BUFFALO

WLM2-G54

Users Guide

Warning

This section explains the symbols, signs and terminology used in this manual.

The following terminology is used in this manual to distinguish between an Ethernet 10/100BASE-T LAN and a Wireless LAN and should not be construed as generally accepted terminology outside this context.

A PC with the BUFFALO Wireless client installed is called the Wireless LAN PC.
Ethernet LAN: A LAN connected by cables
Wireless LAN: A LAN connected by radio signal
The PC used to change the AirStation access point settings: The Setting PC.

For your safety be sure to read, understand and follow the instructions below thoroughly before using the product. This manual contains instructions concerning general operation of the computer to which the product is connected in addition to those concerning the product itself.

Please take note that our warranty will not cover any failures and problems of the computer, any losses and failures of data, or failures and problems of the product caused by misuse.

Signs

Strongly recommended: Follow the warning and caution instructions issued by the PC and peripheral manufactures.

Prohibit: Do not attempt to disassemble or repair the WLM-L11G. This may result in fire or electric shock.

Strongly recommended: Install this product away from children. Failure to do so may result in injury.
Prohibit: Do not handle the equipment with wet hands while it is in operation. This may result in electric shock.

It is strongly recommended to touch a metal object such as a door handle or metal window before touching the device in order to prevent damage to the equipment due to static electricity.

We strongly recommend to refer to the product manual before and during usage of the PC and peripheral.

It is strongly recommended to remove dust from all connectors. Dust may result in failure in performance.

Do not Place this product in the following locations.

- Doing so may result in electric shock or fire, or may adversely affect this product.
- Locations with strong magnetic fields or static electricity (may result in failure)
- Locations prone to vibration (may result in injury or damage)
- Locations that are not level (may result in injury or damage)
- Locations in direct sunlight (may result in failure or deformation)
- Locations close to fire, or subject to heating (may result in failure or deformation)
- Locations with water leakage or current may result in failure or electric shock
- Locations with excessive dust (may result in failure)

It is strongly recommended to not get caught on the cables connected to this product. Doing so may result in personal injury and/or damage this product.

Buffalo strongly recommends the users back up the contents of the hard disk to other media such as floppy disks.

We recommend that dual backups before and after updating of original data be created for important data. Data may be damaged or lost in the following cases.

- When the device is used incorrectly
- When the device receives static electricity or electrical noise
- When the device breaks down or is repaired
- When the power is turned on immediately after the PC is turned off
- When the device is damaged by natural disasters

Please note that BUFFALO TECHNOLOGY INC. shall not be liable for any expenses incurred due to the damage or loss of hard disk data that may arise in the above cases or in any other case.

We also strongly recommend backing up the contents of the hard disk before making any changes to your PC environment such as installing software or installing or removing hardware. Even if data is damaged or lost due to misuse or faults, backup data can minimize the extent of such damage. Please note that BUFFALO TECHNOLOGY INC. shall not be liable for any expenses incurred due to the damage or loss of hard disk data.

PART I

1.0 Introduction I

The WLM2-G54 protects customers' investments over the long term. Buffalo's new WLAN product, WLM2-G54, is the IEEE802.11g-based access point (AP). The Buffalo solution offers simultaneous communication on both 11Mbps and 54Mbps bands without annoying bottlenecks. High reliability, manageability and standard Buffalo features are integrated in the product and will assure easy management and high quality signal communication. The WLM2-G54's versatility will allow indoor as well as outdoor (station-to-station) applications.

1.1 Summary of Features

- Updated and extensive security (128-WEP, 802.1x/EAP, TKIP, RADIUS)
- Network integrity (fault tolerance, link integrity, spanning tree)
- Network load distribution (load balancing, repeater, WDS)
- Interoperable with IEEE802.11g Wi-Fi™, compliant equipment
- Roaming, best access point selection and traffic filtering (IP and MAC address)
- ESS-ID "any" rejection option
- Configurable through web browser
- Command line setup by Telnet and/or a serial console
- Downloadable firmware update
- Long range (diversity antenna) and even longer range (with additional outdoor antenna)
- Bridge to multiple networks, or AP-to-AP communication
- Outdoor point-to-multipoint broadcasting
- Repeating function support
- Power over Ethernet, PoE, for convenient power supply
- Auto MDI/X port for any CAT5 type cables
- Other network administrative functions

2.0 Package Contents

The AirStation™ WLM2-G54 package consists of the following items. If any item is missing, please contact the seller.

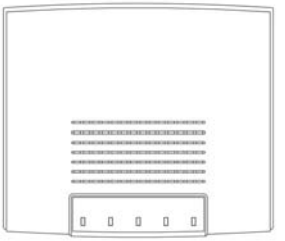
1. WLM2-G54 Access Point
2. AC adapter
3. Power cable
4. Mini-DIN 8 pin-Dsub 9 pin cross serial cable
5. WLM2-G54 Manual
6. Air Navigator CD
7. Warranty and Registration card

3.0 System Requirements

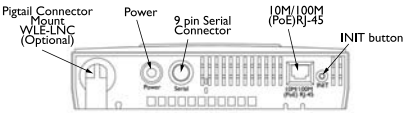
The system requires IP routing externally. The TCP/IP protocol must be loaded on each PC used in the system. Other requirements:

- One broadband Internet connection via an existing LAN system.
- A router, a hub or a switching hub
- UTP network cable with RJ-45 connector
- Internet Explorer 4.0 or higher, or Netscape Navigator 4.0 or higher

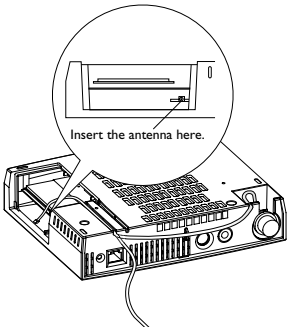
4.0 Product Views



TOP VIEW



BACK VIEW



SIDE VIEW

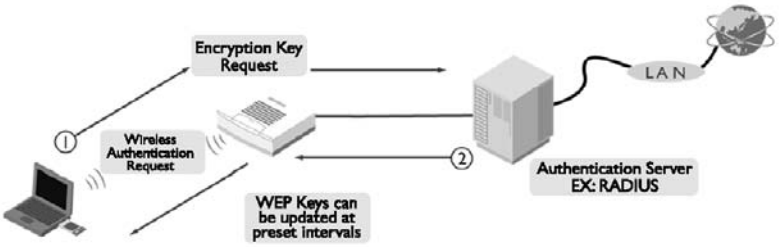
5.0 Features

The Buffalo AirStation Intelligent access point provides the features necessary in today's business environment, with a high level of reliability and security. Use of these features along with VPN will allow the user to have the highest security a WLAN can offer. For minimum security measures Buffalo recommends the use of 128bit WEP and registering client MAC addresses in the AirStation. Some of the noteworthy features are shown below. Other features are listed in Section 9.

5.1 Security Features

The WLM2-G54 model provides three levels of security: authentication, privacy and access authorization. The first level consists of checking and issuing the user's authentication by EAP and 802.1x, similar to the Windows XP authentication process.

The second is encrypting user's data with WEP, TKIP or MIC encryption algorithms. Finally, granting the data access privilege only after the user's authentication is offered by exchanging a specific key under the 802.1x method.



5.1.1 Authentication

The IEEE802.1x security method imposes access port control at the access point level for each user communication signal. The EAP function in a client PC performs an authentication login to the authorization server, such as RADIUS, through the WLM2-G54 access point when the link is established and before data transmission takes place.

EAP – Extensible Authentication Protocol is a function in a client PC, which initiates the authentication login to a network through an AP such as the WLM2-G54. When the client is approved and authenticated for a communication session, the client receives a unique WEP key from a network security server such as RADIUS.

802.1x – Known as .1x, this is the key exchange standard used between a client and an AP for the user's authentication process. Configuration for a large network is much easier since individual WEP settings are no longer required for each client. In addition, access management is performed easily in the RADIUS server environment, making this feature valuable for network administration.

5.1.2 Privacy

Several encryption algorithms can be used to mix with the data for protecting privacy. WEP is the encryption method adopted in the current WLAN industry. Because WEP was found to be vulnerable, WEP will be replaced with a more powerful Advanced Encryption System (AES) in the future so that even higher levels of security will be available. Meanwhile, use of TKIP and MIC can be an alternative to AES.

WEP – Wired Equivalent Privacy is a security method for wireless networking using the RC4 encryption algorithm. WEP consists of two elements: an Initialization Vector (IV) of 24 bits that describes the packet header information, and current data of 40 or 104 bits. For example, a 128bit WEP key means a 24bit IV plus a 104bit data encryption and they are encrypted separately.

TKIP – Temporal Key Integrity Protocol is an advanced encryption method using the RC4 algorithm. Instead of using the sequential IV, a random IV will be used, and the IV key definition will be updated regularly at a preset time interval.

MIC – Message Integrity Check is an encryption method used to prevent a hacker from changing the data content. An encryption algorithm and bit checksum at both the sender and receiver ends are used to check for alteration of the packet content.

5.1.3 Access Authorization

When the client is approved and authenticated for a communication session, the client receives a unique WEP key from the security server, such as a RADIUS server, under the 802.1x/EAP authorization specification. A new WEP key is issued for each connection, thus improving security, and the WEP key is updated regularly at a preset time interval. Another method to screen out unauthorized users is MAC address filtering.

ESS-ID – Extended Service Set Identification is a type of unique identifier applied to both the AP and the wireless client, as well as each information packet. It allows APs to recognize each wireless client and its traffic. This option, however, does not provide sufficient security for today's wireless networking environment. If the ESS-ID is set to "any" or "null", anybody can connect to the AP. Also, Windows XP automatically displays the ESS-ID of the AP when a client receives a "beacon." This is because APs transmit their ESS-ID periodically and these transmissions can be easily intercepted.

MAC Address – Media Access Control address is a hardware address that uniquely identifies network hardware such as a wireless NIC or an AP. It is easy to access a network with a stolen wireless NIC. Although it is used as the top level filtering, it is not secure enough, because MAC addresses can be duplicated by non-registered users.

5.1.4 IBSS Security

IBSS – Independent Basic Service Set security is used for ad hoc communications like the point-to-point protocol (PPP) method. WEP and MAC address filtering can be used at this point.

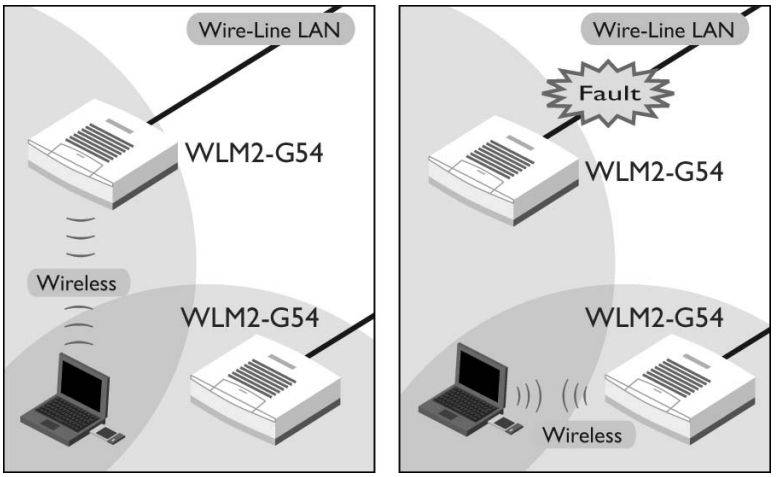
5.2 Integrity Features

5.2.1 Improved Fault Tolerance

A company's Intranet is an important corporate communication backbone, so the WLM2-G54 AP offers features for network stability, which is achieved through the system's redundant switching function, activated automatically in the event of faults. The auto system redundancy provides the network reliability necessary for mission critical applications.

