



CLEAR-COM ENCORE

KB-701 SPEAKER STATION

INSTRUCTION MANUAL

KB-701 Speaker Station Instruction Manual

Part Number: 810350Z Rev. 4

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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 KB-701 station meets 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, 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 KB-701 speaker station is a powerful, yet user-friendly unit that can serve as a versatile intercom station. We recommend that you read through this manual completely to better understand the functions of the KB-701. 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 KB-701 speaker station is designed for use in theatres, live performances, industrial environments, and small television facilities. It features speech intelligibility, even at high-noise levels, and can be customized through its programmable options.

Local or remotely controlled talking or listening is selectable and allows either hands-on or hands-free operation. The *talk* button operates in momentary mode. The integral microphone and speaker offer half-duplex communication. The KB-701 offers both visual and audible call signaling to attract the attention of operators.

A balanced program input allows the monitoring of external audio through the speaker. This program input can also be used as a paging function.

The integral speaker’s volume level can be adjusted using a front-panel knob. An internal control allows setting a minimum speaker level. An automatic speaker switching circuit will quiet the speaker when the *talk* button is activated.

The KB-701 receives power from the Clear-Com intercom line. The unit mounts either in a standard four-gang electrical outlet box or in an optional Clear-Com V-Box. The extra-thick front panel and compact surface-mount circuitry maintains Clear-Com ruggedness. The intercom channel connects to a plug-on-screw terminal strip. Male and female three-pin XLR connectors are provided on the optional V-Box to offer a through connection to the intercom channel.

The EB7-4W four-wire daughter board module is available to allow long-distance connections using separate pairs of wires for send audio and receive audio.

The KB-701 is compatible with all Clear-Com party-line intercoms.

OPERATION

Normal operation of the KB-701 speaker station only requires access to 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.

FRONT PANEL

The controls and indicators on the KB-701 front panel are shown in Figure 1-1 and are described by the following text.

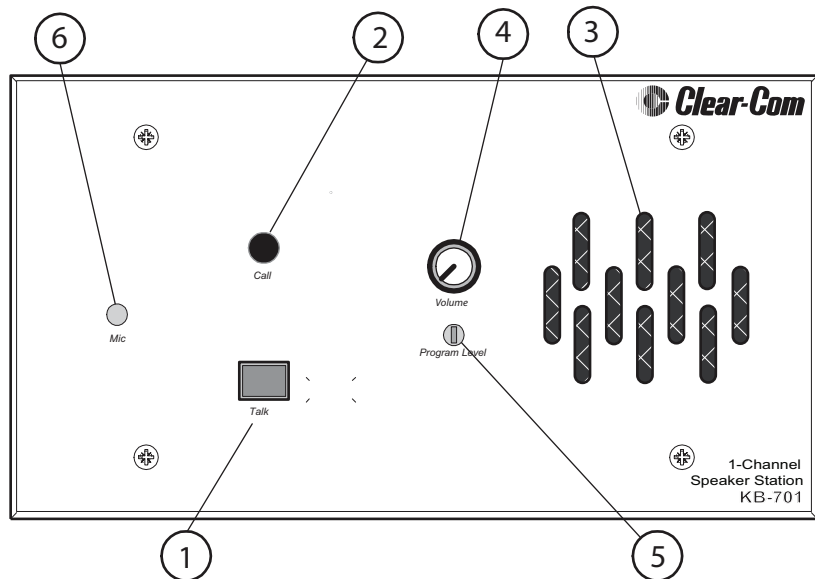


Figure 1-1: Front Panel

1. **Talk Button:** The *talk* button activates the microphone feed to the intercom channel. The button activates when pressed and deactivates when released.

The *talk* button lights amber when the microphone feed to the intercom channel is on, whether activated locally by pressing the button, or activated remotely from another station using the call signal.

The *talk* button lights blue to indicate that the microphone feed to the intercom line is off, but the station is receiving power.

2. **Call Button:** Pressing the *call* button sends a call signal on the intercom line and causes all the call lights on other stations on the intercom channel to light.

The *call* button lights red when a call signal is sent or received on the intercom line.

