

PRODUCT WARRANTY STATEMENT

LIMITED WARRANTY:

Earmark warrants to the original purchaser the Earmark products shown in the following list against defects in materials and workmanship for the period shown listed next to each product, commencing with its date of delivery to the original purchaser except that external cords and connectors are so warranted for three months after such delivery and microphones and antennas are so warranted for twelve months after such delivery.

Series 4C Headsets	36 Months	Tour Headsets	24 Months
Series 4 Belt-Paks™	36 Months	VOXSET II	24 Months
Series 5 Flex-Paks™	36 Months	Series 4S Headset	24 Months
Multi-Man Base Station	36 Months	Junior Headsets	12 Months
BaseMaster VIII™	36 Months	Headphones	12 Months
Compact Base Station	36 Months	LOUDMOUTH Products	36 Months
MiniBase™	36 Months	Earmark Speaker Mics	24 Months

Earmark's only obligation, and the purchaser's sole remedy, under this limited warranty shall be to repair or replace any defective part, or the product itself, upon timely notification of such a defect and upon substantiation that the product has been used for its intended purpose and in the usual manner, and, where applicable, in accordance with Earmark's directions, and has not been altered, misused, abused, or repaired other than by Earmark.

Exclusiveness of Warranty:

THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ANY IMPLIED OR EXPRESS WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE QUALITY OR DESIGN OR ANY OTHER WARRANTY, WHETHER EXPRESS OR IMPLIED.

Limitation of Liability; Remedies:

Earmark shall in no event be liable for (a) any injury or death to persons, or loss or damage to any property; or (b) any commercial losses, special or consequential damages from any cause connected with the Earmark product described herein, such as but not limited to loss to other property or equipment, loss of profits or revenue, cost of capital, cost of purchase of replacement goods, or claims of others against purchaser; and REPAIR OR REPLACEMENT, in the manner and for the period described above, shall constitute purchaser's SOLE REMEDIES and shall fulfill all liabilities of Earmark with respect to the Earmark product described herein, whether in its design, manufacture, sale, delivery, use, non-use, misuse or inability to use the same, and whether based on contract, negligence, product liability, strict liability or otherwise.



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400066 RevA

OWNERS MANUAL



Installation and Operating Guide For: **BASEMASTER VIII™** Portable Repeating Base Station

INTRODUCTION

Your new Earmark Base Station, the BASEMASTER VIII, contains several important features to help you in your daily operations. These features are highlighted below as an introduction. Please refer to the specific section of this manual for operating details and instructions.

BASEMASTER VIII is a repeating Base Station. It operates in full Duplex at all times. Each participant in the network is assigned a unique frequency that is exclusively theirs to use. The Base Station contains one transmitter and as many receivers as there are remote (portable) radios in your network. Whenever someone speaks into their own Earmark portable radio, the Base Station receives the signal and, in addition to playing the signal through the Base Station speaker, it re-transmits (repeats) the signal back out on the Base Station transmit frequency so everyone hears what's being said by any member of the team. The Base Station mixes all the signals it hears; no one is ever cut out of the conversation unless the Base Station Operator does so intentionally.

We've integrated BASEMASTER VIII and its case into a single, easily portable unit. The case and the hardware can't be separated. Any attempt to do so will damage the system and make it inoperable. The case seals the electronic hardware from the elements. When **closed**, BASEMASTER VIII operates in almost any weather; ordinary rain or dust can't penetrate the seal. A sealed, lead/acid, rechargeable battery assures continuous power for over 14 hours, so, you don't have to keep the unit on charge. The back panel contains a sealed headphone jack. The headphone

jack permits the Base Station Operator to monitor the network when the case is closed. Threaded caps protect the accessory antenna connectors on either side of the case. The inner panel houses all operating controls and patch connectors, including the **on/off** switch. You must open the case to turn the Base Station **on** or **off** and to set the various station controls. Once these are set, however, the case can be closed and the unit operated. If you need to use the patch points such as, **line in**, **line out**, or **internal antennas**, the case must be open. Using the BASEMASTER VIII you can interface your Duplex radio network to a hardwired intercom.

