





















## Setting Transmitter Operating Frequency

The Operating Frequency of the SM can be displayed either in MHz or as a two-digit hexadecimal number. (See *Controls and Functions, FREQ Button.*) The SM's operating frequency can be set with the unit in Standby Mode or powered up for normal operation. Use the following procedure to change the Operating Frequency of the SM transmitter:

- 1) If the LCD is displaying something other than the Frequency Screen, press the FREQ button on the SM Control Panel to enter this screen.

*Note: The default display is in MHz. Pressing the FREQ button again displays the operating frequency as a two-digit hexadecimal number that corresponds the equivalent Lectrosonics Frequency Switch Setting.*

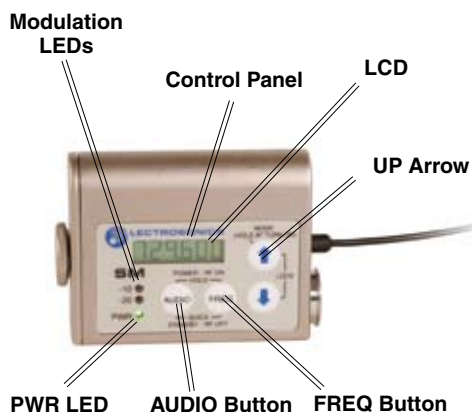
- 2) While holding the FREQ button, use the Up or Down arrow buttons to move the operating frequency up or down in 100 kHz increments from the current setting.

*Note: The operating frequency displayed on the LCD wraps as it reaches the upper or lower end of its range. Thus, if you intend to move the operating frequency from the lower end of the range to the upper end, it may be faster to do this by using the Down arrow until the frequency wraps to the upper end.*

Most Lectrosonics receivers indicate the operating frequency both in MHz and as a two digit hexadecimal number. This conforms to the Lectrosonics tradition of setting the operating frequency using two 16-position rotary switches. The SM offers the ability to set the operating frequency in a similar manner. Pressing the FREQ button while the LCD displays the operating frequency in MHz will change the display to show the equivalent two-digit hexadecimal frequency select switch setting. Simply use the Up or Down arrow to increase or decrease the operating frequency.

**644.400**  
Frequency displayed in MHz

**CH 2C**  
Frequency displayed as two-digit hexadecimal number



## Attaching a Microphone and Adjusting Gain

The front panel Modulation LEDs indicate limiter activity. (See chart below.) Once set, the transmitter's audio level setting **should not** be used to control the volume of your sound system or recorder levels. This gain adjustment matches the transmitter gain with the microphone's output level, the user's voice level and the microphone's position. The audio input level can be set with the unit in Standby Mode or powered up for normal operation.

Signal Level	-20 LED	-10 LED
Less than -20 dB	Off	Off
-20 dB to -10 dB	Green	Off
-10 dB to +0 dB	Green	Green
+0 dB to +10 dB	Red	Green
Greater than +10 db	Red	Red

*Note: Different voices will usually require different settings of the AUDIO control, so check this adjustment as each new person uses the system. If several different people will be using the transmitter and there is not time to make the adjustment for each individual, adjust it for the loudest voice.*

- 1) With the SM powered off, insert the microphone plug into the Audio Input Jack, aligning the pins and ensuring that the connector locks.
  - 2) Place the SM in Standby Mode, or if the unit is to be powered up and adjusted, mute the main sound system prior to powering up the transmitter.
  - 3) Position the microphone in the location where it will be used in actual operation.
  - 4) Observe the SM Modulation LEDs while speaking or singing into the microphone at the same voice level that will be used during the program. While holding the AUDIO button, press the Up or Down arrow buttons until the both the -20 and -10 LEDs glow green, with the -10 LED occasionally flickering red (-10 dB to +0 dB Signal Level as shown in the chart below with only occasional forays into the +0 dB to +10 dB range).
- Note: Setting the audio level too high reduces the dynamic range of if the audio signal. Setting the audio level too low may cause hiss and noise in the audio.*
- 5) If the unit was set up in Standby Mode, it will be necessary to power up the SM and adjust the remaining components of the audio system prior to use.

## Locking or Unlocking the Control Panel

The Lock mode protects the transmitter from accidental changes to its settings.

1. Ensure the SM setup is complete (operating frequency, audio level, Compatibility Mode, sensitivity to remote control).
2. Simultaneously press both the Up and Down arrow buttons to start the Lock timer. When the timer reaches zero, "Loc" is displayed and the controls are locked.



