

BreezeACCESS 900

SU-M-900

Installation Guide

(Preliminary)



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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.

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Installation Guide

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Installation Guide



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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.

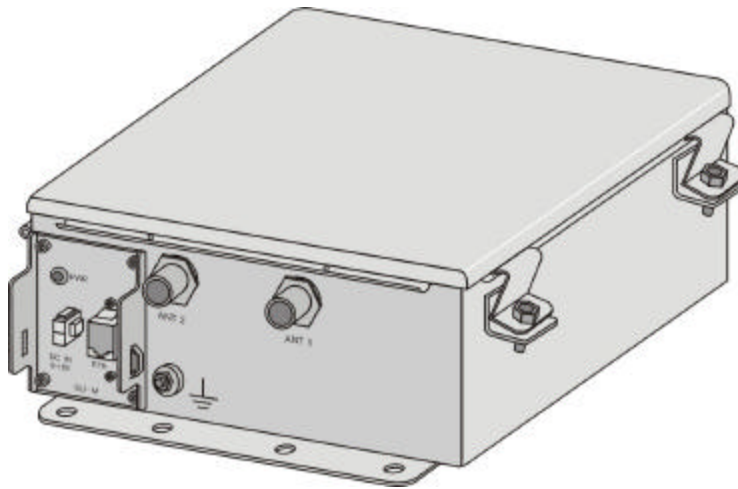


Figure 1-1: SU-M-900 Unit



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

Table 1Error! No text of specified style in document.-1: 900 MHz Radio Specifications		
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	Telnet, using the Monitor program TFTP, using the Configuration upload/download utility SNMP
Management Access	From Wired LAN, Wireless Link
Management Access Protection	Multilevel password Configuration of remote access direction (from Ethernet only, from wireless link only or from both sides) Configuration of IP addresses of authorized stations
SNMP Agents	SNMP ver 1 client. MIB II, Bridge MIB, Private BreezeACCESS MIBs
Security	Association protocol – ESSID RC4 WEP option (encryption of the association process) VLAN according to IEEE 802.1Q IP level filtering for user addresses or protocols Access direction and IP address filtering for management Ethernet broadcast filtering
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 ¾" screws, four ¼" flat washers, four ¼" 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 $\frac{3}{4}$ " 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:

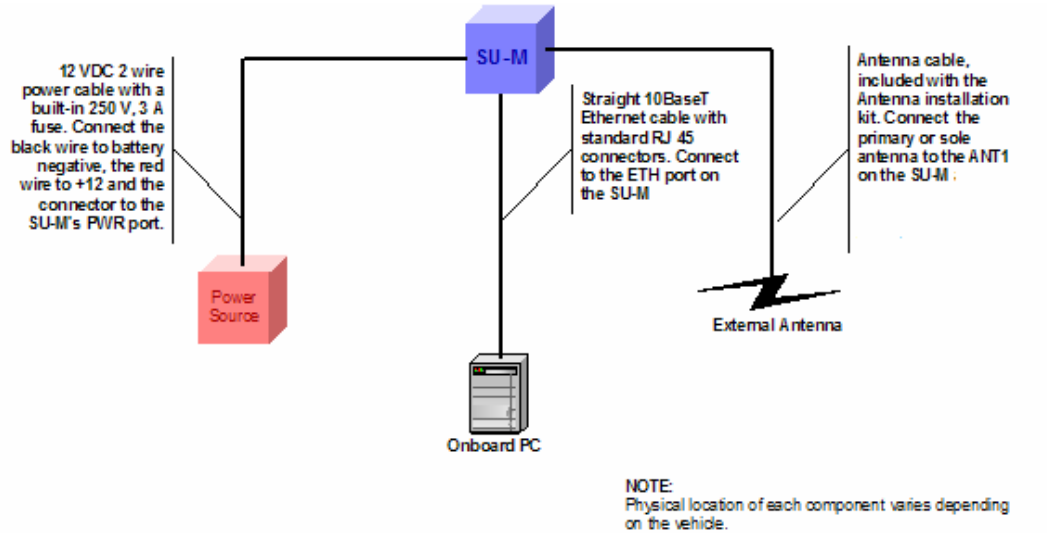


Figure 2-1: Connecting the Unit

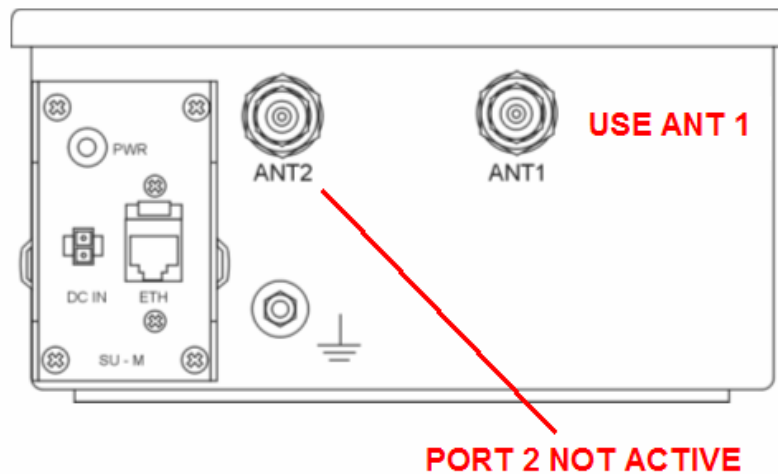


Figure 2-2: SU-M-900 Front Panel Connections

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