

## SPECIFICATIONS: TRBS-1/X, FULL DUPLEX BASE STATIONS

CHANNEL AVAILABLE: 79 F.C.C. Authorized Channels per Part 90.

POWER SUPPLY: 15 VDC, 1 Amp. or external supply. All power internally regulated to 9VDC and filtered.

DIMENSIONS: 7 1/4" x 3 1/2" x 13" (includes handles)

WEIGHT: 14 lbs. (including internal battery)

MICROPHONE: Desk Microphone: Amplified Electret, 600 ohm Impedance with PTT Switch, (supplied with connector Switchcraft #267).

AUDIO: 2 watt, internal speaker (external speaker - jack on rear).

HEADPHONE: 100 ohm dynamic, with 0.141 diameter miniphone plug (Switchcraft #750). Disconnects internal speaker.

ANTENNA: 50 ohm (Receive & Transmit) UHF connector. 50' cord, magnetic base, 1/4 wave whip or 7" Delflex.

LINE IN: 10K ohm internal impedance requires 3Vpp ( 1V RMS audio line) accepts 1/4" phone plug.

LINE OUT: Provides approx. 0.7V RMS (0 dBm) into 10K ohm or higher load impedance. Internal impedance 2.2K ohm. Accepts 1/4" phone plug, 600 ohm -10dBm.

NOTE: Input signal appears at line out at approx. the same level into 10K Ohm or higher load.

SPEAKER: Provides 2 watt (4 watts peak) into 8 ohm, or 8-16 Ohm higher impedance speaker. Both speaker leads must be floating (not grounded).

ANTENNAS: 2 UHF connectors for 50 ohm antennas.

DESK MIC: Stereo 1/4" Phone Jack accepts Switch Craft #267.

I/O OUTPUT: For connection to External Intercom Systems

DISTRIBUTION: Permits matching of single receive antenna for 2 to 8 Preamplic receivers.

RECEIVER CIRCUIT: Dual conversion First Frequency 10.7 MHz, Duplex 4 Pole Quartz Filter. Second IF 455 kHz, 4 Pole Ceramic Filter.

SENSITIVITY: 0.3 uv 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: -70dB

FREQUENCY STABILITY: (-30 to +50 C) 0.005%

RF OUTPUT: 450mW into 50 OHM

SPURIOUS & HARMONICS (Radiated): -75dB

INTERNAL BATTERY: 12V, 7 Amp hour Gel Cell; 6" 1 x 2 1/2" w x 3 7/8" h

INTERNAL FUSE: F1 1.5A 3AG

LICENSING: Earmark communication transmitters are 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.



# EARMARK<sup>®</sup>

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OWNERS MANUAL

## OPERATING INSTRUCTIONS FOR THE TRBS BASE STATION



### I DESCRIPTION AND GENERAL INFORMATION

Your new Portable Repeater Base Station (TRBS 1/X) is designed to be used with Earmark radio Headsets, Belt-Paks and Flex-Paks. The system permits full duplex (party line) communications between all members of your team who are properly equipped, as well as most 3 or 4 wire intercom systems. The Base Station may be utilized as a manned station or as a repeater only, whichever the situation requires.

This Base station is fully portable and will operate for about 14 hours when the internal battery is fully charged. It may be carried in any position or slung on a strap attached to the front handles. However, please do not attempt to operate the Base Station without connecting the antennas, as this will cause internal circuitry damage.

Your Portable Repeater Base Station includes:

- One Base Station, Part No. TRBS-X (X=users)
- One Battery Charger, Part No. 76023

Typical accessories include:

- Base Station Headset, Part No. BSH-5
- Base Station Desk Microphone, Part No. DM-5
- High Band Antenna (yellow)
- Low Band Antenna (red)

## II SETUP

### A. Locate the Base Station on a Secure Surface

Choose a dry, reasonably level surface on which to place the Base Station. The temperature of the surrounding should not exceed 120F for best results. Leave space behind the unit to connect the antennas, desk microphone cables, Battery Charger and any other leads you may require.

### B. Connect the Antenna Leads

Connect the color coded antenna leads (transmit and receive) to the antenna connectors on the back side of the Base Station. Finger tight is all you need; do not apply a wrench. Be sure to match colors... otherwise your complete system will perform poorly.

### C. Connect the Battery Charger

Plug the charger into a 120V, 60 Hz circuit. Then connect it to the Base Station rear panel. The YELLOW charging light on the face of the Base Station will light if power is on. This light will stay on even if the Base Station is turned off, so long as there is live power in the charger.

