| | be assign a IP address from the range. |
|-----------------------|---|
| Show Client | Click to open the Active DHCP Client Table window that |
| | shows the active clients with their assigned IP address, |
| | MAC address and time expired information. |
| 802.11d Spanning Tree | Select to enable or disable the IEEE 802.1d Spanning |
| | Tree function from pull-down menu. |
| Clone MAC Address | Fill in the MAC address that is the MAC address to be |
| | cloned. |
| | Clone MAC address is designed for your special |
| | application that request the clients to register to a server |
| | machine with one identified MAC address. |
| | Since that all the clients will communicate outside world |
| | through the X-Micro WLAN Broadband Router, so have |
| | the cloned MAC address set on the X-Micro WLAN |
| | Broadband Router will solve the issue. |
| Apply Changes | Click the <i>Apply Changes</i> button to complete the new |
| | configuration setting. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |

3.3.7 WAN Interface Setup

This page is used to configure the parameters for wide area network that connects to the WAN port of your X-Micro WLAN Broadband Router. Here you may change the setting for IP address, PPPoE and DNS, etc.

| 🚰 WLAN Broadband Router - Microsoft | Internet Explorer | | | _ 18 | X |
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| Address in http://192.168.1.254/home.as | D | | | 💌 🛃 Go 🛛 Links | » |
| И | VLAN Brod | udband Ro | uter | | |
| Site contents: ■ Status ■ Wireless ■ Basic Settings ▲ Advanced Settings | WAN Interfa This page is used to co your Access Point. Her | ace Setup nfigure the parameters e you may change the | for Internet network which setting for IP addresss, PPP | connects to the WAN port of oE, DNS, etc | <u>•</u> |
| Security | Attain IP Automat | ically (DHCP) | | | |
| - TCP/P Settings | C Fixed IP | | | | |
| LAN Interface | IP Address: | 0.0.0.0 | | | |
| Firewall | Subnet Mask: | 0.0.0 | | | |
| Statistics | Default Gateway: | 0.0.0.0 | | | |
| Save/Reload Settings | C PPPoE | | | | |
| Password | User Name: | | | | |
| | Password: | | | | |
| | Connection Type: | Continuous | Connect | Disconnect | |
| | Idle Time: | 5 | (1-1000 minutes) | | |
| Done | | | | | ل ح |

Screenshot – WAN Interface Setup - 1

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| Cite contractor | Detauti Galeway: | 10:0:0:0 | | | | |
| Site contents: | C PPPoE | | | | | |
| Wireless | User Name: | | | | | |
| Advanced Settings | Password: | | | | | |
| Security | Connection Type: | Continuous | - | Connect | Disconnect | |
| TCR/P Settings | Idle Time: | 5 | (1-1 | 000 minutes) | | |
| WAN Interface | | | | | | 1 |
| Statistics | Attain DNS Auton | ıatically | | | | = . |
| Upgrade Firmware | C Set DNS Manually | / | | | | - |
| Save/Reload Settings | DNS 1: | ļ | | | | |
| | DNS 2: | | | | | |
| | DNS 3: | | | | | |
| | Clone MAC Address | : 000 | 000000000 | | | |
| | | | | | | - |
| | Apply Changes | Reset | | | | |

Screenshot – WAN Interface Setup - 2

| Item | Description |
|----------------------|--|
| Attain IP | Click to select DHCP support on WAN interface for IP |
| Automatically (DHCP) | address assigned automatically from a DHCP server. |
| Fixed IP | Click to select fixed IP support on WAN interface. There |
| | are IP address, subnet mask and default gateway settings |
| | need to be done. |
| IP Address | If you select the fixed IP support on WAN interface, fill |
| | in the IP address for it. |
| Subnet Mask | If you select the fixed IP support on WAN interface, fill |
| | in the subnet mask for it. |
| Default Gateway | If you select the fixed IP support on WAN interface, fill |
| | in the default gateway for WAN interface out going data |
| | packets. |
| PPPoE | Click to select PPPoE support on WAN interface. There |
| | are user name, password, connection type and idle time |
| | settings need to be done. |
| User Name | If you select the PPPoE support on WAN interface, fill in |
| | the user name and password to login the PPPoE server. |
| Password | If you select the PPPoE support on WAN interface, fill in |
| | the user name and password to login the PPPoE server. |
| Connection Type | Select the connection type from pull-down menu. There |
| | are <i>Continuous</i> , <i>Connect on Demand</i> and <i>Manual</i> three |
| | types to select. |
| | <i>Continuous</i> connection type means to setup the |
| | |

