

# **WAC-2004 User's Manual**

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**Second Edition, May 2014**

[www.moxa.com/product](http://www.moxa.com/product)



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# WAC-2004 User's Manual

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# Table of Contents

|                                                         |            |
|---------------------------------------------------------|------------|
| <b>1. Introduction</b>                                  | <b>1-1</b> |
| Overview                                                | 1-2        |
| Package Checklist                                       | 1-2        |
| Product Features                                        | 1-2        |
| Product Specifications                                  | 1-3        |
| Interface Specifications                                | 1-4        |
| LED Indicators                                          | 1-4        |
| Power Reset Button                                      | 1-4        |
| Gigabit Ethernet Port Connection                        | 1-5        |
| Serial Console Connection                               | 1-5        |
| Power Socket                                            | 1-6        |
| Beeper                                                  | 1-6        |
| <b>2. Getting Started</b>                               | <b>2-1</b> |
| Using Web Console to Access the WAC-2004                | 2-2        |
| Using Telnet Console to Access the WAC-2004             | 2-3        |
| Using Serial Console to Access the WAC-2004             | 2-4        |
| <b>3. Web Console Configuration</b>                     | <b>3-1</b> |
| Function Map                                            | 3-2        |
| Overview                                                | 3-3        |
| Basic Settings                                          | 3-3        |
| System Info Settings                                    | 3-3        |
| Network Settings                                        | 3-4        |
| Time Settings                                           | 3-5        |
| Controller Settings                                     | 3-6        |
| Basic WAC Settings                                      | 3-6        |
| WAC Security Settings                                   | 3-8        |
| Mobile IP Settings                                      | 3-9        |
| Advanced Settings                                       | 3-10       |
| SNMP Agent                                              | 3-10       |
| Auto Warning Settings                                   | 3-12       |
| System Log                                              | 3-12       |
| Syslog                                                  | 3-13       |
| E-mail                                                  | 3-14       |
| Trap                                                    | 3-15       |
| Status                                                  | 3-16       |
| System Log                                              | 3-16       |
| Managed Device List                                     | 3-16       |
| Mobile IP Status                                        | 3-17       |
| Maintenance                                             | 3-17       |
| Console Settings                                        | 3-17       |
| Ping                                                    | 3-18       |
| Firmware Upgrade                                        | 3-18       |
| Config Import Export                                    | 3-19       |
| Load Factory Default                                    | 3-20       |
| Password                                                | 3-20       |
| Save Configuration                                      | 3-20       |
| Restart                                                 | 3-21       |
| Logout                                                  | 3-21       |
| <b>4. Software Installation and Configuration</b>       | <b>4-1</b> |
| Overview                                                | 4-2        |
| AWK Search Utility                                      | 4-2        |
| Installing AWK Search Utility                           | 4-2        |
| Configuring AWK Search Utility                          | 4-4        |
| <b>A. References</b>                                    | <b>A-1</b> |
| Roaming Domain                                          | A-2        |
| <b>B. Supporting Information</b>                        | <b>B-1</b> |
| About This User's Manual                                | B-2        |
| DoC (Declaration of Conformity)                         | B-2        |
| Federal Communication Commission Interference Statement | B-2        |

# Introduction

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The WAC-2004 is Moxa's high-end Wireless Access Controller that incorporates with the **AWK-RTG (Rail Train to Ground) series** and is designed **specifically for Railway applications**. The WAC-2004 supports not only single-subnet roaming (Layer 2), it also allows roaming between multiple subnets (Layer 3) with Mobile IP technology.

The following topics are covered in this chapter:

- ❑ **Overview**
- ❑ **Package Checklist**
- ❑ **Product Features**
- ❑ **Product Specifications**
- ❑ **Interface Specifications**
  - LED Indicators
  - Power Reset Button
  - Gigabit Ethernet Port Connection
  - Serial Console Connection
  - Power Socket
  - Beeper

# Overview

The goal of zero-latency roaming is to allow clients to seamlessly maintain their communications as they move from one access point to another. The advanced Moxa Wireless Access Controller, WAC-2004, together with controller-based Turbo Roaming technology, enables **millisecond-level roaming over multiple IP subnets**. The advanced roaming algorithm, along with Mobile IP technology, allows wireless clients to roam between APs in different IP subnets within milliseconds while upholding stringent security in extremely demanding environments. The WAC-2004 is rated to operate at temperatures of 0 to 50°C and is rugged enough for on-site installation in any harsh industrial environment.

## Package Checklist

The WAC-2004 series wireless access controller is shipped with the following items. If any of these items are missing or damaged, please contact your customer service representative.

- WAC-2004 series wireless controller
- 1 AC power cord (C13 type, US or EU)
- 1 serial console cable (DB9 type, female-to-female)
- 4 RJ45 connector protective caps
- Rackmount kit
- Quick installation guide
- Software CD
- Warranty card

|             |                                                                                                                                                     |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NOTE</b> | Depending on the country code, US or EU AC power cords come standard with each WAC-2004 package. For other AC power cords, please order separately. |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|

## Product Features

### **Advanced Turbo Roaming Support**

- Layer-3 Mobile IP tunneling roaming (Controller + HA)
- Millisecond level L2 and L3 handover
- Wireless security support:
  - WPA/WPA2-Personal/Enterprise
  - EAP methods: TLS, TTLS, PEAP
- Less-than-50 ms inter-controller handover
- Less-than-500 ms controller backup recovery
- WAC-Centralized CCoA assignment
- Inter-WAC security setting

### **Value-added Networking Functions**

- Support up to 500 APs
- Ethernet port-binding for Ethernet redundancy
- 450 Mbps of total tunneling bandwidth
- 1+1 WAC/HA hot swap redundancy
- Configuration back-up with ABC-01

**Useful Utilities and Remote Configuration**

- RS-232/Telnet console management
- Web Console (HTTP/HTTPS) management
- Firmware upgrade from TFTP, Web Console, and utility
- Supports SNMP
- Configuration backup and reset

**Industrial-grade Design**

- Rackmount fanless design
- Redundant power

## Product Specifications

**Controller Specification**

|                                     |                                               |
|-------------------------------------|-----------------------------------------------|
| Supported AP/Client models:         | AWK-RTG series                                |
| Supported AP/Client security:       | WPA /WPA2 (IEEE 802.1X/ RADIUS, TKIP and AES) |
| Maximum number of APs per WAC-2004: | 500                                           |

**Interface**

|                            |                                                                 |
|----------------------------|-----------------------------------------------------------------|
| LED indicators:            | PWR1, PWR2, FAULT, STATE, LAN 100M/1000M                        |
| Power reset button         |                                                                 |
| LAN port (LAN1/2 Binding): | 10/100/1000BaseT(X), auto negotiation (RJ45-type), port-binding |
| LAN port (LAN3-4):         | Reserved for future expansion (RJ45-type)                       |
| Serial console:            | RS-232 (DB9-type, male)                                         |
| Power socket:              | Dual C13 AC connector for power supply redundancy               |
| Grounding screw            |                                                                 |

**Physical Characteristics**

|             |                                                                       |
|-------------|-----------------------------------------------------------------------|
| Housing:    | SECC sheet metal (1 mm)                                               |
| Weight:     | 5.48 Kg                                                               |
| Dimensions: | 325 x 440 x 44 mm (12.80 x 17.32 x 1.73 in) (without rack-mount ears) |

**Installation**

Standard 1U, 19-inch rack-mounting

**Environmental Characteristics**

|                            |                            |
|----------------------------|----------------------------|
| Operating Temperature:     | 0 to 50°C (32 to 122°F)    |
| Storage Temperature:       | -40 to 85°C (-40 to 185°F) |
| Ambient Relative Humidity: | 5 to 95% (non-condensing)  |

**Power Requirements**

|                    |                                                              |
|--------------------|--------------------------------------------------------------|
| Input Voltage:     | Dual AC inputs, 100 to 240 VAC/VDC auto-ranging, 47 to 63 Hz |
| Socket:            | C13 AC Connector                                             |
| Power Consumption: | 60W                                                          |

**Standards and Certifications**

|         |                                                                                       |
|---------|---------------------------------------------------------------------------------------|
| Safety: | UL 60950-1                                                                            |
| EMC:    | EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 55024, FCC Part 15 Subpart B Class A |

**Note: Please check Moxa's website for the most up-to-date certification status.**

**Warranty**

|                  |                                                                      |
|------------------|----------------------------------------------------------------------|
| Warranty Period: | 3 years                                                              |
| Details:         | See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a> |

**ATTENTION**

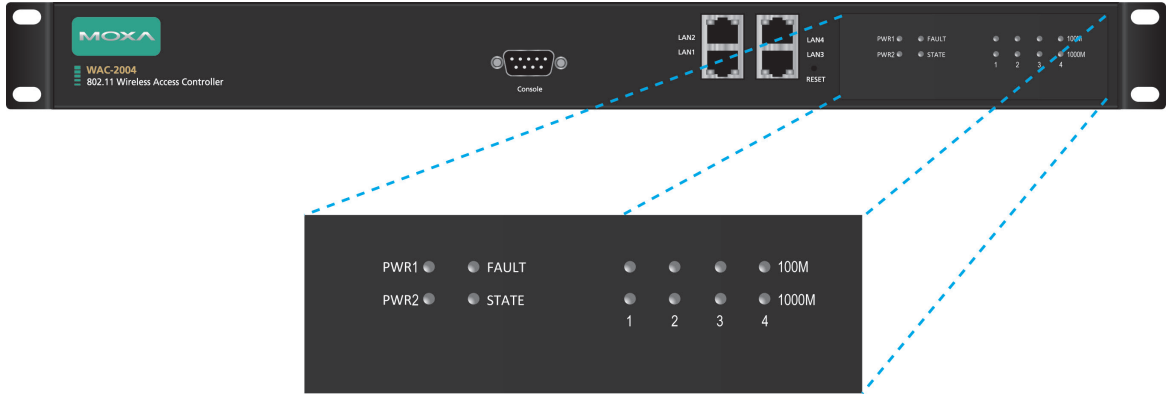
The WAC-2004 is NOT designed for use by the general public. A well-trained technician is required to safely deploy the WAC-2004.

# Interface Specifications

This section provides detailed introduction on the WAC-2004 interfaces.

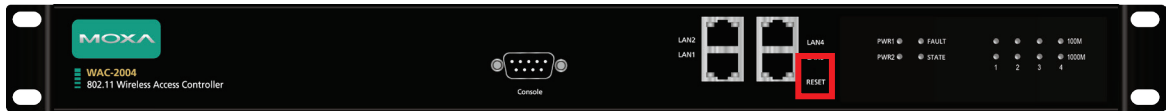
## LED Indicators

The LEDs on the front panel of the WAC-2004 provide quick and easy means of determining the current operational status and wireless settings.



| Front Panel LED Indicators               |                |                  |                                                                 |
|------------------------------------------|----------------|------------------|-----------------------------------------------------------------|
| LED                                      | Color          | State            | Description                                                     |
| PWR1                                     | Green          | On               | Power is being supplied from power input 1.                     |
|                                          |                | Off              | Power is not being supplied from power input 1.                 |
| PWR2                                     | Green          | On               | Power is being supplied from power input 2.                     |
|                                          |                | Off              | Power is not being supplied from power input 2.                 |
| FAULT                                    | Red            | On               | Bootling; System Error.                                         |
|                                          |                | Blinking (fast)  | IP address conflict (interval: 0.5 sec).                        |
|                                          |                | Off              | Normal status.                                                  |
| STATE                                    | Green/<br>Red  | Green            | Software Ready                                                  |
|                                          |                | Green (Blinking) | The device has been located by Search Utility. (interval: 1sec) |
|                                          |                | Red              | Bootling error                                                  |
| Gigabit LAN LEDs 1, 2<br>(3, 4 Reserved) | Green / Orange | Green            | 100 Mbps Ethernet mode.                                         |
|                                          |                | Orange           | 1000 Mbps (Gigabit) Ethernet mode.                              |
|                                          |                | Off              | No activity or 10 Mbps Ethernet mode.                           |

## Power Reset Button



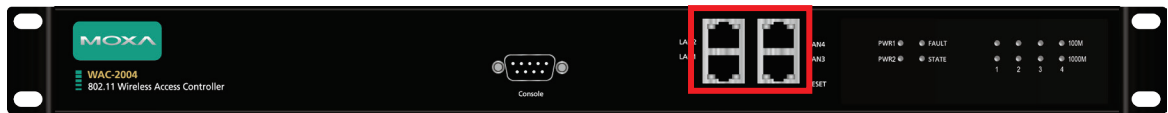
The RESET button located on the top panel of WAC-2004 is for **power reset ONLY**. You can reboot the WAC-2004 by pressing the RESET button with a pointed object, such as an unfolded paper clip.

