

AP900 User's Guide

REV 1.2

1.0 Introduction

This document is the user manual for the 5-in-1 High Gain Wireless-G Mini Access Point product.

1. Quick Start

The default IP address of the 5-in-1 is **192.168.0.10**. The login is “**admin**” and password is “**password**”.

1. Connect an antenna to the SMA connector closer to the LEDs. Note that there are two SMA connectors on the board. The SMA connector closer to the LEDs is required. It is optional to connect an antenna to the other connector
2. Connect the 5-in-1 to a PC using an ethernet cable.
3. Plug in the 5V power supply.
4. Make sure the PC has a IP address on the 192.168.0.xxx subnet, such as 192.168.0.100.
5. Open your web browser and navigate to 192.168.0.10.
6. Type “admin” for the login field and “password” for the password.
7. The default out-of-box operating mode is Access Point (AP) mode. To switch to Repeater, P2P, PMP or Client mode, go to the Mode page and select the desired mode. Click Apply. The board will reboot into the desired mode.
8. After the board reboots, go to the Mode page and click Setup. Configure the applicable properties for that mode, such as security, SSID, channel, etc.
9. The 5-in-1 should now be ready to use.

3. Operating Modes

This section provides an overview of the All-into-1 operating mode.

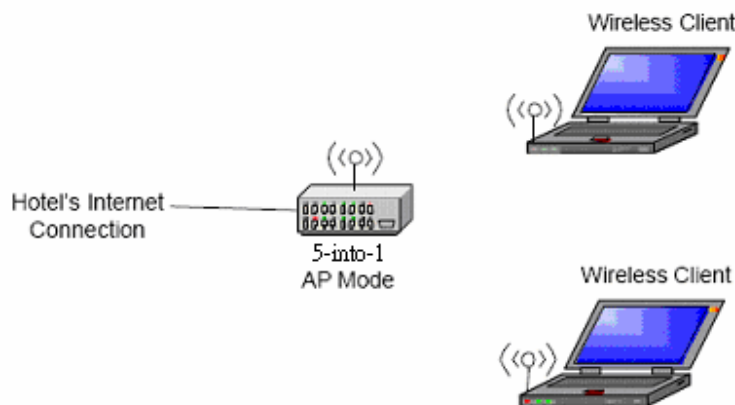
3.1 Introduction to Operating Modes

3.1.1 Traveler's AP Mode

By default, the out-of-box operational mode is Access Point (AP) Mode (or Traveler's AP Mode). When the system is reset to the default manufacturing settings, the operating mode reverts to AP Mode. In AP Mode, the system functions as a standard AP, where wireless clients connected to the AP can then connect to other wireless clients or to the wired network. For example, when traveling to a hotel that has high-speed internet access, the user can connect to the Internet through the AP which is connected to an Ethernet cable in the room (see [Figure 1](#)).

The 5-into-1 AP acts only as a ISO Layer 2 bridge and does not act as a DHCP server. Therefore, it does not supply dynamic IP addresses and relies instead on the network to supply them.

Figure 1: AP Mode



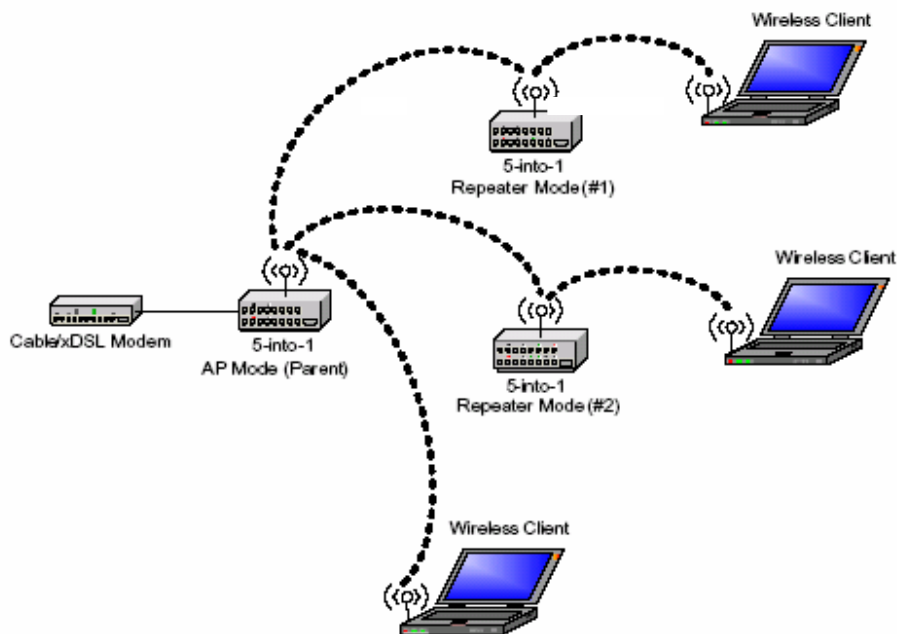
3.1.2 Repeater Mode

A repeater is placed between an AP and a client to extend the distance between the two WLAN devices. Functioning as a repeater, the 5-into-1 connects to both a client card as an AP and to another AP. Two repeater modes are available in the All-into-1:

- WDS Repeater:
WDS Repeaters connect as APs to other APs using the WDS link and MAC address to identify one another.
- Universal Repeater:
Universal Repeaters connect as child clients to parent APs using the SSID to connect.

Figure 2 shows an example of a Repeater network with two 5-into-1 Repeaters connected to a 5-into-1 AP, with each Repeater allowing wireless clients to associate.

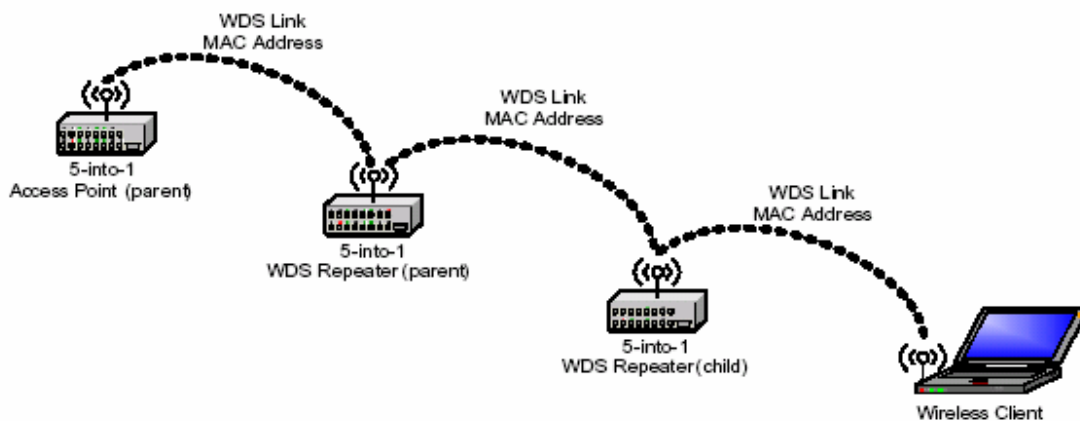
Figure 2: Repeater Mode



3.1.2.1 WDS Repeaters

Wireless Distribution System (WDS) functionality is an industry standard wireless AP mode (repeater) that enables wireless bridging in which WDS APs communicate with one another using a WDS link. In typical repeater applications, APs connecting to other APs equipped with WDS functionality must also support WDS. Typically, repeaters will not function properly with other APs that are not equipped with WDS. [Figure 3](#) shows an example of a WDS Repeater network with 5-into-1 Repeaters in Parent/Child configurations with other Repeaters.

