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Pearce Simpson Cougar 23B Owner's Manual
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PEARCE-SIMPSON

DIVISION OF **GLADDING** CORP.



COUGAR 23B

SECTION 1

GENERAL INFORMATION

DESCRIPTION

Your new PEARCE-SIMPSON COUGAR 23B is a compact, all-transistorized, 23 channel Citizens Band Transceiver. This radio, because of its low current drain, is ideally suited for mobile operation from a 12.6 VDC power source, either negative or positive ground. A 12 VDC power cord and a mounting cradle are included with your COUGAR 23B. To provide the crystal-controlled, 23-channel operation, PEARCE-SIMPSON utilizes an all-transistor HetroSync™ circuit.

The receiver is a sensitive superheterodyne circuit featuring: Dual conversion, low noise RF stage, receive-slide, adjustable squelch, noise blanker, exclusive seven-way meter, built-in automatic noise limiting, ceramic filter, external speaker jack, and instantaneous selection of any of the 23 crystal controlled channels.

The transmitter section is designed around highly reliable silicon transistors and the HetroSync™ circuit. This circuit makes use of the output of three crystal-controlled oscillators which are beat together to produce the desired frequency. The transmitter final is a conservatively rated high gain RF power transistor.

SPECIFICATIONS

GENERAL:

Channels : 23 Crystal-Controlled.
Size : 6 $\frac{7}{8}$ " Wide \times 2 $\frac{1}{4}$ " High \times 8 $\frac{3}{4}$ " Deep.
Weight : 4 Pounds
Antenna : 52-ohm Coaxial
Primary Power : Input Voltage \pm 13.8 VDC (EIA Standard)

IC COMPLEMENT:

IC TA-7061 AP Noise Amplifier

TRANSISTOR COMPLEMENT:

| | | |
|--------|--------|----------------------------|
| TR-1 | 2SC839 | RF Amplifier |
| TR-2 | 2SC839 | 1st Receiver Mixer |
| TR-3 | 2SC839 | 37MHz Oscillator |
| TR-4 | 2SC839 | 2nd Receiver Mixer |
| TR-5 | 2SC839 | 10MHz 2nd Local Oscillator |
| TR-6,7 | 2SC839 | 455kHz IF Amplifier |
| TR-8 | 2SC945 | Squelch Amplifier |
| TR-9 | 2SA733 | Squelch Amplifier |
| TR-10 | 2SC945 | AF Amplifier |
| TR-11 | 2SC733 | AF Driver |

| | | |
|----------|---------|---------------------------|
| TR-12,13 | 2SC1096 | AF Power Amplifier |
| TR-14 | 2SC945 | Mike Amplifier |
| TR-15 | 2SC839 | 10MHz Transmit Oscillator |
| TR-16 | 2SC839 | Transmit Mixer |
| TR-17 | 2SC735 | Transmit Buffer |
| TR-18 | 2SC1018 | Transmit Driver |
| TR-19 | 2SC756 | Transmit Final |
| TR-20 | 2SC733 | Modulation Lamp Amplifier |
| TR-21 | 2SC945 | Pulse Amplifier |
| TR-22 | 2SA733 | Pulse Amplifier |

DIODE COMPLEMENT:

| | | |
|---------|--------|-----------------------------------|
| D-1 | CD37 | RF Gain Control |
| D-2 | CD37 | Receiver RF Amplifier Protector |
| D-3 | 1N60 | Receiver RF Amplifier Protector |
| D-4,15 | CD37 | Mode Switching |
| D-5,6 | 1N60 P | Noise Blanker Gate |
| D-7 | 1N60 | Amplitude Limiter |
| D-8 | 1N60 | AGC Detector |
| D-9,10 | 1N60 | Detector |
| D-11 | CD37 | ANL Gate |
| D-12 | CD37 | Varistor |
| D-13 | 1N60 | S Meter Detector |
| D-14 | 1N60 | S Meter Mode Switching |
| D-16 | 1N60 | AMC Detector |
| D-17,18 | 1N60 P | SWR Meter Detector |
| D-19 | SR1K-1 | Modulation Stabilizer |
| D-20 | CZ092 | Receiver Voltage Regulator |
| D-21 | SR1K-1 | Polarity Protector |
| D-22 | CD37 A | Noise Blanker Amplifier Protector |

RECEIVER:

| | |
|---------------------------------|--|
| Frequency Range | : 26.965 MHz – 27.255 MHz |
| Sensitivity | : 0.5 μ V for 10dB S + N/N using 1,000 Hz, 30% modulation |
| Selectivity | : 6dB bandwidth 5 KHz |
| Cross Modulation | : 75dB for 10 μ V desired |
| Spurious Rejection | : 60dB minimum |
| Adjacent Channel Rejection | : 50dB minimum |
| Squelch Range | : Adjustable from 0.5 μ V – 1,000 μ V |
| 1st I.F. Frequency | : 10.6 MHz |
| 2nd I.F. Frequency | : 455 KHz |
| P.A. Maximum Audio Output Power | : 5 W |
| Speaker | : 4" |

TRANSMITTER :

| | |
|-------------------------------|---|
| Frequency Range | : 26.965 MHz – 27.255 MHz |
| Carrier Frequency Stability | : 0.005%, -30° C to + 50° C |
| Output Power | : 3.5 W into 52 ohm with 13.8 VDC power supply |
| Modulation Capability | : 90% |
| Spurious Harmonic Suppression | : 55dB minimum |
| Emission | : A3 |

FREQUENCIES AVAILABLE FOR CLASS D OPERATION

| Channel | MHz | Channel | MHz | Channel | MHz |
|---------|--------|---------|---------|---------|--------|
| 1 | 26.965 | 9 | 27.065* | 17 | 27.165 |
| 2 | 26.975 | 10 | 27.075* | 18 | 27.175 |
| 3 | 26.985 | 11 | 27.085* | 19 | 27.185 |
| 4 | 27.005 | 12 | 27.105* | 20 | 27.205 |
| 5 | 27.015 | 13 | 27.115* | 21 | 27.215 |
| 6 | 27.025 | 14 | 27.125* | 22 | 27.225 |
| 7 | 27.035 | 15 | 27.135 | 23 | 27.255 |
| 8 | 27.055 | 16 | 27.155 | | |

*Channels available for communications between units of different stations.
(In accordance with FCC Part 95 .41 (d) (2))

WARNING

Operation of this equipment requires a valid station license issued by the Federal Communications Commission. Do Not transmit with your equipment until you have received your license. Illegal operation can result in severe penalties. Be certain that you have read Part 95 of the FCC Rules and Regulations before operating your station.

License applications are to be made on FCC Form 505 available from your nearest FCC field office. (A copy of this form is included with your new transceiver.)

You are required to maintain a current copy of Part 95 of the FCC Rules as a part of your station records. Copies of Part 95 are available from: Superintendent of Documents GPO Washington, DC, 20402, for a fee of \$3.50.

