



CLEAR-COM ENCORE

HB-702 TWO-CHANNEL HEADSET STATION

HB-704 FOUR-CHANNEL HEADSET STATION

INSTRUCTION MANUAL

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www.clearcom.com

Clear-Com Contacts

Americas and Asia-Pacific Headquarters

California, United States

Tel: +1.510.337.6600

Email: CustomerServicesUS@clearcom.com

Europe, Middle East, and Africa Headquarters

Cambridge, United Kingdom

Tel: +44 1223 815000

Email: SalesSupportEMEA@clearcom.com

Canada Office

Quebec, Canada

Tel: +1 (450) 653-9669

China Office

Beijing Representative Office

Beijing, P.R.China

Tel: +8610 65811360 / 65815577

Clear-Com Offices are located in California, USA; Cambridge, UK; Montreal, Canada; and Beijing, China. Specific addresses and contact information can be found on Clear-Com's corporate website:

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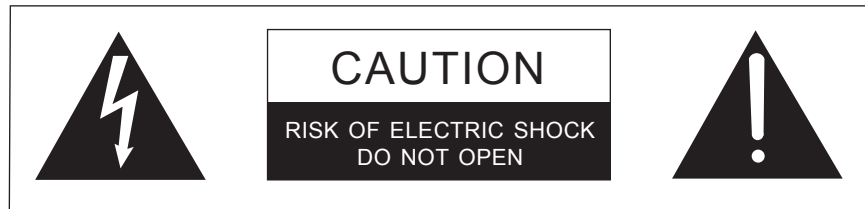
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IMPORTANT SAFETY INSTRUCTIONS

Please read and follow these instructions before operating this product.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Only use attachments/accessories specified by the manufacturer.
10. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
11. Unplug this apparatus during lightning storms or when unused for long periods of time.
12. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
13. **WARNING:** To reduce the risk of fire or electric shock, do not expose this product to rain or moisture.

Please familiarize yourself with the safety symbols in Figure 1. When you see these symbols on this product, they warn you of the potential danger of electric shock if the station is used improperly. They also refer you to important operating and maintenance instructions in the manual.



This symbol alerts you to the presence of uninsulated dangerous voltage within the product's enclosure that might be of sufficient magnitude to constitute a risk of electric shock. Do not open the product's case.



This symbol informs you that important operating and maintenance instructions are included in the literature accompanying this product.

Figure 1: Safety Symbols

EMC AND SAFETY

The HB-702 and HB-704 stations meet all relevant CE and FCC specifications set out below:

EN55103-1 Electromagnetic compatibility. Product family standard for audio, video, audio-visual, and entertainment lighting control apparatus for professional use. Part 1: Emissions.

EN55103-2 Electromagnetic compatibility. Product family standard for audio, video, audio-visual, and entertainment lighting control apparatus for professional use. Part 2: Immunity.

And thereby compliance with the requirement of Electromagnetic Compatibility Directive 2004/108/EC and Low Voltage Directive 2006/95/EC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1

OPERATION

INTRODUCTION

Congratulations on choosing this Clear-Com product. Clear-Com was established in 1968 and remains the market leader in providing intercoms for entertainment, educational, broadcast and industrial applications. The ruggedness and high build-quality of Clear-Com products defines the industry standard. In fact, many of our original beltpacks and main stations are still in daily use around the world.

The HB-702 two-channel and HB-704 four-channel headset stations are powerful, yet user-friendly units that can serve as versatile intercom stations. Please read this manual completely to better understand the functions of these products. If you encounter a situation or have a question that this manual does not address, contact your dealer or call Clear-Com directly at the factory. Our applications support and service people are standing by to assist you. (Refer to Chapter 5: “Warranty” for contact information.) Thank you for selecting Clear-Com for your communications needs.

DESCRIPTION

The Clear-Com HB-702 and HB-704 headset stations are ideal for use in theatres, live performances, industrial environments, and small television facilities. They feature speech intelligibility in all noise levels and can be customized through their programmable options.

Selectable, multi-channel talking and/or listening allows the operator to communicate on one of two (HB-702) or four (HB-704) intercom channels. The dual-action *talk* button operates in electronic *momentary* or *latching* mode. The HB-702 and HB-704 offer visual call signaling to attract the attention of operators. The *remote mic kill* (RMK) feature on main stations will turn off any open microphones on these headset stations.

The HB-702 and HB-704 stations accept dynamic headsets, such as the Clear-Com or the HS-6 telephone headset series. A *sidetone* control allows the operator to vary the level of his voice as heard in the headset.

The HB-702 and HB-704 receive power from the Clear-Com intercom line. They mount in a standard two-gang electrical outlet box.

