# *BreezeACCESS MMDS*

## *Base Station Equipment*

# Installation Manual

July, 2000

Cat. No. 213101

## Trade Names

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

- BreezeCOM Ltd., for products located outside the USA.

- BreezeCOM 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.

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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.

BreezeCOM 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.

## 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 Base Station equipment components and cables.

## Caution

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

## 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.

## 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 Outdoor unit, the antenna and the supporting structure are properly installed to eliminate any physical hazard to either people or property. Verify that the antenna mast is grounded so as to provide protection against voltage surges and static charges. Make sure that the installation of the antenna and cable is performed in accordance with all relevant national and local building and safety codes.

# Table of Contents

**Appendix A. Using Telnet**

# Table of Figures

# Table of Tables

# 1. INTRODUCTION

This manual describes installation guidelines for BreezeACCESS MMDS base station equipment, including the stand-alone AU-E/A-NI-MMDS Access Units and the modular AU-E/A-BS-MMDS Units with the BS-SH rack mounted shelf.

The BreezeACCESS IP Broadband Wireless Local Loop (WLL) system allows access service providers to provide high-speed IP connectivity services to their subscribers. To support IP-based services effectively BreezeACCESS systems employ wireless packet data switching technology.

The BreezeACCESS MMDS line of products uses Frequency Hopping Spread Spectrum radios that operate in Time Duplex Division (TDD) mode in the 2.500GHz – 2.686GHz frequency range.

The AU-A/E-NI and the AU-A/E-BS Access Units are comprised of an indoor unit and an outdoor unit. In the AU-A-NI and AU-A-BS products, the outdoor unit (AU-RA) contains the radio module and an integral flat antenna. In the AU-E-NI and AU-E-BS products, the outdoor unit (AU-RE) contains the radio module and an interface to an external antenna (not included).

The indoor unit of the AU-A/E-NI is a stand-alone unit (AU-NI) that is powered from the mains via its AU-PS power supply unit. The indoor unit of the AU-A/E-BS is a module (BS-AU) that is designed for insertion into the BS-SH shelf. The BS-SH, which is a 3U shelf suitable for installation in 19″ racks, can contain up to six BS-AU active modules and one or two BS-PS power supply modules. The shelf is powered from a –48VDC power source. Power supply redundancy is supported through the optional use of a second BS-PS power supply module.

The indoor unit provides the interface to the network. It also contains an IF (Intermediate Frequency) module and is connected to the outdoor unit via a 50-ohm coaxial IF cable. The IF cable serves for transmission of the 440MHz IF signal between the indoor and the outdoor units. It also serves for transferring power (12VDC), management and control signals from the indoor unit to the outdoor unit.

> *Note:* *The information contained in this manual is applicable to BreezeACCESS MMDS units with software release 2.3.*

# 2. BASIC INSTALLATION

## 2.1 Packing List – Modular Shelf Equipment

### 2.1.1 BS-SH Base Station Shelf

- BS-SH shelf (with blank panels)
- Rubber legs for optional desktop installation

*Note:* *Unless ordered otherwise, each BS-SH will be shipped with one BS-PS power supply installed.*

### 2.1.2 AU-A/E-BS Access Units (up to six per shelf)

- Outdoor unit:
  - ⇒ AU-RA with integral antenna
    
    or
  - ⇒ AU-RE with a connector to an external antenna (not included)
- Pole mounting kit for the outdoor unit (with two brackets, four sets of screws, nuts and washers)
- BS-AU Network Interface module
- Monitor cable

### 2.1.3 BS-PS Power Supply (one or two per shelf)

- BS-PS Power Supply module
- Power cable

## 2.2 Packing List – Stand-alone AU-A/E-NI Access Unit

- AU-NI indoor unit
- Outdoor unit:
    - ⇒ AU-RA with integral antenna

        or
    - ⇒ AU-RE with a connector to an external antenna (not included)
- AU-PS power supply with a mains power cord
- Pole mounting kit for the Outdoor unit (with two brackets, four sets of screws, nuts and washers)
- Wall mounting kit for the AU-NI unit

## 2.3 Other Items Required for Installation

- IF cable (s)* (one for each AU)
- Grounding cable(s) with an appropriate termination (one for each AU)
- Ethernet cable(s) (straight, one for each AU)
- Antenna(s)* and RF cable(s)* (AU-E-NI or AU-E-BS only)
- A portable PC with terminal emulation software
- Installation tools and materials.

*Items marked with an asterisk (*) are available as options from BreezeCOM.*

## 2.4 Guidelines for Selection of Equipment Location

Select appropriate locations for the equipment using the following guidelines:

- The outdoor unit can be pole—or wall mounted. Its location should allow easy access to the unit for installation and testing.