| | connection through PPPoE protocol whenever this X- |
|------------------|--|
| | Micro WLAN Broadband Router is powered on. |
| | Connect on Demand connection type means to setup the |
| | connection through PPPoE protocol whenever you send |
| | the data packets out through the WAN interface; there are |
| | a watchdog implemented to close the PPPoE connection |
| | while there are no data sent out longer than the idle time |
| | set. |
| | Manual connection type means to setup the connection |
| | through the PPPoE protocol by clicking the Connect |
| | button manually, and clicking the <i>Disconnect</i> button |
| | manually. |
| Idle Time | If you select the PPPoE and Connect on Demand |
| | connection type, fill in the idle time for auto-disconnect |
| | function. Value can be between 1 and 1000 minutes. |
| Attain DNS | Click to select getting DNS address for DHCP, PPPoE |
| Automatically | support. Please select Set DNS Manually if the Fixed IP |
| | support is selected. |
| Set DNS Manually | Click to select getting DNS address for <i>Fixed IP</i> support. |
| DNS 1 | Fill in the IP address of Domain Name Server 1. |
| DNS 2 | Fill in the IP address of Domain Name Server 2. |
| DNS 3 | Fill in the IP address of Domain Name Server 3. |
| Apply Changes | Click the Apply Changes button to complete the new |
| | configuration setting. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |

3.3.8 Firewall - Port Filtering

Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.

| WLAN Broadband Router - Microso | ft Internet Explorer | | | _ 8 × |
|---|--|---|---|----------------------------|
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| ddress 🙋 http://192.168.1.254/home.a | asp | | | 💌 🛃 Go 🛛 Links 🎇 |
| | WLAN Broad | lband Route | er | |
| Site contents: | Port Filtering | | | |
| Wireless Basic Settings Advanced Settings Security | Entries in this table are use to Internet through the Ga your local network. | ed to restrict certain type teway. Use of such filter: | s of data packets from your lo s can be helpful in securing or | cal network restricting |
| Access Control | Enable Port Filtering Port Range: | Protocol: Both | Comment: | |
| | Apply Changes | Reset | | |
| MAC Filtering | Current Filter Table: | | | |
| Port Forwarding | Port Range | Protocol | Comment | Select |
| Statistics | 10002-10006 | TCP | ERP | |
| Orgrade Firmware Save/Reload Settings Password | Delete Selected | Delete All F | Reset | |
| | | | | - |

Screenshot - Firewall - Port Filtering

| Item | Description |
|------------------------|--|
| Enable Port Filtering | Click to enable the port filtering security function. |
| Port Range | To restrict data transmission from the local network on |
| Protocol | certain ports, fill in the range of start-port and end-port, |
| Comments | and the protocol, also put your comments on it. |
| | The <i>Protocol</i> can be TCP, UDP or Both. |
| | <i>Comments</i> let you know about whys to restrict data from |
| | the ports. |
| Apply Changes | Click the <i>Apply Changes</i> button to register the ports to |
| | port filtering list. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |
| Delete Selected | Click to delete the selected port range that will be |
| | removed from the port-filtering list. |
| Delete All | Click to delete all the registered entries from the port- |
| | filtering list. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |

3.3.9 Firewall - IP Filtering

Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.

