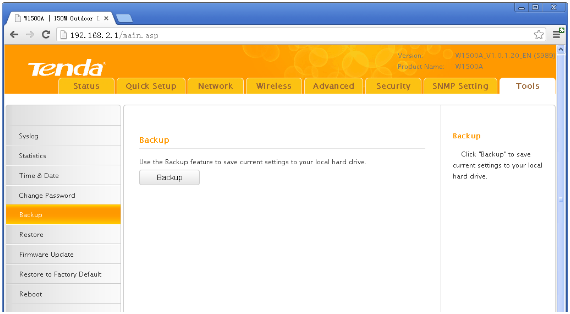
Confirm New Password: Re-enter the new password.

This section is to set a new user name and password to better secure your device and network. Type in correct parameters in the blank and click **save** to finish the username and password settings.

- **Old User Name:** Enter the old username.
- **Old Password:** Enter the old password.
- **New Username:** Enter a new user name for the device.
- **New Password:** Enter a new password for the device.
- **Confirm New Password:** Re-enter to confirm the new password.

Note：It is highly recommended to change the password to secure your network and the device.

8.5 Backup



Version: W1500A_V1.0.1.20_EN (5989)
Product Name: W1500A

Backup

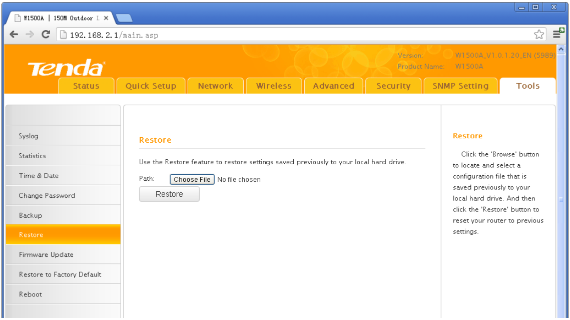
Use the Backup feature to save current settings to your local hard drive.

Backup

Click "Backup" to save current settings to your local hard drive.

Backup: Click this button to back up the device's configurations.

8.6 Restore



Version: W1500A_V1.0.1.20_EN (5989)
Product Name: W1500A

Restore

Use the Restore feature to restore settings saved previously to your local hard drive.

Path: No file chosen

Restore

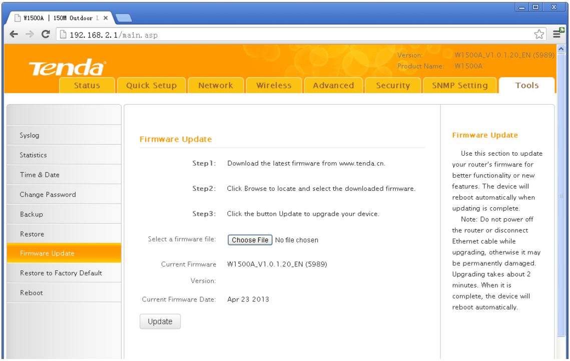
Click the 'Browse' button to locate and select a configuration file that is saved previously to your local hard drive. And then click the 'Restore' button to reset your router to previous settings.

Choose File: Click this button to browse the directory where you backup or save the device's settings.

Restore: Click this button to restore the device's configurations.

8.7 Firmware Update

By upgrading the router's software, you will get more stable version and appreciation of the routing function.



Version: W1500A_V1.0.1.20_EN (5989)
Product Name: W1500A

Firmware Update

Step1: Download the latest firmware from www.tenda.cn.

Step2: Click Browse to locate and select the downloaded firmware.

Step3: Click the button Update to upgrade your device.

Select a firmware file: Choose File No file chosen

Current Firmware Version: W1500A_V1.0.1.20_EN (5989)

Current Firmware Date: Apr 23 2013

Firmware Update

Use this section to update your router's firmware for better functionality or new features. The device will reboot automatically when updating is complete.

Note: Do not power off the router or disconnect Ethernet cable while upgrading, otherwise it may be permanently damaged. Upgrading takes about 2 minutes. When it is complete, the device will reboot automatically.