System Reboot: Press and release the RESET button

### NOTE

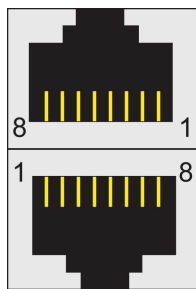
For configuration reset:  
**Web Console (HTTP/HTTPS):** Maintenance → Load Factory Default  
**Telnet/Serial Console:** Maintenance → Load Factory Default

# Gigabit Ethernet Port Connection



The WAC-2004 offers one pair of gigabit Ethernet ports with the port binding feature enabled (LAN 1 and LAN 2) for Ethernet failover redundancy. It also has two extra Ethernet ports (LAN 3-4) reserved for future expansion. When the cable is properly connected, the LED on the front panel will glow to indicate a proper connection.

See below for detailed pin assignment and LED indication:

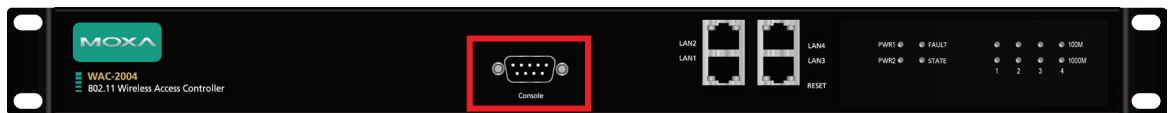


| Pin | 10/100 Mbps | 1000 Mbps |
|-----|-------------|-----------|
| 1   | ETx+        | TRD(0)+   |
| 2   | ETx-        | TRD(0)-   |
| 3   | ERx+        | TRD(1)+   |
| 4   | ---         | TRD(2)+   |
| 5   | ---         | TRD(2)-   |
| 6   | ERx-        | TRD(1)-   |
| 7   | ---         | TRD(3)+   |
| 8   | ---         | TRD(3)-   |

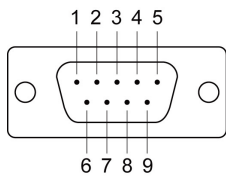
| LED                    | Color  | Description                            |
|------------------------|--------|----------------------------------------|
| Gigabit RJ45 Connector | Green  | 100 Mbps Ethernet mode                 |
|                        | Orange | 1000 Mbps (Gigabit) Ethernet mode      |
|                        | Off    | Not operating or 10 Mbps Ethernet mode |

**NOTE** The pin numbers for the 8-pin RJ45 connectors (and ports) are typically not labeled on the connector (or port). Refer to the diagram above to see how the RJ45 pins are numbered.

# Serial Console Connection



The WAC-2004 offers a serial port with DB9 male connector for its console access. The pin assignments are shown in the following table:



| Pin | RS-232 |
|-----|--------|
| 1   | DCD    |
| 2   | RxD    |
| 3   | TxD    |
| 4   | DTR    |
| 5   | GND    |
| 6   | DSR    |
| 7   | RTS    |
| 8   | CTS    |

**NOTE** The pin numbers for the male DB9 connectors are stated in the table above. The pinhole numbers for the female DB9 connectors are usually labeled on the connector. However, the numbers are typically very small, so you may need to use a magnifying glass to see the numbers clearly.



## Power Socket

The WAC-2004 offers a dual power supply for power failover redundancy. Input voltage ranges from **100 to 240 VAC/VDC, 47 to 63 Hz**, with a male **C13** connector. For US models, the device comes with a US power cord; for EU models, device comes with an EU power cord. As for other countries, please purchase power cords separately.



## Beeper

The beeper emits one short beep when the power is turned on and two short beeps when the system is ready. When the device is located by Search Utility, the beeper emits beeps every second to indicate its location.

## Getting Started

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This chapter explains how to access the WAC-2004 for the first time. There are three ways to access the controller: (1) Web Console, (2) Telnet Console, or (3) Serial Console. The Web and Telnet Consoles are suitable for remote management as the controller can be accessed over an existing network. The Serial Console can be used if you do not have the WAC-2004's IP address; however it requires using a RS-232 serial cable to connect WAC-2004 to your PC's COM port.

In addition, the Web Console provides a more complete collection of functions for status monitoring and controller administration; where the Telnet and Serial Consoles only provide basic administration functions.

The following topics are covered in this chapter:

- ❑ **Using Web Console to Access the WAC-2004**
- ❑ **Using Telnet Console to Access the WAC-2004**
- ❑ **Using Serial Console to Access the WAC-2004**

# Using Web Console to Access the WAC-2004

The WAC-2004's Web Console provides a convenient way to modify controller configuration, monitor the controller and governed AP/Client status, and upgrade FW remotely over an existing network. The recommended web browser is Microsoft® Internet Explorer 8.0 or later releases with JVM (Java Virtual Machine).

| Default Web Console access information |                 |
|----------------------------------------|-----------------|
| IP                                     | 192.168.127.253 |
| Submask                                | 255.255.255.0   |
| Username                               | admin           |
| Password                               | root            |

**NOTE** To use the WAC-2004's management and monitoring functions from a PC host connected to the same LAN as the WAC-2004, you must make sure that the PC host and the WAC-2004 are on the same logical subnet. The WAC-2004's default IP is 192.168.127.253.

## **Step 1: Connect the WAC-2004 to a notebook or PC with an Ethernet cable**

The WAC-2004 supports MDI/MDI-X auto-sensing so you can use either a straight-through cable or crossover cable to connect the WAC-2004 to your computer.

## **Step 2: Setting up the computer IP address**

Choose an IP address on the same subnet as the WAC-2004. Since the WAC-2004's default IP address is 192.168.127.253, and the subnet mask is 255.255.255.0, you should set the IP address of the computer to 192.168.127.xxx/24.

**NOTE** After you select Maintenance → Load Factory Default and click the Submit button, the WAC-2004 will be reset to factory default settings and the IP address will be reset back to 192.168.127.253/24.

## **Step 3: Use the web-based manager to configure the WAC-2004**

Open your computer web browser and type <http://192.168.127.253> in the address field to access the homepage of the WAC-2004 Web Console. For first-time configuration, enter the default username and password (shown below) and click on the Login button:

A screenshot of the Moxa WAC-2004 login page. It has a title 'Moxa WAC-2004'. Below it are two input fields: 'Username : admin' and 'Password : ....'. At the bottom right is a 'Login' button.

For security reasons, we strongly recommend changing the default password. Select Maintenance → Password, and then follow the on-screen instructions to change the password.



## **ATTENTION**

For security reasons, each authenticated login will have a 5-minute idle timeout. If your session is left idle for more than 5 minutes, you will need to re-authenticate your login.

**NOTE** After clicking **Submit** to apply changes, the web page will refresh and (Updated) will appear on the page, and at the same time, a flashing reminder on the upper-right corner of the web page will be displayed

To activate the changes, click the **Restart** button, and then the **Save** and **Restart** button. It will take about 40 seconds for the WAC-2004 to complete the reboot procedure.

## Using Telnet Console to Access the WAC-2004

For basic configuration, Telnet is another option.

| Default Telnet console access information |                 |
|-------------------------------------------|-----------------|
| IP                                        | 192.168.127.253 |
| Submask                                   | 255.255.255.0   |
| Username                                  | admin           |
| Password                                  | root            |

### **Step 1: Connect the WAC-2004 to a notebook or PC with an Ethernet cable**

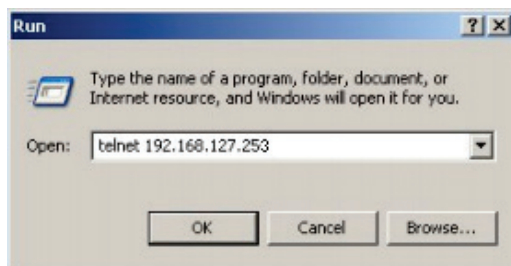
The WAC-2004 supports MDI/MDI-X auto-sensing so you can use either a **straight-through cable** or **crossover cable** to connect the WAC-2004 to your computer.

### **Step 2: Setting up the computer IP address**

Choose an IP address on the same subnet as the WAC-2004. Since the WAC-2004's default IP address is 192.168.127.253, and the subnet mask is 255.255.255.0, you should set the IP address of the computer to 192.168.127.xxx/24.

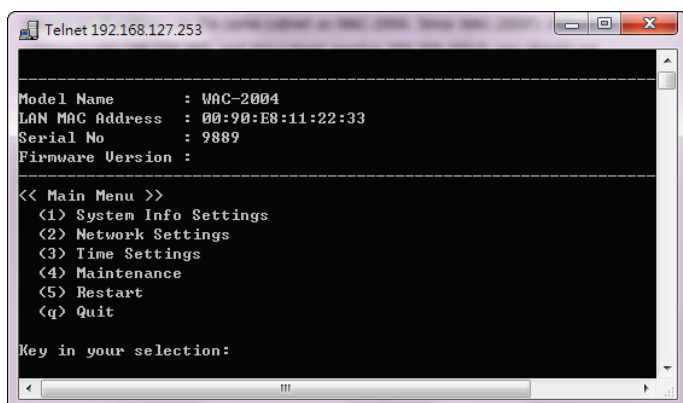
### **Step 3: Establish Telnet connection.**

On Windows XP, click Start → Run. Telnet to the WAC-2004's IP address (see below)  
(You may also issue the telnet command from the MS-DOS prompt.).



### **Step 4: Authentication for Telnet console access**

After the Telnet connection is established, you will be asked to enter username and password. For first-time configuration, please use the default username and password (please refer to section: Using Web Console to access the WAC-2004)



**Step 5: Basic text-based management interface**

Once authentication is complete, a list of text-based menu will be available to you. The following is a summary on the menu items:

| Item | Label                | Description                                                                                                     |
|------|----------------------|-----------------------------------------------------------------------------------------------------------------|
| 1    | System Info Settings | Basic system information, such as Device name, Device location, Device description, Device contact information. |
| 2    | Network Settings     | Basic network parameters, such as IP mode, IP address, Submask, Gateway, DNS settings, etc...                   |
| 3    | Time Settings        | Basic time setting, such as Static time setting, Time server setting, etc...                                    |
| 4    | Maintenance          | Reset configuration back to factory default.                                                                    |
| 5    | Restart              | Reboot the system.                                                                                              |
| q    | Quit                 | Exit Telnet console.                                                                                            |

## Using Serial Console to Access the WAC-2004

If you do not have the WAC-2004's IP address, but you can physically reach the device, use Serial Console to manage the device or obtain the IP address.

| Default Serial Console access information |        |
|-------------------------------------------|--------|
| Baud Rate                                 | 115200 |
| Data Bits                                 | 8      |
| Parity                                    | None   |
| Stop Bits                                 | 1      |
| Terminal                                  | VT100  |
| Username                                  | admin  |

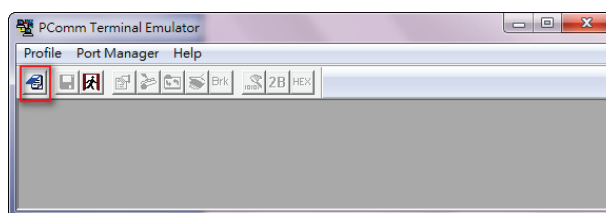
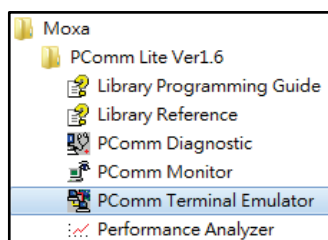
**NOTE** We recommend using Moxa PComm Terminal Emulator, which can be downloaded free of charge from Moxa's website.

**Step 1: Connect the WAC-2004 to your computer**

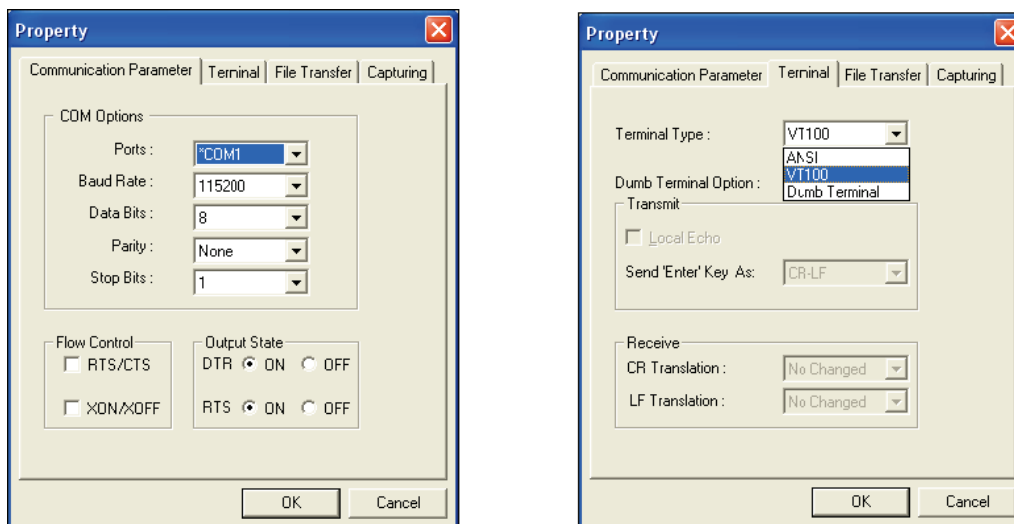
Before running PComm Terminal Emulator, use a DB9 female to DB9 female crossover serial cable to connect the WAC-2004 to your PC's COM port

**Step 2: Connect to the WAC-2004 Serial Console**

Start PComm Terminal Emulator → Click Start → Programs → PCommLite X.X → Terminal Emulator.