### D. Connect the Microphone or Headset

Plug the Desk Microphone connector into the rear panel of the Base Station. Locate the Desk Microphone on any convenient surface. If you plan to use the Base Station Headset (BSH-5) in lieu of the Desk Microphone, plug the Headset into the front panel using the two jacks provided on the extreme right. Connecting the Base Station Headset automatically disconnects Base Station Speaker.

### E. Position the Antennas

The antennas must be properly placed to assure optimum performance. They should be positioned vertically, up or down, at least 12 feet apart. Both antennas have magnetic bases; try to affix them to an overhead beam or other, substantial metal mass (the trunk and hood of a van, for example). If none is available, place the antennas on individual, eight foot square, sheets of iron or steel. Keep the antennas at least three feet away from vertical metal beams or other metallic structures. There should be no cross over of cables. Maintain at least 6 inches separation between the antenna cables at all times.

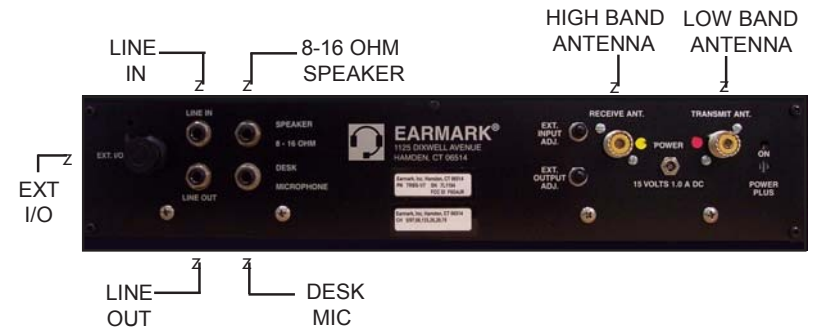
### F. Turn On Your System

Push the Power Switch on the Base Station front panel. The green LED will light denoting the system is operational.

### F. Antenna Connections

There are two connectors for your antenna cables on the back of the TRBS. Each has a colored "dot" next to it... be sure to connect the cable with the matching color to the correct connector. Putting the wrong antenna into a connector will not damage the TRBS, but it will result in very poor reception for your entire multiman system.

#### TRBS REAR PANEL



properly, that whenever connection is made to the EXT I/O Jack, your intercom is turned on.

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.
- 5) Replace the control caps to prevent accidental adjustment.

## V REAR PANEL JACKS

### A. 8-16 OHM Speaker

Requires a 1/4" phone jack. Use a speaker with 8 ohm or higher impedance. Be absolutely certain that neither of the external speaker leads is grounded. Grounding either lead will damage the amplifier. Please note that the internal speaker is automatically disconnected when the external speaker plug is employed.

### B. Line In Jack

Permits connection of an external audio source. 10K ohm load impedance requires 3Vpp (1V RMS); accepts 1/4" phone plug.

### C. Line Out Jack

Provides audio out from system for recording or direct connection to other systems. This signal contains all communications being transmitted by the Base Station. Output is at approximately 0.7V RMS into 10K or higher load impedance. Source impedance is 2.2K ohm. Accepts 1/4" phone plug. 600 Ohm, -10 dBm. LINE IN signal appears at LINE OUT at approximately the same level at which it entered (into 10K Ohm or higher load).

### D. External I/O

Connects to any 3 or 4 wire intercom, or for base to base interconnection.

### E. Desk Mic

For use with Desk Microphone DM-5

## III CONTROLS AND OPERATION



From left to right across the Base Station, the controls are identified as:

### A. System Switch

Push Button; the green LED indicates the system is operational. The yellow LED indicates the battery is charging. The green LED will dim perceptibly as the internal battery discharges. When the green LED goes out, you have used about 98% of the available energy. If the yellow LED is not brightly lit, the supply voltage is too low to affect charging.

### B. Network Controls

All Bases have eight numbers. Push Buttons denote the number of remotes (Headsets and/or Belt-Paks) that may be employed with your system. The green LED indicates the station is turned on. A red LED indicates the remote is turned off or is out of range. Each Network Control is independent of all the others.

### C. Volume Control

Rotary, adjusts the Base Station Speaker volume from min to max (clockwise).

### D. Team/Override

Toggle Switch, spring loaded up for normal, team operations. When the Base Station Operator presses this toggle down, he cuts off all other communication except his own voice. He may, therefore, interrupt the network to deliver important messages whenever necessary.