3. **Speaker:** The audio output for the KB-701 device.
4. **Volume Control:** Turn this control to set the speaker's required listen level. This control does not affect the tone alert level or the program input level.
5. **Program Level Control:** Adjust the *program level* control to set the program audio level heard in the panel speaker.

Note: *Forcing the trimpots past their stop points will damage them.*

6. **Integral Microphone:** The microphone for the KB-701 is built into the front panel.

INTERNAL ADJUSTMENTS AND CONNECTIONS

The controls and connectors inside the KB-701 are shown in the following figure and described by the following text. The controls can be accessed without completely removing the panel from its wall box or V-Box enclosure 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 to make the controls accessible as shown in the lower view of Figure 1-2.

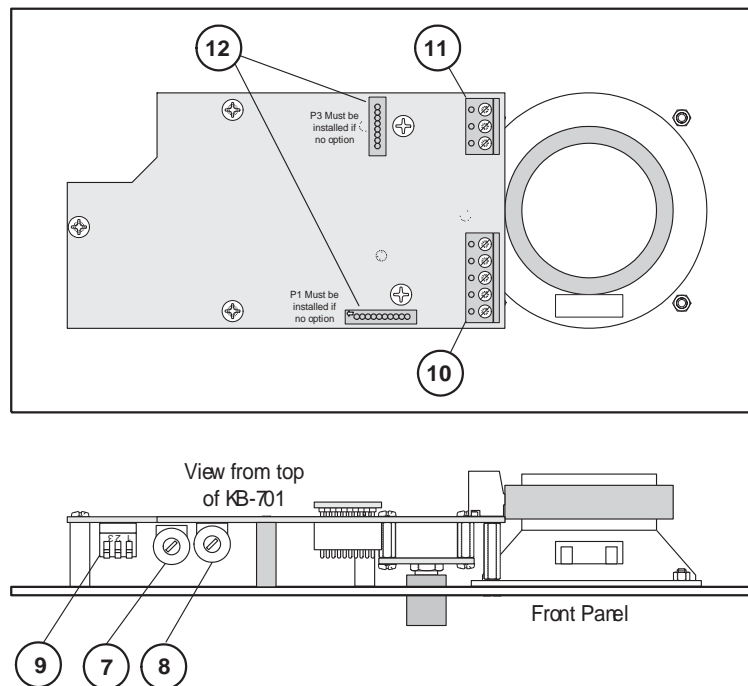


Figure 1-2: Internal Controls

7. **Call Alert Tone Level Control:** This internal control adjusts the volume of the *call alert tone* sound. This is normally adjusted when the system is set up and shouldn't need to be adjusted during normal operation. This

feature can be disabled by turning the control fully counterclockwise. An audible tone alert can sound when a call signal is received on the intercom channel. This can be useful when the operator's attention has been drawn away from the KB-701 indicator panel. The tone alert will not sound if a call signal is originated at the KB-701 station.

Note: *This feature is automatically turned off if the operating mode of the KB-701 is set to any setting other than normal.*

8. **Minimum Volume Control:** This control adjusts the minimum setting of the *intercom level* control on the front panel. Setting this control can prevent people from inadvertently turning the intercom level all the way down. This is normally adjusted when the system is set up and shouldn't need to be adjusted during normal operation. This feature can be disabled by turning the control fully counterclockwise.
9. **Option Switches:** Three *option* switches are provided. They should be configured when the system is set up, but are not changed in normal operation.

Note: *The “on” position of each switch is toward the circuit board and the “off” position is toward the front panel. A description of the function of these switches follows.*

- **Internal Microphone Gain (S-1)**— This switch determines the microphone's sensitivity. When the switch is in the *on* position, talking should be done within 2 ft. (0.61 m) of the front panel. If it is necessary to talk from a greater distance, the switch should be turned *off*. The default position of this switch is in the *on* position.
- **Operating Mode (S-2 and S-3)**—These switches work together to define the operating mode of the KB-701. In modes other than normal, the call signal from other stations on the same channel activates the KB-701. Refer to the following table:

MODE	S-2	S-3	DESCRIPTION
Normal	<i>off</i>	<i>off</i>	Speaker is <i>on</i> Mic is activated by the <i>talk</i> button
Remote Page	<i>off</i>	<i>on</i>	Speaker turns on by remote <i>call signal</i> control Mic is activated by the <i>talk</i> button
Remote Listen	<i>on</i>	<i>off</i>	Speaker is <i>on</i> Mic is activated by remote <i>call signal</i> control or by the <i>talk</i> button
Remote Listen-Page	<i>on</i>	<i>on</i>	Speaker turns on by remote <i>call signal control</i> or by the <i>talk</i> button Mic is normally <i>on</i>

Table 1: KB-701 Operating Mode Options

- The default position of these switches is in the *off* position for normal mode, which is the only mode in which the call alert tone functions

operate. In other modes, the call alert tone is automatically disabled to avoid interference with operation.

Note: *Only normal mode may be used when the EB7-4W four-wire option module is installed.*

10. **Intercom Line Connection:** The KB-701 contains a five-terminal, plug-on connector for intercom line connection. This connector is intended to be unplugged from the circuit board when connecting the intercom line, and then plugged back on when the wiring is completed. 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 --- (NC)
- Pin #3 --- Channel A Audio
- Pin #4 --- Power
- Pin #5 --- Ground (Shield)

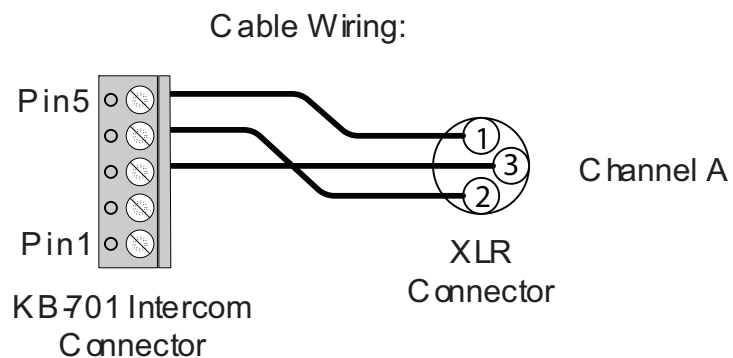


Figure 1-3: Intercom Line Cable Wiring

11. **Program Input:** A three-terminal, plug-on connector provides the program input to the station. Program is fed to the speaker. This level is controlled by the *program level* control. If this input is connected to the stage announce (SA) output of a main station it can be used as a paging input. Since the level of this input is independently adjustable from the intercom audio volume, it can be used to override the intercom audio in all modes except *remote listen-page*. The program input is also independent of the mode setting. The pinout of the program input connector is as follows:

- Pin #1 --- Ground (Shield)
- Pin #2 --- + Signal
- Pin #3 --- - Signal

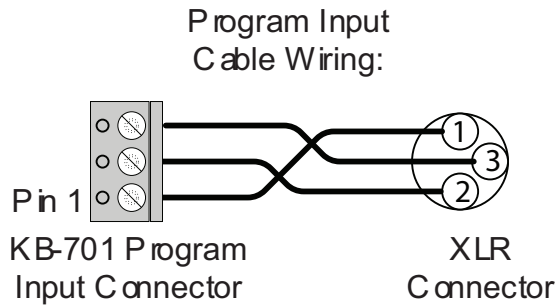


Figure 1-4: Program Input Cable Wiring

12. **Option Board Jumpers:** The two jumper plugs *P1* and *P3* must be installed when optional modules are not used. When the optional EB7-4W module is used, both *P1* and *P3* must be removed. Save these jumper plugs for possible future use.

Note: *The KB-701 will not operate without either the 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 it for any damage that may have occurred during shipping.
2. Set the *option* switches to the default (toward the front panel) position.
3. Connect the intercom lines.
4. Install the KB-701 into the four-gang outlet box or V-Box. (For additional information, refer to the *Clear-Com System Installation Manual*.)
5. Set listen levels. (Refer to “Intercom Level Control.”)
6. The speaker station should now be operating properly.

Read the rest of this manual for further information.

3 MAINTENANCE

This chapter provides maintenance information including a block diagram and troubleshooting tips.

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.

