

# BreezeACCESS 900

## SU-M-900

# Installation Guide

## (Preliminary)



March 2004  
Cat. No. TBD

© 2004 by Alvarion Ltd. All rights reserved.

No part of this publication may be reproduced in any material form without the written permission of the copyright owner.

## Trade Names

BreezeACCESS, BreezeNET, BreezeLINK, BreezeCONFIG, BreezeWIZARD, BreezeVIEW and BreezeMANAGE are trade names of Alvarion Ltd. Other brand and product names are registered trademarks or trademarks of their respective companies.

## Statement of Conditions

The information contained in this manual is subject to change without notice. Alvarion Ltd. shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this manual or equipment supplied with it.

## Warranties; Disclaimers

All Alvarion Ltd. ("Alvarion") products purchased from Alvarion or through any of Alvarion's authorized resellers are subject to the following warranty and product liability terms and conditions.

## Exclusive Warranty

Alvarion warrants that the Product hardware it supplies and the tangible media on which any software is installed, under normal use and conditions, will be free from significant defects in materials and workmanship for a period of fourteen (14) months from the date of shipment of a given Product to Purchaser (the "Warranty Period"). Alvarion will, at its sole option and as Purchaser's sole remedy, repair or replace any defective Product in accordance with Alvarion's standard RMA procedure.

## Disclaimer

(a) UNITS OF PRODUCT (INCLUDING ALL THE SOFTWARE) DELIVERED TO PURCHASER HEREUNDER ARE NOT FAULT-TOLERANT AND ARE NOT DESIGNED, MANUFACTURED OR INTENDED FOR USE OR RESALE IN APPLICATIONS WHERE THE FAILURE, MALFUNCTION OR INACCURACY OF PRODUCTS CARRIES A RISK OF DEATH OR BODILY INJURY OR SEVERE PHYSICAL OR ENVIRONMENTAL DAMAGE ("HIGH RISK ACTIVITIES"). HIGH RISK ACTIVITIES MAY INCLUDE, BUT ARE NOT LIMITED TO, USE AS PART OF ON-LINE CONTROL SYSTEMS IN HAZARDOUS ENVIRONMENTS REQUIRING FAIL-SAFE PERFORMANCE, SUCH AS IN THE OPERATION OF NUCLEAR FACILITIES, AIRCRAFT NAVIGATION OR COMMUNICATION SYSTEMS, AIR TRAFFIC CONTROL, LIFE SUPPORT MACHINES, WEAPONS SYSTEMS OR OTHER APPLICATIONS REPRESENTING A SIMILAR DEGREE OF POTENTIAL HAZARD. ALVARION SPECIFICALLY DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR HIGH RISK ACTIVITIES.

(b) PURCHASER'S SOLE REMEDY FOR BREACH OF THE EXPRESS WARRANTIES ABOVE SHALL BE REPLACEMENT OR REFUND OF THE PURCHASE PRICE AS SPECIFIED ABOVE, AT ALVARION'S OPTION. TO THE FULLEST EXTENT ALLOWED BY LAW, THE WARRANTIES AND REMEDIES SET FORTH IN THIS AGREEMENT ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, INCLUDING BUT NOT LIMITED TO WARRANTIES, TERMS OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, SATISFACTORY QUALITY, CORRESPONDENCE WITH DESCRIPTION, NON-INFRINGEMENT AND ACCURACY OF INFORMATION GENERATED. ALL OF WHICH ARE EXPRESSLY DISCLAIMED. ALVARION' WARRANTIES HEREIN RUN ONLY TO PURCHASER, AND ARE NOT EXTENDED TO ANY THIRD PARTIES. ALVARION NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR IT ANY OTHER LIABILITY IN CONNECTION WITH THE SALE, INSTALLATION, MAINTENANCE OR USE OF ITS PRODUCTS.

