ARESCOM
Broadband Internet & Remote Access Solutions

AresGate 2000/2000S

802.11b Wireless LAN Router
Software User's Guide

Version 2.0
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CHAPTER 1:

OVERVIEW

1.1 Introduction

Thank you for purchasing a state of the art ARESCOM AresGate™ 2000 Series (2000/2000S) Wireless Gateway. It is specifically designed for a variety of applications in a SOHO (Small Office Home Office) networking environment:

- If you are already using a high speed ADSL or Cable modem, AG2000's powerful routing features will enable all your PCs to share high-speed Internet access all over a single broadband Internet account.
- If you are interested in building a wireless networking environment in your home or office, AG2000's wireless AP (Access Point) capability and external antenna gives you the freedom to move your laptop PC from the kitchen to the living room or from office to office while enjoying an "always-on" Internet connection.

This guide will provide easy, step-by-step instructions to install and setup your AG2000 so you can quickly enjoy the many benefits it brings to your SOHO networking environment.

1.2 Features

- High performance 11Mbps data rate for wireless transmission.
- Interoperability with all IEEE 802.11b- compliant equipment.
- User-friendly Web interface (GUI) for quick configuration.
- Provides shared Internet access to your network through DSL modem or Cable modem connection.
- Flexible external antenna for maximum wireless communication.
- Up to 128-bit WEP (Wired Equivalent Privacy) encryption.
- DHCP server simplifies your network administration.
- Supports NAT/PAT firewall capability.
- IP filtering feature protects your network from unauthorized data traffic that enters or leaves the AG2000.
- RIP 1, RIP2, NAT/PAT and DNS relay.
- PPP, PPP over AAL5 and PPPoE.
- Built-in 4-port 10/100 base-T switch for your LAN network (For AG2000S only).

1.3 Package Includes

- ARESCOM AresGate 2000/2000S Wireless Gateway (x 1).
- Power adapter and cord set (x 1).
- RJ-45 to RJ-45 straight-through Ethernet cable (x 1).
- External wireless LAN antenna (x 1).
- AresGate 2000/2000S Software User's Guide (x 1).
- AresGate 2000/2000S Quick Setup (x 1).

1.4 Minimum System Requirements

- Cable or ADSL line.
- Microsoft Windows 98 or later version.
- 166 MHz Pentium or equivalent processor.
- 16 MB RAM or more.
- 170 MB available free hard disk space before installation.
- Available 10BaseT Ethernet on the main computer
- CD-ROM Drive

1.5 Network Scenario

1.5.1 Installing a Single AG2000

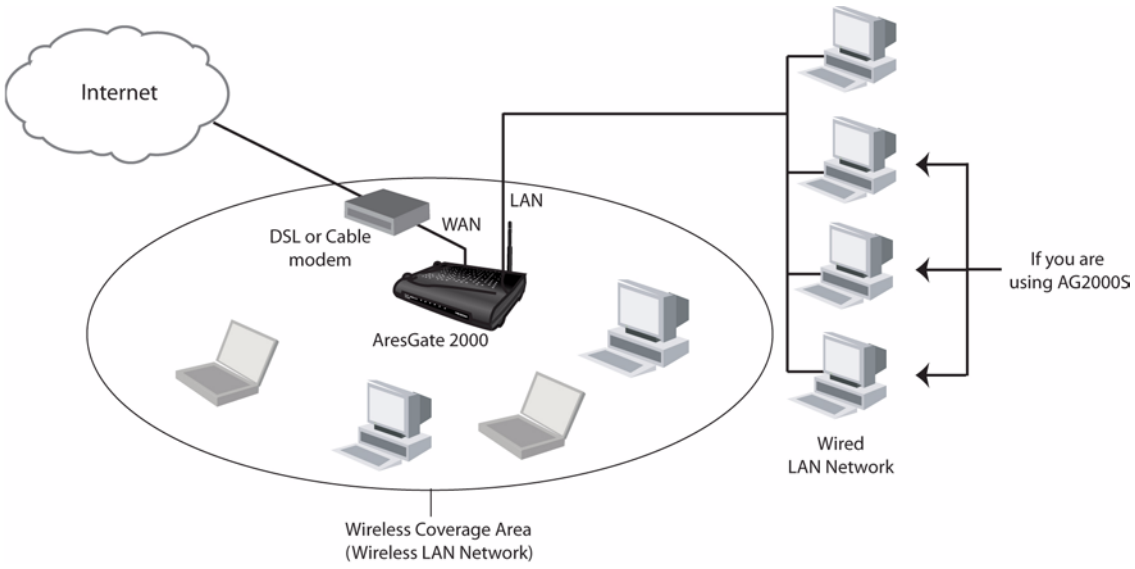


Figure 1.1 Installing a Single AG2000 Network Scenario

The AG2000 provides a connection point to the wireless clients and the wired LAN (See figure above). It works with your existing Internet access equipment (such as a DSL modem or Cable modem) to provide a gateway to the Internet for your entire network.

Wireless LAN Network

You can easily create a wireless network using your AG2000. The PCs, PDAs or other electronic appliances on your wireless network must have 802.11b-compliant wireless devices already installed in them. The AG2000 is compatible with any wireless device that is certified by Wi-Fi. To be able to communicate with the AG2000 wireless network successfully, they all need to share the same SSID, channel number and operating mode (infrastructure) as the AG2000. Please refer to **Chapter 4** for more detailed configurations of the AG2000.

Wired LAN Network

The AG2000 can also connect to the wired LAN through the connection from the Ethernet 10/100BaseT LAN ports on back of the unit. Use a straight-through Ethernet cable to connect the AG2000 to PCs on the LAN network. If you have more than 4 desktop computers in your wired LAN and want to connect to the AG2000, an extra hub or switch is required to be installed.

1.5.2 Installing Multiple AG2000s

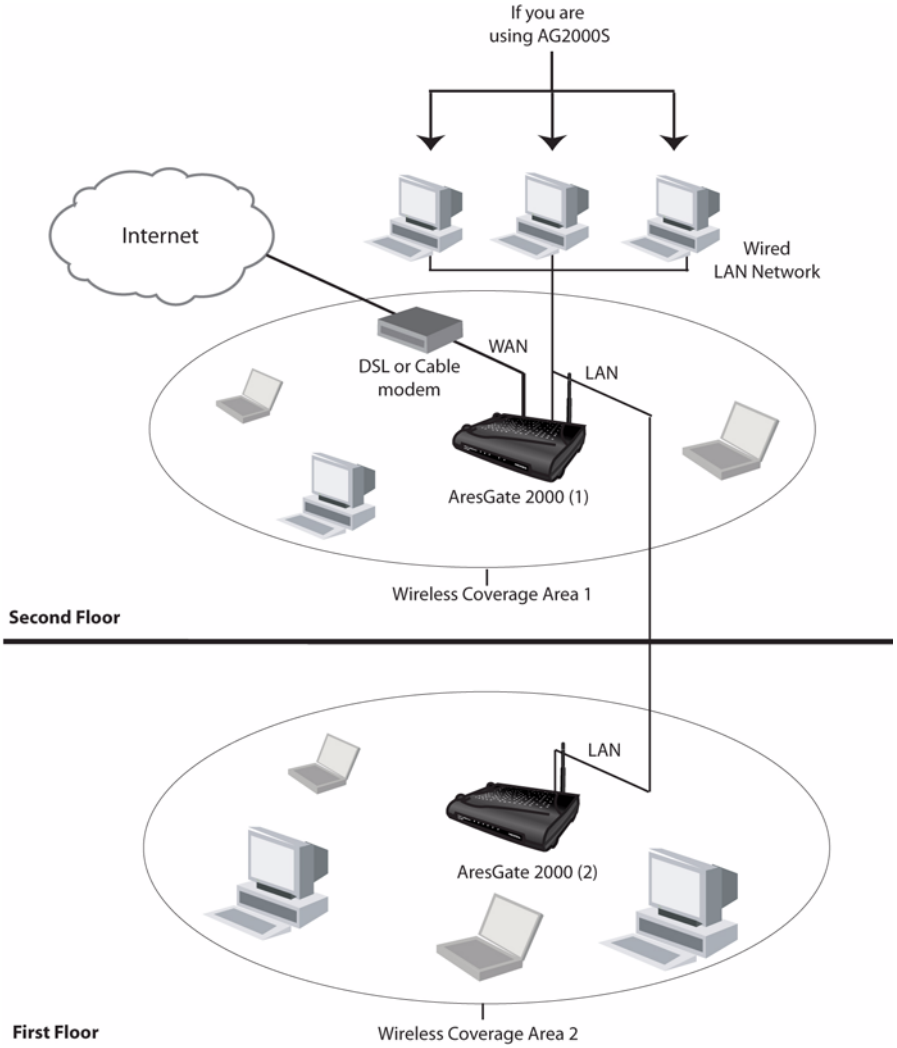


Figure 1.2 Installing Multiple AG2000s Network Scenario

Figure 1.2 displays a typical network scenario that involves multiple AG2000s and PCs. This type of network scenario provides a solution to larger buildings or homes where a single AG2000 wireless coverage range is inadequate. The Second Floor AG2000 connects to a DSL or Cable modem and acts as a router. The First Floor AG2000 connects to the Second Floor AG2000 and acts as a bridge, extending the wireless coverage area.

