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## ROOF MOUNTING

Roof mounting is actually the best location because it provides an almost perfect omnidirectional radiation pattern. However, even the use of a shorter loaded whip on the roof of a vehicle is impractical in this location.

## REAR DECK MOUNTING

Rear deck mounting permits the use of a full quarter-wave antenna or a shorter, loaded whip. The radiation pattern in such a location is somewhat irregular, radiation being slightly greater in the direction of the front fender opposite to the side on which the rear deck antenna is mounted.

## BUMPER MOUNTING

This arrangement uses the rear bumper of the car and is by far the most practical for use with full 108-inch quarter-wave whips. Another advantage is that removal of the antenna is simple and leaves no holes in the car body. The radiation pattern produced by an antenna mounted on the left rear bumper is fairly irregular, with greatest radiation being in two directions – one to the right and forward slightly, the other to the rear and left slightly.

# **BASE STATION ANTENNAS**

## SHORT RANGE

The Lafayette HE-19 (Lafayette Stock No. 99-3015) is a small base loaded whip designed for short range communications work – intercommunication between buildings, etc. It mounts directly in the back of the transceiver. Extended, it measures 45”, closed 15”.

## LONG RANGE

There are three basic types of long-range antennas as shown in Figure 4.

1. Vertical Ground Plane Antennas. These are omnidirectional antennas that provide optimum performance for contacting other fixed stations using vertical type antennas in addition to all mobile stations. For medium-long range communications work.
2. Coaxial Antennas. These are high efficiency type radiators with omnidirectional characteristics, performing as well in most applications as the ground plane type. Ideal for those installations where a vertical ground plane is not feasible. For medium-long range communications work.

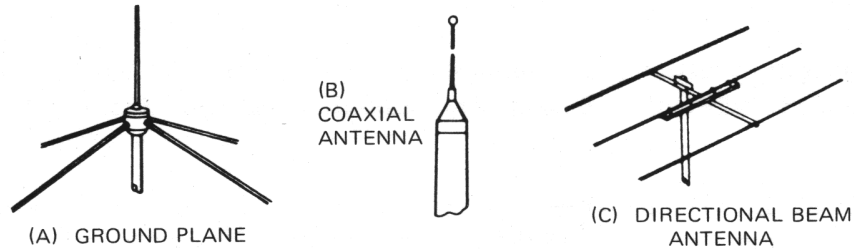


FIGURE 4.

3. Directional Beam Antennas. Highly efficient and directional antennas generally intended for fixed-to-fixed long range communications. An average three-element beam provides an equivalent of 8 db increase in transmitter power.

## OPERATING INSTRUCTIONS

NEVER ATTEMPT TO TRANSMIT WITHOUT AN ANTENNA CONNECTED TO THE TRANSCEIVER.

Make sure the transceiver is properly installed for base or mobile operation (as indicated previously) and that the antenna and power source are connected. If you have not already done so, plug in the microphone.

### RECEIVING

Rotate squelch control to the extreme counter-clockwise position, and select desired channel. Rotate the volume control knob until the switch operates. Advance the volume control to about 1/3 setting. Since the transceiver is fully transistorized, operation will be instantaneous. Adjust to a comfortable listening level. The receiver is now ready to operate.

### SQUELCH ADJUSTMENT

The Squelch control is used to eliminate any annoying background noise when no signals are present. To adjust the SQUELCH control properly during reception, turn up SQUELCH until background noise just disappears. At this point, the receiver will be quiet under "no-signal" conditions, but an incoming signal will overcome the squelch action and be heard. Since this control is variable, it can be used to provide varying degrees of sensitivity to incoming signals. As the control is advanced (from counter-clockwise position), the squelch action is progressively increased and progressively stronger incoming signals are needed to overcome it. To receive extremely weak signals or to disable the squelch circuit, simply turn the control fully counter-clockwise.

NOTE: In areas of high noise, you may have to slightly increase the setting of the Squelch control in order to achieve a "quiet" condition. However, under these conditions an extremely weak signal may not be able to overcome the squelch action and will not be heard. If severe noise is generated by your own vehicle, proper vehicle ignition suppression should be carried out.

## DELTA TUNING

The ▲ TUNE control acts as a “fine tuning” control ( ± 2 KHz) and may be used for reception of a station that is slightly off-frequency. Try all position and select the one that provides best reception.

