



802.11g Wireless LAN Outdoor CPE AP

WAP-6100

User's Manual

Version 1.0



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FCC Caution:

To assure continued compliance.(example-use only shielded interface cables when connecting to computer or peripheral devices). Any changes or modifications not expressly approved by the party responsible for compliance 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.

Federal Communication Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20 cm(8 inches) during normal operation.

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.

Protection requirements for health and safety – Article 3.1a

Testing for electric safety according to EN 60950 has been conducted. These are considered relevant and sufficient.

Protection requirements for electromagnetic compatibility – Article 3.1b

Testing for electromagnetic compatibility according to EN 301 489-1, EN 301 489-17 and EN 55024 has been conducted. These are considered relevant and sufficient.

Effective use of the radio spectrum – Article 3.2

Testing for radio test suites according to EN 300 328-2 has been conducted. These are considered relevant and sufficient.

CE in which Countries where the product may be used freely:

Germany, UK, Italy, Spain, Belgium, Netherlands, Portugal, Greece, Ireland, Denmark, Luxembourg, Austria, Finland, Sweden, Norway and Iceland.

France: except the channel 10 through 13, law prohibits the use of other channels

Safety

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

WEEE regulation



To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

Revision

User's Manual for PLANET 802.11g WLAN Outdoor CPE AP
Model: WAP-6100
Rev: 1.0 (June, 2006)
Part No. EM-WAP6100

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Chapter 1 Introduction

The WAP-6100 is an outdoor 802.11g CPE AP with 12dBi antenna built in. This manual describes the details of how to manage this equipment.

1.1 Package Contents

Make sure that you have the following items:

- One WAP-6100
- One Power Cord
- One PoE Injector
- One Metal Ring
- One 25m CAT5 Cable with RJ-45 plug and ODU connector
- One 1.9m CAT5 Cable with RJ-45 plugs
- One User's Manual and Utility CD
- One Quick Installation Guide

Note:	If any of the above items are missing, contact your supplier as soon as possible.
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1.2 Features

- Wireless LAN IEEE802.11b/g compliant
- Solid housing provides protection against rigorous weather conditions
- Four operating modes support: AP, Wireless Bridge, Wireless Client, and Repeater
- Strong network security with 64/128/152-bit WEP encryption, WPA and WPA-PSK
- Built-in 12dBi patch antenna
- 5 levels of adjustable transmit power control
- Super G mode raises the data rate up to 108Mbps
- Support DHCP Client
- Provides "Connection Status" indication for Repeater and Client modes
- Power over Ethernet design

1.3 Specification

Model	WAP-6100
Standard	IEEE 802.11b, 802.11g
Signal Type	DSSS (Direct Sequence Spread Spectrum)

Modulation	OFDM with BPSK, QPSK, 16QAM, 64QAM, DBPSK, DQPSK, CCK	
Port	10/100Mbps RJ-45 port * 1	
Antenna	Built-in 12dBi patch antenna	
Output Power	18dBm@11Mbps / 17dBm@54Mbps (typical) 5 levels adjustable (Full, Half, Quarter, Eighth, Minimum)	
Sensitivity	-74dBm@54Mbps OFDM, 10% PER -88dBm@11Mbps CCK, 8% PER	
Operating Mode	AP, Wireless Bridge, Wireless Client, Repeater	
Security	<p>WEP setting</p> <ul style="list-style-type: none"> - Authentication type: Open System / Shared Key - Shared keys input type: HEX / ASCII - Shared keys length: (64-bit, 128-bit, 152-bit) - Default WEP Key to use (1-4) <p>WPA-PSK setting</p> <ul style="list-style-type: none"> - PassPhrase - WPA Cipher Type (TKIP, AES) - Group Key Update Interval: 300 <p>WPA setting</p> <ul style="list-style-type: none"> - Radius Server IP Address - Radius Port: 1812 - WPA Cipher Type (TKIP, AES) - Shared Key <p>Group Key Update Interval: 300</p>	
Data Rate	Super G mode	Up to 108Mbps
	802.11g	Up to 54Mbps (6/9/12/18/24/36/48/54)
	802.11b	Up to 11Mbps (1/2/5.5/11)
Dimensions (L x W x H)	185 x 106 x 62mm	
Weight	400g	
Environmental Specification	<p>Operating temperature: -10 – 70 degree C</p> <p>Storage temperature: -30 – 80 degree C</p> <p>Relative humidity: 0% – 90% (non-condensing)</p>	
Power Requirement	48V DC, 0.4A	
Electromagnetic Compatibility	FCC, CE	

1.5 Wireless Performance

The following information will help you utilizing the wireless performance, and operating coverage of

WAP-6100.

1. Site selection

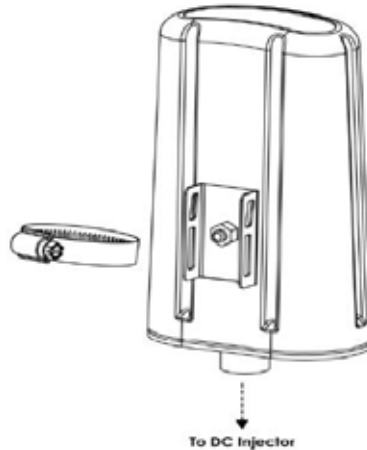
To avoid interferences, please locate WAP-6100 and wireless clients away from transformers, microwave ovens, heavy-duty motors, refrigerators, fluorescent lights, and other industrial equipments. Keep the number of walls, or ceilings between AP and clients as few as possible; otherwise the signal strength may be seriously reduced. Place WAP-6100 in open space or add additional WAP-6100 as needed to improve the coverage.

2. Environmental factors

The wireless network is easily affected by many environmental factors. Every environment is unique with different obstacles, construction materials, weather, etc. It is hard to determine the exact operating range of WAP-6100 in a specific location without testing.

Chapter 2 Hardware Installation

Before you proceed with the installation, it is necessary that you have enough information about the WAP-6100.



1. Locate an optimum location and use the provided metal ring to secure WAP-6100 to a mast.
2. Using provided CAT5 waterproof cable; connect the waterproof connector port of the WAP-6100 to the "P+DATA OUT" port of PoE Injector.
3. Using Category 3 or higher UTP or STP cable, connect the "DATA IN" port of PoE Injector to a 10Mbps or 10/100Mbps Ethernet hub or switch, and connect the management station to a hub or switch on the same LAN.
4. Connect the power cord to the PoE Injector, and plug it into an AC outlet to power up the WAP-6100.

Note: ONLY use the power adapter supplied with the WAP-6100. Otherwise, the product may be damaged.



OUTDOOR INSTALLATION WARNING

IMPORTANT SAFETY PRECAUTIONS:

LIVES MAY BE AT RISK! Carefully observe these instructions and any special instructions that are included with the equipment you are installing.

CONTACTING POWER LINES CAN BE LETHAL. Make sure no power lines are anywhere where possible contact can be made. Antennas, masts, towers, guy wires or cables may lean or fall and contact these lines. People may be injured or killed if they are touching or holding any part of equipment when it contacts electric lines. Make sure there is NO possibility that equipment or personnel can come in contact directly or indirectly with power lines.