To complete the setup for **Installing Multiple AG2000s**, please follow the steps below:

Step 1. Connect the DSL or Cable modem's Ethernet port to the Second Floor AG2000's ***WAN port*** using a RJ-45 straight-through Ethernet cable.

Step 2. Connect the Second Floor AG2000's ***LAN port*** to the First Floor AG2000s' ***LAN port*** using a RJ-45 straight-through Ethernet cable.

Step 3. Configure the Second Floor AG2000 by turning the ***DHCP*** and ***NAT*** features to ***ON***. (DHCP and NAT is ***ON*** by default, please refer to **Chapter 4 "Configuration"** for details)

Step 4. Configure the First Floor AG2000 by turning the ***DHCP*** and ***NAT*** features to ***OFF***. (Please refer to the **Chapter 4 Configuration** for details)

Roaming

When a wireless client moves from one coverage area to another, the access point automatically performs client roaming within the same subnet and the service provided to the client is continuous and seamless. In order to roam in a multiple AG2000s environment, all AG2000s installed need to share the same SSID, channel number, and WEP keys (if enabled).

HARDWARE INSTALLATION

This chapter describes the front and back panel layouts and installation procedure for both AG2000 and AG2000S.

2.1 Panel Information

2.1.1 AresGate 2000 - Front Panel

Figure 2.1 AresGate 2000 Front Panel LEDs

PWR (Power)

The PWR LED is ON when power is supplied to the AG2000.

DIAG (Diagnostic)

The DIAG LED indicates the AG2000 is in a self-diagnostic mode during boot-up. Once it boots up successfully, the LED will automatically turn off. If there is a software malfunction or a problem with the unit, the LED will remain on.

WAN

The WAN LED displays the 10BaseT WAN port Ethernet connection status between the AG2000 and a broadband device (e.g. Cable modem or DSL modem). The WAN LED is solid on when a valid Ethernet link is established. The LED flashes when there is data activity on this port.

LAN

The LAN LED displays the 10BaseT Ethernet connection between the AG2000 and an Ethernet network. The LAN LED is on and remains solid if there is a valid link. The LED flashes when there is data activity on this port.

WLAN

The WLAN LED flashes slowly when there is no activity on this wireless interface. The LED flashes quickly when data is flowing from/to this interface.

2.1.2 AresGate 2000 - Back Panel

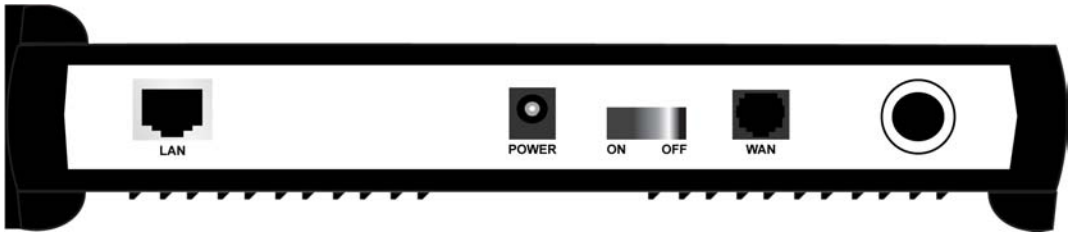


Figure 2.2 AresGate 2000 Back Panel Ports and Switch

LAN

The LAN port connects the AG2000 to a PC, hub or switch on your wired LAN network.

POWER

The POWER port is where you connect the AC power adapter.

ON/OFF Switch

Utilize this ON/OFF switch to turn the AG2000 on or off.

WAN

The 10BaseT WAN port is where you connect your existing Cable/DSL modem.

Antenna Connector

The included external antenna needs to be securely attached to the antenna connector located on the far right side of the back panel.

2.1.3 AresGate 2000S - Front Panel

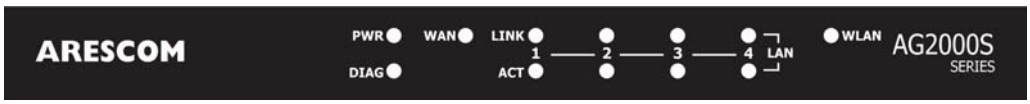


Figure 2.3 AresGate 2000S Front Panel LEDs

PWR (Power)

The PWR LED is ON when power is supplied to the AG2000S.

DIAG (Diagnostic)

The DIAG LED indicates the AG2000S is in a self-diagnostic mode during boot-up. Once it boots up successfully, the LED will automatically turn off. If there is a software malfunction or a problem with the unit, the LED will remain on.

WAN

The WAN LED displays the 10BaseT WAN port Ethernet connection status between the AG2000S and a broadband device (e.g. Cable modem or DSL modem). The WAN LED is solid on when a valid Ethernet link is established. The LED flashes when there is data activity on this port.

LAN

There are 4 sets of LEDs to indicate the Ethernet transmission status of 4 10/100 BaseT LAN ports of the AG2000S. Each set includes a LINK and an ACT LED.

LINK: The LINK LED is solid when a valid Ethernet link is established.

ACT: The ACT LED flashes when there is data activity on this port.

WLAN

The WLAN LED flashes slowly when there is no activity on this wireless interface. The LED flashes quickly when data is flowing from/to this interface.

2.1.4 AresGate 2000S - Back Panel

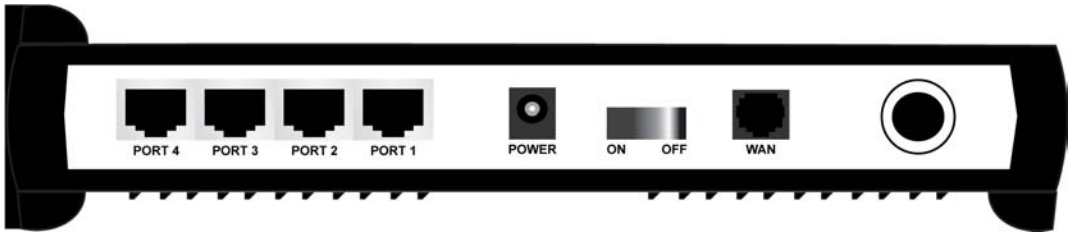


Figure 2.4 AresGate 2000S Back Panel Ports and Switch

LAN (Port 1 - Port 4)

The 4 LAN ports connects the AG2000 to PCs, hubs or switches on your wired LAN network.

POWER

The POWER port is where you connect the AC power adapter.

ON/OFF Switch

Utilize this ON/OFF switch to turn the AG2000 on or off.

WAN

The 10BaseT WAN port is where you connect your existing Cable/DSL modem.

Antenna Connector

The included external antenna needs to be securely attached to the antenna connector located on the far right side of the back panel.

2.2 Location & Placement

- For maximum wireless coverage, locate an installation spot with a minimum number of walls, ceilings or other objects that will block the radio transmission between the AG2000 and the wireless clients.
- Choose an installation location that is away from direct sunlight.
- It is important to place the AG2000 in the center of all the wireless clients.
- Place the AG2000 on the predetermined surface that allows you to see the back panel for convenient cable connection.

2.3 Setup Instructions

Before you start the setup process, make sure you follow the instructions below:

Step 1. Disconnect the broadband service. Make sure your Cable or DSL broadband connection is shut down properly.