| WI AN Broadband Pouter - Microso | ft Internet Explorer | |
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| | WLAN Broadband Router | |
| Site contents: Status Wireless | IP Filtering | |
| TCP/IP Settings | Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network. | |
| IP Filtering MAC Filtering Port Forwarding DM7 | Enable IP Filtering Local IP Address: Protocol: Both Comment: | |
| Statistics | Apply Changes Reset | |
| Save/Reload Settings | Current Filter Table: | |
| | Local IP Address Protocol Comment Select | |
| | 192.168.1.20 TCP | |
| | Delete Selected Delete All Reset | |
| | | |
| Done | 🖉 Internet | |

Screenshot - Firewall - IP Filtering

| Item | Description |
|------------------------|---|
| Enable IP Filtering | Click to enable the IP filtering security function. |
| Local IP Address | To restrict data transmission from local network on |
| Protocol | certain IP addresses, fill in the IP address and the |
| Comments | protocol, also put your comments on it. |
| | The <i>Protocol</i> can be TCP, UDP or Both. |
| | <i>Comments</i> let you know about whys to restrict data from |
| | the IP address. |
| Apply Changes | Click the Apply Changes button to register the IP address |
| | to IP filtering list. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |
| Delete Selected | Click to delete the selected IP address that will be |
| | removed from the IP-filtering list. |
| Delete All | Click to delete all the registered entries from the IP- |
| | filtering list. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |

3.3.10 Firewall - MAC Filtering

Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.

| WLAN Broadband Router - Micros | oft Internet Explorer | | | _ 8 × |
|---|---|--|--|---------|
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| ddress 🙆 http://192.168.1.254/home. | asp | | 💌 🄁 Go | Links » |
| | WLAN Broadband Ro | outer | | |
| Site contents: Status Vireless Advanced Settings Security Access Control TCP/IP Settings Port Filtering IP Filtering MAC Filtering | MAC Filtering Entries in this table are used to restrict certail to Internet through the Gateway. Use of such your local network. F Enable MAC Filtering MAC Address: Apply Changes Reset | n types of data packets from y filters can be helpful in secur uent: | rour local network ing or restricting | |
| Port Forwarding | Current Filter Table: | | | |
| - 📕 Statistics | MAC Address | Comment | Select | |
| Upgrade Firmware | 00:20:ed:00:98:78 | DUT-1 | | |
| Password | Delete Selected Delete All | Reset | | |
| Done | | | 👔 Internet | |

Screenshot - Firewall - MAC Filtering

| Item | Description |
|------------------------|---|
| Enable MAC Filtering | Click to enable the MAC filtering security function. |
| MAC Address | To restrict data transmission from local network on |
| Comments | certain MAC addresses, fill in the MAC address and your |
| | comments on it. |
| | <i>Comments</i> let you know about whys to restrict data from |
| | the MAC address. |
| Apply Changes | Click the <i>Apply Changes</i> button to register the MAC |
| | address to MAC filtering list. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |
| Delete Selected | Click to delete the selected MAC address that will be |
| | removed from the MAC-filtering list. |
| Delete All | Click to delete all the registered entries from the MAC- |
| | filtering list. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |

3.3.11 Firewall - Port Forwarding

Entries in this table allow you to automatically redirect common network services to a specific machine behind the NAT firewall. These settings are only necessary if you wish to host some sort of server like a web server or mail server on the private local network behind your Gateway's NAT firewall.

| WLAN Broadband Router - Micros | oft Internet Explorer | | | | | |
|------------------------------------|--|---|----------------------|-------------------|--|---------|
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| ddress 🥘 http://192.168.1.254/home | .asp | | | | 🗾 🔁 Go | Links » |
| | WLAN Broa | dband R | outer | | | |
| | | | | | | |
| Site contents: | Port Forwar | ding | | | | |
| Status | | | | | | |
| Basic Settings | Entries in this table allow machine behind the NA | w you to automatic T firewall. These s | ally redirect comm | on network servic | ces to a specific sh to host some s | ort of |
| - Advanced Settings | server like a web server | or mail server on th | ne private local net | work behind you | r Gateway's NAT | 011 01 |
| Security | firewall. | | 932 | 22) | 979 | |
| - TCP/IP Settings | 🔽 Fushle Port Forwa | rdina | | | | |
| 🚔 Frewall | m Allerer | | oth y n n | | | |
| Port Filtering | IP Address: | Protocol: | our Port Rang | e: | Comment: | |
| MAC Filtering | | | | | | |
| - Port Forwarding | Apply Changes | Reset | | | | |
| DMZ | | | | | | |
| Upgrade Firmware | | | | | | |
| Save/Reload Settings | Current Port Forwardin | ıg Table: | | | 1000 Mar 100 Mar | |
| Password | Local IP Address | Protocol | Port Range | Comment | Select | |
| | 192.168.1.10 | TCP+UDP | 88 | server-l | | |
| | Delete Selected | | Reset | | | |
| | Delete Deletted | Delete All | 11636(| | | |
| | | | | | | |