BASEMASTER VIII comes equipped with Power Plus, a unique feature that permits the Base Station Operator to increase the Base Station transmit power from 250 mW to 950 mW with the flip of a toggle switch. This feature is very valuable when a station user moves out of normal range and the Base Station Operator needs to call them back or if you simply want to extend the BASEMASTER VIII's transmission range by a few hundred feet. The Power Plus mode consumes more power than does normal power mode, so it should be used only when necessary.

Operating range will vary greatly depending on where you are and the placement of your antennas. Using the internal antennas requires that the case remain open. Closing the case while using the internal antennas will significantly shorten the maximum range. Metal barriers like walls or screens shield radio signals and prevent the signals from reaching their intended antennas. For the absolute best range, try to keep the BaseMaster antennas in line-of-sight of the portable radios. Also, please note that radio signals do not travel well through tunnels, even if there is both a good ground plane and line-of-sight between the antennas.

I SYSTEM DESCRIPTION

BASEMASTER VIII is a Duplex, repeating Base Station designed to be utilized in conjunction with Earmark's portable radios, and to interface, if desired, with almost any wired system. The network is full Duplex; each participant has a private transmitter frequency and can speak whenever they want to. BASEMASTER VIII can be utilized both as a manned station and as a stand alone repeater. The fully portable BASEMASTER VIII operates for over 14 hours on a fully charged battery.

Your BASEMASTER VIII kit contains the following items:

Integrated Base Station and Case, Earmark Part No. 20256N

BASEMASTER VIII Accessory Pack, consisting of:

one, Battery Charger, Earmark Part No. 76023

one, Base Station Headphone, Earmark Part No. BSH-51B

one, Installation and Operating Guide, Earmark Part No. 400066

one, Accessory Pack Carry Case, Earmark Part No. DC-1

two, Magnetic Whip Antenna, Earmark Part No. ANT-2/AL and ANT-2/AH

Please Note: Should you fail to locate any of these items, contact Earmark.

RECEIVER CIRCUIT	Dual conversion First IF Frequency 10.7 MHz, Duplex 4 Pole Quartz Filter. Second IF 455 kHz, 4 Pole Ceramic Filter.
SENSITIVITY	0.3 uv for 20 dB quieting 0.2 uv for 12 dB SINAD
MODULATION ACCEPTANCE	20 kHz
SELECTIVITY	40 kHz from center frequency -55 dB
SPURIOUS & IMAGE	-47dB
INTERMODULATION RESPONSE ATTENUATION DUPLEX	-70 dB
FREQUENCY STABILITY	(-30 to +50 C) 0.005%
RF OUTPUT	250 mW into 50 Ohm (950 mW with Power Plus option)
SPURIOUS & HARMONICS (RADIATED)	-75 dB
FREQUENCY STABILITY	(-30 to +50 C) 0.005%
INTERNAL BATTERY	12V, 7 Amp hour Gel Cell; 6" l x 2 ¹ / ₂ " w x 3 ⁷ / ₈ " h
INTERNAL FUSE	F1 1.5A 3AG
LICENSING	Earmark communication transmitters are type accepted under the rules and regulations of Part 90 of the Code of Federal Regulations. These rules require licensing by the purchaser. Requests for application forms or information may be obtained from the FCC, Gettysburg, PA 17325.

SPECIFICATIONS

POWER SUPPLY	15 VDC, 1 Amp external supply all power internally regulated to 9VDC and filtered.
DIMENSIONS	20" (50.8 cm) x 14" (35.56 cm) x 8" (20.32 cm)
WEIGHT	18 lbs. including battery
MICROPHONE	Desk Microphone: Amplified Electret, 600 Ohm Impedance with PTT Switch
AUDIO	2 watt, internal speaker (external speaker - jack on panel)
HEADPHONE	100 Ohm dynamic element. 2K Ohm Electret Microphone
LINE IN	10K Ohm internal impedance requires 3Vpp (1V RMS) accepts ¼" phone plug.
LINE OUT	Provides approximately 0.7V RMS (0 dBm) into 10K Ohm or higher load impedance. Internal impedance 2.2K Ohm. Accepts ¼" phone plug, 600 Ohm -10 dBm. NOTE: Input signal appears at line out at approximately the same level. (into 10K Ohm or higher load)
SPEAKER 8-16 OHM	Provides 2 watt (4 watts peak) into 8 Ohm, or higher impedance speaker. Both speaker leads must be floating (not grounded).
ANTENNA	2 UHF connectors for 50 Ohm antennas.
DESK MICROPHONE	Stereo ¼" phone jack accepts Switch Craft #267.
I/O OUTPUT	For connection to external intercom system.
DISTRIBUTION PREAMPLIFIER	Permits matching of single receive antenna for 2 to 8 receivers.
GAIN	1
INPUT IMPEDANCE	50 Ohm
OUTPUT IMPEDANCE	50 Ohm, outputs for up to 8 receivers.
RECEIVERS	(2 - 8 depending on model)