Use the Open icon or select Open in the Port Manager menu to establish a new connection.

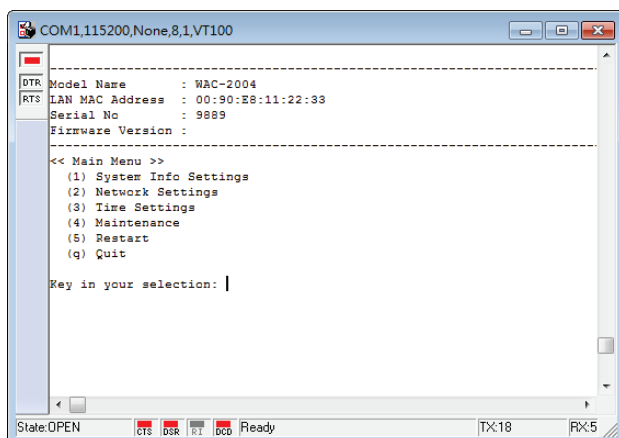


The Communication Parameter page of the Property window will appear. Select the appropriate COM port for Console Connection, 115200 for Baud Rate, 8 for Data Bits, None for Parity, and 1 for Stop Bits

Click the Terminal tab, and select VT100 for Terminal Type. Click OK to establish the connection.

### **Step 3: Authentication for Serial Console access**

After the connection is established, you will be asked to enter username and password. For first-time configuration, please use the default username and password (please refer to section: Using Web Console to access the WAC-2004)



### **Step 4: Basic text-based management interface**

(Please refer to section: **Using Telnet Console to Access the WAC-2004**)



#### **ATTENTION**

If you unplug the RS-232 cable or trigger DTR, a disconnection event will be evoked to enforce logout for network security. You will need to log in again to resume operation.

#### **NOTE**

To modify the appearance of the PComm Terminal Emulator window, select **Edit → Font** and then choose the desired formatting options.

# Web Console Configuration

---

The WAC-2004's Web Console provides a convenient way to modify the controller's configuration, monitor the controller and governed AP/Client status, and upgrade FW remotely over an existing network. The recommended web browser is Microsoft® Internet Explorer 8.0 or later releases with JVM (Java Virtual Machine).

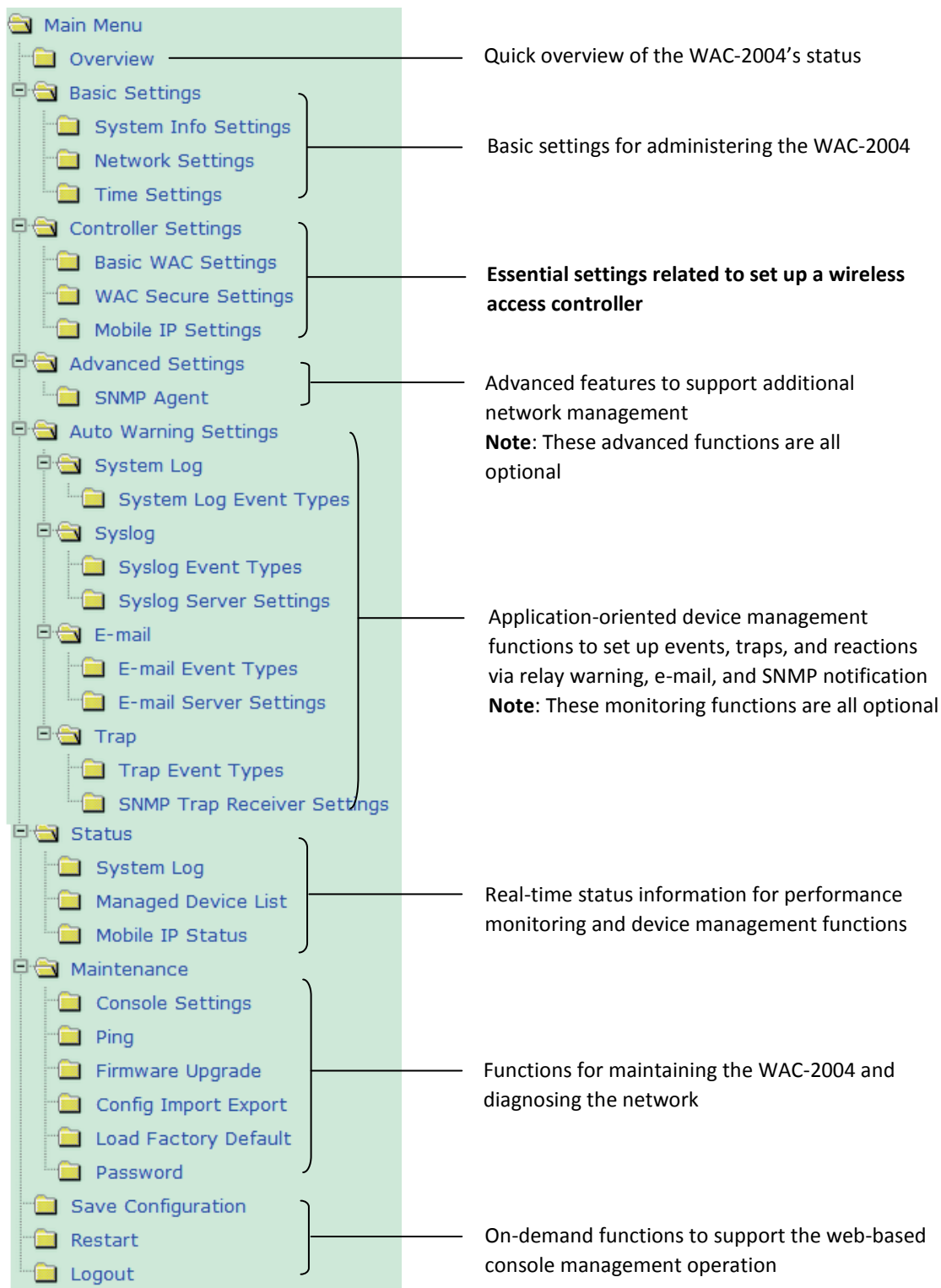
This chapter provides a detailed introduction and description to each WAC-2004 management function. For information on how to access Web Console, please refer to **Chapter 2: Using Web Console to Access the WAC-2004**.

The following topics are covered in this chapter:

- ❑ **Function Map**
- ❑ **Overview**
- ❑ **Basic Settings**
  - System Info Settings
  - Network Settings
  - Time Settings
- ❑ **Controller Settings**
  - Basic WAC Settings
  - WAC Security Settings
  - Mobile IP Settings
- ❑ **Advanced Settings**
  - SNMP Agent
- ❑ **Auto Warning Settings**
  - System Log
  - Syslog
  - E-mail
  - Trap
- ❑ **Status**
  - System Log
  - Managed Device List
  - Mobile IP Status
- ❑ **Maintenance**
  - Console Settings
  - Ping
  - Firmware Upgrade
  - Config Import Export
  - Load Factory Default
  - Password
- ❑ **Save Configuration**
- ❑ **Restart**
- ❑ **Logout**

# Function Map

The Function Map provides a convenient means of determining which functions you need to use.





## Overview

The **Overview** page summarizes the WAC-2004's current status. The information is categorized into several groups: **System info**, **Device info**, and **Controller info**.

| Overview                                        |                             |
|-------------------------------------------------|-----------------------------|
| All information on this page are active values. |                             |
| System info                                     |                             |
| Model name                                      | WAC-2004                    |
| Device name                                     | WAC-2004-1A Main Controller |
| Serial No.                                      | 9889                        |
| System up time                                  | 0 days 02h:45m:17s          |
| Firmware version                                | 0                           |
| Device info                                     |                             |
| Device MAC address                              | 00:90:E8:11:22:33           |
| IP address                                      | 192.168.127.253             |
| Subnet mask                                     | 255.255.255.0               |
| Gateway                                         |                             |
| Controller info                                 |                             |
| Roaming domain                                  | Not setting                 |
| WAC group multicast IP                          | 239.0.1.150                 |
| WAC mode                                        | Primary WAC                 |
| Backup WAC IP address                           |                             |
| Priority 1 roaming threshold                    | -75 (-75 to -35 dBm)        |
| Priority 1 roaming difference                   | 0 (0 to 30 dB)              |
| Priority 1 roaming link quality                 | 30 / 70                     |
| Priority 2 roaming threshold                    | -55 (-75 to -35 dBm)        |
| Priority 2 roaming difference                   | 10 (0 to 30 dB)             |
| Priority 2 roaming link quality                 | 20 / 70                     |
| Roaming stable interval                         | 3 *50 ms                    |

## Basic Settings

The Basic Settings group includes the most commonly used settings required by administrators to maintain and control the WAC-2004.

### System Info Settings

The **System Info** items, especially **Device name** and **Device description**, are displayed and included on the **Overview** page, in SNMP information, and in alarm emails. Setting **System Info** items makes it easier to identify the different WAC-2004 units connected to your network.

| System Info Settings                  |                                                            |
|---------------------------------------|------------------------------------------------------------|
| Device name                           | <input type="text" value="WAC-2004-1A Main Controller"/>   |
| Device location                       | <input type="text" value="Area 32, 5th Floor, Skycity"/>   |
| Device description                    | <input type="text" value="Main CBTC Controller"/>          |
| Device contact information            | <input type="text" value="John Johnson, its@skycity.com"/> |
| <input type="button" value="Submit"/> |                                                            |

#### Device name

| Setting               | Description                                                                               | Factory Default                        |
|-----------------------|-------------------------------------------------------------------------------------------|----------------------------------------|
| Max. 31 of characters | This option is useful for specifying the role or application of different WAC-2004 units. | WAC-2004_<Serial No. of this WAC-2004> |

**Device location**

| Setting               | Description                                        | Factory Default |
|-----------------------|----------------------------------------------------|-----------------|
| Max. of 31 characters | Specifies the location of different WAC-2004 units | None            |

**Device description**

| Setting               | Description                                                          | Factory Default |
|-----------------------|----------------------------------------------------------------------|-----------------|
| Max. of 31 characters | Use this space to record a more detailed description of the WAC-2004 | None            |

**Device contact information**

| Setting               | Description                                                                                                                                                                    | Factory Default |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Max. of 31 characters | Provides information about whom to contact in order to resolve problems. Use this space to record contact information of the person responsible for maintaining this WAC-2004. | None            |

## Network Settings

The Network Settings configuration panel allows you to modify the usual TCP/IP network parameters. An explanation of each configuration item is given below.

**Network Settings**

IP address

192.168.127.253

Subnet mask

255.255.255.0

Gateway

192.168.127.254

Primary DNS server

Secondary DNS server

Submit

**IP address**

| Setting             | Description                                  | Factory Default |
|---------------------|----------------------------------------------|-----------------|
| WAC-2004 IP address | Identifies the WAC-2004 on a TCP/IP network. | 192.168.127.253 |

**Subnet mask**

| Setting              | Description                                                                                                                                          | Factory Default |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| WAC-2004 subnet mask | Identifies the type of network to which the WAC-2004 is connected (e.g., 255.255.0.0 for a Class B network, or 255.255.255.0 for a Class C network). | 255.255.255.0   |

**Gateway**

| Setting                  | Description                                                               | Factory Default |
|--------------------------|---------------------------------------------------------------------------|-----------------|
| WAC-2004 default gateway | The IP address of the router that connects the LAN to an outside network. | None            |

**Primary/Secondary DNS server**

| Setting                                        | Description                                                                                                                                                                                                                                                                                                           | Factory Default |
|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| IP address of the Primary/Secondary DNS server | The IP address of the DNS Server used by your network. After entering the DNS Server's IP address, you can input the WAC-2004's URL (e.g., http://ap11.abc.com) in your browser's address field instead of entering the IP address. The Secondary DNS server will be used if the Primary DNS server fails to connect. | None            |

## Time Settings

The WAC-2004 has a time calibration function based on information from an NTP server or user specified Date and Time information. Functions such as Auto warning can add real-time information to the message.

