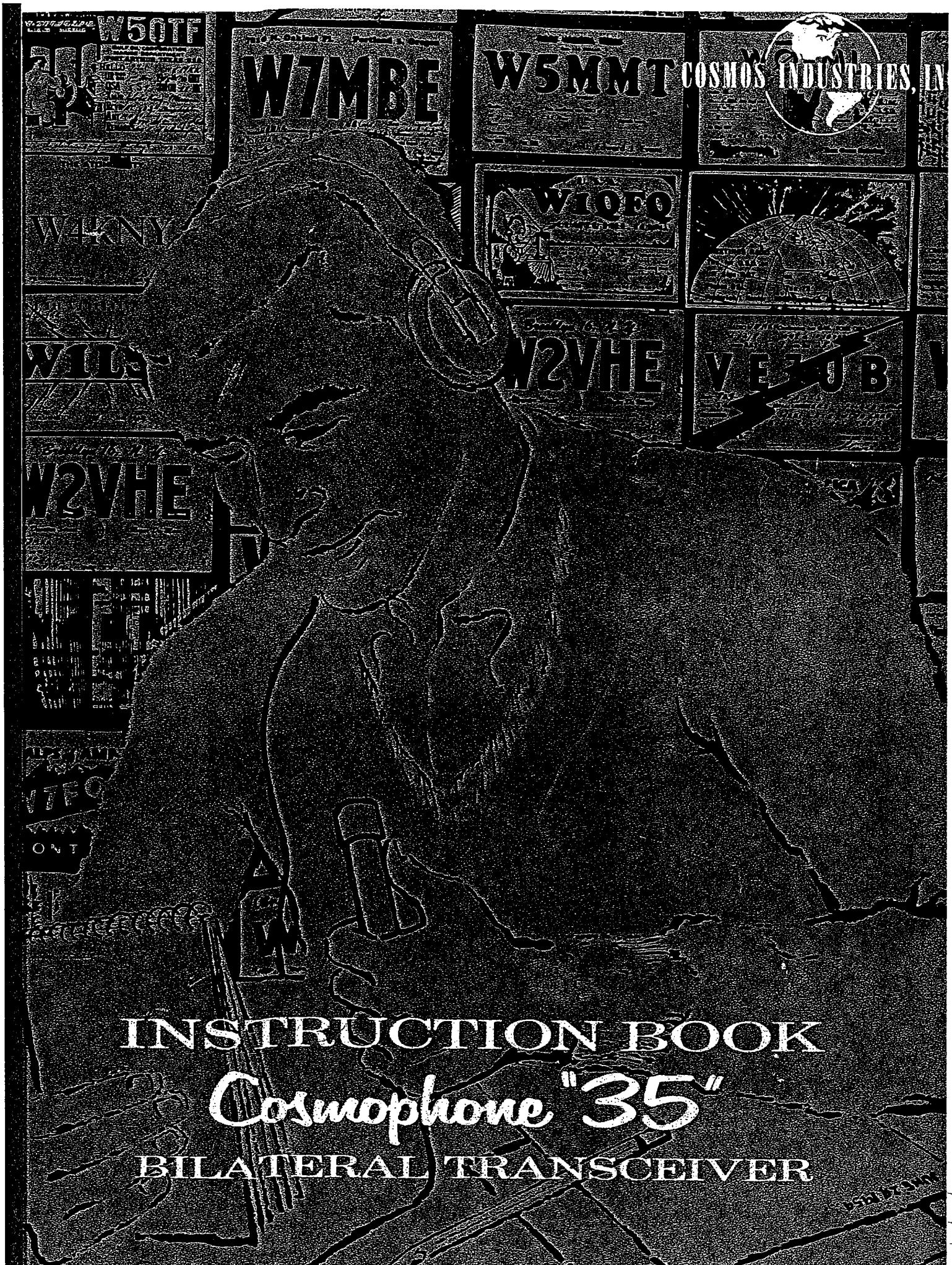

INSTRUCTION BOOK

Cosmophone "35"

BILATERAL TRANSCEIVER

INSTRUCTION BOOK

Cosmophone "35"

BILATERAL TRANSCEIVER

COSMOS INDUSTRIES, INC.

31-28 QUEENS BLVD. • LONG ISLAND CITY 1, N. Y.