II SET-UP

Battery

If the battery has not been fully charged, connect the Battery Charger to the connector marked **power** located on the rear panel. Full battery charge requires about 14 hours of continuous charging. The BASEMASTER may be left on continuous charge without battery damage.

Connections

Place the BASEMASTER VIII on a level, flat surface, open the four restraining latches and lift the case cover. Use a flat, level surface to assure stability. Position the antennas per the instructions of Section V. However, when used with the internal antennas, the Base should be located on a flat surface, with the cover **open** (the antennas are located in the cover) and at least 3 feet from any vertical metal surface.

Closing the cover will materially reduce the effective range. If additional range is needed, then external antennas must be used. To use external antennas, remove the caps on the UHF antenna connectors located on each side of the case. Antennas are color coded for High (yellow) and Lo (red) band. Be sure to connect the external antenna to the proper connector. The coding on the Base is next to the word ANTENNA on the Base top panel. When using external antennas it is necessary to disconnect the internal antenna, which is done by unplugging the two black antenna plugs located on the top panel. Range will suffer if both internal and external antennas are connected.

If you intend to use the BASEMASTER VIII as an unmanned repeater, proceed to Section III. If you intend to have a Base Station Operator present and to keep the case closed against inclement weather, attach the Operator's Headphone (Part No. BSH-51B), to the straight pin on the Back Panel.

If you intend to operate the BASEMASTER VIII with its case open, you can utilize either the Operator's Headphone, supplied as standard equipment, or a Desk Microphone (Earmark Part No. DM-4, optional equipment). The Desk Microphone plugs into the jack, marked **desk mic** on the top panel. The BASEMASTER VIII is now completely set up and ready to operate.

III OPERATIONS & CONTROLS

On/Off

Turn on BASEMASTER VIII by depressing the **SYSTEM** Push Button on the far left side of the top panel. The Green LED lights, indicating the system is enabled. The yellow LED lights only when the Battery Charger is plugged in and the battery is being charged, even if the **SYSTEM** switch is off and the green light is out.

Station Controls

Individual Push Buttons control each of the eight available stations. Though your system may have been purchased with fewer than eight active stations, all the switches are always installed. For each operational station, the number adjacent to the Push Button corresponds to the portable radio (Earmark Headset, Belt-Pak, or Flex Pak) with the same number.

Volume

The **rotary volume knob** controls both the level at the BASEMASTER VIII speaker and that at the headphones. Adjust this, as necessary, for comfort.

Operations Check

One at a time, turn on each of the operational stations by depressing the station's Push Button. As you depress each switch, a green LED lights indicating the station's receiver is on. Since there should be no carriers on, the red LED should also light. If the station's receiver can't find a radio signal strong enough to open squelch, the red LED lights to let you know who's broadcasting and who isn't. By checking each station prior to turning on the portable radios, you can find out if there are any competing radio emissions that might interfere with your operations. If all the portable radios are turned off and a station's red light does not come on, it means there is a competing radio somewhere nearby. Even if you can't hear any sound over the BASEMASTER VIII's built-in speaker, the presence of an undesired carrier could cause a problem. The Base Station's receiving function is very sensitive and adjustments may be necessary if you encounter operating problems. Note any such situations and proceed to the next step.

Next, working with an associate, turn on one BASEMASTER VIII station and the corresponding portable radio. Check each station and portable radio in this manner. There should be clear communication on each channel.