Screenshot - Firewall - Port Forwarding

| Description |
|---|
| Click to enable the Port Forwarding security function. |
| |
| To forward data packets coming from WAN to a specific |
| IP address that hosted in local network behind the NAT |
| firewall, fill in the IP address, protocol, port range and |
| your comments. |
| The <i>Protocol</i> can be TCP, UDP or Both. |
| The <i>Port Range</i> for data transmission. |
| <i>Comments</i> let you know about whys to allow data |
| packets forward to the IP address and port number. |
| Click the Apply Changes button to register the IP address |
| and port number to Port forwarding list. |
| Click the <i>Reset</i> button to abort change and recover the |
| previous configuration setting. |
| Click to delete the selected IP address and port number |
| that will be removed from the port-forwarding list. |
| Click to delete all the registered entries from the port- |
| forwarding list. |
| Click the <i>Reset</i> button to abort change and recover the |
| previous configuration setting. |
| |

3.3.12 Firewall - DMZ

A Demilitarized Zone is used to provide Internet services without sacrificing

unauthorized access to its local private network. Typically, the DMZ host contains devices accessible to Internet traffic, such as Web (HTTP) servers, FTP servers, SMTP (e-mail) servers and DNS servers.

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|--|---------|
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| Address 🙆 http://192.168.1.254/home.asp 🔽 🄁 Go 🛛 | Links » |
| Site contents: Status Wireless Basic Settings Advanced Settings Security Access Control TCP/IP Settings Port Filtering MAC Filtering MAC Filtering MAC Filtering MAC Filtering Statistics Upgrade Firmware Save/Reload Settings | |
| http://192.168.1.254/dmz.asp | |

Screenshot - Firewall - DMZ

| Item | Description |
|---------------------|---|
| Enable DMZ | Click to enable the DMZ function. |
| DMZ Host IP Address | To support DMZ in your firewall design, fill in the IP address of DMZ host that can be access from the WAN interface. |
| Apply Changes | Click the <i>Apply Changes</i> button to register the IP address of DMZ host. |
| Reset | Click the <i>Reset</i> button to abort change and recover the previous configuration setting. |

3.3.13 Statistics

This page shows the packet counters for transmission and reception regarding to wireless, Ethernet LAN and Ethernet WAN networks.

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| ess Abtro://192.168.1.254/bom | | ~ ~ | | T S 60 | Links |
| | | | | | |
| | WLAN Bro | oadband Roi | uter | | |
| | | | | | |
| Site contents: | Statistics | | | | |
| Status | | | | | |
| Vireless | This page shows the | packet counters for transr | nission and reception reg | arding to wireless | |
| - 🧧 Basic Settings | and Ethernet network | (S . | | | |
| Advanced Settings | | | | | |
| Security | - | | | | |
| TCP/IP Settings | Wireless LAN | Sent Packets | 21 | | |
| Frewal | | Received Packets | 0 | | |
| Port Filtering | Ethormot I. A.N. | Sent Packets | 420 | | |
| 📲 IP Filtering | Enternet LALV | Received Packets | 359 | | |
| - MAC Filtering | Educana A VII A N | Sent Packets | 21 | | |
| Port Forwarding | EINEFRET WAIN | Received Packets | 0 | | |
| DMZ | | | 10 | | |
| Statistics | Refresh | | | | |
| Indrodo Euroworo | 20 | | | | |
| Opgrade Firmware Save/Reload Settings | | | | | |
| Upgrade Firmware Save/Reload Settings Password | | | | | |
| Save/Reload Settings Password | | | | | |
| Upgrade Firmware Save/Reload Settings Password | | | | | |
| Upgrade Firmware Save/Reload Settings Password | | | | | |
| Upgrade Firmware Save/Reload Settings Password | | | | | |

