R31
FM 831
M30

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Lectrosonics

Freedomike®

Low Band

Wireless Microphone

Sound Systems

Operation and Troubleshooting

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TABLE A

ACCESSORIES USED WITH FREEDOMIKE SYSTEMS

CAT.NO.	ITEM DESCRIPTION	USE
A-34	Lavalier Cord	Neck cord for M117 and RM-131S Microphones
A-54	Antenna, Telescoping,54"	Replacement antenna for R31 Series Receivers
C-20	Lavalier Clip	Adapts M116 Microphone for lavalier use
CC-12	Carrying Case	For R31, M30, M116 plus accessories
CC-831	Carrying Case	For FM831,M30,M116 plus accessories
CH-12	Charger/Battery Eliminator	M30R Transmitters
CH-16	Charger/Battery Eliminator	M30R Transmitters & some early R31 Series Receivers
CH-40	Charger/Battery Eliminator	R31 Series Receivers & FM831 Receiver/Sound Systems
CP-25	25'Cable,3-Pin Audio Connectors	PLUS POWER & other P.A.systems with 3-pin audio input connectors
CP-50	50'Cable,3-Pin Audio Connectors	PLUS POWER & other P.A.systems with 3-pin audio input connectors
CP-100	100'Cable,3-Pin Audio Connectors	PLUS POWER & other P.A.systems with 3-pin audio input connectors
CP-Y	"Y"Cable,3-Pin Audio Connectors	Two PLUS POWER & other P.A.systems with 3-pin audio input connectors
HM141V	Headset Microphone w/Volume Control	M30 Series Transmitters
MC-16C	16' Microphone Coil Cord	For RM-111S Microphone when connected to FM831 AUX MIC IN jack
MC-37	Microphone Cord for M116	Connects M116 Microphone to M30 Series Transmitter
ML-10	10' Microphone Level Cord	Connects MIC OUT to amplifiers with 1/4" phone jack MIC.inputs
MM-8	8' Cord,Stacking Banana Plugs	For multiple frequency R31 Receiver installations - see para.6.05
MM-16	16'Microphone Cable	For RM-111S Microphone when connected to FM831 AUX MIC IN jack

TABLE A continued
ACCESSORIES USED WITH FREEDOMIKE SYSTEMS

CAT.NO.	ITEM DESCRIPTION	USE
MM-18	18" Cord, Male Phonograph Plugs	For multiple frequency R31 Receiver installations - see para.6.05
MM-36	36" Cord, Male Phonograph Plugs	For connecting HI LEVEL OUT to standard sound system input
MM-50	50' Cord, Male Phonograph Plugs	For connecting HI LEVEL OUT to standard sound system input
MS-37	Microphone Cord for M117	Connects M117 Microphone to M30 Series Transmitter
MC-38	Microphone Cord for RM-131S	Connects RM-131S Microphone to M30 Series Transmitter
P-831	Vinyl Cover with Accessory Pouch	For FM-831
RK-45	Windscreen for M116	
RK-51	Windscreen for M117 & RM-131S	
RM-111	Microphone, Hand-Held	For use with FM831 auxiliary microphone input
RM-111S	Same as RM-111, with on-off slide switch	

1. GENERAL

1.01 This manual contains the functional description, operating procedures and troubleshooting procedures for LECTROSONICS, INC. FREEDOMIKE\ Wireless Microphone Sound Systems operating in the 30 MHz to 50 MHz range. Standard components include the:

M116 Microphone	R31 Series Receivers
M131SW Microphone	FM731 Receiver/Sound System (Obsolete)
M30 Series Transmitters	FM831 Receiver/Sound System

1.02 The function and operation of the FM731 and FM831 are identical. Therefore, procedures in this manual will apply to both models unless otherwise noted.

2. FEDERAL COMMUNICATION COMMISSION REGULATIONS

2.01 The LECTROSONICS M30 Series Transmitters comply with Part 90.75 of F.C.C. Rules and Regulations for use as wireless microphones.

2.02 F.C.C. Regulations require that each M30 Series Transmitter be licensed by the owner. F.C.C. Form 574, together with instructions for its completion are shipped with each transmitter. This form should be submitted to the F.C.C. prior to placing your wireless microphone system into operation.

FIG.1
M116 MICROPHONE
AND
M30 TRANSMITTER

FIG.2
M131SW MICROPHONE

3. EQUIPMENT DESCRIPTION

3.01 M116 MICROPHONE (FIGURE 1)

3.01.1 The M116 Microphone is a miniature electret cardiod microphone. It may be plugged directly into the transmitter, as shown in Figure 1, or may be connected into the transmitter by means of the MC-37 cord when used as a lavalier microphone. The M116 comes with a C-20 lavalier clip, MC-37 cord and RK-45 windscreen.

3.01.2 The M116 Microphone is compatible with all M30 Series Transmitters.

3.02 M131SW MICROPHONE (FIGURE 2)

3.02.1 The M131SW Microphone is an electret, cardiod microphone with on-off slide switch. It is available as an option for M30 users who prefer a hand-held microphone. It comes with an MC-38 cord and RK-50 windscreen.

3.03 M30 SERIES WIRELESS TRANSMITTER (FIGURE 1)

3.03.1 The M30 Series Wireless Transmitter is a crystal controlled low-power FM Transmitter with a self-contained antenna. It is available in three models:

(a) M30 - uses a replaceable 9 volt alkaline battery.
(b) M30R - has a self-contained 9 volt Ni-Cad battery and comes with a separate, plug-in charger.
(c) M30PB - same as the M30 except it is equipped with a spring-loaded "push-to-talk" switch.

3.03.2 The M30 Series Wireless Transmitter transmits on a single frequency in the 30 MHz to 50 MHz range. The operating frequency is printed on a label on the bottom of the transmitter case and must match the frequency of its companion receiver which may be a model R31, R31AC, FM731 or FM831.

3.03.3 All M30 Series Transmitters are designed to operate with the LECTROSONICS M116 Microphone. They will also operate with the hand-held M131SW Microphone using an MC-38 Microphone Cord.

3.03.4 Satisfactory operation up to a range of 200 feet can be expected under conditions normally encountered. This range may extend to 500 feet under optimum conditions.

NOTE

USE OF MICROPHONE OTHER THAN LECTROSONICS' M116 AND M131SW MAY RESULT IN INFERIOR SYSTEM PERFORMANCE

FIG.3
R31 SERIES RECEIVER

3.04 R31 SERIES WIRELESS RECEIVER

3.04.1 The R31 Series Wireless Receivers are crystal controlled receivers specifically designed to operate with LECTROSONICS M30 Series Transmitters. They are available in two models:

(a) R31 - operates from 115 volts, AC, 50-60 Hz, or from its built-in rechargeable battery pack. Both 115 volt AC and 230 volt, 50-60 Hz chargers are available.

(b) R31AC-operates from AC voltage only, using the charger as a battery eliminator.

