INSTRUCTION MANUAL

R172 DUAL-RECEIVER

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INTRODUCTION

The R172 receiver is a fixed frequency design two channel wireless microphone receiver. Designed to offer two simultaneous channels of wireless microphones, the R172 will can operate both channels from one antenna or two for passive diversity operation. The dual antenna configuration reduces the probability of dropouts resulting from multipath interference. Additionally, the audio output from this receiver can be either split into discrete channels or mixed internally for maximum flexibility in any audio installation.

The RF signal first passes through RF filter coils coupled with ultra-low noise J-FETs. The J-FETs are used to provide enough gain to compensate for inherent losses in the filter stages. Crystal controlled oscillators are used to minimize drift and are stable over a wide range of temperatures. The output of the front end is then fed to a double balanced diode mixer which generates an interference free IF signal. The mixer is followed by an LC filter stage and the signal is amplified.

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RECEIVER FRONT PANEL

Front panel controls on the R172 are identical for each channel and operate independently from each other.

MODULATION -- Indicates the modulation (audio level) of the incoming signal. The green LED indicates an adequate modulation level. The red LED indicates maximum or "peak" modulation.

OUTPUT LEVEL -- An output attenuator is used to reduce the audio output level of the receiver. Reduces the audio output levels of the XLR jacks in the rear by rotating the knob counter-clockwise.

NOTE: This control does not affect the **MODULATION** display, the **RF** LED or the **POWER** LED -- it also does not affect the output level of the "**LINE LEVEL**" RCA jack.

RF LED -- Light when the transmitters are turned on. If the carrier signal is too weak to produce a quality signal, the lamp will go out. Each channel has it's own independent **RF** LED.

POWER LED -- Lights when the receiver is turned on.

OFF ON SWITCH - This switch activates the receiver when set to the "ON" position.

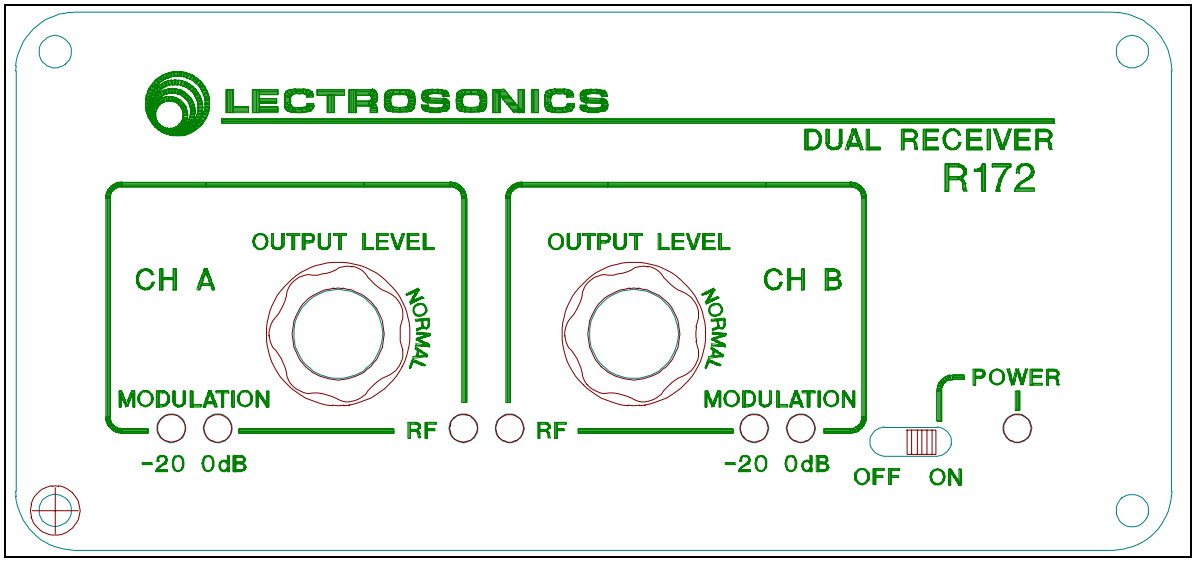

Figure 1 R172 Front Panel

RECEIVER REAR PANEL

ANTENNA terminals -- Standard BNC 50 ohm connectors for connecting the antennas. The R172 is normally shipped with a telescoping whip antenna and a coaxial antenna. Rack mounted units are shipped with two coaxial antennas.