(c) ALVARION SHALL NOT BE LIABLE UNDER THIS WARRANTY IF ITS TESTING AND EXAMINATION DISCLOSE THAT THE ALLEGED DEFECT IN THE PRODUCT DOES NOT EXIST OR WAS CAUSED BY PURCHASER'S OR ANY THIRD PERSON'S MISUSE, NEGLIGENCE, IMPROPER INSTALLATION OR IMPROPER TESTING, UNAUTHORIZED ATTEMPTS TO REPAIR, OR ANY OTHER CAUSE BEYOND THE RANGE OF THE INTENDED USE, OR BY ACCIDENT, FIRE, LIGHTNING OR OTHER HAZARD.

## Limitation of Liability.

(a) ALVARION SHALL NOT BE LIABLE TO THE PURCHASER OR TO ANY THIRD PARTY, FOR ANY LOSS OF PROFITS, LOSS OF USE, INTERRUPTION OF BUSINESS OR FOR ANY INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES OF ANY KIND, WHETHER ARISING UNDER BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE AND WHETHER BASED ON THIS AGREEMENT OR OTHERWISE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

(b) TO THE EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL THE LIABILITY FOR DAMAGES HEREUNDER OF ALVARION OR ITS EMPLOYEES OR AGENTS EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCT BY PURCHASER, NOR SHALL THE AGGREGATE LIABILITY FOR DAMAGES TO ALL PARTIES REGARDING ANY PRODUCT EXCEED THE PURCHASE PRICE PAID FOR THAT PRODUCT BY THAT PARTY (EXCEPT IN THE CASE OF A BREACH OF A PARTY'S CONFIDENTIALITY OBLIGATIONS).

## Warning

Operation of the equipment is subject to national radio regulations and license conditions.

## 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 longterm 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 is 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.

A good ground plane is necessary for optimal RF performance.

# Important Notice

This user manual 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 properly authorized users of the respective Alvarion Ltd. products.
- ◆ No part of its contents may be used for any other purpose, disclosed to any person or firm or reproduced by any means, electronic and mechanical, without the express prior written permission of Alvarion Ltd.
- ◆ The text and graphics are for the purpose of illustration and reference only. The specifications on which they are based are subject to change without notice.
- ◆ The software described in this document is furnished under a license. The software may be used or copied only in accordance with the terms of that license.
- ◆ Information in this document is subject to change without notice. Corporate and individual names and data used in examples herein are fictitious unless otherwise noted.
- ◆ Alvarion Ltd. reserves the right to alter the equipment specifications and descriptions in this publication without prior notice. No part of this publication shall be deemed to be part of any contract or warranty unless specifically incorporated by reference into such contract or warranty.
- ◆ The information contained herein is merely descriptive in nature, and does not constitute an offer for the sale of the product described herein.
- ◆ Any changes or modifications of equipment not expressly approved by Alvarion Ltd. could void the user's authority to operate the equipment.
- ◆ Some of the equipment provided by Alvarion and specified in this manual, is manufactured and warranted by third parties. All such equipment must be installed and handled in full compliance with the instructions provided by such manufacturers as attached to this manual or provided thereafter by Alvarion or the manufacturers. Non-compliance with such instructions may result in serious damage and/or bodily harm and/or void the user's authority to operate the equipment and/or revoke the warranty provided by such manufacturer.



# Installation Guide

## Table of Contents

<b>System Description</b>	<b>1-1</b>
<b>Introducing BreezeACCESS SU-M-900</b> .....	<b>1-2</b>
<b>System Specifications</b> .....	<b>1-3</b>
Radio and Modem .....	1-3
Data Communications .....	1-4
Configuration and Management .....	1-4
Connectors .....	1-5
Mechanical and Electrical .....	1-5
Environmental .....	1-5
<b>Installation</b>	<b>2-1</b>
<b>Packing List</b> .....	<b>2-2</b>
Items Required for Installation .....	2-2
<b>Connecting the Unit</b> .....	<b>2-5</b>
<b>Preliminary Configuration</b>	<b>3-1</b>
<b>Configuration Applications</b> .....	<b>3-2</b>
Accessing the Monitor Program using Telnet .....	3-2
Using BreezeCONFIG ACCESS .....	3-2
<b>Configuring Basic Parameters</b> .....	<b>3-3</b>
<b>Verifying Proper Operation</b> .....	<b>3-4</b>