***Important: Once the transmitter is locked, it cannot be unlocked or powered off using the buttons. The only ways to unlock a locked transmitter are to remove the battery or unlock it via the remote control. The remote control will work only if the transmitter was previously configured to respond to the remote control. Lock mode does not persist when the power is off.***

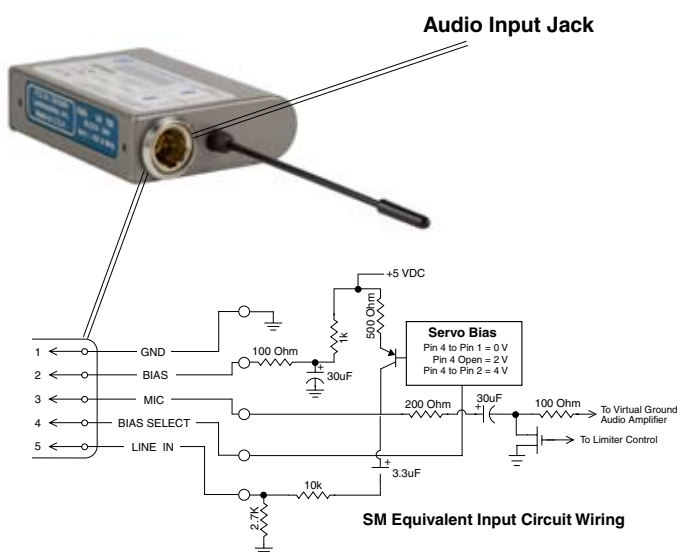
## 5-Pin Input Jack Wiring

The wiring diagrams included in this section represent the basic wiring necessary for the most common types of microphones and other audio inputs. Some microphones may require extra jumpers or a slight variation on the diagrams shown.

It's virtually impossible to keep completely up to date on changes that other manufacturers make to their products. It is possible that you may encounter a microphone that differs from these instructions. If this occurs please call our toll-free number listed under Service and Repair in this manual or visit our web site at:

<http://www.lectrosonics.com>

The Audio Input Jack for the SM is wired as shown below:



- PIN 1** Shield (ground) for positive biased electret lavalier microphones. Shield (ground) for dynamic microphones and line level inputs.
- PIN 2** Bias voltage source for positive biased electret lavalier microphones.
- PIN 3** Low impedance microphone level input for dynamic microphones. Also accepts hand-held electret microphones provided the microphone has its own built-in battery.
- PIN 4** Bias voltage selector for Pin 3. Pin 3 voltage (0, 2 or 4 volts) depends on Pin 4 connection.
- Pin 4 tied to Pin 1: 0 V  
Pin 4 Open: 2 V  
Pin 4 to Pin 2: 4 V
- PIN 5** High impedance, line level input for tape decks, mixer outputs, musical instruments, etc.

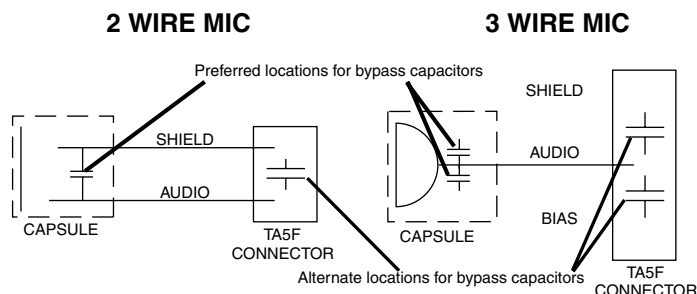
## Microphone RF Bypassing

When used on a wireless transmitter, the microphone element is in the proximity of the RF coming from the transmitter. The nature of electret microphones makes them sensitive to RF, which can cause problems with the microphone/transmitter compatibility. If the electret microphone is not designed properly for use with wireless transmitters, it may be necessary to install a chip capacitor in the mic capsule or connector to block the RF from entering the electret capsule.

Some mics require RF protection to keep the radio signal from affecting the capsule, even though the transmitter input circuitry is already RF bypassed (see schematic diagram).

If the mic is wired as directed, and you are having difficulty with squealing, high noise, or poor frequency response; RF is likely to be the cause.

The best RF protection is accomplished by installing RF bypass capacitors at the mic capsule. If this is not possible, or if you are still having problems, capacitors can be installed on the mic pins inside the TA5F connector housing.