Step 2. Turn off the power. Make sure the Cable/ DSL modem and AG2000 equipment are all turned off.

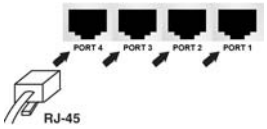
Complete the steps below to connect the cables to the AG2000:

Step 3. Connecting the external antenna.

Tightly attach the external antenna (included) to the **antenna connector** on the back panel (For maximum range, make sure the antennas are perpendicular to the ground).

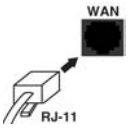
Step 4. Connecting to the LAN port.

Connect the RJ-45 Ethernet cable (included) from the wired Ethernet LAN (such as a PC, hub or switch) to the **LAN** port of the AG2000.



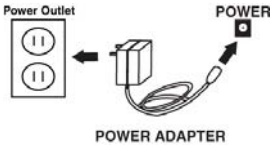
Step 5. Connecting to the WAN port.

Connect the RJ-45 Ethernet cable to the AG2000's **WAN** port and the other end of the same Ethernet cable to the Ethernet port of your existing DSL or Cable modem.



Step 6. Connecting the power.

Connect the AC power adapter to the **POWER** port of the AG2000. Connect the AC plug from the power adapter into a wall outlet or power strip.



Step 7. Turning on the power

Power on your DSL/Cable modem first, then power on your AG2000.

BEFORE YOU START

AG2000 offers a platform-independent, HTML-based GUI (graphical user interface) to simplify the setup and configuration of your AG2000 by using web browser. All the PCs on your LAN network need to be set up properly in order to communicate with the AG2000. Please carefully read and follow the instructions below before you start configuring your AG2000:

1. **Set up the wireless device:**

If you have a wireless device installed on your computer and want to use it to connect to the AG2000, set its channel number to ***6*** and SSID to ***arescom***.

NOTE: The SSID is case-sensitive and set the operating mode to ***Infrastructure***.

2. **Set up an IP address for your PC:**

Since the AG2000 can automatically assign IP address, subnet mask and gateway IP address to your network PCs through its DHCP server, we highly recommend that you configure your TCP/IP Properties to "Obtain an IP address automatically". Select the proper network adapter, either an Ethernet or a Wireless Adapter, that you are using to connect to the AG2000.

NOTE: You **CANNOT** connect a PC to the AG2000 through an Ethernet networking card and a wireless device installed in your PC at the same time

Follow the instructions below to complete the setup:

For Windows 95/98/ME users:

Step 1. Click ***Start*** -> ***Settings*** -> ***Control Panel***.

Step 2. Double-click ***Network***.

Step 3. Double-click ***TCP/IP -> XXXX Ethernet/Wireless Adapters*** ("XXXX" is the maker of your Ethernet card).

Step 4. Select the radio button next to ***Obtain an IP address automatically***.

Step 5. Click the ***Gateway*** tab and remove all previously installed gateways and click ***OK***.

Step 6. Click ***OK*** again.

Step 7. Restart your computer.

For Windows 2000/XP users:

Step 1. Right-click the ***My Network Places*** icon in the desktop.

Step 2. Click ***Properties***.

Step 3. Right-click ***Local Area Connection***.

Step 4. Click ***Properties***.

Step 5. Double-click ***Internet Protocol (TCP/IP)***.

Step 6. Select the radio button next to ***Obtain an IP address automatically*** and click ***OK***.

Step 7. Click ***OK*** again.

3. **Verify your PC's IP address:**

It **MUST** be 192.168.10.X (where **X** is in the range of 2-254). To verify your PC's IP address, please follow the instructions below:

For Windows 95/98/ME users:

Step 1. Click ***Start*** -> ***Run***.

Step 2. Enter ***winipcfg*** and click ***OK*** to prompt the **IP Configuration** window.

Step 3. Select the correct Ethernet or Wireless networking adapter in the white dropdown box.

Step 4. If the IP address displayed in the **IP Address** box is not 192.168.10.X. (where **X** is in the range of 2-254), you need to click ***Release All*** -> ***Renew All*** buttons to have the correct IP address assigned from your AG2000 to your PC.

For Windows 2000/XP users:

Step 1. Click ***Start*** -> ***Run***.

Step 2. Enter ***command*** and click ***OK*** to prompt the **Windows DOS** window.

Step 3. Enter ***ipconfig*** and click ***OK***. Windows will display the **Windows 2000 IP Configuration** information.

Step 4. If the IP address displayed in the **IP Address** field is not 192.168.10.X. (where **X** is in the range of 2-254), you need to enter ***ipconfig /release*** and then ***ipconfig /renew*** commands to receive a correct IP address from the AG2000.

4. **Verify your PC's Internet Properties setting if you were previously using an analog modem.**

Please follow the steps below:

Step 1. Click ***Start***, point to ***Settings***, and then click ***Control Panel***.

Step 2. Double-click ***Internet Options***, and then click the ***Connections*** tab.

Step 3. Click ***Never dial a connection***, click ***Apply***, and then click ***OK***.

4.1 Open Your Browser

Follow the steps below to open your web browser:

Step 1. Launch a web browser (i.e. Internet Explorer or Netscape Navigator) from your computer.

Step 2. Enter the default URL ***http://192.168.10.1*** and press ***Enter***.

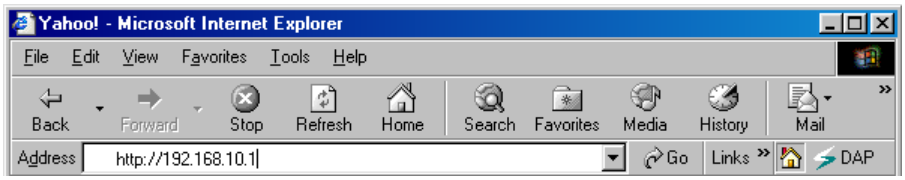


Figure 4.1 Opening an Internet Web Browser

The Web browser may take a minute or two to log on to your AG2000 for first time access. (Pressing the ***Enter*** key or clicking the ***Go*** button twice may speed up the log-on process).

The AG2000's web GUI is divided into two sections: Basic and Advanced.

The **Basic** section allows you to configure basic setup features and view the status of the AG2000. It contains the following GUI pages:

- SETUP
- WIRELESS
- AUTHENTICATION
- DHCP
- USER STATUS
- STATUS

The **Advanced** section allows users to have greater control over the AG2000. It contains the following pages:

- ADMINISTRATION
- PORT MAPPING
- IP ROUTING
- SNMP
- UPGRADE

4.2 Basic - SETUP

Figure 4.2 SETUP Page

Use the **SETUP** page to configure the AG2000's WAN interface, ISP, and Cable modem settings.

4.2.1 ISP Settings

There are three options for you to setup the AG2000's WAN interface:

If you select the option ***Obtain an IP Address automatically from your ISP***, the AG2000's DHCP client will request a dynamic IP address, subnet mask, and Gateway IP address from your ISP's DHCP server. Unless your ISP provides you a static (permanent) IP address, you should select this mode for the AG2000.

If you select the option ***Obtain an IP Address automatically from PPPoE session***, then you need to manually enter the required values listed below:

Username:	The name of the Internet account provided by your ISP.
Password:	The password you use to access your ISP account.

If you select the option **Use a static IP address provided by ISP**, you need to manually enter the required values listed below:

IP Address:	Enter AG2000's WAN IP address provided by your ISP.
Subnet Mask:	Enter AG2000's WAN subnet mask provided by your ISP.
Gateway IP Address:	Enter AG2000's Gateway IP Address provided by your ISP.
Primary DNS:	Allows you to assign the IP Address of the Primary DNS provided by your ISP.

Secondary DNS: Allows you to assign the IP Address of the Secondary DNS provided by your ISP.

4.2.2 Cable Modem

This section is for cable modem users only. Your ISP may request you to manually enter the **Computer Name (Host Name)** for authentication purpose.

Click ***Save*** to save the values to your AG2000. If you do not wish to send the configuration to your AG2000, simply click ***Cancel***.