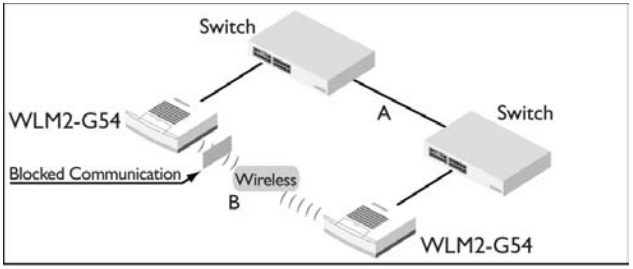
5.2.2 Link Integrity

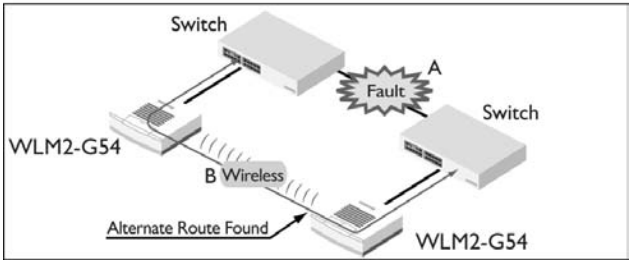
When multiple access points use the same frequency for roaming, they tend to interfere with each other. The WLM2-G54 AP automatically switches all PCs under the same wireless ESS-ID to another available access point if the current access point becomes disconnected form the network, thus preserving the connection and throughput.



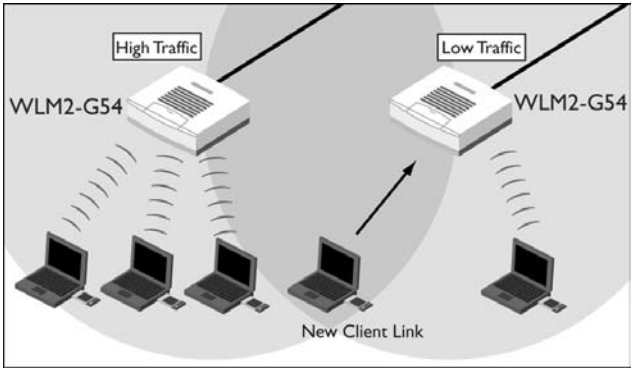
5.2.3 Spanning Tree (IEEE802.1d)

Network looping often results in repeated packet transmission, which causes overloads and interruption of communications. The Spanning Tree in a network loop disconnects one of the links, rerouting the traffic in the





event of failure, avoiding packet sending repetition and increasing network stability.



5.3 Network Load Distribution Features

5.3.1 Load Balancing

This feature enables automatic selection of an available access point with the least load among multiple APs. It allows easy roaming, and the network stability can be increased significantly through even distribution of the traffic load.

5.3.2 Repeater

The WLM2-G54 AP can act as a repeater to other APs. This feature provides a solution for clients operating in the "dead zone," where signal does not reach. Combination of this function and add-on antennas can offer extended range.

5.3.3 WDS – Wireless Distribution System

WDS is used to create access-point to access-point communications when a CAT5 cable cannot be used or is unavailable. Similar to repeating, it is primarily used to extend the reach of the WLAN. Displaying the name of the available AirStation while roaming is also possible.

5.4 Network Administration Features

5.4.1 SNMP – Simple Network Management Protocol

The WLM2-G54 AP supports SNMP. Each unit acts as an SNMP agent so that the network connection status and configuration information may be accessed remotely through the SNMP manager, which enables centralized traffic and fault monitoring.

5.4.2 Syslog

This feature allows sending a copy of the system log to the Syslog server automatically. The log contains information on the operating status of each device, which enables real-time monitoring of operational data, fault data, user login data and other such information. Although the WLM2-G54 model supports

the Syslog server as a part of its administrative utilities, it is possible to use additional off-the-shelf Syslog server software.

5.5 Easy Support Features

Buffalo periodically releases new firmware updates for AirStation products. The firmware is easily uploaded to the AirStation from a PC. Look for new firmware releases on our website.

6.0 Network Solutions

Some basic application scenarios are described in this section. In each scenario specific features of WLM2-G54 are highlighted.

6.1 Typical Office Situations

Buffalo's total wireless solution can provide network connections to distant factories and branch offices efficiently and economically. Remote setups and remote administration functions allow easy detection and quick troubleshooting of network problems. The solution works even when multiple access points are used simultaneously. Buffalo offers the most economical wireless building-to-building communication solution available.

6.2 Apartments or Condominiums

Newer apartments require an Internet-ready solution. Providing separate Internet access to each room can be very expensive, not to mention the high costs of initial installation. Buffalo's wireless solution benefits both the landlord and the tenants. Internet access (by a single DSL or CATV line) to the apartment building can be shared by multiple PCs (or rooms) anywhere in the building, a unique feature of wireless systems. Additionally, the

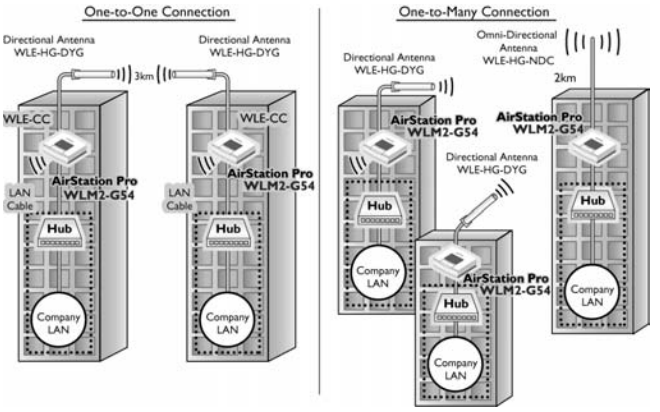


Figure 5.4 Network Administration Features

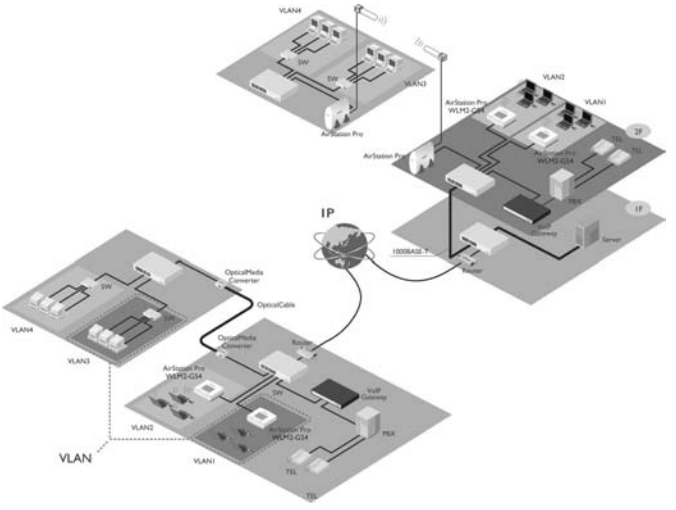


Figure 5.1 Typical Office Situations

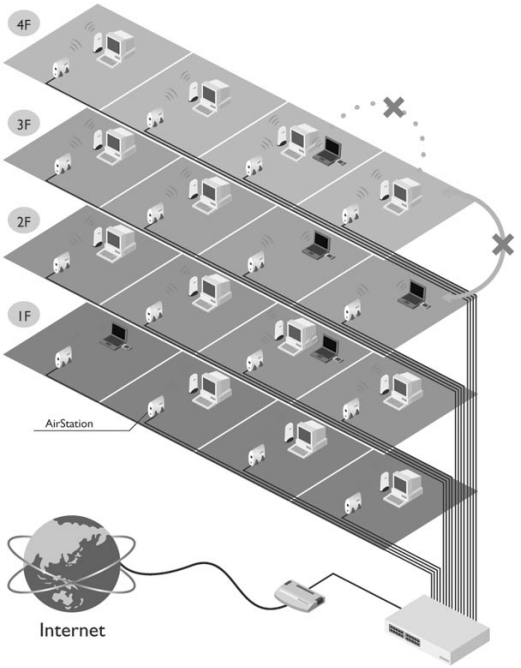


Figure 6.2 Apartments and Condominiums

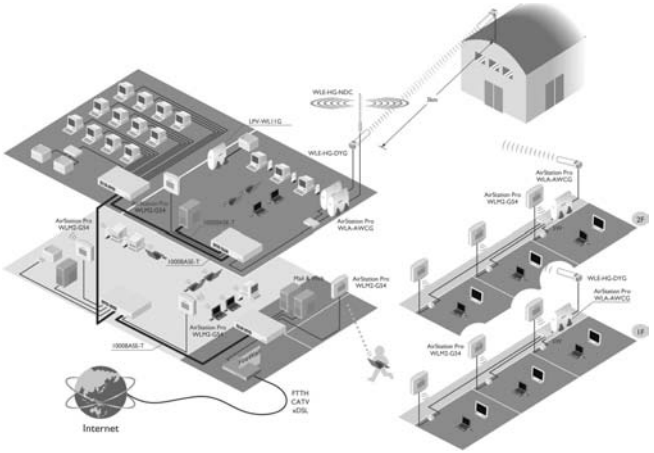


Figure 6.3 Schools

system can be set with authenticated security so that only the authorized tenants can access the network. Buffalo's wireless solution can be used as an optional fee-based service.

6.3 Schools

Sometimes it is necessary for students to have personal Internet connections for schoolwork. Wireless LANs make the network connection flexible within a school campus. The broadband availability area can be expanded using Buffalo's wireless building-to-building solution. This solution uses an outdoor antenna for each building instead of installing CAT5 cable between buildings. Accessing the network and Internet anywhere and anytime on campus is a part of Buffalo's total support of educational technology.

6.4 Hospitals

Medical test results and diagnostics for each patient in the hospital database should be updated in real time. The wireless solution used to connect to the hospital network can be crucial for saving patients' lives. For example, the newest diagnostic data is updated to a hand-held wireless device at the patient's bedside so that the appropriate prescription is prepared on time. Similarly, surgical data can be transmitted to a central database in real time for crosschecking the operating procedures. In these cases, there is no need for network cables. The security of wireless communication is well enhanced by MAC address filtering (port security) so that only authorized personnel can access the hospital network.

6.5 Factories

In this scenario, a wireless LAN is seen in a manufacturing line in a factory. A variety of control machines and robots are connected to the central server and operated wirelessly. Using Buffalo's wireless networking system, the manufacturing data is sent to the factory server immediately so that the center can efficiently respond to decisions and com-

mands. With a wireless LAN, any changes in the factory's machine layout can be completed quickly. Wireless flexibility offers installation and operation cost savings for the factory.

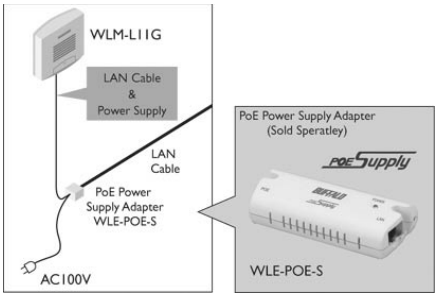
6.6 Area Intranets

Community buildings such as schools, city halls, gyms, etc., can be connected by Buffalo's wireless LAN system to form an area Intranet. Buffalo offers the most effective wireless solution for building-to-building applications. There is no need for costly and time-consuming installations of fiber optics and cables between buildings. Additions to and expansion of the wireless network are simple and flexible. Using Buffalo's wireless solution within the building provides additional freedom and quick data deployment/configuration changes to network systems.

7.0 Support Functions

7.1 PoE - Power over Ethernet

PoE based on the IEEE802.3af specification, draft 2.0, provides power in a CAT5 cable, thus eliminating the need to use a separate power supply cable. It must be used with Buffalo's supply adapter WLE-POE-S (sold separately) as shown below. With PoE, the user can locate a WLM2-G54 anywhere without the need for a power outlet nearby.



