

117-6 Serial No. 34-00 045

W37712

7/10/73



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.

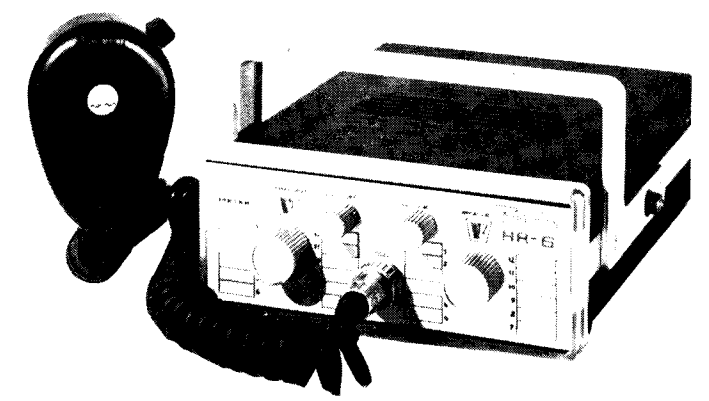
CHANGES

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.

SIX METER  
AMATEUR TRANSCEIVER



MODEL HR-6

INSTRUCTION  
MANUAL

## UNPACKING

- 1 - Transceiver Unit
- 1 - DC Power Cord with Fuse Holder
- 1 - Mobile Mounting Bracket
- 1 - Security Bracket (See Page 16 for Installation)
- 1 - Instruction Manual
- 1 - Warranty Card

To be filled out and returned to:

Regency Electronics, Inc.

7707 Records Street

Indianapolis, Indiana 46226

## OPERATION

It is highly recommended that the section on Operation be read before the initial usage of this unit. A few minutes spent in reading these instructions will certainly reduce or eliminate the number of questions, and problems, that may arise concerning optimum performance and proper usage.

## MAINTENANCE

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

## DESCRIPTION

The Regency HR -6 is an all-transistor, 12 channel FM transceiver designed for use in the 6 Meter (52-54 MHz) Amateur Band. Its receiver section is a double-conversion, super-hetrodyne type with plug-in crystal-

controlled frequency selection. Receiver channel selection is independent from the transmitter's channel selection.

The transmitter section is also crystal controlled on each channel. The transmitter employs phase modulation, using varactor diodes. An internal control is 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 (52-54 MHz).

The HR-6 utilizes silicon transistors (25) throughout for dependability. The use of three 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. A narrowband filter is available; see page 11.

The transmitter employs 2 new ruggedized, Balanced Emitter RF power transistors for high power output (25 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. The receiver section is Certified under Part 15, Subpart C of the FCC Rules and Regulations.

Some extra features include:

1. Provision for connection of an external or remote speaker. See page 7 for details.
2. A mobile mounting bracket for easy installation in a car or truck.
3. A Security Bracket, which will help minimize the possibility of theft. See page 16 for installation illustration.
4. A plug-in high impedance microphone.
5. Provision for using a telephone-type hand-set. See page 7 for details.

#### SPECIFICATIONS

Antenna Impedance.....	50 Ohms
Frequency Range.....	52-54 MHz
Sensitivity.....	0.35 $\mu$ v (nom.), 20 DB Quieting
Selectivity.....	6 DB Down $\pm$ 16 KHz 50 DB Down $\pm$ 32 KHz
Image Rejections.....	60 DB
Spurious Rejections.....	60 DB
Modulation Acceptance.....	$\pm$ 15 KHz
Audio Output (3-4 $\Omega$ Speaker).....	3 Watts @ 10%, or less, Distortion, 5 Watts Maximum
Squeich System.....	"Noise" Operated

I.F. Frequencies..... 10.7 MHz & 455 KHz  
 Channels..... 12; Crystal Controlled  
 Crystal Installed..... 52.525 MHz in Channel 1

TRANSMITTER

Antenna Impedance..... 50 Ohms  
 Frequency Range..... 52-54 MHz  
 Power Output..... 25 Watts (min.) @ 13.8 VDC  
 Power Bandwidth..... 25 Watts from 52-54 MHz  
 Harmonic and Spurious Emissions... 60 DB, or more,  
   below carrier  
 Modulation..... Phase Modulation with  
   automatic deviation limiting  
 Deviation..... Factory adjusted to 10 KHz; internal  
   adjustment of 0-15 KHz deviation  
 Mike Pre-Amp..... FET Input with  
   internal level control  
 Microphone..... Plug-in hand held; high-Z ceramic  
 Channels..... 12; Crystal Controlled with individual  
   trimmer capacitors for Frequency netting  
 Power Amp. Protection... SWR Bridge Limiting Circuit  
 Crystal Installed..... 52.525 MHz in Channel 1