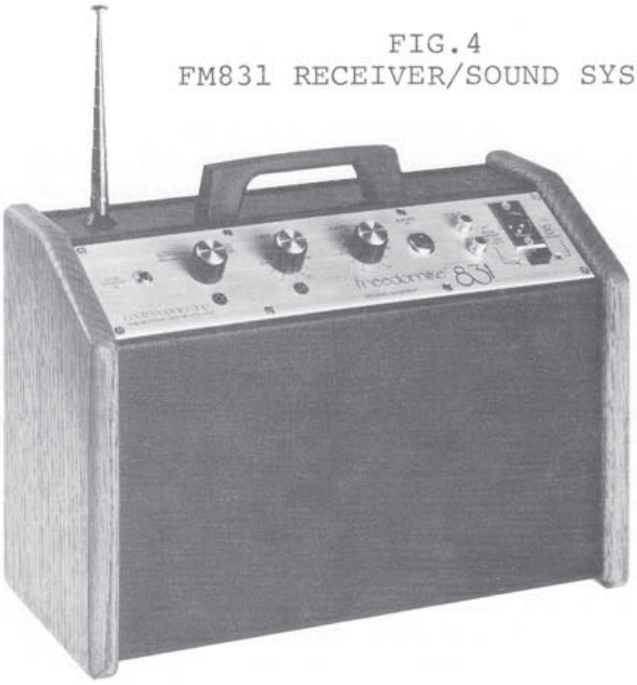
3.04.2 The R31 Series Receivers are provided with high level input jacks and multiple outputs which make the receivers compatible with virtually any sound system. These outputs are:

(a) High-level-phonograph jack

(b) Balanced, low impedance microphone level output (standard 3-pin audio connector)

(c) PLUS POWER output for operation with LECTROSONICS PLUS POWER® amplifier/speakers (standard 3-pin audio connector).

FIG.4
FM831 RECEIVER/SOUND SYSTEM



3.05 FM731 AND FM831 RECEIVER/SOUND SYSTEMS

3.05.1 The FM731 and FM831 Receiver/Sound Systems are portable units combining the features and performance of an FM receiver with an amplifier and speaker. These units are specifically designed to operate with the LECTROSONICS M30 Series Transmitters.

3.05.2 The FM731 and FM831 contain rechargeable batteries which allow operation for up to 30 hours before charging is required. These units may also be operated from 115 volts, AC, 50-60 Hz, using the charger supplied with the unit (230 volt, 50-60 Hz chargers are also available). When operated in this manner, the charger simultaneously powers the unit and charges the battery.

3.05.3 The FM731 and FM831 Receiver/Sound Systems will cover an audience of up to 400 people under normal conditions.

3.05.4 The FM731 and FM831 are provided with the following auxiliary inputs and outputs:

(a) Auxilary microphone input - 1/4"phone jack

(b) High level input - phonograph jack

(c) High level output - phonograph jack

(d) Balanced low impedance microphone level output (standard 3-pin audio connector)

(e) PLUS POWER output for operation with LECTROSONICS PLUS POWER® amplifier/speakers (standard 3-pin audio connector).

4. FREEDOMIKE® SYSTEM OPERATION

4.01 GENERAL CONSIDERATIONS AND PRECAUTIONS

4.01.1 When setting up your FREEDOMIKE® Wireless Microphone System keep in mind that there is, most likely, a certain location for your receiver which will result in optimum system performance. This is particularly true inside a building where many performance disturbing influences are encountered.

4.01.2 Determining the absolute optimum location for the receiver and transmitter is a matter of trial and error. However, by observing a few simple rules, satisfactory system performance can be obtained with a minimum amount of effort.

(a) Locate the receiver and antenna at least six feet away from walls, and large metal objects such as blinds and heating/air conditioning ducts.

(b) Locate the receiver and antenna at least four feet above the floor and at a point where the transmitter is in sight.

(c) Locate the receiver and antenna as far away as possible from fluorescent lamps.

(d) If practical, locate the receiver and antenna away from roads carrying motor vehicles.

(e) Locate the receiver and antenna away from dead spots. These can be found by experimentation as discussed in paragraph 4.02.

(f) Locate speakers so that the emitted sound cannot readily enter the microphone.

4.01.3 "Feedback" is an undesirable howling or squealing sound which must be avoided. Two interacting factors cause feedback. These are:

(a) The amount of system sound output coupled back into the amplifier system via the microphone and receiver.

(b) The gain setting of the amplifier.

Feedback can be prevented by ensuring adequate separation between the microphone and the sound system speakers. If amplifier gain is increased the separation must be increased. Holding the microphone closer to the mouth will allow the gain to be decreased and thereby reduce the probability of feedback.

4.02 DEAD SPOTS

4.02.1 "Dead Spots" are locations where reception of the transmitted radio waves is poor. The two main reasons for dead spots are:

(a) An object between the transmitter and receiver is either absorbing or reflecting the transmitted radio waves so that they cannot reach the antenna at the receiver.

(b) Reflective surfaces between the transmitter and receiver cause the radio waves to arrive at the receiving antenna by multiple paths. This can result in poor reception and sometimes, no reception at all.

4.02.2 Finding dead spots is simply a matter of experimenting with the location of the receiving antenna relative to the location of the transmitter. If the transmitter location is stationary the receiving antenna is moved around until the area of best reception is found.

4.02.3 If the person using the transmitter is going to be moving around, he should determine, by actual experimentation, any dead spots that exist in the area he plans to cover. Once they are located, they can be avoided during the actual presentation.

5. M30 SERIES TRANSMITTER OPERATION

5.01 GENERAL

5.01.1 It is characteristic of FM receivers that they can receive a transmission from only one transmitter at a time. **Simultaneous use of more than one M30 transmitter with a single receiver will result in a loud squeal.** If the individuals using the microphones could be disciplined to turn one transmitter off before another is turned on, it would be possible to use multiple transmitters on the same frequency, however this practice is not recommended.

5.01.2 For best system operation, the microphone should be less than six inches from the speaker's mouth. A distance greater than six inches will require a higher volume control setting which increases the probability of feedback.

5.02 M30 AND M30PB BATTERY INFORMATION AND REPLACEMENT

5.02.1 M30 and M30PB Transmitters use a replaceable 9-volt **alkaline battery** (Eveready No.522, Mallory MN1604 or equivalent) which will provide approximately 15 hours of continuous operation or 20 hours of operation at a rate of 4 hours per day. While other batteries will work for a while, they will result in inferior overall performance and their use is not recommended.

5.02.2 As the stored energy in the battery is used up during transmitter operation, the battery voltage will start to drop causing the transmission range to gradually decrease until total loss of reception will occur at the receiver. To avoid interruption of a presentation due to battery failure, it is recommended that a log of operating time be kept so that the battery can be replaced when it approaches the end of its expected life. In addition, it is wise to keep a spare battery with the transmitter. In critical applications, play it safe and install a new battery.

5.02.3 To replace the battery in the M30 or M30PB Transmitter, perform the following procedures:

CAUTION

WHEN REPLACING THE BATTERY, USE CARE TO AVOID PLACING UNDUE STRAIN ON THE SNAP-ON BATTERY CONNECTOR WIRES.

(a) Verify that the toggle switch on the top of the transmitter is in the off position.

(b) Rotate the thumbscrew counter-clockwise to remove the transmitter cover.

(c) Lift off and set aside the transmitter cover.

(d) Remove the old battery from its compartment and discard.

(e) Insert the new battery. The battery will not go into the compartment if it is put in backwards.

(f) Replace and secure the cover.

NOTE

Some transmitters have a snap-on battery connector.