Your station license is to be posted in accordance with paragraph 95.101 of the Rules and an executed Transmitter Identification Card (FCC Form 452-C) is to be attached to each transmitter. (A copy of this form is included with your new transceiver.)

SECTION 2

INSTALLATION & INITIAL ADJUSTMENT

IMPORTANT

BEFORE DISCARDING ANY OF THE PACKING MATERIALS, EXAMINE THEM CAREFULLY FOR ITEMS YOU MAY HAVE OVERLOOKED.

MOBILE STATION INSTALLATION

MOUNTING

For mobile installation, the mounting cradle is designed to serve as a means of mounting your COUGAR 23B in any position which is convenient. After you have determined the most convenient location, hold the COUGAR 23B and cradle in the exact location desired. If nothing interferes with it, remove the cradle from the COUGAR 23B and use it as a template to mark the location for the mounting bolts. Before drilling the holes, make certain nothing interferes with the installation of the mounting bolts.

POWER CONNECTION

The COUGAR 23B is constructed to be used in vehicles using either positive or negative ground. The red lead is the positive lead and the black lead is the negative lead. If the existing wiring is used, be sure that it is heavy enough to prevent voltage drop to the radio. A good source of battery voltage is at the accessory connection on the ignition switch. Using this as a power source insures the radio will be off when the ignition switch is turned "OFF", and power will be supplied to the radio when it is in the "ON" or "ACCESSORY" position. Determine whether your vehicle has a positive or negative grounded battery system before connecting the power cable.

ANTENNAS

Your COUGAR 23B has been adjusted at the factory to give optimum performance using a 52-ohm antenna. There are a number of 52-ohm antennas available for mobile citizens band use.

For an automobile installation, a whip may be used with good efficiency because the automobile acts as a counterpoise and reduces detuning effects. The mounting location also has a great effect on the efficiency.

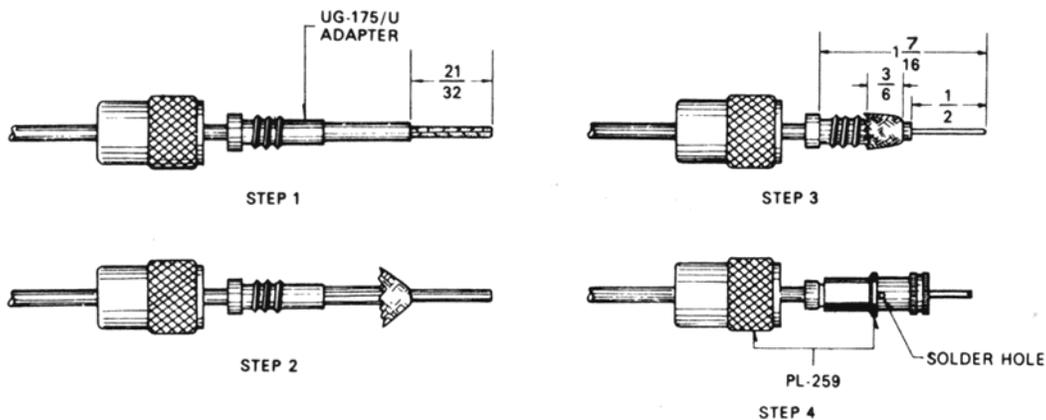
The most efficient and practical installation is a full quarter wave whip mounted on the left rear deck of fender top midway between the rear window and bumper.

The so-called "short whip" is a less efficient antenna because the radiation area is reduced. However, full use of its capability may be achieved since a shorter antenna may be mounted in a more advantageous position on an automobile, such as in the middle of the top.

There are also newer mobile antennas on the market which are made to replace the entertainment radio antenna and are similar in appearance. These antennas serve three purposes: AM and FM entertainment broadcast reception and Citizens Band transmission and reception.

For a marine installation, the full-length quarter wave whip antenna is very efficient, however it requires radials which make it hard to mount in small boats. Another excellent antenna is the coaxial sleeve type which requires no radial. A similar antenna is the center loaded 1/2 wave which is about the same as the full length 1/4 wave whip and it requires no radials. Care must be used when choosing one of the shortened type antenna as considerable variation in efficiency will be found between the various makes and models. As a general rule, avoid those with short radiating elements because the greater the radiating area, the stronger the radiated signal will be.

Your PEARCE-SIMPSON dealer is prepared to offer advice and will help you choose the most desirable antenna for your needs.



ASSEMBLING ANTENNA PLUG TO RG-58U
OR OTHER $\frac{1}{4}$ " COAXIAL CABLE

Figure 1

TRANSMISSION LINE

To connect an antenna to the transceiver, a 52-ohm coaxial transmission line is required.

See Figure 1 for assembling connector to RG-58/U coaxial cable.

INSTALLATION ADJUSTMENTS

The output circuit of the COUGAR 23B transmitter has been factory adjusted to operate into any good 52-ohm antenna. No attempt should be made to tune the transmitter to the antenna. Instead, the antenna should be adjusted to present the lowest possible SWR (Standing Wave Ratio). A very low SWR means that the antenna is operating at maximum efficiency and will also mean that it is adjusted to 52 ohms. An improperly adjusted antenna causes standing waves to appear on the feed line. Since this feed line is a fixed 52 ohms, and cannot be adjusted, this mismatch appears at the transmitter. If the transmitter is adjusted to compensate for this mismatch, both it and the antenna will no longer be operating at peak efficiency. Since the transmitter has already been adjusted for 52 ohms output and the coaxial feed line has a fixed 52-ohm value, the only remaining element to be adjusted to this value is the antenna itself. When received, the antenna is probably cut as near as is possible to this value. The mounting location on the vehicle or building and surrounding objects affect the antenna however, and requires that it be adjusted to compensate for them. Many of the newer Citizens Band antennas provide means of adjusting them for lowest SWR. Instructions for doing so are included with the antenna. For such antennas as the full quarter wave length whip, it is necessary to carefully vary the length until the lowest SWR is obtained. For all adjustments to the antenna, connect an SWR meter in the feed line to the antenna.

The COUGAR 23B will work into an antenna system having an SWR as high as 3:1. For best communications, you will want this figure as near 1:1 as possible so that the antenna will be operating at its best efficiency.

NOISE SUPPRESSION

The COUGAR 23B contains automatic noise limiter and input power filtering. In most vehicular installations, the noise suppression for the entertainment radio will be sufficient. Vehicles and boats not having this suppression may require that it be installed. In most cases, installation of distributor suppressors and generator condensers will be sufficient. In severe cases, the services of a qualified technician may be required. See your PEARCE-SIMPSON dealer for advice.