The extra-thick front panel and compact, surface-mount circuitry results in a smaller-sized and lighter-weight package that maintains Clear-Com ruggedness. The intercom channels connect to a plug-on screw-terminal strip.

The optional EB7-TW daughter board module can be installed to provide an interface to two intercom channels on a single microphone cable. Also, the EB7-4W four-wire daughter board module is available to allow long-distance connections using separate pairs of wire for send audio and receive audio. The

EB7-4W four-wire option supports two-channel operation and may only be used on the HB-702.

The HB-702 and HB-704 are compatible with all Clear-Com party-line intercoms.

OPERATION

Normal operation of the HB-702 or HB-704 headset station requires only the front-panel controls. The controls located elsewhere on the unit are intended to be set-and-forget in nature. For intercom operation, set the *volume* control to the desired level and press the *talk* button when talking. Set the *sidetone* control for the desired amount of sidetone in the earphone.

FRONT PANEL

The controls, indicators, and connectors found on the HB-704 front panel are shown in Figure 1-1 and are described by the following text. The HB-702 front panel is identical except the channel switch has two positions.

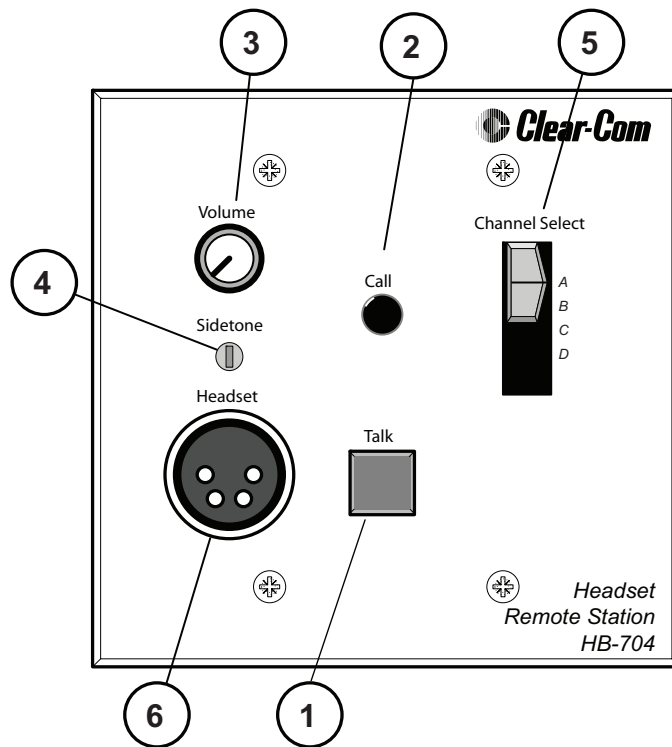


Figure 1-1 HB-704 Front Panel

1. **Talk button and light:** The *talk* button activates the microphone feed to the selected intercom channel. The talk button has a dual action (*momentary* or *latching*) depending upon how the button is pressed. If desired, the latching function can be defeated using an internal switch. The following describes the various functions of this button.
 - **MOMENTARY:** Press and hold the *talk* button while speaking. Release it when finished.

- LATCHING: Press and release the button quickly to latch the *talk* function. Press and release the button again to turn off the talk function.
 - TALK INDICATION: The *talk* button lights amber when the talk function is active. When the talk function is not active, but the station is receiving electrical power, the button lights blue.
2. **Call button and light:** Pressing the *call* button will send a call signal on the selected channel. All the call lights on that channel will then flash. Call signals can also be sent while talking if required. The *call* light will light red while the call button is pressed, or whenever a call signal is present on the selected channel.
 3. **Volume control:** Turn this control to set the *volume* required on the headset.
 4. **Sidetone control:** *Sidetone* is the level of the operator's voice that is heard while talking on the intercom. Setting a comfortable level of sidetone will ensure that the intercom line sounds alive and also helps modulate the operator's voice relative to other voices on the line. Use the following procedure to correctly set the *sidetone level* control.
 1. Set the *volume* control to a comfortable level by having someone talk to the operator from another station.
 2. Press the *talk* button and speak into the microphone while turning the *sidetone* control slowly back and forth until you hear your voice at a comfortable level in the headset.