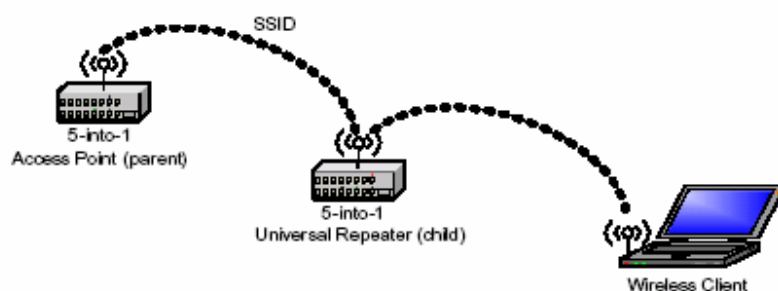
Figure 3: WDS Repeater Mode (Parent/Parent MAC Addresses)



3.1.2.2 Universal Repeaters

When configured as a Universal Repeater, the 5-into-1 allows connectivity to APs that are not equipped with WDS. [Figure 4](#) shows an example of a WDS Repeater network.

Figure 4: Universal Repeater Mode (Parent/Child SSID)



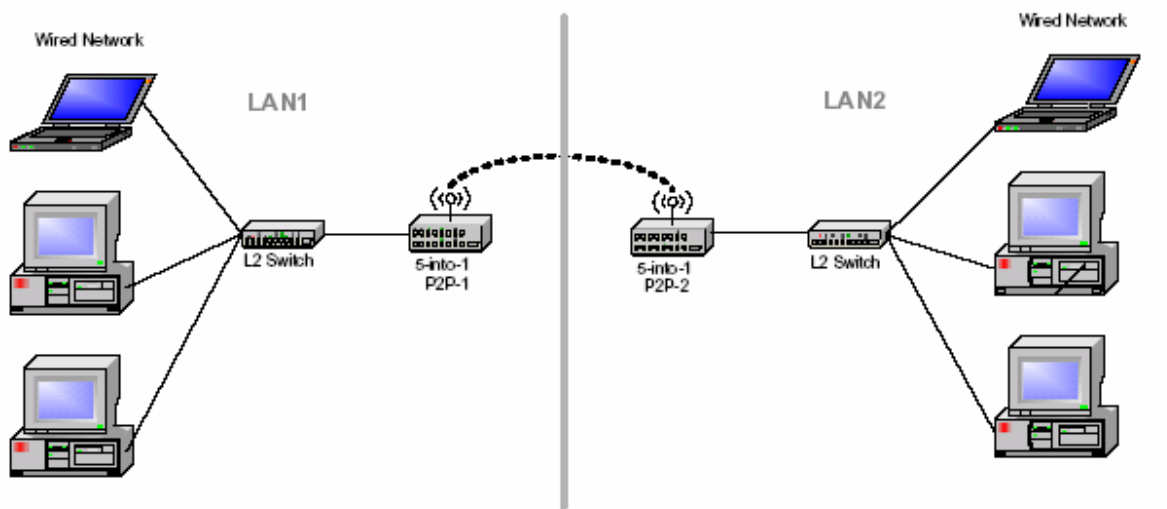
3.1.3 Point-to-Point (P2P) Mode

Two 5-into-1 devices, each in Point-to-Point (P2P) Mode, establish a wireless connection between two wired networks, as shown in [Figure 5](#). The two 5-into-1 devices operating in P2P Mode do not allow client associations.

To configure the 5-into-1 devices to establish a P2P wireless bridge, ensure the following:

1. Enter the MAC address of P2P-2 device in the P2P MAC address field in the P2P-1 device.
2. Enter the MAC address of P2P-1 device in the P2P MAC address field in the P2P-2 device.

Figure 5: P2P Mode (Wireless Bridge)

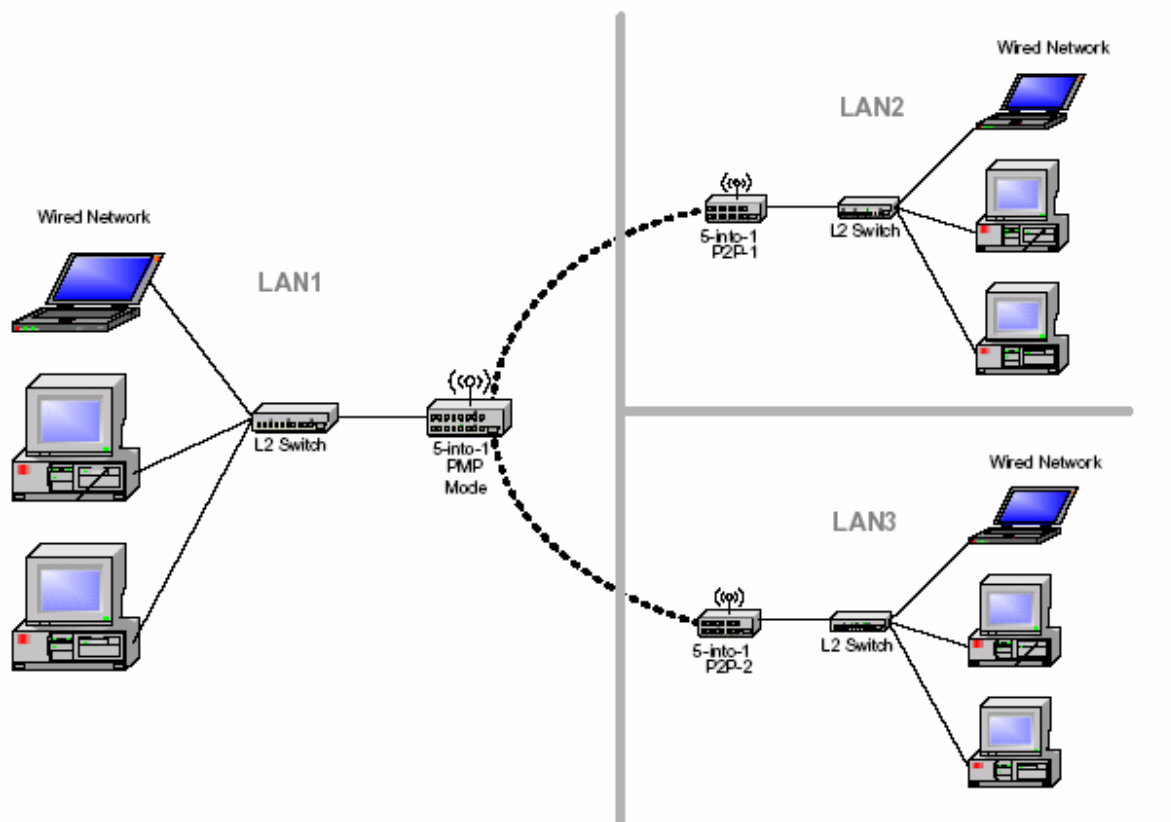


3.1.4 Point-to-Multipoint (PMP) Mode

An 5-into-1 device operating in Point-to-Multipoint (PMP) Mode wirelessly connects two or more wired networks, as shown in [Figure 6](#). The root 5-into-1 device (LAN1) operates in PMP Mode, while the other 5-into-1 devices (LAN2, LAN3) must operate in P2P Mode.

