

Learn How to Configure EnGenius Wi-Fi Products for Popular Applications

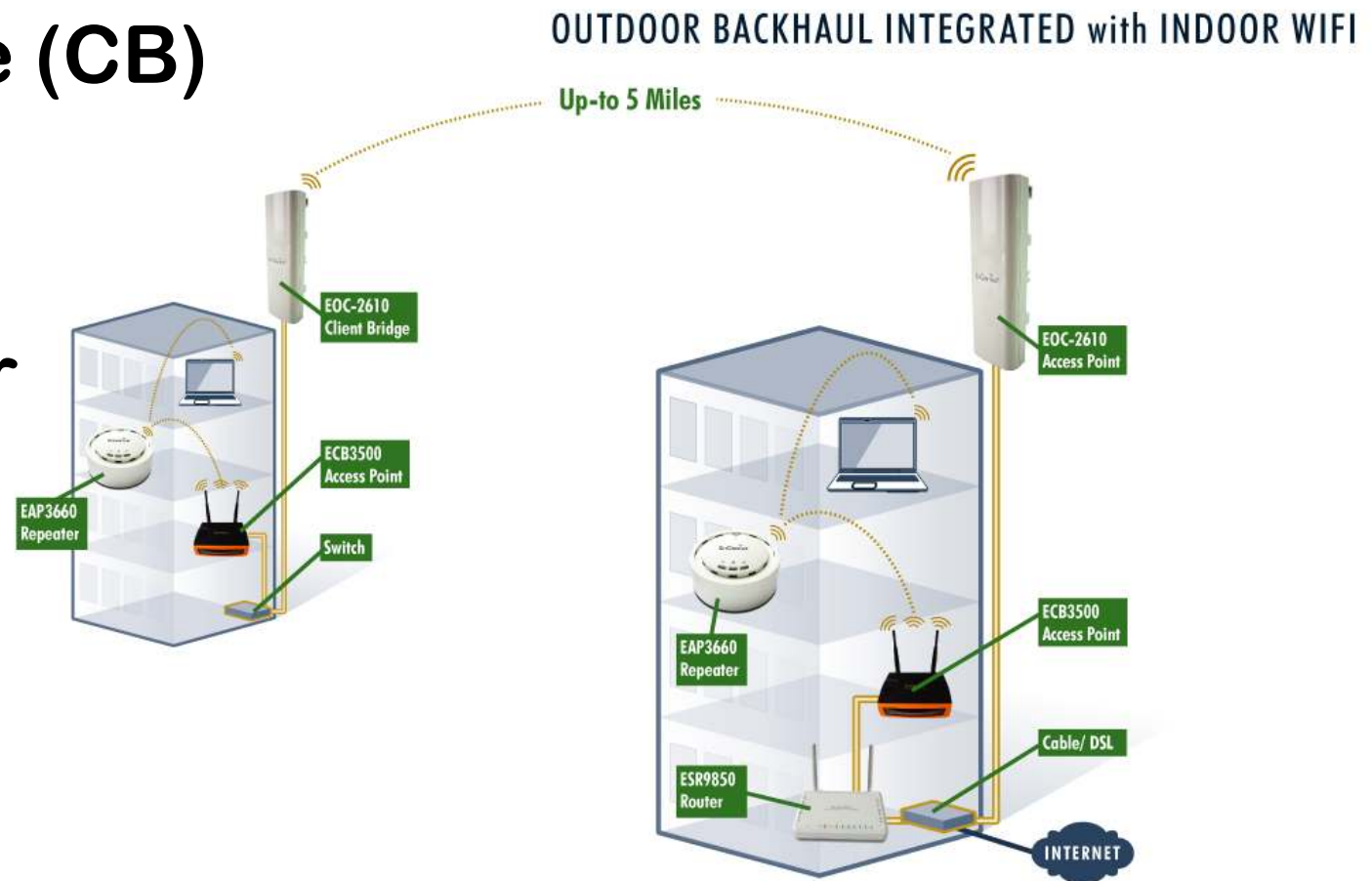


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Long Range Data Communications Systems

EnGenius™

Operation Modes

- Access Point (AP) / WDS AP
- Client Bridge (CB)
- Repeater
- WDS Bridge
- Client Router
- AP Router

