WARRANTY

ONE FULL YEAR WARRANTY

on all parts and components including tubes and tranistors.

Ninety (90) days warranty on labor.



## *Warranty*

The KING RADIO CORP. has designed, engineered and constructed this equipment using the finest materials and components available. This equipment has been thoroughly tested and inspected before leaving the factory.

KING RADIO CORP., therefore, warrants this equipment against all defects of workmanship and material on components and parts manufactured by us for a period of ninety (90) days from the date of installation. A new part will be furnished in exchange for any part which proves to be defective within this time under normal installation, use and service, provided the defective part is returned, transportation charges prepaid, either to the factory or to an Authorized King Radio Corp Warranty Service Center.

## KING KY-90 TRANSCEIVER

The King KY-90 Transceiver with KS-501 or KS-502 Power Supply Modulator is a compact, lightweight, and reliable airborne VHF communication equipment. It is designed and engineered especially for installation in light and medium aircraft where greater power and excellent receiver sensitivity and selectivity are desired or required.

## DESIGN FEATURES

90 PRE-SELECTED Crystal Controlled Channels

10 FREQUENCIES for Double Channel Simplex Operation

TRANSMITTER POWER-10 Watts nominal (8 watts minimum) at up to 90% Modulation

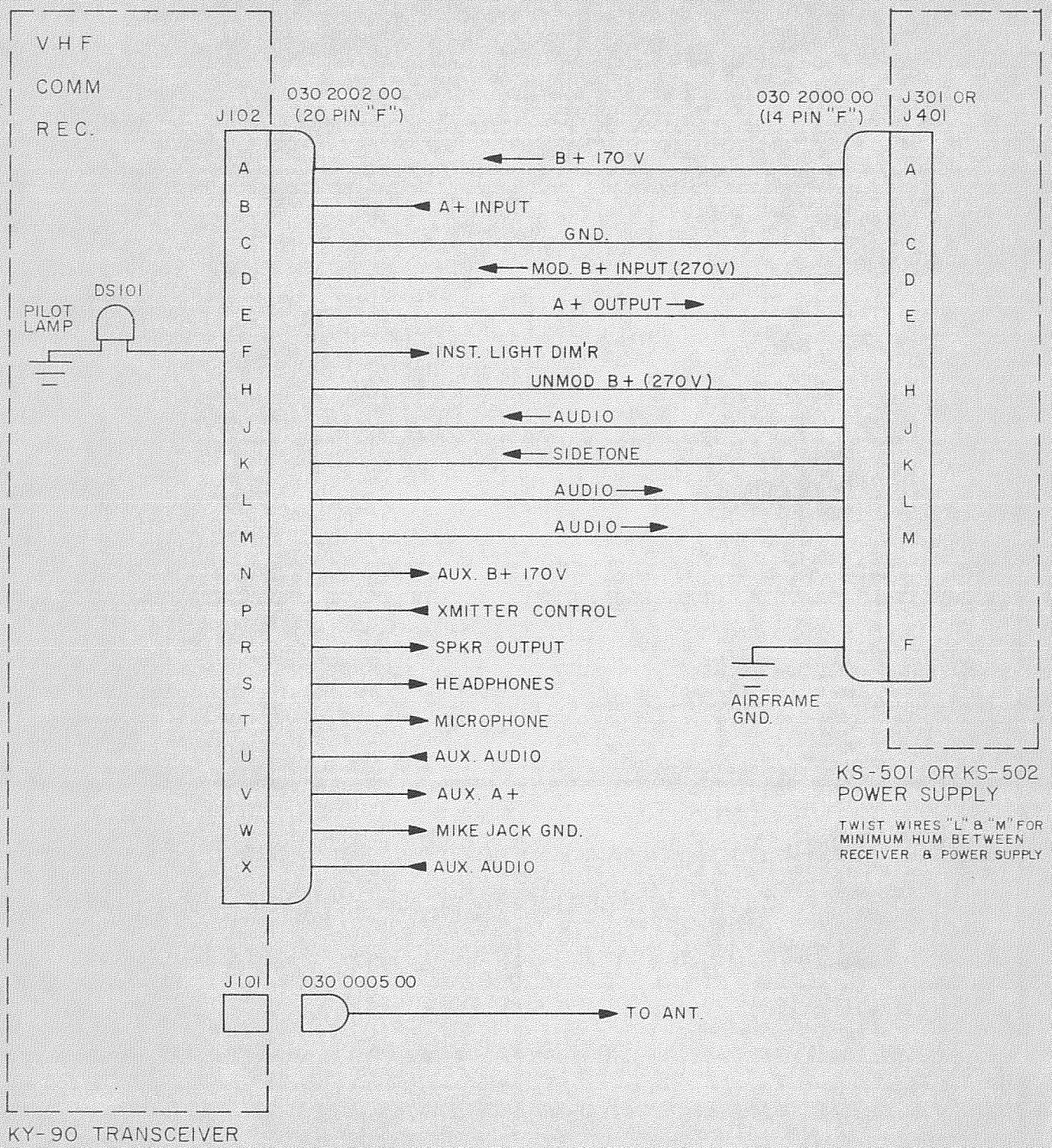
RECEIVER SENSITIVITY - 1 Microvolt Provides at least 1 watt Audio at 6 db Signal + Noise/Noise

3 FRONT PANEL CONTROL FUNCTIONS:
Squelch—Frequency Selector—Volume

CONCENTRIC CHANNEL SELECTORS-
Provide Rapid Control and Wide Angle Observation of Channel Selection

COMPACT - Front Panel Only 6x3 Inches

| | | |
|---|---|---|
| Weight | KY-90 | 4 pounds |
| | KS-501, 502 | 4 pounds |
| Dimensions | KY-90 | 6-1/2" x 3" x 8" |
| | KS-501, 502 | 3-1/2"x3-1/2"x8" |




KY-90 INTERCONNECTING CABLE DIAGRAM

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LIST OF ILLUSTRATIONS


KY–90 TRANSCEIVER

KS–501 POWER SUPPLY MODULATOR

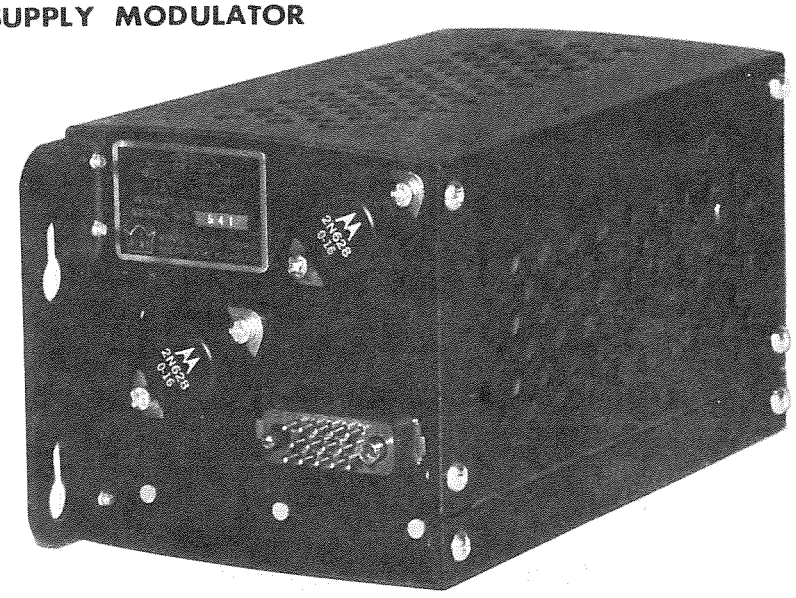


Figure 1–1. Major Units KY–90 Transceiver Installation

SECTION

# GENERAL INFORMATION

The KY-90 Transceiver makes available ninety crystal controlled channels to cover every channel presently in general usage in the VHF communication band of 118.0 to 126.9 megacycles. In addition to the ninety channels in which the receiver and transmitter are operated on the same frequency, a tenth, or DCS (Double Channel Simplex) position is provided on the megacycle selector. This position provides a 6 megacycle separation of the receiver and transmitter frequency. Ten DCS channels are provided with reception frequency 120.0 to 120.9 mc., and transmission frequency 126.0 to 126.9 mc. (Example: receive 120.7 and transmit 126.7mc.) The KY-90 contains the R-F, I-F, detector, squelch, and low level audio circuits of the receiver, and all transmitter circuitry with the exception of the modulator. The KY-90 may be operated on either 14 or 28 volt electrical systems by proper selection with an internal switch.

The KS-501 or KS-502 contain the power supply and high level audio-modulator circuits for the KY-90 and may be mounted in any convenient place in the aircraft. Power supply modulator KS-501 is designed to operate from a 14 volt supply, and KS-502 from a 28 volt supply. Since there are major differences in the units, they are not convertable from 14 to 28 volts or vice versa. The KY-90 has been type accepted by the F.C.C.

Voltage Conversion - KY-90 may be changed for 14 volt or 28 volt operation by the positioning of an internal switch and selection of the correct pilot light bulb. No rewiring is required. KS-501 and KS-502 Power Supply Modulator units are not interchangeable.

### Materials Supplied

The units and accessories supplied on a KY-90 standard order are listed in Table 1-1 below. The major units of the KY-90 are shown in Figure 1-1.

TABLE 1-1
EQUIPMENT SUPPLIED

| QTY | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | | KY-90 TRANSCEIVER |
| | | KS-501 POWER SUPPLY (14 VDC) |
| | | KS-502 POWER SUPPLY (24 VDC) |
| 1 | | FINAL TEST DATA SHEET |
| 1 | | INSTRUCTION MANUAL |
| 1 | | OWNERS MANUAL |
| 1 | | WARRANTY CARD |
| 1 | *047 1010 00 | MOUNTING BASE (POWER SUPPLY) |

| QTY | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | 030 2000 00 | *RECEPTICAL (14 PIN) |
| 1 | 030 2002 00 | *RECEPTICAL (20 PIN) |
| 1 | 030 2005 00 | *CONNECTOR UG 88/U |
| 1 | 092 0003 00 | *HOOD (14 PIN RECEPTICAL) |
| 1 | 092 0004 00 | *HOOD (20 PIN RECEPTICAL) |
| 4 | 092 0002 00 | *LEVER & PIVOT ASSEMBLY |
| 4 | 089 2037 30 | *"U" NUT #8-32 |
| 4 | 089 5067 06 | *#8-32-3/8" MOUNTING SCR. |

*ACCESSORY KIT

## PERFORMANCE SPECIFICATIONS

### Transmitter Section

Frequency Range - 118.0 to 126.9 megacycles in 100 kilocycle steps to provide 90 channels. On tenth position of the megacycle switch (DCS), the transmitter tunes from 126.0 to 126.9 megacycles in ten steps while the receiver tunes 6 mc lower.

Frequency Stability - Within .01% under normal environmental conditions.

Power Output - 10 watts nominal, 8 watts minimum, into 52 ohm antenna load.

Modulation - At least 85% with over-modulation limiting provided by transistor saturation at approximately 90% level.

Sidetone - Up to 100 Milliwatts into 300 ohms (two 600 ohm headphones). Screwdriver adjustment by removal of volume control knob on the front panel.

Microphone - Uses standard or noise cancelling type carbon. Screwdriver adjustment for different microphones is accessable by the removal of the squelch control knob on the front panel.

Spurious Radiations - Below the level of the desired carrier by at least 55 db.

## Receiver Section

Frequency Range - 118.0 to 126.9 megacycles in 100 kilocycle steps to provide 90 channels. Tenth position of megacycle switch (DCS) retunes receiver to cover 120.0 to 120.9 megacycles in ten steps while the transmitter tunes 6 mc higher.

Sensitivity - 1.0 microvolt maximum will provide at least 1 watt output and better than 6 db signal-plus-noise to noise ratio.

Selectivity - Nominally 40 kc. bandwidth at 6 db and 160 kc. bandwidth at 60 db down.

Image and Spurious Rejection - At least 60 db at all frequencies 80 kc. or more from the selected carrier.

AVC Characteristic - Within signal levels of 10 to 10,000 microvolts, the audio output will not vary more than $\pm$ 3 db.

Squelch - Adjustable from the front panel. Positive Action. Carrier operated. Introduces negligable distortion.

Audio Output - 5 watts into 3.2 ohm speaker load. Separate headphone output. Frequency response 300 to 3500 cps within $\pm$6 db.

Duty Cycle - Continuous

**Power Supply Modulator**

KS-501 - For 14 volt systems
KS-502 - For 28 volt systems

D.C. Power Output - 270 volt and 170 volt output taps are provided. Continuous power output rating 25 watts. One minute on, four minute off rating 55 watts. Ratings apply to total drain from both taps. Power for additional receivers and, or, omni converters may be supplied in addition to the KY-90 provided ratings are not exceeded. (KY-90 power consumption is 53 watts transmit mode and 7.2 watts receive mode).

Speaker and modulator output - Supplies audio power for speaker and modulation as specified for transmitter above.

Hum output - When used with the KY-90, residual speaker hum is more than 40 db below maximum rated audio power output.

Line filtering - The power transformer is shielded and the primary line has an LC filter to minimize noise radiation into other aircraft equipment.

## Total Power Drain

13.75 volts:
3.5 amperes in Receive mode
8.5 amperes in Transmit mode

27.5 volts:
2 amperes in Receive mode
5 amperes in Transmit mode

# INSTALLATION SECTION

## GENERAL CONSIDERATIONS

Adherance to the following suggestions will assure an easier and more satisfactory installation.

Unpack the equipment carefully. Small parts are packed in a pocket in one of the packing carton inner cushions. Save the cartons until installation is complete in case damage is discovered or the unit should be returned for any reason. If a check of the equipment shows shipping damage, a claim should be promptly filed with the transportation company.

Carefully plan the location of the panel mounted unit of the KY-90 in the instrument panel. If necessary because of space limitations, the KY-90 can be tuned and read correctly from a wide visual angle. In the integrated central panel layout (as now used on some twin engine craft), the KY-90 may be mounted back of the panel by removal of the knobs, attachment of the unit to the panel, and the replacement of the knobs. Drilling information for this method is shown in figure 2-1.

Assure yourself that air convection through the ventilation holes in the equipment covers is not shut off by other equipments. The temperature of the transistors must not exceed 80° C. and longer life may be expected if lower temperatures are maintained. Vacuum tubes and other heat generating devices have been avoided in the Power Supply Modulator unit. This advantage will be lost if the unit is placed above or too near a heat generator in the airplane. The Power Supply Modulator should be mounted on a surface which has good heat conduction to the outer skin of the aircraft.

The Power Supply Modulator is filtered to reduce noise interference with other equipment in the aircraft. As in all transistor power supplies, some small radiation does exist. For this reason, it is suggested that the unit be mounted at least 6 feet from the ADF loop and the power leads run as a twisted pair.

Make certain that clearance is available for the installation of cables, connectors, and mounting brackets and that normal vibration will not allow bumping against other equipment cases. Cables must be routed to avoid close proximity to heaters, heater ducts, or engine exhausts. Avoid sharp bends in the cable.