- The AU-RA unit with its integrated antenna, or the external antenna connected to the AU-RE unit, should be installed where it provides coverage of all subscriber units in the area it is intended to serve. The higher the AU-RA or the antenna, the better coverage it can provide.

- The AU-RE outdoor unit should be installed as near as possible to its antenna.

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*Note*:   *The distance between any two antennas should be greater than 40 cm.*

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- The outdoor unit is connected to the indoor unit by means of a coaxial IF cable carrying signals, controls and power. The IF frequency is 440 MHz. The maximum allowed attenuation of the IF cable is 15dB and its maximum allowed DC resistance (the sum of the DC resistance of the inner and outer conductors) is 1.5 ohm. This allows for cable lengths of up to 30m when using the standard RG 58 cable. If longer cables are required, a cable with lower attenuation and/or DC resistance should be used.

  Table 2-1 provides data regarding several industry-standard cables such as RG 58 and RG 213. If the spectral environment is polluted with noise in the 440 MHz band, it is recommended to use a higher quality double-shielded cable such as LMR 240 or LMR 400 (manufactured by Times Communications).

**Table 2-1: IF Cables**

| Cable Type | RG 58 | RG 213 | LMR 240 | LMR 400 |
|---|---|---|---|---|
| Maximum cable Length (m) | 30 | 100 | 65 | 150 |

- The BS-SH and its modules and the SU-NI are designed for indoor operation, i.e., inside buildings, a suitable cabinet or a shelter. Air temperature control might be necessary – the equipment is designed to operate over the temperature range 0°C to 45°C.

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*Note:*   *Outdoor units and antennas should be installed ONLY by experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities.*

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*The system complies with the ETS 300 385 standard and is protected against secondary lightning strikes when its outdoor unit is properly grounded according to the applicable country-specific industry standards for protection of structures against lightning.*

*Failure to do so may void the BreezeACCESS product warranty and may expose the end user or the service provider to legal and financial liabilities. BreezeCOM and its resellers or distributors are not liable for injury, damage or violation of regulations associated with the installation of outdoor units or antennas.*

## 2.5  Installing the Outdoor Radio Unit

### 2.5.1  Mounting the Outdoor Unit

The outdoor unit can be secured to the pole using one of the following options:

- Special brackets (supplied with each unit). There are two pairs of screw holes, allowing use of the special brackets with various pole widths.

- U-bolts - size A (inner installation holes, up to 2" pole).

- U-bolt - size B (outside installation holes, up to 3" pole).

- Metal bands (9/16" wide, minimum 12" long).

Figure 2-1 shows the locations of the holes, grooves and screw holes on the rear side of the unit.

Figure 2-2 illustrates the method of installing an AU-RA unit on a pole using the supplied brackets.

Figure 2-3 illustrates the method of installing an AU-RE unit on a pole using the supplied brackets.

*Note:   Make sure to install the unit with the bottom panel (the panel with the connectors) facing downward.*

Grooves for Insertion of 9/16" Metal Band

U-Bolts (3" Pole)