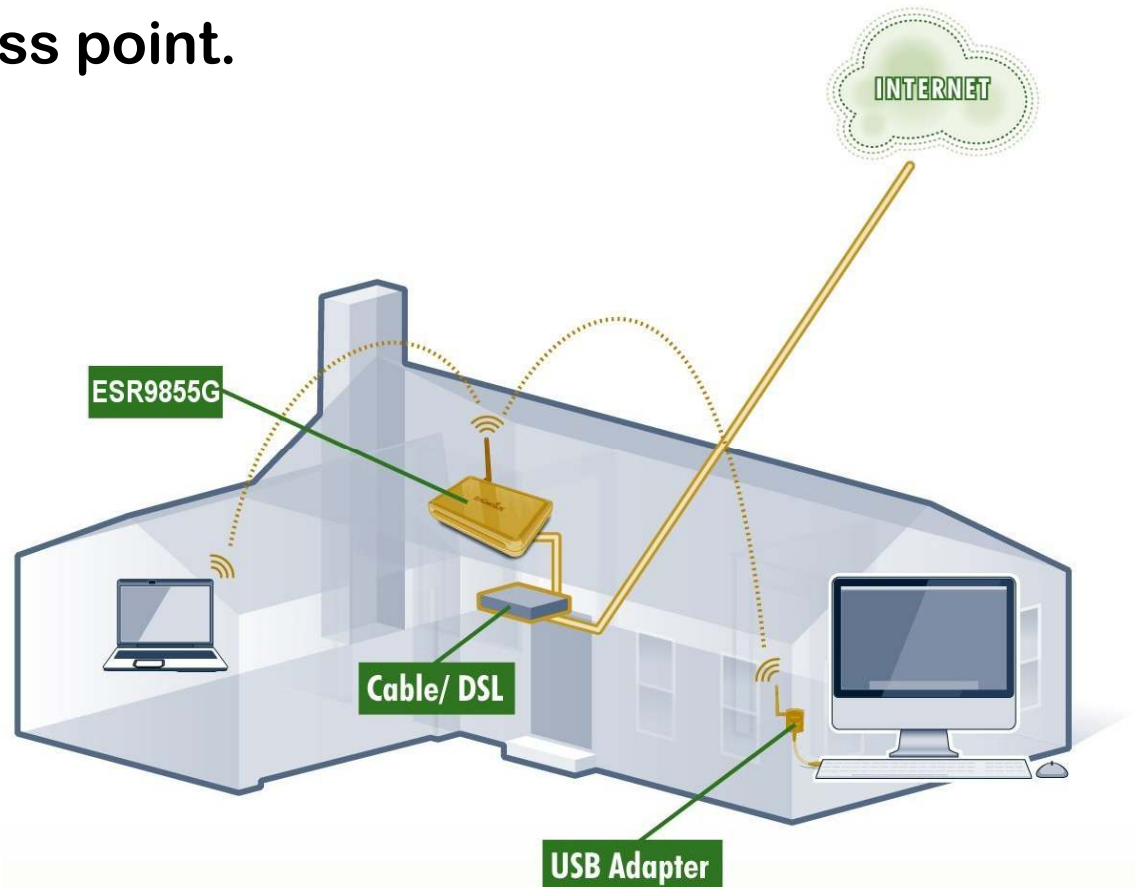


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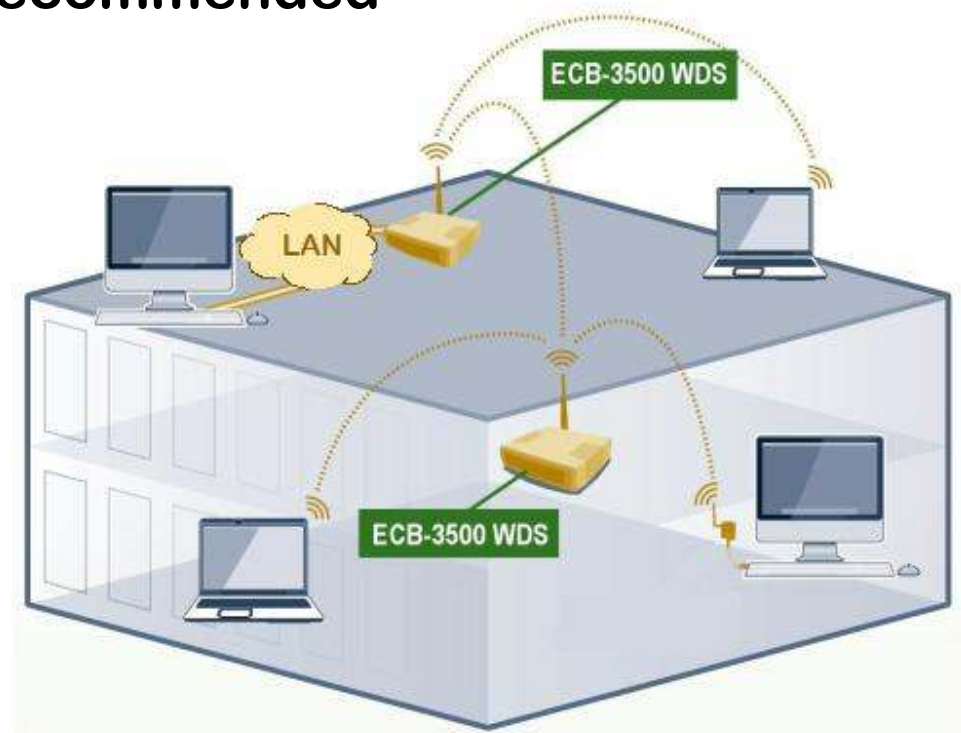
Access Point

- An access point (AP) acts as a central transmitter and receiver of wireless LAN radio signals.
- A wireless router combines the functions of a traditional switch, firewall, and wireless access point.



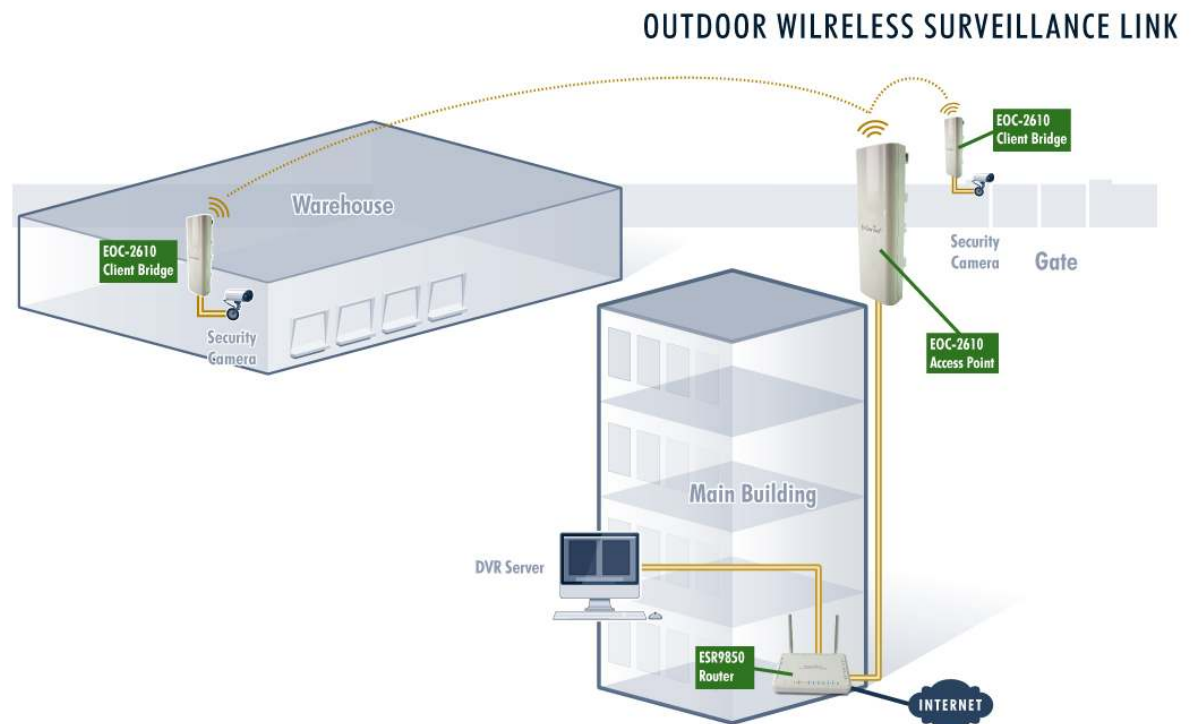
WDS Access Point

- **Wireless Distribution System**
- **Mac Address based ad-hoc connection**
- **Allows multiple access points to communicate without the need for a wired backbone to link them.**
- **Devices using the same chipset recommended**
- **Should be limited to one hop.**



Client Bridge

- Acts as a wireless client that interfaces to an Ethernet device.
- Stand alone device, no drivers required, platform independent.

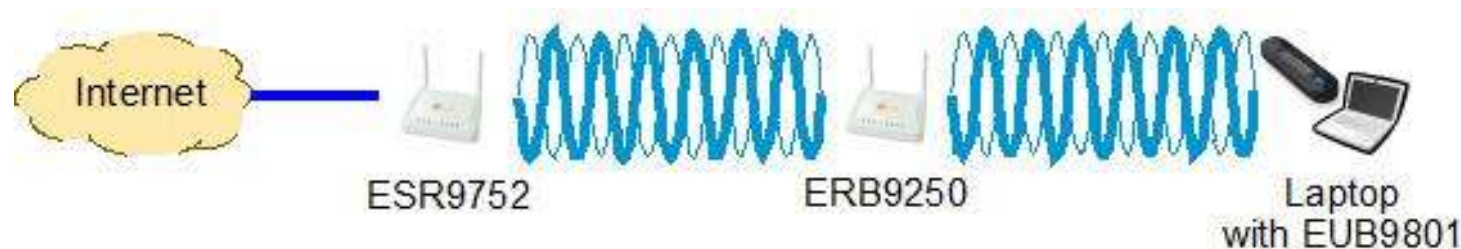


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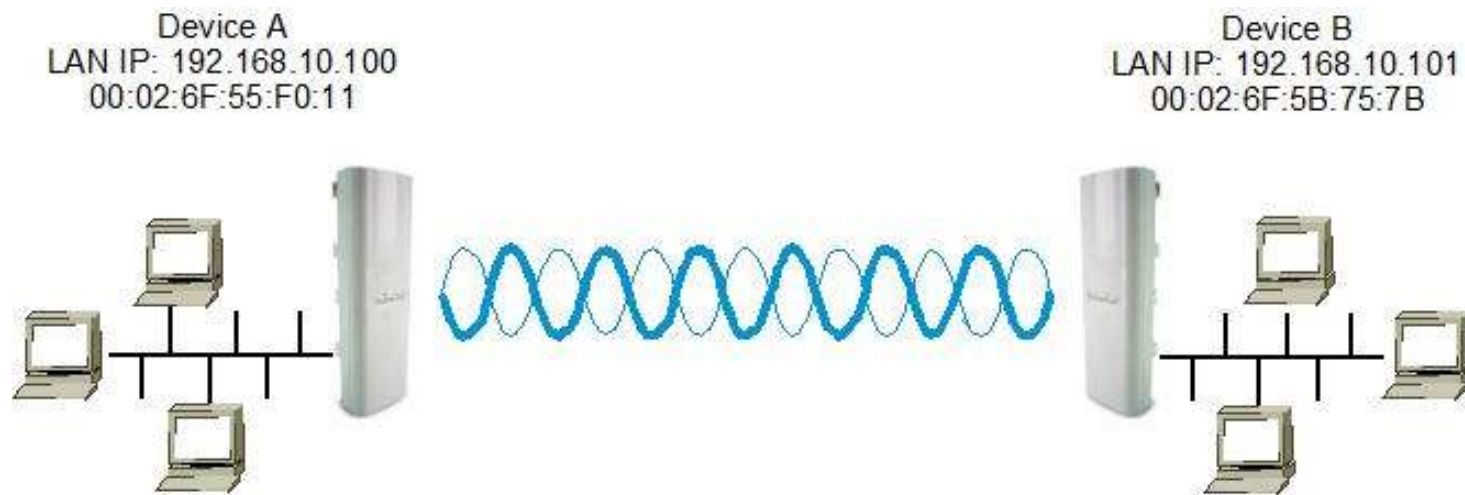
Repeater

