HAWKING® TECHNOLOGY

Hi-Gain™ Dual-Band Wireless-N Bridge   HD45B

USER'S MANUAL ▶▶

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LIMITED WARRANTY

Federal Communication Commission Interference Statement

FCC Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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:

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

FCC Caution

This equipment must be installed and operated in accordance with provided instructions and a minimum 20 cm spacing must be provided between computer mounted antenna and person's body (excluding extremities of hands, wrist and feet) during wireless modes of operation.

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

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 20cm (8 inches) during normal operation.

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of March 9, 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE).

The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8, 2000.

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.

EU Countries Intended for Use

The ETSI version of this device is intended for home and office use in Austria,

Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

The ETSI version of this device is also authorized for use in EFTA member states: Iceland, Liechtenstein, Norway, and Switzerland.

EU Countries NOT intended for use

None.

Table of Contents

Chapter I: Product Information

1-1 Introduction and Safety Information

Thank you for purchasing the HD45B Hi-Gain™ Dual Band Wireless N Access Point/Bridge.   This highly efficient access point is the best choice for **Small office / Home office** users.   It allows computers and network devices to gain wireless access in several modes throughout their network. Easy install procedures allow any computer user to setup a network environment in a very short time.

With built-in dual band 2.4GHz and 5GHz radios, this router supports the IEEE 802.11b/g/n and IEEE 802.11a/n wireless network standards simultaneously.   All computers and wireless-enabled network devices (including PDA, cellular phone, game console, etc.) can connect to this wireless router without additional cabling. 802.11N wireless capability also gives you the highest wireless speeds.   *With a compatible wireless card installed in your PC, you can transfer files at up to 750Mbps (combined 2.4GHz and 5GHz transfer data rate)!*

Other features of the HD45B include:
- Supports 2.4GHz and 5GHz wireless devices simultaneously.
- Provides IEEE 802.11b/g/Draft-N wireless LAN capability
- 5 different Wireless Modes: Access Point, Bridge Client, Bridge Point to Point, Bridge Point to Multi-Point, AP Bridge WDS modes.
- Supports 64/128-bit WEP, WPA, and WPA2 wireless data encryption.
- Supports MAC address filtering (Only allow specific wireless device of your choice to connect to this access point).
- Five wired LAN ports (10/100/1000M)
- Auto MDI / MDI-X function for all wired Ethernet ports.
- Provides IEEE 802.11a/b/g/n wireless LAN capability.
- Support DHCP (Server/Client) for easy IP-address setup.
- Allows you to monitor the access point's status: DHCP Client Log, System Log, Security Log and Device/Connection Status.
- Easy to use Web-based GUI for network configuration and management purposes.

1-2 Safety Information

In order to keep the safety of users and property, please follow these safety instructions:

1. This access point is designed for indoor use only; DO NOT place this access point outdoors.

2. DO NOT put this access point at or near hot or humid places, like kitchens or bathrooms. Also, do not leave this access point in the car in summer.

3. DO NOT pull any connected cable with force; disconnect them from the access point first.

4. If you want to place this access point in a high place or hang on the wall, please make sure the access point is firmly secured. Falling can damage the access point and its accessories and the warranty will be void.

5. Accessories of this access point, like antennas and power supply, are a danger to small children under 3 years old. KEEP THIS ACCESS POINT OUT OF THE REACH OF CHILDREN!

6. The access point will become warm when used for a long period of time (*This is normal and is not a malfunction).* DO NOT put this access point on paper, cloth, or other flammable materials.

7. There are no user-serviceable parts inside the access point. If you have found that the access point is not working properly, please contact technical support or your place of purchase and ask for help. DO NOT disassemble the access point, or warranty will be void.

8. If the access point falls into water when it's powered on, DO NOT use your hands to pick it up. Switch the electrical power off before you do anything, or contact an experienced technician for help.

9. If you smell something strange, or see smoke coming out from the access point or power supply, remove the power supply or switch the electrical power off immediately, and call techsupport or your place of purchase for help.

1-3 System Requirements

- One computer (Mac or PC).
- Internet Web Browser (Internet Explorer, Safari, etc.)
- A Wired or Wireless network adapter (e.g. Airport card, built-in Ethernet adapter, etc.)

1-4 Package Contents

Before you start to use this access point, please check if there's anything missing in the package, and contact your place of purchase or contact Hawking Technologies.

- HD45B Hi-Gain™ Dual Band Wireless N Access Point/Bridge (main body, 1 pcs)
- Quick Installation Guide (1 pcs)
- Setup CD-ROM (1pcs)
- A/C power adapter 12V/1.25A (1 pcs)
- 3dBi Dipole Antennas (3 pcs)

1-5 Product Overview

Front Panel

LED Name	Light Status	Description
⏻ PWR	On	Router is switched on and correctly powered.
2.4G	On	2.4GHz Wireless WPS function is enabled.
	Off	2.4GHz Wireless network is switched off.
	Flashing	2.4GHz Wireless LAN activity (transferring or receiving data).
5G	On	5GHz Wireless WPS function is enabled.
	Off	5GHz Wireless network is switched off.
	Flashing	5GHz Wireless LAN activity (transferring or receiving data).
Wired 1-5 10/100M	On	LAN port is linked in 10/100Mbps speed.
	Off	LAN port is not linked in 10/100Mbps speed.
Wired 1-5 1000M	On	LAN port is linked in 1000Mbps speed
	Off	LAN port is not linked in 1000Mbps speed

Back Panel
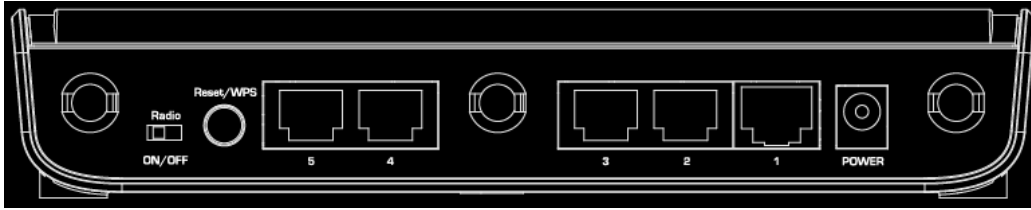
Item Name	Description
Antenna	Three SMA antenna connectors for the 3dBi detachable antenna enclosed with the product.
Power (12V/1A)	Power connector, connects to A/C power adapter 12V/1A.
Reset/WPS	Reset the router to factory default settings (clear all settings) or start WPS function. Press this button and hold for 15 seconds to restore all settings to factory defaults, power off/on. Press this button for less than 5 seconds to start WPS function.
Network 1-5	Local Area Network (LAN)

NOTE: For 2.4GHz 802.11b and 802.11g mode, the signals can be transmitted only by antenna 1 (The antenna on the right side of the rear panel).

For 2.4 GHz 802.11n mode: The router is operating in a 2T2R Spatial Multiplexing MIMO configuration. Two (2) antennas are for signal transmitting and two (2) antennas are for signal receiving.

For 5GHz 802.11a/n mode: The router is operating in 3T3R Spatial Multiplexing MIMO configuration.   Three (3) antennas are for signal transmitting and three (3) antennas are for signal receiving)

Chapter II: System and Network Setup

2-1 Build Network Connection

Please follow the following instructions to build the network connection between your new HD45B access point and your computers and other network devices:

1. Connect your HD45B to the network port of your computer or connect wirelessly to it.

2. Connect all your computers and network devices (network-enabled consumer devices other than computers, like game console, or switch / hub) to the network.

3. Connect the A/C power adapter to the wall socket, and then connect it to the 'Power' socket of the access point.

4. Please check all LEDs on the front panel. 'PWR' LED should be steadily on, LAN LEDs should be on if the device is connected to the network. If PWR LED is not on, or any LED you expected is not on, please recheck the cabling, or jump to *'5-2 Troubleshooting'* for possible reasons and solutions.

2-2 Definitions of Dual Band and HD45B Supported Modes

2.4GHz vs 5GHz
The HD45B supports 2.4GHz and 5GHz bands.

2.4GHz is the most commonly used wireless bandwidth.   It also has a very narrow range of channels, usually between 1-11. Common household devices such as microwaves and cordless phones also use the 2.4GHz bandwidth, and can cause interference with your wireless network.   As a result of its heavy usage and narrow range of channels, the speed and range of typical WiFi devices can be negatively affected.

5GHz solves this problem by providing a faster, less congested, bandwidth with a wider range of available channels.

Modes
The HD45 supports 5 different modes.

Access Point: Standard default mode.   The HD45B will broadcast a WiFi signal for other computers and devices to connect to.   Must be plugged into the router or network after setup.
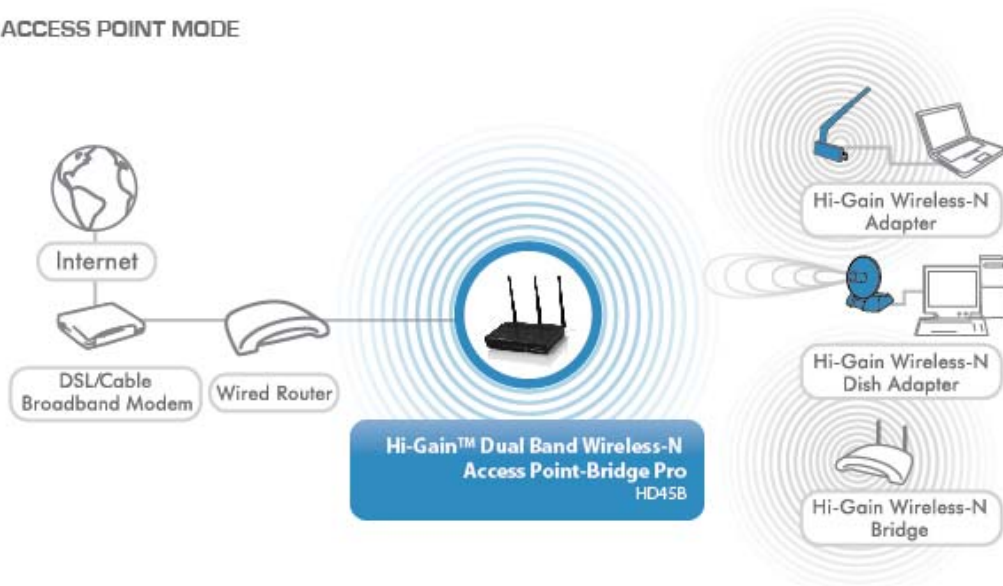
Station – Infrastructure (Bridge): The HD45B will allow you connect wired devices wirelessly to an existing wireless router or access point.   It will "bridge" these

devices wirelessly with your network.   It will not broadcast any WiFi signal.   It will only make a wireless connection between the Access Point and the HD45B.   The HD45B will only connect to either 2.4GHz or a 5GHz network.

Station - Infrastructure (Bridge Mode)
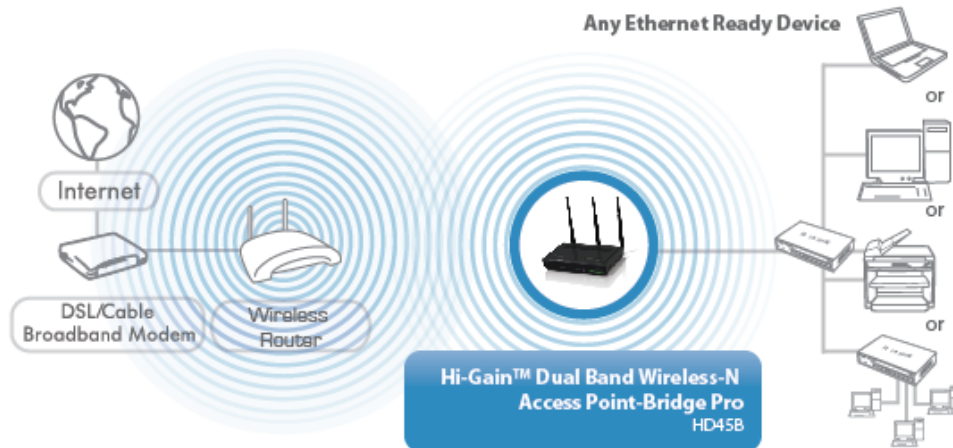
AP Bridge – Point to Point: Similar to station-infrastructure, this requires two HD45B's on each end.   This will create a wireless bridge between these two points. No WiFi signal will be broadcast and it will only make a wireless connection between those two points.

AP BRIDGE - POINT TO POINT MODE
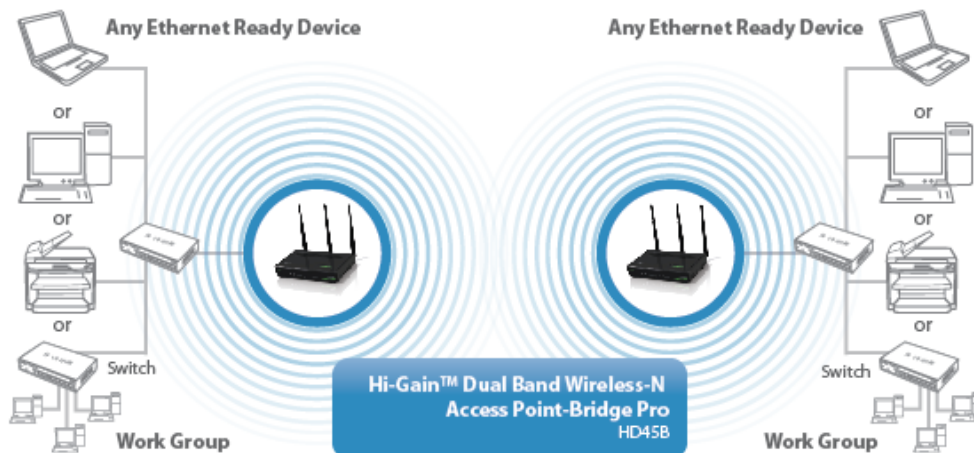
AP Bridge – Point to Multi-Point: Similar to AP Bridge – Point to Point, this allows you to connect several HD45B's to one point.   No WiFi signal will be broadcast and it will only make a wireless connection between the HD45Bs.

