

Light Mesh AP



User's Guide

2009/2/20 v1.0 draft

FCC Certifications

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

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

CAUTION:

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the 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.

For product available in the USA market, only channel 1~11 can be operated. Selection of other channels is not possible.

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

FCC RF Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.

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.

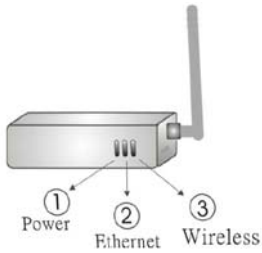
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1. Hardware and Installation

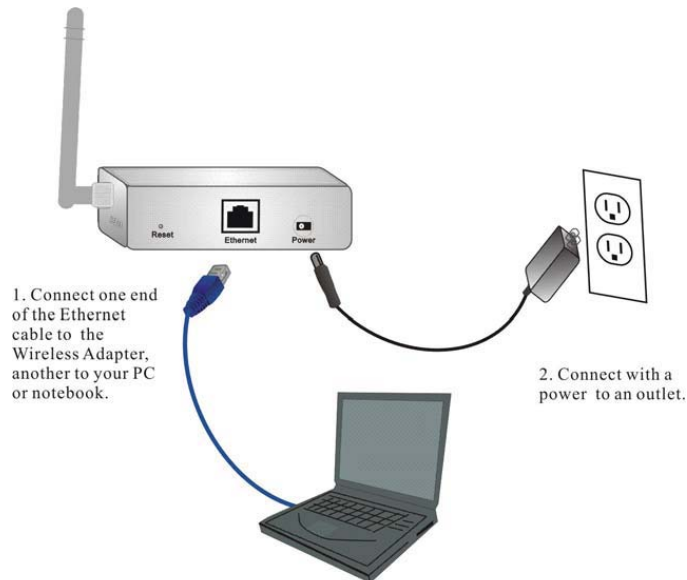
1.1. LED Definitions



	LED indicator	Color	Status	
			Solid	Flashing
1	Power	Blue	Turns solid Blue when the power is applied to this device.	NA
2	Ethernet	Blue	Turns solid Blue when an Ethernet cable is connected.	Receiving/Sending data
3	Wireless	Blue	Turns solid Blue when the wireless is applied to this device.	Receiving/Sending data

1.2. Selecting a Power Supply Method

1. Connect one end of the Ethernet cable to the Light Mesh AP, another end to your PC or notebook.
2. Connect the Light Mesh AP with a power to an outlet



2. Deploying the Mesh AP



3. Features

- Cost-Effective
- High Performance
- Easy for installation
- Auto connection for better signal route
- Easy to Configure by MESH AP Manager

4. First-Time Configuration

4.1. Preparing for Configuration

To configure a Mesh AP, a *managing computer* with a Web browser is needed. For first-time configuration of a Mesh AP, an Ethernet network interface Card (NIC) should have been installed in the managing computer. For maintenance-configuration of a deployed the AP, either a wireless computer or a wired computer can be employed as the managing computer.

Since the configuration/management protocol is HTTP-based, you have to make sure that the IP address of the managing computer and the IP address of the *managed Mesh AP* are in the same IP subnet (the default IP address of an AP is **192.168.1.100** and the default subnet mask is **255.255.255.0**.)

4.2. Connecting the Managing Computer and the AP



4.3. Changing the TCP/IP Settings of the Managing Computer

Use the **Windows Network Control Panel Applet** to change the TCP/IP settings of the managing computer, so that the IP address of the computer and the IP address of the AP are in the same IP subnet. Set the IP address of the computer to **192.168.1.xxx** (the default IP address of an AP is **192.168.1.100**) and the subnet mask to **255.255.255.0**.

NOTE:	For some versions of Windows, the computer needs to be restarted for the changes of TCP/IP settings to take effect.
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4.4. Changing the TCP/IP Settings of the Managing Computer

Before the start page is shown, you will be prompted to enter the user name and password to gain the right to access the Web-based Network Manager. For first-time configuration, use the default user name "**admin**" and default password "**admin**", respectively.

5. Configuration

5.1. Overview

5.1.1. Menu Structure

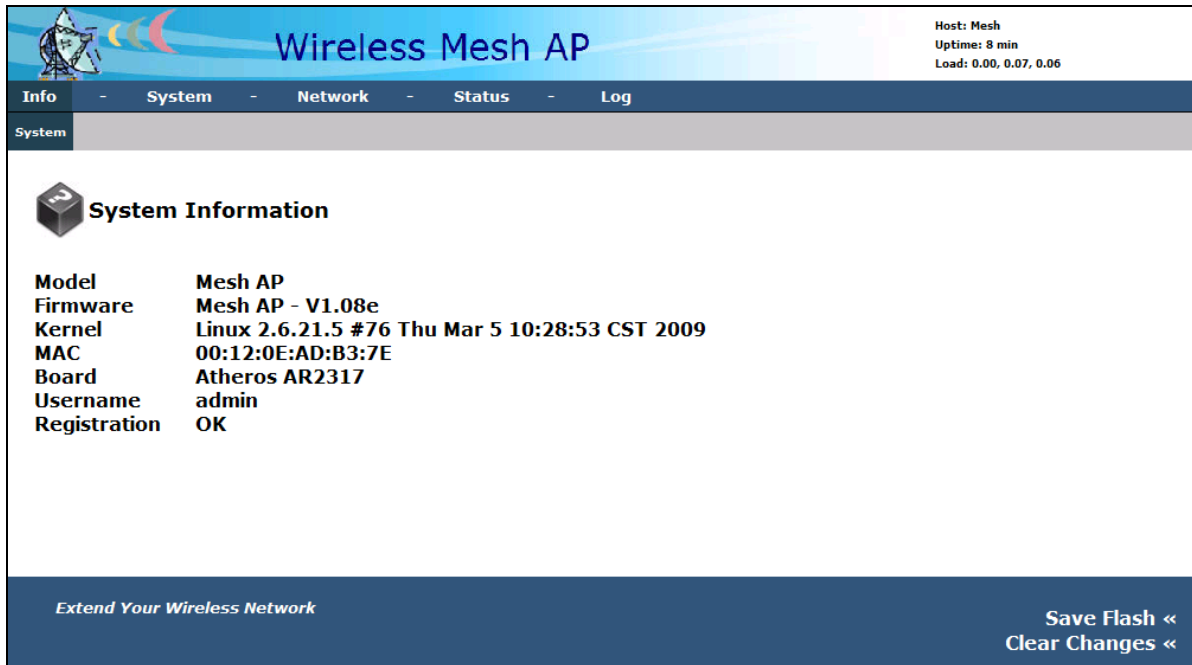


Fig. 1. The Home Page

5.1.2. Menu Structure

The left side of the start page contains a menu for you to carry out commands. Here is a brief description of the hyperlinks on the menu:

- **Info.** For System Information.
 - **System.** System Information which includes Model, Firmware, Kernel, MAC, Board, Use name and Registration.
- **System.** System monitoring information
 - **Settings.** Host Name and Time zone and NTP (Network Time Protocol) server settings
 - **Password.** For changing and Setting administrator password.
 - **Backup and Restore.** The configuration settings of the Mesh AP can be backed up to a file via HTTP for later restoring.
 - **Reset to Default.** Resetting the configuration settings to factory-default values.
 - **Upgrade.** For upgrading the firmware of the Mesh AP
 - **Reboot.** Resetting the configuration settings to factory-default values.
- **Network.** To configure LAN and WLAN
 - **Network.** IP addressing settings and DNS Servers for the Mesh AP to work in the TCP/IP networking world.
 - **Wireless.** IP addressing settings for the Mesh AP to work in the TCP/IP networking

world.

- ◆ **General Wireless Setting.** Basic settings for the Wireless Mesh AP to work properly with wireless clients and operational mode of the Mesh AP—AP + Mesh, AP + STA or AP Only Modes.
- ◆ **AP Configuration.** Setting Parameters on AP Mode.
- ◆ **Mesh Configuration.** Setting Parameters on Mesh Mode.
- ◆ **STA Configuration.** Setting Parameters on STA Mode.
- **Status.** To configure LAN and WLAN
 - **System Summary.** The page shows RAM Usage, Tracked Connections and Mount Usage information.
 - ◆ **RAM Usage.** This is the current RAM usage. The amount free represents how much applications have available.
 - ◆ **Tracked Connections.** This is the number of connections in your router's Contrack table.
 - ◆ **Mount Usage.** This is the amount of space total and used on the file Systems mounted to your router.
 - **Interface.** DNS Server, LAN and Loopback information are shown here.
 - **ARP Cache.** Address Resolution Protocol Cache information.
 - **Netstat.** Network Statistics Information.
 - **Diagnost.** URL Ping Tool.
 - **Mesh.** Mesh Status.
 - **AP.** AP Status
 - **STA.** STA Status
 - **Site Survey.** To search and show a list of available APs in the area.
- **Log.**
 - **Log Settings.** Setting Remote system log and Local System log host.
 - **Syslog.** System log Messages.
 - **Kernel.** System kernel operation information

5.1.3. Save Changes, Save Flash, and Clear Changes

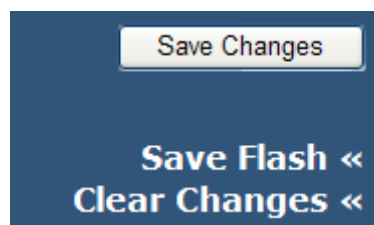


Fig. 2. Save Changes, Save Flash and Clear Changes

At the bottom of each page, there are three buttons—**Save Changes**, **Save Flash**, and **Clear Changes**. Clicking **Save Changes** stores the settings changes to the memory of the Mesh AP. Clicking **Save Flash** stores the settings changes to the memory of the AP. It must click **Save Changes** button before you click the **Save Flash** button. Clicking **Clear Changes** discards any settings changes

and brings you back to the start page. You must go to **System \ Reboot** page to restart the AP immediately for the settings changes to take effect after you have applied **Save Flash** function.

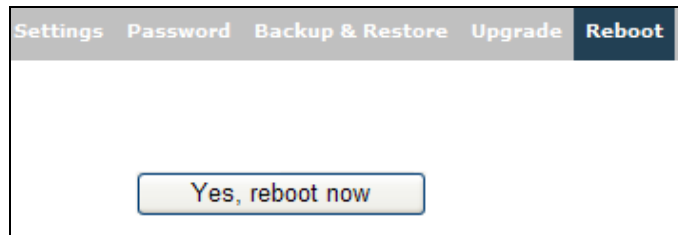


Fig. 3. Reboot Button

5.2. Systems Settings

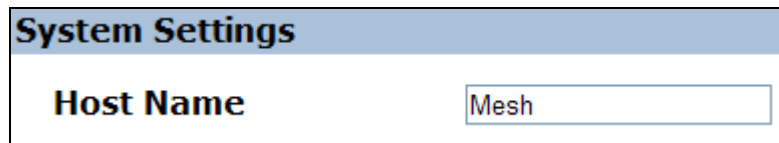


Fig. 4. Host Name Setting

You can specify the **Host name** of the Mesh AP here.

5.2.1. Time Settings

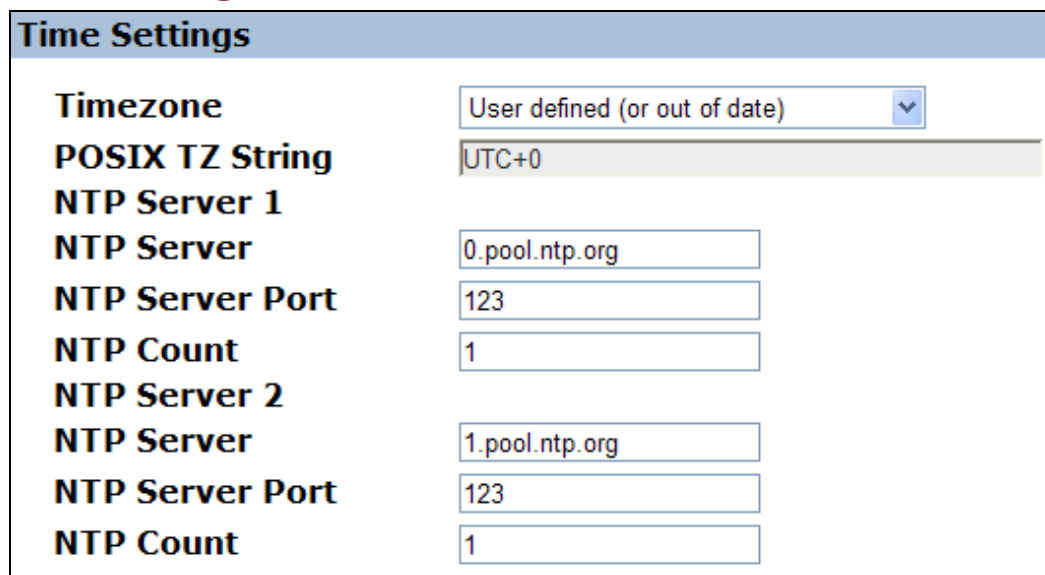


Fig. 5. Time Settings

In this section, you can set Time Zone and NTP Servers here.