KB-701 BLOCK DIAGRAM

The following is a block diagram of the KB-701 speaker station:

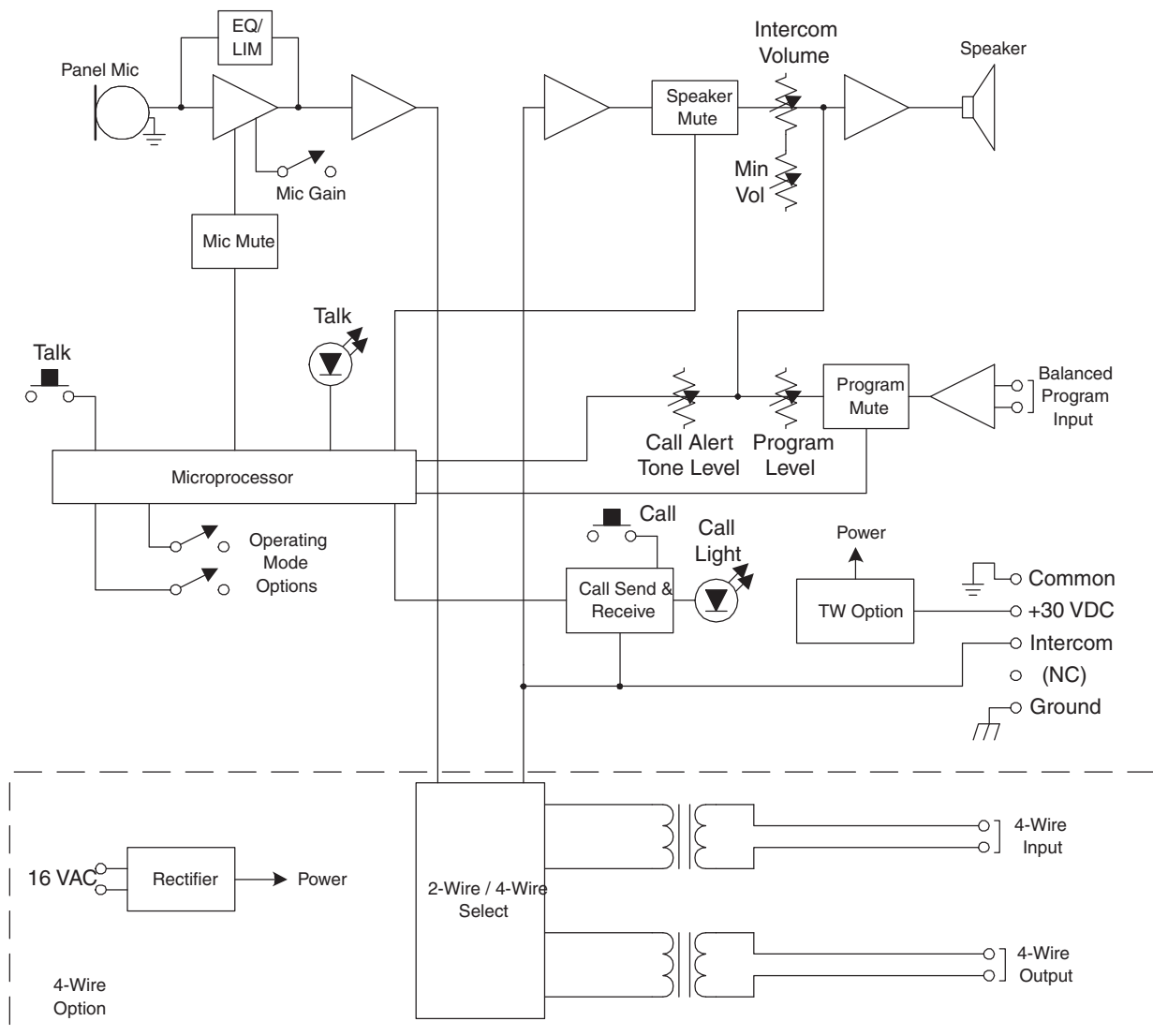


Figure 3-5: Block diagram of the KB-701

TROUBLESHOOTING TIPS

SYMPTOM	CAUSE	SOLUTION
System does not operate. The <i>talk</i> button does not light.	(1) No intercom connection to the KB-701. If the EB7-4W four-wire option module is connected, no AC power is reaching the KB-701.	(1) Check connections and cable.
	(2) The KB-701 has an internal failure.	(2) Unit requires servicing.
System operates incorrectly. The <i>talk</i> button does not turn amber when the <i>talk</i> button is pressed, or stays amber until <i>talk</i> button is pressed and the speaker is <i>off</i> when it should be on.	(1) <i>Operating mode</i> switches are set incorrectly.	(1) Refer to the <i>option</i> switch setting section of this manual.
Speaker does not operate. The <i>talk</i> light turns amber when <i>talk</i> button is pressed.	(2) <i>Intercom level</i> knob turned all the way down.	(2) Adjust control appropriately.
	(3) Speaker plug or wiring has come loose.	(3) Make sure speaker is connected internally.
	(4) Plug <i>P3</i> missing on circuit board.	(4) Plug <i>P3</i> must be installed in jack <i>J3</i> if the EB7-4W option is not used.
Hum or buzz in system.	(1) Inductive pickup caused by close proximity of this speaker station or connected stations to power lines or transformers.	(1) Relocate the offending unit or wiring. If the cable run is exceptionally long, consider adding and using the EB7-4W four-wire option module. (Requires an additional four-wire interface at the opposite end of a “long run.”)
System feedback (Acoustical).	(1) <i>Intercom level</i> control at this station or another station is set too high.	(2) Adjust.
	(2) Channel unterminated.	(2) Set the <i>main station</i> or <i>power supply termination</i> switch for the appropriate channel to the <i>on</i> position.
	(3) The KB-701’s microphone is too close to an open speaker on the same channel.	(3) Change the unit’s location.

SYMPTOM	CAUSE	SOLUTION
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 EB7-4W four-wire option module.
	(2) <i>Multi-channel</i> cable pairs are not individually shielded.	(2) Replace cable with individually shielded pairs.
Program signal sounds distorted.	(1) <i>Program level</i> control set too high.	(1) Turn the <i>program level</i> control counter-clockwise.
