CR170

VHF MINIATURE RECEIVER

OPERATING INSTRUCTIONS
and trouble-shooting guide

LECTROSONICS, INC.

Rio Rancho, NM

INTRODUCTION

Thank you for selecting the Lectrosonics FREEDOMIKE system.

The FREEDOMIKE CR170 receiver represents over 80 years of combined experience in the design of RF and audio devices and sets new standards for RF performance and flexibility. The CR170 receiver design is the result of surveying the needs of professional video producers, audio visual coordinators, and many others in the industry. Numerous conversations with dealers and end-users have established the parameters for the design.

The CR170 is designed for professional users who demand outstanding performance and flexibility. It is the ideal choice for use with video recording equipment or as an "add-on" wireless receiver for almost any type of sound equipment.

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GENERAL TECHNICAL DESCRIPTION

The CR170 receiver employs a two stage, crystal controlled oscillator, individually trimmed to the exact operating frequency, to ensure that the frequency will not drift. This eliminates the need for "tuning" adjustments each time the receiver is used. Numerous frequencies are available from 150 MHz through 216 MHz.

High Q toroidal filters in the RF and IF stages reject interfering adjacent signals and provide over 100 dB of image rejection. Dual gate MOS FET semi-conductors in the RF amplifier and mixer provide excellent sensitivity and resistance to RF overload.

The audio section contains a noise reduction "compandor" to suppress audible noise (hiss) without impairing the natural dynamics of the audio signal. A 6-pole active filter in the audio path eliminates all supersonic and subsonic noise in order to increase the compandor tracking accuracy in weak signal conditions. A time delayed, correlation squelch system is employed in the CR170. This circuit is highly stable and never needs adjustment by the user.

A recessed level control knob adjusts the audio output from microphone level to line level. Since the audio input level requirements vary from one VCR or sound system to another, this control is continuously variable which allows the receiver audio output to be perfectly matched to the audio input of any type of recording or PA equipment.

The receiver may be powered from an internal 9 Volt battery, external 12 Volt DC or from 110 Volts AC using the supplied charger. The battery compartment will accept any brand of 9 Volt alkaline or lithium battery. A unique, floating polarity barrier prevents inserting the battery backward and will automatically adjust itself to accommodate varies lengths of batteries.

The CR170 receiver is compatible with all Lectrosonics 185 series high band transmitters.

RECEIVER FRONT PANEL

OFF/ON
A slide switch which turns the power on and off.

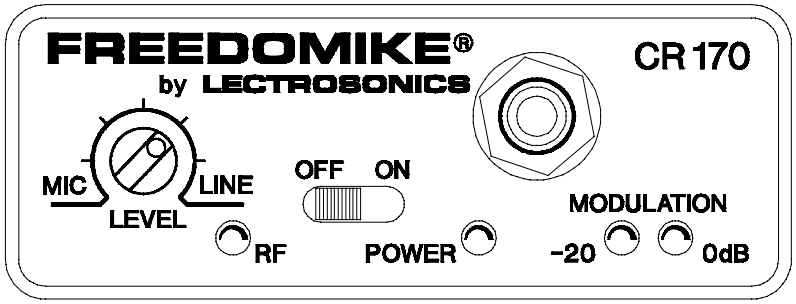
POWER
An LED that glows when the OFF/ON switch is in the "ON" position and the battery is good, or when the AC adapter or external power source is properly connected. If this lamp is very dim or does not light up when the switch is turned on, check the external power source or replace the battery. Use only ALKALINE or LITHIUM batteries.

RF
An LED which lights when the companion transmitter is turned on and there is sufficient signal for good receiver operation. Internal circuits monitor both signal level and interference levels and decide if the transmitted signal is strong and "clean" enough for satisfactory operation. If not, the RF lamp will go out and the receiver will "squelch", shutting off the sound output. This action is automatic and requires no user adjustment.

MODULATION
Two LEDs which continuously monitor the modulation (audio level) of the received signal from the transmitter and are used when making initial adjustment to the transmitter.

LEVEL
An output attenuator used to regulate the output audio level of the receiver. When adjusted fully counter-clockwise to the "MIC" position, the output of the mini jack on the front panel will be the same as from a typical microphone. When adjusted fully clockwise to the "LINE" position, the output level will be at a normal 0dB line level. Intermediate settings are sometimes necessary due to the variations in different input compressors and ALC (automatic level control) circuits on different VCR's and audio inputs.

AUDIO OUTPUT JACK
A mini-phone jack that connects to your VCR, camcorder or sound system. It is a standard 3.5mm jack which is used on most industrial video equipment. A male-to-male patch cord is supplied with the receiver to connect the receiver output to the same type of mini-jack on the external equipment. This is a common type of connector used on many different adapters and cords available from your local audio or electronics dealers, or from Lectrosonics.