5.2.2. Password Change

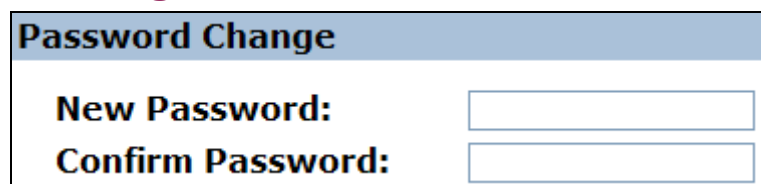


Fig. 6. Administrator password setting

You can change the Password of Administrator in the function.

5.2.3. Backup and Restore

5.2.3.1. Backup Configuration

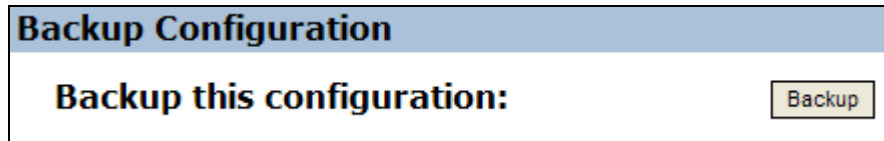


Fig. 7. Save the configuration file by HTTP

To back up configuration of the AP by HTTP:

1. Click **Backup** Button and a pop-up download box will be shown later. If you are not able to see the pop-up download box, you can also click **config.tgz** hyper-link to download configuration file.

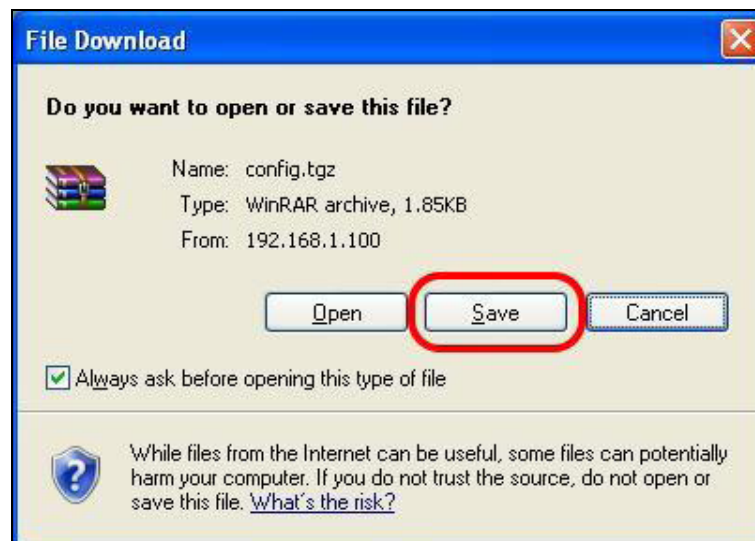


Fig. 8. Pop-up download box

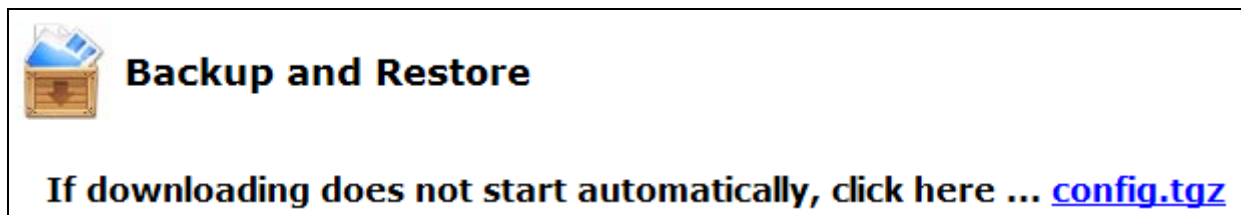


Fig. 9. Configuration File Download Link

2. The configuration file is name config.tgz. Don't change the configuration file name in the **Save As** dialog box. Select a folder in which the configuration file is to be stored. And then, click Save.

NOTE: The procedure may be a little different with different Web browsers.

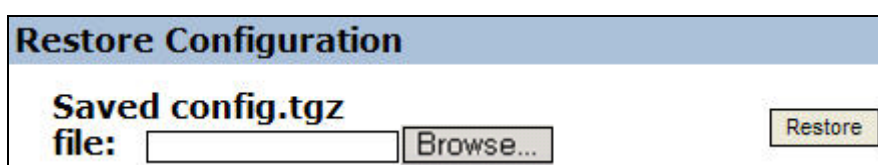


Fig. 10. Configuration restore by HTTP

To restore configuration of the AP by HTTP:

To click **Browse** and then select a correct configuration **.tgz** file. You have to make sure the file name is the AP's MAC address. The Configuration file path will be shown in the **Configuration file name** text box. Clicking **Restore** button and upload the configuration file to the AP.

5.2.3.2. Resetting Configuration to Factory Defaults

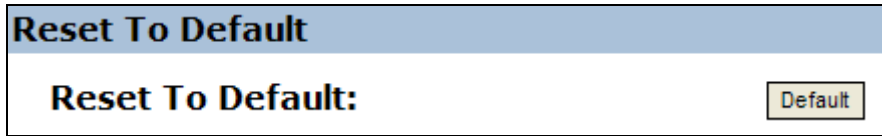


Fig. 11. Resetting configuration to Factory Defaults

5.2.4. Firmware Upgrade



Fig. 12. Firmware upgrade by HTTP

To upgrade firmware of the AP by HTTP:

1. Click **Browse** and then select a correct firmware **.bin** file. The firmware file path will be shown in the Firmware file name text box.
2. Click **Upgrade** to begin the upgrade process.

5.2.5. Reboot

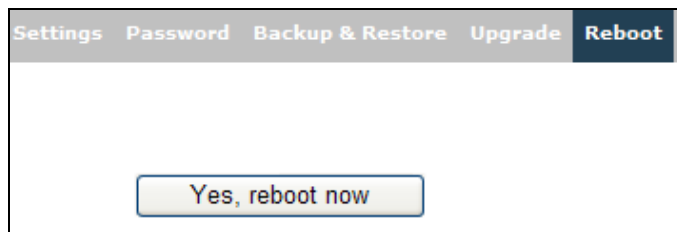


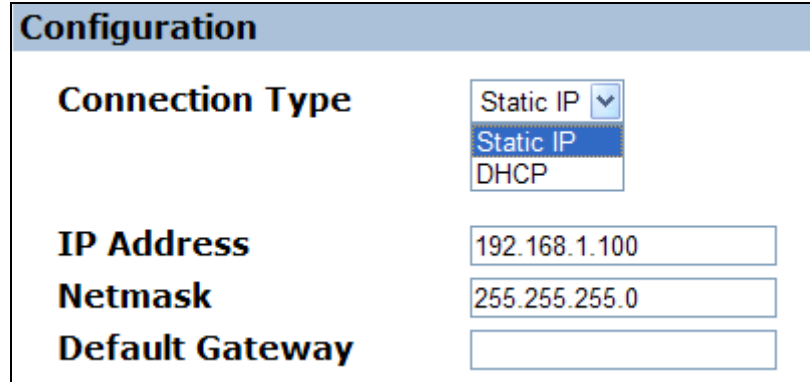
Fig. 13. Reboot Button

To restart the Mesh AP by clicking **“Yes, reboot now”** button. It will take you about 80 Secs.