Assume all overhead lines are power lines.

The horizontal distance from a tower, mast or antenna to the nearest power line should be at least twice the total length of the mast/antenna combination. This will ensure that the mast will not contact power if it falls either during installation or later.

TO AVOID FALLING, USE SAFE PROCEDURES WHEN WORKING AT HEIGHTS ABOVE GROUND.

- Select equipment locations that will allow safe, simple equipment installation.
- Don't work alone. A friend or co-worker can save your life if an accident happens.
- Use approved non-conducting ladders and other safety equipment. Make sure all equipment is in good repair.
- If a tower or mast begins falling, don't attempt to catch it. Stand back and let it fall.
- If anything such as a wire or mast does come in contact with a power line, **DON'T TOUCH IT OR ATTEMPT TO MOVE IT.** Instead, save your life by calling the power company.
- Don't attempt to erect antennas or towers on windy days.

MAKE SURE ALL TOWERS AND MASTS ARE SECURELY GROUNDED, AND ELECTRICAL CABLES CONNECTED TO ANTENNAS HAVE LIGHTNING ARRESTORS. This will help prevent fire damage or human injury in case of lightning, static build-up, or short circuit within equipment connected to the antenna.

- The base of the antenna mast or tower must be connected directly to the building protective ground or to one or more approved grounding rods, using 1 OAWG ground wire and corrosion-resistant connectors.

- Refer to the National Electrical Code for grounding details.

IF A PERSON COMES IN CONTACT WITH ELECTRICAL POWER, AND CANNOT MOVE:

- **DON'T TOUCH THAT PERSON, OR YOU MAY BE ELECTROCUTED.**
- Use a non-conductive dry board, stick or rope to push or drag them so they no longer are in contact with electrical power.

Once they are no longer contacting electrical power, administer CPR if you are certified, and make sure that emergency medical aid has been requested.

Chapter 3 Initial Setup

The WAP-6100 allows configuration either via the configuration utility, known as Locator, or Web Browser through network. For the initial installation, we suggest using the PLANET WAP-6100 Locator. Before using Locator, please make sure the personal firewall installed in your PC is disabled.

It is strongly recommended to configure and manage WAP-6100 using a wired LAN computer.

3.1 Setup Procedures

1. Insert the bundled CD in the CD-ROM drive to initiate the autorun program. Click on the "PLANET WAP-6100 Locator" hyperlink to activate the program.

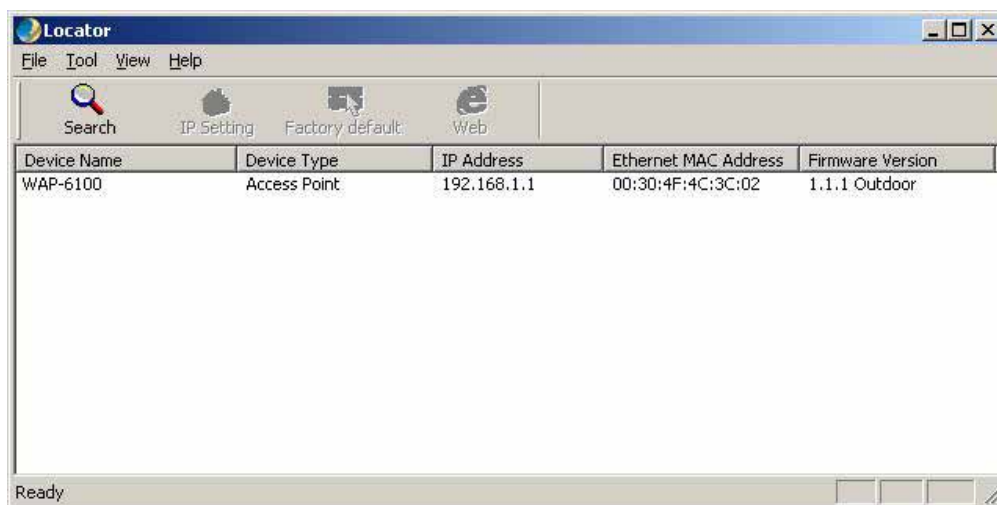
Or you can start the installation as follows.

A. Click on **Start Menu/ Run**.

B. Enter "E:\UTILITY\Locator.exe" in the appeared box, where "E" is the letter of your CD-ROM drive.

C. Click on "OK" button.

2. When the Locator is started, it will search the available WAP-6100 on the same network. The Locator shows you the Device Name, Device Type, IP Address, Ethernet MAC Address and Firmware Version. If there are multiple WAP-6100 or WAP-6100 in the same network, all of them will be listed.



3. To change the IP address, select the target WAP-6100 if there are multiple devices, and click on the "IP Setting" button. A login dialog box will pop up. Please input your user name and password into the fields. Default user name and password are as below:

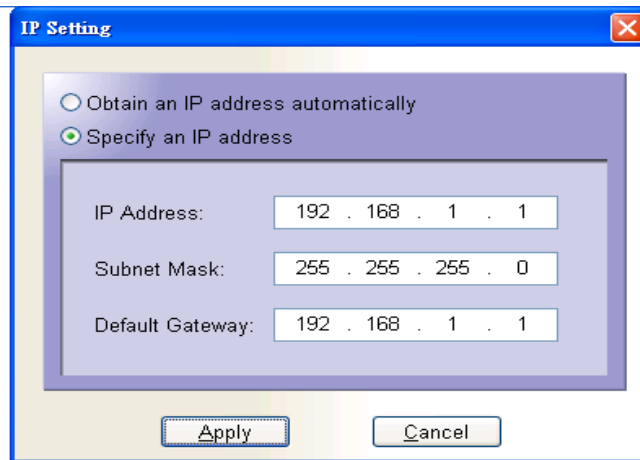
User Name: **Admin**

Password: (blank)

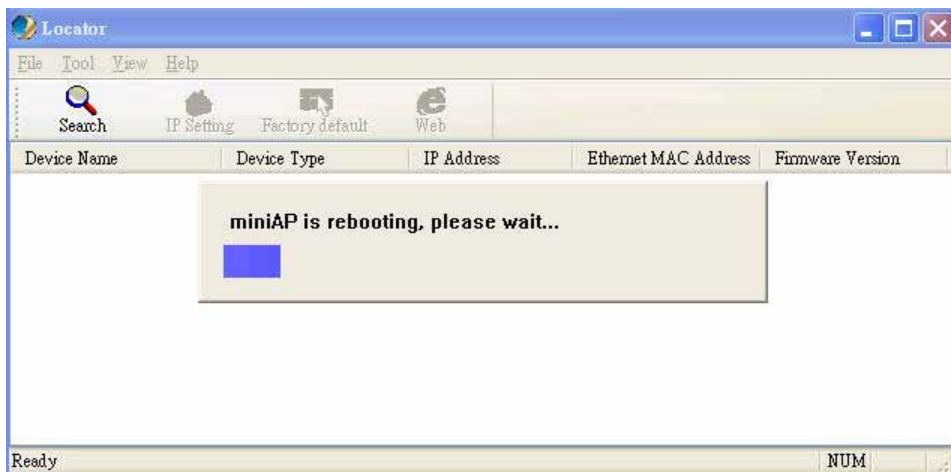
Please note the first character of user name is a capital letter.