SECTION 3 OPERATING INSTRUCTIONS

CONTROLS AND INDICATORS

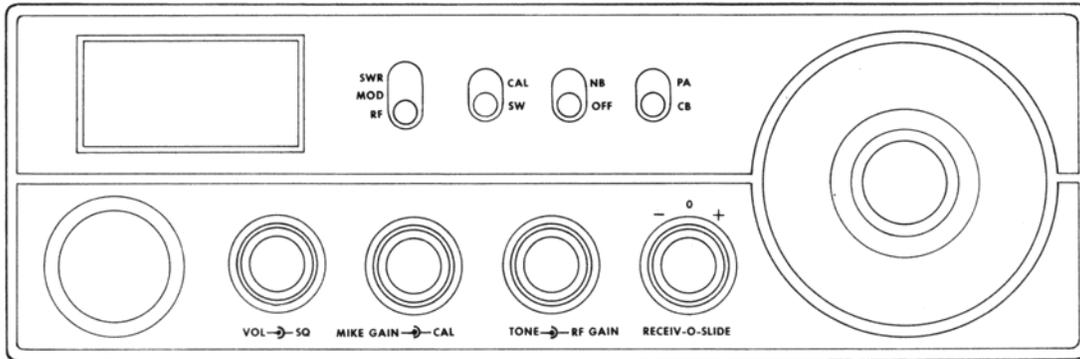


Figure 2

CHANNEL SELECTOR

The Channel Selector Switch has 23 operating positions. This switch sets both transmit and receive frequencies simultaneously by switching the proper crystals into the PEARCE-SIMPSON HetroSync™ circuit for any of the 23 CB channels.

VOLUME CONTROL AND ON-OFF SWITCH

This control turns the power ON and OFF, and adjusts the loudness of received signal.

SQUELCH CONTROL

The Squelch Control is used to silence background noise (atmospheric or man-made noise) in the absence of a received radio signal. In the full counterclockwise position, the COUGAR 23B is unsquelched (no noise silencing at all). In the full clockwise position, the unit is squelched for even very strong signal.

MIKE GAIN CONTROL

This control is used to vary the amount of modulation in transmit. When operating this control, set the slide switch on the extreme left to "MOD" position.

RF GAIN CONTROL

This control is used to optimize the strength of incoming signal. If too strong signal comes in, turn the control counterclockwise. If you are listening to weak signal, turn the control clockwise for optimum quality of received signal.

TONE CONTROL

This control is used to optimize the tone quality of received signal.

RECEIV-O-SLIDE

This permits pinpoint tuning of receiver for reception of off-frequency stations.

PA-CB SWITCH

This switch is to select the operating mode of either CB or PA.

NOISE BLANKER SWITCH

The Noise Blanker is designed to reduce excessive noise such as electrical interference, ignition noise, etc. To operate, simply set the switch to "ON" position.

SWR SENSITIVITY CONTROL

This control is installed to adjust the sensitivity of SWR-FORWARD meter. Connect antenna, and turn on the power switch. Set CAL-SWR switch to CAL position and SWR-MOD-RF switch to SWR position. Then, press the microphone button and adjust CAL control so that the needle on the meter comes to CAL point. Set CAL-SWR switch to SWR position and read the value on the meter. The closer to 1 the value comes, the better matched antenna system will be.

PEARCE-SIMPSON'S EXCLUSIVE SEVEN-WAY METER

This meter is exclusively designed by Pearce-Simpson to work in seven different ways. Those functions are as follows:

1. S meter: A change of one S unit indicates a change of 6dB in signal level. The metering circuit is calibrated so that for 100 microvolts, the S meter will read S9.
2. RF output meter: This shows relative RF power when transmitting. To operate, place the SWR-MOD-RF switch to "RF" position.
3. SWR-FORWARD meter: This is to adjust the sensitivity of the meter. Turn the "SWR-CAL" control knob and make sure the meter needle comes to "CAL" point.
4. SWR-REFLECTED meter: This shows the SWR. Place CAL-SWR switch to the "SWR" position and read the value on the meter. The closer to 1 it comes, the better matched antenna system will be.
5. A receiver-on indicator: when the receiver is on, the meter lights up in amber color.
6. A transmitter-on indicator: when the transmitter is on, the meter lights up in red color.
7. Modulation indicator: the meter fluctuates in brilliant red when the transmitter is modulated.

SECTION 4 MAINTENANCE & SERVICING

CIRCUIT DESCRIPTION

Your COUGAR 23B consists of the following circuits: the PEARCE-SIMPSON HetroSync™ circuit, which provides the receiver injection frequencies and the transmitter carrier frequency; a dual conversion superheterodyne receiver; and an AM-modulated transmitter. It is powered from 13.8 VDC source. (See Block Diagram and schematic.)

HETROSYNC™ CIRCUIT

PEARCE-SIMPSON's method of frequency synthesis makes use of 14 crystals to provide crystal-controlled, 23 channel coverage on both transmit and receive functions. The circuit is composed of a 37.600 to 37.850 MHz master oscillator (TR-3), an 10.140 to 10.180 MHz receive oscillators (TR-5), an 10.595 to 10.635 MHz transmit oscillator (TR-15) and a transmit mixer (TR-16). In the transmit function, the output of the master oscillator (TR-3) and the transmit oscillator (TR-15) are fed into the transmit mixer (TR-16). The two fundamental frequencies are combined in the mixer, whose output will contain the two frequencies fed in, plus the sum of the two and the difference of the two, as well as combinations of the harmonics of the input. We use only the difference frequency. Let us take Channel 9 as an example. The two input frequencies are 37.700 MHz and 10.635 MHz. The mixer outputs are 37.700 MHz, 10.635 MHz, 48.335 MHz and 27.065 MHz. The other frequencies present at much lower levels are the harmonics of the two input frequencies such as 21.270 MHz, 31.905 MHz, 42.540 MHz, etc. In addition to these, will be the sum and difference frequencies from the mixing of the various harmonic and fundamental frequencies. Of all these frequencies, only one falls within the passband of the transmitter. This is 27.065 MHz which is the carrier frequency for Channel 9. The nearest unwanted frequency to the carrier frequency is at least 0.955 MHz away and outside of the transmitter pass band is adequately suppressed.

TRANSMITTER CIRCUIT

The transmitter circuit makes use of the carrier frequency signal output of the transmit mixer (TR-16), which is part of the HetroSync™ circuit. The signal is amplified by the buffer (TR-17), which is a voltage amplifier, whose output is fed to the driver (TR-18). Bandpass transformers L11, 13 and 14 provide the selectivity to select the desired carrier frequency from the mixer (TR-16) output. The driver is a low level Class C power amplifier which supplies the necessary RF power at the carrier frequency to drive the final power amplifier (TR-19). The final supplies RF power to the antenna through a triple pi-matching network. The primary purpose of the modulator is to put the intelligence on the carrier. To do this, the microphone changes sound (mechanical energy) to electrical energy which is an audio frequency signal. Mic amplifier (TR-14) and transmit audio amplifier (TR-11) amplify the signal and drive the audio power amplifier (TR-12 & TR-13). This audio power amplifier varies the supply voltage fed to the

driver and signal at an audio rate. This variation of the supply voltage varies the amplitude modulation.