5.3. Networks

5.3.1. Networks

5.3.1.1. LAN IP Address Configuration



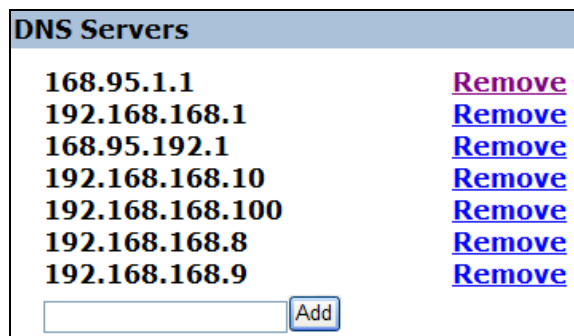
The screenshot shows a configuration window titled "Configuration". It contains the following fields:

Connection Type	Static IP (dropdown menu with options: Static IP, DHCP)
IP Address	192.168.1.100
Netmask	255.255.255.0
Default Gateway	(empty text box)

Fig. 14. LAN IP Address Configuration

The LAN IP address must be set manually to a *private IP address*, say **192.168.1.xxx**. The default LAN IP address is **192.168.1.100** and the default subnet mask is **255.255.255.0**. You can also set DHCP type to get IP Address via DHCP Server. In most cases, these default settings need no change.

5.3.1.2. DNS Server



The screenshot shows a configuration window titled "DNS Servers". It contains a list of IP addresses with "Remove" links next to them, and an "Add" button at the bottom.

168.95.1.1	Remove
192.168.168.1	Remove
168.95.192.1	Remove
192.168.168.10	Remove
192.168.168.100	Remove
192.168.168.8	Remove
192.168.168.9	Remove

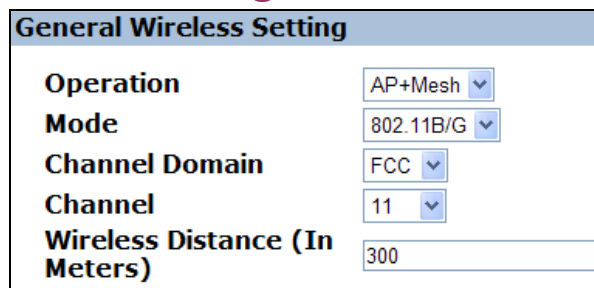
Input field: Add

Fig. 15. DNS Server Setting

It allows you to add IP Address of several DNS Servers here and to remove it by clicking **Remove** hyper-link.

5.3.2. Wireless

5.3.2.1. General Wireless Setting



The screenshot shows a configuration window titled "General Wireless Setting". It contains the following fields:

Operation	AP+Mesh (dropdown menu)
Mode	802.11B/G (dropdown menu)
Channel Domain	FCC (dropdown menu)
Channel	11 (dropdown menu)
Wireless Distance (In Meters)	300 (text box)

Fig. 16. General Wireless Settings

This Mesh AP supports AP Only, AP + Mesh and AP + STA (Station) modes. 'AP Mode' provides pure access point function. The simplest way to build up a wireless LAN is to use 'AP Mode'. In 'AP + Station Mode', the Mesh AP can be used as the repeater of backbone. In 'AP + Mesh Mode', the Mesh AP can be Wireless Mesh mode.

Go to the IEEE 802.11, Communication section to configure IEEE 802.11g-related communication settings, including channel domain (Regulatory Domain), Channel Number, and Wireless Distance.

5.3.2.2.AP Configuration

AP Configuration	
Mode	Access Point <input type="button" value="v"/>
WMM	<input type="radio"/> On <input checked="" type="radio"/> Off
TX Rate	Auto <input type="button" value="v"/>
Tx Power	15 dbm <input type="button" value="v"/>
RTS	<input type="text"/>
Fragmentation	<input type="text"/>
ESSID	Mesh <input type="text"/>
Encryption Type	Disabled <input type="button" value="v"/>

Fig. 17. AP Configuration

The section allows you to set Setting AP Parameters.

WMM Function, WMM (The short of Wi-Fi MultiMedia) is QoS for your wireless network. This will enhance the quality of data transfer performance, video and voice applications for your wireless clients.

TX Rate, Select the transmit rate. It is strongly suggested to select **Auto** for best performance.

TX Power, Set the transmit power of wireless radio, the default value is 15dBm.

RTS Threshold, Set the RTS threshold of wireless radio. It is strongly suggested to set 2347 – 2432 value.

Fragmentation Type, Set the RTS threshold of wireless radio. It is strongly suggested to set 2346 value.

ESSID, Set the name of wireless AP

Encryption Type, please see 5.3.2.5 to set the AP security.

5.3.2.3.Mesh Configuration

Mesh Configuration	
Mode	Mesh <input type="button" value="v"/>
WMM	<input type="radio"/> On <input checked="" type="radio"/> Off
TX Rate	Auto <input type="button" value="v"/>
Tx Power	15 dbm <input type="button" value="v"/>
RTS	<input type="text"/>
Fragmentation	<input type="text"/>
MESH ID	Mesh <input type="text"/>
Encryption Type	Disabled <input type="button" value="v"/>

Fig. 18. Mesh Configuration

The section allows you to set Setting Mesh Parameters.

WMM Function, WMM (The short of Wi-Fi MultiMedia) is QoS for your wireless network. This will enhance the quality of data transfer performance, video and voice applications for your wireless clients.

TX Rate, Select the transmit rate. It is strongly suggested to select **Auto** for best performance.

TX Power, Set the transmit power of wireless radio, the default value is 15dBm.