- After type in correct user name and password, the “IP Setting” box appears. Here you can choose to obtain IP from a DHCP server or specify IP address manually. If your environment or ISP provide DHCP server, you can choose the first option. Otherwise, you need to manually setup IP address. Click on “Apply” button and WAP-6100 will reboot immediately. After the reboot completes, the WAP-6100 is operating with new settings.



- To restore WAP-6100 back to factory default values, click on the “Factory default” icon. This operation requires you to login the WAP-6100 first. Please input correct user name and password into the fields. The WAP-6100 will reboot immediately. After the reboot completes, the WAP-6100 is operating with default settings.



- Click on the “Web” icon, the Internet Explorer will be executed and connect to the web interface of WAP-6100. Please refer to the next chapter for how to manage WAP-6100 via web.

Chapter 4 Web Configuration

Web configuration provides a user-friendly graphical user interface (web pages) to manage your WAP-6100. An AP with an assigned IP address (e.g. <http://192.168.1.1>) will allow you to monitor and configure via web browser (e.g., MS Internet Explorer or Netscape).

1. Open your web browser.
2. Enter the IP address of your WAP-6100 in the address field (default IP address is <http://192.168.1.1>). Please note that your PC's IP address should be on the same IP subnet of the WAP-6100. For example, you can configure your PC's IP address to 192.168.1.2 if WAP-6100 is with IP 192.168.1.1.
3. A User Name and Password dialog box will appear. Please enter your User Name and Password here. Default User Name and Password are as below:

User Name: **Admin**

Password: (blank)

Please note the first character of user name is a capital letter.

4. Then you will see the WAP-6100 web configuration page after click on "OK".

4.1 Access Point Mode

4.1.1 System Summary

The screenshot shows the web configuration interface for a PLANET 802.11g WLAN Outdoor AP. The page title is "System Status -> System Summary". On the left is a navigation menu with categories: Access Point, System Status, System Configuration, and Management. The main content area displays "System Information" with the following details:

System Information	
System Name	WAP-6100
Ethernet MAC Address	00:30:4F:0F:08:2A
Wireless MAC Address	00:30:4F:0F:08:29
Country	NO_COUNTRY_SET
Firmware Version	AP software 1.1.1 Outdoor Built ON Nov 4 2005

Below this is the "Current IP Settings" section:

Current IP Settings	
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DHCP Client	Disable

Finally, the "Current Wireless Settings" section:

Current Wireless Settings	
Operation Mode	Access Point
Wireless Mode	2.4GHz 54Mbps (802.11g)
Wireless Network Name (SSID)	default
Channel / Frequency	Channel 2 / 2417MHz
Security	Disabled
WDS	Disable
Distance	1 Km

System Information

- This will display system name and both Ethernet MAC address and Wireless MAC address. Current country setting and firmware version will also be available here.

Current IP Settings

- This section shows current IP address setting including IP address, Subnet Mask, Default Gateway and DHCP status.

Current Wireless Settings

- This area shows current wireless setting including operation mode, wireless mode, SSID, channel and security setting.

4.1.2 Wireless Station List

Station ID	MAC Address	Status
STA 1	00:0B:54:3D:CE:C4	associated

This page can help user identify current clients who already associated to the WAP-6100. You can also click on the MAC address column then the system will show the detail technical information for each wireless station.

The page below describes the detail connection information with each station. You can get all information needed right here.

Authentication Type	Encryption	Cipher Advertised
Open System	no	None

Authentication	Deauthentication	Association	Disassociation	Reassociation
3	4	5	1	1

	MSDU	Data	Multicast	Management	Control	Errors
Receive	0	0	0	7	0	0
Transmit	6	0	0	6	0	0

Receive Errors	Discarded Frames	Duplicate Frames	CRC Errors	Decrypt Errors	PHY Errors	DMA Errors
0	0	0	0	0	0	0

Transmit Errors	Discarded Frames	Excessive Retries	DMA Errors
0	0	0	0

4.1.3 System Properties

System Configuration -> System Properties

Device Name:	WAP-6100	(1 to 32 characters)
Country/Region:	NO_COUNTRY_SET - NA	
Operation Mode:	<input checked="" type="radio"/> Access Point <input type="radio"/> Wireless Client <input type="radio"/> Repeater <input type="radio"/> Wireless Bridge	

Apply Cancel

You must click Apply to save your settings before moving to another page.

Device Name	You may assign any name to the WAP-6100. Memorable, Unique names are helpful especially if you are employing multiple access points on the same network. The device name needs to be less than 32 characters. After verify the name you input and click "Apply" to save the setting.
Country / Region	Here you can set the WAP-6100 to follow different country and region regulations.
Operation Mode	The default operation mode is Access Point; this mode connects your wireless clients to a wired network. In most cases, no change is necessary. You can switch operation mode to Wireless Client, Repeater or Wireless Bridge mode depends on your application. Wireless Client mode can allow AP act as a client within its range. Your Ethernet devices behind the AP client can connect to a remote AP. Repeater is able to retransmit the signal of a remote AP. Choose repeater mode if you want to extend the range of your original AP. Wireless Bridge mode allow you to create a wireless connection to connect the networks between different building. You may check to the section 4.2/4.3 and 4.4 for more details of those operating mode.

4.1.4 Administration

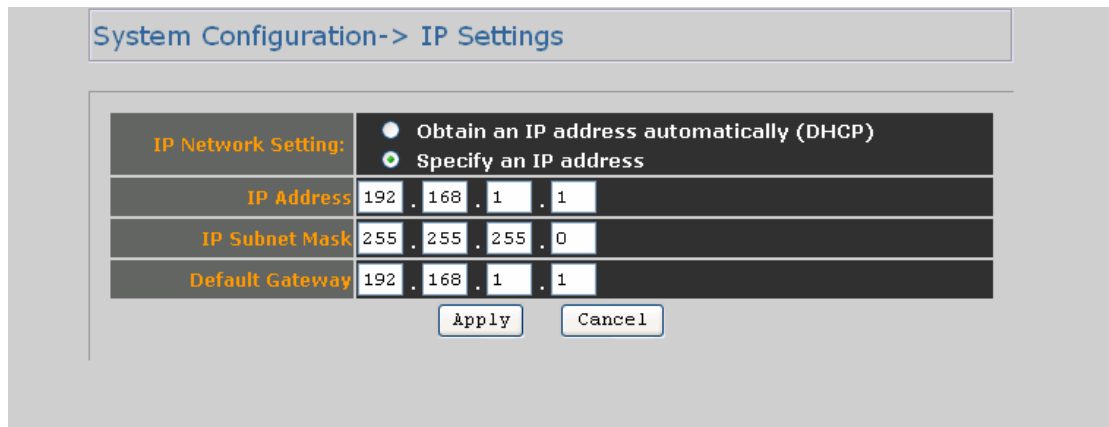
System Configuration -> Administration

Administrator Name	Admin	(0-32 characters)
Password		(0-32 characters)
Confirm Password		

Apply Cancel

Administrator Name	You change the administrator login name in this field.
Password	Type the new password here if you need to change it.
Confirm Password	Re-type the new password again, then click the "Apply" below to save the changes.