	(2) Overload of <i>program input</i> circuit.	(2) Reduce the gain of the program signal at the source, such as an audio mixer.
The call 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 information or recommendations.
	(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>JI</i> jack if the EB7-4W option is not used.

Table 2: Troubleshooting Tips

4

TECHNICAL SPECIFICATIONS

KB-701 SPEAKER STATION

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

Program Line Input

Maximum Level before Clipping $\geq 20\text{dBu}$
Input Impedance $\geq 5\text{K}\Omega$

Speaker Output

Load Impedance $\geq 4\Omega$
Max Output Level before 1% Distortion $20\text{dBu} \pm 2\text{dBu}$

Party Line Output

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

Party Line Input

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

Frequency Response

Program Input - Speaker Out $200 - 18\text{KHz} \pm 3\text{dB}$
Party Line - Speaker Out $200 - 18\text{KHz} \pm 3\text{dB}$

Max Distortion

Program Input - Speaker Out $\leq 0.5\%$
Party Line - Speaker Out $\leq 0.5\%$

Noise

Program Input - Speaker Out $< -60\text{dBu}$
Party Line - Speaker Out $< -50\text{dBu}$

Max Gain

Program Input - Speaker Out $\geq 24\text{dB}$
Party Line - Speaker Out $\geq 40\text{dB}$

Power

Input Voltage Range $20-30\text{VDC}$
Input Current (Idle) $\leq 90\text{mA}$
Input Current (Max) $\leq 110\text{mA}$

Internal Connectors and Jumpers

Intercom: Line	Five terminal connector
Program Input	Three terminal connector
Option Switches	Three DIP switches

Front Panel Controls & Indicators

- (1) Program level control
- (1) Intercom level control
- (1) Talk button
- (1) Call button
- (1) Integral microphone

Environmental

32 - 122° F (0 - 50° C)

Dimensions

8.5 in. W x 4.5 in. H x 1.75 in. D
(210 mm x 114 mm x 44 mm)

Weight

1.04 lbs. (0.47 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 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.

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.

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 beltpacks, 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.

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

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:

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 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.