U-Bolts (2" Pole)
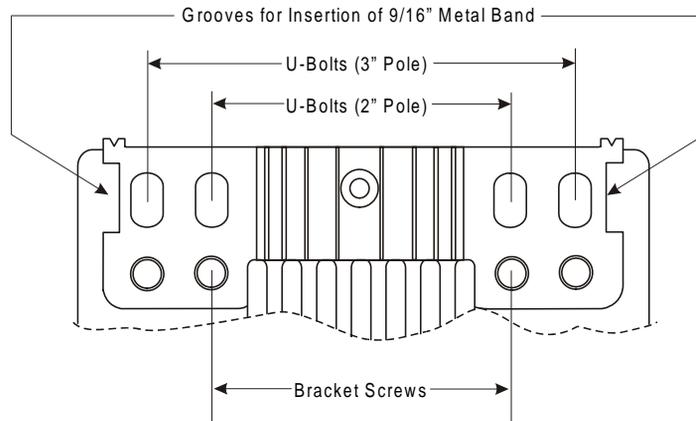
Bracket Screws

**Figure 2-1. Holes/Grooves/Screw Holes**
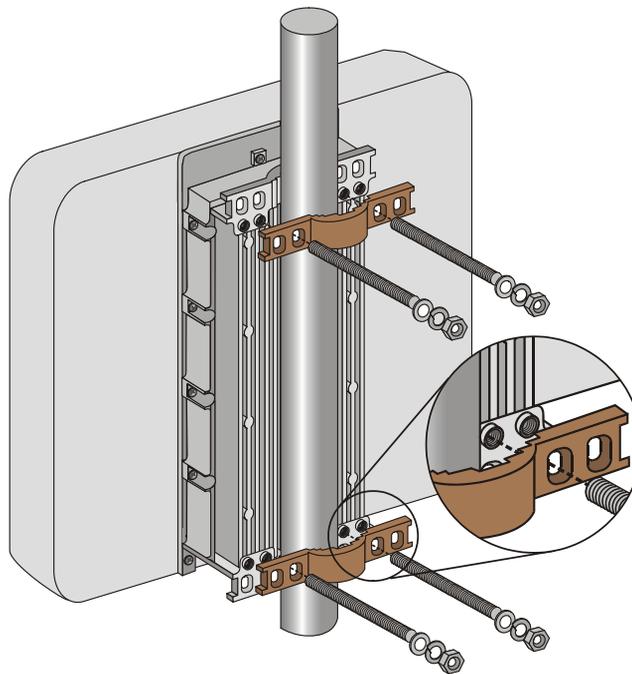
**Figure 2-2. AU-RA 2" Pole Mounting Installation Using the Supplied Brackets**
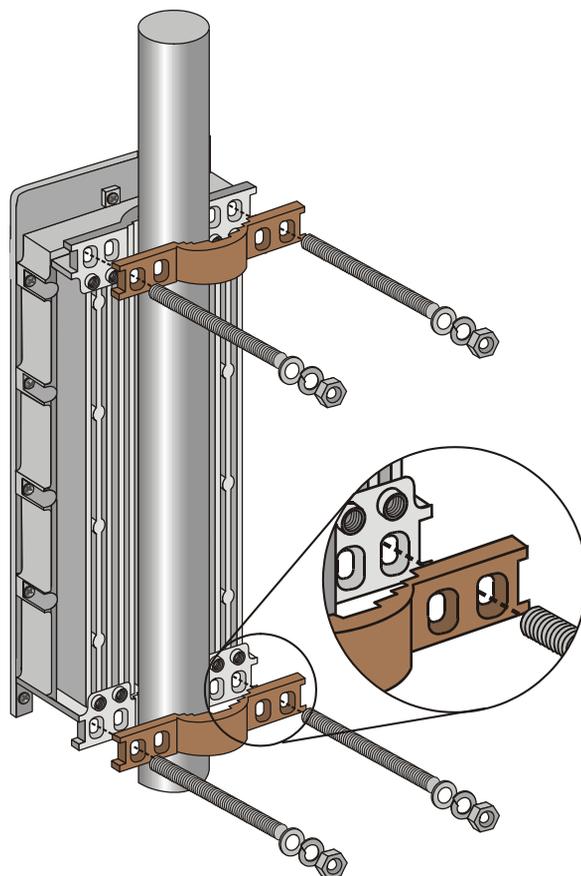
**Figure 2-3. AU-RE 3" Pole Mounting Installation Using the Supplied Brackets**

## 2.5.2  Connecting the Antenna Cable (AU-RE)

Connect an RF cable between the ANT connector (located on the bottom panel of the unit, shown in Figure 4-1) and the antenna.

## 2.5.3  Connecting the Ground and IF Cables

The Ground terminal (marked ⏚) and the IF cable connector (marked IF) are located on the bottom panel of the Outdoor unit, shown in Figure 4-1.

1.  Connect one end of the grounding cable to the Ground terminal and connect the other end to a good ground connection.

2.  Connect the coaxial cable to the IF connector. Verify that the length of the IF cable is sufficient and that it can easily reach the Indoor unit.

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*Note:*  *Make sure to switch OFF the power of the indoor unit prior to connecting/disconnecting the IF cable.*

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## 2.6  Installing the Modular Shelf Indoor Equipment

### 2.6.1  BS-SH Slot Assignments

The Base Station shelf has ten slots, as shown in Figure 2-4.