5.03 M30R CHARGING PROCEDURES

CAUTION

PROLONGED OVERCHARGING CAN CAUSE PREMATURE BATTERY FAILURE

5.03.1 The M30R Transmitter contains a 9-volt rechargeable Ni-Cad battery which will provide approximately six hours of continuous operation between charges when the battery is new.

5.03.2 The CH-16 charger supplied with the M30R will recharge a fully discharged battery in fourteen hours. Three hours of charge time for each hour of operation will ensure a fully charged battery.

5.03.3 To recharge the M30R, perform the following procedures:

(a) Insert the CH-16 charger cord plug fully into the jack on the top of the M30R transmitter. (Failure to completely seat the plug will damage the charger.)

(b) Plug the charger into an AC receptacle.

(c) On the top of the M30R, operate the toggle switch to the off position. The green lamp adjacent to the switch lights, indicating that the battery is charging.

(d) Disconnect the charger after the M30R is recharged based upon the recommendations in 5.03.2.

5.04 USING THE M30 SERIES TRANSMITTER WITH THE M116 MICROPHONE

5.04.1 The M30 Series Transmitter and M116 Microphone may be used as a hand-held unit as shown in Figure 1. If the M116 is to be used as a lavalier microphone with the C-20 clip, connect the M116 to the M30 with the MC-37 cord supplied.

5.04.2 When the M116 is used as a lavalier microphone, the M30 Series Transmitter may be fastened to the belt, dropped in a pocket or taped to the body. Try to locate the microphone less than six inches from the speaker's mouth.

5.04.3 When using the M30 Transmitter, operate the toggle switch to the ON position. The green lamp will light on the receiver indicating that the transmitter is sending a signal. When using the M30PB Transmitter, the spring-loaded toggle switch must be held in the ON position while transmitting.

5.04.4 When not in use, disconnect the MC-37 cord from the microphone and transmitter. Store the cord in a loose coil and avoid sharp bends at the junctions of the cord and the plugs.

5.05 USING THE M30 SERIES TRANSMITTER WITH THE M131SW MICROPHONE

5.05.1 When the M131SW Microphone is used with a M30 Series Transmitter, it must be connected to the transmitter with the MC-38 Cord supplied. For lavalier use, the A-34 lavalier cord is available as an accessory.

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6. R31 SERIES RECEIVER SETUP AND OPERATION

6.01 GENERAL: When the R31 Receiver is to be used in a permanent installation, the extra time and effort spent in determining the best location will pay off in terms of superior performance. The optimum location for the receiver can be found by following the procedure in paragraph 4.0.

6.02 R31 SERIES RECEIVER AUXILIARY INPUTS AND OUTPUTS

R31 Series Receivers are equipped with inputs and outputs which provide for connection to a variety of audio equipment and sound systems:

(a) HI LEVEL IN - RCA phonograph jack input. May be used with line level, auxiliary or high level outputs from tape decks, cassette players, hi-fi systems and other P.A. systems.

(b) HI LEVEL OUT - RCA phonograph jack output. Provides a one volt (at 10K ohms) signal to drive line level, auxiliary and high level inputs of tape decks, cassette players, hi-fi systems and other P.A. systems. This output may be used with up to 50 feet of shielded audio cable.

(c) PLUS POWER/MIC OUT - Three-pin audio connector. This output is switchable to provide the following signals:

(1) When switched to MIC OUT, the output is a balanced, low impedance (200 ohm), 10 millivolt, microphone level output suitable for microphone mixers and other units requiring a microphone level input.

(2) When switched to PLUS POWER, the output is a special, high level, balanced output which includes the audio, on-off control and gain adjust signals for remote control of LECTROSONICS' PLUS POWER® amplifier/speakers.

(3) The PLUS POWER® output can also be used as a balanced line output and will develop 4 volts, RMS, across a 600 ohm load. Pins 2 and 3 of the audio connector are the balanced line output. Pin 1 is the common return and is connected to chassis ground in the receiver. For driving an unbalanced load with one side grounded, connect pin 3 of the audio connector to the high side of the load and pin 1 to the ground side of the load. Do not connect pin 2.

6.03 REMOTE ANTENNA

If a suitable operating location cannot be found for the R31 Receiver, using its integral whip antenna, it will be necessary to use a remote antenna connected to the REMOTE ANTENNA coaxial connector on the rear of the receiver. A suitable antenna can be easily constructed from coaxial cable which should be readily available from your nearest electronic parts supplier. This antenna, along with construction details, is shown in Fig.5. A 108 inch CB antenna, modified as shown in Fig.6, can also be used. When using a remote antenna, keep the cable length between the antenna and the R31 as short as possible. Do not use a shorter CB antenna which commonly has an inductive loading coil to artificially increase its length. These will resonate at the CB frequencies only and will provide poor operation with the R31 receiver.

6.04 INITIAL R31 SERIES RECEIVER SETUP

6.04.1 ERECTING THE WHIP ANTENNA

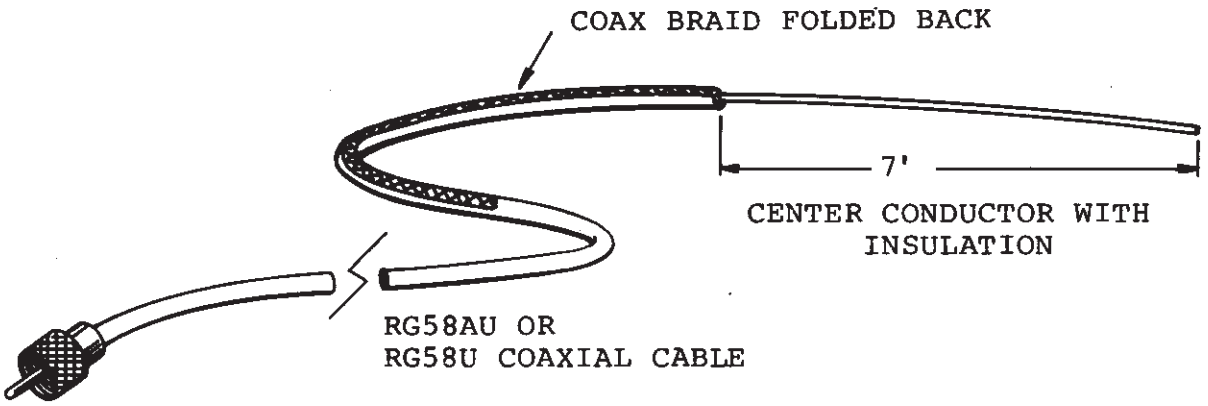
(a) Remove the telescoping antenna from the two storage clips on the rear of the receiver.

(b) Insert the threaded end of the antenna into the hole on the top of the receiver and turn it clockwise until the antenna is securely seated.