4.3 Basic - WIRELESS

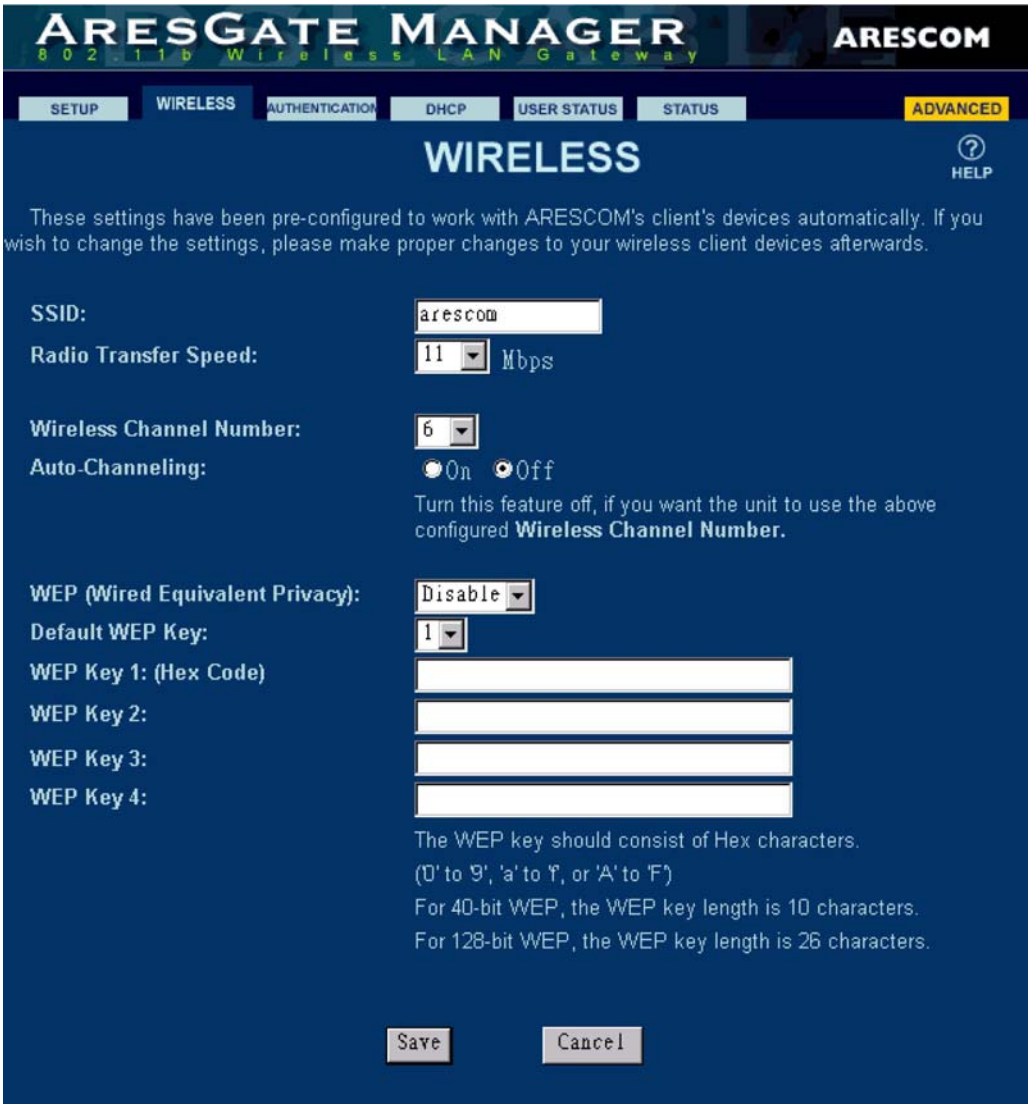


Figure 4.3 WIRELESS Page

The **WIRELESS** page provides the configuration parameters for the AG2000's wireless feature. It contains the following settings:

SSID (Service Set ID)

The SSID is an unique identifier that the AG2000 and wireless clients use to associate with each other. The SSID can be any alphanumeric entry up to 32 characters long and is case sensitive. The default SSID is ***arescom***.

Radio Transfer Speed

The radio transfer speed is the data rate that the AG2000 uses to connect to a wireless client. You can choose the wireless data transfer rate of the AG2000 ranging from 1, 2, 5.5 to 11Mbps. The AG2000 will always attempt the speed you have selected to link to the wireless clients. If the link cannot be established because of interference or other obstacles, the AG2000 automatically gears down the speed to the next lowest rate until a link is successfully established. The default radio transfer speed is ***11Mbps***.

Wireless Channel Number

A wireless channel is a specific frequency band at which the AG2000 communicates with a client. You can select one of the 11 channels from the dropdown menu for the AG2000 to use. However, if you enable the **Auto-Channeling** feature below, the channel you selected here will be ignored by the system. Instead, it will be replaced by the channel number that the system selected. The default channel number is ***6***.

Auto-Channeling

When you turn on the auto-channeling feature, the AG2000 automatically scans the surrounding radio signals, selects the least interference and lowest traffic channel to use, and displays this selected channel in the above **Wireless Channel Number**. The default setting of this feature is ***Off***.

NOTE: Turning on the Auto-Channeling feature may cut off the wireless connection between the AG2000 and your PC. Click **Re-Scan** in the Wireless Configuration Utility program installed in your PC to re-establish the wireless connection.

WEP (Wired Equivalent Privacy)

The Wired Equivalent Privacy (WEP) is used to protect wireless communication from eavesdropping. Since WEP uses a secret key shared between communicators, if you enable the WEP feature, entering the WEP key values below is required.

Default WEP Key

The AG2000 supports 40-bit and 128-bit WEP keys. For 40-bit WEP encryption, you need to enter 10 hexadecimal digits in one of the key fields below. For 128-bit WEP encryption, you need to enter 26 hexadecimal digits in one of the key fields below. Although there are four key fields you can set up for the AG2000, you can choose only one at a time from the Default WEP Key dropdown menu. The WEP key is not case-sensitive. The default key field is ***1***.

1. **Enter either 40-bit WEP keys as 10 HEX digits or 128-bit WEP keys as 26 Hex digits here.**
2. **Enter either 40-bit WEP keys as 10 HEX digits or 128-bit WEP keys as 26 Hex digits here.**
3. **Enter either 40-bit WEP keys as 10 HEX digits or 128-bit WEP keys as 26 Hex digits here.**
4. **Enter either 40-bit WEP keys as 10 HEX digits or 128-bit WEP keys as 26 Hex digits here.**

Click ***Save*** to save the values to your AG2000. If you do not wish to send the configuration to your AG2000, simply click ***Cancel***.