Screenshot - Statistics

| Description |
|--|
| It shows the statistic count of sent packets on the wireless |
| LAN interface. |
| It shows the statistic count of received packets on the |
| wireless LAN interface. |
| It shows the statistic count of sent packets on the |
| Ethernet LAN interface. |
| It shows the statistic count of received packets on the |
| Ethernet LAN interface. |
| It shows the statistic count of sent packets on the |
| Ethernet WAN interface. |
| It shows the statistic count of received packets on the |
| Ethernet WAN interface. |
| Click the refresh the statistic counters on the screen. |
| |

3.3.14 Upgrade Firmware

This page allows you upgrade the Access Point firmware to new version. Please note, do not power off the device during the upload because it may crash the system.

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| iress 🙆 http://192.168.1.254/home.asp 🗾 🄁 Go | Links » |
| WLAN Broadband Router | |
| Site contents: Upgrade Firmware | |
| Wireless This page allows you upgrade the Access Point firmware to new version. Please note, do not power off the device during the upload because it may crash the system. Advanced Settings | |
| Security Access Control Select File: /firmware/wenpages-gv Browse TCP/IP Settings | |
| Freed Upload Reset MAC Filtering MAC Filtering Port Forwarding Port Forwarding | |
| Statistics Upgrade Firmware Save/Reload Settings Password | |
| | |

Screenshot – Upgrade Firmware

| Item | Description |
|-------------|---|
| Select File | Click the <i>Browse</i> button to select the new version of web |
| | firmware image file. |
| Upload | Click the Upload button to update the selected web |
| | firmware image to the X-Micro WLAN Broadband |
| | Router. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |

3.3.15 Save/ Reload Settings

This page allows you save current settings to a file or reload the settings from the file that was saved previously. Besides, you could reset the current configuration to factory default.

| | 1.51.24 |
|--|---------|
| 2 WLAN Broadband Router - Microsoft Internet Explorer | |
| A Back - A - R A A Garch - Escuritar Madia A A - Escuritar | _ |
| | Linka 🔉 |
| Address 🙋 http://192.168.1.254/home.asp | |
| WLAN Broadband Router | |
| Site contents: Save/Reload Settings | |
| Wireless Basic Settings Advanced Settings | |
| Access Control Save Settings to File: Save | |
| Load Settings from File: //config/config-gw.bin Browse Upload | |
| Port Filtering Reset Settings to Default: Reset IP Filtering MAC Filtering Port Forwarding DMZ Statistics Upgrade Firmware Save/Reload Settings Password | |
| 🗳 | |

Screenshot - Save/Reload Settings

| Item | Description |
|--------------------------|--|
| Save Settings to File | Click the Save button to download the configuration |
| | parameters to your personal computer. |
| Load Settings from | Click the <i>Browse</i> button to select the configuration files |
| File | then click the Upload button to update the selected |
| | configuration to the X-Micro WLAN Broadband Router. |
| Reset Settings to | Click the <i>Reset</i> button to reset the configuration |
| Default | parameter to factory defaults. |

3.3.16 Password Setup

This page is used to set the account to access the web server of Access Point. Empty user name and password will disable the protection.

| WLAN Broadband Router - Microso | oft Internet Explorer | | _ [2] × |
|---|---|--|---------|
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| Address 🙋 http://192.168.1.254/home. | asp | 🗾 🔁 Go | Links » |
| | WLAN Broa | dband Router | |
| ቛ Site contents: ■ Status | Password Set | սթ | |
| | This page is used to set the name and password will d | ne account to access the web server of Access Point. Empty user isable the protection. | |
| Security Access Control TCP/IP Settings | User Name: | craig | |
| Port Filtering | New Password: Confirmed Password: | ••••• | |
| MAC Filtering MAC Filtering Port Forwarding DMZ Statistics | Apply Changes | Reset | |
| Save/Reload Settings | | | |
| | | | |
| 9 | | 🚽 🚽 🔮 Internet | |

