BreezeACCESS SU-M

Installation Guide

Trade Names

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Warranty

In the following warranty text, "the Company" shall mean:

Alvarion Ltd., for products located outside the USA.
Alvarion Inc., for products located in the USA.

This BreezeACCESS product is warranted against defects in material and workmanship for a period of one year from date of purchase. During this warranty period the Company will, at its option, either repair or replace products that prove to be defective.

For warranty service or repair, the product must be returned to a service facility designated by the Company. Authorization to return products must be obtained prior to shipment. The buyer shall pay all shipping charges to the Company and the Company shall pay shipping charges to return the product to the buyer.

The Company warrants that the firmware designed by it for use with the unit will execute its programming instructions when properly installed on the unit. The Company does not warrant that the operation of the unit or firmware will be uninterrupted or error-free.

Limitations of Warranty

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the buyer, buyer supplied interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance. No other warranty is expressed or implied. The Company specifically disclaims the implied warranties of merchantability and fitness for any particular purpose.

Alvarion shall not be liable to any person for any special or indirect damages, including, but not limited to, loss of profits or revenues, loss of use or damage to any associated equipment, cost of capital, cost of substitute products, facilities or services, downtime costs or claims resulting from any cause whatsoever arising from or in any way connected with the manufacture, sale, handling, service, repair, maintenance or use of the products. In no event shall the company's liability exceed the purchase price denoted on the invoice.

Electronic Emission Notice

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

FCC Radio Frequency 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 when the equipment is operated in a residential environment notwithstanding use in commercial, business and industrial environments. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

FCC Radiation Hazard Warning

To comply with FCC RF exposure requirements in section 1.1307, a minimum separation distance of 20cm (8 inches) is required between the antenna and all persons:

R&TTE Compliance Statement

This equipment complies with the appropriate essential requirements of Article 3 of the R&TTE Directive 1999/5/EC.

Information to User

Any changes or modifications of equipment not expressly approved by the manufacturer could void the user's authority to operate the equipment.

Safety Considerations

For the following safety considerations, "Instrument" means the BreezeACCESS units' components and their cables.

Caution

To avoid electrical shock, do not perform any servicing unless you are qualified to do so.

DC Line Voltage

Before connecting this instrument to the power line, make sure that the voltage of the power source matches the requirements of the instrument.

Power Cord

Use only the power cord supplied with the unit.

Radio

The instrument transmits radio energy during normal operation. To avoid possible harmful exposure to this energy, do not stand or work for extended periods of time in front of its antenna. The long-term characteristics or the possible physiological effects of Radio Frequency Electromagnetic fields have not been yet fully investigated.

Antenna Installation and Grounding

Be sure that the antenna and the supporting structure are properly installed to eliminate any physical hazard to either people or property. Make sure that the installation of the antenna and cables is performed in accordance with all relevant national and local safety codes.

Important Notice

This Installation Guide is applicable to BreezeACCESS version 4.0 and is delivered subject to the following conditions and restrictions:

✦ This manual contains proprietary information belonging to Alvarion Ltd. Such information is supplied solely for the purpose of assisting explicitly and properly authorized users of BreezeACCESS.

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Table of Contents

System Description

About This Chapter

This chapter introduces the BreezeNET SU-M system. It includes the following section:

✦ **The BreezeACCESS SU-M**, page 1-2, introduces the SU-M and its functions.

✦ **System Specifications**, page 1-3, lists the technical and physical specifications of the SU-M.

The BreezeACCESS SU-M

The BreezeACCESS SU-M is a small, high-power unit designed for mobile use. It is enclosed in a hardened, field-tested container and is specially designed to provide a constant network connection for law enforcement and emergency services personnel.

Figure 1-1: SU-M Unit

> **NOTE:**
>
> The SU-M's case may only be opened by an authorized technician. If the case is opened by anyone other then an authorized technician it may void the warranty.