When operating in PMP Mode, the 5-into-1 device does not allow client associations. The user must enter the MAC addresses (up to six) of each P2P device into the PMP system table of Remote AP MAC addresses.

Figure 6: PMP Mode (Wireless Bridge)



3.1.5 Client Mode

When set to Client Mode, the 5-into-1 device associates with an AP within its range.

Figure 7 shows the Client Mode 5-into-1 operating as a wireless client in infrastructure mode.

Figure 8 shows the Client Mode 5-into-1 joined with another Client Mode 5-into-1 device in an Ad-Hoc network.

The Client behaves like a normal wireless client.

Figure 7: Client in Infrastructure Mode

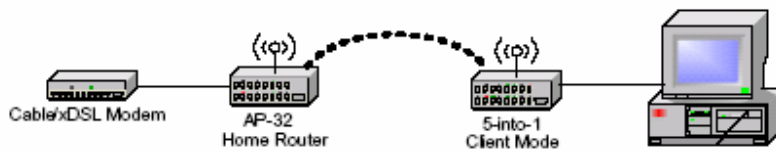


Figure 8: Client in Ad-Hoc Mode



4. Wireless Security Support

The 5-into-1 supports wireless encryption as shown in [Table1](#).

Table 1: Wireless Security

Mode	WEP	WPA-PSK	WPA2	WPA/WPA2 Mixed
AP	Yes	Yes	Yes	Yes
Repeater (WDS)	Yes	No	No	No
Repeater (Universal)	Yes	Yes	No	No
P2P	Yes	No	No	No
PMP	Yes	No	No	No
Client (Infrastructure)	Yes	Yes	No	No
Client (Ad-Hoc)	Yes	No	No	No

5. Mode Selection

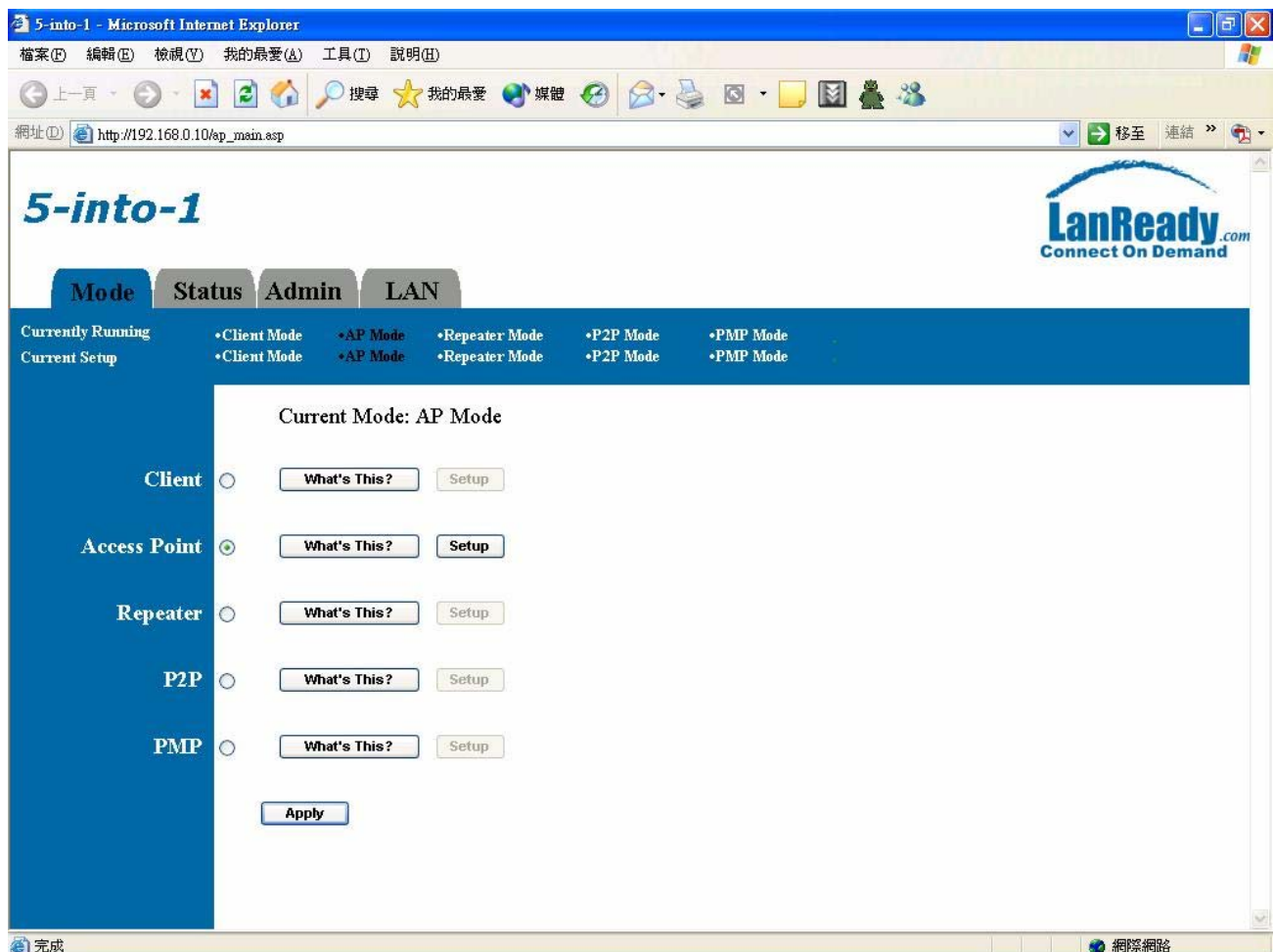
The first step in using the 5-into-1 is selecting the operating mode. The default operating mode is AP Mode.

To view the web page for the device, open a web browser and enter 192.168.0.10 (default IP address of the device) as the URL. The default username is “admin” and the default password is “password.” Figure 9 shows the page displayed once logged in.

To select a mode, click the Mode tab. Click the radio button next to the desired mode and click the Apply button. The device will reboot in the selected mode. After the board reboots, click the Setup button to begin configuring the device.

The “What’s This?” button opens a popup window with a brief description of each mode.

Figure 9: Mode Page



6. AP Setup

6.1 Basic Setup

To configure the 5-into-1 in AP Mode, select AP from the Mode page (Figure 9), allow the board to reboot, and click the AP: Setup button. Figure 10 and Table 2 show the basic AP Mode setup options.