ANTENNA MODE - The unit may be operated as either a single antenna or a dual antenna system. If two antennas are used set the switch to **DUAL**. If operating with only one antenna, set the switch to **SNGL.**

12 VDC DC POWER -- Connect the power supply here -- the CH-12 AC adapter is supplied with the receiver for powering the unit from a 110 V AC outlet -- the receiver may also be powered from 12 volt DC sources using the correct plug (Switchcraft S-760 power plug); the center pin is positive (+).

AUDIO OUTPUTS

MIC LEVEL -- 3 pin XLR at microphone level (80mV max.); 200 ohm impedance for either balanced or unbalanced inputs

LINE LEVEL -- RCA phono jack at "line" level (1 volt max); 1K ohm impedance for unbalanced inputs. The output level of this RCA jack is not affected by the front panel **OUTPUT LEVEL** control.

SEPARATE MIXED SWITCH - Allows the "A" and "B" audio signals to be mixed, if desired. Setting the switch to **SEPARATE** will keep the signals from the two channels discrete. Setting the switch to **MIXED** will mix the signals internally, allowing both channels to be output through either output jack.

AUDIO INPUT (mixing bus)

AUX INPUTS -- RCA phono jack inputs accept external tape deck or other audio source; mixes audio with receiver output. Also allows "stacking" multiple receivers.

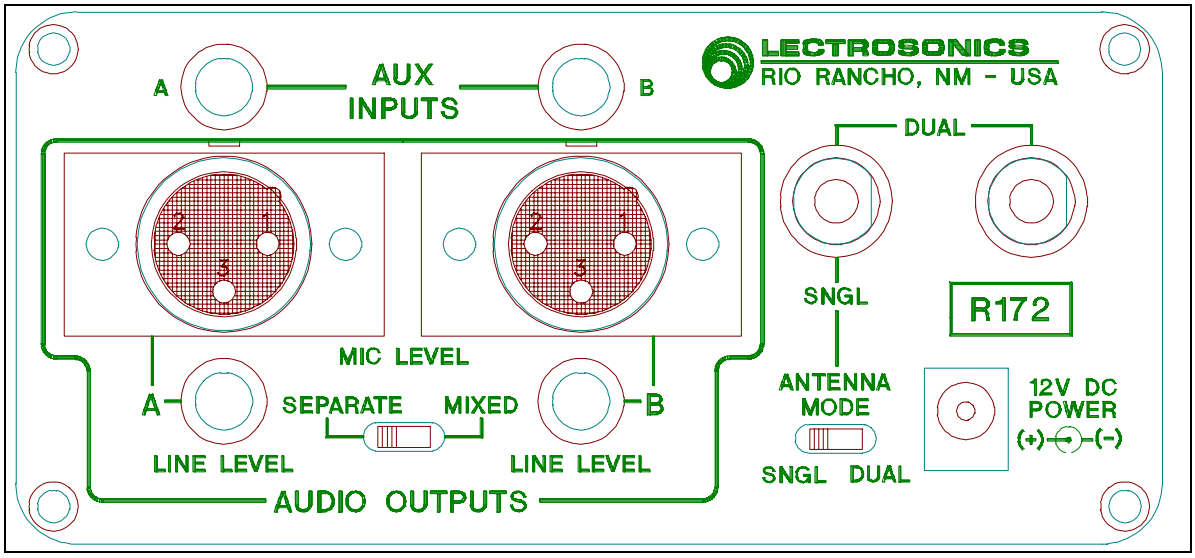

Figure 2 R172 Rear Panel

OPERATING INSTRUCTIONS
SET UP AND OPERATION SEQUENCE

1) CONNECT POWER CORD -- Plug the connector of the CH-12 adapter included with the receiver into the jack labeled "12 VDC INPUT." Insert the plug fully into the jack.