SU-M Specifications

Radio and Modem

Frequency	2.400-2.500 GHz (according to country standard)
Operation Mode	Time Division Duplex
Radio Access Method	FH-CDMA
Standard Compliance	FCC Part 15.247, ETS 300 328
Channel Bandwidth	1 MHz
Central Frequency Resolution	1 MHz
Output Power (at antenna port)	27 dBm
Maximum Input Power (at antenna port)	-20 dBm
Gross Bit Rate	1, 2, 3 Mbps

Receive Nominal Sensitivity (at antenna port, BER 10E-6)		1 Mbps	2 Mbps	3 Mbps
		-84 dBm	-77 dBm	-68 dBm

Modulation	GFSK modulation, with 2, 4, 8 modulation states (1, 2, 3 bits / symbol).
Symbol rate	1 Msymbol/sec.

Data Communications

Standard Compliance	IEEE 802.3 CSMA/CD
VLAN support	Based on IEEE 802.1Q
Layer-2 Traffic Prioritization	Based on IEEE 802.1p
Layer-3 Traffic Prioritization	ToS according to RFC791
MIR (Maximum Information Rate) and CIR (Committed Information Rate)	Programmable for each user, separately for uplink and downlink. Range: 0 2200 Kbps, 1 Kbps resolution.

Environmental

Operating Temperature	-25C to 60C
Operating Humidity	5%-95% non-condensing, weather protected

Connectors

Connector	Description
Antenna	2 N Type female connectors
ETH	10BaseT Ethernet (RJ 45)
DC IN	2 wire 11 ft fused cable with Molex connector

Power Supply Requirements

Unit	Details
SU-M unit	External power supply 12 VDC or Battery

Mechanical

Unit	Structure	Dimensions	Weight
SU-M (excluding antennas and connectors)	Metal box, vehicle mountable	30 x 20 x 12 cm	4.5 kg

Chapter 2

Installation

About This Chapter

The BreezeACCESS SU-M system is comprised of three main components, the SU-M unit, the PC onboard the vehicle and the Antenna. This chapter describes the physical installation procedure for the system. It includes the following sections:

✦ **Packing List**, 2-2, lists the items that are included with the SU-M.

✦ **Installing the SU-M Unit**, page 2-2, describes how to physically install the SU-M unit inside the vehicle.

✦ **Installing the Antenna**, page 2-3, describes how to install the SU-M's antenna on the vehicle.

✦ **Connecting the SU-M Unit**, page 2-3, describes how to connect the SU-M to other components in the system.

NOTE:
This unit is to be installed by a professional installer only.

Packing List

SU-M units are shipped with the following units and accessories.
The exact packing list varies depending on system configuration and
ordered equipment.

✦ The SU-M unit

✦ An omni antenna with mounting kit and cable

✦ A 12 VDC power cable with fuse

✦ Mounting hardware for the SU-M unit

Other Items Required for Installation

✦ A PC in the vehicle with Ethernet capability

✦ Installation tools and materials

Installing the SU-M Unit

The SU-M unit must be installed securely in the vehicle. Four screws
are provided to mount the SU-M to either wood or sheet metal.

The position of the SU-M unit must allow it to be easily connected to
the PC, the omni antenna and the power supply. See the connection
diagram for guidance concerning relative placement and how best to
connect the units.

Install the SU-M as follows:

1   Place the unit against the surface where you wish to mount it.

     Mark the screw placement using four of the mounting holes in the
     unit as guides.

2   Drill four holes in the surface using the marks you made.

3   Clear all paint, dirt and oil away from the immediate area around
     the holes.

4   Screw the unit firmly in place using the mounting kit provided.

Installing the Antenna

The SU-M Antenna consists of two parts: an external base & whip combination, and an NMO mounting assembly. The Antenna is installed on the roof or body of a vehicle as follows

1   Drill a ¾" (19 mm) hole in the roof or body of the vehicle.

2   Clear all paint, dirt and oil away from the immediate area around the hole. It is important that there be a clean metal-to-metal contact point between the antenna mount and the car.

3   Feed the Mounting Assembly through the hole starting from the exterior of the car. (Note: the Locking Nut should already be turned down onto the base about one and a half turns.) Continue feeding the Mounting Assembly through until the serrated portion is also on the interior of the hole.

