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

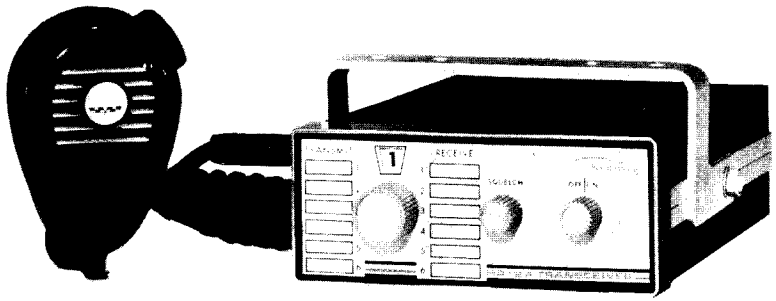
The Company reserves the right to modify or change the equipment, in whole or in part, at any time prior to delivery in order to include refinements deemed appropriate by the Company, but without incurring any liability to modify or change any equipment previously delivered, or to supply new equipment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

Regency

# 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.

2. A mobile mounting bracket for easy installation in a car or truck.

3. A plug-in high impedance microphone with a right angle connector.

## SPECIFICATIONS

### RECEIVER

Frequency Range..... 144-148 MHz

Sensitivity..... 0.35μv (nom.) 20 DB Quieting

Selectivity..... 6 DB Down ± 16 KHz
50 DB Down ± 32 KHz

Image Rejection ..... 45 DB

Spurious Rejections..... 60 DB

Modulation Acceptance..... ± 15 KHz

Audio Output (3-4Ω Speaker)..... 3 Watts 10% Distortion
5 Watts Maximum

Squelch System..... All Electronic Noise Compensated

Channels..... 6 Crystal Controlled with provision for adding an additional 6 channels

I.F. Frequencies..... 10.7 MHz & 455 KHz

### TRANSMITTER

Frequency Range..... 144-148 MHz

Power Output ..... 15 Watts (min.) @ 13.6 VDC

Power Bandwidth..... 15 Watts from 144-148 MHz

Harmonic and Spurious Emissions..... 55 DB, or more, below carrier

Modulation..... Phase Modulation with automatic deviation limiting

Deviation ..... Automatic Limiting with internal adjustments from 0-15 KHz deviation

Mike Pre-Amp..... FET Input with internal level control

Microphone..... Plug-in hand held, high Z Ceramic supplied

Channels..... 6 Crystal controlled with individual trimmer capacitors for Frequency netting

Power Amp Protection..... SWR Bridge Limiting Circuits

POWER

Power Requirements..... 13.6 Volts (nominal)

Receive (Squelched)..... 180 MA.

Receive (Max. audio output)..... 800 MA.

Transmit..... 2.9 Amps (max.)

Fuse Size..... 4 Amp. 3AG

SEMICONDUCTORS

Integrated Circuits..... 2

Silicon Transistors..... 24

Silicon BET Power Transistors..... 2

Zener Diodes..... 2

Varicap Diodes..... 2

Signal Diodes..... 3

Field Effect Transistors..... 2

## INSTALLATION

### Mobile 12 VDC Installation

The HR-2 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.



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 bascially 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:

   $$\text{Crystal frequency} = \frac{146.94 - 10.7}{3} = \frac{136.24}{3} = 45.41333 \text{ MHz}$$
2. Frequency tolerance of .001%
3. 3rd overtone
4. Series resonance -- 250 Hz
5. Maximum equivalent series resisance: 35 Ohms
6. Drive level: 2 MW
7. Holder: HC-25/U



Transmit Crystal:

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

   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 $25^{\circ}$C, .001%
   From $-10 + 60^{\circ}$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.

| CHANNEL SELECTOR POSITION NUMBER | TRANSMIT FREQUENCY (MHz) | RECEIVE FREQUENCY (MHz) |
|---|---|---|
| 1 | 146.94 | 146.94 |
| 2 | 146.16 | 146.76 |
| 3 | 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.

| TRANSMIT CRYSTAL | INITIAL POSITION | RECEIVE CRYSTAL | INITIAL POSITION |
|---|---|---|---|
| 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 | | |

| TRANSMIT CRYSTAL | TOTAL POSITIONS | RECEIVE CRYSTAL | TOTAL POSITIONS |
|---|---|---|---|
| 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.