8 Middle slots - BS-AU modules



Extreme slots - BS-PS Modules
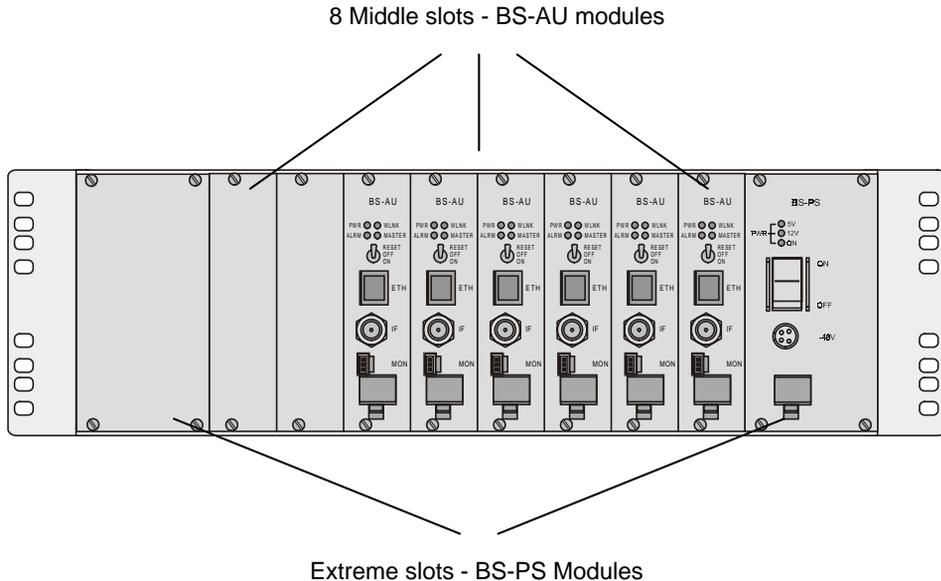
**Figure 2-4.  Shelf Slot Assignments**

The two wide slots on the both sides of the shelf accommodate the BS-PS power supply modules. The shelf is designed to support power supply redundancy through the use of two Power Supply modules. If a single power supply is used, it can be inserted in any of the two available slots.

The remaining eight slots can accommodate up to six active BS-AU modules. Two extra slots are for future use. Active BS-AU modules can be installed in any of the 8 slots. Unused slots should be covered by blank panels.

## 2.6.2  The BS-AU

The BS-AU front panel is shown in Figure 2-5.
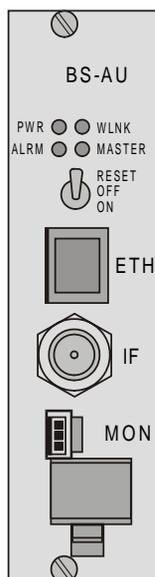


**Figure 2-5.  BS-AU Front panel**

The BS-AU provides the following interfaces:

An Ethernet connector (ETH) for connecting the BS-AU to the network. This connector should be connected to a straight Ethernet cable.

An IF connector for connecting the BS-AU to an outdoor AU-RE or AU-RA radio unit. The outdoor radio unit provides the air link between the BS-AU and the remote Subscriber Units.

A MON connector for connecting an ASCII terminal with terminal emulation software for configuration and maintenance purposes.

The BS-AU front panel LEDs are described in Table 2-2.

**Table 2-2:  BS-AU LEDs**

| Name | Description | Functionality |
|------|-------------|---------------|
| PWR | Power supply 12 VDC | On – 12 VDC power is supplied to AU-RE<br>Off – 12 VDC power is not supplied to AU-RE |
| WLNK | Wireless link activity | Blinking –Receiving packet from the wireless link<br>Off – No reception of packets from the wireless link |
| ALRM | ALARM Indication | On – Loss of hopping synchronization (slave units) |
| MASTER | Master Indication | On – The unit is configured as a Master |
| ETH connector embedded yellow LED | Ethernet activity | On- Receive/Transmit on Ethernet port<br>Off- No Receive/Transmit on Ethernet port |
| ETH connector embedded green LED | ETH Link Integrity | On- Unit is connected to Ethernet segment<br>Off- Unit is not connected to Ethernet segment |

The switch on the BS-AU front panel controls the supply of 12 VDC power to the outdoor unit via the IF cable. The momentary RESET position of this switch is for resetting the outdoor unit. In the OFF position, power is not supplied to the outdoor unit, even when the BS-AU unit is still ON.

## 2.6.3  The BS-PS

The BS-PS provides -48VDC to all the modules installed in the BS-SH rack. The BS-PS front panel is shown in Figure 2-6.
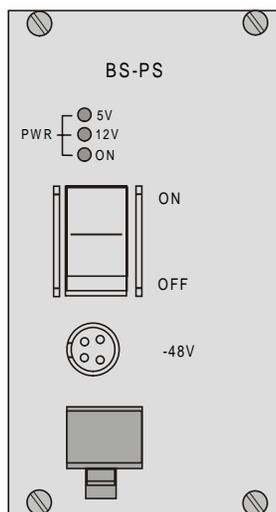


**Figure 2-6.  BS-PS Front Panel**

The BS-AU provides a single connector for connecting the -48VDC power source to the module. The color codes of the cable wires are:

*black*              *-48VDC*
*red*                *+ (Return)*

The switch turns the mains power to the power supply ON and OFF.

**Table 2-3: BS-PS Power Supply LEDs**

| Name | Description |
|------|-------------|
| ON | -48 VDC is available and Power Supply is ON |
| 5V | The 5V power supply module is OK |
| 12V | The 12V power supply module is OK |

## 2.6.4  Shelf and Modules Installation Procedure

1.  Install the BS-SH rack in a 19" cabinet (or place on an appropriate shelf/table). When mounted the BS-SH on a desktop, screw on the rubber legs shipped with unit.