4   Gently pull on the Locking Nut to pull the Mounting Assembly into proper alignment.

5   Continue to pull on the Locking Nut and, at the same time, tighten the Locking Nut until it is finger tight.

6   Hold the Mounting Assembly firmly with a wrench or long nose pliers and, at the same time, hold the Locking Nut with an adjustable or open ending wrench. Tighten firmly but do not over tighten.

7   A red capsule containing Silicone Grease is enclosed in the small bag with the O-ring. Break the capsule open and spread the Silicone Grease around the O-ring before installing it in the Antenna base.

8   Add the O-ring to the base of the exterior Base/Whip Assembly by sliding it into the grove in the walls of the base.

9   Place the Antenna Base onto the Locking Nut and screw down until it is tightened securely. Hand pressure should be sufficient for a secure connection.

Connecting the Unit

1   Once the SU-M unit is installed in the vehicle, connect the 12 VDC power cable to the unit's DC IN port.

Wire the other end of the cable to the power source, making sure that the cable is secure and out of the way.

2   Connect the Ethernet cable to the Ethernet ports on the PC and the ETH port on the SU-M.

3   Connect the Antenna cables to the omni antenna and then to the ANT ports on the SU-M.

If only one antenna is being used, connect it to the ANT 1 port. If two antennas are being used, connect them to both the ANT 1 and ANT 2 ports.

Figure 2-1: SU-M Connectors

NOTE:

The SU-M's case may be opened by an authorized technician ONLY. If the case is opened by anyone other then an authorized technician it may void the warranty.

Preliminary Configuration

About This Chapter

This chapter describes how to set the basic parameters of the BreezeACCESS SU-M. It includes the following sections:

✦ **Introduction**, page 3-2, gives an overview of how to change parameter settings.

✦ **Configuring Basic Parameters**, page 3-2, lists the basic parameters and their defaults.

✦ **Verifying Proper Operation**, page 3-3, describes how to confirm that the SU-M unit is fully operational.

Introduction

After completing the installation process, as described in the preceding chapter, the basic parameters must be configured to ensure that the SU-M operates correctly. Once the basic parameters have been configured, additional parameters can be remotely configured via either the Ethernet port or the wireless link using Telnet, TFTP or SNMP management.

Parameters can be configured using either of the following alternatives:

To access the Monitor Program using Telnet:

Connect a PC to the Ethernet port, using a straight Ethernet cable. Before running the Telnet program, configure the PC's IP parameters to enable connectivity with the unit. The default IP address is 10.0.0.1.

To configure parameters using BreezeCONFIG ACCESS:

Connect a PC to the Ethernet port, using a straight Ethernet cable. Run the BreezeCONFIG program. You can use the Set IP tool of BreezeCONFIG to configure the IP parameters (IP Address, Subnet Mask and Default Gateway Address) based on the unit's MAC Address which is marked on the front panel of the unit.

Refer to BreezeACCESS II System Manual for more information on accessing and using the Monitor program and on configurable parameters. Refer to the BreezeCONFIG ACCESS User's Manual for more information on using BreezeCONFIG for configuring parameters.

Configuring Basic Parameters

The *Basic Configuration* menu in the Monitor program includes all the parameters necessary for the initial operation of BreezeACCESS SU-M. In many installations, most of these parameters should not be changed from their default values. The following list includes the basic parameters and their default values:

Parameter	Default Value	Comment
IP Address	10.0.0.1	
Subnet Mask	255.255.255.0	
Default Gateway Address	0.0.0.0	
DHCP Option	Disable	
Access to DHCP	From Wlan Only	
ESSID	ESSID1	Must be the same as ESSID the Base Station AU.
Transmit Antenna	Antenna 1	
VLAN Link Type	Hybrid Link	
VLAN ID – Management	65535	
Best AU Support	Disable	
Preferred AU MAC Address	00-00-00-00-00-00 (none)	Applicable only when Best AU Support is enabled
Authentication Algorithm	Open System	Can be changed to Shared Key only after configuring the WEP Key and the Default Key ID
Default Key ID	1	
WEP Key 1-4	0000000000 (none)	

Once the basic parameters are configured, the unit must be reset in order to activate the new configuration.