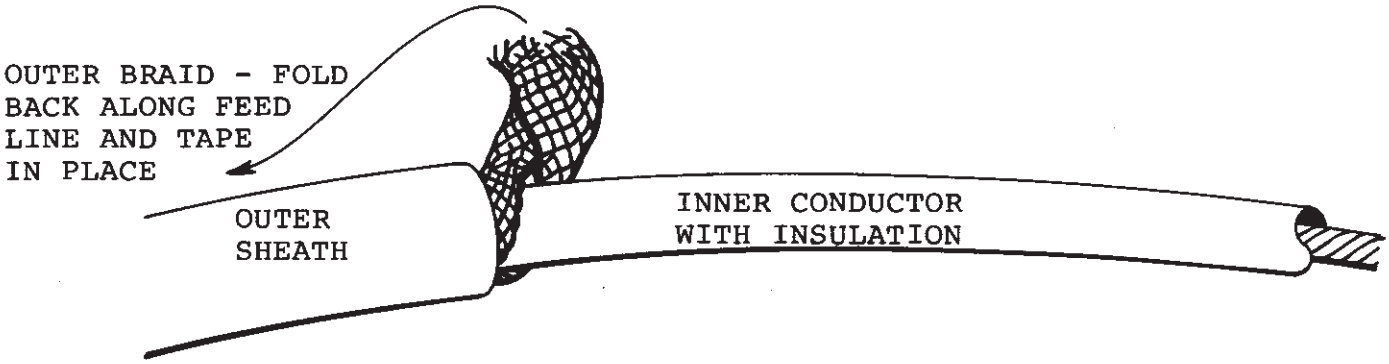
(c) Extend the antenna fully in the vertical plane and ensure that the antenna is not touching any metal objects.

6.04.2 CONNECTING THE RECEIVER TO THE HOUSE SOUND SYSTEM

Using the appropriate accessory cable (see Table A,page III), connect the output of the R31 series receiver to the matching input on your sound system amplifier.



AMPHENOL 83-1SP PLUG
(or equivalent)
TO REMOTE ANTENNA CONNECTOR
ON R31 SERIES RECEIVER



INSTRUCTIONS

1. Remove 7 feet of outer sheath. Use care to avoid damage to the braid.
2. Loosen braid by pushing it back over the center conductor.
3. Open the braid at its junction with the sheath and pull the center conductor through the hole.
4. Flatten the braid and fold it back along the sheath. Tape the braid to the cable using plastic insulating tape.
5. For best results, try both horizontal and vertical orientation of the antenna.

FIGURE 5

REMOTE ANTENNA CONSTRUCTED OF COAXIAL CABLE FOR USE WITH R31 SERIES RECEIVERS

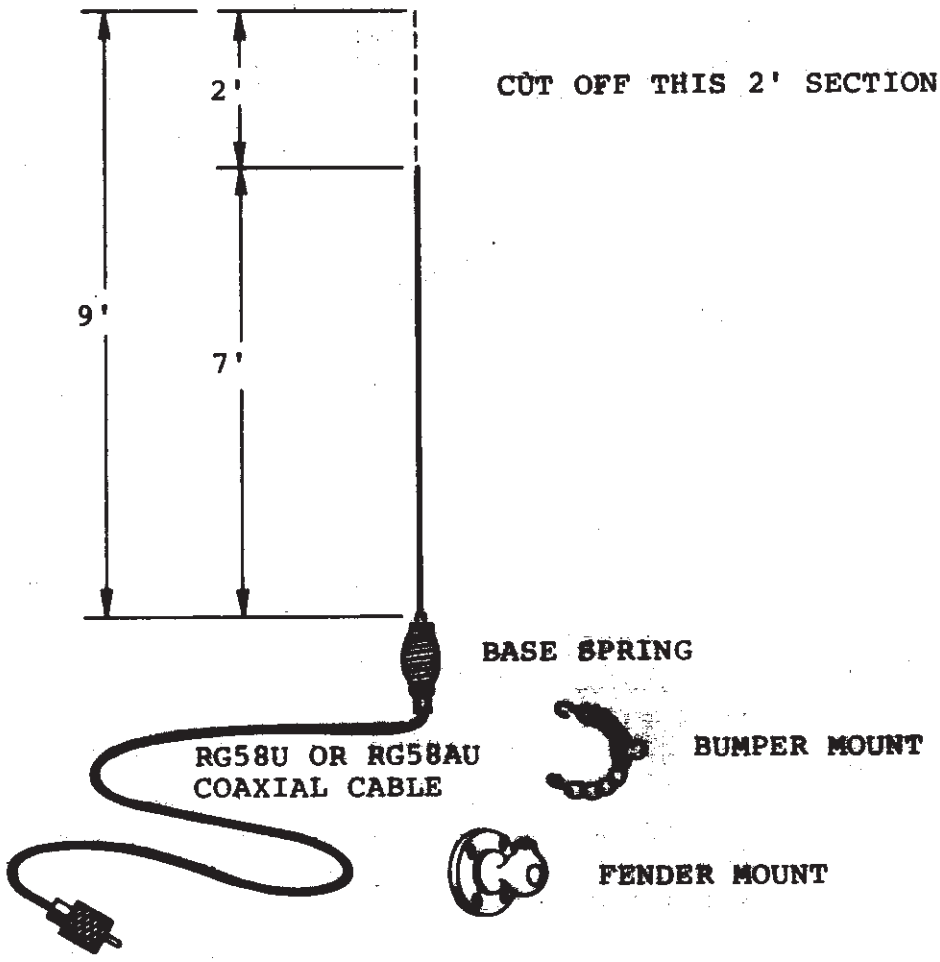


FIGURE 6

CB ANTENNA MODIFIED FOR USE
WITH
R31 SERIES RECEIVERS

6.04.3 APPLYING POWER TO THE RECEIVER

6.04.3.1 R31AC RECEIVER: R31AC receivers operate only on AC power using the supplied charger as a battery eliminator. This receiver is identified by a label near the CHARGER jack with the legend "This unit does not include rechargeable battery". On the R31AC receiver, the OPERATE/CHARGE and CHARGE positions of the mode select switch are not functional. To apply power to the R31AC receiver, perform the following procedures:

(a) Verify that the type number (CH-XX) on the charger label matches the number marked above the CHARGER jack on the R31AC.

(b) Insert the charger cord plug fully into the CHARGER jack (failure to completely seat the plug may damage the CH-16 chargers).

(c) Plug the charger into the AC power receptacle.

(d) On the R31AC rotate the mode select switch to OPERATE. The red power lamp will light.

6.04.3.2 R31 RECEIVER: The R31 receiver operates from either AC power or from its internal rechargeable battery pack. To apply power to the R31 receiver, perform the following procedures.

(a) Verify that the type number (CH-XX) on the charger label matches the number marked above the CHARGER jack on the R31.

(b) Insert the charger cord plug fully into the CHARGER jack (failure to completely seat the plug may damage the CH-16 charger).

(c) Plug the charger into the AC power receptacle.

(d) For AC only operation rotate the mode select switch to CHARGE/OPERATE. The red power lamp will light. The battery pack is being charged in this mode of operation.

(e) For AC operation with battery back-up, rotate the mode select switch to OPERATE. The red power lamp will light. In this mode of operation the receiver is operating from AC power and the battery pack is being charged as long as AC power is applied. In the event an AC power failure occurs, the R31 receiver automatically switches over to battery power.

(f) For charge only operation, rotate the mode select switch to CHARGE. The red power lamp will light. The battery will recharge from a fully discharged condition in approximately 14 hours and may be left on charge indefinitely without damage.

(g) For battery only operation, disconnect the charger and rotate the mode select switch to OPERATE. The red power lamp will light. In this mode a fully charged battery will provide approximately 20 hours of operation.