2.  Carefully insert the BS-PS Power Supply and the BS-AU modules into their intended slots and push firmly until they are securely locked; refer to Section 2.6.1 for a description of the slot assignments. Close the captive screws attached to each module. Place blank covers over all the unused slots.

3.  Connect the IF cable(s) to the connector(s) marked IF located on the front panel(s) of the BS-AU module(s) shown in Figure 2-5. The other side of the IF cable is already connected to the outdoor unit.

4.  Connect the DC power cord to the –48 DC In jack (marked –48V) located on the front panel of the BS-PS power supply shown in Figure 2-6. If a redundant power supply module is installed, connect a power cable to it as well.

5.  Connect the power cord(s) to the –48VDC power source. Connect the black wire to the -48VDC contact of the power source. Connect the red wire to the + (Return) contact. Connect the shield to the Ground.

6.  Switch the BS-PS power supplies to ON. Verify that all the power indicator LEDs on the BS-PS front panel are ON. Refer to Table 2-3 for a description of these LEDs.

7.  Set the switches on the front panel of all BS-AU modules in the rack to ON.

## 2.7 Installing the AU-NI Indoor Unit

1. Place the AU-NI unit in an appropriate location on a shelf or a table. The unit can be wall mounted using the installation materials provided with the unit. Use a 6mm (1/4") drill and the supplied template plate for easy and accurate marking of the holes.

2. Connect the AU -PS power cord to the DC In jack (marked DC-12V) located on the rear panel of the Indoor unit (shown in Figure 2-6).

3. Connect the IF cable to the IF connector (marked IF) on the rear panel of the Indoor unit. The other side of the IF cable should already be connected to the Outdoor unit.

4. Connect the other end of the mains power cord to the AU -PS. Connect the mains power plug to a mains power outlet.
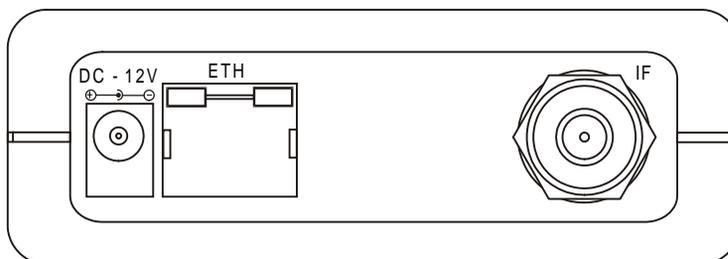


**Figure 2-7. AU -NI Rear Panel**

5. Verify that the Power LED (marked PWR) located on the front panel of the Indoor Unit is turned ON.
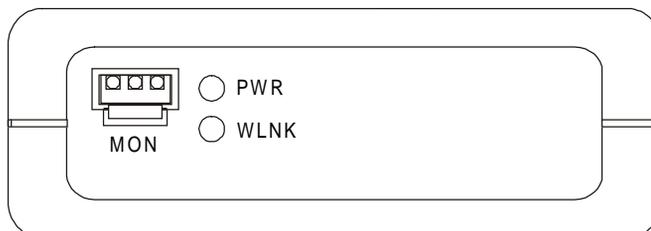


**Figure 2-8. AU -NI Front Panel**

6. Use a straight Ethernet 10baseT cable to connect the base station network (e.g., a hub, switch or router) to the Ethernet port (marked ETH) located on the rear panel of the AU-NI unit.

# 3. CONFIGURING SYSTEM PARAMETERS

After completing the installation process as described in the preceding section, proceed with configuration of the basic system parameters.

This section covers the configuration of basic installation parameters. Refer to the Administration Manual for information related to other parameters.

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*Note:* *Optionally, the product can be configured using Telnet over the Ethernet port, after setting the IP address. See Appendix A of this manual for further information.*

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## 3.1 Getting Started with the Local Terminal

1. Connect one end of the Monitor cable to the MON jack on the front panel of the BS-AU module or the AU-NI unit. Connect the second end of the cable to the COM port of the terminal. The COM port connector on the Monitor cable is a 9 pin D-type plug.