## KY-90 INSTALLATION

Equipment dimensions for thru panel mounting and other alternate methods are shown in figure 2-1. Make certain that your planned location leaves space to plug in and remove connectors and provide access to the 1/4-turn wing nut on the back of the KY-90. For thru panel mounting, cut an opening in the instrument panel and drill mounting holes as shown in the illustration. When installed, the front of the cover should extend in front of the instrument panel about 1/8". Install a support from the rear of the case to a nearby structural member. Make certain all fasteners are tight.

Check the position of the voltage change-over switch under the volume control on the KY-90 chassis. The switch should be pushed toward the front panel for 14 volt operation and away from the panel for 28 volt operation. Make a final check to see that all tubes and shields are in place, then slide the KY-90 in its case and secure it with the quarter turn fastener on the rear of the case.

## POWER SUPPLY MODULATOR INSTALLATION

Drill holes and fasten the Power Supply Modulator unit mounting plate to the chosen mounting surface of the aircraft. Refer to figure 2-2 for hole spacing. Place the Power Supply Modulator on the bracket and slide the unit so that the heads of the 8-32x3/8" screws are over the narrow part of the slotted holes. Tighten the screws securely.

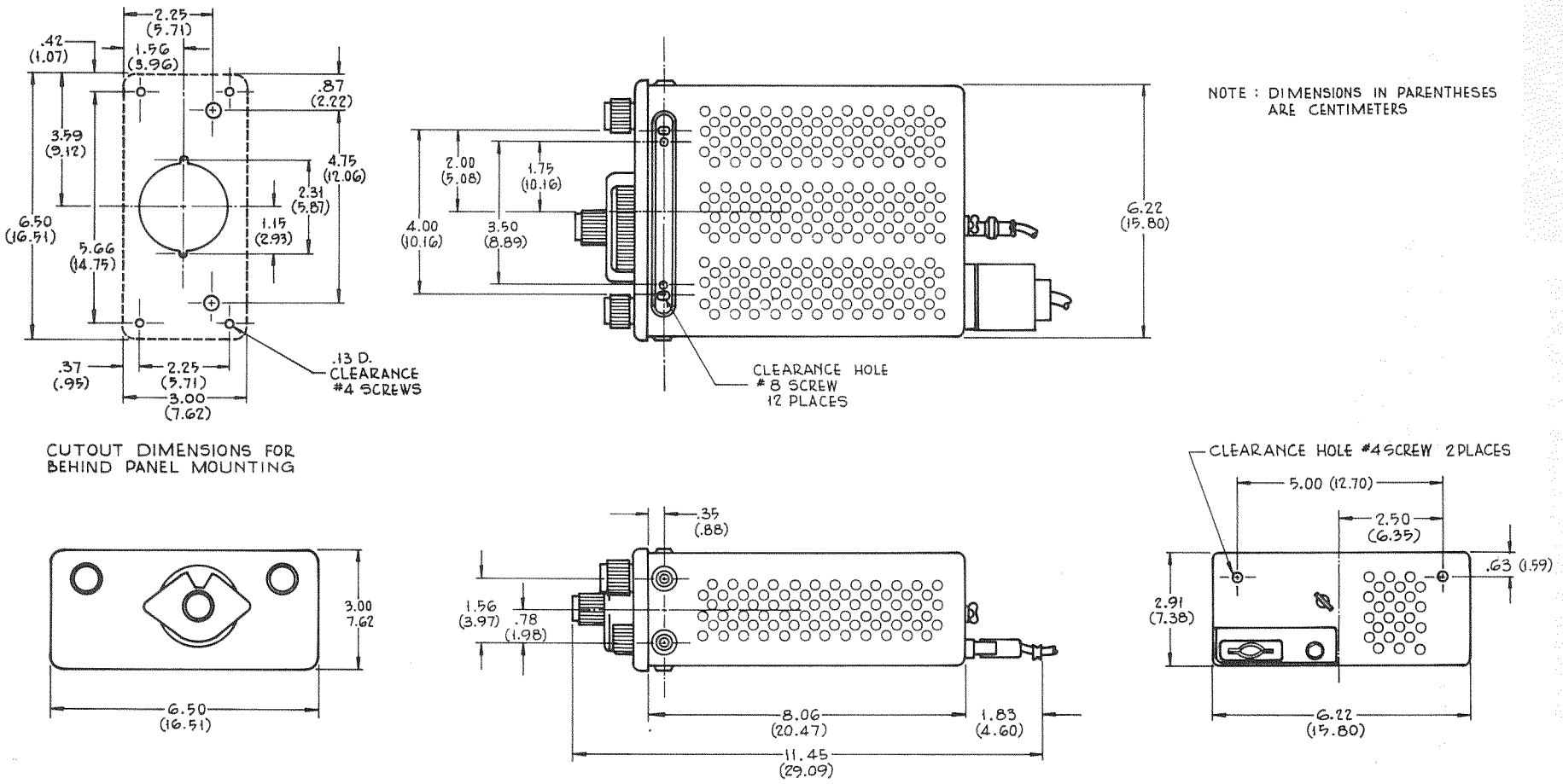



Figure 2-1. KY-90 Transceiver Installation Drawing

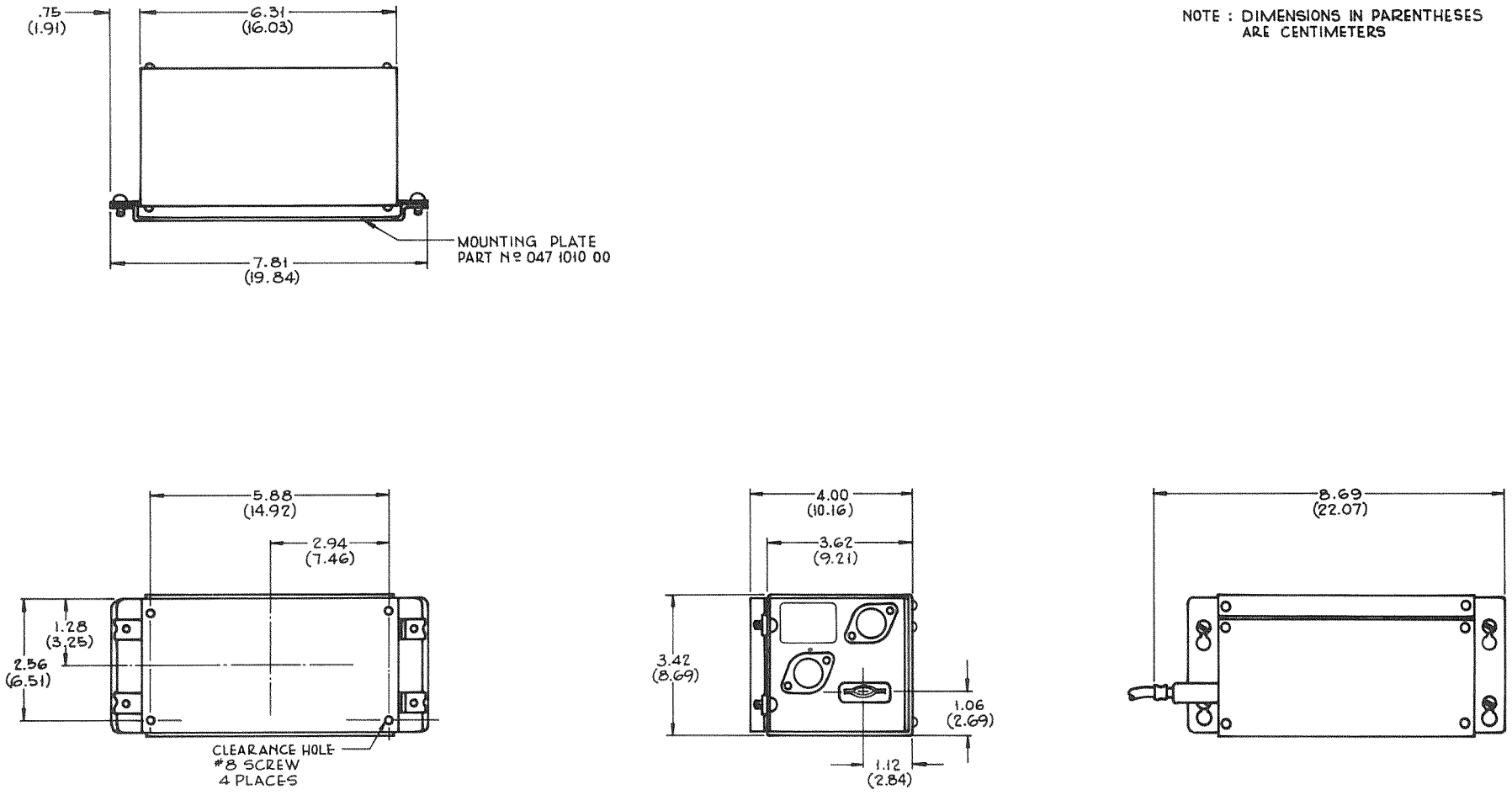



Figure 2-2. Power Supply Modulator Installation Drawing

## ANTENNA

Any standard vertical or bent whip antenna may be used with the KY-90. No antenna switching relay is required unless it is desired to operate a second communication equipment from the same antenna. The antenna should be mounted on the external surface of the airplane on a flat horizontal surface and well removed from other projections and from the engine(s) as far as possible.

## ELECTRICAL

The antenna lead using RG-58A/U coaxial cable is installed from the antenna to the coaxial socket at the rear of the KY-90. Use the following precautions: Keep the antenna cable as short as possible and avoid sharp bends in the routing. Use care in attaching and soldering the UG-88/U connector, noting that the tip of the center pin is flush with the end of the shell flange. Keep the ground as short as possible when attaching the cable at the antenna end.

Refer to figure 2-3 for cabling information. Since the other radio and navigation equipment in the airplane will share the speaker, headphones, and microphone, no attempt is made to cover circuits except those associated with the KY-90. Circuits for speaker selection and muting and microphone switching must be devised by the installer. The KY-90 will not shunt the speaker line of other equipment when the KY-90 is turned off as an extra circuit on the power switch opens the KY-90 speaker circuit in the power off position. Cabling is identical for 14 volt and 28 volt systems except heavier wire is required in the primary leads on 14 volt systems. Refer to table 2-1 for wire sizes to be used in the cable. Use a good quality stranded wire with at least 600 volt insulation.

## FINAL ADJUSTMENTS

The KY-90 has been thoroughly tuned and tested at the factory and no further tuning is necessary except the following adjustments which are all made with the engines running and the usual flight equipment turned on.

### Transmitter Test

Disconnect the antenna lead at the KY-90 and attach an RF wattmeter to the unit with coaxial cable. Check for power output at several frequencies in the lower, middle, and upper regions of the frequency range.

### Microphone Gain Adjustment

Terminate the KY-90 in an RF wattmeter or other suitable low radiation load. Tune a monitor receiver to the transmitted frequency. Remove the Squelch control knob and plug in the microphone which will be used in the aircraft. Depress the microphone button and speak in a normal loud voice. Using a slender shank screwdriver, adjust the microphone gain control clockwise until clipping is detected in a listening test on the receiver. An alternate test could be made by connecting an oscilloscope to the audio output of the receiver in which case visual evidence of clipping is available. After locating the setting of the microphone gain control which produces distortion, the control should be backed off 5 to 10 degrees. Replace the Squelch control knob.

### Sidetone Adjustment

Remove the volume control knob and put on the headphones which will be used in the airplane. With the engines running under power loading, speak into

the microphone while transmitting and then adjust recessed sidetone gain control until a desired sidetone level is obtained. Replace the volume control knob.

## FINAL CHECKS

Check the operation of the squelch control, volume control, and the speaker, headphone, and mike selector switches which you have designed into the custom control system before making a flight test. Label all custom control switches and be sure your customer understands how the equipment is to be operated.

TABLE 2-1
WIRE SIZES

| TERMINALS | |
|---|---|
| B, C, E | #16 MININUM |
| ALL OTHER LEADS | #22 |

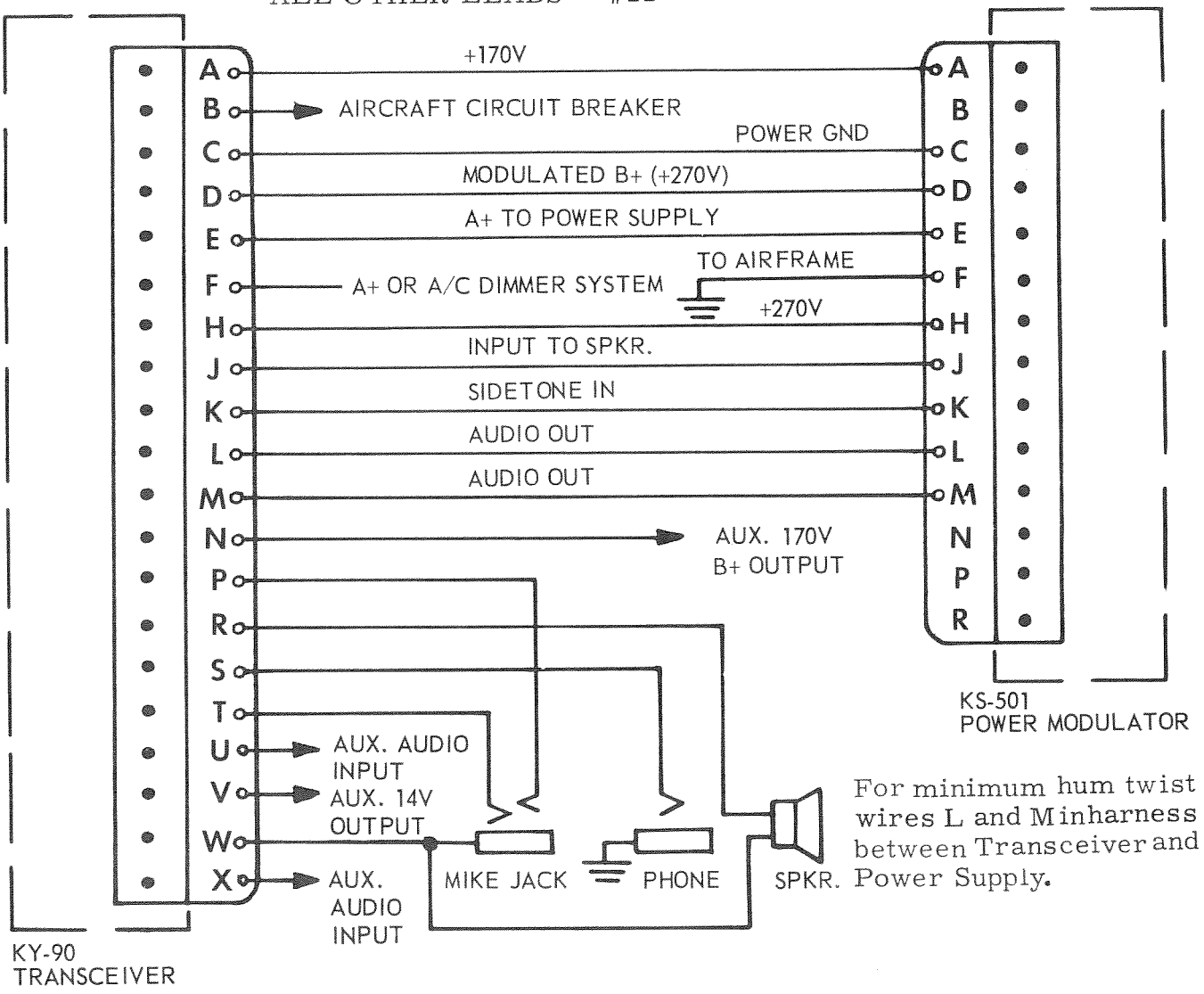



**Figure 2-3. Interconnecting Cable Assembly**

# SECTION III

# OPERATOR'S SECTION

All controls required in flight are positioned on the front panel of the KY-90. Due to the simplicity of the controls, in-flight tuning of the KY-90 is faster than any communication set in general use. Waiting for selector channelling, as when using remote controlled equipment, is not required. Pilots accustomed to the usual radio equipment will be pleased by the approximate 50% greater range provided by the 10 watt transmitter and high sensitivity receiver.