4.4 Basic - AUTHENTICATION

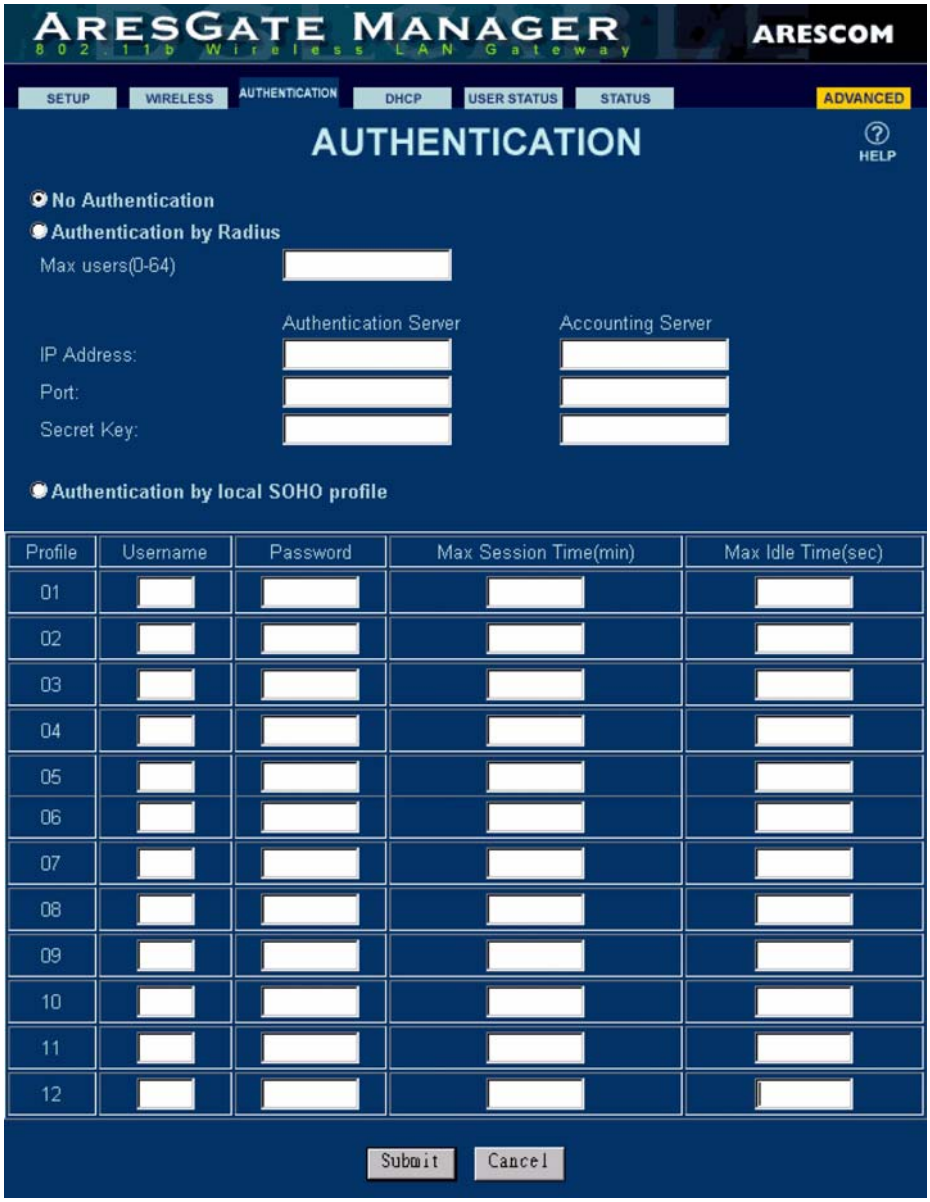


Figure 4.4 AUTHENTICATION Page

The **AUTHENTICATION** page allows you to configure the AP to establish communication with a RADIUS server for the purpose of user authentication and accounting. If the user passes the authentication, then the user is allowed access to the network and service that the AP provides. The AP performs both MAC address and EAP (Extensible Authentication Protocol) authentication automatically for all the associated wireless clients. MAC address authentication is based on the user's MAC address of his/her wireless device for authenticating while EAP authentication is based on the username and password. There are three options for you to choose:

If you select ***No Authentication***, then the AG2000 will not perform the authentication process.

If you select ***Authentication by Radius***, then the AG2000 will perform the authentication process through an external RADIUS (Remote Authentication Dial-In User Service) server. Please follow the steps below to set up the RADIUS server:

Step 1. Enter the maximum number of users allowed to access the AG2000 in the *Max users (0-64)* field.

Step 2. Enter the IP address of the authentication server in the *IP Address* field of the **Authentication Server** section.

Step 3. Enter the port number of the authentication server in the *Port* field. The default port number is **1812**.

Step 4. Enter the shared secret key used by the authentication server in the *Secret Key* field.

Step 5. Repeat Steps 1 - 4 for the **Accounting Server** section. The default port number of the accounting server is ***1645***.

If you select ***Authentication by local SOHO profile***, then you need to manually enter values in the table below. Please follow the steps below to set up authentication by local SOHO profile:

Step 1. Select a profile.

Step 2. Enter a username in the *Username* field.

Step 3. Enter a password in the *Password* field.

Step 4. Specify the maximum amount of time (in minutes) a user is allowed to access the Internet via AG2000 in the *Max Session Time (min)* field.

Step 5. Specify the maximum amount of time (in seconds) a user can stay idly online before he/she is disconnected from the Internet in the *Max Idle Time (sec)* field.

When you are ready, click ***Submit*** to save the values to your AG2000. If you do not wish to send the configuration to your AG2000, simply click ***Cancel***.

4.5 Basic - DHCP

Figure 4.5 DHCP Page

The **DHCP** page allows you configure the DHCP feature and assign or reserve IP addresses. At default, the DHCP feature is set to ***Off***. There are three options for you to choose:

If you select ***Relay On***, then you have activated AG2000's DHCP relay feature. It is necessary for you to configure a DHCP server's IP address in the *DHCP Server* field to allow DHCP packets to forward properly.

If you select ***Server Off***, then you have de-activated AG2000's DHCP server feature.

If you select ***Server On***, then you have activated AG2000's DHCP server feature for automatic assignment of IP addresses, subnet mask, gateway IP address, and DNS to the DHCP clients. Please follow the steps below for a complete DHCP setup:

Step 1. Enter the LAN IP address of the AG2000 in the *IP Address* field under **LAN Settings**. The default LAN IP address is ***192.168.10.1***.

Step 2. Enter the subnet mask of the AG2000 in the *Subnet Mask* field under **LAN Settings**. The default LAN subnet mask is ***255.255.255.0***.

Step 3. Enter the amount of time that a network device can have (lease) a private IP address before AG2000 makes the IP address available for re-assignment in the *Lease Time (Hour)* field.

Step 4. If you wish to specify a pool of IP addresses that can be dynamically assigned as private IP addresses, you can enter an IP address in the *Start IP* field as the beginning and another IP address in the *End IP* field as the end of the IP range.

NOTE: The **IP Pool** feature for the DHCP server is based on the LAN IP address settings. Therefore, you must first configure a LAN IP address and subnet mask in the above **LAN Setting** section before using DHCP.

Step 5. When you are finished with the DHCP configuration, click ***Save***.

4.5.1 Reserved IP Table

The **Reserved IP Table** displays all the private IP addresses that are reserved by the user for other usages. To reserve a new private IP address, simply enter the IP address in the *Reserved IP* field and click ***Add***. To remove an IP address from the Reserved IP Table, enter the IP address and click ***Delete***.

4.6 Basic - USER STATUS

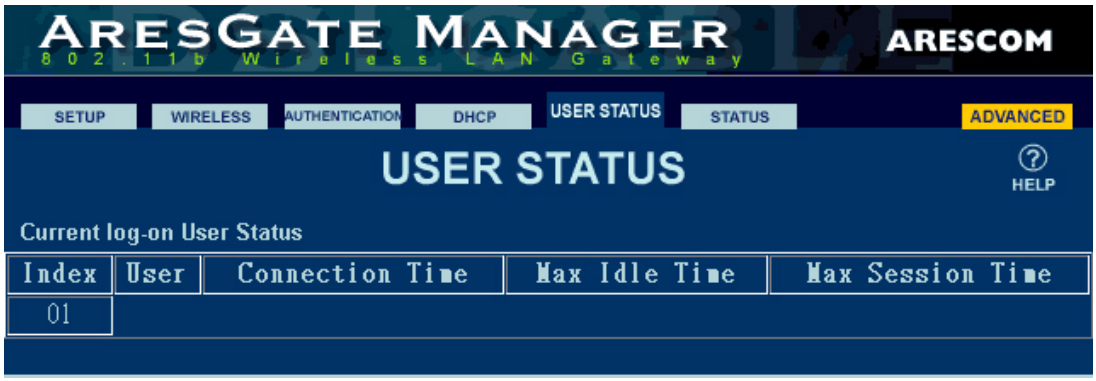


Figure 4.6 USER STATUS Page

4.6.1 Current Log-on User Status

The **USER STATUS** page displays the current logon user status. It contains the following information:

Index:	A serial ID number, which is assigned by the system, for logon users.
User:	It displays user's identification as MAC address for MAC authenticated user or username for EAP authenticated user.
Connection Time:	It indicates the connection time of the service from the beginning of the session.
Max Idle Time:	When the idle data traffic time exceeds the maximum idle time configured by a central RADIUS server, the AG2000 stops the service and ends session.
Max Session Time:	It shows the time that the user is allowed to use the service.