Firmware Update Steps：

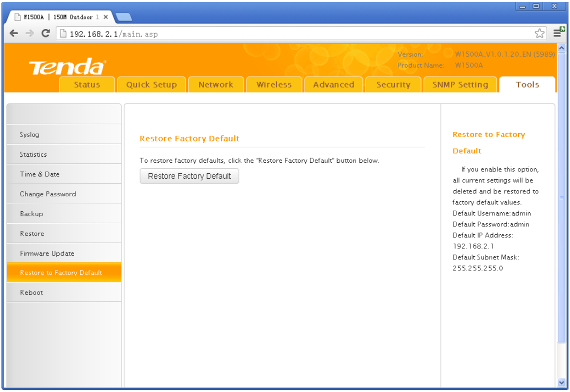
On the Firmware Upgrade screen, click the **Choose File** button and find the new firmware file.

Click **Update** button, and follow the on-screen instructions.

After the upgrade is completed, the device will reboot automatically.

Note: Do not power off the system during the firmware upgrade to avoid damaging the device. The upgrade process will take a few minutes, please wait patiently.

8.8 Restore to Factory Default



Restore Factory Default

To restore factory defaults, click the "Restore Factory Default" button below.

Restore to Factory Default

If you enable this option, all current settings will be deleted and be restored to factory default values.
Default Username:admin
Default Password:admin
Default IP Address: 192.168.2.1
Default Subnet Mask: 255.255.255.0

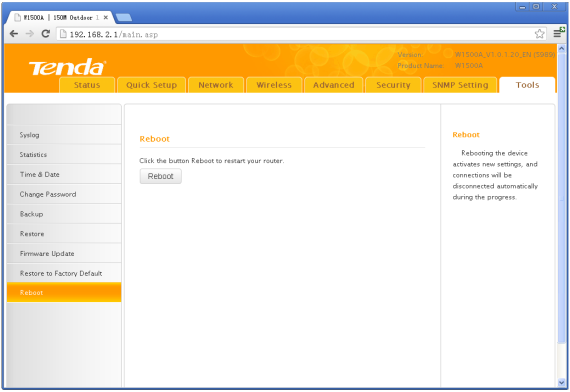
Restore to Factory Default: Click this button is to reset all configurations to the default values. It means the device will lose all the settings you have set.

Factory Default Settings:

- **User Name:** admin
- **Password:** admin
- **IP Address:** 192.168.2.1
- **Subnet Mask:** 255.255.255.0

8.9 Reboot

This page is used to reboot the device. Rebooting the device makes the settings configured go into effect. This process will take about one minute.



Version: W1500A_V1.0.1.20_EN (5989)
Product Name: W1500A

Click the button Reboot to restart your router.

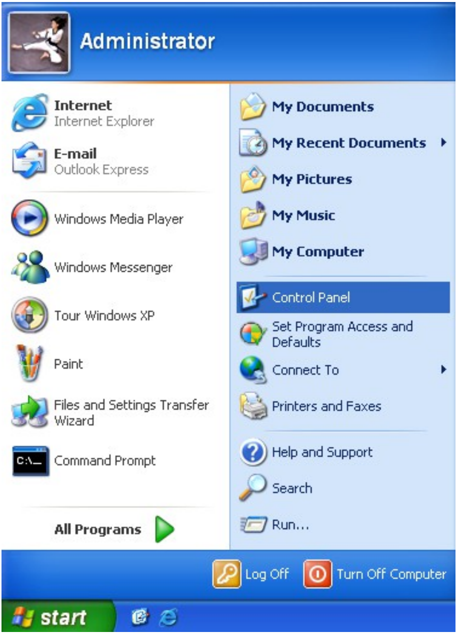
Rebooting the device activates new settings, and connections will be disconnected automatically during the progress.