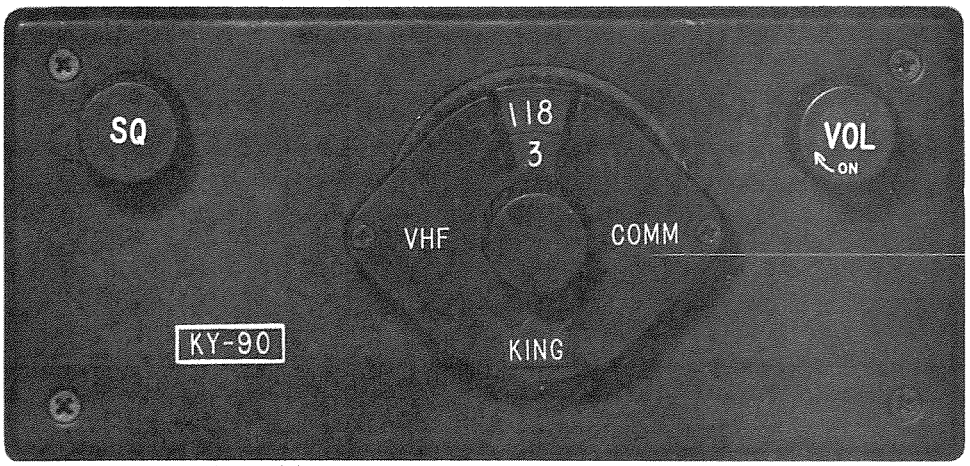



**Figure 3–1. Operator's Front Panel Controls**

## OPERATING SEQUENCE

The volume knob (marked VOL) is rotated clockwise from the OFF position to apply power to the set. In turning the set on, rotate the VOL knob about 1/2 turn. Now turn the squelch knob (marked SQ) fully clockwise. Next select the desired frequency channel by rotating the large outer knob until the desired megacycle appears in the window. Rotate the small knob below the window until the correct tenth megacycle number appears. Both the receiver and transmitter are now tuned to correct frequency. All 90 channels are selected in this manner.

As the tubes warm to operating condition, a hiss will be heard from the speaker. The particularly high gain of the receiver causes this atmospheric noise to be heard when there is no transmitted carrier on the selected channel. After the set has become operative, turn the squelch knob counter-clockwise until the noise just ceases to be heard. You are now ready to transmit and receive. No further adjustments are required except to change the receiver volume to your preferred level. **In no case should the squelch control be turned further counter-clockwise than that position just necessary to shut out undesired noise; otherwise, the squelch may not open on a weak signal which you desire to hear.** Each time the frequency is changed, the squelch should be readjusted.

Double Channel Simplex

In the past, communication with airways stations has been accomplished on the single frequency of 126.7 mc. for both directions of transmission. Due to increasing interference, this procedure has been changed. The aircraft now transmits on 126.7 mc. and receives a reply on 120.7 mc. To set up your KY-90 for this service, simply turn the megacycle selector knob to the position marked "DCS" and the tenth megacycle knob to .7. Nine other DCS channels (126.0 - 120.0, 126.1 - 120.1, etc.) are already in your KY-90 when future requirements cause them to be assigned.

SECTION I

# PRINCIPLES OF OPERATION

The basic functional arrangement of the circuits are as shown in figure 4-1. Reference to this overall functional block diagram will assist in understanding the text. Complex or unusual sections of the circuits will be explained using supplemental illustrations, but the complete schematic diagrams at the rear of this manual are sufficient for most circuit analysis.

## FUNCTIONAL OPERATION

The KY-90 Transceiver contains all receiver circuitry through the low level audio stages and all transmitter circuits except the modulator. The KY-90 also contains the relays for switching signals, voltages, and antenna connection between transmit-receive operation.

The receiver is a dual conversion superheterodyne type with I-F frequencies of 31 mc. and 3 mc. The Receiver High Frequency Oscillator frequency is controlled by the megacycle selector and its output is mixed, in the 1st Mixer, with received frequencies from the R-F Amplifier. Since the decimal selector might be in any of ten positions, (corresponding to a 0.9 mc. or 900 kc. range) the 31 mc. I-F Amplifier and its associated transformers must pass frequencies over this 900 kc. range. The frequency of the Low Frequency Oscillator is determined by the decimal selector. This frequency is mixed with the output of the 31 mc. I-F Amplifier in the Second Mixer. The two 3 mc. I-F Amplifiers and the 3 associated I-F transformers which follow give the receiver its high selectivity. The signal is then rectified and filtered and the resulting audio undergoes one stage of amplification before being routed to the Power Supply Modulator via the transmit-receive relay.

The transmitter of the KY-90 uses two crystal controlled oscillators to determine the frequency of the transmitted signal. The Transmitter High Frequency Oscillator generates a frequency which is determined by the megacycle selector. This signal is fed to the Low Frequency Oscillator, the same oscillator that is used by the receiver. During transmitter operation, this oscillator functions also as a mixer for the two frequencies. The RF Amplifier amplifies the frequency which is the sum of the frequencies produced by the High Frequency Oscillator & Low Frequency Oscillator. This amplified signal is then applied to the Driver stage which feeds the tuned push-pull, Final Amplifier. The control grids are fed the carrier frequency from the Driver while the plate and screen voltages are modulated at audio frequencies. The resulting amplitude modulated carrier is applied to the antenna through the antenna transfer relay.

The KS-501 Power Supply Modulator or the KS-502 Power Supply Modulator, which is similar in theory, supplies the high voltages necessary to operate the KY-90 and contains an amplifier which serves both as the speaker amplifier for receiver operation and as the modulator for transmitter operation.

The power supply in the KS-501 consists of a transistor multivibrator, a voltage step-up transformer, and a full wave bridge rectifier using silicon diodes. Positive 270 volts and 170 volts are produced by the power supply.

The all-transistor amplifier in the KS-501 consists of a driver stage, transformer coupled to a push-pull power amplifier. The transformer which supplies the audio input to the driver has two primary windings and the amplifier

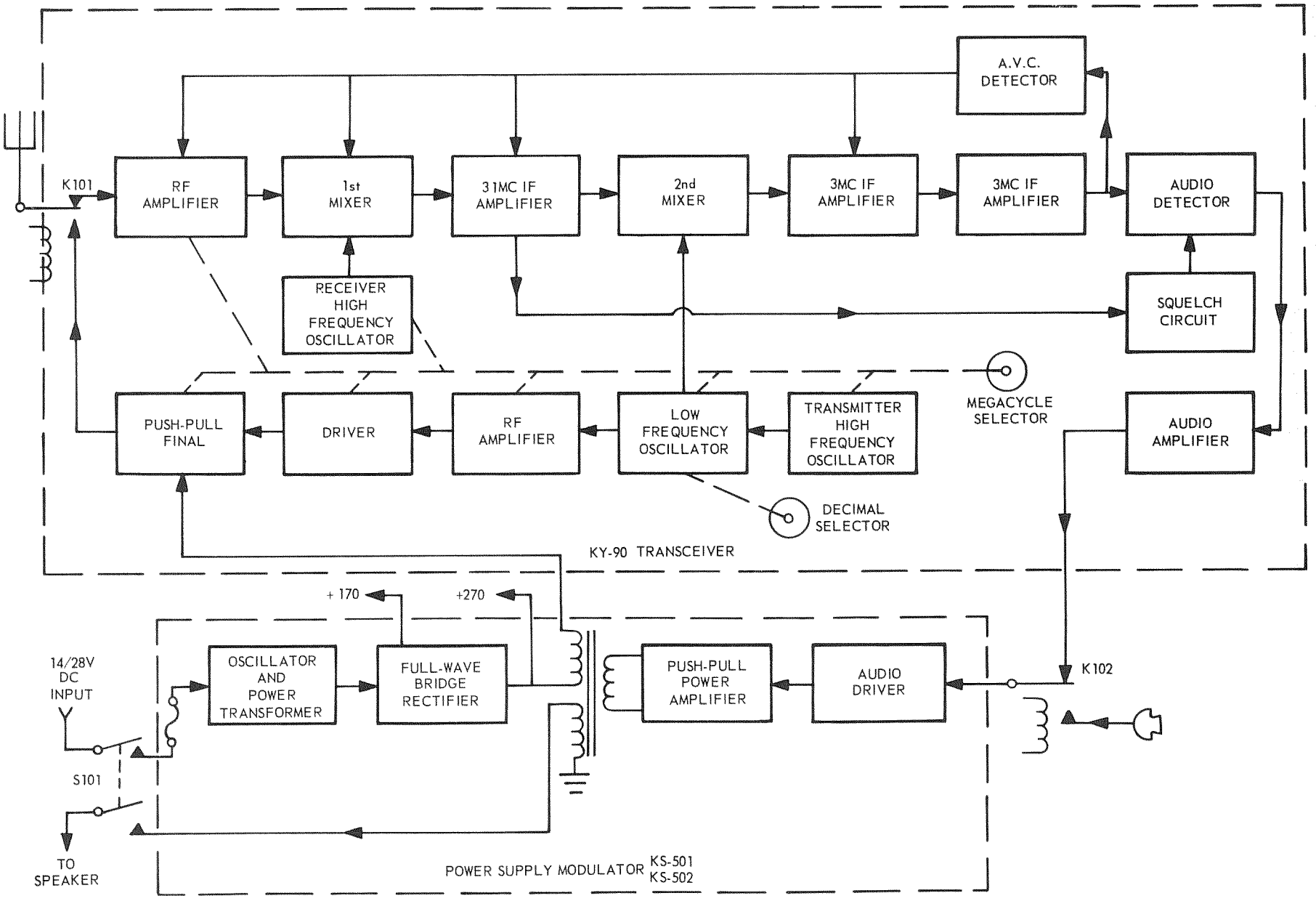



**Figure 4–1. Equipment Functional Block Diagram**

output transformer has two secondary windings. The transmit-receive relay simply determines which windings are connected in the receive and transmit mode, thereby causing the amplifier to function either as the speaker amplifier or the modulator.

# CIRCUIT THEORY

## FREQUENCY CONTROL

### Tuning Inductors

Nine variable inductors are used to tune all of the switched radio frequency resonant circuits in the transmitter and receiver, including the oscillators. This type of switch tuning gives outstanding frequency tracking across the entire operating range. A simplified drawing of the type of variable inductor used is shown in figure 4-2.

The variable inductor may be visualized as a hairpin bent into a circle. As the megacycle setting is increased by selector rotation, the shorting bar shortens the effective length of the hairpin. In the 126 mc position, the loop has been completely shorted and nearly all of the circuit inductance is in the series fixed inductor. As the selector is advanced to the DCS position, all of the hairpin is returned to the circuit; however, an appropriate external element (a single turn coil on the transmitter wafers and a 0.15 microhenry inductor on the receiver wafers) is connected across the hairpin to tune the circuits for DCS operation.

### Crystal Selection

Two banks of crystals are used to operate the crystal controlled oscillators in the KY-90. One bank contains ten crystals; they cover frequencies of 33.4625mc through 34.3625mc in 100 kc steps. The Low Frequency Oscillator uses these crystals as selected by the decimal selector switch. The second crystal bank serves both the transmitter and receiver High Frequency Oscillators. Twelve crystals cover frequencies

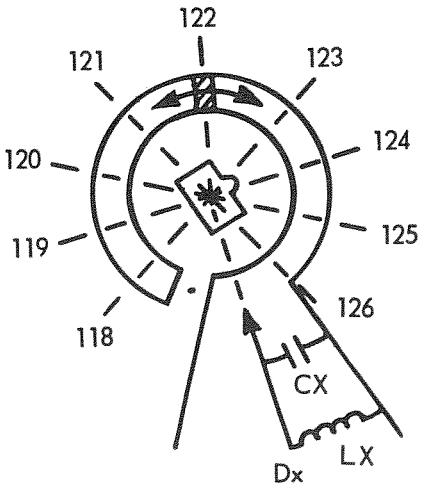



**Figure 4-2. Variable Inductance Tuning Switch**

from 84.5375mc through 95.5375mc in one megacycle steps. The transmitter makes use of the 9 lower frequency crystals and the receiver uses the 9 higher frequencies. The crystal selectors contacts (on the megacycle selector switch) are synchronized so that, except in the DSC position, the receiver oscillator is always three crystals, or three megacycles, above the transmitter oscillator. In this manner, the transmitter and receiver are made to operate at the same frequency.

## RECEIVER

RF Amplifier, Mixer, and High Frequency Oscillator circuits.

The energy received by the antenna is fed via the antenna transfer relay through the tuned antenna transformer, T101, to the grid of the 6AK5 RF Amplifier tube. The amplified signal appearing at the RF Amplifier plate is coupled

to the first mixer grid through two tuned circuits. In order to provide a more positive AVC action in the RF Amplifier and to reduce upward modulation effects under large received signals, the screen of the RF Amplifier is held to a constant 60-70 volts by the voltage divider R102 & R103. Energy from the receiver High Frequency Oscillator is capacitively coupled to the first mixer grid. The difference frequency of 31 megacycles is selected from the plate of the first mixer by a double tuned IF transformer.

The High Frequency Oscillator is a single triode with a tuned circuit in the plate. A capacitor divider feeds energy at low impedance through the selected crystal to the cathode circuit in correct phase to sustain oscillation. The grid is bypassed to ground at the oscillator frequency and a grid resistor develops appropriate bias.

