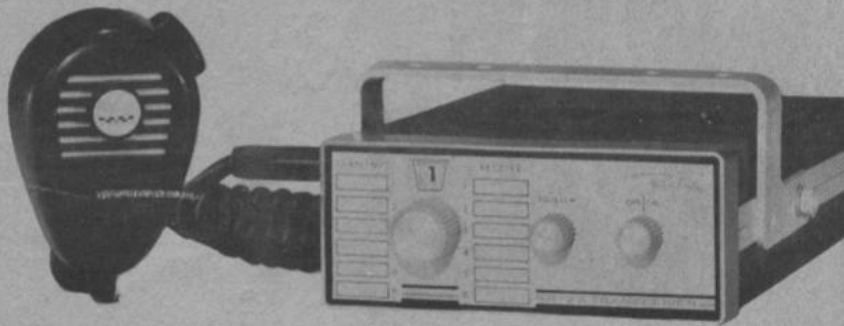




TWO METER  
AMATEUR TRANSCEIVER



*MODEL HR-2A*

**INSTRUCTION  
MANUAL**

## UNPACKING

- 1 - Transceiver Unit
- 1 - DC Power Cord
- 1 - Mobile Mounting Bracket
- 1 - Security Bracket
- 1 - Instruction Manual
- 1 - Warranty Card

To be filled out and returned to:

Regency Electronics, Inc.  
7900 Pendleton Pike  
Indianapolis, Indiana 46226

## MAINTENANCE

It is recommended that the services of a qualified electronic technician be used for troubleshooting.

## DESCRIPTION

The Regency HR -2A is an all-transistor, FM transceiver designed for use in the 2 Meter (144-148 MHz) Amateur Band. Its receiver section is a double-conversion, super-heterodyne type with plug-in crystal-controlled frequency selection.

The transmitter section is crystal controlled on each channel. The transmitter employs phase modulation for the ultimate in carrier stability. Internal controls are provided for adjusting the deviation from 0 to 15 KHz. This control is factory adjusted for approximately 10 KHz deviation.

The transmitter and receiver sections both employ band-pass circuitry so that maximum transmitter power and receiver sensitivity are maintained across the entire band (144-148 MHz).

The HR -2 utilizes silicon transistors (24) throughout for dependability. The use of two Integrated Circuits provides for compactness and circuit reliability. In addition, a ceramic filter employed in the receiver's second I.F. ensures optimum performance in areas of the country where numerous channels are closely grouped together.

The transmitter employs 2 new ruggedized, Balanced Emitter RF power transistors for high power output (15 watts). A large copper heat sink plus a SWR bridge limiting circuit ensures maximum protection even under long periods of "key down" operation and open or shorted antenna conditions. Also, there is virtually no power drop off during lengthy transmissions. In addition, the attenuation of spurious emissions from the transmitter exceed the FCC limits as would be required for Type Acceptance.

Some extra features include:

1. Provision for connection of an external or remote speaker.





For a quick and easier mobile installation, an accessory 12 VDC power cord with a cigarette lighter plug (Regency MA -10) can be used. In this case, the unit can be operated on the front seat of the vehicle.

A "mobile" antenna with a UHF (PL-259) plug on the coax cable is required for good two-way communications.

## OPERATION

### Volume Control/Off-On Switch

This control varies the audio output level for the internal speaker. It also varies the level of audio present at the external speaker connection. Clockwise rotation of this control turns the receiver on and increases the volume.

### Squelch Control

This control eliminates background noise in the absence of a signal. Full clockwise rotation removes all squelch action. Turning this control counter-clockwise until the noise disappears permits the receiver to be "quiet" until an actual signal is received. Even if the squelch control is set fully counter-clockwise, the receiver will still operate properly and not be locked-out or prevented from receiving a signal.

### Channel Selector

This is basically a twelve-position switch which enables the operator to select any one of twelve crystal-controlled transmit-receive channels. However, only the first six positions, numbered 1 through 6, are factory wired for typical simplex or paired frequency operation. For example, channel 1 connects receive crystal No. 1 and transmit crystal No. 1 to their respective oscillator circuits.