TABLE OF CONTENTS:

SECTION I – DESCRIPTION

SECTION II – THEORY OF OPERATION

SECTION III – OPERATION

SECTION IV – MAINTENANCE

SECTION V – ACCESSORIES

SECTION VI – PARTS LIST, COSMOPHONE "35" ..... P. 21

SECTION VII – PARTS LIST, POWER SUPPLY PS-35 ..... P. 25

LIST OF ILLUSTRATIONS:

LIST OF TABLES:

SECTION I
DESCRIPTION

1.1 GENERAL

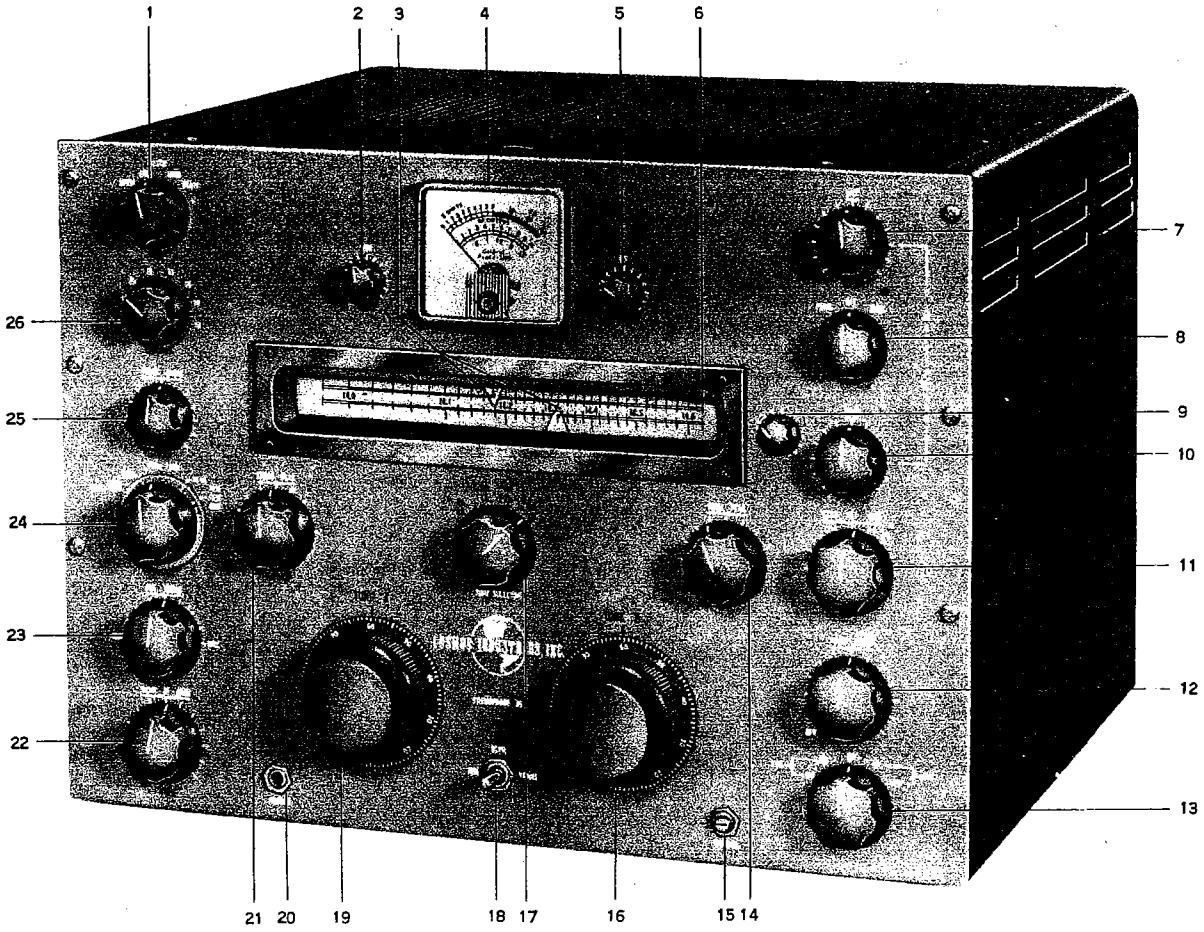

FIGURE 1. COSMOPHONE "35" – OPERATING CONTROLS

The Cosmophone "35" (*figure 1*) is a 35 stage bilateral receiver-transmitter, capable of transmitting or receiving SSB (single sideband), CW, and AM signals on the 10,11,15,20,40 and 80 meter bands. Dual tuning controls, TUNE A and TUNE B, (19 and 16), provide the convenience of transceiver operation plus the flexibility of being able to receive and transmit on separate frequencies. Furthermore, the transmit and receive frequencies can be instantaneously interchanged by rotating a TUNE SELECTOR control (17). Bands are selected by a bandswitch (26) on the front panel. For each position of the bandswitch, a drum type frequency indicating dial (6) is rotated so that it will present the proper scales. Two identically calibrated scales are presented for each band. Each scale has its own frequency indicating pointer (3) that is moved by a corresponding tuning control. The related scale, scale pointer, and tuning control are readily identified by means of matched colored markings. The positions of the TUNE SELECTOR control are also coordinated with the same set of matching colors. Movement of the dial drum, in the horizontal plane, for purposes of calibration, is accomplished by means of a dial calibration knob (9). The type of emission is selected by an emission switch (13). Either upper (UP) or lower (LOW) sideband can be selected in the SSB or AM positions of the emission switch. AM transmission is SSB with carrier inserted. The carrier level is regulated by a front panel CARRIER control (15).