### IF Amplifier, Second Mixer, and Low Frequency Oscillator Circuits

The IF transformer, T102, is adjusted to a center frequency of 30.9125 mc., and has a passband of 900 kilocycles. The signal selected by transformer T102 is amplified in the 6CB6 amplifier and capacitively coupled to the grid of a second mixer. The grid of the second mixer also receives the Low Frequency Oscillator energy by capacitive coupling from the cathode of the Low Frequency Oscillator. The Low Frequency Oscillator uses a single triode of a 12AT7. This oscillator is a modified Clapp type with a crystal substituted for the usual series tuned LC circuit. A small choke is placed across the wafer switch to compensate for the capacitance of the crystal. The effects of lead inductance are minimized by the use of capacitive feed.

When the decimal selector is adjusted to .9, the low frequency oscillator frequency is 34.3625 megacycles. The only frequency which will pass through transformer T102 and result in a second IF frequency of 3.0 mc is 31.3625 mc. Similarly, a setting of .0 on the decimal selector results in a second oscillator frequency of 33.4625 mc. and a first IF frequency of 30.4625 megacycles.

The difference frequency of the first IF and Low Frequency Oscillator is selected from the plate of the second mixer by the first double tuned 3 megacycle IF transformer T103. The first 3 mc IF Amplifier, a type 6BH6 pentode, amplifies the signal and feeds it on to the last IF Amplifier. The last 6BH6 3 mc amplifier is operated with higher screen voltage and no AVC is applied to its grid since it must be a linear device at fairly high signal levels. The selectivity of the receiver is determined by the six tuned circuits in T103, T104, and T105.

### AVC, Squelch, and Audio Circuits

The AVC voltage is developed by a silicon diode CR102, capacitively coupled to the secondary of the last IF transformer T105. The AVC time constant is determined by R124 and C137. The time constant is selected for best communication service since the receiver is never used for navigation.

The squelch circuit of the KY-90 is extremely simple and uses few circuit elements. When a carrier is not being received, the screen of the first IF Amplifier, V103, is held to a relatively low voltage since only that AVC voltage developed by noise is present at the grid of V103. With the Squelch control adjusted so that its center arm is higher in voltage than the screen of V103, the detector diode has reverse bias so that it will not detect the 3 mc signal received from the secondary of T105. When a carrier is received, AVC is applied to the grid of V103 and the screen becomes more positive. Depending on the setting of the squelch control, a point will be reached where the detector CR103 will start demodulation of the 3 mc signal. Clamping diode CR104 provides a means of holding the conduction bias on detector diode CR103 at the point

where most efficient demodulation will occur.

The audio signal passes through noise limiter diode CR105 to the volume control through C142. The audio signal is amplified by one section of triode V107 which has one primary of the audio input transformer T106 in its plate circuit. The secondary of T106 is connected through the interconnecting cable to the base of the driver transistor Q301 in KS-501 or Q401 in KS-502 Power Supply Modulator.

## TRANSMITTER

### High Frequency and Low Frequency Oscillator Circuits

The High Frequency Oscillator for the transmitter has the same circuit configuration as does that for the receiver. The signal out of the High Frequency Oscillator is capacitively coupled into the grid of the Low Frequency Oscillator.

### Low Frequency Oscillator

The prime frequencies out of the Low Frequency Oscillator are the frequencies of the individual oscillators, their sum, and their difference. The tuned circuit in the plate of the Low Frequency Oscillator is tuned to the frequency which is the sum of the two oscillator frequencies, and primarily it is this signal which is capacitively coupled into RF Amplifier V109.

### RF Amplifier, Driver, and Final Amplifier Circuits

The RF Amplifier is a pentode stage. Grid leak bias is developed across the grid resistor R150. The amplifier has a tuned plate circuit to give greater rejection of unwanted frequencies developed in the first two transmitter stages.

The cathode is tied to the keyed side of the relay coils and is at ground when transmitting. This ground is removed during receiver operation however, and the cathode rises to +14 volts, cutting off the stage, and eliminating the detuning of the Low Frequency Oscillator plate circuit.

The signal out of the RF Amplifier is capacitively coupled into the Driver and bias is developed across the grid resistance. The Driver is a tuned pentode which serves to provide sufficient grid drive for the Final Amplifier. The Signal from the Driver is capacitively coupled to the grid circuit of the push-pull Final Amplifier. Both the grid and plate circuits of the final are tuned and bias is developed for both stages across a common resistance in their grid circuits R141. The plate and screen circuits receive the modulating voltage. The RF output is capacitively coupled to the antenna via the antenna transfer relay. The capacitance shunting the antenna connector pin to ground and the inductance of the connecting circuit form a low pass filter which functions to reduce third harmonic radiation.

## FILAMENT AND RELAY CIRCUITS

### S101 and Filament Circuits

The voltage selector switch S101 must be placed in the position corresponding to the primary input voltage (14/28 volts). Placing S101 in the 14 volt position places the two groups of filaments, as shown on the schematic, in parallel. 14 volts is applied directly to the two relay windings (K101 antenna transfer and K102 power transfer). Placing S101 in the 28 volt position connects the two filament groups in series so that approximately 14 volts is dropped across each, and puts a 3 watt resistor in series with the coils of relays K101 and K102 as a voltage dropping element.

The filaments for the high frequency stages are isolated from each other by RF chokes bypassed to ground.

### Relay Circuits

Relays K101 and K102 are operated simultaneously by grounding one side of the coils through the push-to-talk button on the microphone. Relay K101 is the antenna transfer relay. In the de-energized position, the antenna is connected to the tuned input transformer of the receiver. In the energized position, the antenna is connected to the final of the transmitter. The power transfer relay K-102 has 6 sets of contacts, and controls all plate voltage and signal transfer functions for the transmit and receive operations.

## KS-501 POWER SUPPLY MODULATOR

The KS-501 operates from a 14 volt source and has two basic functions. It provides B+ voltages from a transistorized oscillator power supply, and it contains an all transistor amplifier which serves both as an audio amplifier and modulator for the transceiver.

### Power Supply

The oscillator for the power supply uses two 2N628 transistors operating in a simple multivibrator circuit. The primary input voltage is routed in through a pi section LC filter which prevents AC generated in the power supply from being fed back into power line. The 14 volt input is fed to the center tap on the primary transformer T303. The emitter of each transistor is tied to a low level tap on the primary, and each base through a current limiting resistor to the ends of the primary. Bias is established by the resistance values in the base circuit; the in phase feedback from base to emitter causes the pair of transistors to operate in an on-off mode and produce an AC voltage across the power transformer. The full wave silicon diode rectifier gives 270 volts DC at its output, and a level of 170 volts DC is taken from the center tap of the power transformer secondary. The two voltages are filtered and routed to connector J301.

### Amplifier

The audio amplifier which serves both as a speaker amplifier for the receiver and as modulator for the transmitter obtains its signal from the secondary of T106. This transformer has one primary in the audio section of the receiver and another primary fed by the microphone circuit. The driver stage operates in a conventional amplifier circuit with the primary of driver transformer T301 in its collector. The balanced output of this transformer is used to feed a pair of 2N376A type transistors operating in push-pull. They operate directly into the output transformer which has two secondaries; a low impedance winding to drive a 3.2 speaker, and a high voltage or modulation winding. Sidetone energy is taken off the primary of the output transformer.

# MAINTENANCE SECTION

## GENERAL

The maintenance section serves as a guide in trouble shooting the equipment and making replacements and repairs. This section contains alignment procedures for the operating equipment as well as a generalized trouble shooting chart for locating inoperative sections. Voltage and resistance measurements are also included in this section on the KY-90 schematic diagram.

## TEST EQUIPMENT

Watt Meter - Sierra Model 185A Termination Watt Meter or equivalent.
Signal Generator - Measurements Model 65B or equivalent.
Signal Generator - Hewlett-Packard Model 608A or equivalent.
Signal Generator - Boonton Radio Model 211A or equivalent.
14 volt or 28 volt DC power source with good regulation (14 volts if the KS-501 is used, and 28 volts if the KS-502 is used).
Microphone with push-to-talk button.
Loudspeaker - 3.2 ohm impedance (or equivalent resistance).
VTVM - RCA Senior Voltohmyst or equivalent (Do Not use a meter with a low impedance).
Oscilloscope, small soldering iron, clip leads, and alignment tools.

## SERVICING NOTES

There are two areas where extreme caution is required in servicing this or similar equipment; the tuned RF circuits, and the transistor circuits.
The tuned circuits in the KY-90 have been designed for high reliability and factory aligned for optimum performance. While the alignment is not difficult, be sure you are going to improve operation before altering factory settings. In no case should you use unnecessary force in or near the tuned RF components.

The transistor circuits require a certain amount of care when trouble shooting or replacing components. Transistors are particularly sensitive to certain kinds of abuse:

Heat - When soldering near transistors, care should be taken not to get the iron against the transistor. When soldering directly on a transistor lead, hold the lead tightly with pliers between the soldering operation and the transistor body. Use a small soldering tip with a low heat.

Current - The transistor will easily break down under excessive currents. Ground test equipment to the unit when making tests on these circuits. Ground soldering irons to the unit when working on transistor circuits. Do Not use a low impedance meter to measure circuit parameters while the circuits are in operation.

Mechanical Shock - Since transistors are often rigidly mounted and have rather fragile internal connections, be especially careful with hand tools when working near these elements.

**Bench Test Procedure**

With the equipment covers removed from the KY-90 and the Power Supply Modulator being used, turn the power switch off and properly connect the DC power source, headphones, microphone, wattmeter, and speaker to the units under test. If a repair is being made, inspect the equipment for mechanical damage or signs of excessive heating. If foreign matter has accumulated in the unit, clean it carefully before proceding with tests. Turn the volume and squelch controls fully clockwise and allow the equipment to operate for 5 minutes to let the temperature stabilize.

## TROUBLE-SHOOTING

The purpose of the trouble shooting charts is to localize the cause of circuit malfunctions by a logical sequence of checks. These checks will aid the technician in locating the particular electrical area which is inoperative. No attempt is made to define specific component failures, however, complete voltage and resistance measurements are given on the KY-90 schematic diagram at the end of the section.

## WARNING

Make sure power is turned off and allow sufficient time for high voltages to bleed off before making resistance measurements.

## NOTE

The following checks are based on the assumption that all equipment has been correctly installed.

AIRCRAFT CHECKS

| Abnormal Indication | Probable Cause |
|---|---|
| No power supply noise heard in headphones or speaker, or audible relay click when mike button is depressed. (Relay clicks should be heard whenever mike button is depressed). | Break in interconnecting cable between transceiver and power supply.<br><br>Blown fuse in power supply.<br><br>CAUTION<br><br>Make sure power supply curcuit is checked to determine circuit defect before replacing fuse - probably a shorted transistor. |
| Receiver noise is heard and transmit relays click but no stations received on any channel. | Antenna line loose or broken at KY-90 or at antenna. |

BENCH CHECKS - Power Supply Modulator

| Abnormal Indication | Probable Cause |
|---|---|
| Blown Fuse | Shorted transistor, shorted diodes, or shorted electrolytic capacitor. |

BENCH CHECKS - KY-90 Transceiver

Receiver Failures

| Abnormal Indication | Probable Cause |
|---|---|
| One or more tube filaments not lit. | Open filament. |
| No reception on any channel. | Megacycle oscillator or kilocycle oscillator not oscillating. Check tubes. |
| No reception on one channel | Defective crystal. |
| Poor reception | Receiver misaligned or defective tubes. Check tube voltages (See KY-90 schematic). |

Transmitter Failures

| Abnormal Indication | Probable Cause |
|---|---|
| No Transmitting power on any channel | Open filament.<br>Megacycle oscillator or kilocycle oscillator not oscillating. Check tubes. |
| No transmitting power on one channel. | Defective crystal. |
| Low power output. | Transmitter misaligned or defective tubes. Check tube voltages (See KY-90 schematic). |
| No modulation. | No mike current. Check mike bias voltage at R163 and C200. |

## GENERAL

If the preceeding checks fail to isolate the trouble check the equipment as follows: Visually inspect the connectors and cabling between the units and inside the units for broken or shorted wiring; check all tubes and voltages; set and clean relay contacts; check all aircraft wiring such as connectors, cables, circuit breakers, etc.

## REPAIR AND REPLACEMENT OF COMPONENTS

Despite the compactness of the KY-90 and associated Power Supply Modulator, replacement of components, in general, presents no unusual problem. Replacement of the wafers on the megacycle selector however, may be simplified by the following procedure.

Note and record the settings of the megacycle and decimal selectors. Remove the front panel screws. Release the set screws in the three small knobs and large knob and remove the volume and squelch knobs from the front of the panel. Slide the front panel forward, slipping the frequency selector knobs from the shafts. Unclip the dial light; remove the selector switch sprocket belt and idler sprocket, the squelch control and the selector switch mounting nuts and the hardware mounting the front vertical sub-panel and the side panels. This front panel is now restrained only by the wires to the off-on switch, S102 and the volume and sidetone controls and it may be swung off to the side for access to the selector switches.

If it is now desired to replace a wafer on the megacycle selctor, the detent mechanism and center shaft must be removed from the front of the switch. Removal of the two mounting screws at the rear panel will allow the support rods to be withdrawn from the switch. It is suggested that two stiff wires be inserted in place of the support rods at the front of the unit as the rods themselves are withdrawn from the rear. This will prevent the spacers dropping out as the rods are withdrawn.

The unit may be reassembled by reversing the above procedure. Be sure dial readings correspond to selector switch positions.

## ALIGNMENT PROCEDURES

### Receiver Alignment

(1) Turn on equipment and adjust volume and squelch knobs to maximum clockwise position.

(2) Using Measurements 65-B signal generator, inject a 3.0 mc signal on pin 1 of V106, (2nd 3 mc IF amplifier), through a .01 mfd capacitor. Connect VTVM (AC scale) across loudspeaker or dummy load. Tune T105 for a maximum indication on VTVM, reducing signal generator output to keep VTVM indication below 1.5 volts rms.

(3) Move signal generator injection to pin 1 of V105 (1st 3 mc IF amplifier), and repeat Step 2 above while tuning T104 for maximum indication.

(4) Move signal generator injection to pin 1 of V104, (2nd mixer), repeat Step 2 above while tuning T103 for maximum indication.

(5) Using Hewlett-Packard 608 signal generator, inject a 30.9125 mc signal through .01 mfd capacitor on pin 1 of V103, (31 mc IF amplifier). Turn front panel tenth megacycle control to ".5"

position and repeat Step 2 above while tuning C126 for maximum indication.

(6) Move signal generator injection to pin 1 of V102, (1st mixer), and repeat Step 2 above while tuning T102 for maximum indication.

(7) Connect VTVM (-DC scale) to test point TP101, (receiver high frequency oscillator test point). Turn front panel megacycle control to the "122" position and tune C116 for maximum VTVM indication.

(8) Connect Boonton 211A generator to the antenna connection on rear panel of KY-90 transceiver, and tune to 122.5 mc. Connect VTVM (AC scale) across loudspeaker or dummy load. Tune T101, C107, and C109 for maximum indication on VTVM reducing signal generator output to keep VTVM indication below 1.5 volts rms.