The last six positions, lettered A through F, are not factory wired. However, by adding jumpers to appropriate points on the switch decks, See Figures I & II, Page 12,

these six positions can provide the operator with the capability of reusing the first six crystal pairs in a different paired arrangement. For example, receive crystal No. 1 could be paired with transmit crystal No. 2 when the switch is on channel A. In other words, position A through F provide the operator with the necessary flexibility to keep the number of required crystals to a minimum.

### Crystal Specifications

Due to the numerous frequencies or channels involved, only one pair of crystals are installed by the factory. Miniature, plug-in crystals are simply installed by inserting them in the receptacles on the circuit board. Because of the accuracy required, Shepherd Industries' crystals are recommended. They are usually available at the source from which the radio was purchased. Specify exact frequency.

If desired, the crystals may be purchased from other manufacturers. The following information must be included in the order.

#### Receive Crystal:

1. Crystal frequency, determined as follows:

$$\text{Crystal frequency} = \frac{\text{receive frequency} - 10.7 \text{ MHz}}{3}$$

#### Example:

$$\begin{aligned} \text{Crystal frequency} &= \\ \frac{146.94 - 10.7}{3} &= \frac{136.24}{3} = 45.41333 \text{ MHz} \end{aligned}$$

2. Frequency tolerance of .001%
3. 3rd overtone
4. Series resonance -- 250 Hz
5. Maximum equivalent series resistance: 35 Ohms
6. Drive level: 2 MW
7. Holder: HC-25/U

### Transmit Crystal:

1. Crystal frequency, determined as follows:  
Crystal frequency =  $\frac{\text{Transmit Frequency}}{24}$

Example:

$$\text{Crystal Frequency} = \frac{146.94}{24} = 6.1225 \text{ MHz}$$

2. Fundamental mode
3. Load capacity: 32 PF
4. Maximum series resistance: 40 Ohms
5. Drive level: 2 MW
6. Holder: HC-25/U
7. Frequency tolerance: At 25<sup>o</sup>C, .001%  
From -10 + 60<sup>o</sup>C, .0015%

### Crystal Installation:

Prior to installing a crystal, the transceiver's cover should be removed. To remove the cover, unscrew the two large bolts located at the sides of the unit. The cover may then be slipped off by sliding it toward the rear of the unit.

Next, the speaker should be removed. Unscrew the two small metal screws (one located on each side) holding the speaker brackets in place. Then carefully place the speaker assembly along side of the unit.

Insert the crystal, or crystals, in the proper socket pins as indicated on the crystal location drawing. (See page 11). The number by each pair of sockets matches the dial and channel block designation. For each transmit crystal, there is a variable capacitor that can be used for adjusting each transmit crystal to the exact frequency. This adjustment should be made with a frequency counter or by utilizing a receiver which is known to be "on frequency".



The channel, or frequency, blocks on the front panel will accept 1/4" wide embossing tape with up to 7 digits, letters, or other characters. These blocks can be used for identifying the channel frequencies installed in the unit.

Reinstall the speaker and carefully reinstall the cover.

The unit is shipped from the factory with the transmit and receive crystals for 146.94 MHz installed in position One.

#### ILLUSTRATION #1

An example of typical transmit-receive combinations, utilizing the minimum number of crystals, will be demonstrated.

Suppose the following TRANSMIT-RECEIVE combinations are to be set up in the HR-2.

<u>CHANNEL SELECTOR POSITION NUMBER</u>	<u>TRANSMIT FREQUENCY (MHz)</u>	<u>RECEIVE FREQUENCY (MHz)</u>
1	146.94	146.94
2	146.16	146.76
3	<u>6.0925</u> 146.22	146.82
4	146.28	146.88
5	146.34	146.76
6	146.46	146.88
A	146.28	146.76
B	146.28	146.94
C	146.34	146.82
D	146.34	146.88
E	146.34	146.94
F	146.46	146.94

Install the following proper transmit and receive crystals in the appropriate crystal positions. See the crystal location and adjustment diagram, Page 11.