2) ATTACH THE ANTENNAS - Two antennas are provided with the receiver. If the system is not rack mounted, the unit will have a telescoping whip antenna and a coaxial dipole antenna (this antenna looks like a piece of cable with a small loop in one end and a BNC connector on the other). If it has been mounted into an RMP3 rack kit, then it will have two coaxial dipole antennas.

If the system will be installed with one antenna - Attach the single antenna to the BNC connector marked **SNGL** on the rear of the receiver. Set the **ANTENNA MODE** switch to **SNGL**

If the antenna is the telescoping whip, extend the antenna to its full length.

The coaxial dipole antenna should be uncoiled and led away from the receiver. The loop on the end is provided as a convenient attachment point. The cable should be hung on a wall or suspended so the last 3.5 ft are straight and not close to any metal surfaces such as file cabinets, metals walls, or metal studs. Wood stud drywall construction will present no problems and the antenna may be hung against the wall. Some contractors have actually run the antenna up inside hollow walls. Be sure to test the system before committing the system to a particular antenna placement.

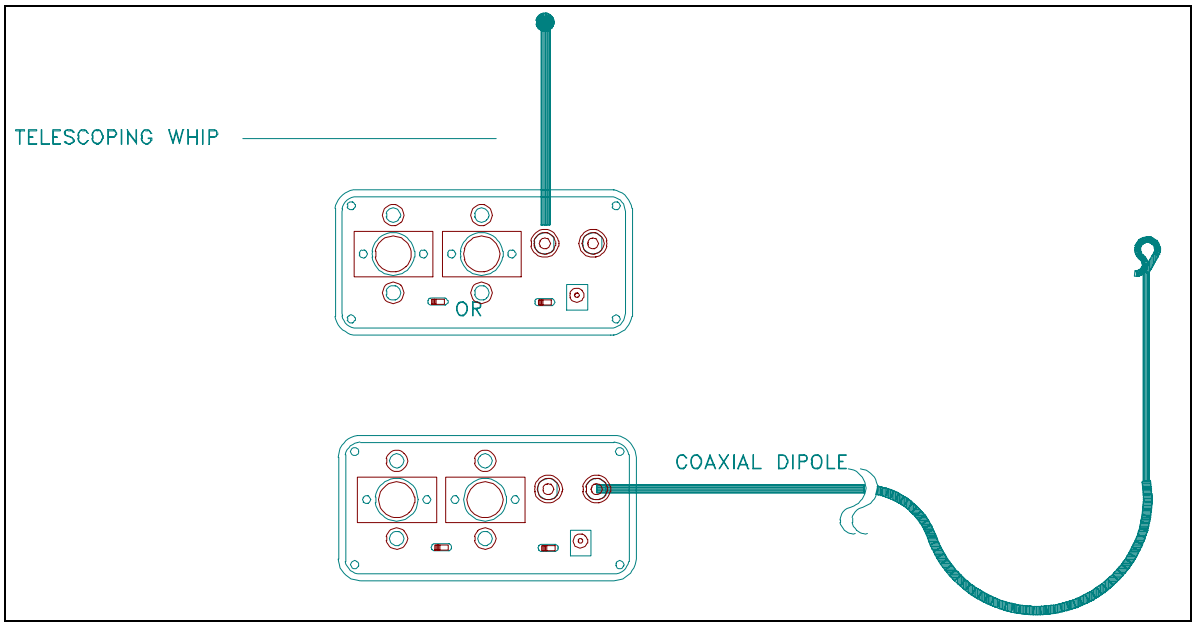

Figure 3 Single Antenna Options

If the system will be installed with dual antennas - Attach both antennas to the dual BNC connectors on the back of the receiver. Set the **ANTENNA MODE** switch to the **DUAL** position. If a telescoping whip is used, fully extend the whip. **DO NOT USE TWO TELESCOPING WHIPS ATTACHED SIDE BY SIDE AT THE RECEIVER.** There is little to no benefit of placing the antennas side by side. Place the coaxial antennas in the same manner as described above. The two antennas should be placed at least 6 ft apart for best reception. This will put each antenna into a different signal path (diversity) and reduce the possibility of dropout.