(9) Carefully set the Boonton 211A generator to within a kilocycle of 122.5 mc and re-touch all receiver tuning adjustments for maximum VTVM indication.

**Transmitter Alignment**

(1) Connect watt meter to the antenna connection on rear panel of KY-90. Connect VTVM (-DC scale) to test point TP105. With front panel frequency controls set at 122.5 mc and microphone "push-to-talk" button depressed, adjust C186 for maximum VTVM indication.

(2) Connect VTVM to test point TP104 and with the mike button depressed, adjust C176 for maximum VTVM indication.

(3) Connect VTVM to test TP103 and with the mike button depressed, adjust C170 for maximum VTVM indication.

(4) Connect VTVM to test point TP102 and with the mike button depressed, adjust C159 for maximum VTVM indication.

(5) Adjust C144 for maximum power output indication on the watt meter.

NOTE : Do Not depress the mike button when signal generator is connected to the antenna connector,

# PARTS LIST

The King KY-90 Transceiver with KS-501 or KS-502

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| C-101 | Capacitor, Fixed Ceramic Dielectric 18 mmfd 10% | $ .10 | 113-5180-00 |
| C-102 | Capacitor, Fixed Ceramic Dielectric 6.8 mmfd 10% | .15 | 113-5068-00 |
| C-103 | Capacitor, Fixed Ceramic Dielectric 68 mmfd 5% | .15 | 115-3680-00 |
| C-104 | Capacitor, Fixed Ceramic Dielectric 4.7 mmfd 10% | .15 | 113-5047-00 |
| C-105 | Same as C-102 | | |
| C-106 | Capacitor, Fixed Ceramic Dielectric 120 mmfd 10% | .15 | 113-5121-00 |
| C-107 | Trimmer Capacitor, Variable .5-4.5 mmfd | 1.32 | 102-0002-00 |
| C-108 | Same as C-103 | | |
| C-109 | Same as C-107 | | |
| C-110 | Capacitor, Fixed Ceramic Dielectic 100 mmfd 10% | .15 | 113-5101-00 |
| C-111 | Capacitor, Fixed Ceramic Dielectric 1.5 mmfd 10% | .10 | 113-5015-00 |
| C-112 | Capacitor, Fixed Ceramic Dielectric 470 mmfd GMV | .10 | 112-8471-00 |
| C-113 | Capacitor, Fixed Ceramic Dielectric 10 mmfd ± 10% | .15 | 113-5100-00 |
| C-114 | Same as C-112 | | |
| C-115 | Same as C-102 | | |
| C-116 | Same as C-107 | | |
| C-117 | Capacitor, Fixed Ceramic Dielectric 15 mmf ± 5% | .15 | 113-3150-00 |
| C-118 | Same as C-113 | | |
| C-119 | Same as C-112 | | |
| C-120 | Same as C-112 | | |
| C-121 | Same as C-112 | | |
| C-122 | Same as C-112 | | |
| C-123 | Capacitor, Fixed Ceramic Dielectric 4700 mmfd GMV | .10 | 114-8472-00 |
| C-124 | Capacitor, Fixed Ceramic Dielectric .01 ufd GMV | .15 | 115-8103-00 |
| C-125 | Same as C-117 | | |
| C-126 | Capacitor, Variable 1.5-12.5 mmfd | 1.47 | 102-0001-00 |
| C-127 | Same as C-103 | | |
| C-128 | Capacitor, Fixed Ceramic Dielectric .47 mmfd 10% | .10 | 106-0001-00 |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| C-129 | Capacitor, Fixed Ceramic Dielectric 1K mmfd GMV | $ .15 | 113-8102-00 |
| C-130 | Same as C-129 | | |
| C-131 | Same as C-129 | | |
| C-132 | Same as C-123 | | |
| C-133 | Same as C-129 | | |
| C-134 | Same as C-129 | | |
| C-135 | Same as C-123 | | |
| C-136 | Same as C-129 | | |
| C-137 | Capacitor, Fixed Ceramic Dielectric .1 ufd GMV | .56 | 117-8104-00 |
| C-138 | Same as C-110 | | |
| C-139 | Same as C-123 | | |
| C-140 | Same as C-129 | | |
| C-141 | Same as C-110 | | |
| C-142 | Same as C-123 | | |
| C-143 | Same as C-137 | | |
| C-144 | Same as C-107 | | |
| C-145 | Capacitor, Fixed Ceramic Dielectric 2.2 mmfd 10% | .15 | 113-5022-00 |
| C-146 | Same as C-101 | | |
| C-147 | Same as C-106 | | |
| C-148 | Same as C-106 | | |
| C-149 | Same as C-106 | | |
| C-150 | Same as C-129 | | |
| C-151 | Same as C-129 | | |
| C-152 | Same as C-129 | | |
| C-153 | Same as C-129 | | |
| C-154 | Same as C-129 | | |
| C-155 | Same as C-129 | | |
| C-156 | Same as C-106 | | |
| C-157 | Same as C-106 | | |
| C-158 | Same as C-112 | | |
| C-159 | Same as C-107 | | |
| C-160 | Same as C-101 | | |
| C-161 | Capacitor, Fixed Ceramic Dielectric 47 mmfd 10% | .10 | 114-5470-00 |
| C-162 | Same as C-112 | | |
| C-163 | Same as C-129 | | |
| C-164 | Same as C-106 | | |
| C-165 | Same as C-129 | | |
| C-166 | Same as C-106 | | |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| C-167 | Same as C-129 | | |
| C-168 | Same as C-106 | | |
| C-169 | Same as C-117 | | |
| C-170 | Same as C-107 | | |
| C-171 | Same as C-129 | | |
| C-172 | Same as C-106 | | |
| C-173 | Same as C-112 | | |
| C-174 | Same as C-106 | | |
| C-175 | Same as C-117 | | |
| C-176 | Same as C-107 | | |
| C-177 | Same as C-101 | | |
| C-178 | Same as C-112 | | |
| C-179 | Same as C-112 | | |
| C-180 | Same as C-104 | | |
| C-181 | Capacitor, Fixed Ceramic Dielectric 68 mmfd 10% | $ .15 | 113-5680-00 |
| C-182 | Same as C-112 | | |
| C-183 | Capacitor, Fixed Ceramic Dielectric 150 mmfd 20% | .15 | 113-7151-00 |
| C-184 | Same as C-113 | | |
| C-185 | Same as C-145 | | |
| C-186 | Same as C-107 | | |
| C-187 | Same as C-129 | | |
| C-188 | Capacitor, Fixed Ceramic Dielectric 12 mmfd 5% | .15 | 113-3120-00 |
| C-189 | Same as C-129 | | |
| C-190 | Same as C-129 | | |
| C-191 | Same as C-129 | | |
| C-192 | Same as C-112 | | |
| C-193 | Same as C-102 | | |
| C-194 | Same as C-112 | | |
| C-195 | Same as C-117 | | |
| C-196 | Same as C-129 | | |
| C-197 | Same as C-129 | | |
| C-198 | Same as C-129 | | |
| C-199 | Same as C-129 | | |
| C-200 | Capacitor, Fixed Electrolytic 6 ufd | .56 | 097-0015-00 |
| C-201 | Capacitor, Fixed Ceramic Dielectric 220 mmfd 10% | .15 | 113-5221-00 |
| C-202 | Same as C-200 | | |
| C-203 | Same as C-137 | | |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| C-204 | Same as C-112 | | |
| C-205 | Same as C-129 | | |
| C-206 | Same as C-129 | | |
| C-207 | Same as C-113 | | |
| CR-101 | Diode, Silicone | $1.80 | 007-6002-00 |
| CR-102 | Same as CR-101 | | |
| CR-103 | Diode, Germanium | 1.35 | 007-6004-00 |
| CR-104 | Diode Silicone | 1.22 | 007-6008-00 |
| CR-105 | Same as CR-101 | | |
| DS-101 | Lamb Bulbs, Bayonet Type 14 Volt | .30 | 037-0001-00 |
| DS-101 | Lamb Bulbs, Bayonet Type 28 Volt | .44 | 037-0002-00 |
| J-101 | Connector, Coax, Receptacle UG1094-u | 1.25 | 030-2004-00 |
| J-102 | Connector, Minature, Plug: 20 pin | 3.91 | 030-2003-00 |
| K-101 | Relay, Antenna | 11.65 | 032-0001-00 |
| K-102 | Relay, Power | 16.08 | 032-0002-00 |
| L-101 | Inductor, Variable | 1.12 | 031-0004-00 |
| L-102 | Same as L-101 | | |
| L-103 | Same as L-101 | | |
| L-104 | Coil, Molded 1uh | .40 | 019-2005-00 |
| L-105 | Coil, Molded .47uh | .40 | 019-2003-00 |
| L-106 | Coil, Molded .15uh | .44 | 019-2006-00 |
| L-107 | Same as L-101 | | |
| L-108 | Coil, Molded .68uh | .44 | 019-2007-00 |
| L-109 A & B | Coil, Final Tank | .96 | 019-2001-00 |
| L-110 | Same as L-101 | | |
| L-111 | Coil, Molded 2.2uh | .40 | 019-2004-00 |
| L-112 | Same as L-106 | | |
| L-113 | Same as L-101 | | |
| L-114 | Same as L-106 | | |
| L-115 | Same as L-111 | | |
| L-116 | Same as L-111 | | |
| L-117 | Same as L-106 | | |
| L-118 | Same as L-101 | | |
| L-119 | Same as L-101 | | |
| L-120 | Same as L-106 | | |
| L-121 | Same as L-104 | | |
| L-122 | Same as L-101 | | |
| L-123 | Same as L-106 | | |
| L-124 | Same as L-104 | | |
| L-125 | Same as L-105 | | |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| L-126 | Same as L-105 | | |
| L-127 | Same as L-105 | | |
| L-128 | Same as L-105 | | |
| L-129 | Same as L-106 | | |
| L-130 | Same as L-106 | | |
| L-131 | Same as L-105 | | |
| L-132 | Same as L-105 | | |
| L-133 | Coil, Molded 1.8uh | $ .44 | 019-2008-00 |
| L-134 | Same as L-106 | | |
| L-135 | Same as L-106 | | |
| L-136 | Same as L-106 | | |
| L-137 | Same as L-106 | | |
| L-138 | Same as L-105 | | |
| R-101 | Resistor, Fixed Carbon 100,000 ohms 10% 1/2 watt | .10 | 130-0104-35 |
| R-102 | Resistor, Fixed Carbon 27,000 ohms 10% 1/2 watt | .10 | 130-0273-35 |
| R-103 | Resistor, Fixed Composition 68,000 ohms 10% 1/2 watt | .10 | 130-0683-35 |
| R-104 | Resistor, Fixed Carbon 2,700 ohms 10% 1/2 watt | .10 | 130-0272-35 |
| R-105 | Resistor, Fixed Carbon 10 ohms 10% 1/2 watt | .10 | 130-0100-35 |
| R-106 | Same as R-102 | | |
| R-107 | Same as R-101 | | |
| R-108 | Resistor, Fixed Carbon 1,000 ohms 10% 1/2 watt | .10 | 130-0102-35 |
| R-109 | Resistor, Fixed Carbon 1 megohm 10% 1/2 watt | .10 | 130-0105-35 |
| R-110 | Same as R-101 | | |
| R-111 | Same as R-108 | | |
| R-112 | Same as R-101 | | |
| R-113 | Same as R-101 | | |
| R-114 | Same as R-108 | | |
| R-115 | Same as R-109 | | |
| R-116 | Same as R-101 | | |
| R-117 | Same as R-108 | | |
| R-118 | Same as R-101 | | |
| R-119 | Resistor, Fixed Composition 270 ohms 10% 1/2 watt | .10 | 130-0271-35 |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| R-120 | Resistor, Fixed, Composition: 47,000 ohms 10% 1/2 watt | $0.10 | 130-0473-35 |
| R-121 | Same as R-108 | | |
| R-122 | Same as R-119 | | |
| R-123 | Same as R-102 | | |
| R-124 | Same as R-109 | | |
| R-125 | Same as R-109 | | |
| R-126 | Same as R-108 | | |
| R-127 | Same as R-120 | | |
| R-128 | Resistor, Variable, 2 Section Pot 100,000 ohms taper (front section) 1,000 ohms taper (rear section) | 1.12 | 133-0001-00 |
| R-129 | Resistor, Fixed, Composition: 15,000 ohms 10% 1/2 watt | .10 | 130-0153-35 |
| R-130 | Same as R-101 | | |
| R-131 | Resistor, Fixed, Composition: 270,000 ohms 10% 1/2 watt | .10 | 130-0274-35 |
| R-132 | Same as R-131 | | |
| R-133 | Resistor, Variable, 2 Section Pot 100,000 ohms taper (front section) 1,000 ohms taper (rear section) | 1.12 | 133-0001-00 |
| R-134 | Same as R-131 | | |
| R-135 | Resistor, Fixed, Composition: 470,000 ohms 10% 1/2 watt | .10 | 130-0474-35 |
| R-136 | Resistor, Fixed, Composition: 470 ohms 10% 1/2 watt | .10 | 130-0471-35 |
| R-137 | Same as R-108 | | |
| R-138 | Same as R-108 | | |
| R-139 | Resistor, Fixed, Composition: 100 ohms 10% 1/2 watt | .10 | 130-0101-35 |
| R-140 | Same as R-139 | | |
| R-141 | Resistor, Fixed, Composition: 6,800 ohms 10% 1/2 watt | .10 | 130-0682-35 |
| R-142 | Same as R-101 | | |
| R-143 | Same as R-139 | | |
| R-144 | Same as R-104 | | |
| R-145 | Same as R-141 | | |
| R-146 | Same as R-139 | | |
| R-147 | Same as R-101 | | |
| R-148 | Same as R-136 | | |
| R-149 | Same as R-141 | | |
| R-150 | Same as R-102 | | |
| R-151 | Same as R-108 | | |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| R-152 | Same as R-108 | | |
| R-153 | Resistor, Fixed Composition 10,000 ohms 10% 1/2 watt | $ .10 | 130-0103-35 |
| R-154 | Same as R-136 | | |
| R-155 | Same as R-102 | | |
| R-156 | Same as R-105 | | |
| R-157 | Resistor, Fixed Composition 150 ohms 10% 1/2 watt | .10 | 130-0151-35 |
| R-158 | Same as R-101 | | |
| R-159 | Resistor, Wire Wound 50 ohms 10% 3 watt | .76 | 132-0007-00 |
| R-160 | Resistor, Variable, 2 Section Pot 100,000 ohms taper (front section) 1,000 ohms taper (rear section) | 1.12 | 133-0001-00 |
| R-161 | Same as R-104 | | |
| R-162 | Same as R-104 | | |
| R-163 | Resistor, Variable, 2 Section Pot 100,000 ohms taper (front section) 1,000 ohms taper (rear section) | 1.12 | 133-0001-00 |
| R-164 | Same as R-136 | | |
| R-165 | Same as R-139 | | |
| R-166 | Same as R-101 | | |
| R-167 | Same as R-120 | | |
| R-168 | Resistor, Wire Wound 10 ohms 10% 3 watt | .76 | 132-0006-00 |
| R-169 | Same as R-136 | | |
| S-101 | Switch, Double Pole, Single Throw: | 1.20 | 031-0006-00 |
| S-102 | Switch, Triple Pole, Double Throw: | .76 | 031-0010-00 |
| T-101 | Transformer: Radio Frequency | 3.71 | 019-3001-00 |
| T-102 | Transformer, IF 31MC | 5.30 | 019-8004-00 |
| T-103 | Transformer, IF 3 MC | 5.52 | 019-8002-00 |
| T-104 | Same as T-103 | | |
| T-105 | Same as T-103 | | |
| T-106 | Transformer, Audio, Transistor Input | 10.60 | 019-5001-00 |
| V-101 | Electron Tube: 6CY5 | 1.98 | 021-0001-00 |
| V-102 | Same as V-101 | | |
| V-103 | Electron Tube: 6CB6 | 1.56 | 021-0003-00 |
| V-104 | Same as V-103 | | |
| V-105 | Electron Tube: 6BH6 | 1.95 | 021-0002-00 |
| V-106 | Same as V-105 | | |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| V-107 | Electron Tube: 12AT7 | $2.16 | 021-0005-00 |
| V-108 | Same as V-107 | | |
| V-109 | Electron Tube: 6DK6 | 1.68 | 021-0006-00 |
| V-110 | Electron Tube: 5686 | 5.15 | 021-0004-00 |
| V-111 | Same as V-110 | | |
| V-112 | Same as V-110 | | |
| Y-101 | Crystal, Quartz: Frequency 33.4625mc | 7.50 | 040-8334-62 |
| Y-102 | Crystal, Quartz: Frequency 33.5625mc | each | 040-8335-62 |
| Y-103 | Crystal, Quartz: Frequency 33.6625mc | | 040-8336-62 |
| Y-104 | Crystal, Quartz: Frequency 33.7625mc | | 040-8337-62 |
| Y-105 | Crystal, Quartz: Frequency 33.8625mc | | 040-8338-62 |
| Y-106 | Crystal, Quartz: Frequency 33.9625mc | | 040-8339-62 |
| Y-107 | Crystal, Quartz: Frequency 34.0625mc | | 040-8340-62 |
| Y-108 | Crystal, Quartz: Frequency 34.1625mc | | 040-8341-62 |
| Y-109 | Crystal, Quartz: Frequency 34.2625mc | | 040-8342-62 |
| Y-110 | Crystal, Quartz: Frequency 34.3625mc | | 040-8343-62 |
| Y-111 | Crystal, Quartz: Frequency 84.5375mc | | 040-8845-37 |
| Y-112 | Crystal, Quartz: Frequency 85.5375mc | | 040-8355-37 |
| Y-113 | Crystal, Quartz: Frequency 86.5375mc | | 040-8865-37 |
| Y-114 | Crystal, Quartz: Frequency 87.5375mc | | 040-8875-37 |
| Y-115 | Crystal, Quartz: Frequency 88.5375mc | | 040-8885-37 |
| Y-116 | Crystal, Quartz: Frequency 89.5375mc | | 040-8895-37 |
| Y-117 | Crystal, Quartz: Frequency 90.5375mc | | 040-8905-37 |
| Y-118 | Crystal, Quartz: Frequency 91.5375mc | | 040-8915-37 |
| Y-119 | Crystal, Quartz: Frequency 92.5375mc | | 040-8925-37 |
| Y-120 | Crystal, Quartz: Frequency 93.5375mc | | 040-8935-37 |
| Y-121 | Crystal, Quartz: Frequency 94.5375mc | | 040-8945-37 |
| Y-122 | Crystal, Quartz: Frequency 95.5375mc | | 040-8955-37 |
| TP-101 | Test Jack | .48 | 010-0002-00 |
| TP-102 | Same as TP-101 | | |
| TP-103 | Same as TP-101 | | |
| TP-104 | Same as TP-101 | | |
| TP-105 | Same as TP-101 | | |
| TP-106 | Same as TP-101 | | |
| TP-107 | Same as TP-101 | | |
| | Standoff, Teflon | .44 | 010-0001-00 |
| | Timing Belt | 3.12 | 029-0001-00 |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| | Drive Gear | $3.18 | 029-0002-00 |
| | Terminal Board Assembly | 2.66 | 009-0001-02 |
| | Shorted Terminal Wafer Switch 12 Positions | .96 | 031-0001-00 |
| | Transmitter Crystal Wafer 12 Positions | 1.54 | 031-0002-00 |
| | Receiver Crystal Wafer 12 Positions | 1.54 | 031-0003-00 |
| | Switch Shaft and Detent Mechanism 12 Position Mounting Shaft used On Kilocycle Selector | 1.28 | 031-0007-00 |
| | Equipment Cover | 11.05 | 047-1006-00 |
| | Face Plate | 6.40 | 047-1007-00 |
| | Switch Actuating Arm | 1.04 | 047-1009-00 |
| | Socket, Bayonett | .30 | 033-0005-00 |
| | Front Mounting Bracket | 2.70 | 047-1002-00 |
| | Rear Mounting Bracket | 3.54 | 047-1008-00 |
| | Shield Post | .45 | 047-1030-00 |
| | Belt Adjusting Skid | .27 | 047-1031-00 |
| | Knob Cover | 2.58 | 088-0005-00 |
| | Knob Kilocycle Selector | 4.32 | 088-0001-00 |
| | Knob Megacycle Selector | 5.25 | 088-0002-00 |
| | Knob Squelch | 2.45 | 088-0004-01 |
| | Knob Volume and On-Off | 2.45 | 088-0004-02 |
| | Light Filter | .45 | 088-0008-00 |
| | Switch Backing Plate | 1.89 | 047-1046-00 |
| | Tube Shield 7 Pin 1-9/16 | .10 | 090-0001-00 |
| | Tube Shield 9 Pin | .10 | 090-0005-00 |
| | Pilot Light Shield | .18 | 090-0009-00 |
| | Grommet, Rubber | .10 | 091-0001-00 |
| | Crystal Holder 12 Crystals | .81 | 091-0002-00 |
| | Lock Tab | .88 | 092-0001-00 |
| | Switch Shaft and Detent Mechanism 12 Position Mounting Shaft used on Megacycle Selector | 1.28 | 031-0007-03 |
| | Brass Bushing (Megacycle Drive) | .63 | 031-0007-02 |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KY-90 TRANSCEIVER