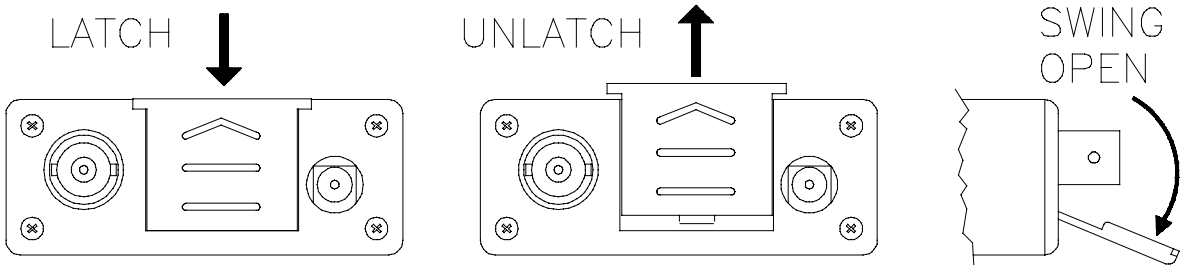
RECEIVER REAR PANEL

ANTENNA CONNECTOR
A standard BNC connector compatible with the supplied A-185BNC telescoping antenna.

12 VDC INPUT
For powering the receiver with the supplied CH-12 AC adapter from a 110V AC source. The receiver may also be powered from an external 12 Volt DC source using a Switchcraft S-760 power plug. The center pin on the receiver jack is positive (+).

BATTERY COMPARTMENT
The CR170 is powered by a standard alkaline 9 Volt battery. A lithium 9 Volt battery may also be used. It is important that you use ONLY an ALKALINE or LITHIUM battery for longest life. Standard zinc-carbon batteries marked "heavy duty" or "long-lasting" are not adequate. They will provide only about one hour of operation. Similarly, nicad rechargeable batteries give less than 2 hours of operation, and will also run down quite abruptly. Alkaline batteries provide about 5 hours of operation, while lithium batteries will give almost 12 hours of useful life.

To open the battery compartment door, use your thumb to press in and outward, with a sliding motion, in the direction of the arrow. Swing the door open and note the polarity marked inside showing the location of the positive (+) and negative (-) terminals. Insert the battery and close the cover. Latch the cover by pressing in and sliding the cover in the opposite direction of the arrow. The battery door will NOT close if the battery is inserted incorrectly.