AP BRIDGE - POINT TO MULTIPLE POINT MODE
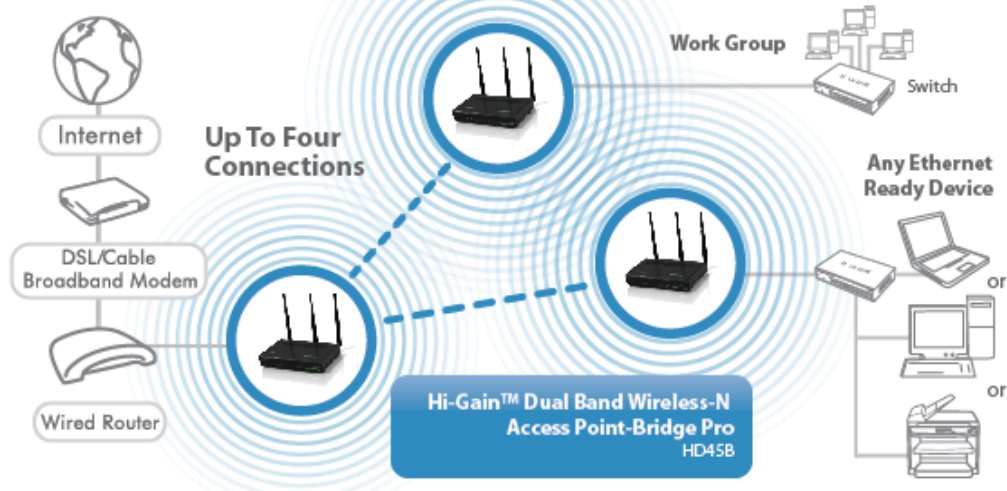
AP Bridge WDS: Wireless Distributing System. This allows you to create a wireless network using up to four HD45B's using the same SSID (wireless name). It will broadcast a WiFI signal.

AP BRIDGE - WDS MODE
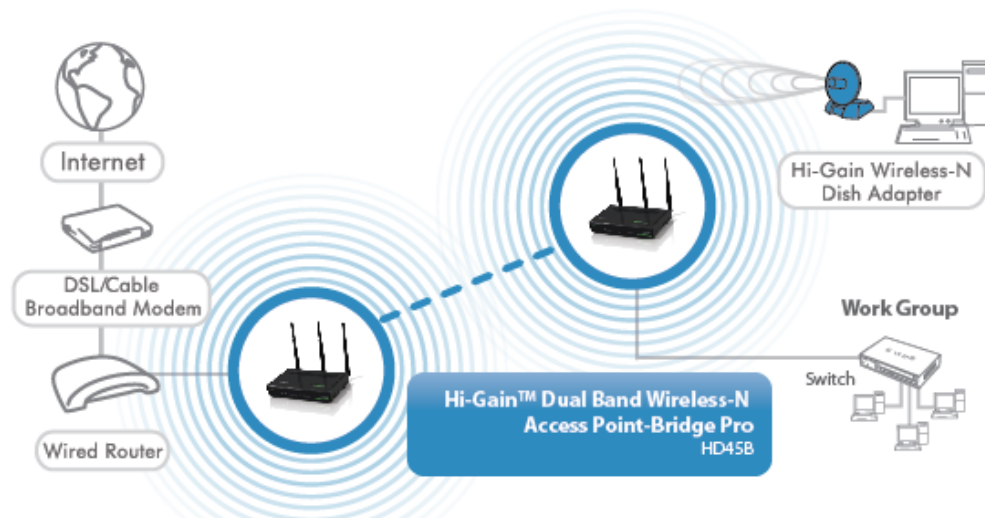
2-3 Connecting to the HD45B via Web Browser

After the network connection is built, the next step you should do is setup the access point with proper network parameters, so it can work properly in your network environment.

Before you can connect to the access point and start configuration procedures, your computer must be set to static IP.   Please follow the following instructions to configure your computer to use a static IP address:

If the operating system of your computer is….

Windows 95/98/Me	**- please go to section 2-3-1**
Windows 2000	**- please go to section 2-3-2**
Windows XP	**- please go to section 2-3-3**
Windows Vista/7	**- please go to section 2-3-4**
Mac OS	**- please go to section 2-3-5**
Tablet/Smartphone	**- please go to section 2-3-6**

2-3-1 Windows 95/98/Me IP address setup

1. Click 'Start' button (it should be located at lower-left corner of your computer), then click control panel. Double-click *Network* icon, and *Network* window will appear. Select 'TCP/IP', then click 'Properties'.
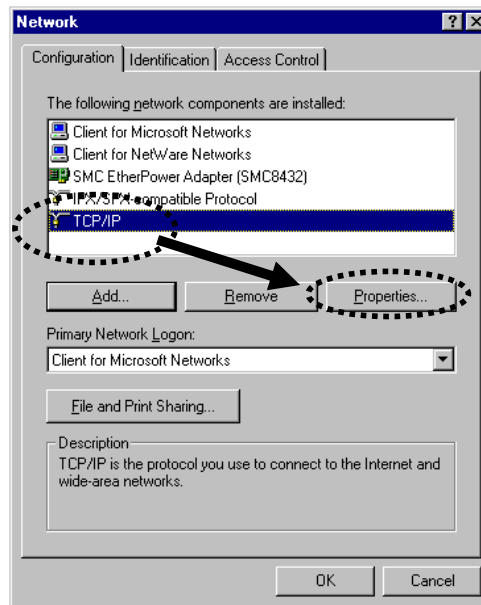
2. Select 'Obtain an IP address from a DHCP server' and then click 'OK'.
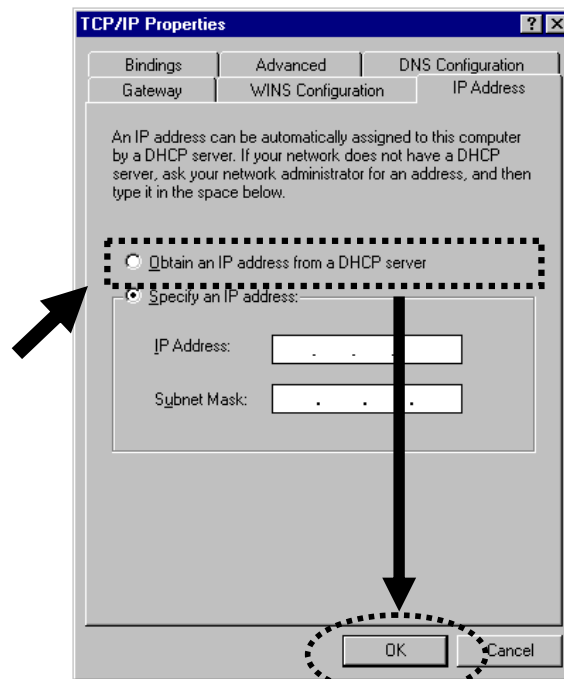
2-3-2 Windows 2000 IP address setup

1. Click 'Start' button (it should be located at lower-left corner of your computer), then click control panel. Double-click *Network and Dial-up Connections* icon; click *Local Area Connection,* and *Local Area Connection Properties* window will appear. Select 'Internet Protocol (TCP/IP)' and then click 'Properties'
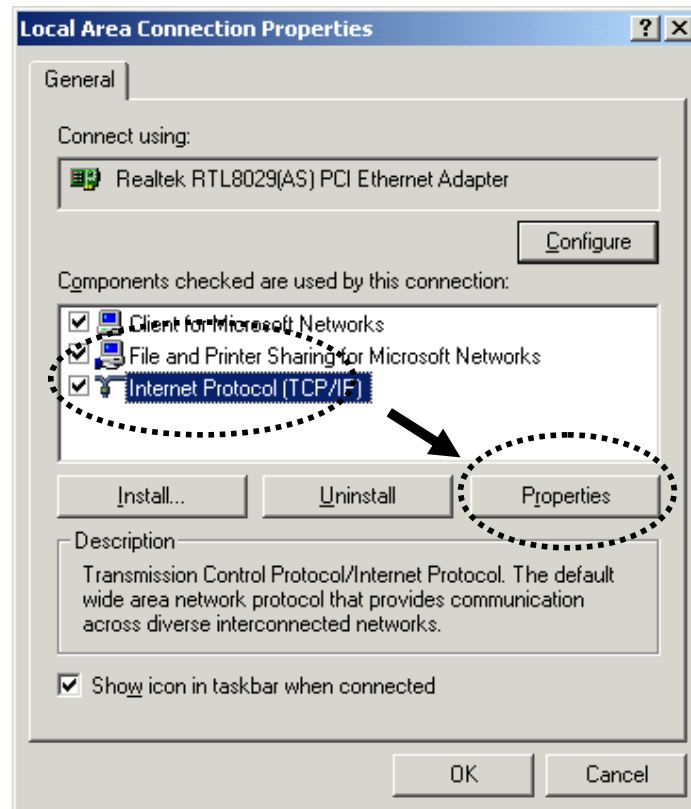
2. Select 'Obtain an IP address automatically' and 'Obtain DNS server address automatically', then click 'OK'.
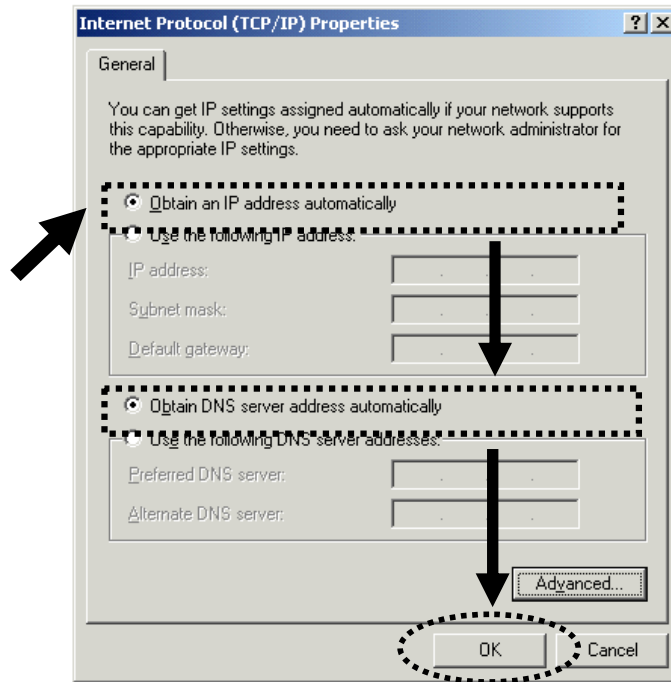
2-3-3 Windows XP IP address setup

1. Click 'Start' button (it should be located at lower-left corner of your computer), then click control panel. Double-click *Network and Internet Connections* icon, click *Network Connections,* and then double-click *Local Area Connection, Local Area Connection Status* window will appear, and then click 'Properties'
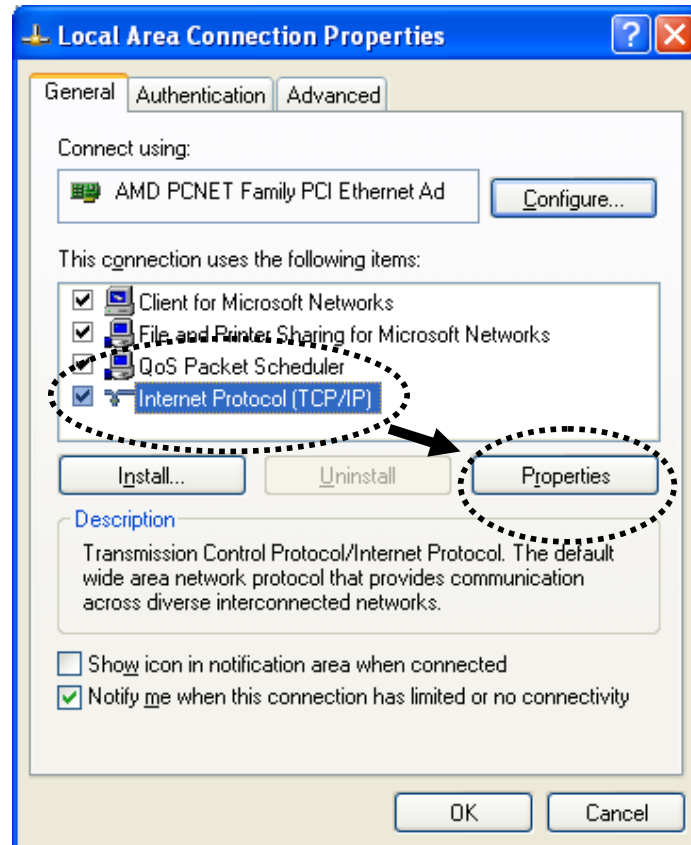
2. Select 'Obtain an IP address automatically' and 'Obtain DNS server address automatically', then click 'OK'.
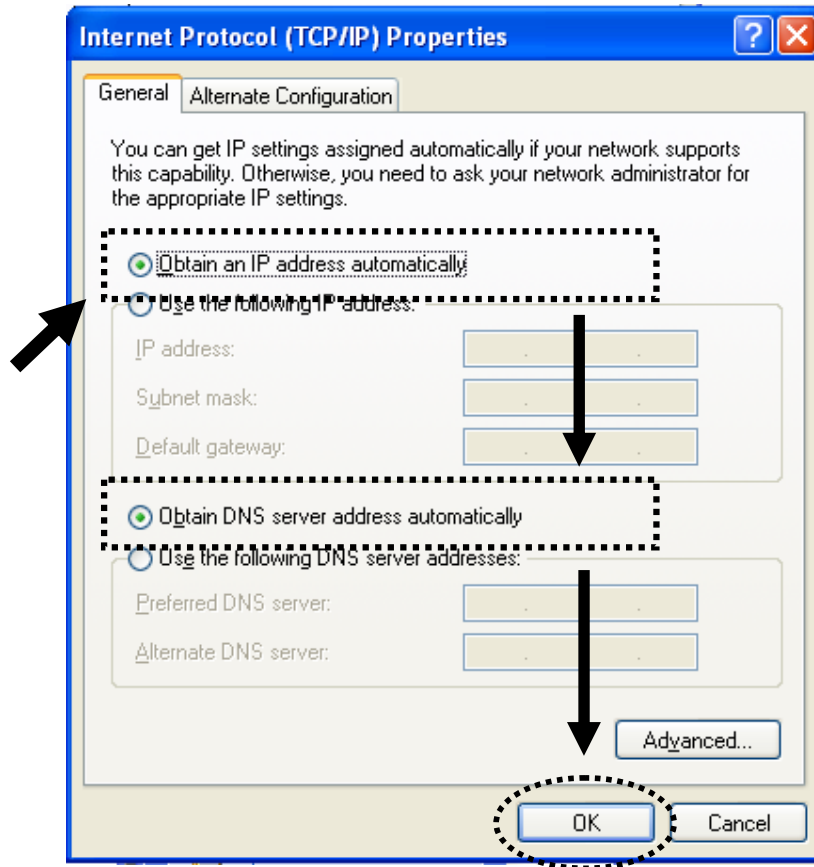
2-3-4 Windows Vista/7 IP address setup