2. Run a terminal emulation program (e.g., ProComm or Windows HyperTerminal) using the following setup:

   | | |
   |---|---|
   | *Baud rate* | 9600 |
   | *Data bits* | 8 |
   | *Stop bits* | 1 |
   | *Parity* | None |
   | *Flow Control* | Xon/Xoff |
   | *Connector* | Available Com Port |

3. Press **Enter**. The *Select Access Level* menu appears. Select the access level according to your authorized access level. You will be requested to enter your password. After entering the correct password press the Enter key. The *main menu* appears as shown in Figure 3-1

Unit Type

```
BreezeACCESS (AU)

Official Release Version – 2.1.1

Release Date:  Tue Mar 07 11:21:22 2000

Main Menu

=====================
1 – Info Screens

2 – Unit Control

3 – Basic Configuration

4 – Site Survey

5 – Advanced Configuration

BreezeACCESS >>>
```

Software
Version No.

Unit Name
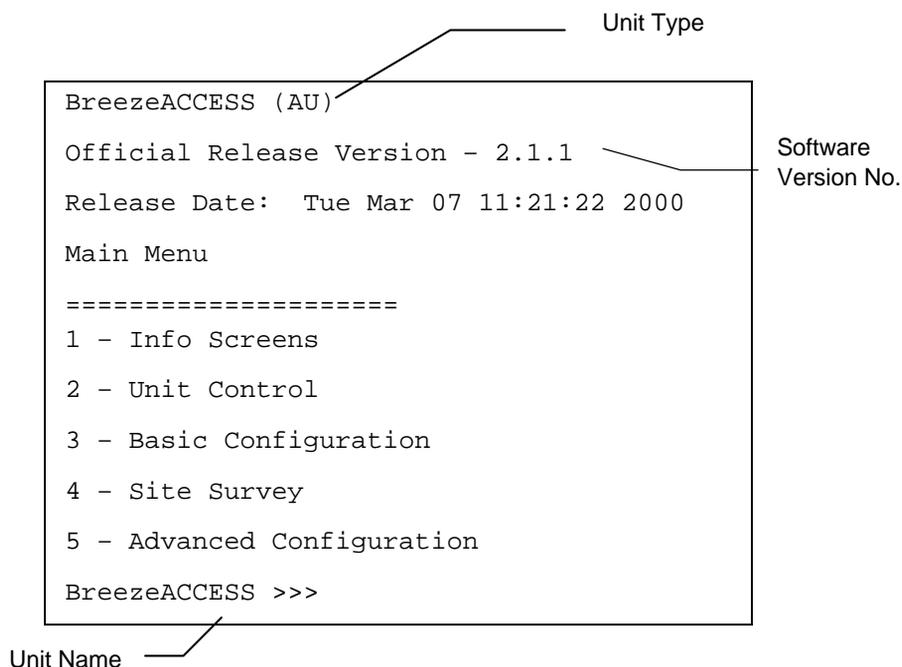
**Figure 3-1.  Main Menu**

The appearance of the displayed *Main Menu* varies in accordance with the access level.

- For users with read only access rights, only the *Info Screens* option is displayed. Users with this access level cannot access the *Unit Control*, *Basic Configuration*, *Site Survey and Advanced Configuration* menus.

- For users with Installer access rights, the first four menu items (*Info Screens*, *Unit Control*, *Basic Configuration* and *Site Survey)* are displayed. Users with this access level cannot access the *Advanced Configuration* menu.

- For users with Administrator access rights, the full *Main Menu* will be displayed. These users can access all the menu items.

4. Operate the monitor program as follows:

- Type an option number to open/activate the option. You may need to press the Enter key in some cases.

- Press the Esc key to exit a menu or an option.

- You can log-out and exit the monitor program at any time by simultaneously pressing the **Ctrl** and **X** keys.

- Reset the unit after making configuration changes for the new values to take effect.

- You can view the current parameters' configuration by selecting 1 in the Main Menu to Access the Info Screens menu, and then selecting 2 in the Info Screens menu to view the Basic Configuration parameters.

## 3.2 Configuration Parameters

The following system parameters must be configured for each Access Unit:

- *ESSID*
- *IP Address*
- *Subnet Mask*
- *Default Gateway Address*
- *Hopping Band*
- *Frequency Offset*
- *Hopping Shift* (if using two or more AUs)
- *Hopping Sync* (if using two or more AUs)

*Note:* *You must select Reset Unit in the Unit Control menu for the changes to take effect.*

1. From the *main menu*, type **3** to access the *Basic Configuration* menu.

```
BreezeACCESS (AU)
Official Release Version – 2.1.1
Release Date:  Tue Mar 07 11:21:22 2000
Basic Configuration
===================
1 – IP Address
2 – Subnet Mask
3 – Default Gateway Address
4 – ESSID
5 – Maximum Data Rate
6 – Frequency Offset
7 – Hopping Shift
8 - Hopping Sync
H - Hopping Band
X - Transmit Power Control
Y - Receive Attenuation Control
S - Show Basic Configuration
BreezeACCESS >>>
```

**Figure 3-2.  Basic Configuration Menu**

2. From the *Basic Configuration* menu, type 1 to access the *IP Address* selection screen. Enter the required IP address.