**IMPORTANT NOTE:** When better reception is obtained with the ▲ TUNE control in either the plus or minus position, there is always the possibility that the station you are receiving is actually on an adjacent channel. While this is not usual, it can occur when the received station is off frequency or when the incoming signal is of sufficient strength to overcome the normal high selectivity of the receiver. To determine whether you are actually tuned to the correct channel, simply switch to each adjacent channel in turn, and note whether better reception (and higher “S” reading) is obtained with the ▲ Tune switch in the normal (center) position.

## EXT. SP JACK

The recommended plug for this jack is a “TINI-PLUG” subminiature phone plug, available from Lafayette under catalog number 34-6031. The impedance of earphones or speakers connected to this jack should be 16 ~ 32 ohms. Insertion of a plug into the jack automatically silences the internal speaker.

## TRANSMITTING

Before operating the transmitter the following **MUST** be done:

1. A valid Class “D” Citizens Band equipment license shall be posted at the main control (fixed) station location.
2. A properly filled out and SIGNED mobile identification card, 452C, must be affixed to the unit.
3. Rules Part 95 must be obtained, read and understood.

To transmit, depress the push-to-talk button on the microphone. The channel indicator dial light will go out and a colored lamp on the front panel will light up, indicating that you are on the air. Hold the microphone 3 to 5 inches from the mouth and slightly to one side so that the voice does not project directly into the microphone (this provides best results). Speak at a normal level – **NEVER RAISE YOUR VOICE OR SHOUT INTO THE MICROPHONE**. A design feature of this transceiver is that high average modulation can be achieved easily at normal voice levels.

During periods of transmission, the receiver is silenced and reception is therefore impossible. In the same way, your signal cannot be heard by another station when he is transmitting -- each must take turns. To receive again, simply release the microphone push-to-talk button.

**NOTE:** If you are using the HB-502 AC power supply, you may observe a slight “flickering” of the transceiver dial light during transmit. This is normal and should be disregarded.

## AUX OPERATION

The impedance at the EX jack is 100K ohms. Input levels of 300 millivolts will produce full output and can be controlled by the VOLUME control. SQUELCH control should be turned to the fully counter clockwise position.

## PUBLIC ADDRESS OPERATION

Special provision has been made for Public Address (PA) operation, utilizing the microphone and audio stages in the transceiver. For PA operation, you should use an external 16-32 ohm speaker connected to the "PA" jack. Use Lafayette catalog No. 34-6031 jack. Set the channel Selector to PA, press the push-to-talk button on the microphone and talk into it – your voice will be heard from the external speaker (which may be mounted on the exterior of a car or building). NOTE: As soon as the microphone push-button is released, the transceiver will return to the normal receive mode to provide CB reception. Note also that the Volume control on the transceiver does not control the speaker output when microphone push-to-talk switch is depressed.

## OPERATING PROCEDURES

A Citizens Band station is NOT intended to be a replacement for a ham station. Transmission of a "CQ" (calling any station) to alert any station that might be listening is in violation of Citizen Band Regulations (except in an emergency). For information on permissible types of communications, you should always refer to Part 95 of the FCC Rules and Regulations.

When a licensed system consists of several mobile units (cars, boats, etc.), it is common practice to designate the control station by the assigned call letters and arbitrarily assign numbers to the mobile units. An example of a typical exchange might then be as follows:

Station 1... "This is 2W9374, unit one calling unit two mobile."  
Station 2... "2W9374 unit one, this is 2W9374 unit two, 10-2 over."  
Station 1... "What is your 10-20 unit two?"  
Station 2... "10-20 is Elm and Maple Streets."  
Station 1... "Proceed to service call at 999 Market Street. 10-4?"  
Station 1... "2W9374 unit one is clear."

For convenience, the National "10-Code" is listed as follows:

## GENERAL PROCEDURE

- |         |   |         |   |
|---------|---|---------|---|
| 10 - 1  | Receiving poorly  | 10 - 14 | Correct time                            |
| 10 - 2  | Signals good  | 10 - 15 | Make a pickup of . . . . . at . . . . . |
| 10 - 3  | Stop transmitting -- channel in use by others           | 10 - 16 | Have picked up or have in possession    |
| 10 - 4  | OK -- affirmative -- message received                   | 10 - 17 | Urgent (business)                       |
| 10 - 5  | Relay message   | 10 - 18 | Anything for us                         |
| 10 - 6  | Operator busy, stand by                                 | 10 - 19 | Nothing for you -- return to station    |
| 10 - 7  | Out of service  | 10 - 20 | What is your location?                  |
| 10 - 8  | In service -- subject to call                           | 10 - 21 | Call me by landline                     |
| 10 - 9  | Repeat transmission -- poor reception                   | 10 - 22 | Report in person to . . . . .           |
| 10 - 10 | Transmission completed -- subject to call (standing by) | 10 - 23 | Stand by                                |
| 10 - 11 | Speaking too rapidly                                    | 10 - 24 | Finished with last assignment           |
| 10 - 12 | Officials or visitors present                           | 10 - 25 | Do you have contact with . . . . .      |
| 10 - 13 | Advise road and weather conditions                      | 10 - 26 | Disregard last information              |
|         |   | 10 - 27 | Moving to channel . . . . .             |

## EMERGENCY OR UNUSUAL

- 10 - 30 Does not conform to rules and regulations
- 10 - 33 Emergency traffic at this station
- 10 - 34 Trouble at this station, help needed
- 10 - 35 Confidential information
- 10 - 36 Accident at . . . . .
- 10 - 37 Wrecker needed at . . . . .
- 10 - 38 Ambulance needed at . . . . .
- 10 - 39 Convoy or escort
- 10 - 70 Fire
- 10 - 79 Report progress of fire

## TECHNICAL

- 10 - 91 Too weak, talk closer to mic
- 10 - 92 Too loud, talk farther from mic
- 10 - 93 Frequency check
- 10 - 94 Give a test: J1 with voice -- J2 without voice (carrier)

## TRANSMITTER IDENTIFICATION CARD

When you have received your license, you are required to fill out the Transmitter Identification Card, FCC Form 452-C which has been supplied. Fill out the card as indicated and attach to the outside of the transceiver.

1. Enter your call sign which is on the left hand corner of your license. The unit designation should agree with the number of stations licensed to you.
2. Enter the name of the licensee.
3. Enter here the home address of individual or address of business if license is kept at a business location.
4. Already answered.
5. The date of expiration on the license should be entered here.
6. Sign the card in this space.

## **SERVICE AND ALIGNMENT**

As an aid to the service technician, this manual contains a layout diagram identifying transistors, transformers, coils, etc., a schematic diagram with voltages, and a functional block diagram. Also included are instructions for aligning the receiver and transmitter sections.

### **RECEIVER ALIGNMENT**

To align the receiver portion of the HB-525E transceiver refer to the layout diagram for location of alignment points and proceed as follows:

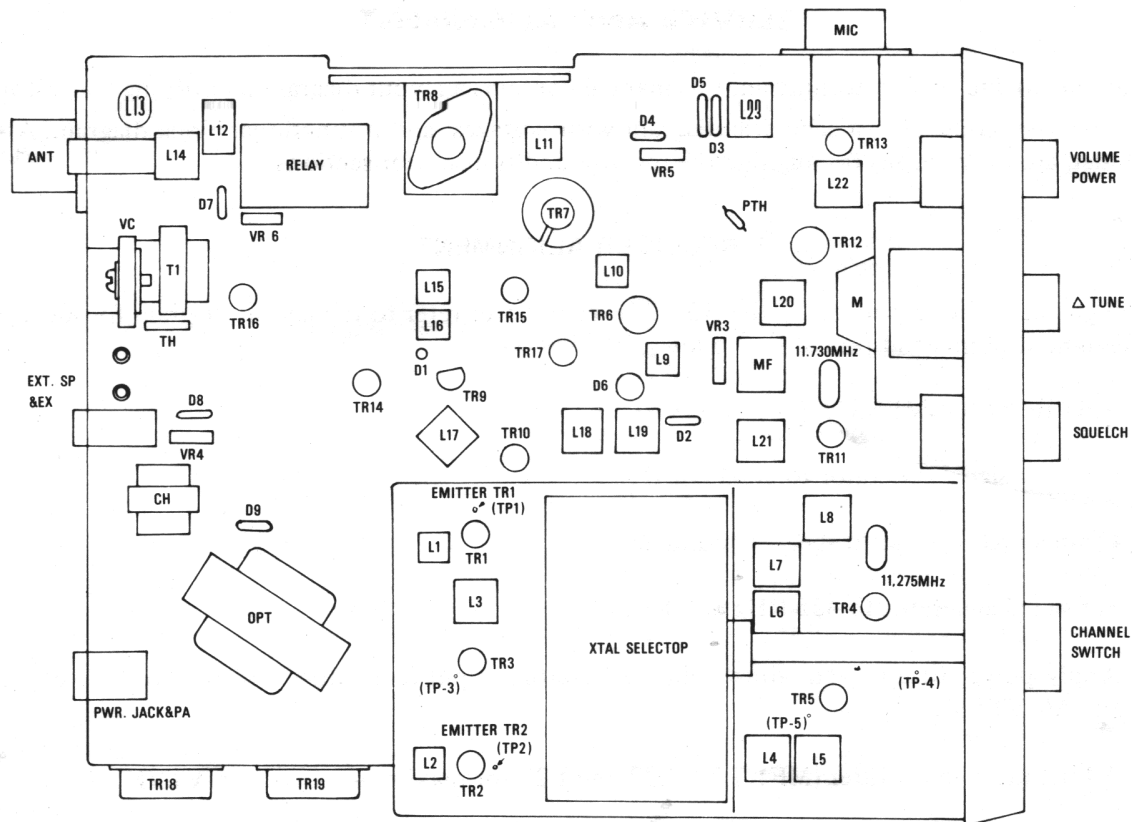
#### **455 KHz IF ALIGNMENT**

1. Connect signal generator to anode of D2.
2. Connect AC VTVM to speaker terminals.
3. Set signal generator to 455 KHz  $\pm$  1 KHz.
4. Apply power to unit and adjust signal generator output to produce a reading of 0.5 volts on the AC VTVM.
5. Adjust mechanical filter (MF), L20, L22 and L23 for maximum output on VTVM.

NOTE: Reduce output of signal generator as necessary to keep VTVM reading around 0.5 volts.

#### **11.275 MHz IF ALIGNMENT**

1. Connect signal generator to base of transistor TR-10.
2. Connect AC VTVM to speaker terminals.
3. Set signal generator to 11.275 MHz. ( $\pm$  1 KHz)



4. Adjust L18 and L19 for maximum output as read on VTVM. Reduce signal generator output as necessary to keep the VTVM reading around 0.5 volts.

**CAUTION:** All coil cores in this unit have been sealed with wax. Before attempting to adjust each core, be sure to melt the wax so as to permit free movement. Failure to do this may result in damaged cores.

#### LOCAL OSCILLATOR ALIGNMENT

1. Connect a DC VTVM between the emitter of TR-1 (TP-1) and ground.
2. Adjust the core of L1 to the bottom of the coil (maximum inductance).
3. Turn core of L1 in a counter-clockwise direction until the local oscillator begins to oscillate. This will be indicated by a reading on the VTVM.
4. Turn core two more turns in a counter-clockwise direction. VTVM should now read approximately + 2.5 volts.



## SYNTHESIZER OSCILLATOR ALIGNMENT

1. Connect a DC VTVM between the emitter of TR-2 (TP-2) and ground.
2. Adjust the core of L2 to the bottom of the coil.
3. Turn the core of L2 in a counter-clockwise direction until the oscillator begins to oscillate. This will be indicated by a reading on the VTVM.
4. Turn core two more turns in a counter-clockwise direction. VTVM should now read approximately + 1.3 volts.

## RF ALIGNMENT (Place delta tune switch in center position)

1. Connect signal generator to antenna connector.
2. Connect AC VTVM across speaker terminals.
3. Set signal generator to 27.115 MHz, modulated 30% with a 1 KHz tone. Set signal generator output to 10  $\mu$ V.
4. Set transceiver to channel 13 and vary signal generator frequency around 27.115 MHz to produce a maximum reading on the AC VTVM.
5. Adjust L15, L16 and L17 to produce maximum output on AC VTVM.
6. Reduce generator output to approximately 1  $\mu$ V. Adjust L3, L4, L5, L15, L16, L17, L18, L19, MF (mechanical filter), L20, L22, and L23 for maximum reading on VTVM.

## SQUELCH ADJUSTMENT

1. Connect signal generator to antenna connector.
2. Set squelch control to the maximum clockwise position.
3. Set signal generator output to 10 mV. Adjust potentiometer VR-3 for opening the squelch.

## TRANSMITTER ALIGNMENT

### OSCILLATORS

The synthesizer and local oscillators are used for both receive and transmit functions of the transceiver. These oscillators have already been adjusted during alignment procedures for the receiver and thus require no further alignment.