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| | BENCH TEST KIT | $13.95 | 050-1007-00 |
| | Receptacle (14 Pin) | | 030-2000-00 |
| | Receptacle (20 Pin) | | 030-2002-00 |
| | Hood (14 Pin) | | 092-0003-00 |
| | Hood (20 Pin) | | 092-0004-00 |
| | INSTALLATION KIT | 19.40 | 050-1004-00 |
| | Receptacle 14 Pin | | 030-2000-00 |
| | Receptacle 20 Pin | | 030-2002-00 |
| | Connector UG88/U Plug | | 030-2005-00 |
| | Hood 14 Pin | | 092-0003-00 |
| | Hood 20 Pin | | 092-0004-00 |
| | Lever & Pivot Assembly | | 092-0002-00 |
| | #8/32 x 3/8 | | 089-5067-06 |
| | U Nut #8/32 | | 089-2037-30 |
| | Mounting Base (Power Supply) | | 047-1010-00 |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KS-501 POWER SUPPLY 14 VOLT

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| C-301 | Capacitor, Electrolytic: 6 mfd 20 volts DC | $ .56 | 097-0015-00 |
| C-302 | Capacitor, Electrolytic: 150 mfd 25 volts DC | .87 | 097-0012-00 |
| C-303 A | Capacitor, Electrolytic, 3 Section 40mfd 450 volts DC | 1.89 | 097-0016-00 |
| C-303 B | 60mfd 250 volts DC | | |
| C-303 C | 60mfd 250 volts DC | | |
| C-304 | Capacitor, Fixed Ceramic Dielectric .1mfd 50 volts DC | .56 | 117-8104-00 |
| C-305 | Same as C-304 | | |
| C-306 | Capacitor, Electrolytic: 25 mfd 3 volts DC | .56 | 097-0018-00 |
| C-307 | Same as C-304 | | |
| C-308 | Same as C-302 | | |
| C-309 | Same as C-302 | | |
| CR-301 | Diode, Silicone | 1.62 | 007-6006-00 |
| CR-302 | Same as CR-301 | | |
| CR-303 | Same as CR-301 | | |
| CR-304 | Same as CR-301 | | |
| F-301 | Fuse, Slo-Blo, 8 Amp. | .32 | 036-0003-00 |
| J-301 | Connector, Plug, 14 Pin | 2.91 | 030-2001-00 |
| L-301 | Inductor, Filter Choke | 4.68 | 019-2002-00 |
| L-302 | Coil, Molded 10mh | 1.15 | 019-2014-00 |
| Q-301 | Transistor | 3.64 | 007-0002-00 |
| Q-302 | Same as Q-301 | | |
| Q-303 | Same as Q-301 | | |
| Q-304 | Transistor | 5.70 | 007-0001-00 |
| Q-305 | Same as Q-304 | | |
| R-301 | Resistor, Fixed Composition 220 ohms 10% 1 watt | .15 | 130-0221-45 |
| R-302 | Resistor, Fixed Composition 470 ohms 10% 1/2 watt | .10 | 130-0471-35 |
| R-303 | Resistor, Fixed Composition 27 ohms 10% 1/2 watt | .10 | 130-0270-35 |
| R-304 | Resistor, Fixed Composition 3.3 ohms 10% 1 watt | .15 | 130-0033-45 |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KS-501 POWER SUPPLY 14 VOLT

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| R-305 | Same as R-303 | | |
| R-306 | Resistor, Fixed Composition 6.8 ohms 10% 1 watt | $ .15 | 130-0068-45 |
| R-307 | Resistor, Fixed Wire Wound 270 ohms 10% 3 watt | .76 | 132-0001-00 |
| R-308 | Same as R-307 | | |
| R-309 | Same as R-306 | | |
| R-310 | Resistor, Fixed Composition 270,000 ohms 10% 1 watt | .15 | 130-0274-45 |
| R-311 | Resistor, Wire Wound 75 ohms 10% 3 watt | .76 | 132-0003-00 |
| R-312 | Resistor, Fixed, Composition 10,000 ohms 10% 1/2 watt | .10 | 130-0103-35 |
| TB-301 | Terminal Board | 2.66 | 009-0001-02 |
| T-301 | Transformer, Interstage | 9.80 | 019-5002-00 |
| T-302 | Transformer, Modulator | 10.92 | 019-5003-00 |
| T-303 | Transformer, Power | 20.88 | 019-7001-00 |
| | Socket Transistor | .15 | 033-0001-00 |
| | Fuse Holder | .40 | 033-0004-01 |
| | Grommet | .10 | 091-0003-00 |
| | Mica Washer for Mounting Transistors | .10 | 091-0004-00 |
| | Equipment Cover | 3.00 | 047-1004-00 |
| | Mounting Plate | 2.73 | 047-1010-00 |
| | Connector Lock Tabs | .88 | 092-0001-00 |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER

KS-502 POWER SUPPLY 28 VOLT

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| C-401 | Capacitor, Electrolytic 6mfd 20 volts DC | $ .56 | 097-0015-00 |
| C-402 | Capacitor, Electrolytic 75mfd 40 volts DC | .86 | 097-0014-00 |
| C-403-A | Capacitor, Electrolytic, 3 Section 40mfd 450 volts DC | 1.89 | 097-0016-00 |
| C-403-B | 60mfd 250 volts DC | | |
| C-403-C | 60mfd 250 volts DC | | |
| C-404 D | Capacitor, Fixed Ceramic Dielectric .1mfd 50 volts DC | .56 | 117-8104-00 |
| C-405 | Same as C-404 | | |
| C-406 | Capacitor, Electrolytic: 25 mfd 3 volts DC | .56 | 097-0018-00 |
| C-407 | Same as C-404 | | |
| C-408 | Capacitor, Fixed Ceramic Dielectric .0047mfd | .10 | 114-8472-01 |
| C-409 | Same as C-402 | | |
| CR-401 | Diode, Silicone | 1.62 | 007-6006-00 |
| CR-402 | Same as CR-401 | | |
| CR-403 | Same as CR-401 | | |
| CR-404 | Same as CR-401 | | |
| F-401 | Fuse, Slo-Blo, 4 Amp. | .40 | 036-0004-00 |
| J-401 | Connector, Plug, 14 Pin | 2.91 | 030-2001-00 |
| L-401 | Inductor, Filter Choke | 5.52 | 019-2019-00 |
| L-402 | Coil, Molded; 10mh | 1.15 | 019-2014-00 |
| Q-401 | Transistor | 8.50 | 007-0004-00 |
| Q-402 | Same as Q-401 | | |
| Q-403 | Same as Q-401 | | |
| Q-404 | Same as Q-401 | | |
| Q-405 | Same as Q-401 | | |
| R-401 | Resistor, Fixed Composition 220 ohms 10% 1 watt | .15 | 130-0221-45 |
| R-402 | Resistor, Fixed Composition 1,000 ohms 10% 1 watt | .15 | 130-0102-45 |
| R-403 | Resistor, Fixed Composition 27 ohms 10% 1/2 watt | .10 | 130-0270-35 |

ALWAYS INCLUDE THE MODEL NO. AND SERIAL NO. OF THE UNIT ALONG WITH KING PART NO. AND REFERENCE SYMBOL WITH YOUR ORDER.