NOTE: The CHARGE and CHARGE/OPERATE functions are not incorporated in all R31 receivers. In some receivers the mode select switch has two positions - OFF and OPERATE. In these units only the operational modes described in (e) and (g) apply.

6.04.4 ADJUSTING THE R31 SERIES RECEIVER: Once the location for the receiver and transmitter have been determined, the receiver and associated amplifier should be adjusted by performing the following procedures. It is assumed throughout these procedures that a person is speaking into the microphone.

(a) Turn on power to the R31 in accordance with the appropriate procedure from paragraph 6.04.3.

(b) On the R31 Receiver, operate the center control to NORMAL.

(c) On the R31 Receiver, rotate the VOLUME control to mid-range. If the control cannot be adjusted above 2 without excessive volume, reduce the gain setting on the associated amplifier. Operating the system with the volume control below 2 may cause a constant hiss in the system.

(d) Once a satisfactory sound level has been achieved the center control may be set to other positions to determine which setting provides the most intelligible and pleasing sound. The NORMAL position will generally be best.

The final adjustments to the R31 Receiver and associated amplifier/speaker system should be such that intelligible sound at an adequate level, is available at the most distant point a listener is expected.

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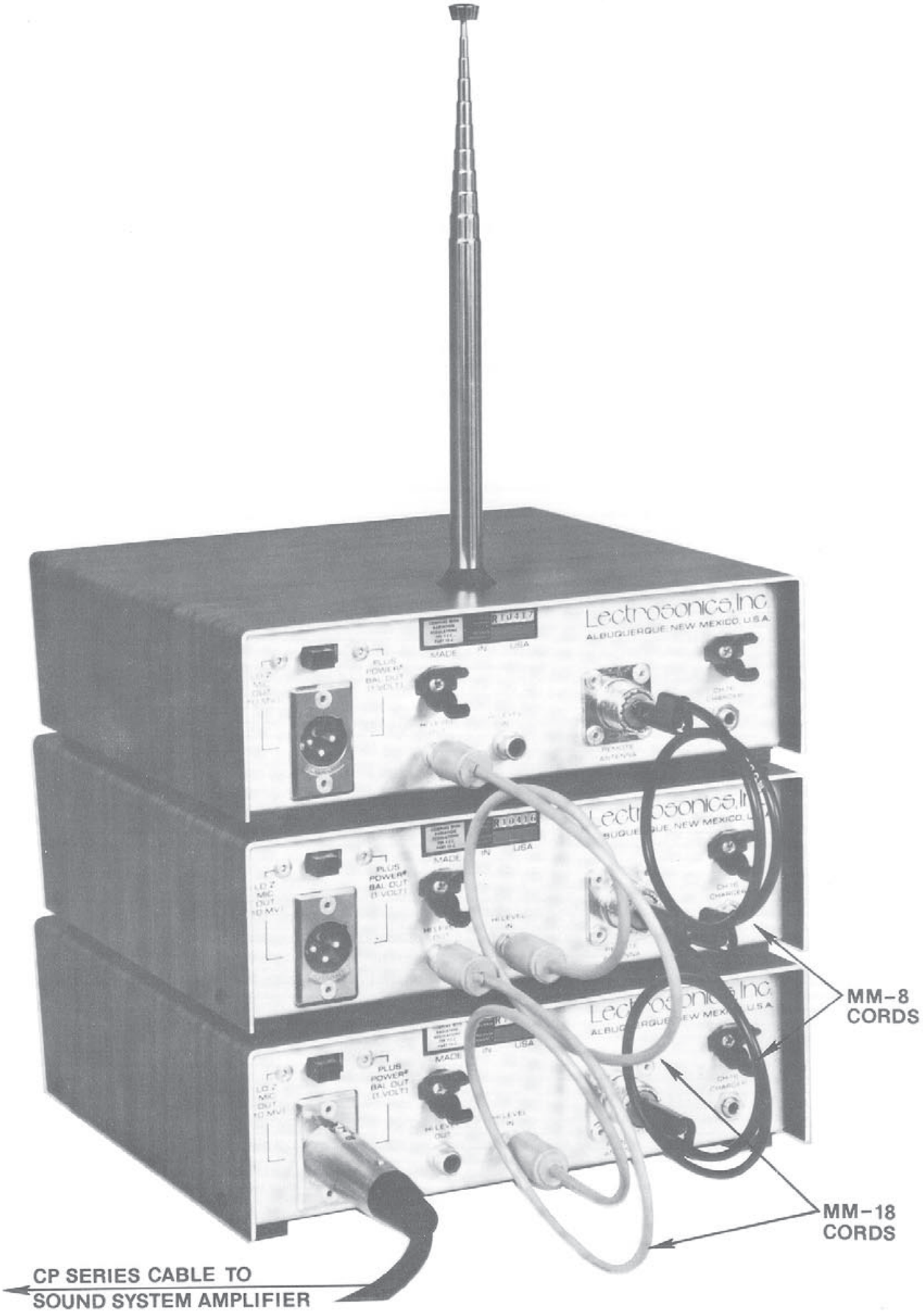


FIG.7
STACKED R31 RECEIVERS

6.05 MULTIPLE FREQUENCY INSTALLATIONS

6.05.1 Conferences and other events where audience participation will occur require a multiple wireless microphone installation. For each microphone used, there must be an M30 Series Transmitter with an R31 Series Receiver on a matching frequency. **Each M30/R31 combination must be on a different frequency.**

6.05.2 The R31 Series Receivers are readily connected for multiple frequency use as shown in Figure 7. As can be seen in the photograph, the system uses only one antenna and one output to the amplifier/speaker system.

6.05.3 In Figure 7 the R31 at the top of the stack has the whip antenna installed in the regular manner. This antenna is made to serve the other two receivers by connecting the REMOTE ANTENNA jacks together with "stacking" banana plug cords. These are available from your local electronics supply house, or as an accessory from LECTROSONICS as part number MM-8. Up to five receivers may be connected in this manner before another antenna will be required. When an external antenna is employed it will be necessary to use an Amphenol 83-1T (or equivalent) coaxial "tee" adapter in order to connect to the second R31 Receiver with the MM-8 cord.

6.05.4 The multiple R31 Receiver outputs are connected into a single sound system amplifier by connecting the HI LEVEL OUT jack of the first (upper) receiver into the HI LEVEL IN jack of the next receiver with a LECTROSONICS MM-18 cord. This procedure is repeated for each successive receiver. On the last receiver, select the output (HI LEVEL, PLUS POWER or MIC) which is compatible with the amplifier input and make the connection with the appropriate cable or cord selected from Table A.

6.05.5 The R31 Series Receivers are designed so that when used in a multiple frequency installation, there is no interaction of the volume or tone controls between individual receivers.

7. FM831 RECEIVER/SOUND SYSTEM SETUP AND OPERATION

7.01 GENERAL

7.01.1 The function, performance and operation of the earlier model FM731 is identical to the FM831. The procedures in the following paragraphs apply to both units.

7.01.2 When setting up the FM831, follow the procedures in paragraph 4. to determine the best operating location relative to the location of the transmitter.