4.7 Basic - STATUS

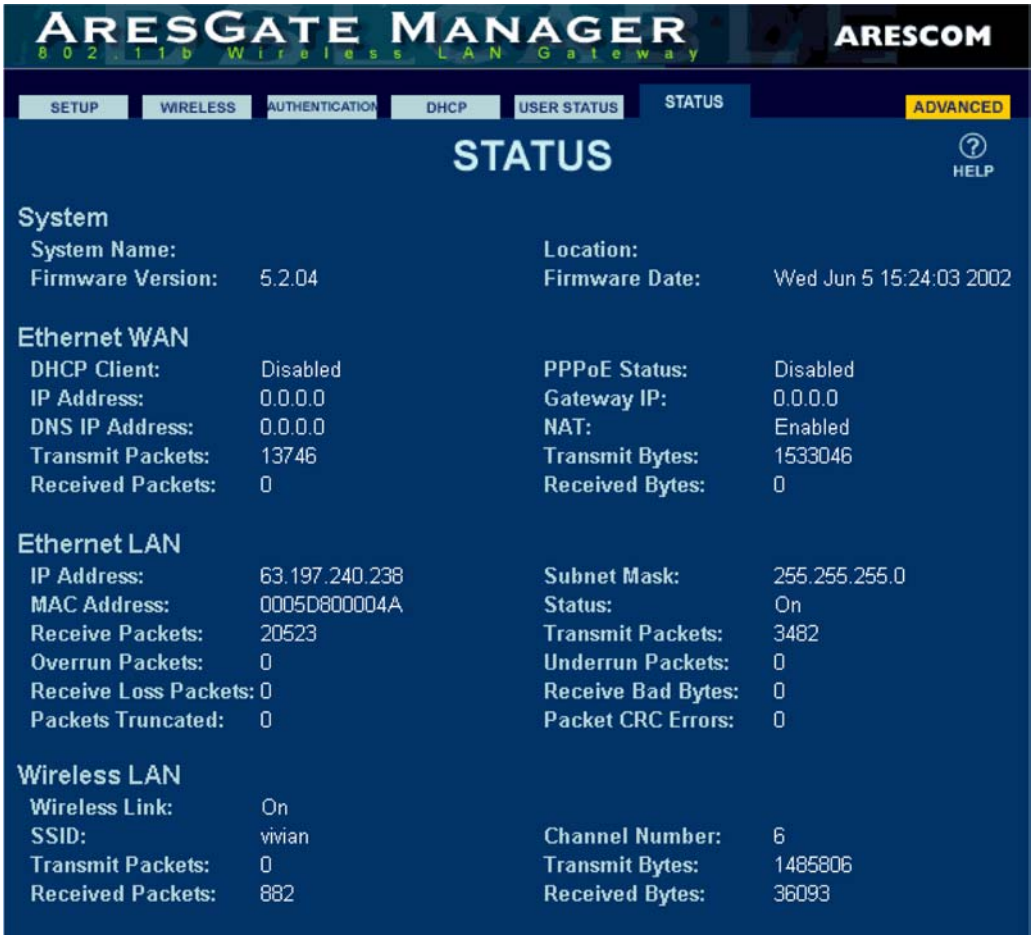


Figure 4.7 STATUS Page

The **STATUS** page displays AG2000's network statistics and general system information.

System

System Name: The device name of the AG2000 used for identification purpose.
Location: The location name where the AG2000 is installed.
Firmware Version: Version of the firmware installed currently.
Firmware Date: The firmware release date.

Ethernet WAN

DHCP Client: The DHCP client status on the WAN interface.
PPPoE Status: The current PPPoE connection status.
IP Address: The WAN IP address of AG2000.
Gateway IP: The gateway IP address of AG2000.
DNS IP Address: The DNS IP address of AG2000.
NAT: The NAT function status of AG2000.
Transmit Packets: The total number of packets transmitted on the WAN port.
Transmit Bytes: The total number of bytes transmitted on the WAN port.
Received Packets: The total number of packets received on the WAN port.

Received Bytes: The total number of bytes received on the WAN port.

Ethernet LAN

IP Address: The IP address of AG2000's LAN port.
Subnet Mask: The subnet mask of AG2000's LAN port.
MAC Address: The MAC address of AG2000's LAN port.
Status: The current LAN connection status.
Received Packets: The total number of packets received on the Ethernet port.
Transmit Packets: The total number of packets transmitted on the Ethernet port.
Overrun Packets: The total number of receiver overruns.
Underrun Packets: The total number of transmitter underruns.
Receive Loss Packets: The total number of packets lost.
Receive Bad Bytes: The total number of bad bytes received.
Packets Truncated: The total number of truncated packets received.
Packet CRC Errors: The total number of packets received with an incorrect CRC.

Wireless LAN

Wireless Link: Indicates whether or not there is a valid wireless connection between AG2000 and other PCs.
SSID: Displays the SSID of the AG2000.
Channel Number: Displays AG2000's current wireless channel number.
Transmit Packets: The total number of packets transmitted on the wireless interface.
Transmit Bytes: The total number of bytes transmitted on the wireless interface.
Received Packets: The total number of packets received on the wireless interface.
Received Bytes: The total number of bytes received on the wireless interface.

4.8 Advanced - ADMINISTRATION

Figure 4.8 ADMINISTRATION Page

To ensure AG2000's maximum administrative security, the **Administration** page in the advanced section allows you to enter a desired username and password. In addition, you can choose to enable or disable AG2000's NAT feature here on this page.

Reboot: Click this button to reboot AG2000 remotely. It acts the same as the power switch on the back of the unit.

Reset: Click this button to restore AG2000 to manufacturer default conditions.

4.8.1 Administration

User Name: Enter a desired username to set up administrator authorization for the management system. It can be any alphanumeric code up to 32 characters long. The default username is ***admin***.

Password: By entering a desired password, it provides maximum security for your AG2000 by limiting access only to users with the correct password. The password can be any alphanumeric code up to 32 characters long. The default password is ***admin***.
When you type in your password, it will appear as asterisk (****).

Re-enter Password: Enter your password again to make sure that you have typed in the correct password.

System Name: Enter a desired device name for the AG2000 for identification purpose.

Location: Enter the location name where the AG2000 is installed.

4.8.2 NAT (Network Address Translation)

NAT allows the AG2000 to perform IP-sharing, which enables multiple PCs on your LAN with Private IP addresses to share Internet access by using only one Public IP address. USE **NAT** page to enable or disable this feature on WAN or PPPoE interface.

WAN:	You can choose to ***Enable*** or ***Disable*** the NAT feature on the WAN interface.
PPPoE:	You can choose to ***Enable*** or ***Disable*** the NAT feature on the PPPoE interface.

When you are ready, click ***Save*** to save the values to your AG2000. If you do not wish to send the configuration to your AG2000, simply click ***Cancel***.

4.9 Advanced - PORT MAPPING

Figure 4.9 PORT MAPPING Page

The **Port Mapping** page provides specific application support or services, such as web hosting, FTP server, mail server or other applications.

4.9.1 Current Port Mapping Table

The **Current Port Mapping Table** displays the ID (index number), Internal IP Address, Internal Port #, External Port #, and Protocol type for each entry.

4.9.2 Add Port Mapping Entry

Internal IP Address: Enter the IP Address of the network PC that provides the service(s). The IP address must be within the AG2000's 192.168.10.1 private subnet. Since AG2000's DHCP feature is set to ON at default, it is recommended to assign a static IP address to the PC.

NOTE: Each time you assign a static IP address (in the range of 192.168.10.2 - 192.168.10.254) to your network PC, reboot your AG2000 so the DHCP server can reserve it.

Internal Port: A port is used to distinguish requests for different services. For example, port #21 is for FTP, #80 is for HTTP, #23 is for Telnet, while #25 is for SMTP, etc.

External Port: The external port is associated with the Dial-Out IP Address.

Protocol: The protocol that is used on the service or application. You can choose **TCP** or **UDP** protocols.

4.9.3 Delete Port Mapping Entry

To delete an entry from the port mapping table above, enter the associated ID number and click **Delete**. Click ***Cancel*** to ignore the settings.

Below is an example on how to set up a WEB hosting service:

Step 1. Enter ***192.168.10.100*** in the *Internal IP Address* field (Assuming the WEB server's IP address is 192.168.10.100 and subnet mask is 255.255.255.0).

Step 2. Enter ***80*** in the *Internal Port* field.

Step 3. Enter ***80*** in the *External Port* field.

Step 4. Select ***TCP*** from the *Protocol* dropdown menu.

Step 5. Click ***Add*** to add the entry in the AG2000's Port Mapping Table.

4.10 Advanced - IP ROUTING

Figure 4.10 IP ROUTING Page

Use the **IP ROUTING** page to create paths or routes for the AG2000 to forward data packets to their destinations. You need to create an IP route when there are other routers on your LAN.