Note: *Do not force the trimpot past its stop points. This will damage it.*

5. **Channel switch:** This switch selects the intercom channel (A, B, C, or D) on which the headset station is active.
6. **Headset connector:** The headset connector is located on the front panel. All Clear-Com headsets are recommended for use with the HB-702 or HB-704. The Clear-Com PT-7 push-to-talk microphone or the HS-6 telephone handset will also plug into the headset connector. The following is a description of the characteristics of a suitable headset:

Mic Type --- Dynamic; see technical specifications for details

Headphone --- Dynamic; see technical specifications for details. The wiring of the headset is to be as follows:

Pin 1 --- microphone ground (shield)

Pin 2 --- microphone hot

Pin 3 --- headphone ground

Pin 4 --- headphone hot

The microphone and headphone wiring in the headset cord must be individually shielded. **Do not connect pins #1 and #3 together.** Headset extension cords or headset "Y" cables are not recommended because they may increase crosstalk between channels.

INTERNAL ADJUSTMENTS AND CONNECTIONS

The controls and connectors found inside the HB-702 and HB-704 are shown in the following figure and described by the following text. The jumpers can be accessed without completely removing the panel from its wall box by removing the top two screws and loosening the bottom two screws a few turns. The panel can then be leaned out from the wall. The jumpers will be accessible as shown in the lower view of Figure 1-2.

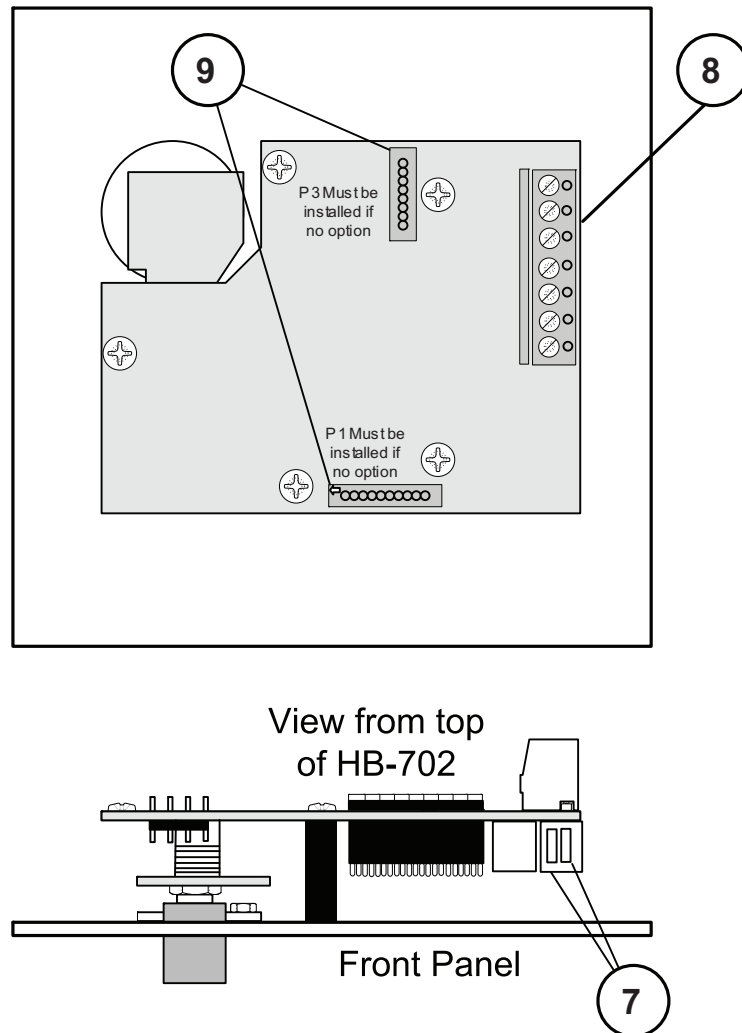


Figure 1-2 Internal Adjustments and Connections

7. **Option Switches:** Two option switches are provided. They should be configured when the system is set up, but shouldn't need to be changed during normal operation.

Note: *The default position of the switches is the OFF position. The function of each switch follows.*

- **Switch 1—Latch Disable.** Setting the *latch disable* switch to the *on* position will disable the latching function of the talk button. In this mode, the talk button must be held in continuously while the operator is talking.
- **Switch 2—Long Line.** If a long cable run is unavoidable and approaches 1,000 ft. (305 m) or more, set the *long line option* jumper to the *on* position. The ability to set a sidetone null depends upon properly setting this switch.