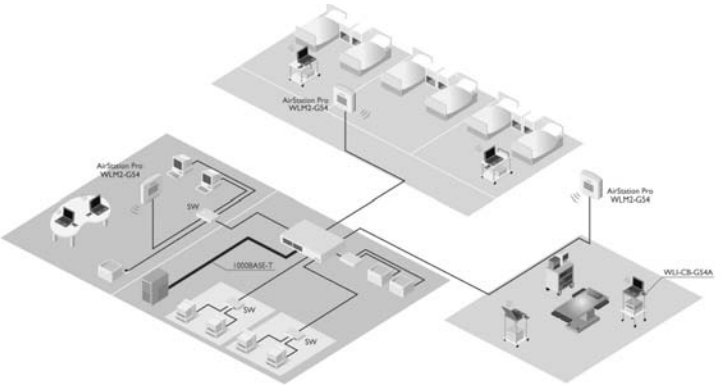


Figure 6.4 Hospitals

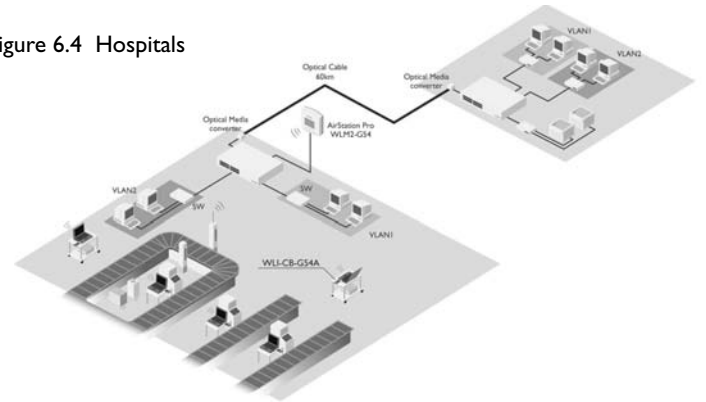


Figure 6.5 Factories

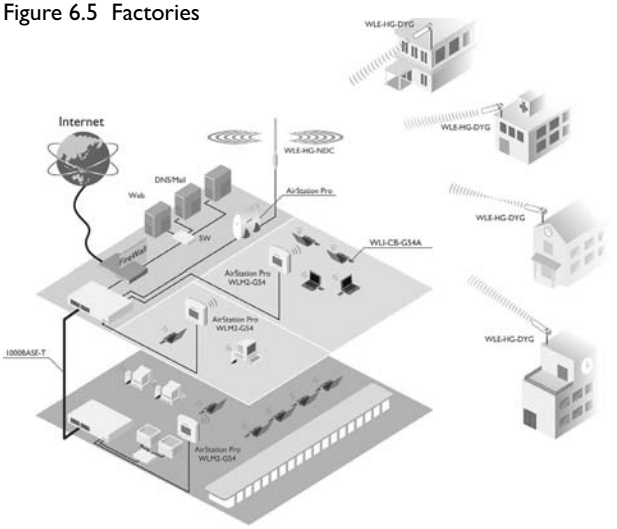


Figure 6.6 Area Intranets

7.2 Environmental Resistance

The WLM2-G54 AP's high durability design allows resistance to environmental conditions like temperature changes. Since it is less susceptible to environmental change, it is suitable for warehouses, public areas and other locations where temperature control is not available. Optional dust-proof and waterproof casings are available.

7.3 Upgradeable Firmware

With Buffalo's firmware upgrade utility tool, updating the firmware will be simple.

7.4 Diagnostic Support

The WLM2-G54 provides tools to monitor and methods to correct its wireless operations. Some of these tools are device status, packet status, wireless PC information, ping test, log information and re-initialization of parameters.

PART II

8.0 Client Configuration
8.1 Introduction II

This chapter provides general information about:

- Basic Setup
- Time Setup
- Administrative Managing
- Bridging Setup
- Routing Setup
- Packet filtering Setup
- Limiting wireless client number
- WDS (AP-to-AP) Setup
- Wireless Setup

Explanations for each parameter and details of how to use the parameter are described in the next chapter. Connecting and setting up the access point for accessing the Internet quickly are the objective of this chapter.

8.2 Setup Preparation

The following parameters must be known before setting up the WLM2-G54 Intelligent Access Point. If you do not have these, you should consult with your IT personnel.

- WLM2-G54's ESS-ID
- WLM2-G54's system name or location name
- WLM2-G54's IP address. If you plan to use DHCP, this is not necessary.
- WLM2-G54's wired side MAC address. Check the label on the back of the WLM2-G54.

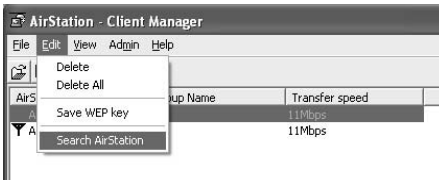
8.3 Setup Overview

A general setup process is shown below. Special setups for security, filtering and others will be explained in later sections.

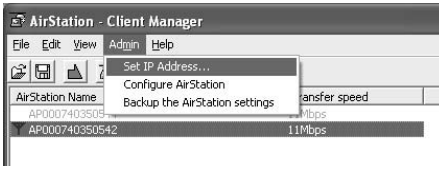
1. Connect the cables to WLM2-G54 based on the wiring instructions. It is possible to use a straight cable to connect the AirStation directly to your PC. In this case you need some type of Terminal Software to set up the WLM2-G54.
2. The PC must have a valid TCP/IP setting. For the TCP/IP setup or to check it, please refer to the instructions for your OS (the default IP and subnet address of the WLM2-G54 is 1.1.1.1 and 255.255.0).

8.4 Installation of the Client Manager

1. Insert the Air Navigator CD into the CD-ROM drive.
2. Start the Install wizard. If the wizard does not start, double click the Setup.exe file in the Air Navigator CD. Install the Client Manager.
3. Click Start and select Programs / AirStation Utility / Client Manager to open the Client Manager. The setup PC must have a valid IP address of its own.
4. Select Edit / Search AirStation to look for the nearest AirStation. Highlight the WLM2-G54.



5. After finding an AirStation, select Admin / Set IP address.



6. Either enter the IP and Subnet Mask address in the boxes or select DHCP.

7. Leave the Password box empty. Click OK.
8. IP address setup is complete.

8.5 Setup Screen

1. Highlight the WLM2-G54, click the "Admin" button, then the "Configure AirStation" tab to open the setup screen. In the password page, enter the following information:

   User Name: root

   Password: [leave blank]

   Click OK.

2. Select the language you want to use. English and Japanese are available.

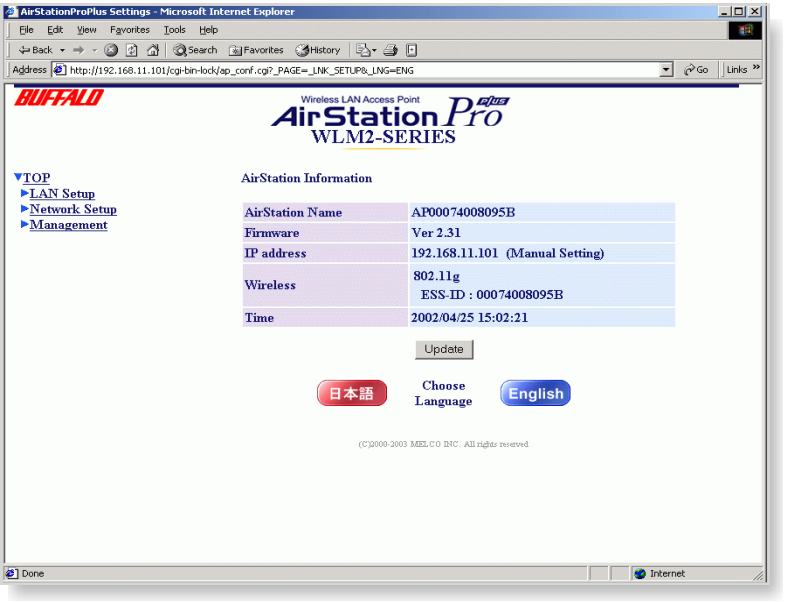


Figure 8.5 Setup Screen

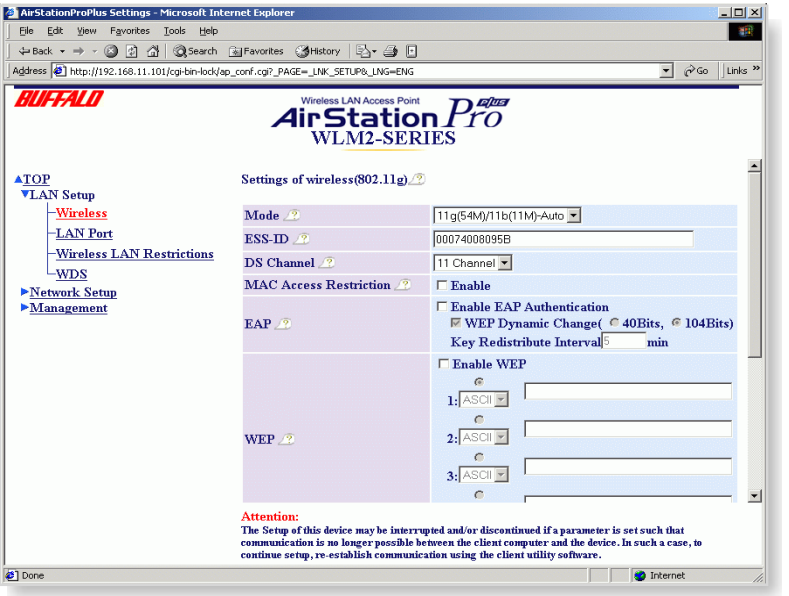


Figure 8.6.4 Security Settings

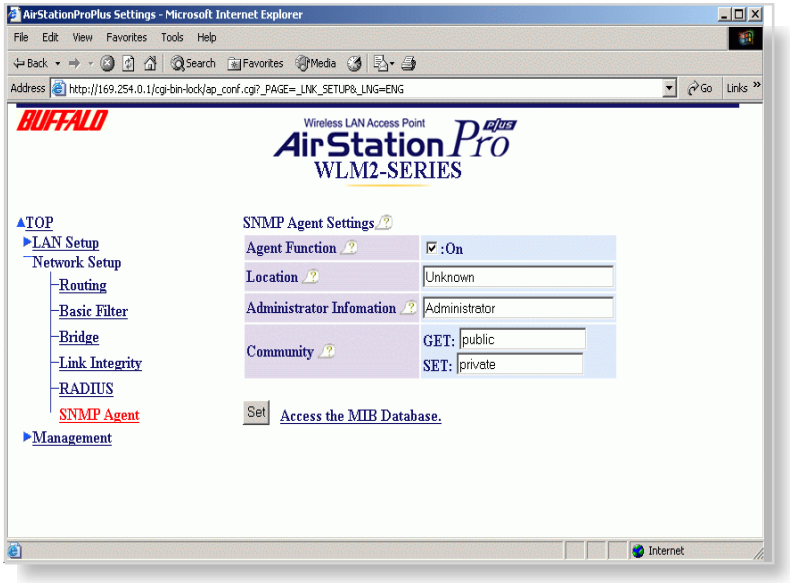


Figure 8.6.7 SNMP Function

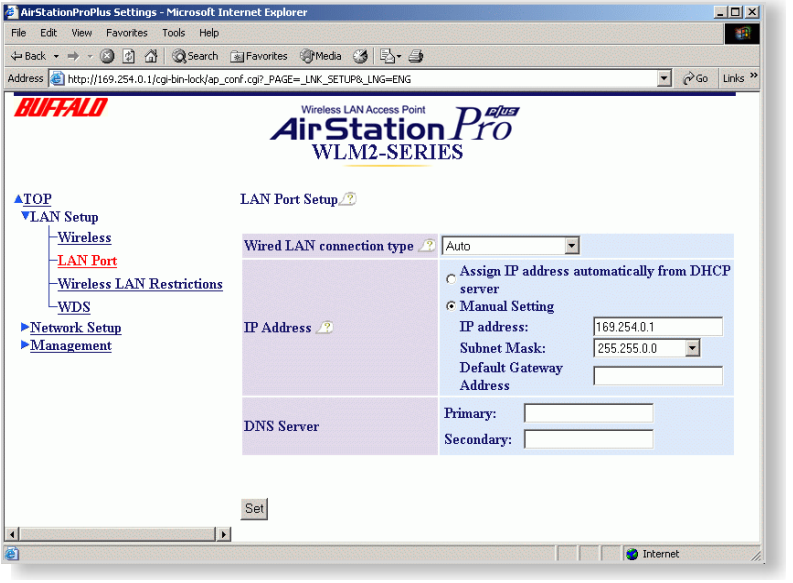


Figure 8.6.9 DHCP and manual IP configuration

8.6 Input Parameters Through the Client Manager

1. Click the "Management" to open the next page.
2. Click the "Time Settings" menu on the left (menu section) to set the current time. Click Set.
3. Click the "LAN Setup" menu on the left; then click the "Wireless" menu.
4. Enter appropriate ESS-ID and channel number. (see previous page)
   ■ Note: ESS-IDs are case sensitive, up to 32 alphanumeric characters in length.
5. Select WEP Enable box. Enter appropriate WEP key on line 1. Click Set. Click Set again.
6. Click the "Network Setup" menu on the left.
7. If you want to use the Agent Function, check "On" and input the WLM2-G54's location, and Administrator Information. Click Set.
8. If the WLM2-G54 is operated in a large network environment, using a pre-determined name identification system may be recommended, to help identify the WLM2-G54 easily. In order to set the name, click the "Host Setup" menu to open the basic setup page. Type an appropriate name in the "AirStation Name" box. Click Set.
9. On the LAN Port page, you may opt to obtain the IP address from the DHCP server or enter a static IP address manually for the access point. If you are given a default gateway IP from your ISP, input that address. If it is not given to you, leave the box empty. Click Set.