4.10.1 Current IP Routing Table

The Current IP Routing Table displays the index number (ID), Destination IP Address, Subnet Mask, Gateway IP Address, and Interface for each entry.

4.10.2 Add Route

Destination IP Address: The IP address of where data packets are to be sent.

Subnet Mask: The subnet mask of the above Destination IP Address.

Gateway IP Address: The IP address of the router on the LAN where data packets are to be sent. The Gateway IP Address can only be set if the route uses the LAN interface.

Interface: Determines data packets are to be sent through the LAN or WAN interface.

4.10.3 Delete Route

Route ID: To delete a route from the routing table, enter the associated ID number and click the **Delete** button. Click ***Cancel*** to ignore the settings.

4.11 Advanced - SNMP

Figure 4.11 SNMP Page

Use the **SNMP** (Simple Network Management Protocol) page to add or delete SNMP entries. This page also lists all the SNMP entries in the AG2000 device.

4.11.1 Current SNMP Table

The Current SNMP Table provides the most up-to-date SNMP entry information including the entry's ID number, community string and access rights. There are two default entries: public and private.

4.11.2 Add SNMP Entry

Community:	Allows you to enter the SNMP string.
Read:	Allows you to enable or disable the *Read* function on this community.
Write:	Allows you to enable or disable the *Write* function on this community.

Click ***Add/Edit*** to add this entry in the SNMP table.

4.11.3 Delete SNMP Entry

SNMP Entry ID: Enter the associated ID number that you want to remove from the table. The last SNMP entry cannot be deleted.

Click ***Delete*** to remove this entry from the SNMP table.

4.12 Advanced - UPGRADE

Figure 4.12 UPGRADE Page

Use the **UPGRADE** page to update the AG2000's firmware through FTP (File Transfer Protocol) from a FTP server. You can perform the firmware upgrade by following the steps below:

Step 1. In the *FTP Server IP Address* field, enter the IP address of the FTP server where the new firmware file is located. The FTP server should allow anonymous login.

Step 2. In the *File Name* field, enter the file name of the new firmware that you want to load and install.

NOTE: The firmware image file must be located in the root directory of the FTP file server.

Step 3. Click ***Upgrade*** to begin the firmware upgrade process. When the upgrade is complete, the AG2000 will reboot automatically. Click ***Cancel*** if you do not wish to upgrade the unit.

5.1 FAQ

Symptoms	Possible Cause	Resolution
Cannot access the AG2000 from a wireless device.	Incorrect settings on the wireless device.	Make sure the SSID, channel # and operating mode settings are all the same as the AG2000.
	Out of the wireless coverage range.	Make sure the PC is within the wireless coverage area.
	Incorrect IP address in your PC.	Make sure your PC's IP address is in the subnet of 192.168.10.1..
Ethernet LAN LED not turned on after Ethernet cable is connected.	Ethernet cable loose or not connected properly.	Reconnect the Ethernet cable into the 10/100 Ethernet/LAN port.
	Ethernet cable defective.	Replace the Ethernet cable.
	Incorrect cable.	A straight-through Ethernet cable is required to connect the LAN port of the AG2000 to a PC's NIC card. For the correct pinouts of crossover or straight-through Ethernet cable, please refer to Appendix C.
Ethernet WAN LED not turned on after Ethernet cable is connected.	Ethernet cable loose or not connected properly.	Reconnect the Ethernet cable into the WAN port of the AG2000.
	Ethernet cable defective.	Replace the Ethernet cable.
	Incorrect cable.	A straight-through Ethernet cable is required to connect the WAN port of the AG2000 to the Ethernet port of your DSL/Cable modem. For the correct pinouts of crossover or straight-through Ethernet cable, please refer to Appendix C.
Cannot access the AG2000 from a Ethernet networking card.	Your PC Ethernet NIC's IP address and the AG2000's LAN IP address are not in the same subnet.	Change your PC's Ethernet IP address to 192.168.10.1 subnet. Setting up "Obtain an IP address automatically" in the NIC's TCP/IP is recommended.
	Ethernet cable loose or not connected properly.	Reconnect the Ethernet cable into the Ethernet port.

Symptoms	Possible Cause	Resolution
Can access the AG2000 web GUI, but still cannot get Internet access.	No WAN IP address in the AG2000.	Check the A21000's WAN IP address in the *STATUS* page of the Web GUI. Make sure the WAN IP address, sub-net mask, Gateway IP address and DNS all exist. If not, reboot your cable/DSL modem and the AG2000.
	Incorrect setup in the AG2000.	Call your ISP to find out if your ISP is using PPPoE or other protocols. Please refer to the Chapter 4 for more details in configuring the AG2000.

TECHNICAL SPECIFICATIONS

A.1 Hardware Specifications

WAN Interface

- One Ethernet 10BaseT (IEEE 802.3) port (RJ-45).

LAN Interface

- **AG2000:** One 10BaseT (IEEE 802.3) Ethernet port (RJ-45).
- **AG2000S:** Four 10/100 BaseT Ethernet switching ports (RJ-45).

Wireless LAN Interface

- IEEE 802.11b High Rate compliant.
- Operating in the unlicensed 2.4GHz ISM band.
- Operation Frequency/Channels (Either one below):

  - North America/FCC: 2.412~2.462 GHz (11 channels).
  - Europe/ETS: 2.412~2.472 GHz (13 channels).
  - Japan TELEC: 2.412~2.472 GHz (14 channels).
- Modulation Technique: Direct Sequence Spread Spectrum (CCK, DQPSK, DBPSK).
- Dynamic Rate Shifting: 11, 5.5, 2 and 1Mbps.
- Media Access Protocol: CSMA/CA with ACK.
- Security Management: 40-bit, 128-bit WEP (wired equivalent privacy) Encryption.
- Maximum Output Power: 17dBm (50mW).

Antenna

- Removable 3-dBi diversity high gain dipole antenna.

LEDs

AG2000

- PWR
- DIAG
- WAN
- LAN
- WLAN

AG2000s

- PWR
- DIAG
- WAN

- LAN/LINK 1 - 4
- LAN/ACT 1 - 4
- WLAN

Mechanical

- Dimensions: 8” (w) x 5.75” (d) x 1.5” (h).
- Weight: 1.5 lbs.

Operating Environment

- Operating temperature: 0°C to 40°C (32°F to 104°F).
- Operating humidity: 0% to 95% non-condensing.

Power

External AC Power Adapter

- Input: 230V 85mA or 120V 155mA, 47-60 Hz.
- Output: 13.5V AC, 1A.
- Power consumption: 8.5 watts nominal.

Power On/Off Switch

Compliance / Regulatory

- EMI: FCC Part15 Class B & Part 15C, CE EN55022 Class B.
- Telecom: FCC Part 68.
- Wi-Fi Certified.
- Immunity: CE EN55024.
- Safety: CE EN60950

A.2 Software Features

Authentication

802.1x Authentication

- EAP/ MD5 (PPP Extensible Authentication Protocol, RFC 2284) mechanism for authentication.
- RADIUS server (RFC2865, RFC 2869)
- RADIUS Accounting (RFC 2866)

MAC Authentication

- Authentication through the client's MAC address (RFC 2865)

Web Re-direction

- Unauthorized users automatically re-direct to a configured web page for

registration

Radio Control

Automatic Channel Selection

- Automatically selects the optimal channel for minimal radio interference from other nearby APs.
- ON/OFF selectable.

Date Rate Selection

- Manually selects data rates from 1Mbps, 2Mbps, 5.5Mbps and 11Mbps.

Roaming

- IEEE 802.11b High Rate compliant.
- Automatic account roll-over.

RADIUS

- Up to two RADIUS authentication servers: Authentication and Accounting Servers.
- Configured port number and accounting port number.

Routing

- TCP/IP (RFC791, RFC792, RFC793), ARP (RFC826).
- Static routing on the LAN and/or WAN.
- Dynamic routing protocol supports RIP1 (RFC1058), RIP2 (RFC1723).

DHCP

- DHCP server (RFC 2131,RFC2132): automatic to assign IP address, Subnet Mask, Gateway, and DNS to workstations.
- DHCP relay.
- DHCP pass-through.