Figure 10: AP Setup Page

5-into-1: AP - Microsoft Internet Explorer

檔案(F) 編輯(E) 檢視(V) 我的最愛(A) 工具(T) 說明(H)

網址(D) http://192.168.0.10/ap.asp

5-into-1

LanReady.com
Connect On Demand

Mode Status Admin LAN

Currently Running
Current Setup

•Client Mode •AP Mode •Repeater Mode •P2P Mode •PMP Mode
•Client Mode •AP Mode •Repeater Mode •P2P Mode •PMP Mode

MODE ☐ 802.11b ☐ 802.11g ☒ Mixed

SSID

AutoLink ☒ Disable ☐ Enable

Boost Mode ☒ Disable ☐ Enable

Broadcast SSID ☐ Disable ☒ Enable

Channel

Security ☐ Disable ☒ WEP ☐ WPA ☐ WPA2 ☐ WPA & WPA2 Mixed Mode

Advanced Settings

Access Filter

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Table 2:

Field	Description
Mode	Selects 802.11g/b mode: 802.11g only, 802.11b only, or Mixed
SSID	Wireless Network Name
AutoLink	When AutoLink is enabled, the configuration utility automatically patches the MAC Address to the SSID. This enables the client card to generate a profile of the AP connected to with AutoLink. To change the SSID, uncheck the AutoLink radio button and change the SSID. Then, recheck the AutoLink radio button to continue.
Boost Mode	When used with Marvell client cards, Boost Mode enhances throughput an additional 30% at 54 Mbps, and extends the additional throughput at 2x the original 54 Mbps range. The result is a relative throughput improvement of up to 300 feet.
SSID Broadcast	Enable/disable the SSID broadcast feature.
Channel	Selects the channel
Security	Select Disable, WEP, WPA, WPA2, WPA/WPA2 Mixed mode security. Select the option, and click the Setup button. Default: Disable Security.
Advanced Settings	Click Setup to configure advanced settings.
Access Filter	Click Setup to configure the access filter

6.2 Security Setup

To enable security, select the desired security mode (WEP or WPA) from the AP setup page and click Setup to enter the keys.

Figure 11: WEP Configuration

AP: WEP - Microsoft Internet Explorer

WEP

Authentication Type: ☒ Open ☐ Shared Key

WEP Length: ☒ WEP-64 ☐ WEP-128

Mode: ☒ HEX ☐ ASCII

Passphrase:

Key 1:

Key 2:

Key 3:

Key 4:

Default TX Key: ☒ Key 1 ☐ Key 2 ☐ Key 3 ☐ Key 4

The following tables describe the security setup options in more detail.

Table 3: AP Mode — WEP Configuration

Field	Description
Authentication Type	Choose Open or Shared Key
WEP Length	Select WEP encryption key length: 64 bits or 128 bits.
Mode	Selects the WEP key format, ASCII or Hex
Passphrase	Passphrase used to generate the WEP keys. Click the Generate button to generate the keys. Click the Clear button to clear the Passphrase field.
Key 1-4	WEP keys. Entered in the format specified by the WEP Length and Mode fields.
Default Tx key	Select default WEP key from Keys 1-4.

Figure 11: WPA Configuration

AP: WPA - Microsoft Internet Explorer

WPA

WPA Data Encryption: TKIP

Authentication Method: ☒ PSK (Pre-Shared keys) ☐ 802.1X

WPA Passphrase: ***** Clear

Group Re-Key Time (seconds): 86400

Apply Close

Table 4: AP Mode — WPA Configuration

Field	Description
WPA Data Encryption	Select AES or TKIP.
Authentication Method	Select Pre-Shared Key (PSK) or 802.1X.
WPA Passphrase	WPA key provided by the user. Click the Clear button to clear the Passphrase field
Group Re-Key Time	Group Re-Key interval (seconds)

Figure 12: WPA2 Configuration

AP: WPA - Microsoft Internet Explorer

WPA2

WPA2 Data Encryption: AES

Authentication Method: ☒ PSK (Pre-Shared keys) ☐ 802.1X

WPA2 Passphrase: ***** Clear

Group Re-Key Time (seconds): 86400

Apply Close

Table 5: AP Mode — WPA2 Configuration

Field	Description
WPA2 Data Encryption	Select AES.
Authentication Method	Select Pre-Shared Key (PSK) or 802.1X.
WPA2 Passphrase	WPA2 key provided by the user. Click the Clear button to clear the Passphrase field
Group Re-Key Time	Group Re-Key interval (seconds)

Figure 13: WPA/WPA2 Mixed Configuration

Table 6: AP Mode — WPA/WPA2 Mixed Configuration

Field	Description
WPA Data Encryption	Select AES or TKIP.
WPA2 Data Encryption	Select AES.
Authentication Method	Select Pre-Shared Key (PSK) or 802.1X.
WPA Passphrase	WPA key provided by the user. Click the Clear button to clear the Passphrase field
WPA2 Passphrase	WPA2 key provided by the user. Click the Clear button to clear the Passphrase field
Group Re-Key Time	Group Re-Key interval (seconds)

6.3 Advanced Settings

Access the Advanced Settings page by clicking the Advanced Settings: Setup button from the AP Mode setup page (Figure 10). The Advanced Settings page allows configuration of advanced Radio settings and range extension of the 5-into-1 in AP Mode by linking it to up to two repeaters. See Figure 14 and Table 7.

Figure 14: Advanced Settings

AP: Advanced Settings - Microsoft Internet Explorer

Beacon Interval 100 (msec, range: 20~1000, default: 100)

RTS Threshold 2347 (range: 256~2347, default: 2347)

DTIM Interval 2 (range: 1~255, default: 2)

Protection Mode ☒ Disable ☐ Enable

Transmit Rate Auto

Preamble Type ☐ Short ☒ Long ☐ Auto

Connect Repeater ☐ Disable ☒ Enable

Repeater MAC Address 00:01:03:15:17:50

Repeater MAC Address 00:00:00:00:00:00

Apply Close

The following table describes the setup options in detail.

Table 7: AP Advanced Settings

Field	Description
Beacon Interval	Beacon interval (in milliseconds)
RTS Threshold	RTS threshold (Bytes)
DTIM Interval	DTIM interval
Protection Mode	Allows user to force 802.11g protection (RTS/CTS) mode off.
Transmit Rate	Selects the transmit rate: Auto or a fixed rate
Preamble Type	Selects short preamble, long preamble, or Auto
Connect Repeater	Enable/Disable the use of a Repeater (WDS Repeater mode only).

Repeater MAC Address	MAC address for each Repeater. Up to two Repeaters may be connected.
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6.3.1 Connect Repeater

Up to two Repeaters may be connected. If a Repeater is used with the AP:

1. Go to the Advanced Settings page.
2. Select Enable for the "Connect Repeater" field.
3. Enter the MAC address for each Repeater in the "Repeater MAC Address" field.

6.4 Access Filter

Click the Access Filter: Setup button from the AP Mode setup page (Figure 10) to access the Access Filter page. The Access Filter page allows the user to configure the AP to allow or deny association to itself based on the MAC address of the client. Up to 32 MAC addresses can be added to the list. Figure 15 and Table 8 detail the options.