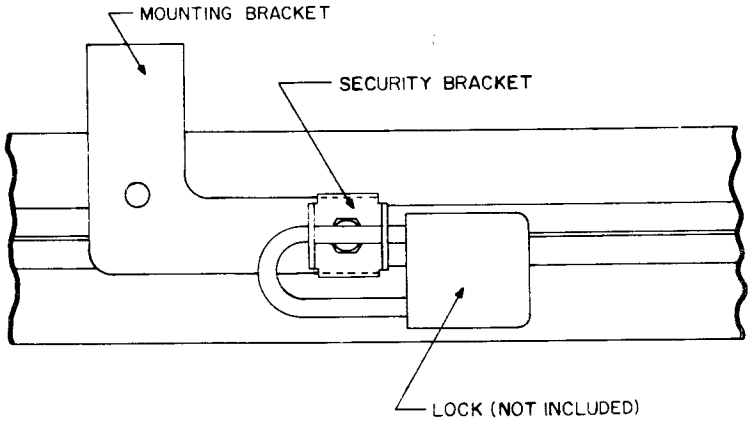
NOTE: Adding a jumper or jumpers, will slightly lower the transmit crystal frequency. Adjust the associated trimmer capacitor on the transmitter board for correction.

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.

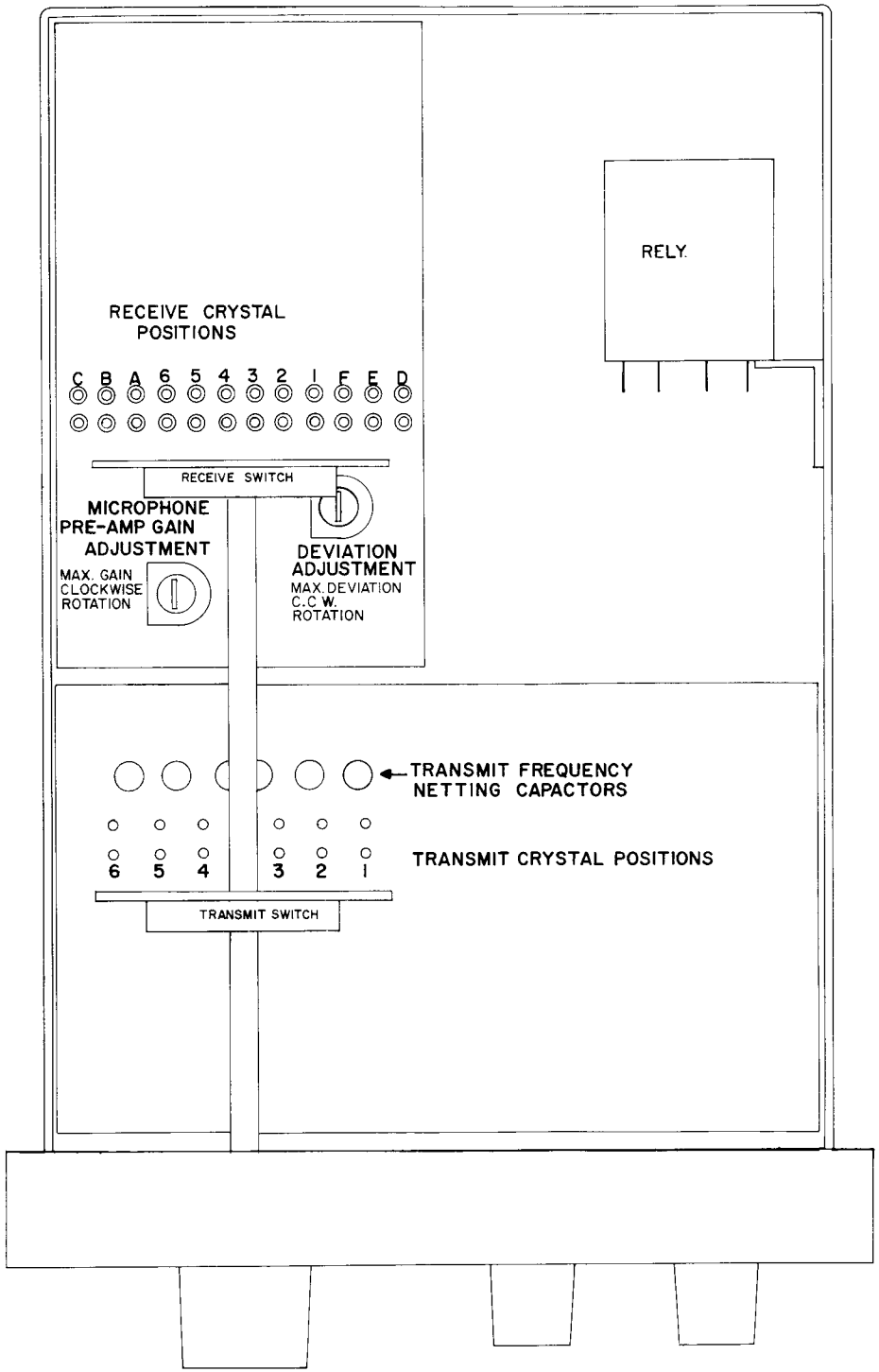
| | | |
|---|---|---|
| Position 4 | to | Position A |
| Position A | to | Position B |
| Position 5 | to | Position D |
| Position D | to | Position C |
| Position D | to | Position E |
| Position 6 | to | Position F |