### ALIGNMENT PROCEDURE

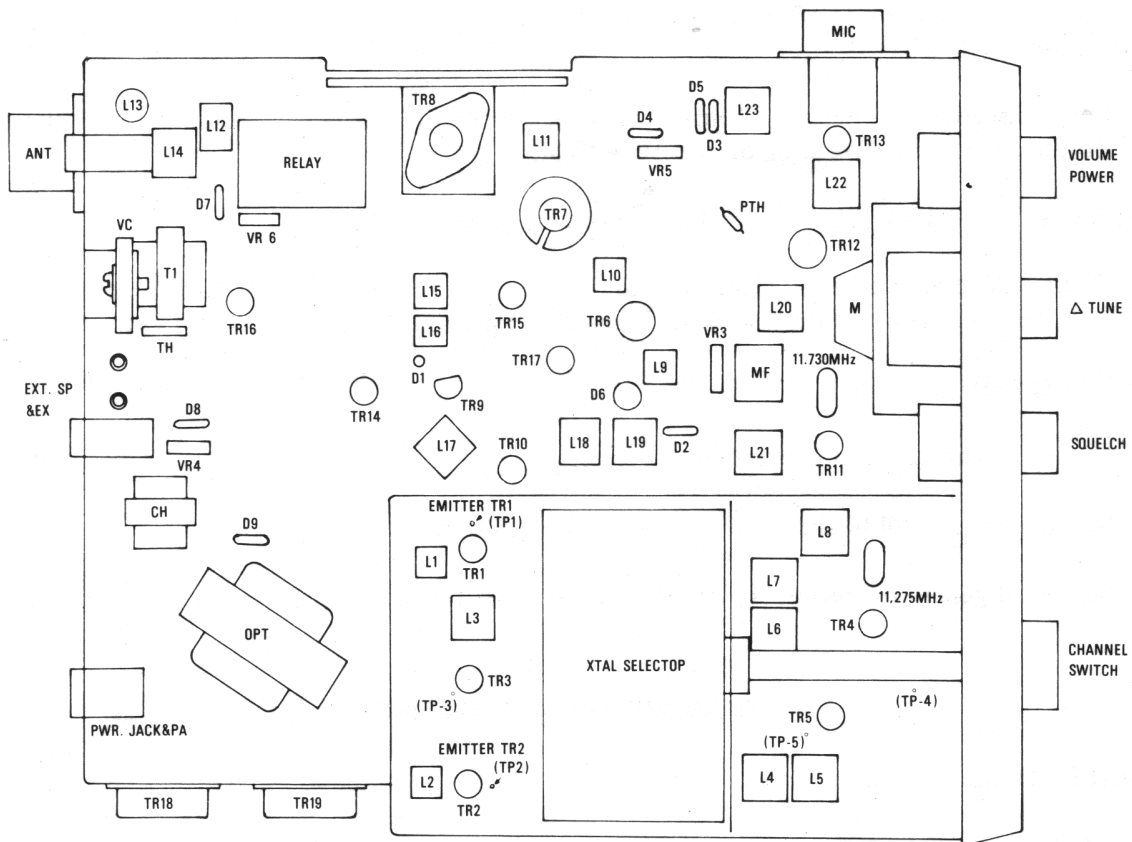
1. Connect a 50 ohm wattmeter to the antenna connector on the transceiver.

2. Set transceiver channel selector to 13.
3. Apply power to transceiver (12.6 volts DC). Depress microphone button and adjust cores of L6, L7, L8, L9, L10 and L11 for maximum on VTVM.

NOTE: Adjustment of L10 is fairly critical. Misadjustment of this coil can reduce the transmitter output to zero.

4. Check power output on all channels. If low on some channels, readjust L6, L7, L8, L9, L10 and L11 for equal output on channels 1 and 23. This will usually ensure equal output on all 23 channels.
5. Adjust L12, L13 and VC for maximum output on the wattmeter.

NOTE: L12 is adjusted by either compressing or expanding the coil turns. Use a non-metallic tuning tool to spread the wire turns.



6. The transceiver may be peaked for maximum RF power output at the actual installation with the antenna connected by re-adjusting VC for maximum radiated power on an RF field strength meter.