Install the capacitors as follows: Use 330 pF capacitors. Capacitors are available from Lectrosonics. Please specify the part number for the desired lead style.

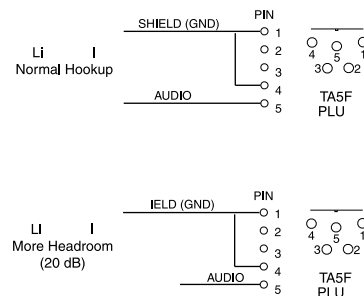
Leaded capacitors: P/N 15117  
Leadless capacitors: P/N SCC330P

All Lectrosonics lavalier mics are already bypassed and do not need any additional capacitors installed for proper operation.

## Line Level Signals

The normal hookup for line level signals is: Signal Hot to pin 5, Signal Gnd to pin 1 and pin 4 jumped to pin 1. This allows signal levels up to 6V RMS to be applied without limiting.

If more headroom is needed, insert a 20 k resistor in series with pin 5. Put this resistor inside the TA5F connector to minimize noise pickup.



# Wiring Hookups for Different Sources

In addition to the wiring hookups illustrated below, Lectrosonics makes a number of cables and adapters for other situations such as connecting musical instruments (guitars, bass guitars, etc.) to the transmitter. These cables can be found in our UHF or Accessories catalogs. Visit [www.lectrosonics.com](http://www.lectrosonics.com), or contact the factory for more information.

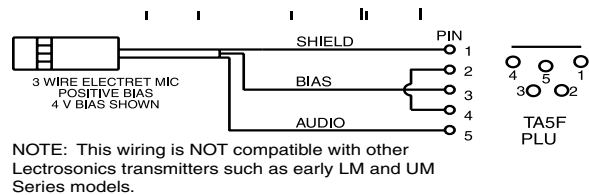
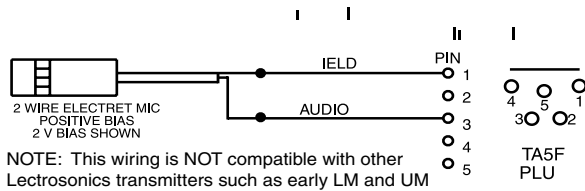
The most radical change is that pin 4 is now a voltage selector pin. The diagrams in the section labeled "Works with SM only" are specific to the SM transmitter and make wiring a Countryman B6 or E6 or a three wire microphone such as a COS-11 very quick and easy. However, these wirings won't work with older Lectrosonics transmitters such as the UM400, UM200, etc. If you need the two wire Countryman B6 or any three wire mic to work with both older transmitters as well as with the SM go to the section below, labeled, "Compatible with SM and other Lectrosonics Transmitters."

Sanken Cos-11 microphones, the Lectrosonics M150 and other three wire microphones to be used with the