8. **Intercom Line Connection:** The HB-702 and HB-704 contain a seven-terminal, plug-on connector for intercom line connection. This connector is intended to be unplugged from the circuit board when connecting the intercom line(s), then plugged back on when the wiring is completed. If less than the maximum number of intercom lines are to be connected to the intercom connector, link unused intercom inputs to a connected input with jumper wires. The connections for each pin are visible on the circuit board when the connector is unplugged. The pinout of this connector is as follows:

- Pin 1 --- (NC)
- Pin 2 --- Channel A audio
- Pin 3 --- Channel B audio
- Pin 4 --- Power
- Pin 5 --- Ground (shield)
- Pin 6 --- Channel C audio (HB-704 only)
- Pin 7 --- Channel D audio (HB-704 only)

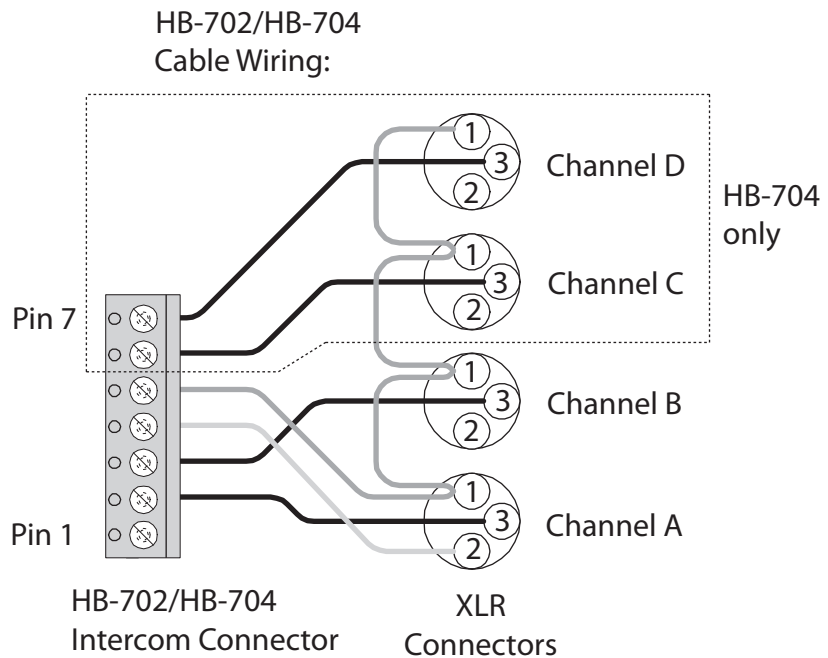


Figure 1-3 HB-702 and HB-704 Cable Wiring

9. **Option Board Jumpers:** The two jumper plugs, *P1* and *P3*, must be installed when optional modules are not used. When the optional four-wire or TW modules are used, both *P1* and *P3* must be removed. Save these jumper plugs for possible future use.

Note: *The HB-702 and HB-704 will not operate without either these jumper plugs or the optional modules installed. The orientation of P1 in J1 and P3 in J3 does not matter.*

2 INSTALLATION

1. Unpack the unit and inspect for any damage that may have occurred during shipping.
2. Connect the intercom lines. If less than the maximum number of intercom lines are to be connected, link unused intercom inputs to a connected input with jumper wires.
3. Install the HB-702 or HB-704 into the two-gang outlet box.

For additional information, refer to the *Clear-Com System Installation Manual*.

4. Connect the appropriate headset or handset.
5. Set listen levels and sidetones.

Refer to the listen level and sidetone setting topics in the *Operation* section of this manual.

6. The headset station should now be operating properly.
7. Read the rest of this manual for further information.

3 MAINTENANCE

INTRODUCTION

This chapter provides maintenance information including troubleshooting tips and block diagrams.

Caution: *These servicing instructions are for use by qualified personnel only. To reduce the risk of electrical shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.*