- Allows a wireless network to be expanded using multiple access points without the need for a wired backbone to link them.
- Client and AP at the same time
- SSID based association
- Works with standard 802.11 access points
- Should limit the use of repeaters to one hop
- Dual radio repeaters are better than single radio repeaters



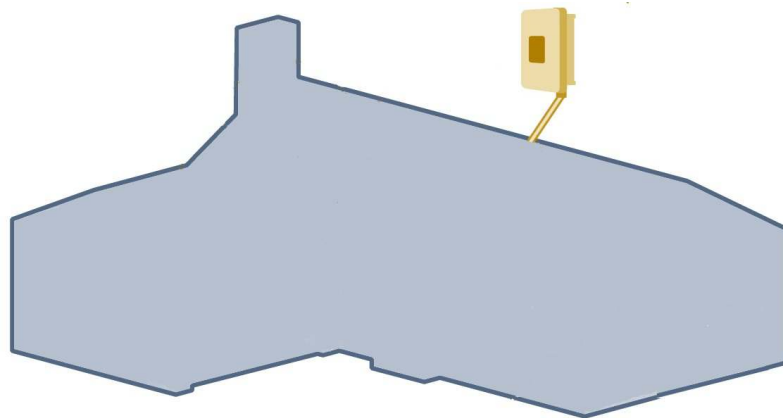
WDS Bridge

- Best for point to point deployments
- MAC Address based Ad-hoc association



Client Router

- Similar mode as client bridge
- Wireless and Ethernet interface separated by NAT firewall
- Wireless interface acts as the WAN, connects to an AP
- Ethernet interface connects to LAN

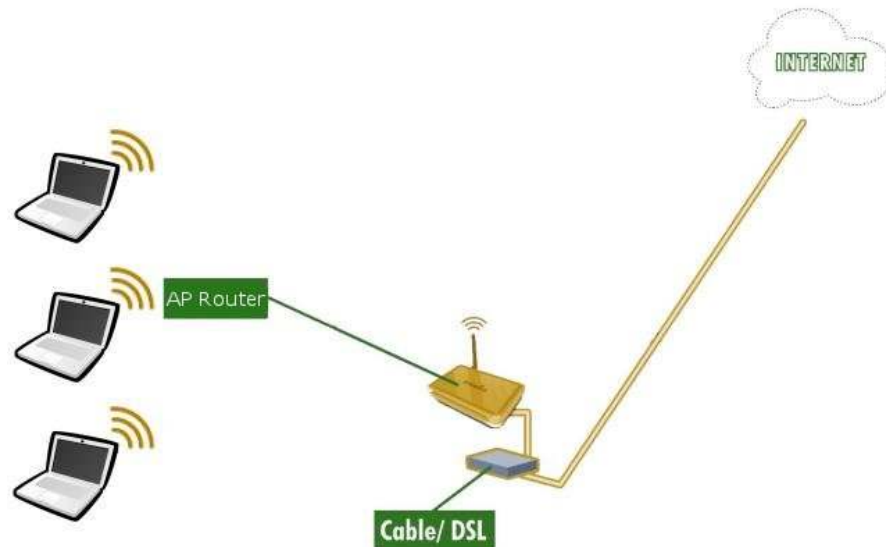


Ethernet IP: 192.168.1.xxx
LAN

Wireless LAN IP: 44.205.3.76
Public

AP Router

- Basic wireless router function with no switch
- Wireless and Ethernet interface separated by NAT firewall
- Ethernet port is the WAN interface and receives a public IP address from the ISP
- Wireless interface acts as the LAN

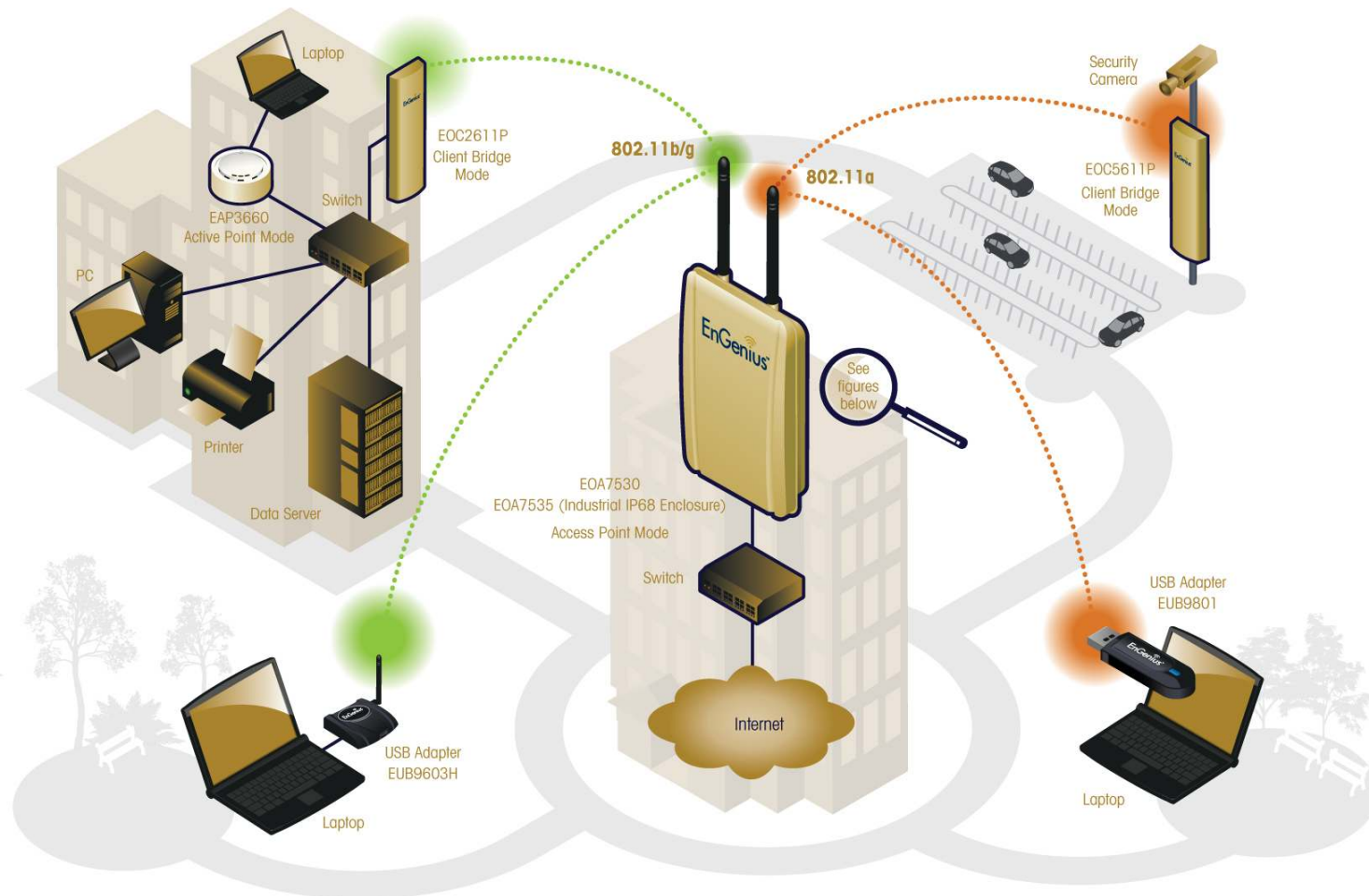


Wireless LAN IP: 192.168.1.xxx
LAN

Ethernet IP: 44.205.3.76
Public

Dual Radio

- Each radio is configured as a separate device on a single unit.
- Can be dual AP, or use 5GHz radio for backhaul and 2.4GHz for clients



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Web Based Configuration

- Configuration is done using a web browser

The screenshot shows a web browser window displaying the EnGenius configuration page for a Wireless Outdoor Access Point/Client Bridge. The browser address bar shows the URL `http://10.128.0.160:5004/setup.cgi`. The page features a navigation menu on the left with sections for Client Bridge, Status, System, Wireless, and Management. The main content area displays the Connection Status, which includes a table of network parameters and a Refresh button.