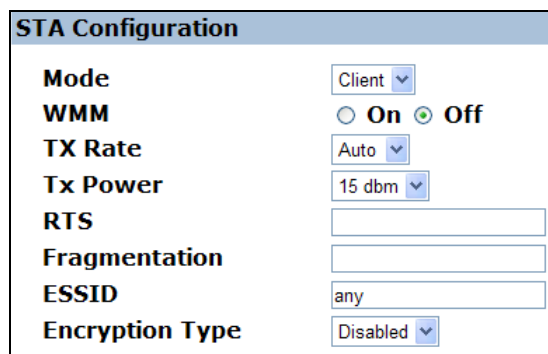
RTS Threshold, Set the RTS threshold of wireless radio. It is strongly suggested to set 2347 – 2432 value.

Fragmentation Type, Set the RTS threshold of wireless radio. It is strongly suggested to set 2346 value.

MESH ID, Set the Mesh ID with a preferred group name, Mesh AP Stations must have the same Mesh ID to be able to associate with each other.

Encryption Type, please see 5.3.2.5 to set the AP security.

5.3.2.4.STA Configuration



STA Configuration	
Mode	Client
WMM	<input type="radio"/> On <input checked="" type="radio"/> Off
TX Rate	Auto
Tx Power	15 dbm
RTS	
Fragmentation	
ESSID	any
Encryption Type	Disabled

Fig. 19. STA Configuration

The section allows you to set Setting AP Parameters.

WMM Function, WMM (The short of Wi-Fi MultiMedia) is QoS for your wireless network. This will enhance the quality of data transfer performance, video and voice applications for your wireless clients.

TX Rate, Select the transmit rate. It is strongly suggested to select **Auto** for best performance.

TX Power, Set the transmit power of wireless radio, the default value is 15dBm.

RTS Threshold, Set the RTS threshold of wireless radio. It is strongly suggested to set 2347 – 2432 value.

Fragmentation Type, Set the RTS threshold of wireless radio. It is strongly suggested to set 2346 value.

ESSID, Set a name of wireless AP which you prefer to connection.

Encryption Type, please see 5.3.2.5 to set the AP security.

5.3.2.5.Security

There are up to 6 security modes:

- **Open System.** No authentication, no data encryption.
- **Static WEP.** WEP (Wired Equivalent Privacy) keys must be manually configured.
- **WPA-PSK.** Only TKIP (Temporal Key Integrity Protocol) mechanism of WPA (Wi-Fi Protected Access) is enabled. In this mode, you have to specify the **Pre-shared key**, which will be used by the TKIP engine as a *master key* to generate keys that actually encrypt outgoing packets and decrypt incoming packets.
- **WPA2-PSK.** The advanced protocol, certified through Wi-Fi Alliance's WPA2 program, implements the mandatory elements of 802.11i. WPA2 is an improvement on the WPA-PSK standard, and is simply using a shared password for access to your network. Only users with this password can access your network.

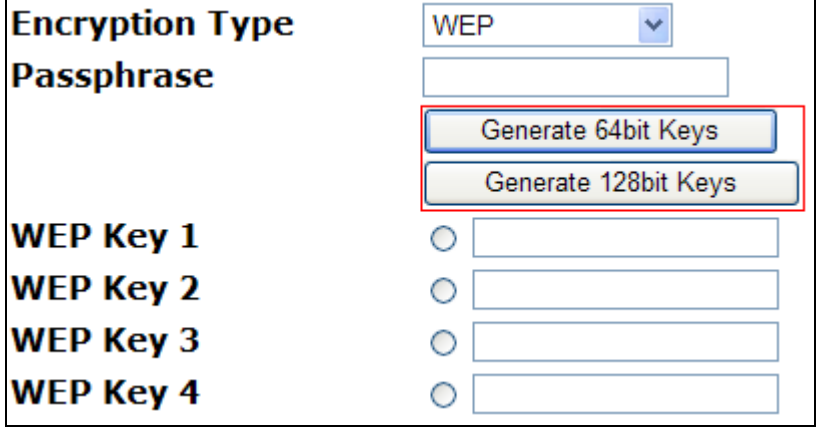
NOTE:	The number of characters of the Pre-shared key setting must be at least 8 and can be up to 63.
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- **WPA-Enterprise (with RADIUS).** This is a full WPA mode, in which both the TKIP and IEEE 802.1x dynamic key exchange mechanisms are enabled. The AP is highly secured in this mode.
- **WPA2-Enterprise (with RADIUS).** This is a full WPA2 mode, in which both the TKIP and IEEE 802.1x dynamic key exchange mechanisms are enabled. The AP is highly secured in this mode.

In the above security modes, a back-end RADIUS (Remote Authentication Dial-In User Service) server is needed if IEEE 802.1x functionality is enabled.

When WEP is enabled by a security mode, the **Key length** can be specified to be **64 Bits** or **128 Bits**. The **Selected key** setting specifies the key to be used as a *send-key* for encrypting traffic from the local device side to the remote device side. All 4 WEP keys are used as *receive-keys* to decrypt traffic from the remote device side to the local device side.

Notes: Each field of a WEP key setting is a *hex-decimal* number from 0-9, A-F. For example, when the security mode is **Static WEP** and the key length is **64 Bits**, you could set Key 1 to “00012E3ADF”. You can also use **Generate 64 / 128bit keys** buttons to generate keys.



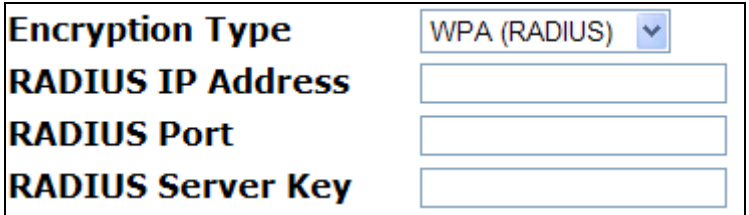
The screenshot shows a configuration window for WEP. At the top, 'Encryption Type' is set to 'WEP' in a dropdown menu. Below it is a 'Passphrase' text input field. Two buttons, 'Generate 64bit Keys' and 'Generate 128bit Keys', are highlighted with a red box. Below these are four 'WEP Key' fields (Key 1 to Key 4), each with a radio button to its left.

Fig. 20. Security Type selection

5.3.2.6. RADIUS Settings

IEEE 802.1x *Port-Based Network Access Control* is a standard for solving some security issues associated with IEEE 802.11, such as lack of user-based authentication and dynamic encryption key distribution. With IEEE 802.1x, a RADIUS (Remote Authentication Dial-In User Service) server, and a user account database, an enterprise or ISP (Internet Service Provider) can manage its mobile users’ access to its wireless LANs. Before granting access to a wireless LAN supporting IEEE 802.1x, a user has to issue his or her *user name* and *password* or *digital certificate* to the backend RADIUS server by EAPOL (Extensible Authentication Protocol Over LAN). The RADIUS server can record accounting information such as when a user logs on to the wireless LAN and logs off from the wireless LAN for monitoring or billing purposes.