POWER

Voltage Requirements..... 13.8 VDC (nom.)  
   11.5 V (min.) – 14.5 V (max.)  
 Current Requirements..... @ 13.8 Volts  
   Receive (Squelched)..... 380 MA.  
   Receive (Max. audio output)..... 1 Amp.  
   Transmit..... 4.5 Amps (max.)  
 Fuse Size..... 10 Amp. 3AG

SEMICONDUCTORS

Integrated Circuits..... 3  
 Silicon Transistors (Total)..... 25  
   Silicon BET Power Transistors..... 2  
   Junction Field Effect Transistors..... 2  
   Dual Gate Mosfet Transistor..... 1  
 Diodes (Total)..... 9  
   Zener Diodes..... 2  
   Varactor Diodes..... 2  
   Signal Diodes..... 4  
   Rectifier Diodes..... 1

## INSTALLATION

### Mobile 12 VDC Installation

The HR -6 transceiver may be used in any car, truck, boat, etc. that has a 12 VDC negative ground system. The red lead with the fuse holder must be connected to the positive terminal side of the battery. The black lead should be connected to the chassis or negative terminal of the battery.

To reduce the possibility of theft, the Security Bracket should be installed (as shown on page 16). The padlock used should be of substantial construction and can be either a key or combination operated type.

The "mobile" antenna used should be adjusted as closely as possible to present a 50  $\Omega$  load to the transceiver. The adjustments recommended by the antenna's manufacturer should be carefully followed to insure that the lowest possible SWR is achieved. It is recommended that any final adjustment to the antenna be made with a reliable SWR indicator in the feedline and with the HR -6 operating. If the SWR is too high, the built-in SWR bridge limiting circuit of the HR -6 will reduce the RF power out, or may even shut off the transmitter entirely.

### Base Station (117 VAC) Installation

The HR -6 may be used with any regulated or well filtered DC power supply that can supply at least 4.5 amperes at 12 to 14.5 VDC. The regulation of the power supply should be such that its output voltage does not get over 14.5 VDC when the transceiver is in the receive mode and is squelched off. Damage to various components may occur if the unit's input voltage exceeds 15 volts for any length of time.

The power supply and/or the power connection to the HR -6 should be properly fused. In addition, the ripple on the supply's output voltage should be less than 1%. It is recommended that Regency's regulated power supply, the P 110, be utilized for base station operation of the HR -6.