<u>TRANSMIT CRYSTAL</u>	<u>INITIAL POSITION</u>	<u>RECEIVE CRYSTAL</u>	<u>INITIAL POSITION</u>
146.94	1	146.94	1
146.16	2	146.76	2
146.22	3	146.82	3
146.28	4	146.88	4
146.34	5		
146.46	6		

<u>TRANSMIT CRYSTAL</u>	<u>TOTAL POSITIONS</u>	<u>RECEIVE CRYSTAL</u>	<u>TOTAL POSITIONS</u>
146.94	1	146.94	1 - B - E - F
146.16	2	146.76	2 - 5 - A
146.22	3	146.82	3 - C
146.28	4 - A - B	146.88	4 - 6 - D
146.34	5 - C - D - E		
146.46	6 - F		

This illustration is shown to demonstrate the extreme versatility incorporated in your HR-2. With the example shown, your HR-2 would be capable of working more than 250 of the single band repeaters as listed in a recently published directory. Only 3 additional Receive crystals and 5 Transmit crystals are required plus, of course, the necessary jumpers to reuse the crystals as indicated.

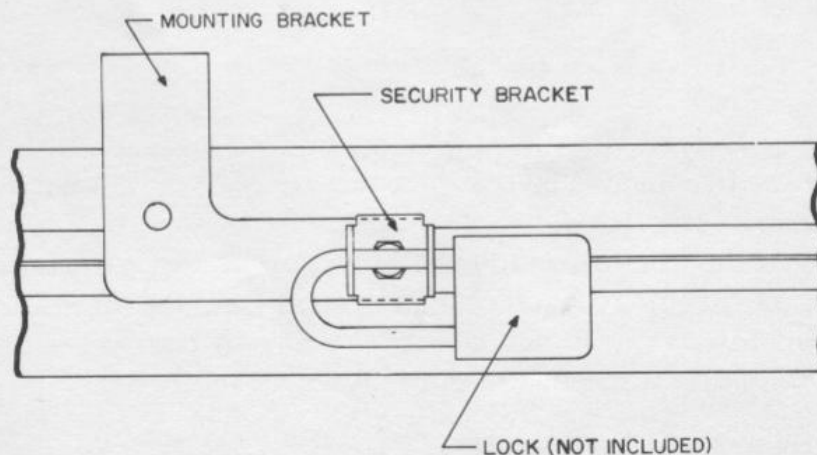
NOTE: Adding a jumper or jumpers, will slightly lower the transmit crystal frequency. Adjust the associated trimmer capacitor on the transmitter board for correction.

Connect the following jumpers on the copper side of the receive switch deck #500-753 as illustrated in Figure I, Page 12. Insulated 22 or 24 gauge wire should be used to avoid shorts.

Position 1 to Position F  
Position F to Position E  
Position E to Position B  
Position 2 to Position 5  
Position 2 to Position A  
Position 3 to Position C  
Position 4 to Position 6  
Position 6 to Position D