The IEEE 802.1x functionality of the access point is controlled by the *security mode* (see Section 5.9.2). So far, the wireless access point supports two authentication mechanisms—EAP-MD5 (Message Digest version 5), EAP-TLS (Transport Layer Security). If EAP-MD5 is used, the user has to give his or her *user name* and *password* for authentication. If EAP-TLS is used, the wireless client computer automatically gives the user’s *digital certificate* that is stored in the computer hard disk or a smart card for authentication. And after a successful EAP-TLS authentication, a session key is automatically generated for wireless packets encryption between the wireless client computer and its associated wireless access point. To sum up, EAP-MD5 supports only user authentication, while EAP-TLS supports user authentication as well as dynamic encryption key distribution.



The screenshot shows a configuration window for RADIUS. 'Encryption Type' is set to 'WPA (RADIUS)' in a dropdown menu. Below it are three text input fields labeled 'RADIUS IP Address', 'RADIUS Port', and 'RADIUS Server Key'.

Fig. 21. RADIUS Settings

You can enter RADIUS IP Address, port and RADIUS Server key after you select WPA (RADIUS) / WPA2 (RADIUS) encryption type.

5.4. Status

5.4.1. Device Status

On this page, the status information of the mesh access point, including its RAM usage, tracked connections and mount Usage.

5.4.1.1. RAM Usage

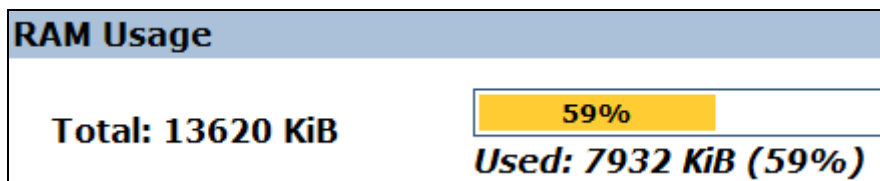


Fig. 22. RAM Usage

This is the current RAM usage. The amount free represents how much applications have available.

5.4.1.2. Tracked Connections

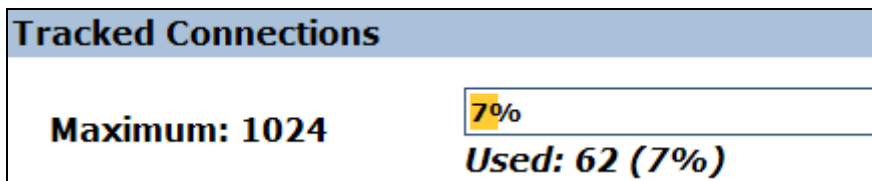


Fig. 23. Tracked Connections

This is the number of connections in your AP's conntrack table.

5.4.1.3. Mount Usage

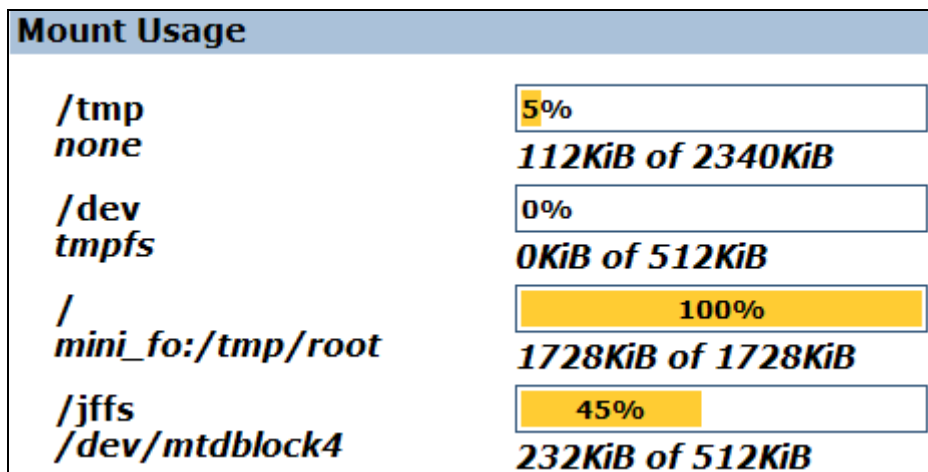


Fig. 24. Mount Usage

This is the amount of space total and used on the file systems mounted to your AP.

5.4.2. Interface

Interfaces	
DNS Servers	
DNS Server 1	127.0.0.1
DNS Server 2	168.95.1.1
LAN	
MAC Address	00:12:0E:AD:B3:7E
IP Address	192.168.168.73
Received	234 pkts (26.1 KiB)
Transmitted	94 pkts (45.0 KiB)
LOOPBACK	
IP Address	127.0.0.1
Received	0 pkts (0.0 B)
Transmitted	0 pkts (0.0 B)
WLAN	
Access Point	00:12:0E:AD:B3:7E
Mode	Master
ESSID	Mesh
Frequency	2.462 GHz
Transmit Power	15 dBm
Noise Level	-96 dBm
Encryption Key	off
Security mode	
Rx Invalid nwid	250
Rx Invalid Encryption	0
Tx Retries in Excess	0
Tx Invalid	0
Tx Missed Beacon	0
Raw Information	
<input type="button" value="Show raw statistics"/>	

Fig. 25. Interface Information

On this page, the status information of the mesh access point, including its RAM usage, tracked connections mount Usage and Raw Information by clicking “**Show raw Statistics**”.

```

Raw Information

LAN Interface
br-lan    Link encap:Ethernet  HWaddr 00:12:0E:AD:B3:7E
          inet addr:192.168.168.73  Bcast:192.168.175.255  Mask:255.255.248.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:5459 errors:0 dropped:0 overruns:0 frame:0
          TX packets:869 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:558079 (544.9 KiB)  TX bytes:469514 (458.5 KiB)

Interface LOOPBACK
lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

Wireless Interface
ath0     IEEE 802.11g  ESSID:"Mesh"  Nickname:""
          Mode:Master  Frequency:2.462 GHz  Access Point: 00:12:0E:AD:B3:7E
          Bit Rate:0 kb/s  Tx-Power=15 dBm  Sensitivity=1/1
          Retry:off  RTS thr:off  Fragment thr:off
          Encryption key:off
          Power Management:off
          Link Quality=0/70  Signal level=-96 dBm  Noise level=-96 dBm
          Rx invalid nwid:26537  Rx invalid crypt:0  Rx invalid frag:0
          Tx excessive retries:0  Invalid misc:0  Missed beacon:0

```

Fig. 26. Raw Information

5.4.2.1. ARP Cache

ARP Cache				
Address Resolution Protocol Cache (ARP)				
MAC Address	IP Address	HW Type	Flags	Mask
00:04:76:DE:9A:2C	192.168.168.64	ETHER	C (completed)	*

Fig. 27. ARP Cache

On this page, it shows the Address Resolution Protocol Cache information here. ARP is similar in function to ping requests from a device on Ethernet or Wide Area Network that are sent to WAN and LAN IP, but it operates using ARP instead of Internet Control Message Protocol.