**Time Settings**

Date (YYYY/MM/DD) Time (HH:MM:SS)

Current local time 2009 / 01 / 23 16 : 58 : 19

Set Time

Time zone (GMT-06:00)Central Time (US & Canada)

Daylight saving time
☒ Enable

Starts at Apr. 1st Sun. 00 : 00 (HH:MM)

Stops at Oct. last Sun. 00 : 00 (HH:MM)

Time offset +01:00

Time server 1 time.nist.gov

Time server 2

Query period 600 (600~9999 seconds)

The **Current local time** shows the WAC-2004's system time when you open this web page. You can click on the **Set Time** button to activate the updated date and time parameters. An "(Updated)" string will appear to indicate that the change is complete. Local time settings will be immediately activated in the system without running Save and Restart.

**NOTE** The WAC-2004 has a built-in real time clock (RTC). We strongly recommend that users update the **Local time** for the WAC-2004 after the initial setup or a long-term shutdown, especially when the network does not have an Internet connection for accessing the NTP server or there is no NTP server on the LAN.

**Current local time**

| Setting              | Description                                                                                                                               | Factory Default |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| User adjustable time | The date and time parameters allow configuration of the local time, with immediate activation.<br>Use 24-hour format: yyyy/mm/dd hh:mm:ss | Local time      |

**Time zone**

| Setting                   | Description                                                                           | Factory Default           |
|---------------------------|---------------------------------------------------------------------------------------|---------------------------|
| User selectable time zone | The time zone setting allows conversion from GMT (Greenwich Mean Time) to local time. | GMT (Greenwich Mean Time) |

**ATTENTION**

Because the current local time will be adjusted automatically as the time zone is being adjusted, you will need to configure the time zone prior to inputting the current local time.

**Daylight saving time**

| Setting        | Description                                                                                                                                                                      | Factory Default |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Enable/Disable | Daylight saving time (also known as DST or summer time) involves advancing clocks (usually 1 hour) during the summer time to provide an extra hour of daylight in the afternoon. | Disable         |

When **Daylight saving time** is enabled, the following parameters will be shown:

- **Starts at:** The date that daylight saving time begins.
- **Stops at:** The date that daylight saving time ends.
- **Time offset:** Indicates how many hours forward the clock should be advanced.

**Time server 1/2**

| Setting                    | Description                                                                                                       | Factory Default |
|----------------------------|-------------------------------------------------------------------------------------------------------------------|-----------------|
| IP/Name of Time Server 1/2 | IP or Domain name of the NTP time server. The 2nd NTP server will be used if the 1st NTP server fails to connect. | None            |

**Query period**

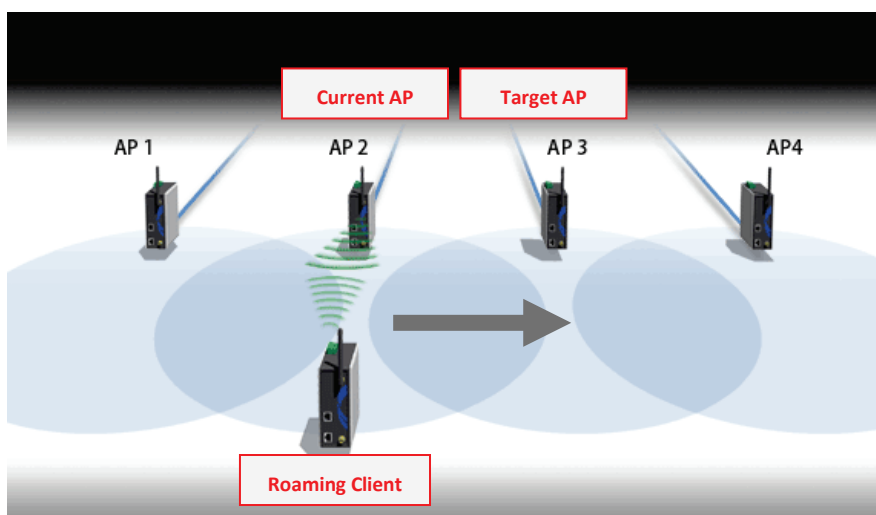
| Setting                                 | Description                                                                  | Factory Default |
|-----------------------------------------|------------------------------------------------------------------------------|-----------------|
| Query period time (600 to 9999 seconds) | This parameter determines how often the time is updated from the NTP server. | 600 (seconds)   |

## Controller Settings

The Controller Settings group includes the most important settings, which enable administrators to set up the Wireless Access Controller services.

### Basic WAC Settings

The **controller information** (including Roaming domain, Roaming threshold, Roaming difference, etc...) are displayed on the **Overview** page.



| Basic WAC Settings                    |                                     |
|---------------------------------------|-------------------------------------|
| Inter WAC enable                      | <input checked="" type="checkbox"/> |
| WAC group ID                          | MOXA                                |
| WAC passphrase                        | *****                               |
| WAC group multicast IP                | 239.0.1.150                         |
| WAC mode                              | Primary WAC                         |
| Backup WAC IP address                 |                                     |
| Roaming domain                        | FF:90:E8: 11 : 22 : 33              |
| Roaming priority                      | Priority 1                          |
| Priority 1 roaming threshold          | -75 (-75 to -35 dBm)                |
| Priority 1 roaming difference         | 0 (0 to 30 dB)                      |
| Priority 1 roaming link quality       | 30 / 70                             |
| Roaming stable interval               | 3 * 50 ms                           |
| Bond option                           | Disable                             |
| <input type="button" value="Submit"/> |                                     |

**Inter WAC enable**

| Setting        | Description                             | Factory Default |
|----------------|-----------------------------------------|-----------------|
| Enable/Disable | Enable or disable the Inter WAC feature | Enable          |

**WAC group ID**

| Setting               | Description                                                                                                                                | Factory Default |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Max. 31 of characters | The group ID for WACs to recognize each other as a member of the same WAC community, and hence the inter WAC feature will operate properly | Moxa            |

**WAC passphrase**

| Setting                        | Description                                                    | Factory Default |
|--------------------------------|----------------------------------------------------------------|-----------------|
| Max. 63 of characters (masked) | The passphrase for inter WAC security and to prevent rouge WAC | None            |

**WAC group multicast IP**

| Setting      | Description                                          | Factory Default |
|--------------|------------------------------------------------------|-----------------|
| Multicast IP | The multicast IP address for inter WAC communication | 239.0.1.150     |

**WAC mode**

| Setting     | Description          | Factory Default |
|-------------|----------------------|-----------------|
| Primary WAC | Act as a primary WAC | Primary WAC     |
| Backup WAC  | Act as a backup WAC  |                 |

**Primary/Backup WAC IP address**

| Setting    | Description                                                                                                                            | Factory Default |
|------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| IP address | The IP address of the pairing controller, when one fails, another controller will take over its function in the network (within 500ms) | None            |

**Roaming domain**

| Setting          | Description                                                                                                                                                   | Factory Default                   |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| 6 Hex characters | This specifies the area served by the WAC-2004. All related controllers, APs, and clients use this as identification to work and communicate with each other. | <The Mac address of the WAC-2004> |

**NOTE** The **Roaming domain** must be set at the time of initial (first time) installation.

**Roaming priority**

| Setting    | Description                                                             | Factory Default |
|------------|-------------------------------------------------------------------------|-----------------|
| Priority 1 | APs with "Priority 1" take higher precedent than APs with "Priority 2". | Priority 1      |
| Priority 2 |                                                                         |                 |

**Priority 1/2 roaming threshold**

| Setting               | Description                                                                         | Factory Default                    |
|-----------------------|-------------------------------------------------------------------------------------|------------------------------------|
| Signal strength (dBm) | The signal strength of the current AP and Client must be lower than this threshold. | Priority 1: -75<br>Priority 2: -50 |

**Priority 1/2 roaming difference**

| Setting             | Description                                                                          | Factory Default                 |
|---------------------|--------------------------------------------------------------------------------------|---------------------------------|
| Relative value (dB) | The signal strength between the target AP and Client must be greater than this value | Priority 1: 0<br>Priority 2: 10 |

**Priority 1/2 roaming link quality**

| Setting                | Description                                                                                                                | Factory Default                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Link quality (Integer) | The link quality (signal strength – Background noise) between the target AP and Client must be greater than this threshold | Priority 1: 30<br>Priority 2: 20 |

**Roaming stable interval**

| Setting                    | Description                                                                              | Factory Default |
|----------------------------|------------------------------------------------------------------------------------------|-----------------|
| Multiple of 50ms (Integer) | The above three conditions must stay true for X amount of time to ensure a stable state. | 3 (x50ms)       |

**Bond option**

| Setting        | Description                                                                           | Factory Default |
|----------------|---------------------------------------------------------------------------------------|-----------------|
| Enable/Disable | Enable or disable the LAN1/2 port bonding feature for Ethernet connection redundancy. | disable         |

## WAC Security Settings

By enabling the 802.1X/EAP on the WAC-2004, the controller acts as an **authentication proxy/relay** between the APs and the RADIUS server. So when configuring your RADIUS server, instead of entering IPs for every authentication requester (in normal cases, it will be your APs), you only need to enter the IP for the WAC-2004.

**WAC Secure Settings**

**RADIUS proxy settings**

802.1X/ EAP ☒

Primary RADIUS server IP

Primary RADIUS server port

Primary RADIUS shared key

Secondary RADIUS server IP

Secondary RADIUS server port

Secondary RADIUS shared key

**802.1X/ EAP**

| Setting        | Description                      | Factory Default |
|----------------|----------------------------------|-----------------|
| Enable/Disable | Enables EAP proxy/relay support. | Disable         |

**Primary/ Secondary RADIUS server IP**

| Setting                             | Description                                   | Factory Default |
|-------------------------------------|-----------------------------------------------|-----------------|
| The IP address of the RADIUS server | Specifies the delegated RADIUS server for EAP | None            |

**Primary/ Secondary RADIUS server port**

| Setting     | Description                                              | Factory Default |
|-------------|----------------------------------------------------------|-----------------|
| Port number | Specifies the port number of the delegated RADIUS server | 1812            |

**Primary/ Secondary RADIUS shared key**

| Setting            | Description                                             | Factory Default |
|--------------------|---------------------------------------------------------|-----------------|
| Max. 63 characters | The secret key shared between the AP and RADIUS server. | None            |

**NOTE** The wireless security settings of all the APs that are deployed in the same **roaming domain** must be consistent and homogeneous. Different security settings in same-grouped APs may cause **Turbo Roaming** failures. Refer to the AWK-RTG manual for detailed information about the Wireless Setting.

## Mobile IP Settings

Mobile IP allows you to access the same IP address even when the Client is travelling across different subnets.

**Mobile IP Settings**

**Mobile IP**
☒ Enable

**Tunnel bandwidth**

10 Mbps

Support 25 tunnels (Estimated)

| No. | Enable                              | Start IP address | Number of available IP | Netmask         | Gateway     |
|-----|-------------------------------------|------------------|------------------------|-----------------|-------------|
| 1   | <input checked="" type="checkbox"/> | 172.28.0.51      | 5                      | 255.255.255.192 | 172.28.0.62 |
| 2   | <input checked="" type="checkbox"/> | 172.28.2.51      | 5                      | 255.255.255.192 | 172.28.2.62 |
| 3   | <input checked="" type="checkbox"/> | 172.28.4.51      | 5                      | 255.255.255.192 | 172.28.4.62 |
| 4   | <input checked="" type="checkbox"/> | 172.28.6.51      | 5                      | 255.255.255.192 | 172.28.6.62 |
| 5   | <input type="checkbox"/>            | 0.0.0.0          | 5                      | 255.255.255.0   | 0.0.0.0     |
| 6   | <input type="checkbox"/>            | 0.0.0.0          | 5                      | 255.255.255.0   | 0.0.0.0     |
| 7   | <input type="checkbox"/>            | 0.0.0.0          | 5                      | 255.255.255.0   | 0.0.0.0     |
| 8   | <input type="checkbox"/>            | 0.0.0.0          | 5                      | 255.255.255.0   | 0.0.0.0     |

Submit

**Mobile IP**

| Setting        | Description                         | Factory Default |
|----------------|-------------------------------------|-----------------|
| Enable/Disable | Enable or disable Mobile IP feature | Enable          |

**Tunnel bandwidth**

| Setting   | Description                                                      | Factory Default |
|-----------|------------------------------------------------------------------|-----------------|
| 1-25 Mbps | Bandwidth per single Mobile IP tunnel (total bandwidth 450 Mbps) | 10 Mbps         |

**Enable**

| Setting        | Description                                | Factory Default |
|----------------|--------------------------------------------|-----------------|
| Enable/Disable | Enable or disable a particular mobile rule | Disable         |

**Start IP address**

| Setting                  | Description                                                     | Factory Default |
|--------------------------|-----------------------------------------------------------------|-----------------|
| Starting CCoA IP address | The starting IP for CCoA IP Assignment for the specified subnet | 0.0.0.0         |

**Number of available IP**

| Setting       | Description                                           | Factory Default |
|---------------|-------------------------------------------------------|-----------------|
| Number of IPs | Number of IPs can be assigned in the specified subnet | 5               |

**Netmask**

| Setting     | Description                      | Factory Default |
|-------------|----------------------------------|-----------------|
| Subnet mask | The subnet mask for CCoA subnets | 255.255.255.0   |

**Gateway**

| Setting         | Description                                       | Factory Default |
|-----------------|---------------------------------------------------|-----------------|
| Default gateway | The default gateway for the specified CCoA subnet | 0.0.0.0         |

## Advanced Settings

Advanced features to support additional network management

### SNMP Agent

The WAC-2004 supports SNMP V1/V2c/V3. SNMP V1 and SNMP V2c use a community string match for authentication, which means that SNMP servers access all objects with read-only or read/write permissions using the community string *public/private* (default value). SNMP V3, which requires you to select an authentication level of MD5 or SHA, is the most secure protocol. You can also enable data encryption to enhance data security.