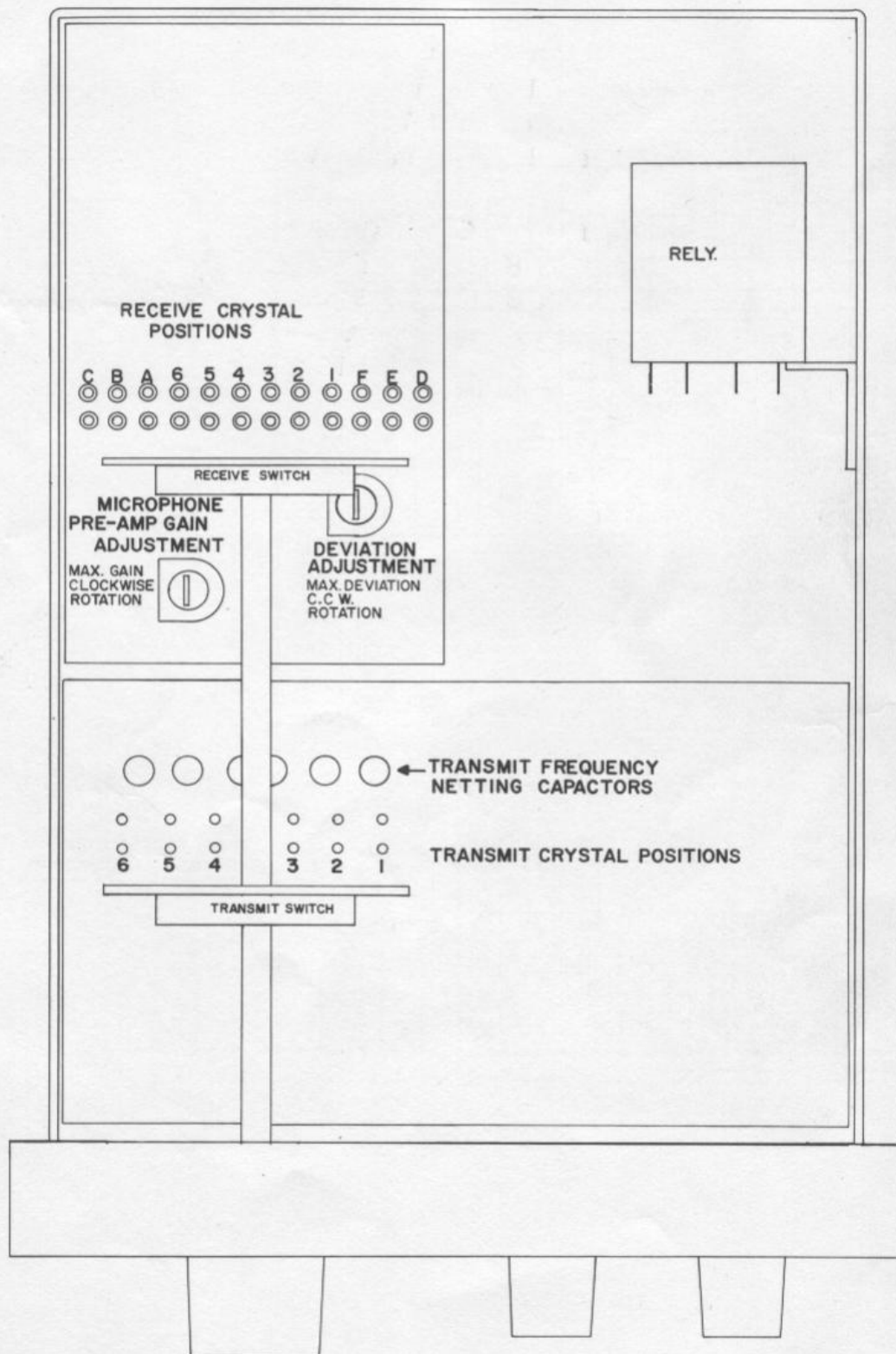
Connect the following jumpers on the copper side of the transmit switch deck #500-831 as illustrated in Figure II, Page 12.

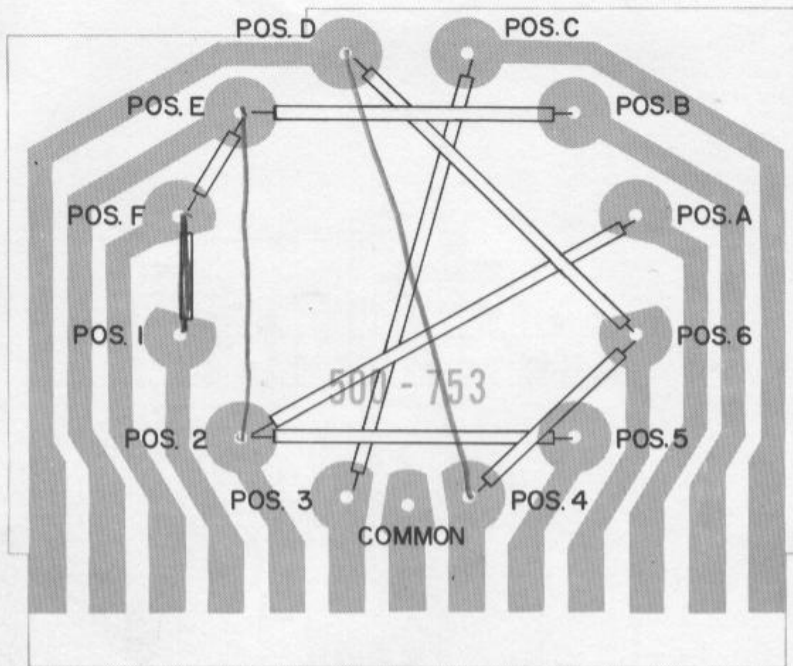
Position 4 to Position A  
Position A to Position B  
Position 5 to Position D  
Position D to Position C  
Position D to Position E  
Position 6 to Position F