8.7 Input Parameters Through a Wired PC, Terminal Software

1. Use the serial cable provided to connect the WLM2-G54 to the PC's COM port.
2. Start the HyperTerminal software included in the Windows OS. HyperTerminal is a standard software in Windows but it is

possible to use any other off-the-shelf software.

■ Note: If the AirStation is already connected by Telnet or Client Manager, you cannot log in from the terminal software.

3. Setup the terminal as follows:

   Baud rate: 57600

   Data bit: 8

   Parity: None

   Stop bit: 1

   Flow Control: None

4. When the "Apxxxxxxxxxxxxx login" prompt appears, login the WLM2-G54 by "root".
5. Set the WLM2-G54's time by using "date" command: Setup date year/month/date

   (use two digit number for the month and the date, Example: "set date 2002/03/27")
6. Set the WLM2-G54's ESS-ID by using "essid" command.
   airset 11g essid xxxxxx
   (ESS-ID is defined by up to 32 alphanumeric characters. The default value is 12 digits. You can reset the ESS-ID to the default value by using "airset 11g essid_default" command.)
7. Set the WLM2-G54's wireless channel. Use
   "airset 11g channel xx"
   command. Select one number from 1~11. The default number is 11.
8. Set the WLM2-G54's WEP. Use "airset 11g wep xxxx yyyy zzzz" command. Xxxx is the key type (40 or 128bit) and yyyy is the key index number and zzzz is the actual key as shown below.

   Keytype: Key – 40bit WEP

   Key128 – 128bit WEP

   Key index: The index number of the WEP to be used, select one from 1~4. The default is 1.

   Key: "text" + 5 blank spaces + 5 letters or 10 digits hexadecimal (for 40bit WEP) or 13 characters or 26 digits hexadecimal (for 128bit WEP)

   ■ Note: the text must be used with " " mark.s. Examples:

   airset 11g wep key text "skey5"

   airset 11g wep key a3d58bb632

   airset 11g wep key index 1 text "skey5"

   If you want to clear the WEP key use: airset 11g wep keytype clear (the keytype is explained above).
9. Set the WLM2-G54's system ID name. Use the "set apname xxx" command. Xxx is a numeral of up to 32 characters. An example is: Set apname AirStation01. If you need to re-set the device to default name use the following example. Set apname _default.
10. Set the WLM2-G54's IP address. Use "ip address lan0 assigned_ip" command. Assigned_ip: The IP address assigned by your ISP. Examples:

    Ip address lan0 192.168.100.60/ 255.255.255.0 – manually input the IP address and Netmask.

    Ip address lan0 dhcp – use the DHCP server

    Ip address lan0 clear – clears the IP address
11. Set the WLM2-G54's default gateway. Use "ip defaultgw gw_ip" command. Gw_ip is the assigned gateway IP. Example: gw_ip 192.168.0.10

8.8 Input Parameters Through a Wired PC, Telnet Software

The WLM2-G54 setup can be performed by using Telnet software similar to the Terminal software above.

In order to bring up the setup page:

1. Connect the supplied serial cable to the AirStation and the PC's COM port.
2. Select Start / Run.
3. Input "Telnet <WLM2-G54's IP address>" in the file name and press "Enter". The IP address can be identified through the Client

Manager or Terminal Software setup screen.

4. When login prompt appears, enter "root" as a default login name.
5. Input "?"/press "Enter" to view list of commands.

PART III

9.0 Detailed Configurations

9.1 Introduction III

Although your AirStation will work fine in most network environments, you may wish to explore the advanced options. This chapter explains each parameter in the setup screen.

9.2 Basic Settings

Basic Settings includes the following parameters:

AirStation Name

Connection type

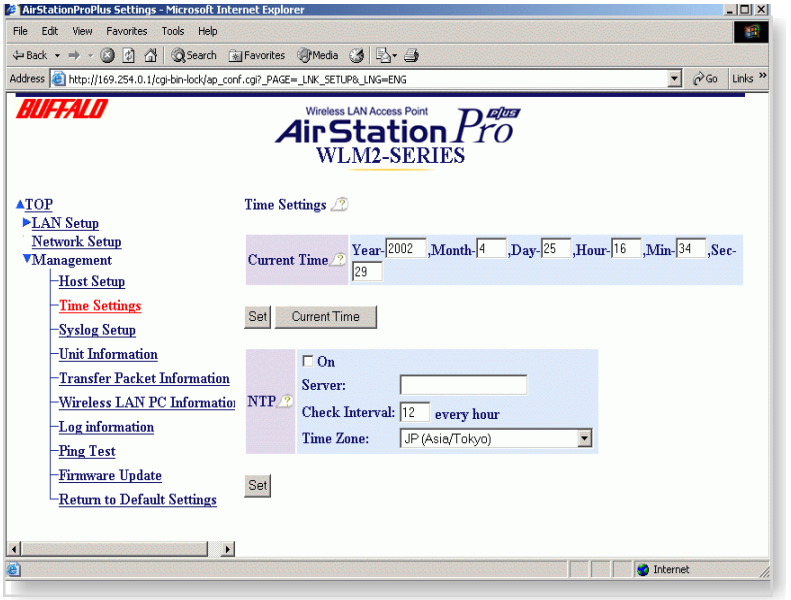


Figure 9.3 Time Settings

IP address

Default Gateway

DNS Server

9.2.1 AirStation Name

A unique name can be set for your AirStation in order for clients to recognize it. It identifies each access point when multiple access points are present. Although it is not necessary to set this parameter, it can be useful. Once it is set, the name will be shown at the top of the initial setup screen.

9.2.2 Connection type

The following options are possible for the wired LAN port setting:

10 Mbps Half Duplex

100 Mbps Half Duplex

Auto

If the port on the LAN hub is set to Full Duplex, set the WLM2-G54 to Auto.

9.2.3 IP Address

If you do not use a DHCP server on your network, you have to assign an IP address manually. A specific IP address should be obtained for this. You can use DHCP by selecting "auto IP assignment from DHCP Server."

9.2.4 Default Gateway

A default gateway IP should be assigned to the AirStation. If the gateway IP is unknown, leave the box blank. If "Auto IP assignment from DHCP Server" is selected, the gateway IP will be assigned automatically.

9.2.5 DNS Server

Input the IP address of the server to be used by the WLM2-G54 for DNS resolution. If DNS is not used, leave blank.

9.3 Time Settings

Input the correct time manually or input the NTP server on your network. Using NTP Server: Check ON box in NTP. Specify the NTP server name, check interval, and time zone. (see previous page)

9.4 Management

Management Settings includes the following parameters:

Host Setup

Time Settings

Syslog Setup

Unit Information

Transfer Packet Information

Wireless LAN PC Information

Log Information

Ping Test

Firmwave Update

Return to Default Setting

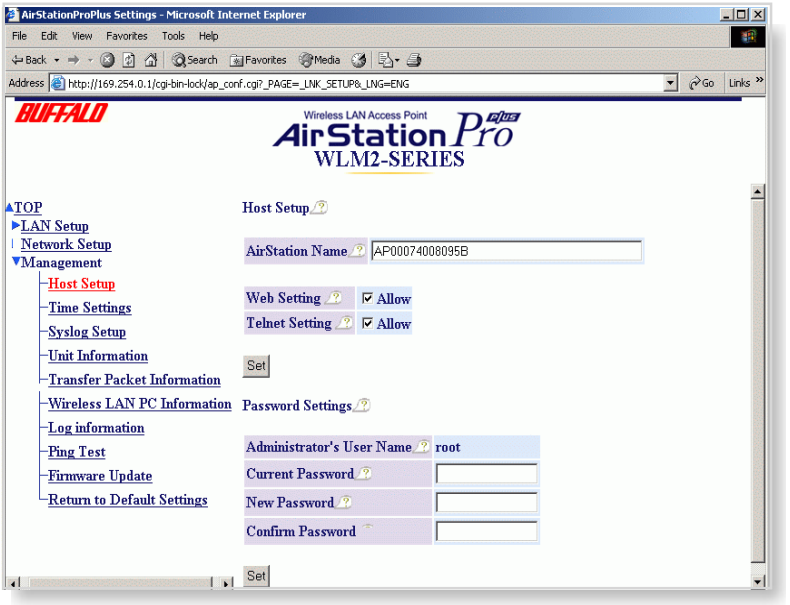


Figure 9.4.1 Host Setup

9.4.1 Host Setup

The user ID is "root". The default password is blank -- no password.

To input a new password:

- Enter the password in the "New Password" field
- Re-enter the password in the "Confirm Password" field

If you are changing an old password, you must enter the old password in the "Current Password" field also.

Configuration of the WLM2-G54 via a web browser (including Client Manager) or a Telnet session may be enabled or disabled here. A wired session via the serial port and terminal software may be used to configure the WLM2-G54 if WEB and Telnet are disabled.

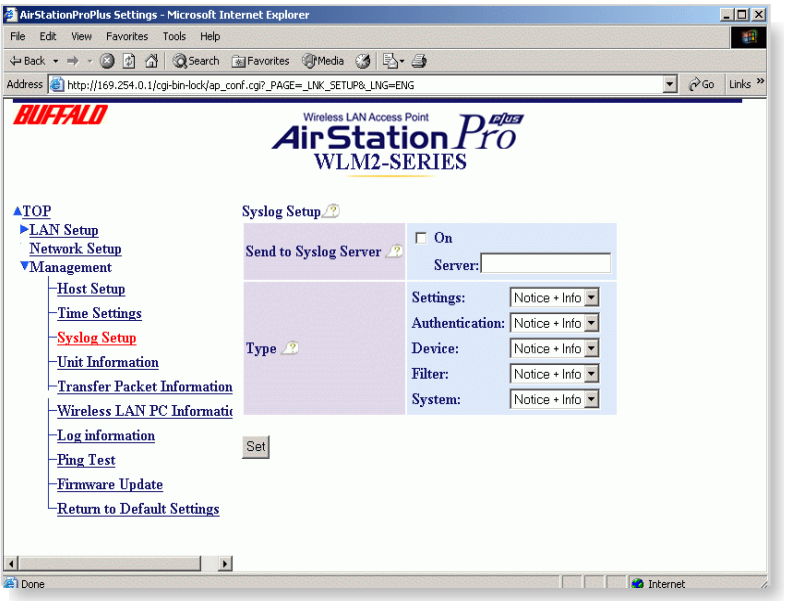


Figure 9.4.2 Syslog Setup

9.4.2 Syslog Setup

This enables reporting to the syslog server. Check the "ON" box if you want the system logs to be sent to the log server. The setup for the log server should be found in the syslog's manual. The following log type can be tranfered: Setting, Autheutification, Device, Filter, and System.
(see previous page)

9.4.3 Moved to Network Setup section

Enabling the SNMP agent function allows the following:

Access from the SNMP manager. Access the WLM2-G54 local MIB information (through a web browser) such as the WLM2-G54's location, the WLM2-G54's administrator, and the SNMP community where the WLM2-G54 belongs.