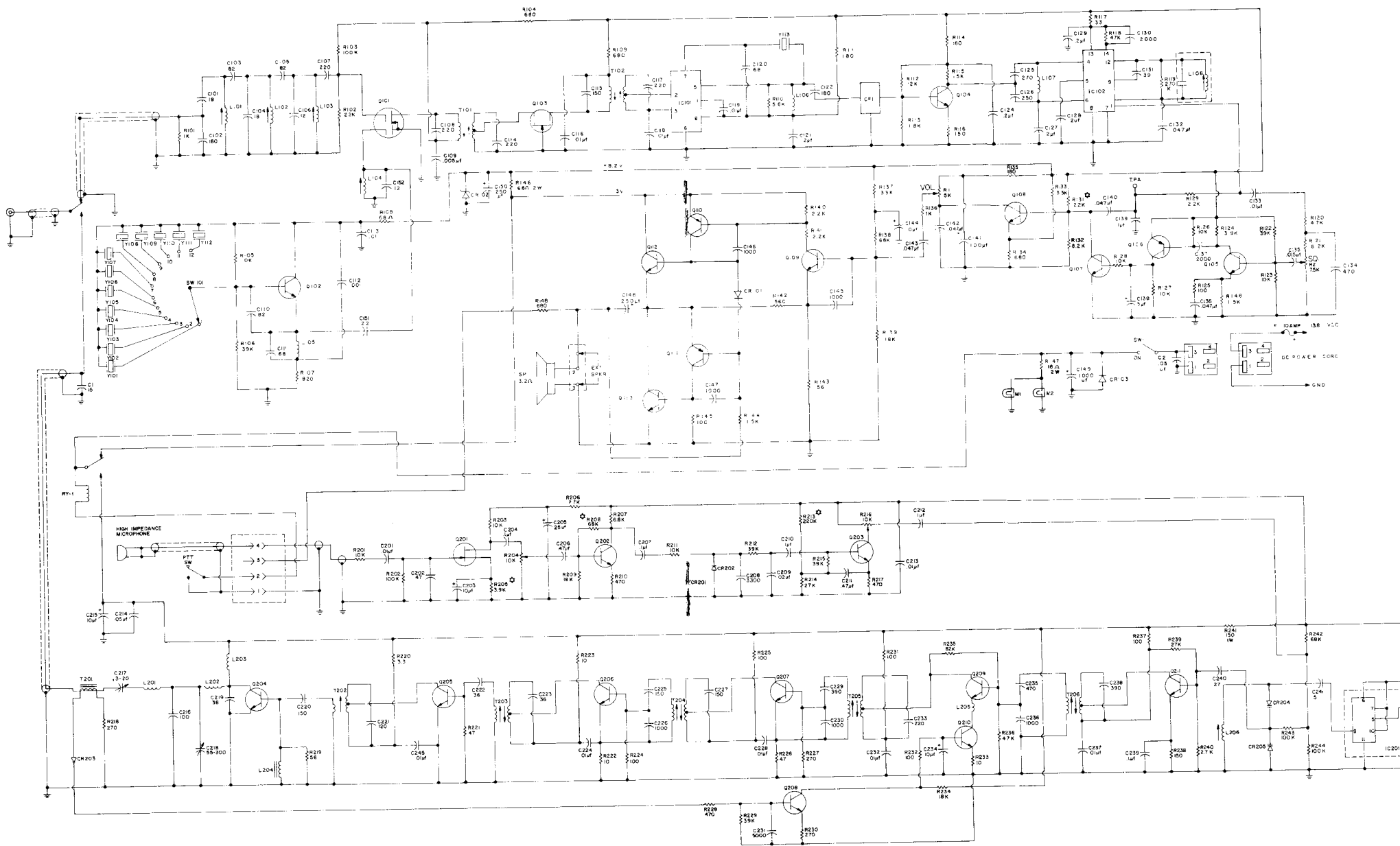
The antenna impedance should be adjusted or matched as closely as possible for use with 50 ohm coaxial cable. Use of RG -58/U should be considered only if the length of coax needed is 30 feet or less. For longer runs of feedline, it is recommended that a lower-loss cable, such as RG -8/U (especially of the "foam" type) should be used.