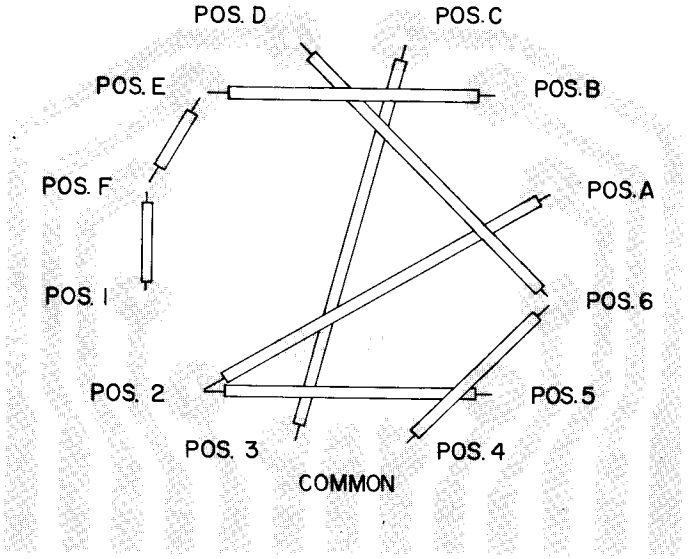



SIDE VIEW SHOWING SECURITY BRACKET INSTALLATION

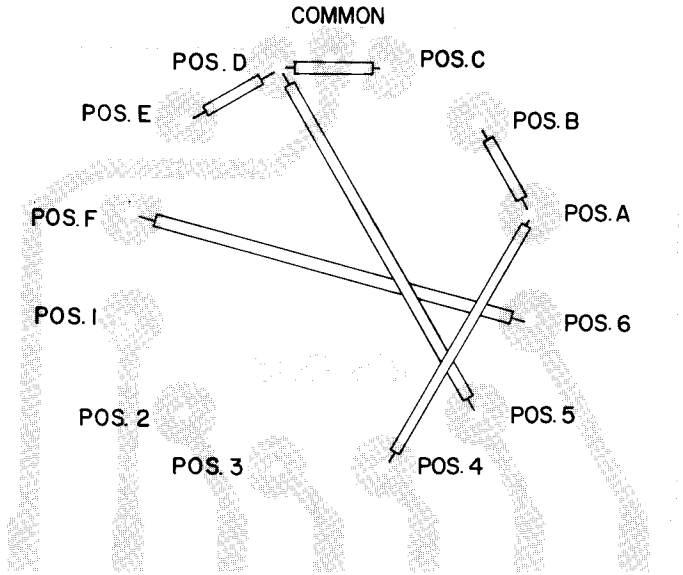


CRYSTAL LOCATION AND ADJUSTMENT DIAGRAM

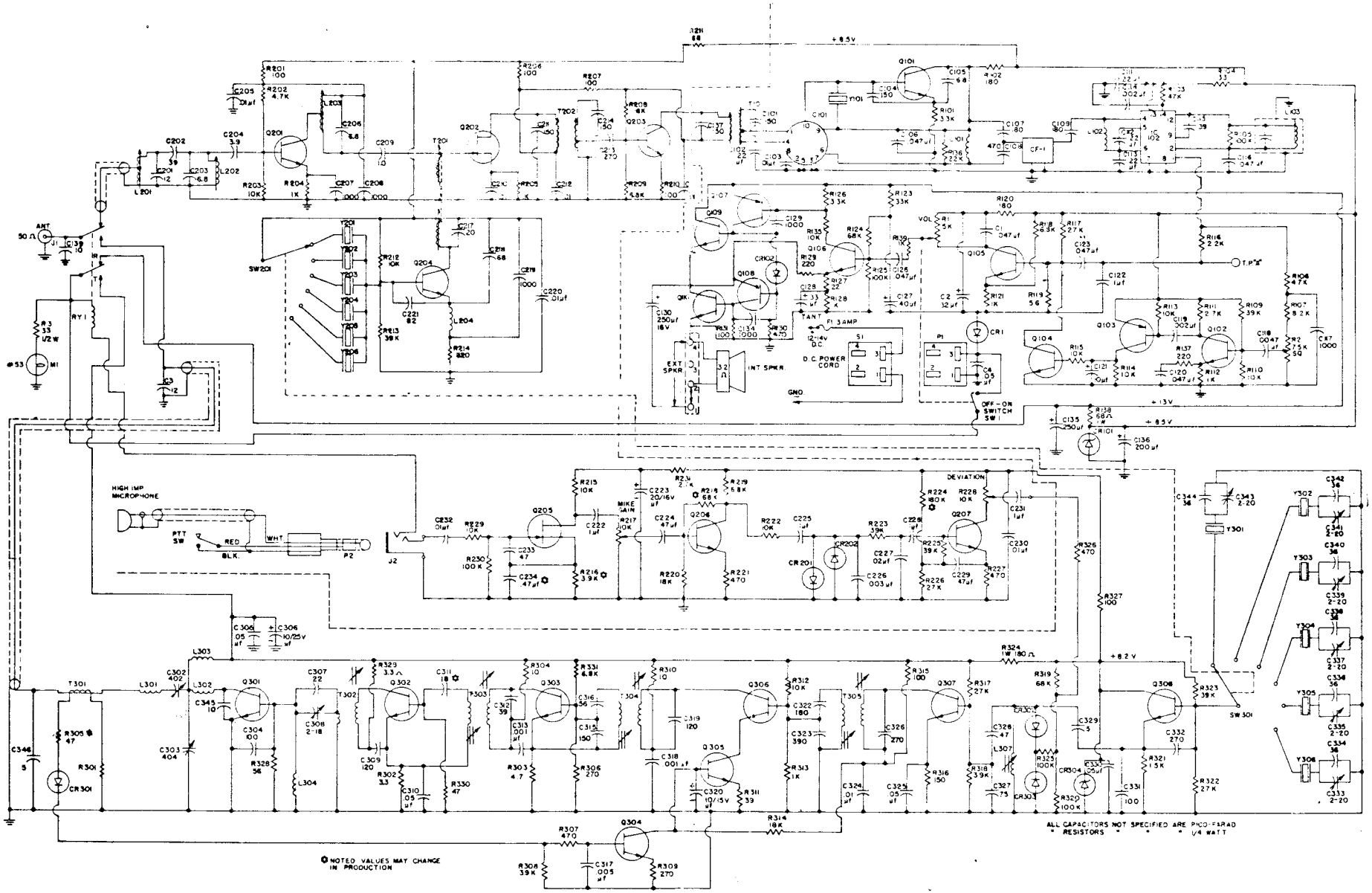





RECEIVE SWITCH DECK
500-753
FIGURE I




TRANSMIT SWITCH DECK
500-831
FIGURE II


+8.5V
+13V
+8.2V
ANT
50Ω
SW201
RY1
M1
SPKR
INT SPKR
EXT SPKR
D.C. POWER CORD
GND
OFF-ON SWITCH SW1
FUSE 3 AMP
TANT
HIGH IMP MICROPHONE
PTT SW
RED
WHT
BLK
P2
J2
DEVIATION
MIKE GAIN
SW301
T.P."A"
Y301
Y302
Y303
Y304
Y305
Y306
CR301
CR302
CR201
CR202
CR303
CR304
CF-1
Q101
Q102
Q103
Q104
Q105
Q106
Q107
Q108
Q109
Q201
Q202
Q203
Q204
Q205
Q206
Q207
Q208
Q301
Q302
Q303
Q304
Q305
Q306
Q307
Q308
ALL CAPACITORS NOT SPECIFIED ARE PICO-FARAD
* RESISTORS * * * 1/4 WATT
* NOTED VALUES MAY CHANGE IN PRODUCTION