When MIB file is accessed, the following object ID (the ID which indicates information to be included in general network devices) or the number will be used.

System(1)=General administrative information

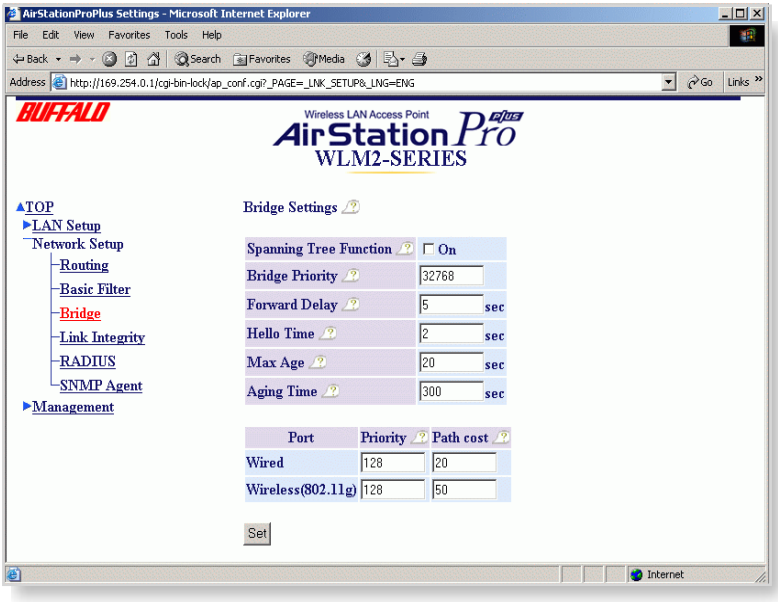


Figure 9.5 Bridge

Interfaces(2)=PHY interface information

IP(4)=Whether IP is working or not.

Icmp(5)=Whether ICMP protocol is working or not.

TCP(6)=Whether TCP protocol is working or not.

UDP(7)=Whether UDP protocol is working or not.

SNMP(11)=Whether SNMP is working or not.

The number that corresponds to the ID will be displayed. If you want to assign a different value, input the desired value and click "Set."

9.5 Bridge

Bridge settings includes the following parameters:

Spanning Tree Function

Bridge Priority

Forward Delay

Hello Time

Max Age

Aging Time

Port Priority

Path Cost

9.5.1 Spanning Tree

This function is used to prevent data from being circulated infinitely when the network is a loop type.

9.5.2 Bridge Priority

The priority of the bridge can be set anywhere between 0~65535. The value depends on how you form the Spanning Tree. The primary routing bridge within the Tree must be assigned the minimum value. An arbitrary value can be assigned to other bridges. The default value is 32768.

9.5.3 Forward Delay

Data forwarding can be delayed by a preset length of time. The delay time value may be from 4~30 seconds. The default value is 5 seconds.

9.5.4 "Hello" Time

The Hello message (to the network) broadcast time interval can be changed. The "Hello" message is used to set up network routing under the Spanning Tree protocol. The interval can be 1~10 seconds. The default value is 2 seconds.

9.5.5 Max Age

The "Hello" message time out period can be changed. The time out period starts the spanning tree elapse timing calculation once the "Hello" message signal reception has ceased. Once the Max Age time period is exhausted, the network topology will change.

9.5.6 Aging Time

Self-learned or registered MAC addresses that are not active will be erased after the Aging Time has elapsed. The value can be set anywhere from 10~1000000 seconds. The default value is 300 seconds.

9.5.7 Port Priority

The priority of the STP port can be set from 0~255. Smaller values will have higher priority. The default value is 128.

9.5.8 Path Cost

The primary bridge owns a lower cost than the cost to other bridges so that the "Hello" message issued from the primary bridge automatically adds the cost to the message received from its parent bridge. The "Hello" message issued from a route bridge has 0 as the route path cost.

9.6 Routing

Communication routing can be set between WLM2-G54 and other network devices in the same network. The following parameters

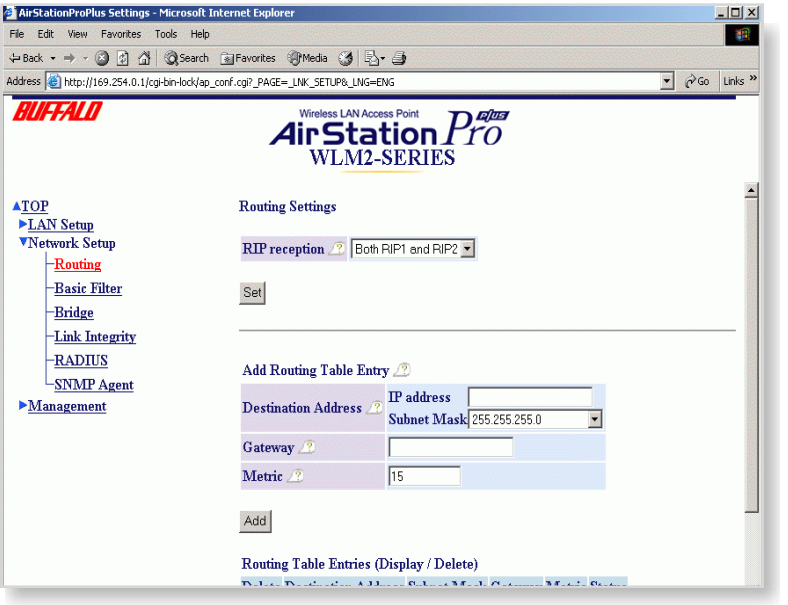


Figure 9.6 Routing

are supported:

RIP reception

Add Routing Table Entry

Routing Table Entries

9.6.1 RIP Reception

The RIP information received by the WLM2-G54 can be set to RIP1, RIP2, RIP1 and RIP2, or no RIP. The default is both RIP1 and RIP2.

9.6.2 Add Routing Table Entry

Routing (or RIP) information can be set manually. The following parameters will be used. Destination address=The network IP address and the subnet mask for the destination. Gateway=The packet to the destination passes through the gateway address.

Metric=total number of routers to be passed before the packet reaches its destination. You can select from 1~15. The default value is 15. click "Add."

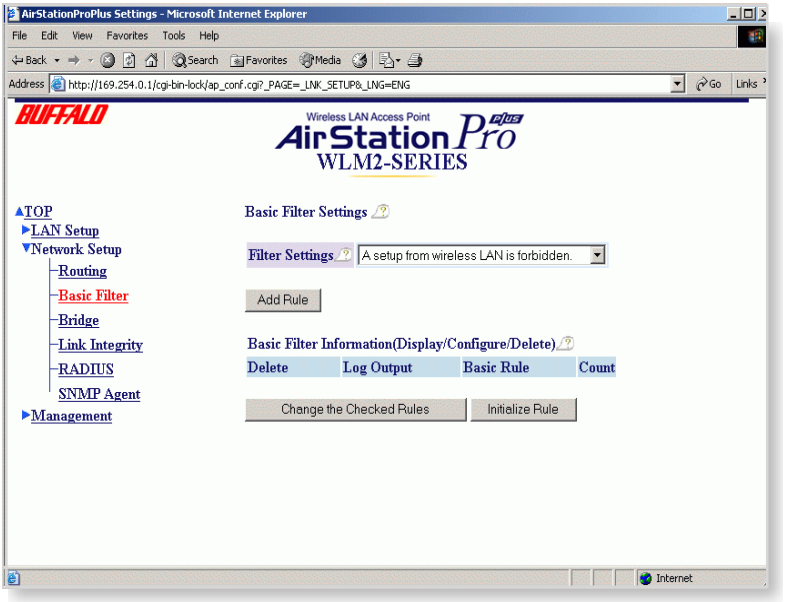


Figure 9.7 Basic Filter

9.6.3 Routing Table Entries

Set routing information recognition and elimination. Check the item to be eliminated; then click "Delete Checked Items."

9.7 Basic Filter

This is a simple filter for limiting access to the WLM2-G54.

9.7.1 Filter Settings

Four filters can be enabled by clicking "add the rule." They are:

- A setup from a wireless LAN is forbidden. This will prohibit access to the WLM2-G54's configuration screen from a wireless client.
- A setup from a wired LAN is forbidden. This will disable access to the configuration screens from a wired LAN PC.
- A setup over an AP is forbidden. This keeps anyone who is actually connected to a DIFFERENT AP from configuring the WLM2-G54.
- A request from a WLAN is ignored.

Changes to the parameters (DHCP, DNS, etc.) are locked out. If you make a mistake here and "lock yourself out," the WLM2-G54 can be returned to the factory default settings (ALL of them!) by holding down the INIT button on the back of the unit for 3 seconds.

9.7.2 Basic Filter Information

Displays the current settings. To change a setting, check the box on the item to be changed and click "delete the checked rules." The setting can be reset to the default by clicking "Initialize Rule."

9.8 RADIUS

Set up RADIUS parameters. When a client requests communication with the WLM2-G54 access point, the WLM2-G54 reports its own MAC address to the RADIUS server and asks for communication approval to the client. Once the client is recognized by the RADIUS, the RADIUS issues a key to the AP as well as the client for initiation of communications.

Server Name=The name of the RADIUS server or the IP address.

Port Number=The port number to be used at the RADIUS upon approval. Some systems use 1645 as the default port number.

Shared Secret=The secret key to be used between the WLM2-G54 and the client. It is the same key used between the RADIUS server and the AP for communication. Use numeral characters between 1~255.
(see next page)

9.9.1 Manual Setting

MAC addresses may be added to the authorized list manually. If RADIUS is enabled, the user must first be authenticated. Enter the MAC address in the "MAC address of wireless LAN PC" field and click "add." The MAC address must be in two-digit groups separated by colons. For example, 00:40:26:00:11:22. (see next page)

9.9.2 List of the Wireless PCs

Displays the PCs that are communicating with the WLM2-G54. Check the "registration" box and click the "change" button to add a MAC address.

9.9.3 Authorized Wireless LAN PCs

Displays all MAC addresses that are allowed to communicate with the WLM2-G54. The status shows the current active MAC addresses on the network. To eliminate a specific MAC address from the network, check the "delete" box and click the "change" button.

■ Note: If configuring from a wireless PC, add your MAC address to the list of authorized wireless LAN PCs (MAC restrict screen).

9.10 Wireless

Wireless communication parameters and how to use them under the "IEEE802.11g" page. (see next page)

9.10.1 Add Peer AirStation (MAC Address)

The wireless LAN MAC addresses of all AirStations that will be communicating with each other have to be registered in each AirStation. Up to 6 AirStations can be registered in one AP. Input the MAC address in the two-digit format (00:40:26:00:11:22). Click "add" to register the MAC address. The added MAC address is checked in the "wireless MAC address" under the Diagnostic screen, on the Device Information page.

1. Open the Configuration Screen of the primary WLM2-G54, and go to the LAN Settings screen
2. The User Name should be "root", and there is no password unless you have set one up on a previous configuration session.
3. Click on the WDS link at the bottom left side of the screen.