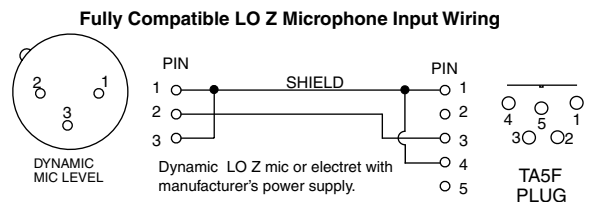
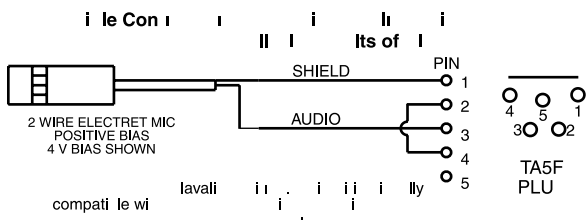
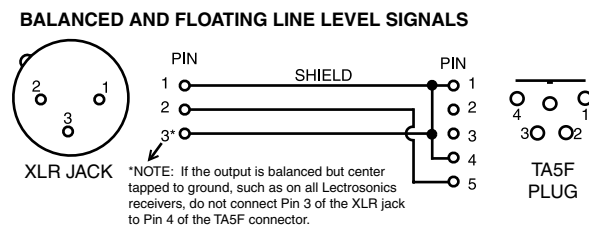
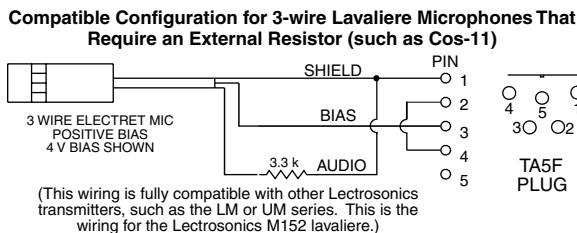
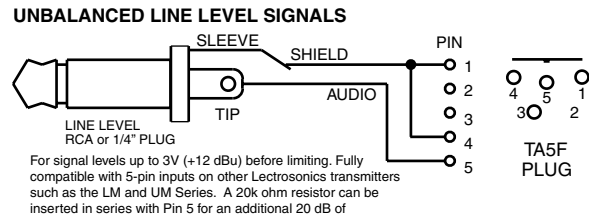
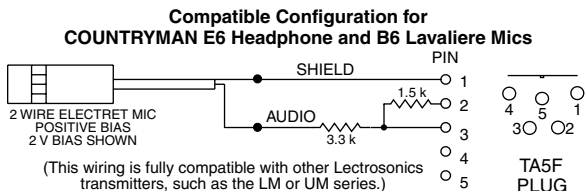
SM will require new wiring. If the wiring is not changed, they will have much higher output than usual and extra distortion at high levels. The reason is that the source follower wiring used with the UM200 and UM400 series is not compatible with the SM virtual ground input. The second diagram in the "Compatible with SM and other Lectrosonics Transmitters" section shows a compatible wiring that will work with all 5-Pin Lectrosonics transmitters. This wiring converts the three-wire microphone to a two wire system without changing the audio quality. (The microphone polarity will be reversed so you may want to enable the phase switch on the Lectrosonics receiver.) This wiring is electrically equivalent to the easy wiring in the "Works with SM only" section.

All two-wire mics (except the Countryman B6 and E6) such as the MKE-2 and the Lectro M152 will work with the SM with no changes. The two wire setup is shown in the third diagram in the "Compatible with SM and other Lectrosonics Transmitters" section.

## Works with SM Only:



## Compatible with SM and other Lectrosonics Transmitters:



# Troubleshooting

Before going through the following chart, be sure that you have a good battery in the transmitter. It is important that you follow these steps in the sequence listed.

## SYMPTOM

## POSSIBLE CAUSE

### TRANSMITTER PWR LED OFF

- 1) Battery is inserted backwards or dead.
- 2) Transmitter not powered up. (See *Operating Instructions, Power UP and Boot Sequence.*)

### TRANSMITTER PWR LED BLINKS GREEN EVERY FEW SECONDS, TRANSMITTER DOES NOT RESPOND OTHERWISE

- 1) Transmitter has been put to sleep by the remote control. Either use the remote control to wake it up again or remove and reinsert the transmitter's battery.

### NO TRANSMITTER MODULATION LEDs

- 1) Gain control set to minimum.
- 2) Battery is dead or installed backwards. Check PWR LED.
- 3) Mic capsule is damaged or malfunctioning.
- 4) Mic cable damaged or mis-wired.

### RECEIVER RF INDICATOR OFF

- 1) Transmitter not turned on, or is in Standby Mode.
- 2) Transmitter battery is dead.
- 3) Receiver antenna missing or improperly positioned.
- 4) Transmitter and receiver not on same frequency. Check switches/display on transmitter and receiver.
- 5) Transmitter and receiver not on same frequency block.
- 6) Operating range is too great.
- 7) Defective transmitter antenna.

### NO SOUND (OR LOW SOUND LEVEL), RECEIVER INDICATES PROPER AUDIO MODULATION

- 1) Receiver output level set too low.
- 2) Receiver output disconnected, or cable defective or mis-wired.
- 3) Sound system or recorder input is turned down.

### DISTORTED SOUND

- 1) Transmitter gain (audio level) is far too high. Check SM Modulation LEDs and receiver audio levels as SM is being used.
- 2) Receiver output may be mis-matched with the sound system or recorder input. Adjust output level on receiver to the correct level for the recorder, mixer or sound system. (Use the receiver's Tone function to check level.)
- 3) Excessive wind noise or breath "pops." Reposition microphone and/or use a larger windscreen.
- 4) Transmitter is not set to same frequency as receiver.

Check that

- operating frequency on receiver and transmitter match.
- 5) Receiver/Transmitter Compatibility Mode mismatched.