5.4.2.2. Netstat

Netstat

Ethernet/Wireless Physical Connections

IP address	HW type	Flags	HW address	Mask	Device
192.168.168.64	0x1	0x2	00:04:76:DE:9A:2C	*	br-lan

Routing Table

Kernel IP routing table

Destination	Gateway	Genmask	Flags	MSS Window	irtt	Iface
192.168.168.0	0.0.0.0	255.255.248.0	U	0 0	0	br-lan
10.0.0.0	0.0.0.0	255.0.0.0	U	0 0	0	br-lan

Device Listening Ports

Active Internet connections (only servers)

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State
tcp	0	0	0.0.0.0:80	0.0.0.0:*	LISTEN
udp	0	0	0.0.0.0:52525	0.0.0.0:*	

Connections to the Device

Active Internet connections (w/o servers)

Proto	Recv-Q	Send-Q	Local Address	Foreign Address	State
tcp	0	0	192.168.168.240:80	192.168.168.64:4228	TIME_WAIT
tcp	0	0	192.168.168.240:80	192.168.168.64:4229	TIME_WAIT
tcp	0	0	192.168.168.240:80	192.168.168.64:4230	TIME_WAIT
tcp	0	0	192.168.168.240:80	192.168.168.64:4231	TIME_WAIT
tcp	0	0	192.168.168.240:80	192.168.168.64:4232	TIME_WAIT
tcp	0	0	192.168.168.240:80	192.168.168.64:4233	TIME_WAIT
tcp	0	0	192.168.168.240:80	192.168.168.64:4234	TIME_WAIT
tcp	0	0	192.168.168.240:80	192.168.168.64:4235	TIME_WAIT
tcp	0	0	192.168.168.240:80	192.168.168.64:4236	TIME_WAIT
tcp	0	0	192.168.168.240:80	192.168.168.64:4237	TIME_WAIT
tcp	0	1238	192.168.168.240:80	192.168.168.64:4238	ESTABLISHED

Fig. 28. Netstat

On the page, it shows network statistics as you apply **netstat** command on several operation systems (Windows, UNIX and Linux etc.).

5.4.2.3. Diagnostics

Diagnostics

Network Utilities

Fig. 29. Diagnostics

The function will help you to respond to ping requests from a **URL Address** or **IP Address** and also

it can trace routing table.

```
Please wait for output of "traceroute tw.yahoo.com" ...

traceroute to tw-tpe-fo.fyap.b.yahoo.com (119.160.246.241), 30 hops max, 38 byte packets
 2 59-120-41-254.HINET-IP.hinet.net (59.120.41.254) 39.809 ms 33.905 ms 57.373 ms
 3 tp-e4-c76r1.router.hinet.net (168.95.84.218) 57.503 ms 32.967 ms 33.330 ms
 4 tp-e4-c12r1.router.hinet.net (211.22.36.50) 33.407 ms tp-e4-c12r2.router.hinet.net (211.22.36.178) 34.200 ms 220-128-
 5 tp-crs11.router.hinet.net (220.128.1.110) 38.603 ms tp-crs11.router.hinet.net (220.128.2.170) 33.673 ms tp-crs11.rout
 6 tp-s2-c76r1.router.hinet.net (220.128.1.221) 62.104 ms 40.994 ms
 7 *
 8 te-8-1.bas2-1-prd.tw1.yahoo.com (119.160.240.3) 34.929 ms 34.397 ms te-8-1.bas1-1-prd.tw1.yahoo.com (119.160.240.1)
 9 *
```

Fig. 30. Routing Tracing

5.4.2.4. Mesh Status

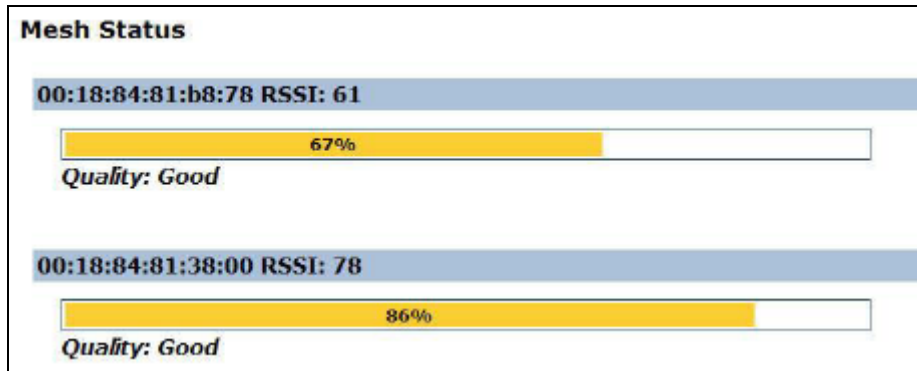


Fig. 31. Mesh Status

On this page, the MESH information of each associated neighboring nodes, including its MAC address, RSSI (Received Signal Strength Indication) and Link Quality are shown.

5.4.2.5. AP Status

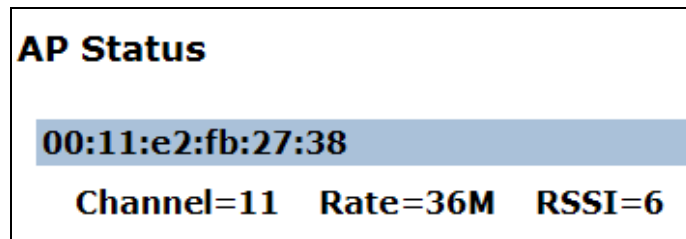


Fig. 32. AP Status

On this page, the status information of each associated client, including its MAC address, Channel, TX Rate and RSSI (Received Signal Strength Indication) are shown.

5.4.2.6. STA Status

STA Status

STA Associates to AP61_2

SSID: AP61_2

ESSID: 00:12:0E:AD:B3:80


CHANNEL: 1

RSSI: 64 (Quality is good)

Fig. 33. STA Status

On this page, the status information of AP that you have associated, including its SSID, MAC address, Channel and RSSI (Received Signal Strength Indication) are shown.