4.1.5 IP Settings



This page can configure system IP address. Default IP address is 192.168.1.1 and Subnet Mask is 255.255.255.0. You can manually input IP address setting or get an IP from a DHCP server.

IP Network Setting	Here you can choose to get IP from a DHCP server or specify IP address manually. Choose to obtain an IP address from DHCP server if your environment or ISP provide DHCP server. Otherwise, you must manually setup IP address.
IP Address	If you select "Specify an IP address", you must enter a unique IP address here.
IP Subnet Mask	The Subnet Mask must be the same as your Ethernet network setting.
Default Gateway	Enter the IP address of your gateway here. If your network does not have a Gateway, you can leave this field blank.

4.1.6 Wireless Network

System Configuration -> Wireless Network

SSID	default (1 to 32 characters)
Suppressed SSID	<input type="checkbox"/>
Wireless Mode	2.4GHz 54Mbps (802.11g)
Channel / Frequency	SmartSelect

Apply Cancel

SSID	The SSID is the unique name shared among all APs and clients in a wireless network. The SSID must be identical for all points in the wireless network. It is case-sensitive and must not exceed 32 alphanumeric characters, which may be any keyboard character. Make sure this setting is the same for all points in your wireless network. For added security, you should change the SSID from the default name default , to a unique name.
Suppressed SSID	This option can hide the SSID. Enable this function only if you do not want the WAP-6100 to be found by others.
Wireless Mode	Default setting is “ 2.4GHz 54Mbps (802.11g) ”. This will support all 802.11b/g clients connect to the WAP-6100. You can choose “ 2.4GHz 11Mbps (802.11b) ” in wireless mode column if your environment has only 802.11b clients. The final selection “ 2.4GHz 108Mbps (802.11 SuperG) ” supports high-speed 108Mbps SuperG function. In order to support SuperG 108M transmission, all wireless clients will need to be Atheros® solution.
Channel / Frequency	Select the appropriate channel from the list provided to correspond with your network settings. All points in your wireless network must use the same channel in order to function correctly. The default setting is “ SmartSelect ” means the system will pick best channel for you automatically. Stay with default setting if you do not have special request on channel selection.

4.1.7 Wireless Security

The wireless security settings configure the security of your wireless network. There are three wireless security mode options supported by the WAP-6100: WEP, WPA-PSK and WPA. (WPA stands for Wi-Fi Protected Access, which is a security standard stronger than WEP encryption. WEP stands for Wired Equivalent Privacy.)

In Wireless Security page, you can configure the AP to work with **No Security**, **WEP**, **WPA-PSK** and

WPA security mode. Once you setup the AP to work in security mode, all wireless stations will also need to have corresponding settings. System default setting is **“No Security”**.

System Configuration -> Wireless Security

Changing the wireless security settings may cause this access point to associate with a different one. This may temporarily disrupt your configuration session.

Security: NO Security

Apply

You must click Apply All Changes to save your settings before moving to another page.

WEP

System Configuration -> Wireless Security

Changing the wireless security settings may cause this access point to associate with a different one. This may temporarily disrupt your configuration session.

Security: WEP

Authentication type: Open System

Shared keys input type: HEX

Enter all four shared keys, then select a key by clicking a radio button:

Default Key	Shared Key	Key Length
<input type="radio"/> #1		None
<input type="radio"/> #2		None
<input type="radio"/> #3		None
<input type="radio"/> #4		None

Apply Cancel

You must click Apply All Changes to save your settings before moving to another page.

Authentication type	Select the appropriate value - "Open System" or "Shared Key". All Wireless stations must then be set to use the same method.
----------------------------	--

Shared keys input type	Select HEX or ASCII depends on your preference.
Default key	The default key, selected by the radio button, is required. The other keys are optional. Other stations must have matching key values.
Shared key	There are 4 keys available, please ensure you have enter correct number for the key values with different Key Length and coding (Hex or ASCII).
Key length	Select the level of encryption you want among the options. WAP-6100 supports 64, 128, and 152-bit encryptions.

After all changes are made, be sure to click on "Apply" to make sure all changes are saved into system.

WPA-PSK

System Configuration -> Wireless Security

Changing the wireless security settings may cause this access point to associate with a different one. This may temporarily disrupt your configuration session.

Security: WPA-PSK

PassPhrase:	<input style="width: 95%;" type="text"/> (8-63 characters)
Cipher Type:	TKIP
Group Key Update Interval:	<input style="width: 40%;" type="text" value="1800"/> [30-3600] seconds (0: Disabled)

Apply
Clear

You must click Apply All Changes to save your settings before moving to another page.

Passphrase	Enter a hard-to-guess passphrase (between 8 and 63 characters) in the field.
Cipher type	WPA gives you two encryption methods, TKIP and AES, with dynamic encryption keys. Select the type of algorithm, TKIP or AES .
Group key update interval	Enter the time interval in seconds which instructs the WAP-6100 how often it should change the encryption keys. Usually the security level will be higher if you set the period shorter to change encryption keys more often. Default value is 1800 seconds. Setting 0 in this field would disable key renewal.

After all changes are made, be sure to click on "Apply" to make sure all changes are saved into system.

WPA

System Configuration -> Wireless Security

Changing the wireless security settings may cause this access point to associate with a different one. This may temporarily disrupt your configuration session.

Security: WPA

RADIUS Server:	<input type="text"/>
RADIUS Port:	<input type="text" value="1812"/>
RADIUS Secret:	<input type="text"/>
Cipher Type:	<input type="text" value="TKIP"/>
Group Key Update Interval:	<input type="text" value="1800"/> [30-3600] seconds (0: Disabled)

You must click Apply All Changes to save your settings before moving to another page.

RADIUS server	Enter the IP address of your RADIUS server.
RADIUS port	Specify the port number for RADIUS service, default value is 1812.
RADIUS secret	RADIUS secret is the key shared between WAP-6100 and RADIUS server.
Cipher type	WPA gives you two encryption methods, TKIP and AES, with dynamic encryption keys. Select the type of algorithm, TKIP or AES .
Group key update interval	Enter the time interval in seconds which instructs the WAP-6100 how often it should change the encryption keys. Usually the security level will be higher if you set the period shorter to change encryption keys more often. Default value is 1800 seconds. Setting 0 in this field would disable key renewal.

After all changes are made, be sure to click on "Apply" to make sure all changes are saved into system.