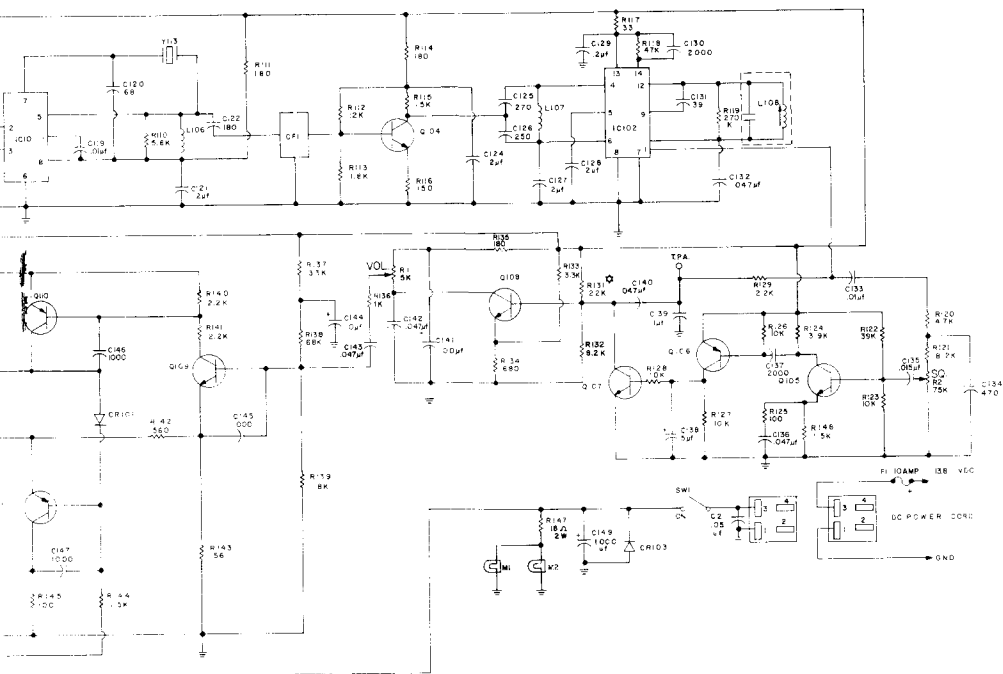
## ACCESSORIES

For a quick and easy mobile installation, an accessory, (Regency MA -47), 12 VDC power cord with a cigarette lighter plug can be used. In this case, the unit can be operated from on the front seat of the vehicle.

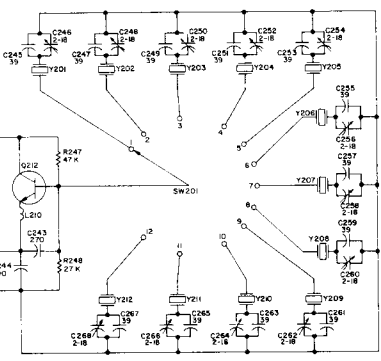
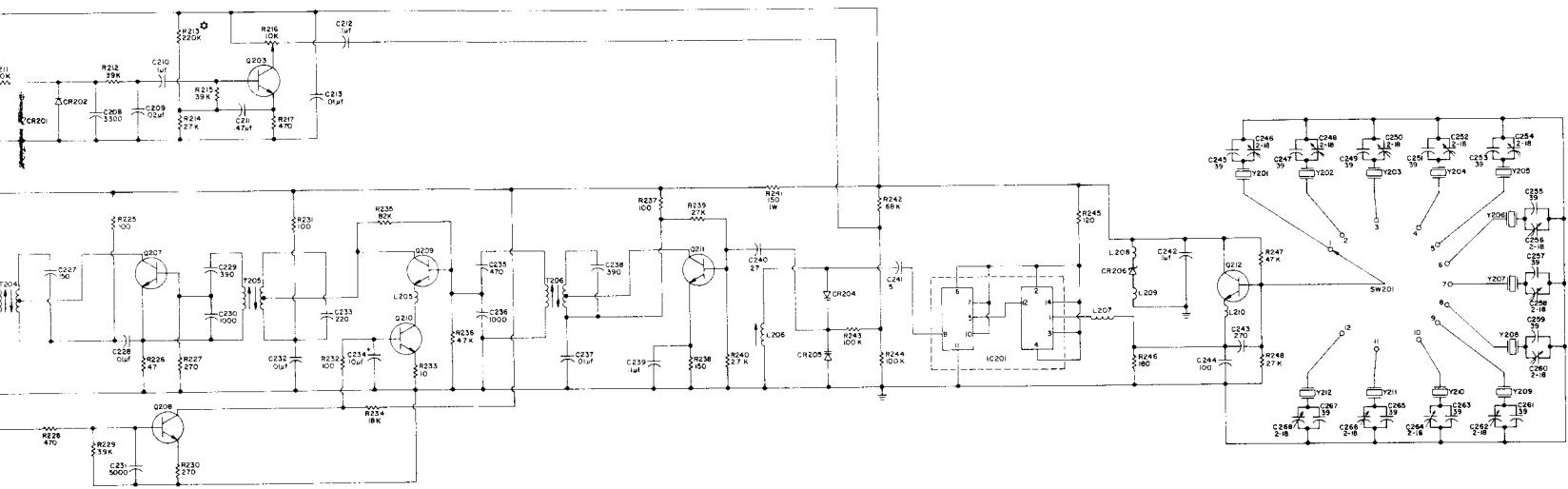
A handset, (telephone type) accessory, MA -44, is available and has the necessary connector already installed for easy and proper connection to the HR -6. The internal speaker may, or may not, be left connected when using the MA -44. To disable the internal speaker, merely disconnect one end of the link between the two screws on the terminal strip located on the rear panel of the HR -6.