The WAC-2004's MIB can be found in the software CD and supports reading/writing the attributes via SNMP.

SNMP security modes and security levels supported by the WAC-2004 are shown in the following table. Select the security mode and level that will be used to communicate between the SNMP agent and manager.

| Protocol Version | Setting on UI web page       | Authentication Type                | Data Encryption     | Method                                                                                                                                                                                                     |
|------------------|------------------------------|------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SNMP V1, V2c     | V1, V2c Read Community       | Community string                   | No                  | Use a community string match for authentication                                                                                                                                                            |
|                  | V1, V2c Write/Read Community | Community string                   | No                  | Use a community string match for authentication                                                                                                                                                            |
| SNMP V3          | No-Auth                      | No                                 | No                  | Use account with admin or user to access objects                                                                                                                                                           |
|                  | MD5 or SHA                   | Authentication based on MD5 or SHA | No                  | Provides authentication based on HMAC-MD5, or HMAC-SHA algorithms. 8-character passwords are the minimum requirement for authentication.                                                                   |
|                  | MD5 or SHA                   | Authentication based on MD5 or SHA | Data encryption key | Provides authentication based on HMAC-MD5 or HMAC-SHA algorithms, and data encryption key. 8-character passwords and a data encryption key are the minimum requirements for authentication and encryption. |



The following parameters can be configured on the **SNMP Agent** page. A more detailed explanation of each parameter is given below the following figure.

#### **Enable**

| Setting | Description         | Factory Default |
|---------|---------------------|-----------------|
| Enable  | Enables SNMP Agent  | Disable         |
| Disable | Disables SNMP Agent |                 |

#### **Read community (for V1, V2c)**

| Setting                | Description                                                                                                                                                                                    | Factory Default |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| V1, V2c Read Community | Use a community string match with a maximum of 31 characters for authentication. This means that the SNMP agent can access all objects with read-only permissions using this community string. | public          |

#### **Write community (for V1, V2c)**

| Setting                       | Description                                                                                                                                                                                       | Factory Default |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| V1, V2c Read /Write Community | Use a community string match with a maximum of 31 characters for authentication. This means that the SNMP agent can accesses all objects with read/write permissions using this community string. | private         |

#### **SNMP agent version**

| Setting                             | Description                                              | Factory Default |
|-------------------------------------|----------------------------------------------------------|-----------------|
| V1, V2c, V3, or V1, V2c, or V3 only | Select the SNMP protocol version used to manage the WAC. | V1, V2c         |

#### **Admin auth type (for V1, V2c, V3, and V3 only)**

| Setting | Description                                                                                                                    | Factory Default |
|---------|--------------------------------------------------------------------------------------------------------------------------------|-----------------|
| No Auth | Use admin account to access objects. No authentication                                                                         | No Auth         |
| MD5     | Provide authentication based on the HMAC-MD5 algorithms. 8-character passwords are the minimum requirement for authentication. |                 |
| SHA     | Provides authentication based on HMAC-SHA algorithms. 8-character passwords are the minimum requirement for authentication.    |                 |

#### **Admin privacy type (for V1, V2c, V3, and V3 only)**

| Setting | Description               | Factory Default |
|---------|---------------------------|-----------------|
| Disable | No data encryption        | Disable         |
| DES     | DES-based data encryption |                 |
| AES     | AES-based data encryption |                 |

**Private Key**

| Setting            | Description                                                           | Factory Default |
|--------------------|-----------------------------------------------------------------------|-----------------|
| Max. 63 characters | A data encryption key is the minimum requirement for data encryption. | None            |

**Private MIB Information Device Object ID**

Also known as **OID**, this is the WAC-2004's enterprise value and is fixed.

## Auto Warning Settings

Since industrial-grade devices are often located at the endpoints of a system, these devices will not always know what is happening elsewhere on the network. This means that these devices, including wireless APs or clients, must provide system maintainers with real-time alarm messages. Even when system administrators are out of the control room for an extended period, they can still be informed of the status of devices almost instantaneously when exceptions occur.

In addition to logging these events, the WAC-2004 supports different approaches to warn engineers automatically, such as SNMP trap, and e-mail.

## System Log

**System Log Event Types**

Detail information for grouped events is shown in the following table. You can check the box for **Enable log** to enable the grouped events. All default values are enabled (checked). The log for system events can be seen in **Status → System Log**.

| System Log Event Types                |                                     |
|---------------------------------------|-------------------------------------|
| Event group                           | <input type="checkbox"/> Enable log |
| System-related events                 | <input checked="" type="checkbox"/> |
| Network-related events                | <input checked="" type="checkbox"/> |
| Config-related events                 | <input checked="" type="checkbox"/> |
| Controller-related events             | <input checked="" type="checkbox"/> |
| <input type="button" value="Submit"/> |                                     |

| System-related events                     | Event is triggered when...                                                                   |
|-------------------------------------------|----------------------------------------------------------------------------------------------|
| System restart (warm start)               | The WAC-2004 is rebooted, such as when settings are changed (IP address, subnet mask, etc.). |
| Network-related events                    | Event is triggered when...                                                                   |
| LAN link on                               | The LAN port is connected to a device or network.                                            |
| LAN link off                              | The port is disconnected (e.g., the cable is pulled out, or the opposing device shuts down). |
| Config-related events                     | Event is triggered when...                                                                   |
| Configuration changed                     | A configuration item has been changed.                                                       |
| Configuration file import via Web Console | The configuration file is imported to the WAC-2004.                                          |
| Console authentication failure            | An incorrect password is entered.                                                            |
| Firmware upgraded                         | The WAC-2004's firmware is updated.                                                          |
| Controller-related events                 | Event is triggered when...                                                                   |
| CPU status                                | CPU over-temperature or overload                                                             |
| AP status                                 | AP joined/left                                                                               |
| STA status                                | Client joined/left                                                                           |
| Home Agent status                         | Home Agent overload and connection changed                                                   |
| Controller status                         | Primary/Backup WAC up/down, Inter WAC joined/left                                            |
| Roaming status                            | Client roaming                                                                               |

## Syslog

This function provides the event logs for the Syslog server. The function supports up to three configurable Syslog servers and Syslog server UDP port numbers. When an event occurs, the event will be sent as a Syslog UDP packet to the specified Syslog servers.

### Syslog Event Types

Detail information for the grouped events is shown in the following table. You can check the box for **Enable log** to enable the grouped events. All default values are enabled (checked). Details for each event group (except WAC RSSI report events) can be found on the "System log Event Types" table.

| Syslog Event Types        |                                     |
|---------------------------|-------------------------------------|
| Event group               | <input type="checkbox"/> Enable log |
| System-related events     | <input checked="" type="checkbox"/> |
| Network-related events    | <input checked="" type="checkbox"/> |
| Config-related events     | <input checked="" type="checkbox"/> |
| WAC RSSI report events    | <input type="checkbox"/>            |
| Controller-related events | <input checked="" type="checkbox"/> |

| WAC RSSI report events                            | Event is triggered when...                                                                                                                                                     |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RSSI between governed Client and its monitor-APs. | Continuously reports the RSSI value between the governed Client and its monitor-APs. This report is used by "Moxa RSSI Transformer" to assist site surveying and system setup. |

### Syslog Server Settings

You can configure the parameters for your Syslog servers in this page.

| Syslog Server Settings |                                  |
|------------------------|----------------------------------|
| Syslog server 1        | <input type="text"/>             |
| Syslog port            | <input type="text" value="514"/> |
| Syslog server 2        | <input type="text"/>             |
| Syslog port            | <input type="text" value="514"/> |
| Syslog server 3        | <input type="text"/>             |
| Syslog port            | <input type="text" value="514"/> |

#### Syslog server 1/ 2/ 3

| Setting    | Description                                             | Factory Default |
|------------|---------------------------------------------------------|-----------------|
| IP address | Enter the IP address of the 1st/ 2nd/ 3rd Syslog Server | None            |

#### Syslog port

| Setting                          | Description                                           | Factory Default |
|----------------------------------|-------------------------------------------------------|-----------------|
| Port destination<br>(1 to 65535) | Enter the UDP port of the corresponding Syslog server | 514             |

## E-mail

### E-mail Event Types

Check the box for **Active** to enable the event items. All default values are deactivated (unchecked). Details for each event item can be found on the "System log Event Types" table.

| Event                          | <input type="checkbox"/> Active |
|--------------------------------|---------------------------------|
| Cold start                     | <input type="checkbox"/>        |
| Warm start                     | <input type="checkbox"/>        |
| Configuration changed          | <input type="checkbox"/>        |
| Console authentication failure | <input type="checkbox"/>        |
| LAN link on                    | <input type="checkbox"/>        |
| LAN link off                   | <input type="checkbox"/>        |
| CPU status                     | <input type="checkbox"/>        |
| AP status                      | <input type="checkbox"/>        |
| STA status                     | <input type="checkbox"/>        |
| Home Agent Status              | <input type="checkbox"/>        |
| Controller Status              | <input type="checkbox"/>        |
| Roaming Status                 | <input type="checkbox"/>        |

### E-mail Server Settings

You can set up to 4 e-mail addresses to receive alarm emails from the WAC-2004. The following parameters can be configured on the **E-mail Server Settings** page. In addition, a **Send Test Mail** button can be used to test whether the Mail server and e-mail addresses work well. More detailed explanations about these parameters are given after the following figure.

| E-mail Server Settings |                          |
|------------------------|--------------------------|
| Mail server (SMTP)     | <input type="text"/>     |
| User name              | <input type="text"/>     |
| Password               | <input type="password"/> |
| From e-mail address    | <input type="text"/>     |
| To e-mail address 1    | <input type="text"/>     |
| To e-mail address 2    | <input type="text"/>     |
| To e-mail address 3    | <input type="text"/>     |
| To e-mail address 4    | <input type="text"/>     |

#### Mail server (SMTP)

| Setting    | Description                          | Factory Default |
|------------|--------------------------------------|-----------------|
| IP address | The IP Address of your email server. | None            |

#### User name & Password

| Setting | Description                                    | Factory Default |
|---------|------------------------------------------------|-----------------|
|         | User name and password used in the SMTP server | None            |

#### From e-mail address

| Setting            | Description                                                                                           | Factory Default |
|--------------------|-------------------------------------------------------------------------------------------------------|-----------------|
| Max. 63 characters | Enter the administrator's e-mail address which will be shown in the "From" field of a warning e-mail. | None            |

#### To E-mail address 1/ 2/ 3/ 4

| Setting            | Description                            | Factory Default |
|--------------------|----------------------------------------|-----------------|
| Max. 63 characters | Enter the receivers' e-mail addresses. | None            |

## Trap

Traps can be used to signal abnormal conditions (notifications) to a management station. This trap-driven notification can make your network more efficient.

Because a management station usually takes care of a large number of devices that have a large number of objects, it will be overloading for the management station to poll or send requests to query every object on every device. It would be better if the managed device agent could notify the management station by sending a message known as a trap for the event.