5.4.2.7. Site Survey

 **Wireless survey**

[Re-scan](#)















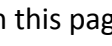

Signal/Noise	Status	SSID	MAC	Channel
		AP61_1	00:12:0E:AD:B3:7C	1
		AP61_2	00:12:0E:AD:B3:80	1
		energyfull	00:11:95:23:C6:89	6
		Mesh	00:18:84:81:95:84	6
		Wireless-B	00:12:0E:9A:A2:33	11
		wireless-Oz	00:0E:8E:02:58:75	11
		wireless	00:09:92:02:E5:37	11
		ddd	02:05:B4:05:39:40	6

Fig. 34. Site Survey

On this page, lists of available APs in the area are shown.

5.5. Log

5.5.1. Log Settings

5.5.1.1. Remote Syslog

Remote Syslog

Server IP Address

Server Port

Fig. 35. Remote Syslog

IP address and port of the remote logging host. Leave this address blank for no remote logging.

5.5.1.2. Local Log

Local Log	
Log type	Circular <input type="button" value="v"/>
Log Size	16 <input type="button" value="KiB"/>

Fig. 36. Local Log

IP address and port of the remote logging host. Leave this address blank for no remote logging.

5.5.1.3. Kernel Log

Kernel Log	
Messages Priority	<input type="text"/>
Ring Buffer Size	<input type="text"/> <input type="button" value="KiB"/>

Fig. 37. Kernel Log

Messages Priority, Log messages up to the defined priority, the default priority level is 7 (debug).
Ring Buffer Size, How much space to kernel reserve for messages in memory. The default size is 16 KiB.

5.5.1.4. Boot Time Log

Boot Time Log	
Backup Boot Time Messages	<input type="checkbox"/>
Backup File	<input type="text" value="/var/log/dmesg"/>
Compress Backup	<input checked="" type="checkbox"/>

Fig. 38. Boot Time Log

Backup Boot Time Messages, the boot time messages will get overwritten by other events. You can save them for the later reference.

5.5.2. Syslog

5.5.2.1. Syslog Messages

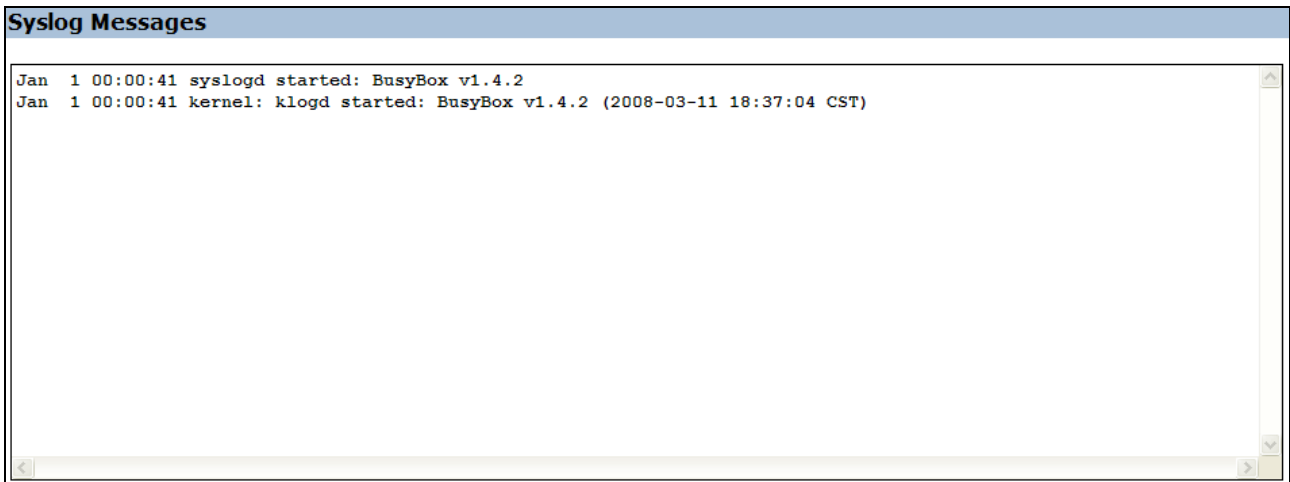
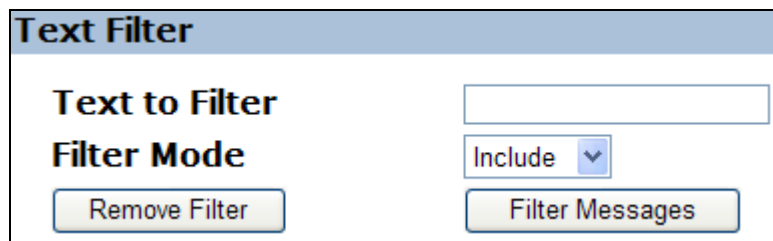


Fig. 39. Syslog Message

System events are recorded in the memory of the AP. The logged information is useful for troubleshooting purposes.

5.5.2.2. Text Filter



The screenshot shows a form titled "Text Filter". It contains the following elements:

- Text to Filter:** A text input field.
- Filter Mode:** A dropdown menu currently set to "Include".
- Remove Filter:** A button.
- Filter Messages:** A button.

Fig. 40. Text Filter

Text to Filter, insert a string that covers what you would like to see or exclude. In fact you can use the regular expression constants like: `00:[[:digit:]]{2}:[[:digit:]]{2}` or `.debug|.err`. Filter Mode, you will see only messages containing the text in the Include mode while you will not see them in the Exclude mode.

5.5.3. Kernel

5.5.3.1. Kernel Ring Buffer

```
Kernel Ring Buffer

Current messages

Linux version 2.6.21.5 (nehemiah@nehemiah-desktop) (gcc version 4.1.2) #76 Thu Mar 5 10:28:53 CST 2009
CPU revision is: 00019064
Determined physical RAM map:
 memory: 01000000 @ 00000000 (usable)
Initrd not found or empty - disabling initrd
On node 0 totalpages: 4096
  DMA zone: 32 pages used for memmap
  DMA zone: 0 pages reserved
  DMA zone: 4064 pages, LIFO batch:0
  Normal zone: 0 pages used for memmap
Built 1 zonelists. Total pages: 4064
Kernel command line: console=ttyS0,9600 rootfstype=squashfs,jffs2 init=/etc/preinit
Primary instruction cache 16kB, physically tagged, 4-way, linesize 16 bytes.
Primary data cache 16kB, 4-way, linesize 16 bytes.
Synthesized TLB refill handler (20 instructions).
Synthesized TLB load handler fastpath (32 instructions).
Synthesized TLB store handler fastpath (32 instructions).
Synthesized TLB modify handler fastpath (31 instructions).
```

Fig. 41. Kernel Ring Buffer Message

On this page, it shows a Linux kernel log and debugging messages, it contains messages from the kernel, from modules, etc.