4.1.8 Wireless Advanced Settings

System Configuration -> Wireless Advance Settings

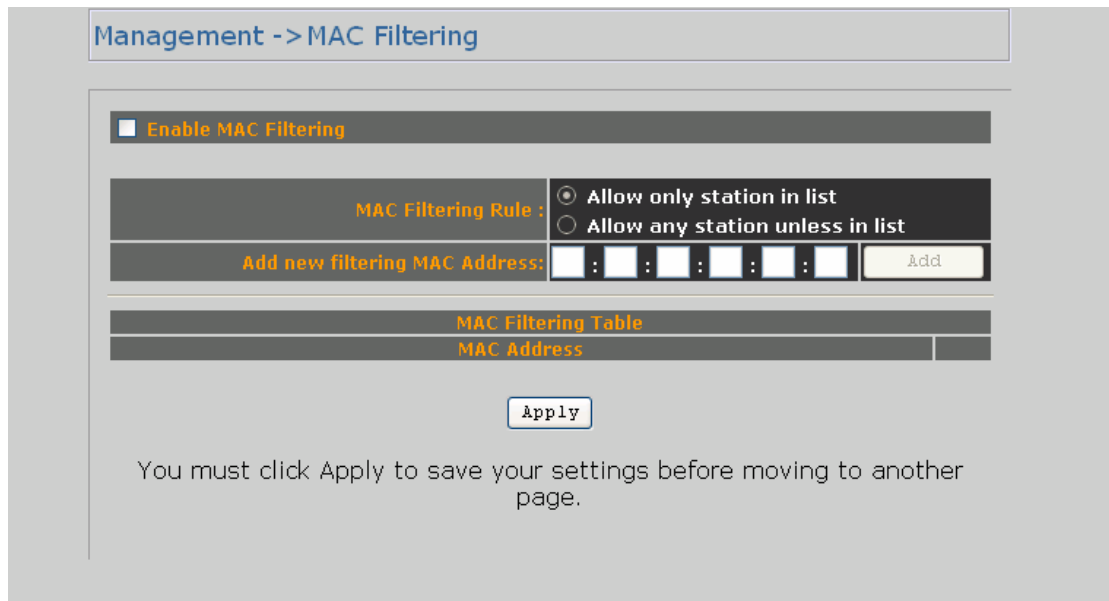
Data Rate:	best ▾
Transmit Power:	Full ▾
Beacon Interval (20 - 1000):	100 ms
Data Beacon Rate (DTIM) (1 - 255):	1
Fragment Length (256 - 2346):	2346 bytes
RTS/CTS Threshold (256 - 2346):	2346
Short Preamble:	<input checked="" type="radio"/> Disable <input type="radio"/> Enable
Protection Mode:	Auto ▾
eXtended Range :	Disable ▾
Distance (1-30):	1 Km

Data rate	You can select all data rates supported in current operation mode. Default value is “ best ” which means the system will automatically adjust the connection speed dynamically according to your current link status.
Transmit power	You can reduce RF output power by selecting Half (-3dB) / Quarter (-6dB) / Eighth (-9dB) / Minimum. To change transmit power may decrease your wireless signal coverage.
Beacon interval (20-1000)	This value indicates the frequency interval of the beacon. A beacon is a packet broadcast by the WAP-6100 to keep the network synchronized. A beacon includes the wireless LAN service area, the AP address, the Broadcast destination address, a time stamp, Delivery Traffic Indicator Maps, and the Traffic Indicator Message (TIM).
Data beacon rate (DTIM) (1-255)	Enter a value between 1 and 255 that specifies the Delivery Traffic Indication Message (DTIM). A DTIM is a countdown informing clients of the next window for listening to broadcast and multicast messages. When the AP has buffered broadcast or multicast messages for associated clients, it sends the next DTIM with a DTIM Interval value. AP Clients hear the beacons and awaken to receive the broadcast and multicast messages.

Fragment length (256-2346)	This specifies the maximum size of a data packet. It should remain at its default setting of 2,346. A smaller setting means smaller packets, which will create more packets for each transmission. If you have decreased this value and experience high packet error rates, you can increase it again, but it will likely decrease overall network performance. Only minor modifications of this value are recommended.
RTS/CTS threshold (256-2346)	Enter the preferred setting between 256 and 2346. Normally, this can be left at the default value.
Short preamble	Preambles are a sequence of binary bits that help the receivers synchronize and ready for receipt of a data transmission. Some older wireless systems like 802.11b implementation use shorter preambles. If you are having difficulty connecting to an older 802.11b device, try to enable short preamble.
Protection mode	Protection Mode should remain default value (Auto) unless you are having severe problems with your 11g Wireless LAN products not being able to transmit to the WAP-6100 in an environment with heavy 802.11b traffic. To enable this function boosts the WAP-6100's ability to catch all 11g Wireless transmissions but will severely decrease performance.
Extended Range	Atheros eXtended Range technology is fully compatible with IEEE and Wi-Fi Alliance standards. In outdoor environments, XR enables more economical point to point fixed wireless system and provides for greater utility of public hot spots infrastructure with increased numbers of users able to connect each access point.
Distance (1-30)	Setup " Distance " according to the longest link distance between the point to point or point to multi-point in the network. The input needs to be greater than or equal to the real distance. The range can be from <i>1KM to 30KM</i> for normal mode and <i>1KM to 15 KM</i> in Super mode .

After all changes are made, be sure to click on "Apply" to make sure all changes are saved into system.

4.1.9 MAC Filter



Management -> MAC Filtering

Enable MAC Filtering

MAC Filtering Rule : Allow only station in list
 Allow any station unless in list

Add new filtering MAC Address: : : : : :

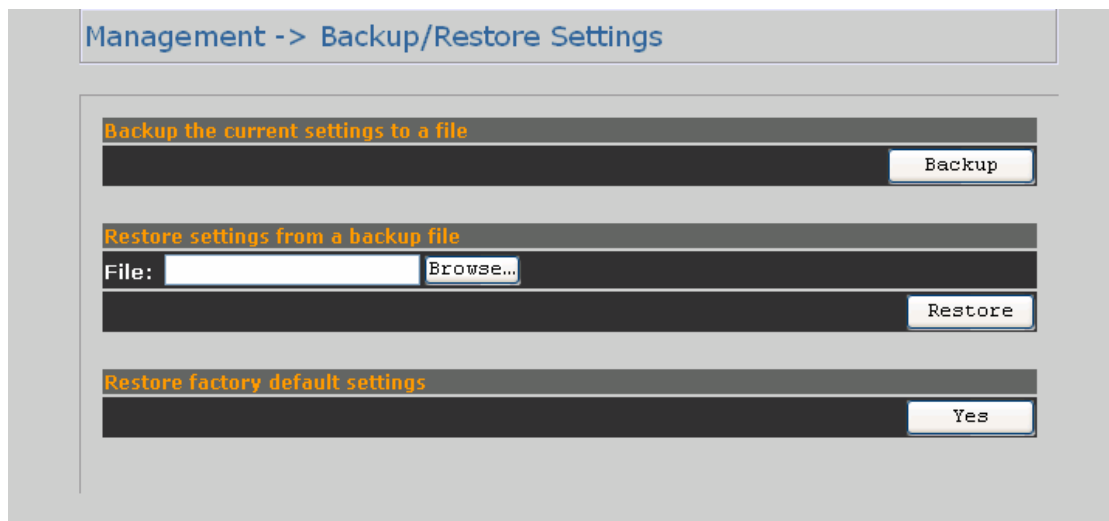
MAC Filtering Table

MAC Address

You must click Apply to save your settings before moving to another page.

Click on the “Enable MAC Filtering” button, the rule have allow only station in list (accept) or allow any station unless in list (deny). You can edit the MAC Filtering Table in you need associated the access point.