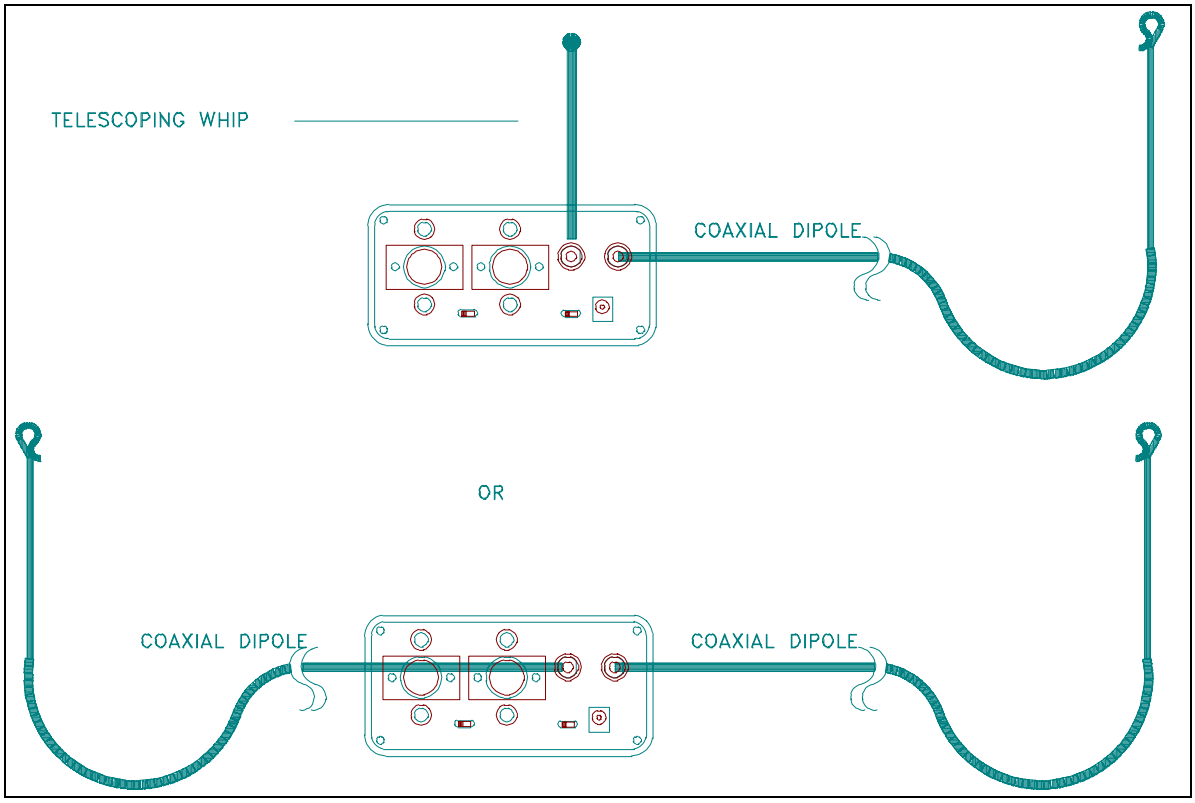

Figure 4 Dual Antenna Options

3) CONNECT THE AUDIO CABLE/S -

If the receiver will be connected directly to an amplifier and there is only one audio input available, set the **SEPARATE/MIXED** switch to the mixed position and connect the cable to either the "A" or "B" output jack. You may also used the MIXED position to connect the receiver to a tape deck and an amplifier for simultaneous recording. See the illustration below.

If the receiver will be connected to a mixer or an amplifier with two (or more) audio inputs, then set the switch to **SEPARATE**. By doing so, the audio signals will be separate and can be adjusted independently at the mixer or amplifier. Connect the receiver with two cables to the amplifier or mixer.