Bridging

- IEEE 802.1d-compliant transparent bridging between wireless interface and wired LAN interface.
- Bridge Filters – Up to 32 filter entries, MAC address criteria setup.
- Supports up to 510 MAC learning addresses.
- RFC1483-bridged (LLC or VC MUX encapsulation) over ATMPVC.

Internet Access Sharing

- NAT/PAT (RFC1631) proxy supports unlimited multi-user sharing via Ethernet LAN.
- NAT (Network Address Translation) supports PAT (Port Address Translation) for Web server hosting, multimedia applications, and Internet gaming.
- NAT supports PPTP and IPSec VPN pass through.

Security

- IEEE 802.1X port-based network access control.
- PAT (RFC1334), CHAP (RFC1994), and MS-CHAP user authentication.
- Username and password control for network management access.
- WEP (Wired Equivalent Privacy): 40/128-bit encryption keys and SSID.

Network Management

Access Interfaces

- Web browser-based manager.
- Command Line Interface through RS-232 console port.
- Telnet support.
- SNMP (Simple Network management Protocol): RFC1157.

SNMP

- MIB II (RFC1213).
- Wireless MIB (IEEE 802dot11).
- Private MIB.
- SNMP traps (RFC1215).

Functions

- Device configuration.
- Firmware upgrade available via FTP or locally.
- Real time status display and event report and Syslog.
- Remote reboot (hardware) and reset.

NOTE: Product specifications are subject to change without prior notice.

CABLE AND CONNECTORS

B.1 Connector Specifications

B.1.1 10/100 Ports

The 10/100 Ethernet ports use standard RJ-45 connectors and Ethernet pinouts with internal crossovers, as shown by an X in the port name. These ports have their transmit (Tx) and receive (Rx) signals internally crossed so that a straight-through Ethernet cable and an adapter can be attached to the port. The figure below shows the pinouts.

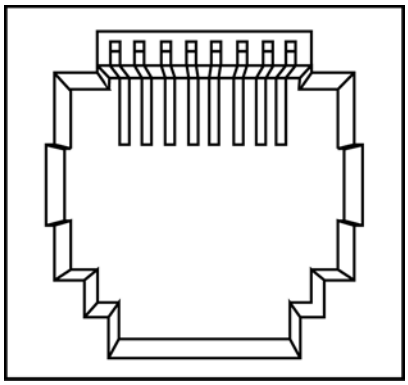
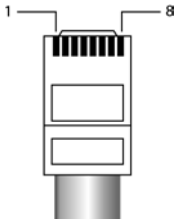
Pin	Label	1 2 3 4 5 6 7 8
1	Tx+	
2	Tx-	
3	Rx+	
4	NC	
5	NC	
6	Rx-	
7	NC	
8	NC	

Figure B.1 10/100 Ethernet Port Pinout

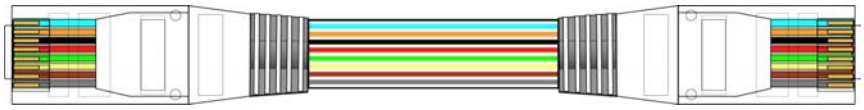
B.2 Cable Specification

B.2.1 RJ-45

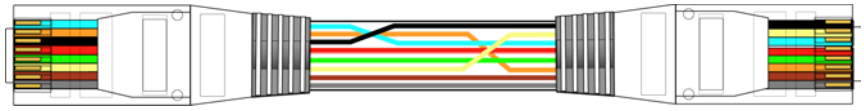
The pin assignment is as follows:



RJ-45 to RJ-45 Straight-through Ethernet Cable:



RJ-45 to RJ-45 Crossover Ethernet Cable:



GLOSSARY

802.1X	An IEEE standard for local and metropolitan area networks, called Port-based Network Access Control. It is used to securely establish an authenticated association between the client and the AP.
AP (Access Point)	A hardware device, or software used in conjunction with a computer, that serves as a communications "hub" for wireless clients and provides a connection to a wired LAN. An AP can double the range of wireless clients and provide enhanced security.
Ad-Hoc Mode	A client setting that provides independent peer-to-peer connectivity in a wireless LAN. An alternative set-up is where PCs communicate with each other through an AP (see also **Infrastructure Mode**).
Bandwidth	The amount of data that can be transmitted by the network "information highway", used as an indication for speed of data transmission. An Ethernet link is capable of moving 10 million bits of data per second.
Bit	The term used to refer to a single unit of data in digital data communications. It takes 8 bits to make 1 byte, which is a unit of measurement for computer data.
Bps (Bits per second)	Refers to the unit of measurement used for data transmission speeds over a data communication link.
Bridge	A hardware device that passes packets between multiple network segments using the same networking protocol to connect the different network segments. Bridge operates at the hardware layer and has no routing capabilities.
Broadband	Any high-bandwidth (see also **Bandwidth**) data communication technology that runs at speeds of 200 Kbps or more and allows combined transmission of voice, data, and video over a single physical connection. Broadband is in contrast to narrowband such as traditional 56K analog modem. DSL, Cable, wireless, and satellite technology are all different types of broadband technology.
Byte	A unit of data equaling to 8 bits (1 Byte = 8 bits).
DHCP (Dynamic Host Configuration Protocol)	An Internet protocol that allows the DHCP server to dynamically assign IP addresses to any client workstation (any device connected to your LAN, such as a PC) for a set period of time and then sends them back so that they can be reassigned to other workstations. This feature saves the ISP and Network Managers from having to manually configure IP addresses for each PC on the LAN.
DNS (Domain Name System)	A mechanism that translates host domain names into its numeric IP Address and vice-versa. A domain name is an easy-to-remember nickname for numerical IP addresses required by a computer, such as janedoe@arescom.com.

Encapsulation	The encapsulating or enclosing data within a particular IP header. Sometimes the entire frame from one network is placed in the header used by the data link layer protocol of another network.
Encryption	A specific algorithm used to encrypt or encode the data so that it becomes unreadable to unauthorized users that do not know the decryption key. A good example of encryption technology is WEP (Wired Equivalent Private).
Ethernet	Most popular LAN (Local Area Network) technology that uses CSMA/CD (Collision Detection) and transfers data between workstations over a variety of cable types at 10Mbps, also called 10BaseT. Most Ethernet LANs use twisted pair 10BaseT cables and support both Ethernet as well as Fast Ethernet at 100Mbps (100BaseT).
Firewall	A security device (either hardware, software, or a combination of both) that selectively blocks out or filters unwanted IP traffic from a public network. Firewall allows the private LAN network to be invisible to the public network outside, preventing intrusion from unauthorized users.
Hub	A hardware device that repeats all data traffic to all CPE (Customer Premises Equipment) ports. A hub functions as the center of a LAN and all other network devices on the LAN, including PCs, printers, DSL modem or Gateways, are connected to the hub through cabling.
Infrastructure Mode	A client setting providing connectivity to an AP. As compared to Ad-Hoc Mode, where PCs communicate directly with each other, clients set in Infrastructure Mode all pass data through a central AP. The AP not only mediates wireless network traffic in the immediate neighborhood, but it also provides communication with the wired network (see also **Ad-Hoc Mode** and **Access Point**).
Internet	A massive worldwide network of computer networks interconnecting thousands of computers and networks around the world and readily accessible from any computer with a modem or router connection and the corresponding software.
IP (Internet Protocol)	A protocol standard for the Internet. A kind of Internet software that keeps track of all the addresses on the Internet for different nodes, forwards outgoing IP traffic, and recognizes incoming IP traffic.
IP Address	Numeric address assigned to each machine on the Internet. Consists of four sets of one, two, or three octal digits separated by periods.
ISP (Internet Service Provider)	The telecommunication company that provides Internet service for the subscriber. The ISP can be a telephone company, a CLEC or ILEC, or any other company that provides Internet access to the end user such as AOL, Earthlink or MSN.
LAN (Local Area Network)	A collection of privately-owned, interconnected computers within a confined service area.
WEP (Wired Equivalent Privacy)	WEP data encryption is defined by the 802.11 standard to prevent (i) access to the network by “intruders” using similar wireless LAN equipment and (ii) capture of wireless LAN traffic through eavesdropping. WEP allows the administrator to define a set of respective “Keys” for each wireless network user based on a “Key String” passed through the WEP encryption algorithm. Access is denied by anyone who does not have an assigned key.