4.1.10 Backup / Restore Settings



Management -> Backup/Restore Settings

Backup the current settings to a file

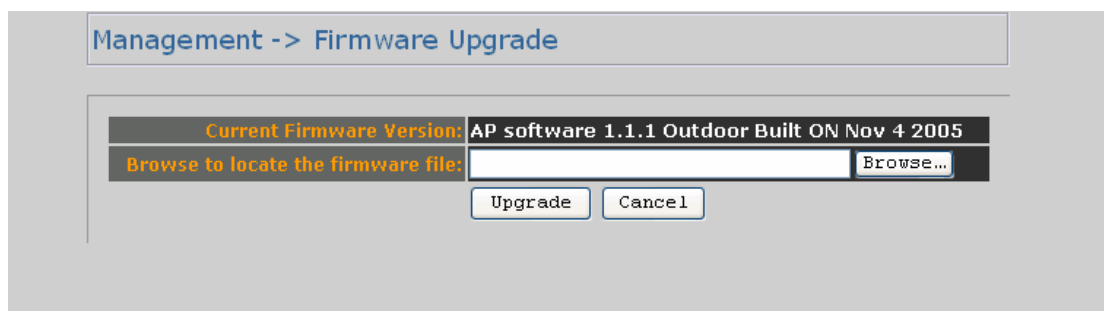
Restore settings from a backup file

File:

Restore factory default settings

Backup the current settings to a file	Click on the “Backup” button, system will prompt you where to save the backup file. You can choose the directory to save your configuration file.
Restore settings from a backup file	You can restore the configuration file from where you previously saved.
Restore factory default settings	Please be careful before restore system back to default since you will lose all current settings immediately.

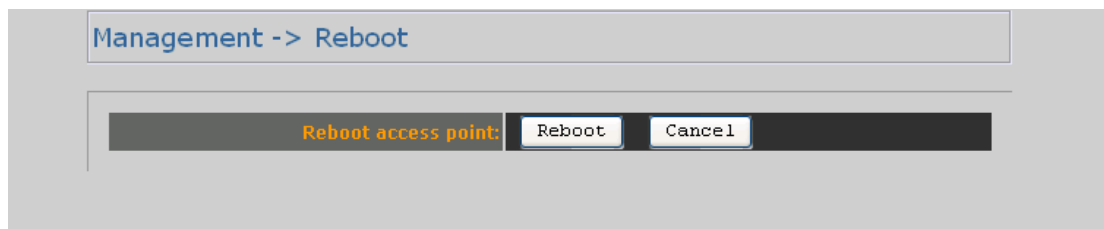
4.1.11 Firmware Upgrade



The screenshot shows a web interface for firmware upgrade. At the top, a breadcrumb trail reads "Management -> Firmware Upgrade". Below this, there are two rows of information. The first row shows "Current Firmware Version:" followed by "AP software 1.1.1 Outdoor Built ON Nov 4 2005". The second row shows "Browse to locate the firmware file:" followed by a text input field and a "Browse..." button. Below the input field are two buttons: "Upgrade" and "Cancel".

Enter the location of the new firmware file in the file path field, or click the “Browse” button to find the firmware upgrade file. Then click on the “Upgrade” button, and follow the on-screen instructions. The whole firmware upgrade process will take around 60 seconds.

4.1.12 Reboot



The screenshot shows a web interface for rebooting. At the top, a breadcrumb trail reads "Management -> Reboot". Below this, there is a single row with the text "Reboot access point:" followed by two buttons: "Reboot" and "Cancel".

Click on “**Reboot**” button to restart WAP-6100.

4.2 Wireless Client Mode

WAP-6100 can also work as an Ethernet client bridge to connect up to 16 Ethernet device into wireless network. In order to setup the WAP-6100 to work in Ethernet bridge mode, you need to choose “**Wireless Client**” mode and click “**Apply**” at System Properties page. You also need to reboot the WAP-6100. After the system reboot is done, you can see the page as below. Status page shows the WAP-6100 is now working in Wireless Client mode.

The screenshot shows the PLANET 802.11g WLAN Outdoor AP web interface. The main content area is titled "System Status -> System Summary". On the left, there is a navigation menu for "Wireless Client (Infrastructure)" with sub-sections: System Status, System Configuration, and Management Control. The main content area is divided into three sections:

- System Information:**

System Name	WAP-6100
Ethernet MAC Address	00:30:4F:0F:08:2A
Wireless MAC Address	00:30:4F:0F:08:29
Country	UNITED STATES
Firmware Version	AP software 1.1.1 US Outdoor Built ON Nov 4 2005
- Current IP Settings:**

IP Address	192.168.1.33
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DHCP Client	Disable
- Current Wireless Settings:**

Operation Mode	Wireless Client
Wireless Mode	2.4GHz 54Mbps (802.11g)
Wireless Network Name (SSID)	6000
Channel / Frequency	Channel 7 / 2442MHz
Security	Disabled
Distance	1 Km

4.2.1 Connection Status

The screenshot shows the PLANET 802.11g WLAN Outdoor AP web interface. The main content area is titled "System Status -> Connection Status". It displays a table of connection details for the wireless client:

Network Type	Wireless Client
SSID	johns
BSSID	00:30:4F:2F:C7:A4
Connection Status	Associated
Wireless Mode	2.4GHz 108Mbps (802.11 Super G static)
Current Channel	2437 MHz (Channel 6)
Security	Disabled
Rx Data Rate(Mbps)	12
Tx Data Rate(Mbps)	18
Link Quality	16%
Signal strength	60%
Activity (Packets Rx)	3
Activity (Packets Tx)	57

At the bottom of the table, there is a "Refresh" button.

Network type	Here indicates the WAP-6100 works in AP mode or Client mode (Infrastructure mode / Ad Hoc mode).
SSID	Here displays current SSID assigned to the WAP-6100.
BSSID	The MAC address of the associated AP.
Connection status	This column shows current connection status. If WAP-6100 already connects to an Access Point or station, here will show " Associated ". Otherwise, connection column will show " N/A " which means no connection to any Access Point or station.
Wireless mode	Here show the Access Point current work in 11b, 11g, or super G mode.
Current channel	This column indicates the radio channel currently in use.
Security	Here indicates AP security settings in client mode. Should be either " Disabled ", " WEP " or " WPA-PSK ".
Rx data rate (Mbps)	Displays current receive data rate.
Tx data rate (Mbps)	Displays current transmit data rate.
Link quality	This column shows current link quality with AP in 0 to 100 percentage scale.
Signal strength	This column shows current signal strength with AP in 0 to 100 percentage scale.
Activity	Displays the number of packets received and transmitted through this WAP-6100.