### Trap Event Types

Details for each event group can be found on the "System log Event Types" table.

| Trap Event Types               |                                 |
|--------------------------------|---------------------------------|
| Event                          | <input type="checkbox"/> Active |
| Cold start                     | <input type="checkbox"/>        |
| Warm start                     | <input type="checkbox"/>        |
| Configuration changed          | <input type="checkbox"/>        |
| Console authentication failure | <input type="checkbox"/>        |
| LAN link on                    | <input type="checkbox"/>        |
| LAN link off                   | <input type="checkbox"/>        |
| CPU status                     | <input type="checkbox"/>        |
| AP status                      | <input type="checkbox"/>        |
| STA status                     | <input type="checkbox"/>        |
| Home Agent Status              | <input type="checkbox"/>        |
| Controller Status              | <input type="checkbox"/>        |
| Roaming Status                 | <input type="checkbox"/>        |

### SNMP Trap Receiver Settings

SNMP traps are defined in SMIPv1 MIBs (SNMPv1) and SMIPv2 MIBs (SNMPv2c). The two styles are basically equivalent, and it is possible to convert between the two. You can set the parameters for SNMP trap receivers through the web page.

| SNMP Trap Receiver Settings |                                       |
|-----------------------------|---------------------------------------|
| SNMP alert type             | Trap <input type="button" value="v"/> |
| 1st Trap version            | V1 <input type="button" value="v"/>   |
| 1st Trap server IP/name     | <input type="text"/>                  |
| 1st Trap community          | alert <input type="text"/>            |
| 2nd Trap version            | V1 <input type="button" value="v"/>   |
| 2nd Trap server IP/name     | <input type="text"/>                  |
| 2nd Trap community          | alert <input type="text"/>            |

#### SNMP alert type

| Setting | Description                                                                                                                                                        | Factory Default |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Trap    | Send the event notification to the Trap Receiver once and once only                                                                                                | Trap            |
| Inform  | Send the event notification to the Trap Receiver and expecting an acknowledgement. If the acknowledgement is not received, controller will resend the notification |                 |

#### 1st / 2nd Trap version

| Setting | Description                 | Factory Default |
|---------|-----------------------------|-----------------|
| V1      | SNMP trap defined in SNMPv1 | V1              |
| V2      | SNMP trap defined in SNMPv2 |                 |

**1st / 2nd Trap server IP/name**

| Setting                 | Description                                                           | Factory Default |
|-------------------------|-----------------------------------------------------------------------|-----------------|
| IP address or host name | Enter the IP address or name of the trap server used by your network. | None            |

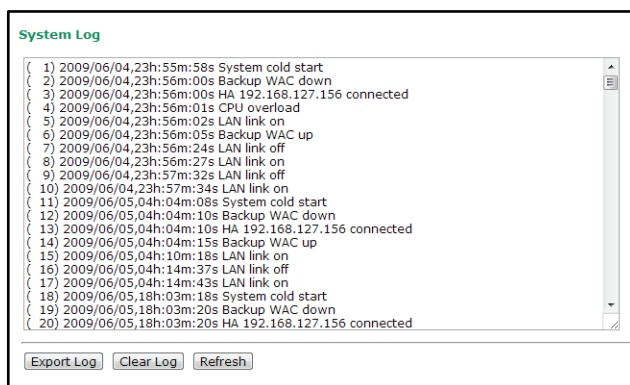
**1st / 2nd Trap community**

| Setting               | Description                                                                      | Factory Default |
|-----------------------|----------------------------------------------------------------------------------|-----------------|
| Max. of 31 characters | Use a community string match with a maximum of 31 characters for authentication. | alert           |

## Status

### System Log

Triggered events are recorded in System Log. You can export the log contents to an available viewer by clicking **Export Log**. You can use the **Clear Log** button to clear the log contents and the **Refresh** button to refresh the log.



### Managed Device List

The **Managed Device List** displays all AWK APs, which are managed by the WAC-2004; the associated clients are also displayed here. Select the **Auto refresh check box** to enable periodic updates.

| Managed Device List         |                   |         |                   |                                     |            |                   |           |                       |        |  |
|-----------------------------|-------------------|---------|-------------------|-------------------------------------|------------|-------------------|-----------|-----------------------|--------|--|
| Auto refresh                |                   |         |                   | <input checked="" type="checkbox"/> |            |                   |           |                       |        |  |
| Refresh timer               |                   |         |                   | 3                                   |            |                   |           |                       |        |  |
| Number of managed AP(s)     |                   |         |                   | 2                                   |            |                   |           |                       |        |  |
| Number of managed client(s) |                   |         |                   | 1                                   |            |                   |           |                       |        |  |
| AP                          |                   |         |                   |                                     | Client     |                   |           |                       |        |  |
| IP                          | MAC               | Channel | Noise Level (dBm) | Status                              | IP         | MAC               | RSSI (dB) | Signal Strength (dBm) | Status |  |
| 172.28.2.1                  | 06:90:E8:00:03:DE | 1       | -96               | On                                  | N/A        | N/A               | N/A       | N/A                   | N/A    |  |
| 172.28.0.1                  | 06:90:E8:00:03:DF | 1       | -96               | On                                  | 172.26.0.1 | 00:90:E8:17:1A:A1 | 63        | -33                   | On     |  |

All monitored APs will be listed on the left-hand side of the table, along with their IP addresses, MAC addresses, operating channels, noise level, and device status.

All monitored Clients will be listed on the right-hand side of the table, along with their IP addresses, MAC addresses, RSSI and Signal Strength values against the associated AP, as well as the status of the Client device.

## Mobile IP Status

The Mobile IP Status displays the status of all Mobile IP Clients, which are managed by this particular WAC-2004. This page contains two main tables - **CCoA Subnet Status** and **Home Subnet Status**.

The **CCoA Subnet Status** table provides the Mobile IP Client's IP information from the CCoA's (Collocated Care-of-Address) point of view.

**Mobile IP Status**

Auto refresh ☒

Refresh timer 4

| CCoA Subnet Status |                 |             |                          |
|--------------------|-----------------|-------------|--------------------------|
| Start IP/Count     | Netmask         | Gateway     | CCoA-Station Pair        |
| 172.28.0.51 / 5    | 255.255.255.192 | 172.28.0.62 | 172.28.0.52 - 172.26.0.1 |
| 172.28.2.51 / 5    | 255.255.255.192 | 172.28.2.62 |                          |
| 172.28.4.51 / 5    | 255.255.255.192 | 172.28.4.62 |                          |
| 172.28.6.51 / 5    | 255.255.255.192 | 172.28.6.62 |                          |

CCoA-IP      MN-IP

The **Home Subnet Status** table provides the Mobile IP Client's IP information from the HA's (Home Agent) point of view.

| Home Subnet Status |                          |
|--------------------|--------------------------|
| HA                 | Service Station          |
| 172.26.15.201      | 172.26.0.1 - 172.28.0.52 |

MN-IP      CCoA-IP

## Maintenance

Maintenance functions provide the administrator with tools to manage the WAC-2004 and wired/wireless networks.

## Console Settings

You can enable or disable access permission for the following consoles: HTTP, HTTPS and Telnet connections. For more security, we recommend you only allow access to the secured console.

**Console Settings**

HTTP console ☒ Enable ☐ Disable

HTTPS console ☒ Enable ☐ Disable

Telnet console ☒ Enable ☐ Disable

SSH console ☒ Enable ☐ Disable

## Ping

**Ping** helps to diagnose the integrity of wired or wireless networks. By inputting a node's IP address in the **Destination** field, you can use the **ping** command to make sure it exists and whether or not the access path is available.

**Ping**

Destination

If the node and access path are available, you will see that all packets were successfully transmitted with no loss. Otherwise, some, or even all, packets may get lost, as shown in the following figure.

**Ping**

Destination

---

PING 192.168.127.2 (192.168.127.2): 56 data bytes

--- 192.168.127.2 ping statistics ---

4 packets transmitted, 0 packets received, 100% packet loss

## Firmware Upgrade

The WAC-2004 can be enhanced with more value-added functions by installing firmware upgrades.

Note that while the firmware is being upgraded, all APs controlled by the WAC-2004 will be out of service. Click the **Browse** button to specify the firmware image file and click **Firmware Upgrade and Restart** to start the firmware upgrade. After the progress bar reaches 100%, the WAC-2004 will reboot itself.

When upgrading your firmware, the WAC-2004's other functions are forbidden.

**Firmware Upgrade**

Select update image  WAC2004\_1.2\_...12110902.rom

---



### ATTENTION

Please make sure the power source is stable when you upgrade your firmware. An unexpected power breakup may damage your WAC-2004.



## Config Import Export

You can backup or restore the WAC-2004's configuration with **Config Import Export**.

In the **Config Import** section, click **Browse** to specify the configuration file and click **Config Import** button to begin importing the configuration.

In the **Config Export** section, click the **Config Export** button and save the configuration file onto your local storage media. The configuration file is a text file and you can view and edit it with a general text-editing tool.

You can also backup or restore the WAC-2004's configuration via **TFTP**.

### **TFTP server IP**

| Setting    | Description                       | Factory Default |
|------------|-----------------------------------|-----------------|
| IP address | The IP address of the TFTP server | None            |

### **Configuration path**

| Setting                                           | Description                                                    | Factory Default |
|---------------------------------------------------|----------------------------------------------------------------|-----------------|
| File system characters<br>(a-z, A-Z, 0-9, etc...) | The relative path to the configuration file on the TFTP server | None            |

### **File name**

| Setting                                           | Description                             | Factory Default |
|---------------------------------------------------|-----------------------------------------|-----------------|
| File system characters<br>(a-z, A-Z, 0-9, etc...) | The file name of the configuration file | None            |

In the **Config Import** section, click **Config Import** button to begin importing the configuration.

In the **Config Export** section, click the **Config Export** button and the configuration file will be saved to the specified TFTP server as "importTFTP.ini".

## Load Factory Default

Use this function to reset the WAC-2004 and roll all settings back to the factory default values.

**Load Factory Default**

**Reset to Factory Default**

Click **Activate** to reset all settings, including the console password, to the factory default values.  
The system will be restarted immediately.

## Password

You can change the administration password for each of the WAC-2004's console managers by using the **Password** function. Before you set up a new password, you must input the current password and reenter the new password for confirmation. For your security, do not use the default password **root**, and remember to change the administration password regularly.

**Password**

Current password

••••

New password

••••••

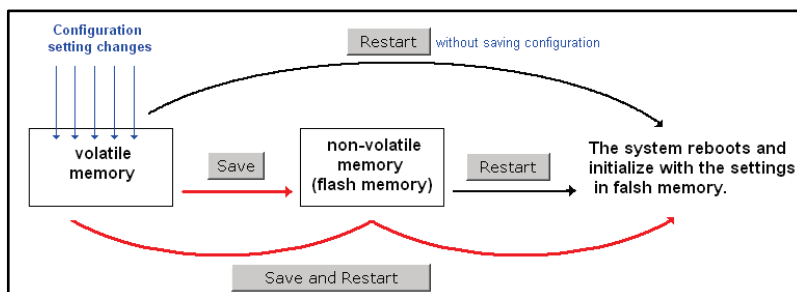
Confirm password

••••••

## Save Configuration

The following figure shows how the WAC-2004 stores the setting changes into volatile and non-volatile memory. All data stored in volatile memory will disappear when the WAC-2004 is shutdown or rebooted unless they are saved onto the flash (non-volatile) memory. Because the WAC-2004 starts up and initializes with the settings stored in flash memory, all new changes must be saved to flash memory before restarting the WAC-2004.

This also means the new changes will not work unless you run either the **Save Configuration** function or the **Restart** function.



After clicking on **Save Configuration** in the left menu box, the following screen will appear. Click **Save** to update the configuration settings in the flash memory at this time. Alternatively, you may choose to run other functions and put off saving the configuration until later. However, the new setting changes will remain in the non-volatile memory until you save the configurations.

**Save Configuration**

If you have submitted any configuration changes, you must save the changes and restart the system before they take effect. Click **Save** to save the changes in WAC-2004's memory. Click **Restart** to activate new settings in the navigation panel.

Save

## Restart

If you submitted configuration changes, you will see a blinking alert message on the upper right corner of the screen. After making all your changes, click the **Restart** function in the left menu box. One of two different screens will appear.

If you made changes recently but did not save, you will be given two options. Clicking the **Restart** button here will reboot the WAC-2004, and all setting changes will be ignored. Clicking the **Save and Restart** button will apply all setting changes and then reboot the WAC-2004.

**Restart**

!!! Warning !!!

Click "Restart" to discard changes and reboot WAC-2004 directly.

Click "Save and Restart" to apply all setting changes and reboot WAC-2004.

Restart

Save and Restart

If you run the **Restart** function without changing any configurations or saving all your changes, you will see just one **Restart** button on your screen.

**Restart**

!!! Warning !!!

Clicking Restart will disconnect all Ethernet connections and reboot WAC-2004.

Restart

You will not be able to run any of the WAC-2004's functions while the system is rebooting.

## Logout

**Logout** helps users disconnect the current HTTP or HTTPS session and go to the Login page. For security reasons, we recommend you logout before quitting the console manager.

**Logout**

Click **Logout** to get the default Login page.

Logout

# Software Installation and Configuration

---

The following topics are covered in this chapter:

- ❑ **Overview**

- ❑ **AWK Search Utility**

- Installing AWK Search Utility
- Configuring AWK Search Utility

# Overview

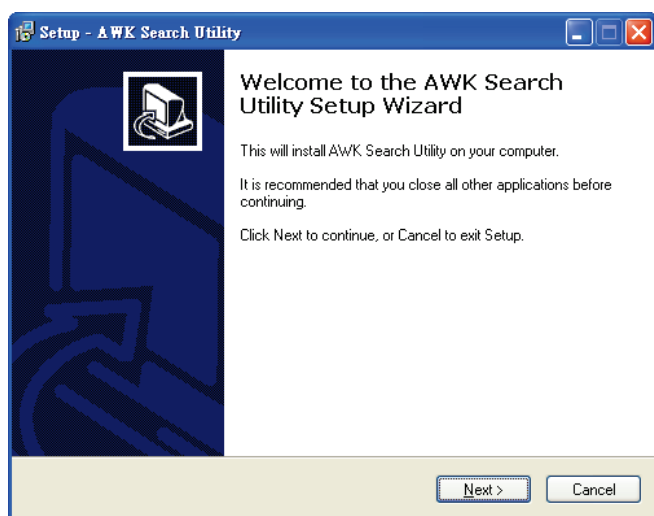
The Documentation & Software CD included with your WAC-2004 is designed to make the installation and configuration procedure easy and straightforward. This auto-run CD includes AWK Search Utility (to broadcast search for all WAC/AWK's accessible over the network), the WAC-2004 User's Manual, and Quick Installation Guide.