Connection Status	
Network Type	Client Bridge
SSID	Lab
BSSID	00:02:6F:4C:E4:E7
Connection Status	Associated
Wireless Mode	IEEE 802.11g
Current Channel	2437MHz(Channel 6)
Security	WPA-PSK
Tx Data Rate(Mbps)	54
Current noise level	-109 dBm
Signal strength	-46 dBm

TCP/IP

- No drivers required for AP/CB devices.
- Devices can be configured with Windows, Mac OS X, or Linux.
- Most EnGenius Access Point / Client Bridge models have a default IP Address of **192.168.1.1**, unless otherwise stated in the documentation that comes with the product.
- The Network Interface Card (NIC) on the PC used to configure the device must have an IP address on the same IP subnet, **192.168.1.xxx** in order to access the web based graphic user interface (GUI).

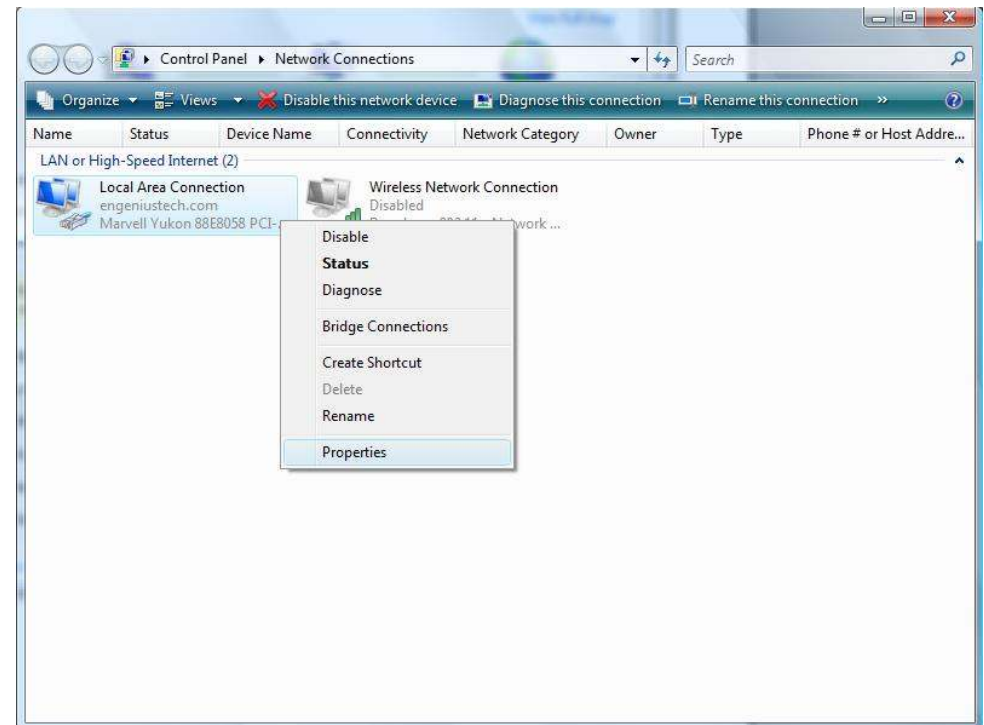
Local Area Connection Properties

- Navigate to the **Network Connections** window.
- Right click on the icon for the **Local Area Connection**, then select **Properties**.

Windows XP



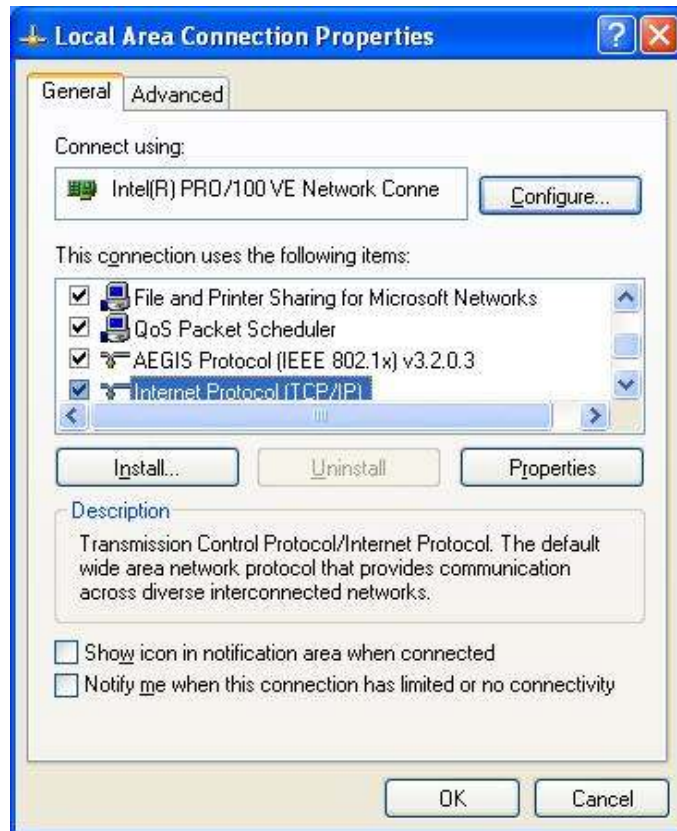
Windows Vista / 7



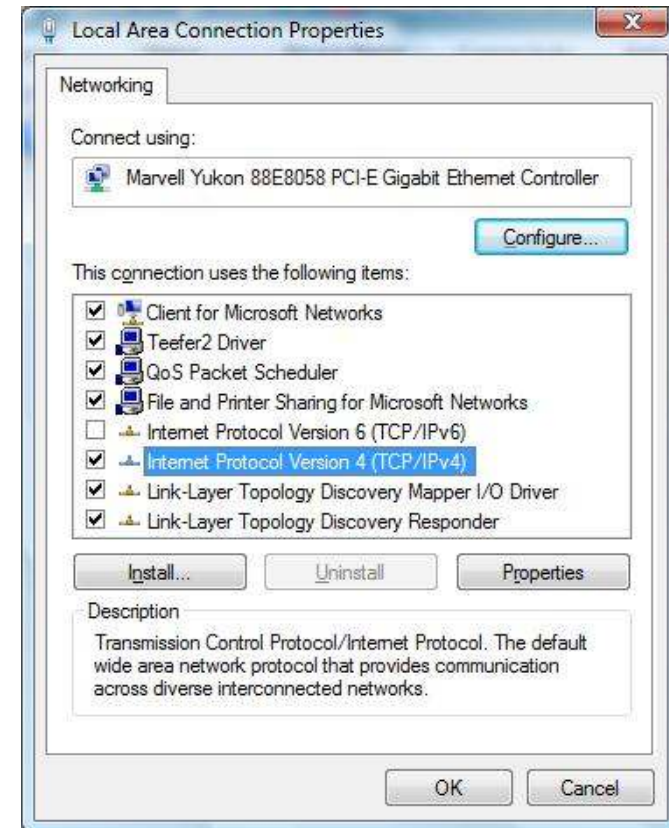
Network Connections

- Double click on the listing for **Internet Protocol (TCP/IP)**
- In Windows Vista and 7, make sure to select **Version 4**

Windows XP



Windows Vista / 7



Internet Protocol (TCP/IP)

- Select the option to **Use the following IP address**
- Enter the IP address **192.168.1.10** and Subnet Mask **255.255.255.0** , then click **OK**.