4.2.2 Wireless Network

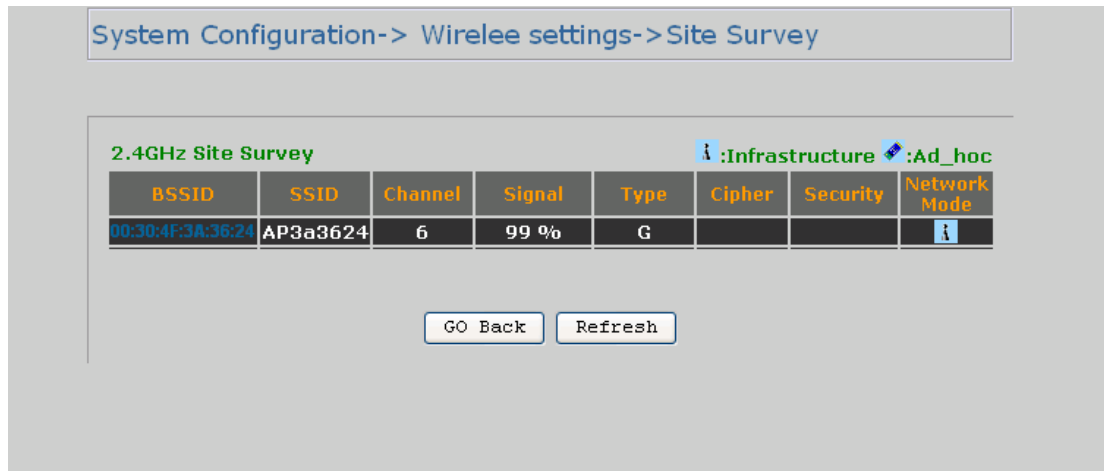
System Configuration -> Wireless Network

Wireless Mode:	2.4GHz 54Mbps (802.11g) ▼
SSID:	<input type="radio"/> Attach to any available SSID <input checked="" type="radio"/> Specify the static SSID: <input style="width: 100px;" type="text" value="6000"/> (1 to 32 characters)
	Or press the button to search for any available WLAN Service <input type="button" value="Site Survey"/>
Channel / Frequency:	SmartSelect ▼

You must click [Apply All Changes](#) to save your settings before moving to another page.

Network mode	You can set the wireless client into 2 different modes by clicking radio button. Wireless Client (Infrastructure) act as an AP client while Ad-hoc can support peer-to-peer network. The Infrastructure mode can support up to 108M SuperG transmission.
Wireless mode	Select the proper mode according to your wireless network.
SSID	<p>The SSID is the unique name shared among all points in a wireless network. The SSID must be identical for all points in the wireless network. It is case-sensitive and must not exceed 32 alphanumeric characters, which may be any keyboard character. You can choose “Attach to any available SSID”; system will determine the Access Point currently available and establish connection with that Access Point. If you already understand your wireless environment well, you can type in the SSID in “Specify the static SSID” manually.</p> <p>Moreover, you can easily click on the “Site Survey” to find all wireless networks available in your current environment. Please refer to the description below.</p>

Site Survey



The Site Survey page can help you identify all available APs in your environment. Just easily click on the BSSID column; the system will join you to the SSID you specify after reboot. In the Site Survey page you can also see the details of all SSID currently available.

4.2.3 Wireless Security

In Wireless client mode, WAP-6100 has support WEP and WPA-PSK security mechanisms. Please refer to section 4.1.7 for detailed descriptions of the security configuration.

4.2.4 Ethernet Client List

Management Control -> Ethernet Client List ?

The Wireless Workgroup Bridge will support several specific Ethernet devices as clients. Use the Refresh button to update the table.

Client	IP Address	MAC Address
1	192.168.99.22	00:01:29:40:49:E1

Refresh

You can check all the details about Ethernet clients including IP Address and MAC Address. Press “Refresh” if you add any new Ethernet client into network. The page will update latest status of current Ethernet network.

4.3 Repeater Mode

PLANET 802.11g WLAN Outdoor AP

System Status -> System Summary

Wireless Repeater

- System Status
 - System Summary
 - Connection Status
 - Wireless Status List
- System Configuration
 - System Properties
 - Administration
 - IP Settings
 - Wireless Network
 - Wireless Security
 - Wireless Advanced Settings
- Management Control
 - MAC Filtering
 - Backup/Restore Settings
 - Firmware Upgrade
 - Reboot

System Information

System Name	WAP-6100
Ethernet MAC Address	00:30:4F:0F:08:2A
Wireless MAC Address	00:30:4F:0F:08:29
Country	UNITED STATES
Firmware Version	AP software 1.1.1 US Outdoor Built ON Nov 4 2005

Current IP Settings

IP Address	192.168.1.39
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DHCP Client	Disable

Current Wireless Settings

Operation Mode	Wireless Repeater
Wireless Mode	2.4GHz 54Mbps (802.11g)
Wireless Network Name (SSID)	6000
Channel / Frequency	Channel 7 / 2442MHz
Security	Disabled
Distance	1 Km

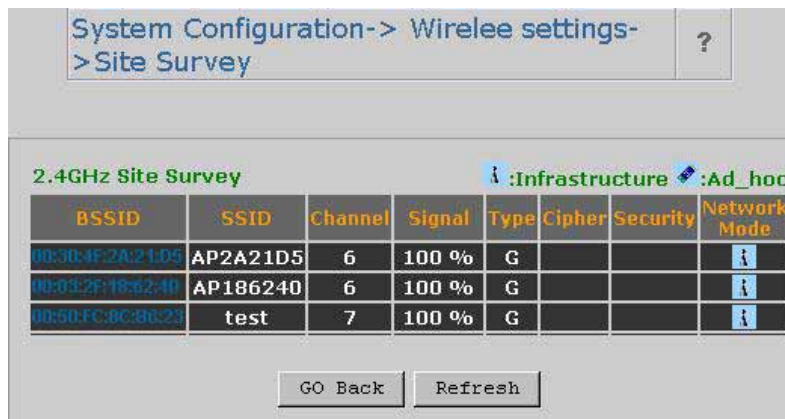
Repeater is able to retransmit the signal of a remote AP. Choose repeater mode if you want to extend the range of your original AP. In order to setup this mode, you need to choose “Repeater” mode and click “Apply” at System Properties page. You also need to reboot the WAP-6100 to make the setting effective.

4.3.1 Wireless Network



After enable the repeater mode, you can click on **“Wireless Network”** and choose **“Site Survey”** to pick one of the SSIDs you would like to retransmit its signal. (Please be noted that while using the repeater mode, the throughput performance maybe nearly only half compare with Access Point mode. Because the repeater needs to communicate with original AP and also the clients associate to the repeater at the same time.)

Site Survey



After click on the **“Site Survey”** button, you can choose the Access Point you need to extend its range by clicking on **“BSSID”** column. Then **“Apply”** the change to make sure system working properly with new setting. After all the changes are made, you can check the **“Connect Status”** page to check current SSID and link quality / signal strength. Some more information is available at that page.

4.3.2 Wireless Security

In Repeater mode, WAP-6100 supports only WEP security mechanisms. Please refer to section 4.1.7 for detailed descriptions.