1. Click 'Start' button (it should be located at lower-left corner of your computer), then click control panel. Click **View Network Status and Tasks**, and then click **Manage Network Connections.** Right-click **Local Area Network, then select 'Properties'. Local Area Connection Properties** window will appear, select 'Internet Protocol Version 4 (TCP / IPv4), and then click 'Properties'
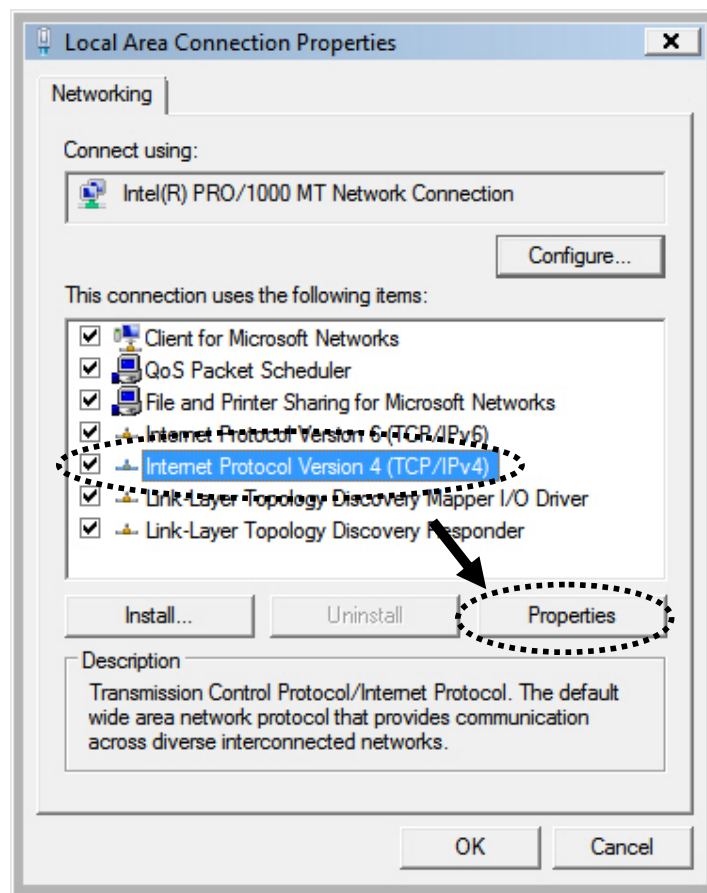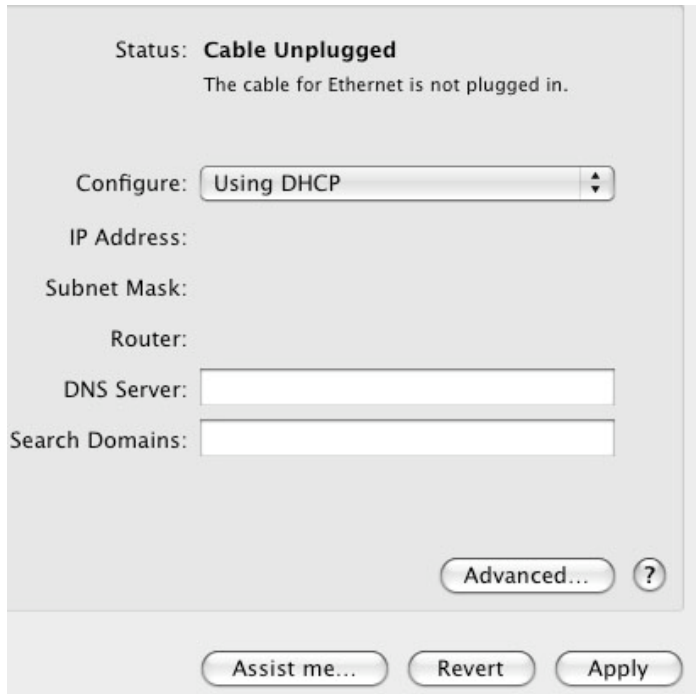
2. Select 'Obtain an IP address automatically' and 'Obtain DNS server address automatically', then click 'OK'.
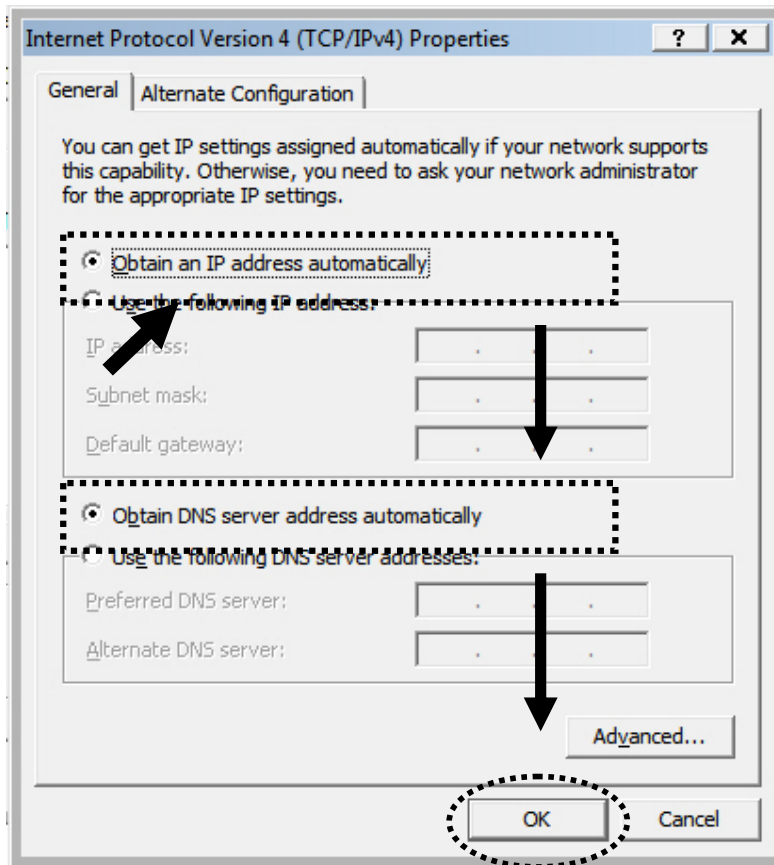
2-3-5 Mac OS X IP Address Setup

1) Go to your system preferences, go to network.   Make sure next to "Configure", you have it set under "Using DHCP"

2-3-6 Tablet/Smartphone Setup

iOS (iPhone or iPad)

Go to your settings on your tablet or smart phone

First, make sure JavaScript is On: Go to Settings icon Select (a) Safari > make sure (b) JavaScript is ON.

Go back to Home Screen > Select Settings > In Wi-Fi Networks, select (c) "Hawking_HD45B_2.4GHz" > (d) Make sure your Wi-Fi is connected to Hawking_HD45B_2.4GHz

Android (Android 2.1 +)

Go to Settings
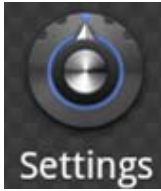
Go to Wireless & Networks
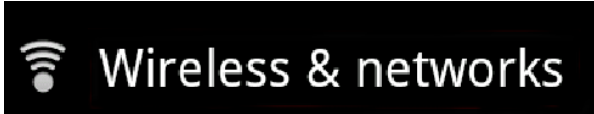
Check "Turn on Wi-Fi" and then click on Wi-Fi settings
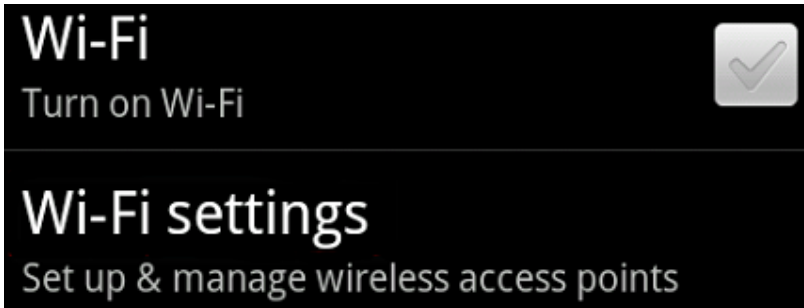
Look for Hawking_HD45B_2.4GHz, then select to connect
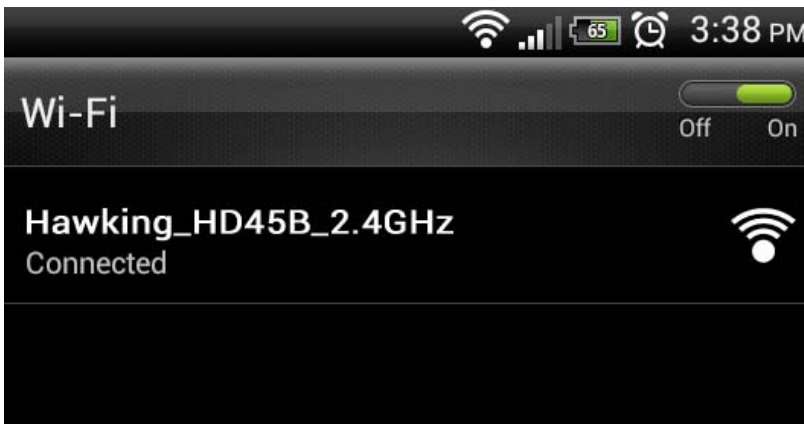
2-3-7 Accessing the Web Page User Interface

After the IP address setup is complete, please open your web browser.
In the address field, please type: '192.168.1.241' and press enter.
The following message should be shown:
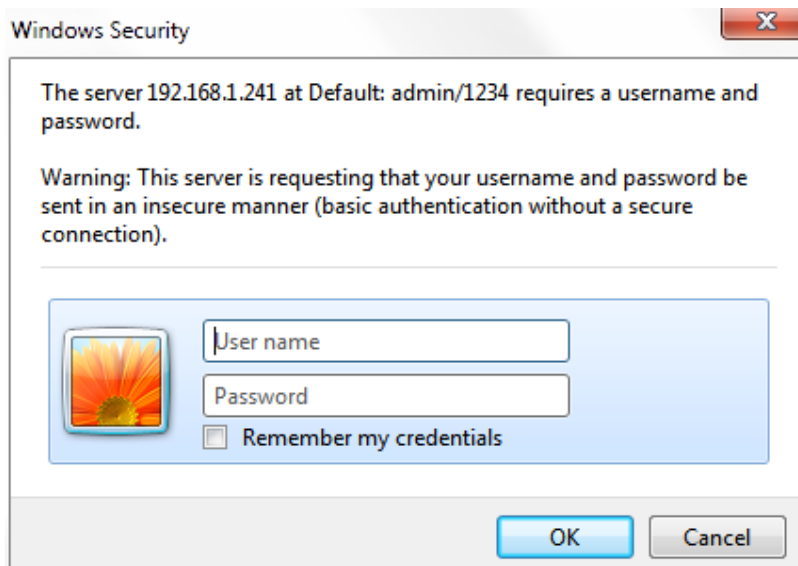
Please input user name and password in the field respectively,
Default Username: admin
Default Password: 1234

Press 'OK' button, and you will then see the management interface of this access point:

Welcome to the Setup Wizard

This section allows you to set up your Hi-Gain™ Dual Band Wireless N Access Point/Bridge. In the drop down box below, please select your mode.

Mode: AP

2.4 GHz Wireless: Enable

2.4 GHz Band: 2.4 GHz (B+G+N)

2.4 GHz ESSID: Hawking_HD45B_2.4GHz

Channel Number: 11

Associated Clients: Show Active Clients

5 GHz Wireless: Enable

5 GHz Band: 5 GHz (A+N)

5 GHz ESSID: Hawking_HD45B_5GHz

Channel Number: 36

Associated Clients: Show Active Clients

Advanced IP Address Settings:

☑ To input your own IP Address settings, Uncheck the box and enter it below.
Note: The default IP address of the HD45B is 192.168.1.241

IP Address: 192.168.1.241

Subnet Mask: 255.255.255.0

Next
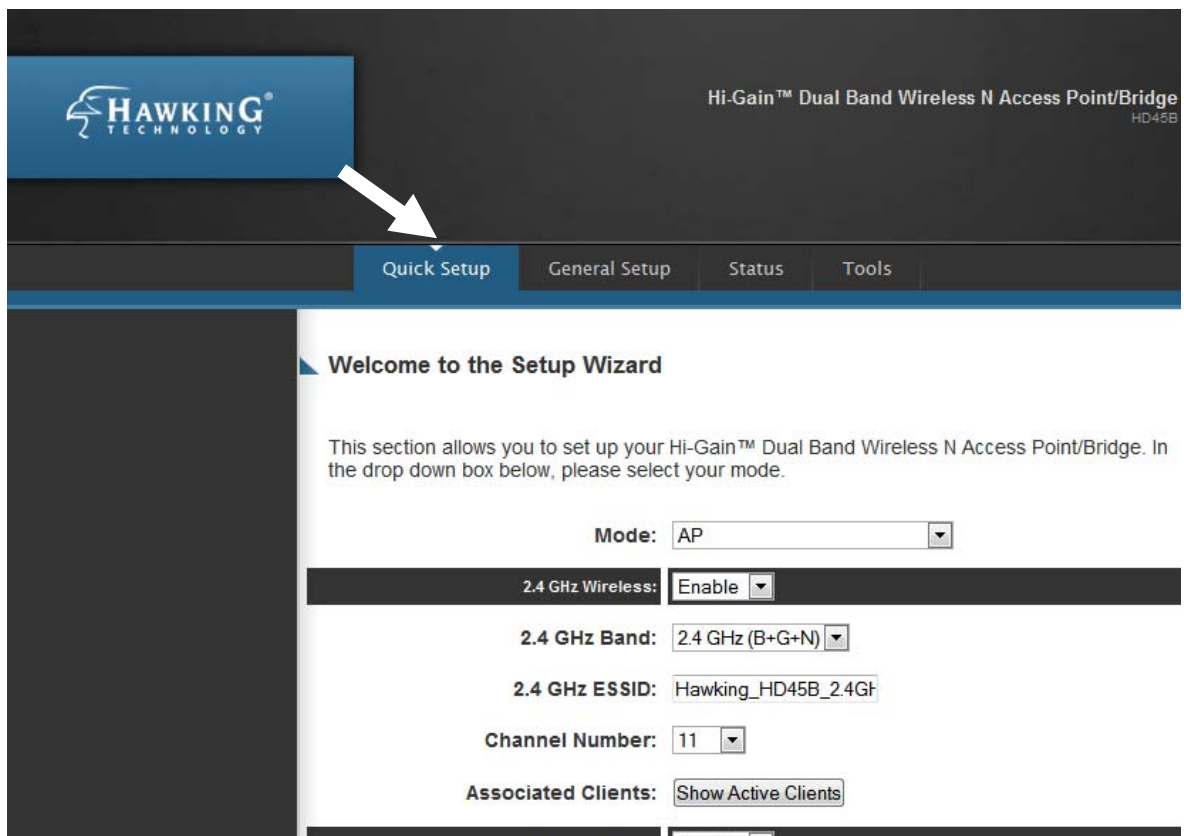
NOTE: If you can't see the web management interface, and you are being prompted to input user name and password again, it means you didn't input username and password correctly. Please retype user name and password again. If you are certain that user name and password you typed are correct, please go to '5-2 Troubleshooting' to perform a factory reset, to set the password back to default value.