Figure 15: Access Filter

AP: MAC Filter Settings - Microsoft Internet Explorer

MAC Filtering

Filter Mode

Filter List

☐ Enable ☒ Disable

☒ Only **deny** PCs with MAC listed below to access this device
☐ Only **allow** PCs with MAC listed below to access this device

1	00:00:00:00:00:00	17	00:00:00:00:00:00
2	00:00:00:00:00:00	18	00:00:00:00:00:00
3	00:00:00:00:00:00	19	00:00:00:00:00:00
4	00:00:00:00:00:00	20	00:00:00:00:00:00
5	00:00:00:00:00:00	21	00:00:00:00:00:00
6	00:00:00:00:00:00	22	00:00:00:00:00:00
7	00:00:00:00:00:00	23	00:00:00:00:00:00
8	00:00:00:00:00:00	24	00:00:00:00:00:00
9	00:00:00:00:00:00	25	00:00:00:00:00:00
10	00:00:00:00:00:00	26	00:00:00:00:00:00
11	00:00:00:00:00:00	27	00:00:00:00:00:00
12	00:00:00:00:00:00	28	00:00:00:00:00:00
13	00:00:00:00:00:00	29	00:00:00:00:00:00
14	00:00:00:00:00:00	30	00:00:00:00:00:00
15	00:00:00:00:00:00	31	00:00:00:00:00:00
16	00:00:00:00:00:00	32	00:00:00:00:00:00

Apply

Close

Settings

The following table describes the setup options in detail.

Table 8: AP Access Filter Settings

Field	Description
MAC filtering	Enables/Disables MAC filtering mode
Filter Mode	Provides the option to allow or deny clients with MAC addresses listed
Filter List	Up to 32 MAC addresses can be listed.
MAC addresses	List of MAC addresses to filter

7. Repeater Setup

To configure the 5-into-1 in Repeater Mode, select Repeater from the Mode page (Figure 9), allow the board to reboot, and click the Repeater: Setup button. Figure 16 and Table 9 show the Repeater Mode setup options.

- To select a Repeater Mode, choose WDS Repeater or Universal Repeater in the Repeater Type field.
- To set up a WDS Repeater, enter the MAC address of the Parent AP/Router (to be connected to the Repeater) in the Parent MAC Address field. To link an additional repeater, check the Enable Linked Repeater Repeater box and enter the MAC address of the additional repeater in the field provided.
- To set up a Universal Repeater, enter the SSID of the Parent AP in the Parent SSID field.

7.1 WDS Repeater

WDS is a wireless AP mode (repeater) that enables wireless bridging where WDS APs communicate with one another. APs connecting to other APs equipped with industry standard WDS functionality must also support WDS.

Figure 16: WDS Repeater Mode Setup

5-into-1: Repeater - Microsoft Internet Explorer

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地址(D) http://192.168.0.10/repeater.asp

5-into-1

LanReady.com
Connect On Demand

Mode Status Admin LAN

Currently Running
Current Setup

•Client Mode •AP Mode •Repeater Mode •P2P Mode •PMP Mode
•Client Mode •AP Mode •Repeater Mode •P2P Mode •PMP Mode

NOTE Please note that all repeater settings are duplicated from Access Point settings. If you need to make changes please do so below. If these changes are applied, they will also be duplicated when you choose to activate the Access Point.

Repeater Type WDS Repeater What's This?

Parent SSID

Channel Channel 9

Parent MAC Address 00:01:03:15:17:50

☐ Enable Linked Repeater 00:00:00:00:00:00

MODE ☐ 802.11b ☐ 802.11g ☒ Mixed

SSID ap900-27

AutoLink ☒ Disable ☐ Enable

Broadcast SSID ☐ Disable ☒ Enable

Security ☐ Disable ☒ WEP ☐ WPA Setup

Advanced Settings Setup

Access Filter Setup

Apply Cancel

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7.2 Universal Repeater

Universal Repeaters allow connectivity to APs that are not equipped with WDS.

Figure 17: Universal Repeater Mode Setup

5-into-1 Repeater - Microsoft Internet Explorer

http://192.168.0.10/repeater.asp

5-into-1 LanReady.com Connect On Demand

Mode Status Admin LAN

Currently Running
Current Setup

•Client Mode	•AP Mode	•Repeater Mode	•P2P Mode	•PMP Mode
•Client Mode	•AP Mode	•Repeater Mode	•P2P Mode	•PMP Mode

NOTE
Please note that all repeater settings are duplicated from Access Point settings. If you need to make changes please do so below. If these changes are applied, they will also be duplicated when you choose to activate the Access Point.

Repeater Type: Universal Repeater (What's This?)

Parent SSID:

Channel: Channel 9

Parent MAC Address: 00:01:03:15:17:50

☐ Enable Linked Repeater 00:00:00:00:00:00

MODE: ☐ 802.11b ☐ 802.11g ☒ Mixed

SSID: ap900-27

AutoLink: ☒ Disable ☐ Enable

Broadcast SSID: ☒ Disable ☐ Enable

Security: ☐ Disable ☒ WEP ☐ WPA Setup

Advanced Settings: Setup

Access Filter: Setup

Apply Cancel

Table 9: Repeater Setup

Field	Description
Repeater Type	Select WDS Repeater or Universal Repeater.
Parent SSID	Wireless Network Name of parent Repeater. NOTE: Only applies to Universal Repeater mode.
Channel	Selects the channel
Parent MAC Address	MAC address of Parent AP/Router to which this Repeater is connected. NOTE: Only applies to WDS Repeater mode.
Mode	Selects 802.11g/b mode: 802.11g only, 802.11b only, or Mixed

SSID	Wireless Network Name.
AutoLink	Enable/disable the AutoLink feature. When AutoLink is enabled, the configuration utility automatically patches the MAC Address to the SSID. This enables the client card to generate a profile of the AP connected to with AutoLink. To change the SSID, uncheck the AutoLink radio button and change the SSID. Then, recheck the AutoLink radio button to continue.
Broadcast SSID	Enable/disable the SSID broadcast feature.
Security	Select Disable, WEP, or WPA security. Select the option, and click the Setup button to enter the key(s) for WEP or WPA.
Advanced Settings	Click Setup to configure advanced settings.
Access Filter	Click Setup to configure the access filter

7.3 Security Setup

To enable security, select the desired security mode (WEP or WPA) from the Repeater Mode setup page (Figure 16) and click the Setup button to enter the keys. The following tables describe the security setup options in more detail.

Table 10: WEP Setup

Field	Description
WEP Length	Selects the WEP key length: 64 bits or 128 bits.
Mode	Selects the WEP key format, ASCII or Hex
Passphrase	Passphrase used to generate the WEP keys. Click the Generate button to generate the keys. Click the Clear button to clear the Passphrase field.
Key 1-4	WEP keys
Default Tx key	Selects the default WEP key (1-4)

Table 11: WPA Setup

Field	Description
Authentication Method	Select PSK mode
Passphrase	WPA key
Group Re-Key Time	Group Re-Key interval (seconds)

7.4 Advanced Settings

Access the Advanced Settings page by clicking the Advanced Settings: Setup button from the Repeater Mode setup page ([Figure 16](#)). The Advanced Settings page allows the user to

configure advanced Radio settings for the Repeater. Figure 18 and Table 12 detail the options.