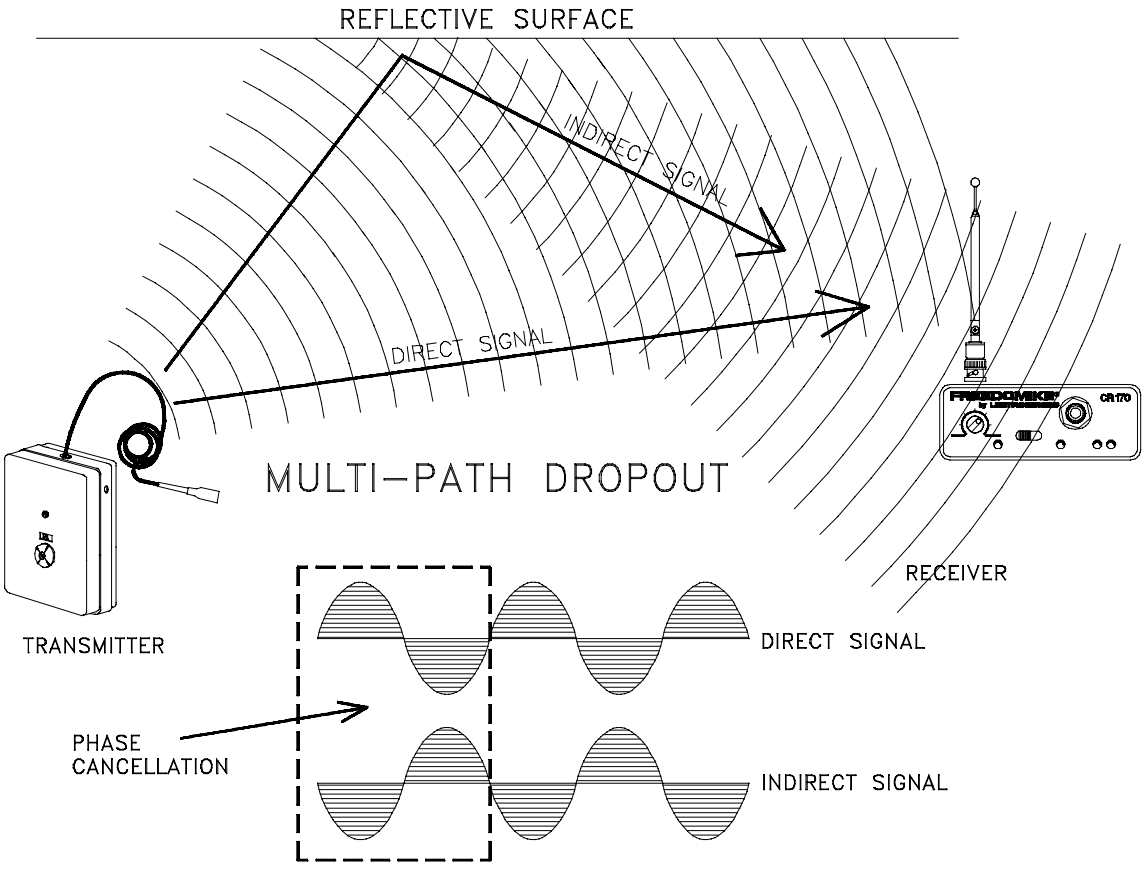
ANTENNA USE AND PLACEMENT

Connect the antenna to the rear panel jack. Extend the antenna fully. Position the antenna so that it is not touching or within 3 or 4 feet of large metal surfaces. It is also good practice to position the receiver so that there is a direct "line of sight" between the transmitter and the receiver antenna.

A wireless transmitter sends a radio signal out in all directions. This signal will often bounce off nearby walls, ceilings, etc. and a strong reflection can arrive at the receiver antenna along with the direct signal. If the direct and reflected signals are out of phase with each other, as depicted in the figure below, a partial or complete cancellation of the received signal will occur. The result will be a "drop out." A drop out sounds like either audible noise (hiss), or in severe cases, may result in a complete loss of the sound when the transmitter is positioned in certain locations in the room. Moving the transmitter even a few inches may change the sound of the hum or hiss, or eliminate it. A dropout situation may become either better or worse as the crowd fills or leaves the room.

In the event that you do encounter a dropout problem, first try moving the receiver/antenna at least 3 or 4 feet from where it was. This may alleviate the dropout problem. If dropouts are still a problem, try moving the receiver and/or the antenna to an entirely different location in the room.

Lectrosonics transmitters radiate more power, and the receivers are more sensitive than others on the market. These design improvements generally reduce dropouts to an insignificant level. If, however, you do encounter dropouts frequently, call the factory. There is probably a simple solution to the problem.



OPERATING INSTRUCTIONS

This sections covers the initial adjustments to the companion transmitter and CR170 that must be made before the system is placed into operation. The step-by-step procedures are listed in the order in which they should be performed:

1) Install the battery in the receiver or connect the power cord if you are going to use external power. If using an external 12 Volt DC source, be sure the center pin on the plug is positive (+).

2) Connect and extend the CR170 antenna.

3) Operate the CR170 POWER switch to ON. Observe that the red POWER lamp lights.

4) Plug your microphone into the companion transmitter. Make sure the plug is locked securely.

5) Turn the transmitter power on and verify that the red lamp on it lights. If the lamp is very dim, or does not light, replace the battery.

6) Observe that the RF lamp on the CR170 control panel is lighted. This verifies that the receiver is receiving a useable signal from the transmitter.

7) Position the microphone on your person in the location it will be during actual operation. The microphone should be within 3 inches of the mouth to minimize the possibility of feedback.

8) A small screwdriver is supplied with the transmitter. The screwdriver is used to adjust the audio gain of the transmitter to match your microphone and your voice. The adjustment is made while observing the MODULATION lamps on the CR170 control panel. (Refer to your transmitter operating manual.)

9) Speak at the voice level you will be using during actual operation. While speaking, use the small screwdriver to adjust the gain of the transmitter until the -20 lamp is lighted or flickers and the 0dB lamp blinks only on the loudest words. Raise and lower your voice while observing the lamps. The 0dB lamp should blink only occasionally.

10) Connect the audio patch cord between the CR170 control panel audio output connector and the audio input connector on the VCR or external PA equipment.

11) Adjust the CR170 LEVEL control as necessary to accommodate the input requirements of the external equipment. The input levels on different VCRs and PA equipment vary and may require that you set the LEVEL control in an intermediate position somewhere in between the MIC and LINE positions of the knob. Try different settings and listen to the results. If the output of the receiver is too high, you may hear distortion or a loss of the natural dynamics of the audio signal. If the output is too low, you may hear steady noise (hiss) along with the audio.

NOTE

Do not use the transmitter gain control to adjust the audio output level of the CR170 RECEIVER.

TROUBLESHOOTING GUIDE

This guide covers only the CR170 receiver.
Transmitters are covered in separate manuals.