Be particularly careful with any station on which you detected a competing transmission (see above). If the competing transmission is weak and doesn't cause communication problems at short range, it's likely that the only effect will be a slight reduction in maximum range for the specific station in question. If the competing signal is strong and does interfere with your communications, you must turn off that station until the situation can be remedied.

During normal operations only those stations that are matched to an operating portable radio should be on. All other stations should be turned off (green LED is not lit). If an extra station is left on, it may pick up spurious atmospheric signals, create excess noise and disrupt your network.

Team - Override

The **TEAM - OVERRIDE** switch, mounted near the center of the top panel, controls the BASEMASTER VIII's repeat function. This is a spring loaded switch. When the switch is down, in **OVERRIDE** position, the Base Station is not repeating. When the switch is up, the team members cannot hear each other, they can only hear the

Where such additional antennas are needed, a special splitter is required to properly match the combination of antennas to the transmitter and receiver in the Base Station. These splitters are provided in several configurations. Please specify your precise requirement when ordering.

All antennas are 50 Ohm impedance and, for short runs, may be connected using RG 58 Co-axial Cable. We recommend RG 8 Co-axial Cable for runs longer than 200'. Antennas for use in high band channels are marked with a yellow dot or yellow cap. Low band antennas are coded red.

If you have any question about antenna installation or you've got a problem we haven't covered here, call Earmark at (888) EARMARK (327-6275). We'll be happy to assist you in any way we can.

EARMARK SERVICE POLICY

Earmark is proud to produce a quality, rugged product that is designed for use in tough industrial environments. The true sign of a company committed to excellence is shown by the commitment to product design AND customer service. At Earmark, we have gone one step further by ensuring that the experience that we gain in service is used in designing all of our products, making our products excellent for use in tough environments. But ultimately, all products require some level of service, especially after hard use and long periods of active use.

At Earmark, we are committed to making your service experience painless. We provide two levels of service with every product that we ship:

Phone Support

You can always call Earmark for help with an operational problem. Just dial our toll free number 1-888-EARMARK (USA only) or our direct number and ask to speak to our service department. Whether you have difficulty with your initial installation or have noticed a change in your equipment's performance, it is very likely that we can diagnose and hopefully fix the problem over the phone.

Repair

In the event that service is required for your Earmark product, we ask that you follow this simple procedure:

1. Pack the product in a rugged cardboard container. We recommend that headsets be sent to us in their plastic carrying cases for protection.
2. In the package include a piece of paper that has at the very least your contact information (contact name, phone/#, company name, shipping address), a problem description, and special shipping instructions, if desired (we ship FedEx 3-day if not specified)
3. Ship the container to Earmark – Attn: Service, 1125 Dixwell Ave, Hamden, CT 06514 USA.
4. While not required, we recommend that you also fax the paper to 203-777-2886 so that we can be prepared to receive your equipment.

All repairs are handled at Earmark equally – whether they are in or out of warranty. Once your equipment is checked in and inspected by our technicians you will be contacted by our service department with an estimate of parts and labor (if out of warranty) and an estimated ship date. In the event that any charges are incurred, you will also be asked for payment information (credit card, prepayment, or purchase order).

Warranty

All warranty work will be shipped back to you in the same timeframe that it was sent to us. For instance, if you sent your repair work using a 2-day carrier then it will be shipped back 2-day (we will only use FedEx, however). If you are unsure whether your equipment is still under warranty, please read the next page or call our service department.

We hope that you enjoy using your Earmark product. As always, we look forward to your comments and suggestions. Please feel free to contact us by phone, fax, or on the web.

require 200', then the guidelines are much less important. In general, the better the original antenna installation, the happier you will be with your overall system performance.

Accessory Antenna Placement

Always keep the transmit and receive antennas at least 12 feet apart with the antennas set vertically. Mount the receive antenna at least 10 feet from the nearest Earmark portable radio. Be sure to keep the antenna cables separated by at least 6 inches for long cable runs. If such placement is not possible and you experience distortion or whistles from antenna saturation, you may need to use an attenuator in the receiver antenna. Call Earmark for assistance.

