

**LMa**

# Frequency-Agile UHF Belt-Pack Transmitter



**Featuring**  
**Digital Hybrid Wireless™ Technology**  
(US Patent Pending)

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# Introduction

Thank you for selecting the Lectrosonics LM or IM frequency agile, belt-pack transmitter.

The design of these transmitters introduces at a moderate cost the advanced technology and features of a Lectrosonics belt-pack transmitter. The design is based on the Digital Hybrid Wireless™ system (US Patent Pending) which combines a digital audio chain with an analog FM radio link. This digital process eliminates the compandor and its problems, yet preserves the extended operating range of the finest analog wireless systems. The IM is offered as part of the IS400 package and differs slightly from the LM in that its low-frequency response has been extended for use with musical instruments.

Both transmitters also preserve your investment. They can emulate the compandor found in Lectrosonics 100 Series, 200 Series and IFB transmitters, and certain transmitters from other manufacturers. (Call Lectrosonics for more details.) Changing the compatibility mode is accomplished with a simple procedure that does not require opening the unit.

Mechanically, the assemblies are rugged, machined aluminum packages with removable, stainless steel wire belt clips. Their input jack is a standard Lectrosonics 5-pin type for use with electret lavalier mics, dynamic mics and line level signals. LEDs are provided on the front panel to make quick and accurate level settings without having to view the receiver. The battery compartment accepts any 9 volt battery (alkaline or lithium recommended) and makes a positive connection via self-adjusting contacts. The antenna is a super-rugged, permanently attached 1/4 wavelength design made of flexible galvanized steel cable.

Only the LM and IM transmitters are covered in this manual. Companion receivers are covered in separate manuals.

The Digital Hybrid Wireless™ system uses 75 kHz wide deviation for an extremely high signal to noise ratio. The switching power supplies provide constant voltages to the transmitter circuits from the beginning (9.3 VDC) to the end (5.5 VDC) of battery life. The input amplifier uses an ultra low noise operational amplifier (op amp) for quiet operation. It is gain controlled with a wide range dual envelope input limiter that tames input signal peaks over 30 dB above full modulation.

## Digital Hybrid Technology

All wireless links suffer from channel noise to some degree, and all wireless microphone systems seek to minimize the impact of that noise on the desired signal. Conventional analog systems use compandors for enhanced dynamic range, at the cost of subtle artifacts (known as “pumping” and “breathing”). Wholly digital systems defeat the noise by sending the audio information in digital form, at the cost of some combination of power, bandwidth, operating range and resistance to interference.

The Lectrosonics Digital Hybrid Wireless™ system overcomes channel noise in a dramatically new way, digitally encoding the audio in the transmitter and decoding it in the receiver, yet still sending the encoded information via an analog FM wireless link. This proprietary algorithm is not a digital implementation of an analog compandor but a technique which can be accomplished only in the digital domain. (The patent is still pending, so we cannot publish detailed information.)

Channel noise still has an impact on received signal quality and will eventually overwhelm the receiver. The Digital Hybrid Wireless™ system simply encodes the signal to use a noisy channel as efficiently and robustly as possible, yielding audio performance that rivals that of wholly digital systems, without the power, noise and bandwidth problems inherent in digital transmission. Because it uses an analog FM link, Digital Hybrid Wireless™ enjoys all the benefits of conventional FM wireless systems, such as excellent range, efficient use of RF spectrum, and long battery life. However, unlike conventional FM systems, Digital Hybrid Wireless™ has done away with the analog compandor and its artifacts.

## Frequency Agility

The transmitter section uses a synthesized, frequency selectable main oscillator. The frequency is extremely stable over a wide temperature range and over time.

Two rotary switches, located on the side panel of the unit, provide 256 frequencies in 100 kHz steps over a 25.5 MHz range. This alleviates carrier interference problems in mobile or traveling applications.

## Wide-Band Deviation

By employing  $\pm 75$  kHz deviation, Lectrosonics dramatically improves the capture ratio, signal to noise ratio and AM rejection of our wireless system.

## Long Battery Life

The use of switching power supplies throughout the design allows over 6 hours of operation using a single 9 volt alkaline battery and over 13 hours of operation with a 9 volt lithium battery. The battery contacts are spring loaded to prevent “rattle” as the unit is handled.

## Servo Input

The LMA input is a radically different input system compared to previous Lectrosonics transmitter microphone inputs. It is so superior that this input system will eventually be utilized by all Lectrosonics UHF transmitters. The improvements are audible and make the transmitters easier to use and much harder to overload. It is no longer necessary on some mics to introduce pads to prevent overload of the input stage, divide the bias voltage down for some low voltage mics, or reduce the limiter range at minimum gain settings.

## Input Limiter

The transmitter employs a digitally-controlled analog audio limiter prior to the analog-to-digital converter. The limiter has a range greater than 30 dB for excellent overload protection. A dual release envelope makes the limiter acoustically transparent while maintaining low distortion. It can be thought of as two limiters in series, connected as a fast attack and release limiter followed by a slow attack and release limiter. The limiter recovers quickly from brief transients, so that its action is hidden from the listener, but recovers slowly from sustained high levels, to both keep audio distortion low and preserve short term dynamic changes.

## No Pre-Emphasis/De-Emphasis

Because the signal to noise ratio of the hybrid system is so high, there is no need for conventional pre-emphasis (HF boost) in the transmitter and de-emphasis (HF roll off) in the receiver. Thus, the possible distortion problems associated with pre-emphasis and de-emphasis are eliminated.

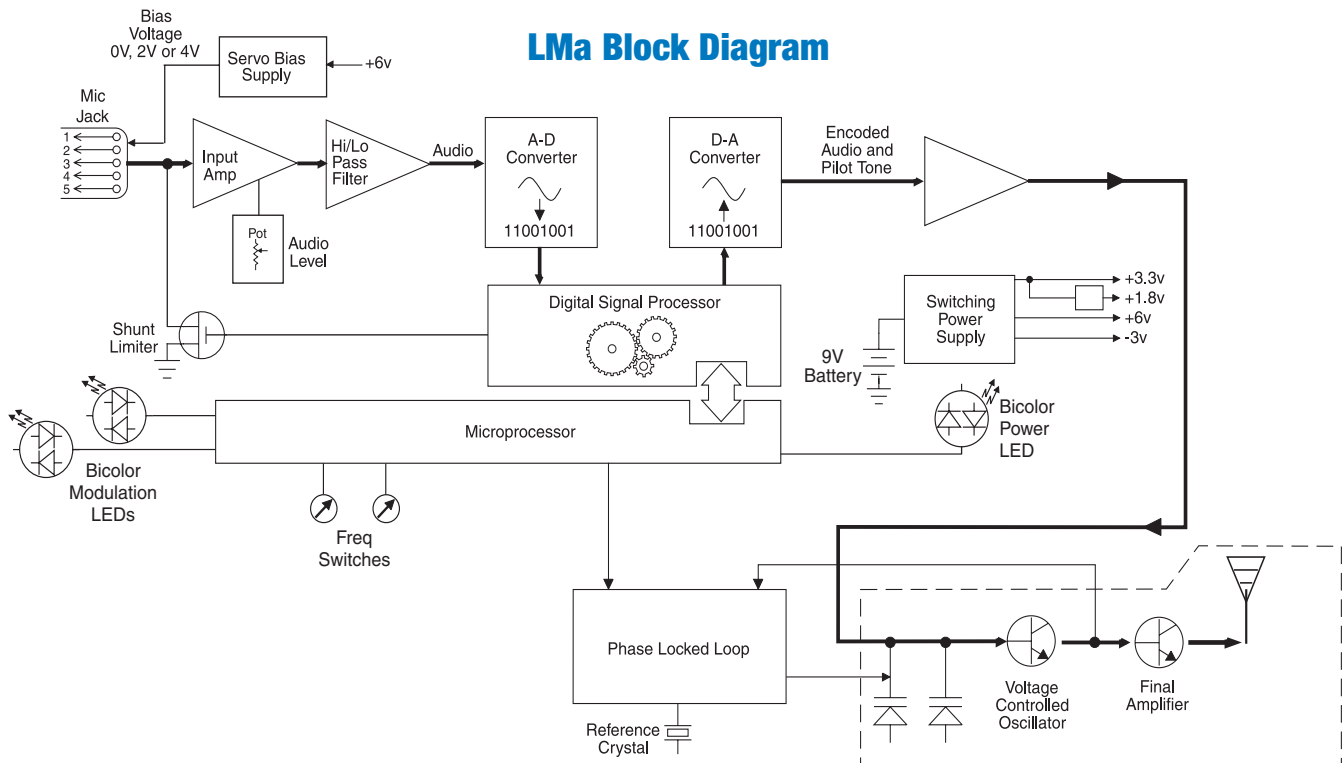
## Pilot Tone Squelch

The hybrid system uses one of 256 different ultrasonic tones between 25 and 32 kHz, that modulate the carrier to operate the receiver squelch. The pilot tone frequency is chosen according to which of the 256 channels has been selected by the frequency switch setting. The benefit of a pilot tone squelch system is that the receiver will remain muted until it receives the pilot tone from the matching transmitter, even if a strong RF signal is present on the carrier frequency of the system.

The 400 Series extends this concept even further by insuring that all transmitters in a system have different pilot tone frequencies so that even spurious RF from the wrong transmitters can't open the receiver squelch.

## Antenna

The antenna consists of a permanently attached flexible, unbreakable 1/4 wavelength galvanized steel cable.



# Controls and Functions

## Input Jack

The 5-pin (Switchcraft TA5F compatible) input accommodates virtually every lavalier, hand-held or shotgun microphone available, and most musical instrument signals. Line level signals can also be accommodated. (See 5-Pin Input Jack Wiring.)

## Power ON/OFF Switch

The Power ON/OFF switch turns the transmitter on and off. A pilot tone muting system prevents “thumps” or transients from occurring at the receiver even if the transmitter is abruptly switched on or off.

## Power LED

The Power LED glows green when the transmitter is operating and the battery is good. It turns red when the battery voltage drops to 6.1 VDC and starts blinking red when the voltage drops to 5.6 VDC. When using a recommended lithium or alkaline battery, there will be about 30 minutes of operating time remaining when the Power LED first begins blinking red.

**Note:** A weak battery will sometimes cause the Power LED glow green, but it will soon discharge to the point where the Power LED will glow red or go out completely. If in doubt, replace the battery with a known new battery. If the Power LED fails to glow when the transmitter is turned on, replace the battery.

NiMH batteries give little or no warning when they are depleted. If you wish to use NiMH batteries in the transmitter, you will need to manually keep track of the operating time. Start with a fully charged battery, then measure the time it takes for the Power LED to go out completely. A number of Lectrosonics receivers incorporate a Battery Timer function which tracks the amount of time the transmitter signal is detected (See your receiver manual to determine if this function is available.) By using the receiver’s battery timer and replacing the transmitter battery before the premeasured time is up, users can minimize potential loss of audio when NiMH batteries are used.

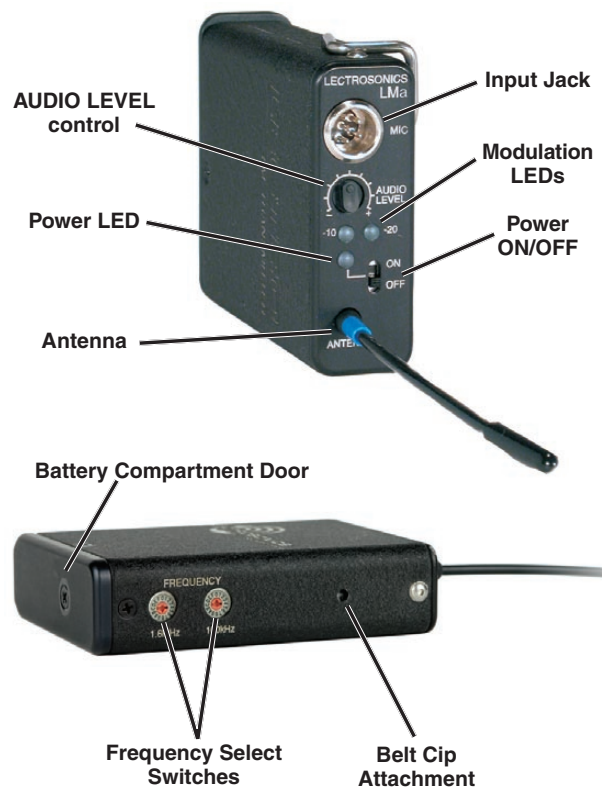
## Frequency Select Switches

Two 16-position rotary Frequency Select Switches, accessed through the left side panel, are used to adjust the transmitter’s operating frequency. These switches are labeled 1.6M and 100K. The 1.6M switch is used for coarse frequency adjustments and the 100K is used for fine frequency adjustment.

## Modulation LEDs

The Modulation LEDs provide a visual indication of the input audio signal level from the microphone or musical instrument. These two bicolor LEDs can glow either red or green to indicate modulation levels.

(LM Shown for illustrative purposes)



The Modulation LEDs are also used to indicate the Compatibility Mode when the transmitter is initially turned on. The Modulation LEDs will blink simultaneously:

- Once for 100 Series mode
- Two times for 200 Series mode
- Three times for mode 3
- Four times for Digital Hybrid Wireless™ or 400 Series mode
- Five times for IFB mode

## Audio Level

The AUDIO LEVEL control is used to set the level of the transmitter’s input for the proper modulation.

## Antenna

The flexible, insulated galvanized steel cable antenna supplied with the transmitter is cut to 1/4 wavelength of the center of the frequency block (the frequency range) of the transmitter.

## Belt Clip

The belt clip may be removed for special applications by pulling the ends out of the holes in the sides of the case. An optional hinged belt clip (P/N BCHINGED) is also available. Contact a Lectrosonics sales representative, or visit our web site ([www.lectrosonics.com](http://www.lectrosonics.com)) for more details.

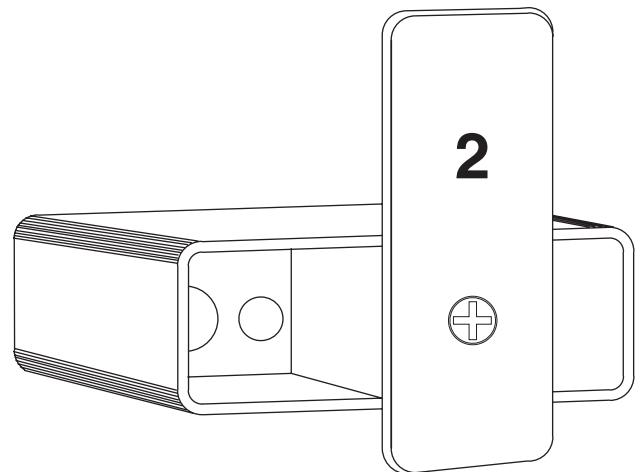
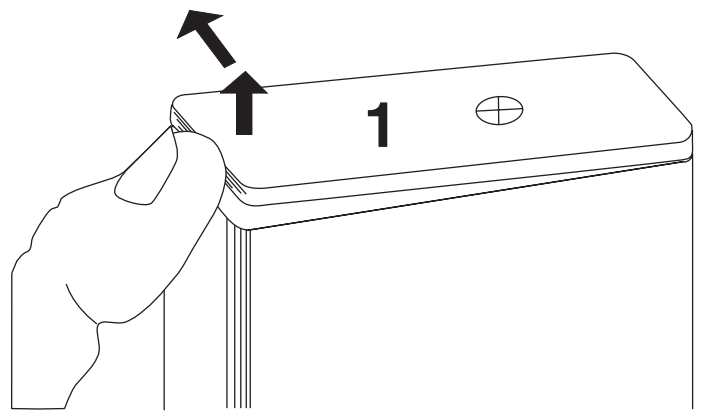
## Battery Installation

The transmitter is powered by a standard 9 volt battery. We recommend using alkaline or lithium batteries for longest life. Standard zinc-carbon batteries marked “**heavy-duty**” or “**long-lasting**” are not adequate. Alkaline batteries provide over six hours of operation at room temperature. Lithium batteries can provide up to 13 hours and will work at lower temperatures. The battery status circuitry is designed for the voltage drop over the life of alkaline batteries. NiMH rechargeable batteries will also work; although they provide fewer hours of operation and will run down quite abruptly. Because of this, using the Power LED to verify battery status is not reliable with NiMH batteries; although, it may be possible to track battery status using the Battery Timer function available in a number of Lectrosonics receivers. (Refer to the associated receiver manual to determine if this function is available in your situation.)

**Warning: Care should be taken not to leave a fully discharged lithium battery in the transmitter, as swelling of the battery can make it difficult to remove from the compartment.**

To replace the battery, push up on the Battery Compartment Door and rotate it clockwise. (See illustration.) Remove the old battery and take note of the polarity marked inside showing the location of the positive (+) and negative (-) terminals. (You can see the large and small contact holes inside the battery compartment with the door open.)

Insert the new battery correctly and close the Battery Compartment Door by reversing the opening procedure. If the battery is inserted incorrectly, the door will not fully close. Do not force the door closed.



# Operating Instructions

## Selecting the Compatibility Mode

All units with serial number 601 (101 for IM) and up are capable of working with Lectrosonics 400 Series Digital Hybrid Wireless™, 200 Series analog, 100 Sseries analog and some non-Lectrosonics analog wireless receivers (contact the factory for details). The transmitter must be set to the operating mode of the matching receiver, which is easily done using only the supplied screwdriver and a battery.

**NOTE:** The unit is supplied from the factory as a 400 series transmitter.

- 1) Ensure the battery is good.
- 2) Turn OFF the transmitter.
- 3) With a small screwdriver (one is included with your unit), set the Frequency Select Switches to CC. (for Change, Change).
- 4) Toggle the power switch ON briefly – just long enough for the LED’s to light up and then turn it OFF.
- 5) Change the Frequency Select Switches to one of the following settings:
  - 100 Series mode: 1,1
  - 200 Series mode: 2,2
  - Mode 3: 3,3
  - 400 Series mode: 4,4
  - IFB Series mode: 5,5
  - Mode 6: 6,6
- 6) Toggle the power switch ON, then OFF again.
- 7) Change the Frequency Select Switches to 0,0.
- 8) Turn the transmitter ON to complete the operation.

The LEDs will blink to indicate the selected compatibility mode. Immediately after power up, all LEDs will blink together red, then green, followed by the audio level LEDs (-20 and -10) blinking to indicate the mode.

The LEDs will blink:

- **Once for 100 Series mode**
- **Two times for 200 Series mode**
- **Three times for some other receivers**
- **Four times for 400 Series mode**
- **Five times for IFB mode\***
- **Six times for Mode 6**

**Note:** Each time the transmitter is turned on, the Power LED will confirm the current operating mode with the number of blinks listed in Step 2. The mode setting will not change until it is reset with the procedure listed above.

**Attention:** During the procedure to set the compatibility mode, each step between toggles of the power switch must be performed within ten seconds, or the procedure must be started from the beginning.

Frequency Select Switch Settings (C,C)



## Attaching a Microphone or Musical Instrument and Adjusting Audio Levels

The front panel Modulation LEDs indicate input level and limiter activity. (See Modulation LED Signal Level Chart.) Since the distortion introduced by the limiter is minimal and full modulation is assured, occasional brief forays into the red by the -20 LED is ideal.

Different voices or instruments will usually require different settings of the AUDIO LEVEL 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.

Musicians also vary their volume depending on the nature of the music. It is suggested that the transmitter be adjusted for the passage with the loudest volume.

- 1) If necessary, install a fresh battery.
- 2) Insert the 5-pin into the input jack. Ensure the pins are aligned and the connector locks in (it will click).  
For those using a musical instrument, insert the 1/4 inch plug on the other end of the MI33A Instrument Cable into the appropriate jack on your your musical instrument.
- 3) Mute the main sound system and rotate the AUDIO LEVEL control on the transmitter to maximum counterclockwise (Off).

Modulation LED Signal Level Chart

Signal Level	-10 LED	-20 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



- 4) Set the transmitter Power switch to ON.
- 5) For microphone users, position the microphone in the location where it will be used in actual operation.  
For musicians, adjust the instrument volume controls to the highest levels that would be used during a performance.
- 6) For microphone users, observe the Modulation LEDs while speaking or singing at the same voice level that will be used during the program. Gradually rotate the AUDIO LEVEL control clockwise until the -10 LED glows green and the -20 dB glows green with occasional red flickers. This indicates full modulation and is the optimum setting for the transmitter's gain.

For musicians, gradually rotate the AUDIO LEVEL control clockwise while playing the loudest notes that will be played during the performance. Although the optimum setting is for both Modulation LEDs to glow green, it is ideal for the -20 LED to briefly flicker red during the loudest passages.

- 7) Once the transmitter's audio gain has been set, the remaining components of the audio system can be energized and adjusted.

**Warning: DO NOT use the audio level control for controlling the volume of your sound system or recorder levels. This gain adjustment matches the transmitter gain with the user's voice level and microphone positioning, or instrument output.**

## Adjusting the Transmitter Frequency

### Frequency Select Switches



If you are experiencing interference from another signal on your operating frequency, you may need to change the operating frequency of your system. This is done through two Frequency Select Switches located on the left side of the transmitter case. (See Frequency Select Switch Locations.)

The left switch adjusts the operating frequency of the transmitter up or down in 1.6 MHz steps. The right switch adjusts the operating frequency of the transmitter up or down in 100 kHz steps. It is suggested to use the metering on the associated receiver to find a clear channel. Turn the transmitter off and leave the receiver turned on.

All 400 Series (and a number of earlier receivers) offer front panel LCDs that indicate the correct transmitter switch settings, and built in scanning functions to help locate clear channels. Use the scanning functions on these receivers to find a clear channel, then switch both the receiver and transmitter to the Frequency Select Switch settings indicated in the receiver's display.

The R400 Series receivers have an autotune function (SmartTune) that automatically locates clear operating channels.

If your receiver does not have an autotune or built in scanning function, manually tune the receiver across its band and find a frequency where little or no RF activity is displayed.

After finding a clear channel, set the transmitter to this new frequency, then turn it on and make sure the RF signal is strongly indicated at the receiver. Be sure the switch settings between the receiver and transmitter are set exactly the same. If, for example, the 100K switch is one click above or below the desired frequency, the receiver will indicate RF, but no audio (or severely distorted audio) will be produced.



# 5-Pin Input Jack Wiring

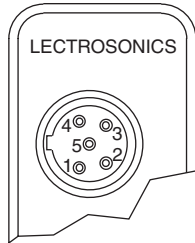
The wiring diagrams included in this section represent the basic wiring necessary for the most common types of microphones and other audio inputs. Some microphones may require extra jumpers or a slight variation on the diagrams shown.

It is virtually impossible to keep completely up to date on changes that other manufacturers make to their products, thus 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 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.



TRANSMITTER INPUT JACK

- 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.

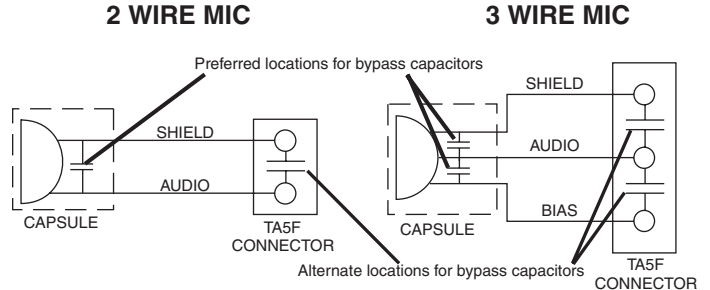
## Microphone RF Bypassing

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 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

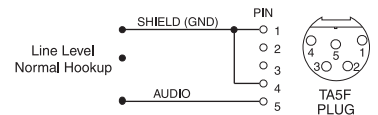
Leadless capacitors: P/N SCC330P

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

## Line Level Signals

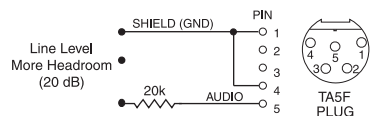
The normal hookup for line level signals is:

- Signal Hot to pin 5
- Signal Gnd to pin 1
- pin 4 jumped to pin 1



This allows signal levels up to 3V 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

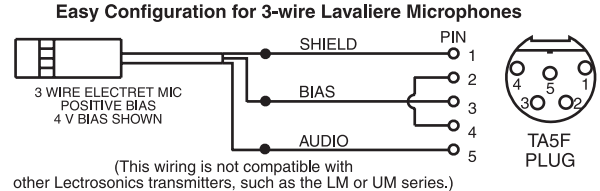
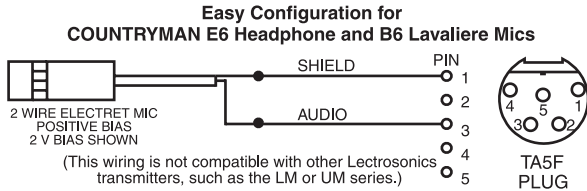
In addition to the wiring hookups illustrated below, Lectrosonics makes a number of cables and adapters for other situations such as connecting musical instruments (guitars, bass guitars, etc.) to the transmitter. These cables can be found in our UHF or Accessories catalogs. Visit [www.lectrosonics.com](http://www.lectrosonics.com),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

In the LMA Series, there is a new input circuit where 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.”