**SYMPTOM****POSSIBLE CAUSE**

- |   |  |
|---|--|
| <b>HISS AND NOISE -- AUDIBLE DROPOUTS</b>                       | <ol style="list-style-type: none"> <li>1) Transmitter gain (audio level) far too low.</li> <li>2) Receiver antenna missing or obstructed.</li> <li>3) Transmitter antenna missing.</li> <li>4) Operating range too great.</li> <li>5) Signal interference. Turn off transmitter. If receiver's signal strength indicator does not drop to nearly zero, this indicates an interfering signal may be the problem. Try a different operating frequency.</li> </ol>  |
| <b>EXCESSIVE FEEDBACK</b>                                       | <ol style="list-style-type: none"> <li>1) Transmitter gain (audio level) too high. Check gain adjustment and/or reduce receiver output level.</li> <li>2) Talent standing too close to speaker system.</li> <li>3) Mic is too far from user's mouth.</li> </ol>  |
| <b>“Loc” APPEARS IN DISPLAY WHEN ANY BUTTON IS PRESSED</b>      | <ol style="list-style-type: none"> <li>1) Control Panel is locked. (See <i>Operating Instructions, Locking and Unlocking the Control Panel.</i>)</li> </ol>  |
| <b>“Hold” APPEARS IN DISPLAY WHEN ARROW BUTTONS ARE PRESSED</b> | <ol style="list-style-type: none"> <li>1) Reminder that it is necessary to hold down the AUDIO or FREQ button while adjusting the audio gain or frequency settings.</li> </ol>   |
| <b>“PLL” APPEARS IN DISPLAY</b>                                 | <ol style="list-style-type: none"> <li>1) Indication that the PLL is not locked. This is a serious condition that requires factory repair. It may be possible to operate on another frequency far removed from the one that was selected when the unlocked condition was indicated.</li> </ol>   |
| <b>TRANSMITTER WON'T RESPOND TO REMOTE CONTROL</b>              | <ol style="list-style-type: none"> <li>1. If LCD blinks “rc OFF”, transmitter has not be configured to respond to the remote control. See “Remote Control Operation” on page 9 for instructions on how to configure.</li> <li>2. If LCD blinks “- - - - -”, transmitter is already set as requested by the remote control.</li> <li>3. If transmitter doesn't not respond at all, try moving the remote control closer to the microphone or increasing the remote control's loudness setting.</li> <li>4. Be sure the transmitter has firmware v1.5 or newer (see section on Power On Boot Sequence).</li> </ol> |





# Specifications and Features

## Operating frequencies:

Block 21 537.600 - 563.100  
 Block 22 563.200 - 588.700  
 Block 23 588.800 - 607.900 and 614.100 - 614.300  
 Block 24 614.400 - 639.900  
 Block 25 640.000 - 665.500  
 Block 26 665.600 - 691.100  
 Block 27 691.200 - 716.700  
 Block 28 716.800 - 742.300  
 Block 29 742.400 - 767.900

<b>Frequency range:</b>	256 frequencies in 100 kHz steps for one 25.5 MHz wide block
<b>Channel Spacing:</b>	100 kHz
<b>Frequency selection:</b>	Control panel mounted membrane switches
<b>RF Power output:</b>	100 mW (nominal)
<b>Compatibility Modes (6)</b>	Digital Hybrid Wireless™ (400 Series), 200 Series, 100 Series, Mode 3 (other analog), Mode 6, and IFB
<b>Pilot tone:</b>	25 to 32 kHz; 5 kHz deviation (in 400 Series Mode)
<b>Frequency stability:</b>	± 0.002%
<b>Deviation:</b>	± 75 kHz max. (in 400 Series Mode)
<b>Spurious radiation:</b>	60 dB below carrier
<b>Equivalent input noise:</b>	-125 dBV, A-weighted
<b>Input level:</b>	
<b>If set for dynamic mic:</b>	0.5 mV to 50 mV before limiting. Greater than 1 V with limiting.
<b>If set for electret lavalier mic:</b>	1.7 uA to 170 uA before limiting. Greater than 5000 uA (5 mA) with limiting.
<b>Line level input:</b>	5.0 mV to 6 V before limiting. Greater than 15 V with limiting.
<b>Input impedance:</b>	
<b>Dynamic mic:</b>	300 Ohms
<b>Electret lavalier:</b>	Input is virtual ground with servo adjusted constant current bias
<b>Line level:</b>	2.7 k Ohms