## IV OPERATING YOUR PORTABLE REPEATER BASE STATION

Once the system is properly installed, there is little else to do except turn it on and start your operations. Each installation is a little different than those that have preceded it, so, it is not unusual to find that adjustments are necessary to get optimum performance. This is particularly true as regards to antenna placement. Every building or site is unique; sometimes it's essential to move your antennas around to get the best results. Don't be afraid to move the antennas- additional separation or realignment may very well improve the system's overall performance. Extension cables are available from Earmark if you desire to locate the antennas away from the preferred Base Station position.

### A. Avoid Antenna Overload

Antenna overload generally occurs when the remote Headsets are operating very close

to the Base Station receiving antenna (12 feet or less). When overload occurs, the voice becomes distorted and very often you can hear whistles. The best solution for this problem depends upon the specific circumstances. If you are operating your entire team close to the Base Station, you will probably find it necessary to add a 10 dB or 20 dB attenuator to the receiving antenna (Earmark Part No. 203088, 10 dB or 203089, 20 dB).

#### B. Operate Only the Stations You Need

When a remote station is deliberately off the air, turn off the corresponding station switch (the number on the panel corresponds to the number on the Headset or Belt-Pak). With no signal coming from the remote, the receiver in the Base Station may hunt until it finds another signal. This could add noise to the network and make things uncomfortable for everyone.

#### C. Using the desk Microphone (Earmark Part No. DM-5)

The desk Mic has a *Push to Talk* bar. When the mic *Push to Talk* bar is depressed, the mic is activated and the Base Station speaker volume is reduced to minimize the potential for an audio feedback loop. Remember, any environmental noise around the mic will be picked up and rebroadcast into your network whenever the *Push to Talk* bar is depressed.



#### D. Using the Base Station Headset

The Base Station Headset (Earmark Part No. BSH-5) replaces the Desk Microphone and the Base Station Speaker. The Headset provides privacy and its noise reducing features allow the Base Station Operator to minimize the effects of external noise. This accessory connects to the front panel using the jacks on the extreme right (red to MIC). The rotary VOLUME control adjusts headset volume. The Team/Override switch functions normally.



#### E. Using An External Intercom

An 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 10 foot cable length (unterminated). Call 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 2.2V, pp (1.76mV to 0.7V 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 (0.21 to 7.0V RMS)

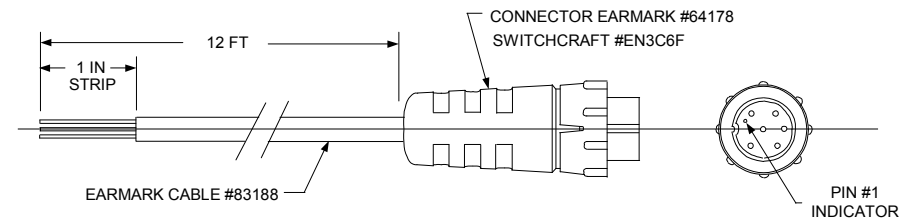
Detent:	1	0.6Vpp	(0.21 RMS)
	9	1.2Vpp	(0.42V RMS)
	14	2.2Vpp	(0.7V RMS)
	18	4.9Vpp	(1.5V RMS)
	23	8.8Vpp	(3.0V RMS)
	27	16Vpp	(5.6V RMS)
	30	20Vpp	(7.0V RMS)

#### F. Base to Base Interconnection

For full functioning communication between two Base Stations, use cable PN: 202580 connected to the EXT I/O Jacks. Set (on both Bases) EXT ADJ OUTPUT full CCW, EXT ADJ INPUT 8 detents from full CCW.

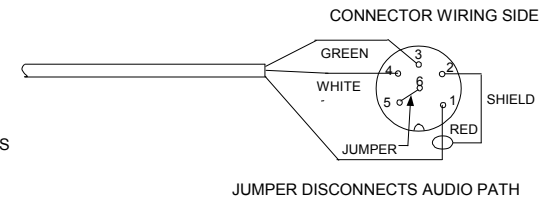
If possible, select an audio output from your intercom that is a fixed level. If not available, be sure to note any volume (level) control setting, so that it can be set to the same level each time the intercom is connected to the Base. The same consideration must be given to the input signal.

#### Making Connection to EXT I/O Jack



#### PINOUT OF CONNECTOR:

- PIN 1 - AUDIO IN HIGH FROM INTERCOM
- PIN 2 - AUDIO IN LOW FROM INTERCOM
- PIN 3 - AUDIO OUT TO INTERCOM
- PIN 4 - AUDIO OUT TO INTERCOM
- PIN 5 & 6 - INTERNAL JUMPER ACTUATES BASE AUDIO REPEAT SWITCH



**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