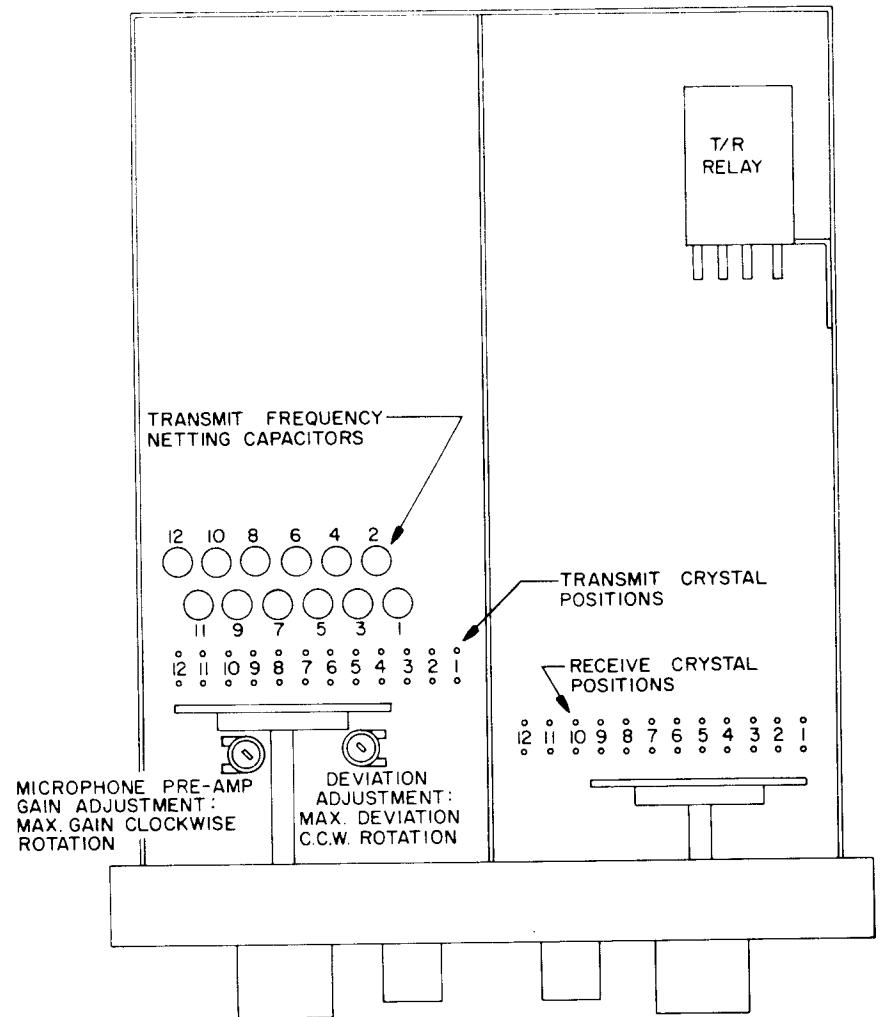
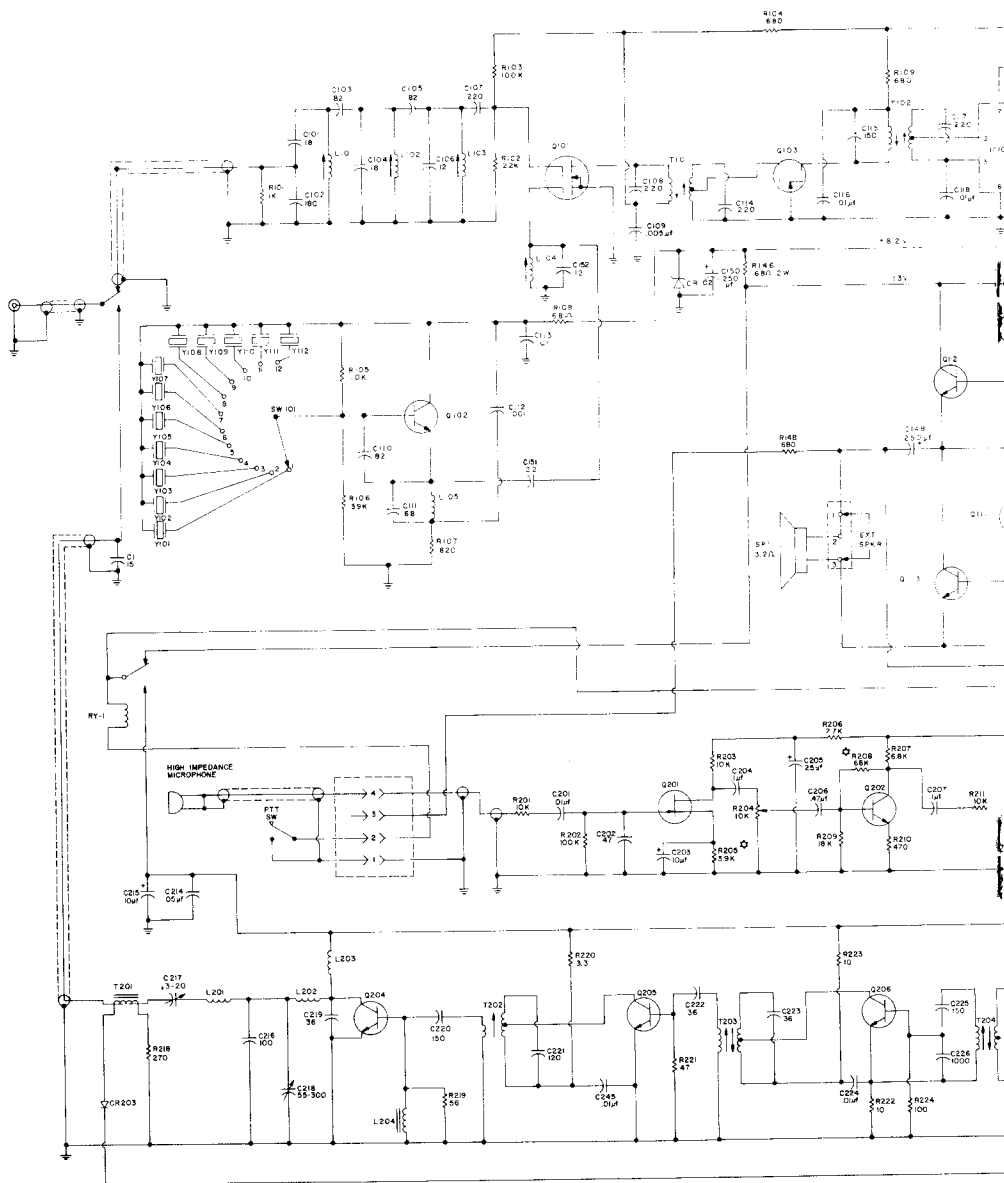
A remote or external speaker, such as Regency's accessory MA -8, can be easily connected to the HR -6. Connect one lead of the remote speaker to terminal No. 1, (terminal strip located on rear panel). Disconnect the link between terminals No. 2 and No. 3. Connect the other remote speaker lead to terminal No. 3. For