# Installation Guide



## Table of Figures

Figure 1-1: SU-M-900 Unit.....	1-2
Figure 2-1: Connecting the Unit.....	2-5
Figure 2-2: SU-M-900 Front Panel Connections .....	2-5



# Chapter 1

# System Description



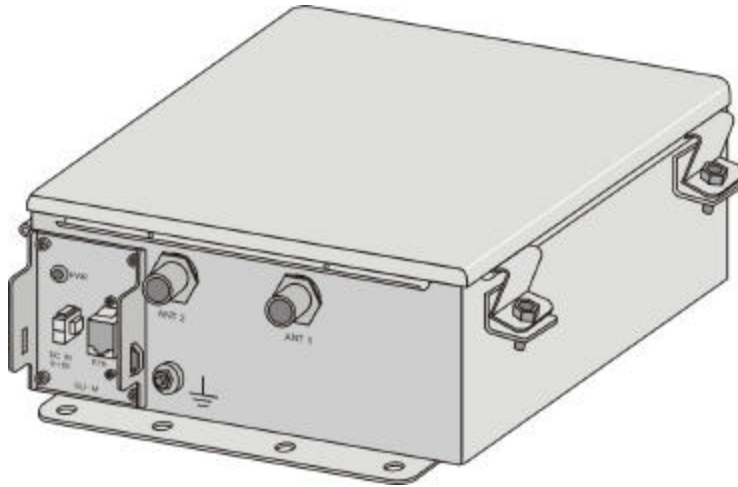
## About This Chapter

This chapter introduces the BreezeACCESS SU-M-900 system. It includes the following section:

- ◆ **Introducing BreezeACCESS SU-M-900**, page 1-2, introduces the SU-M-900 and its functionality.
- ◆ **System Specifications**, page 1-4, lists the technical and physical specifications of the SU-M-900.

# Introducing BreezeACCESS SU-M-900

The BreezeACCESS SU-M-900 is a small, high-powered unit designed for mobile use. Enclosed in a hardened, field-tested container, the BreezeACCESS SU-M-900 is specially designed to provide a constant network connection for law enforcement and emergency services personnel.



**Figure 1-1: SU-M-900 Unit**



**NOTE:**

The SU-M-900's case may only be opened by an authorized technician. Should anyone other than an authorized technician open the case, the warranty may be voided.

**NOTE:** Connect antenna to ANT 1 port only. ANT 2 is not active. Do not change software setting from antenna 2, it is hardwired to ANT 1.

# System Specifications

## Radio and Modem

Item	Description	
Frequency Band	902 – 928 MHz ISM band	
Operation Mode	Time Division Duplex (TDD)	
Radio Access Method	FH-CDMA	
Standard Compliance	FCC Part 15.247	
Channel Bandwidth	2 MHz	
Central Frequency Resolution	1 MHz	
SU-M-900 Antenna	5 dBi close-coil linear polarized omni-directional	
Maximum Input Power (at antenna port)	-20 dBm	
Output Power (at antenna port)	23 dBm typical	
Gross Bit Rate	1, 2, 3 Mbps	
Sensitivity, typical (dBm at antenna port, BER 10E-6)	<u>Gross Rate</u>	<u>Sensitivity</u>
	1 Mbps	-90 dBm
	2 Mbps	-84 dBm
	3 Mbps	-77 dBm
Modulation	GFSK modulation, 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 per user, separately for uplink and downlink. Range: 0 - 2200 Kbps, 1 Kbps resolution.

## Configuration and Management

Management Options	<p>Telnet, using the Monitor program</p> <p>TFTP, using the Configuration upload/download utility</p> <p>SNMP</p>
Management Access	From Wired LAN, Wireless Link
Management Access Protection	<p>Multilevel password</p> <p>Configuration of remote access direction (from Ethernet only, from wireless link only or from both sides)</p> <p>Configuration of IP addresses of authorized stations</p>
SNMP Agents	<p>SNMP ver 1 client.</p> <p>MIB II, Bridge MIB, Private BreezeACCESS MIBs</p>
Security	<p>Association protocol – ESSID</p> <p>RC4 WEP option (encryption of the association process)</p> <p>VLAN according to IEEE 802.1Q</p> <p>IP level filtering for user addresses or protocols</p> <p>Access direction and IP address filtering for management</p> <p>Ethernet broadcast filtering</p>
Authentication and Accounting	RADIUS client in the SU according to RFC 2866 and RFC 2865
Allocation of IP Parameters	Configurable or automatic (DHCP client)
Software Upgrade	Via TFTP