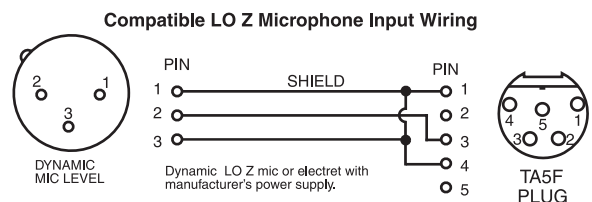
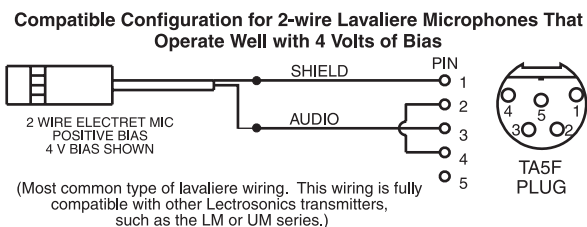
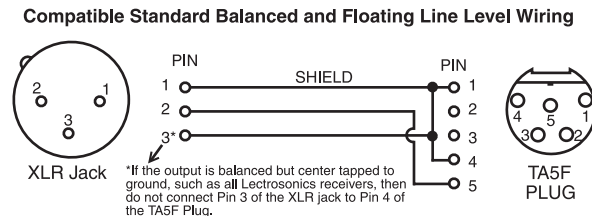
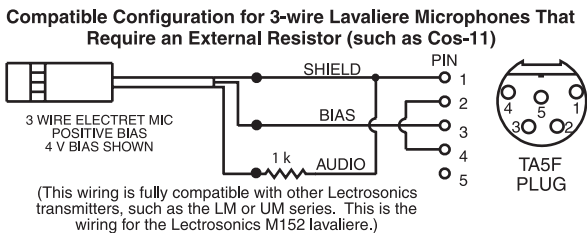
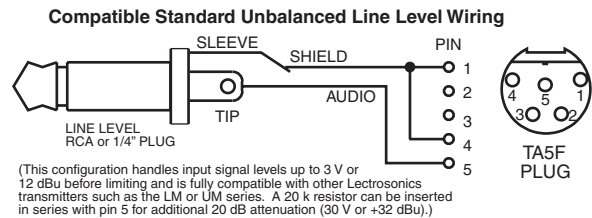
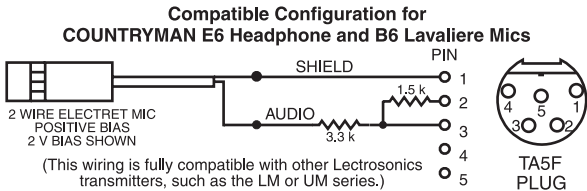
Sanken Cos-11 microphones, the Lectrosonics M150 and other three wire microphones to be used with the SM will require new wiring. If the wiring is not changed, they will have much higher output than usual and extra distortion at high levels. The reason is that the source follower wiring used with the UM200 and UM400 series is not compatible with the SM virtual ground input. In the “Compatible with SM Series 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 Series and other Lectrosonics Transmitters” section.

## Works with Servo Input Only:



## Compatible with SM Series and other Lectrosonics Transmitters:

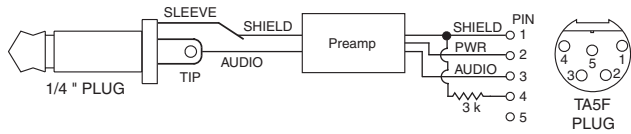


## Wiring Diagram for MI33A Instrument Cable

The MI33ARA and MI33AST instrument cable assemblies allow an optimum match between musical instrument pickups and Lectrosonics transmitters with 5-pin input connectors.

The active preamp and low noise wire cable provide a "same as wire" experience in a wireless environment.

The 30 inch long cable offers enough cable to comfortably link the instrument to the wireless transmitter without being excessive.



Note: This cable is prewired and cannot be field modified. The cable is available in two configurations, MI33ARA (right angle) and MI33AST (straight).



# Troubleshooting

It is important that you follow these steps in the sequence listed.

## Symptom:

## Possible Cause:

**Transmitter Battery LED off when Power Switch “ON”**

1. Battery is inserted backwards.
2. Battery is dead.

**No Transmitter Modulation LEDs when Signal Should be Present**

1. Gain control turned all the way down.
2. Battery is in backwards. Check power LED.
3. Mic capsule is damaged or malfunctioning.
4. Mic cable damaged or miswired.
5. Instrument Cable damaged or not plugged in.
6. Musical instrument volume control set too low.

**Receiver Indicates RF But No Audio**

1. Ensure that the transmitter and receiver Frequency Select Switches are set to the same frequency.
2. Make sure the compatibility mode is the same on transmitter and receiver.
3. Ensure musical instrument volume control is not set to minimum.

**Receiver RF Indicator Off**

1. Transmitter not turned on, or battery is dead.
2. Receiver antenna missing or improperly positioned.
3. Transmitter and receiver not on same frequency. Check switches/display on transmitter and receiver.
4. Operating distance is too great.

**No Sound (Or Low Sound Level), Receiver Indicates Proper Audio Modulation**

1. Receiver output level set too low.
2. Receiver output is disconnected; cable is defective or miswired.
3. Sound system or recorder input is turned down.