## AWK Search Utility

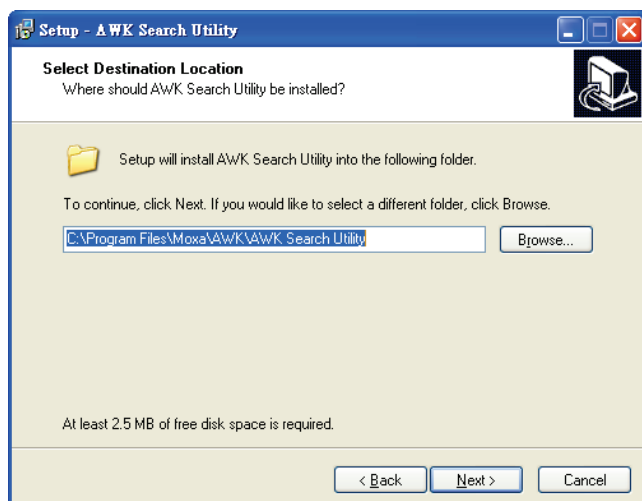
### Installing AWK Search Utility

Click the **INSTALL UTILITY** button in the AWK Installation CD auto-run window to install AWK Search Utility. Once the program starts running, click **Yes** to proceed.

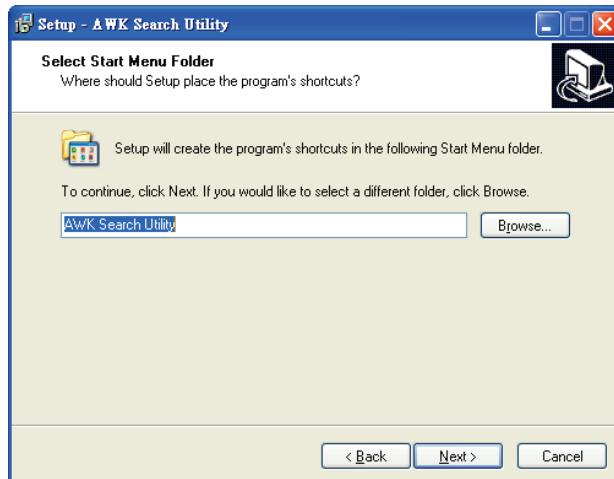
1. Click **Next** when the **Welcome** screen opens to proceed with the installation.



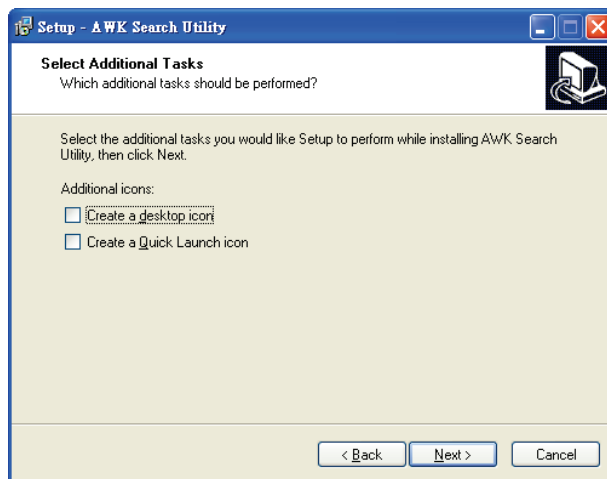
2. Click **Next** to install program files to the default directory, or click **Browse** to select an alternate location.



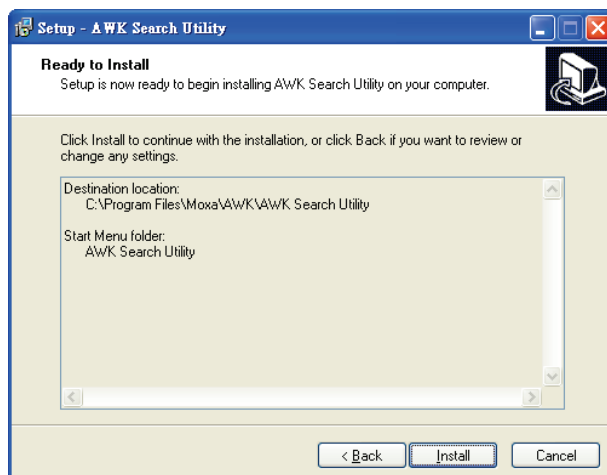
- Click **Next** to create the program's shortcut files to the default directory, or click **Browse** to select an alternate location.



- Click **Next** to select additional tasks.

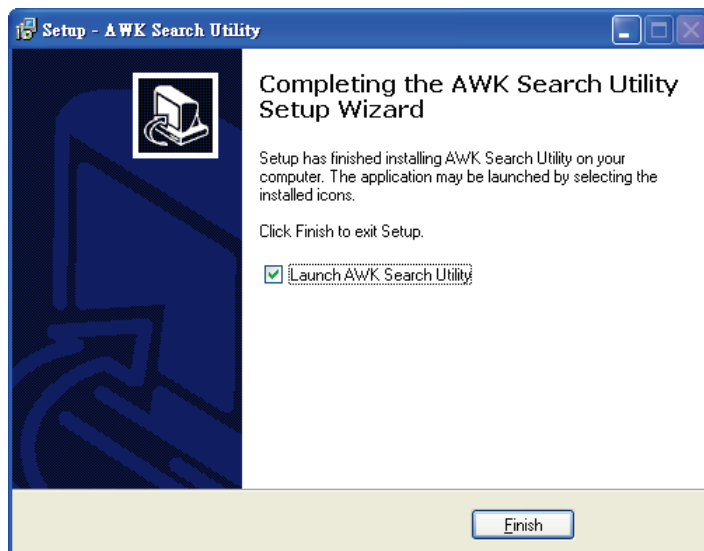


- Click **Next** to proceed with the installation. The installer then displays a summary of the installation options.



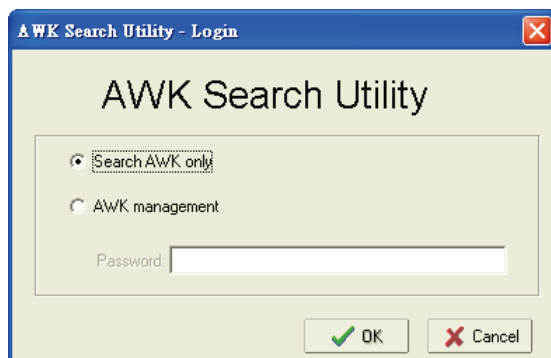
- Click **Install** to begin the installation. The setup window will report the progress of the installation. To change the installation settings, click **Back** and navigate to the previous screen.

- Click **Finish** to complete the installation of AWK Search Utility.

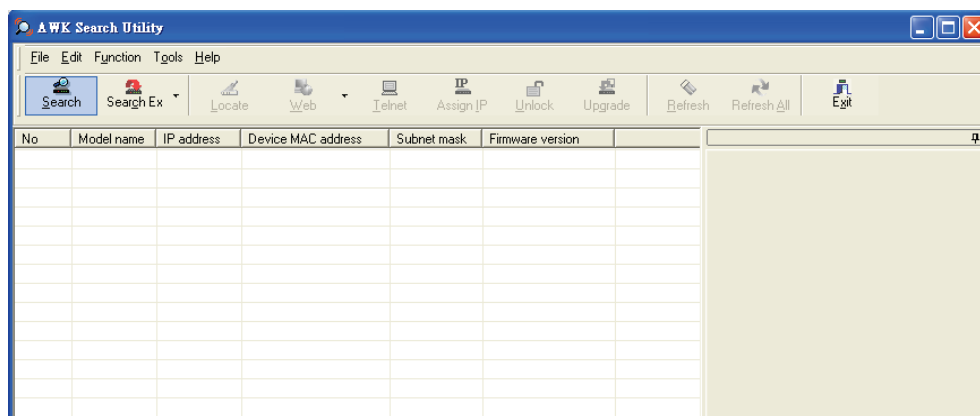


## Configuring AWK Search Utility

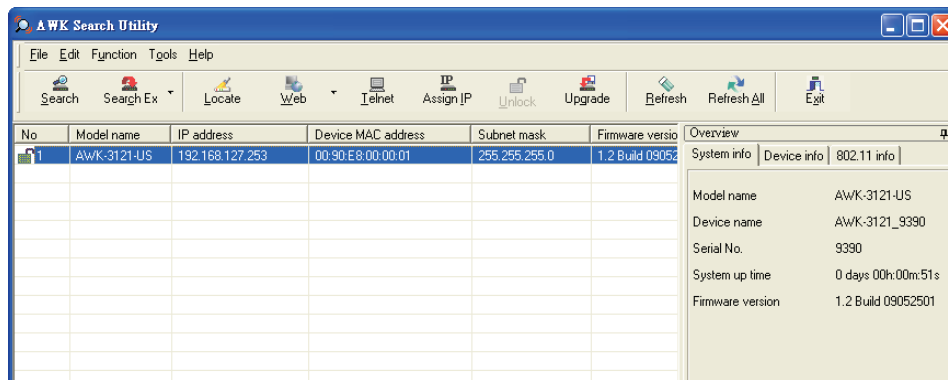
- The **Search** function is used to locate all AWK devices and WAC controllers that are connected to the same LAN as your computer. After locating a device, you will be able to perform simple device management activities, such as change the IP address, etc... Start the **AWK Search Utility** program. When the Login page appears, select the "Search AWK only" option to search for AWKs and to view each AWK's configuration. Select the "AWK management" option to assign IPs, upgrade firmware, and locate devices.



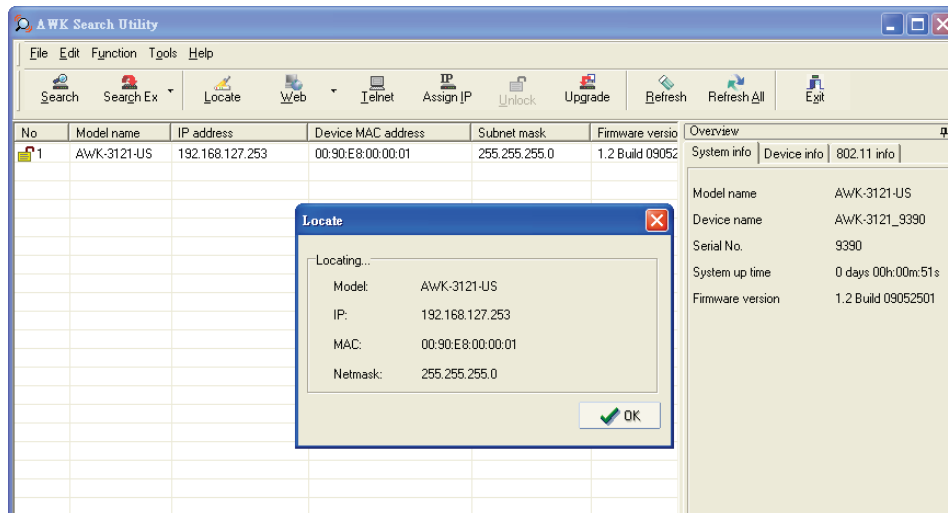
- Open the AWK Search Utility and then click the **Search** icon.



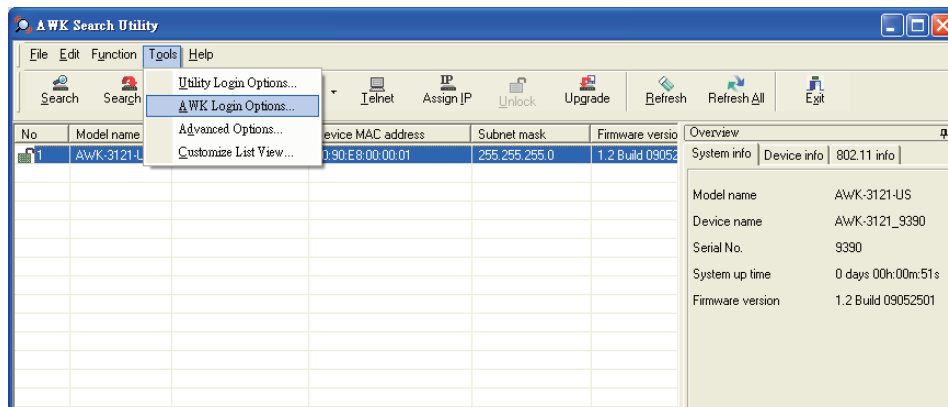
- The "Searching" window indicates the progress of the search. When the search is complete, all WAC and AWK units that were located will be displayed in the AWK Search Utility window.