## Connectors

Connector	Description
Antenna	N Type jacks (ONLY ANT 1 ACTIVE)
ETH	10BaseT Ethernet (RJ 45) jack
DC IN	2 pins Molex DC plug

## Mechanical and Electrical

Dimensions	30 x 20 x 12 cm (11.8 x 7.9 x 4.7 in)
Weight	4.5 kg (9.9 lbs)
Electrical	9-18 VDC, 1A max.

## Environmental

Operating Temperature	-10°C (-14 °F) to 40°C (131 °F)
Storage Temperature	-40°C (-40 °F) to 70°C (158 °F)
Operating Humidity	5%-95% non-condensing, weather protected
Shock/Vibration	According to ETSI EN 300 019-2-5







## Chapter 2

# Installation

### About This Chapter

The BreezeACCESS SU-M-900 system is comprised of three main components, as follows:

- ◆ **The SU-M-900 unit.**
- ◆ **The PC aboard the vehicle (not included)**
- ◆ **The Antenna.**

This chapter describes the physical installation procedures for the SU-M-900 system and includes the following sections:

- ◆ **Packing List**, 2-2, lists the items included with the SU-M-900.
- ◆ **Installing the SU-M-900 Unit**, page 2-3, describes how to physically install the SU-M-900 unit inside the vehicle.
- ◆ **Installing the Antenna** page 2-4, describes how to install the SU-M-900's antenna on the vehicle.
- ◆ **Connecting the SU-M-900 Unit**, page 2-4, describes how to connect the SU-M-900 to other components in the system.

**NOTE:**

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

## Packing List

SU-M-900 units are shipped with the following units and accessories:

- ◆ The SU-M-900 unit
- ◆ An omni antenna with mounting kit and cable
- ◆ A 12 VDC power cable with 250 V, 3 A fuse

## Items Required for Installation

The following list comprised items required to install the SU-M-900 that are not included with the installation package.

- ◆ Installation hardware for the SU-M-900 unit: Four #12 x  $\frac{3}{4}$ " screws, four  $\frac{1}{4}$ " flat washers, four  $\frac{1}{4}$ " star washers
- ◆ A PC in the vehicle with Ethernet capability
- ◆ Installation tools and materials

# Installing the SU-M-900 Unit

The SU-M-900 unit must be installed securely in the vehicle. Four screws are needed to mount the SU-M-900 to either a sheet metal or a wooden surface.

The position of the SU-M-900 unit must enable it to be easily connected to the PC, the omni antenna and the power supply. See the connection diagram for guidelines regarding relative placement and how best to connect the units.

➤ **To install the SU-M-900:**

1. Place the unit against the surface to which it is to be mounted. 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 area around the holes.
4. If the SU-M-900 unit is being mounted directly to the car chassis, sheet metal screws should be used. Star washers must be used to provide a ground connection through the screw to the metal car body.  
Or  
If the SU-M-900 is being mounted on a non-conductive surface, such as wood, suitable 3/4" wood screws should be used.
5. In addition to the star washers a ground strap with a terminal lug is needed for connecting the SU-M-900 ground screw, which is located on the front panel, to another grounding point in the car body.
6. Affix the unit firmly in place with the appropriate screws.

# Installing the Antenna

The SU-M-900 Antenna consists of the following components:

- ◆ An antenna base & whip combination
- ◆ A lock nut
- ◆ An O-Ring washer
- ◆ A bushing assembly with an O-Ring.