**Distorted Sound**

1. Transmitter gain (audio level) is too high. Check Modulation LEDs on transmitter and receiver as transmitter is being used. (Refer to ATTACHING A MICROPHONE OR MUSICAL INSTRUMENT AND ADJUSTING AUDIO LEVELS.)
2. Receiver output may be mismatched with the sound system or recorder input. Adjust output level on receiver to the correct level for the recorder, mixer or sound system.
3. Transmitter is not set to same frequency as receiver. Check that frequency select switches on receiver and transmitter match.
4. RF interference. Reset both transmitter and receiver to a clear channel.

**Wind Noise or Breath “Pops”**

1. Reposition microphone, or use a larger windscreen, or both.

**Hiss and Noise -- Audible Dropouts**

1. Transmitter gain (audio level) far too low.
2. Receiver antenna missing or obstructed.
3. Operating distance too great.
4. RF interference. Reset both transmitter and receiver to a clear channel.
5. Musical instrument volume set too low.

**Excessive Feedback (With Mic)**

1. Transmitter gain (audio level) too high. Check gain adjustment and/or reduce receiver output level.
2. Transmitter too close to speaker system.
3. Mic is too far from user’s mouth.

# Specifications and Features

Operating frequencies:	Block 21 Block 22 Block 23 Block 24 Block 25 Block 26 Block 27 Block 28 Block 29	537.600 - 563.100 563.200 - 588.700 588.800 - 607.900 and 614.100 - 614.300 614.400 - 639.900 640.000 - 665.500 665.600 - 691.100 691.200 - 716.700 716.800 - 742.300 742.400 - 767.900
Frequency Selection:	256 frequencies in 100 kHz steps	
Channel Separation:	100 kHz	
Compatibility Modes:	Lectrosonics 400 Series (Digital Hybrid), 200 Series, 100 Series, and IFB. Mode 3, Mode 6 (Other brands).	
RF Power output:	Greater than 50 mW	
Pilot tone:	25 to 32 kHz frequency; 5 kHz deviation (400 Series only)	
Frequency stability:	± 0.002%	
Deviation:	± 75 kHz max. (200 & 400 Series Modes)	
Spurious radiation:	60 dB below carrier	
Equivalent input noise:	-120 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 lavaliere 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 lavaliere:</b>	Input is virtual ground with servo adjusted constant current bias	
<b>Line level:</b>	2.7 k Ohms	
Input limiter:	Dual envelope, >30 dB range	
	(Note: The dual envelope "soft" limiter provides exceptionally good handling of transients using variable attack and release time constraints.)	
Gain control range:	43 dB; semi-log rotary control	
Modulation indicators:	Dual bicolor LEDs indicate modulation of -20, -10, 0, +10 dB referenced to full modulation.	
Low frequency roll-off:	LM: -12 dB/octave; -3 dB @ 70 Hz IM: -12 dB/octave; -3 dB @ 35 Hz	
Audio frequency response (overall system):	LM: 90 Hz to 20 kHz (+/- 1 dB) with the 70Hz low frequency roll-off filter. IM: 40 Hz to 20 kHz (+/- 1 dB)	
	(Note: The transmitter is deliberately rolled off at 70Hz in the LM transmitter to reduce transmission of the lower frequency noise when used with a microphone.)	
Controls:	2 position "OFF-ON" slide switch for noiseless turn on/turn off operation. Front panel audio gain control. Rotary switches on side panel adjust transmitter frequency.	
Audio Input Jack:	Switchcraft 5 pin locking (TA5F)	
Antenna:	Galvanized steel, flexible wire.	
Battery:	Precision compartment auto-adjusts to accept any known alkaline 9 volt battery.	
Battery Life:	6 hours (alkaline); 13 hours continuous (lithium)	
Weight:	6.3 ozs. including battery	
Dimensions:	3.1 x 2.4 x .75 inches	
Emission Designator:	180KF3E	

Specifications subject to change without notice.

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.

## 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 email 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.

#### Lectrosonics USA:

**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

**E-mail:**

sales@lectrosonics.com

#### Lectrosonics Canada:

**Mailing Address:**

49 Spadina Avenue,  
Suite 303A  
Toronto, Ontario M5V 2J1

**Telephone:**

(416) 596-2202  
(877) 753-2876 Toll-free  
(877-7LECTRO)  
(416) 596-6648 Fax

**E-mail:**

Sales: colinb@lectrosonics.com  
Service: joeb@lectrosonics.com



## 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.