RECEIVER CIRCUIT

The receiver in the COUGAR 23B is a dual conversion superheterodyne circuit. Channel 9 (27.065 MHz) will be used as an example to show how the receiver circuit works. A signal at 27.065 MHz is received at the antenna and amplified by RF amplifier (TR-1) and fed into 1st receiver mixer (TR-2). The 27.065 MHz signal is mixed with 37.700 MHz injection from the HetroSync™ circuit. The 10.635 MHz 1st IF output from the 1st receiver mixer is fed into the 2nd receiver mixer (TR-4) along with the 10.180 MHz injection from the HetroSync™ circuit. The 455 kHz 2nd IF output from the 2nd receiver mixer is amplified by the IF amplifiers (TR-6 & TR-7). Then, the signal is detected by detector diode D-9 and 10 to remove the audio from the IF carrier. The audio is coupled from the detector through the automatic noise limiter network to the 1st receiver audio amplifier (TR-10). This amplifier also acts as a squelch gate. If the squelch control has been properly adjusted, this amplifier is biased off and will not allow any noise to be passed. When a signal is received, the amplifier is biased on and audio is allowed to be passed on the 2nd audio amplifier (TR-11). TR-11 in turn, feeds the audio to the audio power amplifier (TR-12 & TR-13) which drives the speaker.

CRYSTAL FREQUENCY CHART

| Master TX | 10.635 | 10.625 | 10.615 | 10.595 |
|-----------|----------|----------|----------|----------|
| 37.600 | Chan. 1 | Chan. 2 | Chan. 3 | Chan. 4 |
| 37.650 | Chan. 5 | Chan. 6 | Chan. 7 | Chan. 8 |
| 37.700 | Chan. 9 | Chan. 10 | Chan. 11 | Chan. 12 |
| 37.750 | Chan. 13 | Chan. 14 | Chan. 15 | Chan. 16 |
| 37.800 | Chan. 17 | Chan. 18 | Chan. 19 | Chan. 20 |
| 37.850 | Chan. 21 | Chan. 22 | | Chan. 23 |
| RX | 10.180 | 10.170 | 10.160 | 10.140 |

WARNING

FCC Rules require that ALL transmitter adjustments, other than those supplied by the manufacturer as front panel operating controls, be made by or under the supervision of the holder of an FCC issued 1st or 2nd class radio operator's license.

Replacement or substitution of crystals, transistors, regulator diodes or any other part of a unique nature, with parts other than those recommended by the manufacturer may cause violation of the technical regulations of Part 95 of the FCC Rules or violation of the Type Acceptance requirements of Part 2 of the Rules.

SERVICING — TRANSMITTER SECTION

1. EQUIPMENT REQUIRED

- a. VTVM (full scale: 1V DC, with RF probe)
- b. DC Ampere Meter (max.: 1 Amp.)
- c. RF Output power meter
- d. Field Strength Meter
- e. Frequency Counter
- f. DC power Supply (13.8V/2 Amp.)
- g. 50 ohm, load and atten.

2. PROCEDURE

| STEP | PRESET TO | CONNECTIONS | ADJUSTMENTS | REMARKS |
|------|---|--|-------------|--|
| 1. | Tx. Mode, No Modulation Channel No.23 | VTVM to Secondary of L-3 (TP-1,2) | L-3 | Adjust for OSC. peak, then turn the slug to CW, and fix at the point of 10% down from the OSC. peak. |
| 2. | Tx. Mode, No Modulation Channel No.13 | VTVM to Secondary of L-14 (TP-3,4) | L-11,13,14 | Adjust for Max. reading on VTVM. |
| 3. | Same as Step 2 | RF Output Power Meter to Antenna Jack (J-1) | L-15,16 | Adjust for Max. reading on RF Output Power Meter. |
| 4. | Same as Step 2 | DC Milliampere Meter to TP-5 | L-19 | Adjust L-19 to obtain 5.5 Watts of DC Input Power. |
| 5. | Same as Step 2 | Field strength Meter to Ant. | L-21 | Adjust L-21 to eliminate spurious radiation at 54MHz. |
| 6. | Repeat the above adjustments, in order to make sure that the adjustments have been made correctly. | | | |
| 7. | Tx. Mode, No Modulation, All Channels | Frequency Counter to Ant. through a suitable load and attenuator | | Check Frequency of all channels. |

SERVICING — RECEIVER SECTION

1. EQUIPMENT REQUIRED:

- a. Signal Generator (455kHz and 27MHz Band, 1,000Hz., 30% AM Modulation & Output Impedance 50 ohm)
- b. AF Output Meter
- c. Oscilloscope
- d. Dummy Load (8 ohm, 5 watts, resistive)
- e. DC Power Supply (13.8V, 2 Amp.)