Windows XP

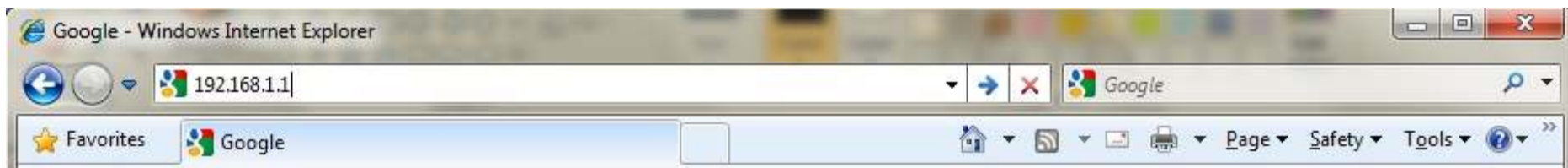
The screenshot shows the 'Internet Protocol (TCP/IP) Properties' dialog box in Windows XP. The 'General' tab is selected. The text reads: 'You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.' There are two radio button options: 'Obtain an IP address automatically' (unselected) and 'Use the following IP address:' (selected). Below this, there are three input fields: 'IP address:' with the value '192 . 168 . 1 . 10', 'Subnet mask:' with the value '255 . 255 . 255 . 0', and 'Default gateway:' which is empty. Below these are two more radio button options: 'Obtain DNS server address automatically' (unselected) and 'Use the following DNS server addresses:' (selected). There are two empty input fields for 'Preferred DNS server:' and 'Alternate DNS server:'. At the bottom right is an 'Advanced...' button. At the bottom are 'OK' and 'Cancel' buttons.

Windows Vista / 7

The screenshot shows the 'Internet Protocol Version 4 (TCP/IPv4) Properties' dialog box in Windows Vista / 7. The 'General' tab is selected. The text reads: '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.' There are two radio button options: 'Obtain an IP address automatically' (unselected) and 'Use the following IP address:' (selected). Below this, there are three input fields: 'IP address:' with the value '192 . 168 . 1 . 100', 'Subnet mask:' with the value '255 . 255 . 255 . 0', and 'Default gateway:' which is empty. Below these are two more radio button options: 'Obtain DNS server address automatically' (unselected) and 'Use the following DNS server addresses:' (selected). There are two empty input fields for 'Preferred DNS server:' and 'Alternate DNS server:'. At the bottom right is an 'Advanced...' button. At the bottom are 'OK' and 'Cancel' buttons.

Logging In

- Type the default IP address your device in the address bar of your web browser.



- When prompted, enter the default username and password.

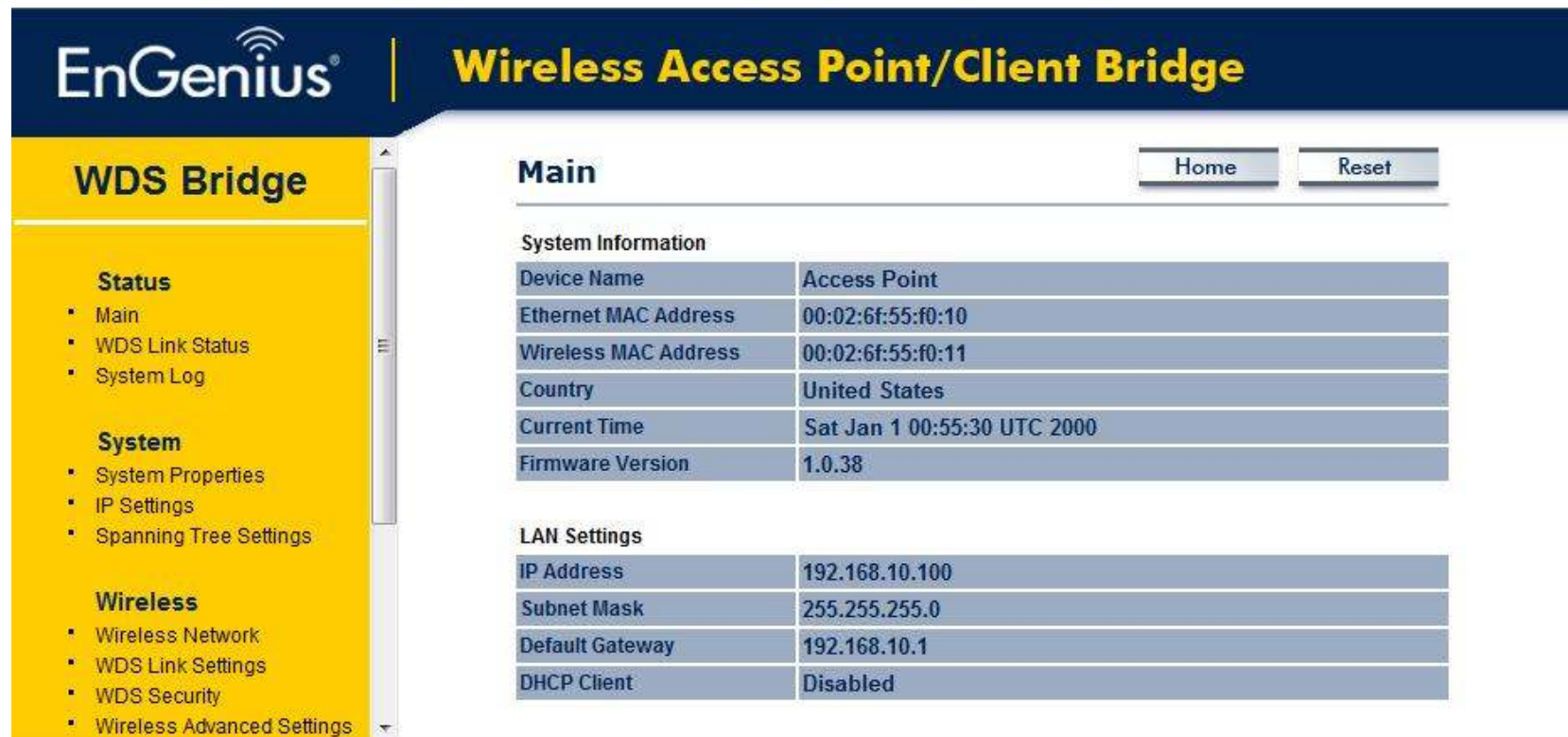
Username: admin

Password: admin



Status

Once logged in, the status page will display information about the device.



The screenshot displays the EnGenius WDS Bridge status page. The page is titled "Wireless Access Point/Client Bridge" and features a navigation menu on the left with sections for Status, System, and Wireless. The main content area is titled "Main" and includes two tables: "System Information" and "LAN Settings".

System Information

Device Name	Access Point
Ethernet MAC Address	00:02:6f:55:f0:10
Wireless MAC Address	00:02:6f:55:f0:11
Country	United States
Current Time	Sat Jan 1 00:55:30 UTC 2000
Firmware Version	1.0.38

LAN Settings

IP Address	192.168.10.100
Subnet Mask	255.255.255.0
Default Gateway	192.168.10.1
DHCP Client	Disabled

Mode Selection

Click on **System**, then **System Properties** to choose an **Operation Mode**, then click **Apply**.