The higher you place your antennas, the better your range will be. If your portable radios will be operating outside the building, the roof is a good place to put your antennas, provided you have at least an 8 Ft. X 8 Ft. metal base or you use a ground plane antenna. Metal between the antenna and the remote radio will sharply reduce the range, so, the best solution for metal (Butler type) buildings or reinforced concrete walls is to get the antennas above them.

Running the Accessory Antenna Cables

To get from the Base Station to the antennas, you may need to use antenna extension cables. Before assembling the antenna extension, match mark the ends so you can tell which is which, ie, transmit or receive, when you're out of sight of the Base Station. Make sure the connections are firmly, hand tight. Do not tighten the antenna connectors with pliers or other tools. If they don't fit together easily, take them apart and start again. If the connection will be outdoors or exposed to the elements, wrap it with electrician's tape to keep water from pooling on the wires.

Make certain you have connected the antennas to the proper port on the Base Station. The antennas and the Base Station are color-coded. If you've match marked the extensions, everything is simple. Avoid cutting the antenna cables. If you cut the cable and then patch it on the other side of the wall, you'll have reduced the signal strength somewhat. Antennas don't behave exactly the same way as ordinary electrical lines. It's best not to cut them. Any excess cable can be coiled up and stored in a convenient location, just be certain that the transmit and receive cable coils are at least a foot apart.

Installing Multiple Antennas for One System

In situations where communication is required through a solid metal enclosure such as wing tanks, metal storage vessels, or nuclear reactor buildings, a second set of antennas is needed for proper operation. Additional antennas may also be needed to cover poor performance areas caused by peculiar building construction.

Base Station Operator.

In the event of an operations emergency, the Base Station Operator may wish to cut off conversation between team members so they are forced to listen to an emergency message. Pushing the switch down cuts off all two-way communications between the team members and assures they will all hear the Base Station.

External Intercom

The external interface connection is made through the **EXT I/O** Jack on the rear panel and is designed to interface with any 3 or 4 wire intercom system. The intercom interface cable is supplied as an accessory item, Part No. 202579, and has a 12 foot cable length (unterminated). Call Earmark Inc. (1-888-Earmark) if you want a special termination or if your input is less than 27 Ohm.

The **I** (Input) and **O** (Output) adjustments are located on the rear panel. The adjustment controls have 32 detented positions (with detent #1 being full counter clockwise). If you know the signal levels of your intercom system, the following table will allow you to make the proper adjustments. If the values you need fall in between the table value, you may approximate by using the in between detents. The **EXT Output** (the signal required by your intercom) covers a range of 5mV to 2.2Vpp (1.76mV to .7V RMS).

Detent: 1	2.2Vpp	(0.7V RMS)
4	1.4Vpp	(0.49V RMS)
6	0.44pp	(0.15V RMS)
8	0.24pp	(0.08V RMS)
12	0.1Vpp	(0.035V RMS)
15	0.05Vpp	(0.017V RMS)
20	0.02Vpp	(0.007V RMS)
25	0.01Vpp	(0.0035V RMS)
32	0.005Vpp	(0.0017V RMS)

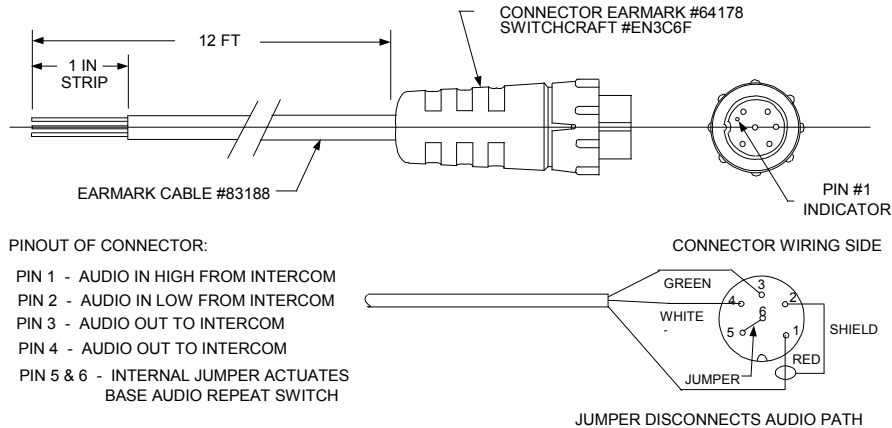
The Output may be connected to any intercom having an input load of 27 Ohm or higher.