Verifying Proper Operation

1　Verify that the PWR LED on the SU-M unit is on.

2　Confirm that the PC is operational.

3　Send and receive a test message from the vehicle in order to confirm the wireless link.

Wireless Status Monitor

About This Chapter

This chapter describes the Wireless Status Monitor application includes the following sections:

✦ **Introduction**, page 4-2, introduces and describes the Wireless Status Monitor.

✦ **Installation**, page 4-2, describes how to install the Wireless Status Monitor

✦ **Using the Wireless Status Monitor**, page 4-3, describes how to use the application and interpret the data it provides.

Introduction

The Wireless Status Monitor allows you to check the performance of the SU-M and it's wireless link during operation. The application runs on any PC.

Installation

1   Place the Applications CD in the CD-ROM drive of the target computer.

2   Open the **WSM** folder on the CD.

3   Run the .exe file found in the folder.

4   Follow the instructions in the installation wizard.

5   Select **Wireless Status Monitor** from the Program folder in the Start menu.

6   When prompted, enter the IP address of the target unit.

Using the Wireless Status Monitor

The Wireless Status Monitor starts automatically when the computer is booted up. If it fails to start automatically or must be started at a later point it may be selected from the Programs folder in the Start menu.
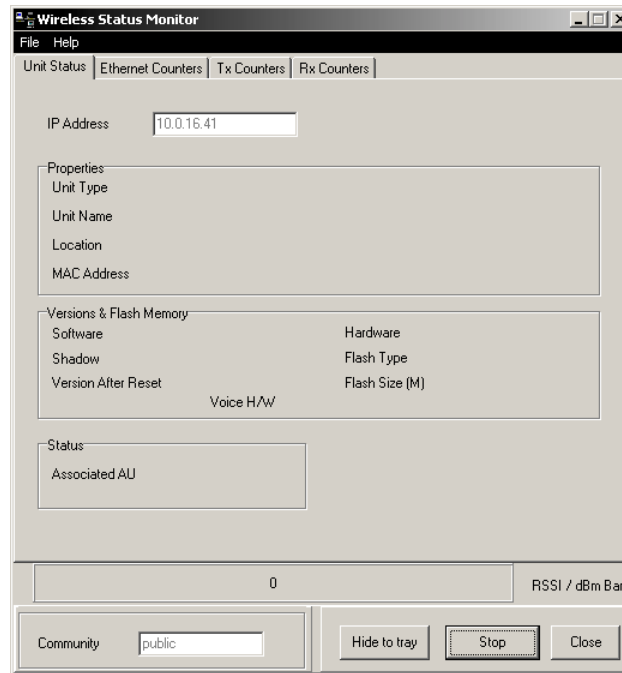

Figure 4-1: Wireless Status Monitor, Main Screen

The Wireless Status Monitor appears.

The main screen of the Wireless Status Monitor features the four parameter babs in addition to the following user-defineable components:

✦ **RSSI/dBm Bar:** The bar shows the strength of the wireless signal. The longer the bar, the stronger the signal. You may set the units displayed in the bars, RSSI or dBm from the Unit Status parameter tab.

✦ **Community:** Sets the SNMP community for the unit.

 The default is **Public**.

✦ **Hide to tray:** Minimizes the Wireless Status Monitor to a tray icon. The icon appears as 🔷 when a link is present, 🔷 when no link is established. When the link status changes, a sound alert is heard.

✦ **Start/Stop:** Click to begin or to stop monitoring the wireless link.

✦ **Close:** Click to exit the program.