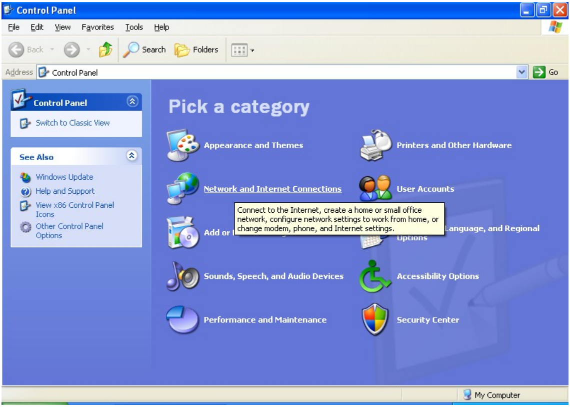
Reboot: Click this button to reboot the device.

Appendix 1 TCP/IP Settings

If you are using Windows XP, do as follows:

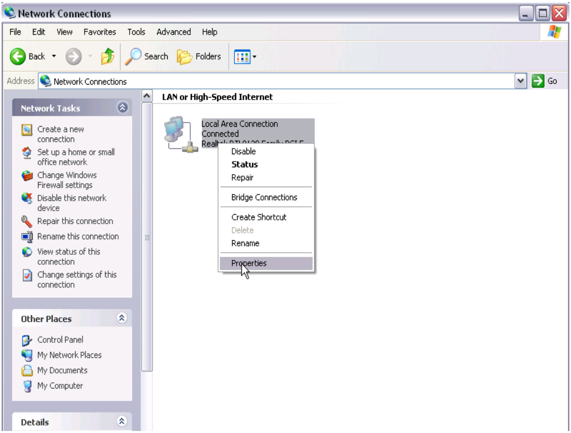
1. From the desktop, click **Start > Control Panel** > **Network** and **Internet Connections**.



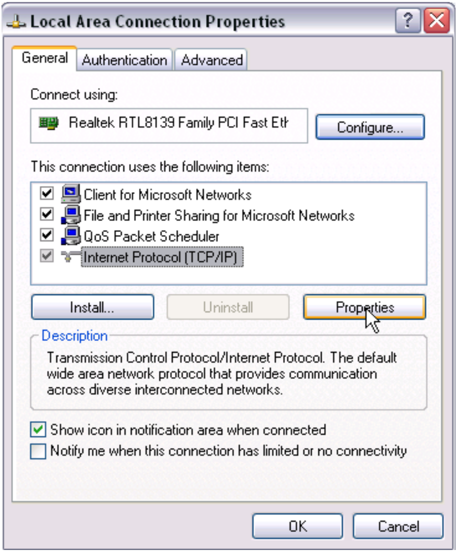

Control Panel
File Edit View Favorites Tools Help
Back Search Folders
Address Control Panel Go
Control Panel
Switch to Classic View
See Also
Windows Update
Help and Support
View x86 Control Panel Icons
Other Control Panel Options
Pick a category
Appearance and Themes
Printers and Other Hardware
Network and Internet Connections
User Accounts
Add or
Language, and Regional Options
Sounds, Speech, and Audio Devices
Accessibility Options
Performance and Maintenance
Security Center
My Computer

Connect to the Internet, create a home or small office network, configure network settings to work from home, or change modem, phone, and Internet settings.

2. Right-click on the **Local Area Connection** and select **Properties**.



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



Connect using:

Realtek RTL8139 Family PCI Fast Eth

This connection uses the following items:

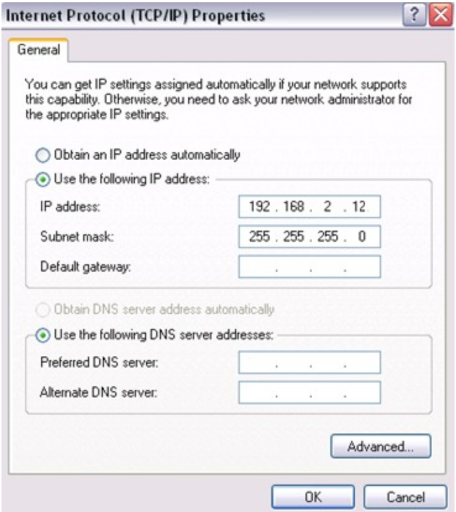
☑ Client for Microsoft Networks
☑ File and Printer Sharing for Microsoft Networks
☑ QoS Packet Scheduler
☑ Internet Protocol (TCP/IP)