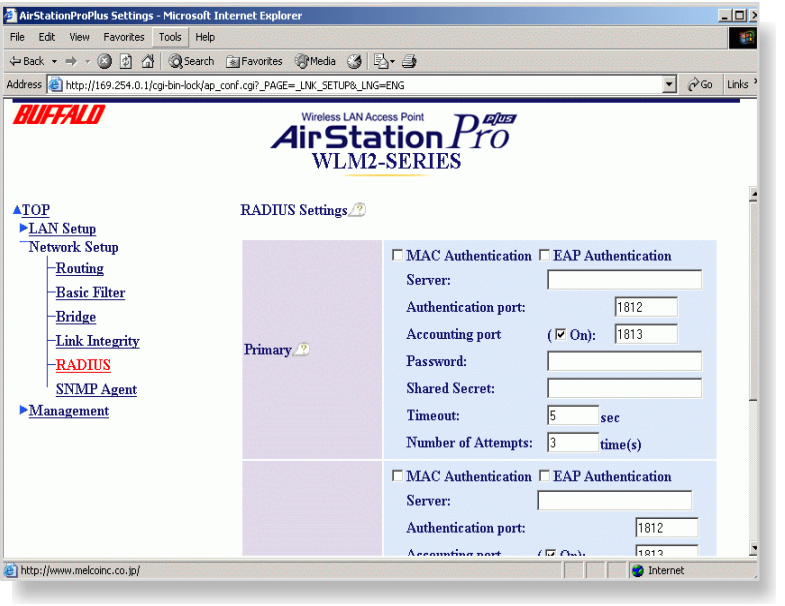


Figure 9.8 RADIUS

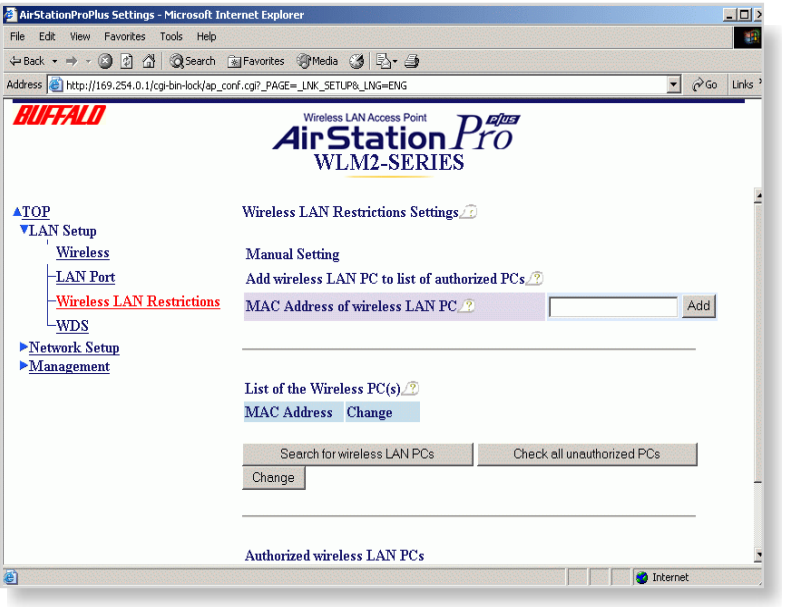


Figure 9.9.1 Manual Setting

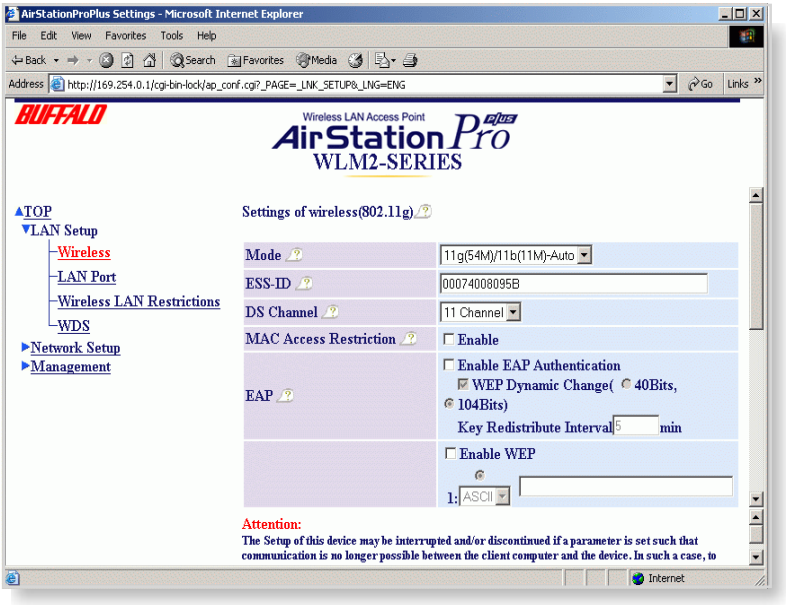


Figure 9.10 Wireless

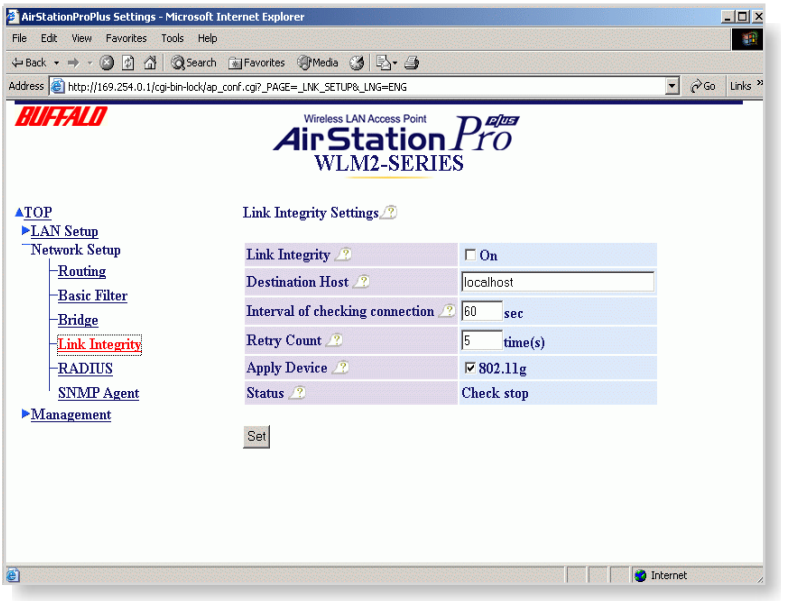


Figure 9.11 Link Integrity Settings

4. You will need the Wireless MAC address of the target WLM2-G54. Enter its MAC address in the field labeled "MAC Address of AirStation (Wireless)." Use the format XX:XX:XX:XX:XX:XX for the MAC address.
5. Click "Add." Repeat this process for up to 5 additional access points.
6. Once all of the MAC addresses are entered, repeat this process for each WLM2-G54 you wish to set up for AP-AP communications. The second WLM2-G54 must have the MAC address of the first one.

   Example: Suppose you wish to set up three units, #1 as a central unit, with #2 and #3 talking to #1, but not to each other. AP #1 would have the MAC addresses of both #2 and #3, as noted above, but #2 and #3 would only have the MAC address of #1.

9.10.2 ESS-ID

Allows administrator to alter the ESS-ID of the AirStation. To communicate with a specific AP only, the AP's ESS-ID must be entered in the client computer. The client looks only for that specific AP (or ESS-ID) for wireless communication. Use up to 32 alphanumeric characters for the ESS-ID (case sensitive). Roaming is possible by setting identical ESS-IDs and WEP in WLM2-G54s.

9.10.3 DS Channel (Wireless Channel Set)

The channel to be used for wireless communication. There are 11 channels.

■ Note: This is automatically set in the client computer.

9.10.4 MAC Restrict

Enable or disable access by MAC address through the wireless LAN network infrastructure mode.

9.10.5 EAP

Configure EAP authentication process.

Configure EAP in the Security/802.11g screen.

■ Note: For MAC Access Restriction, do not check the "Enable" box until you have set up Authorized MAC addresses (Section 9.8.4.3).

9.10.6 Privacy, WEP

Set the encryption method used in wireless communications for the protection of your data. It is necessary that the WEP key match between two parties for secure communications. If multiple keys are used, the order must match between communicating devices. Examples of WEP key input are:

- 5 digits of ASCII characters. They are case sensitive and "_" is allowed, i.e. Skey5.
- 10 digits of hexadecimal numbers, i.e. a3d58b62fe.
- If WEP is not used, leave the box blank or input all 0s, which is equivalent to no-WEP.

9.10.7 PS - Privacy Separator

Enables automatic selection of the WLM2-G54 with the least load within the roaming area. If PS is used, communications between wireless clients will be automatically blocked. All clients are forced to go through the WLM2-G54 and the system's combined security measures.

9.10.8 BSS (Basic Service Set) Basic Rate Set

The transmission data rate between devices. If one device supports 2Mbps only, the data rate for the entire network will be limited to 2Mbps. Otherwise, use 11Mbps max.

9.10.9 DTIM Period

WLM2-G54 transmits beacon signals to nearby clients in the preset interval. Once this option is used in the AP, the client must set the power management of the client card in order to control the beacon interval. Select a number from 1~255 sec. Selection of a larger number may save energy consumption, but it may delay wireless communication. The default value 1

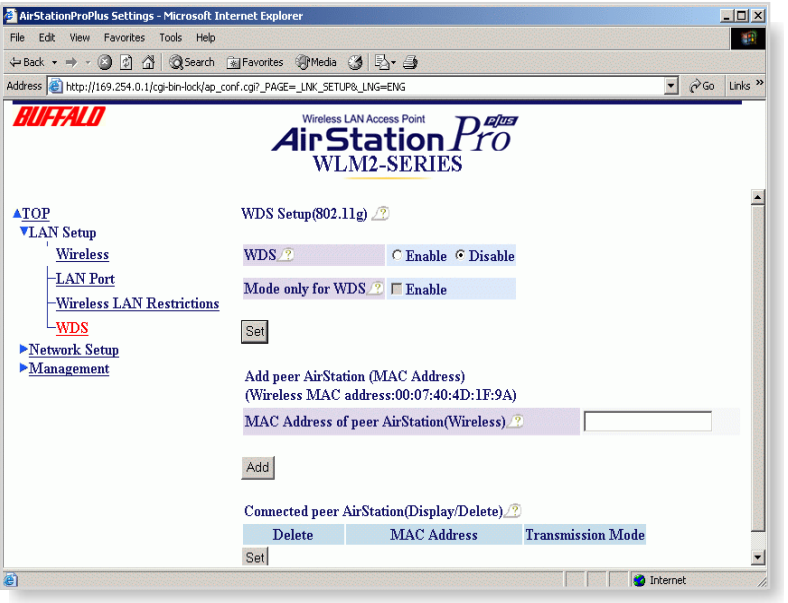


Figure 9.12 Wireless Distribution System Settings

recommended.

9.10.10 ANY Connection

Allows a client PC to connect to the nearest WLM2-G54 by manually entering the word "any" for the ESS-ID in the Client Manager. If the "ANY Connection" is deselected in the WLM2-G54, the WLM2-G54 will not be found using the ESS-ID of "any" in the client PC.

9.11 Link Integrity Settings

Link Integrity is a rerouting feature activated when the wired connection is lost.
(see previous page)

9.11.1 Link Integrity

Enable or disable the Link Integrity feature.

9.11.2 Destination Host

Specify a host server name to which the WLM2-G54 sends packets to confirm connection.

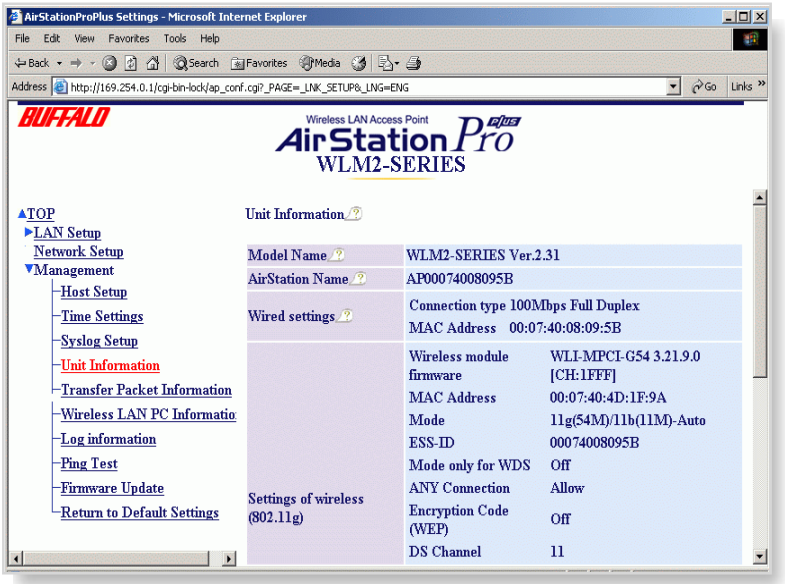


Figure 10.2.1 Unit Information

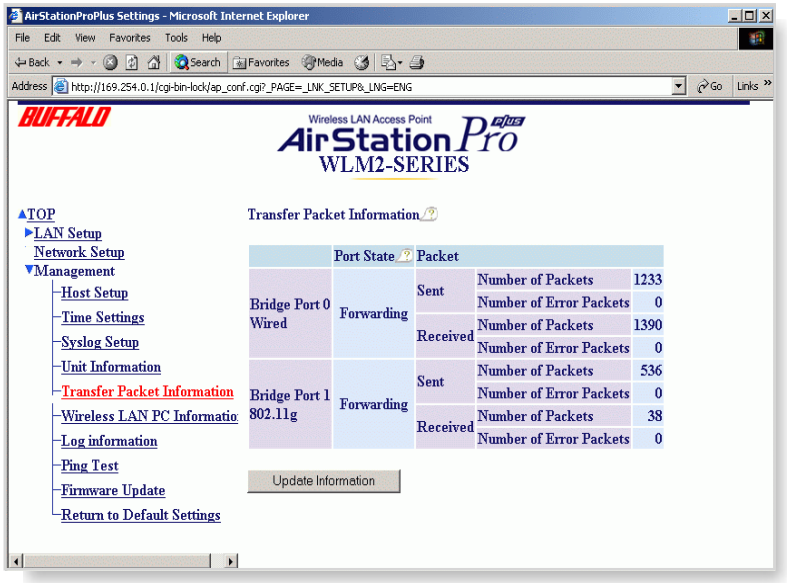


Figure 10.2.2 Transfer Packet Information

9.11.3 Interval of Checking Connection

Interval timer to check connection with destination host.