2-4 'Quick Setup'

This access point provides a 'Quick Setup' procedure, which will help you to complete all required settings you need to access the Internet in very short time. Please follow the following instructions to complete the 'Quick Setup':

Please go to Quick Setup Wizard menu by clicking 'Quick Setup' button.

On the drop down box, please choose the wireless mode you wish to use.   There are 5 modes that the HD45B supports:

Access Point	**- Please go to section 2-4-1**
Station-Infrastructure (Bridge)	**- Please go to section 2-4-2**
Bridge Point to Point	**- Please go to section 2-4-3**
Bridge Point to Multi-Point	**- Please go to section 2-4-4**
WDS	**- Please go to section 2-4-5**

If you're not sure, please contact your network administrator. Choosing a wrong mode will cause wireless and network issues.

2-4-1 Setup Procedure for 'Access Point'

Wireless (1):   Shows you if the wireless is enabled/disabled

ESSID (2):   The HD45B transmits in both 2.4GHz and 5GHz WiFi
                        frequencies. Please input the ESSID (the name used to
                        identify this wireless access point) for each frequency here.
                        You can input up to 32 alphanumerical characters. **PLEASE
                        NOTE THAT ESSID IS CASE SENSITIVE.**
                        Default SSID
                        2.4GHz: Hawking_HD45B_2.4GHz
                        5GHz: Hawking_HD45B_5GHz

Band (3):   Please select the wireless band you wish to use. By selecting
                        different band setting, you'll be able to allow or deny the

wireless client of a certain band.

2.4GHz Band
If you select 2.4GHz (B), 2.4GHz (N), or 2.4GHz (G), only wireless clients using the wireless band you select (802.11b, 802.11 Draft-N, or 802.11g) will be able to connect to this access point.

If you select 2.4GHz (B+G), then only wireless clients using 802.11b and 802.11g band will be able to connect to this access point.

If you want to allow 802.11b, 802.11g, and 802.11 Draft-N clients to connect to this access point, select 2.4GHz (B+G+N).

5GHz Band
5GHz (A): this mode allows 802.11a wireless network client to connect this router (maximum transfer rate 54Mbps for 802.11a clients).

5GHz (N): this mode allows 802.11n wireless network client to connect this router (maximum transfer rate 450Mbps for 802.11n clients).

5GHz (A+N): this mode allows 802.11a and 802.11n wireless network client to connect this router (maximum transfer rate 54Mbps for 802.11a clients, and maximum 450Mbps for 802.11n clients).

Channel Number (4):   *Please select a channel number you wish to use. If you know a certain channel number is being used by other wireless access points nearby, please refrain from using the same channel number*

Associated Clients (5):   *Click 'Show Active Clients' button and a new popup window will appear which contains the information about all*

*wireless clients connected to this access point. You can click
'Refresh' button in popup window to keep information
up-to-date.*

Adv. IP Address (6)   *This section allows you to set an IP Address and subnet mask
to fit your network if needed. Uncheck the box to input.
Otherwise, the default IP Address is 192.168.1.241*

After you finish with all settings, please click 'Next' (7) button.

If you wish to have security, please select your level of security here. Refer to Section
3-4-3 for descriptions of security types. Click 'Apply' for the device to restart.
Click 'Back' if you wish to make changes. Plug the HD45B into your router or
network. Congratulations, you have set up the HD45B in Access Point!

2-4-2 Setup Procedure 'Station-Infrastructure' (Wireless Bridge)

Wireless (1):	*Shows you if the wireless is enabled/disabled*
Main ESSID (2):	*The wireless name of the network you wish to bridge to.*
Site Survey (3):	*When you select bridge mode, you have to associate it with a working access point. Click 'Select Site Survey', a "Wireless Site Survey Table" will pop up and list all available access points nearby. Select one access point in the table and it will join wireless LAN through this access point. Note: The HD45B will only repeat a 2.4GHz or a 5GHz network. Blue will be 2.4GHz networks and orange will be 5GHz*

Wireless Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

Select	Band	Channel	SSID	BSSID	Encryption	Authentication	Signal	Mode
⊙	2.4	1	Hawking_HD45R_2.4GHz	80:1F:02:0D:CF:2C	NONE	OPEN	100	11b/g/n
⊙	2.4	3		00:0E:3B:0F:FC:98	AES	WPA2PSK	18	11b/g/n
⊙	2.4	3		80:1F:02:2B:E5:76	AES	WPA2PSK	89	11b/g/n
⊙	5	36	Hawking_HD45R_5GHz	80:1F:02:0D:CF:2E	NONE	OPEN	100	11a/n

[Refresh] [Connect]

Adv. IP Address (4)   *This section allows you to set an IP Address and subnet mask to fit your network if needed.   Uncheck the box to input. Otherwise, the default IP Address is 192.168.1.241*

When you finish with all settings, press 'Next' .

Wireless Security or Passphrase

Wireless Password [   ]

☐ Display characters

[Back] [Apply]

If the network you selected was a secure network, please enter the wireless password here.   Click 'Apply' for the device to restart.   Click 'Back' if you wish to make changes. Plug the deivces that wish to use this as a Bridge. Congratulations, you have set up the HD45B as a Bridge!

2-4-3 Setup procedure for 'AP Bridge-Point to Point':

Welcome to the Setup Wizard

This section allows you to set up your Hi-Gain™ Dual Band Wireless N Access Point/Bridge. In the drop down box below, please select your mode.

Mode:	AP Bridge-Point to Point ▼
2.4 GHz Wireless:	Enable ▼ 1
2.4 GHz Band:	2.4 GHz (B+G+N) ▼ 2
Channel Number:	11 ▼ 3
MAC address 1:	000000000000 4
Set Security:	Set Security 5
5 GHz Wireless:	Enable ▼ 1
5 GHz Band:	5 GHz (A+N) ▼ 2
Channel Number:	36 ▼ 3
MAC address 1:	000000000000 4
Set Security:	Set Security 5

Advanced IP Address Settings:

☑ To input your own IP Address settings, Uncheck the box and enter it below.

Note: The default IP address of the HD45B is 192.168.1.241

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IP Address:	192.168.1.241
Subnet Mask:	255.255.255.0

Apply 7

Wireless (1):   *Shows you if the wireless is enabled/disabled*

Band (2):   *Please select the wireless band you wish to use. By selecting different band setting, you'll be able to allow or deny the wireless client of a certain band.*

2.4GHz Band

If you select 2.4GHz (B), 2.4GHz (N), or 2.4GHz (G), only wireless clients using the wireless band you select (802.11b, 802.11 Draft-N, or 802.11g) will be able to connect to this access point.

If you select 2.4GHz (B+G), then only wireless clients using 802.11b and 802.11g band will be able to connect to this access point.

If you want to allow 802.11b, 802.11g, and 802.11 Draft-N clients to connect to this access point, select 2.4GHz (B+G+N).

5GHz Band

5GHz (A): this mode allows 802.11a wireless network client to connect this router (maximum transfer rate 54Mbps for 802.11a clients).

5GHz (N): this mode allows 802.11n wireless network client to connect this router (maximum transfer rate 450Mbps for 802.11n clients).

5GHz (A+N): this mode allows 802.11a and 802.11n wireless network client to connect this router (maximum transfer rate 54Mbps for 802.11a clients, and maximum 450Mbps for 802.11n clients).

Channel Number (3):   *Please select a channel number you wish to use.   Please note that this should be the same channel as the other bridge you wish to connect to.*

Mac Address (4):   *Please input the MAC address of the other bridge you wish to make a connection with*

Set Security (5):   *Click this button to select an encryption mode for this wireless link, a new popup window will appear.   Note: the security must be the same on the other bridge.*

Adv. IP Address (6)   *This section allows you to set an IP Address and subnet mask to fit your network if needed.   Uncheck the box to input. Otherwise, the default IP Address is 192.168.1.241*

When you finish with all settings, please click 'Apply' (7); Plug in the devices that you wish to bridge.   Congratulations, you have set up the HD45B in AP Bridge-Point to Point!

2-4-4 Setup procedure for 'AP Bridge-Point to Multi-Point'

Welcome to the Setup Wizard

This section allows you to set up your Hi-Gain™ Dual Band Wireless N Access Point/Bridge. In the drop down box below, please select your mode.

Mode:	AP Bridge-Point to Multi-Point
2.4 GHz Wireless:	Enable 1
2.4 GHz Band:	2.4 GHz (B+G+N) 2
Channel Number:	11 3
MAC address 1:	000000000000
MAC address 2:	000000000000 4
MAC address 3:	000000000000
MAC address 4:	000000000000
Set Security:	Set Security 5
5 GHz Wireless:	Enable 1
5 GHz Band:	5 GHz (A+N) 2
Channel Number:	36 3
MAC address 1:	000000000000
MAC address 2:	000000000000 4
MAC address 3:	000000000000
MAC address 4:	000000000000
Set Security:	Set Security 5

Advanced IP Address Settings:

☑ To input your own IP Address settings, Uncheck the box and enter it below.

Note: The default IP address of the HD45B is 192.168.1.241

6

IP Address:	192.168.1.241
Subnet Mask:	255.255.255.0

Apply 7

Wireless (1):   *Shows you if the wireless is enabled/disabled*

Band (2):   *Please select the wireless band you wish to use. By selecting different band setting, you'll be able to allow or deny the wireless client of a certain band.*

2.4GHz Band

If you select 2.4GHz (B), 2.4GHz (N), or 2.4GHz (G), only wireless clients using the wireless band you select (802.11b, 802.11 Draft-N, or 802.11g) will be able to connect to this access point.

If you select 2.4GHz (B+G), then only wireless clients using 802.11b and 802.11g band will be able to connect to this access point.

If you want to allow 802.11b, 802.11g, and 802.11 Draft-N clients to connect to this access point, select 2.4GHz (B+G+N).

5GHz Band

5GHz (A): this mode allows 802.11a wireless network client to connect this router (maximum transfer rate 54Mbps for 802.11a clients).

5GHz (N): this mode allows 802.11n wireless network client to connect this router (maximum transfer rate 450Mbps for 802.11n clients).

5GHz (A+N): this mode allows 802.11a and 802.11n wireless network client to connect this router (maximum transfer rate 54Mbps for 802.11a clients, and maximum 450Mbps for 802.11n clients).

Channel Number (3): *Please select a channel number you wish to use.   Please note that this should be the same channel as the other bridge you wish to connect to.*

Mac Address (4): *Please input the MAC addresses of the other bridges you wish to make a connection with.*

Set Security (5): *Click this button to select an encryption mode for this wireless link, a new popup window will appear.   Note: the security must be the same on the other bridges.*

Adv. IP Address (6)   *This section allows you to set an IP Address and subnet mask*
                             to fit your network if needed.   Uncheck the box to input.
                             Otherwise, the default IP Address is 192.168.1.241.

When you finish with all settings, please click 'Apply' (7); Plug in the devices that you wish to bridge.   Congratulations, you have set up the HD45B in AP Bridge-Point to Multi-point!

2-4-5 Setup Procedure for 'AP-Bridge WDS'

Wireless (1):   *Shows you if the wireless is enabled/disabled*

Band (2):   **2.4GHz Band**

                      If you select 2.4GHz (B), 2.4GHz (N), or 2.4GHz (G), only

                      wireless clients using the wireless band you select (802.11b,

802.11 Draft-N, or 802.11g) will be able to connect to this access point.

If you select 2.4GHz (B+G), then only wireless clients using 802.11b and 802.11g band will be able to connect to this access point.

If you want to allow 802.11b, 802.11g, and 802.11 Draft-N clients to connect to this access point, select 2.4GHz (B+G+N).

5GHz Band
5GHz (A): this mode allows 802.11a wireless network client to connect this router (maximum transfer rate 54Mbps for 802.11a clients).

5GHz (N): this mode allows 802.11n wireless network client to connect this router (maximum transfer rate 450Mbps for 802.11n clients).

5GHz (A+N): this mode allows 802.11a and 802.11n wireless network client to connect this router (maximum transfer rate 54Mbps for 802.11a clients, and maximum 450Mbps for 802.11n clients).

SSID (3):	*Please input the ESSID (the name used to identify this wireless access point) here. You can input up to 32 alphanumerical characters.* **PLEASE NOTE THAT ESSID IS CASE SENSITIVE.**
Channel Number (4):	*The HD45B transmits in both 2.4GHz and 5GHz WiFi frequencies. Please select a channel number you wish to use. Please note that this should be the same channel as the other WDS devices you plan to connect to.*
Mac Address (5):	*Please input the MAC addresses of the other WDS devices you wish to make a connection with.*

Set Security (6):   *Click this button to select an encryption mode for this*
                     wireless link, a new popup window will appear.   Note: the
                     security must be the same on the other WDS Devices

Adv. IP Address (7)   *This section allows you to set an IP Address and subnet mask*
                     to fit your network if needed.   Uncheck the box to input.
                     Otherwise, the default IP Address is 192.168.1.241.

When you finish with all settings, please click 'Apply' (7); Connect you're your
wireless devices to the WDS network.   Congratulations, you have set up the HD45B
in AP Bridge-WDS!