7.02 FM831 AUXILIARY INPUTS AND OUTPUTS (FIGURE 8)

FM831 Receiver/Sound systems are equipped with inputs and outputs which provide for connection to a variety of audio equipment and sound systems:

(a) AUX MIC IN - Standard 1/4 inch phone jack.
Accepts either low or high impedance microphones and can be used in conjunction with the M30 Transmitter. The LECTROSONICS RM-111 or RM-111S microphone with an MC-16C or MM-16 microphone cord are recommended for this application.

(b) HI LEVEL IN - RCA phonograph jack input.
May be used with line level, auxiliary or high level outputs from tape decks, cassette players, hi-fi systems and other P.A. systems.

(c) HI LEVEL OUT - RCA phonograph jack output.
Provides a one volt signal to drive line level, auxiliary and high level inputs of tape decks, cassette players, hi-fi systems and other P.A. systems. This output may be used with up to 50 feet of shielded audio cable.

(d) PLUS POWER/MIC OUT - Three-pin audio connector.
This output is switchable to provide the following signals:

(1) When switched to MIC OUT, the output is a balanced, low impedance (200 ohm), 10 millivolt, microphone level output suitable for microphone mixers and other units requiring a microphone level input.

(2) When switched to PLUS POWER, the output is a special, high level, balanced output which includes the audio, on-off control and gain adjust signals for remote control of LECTROSONICS' PLUS POWER® amplifier/speakers.

(3) The PLUS POWER output can also be used as a balanced line output and will develop 4 volts, RMS, across a 600 ohm load. Pins 2 and 3 of the audio connector are the balanced line output. Pin 1 is the common return and is connected to chassis ground in the receiver. For driving an unbalanced load with one side grounded, connect pin 3 of the audio connector to the high side of the load and pin 1 to the ground side of the load. Do not connect pin 2.

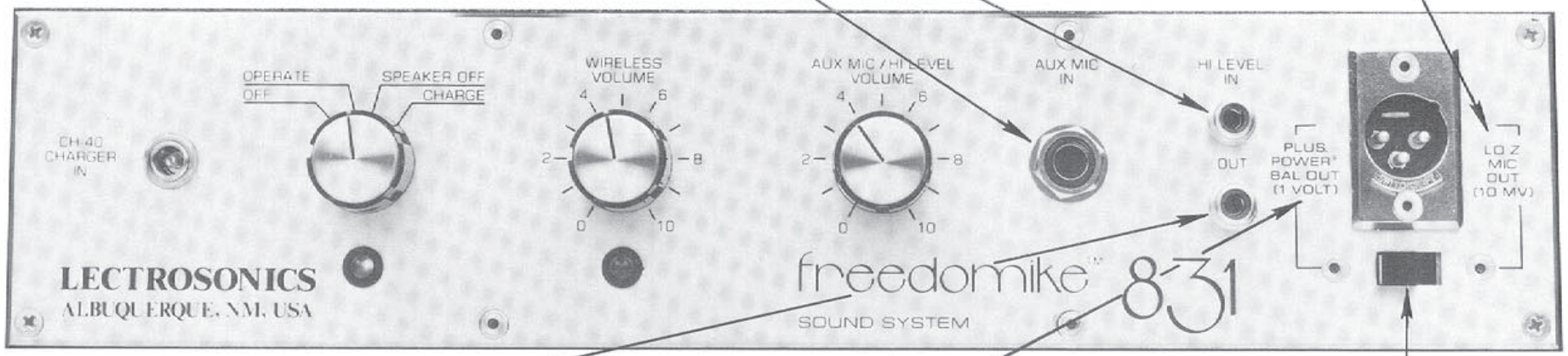


FIG.8

FM831 AUXILIARY INPUTS AND OUTPUTS

7.03 APPLYING POWER TO THE FM831

The FM831 Receiver/Sound System operates from either AC power or from its internal rechargeable battery pack. To apply power to the FM831, perform the following procedures:

(a) Verify that the type number (CH-XX) on the charger label matches the number marked near the CHARGER IN jack on the FM831.

(b) Insert the charger cord plug fully into the CHARGER IN jack.

(c) Plug the charger into the AC power receptacle.

(d) For AC operation with battery back-up, rotate the mode select switch to OPERATE. The red power lamp will light. In this mode of operation the FM831 is operating from AC power and the battery pack is being charged as long as AC power is applied. In the event an AC power failure occurs, the FM831 automatically switches over to battery power. To verify that the charger is operating correctly, momentarily rotate the mode select switch to CHARGE. If the red power lamp lights, the charger is operating.

(e) For battery only operation, disconnect the charger and rotate the mode select switch to OPERATE. The red power lamp will light. In this mode a fully charged battery pack will provide approximately thirty (30) hours of operation.

7.04 FM831 BATTERY CHARGING INFORMATION

IMPORTANT

FAILURE TO OBSERVE THE PRECAUTIONS IN 7.04.2 AND 7.04.3 CAN CAUSE PREMATURE BATTERY FAILURE. THIS TYPE BATTERY FAILURE IS NOT COVERED BY THE WARRANTY AND WILL NOT OCCUR IF THE PRECAUTIONS ARE OBSERVED.

7.04.1 The battery pack in the FM831 can be recharged from a fully discharged condition in approximately 16 hours. If discontinuous, battery only, operation is to be employed, it is recommended that a log be kept of operating time so that interruption of a presentation due to a discharged battery pack will be avoided.

7.04.2 The battery pack in the FM831 should be recharged for 16 hours at least once every six months even though the unit is not used.

7.04.3 The battery pack should not be left fully discharged for a period exceeding two weeks.

7.04.4 Storage, operation and charging at more than 10 degrees above room temperature will result in reduced battery life.

7.05 ADJUSTING THE FM831 RECEIVER/SOUND SYSTEM

7.05.1 Once the locations for the FM831 and transmitter have been determined, the FM831 should be adjusted by performing the following procedures. It is assumed throughout these procedures that a person is speaking into the microphone.

(a) On the FM831, operate the mode switch to OPERATE. The red power lamp lights. If a signal is being received from the transmitter, the green lamp beneath the WIRELESS VOLUME control will light.

(b) Adjust the WIRELESS VOLUME control until intelligible sound, at an adequate level is available at the most distant point a listener is expected. A setting between 2 and 6 provides the best signal-to-noise ratio with lowest distortion.

7.05.2 The AUX MIC/HI LEVEL VOLUME control adjusts the volume of both the AUX MIC IN input and the HI LEVEL IN input. If both inputs are to be used at the same time, the control should be used to adjust the volume of the AUX MIC IN. Use the volume control on the unit connected to the HI LEVEL IN jack to control the level of that input.

7.05.3 When using an FM831 output to drive another amplifier/speaker system, the WIRELESS VOLUME control should be set between 2 and 6 and the volume control on the auxiliary amplifier used to set the desired sound output level for the P.A. system.

7.05.4 When an auxiliary amplifier/speaker is being used, the FM831 speaker can be turned off by rotating the mode select switch to SPEAKER OFF. With the exception of the speaker, the FM831 functions as though the switch were in the OPERATE position.

8. TROUBLESHOOTING AND SERVICE

8.01 If your FREEDOMIKE®system malfunctions, you should attempt to correct or isolate the trouble before concluding that the equipment requires repair. In many instances the malfunction will be due to operator error or a "low-battery" condition. Table B is an easy-to-use troubleshooting table which lists symptoms together with possible causes.