KS-502 POWER SUPPLY 28 VOLT

| REF. SYMBOL | DESCRIPTION | LIST PRICE | KING PART NO. |
|---|---|---|---|
| R-404 | Resistor, Fixed, Composition: 3.3 ohms 10% 1 watt | $ .15 | 130-0033-45 |
| R-405 | Same as R-403 | | |
| R-406 | Resistor, Fixed, Wire Wound: 6.8 ohms 10% 3 watt | .69 | 132-0004-00 |
| R-407 | Resistor, Fixed Wire Wound: 500 ohms 10% 3 watt | .84 | 132-0002-00 |
| R-408 | Same as R-407 | | |
| R-409 | Same as R-406 | | |
| R-410 | Resistor, Fixed, Composition: 270,000 ohms 10% 1 watt | .15 | 130-0274-45 |
| R-411 | Resistor, Fixed, Wire Wound: 75 ohms 10% 3 watt | .76 | 132-0003-00 |
| R-412 | Same as R-401 | | |
| TB-401 | Terminal Board | 2.66 | 009-0001-02 |
| T-401 | Transformer, Interstage | 9.80 | 019-5002-00 |
| T-402 | Transformer, Modulator | 11.52 | 019-5005-00 |
| T-403 | Transformer, Power | 43.60 | 019-7003-00 |
| | Socket Transistor | .15 | 033-0001-00 |
| | Fuse Holder | .36 | 033-0004-00 |
| | Grommet | .10 | 091-0003-00 |
| | Mica Washer for Mounting Transistors | .10 | 091-0004-00 |
| | Equipment Cover | 3.00 | 047-1004-00 |
| | Mounting Plate | 2.73 | 047-1010-00 |
| | Connector Lock Tabs | .88 | 092-0001-00 |