Screenshot – Password Setup

| Item | Description |
|---------------------------|---|
| User Name | Fill in the user name for web management login control. |
| New Password | Fill in the password for web management login control. |
| Confirmed Password | Because the password input is invisible, so please fill in |
| | the password again for confirmation purpose. |
| Apply Changes | Clear the User Name and Password fields to empty, |
| | means to apply no web management login control. |
| | Click the <i>Apply Changes</i> button to complete the new |
| | configuration setting. |
| Reset | Click the <i>Reset</i> button to abort change and recover the |
| | previous configuration setting. |

4 Frequently Asked Questions (FAQ)

4.1 What and how to find my PC's IP and MAC address?

IP address is the identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255. For example, 191.168.1.254 could be an IP address.

The MAC (Media Access Control) address is your computer's unique hardware number. (On an Ethernet LAN, it's the same as your Ethernet address.) When you're connected to the Internet from your computer (or host as the Internet protocol thinks of it), a correspondence table relates your IP address to your computer's physical (MAC) address on the LAN.

To find your PC's IP and MAC address,

- ✓ Open the Command program in the Microsoft Windows.
- ✓ Vype in *ipconfig /all* then press the *Enter* button.
- Your PC's IP address is the one entitled IP Address and your PC's MAC address is the one entitled Physical Address.

4.2 What is Wireless LAN?

A wireless LAN (WLAN) is a network that allows access to Internet without the need for any wired connections to the user's machine.

4.3 What are ISM bands?

ISM stands for Industrial, Scientific and Medical; radio frequency bands that the Federal Communications Commission (FCC) authorized for wireless LANs. The ISM bands are located at 915 +/- 13 MHz, 2450 +/- 50 MHz and 5800 +/- 75 MHz.

4.4 How does wireless networking work?

The 802.11 standard define two modes: infrastructure mode and ad hoc mode. In infrastructure mode, the wireless network consists of at least one access point connected to the wired network infrastructure and a set of wireless end stations. This configuration is called a Basic Service Set (BSS). An Extended Service Set (ESS) is a set of two or more BSSs forming a single subnetwork. Since most corporate WLANs require access

to the wired LAN for services (file servers, printers, Internet links) they will operate in infrastructure mode.



Example 1: wireless Infrastructure Mode

Ad hoc mode (also called peer-to-peer mode or an Independent Basic Service Set, or IBSS) is simply a set of 802.11 wireless stations that communicate directly with one another without using an access point or any connection to a wired network. This mode is useful for quickly and easily setting up a wireless network anywhere that a wireless infrastructure does not exist or is not required for services, such as a hotel room, convention center, or airport, or where access to the wired network is barred (such as for consultants at a client site).



Example 2: wireless Ad Hoc Mode

4.5 What is BSSID?

A six-byte address that distinguishes a particular a particular access point from others. Also know as just SSID. Serves as a network ID or name.

4.6 What is ESSID?

The Extended Service Set ID (ESSID) is the name of the network you want to access. It is used to identify different wireless networks.

- 4.7 What are potential factors that may causes interference? Factors of interference:
 - > Obstacles: walls, ceilings, furniture... etc.
 - > Building Materials: metal door, aluminum studs.
 - > Electrical devices: microwaves, monitors and electrical motors.

Solutions to overcome the interferences:

- ✓ Minimizing the number of walls and ceilings.
- ✓ Position the WLAN antenna for best reception.
- ✓ Keep WLAN devices away from other electrical devices, eg: microwaves, monitors, electric motors, ... etc.
- ✓ Add additional WLAN Access Points if necessary.