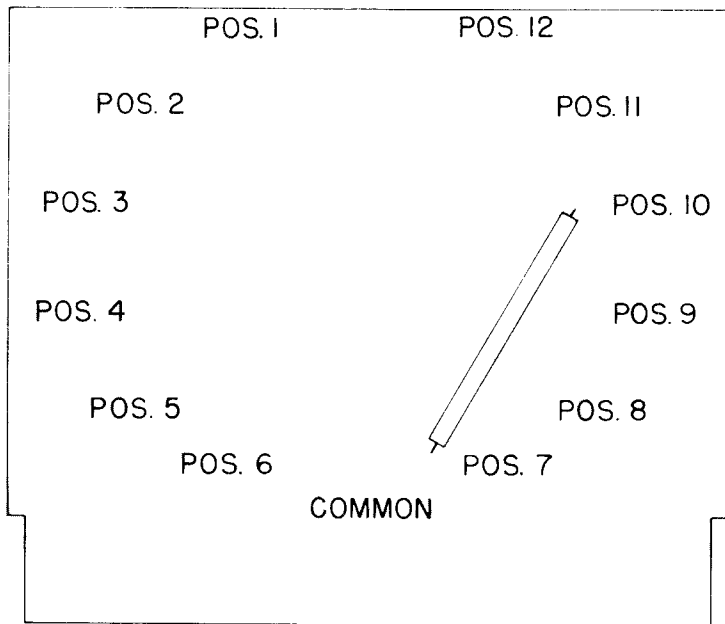
NOTES:  
 1. ALL CAPACITOR VALUES NOT SPECIFIED ARE PICO-FARAD.  
 2. ALL RESISTOR VALUES NOT SPECIFIED ARE OHMS, 1/4 WATT.  
 3. NOTED VALUES ARE FACTORY SELECTED NOMINAL VALUES SHOWN.  
 4. L201, L206, L209, AND L210 ARE FERRITE BEADS PLACED OVER COMPONENT LEADS.