Chapter III General Setup

In this chapter, you'll know how to change the major settings of the HD45B.   Log onto the device and click on 'General Setup'.
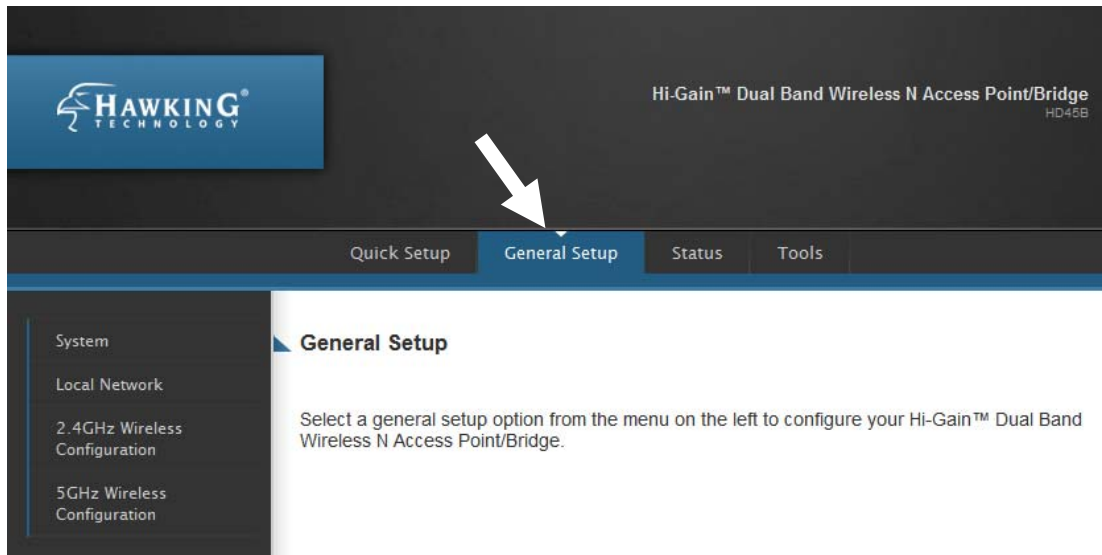
3-1 Time zone and time auto-synchronization

Please follow the following instructions to set time zone and time auto-synchronization parameters:

Please click 'General Setup' at the top of web management interface, select 'System' on the left hand column, and select 'Time Zone'.

Time Zone

Set Time Zone:

(GMT- 8:00) Pacific Time (US & Canada): Tijuana ▼

Time Server Address:

192.43.244.18

Daylight Savings:

☐ Enable Function

Times From Jan ▼ 1 ▼ to Jan ▼ 1 ▼

[Back] [Apply]

The time zone settings will be displayed in your web browser: Please select the correct time zone from the drop-down list, and input the IP address or host name of the time server. If you want to enable daylight savings setting, please check 'Enable Function' box, and set the duration of daylight setting.

After you finish with all settings, please click 'Apply' button and the following message will be displayed on your web browser:

Settings Saved Successfully!

You may press Go Back button to continue configuring other settings or press APPLY button to restart the system to make the changes take effect.

[Go Back] [Apply]

Please click 'Go Back' to go back to previous setup menu, or click 'Apply' to reboot the access point so the settings will take effect. Please wait 30-60 seconds for the access point to reboot.

3-2 Change Management password

Default password of this access point is '1234', and it's displayed on the login prompt when accessed from the web browser. There's a security risk if you don't change the default password, since everyone can see it. This is very important when you have wireless function enabled.

To change password, please follow the instructions:

Please click 'General Setup' at top of web management interface, select 'System' tab on the left hand column, and then click 'Password Settings', and the following message will be displayed on your web browser:

Password Settings

You can change the password required while logging into the Hi-Gain™ Dual Band Wireless N Access Point/Bridge's web-based management system. By default, the password is 1234.

Passwords can contain 0 to 30 alphanumeric characters and are case sensitive.

Current Password: 1

New Password: 2

Confirm Password: 3

Reset   Apply

Current Password (1):	*Please input current password here.*
New Password (2):	*Please input new password here.*
Confirm Password (3):	*Please input new password here again.*

If the password you typed in 'New Password' (2) and 'Confirm Password' (3) field are not the same, you'll see the following message:
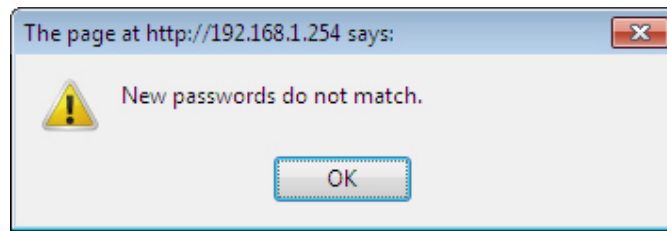
Please retype the new password again when you see above message.

If you see the following message:
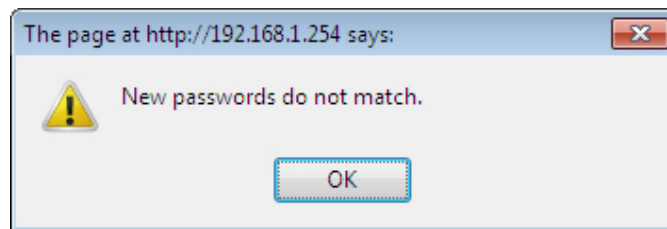
It means the content in 'Current Password' field is wrong, please click 'OK' to go back to previous menu, and try to input current password again.

If the current and new passwords are correctly entered, after you click 'Apply', you'll be prompted to input your new password:
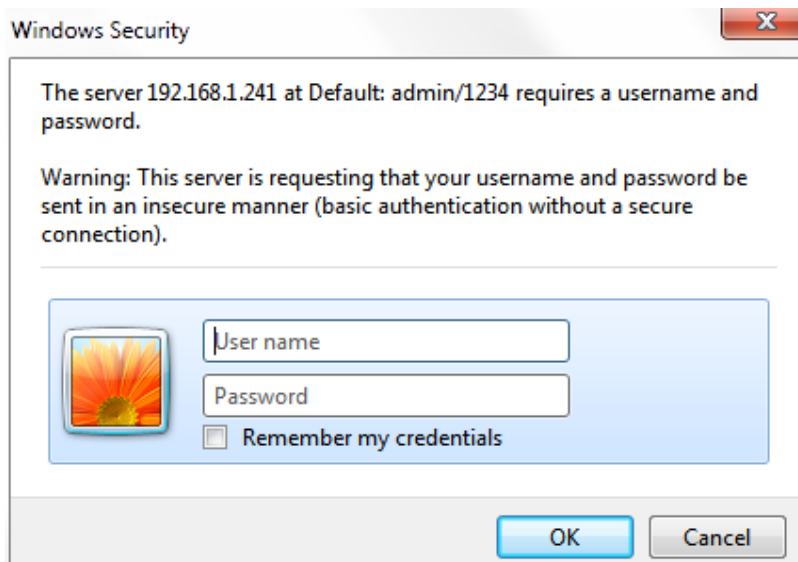
Please use new password to enter web management interface again, and you should be

able to login with new password.

3-3 Wired LAN Configuration

Before all computers using wired Ethernet connection (i.e. those computers connected to this access point's LAN port 1 to 5 by Ethernet cable) can communicate with each other and access Internet, they must have a valid IP address.

There are two ways to assign IP addresses to computers: static IP address (set the IP address for every computer manually), and dynamic IP address (IP address of computers will be assigned by access point automatically. It's recommended for most computers to use dynamic IP address, it will save a lot of time on setting IP addresses for every computer, especially when there are a lot of computers in your network; for servers and network devices which will provide services to other computers and users that come from the Internet, a static IP address should be used.

Suggestions on IP Address numbering plan:

If you have no idea on how to define an IP address plan for your network, here are some suggestions.

1. **A valid IP address has 4 fields: a.b.c.d, for most of home and company users, it's suggested to use 192.168.c.d, where c is an integer between 0 and 254, and d is an integer between 1 and 254. This router is capable to work with up to 253 clients, so you can set 'd' field of IP address of router as 1 or 254 (or any number between 1 and 254), and pick a number between 0 and 254 for field 'c'.**
2. **In most cases, you should use '255.255.255.0' as subnet mask, which allows up to 253 clients (this also meets router's capability of working with up to 253 clients).**
3. **For all servers and network devices which will provide services to other people (like Internet service, print service, and file service), they should use static IP address. Give each of them a unique number between 1 and 253, and maintain a list, so everyone can locate those servers easily.**
4. **For computers which are not dedicated to provide specific service to others, they should use dynamic IP address.**

Please click 'General Setup' at the top of web management interface and click 'Local Network' on the left hand column.
There are two setup groups here: 'LAN IP' and 'DHCP Server'

3-3-1 Local Network

IP address (1):	Please input the IP address of this access point.
Subnet Mask (2):	Please input subnet mask for this network.
Gateway Address (3):	Please input your gateway address for the network.
DNS Server (4):	Please input your DNS Server addresses for the network.
DHCP Server (5):	If you want to activate DHCP server function of this access point, select 'Enabled', or set it to 'Disabled'.

Recommended Value if you don't know what to fill:

IP Address: 192.168.1.241   DNS Server: (leave it blank)
Subnet Mask: 255.255.255.0   DHCP Server: Disabled
Gateway Address: (leave it blank)

3-3-2 DHCP Server:

These settings are only available when 'DHCP Server' in 'LAN IP' section is 'Enabled'.

Lease Time (1):	*Please choose a lease time (the duration that every computer can keep a specific IP address) of every IP address assigned by this access point from dropdown menu.*
Default Gateway (2):	*Please input your default gateway address*
Domain Server IP (3):	*Please input your DNS server address*
Start IP (4):	*Please input the start IP address of the IP range.*
End IP (5):	*Please input the end IP address of the IP range.*
Domain Name (6):	*If you wish, you can also optionally input the domain name for your network. This is optional.*

Recommended Value if you don't know what to fill:
Lease Time: Two Weeks (or 'Forever', if you have less than 20 computers)
Default Gateway: (leave it blank)
Domain Server IP: (leave it blank)
Start IP: 192.168.1.100
End IP: 192.168.1.200
Domain Name: (leave it blank)

NOTE:

1. The number of the last field (mentioned 'd' field) of 'End IP' must be greater than 'Start IP', and can not be the same as router's IP address.

2. The former three fields of IP address of 'Start IP', 'End IP', and 'IP Address of 'LAN IP' section (mentioned 'a', 'b', and 'c' field) should be the same.

3. These settings will affect wireless clients too.

3-4 Wireless Network

If your computer, PDA, game console, or other network devices is equipped with a wireless network adapter, you can use the wireless function of this access point to let them connect to the Internet and share resources with other computers.

Please click 'General Setup' tab at the top of web management interface, and then click 'Wireless Configuration' tab on the left hand column. The following message will be displayed on your web browser:

Wireless

The Hi-Gain™ Wireless 300N Access Point/Bridge has many wireless modes. The settings also support data encryption and client filtering.

Wireless Module :   ● Enable ○ Disable

Settings Saved Successfully!

You may press Go Back button to continue configuring other settings or press APPLY button to restart the system to make the changes take effect.

[Go Back] [Apply]

Please click 'Go Back' to go back to previous setup menu, or click 'Apply' to reboot the access point so the settings will take effect. Please wait 30-60 seconds for the access point to reboot

3-4-1 Basic Wireless Settings

Please click 'General Setup' menu at the top of web management interface, then click '2.4GHz Wireless Configuration' or '5GHz Wireless Configuration' on the left hand column.   Choose 'Basic Settings'.   Next to the Mode option, please select your Mode.

3-4-1-1 Access Point

Standard default mode.   The HD45B will broadcast a WiFi signal for other computers and devices to connect to.   Must be plugged into the router or network after setup.

Basic Settings

This page allows you to define and configure the different wireless modes.

Mode :	AP
Band :	2.4 GHz (B+G+N) **1**
MAIN ESSID :	Hawking_HWABN2_AP **2**
Channel Number :	7 **3**
Associated Clients :	Show Active Clients **4**

Cancel   Apply

Band (1):   *Please select the radio band from one of following options:*

2.4GHz

2.4 GHz (B)   2.4GHz band, only allows 802.11b wireless network clients to
                       connect to this router (maximum transfer rate 11Mbps).

2.4 GHz (N)   2.4GHz band, only allows 802.11n wireless network clients to
                       connect to this router (maximum transfer rate 300Mbps).

2.4 GHz (B+G)   2.4GHz band, only allows 802.11b and 802.11g wireless
                       network clients to connect to this router (maximum transfer
                       rate 11Mbps for 802.11b clients, and maximum 54Mbps for
                       802.11g clients).

2.4 GHz (G)   2.4GHz band, only allows 802.11g wireless network clients to
                       connect to this router (maximum transfer rate 54Mbps).

2.4 GHz (B+G+N)   2.4GHz band, allows 802.11b, 802.11g, and 802.11n wireless
                       network clients to connect to this router (maximum transfer
                       rate 11Mbps for 802.11b clients, maximum 54Mbps for
                       802.11g clients, and maximum 300Mbps for 802.11n clients).

5GHz

5GHz (A):   5GHz band, this mode allows 802.11a wireless network client
                       to connect this router (maximum transfer rate 54Mbps for
                       802.11a clients).

5GHz (N):   5GHz band, this mode allows 802.11n wireless network client
                       to connect this router (maximum transfer rate 450Mbps for
                       802.11n clients).

5GHz (A+N):   5GHz band, this mode allows 802.11a and 802.11n wireless
                       network client to connect this router (maximum transfer rate
                       54Mbps for 802.11a clients, and maximum 450Mbps for
                       802.11n clients).

**NOTE: If you don't have special reason to limit the type of allowed
wireless clients, it's recommended to choose '2.4 GHz (B+G+N) and
5GHz (A+N) to maximize wireless client compatibility.**

ESSID (2): This is the name of wireless access point. You can type any alphanumerical characters here, maximum 32 characters. ESSID is used to identify your own wireless access point from others when there are other wireless access points in the same area.
Default SSID
2.4GHz: Hawking_HD45B_2.4GHz
5GHz: Hawking_HD45B_5GHz
It's recommended to change default ESSID value to the one which is meaningful to you, such as, 'myhome', 'office_room1', etc.

Channel Number (3): Please select a channel from the dropdown list of 'Channel Number', You can choose any channel number you want to use, and almost all wireless clients can locate the channel you're using automatically without any problem. However, it's still useful to remember the channel number you use, as some wireless clients support manual channel number selecting, and this would help in certain scenarios when there are radio communication conflicts.

> **TIP: You can try to change channel number to another one if you think the data transfer rate is too slow. There could be some other wireless routers using the same channel, which will disturb the radio communication between wireless client and the wireless router.**

Associated Clients (4): Click 'Show Active Clients' button, then an "Active Wireless Client Table" will pop up. You can see the status of all active wireless stations that are connecting to the access point.

After you finish these wireless settings, please click 'Apply' button, button, and the following message will be displayed on your web browser:

Settings Saved Successfully!

You may press Go Back button to continue configuring other settings or press APPLY button to restart the system to make the changes take effect.

Go Back   Apply

Please click 'Go Back' to go back to previous setup menu; to continue on access point setup, or click 'Apply' to reboot the access point so the settings will take effect. Please wait 30-60 seconds for the access point to reboot.