2. PROCEDURE:

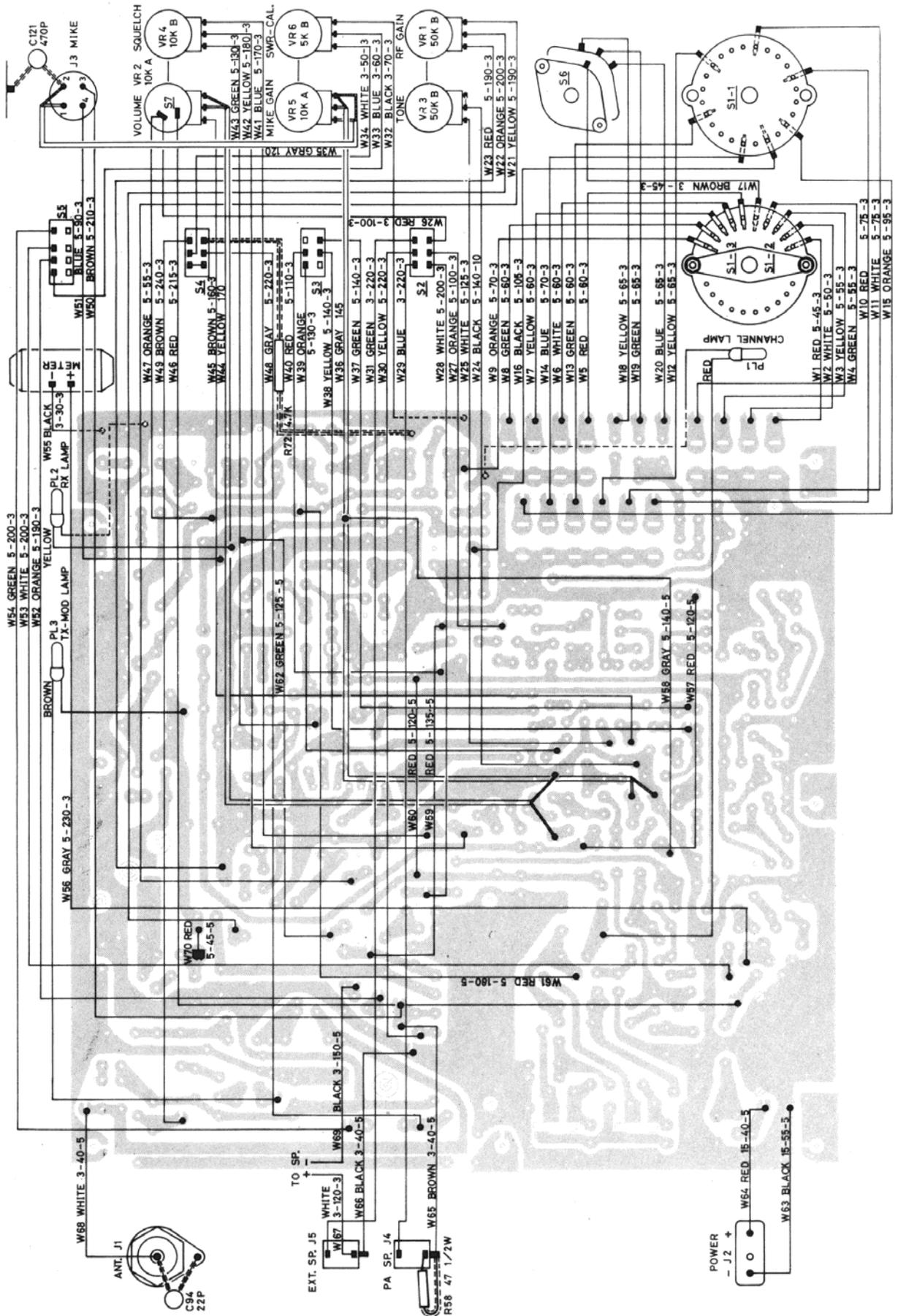
| STEP | SG CONNECTION & FREQUENCY | PRESET TO | OUTPUT METER CONNECTION | ADJUSTMENT | REMARKS |
|------|--|---|-------------------------|----------------|--|
| 1. | To the base of TR4 through 0.01 μ F Cap. Freq.: 455kHz. | Delta Tune: 0 SQ : Mini. VR : Max. NB : OFF Tone : Mini. RF Gain: Max. | To Ext. SP. Jack (J-3) | L7,8,9,10 | Adjust for Max. Output |
| 2. | To the Ant. Connector (J-1) Freq.: 27.115MHz. | Same as Step 1 | Same as Step 1 | L1,2,4,5 | Adjust for Max. Output |
| 3. | Same as Step 2 | Same as Step 1 | Same as Step 1 | VR 7 | Adjust for 2 volt AF Output at SG output Level of 0.5 μ V |
| 4. | Same as Step 2 | Same as Step 1 | Same as Step 1 | VR 8 (Squelch) | Adjust for 2V AF output at SG output level of 300 μ V |
| 5. | Same as Step 2 | Same as Step 1 | Same as Step 1 | VR 9 (S-Meter) | Adjust for S9 reading on S-Meter at SG output level of 100 μ V |
| 6. | Repeat the above adjustments, in order to make sure that adjustments have been made correctly. | | | | |