Figure 18: Repeater Mode — Advanced

The screenshot shows a web browser window titled "AP: Advanced Settings - Microsoft Internet Explorer". The page has a blue sidebar on the left with the following settings listed: Beacon Interval, RTS Threshold, DTIM Interval, Protection Mode, Transmit Rate, and Preamble Type. The main content area on the right contains the corresponding input fields and controls. The "Beacon Interval" is a text box with "100" and "(msec, range: 20~1000, default: 100)". The "RTS Threshold" is a text box with "2347" and "(range: 256~2347, default: 2347)". The "DTIM Interval" is a text box with "2" and "(range: 1~255, default: 2)". The "Protection Mode" has two radio buttons: "Disable" (selected) and "Enable". The "Transmit Rate" is a dropdown menu with "Auto" selected. The "Preamble Type" has three radio buttons: "Short", "Long" (selected), and "Auto". At the bottom right, there are "Apply" and "Close" buttons.

Table 12: Repeater Advanced Settings

Field	Description
Beacon Interval	Beacon interval (in milliseconds)
RTS Threshold	RTS threshold (Bytes)
DTIM Interval	DTIM interval
Protection Mode	Allows user to force 802.11g protection (RTS/CTS) mode off.
Transmit Rate	Selects the transmit rate: Auto or a fixed rate
Preamble Type	Selects short preamble, long preamble or Auto

7.5 Access Filter

Click the Access Filter:Setup button from the Repeater Mode setup page (Figure 16) to access the Access Filter page. The Access Filter page allows the user to configure the Repeater to allow or deny association to itself based on the client's MAC address. Up to 32 MAC addresses can be added to the list.

The Repeater Mode Access Filter webpage is identical to the one for AP Mode. See Figure 15 for reference. Table 13 details the options.

Table 13: Repeater Access Filter Settings

Field	Description
MAC filtering	Enables/Disables MAC filtering mode
Filter Mode	Provides the option either to allow or deny clients with the MAC addresses listed.
Filter List	Up to 32 MAC addresses can be listed.
MAC addresses	List of MAC addresses to filter

8. Point-to-Point (P2P) Setup

8.1 Basic Setup

To configure the 5-into-1 in P2P Mode, select P2P from the Mode page (Figure 9), allow the board to reboot, and click the P2P: Setup button. Figure 19 and Table 14 describe the P2P Mode setup options.

To set up the P2P bridge, the user must enter the MAC address of the other P2P bridge to be connected to this P2P bridge in the AP MAC Address field of the P2P Mode setup page.

Figure 19: P2P Setup

Table 14: P2P Setup

Field	Description
AP MAC Address	MAC address of the P2P bridge that this bridge is connected to
Mode	Selects 802.11g/b mode: 802.11g only, 802.11b only, or Mixed
Channel	Selects the channel

Security	Selects the option to disable security or to use WEP security. If using WEP, click the Setup button to enter the key(s).
Advanced Settings	Click Setup to configure advanced settings.

8.2 Security Setup

To enable security, select WEP from the setup page and click Setup to enter the keys. The following tables describe the security setup options in more detail.

Table 15: WEP Setup

Field	Description
WEP Length	Selects the WEP key length: 64 bits or 128 bits.
Mode	Selects the WEP key format, ASCII or Hex
Passphrase	Passphrase used to generate the WEP keys. Click the Generate button to generate the keys. Click the Clear button to clear the Passphrase field.
Key 1-4	WEP keys
Default Tx key	Selects the default WEP key (1-4)

8.3 Advanced Settings

Access the Advanced Settings page by clicking the Advanced Settings:Setup button from the P2P Mode setup page (Figure 19). The Advanced Settings page allows the user to configure advanced Radio settings. Figure 20 and Table 16 detail the options.

Figure 19: P2P Mode— Advanced Settings

AP: Advanced Settings - Microsoft Internet Explorer

RTS Threshold: (range: 256~2347, default: 2347)

DTIM Interval: (range: 1~255, default: 2)

Protection Mode: ☒ Disable ☐ Enable

Transmit Rate: ▼

Preamble Type: ☐ Short ☒ Long ☐ Auto

Table 16: P2P Advanced Settings

Field	Description
RTS Threshold	RTS threshold (Bytes)
DTIM Interval	DTIM interval
Protection Mode	Allows user to force 802.11g protection (RTS/CTS) mode off.
Transmit Rate	Selects the transmit rate: Auto or a fixed rate
Preamble Type	Selects short preamble, long preamble or Auto

9. Point-to-Multipoint (PMP) Setup

9.1 Basic Setup

To configure the 5-into-1 in PMP Mode, select PMP from the Mode page (Figure 9), allow the board to reboot, and click the PMP: Setup button. Figure 20 and Table 17 describe the PMP Mode setup options.

To set up the PMP bridge, the user must enter the MAC address(es) of the P2P bridge(s) to be connected to this PMP bridge in the AP MAC Address field(s) of the PMP Mode setup page. Up to six MAC addresses can be entered.

Figure 20: PMP Setup

5-into-1: PMP - Microsoft Internet Explorer

http://192.168.0.10/pmp.asp

5-into-1

LanReady.com
Connect On Demand

Mode Status Admin LAN

Currently Running	•Client Mode	•AP Mode	•Repeater Mode	•P2P Mode	•PMP Mode
Current Setup	•Client Mode	•AP Mode	•Repeater Mode	•P2P Mode	•PMP Mode

NOTE

Please note that all PMP settings are duplicated from Access Point settings. If you need to make changes please do so below. If these changes are applied, they will also be duplicated when you choose to activate the Access Point.

Remote AP Connection Mode

Static

AP1 MAC Address 00:00:00:00:00:00

AP2 MAC Address 00:00:00:00:00:00

AP3 MAC Address 00:00:00:00:00:00

AP4 MAC Address 00:00:00:00:00:00

AP5 MAC Address 00:00:00:00:00:00

AP6 MAC Address 00:00:00:00:00:00

MODE

☐ 802.11b ☐ 802.11g ☒ Mixed

Channel

Channel 6

Security

☐ Disable ☒ WEP

Setup

Setup

Apply Cancel

Table 17: PMP Setup

Field	Description
Remote AP Connection Mode	Default is Static.
AP MAC Address (1-6)	MAC address(es) of the P2P bridges that are connected to this PMP bridge

Mode	Selects 802.11g/b mode: 802.11g only, 802.11b only, or Mixed
Channel	Selects the channel
Security	Selects the option to disable security or to use WEP security. If using WEP, click the Setup button to enter the key(s).
Advanced Settings	Click Setup to configure advanced settings.

9.2 Security Setup

To enable security, select WEP from the setup page and click Setup to enter the keys. The following tables describe the security setup options in more detail.

Table 18: WEP Setup

Field	Description
WEP Length	Selects the WEP key length: 64 bits or 128 bits.
Mode	Selects the WEP key format, ASCII or Hex
Passphrase	Passphrase used to generate the WEP keys. Click the Generate button to generate the keys. Click the Clear button to clear the Passphrase field.
Key 1-4	WEP keys
Default Tx key	Selects the default WEP key (1-4)

9.3 Advanced Settings

The Advanced Settings page allows you to configure advanced Radio settings. The following table describes the setup options in detail.