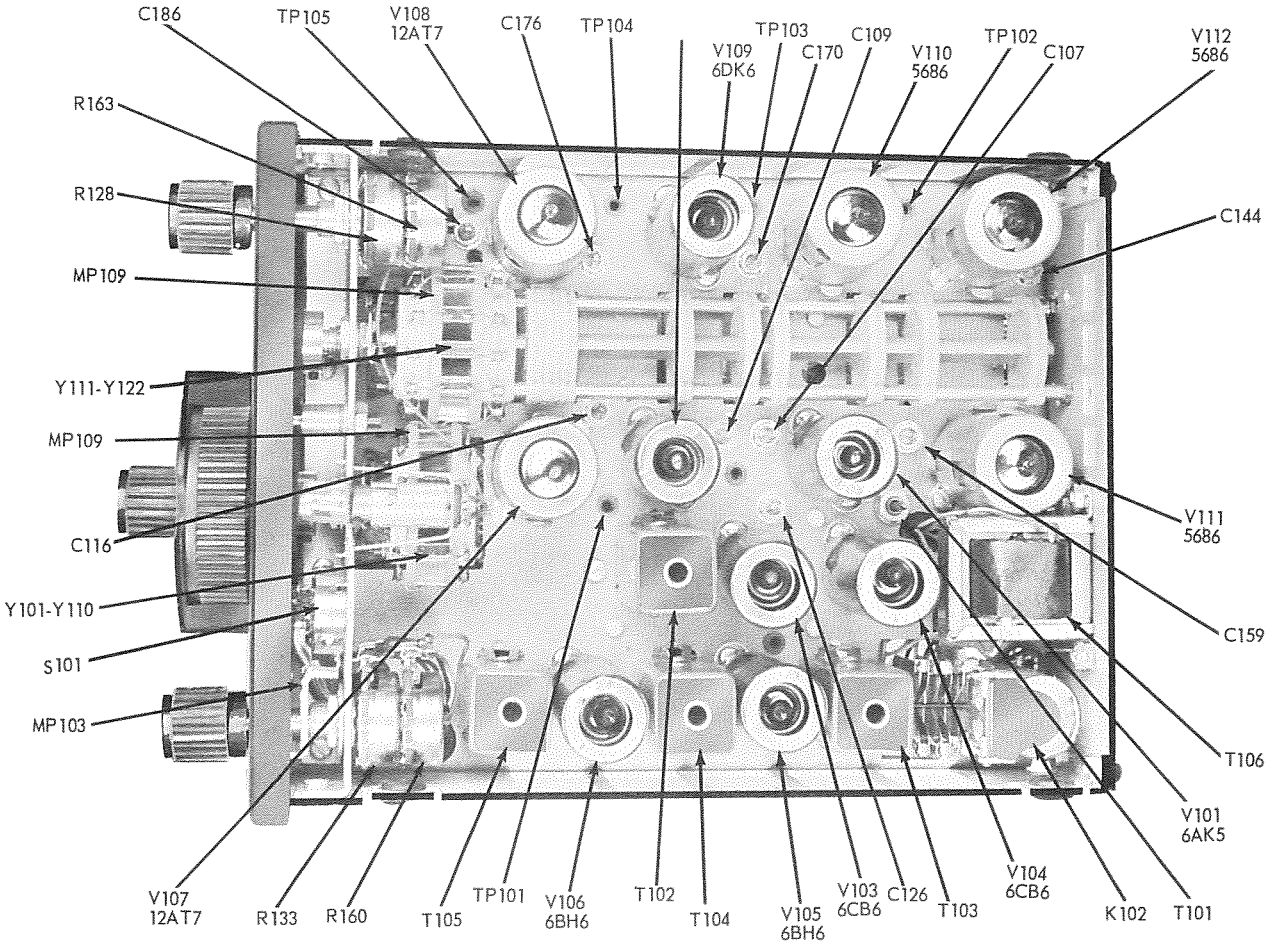



**Figure 6–1. KY–90 Transceiver Top View, Cover Removed**

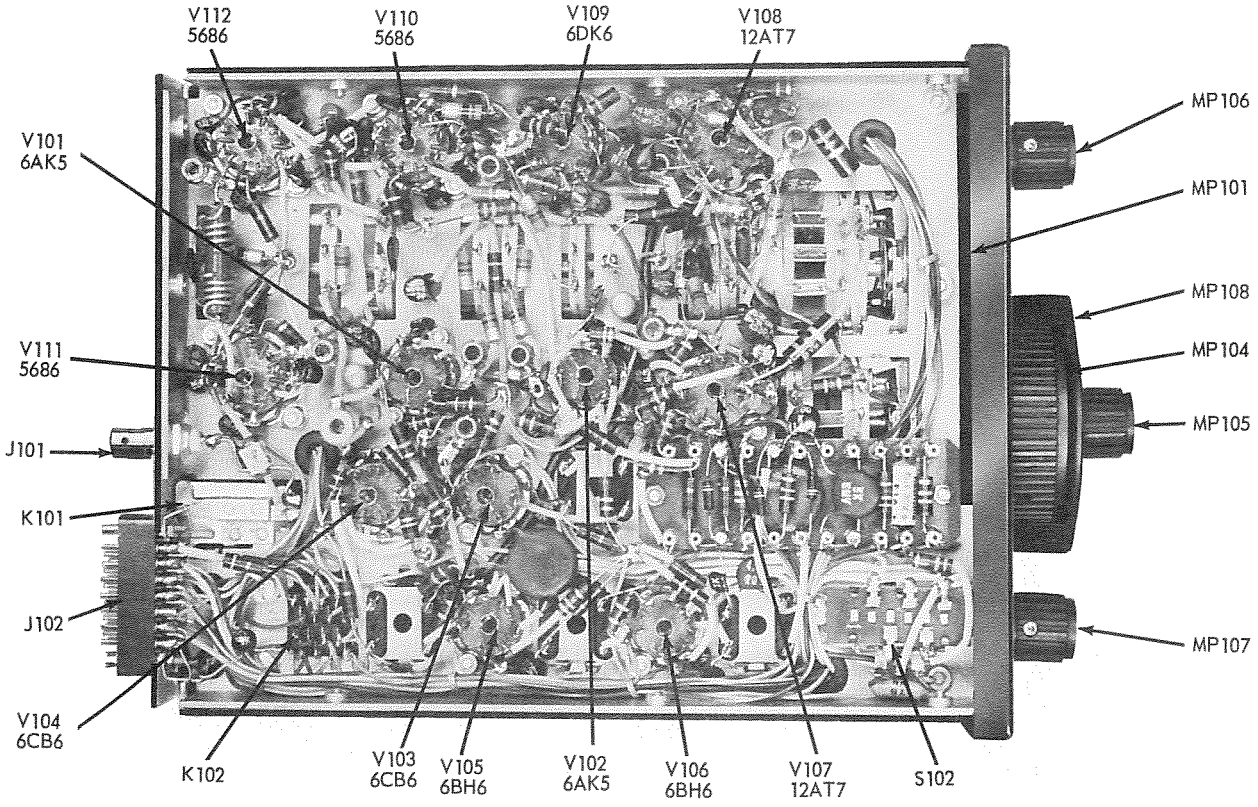



**Figure 6–2. KY–90 Transceiver Bottom View, Cover Removed**

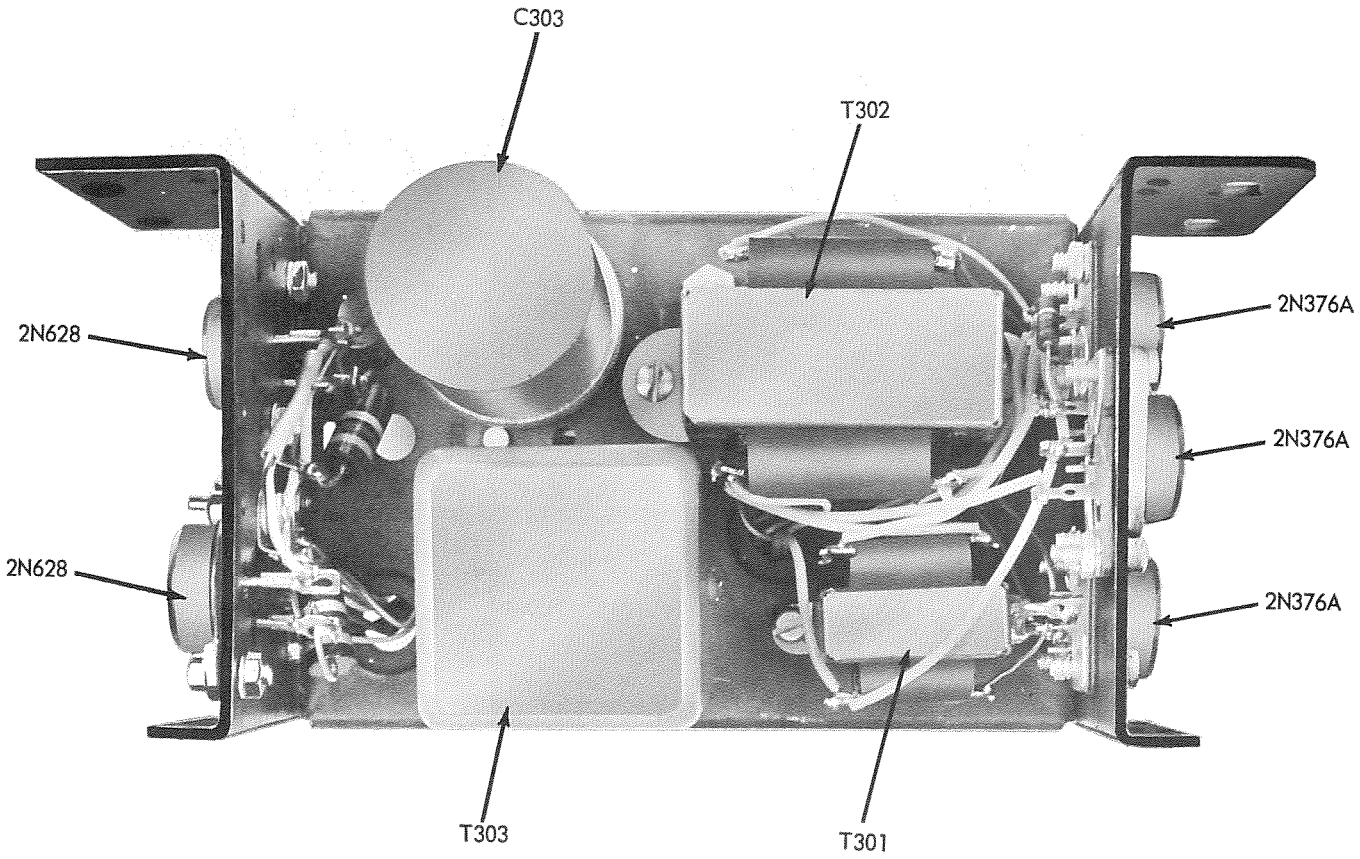



**Figure 6–3. KS–501 Power Supply Modulator Top View, Cover Removed**

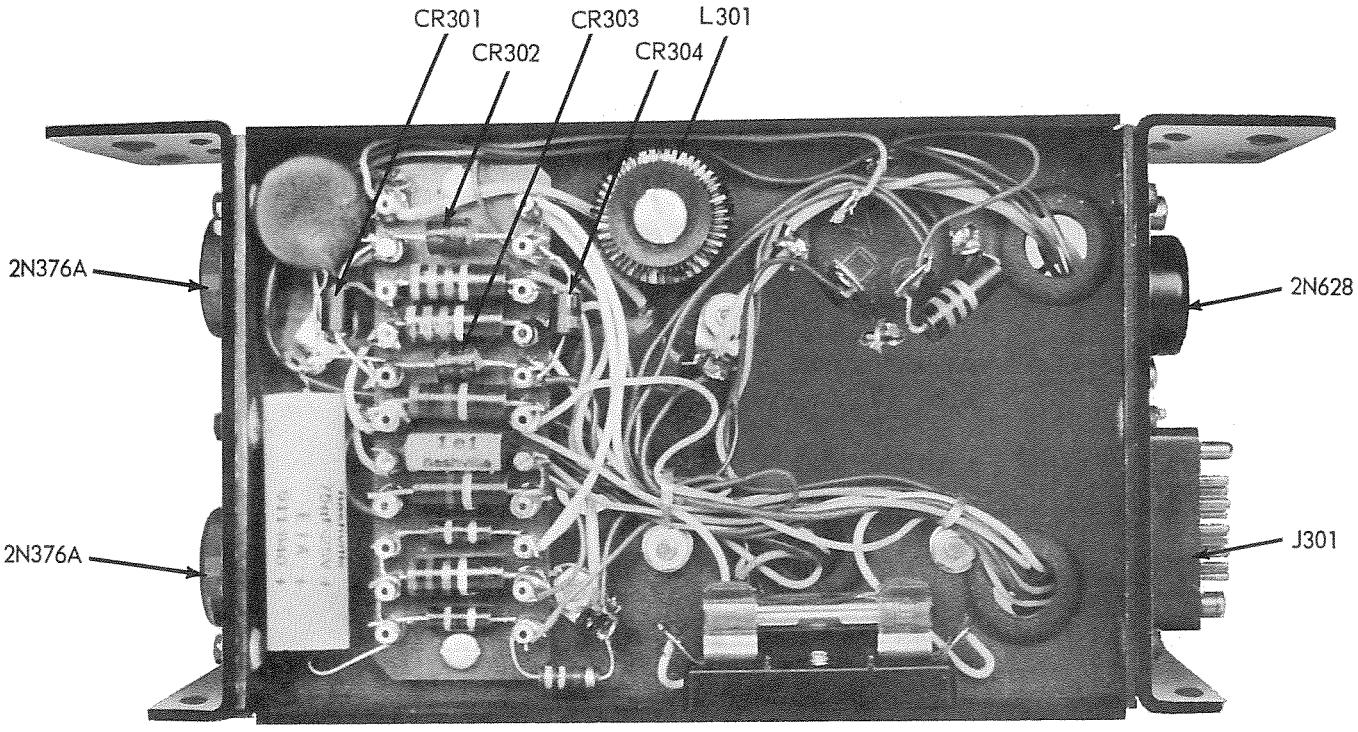



**Figure 6–4. KS–501 Power Supply Modulator Bottom View, Cover Removed**

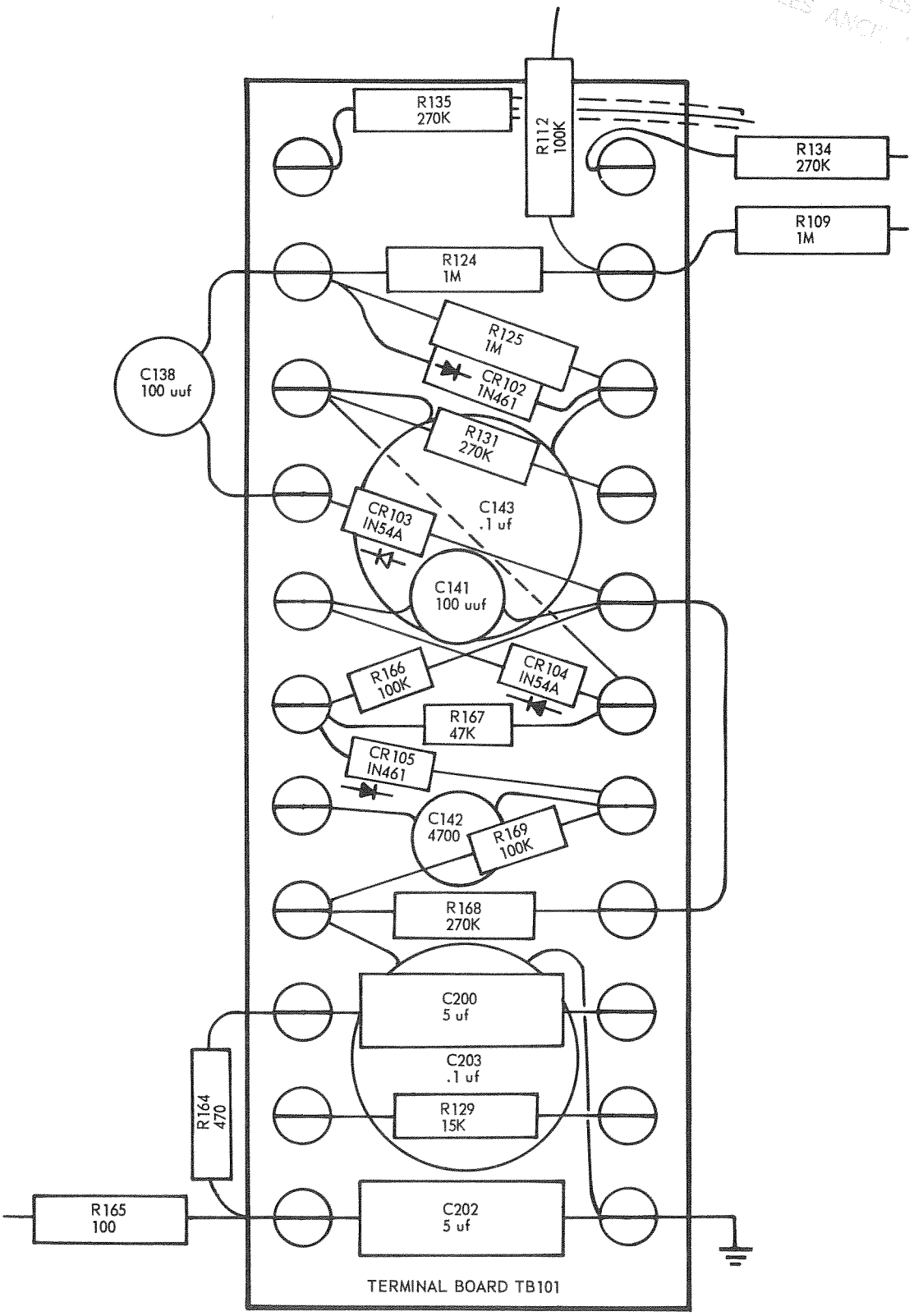
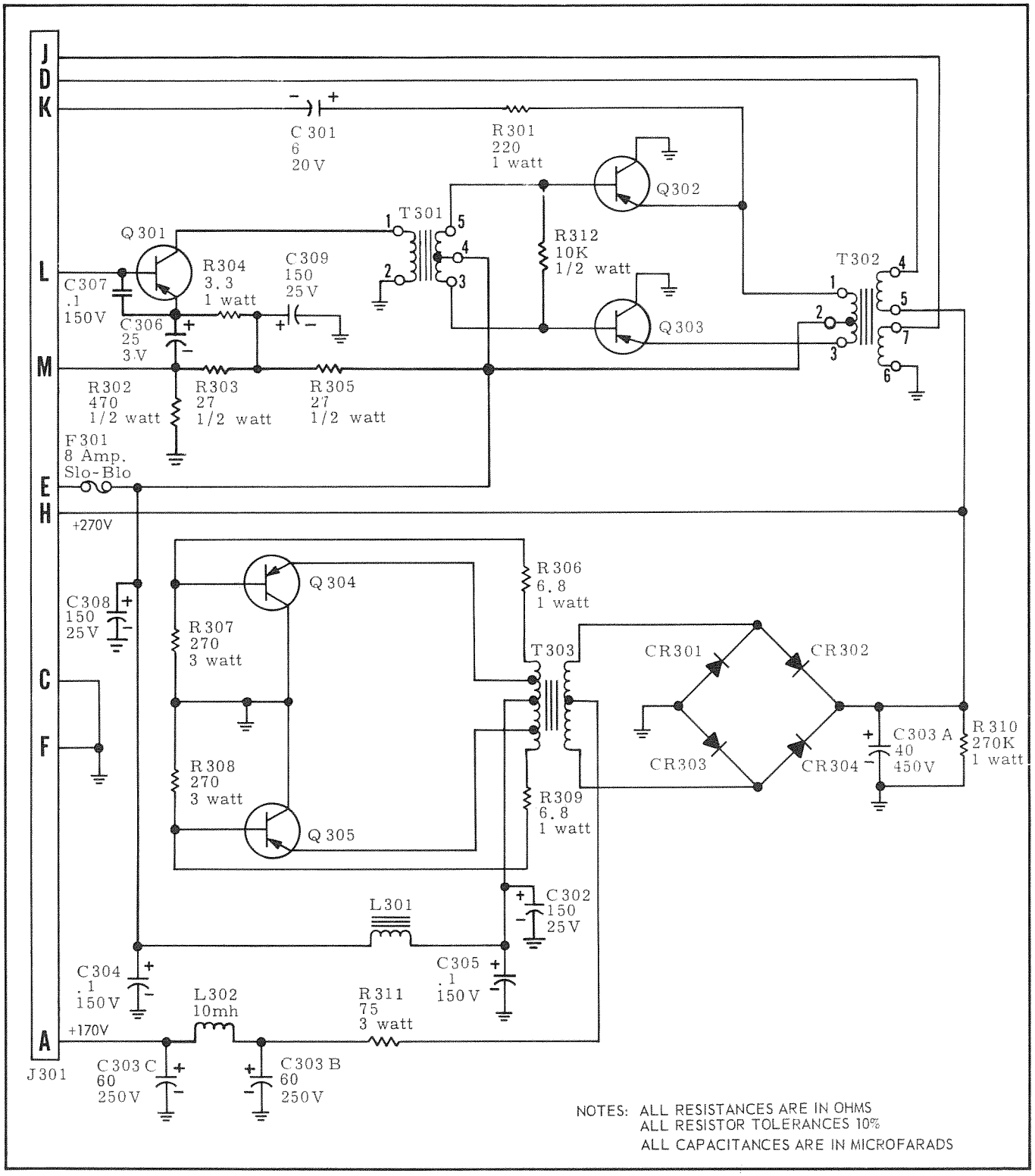



**Figure 6–5. Terminal Board Components**

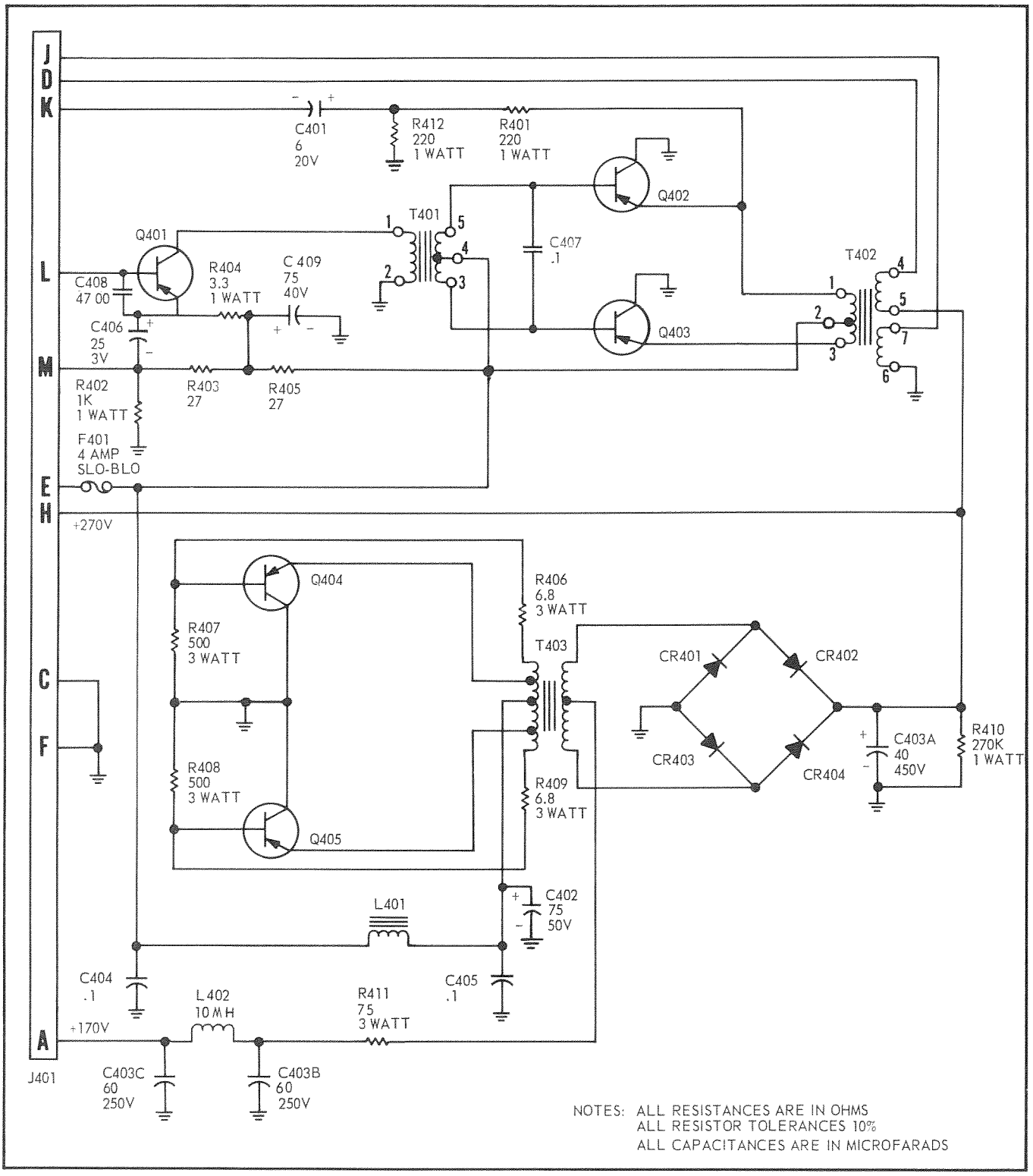
SECTION VI

# SCHEMATIC DIAGRAMS




KS-501

**Figure 7-1. Power Supply Modulator Schematic Diagram**




KS-502

**Figure 7-1. Power Supply Modulator Schematic Diagram**

## CRYSTAL CHART

| CRYSTAL NO. | CRYSTAL FREQ. | CHANNEL FREQ |
|---|---|---|
| Y114 | 87.5375 MC | 118MC |
| Y115 | 88.5375 MC | 119 |
| Y116 | 89.5375 MC | 120 |
| Y117 | 90.5375 MC | 121 |
| Y118 | 91.5375 MC | 122 |
| Y119 | 92.5375 MC | 123 |
| Y120 | 93.5375 MC | 124 |
| Y121 | 94.5375 MC | 125 |
| Y122 | 95.5375 MC | 126 |

RECEIVER

**A**

| CRYSTAL NO. | CRYSTAL FREQ. | CHANNEL FREQ |
|---|---|---|
| Y101 | 33.4625 MC | .0MC |
| Y102 | 33.5625 MC | .1 |
| Y103 | 33.6625 MC | .2 |
| Y104 | 33.7625 MC | .3 |
| Y105 | 33.8625 MC | .4 |
| Y106 | 33.9625 MC | .5 |
| Y107 | 34.0625 MC | .6 |
| Y108 | 34.1625 MC | .7 |
| Y109 | 34.2625 MC | .8 |
| Y110 | 34.3625 MC | .9 |

DECIMAL

**B**

| CRYSTAL NO. | CRYSTAL FREQ. | CHANNEL FREQ |
|---|---|---|
| Y111 | 84.5375MC | 118MC |
| Y112 | 85.5375MC | 119 |
| Y113 | 86.5375MC | 120 |
| Y114 | 87.5375MC | 121 |
| Y115 | 88.5375MC | 122 |
| Y116 | 89.5375MC | 123 |
| Y117 | 90.5375 MC | 124 |
| Y118 | 91.5375 MC | 125 |
| Y119 | 92.5375 MC | 126 |

TRANSMITTER

**C**

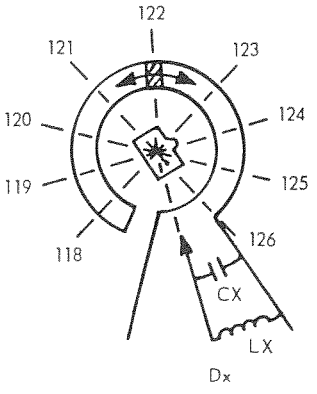
| PIN | RESISTANCE |
|---|---|
| A | 40K |
| B | ∞ |
| C | 0 |
| D | ∞ |
| E | .2 |
| F | 1.2 |
| H | ∞ |
| J | ∞ |
| K | 1K |
| L | ∞ |

| PIN | RESISTANCE |
|---|---|
| M | ∞ |
| N | 50K |
| P | 12 |
| R | ∞ |
| S | 1K |
| T | 570 |
| U | 3 K |
| V | .2 |
| W | 0 |
| X | 2.8K |

RESISTANCE MEASUREMENTS
FROM PINS OF J102 TO GROUND

| | LX | CX |
|---|---|---|
| L 101 | L134 .15 | None |
| L 102 | L135 .15 | None |
| L 103 | L136 .15 | None |
| L 107 | L137 .15 | C207 10 uuf |
| L 122 | 1 Turn Loop | None |
| L 119 | 1 Turn Loop | None |
| L 118 | 1 Turn Loop | None |
| L 113 | 1 Turn Loop | None |
| L 110 | 1 Turn Loop | None |

TUNING SWITCH DX CHART
(See Below)




TUNING SWITCH