4.8 What are the Open System and Shared Key authentications?

IEEE 802.11 supports two subtypes of network authentication services: open system and shared key. Under open system authentication, any wireless station can request authentication. The station that needs to authenticate with another wireless station sends an authentication management frame that contains the identity of the sending station. The receiving station then returns a frame that indicates whether it recognizes the sending station. Under shared key authentication, each wireless station is assumed to have received a secret shared key over a secure channel that is independent from the 802.11 wireless network communications channel.

4.9 What is WEP?

An optional IEEE 802.11 function that offers frame transmission privacy similar to a wired network. The Wired Equivalent Privacy generates secret shared encryption keys that both source and destination stations can use to alert frame bits to avoid disclosure to eavesdroppers.

WEP relies on a secret key that is shared between a mobile station (e.g. a laptop with a wireless Ethernet card) and an access point (i.e. a base station). The secret key is used to encrypt packets before they are transmitted, and an integrity check is used to ensure that packets are not modified in transit.

4.10 What is Fragment Threshold?

The proposed protocol uses the frame fragmentation mechanism defined in IEEE 802.11 to achieve parallel transmissions. A large data frame is fragmented into several

fragments each of size equal to fragment threshold. By tuning the fragment threshold value, we can get varying fragment sizes. The determination of an efficient fragment threshold is an important issue in this scheme. If the fragment threshold is small, the overlap part of the master and parallel transmissions is large. This means the spatial reuse ratio of parallel transmissions is high. In contrast, with a large fragment threshold, the overlap is small and the spatial reuse ratio is low. However high fragment threshold leads to low fragment overhead. Hence there is a trade-off between spatial re-use and fragment overhead.

Fragment threshold is the maximum packet size used for fragmentation. Packets larger than the size programmed in this field will be fragmented.

If you find that your corrupted packets or asymmetric packet reception (all send packets, for example). You may want to try lowering your fragmentation threshold. This will cause packets to be broken into smaller fragments. These small fragments, if corrupted, can be resent faster than a larger fragment. Fragmentation increases overhead, so you'll want to keep this value as close to the maximum value as possible.

4.11 What is RTS (Request To Send) Threshold?

The RTS threshold is the packet size at which packet transmission is governed by the RTS/CTS transaction. The IEEE 802.11-1997 standard allows for short packets to be transmitted without RTS/CTS transactions. Each station can have a different RTS threshold. RTS/CTS is used when the data packet size exceeds the defined RTS threshold. With the CSMA/CA transmission mechanism, the transmitting station sends out an RTS packet to the receiving station, and waits for the receiving station to send back a CTS (Clear to Send) packet before sending the actual packet data.

This setting is useful for networks with many clients. With many clients, and a high network load, there will be many more collisions. By lowering the RTS threshold, there may be fewer collisions, and performance should improve. Basically, with a faster RTS threshold, the system can recover from problems faster. RTS packets consume valuable bandwidth, however, so setting this value too low will limit performance.

4.12 What is Beacon Interval?

In addition to data frames that carry information from higher layers, 802.11 includes management and control frames that support data transfer. The beacon frame, which is a type of management frame, provides the "heartbeat" of a wireless LAN, enabling

stations to establish and maintain communications in an orderly fashion.

Beacon Interval represents the amount of time between beacon transmissions. Before a station enters power save mode, the station needs the beacon interval to know when to wake up to receive the beacon (and learn whether there are buffered frames at the access point).

4.13 What is Preamble Type?

There are two preamble types defined in IEEE 802.11 specification. A long preamble basically gives the decoder more time to process the preamble. All 802.11 devices support a long preamble. The short preamble is designed to improve efficiency (for example, for VoIP systems). The difference between the two is in the Synchronization field. The long preamble is 128 bits, and the short is 56 bits.

4.14 What is SSID Broadcast?

Broadcast of SSID is done in access points by the beacon. This announces your access point (including various bits of information about it) to the wireless world around it. By disabling that feature, the SSID configured in the client must match the SSID of the access point.

Some wireless devices don't work properly if SSID isn't broadcast (for example the Dlink DWL-120 USB 802.11b adapter). Generally if your client hardware supports operation with SSID disabled, it's not a bad idea to run that way to enhance network security. However it's no replacement for WEP, MAC filtering or other protections.

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