Table 19: PMP Advanced Settings

Field	Description
RTS Threshold	RTS threshold (in bytes)
DTIM Interval	DTIM interval
Protection Mode	Allows user to force 802.11g protection (RTS/CTS) mode off.
Transmit Rate	Selects the transmit rate: Auto or a fixed rate
Preamble Type	Selects short preamble, long preamble or Auto

10. Client Mode Setup

10.1 Basic Setup

To configure the 5-into-1 in Client Mode, select Client from the Mode page (Figure 9), allow the board to reboot, and click the Client: Setup button. Figure 21 and Table 20 describe the Client Mode setup options.

Figure 21: Client Bridge Setup

The screenshot shows the '5-into-1 Client' setup page in Microsoft Internet Explorer. The browser's address bar shows 'http://192.168.0.10/client.asp'. The page has a blue header with the '5-into-1' logo and the 'LanReady.com' logo. Below the header, there are tabs for 'Mode', 'Status', 'Admin', and 'LAN'. The 'Mode' tab is selected, and it shows a list of modes: 'Client Mode', 'AP Mode', 'Repeater Mode', 'P2P Mode', and 'PMP Mode'. The 'Client Mode' is currently selected. Below the mode list, there are several configuration options: 'Station Mode' with radio buttons for '802.11b', '802.11g' (selected), and 'Auto'; 'MAC Cloning Mode' with radio buttons for 'Disabled' (selected) and 'Enabled'; 'SSID' with a text box containing 'Marvell-5in1' and a 'Site Survey' button; 'Operation Mode' with radio buttons for 'Ad-Hoc' and 'Infrastructure' (selected); 'Channel' with a dropdown menu showing 'Channel 14'; 'Security' with radio buttons for 'Disable' (selected), 'WEP', 'WPA', and 'WPA2', and a 'Setup' button; 'Preamble Type' with radio buttons for 'Short' and 'Long' (selected); and 'Transmit Rate' with a dropdown menu showing 'Auto'. At the bottom of the configuration section, there are 'Apply' and 'Cancel' buttons.

Table 20: AP Setup

Field	Description
Station Mode	Selects 802.11g/b mode: 802.11b only or 802.11g/b
MAC Cloning Mode	Enable MAC Cloning Mode. This clones all the MAC addresses of devices connected to the Ethernet (wired) port to a single MAC address sent out wirelessly to an AP or Repeater
SSID	Wireless Network Name. You can enter it directly in this field or click the Site Survey button to select from a list of available networks.

Table 20: AP Setup (Continued)

Field	Description
Operation Mode	Selects Ad-Hoc or Infrastructure mode
Channel	Selects the channel (Ad-Hoc network only)
Security	Selects the option to disable security or to use WEP or WPA security. If using WEP or WPA, click the Setup button to enter the key(s).
Preamble Type	Selects short or long preamble
Transmit Rate	Selects the transmit rate: a fixed rate or Auto

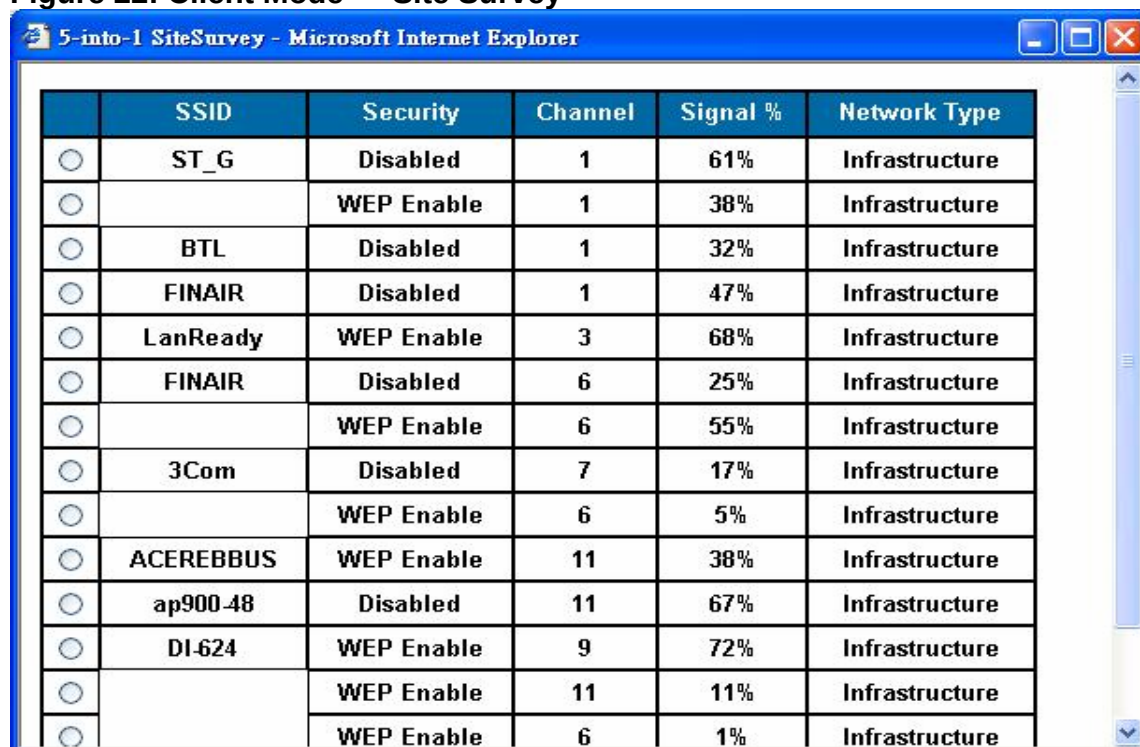
10.2 MAC Cloning

To enable MAC cloning mode, go to the MAC Cloning field on the LAN page and select Enabled. MAC cloning clones all the MAC addresses of the devices connected to the ethernet (wired) port to a single MAC address sent out wirelessly to an AP or Repeater.

10.3 Client Mode — Site Survey

Clicking the Site Survey button brings up the Site Survey page, which displays the available Access Points and Ad-Hoc networks in the neighborhood. The user then selects the AP or Ad-Hoc network to join. Figure 22 and Table 21 describe the options.

Figure 22: Client Mode — Site Survey



	SSID	Security	Channel	Signal %	Network Type
☐	ST_G	Disabled	1	61%	Infrastructure
☐		WEP Enable	1	38%	Infrastructure
☐	BTL	Disabled	1	32%	Infrastructure
☐	FINAIR	Disabled	1	47%	Infrastructure
☐	LanReady	WEP Enable	3	68%	Infrastructure
☐	FINAIR	Disabled	6	25%	Infrastructure
☐		WEP Enable	6	55%	Infrastructure
☐	3Com	Disabled	7	17%	Infrastructure
☐		WEP Enable	6	5%	Infrastructure
☐	ACEREBBUS	WEP Enable	11	38%	Infrastructure
☐	ap900-48	Disabled	11	67%	Infrastructure
☐	DI-624	WEP Enable	9	72%	Infrastructure
☐		WEP Enable	11	11%	Infrastructure
☐		WEP Enable	6	1%	Infrastructure

Table 21: Client Mode — Site Survey

Field	Description
SiteSurvey table	Lists the available Access Points and Ad-Hoc networks. To select a wireless network to join, click its radio button.
Scan	Start the Site Survey Scan process.
Join	Select a wireless network. Click the Join button to associate the client bridge with the selected AP/node or Ad-Hoc network.
Close	Close the Site Survey page.