9.11.4 Retry Count

The number of times a retry will be attempted when a failed connection is detected. The retry is performed every 2 seconds.

9.11.5 Apply Device

Specify wireless device that is applicable Link Integrity function.

9.11.6 Status

Link integrity status.

9.12 Wireless Distribution System Settings

WDS is used for wireless communication between access points. Allows the WLM2-G54 to communicate with up to 6 other WLM2-G54s. Since the communication method is proprietary and is not defined in Wi-Fi interoperable procedures, it communicates to WLM2-G54s only, and not other brands of APs. The WDS setup is the same as repeater function setup.

- Add AirStation
- Connected AirStation

PART IV

10.0 Diagnostics
10.1 Introduction IV

Diagnostics is a convenient tool for monitoring network operation and traffic.

10.2 Parameters for the Diagnostic Operation

The following parameters are used: Unit information, Packet information, Wireless LAN PC information, Ping testing, Log information and Setting initialization.

10.2.1 Unit Information

(see previous page)

Parameters used in the WLM2-G54:

1. Model Name: The AirStation model name and firmware version number
2. AirStation Name: The alias for the AirStation
3. Wired Settings: WLM2-G54's wired MAC address
4. Wireless Firmware: The wireless LAN card model name and firmware version number
5. Wireless MAC address: WLM2-G54's wireless MAC address
6. Wireless Setting: Indicates wireless communication setting such as WDS mode, ANY connection, PS, ESS-ID, WEP, Channel and System Scale
7. IP address setup: Selection for setting the IP address. If auto IP address acquisition from the DHCP server is selected, the acquisition success or failed parameter will be shown.
8. Link Integrity: Indicates whether Link Integrity is working
9. Auto IP address acquisition: Acquisition of the IP address from the DHCP or update is performed.

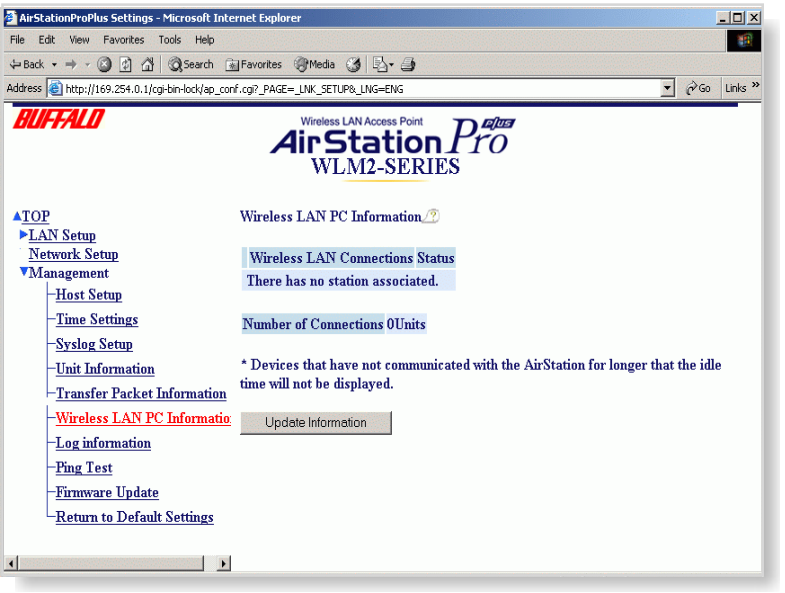


Figure 10.2.3 Wireless LAN PC Information

10.2.2 Transfer Packet Information

Displays the actual packet volume used for wired and wireless communication. Packet volume for transmission receiving and their errors are shown separately.

(see previous page)

10.2.3 Wireless LAN PC Information

This information displays all PCs using the WLM2-G54 wireless communication. The MAC addresses of communicating clients are shown. The information is updated periodically.

10.2.4 Log Information

Includes system operation, login approval, and wireless communication access approval. A

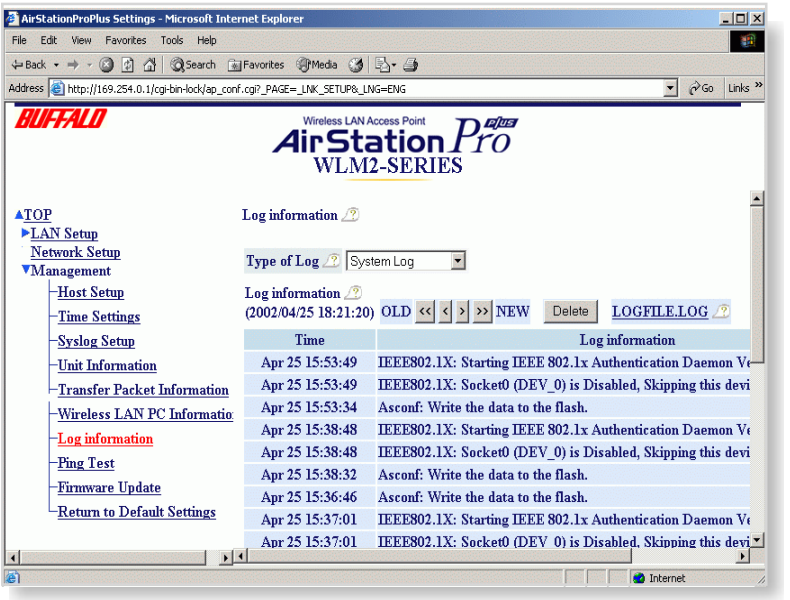


Figure 10.2.4 Log Information

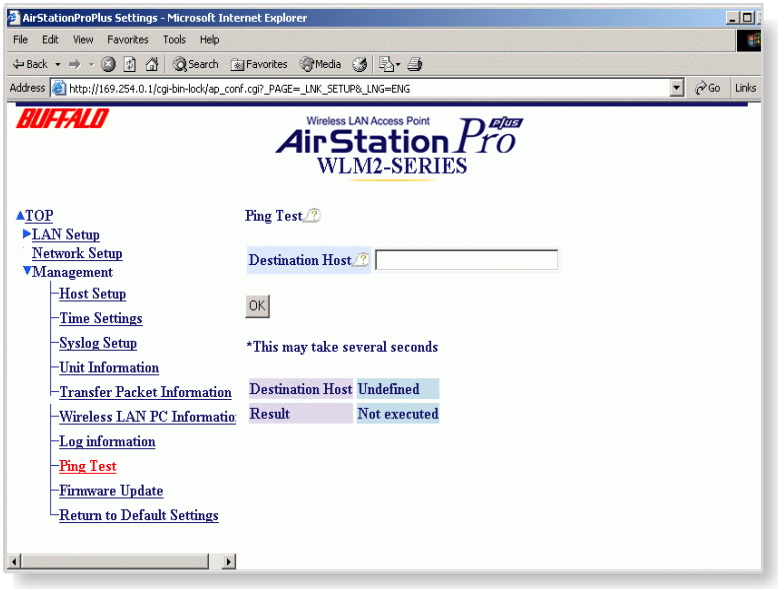


Figure 10.2.5 Ping Test

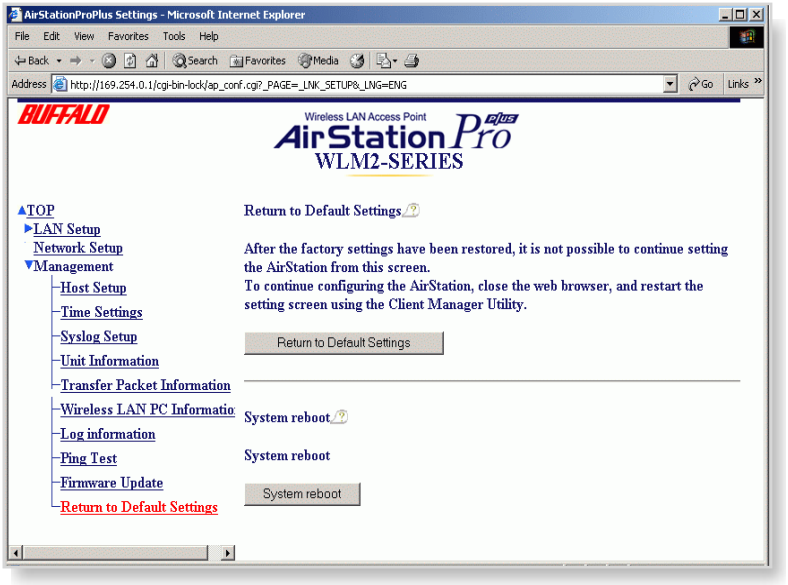


Figure 10.2.6 Return to Default Setting

log related to the setup history from a browser or Telnet session is recorded.

10.2.5 Ping Test

The WLM2-G54 issues a ping test to the target PC in order for the AirStation to check the communication link. Input the target device's IP address and click "OK".

10.2.6 Return to Default Setting

Allows the user to reinitialize all parameters back to factory defaults. After the reinitialization, the system will restart automatically.

Additional Information

For more information, please consult one of the following:

- The on-line help system of your AirStation wireless system - for information about software and driver functionality.
- The AirStation web site - for frequently asked questions (FAQ's) and Software Updates.

Appendix A

Range Information

- The range of your wireless devices can be affected when the AirStation is placed near metal surfaces and solid high-density materials.
- Range is also impacted due to "obstacles" in the signal path of the radio that may either absorb or reflect the wireless signal.