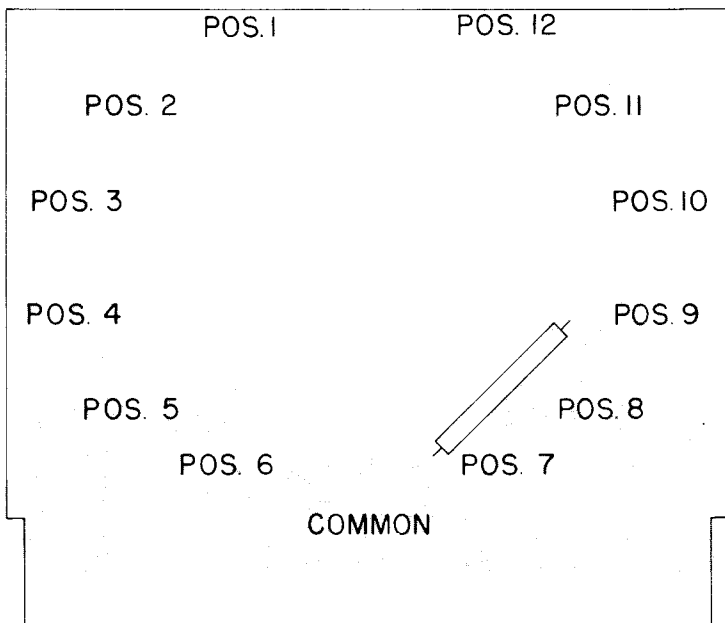


CRYSTAL LOCATION AND ADJUSTMENT DIAGRAM





**RECEIVE SWITCH DECK 500-753  
FIGURE I**



**TRANSMIT SWITCH DECK 500-753  
FIGURE II**

optimum performance a 3 to 4 ohm speaker should be used. The MA-8 is a 4-inch, 3.2 ohm speaker housed in a black vinyl-covered metal cabinet. The cabinet is provided with rubber feet and a small mounting bracket so that the MA-8 may be utilized as a base or mobile station accessory.

Two narrowband filter modification kits are presently available for the receiver section of the HR-6. One, the MA-41, provides for narrowband selectivity with a minimum of 50 DB attenuation to all spurious responses. The other kit, the MA-46, provides for at least 70 DB attenuation to all spurious responses. All parts and the necessary instructions are included in each kit. It should be noted that modulation acceptance of the receiver is reduced to  $\pm 8$  KHz when either one of these kits is installed.

## 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 Selectors

These are twelve-position rotary switches which enables the operator to independently select any one of the twelve crystal-controlled transmit or receive channels.

## CRYSTAL INFORMATION

### Crystal Specifications

Due to the numerous frequencies or channels involved, only one pair of crystals is installed by the factory. Miniature, plug-in crystals are simply installed by inserting them into the receptacles on the circuit board. Because of the accuracy required, Shepherd Industries' crystals are recommended. They are usually available from 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:

$$\text{Crystal Freq.} = \text{Receive Frequency} - 10.7 \text{ MHz}$$

#### Example:

$$\text{Crystal freq.} = 52.525 \text{ MHz} - 10.7 \text{ MHz} = 41.825 \text{ MHz}$$

2. Frequency tolerance: .001% @ 25°C;  
.002% from -10° to +60°C
3. 3rd overtone
4. Series resonance - 650 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:

$$\text{Crystal frequency} = \frac{\text{Transmit Frequency}}{6}$$

#### Example:

$$\text{Crystal Frequency} = \frac{52.525 \text{ MHz}}{6} = 8.754167 \text{ MHz}$$

2. Frequency tolerance: .001% @ 25°C;  
.002% from -10° to +60°C
3. Fundamental mode
4. Load capacity: 32PF
5. Maximum series resistance: 25 Ohms
6. Drive level: 2 MW
7. Holder: HC-25/U

### 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. The four rubber feet do NOT have to be removed.

When the speaker is installed, the speaker cover should be attached to the front panel coverment in order to prevent the speaker from being damaged. The speaker should be attached to the speaker assembly along side of the unit.

The unit is shipped from the factory with the transmit and receive crystals for 32 SLE installed in channel 1.