➤ **To install the antenna on the roof or body of a car:**

1. Position the antenna as far from the emergency lights as possible while still on a relatively flat surface. The surface thickness must be between 0.20" to 0.40".
2. Drill a 3/4" (19 mm) hole in the selected area.
3. 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.
4. Insert the bushing assembly into the hole from the top of the car by tilting the assembly slightly and slipping it into the hole at an angle.
5. Once the bushing assembly is inserted hold it in place either within the car, from below the hole, using a 1/2" Open-Ended wrench or Adjustable wrench,

Or

From above, by gripping the bushing assembly using Bent Needle-Nosed pliers inserted in the 0.1" holes on the top of the bushing assembly.

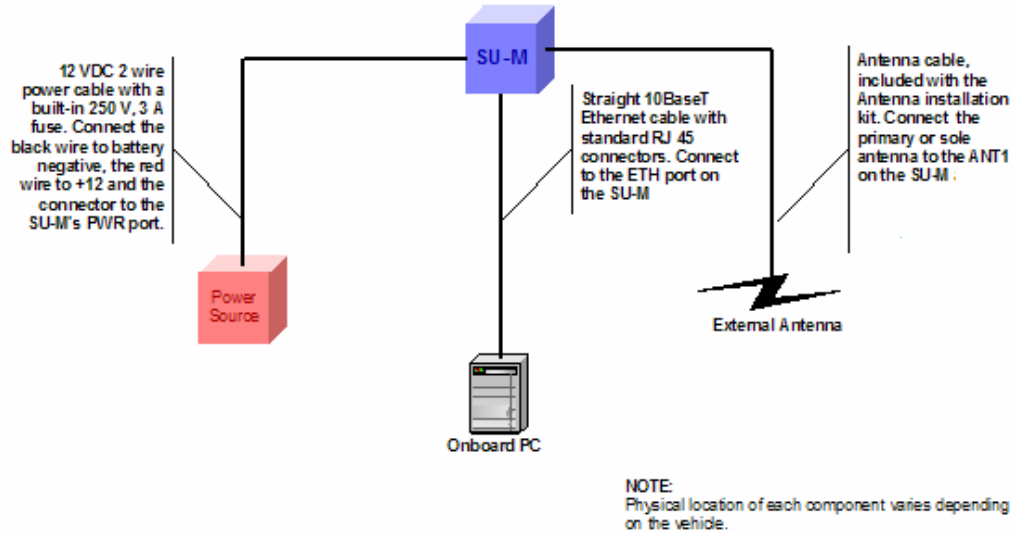
**WARNING:**

Do not use the antenna connector to hold the bushing assembly in place. This may damage the unit.

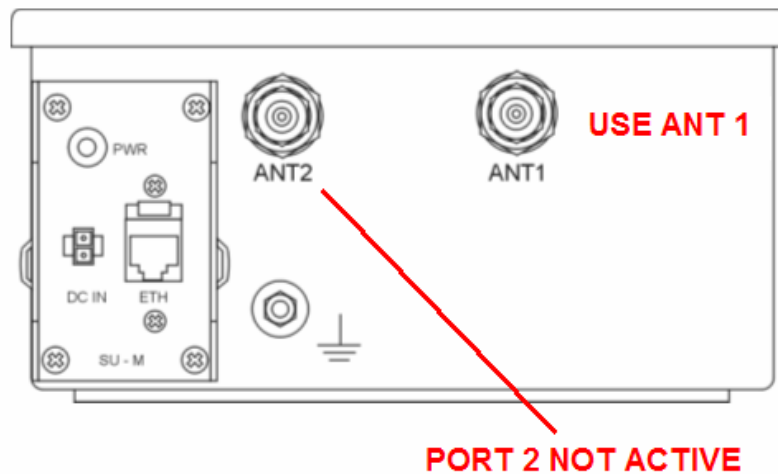
6. Thread the lock nut onto the bushing assembly, ensuring that the O-ring is inserted in the groove of the lock nut before tightening.
7. Tighten the lock nut until it comes into contact with the surface and the O-ring is fully compressed against the surface.
8. Slip the O-ring washer over the bushing assembly and lock nut until it is flush with the surface.
9. Thread the antenna base onto the lock nut and tighten the connection using a 1" Open-Ended wrench or Adjustable wrench.

# Connecting the Unit

This section describes how to connect the unit to its power supply, Ethernet connection and antenna, as shown in the figure below:



**Figure 2-1: Connecting the Unit**



**Figure 2-2: SU-M-900 Front Panel Connections**

➤ **To connect the SU-M-900 Unit:**

1. Once the SU-M-900 unit is installed in the vehicle, connect the 12 VDC power cable to the unit's DC IN port.

2. Wire the other end of the cable to the power source, ensuring that the cable is secure and out-of-the-way for its protection. Proper polarity must be observed, with the black cable attached to negative and the red to positive.
3. Connect the Ethernet cable to the Ethernet ports on the PC and the ETH port on the SU-M-900. Ensure that the cable is secure and out-of-the-way for its protection.
4. Connect the antenna cables to the omni antenna using an SMA Torque Wrench and then to the ANT 1 port on the SU-M-900. Ensure that the cable is secure and out-of-the-way to protect it from snagging or breaking.
5. Only one antenna can be used, connect it to the ANT 1 port. Do not change the software setting from Antenna 2; it is hardwired to ANT 1. ANT 2 is not connected.

**NOTE:**

The SU-M-900's case may only be opened by an authorized technician. Should anyone other than an authorized technician open the case, the warranty may be voided.

## Chapter 3



# Preliminary Configuration

### About This Chapter

This chapter describes how to set the basic parameters of the BreezeACCESS SU-M-900 and includes the following sections:

- ◆ **Configuration Applications**, page 3-2, provides an overview of how to change parameter settings.
- ◆ **Configuring Basic Parameters**, page 3-3, lists the basic parameters and their default values.
- ◆ **Verifying Proper Operation**, page 3-4, describes how to confirm that the SU-M-900 unit is fully operational.

# Configuration Applications

After completing the installation process, as described in the preceding chapter, the basic parameters must be configured to ensure that the SU-M-900 operates correctly. Once the basic parameters have been configured, additional parameters can be remotely configured via the Ethernet port or the wireless link using Telnet, TFTP or SNMP management.

Parameters can be configured using either of the following alternatives:

## Accessing 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.

## 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 900 System Manual* for more information on accessing and using the Monitor program and on configuring 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 of the Monitor program includes all the parameters necessary for the initial operation of BreezeACCESS SU-M-900.

YOU MUST PERFORM A SITE SURVEY AND SPECTRUM SWEEP PRIOR TO CONFIGURING THE AU'S IN ORDER TO DETERMINE THE AVAILABLE CLEAR CHANNELS.

The following list includes the basic parameters and their default values (applies to Version 4.3.9):

Parameter	Default Value	Comment
<b>IP Address</b>	10.0.0.1	
<b>Subnet Mask</b>	255.0.0.0	
<b>Default Gateway Address</b>	0.0.0.0	
<b>Transmit Antenna</b>	Antenna 2 in software. DO NOT CHANGE	USE ANT 1 PHYSICAL PORT, ANT 2 NOT CONNECTED.
<b>ESSID</b>	ESSID1	Must be the same as the ESSID the Base Station AU.
<b>Hopping channels</b>	None	Configure according to site survey results
<b>Best AU Support</b>	enable	Set scanning time
<b>Best AU scanning time</b>	Set to 7	Makes roam decision faster
<b>Scan Entire band</b>	Disable	Set only to channels used in all AUs
<b>Max number of Bad Synch</b>	Set to 115	
<b>Max number of Assoc/Auth TimeOut</b>	Set to 100	Improves roaming performance in edge areas
<b>Number of Dwells to retransmit</b>	Set to 1	
<b>Max TX Data Rate</b>	Set to 2 Mbps	Improves throughput by limiting multi-rate algorithm
<b>Operator ESSID</b>	Disable	Enable if using operator ESSID on all AU cells.

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

# Verifying Proper Operation

This section describes how to ensure that the SU-M-900 unit is fully operational.

➤ **To verify unit operation:**

1. Verify that the PWR LED on the SU-M-900 unit is lit.
2. Confirm that the PC is operational.
3. Send and receive a test message or PING test from the vehicle to confirm connection to the wireless link.