3. Type 2 to access the *Subnet Mask* selection screen. Enter the required subnet mask.

4. Type 3 to access the *Default Gateway Address* selection screen. Enter the required default gateway address.

5. Type 4 to access the *ESSID* selection screen. Enter the required ESSID.

6. Type H to access the *Hopping Band* menu. Enter the required bandwidth.

7. Type 6 to access the *Frequency Offset* selection screen. Enter the required frequency offset.

8. If more than one AU is used, they should be synchronized for optimal spectrum utilization. Type 7 to access the Hopping Shift selection screen and enter the required shift. Type 8 to access the Hopping Sync selection screen. Enter the required hopping sync status (Master or Slave).

*Note:*  *Only* *one AU should be defined as a Master. The other units should be defined as slaves. If only one AU is used, it should be defined as Idle.*

## 3.3  Reset Unit

1.  From the *main menu*, type **2** to access the *Unit Control* menu.

2.  Type **1** to access the *Reset Unit* menu. Type **1** to reset the unit so that new configuration settings are applied.

---

*Note:*   *Should you make any mistakes during configuration or encounter any problems associated with system configuration parameters, you may configure the unit back to the factory defaults, as follows:*

*Type **2** in the Unit Control menu to access the Set Factory Defaults menu. Type in **2** (Set Factory defaults-Full) to load the default values. Reset the unit for the factory defaults values to take effect.*

---

# 4. VERIFYING CORRECT OPERATION

## 4.1 Verifying Correct Operation of the AU-A/E-BS

After completing the installation as described above, the system starts operation. To verify correct operation, view the LED indicators located on the front panel of the BS-AU modules as shown in Table 2-2on page 12.

*Note:* *If the Access Units are not synchronized, reset the Master BS-AU unit and then the Slave units to re-synchronize them.*

## 4.2 Verifying Correct Operation of the AU-A/E-NI

To verify proper operation, view the LED indicators located on the front panel of the AU-NI unit as described in Table 4-1.

**Table 4-1: AU-RA/RE Outdoor Unit LEDs**

| Name | Description | Functionality |
|------|-------------|---------------|
| ALARM | Alarm Indication | On – A problem with the power amplifier or in the locking process of any of the synthesizers<br><br>Off –Normal operation |
| WLNK | Wireless link activity | Blinking –Receiving packet from the wireless link<br><br>Off – No reception of packets from the wireless link |
| ETH | Ethernet activity | Blinking – Data received from or transmitted to Ethernet LAN<br><br>Off – No activity on the Ethernet LAN |
| RSSI | Bar display | Displays the Received Signal Strength Indication. The higher the number of green LEDs that are ON, the higher the level of the received signal. |

| Name | Description | Functionality |
|------|-------------|---------------|
| | Yellow LED | On - Power On<br>Off – Power is not received from the Indoor unit |
| | 8 Green LEDs | RSSI in 4 dB resolution starting at –91dBm |
| | Red LED | Received signal strength is –40dBm or higher |

## 4.3  Verifying Correct Operation of the Outdoor Unit

To verify proper operation, view the LED indicators located on the bottom panel of the Outdoor unit as shown in Figure 4-1.
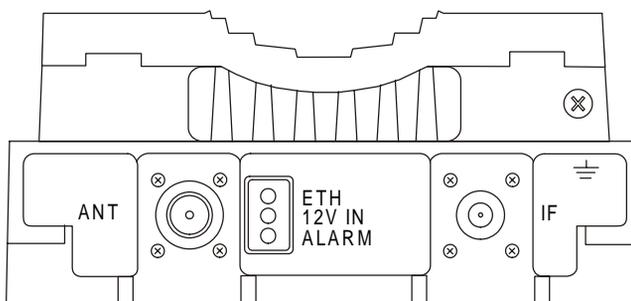


**Figure 4-1.  AU-RE Radio Unit Bottom Panel**

*Note:*   *The bottom panel of the AU-RA unit is identical to the bottom panel of the AU-RE shown above, except that it does not have an ANT connector.*

Table 4-2 lists the various LED states.