4.4 Wireless Bridge

The screenshot displays the web interface for a Planet 802.11g WLAN Outdoor AP. The interface is titled "System Status -> System Summary" and is divided into several sections:

- System Information:**

System Name	WAP-6100
Ethernet MAC Address	00:30:4F:0F:00:2A
Wireless MAC Address	00:30:4F:0F:08:29
Country	UNITED STATES
Firmware Version	AP software 1.1.1 US Outdoor Built ON Nov 4 2005
- Current IP Settings:**

IP Address	192.168.1.33
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DHCP Client	Disable
- Current Wireless Settings:**

Operation Mode	Wireless Bridge
Wireless Mode	2.4GHz 54Mbps (802.11g)
Wireless Network Name (SSID)	6000
Channel / Frequency	Channel 7 / 2442MHz
Distance	1 Km

A sidebar on the left contains a navigation menu with the following items:

- System Status
 - System Summary
 - WDS Link Status
- System Configuration
 - System Properties
 - IP Settings
 - Wireless Network
 - WDS Link Settings
 - WDS Security Settings
 - Wireless Advanced Settings
- Management
 - Administration
 - Backup/Restore Settings
 - Firmware Upgrade
 - Reboot

Wireless Bridge mode help to make the two or more Ethernet networks connected without any wire. With multiple WAP-6100s in this mode, several LANs in distance can communicate to each other. This could be deployed if the networks are hard to make the wire in between.

4.4.1 WDS Link Settings

In the “**WDS Link Settings**”, select “**Enable**” in the “**Mode**” field. Then you are able to fill in MAC Address of each target WAP-6100.

System Configuration -> WDS Link Settings

ID	MAC Address	Mode
1	00 : 00 : 00 : 00 : 00 : 00	Disable
2	00 : 00 : 00 : 00 : 00 : 00	Disable
3	00 : 00 : 00 : 00 : 00 : 00	Disable
4	00 : 00 : 00 : 00 : 00 : 00	Disable
5	00 : 00 : 00 : 00 : 00 : 00	Disable
6	00 : 00 : 00 : 00 : 00 : 00	Disable
7	00 : 00 : 00 : 00 : 00 : 00	Disable
8	00 : 00 : 00 : 00 : 00 : 00	Disable

Apply Clear

You must click Apply to save your settings before moving to another page.

Considerations before installation –

- **Loop Prevention** – Be careful to plan your WDS connections, prevent your wireless network topology to have loop. Once loop shows up, your network traffic will become unstable.
- **Performance** – The system can support up to 8 WDS links. But all links and wireless stations that operate at the same time will all share single radio bandwidth. (Ex. 11g have 54Mbps bandwidth)
- **Latency** – In the chain topology configuration, if the chain becomes very long, end-to-end latency issue may come in play. We suggest the WDS link topology planning should not exceed 2 hops in chain configuration.

4.4.2 WDS Security Settings

WDS mode supports WEP and WPA-PSK. Please refer to section 4.1.7 for the detail of the configuration.

System Configuration -> WDS Security Settings

Security: None

WEP Key: [] 40/ 64-bit(10 hex digits)

Passphrase: (8-63 ASCII characters or 64 hexadecimal digits)
Notice: When using WPA-PSK, the SSID setting among WDS peers should be identical.

Apply Clear

You must click Apply to save your settings before moving to another page.

Appendix A Glossary

802.11b - An IEEE wireless networking standard that specifies a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz.

802.11g - An IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps, an operating frequency of 2.4GHz, and backward compatibility with 802.11b devices.

Adapter - This is a device that adds network functionality to your PC.

Ad-hoc - A group of wireless devices communicating directly with each other (peer-to-peer) without the use of an access point.

Backbone - The part of a network that connects most of the systems and networks together, and handles the most data.

Bandwidth - The transmission capacity of a given device or network.

Beacon Interval - Data transmitted on your wireless network that keeps the network synchronized.

Bit - A binary digit.

Browser - An application program that provides a way to look at and interact with all the information on the World Wide Web.

CSMA/CA (Carrier Sense Multiple Access/Collision Avoidance) - A method of data transfer that is used to prevent data collisions.

CTS (Clear To Send) - A signal sent by a wireless device, signifying that it is ready to receive data.

Database - A collection of data that is organized so that its contents can easily be accessed, managed, and updated.

DHCP (Dynamic Host Configuration Protocol) - A networking protocol that allows administrators to assign temporary IP addresses to network computers by "leasing" an IP address to a user for a limited amount of time, instead of assigning permanent IP addresses.

Download - To receive a file transmitted over a network.

DSSS (Direct-Sequence Spread-Spectrum) - Frequency transmission with a redundant bit pattern resulting in a lower probability of information being lost in transit.

DTIM (Delivery Traffic Indication Message) - A message included in data packets that can increase wireless efficiency.

Encryption - Encoding data transmitted in a network.

Ethernet - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium.

Firmware - The programming code that runs a networking device.

Fragmentation - Breaking a packet into smaller units when transmitting over a network medium that cannot support the original size of the packet.

Gateway - A device that interconnects networks with different, incompatible communications protocols.

Hardware - The physical aspect of computers, telecommunications, and other information technology devices.

IEEE (The Institute of Electrical and Electronics Engineers) - An independent institute that develops networking standards.

Infrastructure - A wireless network that is bridged to a wired network via an access point.

IP (Internet Protocol) - A protocol used to send data over a network.

IP Address - The address used to identify a computer or device on a network.

ISM band - Radio bandwidth utilized in wireless transmissions.

ISP (Internet Service Provider) - A company that provides access to the Internet.

LAN - The computers and networking products that make up your local network.

MAC (Media Access Control) **Address** - The unique address that a manufacturer assigns to each networking device.

Network - A series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.

Node - A network junction or connection point, typically a computer or work station.

Packet - A unit of data sent over a network.

Passphrase - Used much like a password, a passphrase simplifies the WEP encryption process by automatically generating the WEP encryption keys for Linksys products.

Port - The connection point on a computer or networking device used for plugging in cables or adapters.

Roaming - The ability to take a wireless device from one access point's range to another without losing the connection.

Router - A networking device that connects multiple networks together.

RTS (Request To Send) - A networking method of coordinating large packets through the RTS Threshold setting.

Server - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.

SNMP (Simple Network Management Protocol) - A widely used network monitoring and control protocol.

Software - Instructions for the computer. A series of instructions that performs a particular task is called a "program".

SOHO (Small Office/Home Office) - Market segment of professionals who work at home or in small offices.

Spread Spectrum - Wideband radio frequency technique used for more reliable and secure

data transmission.

SSID (Service Set Identifier) - Your wireless network's name.

Static IP Address - A fixed address assigned to a computer or device that is connected to a network.

Subnet Mask - An address code that determines the size of the network.

Switch - 1. A data switch that connects computing devices to host computers, allowing a large number of devices to share a limited number of ports. 2. A device for making, breaking, or changing the connections in an electrical circuit.

TCP (Transmission Control Protocol) - A network protocol for transmitting data that requires acknowledgement from the recipient of data sent.

TCP/IP (Transmission Control Protocol/Internet Protocol) - A set of instructions PCs use to communicate over a network.

TKIP (Temporal Key Integrity Protocol) - a wireless encryption protocol that provides dynamic encryption keys for each packet transmitted.

Topology - The physical layout of a network.

Upgrade - To replace existing software or firmware with a newer version.

WEP (Wired Equivalent Privacy) - An optional cryptographic confidentiality algorithm specified by IEEE 802.11 that may be used to provide data confidentiality that is subjectively equivalent to the confidentiality of a wired local area network (LAN) medium that does not employ cryptographic techniques to enhance privacy confidentiality.

WPA (Wi-Fi Protected Access) - a wireless security protocol using TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.

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