Appendix A - Intelligent Access Point (WLM2-G54) Specifications

Frequency Band	2.4GHz channel support
Operating Channels	11 channels; 20 MHz BW
	1:2412, 2:2417, 3:2422, 4:2427, 5:2432, 6:2437, 7:2442, 8:2447, 9:2452, 10:2457, 11:2462
Standards 1x/EAP, Wi-Fi	IEEE 802.11g, IEEE 802.3 (10BASE-T), IEEE 802.
Data Rates Supported	54Mbps Fullback to 48, 36, 24, 18, 12, 9 and 6 54Mbps OFDM modulation 11Mbps Fallback to 5.5, 2 and 1
	11Mbps – CCK modulation with Baker Code
	5.5Mbps – DQPSK modulation
	2 and 1 Mbps – DBPSK modulation
Typical Range at Low Speed	Outdoor: 550m (1804 ft); Indoor: 115m (377 ft) (*)
Typical Range at Standard Speed	Outdoor: 400m (1312 ft);
	Indoor: 90m (295 ft) – Max
	40m (130ft) – Normal (*)
Typical Range at High Speed	Outdoor: 160m (525 ft);
	Indoor: 50m (164 ft) – Max
	25m (82 ft) – Normal (*)
Interface	NDIS 5.0 Miniport Driver
Supporting OS	Windows 9x, ME, 2k, XP
Bit Error Rate	Less than 10-5
Antenna	Integrated & capable to connect Buffalo indoor & outdoor antennas
Interface	10/100BASE-T
WAN – Protocols	TCP/IP, IPX/SPX, NetBEUI, DHCP
Media Access Protocol	CSMA/CA with ACK
Status Indicators (LED)	Power, Ethernet activity, Wireless Activity, Diagnostics
Encryption/Security MAC address Monitoring/Filtering, ESS-ID, Password	IEEE802.1x/EAP, WEP 40 bit or 128 bit, RC 4 algorithm,
Receive Sensitivity	-69 dBm~-92 dBm depending on the data rate
Delay Spread	65 ns~500 ns depending on the data rate
Output Power	15dBm, 1.2 A nominal and 0.16A PoE
Power Supply cabling (from PowerBASE-T module), or 5V DC	Power over Ethernet 48VDC over 10Base-T
Radio/Electromagnetic Conformance Complacence	ETS 300 328, ETS 300 826, CE, EMV to EN 60950) (medical environment), FCC Part 15 B
Temperature & Humidity 95% (no condensation)	0~60° C operational, -20~75° C Storage,
Dimensions	W169 x H46 x L195mm
Weight	620g

Appendix B - Troubleshooting

This appendix is divided into following sections with each with it's own specific troubleshooting tips:

- LED Activity on section B.1.
- Other Problems on section B.2.

B.1 LED Activity

- Power LED should be GREEN
- Wireless LED should be GREEN if the line is active. If is it blinking GREEN, wireless communication is in use.
- Ethernet LED should be GREEN (100Mbps) or AMBER (10Mbps) while the communication is in use.

TABLE B.1 DIAG LED Activity Table

DIAG

LED Display	Time	Description/Action
Continuous Red	Starting	RAM Error
Red flash, 2 times	Starting	Flash ROM Error
Red flash, 3 times	Starting	problem in wired LAN side
Red flash, 4 times	Starting	problem in wireless LAN side
Red flash, 2 times	After setup completed	Flash ROM Error
Red flash, 2 times	During firmware update	Flash ROM Error

B. 2 Other Problems

- Out of range, which prevents the AirStation Client from establishing a wireless connection with the network.
- Configuration mismatch, which prevents the AirStation Client from establishing a wireless connection with the network
- Absence or conflict of the AirStation Driver in the client PC.
- Conflict of the AirStation hardware with another device.

GLOSSARY

10BaseT or 100BaseTx: 802.3 based Ethernet network that uses UTP (Unshielded twisted pair) cable and a star topology. 10 is 10 Mbps and 100 is 100 Mbps.

802.1x: The standard for wireless LAN authentication used between an AP and a client. 802.1x with EAP will initiate key handling.

AdHoc Network: The wireless network based on peer-to-peer for the duration of a communications session. Also referred to as Ad-Hoc.

Address Aging Period: The maximum time during which the forwarding database entries are considered valid. This value should be set low if your network has regularly heavy traffic. Each new device that sends a packet to a device has its MAC address added to the System Forwarding Database. The Database can store up to a maximum of 8192 MAC addresses at any one time. After the maximum number of MAC addresses has been reached, the earliest stored addresses are overwritten with new, incoming information.

AES (Advanced Encryption Standard): A symmetric 128bit block data encryption technique used for security.

Bandwidth: The transmission capacity of a computer, or a communication channel, stated in Megabits per second (Mbps).

BOOTP: Software protocol used by servers. When the client PC starts, it contacts the server, and requests a new set of IP Configurations. The server obtains the new IP Configuration information from a static pool of available addresses. The client PC will keep its IP Configuration information until it is turned off and restarted. BOOTP is not always fully supported in newer operating systems.

BNC (British Naval Connector): A BNC connector has a bayonet-type shell with two small knobs on the female connector, which twist-lock into slots in the male connector. Used with coaxial cable.

BSS (Basic Service Set): An 802.11 networking framework that includes an Access Point.

Bus Mastering: A system in which the specified Input/Output device (e.g., NIC Card) can perform tasks without the intervention of the CPU.

Client: A PC or a workstation on a network.

CRC (Cyclic Redundancy Check): Calculation method used to check the accuracy of a digital transmission over a communications link.

Cross-Over Wiring: A UTP cable that has its transmit and receive wires crossed to allow communications between two devices.

DCE (Data Communications Equipment): Hardware to be used for communication with a Data Terminal Equipment (DTE) device

Default Gateway: The IP Address of either the nearest router for the LAN or server for the LAN.

Default Parameter: Parameters set by the manufacturer.

Destination Address: The address portion of a packet that identifies the intended recipient station.

DHCP (Dynamic Host Configuration Protocol): Based on BOOTP, it uses a pool of IP addresses, which it gives out to each device connected to it, and retrieves the addresses when the devices become dormant for a period of time.

DNS (Domain Name System): The on-line distributed database system used to map human-readable machine names into IP addresses. DNS servers throughout the connected Internet implement a hierarchical namespace that allows sites freedom in assigning machine names and addresses. DNS also supports separate mappings between mail destinations and IP addresses.

Driver: A software program that tells an operating system how to use a hardware device.

DSSS (Direct Sequence Spread Spectrum): A method that spreads the wireless signal into wide frequency bandwidth.

DTE (Data Terminal Equipment): Device that controls data flowing to or from a computer.

Dynamic IP Address: An IP address that is automatically assigned to a client station in a TCP/IP network, typically by a DHCP server.

ESS (Extended Service Set): A set of two or more BSSs that form a single sub-network. ESS-ID is user identification to be used in the ESS LAN configuration.

Ethernet: The most widely used architecture for Local Area Networks (LANs). It is a shared media network architecture.

Ethernet cable: A wire similar to telephone cable that carries the signals between Ethernet devices.

File and Print Sharing: An application supplied by Microsoft that allows the computers on a network to share files and printers.

Firmware: Programming that is inserted into programmable read-only memory, thus becoming a permanent part of a computing device.

Frame: A frame includes: the data packet, the destination device's address, source device's address, the length of the data packet, and error checking information.

Full-Duplex: Capability for simultaneous transmission in both directions, allowing devices to send & receive data at the same time.

Gbps (Gigabits per second): A measurement of billions of bits per second.

Half-duplex: To transmit on the same channel in both directions, one direction at a time.

Hub: A device which allows connection of computers and other devices to form a LAN. When a hub receives packets from a computer or other device, it repeats the packets to all of the devices connected to its ports.

IEEE (Institute of Electrical and Electronics Engineers): The professional organization which promotes development of electronics technology.

IP (Internet Protocol) Address: A unique 32-binary digit number assigned by an Internet authority that identifies each sender or receiver

of information that is sent in packets across the Internet or Intranet.

Infrastructure: A wireless network or other small network in which the wireless network devices are made a part of the network through the Access Point.

ISP (Internet Service Provider): A company that provides access to the Internet and related services.

IV (Initialization Vector): The header section of a message packet.

LAN (Local Area Network): A group of computers and peripheral devices connected to share resources

LED (Light Emitting Diode): The lights on a hardware device representing the activity through the ports.

MAC (Medium Access Control) Address: The physical address of a network node.

Mbps (Mega Bits Per Second): A measurement of millions of bits per second.

MHz (Mega Hertz): A measurement of millions of cycles per second.

MIB (Management Information Base): An internal database of commands and data structures used to define and profile the capabilities of the device for which it was written.

MIC (Message Integrity Check): A method of using a checksum to ensure a data message is not altered by a third party.

MIPS (Millions of Instructions Per Second): A measurement of processing speed.

NAT (Network Address Translation): An Internet standard that enables a LAN to use one set of IP addresses for internal traffic and a second set of addresses for external traffic.

NIC (Network Interface Card): An expansion board inserted into a computer so the computer can be connected to a network.

Packet: A block of data that is transferred as a single unit; also called a frame or a block.

Packet Filtering: Discarding unwanted network traffic based on its originating address or its type.

PCI (Peripheral Component Interconnect): A bus that is connected directly with the CPU.

PCMCIA (Personal Computer Memory Card International Association) Card: A PC card suitable for several types of applications.

Ping (Packet Internet Groper): An Internet utility used to determine whether a particular IP address is online.

Plug and Play: Hardware that, once installed ("plugged in"), can immediately be used ("played"), as opposed to hardware that requires manual configuration.

PoE (Power over Ethernet): A mechanism to send DC power to a device using a CAT5 Ethernet cable.

PPPoE (Point-to-Point Tunneling Protocol): A specification for connecting users on an ethernet line to the internet through a common broadband medium.

Protocol: A standard way of exchanging information between computers.

RADIUS (Remote Authentication Dial In User Service): A server that issues authentication keys to clients.

RAM (Random Access Memory): Non permanent memory.

Repeater Hub: A device that collects, strengthens and transmits information to all connected devices, allowing the network to be extended to accommodate additional workstations.

RC4: The encryption algorithm that is used in WEP

RJ-45 connector: An 8-pin connector used for connecting twisted pair cable to a data transmissions device.

ROM (Read Only Memory): Permanent memory.

Router: A device that can connect individual LANs and remote sites to a server.

Roaming: The ability to use a wireless device and be able to move from one access point to another without losing the connection.

Script: A macro or batch file that contains instructions that the computer executes to perform a task.

Server: Any computer that makes access to files or peripheral devices available to users of the network.

SMTP (Simple Mail Transfer Protocol): The protocol used to define and deliver electronic mail (e-mail) from one server to another.

SNMP (Simple Network Management Protocol): An application layer protocol that outlines the formal structure for communication among network devices.

Static IP Address: Also known as a global IP. A permanent IP address that is assigned to a node in a TCP/IP network.

STP (Shielded Twisted Pair): See Twisted Pair.

Subnet Mask: An eight byte address divided into 4 parts grouped by periods.

TCP/IP (Transmission Control Protocol/Internet Protocol): The protocol used by computers when they communicate across the Internet or Intranets.

TFTP (Trivial File Transfer Protocol): Simple form of FTP (File Transfer Protocol). Uses UDP (User Datagram Protocol) and provides no security features.

TKIP (Temporal Key Integrity Protocol): An encryption method replacing WEP. TKIP uses random IV and frequent key exchanges.

Topology: The shape of a LAN (Local Area Network) or other communications system.

Twisted Pair: Cable that comprises 2 or more pairs of insulated wires twisted together

UDP (User Datagram Protocol): A communication method (protocol) that offers a limited amount of service when messages are exchanged between computers in a network. UDP is used alternatively to TCP/IP.

Uplink: Links to the next level up in the herarchy of a network.

UTP (Unshielded Twisted Pair) cable: A standard UTP cable has straight-through wiring. See Twisted Pair.

WAN (Wide Area Network): A networking system that covers a wide geographical area.

WDS (Wireless Distribution System): A method for an AP to communicate with another AP. This method is powerful for point-to-point or point-to-multipoint infrastructure.

WEP (Wired Equivalent Privacy): An encryption method based on 64 or 128bit algorithm.

Web Browser: A software program that allows the user to view Internet pages.

Wi-Fi (Wireless Fidelity): An organization that tests and assures interoperability among WLAN devices.

Wire Speed: The maximum speed that a given packet can be transferred using Ethernet and Fast Ethernet standard specifications.

WLAN (Wireless LAN): A LAN topology using wireless devices.

VPN (Virtual Private Network): A security method to connect remote LAN users to their corporate LAN system.

Notes:

Notes:

Buffalo Technology Technical Support

Web

USA	http://www.buffalotech.com/wireless
EUROPE	http://www.buffalo-technology.com
CHINA	http://www.buffalo-china.com
TAIWAN	http://www.buffalo-tech.com.tw
KOREA	http://www.buffalotech.co.kr

The constantly evolving state of wireless products and operating systems requires Buffalo Technology to occasionally release updated software to take advantage of new technologies and to comply with industry standards. For the most recent software, firmware, driver, and technical whitepaper releases available, please visit the Buffalo Technology website.

FCC Compliance Statement -See owners manual for complete statement. 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.

R&TTE Compliance Statement -See owners manual for complete statement. This equipment complies with all the requirements of the DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of 9 March 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE).