Excerpt from FAQ #70

What are the mic wiring differences between the new SM transmitter and the other older Lectrosonics transmitters such as the UM400? What should I do with my current microphones?

The SM Series transmitters introduced a radically different input circuit compared to previous Lectrosonics transmitter microphone inputs. It is so superior to the old way of doing things that we will eventually introduce this input system on all our UHF transmitters. We realize this causes some confusion for our customers but the advantages are very real. 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. For a more detailed technical discussion of the improvements in the SM servo input stage, read FAQ #61 on our web site.

We spent many hours trying to make the change from the old system to the new system as painless as possible.

For most microphones in common use, no changes are necessary to the wiring of the 5-pin connector. For some microphones the wiring can be simplified. For line level inputs, our custom musical instrument cables, adapter cables and so forth we have managed to keep the 5-pin wiring the same for old and new transmitters.

The introduction discusses what each pin of the TA5F connector does. The most radical change is that pin 4 is now a voltage selector pin. The first box, labeled “Works with Servo Bias Inputs 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 labeled, “Compatible with Servo Bias Inputs and Older Style Input Circuits.”

Sanken COS-11 microphones, the Lectrosonics M152 and other three wire microphones to be used with the SM Series 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 third diagram in the “Compatible with Servo Bias Inputs and Older Style Input Circuits” 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 Servo Bias Inputs 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 second diagram in the “Compatible with Servo Bias Inputs and Older Style Input Circuits” section.

For a longer and more detailed version of this explanation see FAQ #70 on our web site.

NOTE: The servo bias input on SM Series transmitters is being added to revised versions of all Lectrosonics transmitters with 5-pin input jacks such as the UM400a and UM450. Check with the factory for details regarding exactly which models are affected. Your best wiring option will depend on your inventory of transmitter models.
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: www.lectrosonics.com

Audio input jack wiring:

PIN 1  Shield (ground) for positive biased electret lavaliere microphones. Shield (ground) for dynamic microphones and line level inputs.

PIN 2  Bias voltage source for positive biased electret lavaliere 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.

Installing the Connector:

1) If necessary, remove old connector from microphone cable.

2) Slide Rubber Boot onto microphone cable with the large end facing away from the microphone. (See illustration above.)

3) If necessary, slide the 1/8-inch black shrink tubing onto the microphone cable. (This tubing is needed for some cables to ensure the cable fits snugly in the rubber boot.)

4) Use the resistors and connector included with this kit to configure the TA5F to your particular microphone. (See Wiring Diagrams below.) A length of .065 OD clear tubing is included if insulating the resistor leads or shield wire is necessary. (Remove rubber strain relief from connector backshell by pulling it out of the backshell.)

5) Slide the Strain Relief over the TA5F Insert and crimp as shown to the right. Then insert the TA5F Insert and Strain Relief in the TA5F Latchlock. Screw the TA5F Flex Relief onto the TA5F Latchlock.

6) If needed, position and shrink the 1/8-inch shrink tubing on the microphone cable, then slide the Rubber Boot down over the TA5F connector.

Note: If you use the dust boot, remove the rubber strain relief that is attached to the TA5F cap, or the boot will not fit over the assembly.

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SM Equivalent Input Circuit Wiring

![Wiring Diagram](image-url)
Microphone Cable Termination for Non-Lectrosonics Microphones

TA5F Connector Assembly

Mic Cord Stripping Instructions

Crimping to Shield and Insulation

Strip and position the cable so that the clamp can be crimped to contact both the mic cable shield and the insulation. The shield contact reduces noise with some microphones and the insulation clamp increases ruggedness.

NOTE: This termination is intended for UHF transmitters only. VHF transmitters with 5-pin jacks require a different termination. Lectrosonics lavaliere microphones are terminated for compatibility with VHF and UHF transmitters, which is different than what is shown here.
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 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 microphone and line level 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. Visit www.lectrosonics.com and click on Accessories, or download the master catalog.

A lot of information regarding microphone wiring is also available in the FAQ section of the web site at: http://www.lectrosonics.com/faq.htm

Follow the instructions to search by model number or other search options.

Compatible Wiring for Both Servo Bias Inputs and Earlier Transmitters:

1. **2 VOLT POSITIVE BIAS 2-WIRE ELECTRET**
   - PIN 1: SHIELD
   - PIN 2: AUDIO
   - PIN 3: 2.7 k
   - PIN 4: 3 k
   - PIN 5: TA5F PLUG
   - Compatible wiring for microphones such as Countryman E6 headworn and B6 lavaliere.

2. **4 VOLT POSITIVE BIAS 2-WIRE ELECTRET**
   - PIN 1: SHIELD
   - PIN 2: AUDIO
   - PIN 3: 2.7 k
   - PIN 4: 3 k
   - PIN 5: TA5F PLUG
   - Must common type of wiring for lavaliere mics. Fully compatible with 5-pin inputs on Lectrosonics transmitters such as the LM and UM Series.

3. **DPA MICROPHONES (Danish Pro Audio)**
   - PIN 1: SHIELD
   - PIN 2: AUDIO
   - PIN 3: 2.7 k
   - PIN 4: 3 k
   - PIN 5: TA5F PLUG
   - This wiring is for DPA lavaliere and headset microphones. NOTE: The resistor value can range from 3k to 4k ohms.