BLOCK DIAGRAM OF HB-702 TWO-CHANNEL HEADSET STATION

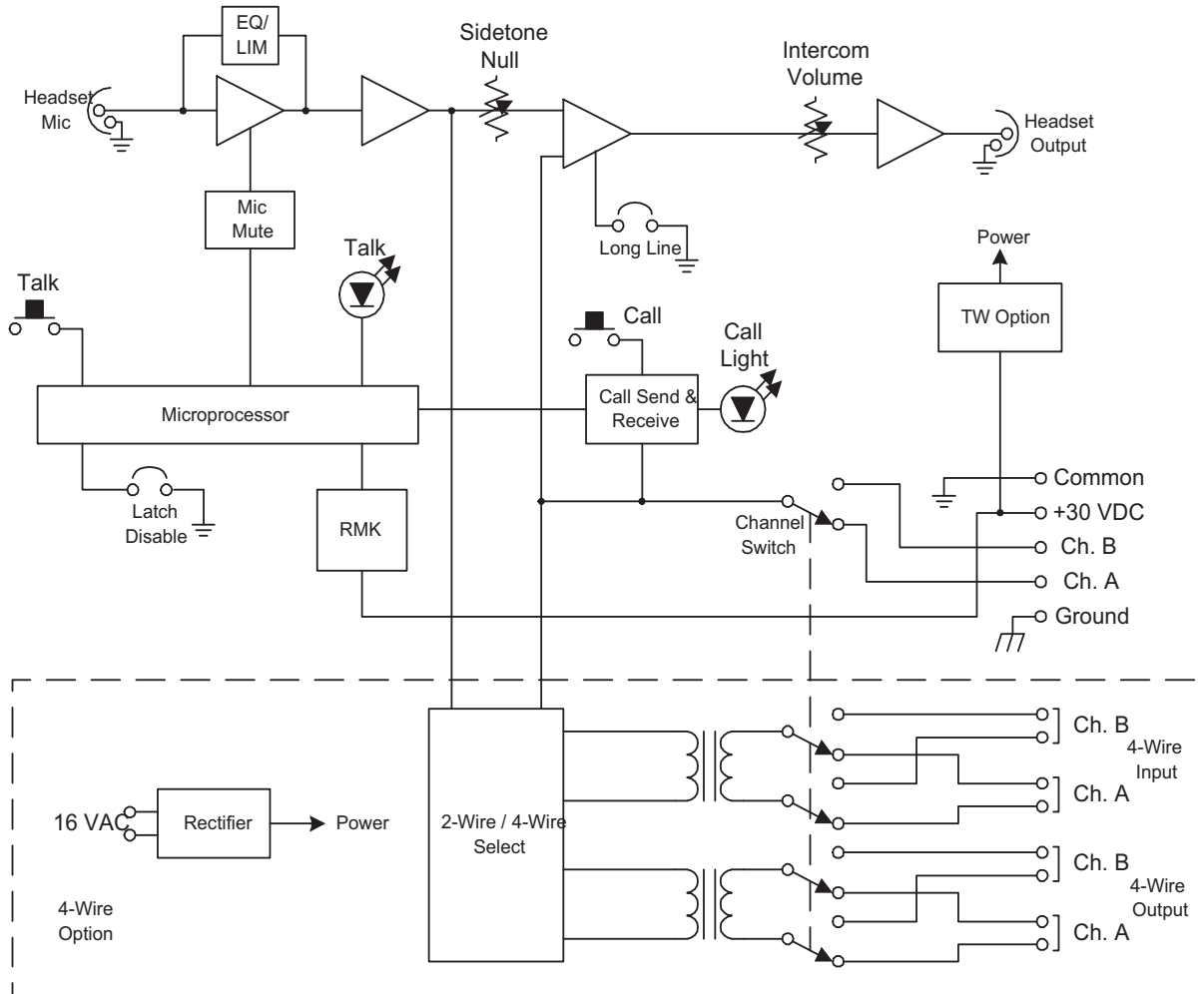


Figure 3-4 HB-702 Block Diagram

BLOCK DIAGRAM OF HB-704 FOUR-CHANNEL HEADSET STATION

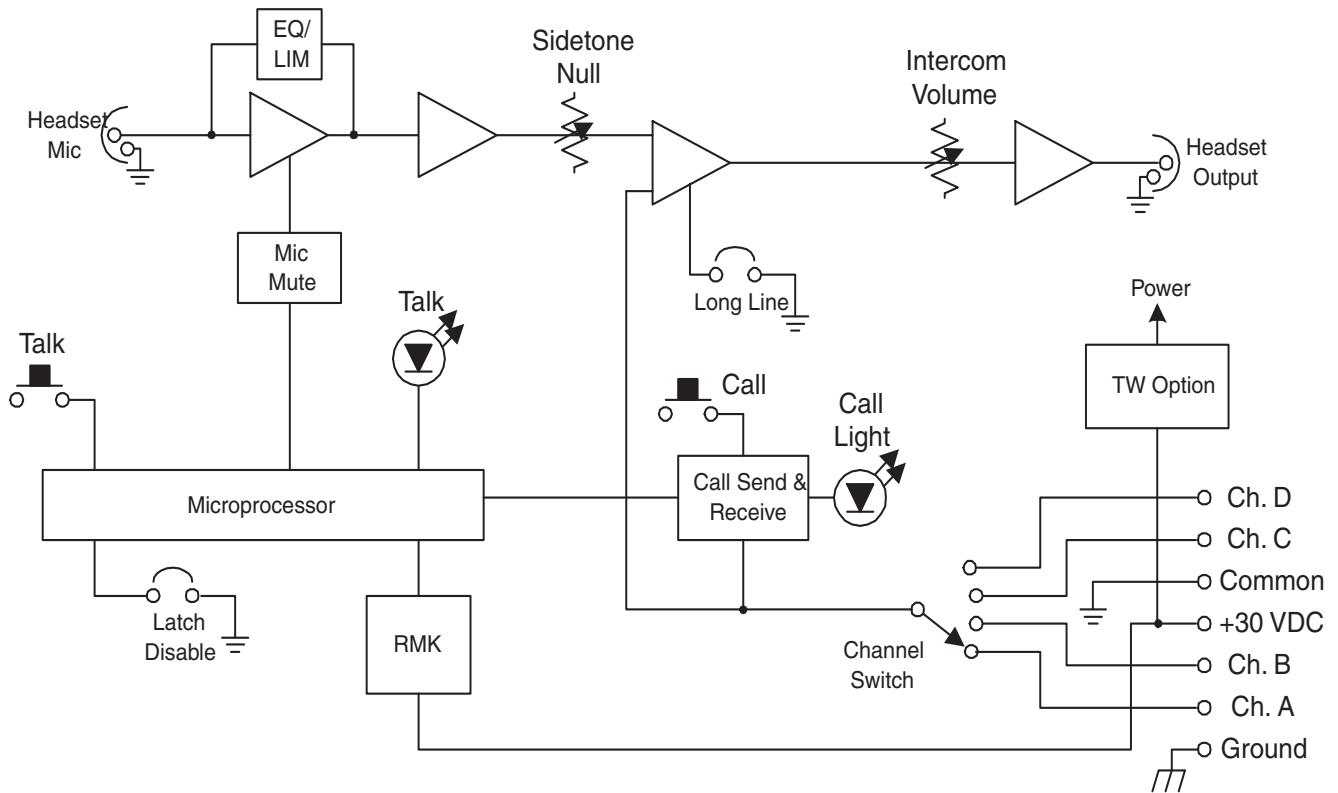


Figure 3-5 HB-704 Block Diagram

TROUBLESHOOTING TIPS

SYMPTOM	CAUSE	SOLUTION
System does not operate. <i>Talk</i> button does not light amber when talk button is pressed.	(1) The HB-702 or HB-704 doesn't have an intercom connection. If the EB-4W four-wire option module is connected, the HB-702 may not be receiving AC power.	(1) Check connections and cable.
	(2) The HB-702 or HB-704 has an internal failure.	(2) Unit requires servicing.
Headset does not operate. <i>Talk</i> button lights amber when talk button is pressed.	(1) The headset is unplugged, the <i>intercom level</i> knob is turned all the way down, or the <i>channel switch</i> is set to an unused channel.	(1) Adjust controls appropriately.
	(2) Defective headset.	(2) Test with another headset.

SYMPTOM	CAUSE	SOLUTION
	(3) Plug <i>P3</i> is missing on circuit board.	(3) Plug <i>P3</i> must be installed in the <i>J3</i> jack if the EB-4W or EB-TW option is not used.
Hum or buzz in system	Inductive pickup caused by close proximity of this headset station or connected stations to power lines or transformers.	Relocate the offending unit or wiring. If the cable run is exceptionally long, consider adding and using the EB-4W four-wire option module. (Requires an additional four-wire interface at the opposite end of the “long run.”)
System feedback (acoustical)	(1) <i>Listen level</i> control at this station or another station is set too high.	(1) Adjust.