8.02 If you are unable to correct the problem, consult the authorized LECTROSONICS dealer from whom you purchased the equipment. If you desire, you may contact the factory for assistance:

LECTROSONICS, INC.
P.O.Box 12617
Albuquerque, N.M. 87195
Tel: (505)831-1010
Telex: 660431 LECSONICO ABQ

8.03 Service of FREEDOMIKE®equipment should be performed only by authorized dealers or the factory. Attempted repair or alignment by unauthorized facilities may void the warranty.

8.04 LECTROSONICS'service department is equipped and staffed to expeditiously repair and align your equipment. In-warranty repairs (with proof of purchase) are made at no charge in accordance with the terms of the warranty. Out-of-warranty repairs are charged at a modest rate plus parts.

8.05 Do not return equipment to the factory for repair without first contacting LECTROSONICS. We need to know the model and serial number of the equipment, the nature of the problem and a telephone number where you can be reached during working hours.

8.06 Upon receiving your request for service, we will provide you with a return authorization number and, if necessary, send you special packing materials and a shipping label. Upon receipt of the return authorization, pack the equipment carefully and ship it to us, shipping costs prepaid. **Equipment returned without prior authorization or on which transportation has not been prepaid will not be accepted. It is also strongly recommended that you insure the equipment, since LECTROSONICS will assume no responsibility for shipping damage on returned merchandise.**

TABLE B

TROUBLESHOOTING THE FREEDOMIKE, LOWBAND, WIRELESS MICROPHONE SYSTEM

SYMPTOM	POSSIBLE CAUSE
Red power lamp dark or dim.	(1) Mode select switch in wrong position. (2) Charger not plugged into active AC receptacle and battery pack is run down. (3) Charger not fully plugged into charger jack and battery pack is run down. (4) Defective charger.
Red power lamp is lighted but green lamp is dark.	(1) M30 not turned on. (2) M30 frequency different from R31 or FM831. (3) R31 antenna not screwed in securely. (4) M30 battery dead. (5) Battery pack in R31 or FM831 nearly run down.
Red and green lamps fully lighted but no sound.	(1) Volume control on R31 or RM831 turned completely down. (2) On FM831, mode select switch in SPEAKER OFF position. (3) Volume control on auxiliary amplifier/speaker turned down or off. (4) Auxilliary amplifier/speaker defective. (5) R31 or FM831 output being used is not compatible with auxiliary amplifier/speaker. (6) PLUS POWER/MIC OUT select switch in wrong position. (7) Microphone cable not fully plugged in. (8) Defective microphone. (9) Defective interconnect cable between R31 or FM831 and auxilliary amplifier/speaker.