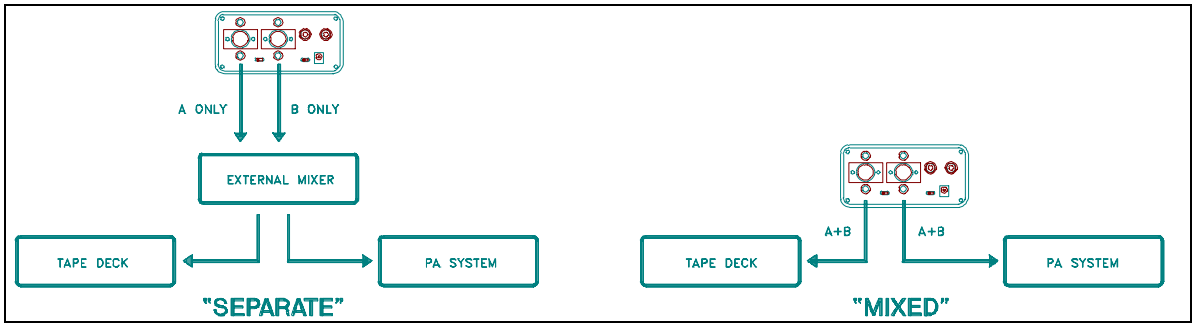

Figure 5 Audio Connections

4) SET FRONT PANEL SWITCH TO "ON" POSITION - Be sure the POWER LED lights.

5) ADJUST TRANSMITTER "MIC LEVEL" (See transmitter manual)

This is perhaps the most important step in the set up procedure. See your transmitter manual for specific instructions on the proper gain adjustment of your transmitter. With some transmitter models you will need to observe the **MODULATION** LED's on the receiver front panel as you adjust the gain on the transmitter.

6) SET THE OUTPUT LEVELS - Set the front panel controls for **OUTPUT LEVEL** on each channel to the "**NORMAL**" (at the 3 o'clock position)

7) ADJUST THE SOUND SYSTEM VOLUME

ANTENNA USE AND PLACEMENT

Extend the antennas fully. Position the antennas so that they are not touching each other 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. In the dual antenna mode, place the antennas at least 6 ft apart. If the installation has two rooms serviced by the same receiver, you may want to extend one antenna into one room and place the other antenna into the second room. See the illustration below.

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 a cancellation may occur. The result would 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. A dropout normally sounds like "hum" or "hiss." Moving the transmitter (even a few inches) will change the hum or hiss, or eliminate it. A dropout situation may be either better or worse as the crowd fills and/or leaves the room. The dual antenna configuration (passive diversity) of the R172 helps reduce the probability of this problem occurring.

In the event that you do encounter a dropout problem, first try moving the receiver/antennas at least 3 or 4 feet from where they were. This may alleviate the dropout problem. If dropouts are still a problem, try moving the receiver and/or the antennas to an entirely different location in the room. **Note - moving the receiver will only have an effect if there is a telescoping whip antenna attached directly to the receiver.** If both antennas are the coaxial cable type, you will only need to move them around.

MULTI-CHANNEL AUDIO MIXING

The R172 receiver offers a unique feature that eliminates the necessity of using an external audio mixer in multi-channel applications. When using two R172 receivers together, the **LINE LEVEL** and **AUX INPUTS** jacks provide "unity gain" mixing of the audio signals. This means that the audio output of the receivers may be mixed together through these connectors without affecting the volume levels. Connect the **LINE LEVEL** jack of one receiver to the AUDIO IN jack of the next receiver, then connect its **LINE LEVEL** jack to the **AUX INPUTS** jack of the next receiver, forming a "chain" as shown in the illustration.

Two receivers may be interconnected in this manner so that a single audio output is available from the output of the last receiver in the "chain".

The output level of the **LINE LEVEL** RCA jack is not affected by the **OUTPUT LEVEL** control. The **OUTPUT LEVEL** control on the last receiver in the "chain" will control the combined volume of all the receiver outputs. In order to control the receiver outputs independently, you will need to use an external microphone mixer without the "jumper" cords shown below.

MIXING AN EXTERNAL TAPE DECK WITH RECEIVER OUTPUT

A tape player (or other audio source) may be connected to the AUDIO IN jack on the rear panel to mix the tape player output with the receiver output. Adjust the volume of the tape player with the volume control on the tape player since there is not a separate control for this purpose on the receiver. You may also record from the R172 by connecting to the **LINE LEVEL** jacks on the rear panel.