EnGenius | **Wireless Access Point/Client Bridge**

WDS Bridge

- Status**
 - Main
 - WDS Link Status
 - System Log
- System**
 - System Properties**
 - IP Settings
 - Spanning Tree Settings
- Wireless**
 - Wireless Network
 - WDS Link Settings
 - WDS Security
 - Wireless Advanced Settings

System Properties Home Reset

Device Name	Access Point (1 to 32 characters)
Country/Region	United States
Operation Mode	<input type="radio"/> Access Point <input type="radio"/> Client Bridge <input checked="" type="radio"/> WDS Bridge <input type="radio"/> Repeater <input type="radio"/> AP Router <input type="radio"/> Client Router

Apply Cancel

Access Point Mode

- In AP mode, a device will broadcast an SSID for Wi-Fi devices to see.
- No configuration is necessary, but it is advised to change the SSID and enable some level of encryption to prevent unwanted users.
- Click on **Wireless**, then click on **Edit** to make custom configurations to the settings that wireless clients will use to connect to the AP.

EnGenius | **Wireless Access Point**

Access Point

Status

- Main
- Client List
- System Log

System

- System Properties
- IP Settings

Wireless

- **Wireless Network**
- Wireless MAC Filter
- WDS Link Settings
- Wireless Advanced Settings

Wireless Network Home Reset

Wireless Mode: 802.11b/g Mixed (2.4GHz/54Mbps) ▾
Channel / Frequency: Ch1-2.412GHz ▾

Current Profiles

SSID	Security	VID	Enable	Edit
IEEE80211	Open System/WEP	1	<input checked="" type="checkbox"/>	Edit
EnGenius2	Open System/No Encryption	2	<input type="checkbox"/>	Edit
EnGenius3	Open System/No Encryption	3	<input type="checkbox"/>	Edit
EnGenius4	Open System/No Encryption	4	<input type="checkbox"/>	Edit

No Isolation

SSID Profile

- The **SSID Profile** window will allow you to change the SSID which is the network name that wireless clients will see.
- While not necessary, the **Wireless Security > Security Mode** drop down box will allow different levels of password protection for clients joining the wireless network.
- Click **Save** to apply your settings.

SSID Profile

Wireless Setting

SSID	IEEE80211	(1 to 32 characters)
VLAN ID	1	(1~4095)
Suppressed SSID	<input type="checkbox"/>	
Station Separation	<input checked="" type="radio"/> Enable	<input type="radio"/> Disable

Wireless Security

Security Mode	WPA2-PSK	
Encryption	AES	
Passphrase	1580scenicave	(8 to 63 characters) or (64 Hexadecimal characters)
Group Key Update Interval	3600	seconds(30~3600, 0: disabled)
Group Key Update Timeout	1	seconds(1~300)
Pairwise Key Update Timeout	1	seconds(1~300)

Save Cancel

Client Bridge Mode

- A client bridge must be configured to connect to an AP
- Click on Wireless, then manually type the SSID of the AP that you wish to connect to or click on Site Survey to scan for the APs in range (Also applies to Repeater & Client Router mode).

The screenshot shows the EnGenius web interface for configuring a Client Bridge. The page title is "Wireless Outdoor Access Point/ Client Bridge". The left sidebar is titled "Client Bridge" and contains a menu with sections: "Status" (Main, Connection Status, System Log), "System" (System Properties, IP Settings, Spanning Tree Settings), and "Wireless" (Wireless Network, Wireless Security, Wireless Advanced Settings). A red arrow points to the "Wireless" section in the sidebar. The main content area is titled "Wireless Network" and includes "Home" and "Reset" buttons. The configuration fields are as follows:

Wireless Mode	802.11b/g Mixed (2.4GHz/54Mbps) ▼
SSID	Specify the static SSID : Lab (1 to 32 characters) Or press the button to search for any available WLAN Service. Site Survey
WDS Support	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

At the bottom of the configuration area are "Apply" and "Cancel" buttons. Red arrows in the image point to the "Wireless" menu item in the sidebar, the "Lab" SSID input field, and the "Site Survey" button.

Site Survey

- The Site Survey will display information about APs in range.
- Select the AP you wish to connect to.
- If encryption is enabled on the AP, you must also provide the matching encryption information.

EnGenius | **Wireless Outdoor Access Point/ Client Bridge**

Client Bridge

Status

- Main
- Connection Status
- System Log

System

- System Properties
- IP Settings
- Spanning Tree Settings

Wireless

- Wireless Network
- Wireless Security
- Wireless Advanced Settings

Site Survey

2.4GHz Site Survey i:Infrastructure Ad_hoc

BSSID	SSID	Channel	Signal	Type	Security	Network Mode
00:02:6f:52:8b:ff	IEEE80211	1	-65 dBm	G	WEP	i
00:02:6f:4c:19:12	wireless	1	-85 dBm	G	NONE	i
00:02:6f:4c:e4:e7	Lab	6	-180 dBm	G	WPA	i

Refresh

Connection Status

- If correctly configured and is wirelessly communicating with an AP, the **Connection Status** will say **Associated**.

The screenshot displays the EnGenius web interface for a Wireless Outdoor Access Point/Client Bridge. The left sidebar shows a navigation menu with sections: Status (Main, Connection Status, System Log), System (System Properties, IP Settings, Spanning Tree Settings), Wireless (Wireless Network, Wireless Security, Wireless Advanced Settings), and Management. The main content area is titled 'Connection Status' and includes 'Home' and 'Reset' buttons. A table lists various network parameters, with 'Connection Status' highlighted as 'Associated'.

Network Type	Client Bridge
SSID	Lab
BSSID	00:02:6F:4C:E4:E7
Connection Status	Associated
Wireless Mode	IEEE 802.11g
Current Channel	2437MHz(Channel 6)
Security	WPA-PSK
Tx Data Rate(Mbps)	54
Current noise level	-110 dBm
Signal strength	-54 dBm

Refresh

IP Settings

- All devices on a TCP/IP network should have a unique IP Address on the same subnet.
- Click on **System** > **IP Settings** to change the IP configuration.
- This applies to all configuration modes.

EnGenius | **Wireless Access Point/Client Bridge**

WDS Bridge

- Status
 - Main
 - WDS Link Status
 - System Log
- System**
 - System Properties
 - IP Settings**
 - Spanning Tree Settings
- Wireless
 - Wireless Network
 - WDS Link Settings
 - WDS Security
 - Wireless Advanced Settings

IP Settings Home Reset

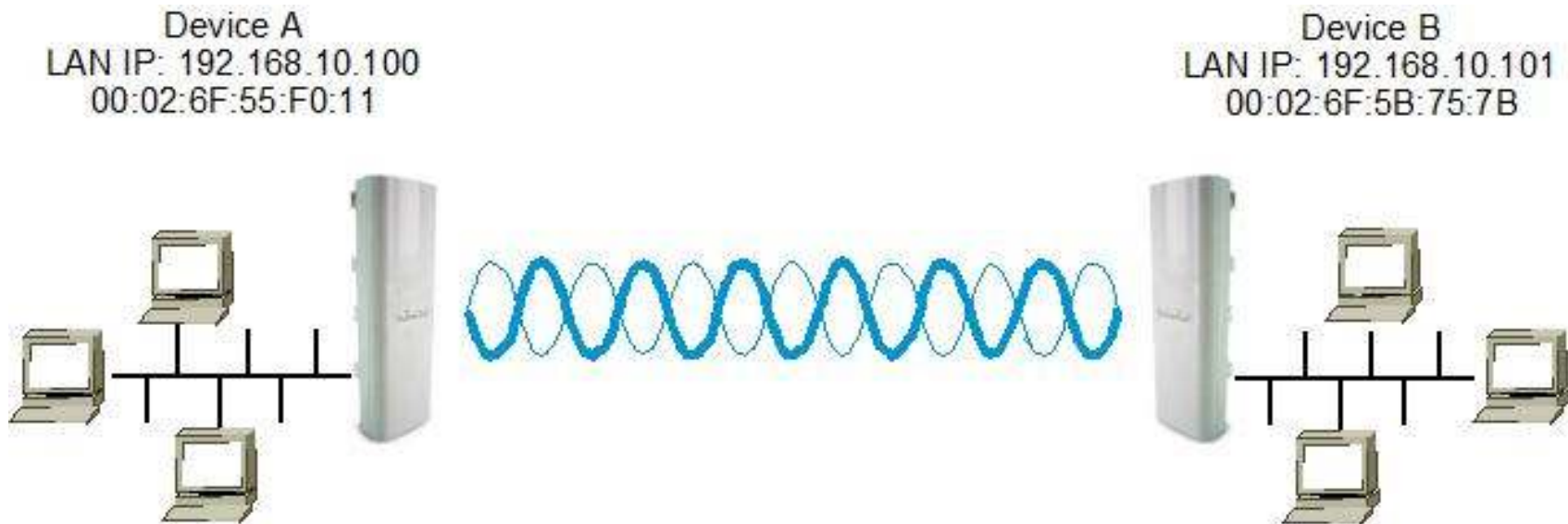
Obtain an IP address automatically (DHCP)
 Specify an IP address