<b>Input limiter:</b>	Soft limiter, 30 dB range
<b>Bias voltages:</b>	Fixed 5 V at up to 5 mA Selectable 2 V or 4 V servo bias for any electret lavalier.
<b>Gain control range:</b>	40 dB; panel mounted membrane switches
<b>Modulation indicators:</b>	Dual bicolor LEDs indicate modulation of -20, -10, 0, +10 dB referenced to full modulation.
<b>Low frequency roll-off:</b>	-18 dB/octave; 70 Hz

<b>Controls:</b>	Control panel with LCD and four membrane switches.												
<b>Audio Frequency Response:</b>	35 Hz to 20 kHz, +/-1 dB (The audio is deliberately rolled off at 70 Hz using a 18 dB/octave filter. This filter cannot be disabled.)												
<b>Signal to Noise Ratio (dB): (overall system, 400 Series mode)</b>	<table> <thead> <tr> <th>SmartNR</th> <th>No Limiting</th> <th>w/Limiting</th> </tr> </thead> <tbody> <tr> <td>OFF</td> <td>103.5</td> <td>108.5</td> </tr> <tr> <td>NORMAL</td> <td>107.0</td> <td>111.5</td> </tr> <tr> <td>FULL</td> <td>108.5</td> <td>113.0</td> </tr> </tbody> </table>	SmartNR	No Limiting	w/Limiting	OFF	103.5	108.5	NORMAL	107.0	111.5	FULL	108.5	113.0
SmartNR	No Limiting	w/Limiting											
OFF	103.5	108.5											
NORMAL	107.0	111.5											
FULL	108.5	113.0											

Note: The dual envelope "soft" limiter provides exceptionally good handling of transients using variable attack and release time constants. Once activated, the limiter compresses 30+ dB of transmitter input range into 4.5 dB of receiver output range, thus reducing the measured figure for SNR without limiting by 4.5 dB

<b>Total Harmonic Distortion:</b>	0.2% typical (400 Series mode)
<b>Audio Input Jack:</b>	Switchcraft 5-pin locking (TA5F)
<b>Antenna:</b>	Flexible, unbreakable steel cable.
<b>Battery:</b>	1.5 Volt AA lithium or NiMH recommended
<b>Battery Life:</b>	1.5 hours (alkaline); 5.5 hours (lithium), 4 hours with 2500 mAh NiMH
<b>Weight:</b>	2.7 oz. (75.9 grams) with lithium battery
<b>Overall Dimensions:</b>	2.3 x 1.8 x 0.64 inches (not including microphone) 58 x 46 x 16 mm (not including microphone)

**Emission Designator:** 180KFE3  
 Specifications subject to change without notice.

## 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 the interconnecting cables and then go through the TROUBLESHOOTING section in this 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

For timely service, please 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 A.M. to 4 P.M. (U.S. 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

### Telephone:

(505) 892-4501  
(800) 821-1121 Toll-free  
(505) 892-6243 Fax

### Web:

[www.lectrosonics.com](http://www.lectrosonics.com)

### E-mail:

[sales@lectrosonics.com](mailto:sales@lectrosonics.com)

The FCC requires that the following statement be included in this manual:

This device complies with FCC radiation exposure limits as set forth for an uncontrolled environment. This device should be installed and operated so that its antenna(s) are not co-located or operating in conjunction with any other antenna or transmitter.



## 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, Lectrosonics, Inc. will, at our option, repair or replace any defective parts without charge for either parts or labor. If Lectrosonics, Inc. cannot correct the defect in your equipment, it will be replaced at no charge with a similar new item. Lectrosonics, Inc. will pay for the cost of returning your equipment to you.

This warranty applies only to items returned to Lectrosonics, Inc. or an authorized dealer, shipping costs prepaid, within one year from the date of purchase.

This Limited Warranty is governed by the laws of the State of New Mexico. It states the entire liability of Lectrosonics Inc. and the entire remedy of the purchaser for any breach of warranty as outlined above. NEITHER LECTROSONICS, INC. NOR ANYONE INVOLVED IN THE PRODUCTION OR DELIVERY OF THE EQUIPMENT SHALL BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, CONSEQUENTIAL, OR INCIDENTAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THIS EQUIPMENT EVEN IF LECTROSONICS, INC. HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE LIABILITY OF LECTROSONICS, INC. EXCEED THE PURCHASE PRICE OF ANY DEFECTIVE EQUIPMENT.

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