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 BATTERY LED OFF	1) External LED is turned off. Check internal slide switch. 2) Battery is inserted backwards. 3) Battery is dead.
NO TRANSMITTER MOD LEVEL LEDs	1) Gain control turned all the way down. 2) Battery is in backwards. Check power LED. 3) Mic capsule is damaged or malfunctioning.
RECEIVER RF LAMP OFF	1) Transmitter not turned on. 2) Transmitter battery is dead. 3) Receiver antenna missing or improperly positioned. 4) Transmitter and receiver not on same frequency. Check labels on transmitter and receiver. 5) Operating range is too great.
NO SOUND AND RECEIVER MOD LEVEL LEDs ARE OFF	Transmitter audio muted. Make sure bottom panel "A" switch is turned on. Push switch toward the letter "A" to turn the audio on.
NO SOUND BUT RECEIVER MOD LEVEL LEDs ARE ON	1) Receiver audio is muted. Refer to receiver manual. 2) Receiver audio output is disconnected or cable is defective or mis-wired. 3) Sound system or recorder input is turned down.
DISTORTED SOUND	1) Transmitter gain (audio level) is too high. Speak or sing into the transmitter and check mod level lamps on transmitter and receiver. 2) Receiver output may be mis-matched with the sound system or recorder input. 3) Excessive wind noise or breath "pops."
HISS AND NOISE -- AUDIBLE DROPOUTS	1) Transmitter gain (audio level) too low. 2) Receiver antenna missing or obstructed. 3) Operating range too great.
EXCESSIVE FEEDBACK	1) Transmitter gain (audio level) too high. Check gain adjustment and/or reduce receiver output level. 2) Transmitter too close to speaker system. 3) Move transmitter closer to the user's mouth.

SPECIFICATIONS

Operating frequencies:	150 to 216 MHz crystal controlled
Sensitivity:	1.0uV for 20dB SINAD 2.0uV for 50dB S/N ratio
Signal/noise ratio:	96 dB A-weighted
Squelch quieting:	greater than 96 dB
AM rejection:	better than -40 dB (10uV to 0.1 volts)
Modulation acceptance:	+/- 15KHz
Image/spurious rejection:	greater than 100 dB
Audio outputs:	* XLR: 200 ohm balanced; 100mV max. * RCA: 1K ohm unbalanced; 1 volt max.
Audio input:	RCA jack for unity gain audio mixing bus
Antenna input:	BNC connectors; 50 ohm impedance
Controls:	**OUTPUT LEVEL** attenuators control A & B balanced outputs; **POWER** switch **SEPARATE/MIXED** audio switch **SNGL/DUAL ANTENNA MODE** switch
Indicators:	**POWER** LED for power "ON" **MODULATION** LEDs for modulation level on each channel "**RF**" LED
Power requirements:	* 12 volt DC direct to panel mounted jack * 110 volt AC via CH-12 AC adapter
Power consumption:	125 mA max.
Weight:	2 lbs 5 oz.
Dimensions:	2.9H x 5.3W x 7.4D inches

FACTORY REPAIR SERVICE

ALWAYS CONTACT THE FACTORY BEFORE SHIPPING ANYTHING BACK FOR SERVICE.

DO NOT try to repair this transmitter yourself.

DO NOT try to adjust any controls inside the unit. Alignment of the receivers requires a spectrum analyzer, an RF voltmeter, and a wide bandwidth oscilloscope. The various controls and trimmers do not drift with age or vibration. Once they are set at the factory they never require readjustment. There are no adjustments inside the unit that will make a malfunctioning unit start working.

LECTROSONICS will supply, on request, a technical service package of schematics and alignment instructions to qualified personnel. This information will be supplied free of charge.

LECTROSONICS service department is equipped and staffed to repair your equipment quickly. In-warranty repairs are made at no charge in accordance with the terms of the warranty in the front of this manual. Out of warranty repairs are charged at a modest flat rate plus parts. 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.

RETURNING UNITS FOR REPAIR

Please save yourself time and trouble by following the steps outlined below:

1) Call or write first -- we will need to know the model number, serial number, and the nature of the problem.
2) We will issue a return authorization number (RA) to you -- this number must be marked on the outside of the carton.
3) Pack the equipment carefully -- if you need shipping containers, they are available from the factory.
4) We strongly recommend that you insure the equipment. We cannot be responsible for shipping damage or loss. We insure it when it is shipped back to you.

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