The **EXT Input** (the signal from your intercom) accepts a range of .6 to 20Vpp (.21 to 7V RMS)

Detent: 1	0.6Vpp	(0.21 RMS)
9	1.2Vpp	(0.42V RMS)
14	2.2Vpp	(0.7V RMS)
18	4.9Vpp	(1.5V RMS)
23	8.8Vpp	(3.0V RMS)
27	16.0Vpp	(5.6V RMS)
30	20.0Vpp	(7.0V RMS)

If possible, select an audio output from your intercom that is a fixed level. If not available, be sure to note any volume (level) control setting, so that it can be set to the same level each time the intercom is connected to the Base. The same consideration must be given to the input signal.

Making Connection to EXT I/O Jack



CAUTION: Connecting the interface cable to the base automatically disconnects the audio path from the team members and Base microphone to the Base transmitter. These signals are instead passed to your intercom system so anyone on the wired intercom will hear everyone in the Earmark Base system. It is necessary, for the Earmark Base to work properly, that whenever connection is made to the EXT I/O Jack, your intercom is fully operational.

If you do not know your intercom system levels, use the following procedure:

- 1) Make sure the Earmark Base is working properly without connection to the EXT I/O Jack.
- 2) Connect the intercom to the Earmark Base using the accessory cable.
- 3) Turn on both the Earmark Base and the intercom. Have one person speak using a wireless headset while another person listens at the intercom station. Adjust the EXT Output control until the person at the intercom hears the Earmark Base at a level equal to the normal intercom level.
- 4) Now have the person at the intercom station speak. Adjust the EXT Input control until the volume in the headset reaches a maximum volume, then back down on the Input control until the volume just begins to drop.

IV ACCESSORIES

Base Station Headphones

The headphone jack is located on the rear panel. The Standard Base Station Headphone, Model BSH-51B, is optimum for most situations in that it permits unobstructed monitoring of the BASEMASTER VIII network yet permits the operator to hear everything that goes on around him. For special situations, Earmark can

provide other headphones with unique characteristics, including the Model BSH-5B for high noise and the Model FC-5B for low noise environments.

Antennas

Earmark offers an assortment of specialized antenna options to suit most operating conditions, including attached antennas and Whip antennas (See part V). If these do not offer adequate range for your application, please call us at 1-888-EARMARK to discuss your specific requirement.

Shielded spaces, such as storage tanks or nuclear containment areas, offer special challenges for good antenna coverage. Earmark offers a complete kit to facilitate uninterrupted communications under these exacting conditions. Order Earmark Part No. A-KIT/2.

Desk Microphone

Earmark's optional Desk Microphone, Model DM-5, operates well in situations where local noise does not impinge on the Base Station Operator. While you can always monitor all communications through the BASEMASTER VIII's built-in speaker, the Desk Microphone adds speaking capability for those who don't wish to use a headphone.

When using the Desk Microphone, be sure to stand slightly back and away from the BASEMASTER VIII's speaker or feedback problems may occur. If you do experience difficulties, turn down the speaker volume a bit and make certain the Desk Microphone points away from the speaker. The speaker volume is reduced, while the push to talk bar is depressed.

Base to Base Interconnecting Cable

Connects two bases for full function communication with both teams. Order cable #202580. For installation connect cable to EXT I/O Jack, set (on both bases) EXT ADJ Output to full CCW. Set EXT ADJ Input 8 detents from full CCW.

Base to Intercom Cable

Order cable #202579. See page 5 (External Intercom) for installation.

V ACCESSORY ANTENNA INSTALLATION

Antenna installation and positioning is not a precise science, it follows a few general rules and sometimes requires a bit of patience to get optimum results. The importance of the following guidelines depends entirely upon how much range you need from your Earmark system; if you need maximum range (¼ mile or more), then you will be using accessory antennas and the guidelines are very important. If you only