3-4-1-2 Station-Infrastructure (Bridge)

The HD45B will allow you connect wired devices wirelessly to an existing wireless router or access point.   It will "bridge" these devices wirelessly with your network. It will not broadcast any WiFi signal.   It will only make a wireless connection between the Access Point and the HD45B.   The HD45B will only connect to either 2.4GHz or a 5GHz network.

Basic Settings

This page allows you to define and configure the different wireless modes.

Mode: Station-Infrastructure

Band: 2.4 GHz (B+G+N) 2

SSID: Hawking_HD45B_2.4GH 3

Site Survey: Select Site Survey 4

Cancel   Apply

Band (2):	*Select the band you want to use. Refer to 3-4-1-1 for definitions.*
SSID (3):	*This is the name of wireless network. You can type the SSID of the network you would like to connect here.*
Site Survey (4):	*When you use this wireless router as a wireless station for Ethernet network device to have wireless capability, you have to associate it with a working access point. Click 'Select Site Survey' button, then a "Wireless Site Survey Table" will pop up. It will list all available access points near by. You can select one access point in the table and it will join wireless LAN through this access point.*

3-4-1-3 AP Bridge-Point to Point

Similar to station-infrastructure, this requires two HD45B's on each end.   This will create a wireless bridge between these two points.   No WiFi signal will be broadcast and it will only make a wireless connection between those two points.

Basic Settings

This page allows you to define and configure the different wireless modes.

Mode : AP Bridge-Point to Point

Band : 2.4 GHz (B+G+N) 2

Channel Number : 7 3

MAC address 1 : 000000000000   4

Set Security : Set Security 5

Cancel   Apply

NOTE: Two HD45B's must use the same mode, band, channel number, and security setting!

Band (2):   *Select the band you want to use, the two HD45B's must use the same setting.   Refer to 3-4-1-1 for definitions.*

Channel Number (3):   *Select the channel you want to use, the two wireless HD45Bs must use the same setting.*

MAC Address (4):   *Input the MAC address of another HD45B*

Security Settings (5): *Click to setting security for this connection (Please go to section '3-4-3 Wireless Security' for detailed instructions).*

3-4-1-4 AP Bridge-Point to Multi-Point

Similar to AP Bridge – Point to Point, this allows you to connect several HD45B's to one point.   No WiFi signal will be broadcast and it will only make a wireless connection between the HD45Bs.

Basic Settings

This page allows you to define and configure the different wireless modes.

Mode : AP Bridge-Point to Multi-Point
Band : 2.4 GHz (B+G+N)   2
Channel Number : 7   3
MAC address 1 : 000000000000
MAC address 2 : 000000000000
MAC address 3 : 000000000000   4
MAC address 4 : 000000000000
Set Security : Set Security   5

Cancel   Apply

Band (2):	*Select the band you want to use, all HD45B's must use the same setting. Refer to 3-4-1-1 for definitions.*
Channel Number (3):	*Select the channel you want to use, all HD45B's must use the same setting*
MAC address 1 to 4:	*Input the MAC address of other HD45Bs.*
Security Settings (8):	*Click to set security settings for this connection (Please go to section '3-4-3 Wireless Security' for detailed instructions).*

3-4-1-5 AP Bridge-WDS

Wireless Distributing System. This allows you to create a wireless network using up to four HD45B's using the same SSID (wireless name). It will broadcast a WiFI signal.

> **NOTE: For WDS mode, the output signal nature is the same as that of normal AP mode.**

Basic Settings

This page allows you to define and configure the different wireless modes.

Mode : AP Bridge-WDS

Band : 2.4 GHz (B+G+N) 2

MAIN ESSID : Hawking_HWABN2_AP 3

Channel Number : 7 4

Associated Clients : Show Active Clients 5

MAC address 1 : 000000000000

MAC address 2 : 000000000000

MAC address 3 : 000000000000 6

MAC address 4 : 000000000000

Set Security : Set Security 7

Cancel   Apply

Band (2):	*Select the band you want to use, all the HD45B's must use the same setting. Refer to 3-4-1-1 for definitions.*
SSID (3):	*Input the SSID of your HD45B's, the setting should be the same with other HD45B's for the convenience of roaming.*
Channel Number (4):	*Select the channel you want to use, all the HD45B's must use the same setting.*
Associated Clients (5):	*Click 'Show Active Clients' button, then an "Active Wireless Client Table" will pop up. You can see the status of all active*

wireless stations that are connecting to the access point.

MAC address *1 to 4 (6):*	*Input the MAC address of other HD45B's*
Security *Setting (7):*	*Click to set security settings for this connection* *(Please go to section '3-4-3 Wireless Security' for detailed* *instructions).*

3-4-2 Advanced Wireless Settings

This access point provides some advanced control of wireless parameters, if you want to configure these settings, please click 'General Setup' at the top of web management interface and click 'Wireless Configuration' on the left hand column. Choose "Advanced Settings'.

Advanced Settings

Advanced wireless settings for your Wireless Network.

Fragment Threshold: 2346 (256-2346) **1**
RTS Threshold: 2347 (0-2347) **2**
Beacon Interval: 100 (20-1024 ms) **3**
DTIM Period: 3 (1-10) **4**
Data Rate: Auto ▾ **5**
N Data Rate: Auto ▾ **6**
Channel Width: ◉ Auto 20/40 MHZ ◯ 20 MHZ **7**
Preamble Type: ◉ Long Preamble ◯ Short Preamble **8**
Broadcast ESSID: ◉ Enable ◯ Disable **9**
WMM: ◯ Enable ◉ Disable **10**
CTS Protect: ◉ Auto ◯ Always ◯ None **11**
Transmit Power: 100 % ▾ **12**

Cancel Apply

Fragment Threshold(1): Set the Fragment threshold of wireless radio. **Do not modify the default value if you do not understand the function, default value is '2346'.**

RTS Threshold(2): Set the RTS threshold of wireless radio. **Do not modify the default value if you do not understand the function, default value is '2347'.**

Beacon Interval(3): Set the beacon interval of wireless radio. **Do not modify the default value if you do not understand the function, default**

65

value is '100'.

DTIM Period(4):	*Set the DTIM period of wireless radio.* **Do not modify the default value if you do not understand the function, default value is '3'.**

Data Rate(5): Set the wireless data transfer rate to a certain value. Since most of wireless devices will negotiate with each other and pick a proper data transfer rate automatically. **It is not necessary to change this value unless you know what will happen after modification.**

N Data Rate(6): Same as above, but only for 802.11n clients.

Channel Width(7): Set channel width of wireless radio. **Do not modify the default value if you do not understand the function, default setting is 'Auto 20/40 MHz'.**

Preamble Type(8): Set the type of preamble, **do not modify the default value if you do not know what it is, default setting is 'Short Preamble'.**

Broadcast ESSID(9): Decide if the wireless access point will broadcast its own ESSID or not. You can hide the ESSID of your wireless access point (set the option to 'Disable'), so only those people who know the ESSID of your wireless access point can connect to the unit.

WMM(10): Wi-Fi MultiMedia (WMM) will enhance the data transfer performance of multimedia contents when they are being transferred over a wireless network. **If you do not understand the function, then it is safe to set this option to 'Enable', however, default value is 'Disable'.**

CTS Protect(11): Enabling this setting will reduce the chance of radio signal collisions between 802.11b and 802.11g/n wireless access points. It is recommended to set this option to 'Auto' or

'Always'. However, if you set to 'None', your wireless access point should be able to function properly.

Transmit Power(12): *You can set the output power of wireless radio. Unless you are using this wireless access point in a large open space, you may not have to set output power to 100%.* ***This will enhance security (malicious / unauthorized users in distance will not be able to reach your wireless access point).***

_____

After you finish these wireless settings, please click 'Apply' button, button, and the following message will be displayed on your web browser:

Settings Saved Successfully!

You may press Go Back button to continue configuring other settings or press APPLY button to restart the system to make the changes take effect.

[Go Back] [Apply]

Please click 'Go Back' to go back to previous setup menu; to continue on access point setup, or click 'Apply' to reboot the access point so the settings will take effect. Please wait 30-60 seconds for the access point to reboot.

3-4-3 Security Settings

It is important to set your wireless security settings properly! If you do not configure a wireless security setting, unauthorized users can use your network and/or obtain valuable data without your consent.

To set wireless security settings, please click 'General Setup' tab at the top of web management interface, then click 'Wireless Configuration' on the left hand column. Choose 'Security Settings'.

Please select an encryption method from the 'Encryption' dropdown menu, there are four options:

Disable	**-Please go to section 3-4-3-1**
WEP	**-Please go to section 3-4-3-2**
WPA	**-Please go to section 3-4-3-3**
WPA Radius	**-Please go to section 3-4-3-4**

3-4-3-1 Disable wireless security

When you select this mode, data encryption is disabled, and every wireless device in proximity will be able to connect your wireless access point if no other security measure is enabled (like MAC address access control - see section 3-4-4, or disable SSID broadcast).

Use this option only when you want to allow any user to use your wireless access point, and you are not concerned about unauthorized access to your files and/or transfers over your network.

3-4-3-2 WEP - Wired Equivalent Privacy

When you select this mode, the wireless access point will use WEP encryption, and the following setup menu will be shown on your web browser:

Key Length (2):   *There are two types of WEP key length: 64-bit and 128-bit. Using '128-bit' is safer than '64-bit', but will reduce some data transfer performance.*

Key Format (3):   *There are two types of key format: ASCII and Hex. When you select a key format, the number of characters of key will be displayed. For example, if you select '64-bit' as key length, and 'Hex' as key format, you'll see the message at the right of 'Key Format' is 'Hex (10 characters), which means the length of WEP key is 10 characters.*

Default Tx Key (4):   *You can set up to four sets of WEP key, and you can decide which key is being used by default here.* **If you don't know which one you should use, select 'Key 1'.**

Encryption Key   *Input WEP key characters here, the number of*
 1 to 4 (5-8):   *characters must be the same as the number displayed at 'Key Format' field. You can use any alphanumerical characters (0-9, a-z, and A-Z) if you select 'ASCII' key format, and if you select 'Hex' as key format, you can use characters 0-9, a-f, and A-F. You must enter at least one encryption key here, and if you entered multiple WEP keys, they should not be*

same with each other.

Enable 802.1x Authentication (9):	*IEEE 802.1x is an authentication protocol. Every user must use a valid account to login to this wireless access point before accessing the wireless LAN. The authentication is processed by a RADIUS server. This mode only authenticates user by IEEE 802.1x, but it does not encryption the data during communication. If there is a RADIUS server in you environment, please enable this function. Check this box and another sub-menu will appear:*
RADIUS Server IP address (10):	*Please input the IP address of RADIUS server here.*
RADIUS Server Port (11):	*Please input the port number of RADIUS server here.*
RADIUS Server Password (12):	*Please input the password here.*

TIPS: Examples of WEP key

       ASCII (5 characters): pilot phone   23561   2Hyux   #@xmL

       ASCII (13 characters): digitalFAMILY 82Jh26xHy3m&n

       Hex (10 characters): 287d2aa732   1152dabc85

       Hex (26 characters): 9284bcda8427c9e036f7abcd84

To improve security level, do not use words that can be found in a dictionary or are easy to remember! Wireless clients will automatically remember the WEP key, so you only have to input the WEP key on wireless client once, and it is suggested that to use a complex WEP key to improve security level.　Once you have chosen a password, write it down and keep it in a secure place.

After you finish WEP setting, please click 'Apply' (13) button and the following message will be displayed on your web browser:

Settings Saved Successfully!

You may press Go Back button to continue configuring other settings or press APPLY button to restart the system to make the changes take effect.

Go Back   Apply

Please click 'Go Back' to go back to previous setup menu, or click 'Apply' to reboot the access point so the settings will take effect.   Please wait 30-60 seconds for the access point to reboot.

3-4-3-3 Wi-Fi Protected Access (WPA):

When you select this mode, the wireless access point will use WPA encryption, and the following setup menu will be shown on your web browser:

Wireless Security   WPA Pre-Shared Key ▼

WPA Unicast Cipher Suite: ○ WPA(TKIP) ○ WPA(AES) ○ WPA2(Mixed) 2
Pre-shared Key Format: Passphrase   ▼   3
Pre-shared Key: 4

Cancel   Apply 5

WPA Unicast	*Please select a type of WPA cipher suite.*
Cipher Suite (2):	*Available options are: WPA (TKIP), WPA2 (AES), and WPA2 Mixed. You can select one of them, but you have to make sure your wireless client support the cipher you selected.*
Pre-shared	*Select the type of pre-shared key, you*
Key Format (3):	*can select Passphrase (8 or more alphanumerical characters, up to 63), or Hex (64 characters of 0-9, and a-f).*
Pre-shared	*Please input the WPA passphrase here.*
Key (4):	***It's not recommended to use a word that can be found in a dictionary due to security reason.***

After you finish WPA Pre-shared key setting, please click 'Apply' button (5) and the following message will be displayed on your web browser:
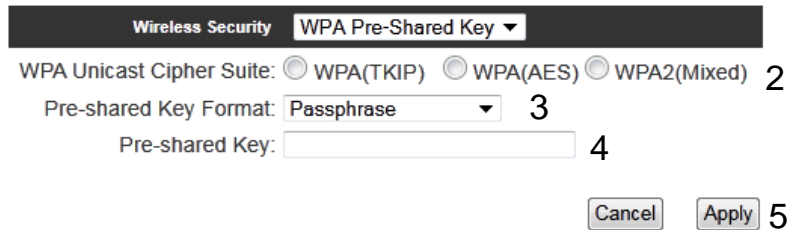
Settings Saved Successfully!

You may press Go Back button to continue configuring other settings or press APPLY button to restart the system to make the changes take effect.

Go Back | Apply

Please click 'Go Back' to go back to previous setup menu, or click 'Apply' to reboot the access point so the settings will take effect. Please wait 30-60 seconds for the access point to reboot.

> **NOTE: Some wireless clients (especially those manufactured before year 2003) only support WEP or WPA (TKIP) cipher. A driver upgrade would be needed for those clients to use WPA and WPA2 encryption.**

3-4-3-4 WPA RADIUS:

If you have a RADIUS server, this access point can work with it and provide safer wireless authentication.