	(2) <i>Sidetone null</i> control at this station or another station is not adjusted correctly.	(2) Adjust. Refer to section regarding “Front Panel.”
	(3) Channel not terminated.	(3) Set the <i>main station</i> or <i>power supply termination</i> switch for that channel to the <i>on</i> position.
	(4) The <i>channel</i> switch is set to an unconnected channel.	(4) If less than the maximum number of intercom lines are to be connected, link unused intercom inputs to a connected input with jumper wires.
	(5) A headset extension cord was used.	(5) Headset extension cords are not recommended because they increase crosstalk.
Excessive crosstalk	(1) High DC resistance in ground return.	(1) Use heavier cable; add additional conductor(s) to ground return. If the cable run is exceptionally long, consider adding and using the EB-4W four-wire option module.
	(2) <i>Multi-channel</i> cable pairs are not individually shielded.	(2) Replace cable with individually shielded pairs.
	(3) Headset cables are not wired properly or shielded properly.	(3) Correct wiring. Use headsets with properly shielded wiring.

SYMPTOM	CAUSE	SOLUTION
The <i>call</i> signal does not function.	(1) Excessive DC loading of intercom line.	(1) Remove any audio transformers or other equipment that may be connected across the intercom line. If equipment other than Clear-Com intercom equipment must be connected to the intercom line, please contact Clear-Com application or service personnel for advice.
	(2) Far too many terminations on the intercom line.	(2) Check all main stations and power supplies to make sure each intercom channel is terminated at only one point.
	(3) Plug <i>PI</i> missing on circuit board.	(3) Plug <i>PI</i> must be installed in the <i>J1</i> jack if the EB-4W or EB-TW options are not used.