Parameter Tabs

The parameter tabs display data concerning the unit and the link status. All fields in the parameter tabs are read-only, save for the **IP Address** field in the Unit Status tab.
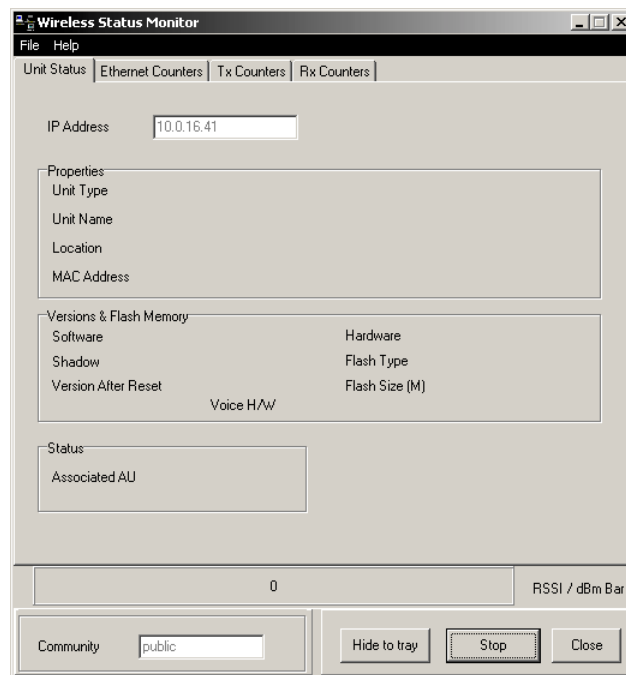
Unit Status

Figure 4-2: Wireless Status Monitor, Unit Status Tab

The *Unit Status* tab enables you to view the name, IP Address, location and other information about the unit. In addition, the *Unit Status* tab displays details regarding the unit's firmware and hardware versions and it's AU.

The *Unit Status* tab is comprised of the following components:

✦ **IP Address:** Displays the IP address of the unit.

   This field may be changed, but only when the Wireless System Monitor is disabled. Click the **Stop** button to disable the program.

✦ **Unit Type**: Identifies the unit's function.

✦ **Unit Name:** Displays the name for the selected unit.

✦ **Location:** Displays descriptive geographical or site location for the selected unit.

✦ **MAC Address:** Displays the unit's MAC address.

✦ **Versions and Flash Memory**

❖ **Software:** Displays the version number of the unit's current active software.

❖ **Shadow:** Displays the version number of the unit's backup software.

❖ **Version After Reset:** Displays the version number of the software that is defined to be active following the next reset.

❖ **Hardware:** Displays the model identification of the unit hardware

❖ **Flash Type:** Displays the type of Flash memory installed in the unit, either **STRATA FLASH Type S** or **Type F**.

❖ **Flash Size (M):** Displays the size of the unit's Flash memory in Megabytes.

❖ **Voice H/W (SU with voice only):** Displays the model identification of the unit's voice-enabling hardware.

✦ **Associated AU:** Displays the MAC address of the Access Unit with which the Subscriber Unit is currently associated.
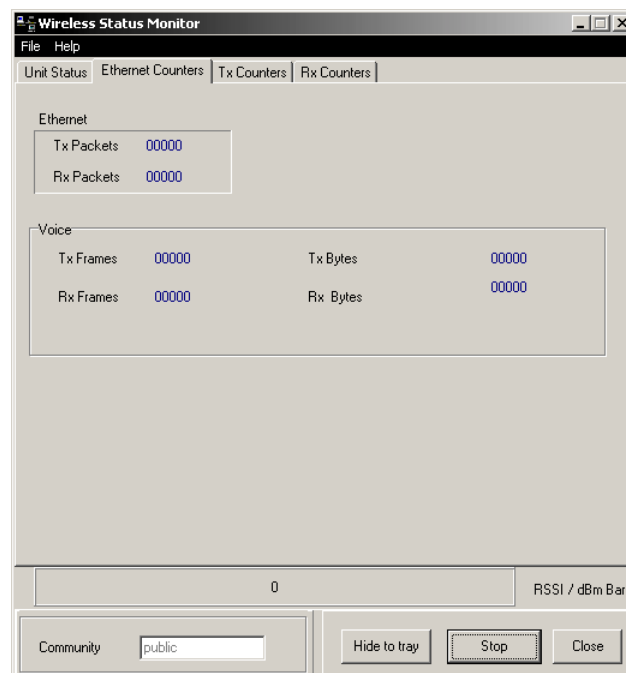
Ethernet Counters

Figure 4-3: Wireless Stastus Monitor, Ethernet Counters Tab

The *Ethernet Counters* tab displays general traffic statistics for the unit and is comprised of the following components:

✦ **Ethernet**

❖ **Tx Packets:** Displays the total number of packets received from the Ethernet port.