Wireless Security	WPA Radius
WPA Unicast Cipher Suite:	○ WPA(TKIP) ○ WPA(AES) ○ WPA2(Mixed) **2**
RADIUS Server IP Address:	**3**
RADIUS Server Port:	1812 **4**
RADIUS Server Password:	**5**
	Cancel	Apply **6**

WPA Unicast Cipher Suite:	*Please select a type of WPA cipher suite.* *Available options are: WPA (TKIP), WPA2 (AES), and WPA2 Mixed. You can select one of them, but you have to make sure your wireless client support the cipher you selected.*
RADIUS Server IP address (3):	*Please input the IP address of your Radius authentication server here.*

RADIUS Server	*Please input the port number of your*
Port (4):	*Radius authentication server here.*
	Default setting is 1812.
RADIUS Server	*Please input the password of your Radius*
Password (5):	*authentication server here.*

After you finish with all settings, please click 'Apply' (6) button and the following message will be displayed on your web browser:

Settings Saved Successfully!

You may press Go Back button to continue configuring other settings or press APPLY button to restart the system to make the changes take effect.

Go Back   Apply

Please click 'Go Back' to go back to previous setup menu, or click 'Apply' to reboot the access point so the settings will take effect.   Please wait 30-60 seconds for the access point to reboot.

3-4-4 Wireless Access Control

This function will help you prevent unauthorized users from connecting to your wireless access point; only those wireless devices who have a MAC address you assigned can gain access to your wireless access point. Use this function with other security measures described in previous section, to create a safer wireless environment.

You can add up to 20 MAC addresses by using this function. Please click 'General Setup' at the top of web management interface and click 'Wireless Configuration' on the left hand column.   Select 'Access Control'.

All allowed MAC addresses will be displayed in 'MAC Address Filtering Table.

Enable Wireless Access Control (1):	To enforce MAC address filtering, you have to check 'Enable Wireless Access Control'. When this item is unchecked, wireless access point will not enforce MAC address filtering of wireless clients.
MAC Address (2):	Input the MAC address of your wireless devices here, dash

(-) or colon (:) are not required. (i.e. If the MAC address label of your wireless device indicates 'aa-bb-cc-dd-ee-ff' or 'aa:bb:cc:dd:ee:ff', just input 'aabbccddeeff'.

Comment (3):	*You can input any text here as the comment of this MAC address, like 'ROOM 2A Computer' or anything. You can input up to 16 alphanumerical characters here. This is optional and you can leave it blank, however, it's recommended to use this field to write a comment for every MAC addresses as a memory aid.*
Add (4):	*Click 'Apply' button to add the MAC address and associated comment to the MAC address filtering table.*
Clear (5):	*Click 'Clear' to remove the value you inputted in MAC address and comment field.*
Delete Selected (6):	*If you want to delete a specific MAC address entry, check the 'select' box of the MAC address you want to delete, then click 'Delete Selected' button. (You can select more than one MAC addresses).*
Delete All (7):	*If you want to delete all MAC addresses listed here, please click 'Delete All' button.*

After you finish with all settings, please click 'Apply' (8) button and the following message will be displayed on your web browser:

Settings Saved Successfully!

You may press Go Back button to continue configuring other settings or press APPLY button to restart the system to make the changes take effect.

[Go Back] [Apply]

Please click 'Go Back' to go back to previous setup menu, or click 'Apply' to reboot the access point so the settings will take effect. Please wait 30-60 seconds for the access point to reboot.

3-4-5 Wi-Fi Protected Setup (WPS)

Wi-Fi Protected Setup (WPS) is the simplest way to build connection between wireless network clients and this wireless access point. You don't have to select an encryption mode and input a long encryption passphrase every time when you need to set up a wireless client, you only have to press a button on the wireless client and this wireless access point, and the WPS will automatically configure for you.

This wireless access point supports two types of WPS: Push-Button Configuration (PBC), and PIN code. If you want to use PBC, you have to push a specific button on the wireless client to start WPS mode, and switch this wireless access point to WPS mode too. You can push Reset/WPS button of this wireless access point, or click 'Start PBC' button in the web configuration interface to do this; if you want to use PIN code, you have to know the PIN code of wireless client and switch it to WPS mode, then provide the PIN code of the wireless client you wish to connect to this wireless access point. The detailed instructions are listed follow:

Please click 'General Setup' at the top of web management interface and click 'Wireless Configuration' on the left hand column.   Select 'WPS'

Wi-Fi Protected Setup (WPS)

This section allows you to chnage the setting for Wi-Fi Protected Setup (WPS). Wi-Fi Protected Setup can help your wireless client automatically connect to the Hi-Gain™ Dual Band Wireless N Access Point/Bridge.

1 ☑ **Enable WPS**

WPS Information

WPS Status:	Configured
PinCode Self:	**09049949**
SSID:	Hawking_HD45B_5GHz
Authentication Mode:	Disable
Paraphrase Key:	********

2

Device Configure

Config Mode:	Registrar ▾ 3
Configure by Push Button:	Start PBC 4
Configure by Client PinCode:	[ ] Start PIN 5

Enable WPS (1)	*Check this box to enable WPS function, uncheck it to disable WPS.*
WPS Information (2)	*WPS Status: If the wireless security (encryption) function of this wireless access point is properly set, you'll see 'Configured' message here. If wireless security function has not been set, you'll see 'Not configured'.*
	Self PIN code: This is the WPS PIN code of this wireless access point. This code is useful when you need to build wireless connection by WPS with other WPS-enabled wireless devices.
	SSID: The SSID of this wireless access point will be displayed here.
	Authentication Mode: The wireless security authentication mode of this wireless access point will be displayed here. If you do not enable security function of the wireless access point before WPS is activated, the access point will auto set the security to WPA (AES) and generate a set passphrase key for WPS connection.
	Passphrase Key: The wireless security key of the access point will be displayed here.
Config Mode (3)	*There are 'Registrar' and 'Enrollee' modes for the WPS connection. When 'Registrar' is enabled, the wireless clients will follow the access point's wireless settings for WPS connection. When 'Enrolle' mode is enabled, the access point will follow the wireless settings of wireless client for WPS connection.*
Configure by Push Button (4)	*Click 'Start PBC' to start Push-Button style WPS setup procedure. This wireless access point will wait for WPS requests from wireless clients for 2 minutes. The 'WLAN' LED light on the wireless access point will be*

steady for 2 minutes when this wireless access point is waiting for incoming WPS request.

Configure by client PinCode (5)	*Please input the PIN code of the wireless client you wish to connect, and click 'Start PIN' button. The 'WLAN' LED light on the wireless access point will be steady when this wireless access point is waiting for incoming WPS request.*

3-4-6 Security Tips for Wireless Network

Here are some quick tips to help you improve the security level of your wireless network:

1. Never use simple words for your password, such as "password" or "1234567890".

2. A complicated (combination of numbers, alphabets, and even symbols) WEP key and WPA passphrase is more secure than simple and short words. Remember that the wireless client is capable of keeping the key or passphrase for you, so you only have to input the complicated key or passphrase once.   Once you have chosen a password, write it down and keep it in a secure place.

3. You can hide the ESSID of this access point by setting the 'Broadcast ESSID' option to 'Disable'. Your wireless access point will not be found by other people in proximity if they are using the Access Point scanning function of their wireless client, and this can reduce unauthorized access.

4. Use 'Access Control' function, described in section 3-4-4, to allow authorized users access to the wireless access point using their specific MAC address.

Chapter IV Status and Tools

4-1 System Status

The functions described here will provide you with system related information. To enter system status menu, please either click 'Status' link located at top of web management interface.

4-1-1 System information and firmware version

You can use this function to know the system information and firmware version of this access point.

Please click 'Status' tab at the top of web management interface.

Status

The Hi-Gain™ Dual Band Wireless N Access Point/Bridge's status information provides the following information: Hardware/Firmware version, Serial Number, and its current operating status.

System	
Model:	HD45B
Up Time:	0day:3h:47m:21s
Hardware Version:	Rev. A
Boot Code Version:	1.0
Firmware Version:	1.00g

NOTE: Information displayed here may vary.

4-1-2 Local Network

You can use this function to know the status of your access point.

Please click 'Status' menu at the top of web management interface, and then click 'Local Network' on the left hand column.

Local Network

View the current status of the Hi-Gain™ Dual Band Wireless N Access Point/Bridge.

Wireless Network Configuration	
	2.4G
Mode:	Station-Infrastructure
ESSID:	Hawking_HD45B_2.4GHz
Channel Number:	11
Security:	Disable
	5G
Mode:	Station-Infrastructure
ESSID:	Hawking_HD45B_5GHz
Channel Number:	36
Security:	Disable

Local Network Configuration	
IP Address:	192.168.1.241
Subnet Mask:	255.255.255.0
DHCP Server:	Disabled
MAC Address:	80:1f:02:0d:cf:20

NOTE: Information displayed here may vary.

4-1-3 System Log

All important system events are logged. You can use this function to check the event log of your access point.

Please click 'Status' menu at the top of web management interface, and then click 'System Log' on the left hand column.
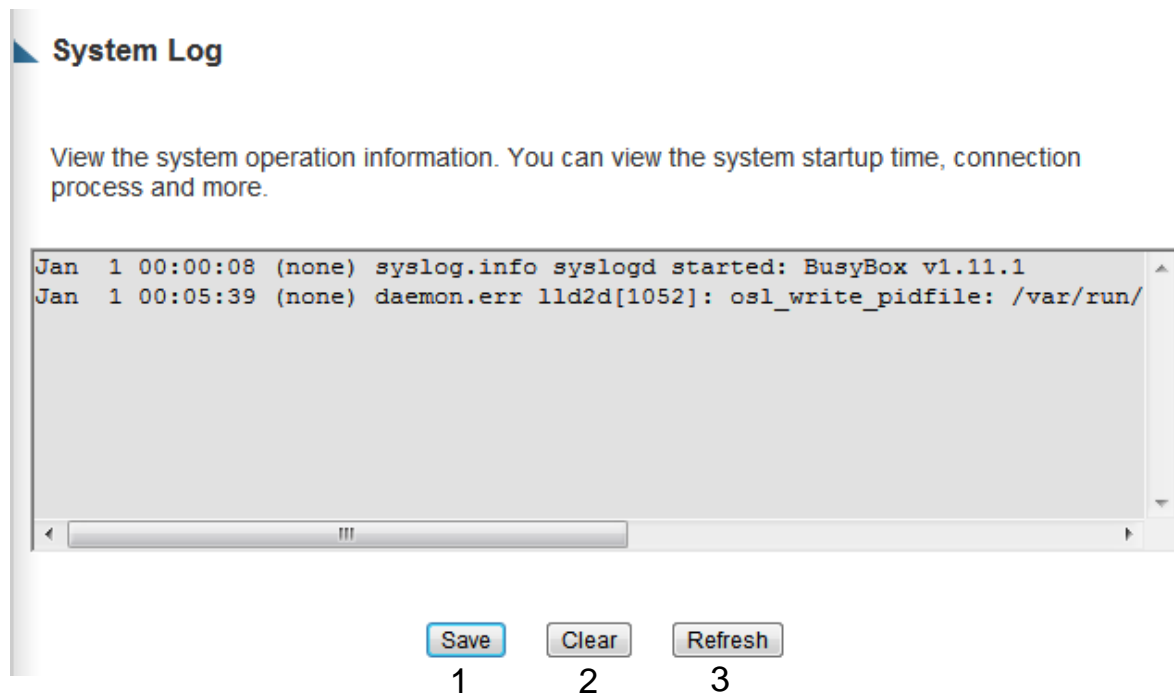
The system events will be displayed in this page, and here are descriptions of every buttons:

Save (1):	*Save current event log to a text file.*
Clear (2):	*Delete all event logs displayed here.*
Refresh (3):	*Refresh the event log display.*

4-1-4 Security Log

All information about network and system security is kept here, and you can use this function to check the security event log of your access point.

Please click 'Status' menu at the top of web management interface, and then click 'Security Log' on the left hand column.
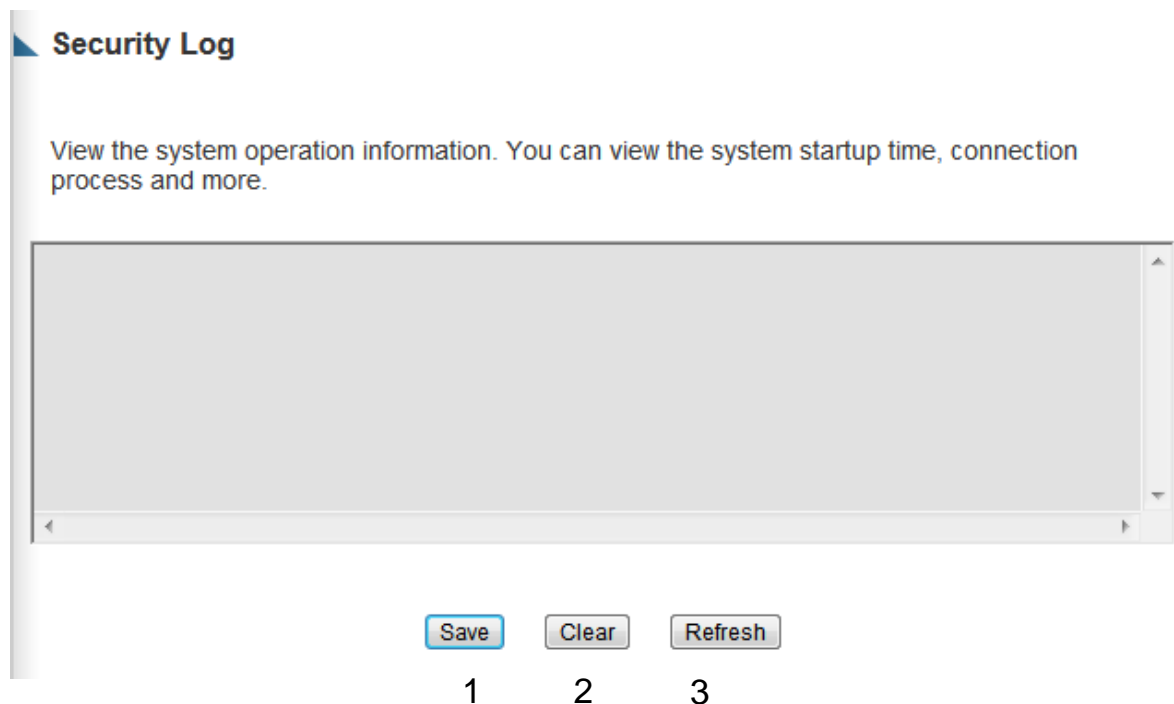
Security Log

View the system operation information. You can view the system startup time, connection process and more.