Table 3-1: Troubleshooting Tips

4

TECHNICAL SPECIFICATIONS

HB-702/HB-704 TWO- AND FOUR CHANNEL HEADSET STATIONS

dBu is an absolute measurement. 0 dBu is referenced to 0.775 volts RMS

Headset Microphone Input

Input Type	Dynamic
Input Impedance	$\geq 1K\Omega$
Mic Limiter Threshold	$-2dBu \pm 3dB$
Mic Limiter Range	$\geq 15dB$

Program Line Input

Input Impedance	$\geq 5K\Omega$
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Headset Output

Load Impedance	$\geq 8\Omega$
Output Impedance	$\leq 25\Omega$
Output Limiter Threshold	$+5dBu \pm 3dB$
Maximum Output Level before Distortion	$\geq 17dBu$

Party Line Output

Off Noise	$< -74dBu$
Output Impedance	$> 10K\Omega$

Party Line Input

Crosstalk	$< -60dB$
Max level before Clipping	$\geq 12dBu$

Frequency Response

Headset Mic - Party Line	300 - 15KHz $\pm 3dB$
Party Line - Headset Out	300 - 15KHz $\pm 3dB$

Max Distortion

Headset Mic - Party Line	$\leq 0.5\%$
Party Line - Headset Out	$\leq 0.2\%$

Noise

Headset Mic - Party Line	$< -70dBu$
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Max Gain

Headset Mic - Party Line	41dB ± 2dB
Party Line - Headset Out	>= 34dB

Power

Input Voltage Range	20-30 VDC
Input Current (Idle)	<= 50mA
Input Current (Max)	<=100mA

Internal Adjustments and Connections

Intercom Line (HB-702/HB-704)	Seven terminal connector
Option Switches	Two DIP switches
Option Board Jumper	Two sets of options jumpers

Front Panel Connectors

Headset:	(1) XLR-4M
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Front Panel Controls & Indicators

- (1) Sidetone control
- (1) Talk button
- (1) Call button
- (1) Channel select switch
- (1) Volume control

Environmental

32 - 122° F (0 - 50° C)

Dimensions (HB-702/HB-704)

4.625 in. W x 4.5 in. H x 1.75 in. D
(117 mm x 114 mm x 44 mm)

Weight

0.46 lbs. (0.21 Kg)

Notice About Specifications

While Clear-Com makes every attempt to maintain the accuracy of the information contained in its product manuals, that information is subject to change without notice. Performance specifications included in this manual are design-center specifications and are included for customer guidance and to facilitate system installation. Actual operating performance may vary.

LIMITED WARRANTY

Clear-Com offers 24 x 7 customer support if you have an Extended Warranty or Service Contract.

Return Material Authorization (RMA) numbers are required for all returns.

Both warranty and non-warranty repairs are available.

Clear-Com warrants that at the time of purchase, the equipment supplied complies with any specification in the order confirmation when used under normal conditions, and is free from defects in workmanship and materials during the warranty period.

During the warranty period Clear-Com, or any service company authorized by Clear-Com, will in a commercially reasonable time remedy defects in materials, design, and workmanship free of charge by repairing, or should Clear-Com in its discretion deem it necessary, replacing the product in accordance with this limited warranty. In no event will Clear-Com be responsible for incidental, consequential, or special loss or damage, however caused.

WARRANTY PERIOD

The product may consist of several parts, each covered by a different warranty period. The warranty periods are:

- Cables, accessories, components, and consumable items have a limited warranty of 90 days.
- Headsets, handsets, microphones, and spare parts have a limited warranty of one year.
- UHF wireless IFB products have a limited warranty of one year.
- UHF wireless intercom systems have a limited warranty of three years.
- All other Clear-Com and Drake brand systems and products, including backpacks, have a limited warranty of two years.

The warranty starts at the time of the product's original purchase. The warranty start date for contracts which include installation and commissioning will commence from the earlier of date of the Site Acceptance Test or three months from purchase.

TECHNICAL SUPPORT

To ensure complete and timely support to its customers, Clear-Com's User Support Center is staffed by qualified technical personnel. Telephone and email technical support is offered worldwide by the User Support Center.

The User Support Center is available to Clear-Com's customers during the full course of their warranty period. Telephone support during the warranty

period will be offered at no charge between 09:00 and 17:00 according to the customer's local time zone.

In addition, for customers who purchase an Extended Warranty or Service Contract, 24-hour customer support is offered immediately upon purchase of such agreement. For more information, contact your authorized dealer, distributor, or sales representative.