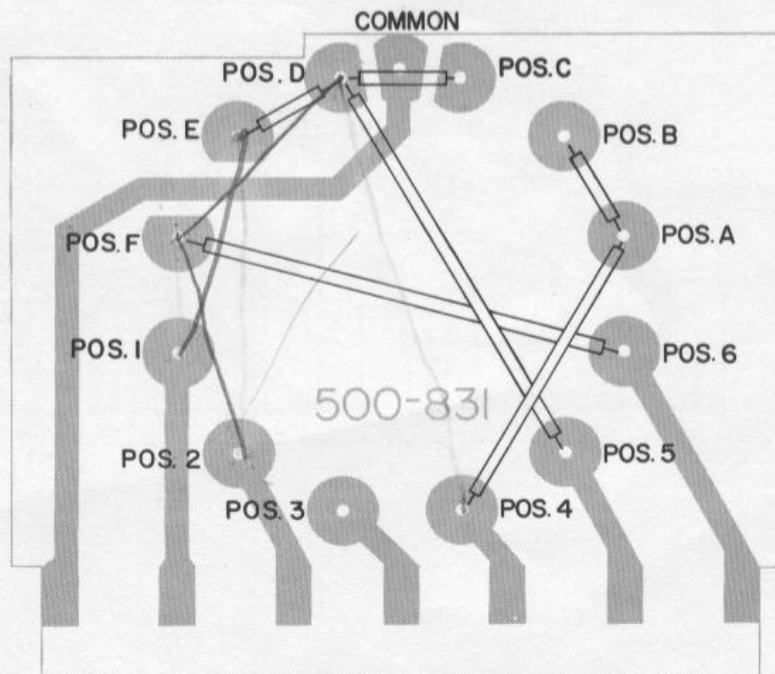
SIDE VIEW SHOWING SECURITY BRACKET INSTALLATION

# CRYSTAL LOCATION AND ADJUSTMENT DIAGRAM





RECEIVE SWITCH DECK  
500-753  
FIGURE I



TRANSMIT SWITCH DECK  
500-831  
FIGURE II  
12



#### WARRANTY

This Transceiver is sold under a 90 day warranty, which warrants it to be free from defects in material and workmanship. We agree to repair or replace at the point of manufacture, without charge, all parts showing such defects, provided the unit is delivered to us, intact for our examination, with all transportation charges prepaid to our factory, within 90 days from the date of sale to the original purchaser, and provided such examination discloses in our final judgment, that it is thus defective. Pilot lights, tubes, vibrator, fuses, and diodes shall be covered by the manufacturer's standard EIA warranty and such items shall be excluded from the provisions of this warranty.

This warranty does not apply if the Transceiver has been subjected to misuse, neglect, accidents, incorrect wiring not our own, improper installation, or put to use in violation of instructions furnished by us, nor to that have been damaged by lightning, excess current, repaired or altered outside our factory, not to the Transceiver that has had its serial number altered or removed.

#### CHANGES

The Company reserves the right to modify or change the equipment, in whole or in part, at any time prior to delivery in order to include refinements deemed appropriate by the Company, but without incurring any liability to modify or change any equipment previously delivered, or to supply new equipment in accordance with earlier specifications.

#### WARNING

ALL TRANSMITTER FINAL ADJUSTMENTS ARE SEALED AT THE FACTORY. IF ANY OF THESE SEALS ARE BROKEN, THE WARRANTY ON ALL POWER SEMICONDUCTORS IS VOIDED.