4. Click **Locate** to cause the selected device to beep.



5. The **Search Utility** only supports WAC configurations via the Web or telnet (other functions will be deactivated).
6. Go to **Tools → AWK login Options** to manage and unlock additional AWKs.



7. Use the scroll down list to select the MAC addresses of those AWKs/WACs you would like to manage, and then click **Add**. Key in the password for the AWK device and then click **OK** to save. If you return to the search page and search for the devices again, you will find that the AWK will unlock automatically.

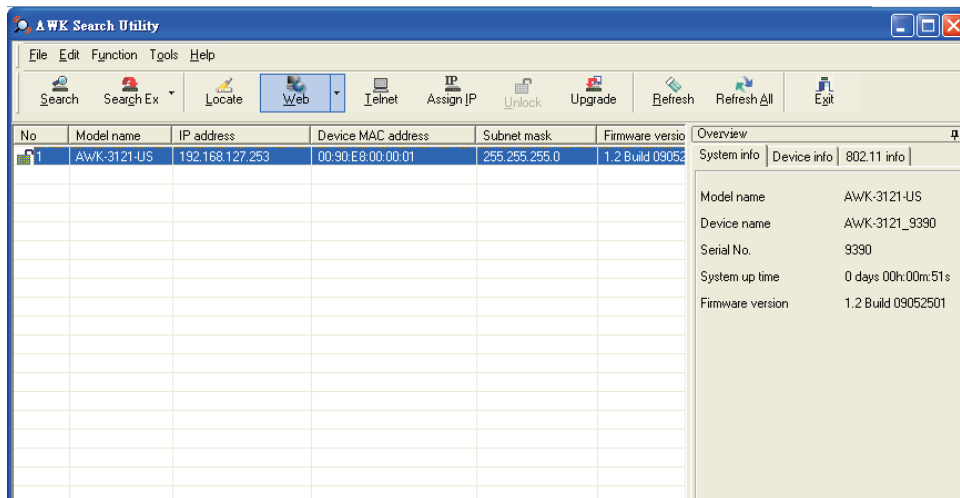


### ATTENTION

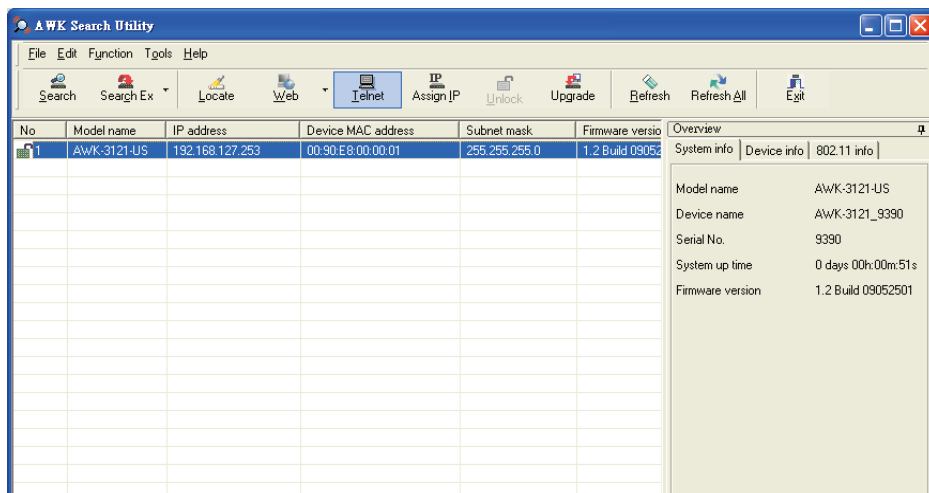
For security purposes, we suggest you can change the AWK search utility login password instead of using the default.



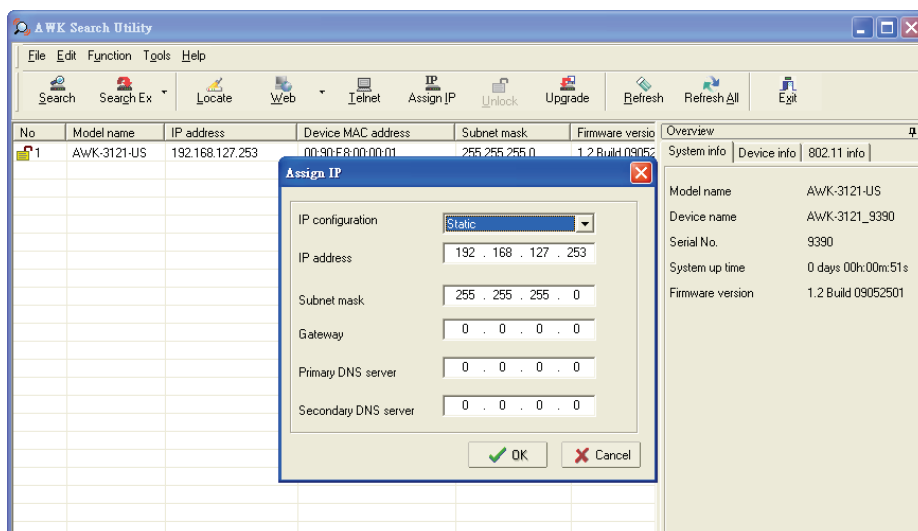
To modify the configuration of the highlighted WAC or AWK, click on the Web icon to open the Web Console. This will take you to the Web Console, where you can make all configuration changes. Refer to Chapter 3, "Using the Web Console," for information on how to use the Web Console.



8. Click on **Telnet** if you would like to use telnet to configure your WACs and AWKs.



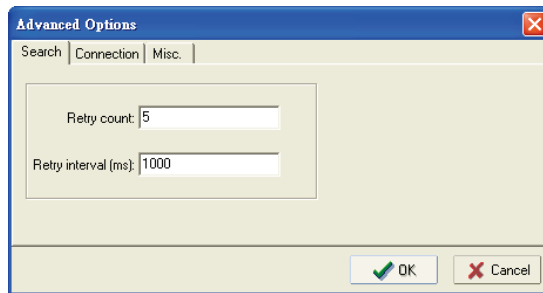
9. Click **Assign IP** to change the IP setting.



Go to **Tools** -> Advanced Options to find Search, Connection and Miscellaneous settings. See following for detail explanation:

### Search

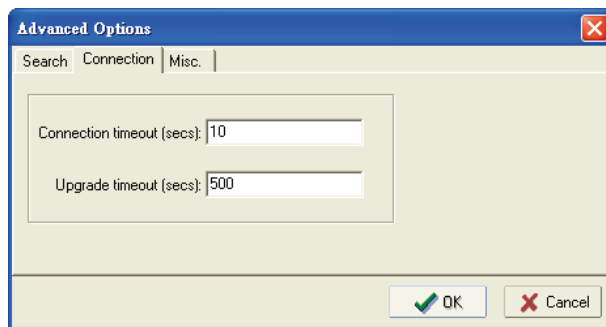
- **Retry count (default=5):** Indicates how many times the search will be retried automatically.
- **Retry interval (ms):** The time lapse between retries.



The screenshot shows the 'Advanced Options' dialog box with the 'Search' tab selected. It contains two input fields: 'Retry count' with the value '5' and 'Retry interval (ms)' with the value '1000'. At the bottom right are 'OK' and 'Cancel' buttons.

### Connection

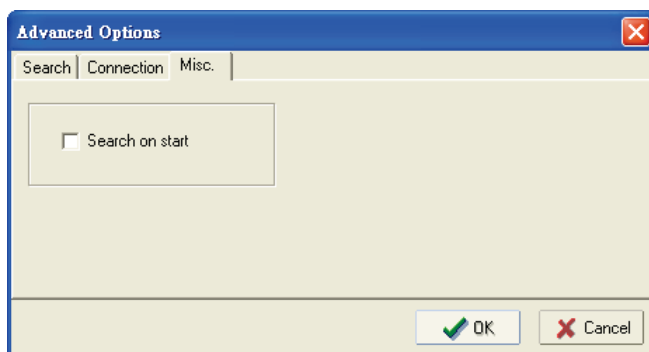
- **Connection timeout (secs):** Use this option to set the waiting time for the **Default Login, Locate, Assign IP, Upload Firmware, and Unlock** to complete.
- **Upgrade timeout (secs):** Use this option to set the waiting time for the connection to disconnect while the firmware is upgrading. Use this option to set the waiting time for the firmware to write to flash.



The screenshot shows the 'Advanced Options' dialog box with the 'Connection' tab selected. It contains two input fields: 'Connection timeout (secs)' with the value '10' and 'Upgrade timeout (secs)' with the value '500'. At the bottom right are 'OK' and 'Cancel' buttons.

### Misc.

**Search on start:** Checkmark this box if you would like the search function to start searching for devices after you log in to the AWK search Utility.



The screenshot shows the 'Advanced Options' dialog box with the 'Misc.' tab selected. It contains a checkbox labeled 'Search on start' which is currently unchecked. At the bottom right are 'OK' and 'Cancel' buttons.

## References

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This chapter provides more detailed information about wireless-related technologies. The information in this chapter can help you administer your WAC-2004s and plan your industrial wireless network better.

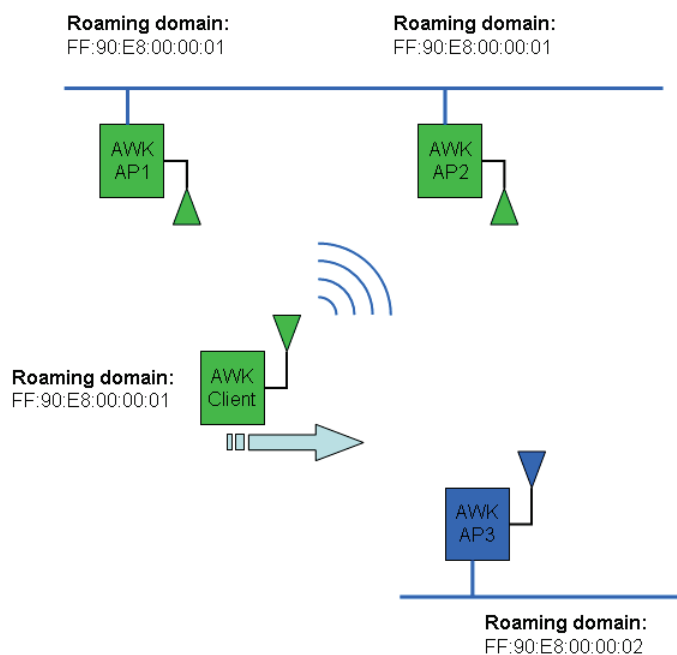
The following topics are covered in this appendix:

- ❑ **Roaming Domain**

# Roaming Domain

A roaming domain defines an area where all related wireless controllers, APs, and clients work together to enable fast roaming. Such a domain is specified as six groups of two hexadecimal digits beginning with the fixed identifier, **FF:90:E8**.

Note that the default value of a roaming domain resembles a controller's MAC address; however, it is not necessary to take the last 3-bytes of a controller's MAC address to form a roaming domain. You may take any six hexadecimal digits to form a unique roaming domain; this will be dissimilar enough for other roaming domains to tell themselves apart.



The purpose of a roaming domain is to ensure that wireless clients roam in the same area, and do not jump onto unintended areas. For example, as illustrated above, a wireless client is disconnected from **AWK AP1** and is trying to connect to the next AP. Even though **AWK AP2** and **AWK AP3** have the same SSID, channel, and wireless settings, the client will not roam onto **AWK AP3** because it is in a different roaming domain. A **roaming domain** setting provides wireless clients with consistent roaming among specific APs.

## Supporting Information

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This chapter presents additional information about this manual and product. You can also learn how to contact Moxa for technical support.

The following topics are covered in this appendix:

- ❑ **About This User's Manual**

- ❑ **DoC (Declaration of Conformity)**

- Federal Communication Commission Interference Statement

# About This User's Manual

This manual is mainly designed for, but not limited to, the following hardware and firmware for the WAC-2004:

- Hardware Rev: **1.0**
- Firmware Ver: **1.2**

You are strongly recommended to check with your sales representative for the latest product datasheet, firmware, QIG (Quick Installation Guide), UM (User's Manual), and related information.

## DoC (Declaration of Conformity)

### Federal Communication Commission Interference Statement

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

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

**FCC Caution:** To assure continued compliance, (example – use only shielded interface cables when connecting to computer or peripheral devices). Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

#### **FCC Radiation Exposure Statement**

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

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.

|             |                                                                                                                                                                                                                                             |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NOTE</b> | The availability of some specific channels and / or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user. |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|