❖ **Rx Packets:** Displays the number of packets transmitted by the unit to the Ethernet port. These include packets received from the wireless media and packets generated by the unit itself.
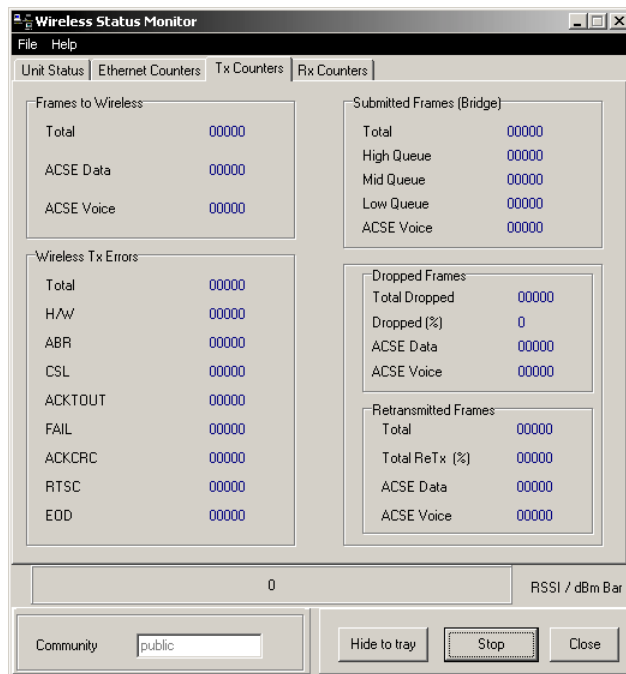
Tx Counters

Figure 4-4: Wireless Status Monitor, Tx Counters Tab

The *Tx Counters* tab displays information regarding data transmitted from the unit and is comprised of the following components:

✦ **Frames to Wireless**

❖ **Total:** Displays the total number of frames transmitted to the wireless media. This includes data, RTP, control and wireless management frames and beacons. This total excludes retransmissions.

❖ **ACSE Data:** Displays the total number of data frames transmitted by the unit to the wireless media. This excludes retransmissions. This statistic is only applicable if the *ACSE Option* is set at **Enable**.

❖ **ACSE Voice:** Displays the total number of ACSE voice frames transmitted by the unit to the wireless media. This statistic is only applicable if the *ACSE Option* is set at **Enable**.

❖ **ACSE Beacons:** Displays the total number of beacons transmitted by the unit to the wireless media. This statistic is only applicable if the *ACSE Option* is set at **Enable**.

✦ **Wireless Tx Errors**

❖ **Total:** Displays the total number of errors that occurred whereby frames were discarded or transmissions where aborted or unacknowledged for various reasons. Additional fields display counters for the number of errors due to specific reasons.

❖ **H/W:** The number of errors due to internal hardware problems in the modem.

❖ **ABR:** The number of errors due to aborting the transmission before completion because of internal problems in the DSP.

❖ **CSL:** The number of errors due to canceling the transmission because the modem was occupied receiving data.

❖ **ACKTOUT:** The number of errors due to an acknowledge timeout, where a frame remained unacknowledged past the time defined in the *Acknowledge Delay Limit* parameter.

❖ **FAIL:** The number of errors due to internal timeouts in the modem.

❖ **ACKCRC:** The number of errors due to a CRC error in the ACK message.

❖ **RTSC:** The number of errors due to an RTS collision where the RTS was sent, and the CTS was not received.

❖ **EOD:** The number of errors due to an End of Dwell, where not enough time is left to transmit the message

✦ **Submitted Frames (Bridge)**

❖ **Total:** Displays the total number of data and RTP frames submitted to the bridge for transmission to the wireless media. This statistic does not include internally generated control or wireless management frames or retransmissions.

❖ **High Queue:** Displays the number of frames sent to the bridge and routed to the highest priority queue.

❖ **Mid Queue:** Displays the number of frames sent to the bridge and routed to the medium priority queue.