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

☑ Show icon in notification area when connected
□ Notify me when this connection has limited or no connectivity

4. Select **Use the following IP address**.



Internet Protocol (TCP/IP) Properties

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address:	192 . 168 . 2 . 12
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	. . .

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server:	. . .
Alternate DNS server:	. . .

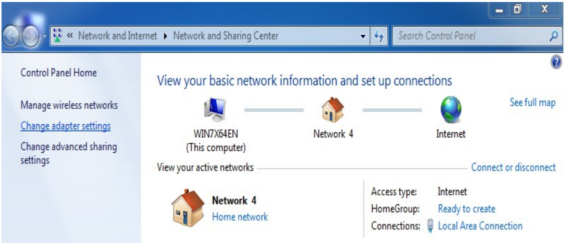
IP address: Enter 192.168.2.xxx where xxx can be any number between 2 and 253).

Subnet mask: Enter 255.255.255.0.

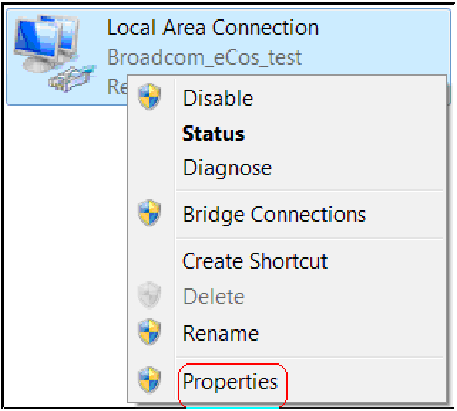
Click **OK** twice to save your settings.

If you are using Windows 7, do as follows:

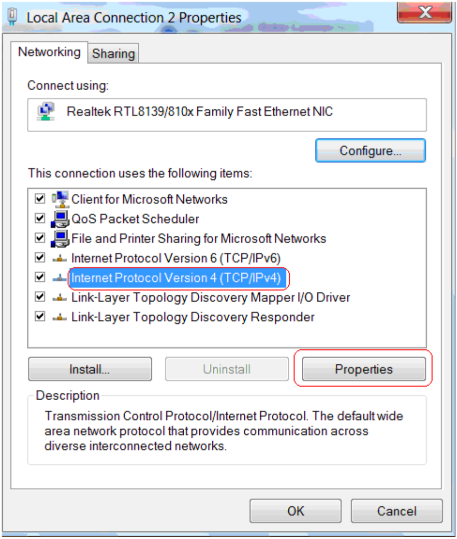
1. Click on **Start**-> **Control Panel** -> **Network and Internet**-> **Network** and **Sharing Center**. Click **Change adapter settings**.


« Network and Internet ▸ Network and Sharing Center
Search Control Panel
Control Panel Home
Manage wireless networks
Change adapter settings
Change advanced sharing settings
View your basic network information and set up connections
See full map
WIN7X64EN (This computer)
Network 4
Internet
View your active networks
Connect or disconnect
Network 4
Home network
Access type: Internet
HomeGroup: Ready to create
Connections: Local Area Connection

2. Right-click on the **Local Area Connection** and select **Properties**.



3. Select **Internet Protocol Version 4 (TCP/IPv4)** and **click Properties or directly** double-click on **Internet Protocol Version 4 (TCP/IPv4).**



Local Area Connection 2 Properties

Networking | Sharing

Connect using:

Realtek RTL8139/810x Family Fast Ethernet NIC

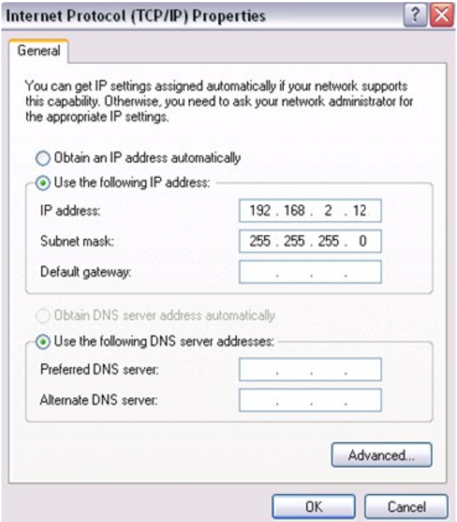
This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

4. Select **Use the following IP address**.



Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 2 . 12

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: . . .

Alternate DNS server: . . .

IP address: Enter 192.168.2.xxx where xxx can be any number between 2 and 253).

Subnet mask: Enter 255.255.255.0.

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

Appendix 2: Glossary

Channel

A communication channel, also known as channel, refers either to a physical transmission medium such as a wire or to a logical connection over a multiplexed medium such as a radio channel. It is used to transfer an information signal, such as a digital bit stream, from one or more transmitters to one or more receivers. If there is only one AP in the range, select any channel you like. The default is Auto.
If there are several APs coexisting in the same area, it is advisable that you select a different channel for each AP to operate on, minimizing the interference between neighboring APs. For example, if 3 American- standard APs coexist in one area, you can set their channels respectively to 1, 6 and 11 to avoid mutual interference.

SSID

Service set identifier (SSID) is used to identify a particular 802.11 wireless LAN. It is the name of a specific wireless network. To let your wireless network adapter roam among different APs, you must set all Aps' SSID to the same name.

Wired Equivalent Privacy (WEP) is a security algorithm for IEEE 802.11 wireless networks with the intention to provide data confidentiality comparable to that of a traditional wired network .WEP, recognizable by the key of 10 or 26 hexadecimal digits, is widely in use. WEP uses the stream cipher RC4 for confidentiality,[5] and the CRC-32 checksum for integrity. Standard 64-bit WEP uses a 40-bit key (also known as WEP-40), which is concatenated with a 24-bit initialization vector (IV) to form the RC4 key. The extended 128-bit WEP protocol uses a 104-bit key size (WEP-104). A 152-bit WEP is available from some vendors. Static WEP encryption allows to include 4 WEP Keys while dynamic WEP encryption changes WEP key dynamically.

WPA/WPA2

The WPA protocol implements the majority of the IEEE 802.11i standard. It enhances data encryption through the Temporal Key Integrity Protocol (TKIP) which is a 128-bit per-packet key, meaning that it dynamically generates a new key for each packet. WPA also includes a message integrity check feature to prevent data packets from being hampered with. Only authorized network users can access the wireless network.

The later WPA2 protocol features compliance with the full IEEE 802.11i standard and uses Advanced Encryption Standard (AES) in addition to TKIP encryption protocol to guarantee better security than that provided by WEP or WPA. Currently, WPA is supported by Windows XP SP1.

Appendix 3 FAQs

This section provides solutions to problems that may occur during installation and operation of the device. Read the following if you are running into problems. If your problem is not covered here, please go to our website of www.tendacn.com or e-mail to support@tenda.cn for help.

1. Q: I entered the device's LAN IP address in the web browser but cannot access the utility. What should I do?

A: 1) Verify physical connectivity by checking whether a corresponding port's link LED lights up. If not, try a different cable. Note that an illuminated light does NOT ALWAYS indicate successful connectivity.

2). In **Router Mode**, you must use a wireless network adapter to connect to the device, as the **LAN/WAN** Ethernet port works as a **WAN** port for Internet connection; while in **AP Mode**, **Universal Repeater Mode**, you must specify an IP address (192.168.2.2~192.168.2.253) on your PC to connect to the device. 3) Click **Start**-->**Run**, enter **cmd** and then input **ping 192.168.2.1** to check the connectivity status between your PC and device. If ping succeeds, then check whether the Proxy Server feature is enabled on your browser. If enabled, disable it immediately. In case that ping fails, press and hold the "RESET" button on your device for 7 seconds to restore factory default settings, and then run "ping192.168.2.1" again.