TRANSISTOR VOLTAGE CHART

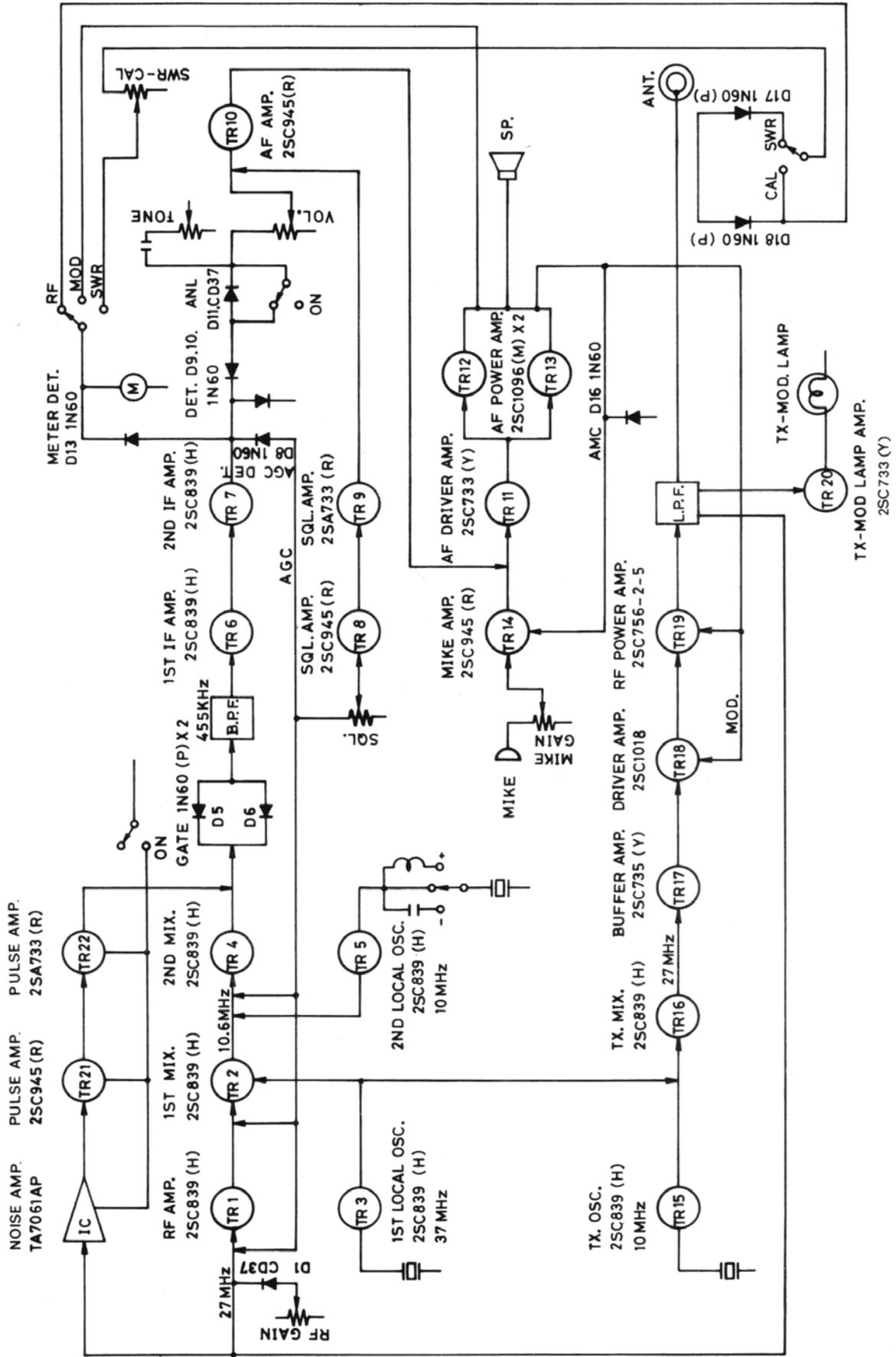
| TR | Rx | | | Tx | | | PA | | |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | B | E | C | B | E | C | B | E | C |
| 1 | 1.34 | 0.70 | 4.6 | 0 | 0 | 0.3 | 1.03 | 0.33 | 0.43 |
| 2 | 1.20 | 0.90 | 9.0 | 0.47 | 0.40 | 9.1 | 1.10 | 0.45 | 9.10 |
| 3 | 2.15 | 2.80 | 12.1 | 2.30 | 2.60 | 12.4 | 0.015 | 0 | 0.08 |
| 4 | 1.25 | 0.70 | 9.0 | 0.50 | 0.08 | 9.1 | 1.10 | 0.45 | 9.1 |
| 5 | 1.27 | 0.75 | 5.0 | 0.18 | 0 | 0.70 | 0.18 | 0 | 0.70 |
| 6 | 1.10 | 0.45 | 9.2 | 1.10 | 0.45 | 9.2 | 1.10 | 0.45 | 9.2 |
| 7 | 1.60 | 0.92 | 9.2 | 1.60 | 0.92 | 9.2 | 1.60 | 0.92 | 9.2 |
| 8 | 0.32 | 0 | 9.2 | 0.16 | 0 | 9.2 | 0.27 | 0 | 9.2 |
| | (0.63) | (0) | (0.06) | (0.58) | (0) | 3.2 | (0.63) | (0) | (0.05) |
| 9 | 9.2 | 4.00 | 0 | 9.2 | 0.50 | 0 | 9.2 | 0.50 | 0 |
| | (0.06) | (0.65) | (0) | (3.2) | (0.50) | (0) | (0.05) | (0.50) | (0) |
| 10 | 1.05 | 0.49 | 3.70 | 0.13 | 0 | 0.66 | 0.15 | 0 | 0.74 |
| | (0.17) | (0) | (5.30) | (0.13) | (0) | (0.66) | (0.14) | 0 | (0.74) |
| 11 | 1.60 | 0.95 | 8.6 | 1.55 | 0.94 | 8.5 | 1.55 | 0.94 | 8.5 |
| 12 | 0.64 | 0.03 | 13.6 | 0.64 | 0.03 | 13.6 | 0.64 | 0.03 | 13.6 |
| 13 | 0.64 | 0.03 | 13.6 | 0.64 | 0.03 | 13.6 | 0.64 | 0.03 | 13.6 |
| 14 | 1.90 | 4.70 | 9.0 | 1.60 | 0.99 | 4.7 | 1.55 | 0.93 | 3.40 |
| 15 | 3.65 | 4.78 | 13.5 | 2.35 | 2.35 | 11.0 | 2.40 | 2.35 | 11.0 |
| 16 | 1.20 | 0.70 | 13.6 | 1.03 | 0.57 | 13.6 | 1.40 | 0.75 | 13.6 |
| 17 | 2.80 | 4.80 | 13.6 | [1.02] | 2.2 | [3.75] | 2.55 | 2.00 | 13.6 |
| 18 | 0 | 0 | 13.3 | [2.4] | 0 | [11.2] | 0 | 0 | 0.015 |
| 19 | 0 | 0 | 13.3 | [3.2] | 0 | [20.5] | 0 | 0 | 0.015 |
| 20 | 0 | 0 | 13.3 | [2.8] | 0 | 7.3 | 0 | 0 | 0.015 |
| 21 | 0 | 0 | 8.5 | 0 | 0 | 8.5 | 0 | 0 | 8.5 |
| 22 | 8.5 | 9.2 | 0 | 8.5 | 9.2 | 0 | 8.5 | 9.2 | 0 |

() = at SQ ON, [] : RF RMS, Others : DC VOLTAGE

WIRING DIAGRAM



BLOCK DIAGRAM



SECTION 5 REPLACEMENT PARTS

SEMICONDUCTORS

| SYMBOL | DESCRIPTION | PART NUMBER |
|----------|-----------------------------------|-------------|
| TR-1 | 2SC839 RF Amplifier | 5001-014 |
| TR-2 | 2SC839 1st Receiver Mixer | 5001-014 |
| TR-3 | 2SC839 37MHz Oscillator | 5001-014 |
| TR-4 | 2SC839 2nd Receiver Mixer | 5001-014 |
| TR-5 | 2SC839 10MHz 2nd Local Oscillator | 5001-014 |
| TR-6,7 | 2SC839 455kHz IF Amplifier | 5001-014 |
| TR-8 | 2SC945 Squelch Amplifier | 5001-038 |
| TR-9 | 2SA733 Squelch Amplifier | 5001-066 |
| TR-10 | 2SC945 AF Amplifier | 5001-038 |
| TR-11 | 2SC733 AF Driver | 5001-072 |
| TR-12,13 | 2SC1096 AF Power Amplifier | 5001-064 |
| TR-14 | 2SC945 Mike Amplifier | 5001-038 |
| TR-15 | 2SC839 10MHz Transmit Oscillator | 5001-014 |
| TR-16 | 2SC839 Transmit Mixer | 5001-014 |
| TR-17 | 2SC735 Transmit Buffer | 5001-021 |
| TR-18 | 2SC1018 Transmit Driver | 5001-044 |
| TR-19 | 2SC756 Transmit Final | 5001-068 |
| TR-20 | 2SC733 Modulation Lamp Amplifier | 5001-072 |
| TR-21 | 2SC945 Pulse Amplifier | 5001-038 |
| TR-22 | 2SA733 Pulse Amplifier | 5001-066 |

DIODES

| SYMBOL | DESCRIPTION | PART NUMBER |
|---------|--|-------------|
| D-1 | CD37 RF Gain Control | 5001-145 |
| D-2 | CD37 Receiver RF Amplifier Protector | 5001-145 |
| D-3 | 1N60 Receiver RF Amplifier Protector | 5001-080 |
| D-4,15 | CD37 Mode Switching | 5001-145 |
| D-5,6 | 1N60 P Noise Blanker Gate | 5001-134 |
| D-7 | 1N60 Amplitude Limiter | 5001-080 |
| D-8 | 1N60 AGC Detector | 5001-080 |
| D-9,10 | 1N60 Detector | 5001-080 |
| D-11 | CD37 ANL Gate | 5001-145 |
| D-12 | CD37 Varistor | 5001-145 |
| D-13 | 1N60 S Meter Detector | 5001-080 |
| D-14 | 1N60 S Meter Mode Switching | 5001-080 |
| D-16 | 1N60 AMC Detector | 5001-080 |
| D-17,18 | 1N60 P SWR Meter Detector | 5001-134 |
| D-19 | SR1K-1 Modulation Stabilizer | 5001-117 |
| D-20 | CZ092 Receiver Voltage Regulator | 5001-152 |
| D-21 | SR1K-1 Polarity Protector | 5001-117 |
| D-22 | CD37 A Noise Blanker Amplifier Protector | 5001-144 |