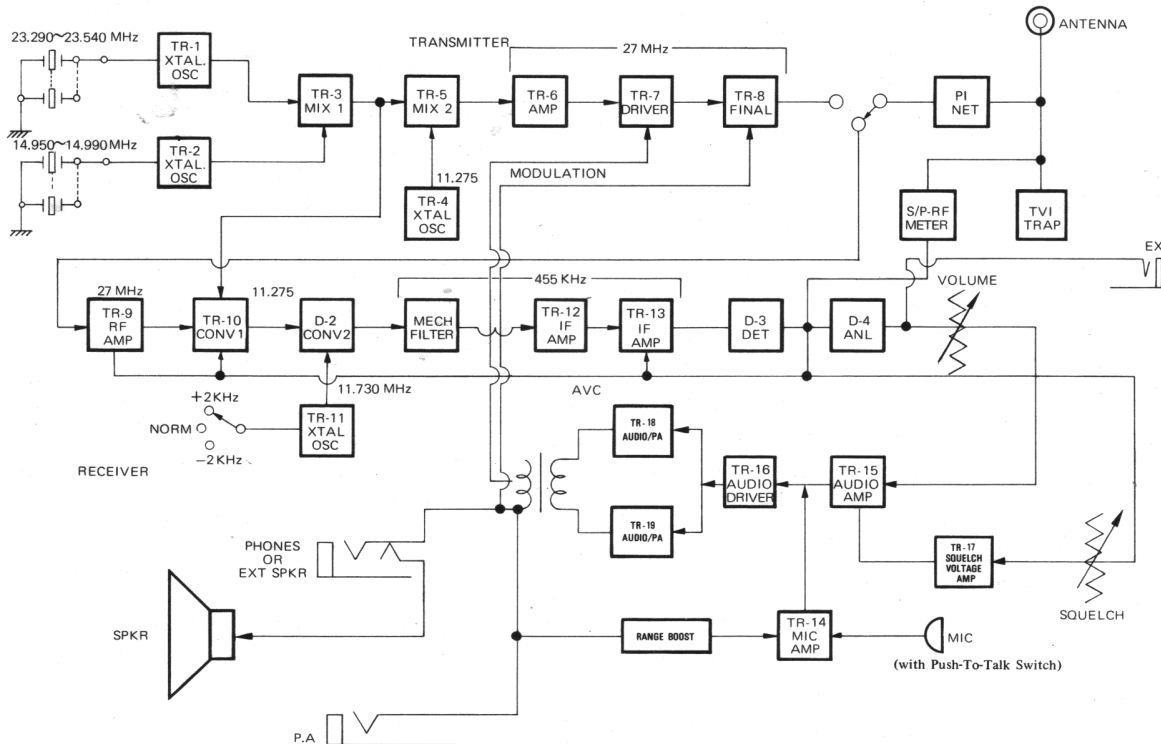
## MODULATION ADJUSTMENT

1. Connect a modulation monitor to the transceiver.
2. Connect an audio generator between ground and the center pin on the microphone connector on the transceiver. Set generator frequency to 1 KHz and adjust output level to 10 mV.
3. Apply power to transceiver and depress microphone button. Adjust potentiometer VR-4 to produce 80% modulation as indicated by the modulation monitor.

NOTE: Following above steps will produce 100% modulation on voice signals. In no case shall the modulation exceed 100%.

## TVI ADJUSTMENT

1. Use a TV receiver set to channel 2 as an indicator.
2. Depress transceiver microphone button and adjust L14 (rear of transceiver) for minimum interference on TV receiver.



FUNCTIONAL BLOCK DIAGRAM

## **RETURNING THE UNIT FOR REPAIR**

If you wish to return the unit for repair (either in or out of warranty), we recommend that you return the transceiver to the Lafayette store from which it was purchased. If the unit is to be shipped to our main office for service, please read the instructions which follow.

### **SHIPPING INSTRUCTIONS**

Pack the unit very carefully to avoid damage in transit, preferably in its original carton. If the original carton is not available, use a sturdy carton with least 3 inches of shredded paper or excelsior around the unit. In the latter case, wrap the unit in paper first to avoid particles of packing material getting into it. Include with the unit a letter explaining exactly what difficulties you have encountered [remember to add extra First Class postage and indicate on the outside of the carton that First Class-Mail is enclosed]. Ship by prepaid express if possible and mark ELECTRONIC EQUIPMENT – FRAGILE. Clearly address the carton as follows:

SERVICE DIVISION  
LAFAYETTE RADIO ELECTRONICS CORP.  
150 Engineers Road  
Hauppauge, L.I., N.Y. 11787