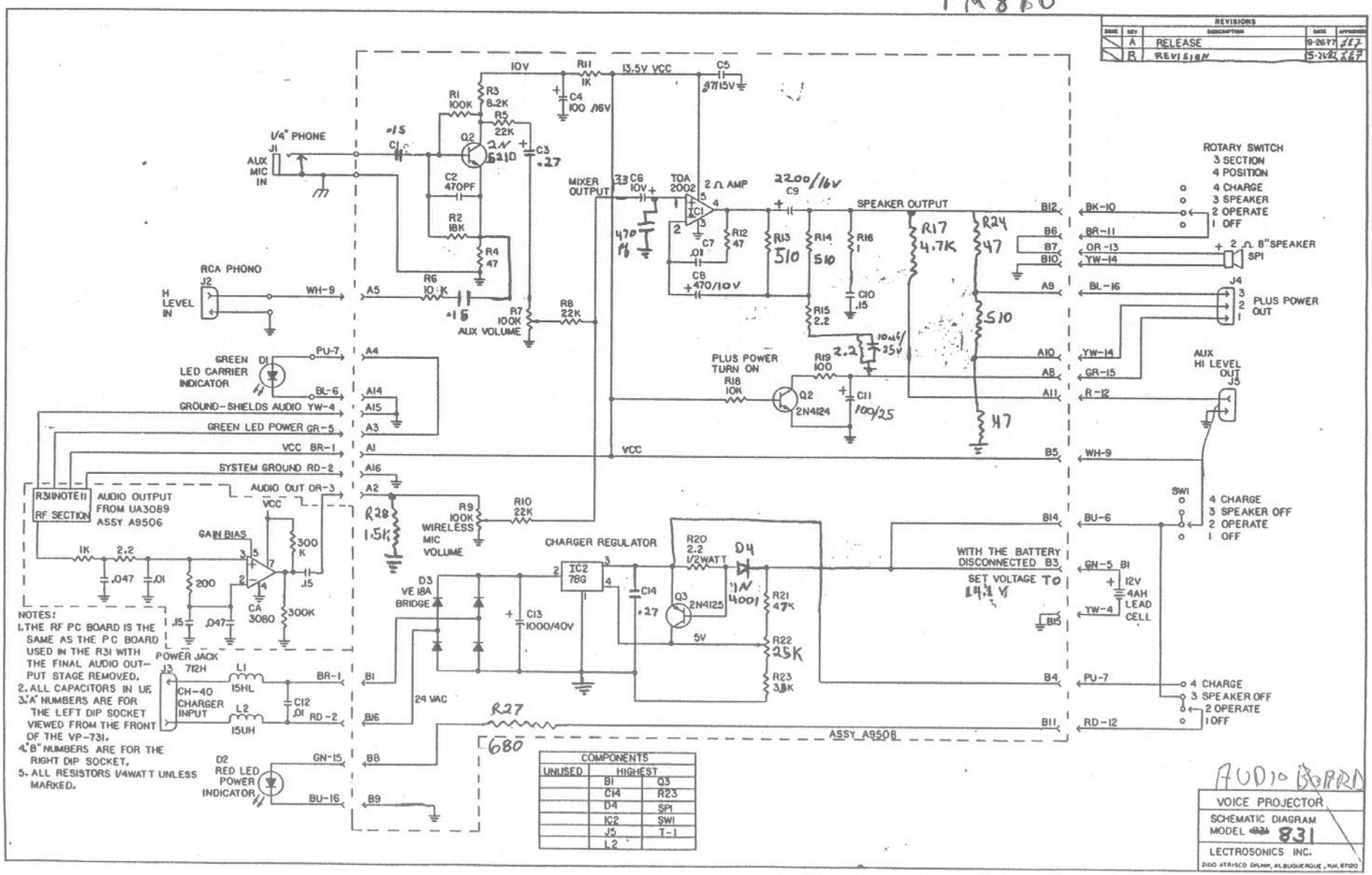
TABLE B continued

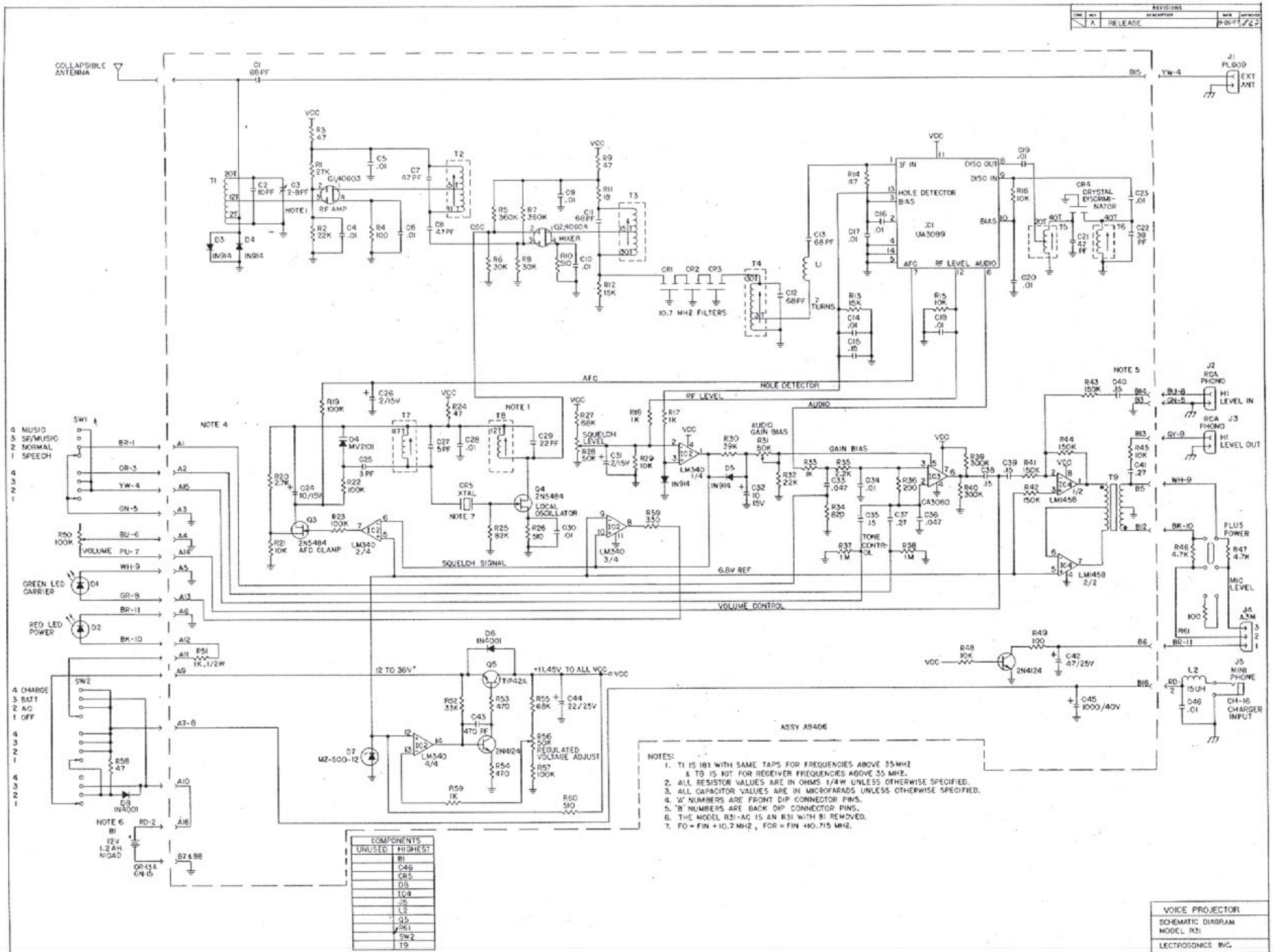
TROUBLESHOOTING THE FREEDOMIKE, LOWBAND, WIRELESS MICROPHONE SYSTEM

SYMPTOM	POSSIBLE CAUSE
System operation normal except for excessive hiss.	(1) Receiving antenna not fully extended. (2) Receiving antenna too close to large metal surfaces. (3) Volume control on R31 or FM831 set below 2. (4) R31 or FM831 output being used is not compatible with auxiliary amplifier/speaker. (5) Low battery in M30. (6) Low battery in R31 or FM831. (7) Microphone too far from speaker's mouth. (8) M30 Transmitter too far from R31 or FM831.
System operation normal except for excessive hum or buzzing.	(1) Noise on AC power line. To verify, disconnect charger and switch to battery only operation. (2) Receiving antenna too close to AC power cables. (3) Low battery in R31 or FM831. If battery is very low the unit will hum for approximately two minutes at the start of the charge cycle and then should cease. (4) Defective fluorescent bulbs in area picking up and re-radiating transmitted signal. Isolate by turning off lights. (5) Defective interconnect cables between R31 or FM831 and auxiliary amplifier/speaker. (6) Defective amplifier/speaker.
System operation is normal except for excessive distortion.	(1) R31 or FM831 volume control set too high. (2) R31 or FM831 output being used is not compatible with the auxiliary amplifier/speaker. (3) Low battery in R31 or FM831. (4) Microphone too close to speaker's mouth (applies only to systems with pre-1982 M30 transmitters. (5) Transmitter is other than LECTROSONICS M30 Series.

FM 831

ALSO FM870




REVISIONS
A RELEASE 9-26-77
COLLAPSIBLE ANTENNA
C1 68 PF
J1 PL909 EXT ANT
VOLUME CONTROL
AFC
HOLE DETECTOR
RF LEVEL
AUDIO
SQUELCH SIGNAL
6.8V REF
GAIN BIAS
AUDIO GAIN BIAS
10.7 MHZ FILTERS
RF AMP
MIXER
LOCAL OSCILLATOR
AFC CLAMP
CRYSTAL DISCRIMINATOR
TONE CONTROL
IF IN
HOLE DETECTOR BIAS
DISC OUT
DISC IN
RF LEVEL AUDIO
4 MUSIC
3 SP/MUSIC
2 NORMAL
1 SPEECH
VOLUME
GREEN LED CARRIER
RED LED POWER
4 CHARGE
3 BATT
2 AC
1 OFF
12V 1.2AH NIGAD
12 TO 36V+
+11.45V TO ALL VCC
REGULATED VOLTAGE ADJUST
J2 RCA PHONO HI LEVEL IN
J3 RCA PHONO HI LEVEL OUT
PLUS POWER
MIC LEVEL
J4 A3M
J5 MINI PHONE CH-16 CHARGER INPUT
L2 15UH
ASSY A9406
NOTES:
1. T1 IS 181 WITH SAME TAPS FOR FREQUENCIES ABOVE 35 MHZ & T8 IS 10T FOR RECEIVER FREQUENCIES ABOVE 35 MHZ.
2. ALL RESISTOR VALUES ARE IN OHMS 1/4W UNLESS OTHERWISE SPECIFIED.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
4. 'A' NUMBERS ARE FRONT DIP CONNECTOR PINS.
5. 'B' NUMBERS ARE BACK DIP CONNECTOR PINS.
6. THE MODEL R31-AC IS AN R31 WITH B1 REMOVED.
7. FO = FIN + 10.7 MHZ, FOR = FIN +10.715 MHZ.
COMPONENTS
UNUSED HIGHEST
B1
C46
CR5
D8
IC4
J5
L2
Q5
R61
SW2
T9
VOICE PROJECTOR
SCHEMATIC DIAGRAM
MODEL R31
LECTROSONICS INC.

Limited One Year Warranty

This equipment warranted for one year from date of purchase against defects in material 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. This warranty does not apply to used or demonstrator equipment.

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

This warranty applies only to items returned to us, shipping costs prepaid, within one year from the date of purchase. Refer to the other side of this card for the procedure to follow in order to obtain service under the terms of this warranty.

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

Lectrosonics, Inc