4. **2 VOLT NEGATIVE BIAS 2-WIRE ELECTRET**
   - PIN 1: SHIELD
   - PIN 2: AUDIO
   - PIN 3: 2.7 k
   - PIN 4: 3 k
   - PIN 5: TA5F PLUG
   - Compatible wiring for microphones such as negative bias TRAM models. NOTE: The resistor value can range from 2k to 4k ohms.

5. **4 VOLT POSITIVE BIAS 3-WIRE ELECTRET WITH EXTERNAL RESISTOR**
   - PIN 1: SHIELD
   - PIN 2: AUDIO
   - PIN 3: 2.7 k
   - PIN 4: 3 k
   - PIN 5: TA5F PLUG
   - Used for 3-wire lavaliere microphones that require an external resistor such as the Senaan COS-11.
   - This wiring is fully compatible with 5-pin inputs on Lectrosonics transmitters such as the LM and UM Series. This is the wiring for the Lectrosonics M152 lavaliere microphone.

6. **LO-Z MICROPHONE LEVEL SIGNALS**
   - PIN 1: SHIELD
   - PIN 2: AUDIO
   - PIN 3: 2.7 k
   - PIN 4: 3 k
   - PIN 5: TA5F PLUG
   - For low impedance dynamic mics or electret mics with internal battery or power supply.
   - Insert 1k resistor in series with pin 3 if attenuation is needed.

7. **BALANCED AND FLOATING LINE LEVEL SIGNALS**
   - PIN 1: SHIELD
   - PIN 2: XLR JACK
   - PIN 3: 2 VOLT POSITIVE BIAS 2-WIRE ELECTRET
   - PIN 4: TA5F PLUG
   - NOTE: If the output is balanced but center tapped to ground, such as on all Lectrosonics receivers, do not connect Pin 3 of the XLR jack to Pin 4 of the TA5F connector.

8. **UNBALANCED LINE LEVEL SIGNALS**
   - PIN 1: LINE LEVEL RCA or 1/4" PLUG
   - PIN 2: TIP
   - PIN 3: AUDIO
   - PIN 4: TA5F PLUG
   - For signal levels up to 3V (+12 dBu) before limiting. Fully compatible with 5-pin inputs on other Lectrosonics transmitters such as the LM and UM Series. A 20k ohm resistor can be inserted in series with Pin 5 for an additional 20 dB of attenuation to handle up to 30V (+32 dBu).

9. **2 VOLT POSITIVE BIAS 3-WIRE ELECTRET**
   - PIN 1: SHIELD
   - PIN 2: AUDIO
   - PIN 3: 2 k
   - PIN 4: 3 k
   - PIN 5: TA5F PLUG
   - Simplified wiring for microphones such as Countryman E6 Lavaliere and E6 Earset models and others.
   - NOTE: This servo bias wiring is not compatible with earlier versions of Lectrosonics transmitters. Check with the factory to confirm which models can use this wiring.

10. **2 VOLT NEGATIVE BIAS 2-WIRE ELECTRET**
   - PIN 1: SHIELD
   - PIN 2: AUDIO
   - PIN 3: 2 k
   - PIN 4: 3 k
   - PIN 5: TA5F PLUG
   - Simplified wiring for microphones such as negative bias TRAM.
   - NOTE: This servo bias wiring is not compatible with earlier versions of Lectrosonics transmitters. Check with the factory to confirm which models can use this wiring.

11. **4 VOLT POSITIVE BIAS 3-WIRE ELECTRET**
    - PIN 1: SHIELD
    - PIN 2: AUDIO
    - PIN 3: 2 k
    - PIN 4: 3 k
    - PIN 5: TA5F PLUG
    - Used for 3-wire lavaliere microphones that require an external resistor such as the Sanken COS-11.
    - This wiring is for 3-wire lavaliere microphones that require an external resistor such as the Sanken COS-11.
    - This wiring is fully compatible with 5-pin inputs on other Lectrosonics transmitters such as the LM and UM Series. A 20k ohm resistor can be inserted in series with Pin 5 for an additional 20 dB of attenuation to handle up to 30V (+32 dBu).

12. **2 VOLT NEGATIVE BIAS 3-WIRE ELECTRET**
    - PIN 1: SHIELD
    - PIN 2: AUDIO
    - PIN 3: 2 k
    - PIN 4: 3 k
    - PIN 5: TA5F PLUG
    - Simplified wiring for microphones such as negative bias TRAM.
    - NOTE: This servo bias wiring is not compatible with earlier versions of Lectrosonics transmitters. Check with the factory to confirm which models can use this wiring.

13. **4 VOLT POSITIVE BIAS 3-WIRE ELECTRET**
    - PIN 1: SHIELD
    - PIN 2: AUDIO
    - PIN 3: 2 k
    - PIN 4: 3 k
    - PIN 5: TA5F PLUG
    - Simplified wiring for microphones such as negative bias TRAM.
    - NOTE: This servo bias wiring is not compatible with earlier versions of Lectrosonics transmitters. Check with the factory to confirm which models can use this wiring.