Insert the crystal, or crystals, in the proper socket pins as indicated on the crystal location drawing. (See page 9). 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 (netting) 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".

Reinstall the speaker; carefully reinstall the cover.

The channel, or frequency, blocks on the front panel will accept 1/4" wide embossing tape with up to 5 digits, letters, or other characters. These blocks are to be used for identifying the channel frequencies installed in the unit.

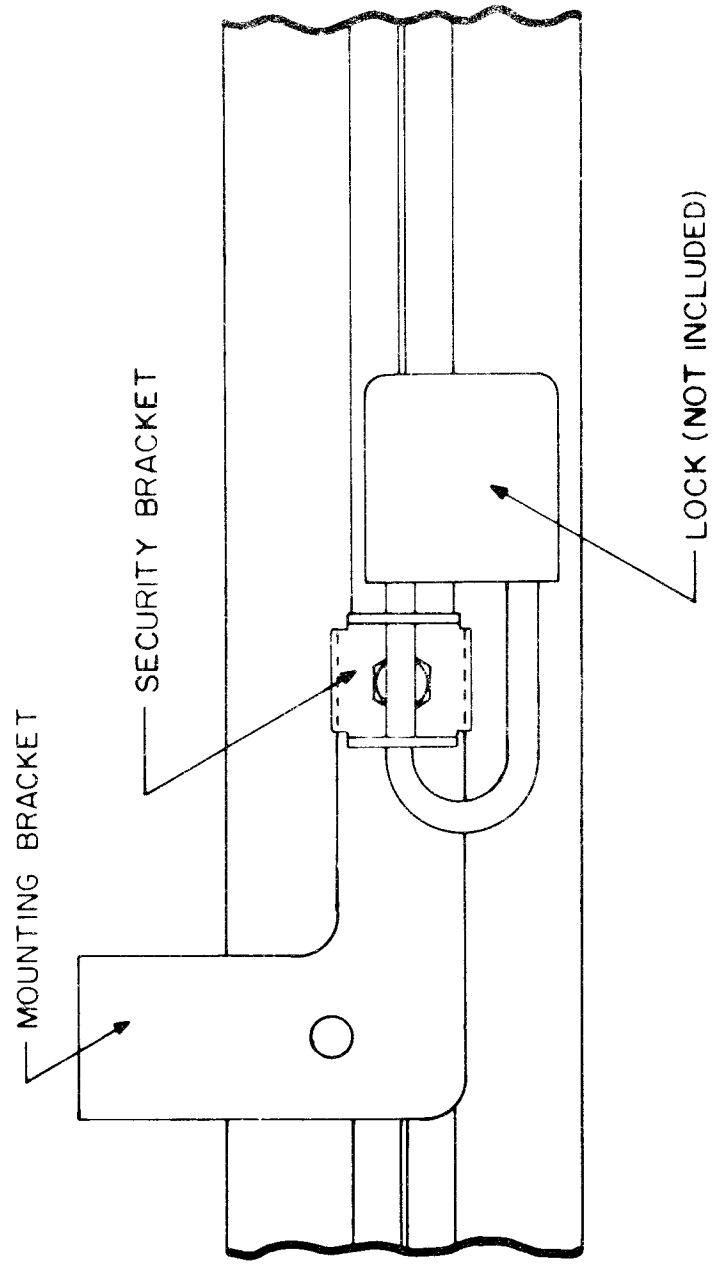
### Crystal Jumpering

Either Transmit or Receive crystal may be used in more than one channel by simply adding a jumper to the printed circuit switch. Thus, the total number of crystals needed is reduced if any of the required frequencies are repeated (used in more than one channel). Figures I and II on page 10 illustrates how jumpers are to be installed on the copper side of the switch decks for re-using Channel 7 crystals in another position. The jumpers should be insulated, No. 22 or 24 gauge wire.

NOTE: It is recommended that no more than three additional positions be jumpered to the original crystal position. Also, the jumpering should be worked out so as to keep the continuous jumper length to a minimum. Adding a jumper may slightly change the transmit crystal frequency. Adjust the associated trimmer capacitor on the transmitter board for correction if necessary.

*5/16 Add 5000 MK (Class 2, 3, 4) to input*

*5/23/74 - add receiver input side of PA  
- by loading top of PA to cut out spurious emission*



SIDE VIEW SHOWING SECURITY BRACKET INSTALLATION