11. Status Page

The status page reports relevant status information for the device, for both the ethernet and wireless interfaces.

Figure 22: Status Page

5-into-1 - Microsoft Internet Explorer

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網址(1) http://192.168.0.10/ap_status.asp

5-into-1

LanReady.com
Connect On Demand

Mode Status Admin LAN

Currently Running
Current Setup

•Client Mode •AP Mode •Repeater Mode •P2P Mode •PMP Mode
•Client Mode •AP Mode •Repeater Mode •P2P Mode •PMP Mode

Ethernet (00 : 01 : 03 : 15 : 17 : 40)

IP Address:	192 . 168 . 0 . 10
Subnet Mask:	255 . 255 . 255 . 0
Gateway:	0 . 0 . 0 . 0
Link:	Up, 100 Mbps

Wireless (00 : 01 : 03 : 15 : 17 : 40)

SSID:	ap900-27
Channel:	9
Coexistence:	802.11b/g Mixed
Encryption Function:	Required
Link:	Up, Auto rate

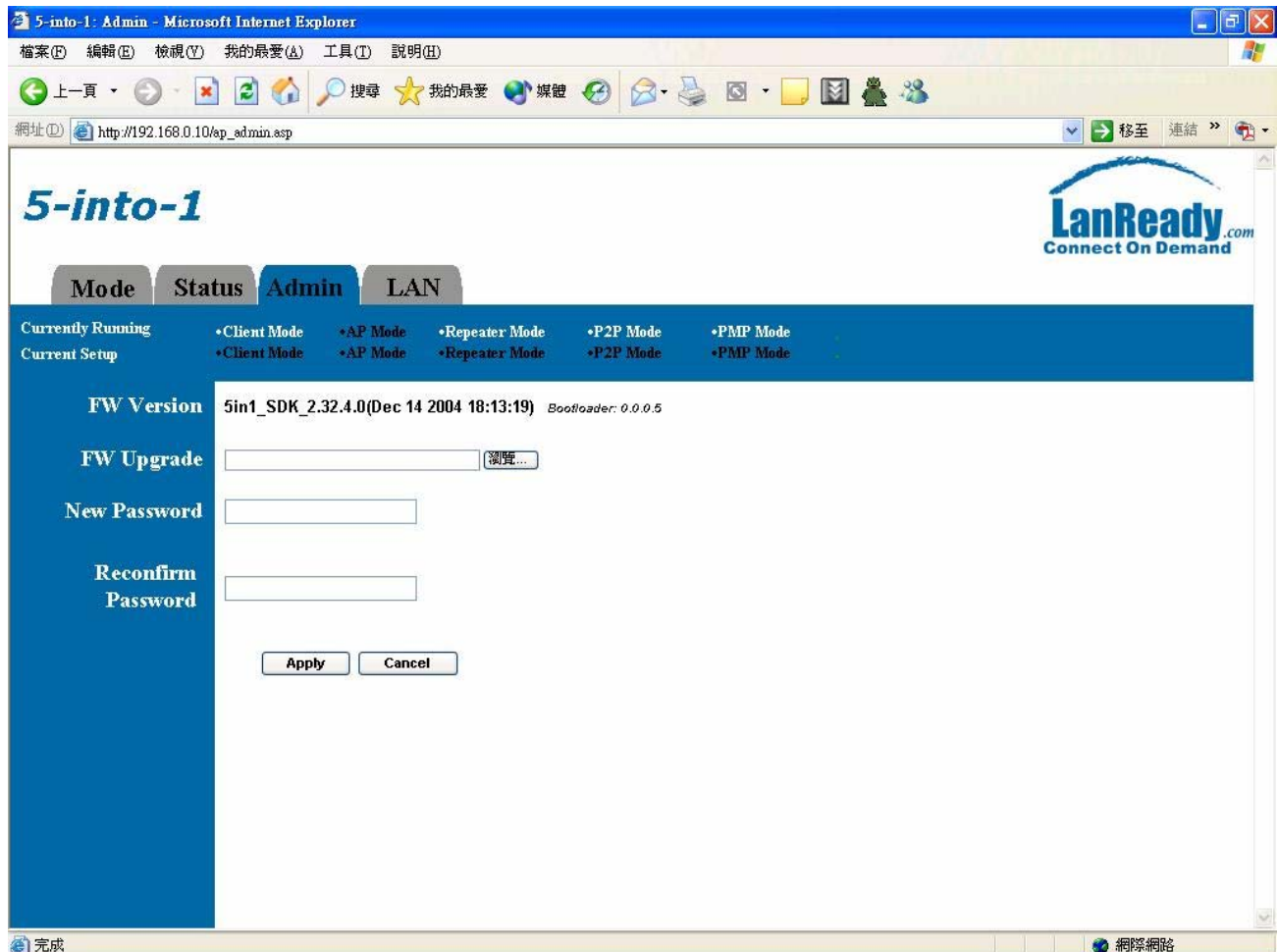
Station List

網際網路

12. Admin Page

The admin page lets you upgrade the device's firmware or change the password.

Figure 23: Admin Pag



12.1 Firmware Upgrade

To upgrade the firmware, click the Browse button and select the image file. Click Apply to upgrade.

12.2 Update Password

To change the password, enter the new password in the New Password and Reconfirm Password fields and click Apply.

13. LAN Page

The LAN page lets you set the device's IP address. The device can be configured to use an automatic (DHCP) address or a fixed IP address.

The default IP address is 192.168.0.10.

When the device is in Client mode, the LAN page also provides the MAC cloning option. It is important that before you configure the 5-in-1 device (regardless of the mode it is in) to Automatic IP, you should know how to determine the 5-in-1 device's IP address from the device it is connected to.

Figure 24: LAN Page

The screenshot shows the '5-into-1' LAN configuration page in a Microsoft Internet Explorer browser window. The address bar shows 'http://192.168.0.10/ap_lan.asp'. The page has a blue header with the '5-into-1' logo and 'LanReady.com Connect On Demand' text. Below the header, there are tabs for 'Mode', 'Status', 'Admin', and 'LAN'. The 'LAN' tab is selected. Under the 'LAN' tab, there are two sections: 'Currently Running' and 'Current Setup'. The 'Current Setup' section shows the following configuration:

Mode	Client Mode	AP Mode	Repeater Mode	P2P Mode	PMP Mode
Currently Running	• Client Mode	• AP Mode	• Repeater Mode	• P2P Mode	• PMP Mode
Current Setup	• Client Mode	• AP Mode	• Repeater Mode	• P2P Mode	• PMP Mode

Below the table, there are fields for 'Device Name' (AP31334455) and 'Automatic IP' (selected). There is an 'Important' button next to the 'Automatic IP' field. Below these, there are fields for 'Fixed IP' (selected), 'Specify IP' (192, 168, 0, 10), 'Subnet Mask' (255, 255, 255, 0), and 'Gateway' (0, 0, 0, 0). There are 'Apply' and 'Cancel' buttons at the bottom.

Federal Communication Commission Interference Statement

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

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

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.

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

IMPORTANT NOTE:**FCC Radiation Exposure Statement:**

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

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.