Save	Clear	Refresh
1	2	3

The system events will be displayed in this page, and here are descriptions of every buttons:

Save (1):	*Save current event log to a text file.*
Clear (2):	*Delete all event logs displayed here.*
Refresh (3):	*Refresh the event log display.*

4-1-5 Active DHCP client list

If you're using the DHCP server function of this access point, you can use this function to check all active DHCP leases issued by this access point.

Please click 'Status' menu at the top of web management interface, and then click 'Active DHCP Client' on the left hand column.

Active DHCP Client

This section shows the assigned IP address, MAC address and time expired for each DHCP leased client.

Wireless Configuration	MAC Address	Time Expired (Second)
None	----	----

Refresh

All information about active DHCP leases issued by this access point will be displayed here. You can click 'Refresh' button to display latest information.

4-1-6 Statistics

You can use this function to check the statistics of wireless, LAN, and WAN interface of this access point.

Please click 'Status' menu at the top of web management interface, and then click 'Statistics' on the left hand column.

Statistics

This section shows the assigned IP address, MAC address and time expired for each DHCP leased client.

2.4GHz Wireless LAN	Packet Sent: 65702
	Packet Received: 224454
5GHz Wireless LAN	Packet Sent: 30
	Packet Received: 12
Ethernet LAN	Packet Sent: 0
	Packet Received: 0

Refresh

You can click 'Refresh' button to display latest information.

4-2 Configuration Tools

You can back up all configurations of this access point to a file, so you can make several copied of access point configuration for security reason.

To backup or restore access point configuration, please follow the instructions:

Please click 'Tools' menu at the top of web management interface, and then click 'Configuration Tools' on the left hand column.

Configuration Tools

Use the "Backup" tool to save the Hi-Gain™ Dual Band Wireless N Access Point/Bridge's current configurations to a file named "config.bin". You can then use the "Restore" tool to restore the saved configuration to the Access Point/Bridge. Alternatively, you can use the "Restore to Factory Default" tool to force the Access Point/Bridge to perform System Reset and restore the original factory settings.

Backup Settings [Save] 1

Restore Settings [_____] [Browse...] [Upload] 2
Restore to Factory Default [Reset] 3

Backup Settings (1):	*Press 'Save...' button, and you'll be prompted to download the configuration as a file, default filename is 'default.bin', you can please save it as another filename for different versions, and keep it in a safe place.*
Restore Settings (2):	*Press 'Browse...' to pick a previously-saved configuration file from your computer, and then click 'Upload' to transfer the configuration file to access point. After the configuration is uploaded, the access point's configuration will be replaced by the file you just uploaded.*
Restore to Factory Default (3):	*Click this button to remove all settings you made, and restore the configuration of this access point back to factory default settings.*

4-3 Firmware Upgrade

The system software used by this access point is known as 'firmware', just like any applications on your computer, when you replace the old application with a new one; your computer will be equipped with new function. You can also use this firmware upgrade function to add new functions to your access point, even fix the bugs of this access point.

To upgrade firmware, please follow the instructions:

Please click 'Tools' menu at the top of web management interface, and then click 'Firmware Upgrade' on the left hand column.

Firmware Upgrade

This tool allows you to upgrade the Hi-Gain™ Dual Band Wireless N Access Point/Bridge's system firmware. Enter the path and name of the upgrade file and then click the APPLY button below. You will be prompted to confirm the upgrade. See below for the Access Point/Bridge's current firmware. You can go to www.hawkingtech.com for the latest firmware files.

The system will automatically reboot the after you finished the firmware upgrade process. If you don't complete the firmware upgrade process in the next step, you have to manually restart the Access Point/Bridge.

Firmware Version: 1.00g

[Next]

Click 'Next' button if you wish to upgrade your firmware.

Firmware Upgrade

This tool allows you to upgrade the Hi-Gain™ Dual Band Wireless N Access Point/Bridge. Enter the path and name of the upgrade file and then click the Apply button below. You will be prompted to confirm the upgrade.

[_____] [Browse...] [Apply]

Click 'Browse' button, and you'll be prompted to provide the filename of the firmware upgrade file. Please download the latest firmware file from the Hawking Technologies website at www.hawkingtech.com, and use it to upgrade your access point.

After a firmware upgrade file is selected, click 'Apply' button, and the access point will start firmware upgrade procedure automatically. The procedure may take several minutes, please be patient.

NOTE: Never interrupt the upgrade procedure by closing the web browser or physically disconnect your computer from router. If the firmware you uploaded is corrupt, the firmware upgrade will fail, and you may have to return this router to the dealer of purchase to ask for help. Warranty is void if you interrupt the upgrade procedure.

4-4 System Reset

If you think your network performance is bad or you find the behavior of the access point is strange, you can perform a access point reset. Sometimes it will solve the problem.

Please click 'Tools' menu at the top of web management interface, and then click 'Reset' on the left hand column.

Reset and Reboot

In the event that the system stops responding correctly or stops functioning, you can perform a Reboot. Your settings will not be changed. To perform the reboot, click on the Reboot button below. You will be asked to confirm your decision. The Reboot will be complete when the LED Power light stops blinking.

Reboot: Reboot

If resetting the Access Point/Bridge does not work you may attempt to reset the Access Point/Bridge back to factory default settings. Note that all your current settings will be erased.

Reset to Factory Default Setting: Reset

Please click 'Apply' to reset your access point, and it will be available again after a few minutes, please be patient.

Chapter V: Appendix

5-1 Hardware Specification

SOC+RF: Ralink RT3883 (CPU+5GHz) + RT3092 (2.4GHz)

Gigabit Switch: Realtek RTL8367R

Flash: 8MB Parallel Flash

RAM: 64MB DDR2 RAM

LAN Ports: 10/100/1000M (Auto-MDI/MDI-X) UTP Port x 5

MIMO Technology:　5GHz: 3T3R MIMO, 2.4GHz: 2T2R MIMO

Antenna: 3dBi Dual Band Fixed Dipole Antenna x 3 (3T3Rfor 5GHz and 2T2R for 2.4GHz)

Output Power:

2.4GHz

11b(11Mbps): 18±1.5dBm

11g(54Mbps): 17±1.5dBm

11n(20MHz, MCS15): 17±1.5dBm

11n(40MHz, MCS15): 16±1.5dBm

5GHz

11a(54Mbps): 15±1.5dBm

11n(20MHz, MCS23): 14±1.5dBm

11n(40MHz, MCS23): 14±1.5dBm

Receive Sensitivity:

2.4GHz

11b(11Mbps): -86dBm±2dBm

11g(54Mbps): -72dBm±2dBm

11n(20MHz, MCS15): -66dBm±2dBm

11n(40MHz, MCS15): -63dBm±2dBm

5GHz

11a(54Mbps): -72dBm±2dBm

11n(20MHz, MCS23): -66dBm±2dBm

11n(40MHz, MCS23): -63dBm±2dBm

Power: 12V, 1.25A Switch Power Adapter

Dimension: 32(H) x 180(W) x 118(D) mm

Temperature Operating: 0~40C, Storage: -20~60C

Humidity Operating: Operating: 10~90% (Non Condensing), Storage: Max.95% (Non Condensing)

5-2 Troubleshooting

If you find that the access point is working improperly or stops responding, check some of the FAQs below.   You can also contact our support by email or phone.

Scenario	Solution
Access point is not responding to me when I want to access it by web browser	a. Please check the connection of power cords and network cables of this access point. All cords and cables should be correctly and firmly inserted into the access point. b. If all LEDs on this access point are off, please check the status of A/C power adapter, and make sure it's correctly powered. c. You must use the same IP address section which access point uses. d. Are you using MAC or IP address filter? Try to connect the access point by another computer and see if it works; if not, please restore your access point to factory default settings (pressing 'reset' button for over 10 seconds). e. Set your computer to obtain an IP address automatically (DHCP), and see if your computer can get an IP address. f. If you did a firmware upgrade and this happens, contact your dealer of purchase for help. g. If all above solutions don't work, contact the dealer of purchase for help.
I can't locate my access point by my wireless client	a. 'Broadcast ESSID' set to off? b. All three antennas are properly secured. c. Are you too far from your access point? Try to get closer. d. Please remember that you have to input ESSID on your wireless client manually, if ESSID broadcast is disabled.
File download is very slow or breaks frequently	a. Are you using QoS function? Try to disable it and try again. b. Internet is slow sometimes, be patient. c. Try to reset the access point and see if it's better

	after that.
	d. Try to know what computers do on your local network. If someone's transferring big files, other people will think Internet is really slow.
	e. If this has never happened before, call your Internet service provider to know if there is something wrong with their network.
I can't log onto web management interface: password is wrong	a. Make sure you're connecting to the correct IP address of the access point!
	b. Password is case-sensitive. Make sure the 'Caps Lock' light is not illuminated.
	c. If you really forgot the password, do a hard reset.
Access point becomes hot	a. This is not a malfunction, as long as it is not so hot that you cannot touch it for a prolonged period of time
	b. If you smell something wrong or see smoke coming out from access point or A/C power adapter, please disconnect the access point and A/C power adapter from utility power (make sure it's safe before you're doing this!), and call your dealer of purchase for help.
The date and time of all event logs are wrong	a. Adjust the internal clock of access point.

5-3 Glossary

Default Gateway (Access point): Every non-access point IP device needs to configure a default gateway's IP address. When the device sends out an IP packet, if the destination is not on the same network, the device has to send the packet to its default gateway, which will then send it out towards the destination.

DHCP: Dynamic Host Configuration Protocol. This protocol automatically gives every computer on your home network an IP address.

DNS Server IP Address: DNS stands for Domain Name System, which allows Internet servers to have a domain name (such as www.Broadbandaccess point.com) and one or more IP addresses (such as 192.34.45.8). A DNS server keeps a database of Internet servers and their respective domain names and IP addresses, so that when a domain name is requested (as in typing "Broadbandaccess point.com" into your Internet browser), the user is sent to the proper IP address. The DNS server IP address used by the computers on your home network is the location of the DNS server your ISP has assigned to you.

DSL Modem: DSL stands for Digital Subscriber Line. A DSL modem uses your existing phone lines to transmit data at high speeds.

Ethernet: A standard for computer networks. Ethernet networks are connected by special cables and hubs, and move data around at up to 10/100 million bits per second (Mbps).

Idle Timeout: Idle Timeout is designed so that after there is no traffic to the Internet for a pre-configured amount of time, the connection will automatically be disconnected.

IP Address and Network (Subnet) Mask: IP stands for Internet Protocol. An IP address consists of a series of four numbers separated by periods, which identifies a single, unique Internet computer host in an IP network. Example: 192.168.1.254. It consists of 2 portions: the IP network address, and the host identifier.

The IP address is a 32-bit binary pattern, which can be represented as four cascaded decimal numbers separated by ".": aaa.aaa.aaa.aaa, where each "aaa" can be anything from 000 to 255, or as four cascaded binary numbers separated by ".": bbbbbbbb.bbbbbbbb.bbbbbbbb.bbbbbbbb, where each "b" can either be 0 or 1. A network mask is also a 32-bit binary pattern, and consists of consecutive leading

1's followed by consecutive trailing 0's, such as 11111111.11111111.11111111.00000000. Therefore sometimes a network mask can also be described simply as "x" number of leading 1's.

When both are represented side by side in their binary forms, all bits in the IP address that correspond to 1's in the network mask become part of the IP network address, and the remaining bits correspond to the host ID.

For example, if the IP address for a device is, in its binary form, 11011001.10110000.10010000.00000111, and if its network mask is, 11111111.11111111.11110000.00000000
It means the device's network address is 11011001.10110000.10010000.00000000, and its host ID is, 00000000.00000000.00000000.00000111. This is a convenient and efficient method for access points to route IP packets to their destination.

ISP Gateway Address: (see ISP for definition). The ISP Gateway Address is an IP address for the Internet access point located at the ISP's office.

ISP: Internet Service Provider. An ISP is a business that provides connectivity to the Internet for individuals and other businesses or organizations.

LAN: Local Area Network. A LAN is a group of computers and devices connected together in a relatively small area (such as a house or an office). Your home network is considered a LAN.

MAC Address: MAC stands for Media Access Control. A MAC address is the hardware address of a device connected to a network. The MAC address is a unique identifier for a device with an Ethernet interface. It is comprised of two parts: 3 bytes of data that corresponds to the Manufacturer ID (unique for each manufacturer), plus 3 bytes that are often used as the product's serial number.

NAT: Network Address Translation. This process allows all of the computers on your home network to use one IP address. Using the broadband access point's NAT capability, you can access the Internet from any computer on your home network without having to purchase more IP addresses from your ISP.

Port: Network Clients (LAN PC) uses port numbers to distinguish one network application/protocol over another. Below is a list of common applications and protocol/port numbers:

Application	Protocol	Port Number
Telnet	TCP	23
FTP	TCP	21
SMTP	TCP	25
POP3	TCP	110
H.323	TCP	1720
SNMP	UCP	161
SNMP Trap	UDP	162
HTTP	TCP	80
PPTP	TCP	1723
PC Anywhere	TCP	5631
PC Anywhere	UDP	5632

PPPoE: Point-to-Point Protocol over Ethernet. Point-to-Point Protocol is a secure data transmission method originally created for dial-up connections; PPPoE is for Ethernet connections. PPPoE relies on two widely accepted standards, Ethernet and the Point-to-Point Protocol. It is a communications protocol for transmitting information over Ethernet between different manufacturers

Protocol: A protocol is a set of rules for interaction agreed upon between multiple parties so that when they interface with each other based on such a protocol, the interpretation of their behavior is well defined and can be made objectively, without confusion or misunderstanding.

Access point: A access point is an intelligent network device that forwards packets between different networks based on network layer address information such as IP addresses.

Subnet Mask: A subnet mask, which may be a part of the TCP/IP information provided by your ISP, is a set of four numbers (e.g. 255.255.255.0) configured like an IP address. It is used to create IP address numbers used only within a particular network (as opposed to valid IP address numbers recognized by the Internet, which must be assigned by InterNIC).

TCP/IP, UDP: Transmission Control Protocol/Internet Protocol (TCP/IP) and

Unreliable Datagram Protocol (UDP). TCP/IP is the standard protocol for data transmission over the Internet. Both TCP and UDP are transport layer protocol. TCP performs proper error detection and error recovery, and thus is reliable. UDP on the other hand is not reliable. They both run on top of the IP (Internet Protocol), a network layer protocol.

WAN: Wide Area Network. A network that connects computers located in geographically separate areas (e.g. different buildings, cities, countries). The Internet is a wide area network.

Web-based management Graphical User Interface (GUI): Many devices support a graphical user interface that is based on the web browser. This means the user can use the familiar Netscape or Microsoft Internet Explorer to Control/configure or monitor the device being managed.