SYMPTOM	POSSIBLE CAUSE
NO POWER LAMP	1) Receiver switch in "OFF" position 2) Dead or weak battery 3) AC wall outlet inoperative 4) CH-12 AC adapter disconnected
NO RF LAMP	1) Receiver antenna not connected 2) Transmitter battery dead 3) No microphone connected to transmitter 4) See transmitter manual
RF LAMP ON BUT NO SOUND	1) Transmitter switch in "MUTE" position 2) Transmitter microphone not connected 3) Microphone switch in "OFF" position 4) See transmitter manual
MODULATION LED's ON BUT NO SOUND	1) Receiver LEVEL control turned down 2) Audio cable disconnected 3) Sound system off, or not properly adjusted

REPLACEMENT PARTS and ACCESSORIES

Part No.	Description
CH-12	110 Volt AC adapter for CR170 receiver
A-185BNC	Telescoping, swivel-mount antenna

SERVICE AND REPAIR

If your system malfunctions, you should attempt to correct or isolate the trouble before concluding that the equipment needs repair. Make sure you have followed the setup procedure and operating instructions. Check out the inter-connecting cords and then go through the TROUBLE SHOOTING section in the manual

We strongly recommend that you **do not** try to repair the equipment yourself and **do not** have the local repair shop attempt anything other than the simplest repair. If the repair is more complicated than a broken wire or loose connection, send the unit to the factory for repair and service. Don't attempt to adjust any controls inside the units. Once set at the factory, the various controls and trimmers do not drift with age or vibration and never require readjustment. **There are no adjustments inside that will make a malfunctioning unit start working**.

LECTROSONICS service department is equipped and staffed to quickly repair your equipment. In-warranty repairs are made at no charge in accordance with the terms of the warranty. Out of warranty repairs are charged at a modest flat rate plus parts and shipping. Since it takes almost as much time and effort to determine what is wrong as it does to make the repair, there is a charge for an exact quotation. We will be happy to quote approximate charges by phone for out of warranty repairs.

RETURNING UNITS FOR REPAIR

You will save yourself time and trouble if you will follow the steps below:

A. DO NOT return equipment to the factory for repair without first contacting us by letter or by phone. We need to know the nature of the problem, the model number and the serial number of the equipment. We also need a phone number where you can be reached 8 am to 4 pm (Mountain Standard Time).

B. After receiving your request, we will issue you a return authorization number (R.A.). This number will help speed your repair through our receiving and repair departments. The return authorization number must be clearly shown on the outside of the shipping container.

C. Pack the equipment carefully and ship to us, shipping costs prepaid. If necessary, we can provide you with the proper packing materials. UPS is usually the best way to ship the units. Heavy units should be "double-boxed" for safe transport.

D. We also strongly recommend that you insure the equipment, since we cannot be responsible for loss of or damage to equipment that you ship. Of course, we insure the equipment when we ship it back to you.

Mailing address:
Lectrosonics, Inc.
PO Box 15900
Rio Rancho, NM 87174
USA

Shipping address:
Lectrosonics, Inc.
581 Laser Rd.
Rio Rancho, NM 87124
USA

Telephones:
Regular: (505) 892-4501
WATS: (800) 821-1121
FAX: (505) 892-6243

SPECIFICATIONS AND FEATURES

Operating frequencies:	150 to 216 MHz crystal controlled
Sensitivity:	1.0uV for 20dB SINAD 2.0uV for 50dB S/N ratio
Signal/noise ratio:	95dB flat; 100dB A-weighted
Squelch quieting:	greater than 100dB
AM Rejection:	-40 dB (10uV to 0.1 Volts)
Modulation acceptance:	±15kHz
Image and spurious rejection:	greater than 100 dB
Audio output:	Front panel mini jack; variable -40dBm to +3dBm
Antenna input:	Rear panel BNC connector
Controls:	Front panel output attenuator
Indicators:	LED for power "ON" 2 LEDs for modulation level "RF" LED for transmitter "ON"
Power requirements:	* 9 Volt alkaline battery * External 12 Volt source * 110 Volt AC via CH-12 adapter
Power consumption:	35 mA (max.)
Weight:	9.5 ozs. with battery
Dimensions:	1.1 x 2.8 x 4.6 inches

LIMITED ONE YEAR WARRANTY

The equipment is warranted for one year from date of purchase against defects in materials or workmanship provided it was purchased from an authorized dealer. This warranty does not cover equipment which has been abused or damaged by careless handling or shipping. This warranty does not apply to used or demonstrator equipment.

Should any defect develop, we will, at our option, repair or replace any defective parts without charge for either parts or labor. If we cannot correct the defect in your equipment, we will replace it at no charge with a similar new item. We will pay for the cost of returning your merchandise to you.

This warranty applies only to items returned to us, shipping costs prepaid, within one year from the date of purchase.

This warranty gives you specific legal rights. You may have additional legal rights which vary from state to state.

LECTROSONICS, INC.

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