Instructions for reaching Clear-Com's User Support Centers are given below.

Telephone for Europe, Middle East and Africa: +49 40 6688 4040

Telephone for the Americas and Asia: +1 510 337 6600

Email: vitec.support@AVC.de

Once the standard warranty period has expired, the User Support Center will continue to provide telephone support if you have purchased an Extended Warranty or Service Contract. In these cases, you will have access to telephone support 24 hours per day, 7 days per week.

WARRANTY REPAIRS AND RETURNS

Before returning equipment for repair, contact a User Support Center to obtain a Return Material Authorization (RMA). Clear-Com representatives will give you instructions and addresses for returning your equipment. You must ship the equipment at your expense, and the support center will return the equipment at Clear-Com's expense.

For out-of-box failures, use the following contact information:

Europe, Middle East and Africa

Tel: +44 1223 815000 Email: customerservicesEMEA@vitecgroup.com

North America, Canada, Mexico, Caribbean & US Military

Tel: +1 510 337 6600 Email: customerservicesUS@vitecgroup.com

Asia Pacific & South America

Tel: +1 510 337 6600 Email: customerservicesAPAC@vitecgroup.com

Clear-Com has the right to inspect the equipment and/or installation or relevant packaging.

NON-WARRANTY REPAIRS AND RETURNS

For items not under warranty, you must obtain an RMA by contacting the User Support Center. Clear-Com representatives will give you instructions and addresses for returning your equipment.

You must pay all charges to have the equipment shipped to the support center and returned to you, in addition to the costs of the repair.

EXTENDED WARRANTY

If you purchase an Extended Warranty, you are also given access free of charge to the User Support Center 24 hours a day, 7 days a week.

You can purchase an extended warranty at any time during the first two years of ownership of the product. The purchase of an extended warranty extends to five years the warranty of any product offered with a standard two-year warranty. The total warranty period will not extend beyond five years. Any purchase of an extended warranty provides 24 x 7 customer support in addition to the warranty immediately upon purchase of the warranty extension.

Note: Clear-Com does not offer warranty extensions on UHF wireless intercom systems, or on any product with a 1-year or 90-day warranty.

SERVICE CONTRACT

Clear-Com also offers service contracts that provide 24 x 7 telephone support, advance replacements, training, proactive maintenance, on-site visits, and no charge for repair or replacement of equipment. For more information, contact your authorized dealer, distributor, or sales representative.

LIABILITY

THE FOREGOING WARRANTY IS CLEAR-COM'S SOLE AND EXCLUSIVE WARRANTY. THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ANY OTHER REQUIRED IMPLIED WARRANTY SHALL EXPIRE AT THE END OF THE WARRANTY PERIOD. THERE ARE NO OTHER WARRANTIES (INCLUDING WITHOUT LIMITATION WARRANTIES FOR CONSUMABLES AND OTHER SUPPLIES) OF ANY NATURE WHATSOEVER, WHETHER ARISING IN CONTRACT, TORT, NEGLIGENCE OF ANY DEGREE, STRICT LIABILITY OR OTHERWISE, WITH RESPECT TO THE PRODUCTS OR ANY PART THEREOF DELIVERED HEREUNDER, OR FOR ANY DAMAGES AND/OR LOSSES (INCLUDING LOSS OF USE, REVENUE, AND/OR PROFITS). SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR THE LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. IN ANY EVENT, TO THE MAXIMUM EXTENT PERMITTED UNDER APPLICABLE LAW, CLEAR-COM'S LIABILITY TO CUSTOMER HEREUNDER SHALL NOT UNDER ANY CIRCUMSTANCES EXCEED THE COST OF REPAIRING OR REPLACING ANY PART(S) FOUND TO BE DEFECTIVE WITHIN THE WARRANTY PERIOD AS AFORESAID.

This warranty does not cover any damage to a product resulting from cause other than part defect and malfunction. The Clear-Com warranty does not cover any defect, malfunction, or failure caused beyond the control of Clear-Com, including unreasonable or negligent operation, abuse, accident,

failure to follow instructions in the manual, defective or improperly associated equipment, attempts at modification and repair not approved by Clear-Com, and shipping damage. Products with their serial numbers removed or defaced are not covered by this warranty.

This warranty does not include defects arising from installation (when not performed by Clear-Com), lightning, power outages and fluctuations, air conditioning failure, improper integration with non-approved components, defects or failures of customer furnished components resulting in damage to Clear-Com provided product.

This limited warranty is not transferable and cannot be enforced by anyone other than the original consumer purchaser.

This warranty gives you specific legal rights and you may have other rights which vary from country to country.