Contact our technical support for help if the problem still exists after you tried all the above.

2. Q: What should I do if I forget the login password to my device?

A: Reset your device by pressing the Reset button on the PoE injector for 8~10 seconds. Note: All settings will be deleted and restored to factory defaults once you pressed the Reset button.

3. Q: My computer shows an IP address conflict error after having connected to the device. What should I do?

A: 1) Check if there are other DHCP servers present in your LAN. If there are other DHCP servers except your router, disable them immediately.

2) The default IP address of the device is 192.168.2.1; make sure this address is not used by another PC or device. In case that two computers or devices share the same IP addresses, change either to a different address.

4. Q:My computer can neither log in to the device nor access Internet, and there is a yellow triangle with an exclamation mark shown in the network adapter icon on the right bottom corner of my computer desktop; how am I supposed to deal with it?

A: This problem occurs because your network card has not been assigned with an IP address. If your computer is set to obtain an IP address automatically, please ensure that the router's DHCP function is enabled. DHCP can automatically assign an IP address to your computer. If there is no DHCP server available on your network, please set a static IP address and fill in gateway and DNS, otherwise you cannot access Internet.

5. Q: How do I share resources on my computer with users on Internet through the device?

A: To let Internet users access internal servers on your LAN such as e-mail server, Web, FTP, via the device, use the "Virtual Server" feature. To do so, follow steps below:

Step 1: Create your internal server, make sure the LAN users can access these servers and you need to know related service ports, for example, port for Web server is 80; FTP is 21; SMTP is 25 and POP3 is 110.

Step 2: Click “Virtual Server” and select “Port Range Forwarding” (also known as Port Forwarding on some devices) on device’s web interface.

Step 3: Input the Start Port/External Port, say, 80.

Step 4: Input the End Port/Internal Port, say, 80.

Input the internal server’s IP address. For example, assuming that your Web server’s IP address is 192.168. 2.10, then simply input it.

Step 6: Select a communication protocol used by your internal host: TCP, UDP or

ICMP and enable the rule.

Step 7: Save your settings.

For your reference, we collected a list of some well-known service ports as follows:

For your reference, we collected a list of some well-known service ports as follows:

Server	Protocol	Service Port
Web Server	TCP	80
FTP Server	TCP	21
Telnet	TCP	23
NetMeeting	TCP	1503、1720
SKype	TCP/UDP	File Send:6891-6900(TCP) Voice:1863、6901(TCP) Voice:1863、5190(UDP)
PPTP VPN	TCP	1723
Iphone5.0	TCP	22555
SMTP	TCP	25
POP3	TCP	110

If your problems are not covered here, please feel free to go to www.tendacn.com to find solutions or email your problems to: support@tenda.com.cn or or support02@tenda.com.cn. We will be more than happy to help you out as soon as possible.

Website: www.tendacn.com

Technical Support: support@tenda.com.cn

Shenzhen Tenda Technology Co., Ltd

www.tendacn.com

Appendix 4 Safety and Emission Statement

CE Mark Warning

This is a Class B product In a domestic environment,this product may cause radio interference,in which case the user may be required to take adequate measures.This device complies with EU 1999/5/EC.

NOTE:(1)The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment.(2) To avoid unnecessary radiation interference, it is recommended to use a shielded RJ45 cable

FCC Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to pro-vide reasonable protection against harmful interference when the equipment is operate din a commercial environment. This equipment generates, uses, and can radiate radiofrequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and(2) this device must accept any interference received, including interference that may cause undesired operation. The manufacturer is not responsible for any radio or TV interference

caused by unauthorized modifications to this equipment.

NOTE:(1)The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment.(2) To avoid unnecessary radiation interference, it is recommended to use a shielded RJ45 cable