**Table 4-2: AU-RA/RE LEDs**

| Name | Description | Functionality |
|------|-------------|---------------|
| ALARM | Alarm Indication | On – A problem with the power amplifier or in the locking process of any of the synthesizers |
| | | Off –Normal operation |
| 12V IN | 12V DC power supply | On – 12VDC power is supplied to the unit |
| | | Off – 12VDC is not available |
| ETH | Ethernet activity | Blinking – Data received from or transmitted to Ethernet LAN |
| | | Off – No activity on the Ethernet LAN |

*Note: Verifying proper operation of the outdoor unit using the LEDs as described above is possible only after completion of the configuration process.*

# 5. SPECIFICATIONS

## 5.1 Radio

| | |
|---|---|
| Frequency | 2.500GHz –2.686GHz |
| Radio Access Method | FH-CDMA or TDMA |
| Operation Mode | Time Duplex Division |
| Sub-Channel Bandwidth | 1 MHz |
| Frequency Setting Resolution | 1 MHz |
| Antenna Gain (AU-RA) | 17 dBi, $20^0$ |
| Output Power (at antenna port) | 27 dBm typical. Power Control range – 20 dB |
| Sensitivity <br><br> (dBm at antenna port, BER 1E10$^{-6}$) | 1Mbps    -87 <br> 2Mbps    -80 <br> 3Mbps    -71 |
| Data Rate | 3Mbps max |
| Modulation | Multilevel GFSK |

## 5.2 Outdoor Unit to Indoor Unit Communication

| | |
|---|---|
| IF Frequency | 440 MHz |
| IF cable Impedance | 50 ohm |
| Maximum IF cable Attenuation | 15dB |
| Maximum IF cable DC Resistance | 1.5 ohm |

## 5.3  Configuration and Management

| | |
|---|---|
| Local Management | Via MON port, Monitor program using terminal emulation |
| Remote Management | SNMP, Telnet, TFTP |
| Remote Management Access | From Wired LAN, Wireless Link |
| SNMP Agents | MIB II, Bridge MIB, Private MIBs |
| Security | Authentication and filtering |
| Software upgrade | TFTP download |

## 5.4  Interfaces

| Interface | Outdoor Unit | Indoor Equipment |
|---|---|---|
| RF (AU-E) | N-Type jack | |
| IF | TNC jack, lightning protected | TNC jack, lightning protected |
| Ethernet | | 10BaseT (RJ-45) with two embedded LEDs |
| Monitor | | 3 pin low profile |
| Power | 12 VDC via the IF cable | 4-pin power connector (BS-PS),<br><br> DC plug for the AU-PS power supply (SU-NI) |

## 5.5  Electrical

| | |
|---|---|
| Outdoor Unit | 12 VDC via the IF cable |
| Indoor Modular Shelf Equipment | -48 VDC, 200 W for a fully equipped shelf.<br>AU (Indoor + Outdoor): 25W |
| Indoor Su-NI Unit | SU-NI: 12VDC/2.5A from SU-PS<br>SU-PS: 100 - 240 VAC, 47-63 Hz |

## 5.6  Mechanical

| | |
|---|---|
| Outdoor Unit | AU-RE: 30cm x 12cm x 5cm, 2.2 kg.<br>AU-RA: 30cm x 30cm x 7.2cm, 3 kg. |
| Indoor Modular Shelf Equipment | BS-SH: 19",3U, depth 26cm, 6 kg. Fully loaded |
| Indoor SU-NI Unit | SU-NI: 13cm x 8.6cm x 3cm, 0.5 kg.<br>SU-PS: 10cm x 6.5cm x 3.5cm, 0.4 kg. |

## 5.7  Environmental

| | **Outdoor Unit** | **Indoor Equipment** |
|---|---|---|
| Operating Temperature | $-40^0$C to $60^0$C | $0^0$C to $45^0$C |
| Operating Humidity | 5%-95% non condensing<br>Weather protected | 5%-95% non condensing |

## 5.8  Standards Compliance, General

| | |
|---|---|
| EMC | EN300 385:1998 |
| Safety | EN 60950 |
| Environmental | ETS 300 019 |

# APPENDIX A. USING TELNET

Use the following procedure to connect to BreezeACCESS 3.5 units via a Telnet session.

1. Connect the PC to the Ethernet port of the unit (or the hub to which the unit is connected) using a straight Ethernet cable. If you connect the PC directly to a unit that is normally connected to a hub, use a crossed Ethernet cable. You may also connect the PC to any Ethernet port on the network and communicate with the unit to be managed via the wired or wireless media.

2. Make sure that the IP parameters of the PC are configured to enable connectivity with the unit.

3. Run a Telnet application and use the IP address of the unit to be managed as the Host Name.

4. Set Port to *Telnet* (this is the default).

5. Set Terminal Type to *VT100* (this is the default).

6. Enter the Service Provider password.

7. When the password is recognized, the following message is displayed:

```
You have entered.
```

8. Press **Enter**, the Breeze ACCESS Monitor is displayed on the screen.

9. To exit the Telnet session, choose *Disconnec*t from the *Connect* menu. (The session is terminated automatically, after a specific time of inactivity determined by the Log-out Timer).