CAPACITORS

| SYMBOL | DESCRIPTION |
|--------|-------------------|
| C-1 | 27pF 50V, Ceramic |

REPLACEMENT PARTS

| SYMBOL | DESCRIPTION | PART NUMBER |
|---------------------------|--------------------------------|-------------|
| C-2,106 | 0.001 μ F 50V, Ceramic | |
| C-3,5,6,9,11,12,13, 15 | 0.01 μ F 50V, Ceramic | |
| C-4,62,64 | 3pF 50V, Ceramic | |
| C-7,33,60,65,71, 88,92 | 100pF 50V, Ceramic | |
| C-8,20,84 | 10pF 50V, Ceramic | |
| C-10,32 | 47 μ F 16V, Electrolytic | 5018-034 |
| C-14 | 2pF 50V, Ceramic | |
| C-16,21,22,26,29, 34 | 0.01 μ F 50V, Ceramic | |
| C-17,63,85 | 150pF 50V, Ceramic | |
| C-18,55,121 | 470pF 50V, Ceramic | |
| C-19 | 68pF 50V, Ceramic | |
| C-23,24 | 0.001 μ F 50V, Ceramic | |
| C-25,31,38,42 | 0.05 μ F 50V, Mylar | |
| C-27 | 1pF 50V, Ceramic | |
| C-28,80,111,112 | 0.047 μ F 50V, Ceramic | |
| C-30 | 0.01 μ F 50V, Mylar | |
| C-35,40,41 | 10 μ F 16V, Electrolytic | 5018-005 |
| C-36 | 0.002 μ F 50V, Ceramic | |
| C-37,46,47,99 | 1 μ F 16V, Electrolytic | 5018-002 |
| C-39 | 0.03 μ F 50V, Mylar | |
| C-43,52,53,57,61, 67 | 0.01 μ F 50V, Ceramic | |
| C-44,100 | 100 μ F 6.3V, Electrolytic | 5018-013 |
| C-45,54,102 | 22 μ F 16V, Electrolytic | 5018-042 |
| C-48 | 220 μ F 6.3V, Electrolytic | 5018-044 |
| C-49 | 100 μ F 16V, Electrolytic | 5018-012 |
| C-50,51,119 | 0.022 μ F 50V, Mylar | |
| C-56,70 | 220pF 50V, Ceramic | |
| C-58,66,78 | 33pF 50V, Ceramic | |
| C-59,94,114 | 22pF 50V, Ceramic | |
| C-68,69,72,73,76, 77 | 0.01 μ F 50V, Ceramic | |
| C-74 | 82pF 50V, Ceramic | |
| C-75 | 250pF 50V, Ceramic | |
| C-79,81,83,86,89, 90 | 0.01 μ F 50V, Ceramic | |
| C-87 | 47pF 50V, Ceramic | |
| C-91,93,95,96,97, 101 | 0.01 μ F 50V, Ceramic | |
| C-98 | 1 μ F 50V, Electrolytic | 5018-035 |
| C-103 | 0.0022 μ F 50V, Mylar | |
| C-104,107,108,109, 113 | 0.01 μ F 50V, Ceramic | |
| C-105 | 0.1 μ F 50V, Mylar | |
| C-110 | 470 μ F 16V, Electrolytic | 5018-024 |

REPLACEMENT PARTS

| SYMBOL | DESCRIPTION | PART NUMBER |
|---------------------------|---------------------|-------------|
| C-82 | 180pF 50V, Ceramic | |
| C-115,116,117,118, 120 | 0.01μF 50V, Ceramic | |

RESISTORS

| SYMBOL | DESCRIPTION | PART NUMBER |
|----------------------------------|---------------------------|-------------|
| R-1,2,7,13,23,31, 42,44,50,81 | 3.3K ohm ¼W, Carbon | |
| R-3,22,30,33,70 | 470 ohm ¼W, Carbon | |
| R-4,64,91 | 10K ohm ¼W, Carbon | |
| R-5,6,11,15,25,54, 62,63 | 220 ohm ¼W, Carbon | |
| R-8,19,29,32,61,47 | 15K ohm ¼W, Carbon | |
| R-9,17,94 | 330 ohm ¼W, Carbon | |
| R-10,14,24,49,55, 79,80,83,12 | 1K ohm ¼W, Carbon | |
| R-16,56,69,71,85,92 | 100 ohm ¼W, Carbon | |
| R-18,48,51,60,67,84 | 5.6K ohm ¼W, Carbon | |
| R-20 | 15 ohm ¼W, Carbon | |
| R-21 | 10 ohm ¼W, Carbon | |
| R-26,43,93 | 82K ohm ¼W, Carbon | |
| R-27 | 1.5K ohm ¼W, Carbon | |
| R-28,76,78 | 2.2K ohm ¼W, Carbon | |
| R-34,46,77,90 | 6.8K ohm ¼W, Carbon | |
| R-35,37 | 33K ohm ¼W, Carbon | |
| R-36,65 | 47K ohm ¼W, Carbon | |
| R-38,39,41,95 | 100K ohm ¼W, Carbon | |
| R-40 | 470K ohm ¼W, Carbon | |
| R-45,72 | 4.7K ohm ¼W, Carbon | |
| R-52,68,82 | 22K ohm ¼W, Carbon | |
| R-53,75 | 56 ohm ¼W, Carbon | |
| R-57 | 0.5 ohm ½W, Wirewound | 5019-004 |
| R-58 | 47 ohm ½W, Carbon | |
| R-59 | 12 ohm 2W, Metal-covered | 5019-011 |
| R-66,88 | 47 ohm ¼W, Carbon | |
| R-73 | 56 ohm ½W, Solid | |
| R-74 | 1K ohm ½W, Carbon | |
| R-86 | 150 ohm 2W, Metal-covered | |
| R-87 | 680 ohm ¼W, Carbon | |
| R-89 | 22 ohm ½W, Carbon | |

SWITCHES

| SYMBOL | DESCRIPTION | PART NUMBER |
|--------|--|-------------|
| SR-046 | Channel Selector Switch | 5009-037 |
| SR-050 | Receiv-O-Slide Switch | |
| SW-020 | Slide Switch for PA-CB, Noise Blanker, CAL/SWR | |
| SW-031 | Slide Switch for SWR Meter Mode | |