❖ **Low Queue:** Displays the number of frames sent to the bridge and routed to the lowest priority queue.

❖ **ACSE Voice:** Displays the number of ACSE voice frames sent to the bridge for transmission to the wireless media. This statistic is only applicable if the *ACSE Option* is set to **Enable**.

✦ **Dropped Frames**

❖ **Total Dropped:** Displays the total number of frames that were dropped after being retransmitted to the extent of the maximum permitted number of retransmissions.

❖ **Dropped %:** Displays the number of dropped frames as a percentage of the total transmitted frames.

❖ **ACSE Data:** Displays the number of dropped data frames and is only applicable if the *ACSE Option* is enabled.

❖ **ACSE Voice:** Displays the number of dropped voice frames and is only applicable if the *ACSE Option* is enabled.

✦ **Retransmitted Frames**

❖ **Total:** Displays the total number of retransmitted frames. A separate count is submitted for each retransmission attempt.

❖ **Retransmissions (%):** Displays the number of retransmitted frames as a percentage of the total transmitted frames.

❖ **ACSE Data:** Displays the number of retransmitted data frames and is only applicable if the *ACSE Option* is enabled.

❖ **ACSE Voice:** Displays the number of retransmitted voice frames and is only applicable if the *ACSE Option* is enabled.
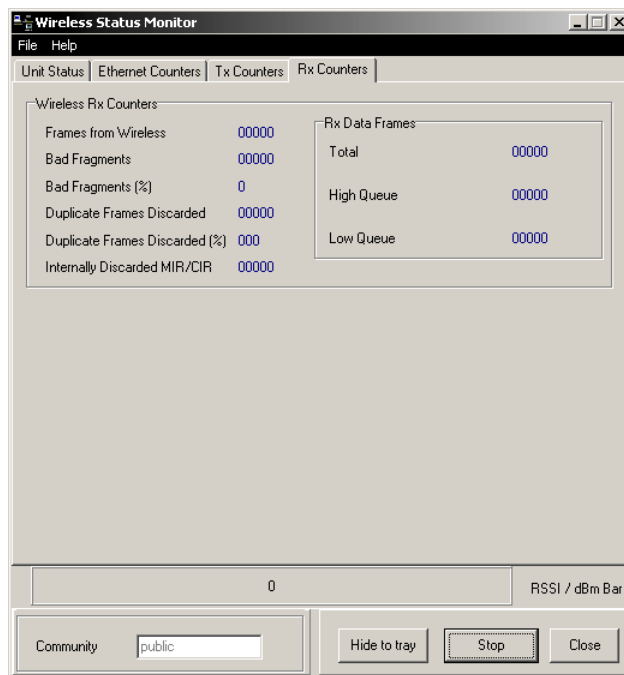
Rx Counters

Figure 4-5: Wireless Status Monitor, Rx Counters Tab

The *Rx Counters* tab displays statistics regarding the traffic received by the selected unit and is comprised of the following components:

✦ **Wireless Rx Counters**

❖ **Frames from Wireless:** Displays the total number of frames received from the wireless media, including data, control and wireless management frames and beacons received from the AU. The count does not include frames discarded internally, bad frames and duplicate frames.

- ❖ **Bad Fragments:** Displays the total number of frames received from the wireless media that contain CRC errors.
- ❖ **Bad Fragments (%):** Displays the number of bad fragments as a percentage of the total received frames.
- ❖ **Duplicate Frames Discarded:** Displays the number of frames discarded because multiple copies are received.
- ❖ **Duplicate Frames Discarded (%):** Displays the number of discarded duplicate frames as a percentage of the total received frames.
- ❖ **Internally Discarded MIC/CIR:** Displays the number of frames received from the Ethernet port that are discarded to avoid exceeding the maximum permitted information rate.

✦ **Rx Data Frames**

- ❖ **Total:** Displays the total number of data frames received by the selected unit.
- ❖ **High Queue:** Displays the number of data frames received by the selected unit routed from the highest priority queue.
- ❖ **Low Queue:** Displays the number of data frames received by the selected unit routed from the lowest priority queue.