IP Address	192	168	10	100
IP Subnet Mask	255	255	255	0
Default Gateway	192	168	10	1

Apply Cancel

WDS Bridge

- No AP is present, instead a pair of devices communicate in Ad-hoc mode.
- Association is based on MAC Address, not SSID.
- Before setting up the wireless connections it is recommended to assign different IP addresses to each device.
- For example:
 - Device A: LAN IP address to 192.168.10.100
 - Device B: LAN IP address to 192.168.10.101



Wireless MAC Address

- Recording the **Wireless MAC Address** is VERY IMPORTANT when configuring WDS.
- This can be found on the **Status** page.
- Each WDS device will need the Wireless MAC address of the other device it will be communicating with.

The screenshot displays the EnGenius web interface for a Wireless Outdoor Access Point/Client Bridge. The left sidebar shows the 'WDS Bridge' menu with 'Status' highlighted. The main content area shows the 'Main' page with 'Home' and 'Reset' buttons. The 'System Information' table lists various device details, with the 'Wireless MAC Address' highlighted in red. The 'LAN Settings' table is also visible below.

System Information	
Device Name	Access Point
Ethernet MAC Address	00:02:6f:5b:75:7a
Wireless MAC Address	00:02:6f:5b:75:7b
Country	N/A
Current Time	Sat Jan 1 00:10:49 UTC 2000
Firmware Version	1.0.39

LAN Settings	
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0
DHCP Client	Disabled

Wireless Channel/Frequency

- Wifi devices must be on the same **Wireless Channel** to communicate.
- Click **Wireless** to configure desired **Channel/Frequency**.
- This setting applies to all operation modes.

The screenshot shows the EnGenius web interface for configuring a Wireless Outdoor Access Point/Client Bridge. The interface is divided into a left sidebar and a main content area.

EnGenius | **Wireless Outdoor Access Point/ Client Bridge**

Wireless Network Home Reset

Wireless Mode	802.11b/g Mixed (2GHz/54Mbps) ▾
Channel / Frequency	Ch6-2.437GHz ▾

Apply Cancel

Left Sidebar:

- Status**
 - Main
 - WDS Link Status
 - System Log
- System**
 - System Properties
 - IP Settings
 - Spanning Tree Settings
- Wireless**
 - Wireless Network** (highlighted with a red box)
 - WDS Link Settings
 - WDS Security
 - Wireless Advanced Settings
- Management**

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WDS Link Settings

- Click **WDS Link Settings** and change the mode setting to **Enable**.
- Fill in WDS link partner's **WLAN MAC address**, then click **Apply**.
- Repeat the above steps for both WDS Bridges, so that Device **A** has the **MAC Address** of Device **B** and vice versa.

EnGenius | **Wireless Outdoor Access Point/ Client Bridge**

WDS Bridge

Status

- Main
- WDS Link Status
- System Log

System

- System Properties
- IP Settings
- Spanning Tree Settings

Wireless

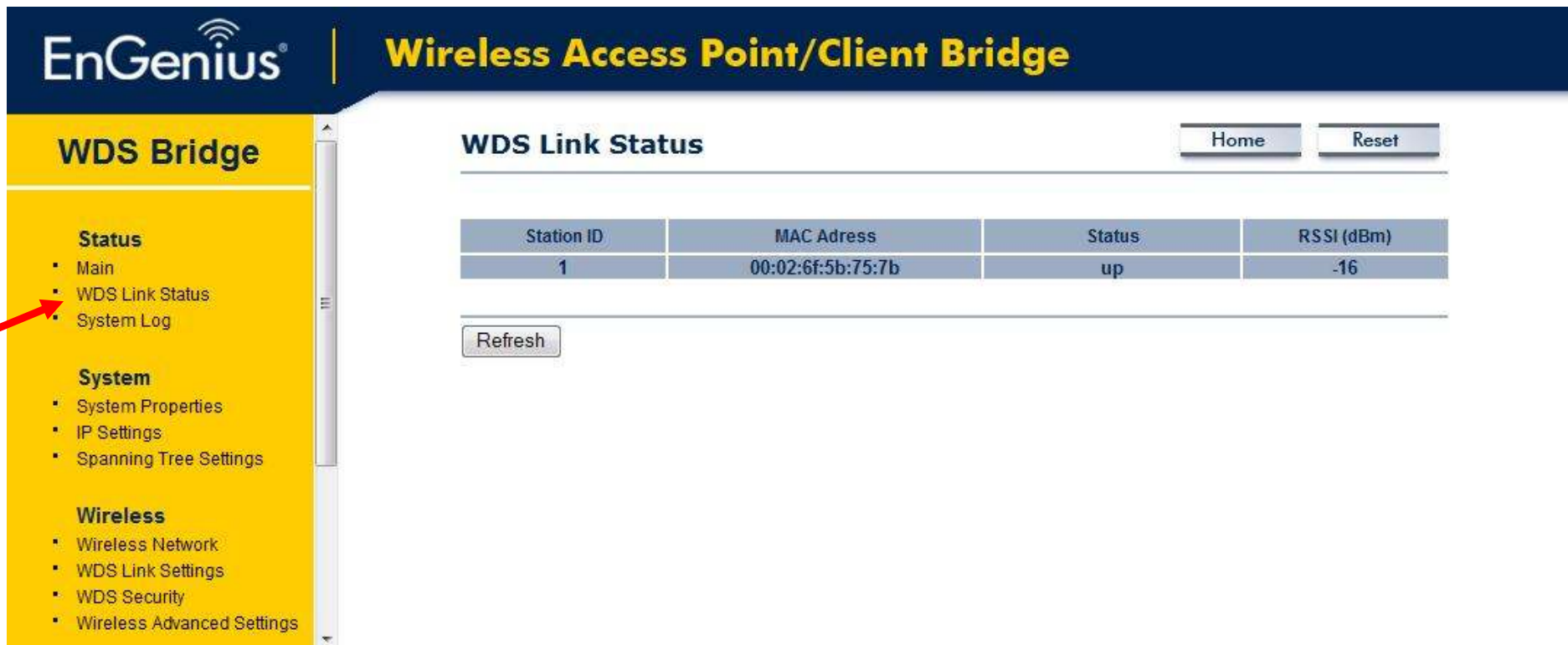
- Wireless Network
- **WDS Link Settings**
- WDS Security
- Wireless Advanced Settings

WDS Link Settings Home Reset

ID	MAC Address						Mode
1	00	: 02	: 6F	: 55	: F0	: 11	Enable ▾
2		:	:	:	:	:	Disable ▾
3		:	:	:	:	:	Disable ▾
4		:	:	:	:	:	Disable ▾
5		:	:	:	:	:	Disable ▾
6		:	:	:	:	:	Disable ▾
7		:	:	:	:	:	Disable ▾
8		:	:	:	:	:	Disable ▾
9		:	:	:	:	:	Disable ▾
10		:	:	:	:	:	Disable ▾

WDS Link Settings

- To check WDS link status, click **Status > WDS Link Status**. Status “up” means the a connection is established.