REPLACEMENT PARTS

INDUCTANCE

| SYMBOL | DESCRIPTION | PART NUMBER |
|--------------|---|-------------|
| L-1 | LA-029 (TKXN-22160BU) Antenna Coil | 5006-118 |
| L-2 | LA-041 (TKXC-22534BU) RF Coil | 5006-189 |
| L-3 | LA-042 (TKXC-22535BM) 37MHz Oscillator Coil | 5006-190 |
| L-4 | LA-016 (TKAC-20621IE) 10.6MHz 1st IF Coil | 5006-111 |
| L-5 | LA-019 (TKAC-21165A) 10.6MHz 1st IF Coil | 5006-112 |
| L-6,12,17,22 | Micro Inductor 2R2 | 5006-054 |
| L-7 | LA-078 (RLN-40479N) 455kHz 2nd IF Coil | |
| L-8 | LA-079 (RLN-40480N) 455kHz 2nd IF Coil | |
| L-9 | LA-106 (YOC-15001F) 455kHz 2nd IF Coil | 5006-195 |
| L-10 | LA-107 (YMC-15002A) 455kHz 2nd IF Coil | 5006-196 |
| L-11,13 | LA-009 (KXN-13638HM) 27MHz B.P.F. Coil | 5006-049 |
| L-14 | LA-008 (KXN-13636BM) 27MHz B.P.F. Coil | 5006-050 |
| L-15 | LC-019 (TC-71025) Buffer Coil | 5006-188 |
| L-16 | LC-018 (TC-71024) Driver Coil | 5006-116 |
| L-18 | LD-012 (TC-71029) Choke Coil | 5006-122 |
| L-19 | LC-019 (TC-71025) Final Coil | 5006-188 |
| L-20 | LE-006 (NS-1344) Filter Coil | 5006-083 |
| L-21 | LC-019 (TC-71025) Filter Coil | 5006-188 |
| L-23 | LD-017 (TC-71095) Power Filter Coil | |
| L-24 | LA-104 (TKXN-20979A) 23.5MHz Noise Blanker Coil | |
| L-25 | LA-077 (TKXC-14299A) 23.5MHz Noise Blanker Coil | |

TRANSFORMERS

| SYMBOL | DESCRIPTION | PART NUMBER |
|--------|---------------------------------|-------------|
| T-1 | TF-012 (69M) Input Transformer | 5007-008 |
| T-2 | TF-016 (91A) Output Transformer | 5007-033 |
| T-3 | TF-018 (115C) Choke Transformer | 5006-124 |

VARIABLE RESISTORS

| SYMBOL | DESCRIPTION | PART NUMBER |
|--------|---------------------------------|-------------|
| VR-1,3 | RV-082, Variable | 5008-005 |
| VR-2,4 | RV-080 (EVK-AFTF20105) Variable | 5008-006 |
| VR-5,6 | RV-081 (EVK-AFTF20329) Variable | 5008-006 |
| VR-7,9 | 20K ohm, B, 2P, 6BM, Semi-fixed | 5008-008 |
| VR-8 | 50K ohm, B, 2P, 6BM, Semi-fixed | 5008-032 |
| VR-10 | 30K ohm, B, 2P, 6BM, Semi-fixed | 5008-023 |
| VR-11 | 10K ohm, B, 2P, 6BM, Semi-fixed | 5008-008 |

CRYSTALS

| SYMBOL | DESCRIPTION | PART NUMBER |
|--------|------------------|-------------|
| X-1 | QX-009 37.600MHz | 5003-001 |
| X-2 | QX-009 37.650MHz | 5003-002 |
| X-3 | QX-009 37.700MHz | 5003-003 |
| X-4 | QX-009 37.750MHz | 5003-004 |

REPLACEMENT PARTS

| SYMBOL | DESCRIPTION | PART NUMBER |
|--------|------------------|-------------|
| X-5 | QX-009 37.800MHz | 5003-005 |
| X-6 | QX-009 37.850MHz | 5003-006 |
| X-7 | QX-005 10.140MHz | 5003-011 |
| X-8 | QX-005 10.160MHz | 5003-012 |
| X-9 | QX-005 10.170MHz | 5003-013 |
| X-10 | QX-005 10.180MHz | 5003-014 |
| X-11 | QX-006 10.595MHz | 5003-007 |
| X-12 | QX-006 10.615MHz | 5003-008 |
| X-13 | QX-006 10.625MHz | 5003-009 |
| X-14 | QX-006 10.635MHz | 5003-010 |

MISCELLANEOUS

| DESCRIPTION | PART NUMBER |
|-------------------------------------|-------------|
| Crystal Socket S-D0105 | 5010-002 |
| Meter MT-030 | |
| Mike Connector SM144, 4-prong | 5010-021 |
| Antenna Connector, M-R | 5010-009 |
| Power Cord Connector CN-3795 | 5010-026 |
| External Speaker Jack SJ-296 | 5010-012 |
| PA Speaker Jack SJ-296 | 5010-012 |
| Pilot Lamp 14V 50mA Clear | 5013-023 |
| Pilot Lamp 8V 80mA Amber | |
| Pilot Lamp 4.5V 40mA Red | 5013-015 |
| Speaker 8 ohm 2W, SP-003 | 5012-003 |
| Inline Fuse Holder RF-104 | 5029-001 |
| Fuse 2A | 5028-001 |
| Microphone, MK-002 | 5004-009 |
| Microphone Hanger | |
| DC Power Cord | |
| Chassis | |
| Metal Cabinet | 5020-016 |
| Mounting Cradle | 5025-007 |
| Front Panel | 5020-015 |
| Channel Selector Knob | 5022-019 |
| Channel Number Disc | |
| Power On-Off/Volume Control Knob | |
| Squelch Control Knob | |
| RF Gain Control Knob | |
| Tone Control Knob | |
| Front Plate, Silver Hairline Finish | |
| Brand Name Plate, Woodgrain Finish | |
| Microphone Name Plate | |
| FCC plate | |
| Instruction Manual | |
| Display Box | |
| Styrofoam Box | |

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This electronic equipment, manufactured by Pearce-Simpson, Inc., is warranted in accordance with the following terms and conditions —

A. PEARCE-SIMPSON, INC. WILL:

Replace any defective part of this equipment during the one year period following purchase.

Repair, at our factory, without charge, this equipment, if a defect develops during the first one year following purchase. (This repair service is free only at the factory. No reimbursements can be made for non-factory repair charges.)

B. THE PURCHASER WILL:

Return the warranty registration card within 10 days of purchase.

Pay all transportation charges involved when equipment is returned for factory repair, provide information regarding nature of failure, and accept freight collect shipment of repaired equipment.

The above is void if equipment is modified or repaired without authorization, subjected to misuse, abuse, accident, water damage or other neglect, or has its serial number defaced or removed, or if more than 18 months has elapsed since factory shipment date to dealer.

No obligation is assumed by Pearce-Simpson, Inc., to update previously manufactured equipment.

This warranty is in lieu of all other warranties expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

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