EnGenius | **Wireless Access Point/Client Bridge**

WDS Bridge

- Status**
 - Main
 - WDS Link Status**
 - System Log
- System**
 - System Properties
 - IP Settings
 - Spanning Tree Settings
- Wireless**
 - Wireless Network
 - WDS Link Settings
 - WDS Security
 - Wireless Advanced Settings

WDS Link Status Home Reset

Station ID	MAC Adress	Status	RSSI (dBm)
1	00:02:6f:5b:75:7b	up	-16

Refresh

WDS AP

- The same concepts apply when configuring a WDS AP.
- When in Access Point mode, this function is enabled by clicking on the **WDS Link Settings**.
- This allows APs to act as a type of wireless repeater.

EnGenius | **Wireless Access Point/Client Bridge**

Access Point

- Status
 - Main
 - Wireless Client List
 - System Log
- System
 - System Properties
 - IP Settings
 - Spanning Tree Settings
- Wireless
 - Wireless Network
 - Wireless MAC Filter
 - WDS Link Settings**
 - Wireless Advanced Settings
- Management

WDS Link Settings Home Reset

Notice: When using this WDS Link Settings feature, please disable isolation feature first in Wireless Network page.

ID	MAC Address						Mode
1	00	: 02	: 6F	: 5B	: 75	: 7A	Enable ▾
2		:	:	:	:	:	Disable ▾
3		:	:	:	:	:	Disable ▾
4		:	:	:	:	:	Disable ▾
5		:	:	:	:	:	Disable ▾
6		:	:	:	:	:	Disable ▾
7		:	:	:	:	:	Disable ▾
8		:	:	:	:	:	Disable ▾

Apply Cancel

Repeater

- For single radio devices such as the ECB-3500, configuration is identical to **Client Bridge** mode.
- The device broadcasts the SSID of the AP that it is associated to.
- For dual radio devices like the EOR-7550 or the EOA7530 / 7535, the process for each radio is the same as if you were configuring two separate devices in the selected mode.

The screenshot displays the EnGenius web interface for a Dual Radio Multi-Function 11N AP. The page title is "Dual Radio Multi-Function 11N AP". On the left, a yellow sidebar menu is titled "Universal Repeater Mode" and contains the following items: System (with sub-items: Operation Mode, Status, Schedule, Event Log, Monitor), Wireless, Network, Management, Tools, and Logout. The main content area shows three configuration sections: "Radio 1 (11a/b/g)" with a dropdown menu set to "CB", "Radio 2 (11b/g/n)" with a dropdown menu set to "AP", and "Ethernet" with a dropdown menu set to "LAN". Below these dropdowns are "Apply" and "Reset" buttons. Two red arrows point to the "Radio 1" and "Radio 2" dropdown menus.

Client Router

- Wireless configuration is identical to **Client Bridge** mode but acts as a WAN port.

The screenshot shows the EnGenius web interface for the Client Router. The left sidebar is yellow and contains a navigation menu with sections: Status (Main, DHCP Client Table, Connection Status, System Log), System (System Properties), Router (WAN Settings, LAN Settings, VPN Pass Through), Wireless (Wireless Network, Wireless Security, Wireless Advanced Settings), and Management (Administration). The main content area is titled "Wireless Access Point/Client Bridge" and "WAN Settings". It includes "Home" and "Reset" buttons. The "Internet Connection Type" is set to "DHCP". Under "Options", there are input fields for "Account Name (if required)", "Domain Name (if required)", and "MTU" (set to "Auto" with a value of "1500"). The "Domain Name Server (DNS) Address" section has two radio buttons: "Get Automatically From ISP" (selected) and "Use These DNS Servers". Below are input fields for "Primary DNS" and "Secondary DNS", both showing "0 . 0 . 0 . 0". At the bottom are "Apply" and "Cancel" buttons.

EnGenius | **Wireless Access Point/Client Bridge**

Client Router

WAN Settings Home Reset

Internet Connection Type: DHCP

Options

Account Name (if required):

Domain Name (if required):

MTU: Auto 1500

Domain Name Server (DNS) Address

Get Automatically From ISP

Use These DNS Servers

Primary DNS: 0 . 0 . 0 . 0

Secondary DNS: 0 . 0 . 0 . 0

Apply Cancel

AP Router

- Wireless configuration is identical to **AP** mode.
- Ethernet interface has **WAN Setting** configuration.

The screenshot displays the EnGenius AP Router configuration interface. The left sidebar shows the navigation menu with categories: Status, System, Router, Wireless, and Management. The main content area is titled "Wireless Access Point/Client Bridge" and "WAN Settings". It includes a "Home" and "Reset" button. The "Internet Connection Type" is set to "Static IP". Under "Options", the "Account Name" and "Domain Name" are both set to "none", and the "MTU" is set to "Auto" with a value of 1500. The "Internet IP Address" section shows the IP Address as 10.1.1.100, the IP Subnet Mask as 255.255.0.0, and the Gateway IP Address as 10.1.1.150. The "Domain Name Server (DNS) Address" section shows both Primary and Secondary DNS addresses as 0.0.0.0.

EnGenius | **Wireless Access Point/Client Bridge**

AP Router

- Status**
 - Main
 - Wireless Client List
 - DHCP Client Table
 - Connection Status
 - System Log
- System**
 - System Properties
- Router**
 - WAN Settings
 - LAN Settings
 - VPN Pass Through
- Wireless**
 - Wireless Network
 - Wireless MAC Filter
 - WDS Link Settings
 - Wireless Advanced Settings
- Management**

WAN Settings [Home] [Reset]

Internet Connection Type: Static IP

Options

Account Name (if required): none

Domain Name (if required): none

MTU: Auto 1500

Internet IP Address

IP Address: 10 . 1 . 1 . 100

IP Subnet Mask: 255 . 255 . 0 . 0

Gateway IP Address: 10 . 1 . 1 . 150

Domain Name Server (DNS) Address

Primary DNS: 0 . 0 . 0 . 0

Secondary DNS: 0 . 0 . 0 . 0

Wireless Security

- Encrypt the wireless network with a password.
 - Once a wireless client joins a Wi-Fi network, it stores the profile so that it does not have to be entered again.
 - WEP
 - WPA/WPA2-PSK
 - WPA/WPA2 Enterprise level, requires RADIUS server
- Good
Better
Best (AP Mode)

SSID Profile

Wireless Setting

SSID	EnGenius1	(1 to 32 characters)
VLAN ID	1	(1~4095)
Suppressed SSID	<input type="checkbox"/>	
Station Separation	<input checked="" type="radio"/> Enable	<input type="radio"/> Disable

Wireless Security

Security Mode	Disabled
---------------	----------

- Disabled
- WEP
- WPA-PSK
- WPA2-PSK
- WPA-PSK Mixed
- WPA
- WPA2
- WPA Mixed

Backup / Restore Settings

- Configuration can be saved to a file in case the device loses its settings
- Also good when configuring many devices with the same settings.

The screenshot displays the EnGenius web interface for a Wireless Access Point/Client Bridge. The left sidebar is titled 'Access Point' and contains a menu with categories: Status (Main, Wireless Client List, System Log), System (System Properties, IP Settings, Spanning Tree Settings), Wireless (Wireless Network, Wireless MAC Filter, WDS Link Settings, Wireless Advanced Settings), and Management (Administration, Management VLAN, SNMP Settings, Backup/Restore Settings, Firmware Upgrade). A red arrow points to the 'Backup/Restore Settings' menu item. The main content area is titled 'Backup/Restore Settings' and includes 'Home' and 'Reset' buttons. It features three sections: 'Save A Copy of Current Settings' with a 'Backup' button; 'Restore Saved Settings from A File' with a file selection field, a 'Browse...' button, and a 'Restore' button; and 'Revert to Factory Default Settings' with a 'Factory Default' button.