The unit is highly selective, employing a narrowband mechanical filter as well as a peak-null Q-multiplier circuit that has manually operated amplitude (AMP) and frequency (FREQ) controls (7 and 10). The PEAK, NULL, or OFF positions of the multiplier are selected by a switch (8). AVC as well as manual gain has been applied to the RF and IF receiver amplifier stages. A RCVR RF GAIN control (22) is located on the front panel. A single meter (4) presents rf-volts, grid and plate currents, as well as S-meter indications. A METER SWITCH (1), selects the desired meter function.

Vox and antitrip circuitry provide as smooth an

operation as is possible. The vox and antitrip levels are regulated by VOX and QT front panel controls (2 and 5). Switching from receive to transmit or vox operation is readily achieved by means of a three-position toggle switch (18).

Other front panel controls include receive and transmit audio (12 and 25), receive and transmit peaking (14 and 21), receiver antenna trimming (11), transmitter antenna tuning (23), and a FINAL TANK control (24). A phone jack (10), designated PHONES, is located at a convenient place on the panel.

1.2 EXTERNAL CONNECTIONS

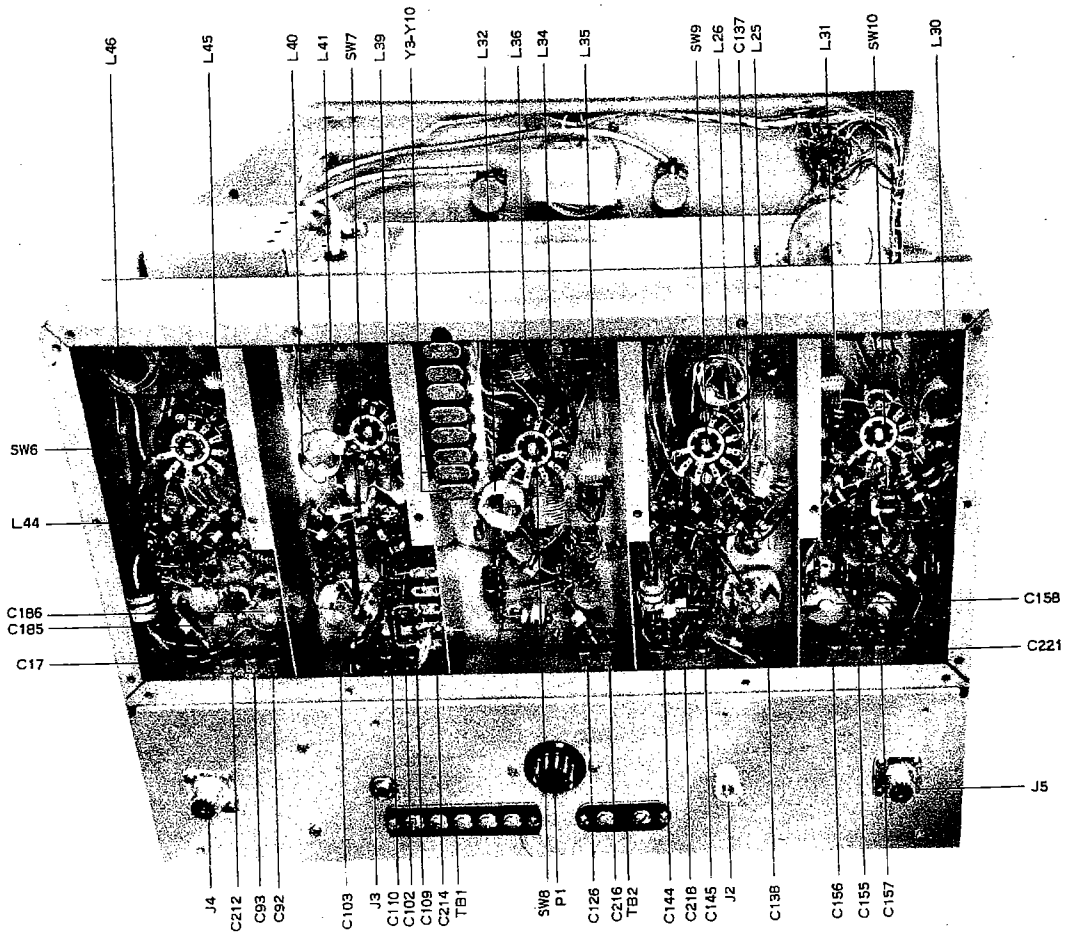

FIGURE 2. COSMOPHONE "35" – REAR VIEW

All external connections except phones, are made at the rear of the unit *(refer to figure 2)*. A cover over the rear apron has been marked so that the connections are easily identified. Receiving and transmitting antennas are to be connected to the two connectors (J-4 and J-5) labeled RECEIVE ANTENNA and TRANSMIT ANTENNA. A key jack (J-3), designated KEY, and a connector (J-2), designated MICROPHONE, are the connection points for a key and microphone. Power is brought into the unit through a power plug receptacle (P-1). A terminal board, TB-1, having five terminals, serves as the point for speaker attachment. Another terminal board, TB-2, having two terminals, has been provided for the attachment of an antenna relay. The correct method of attaching an antenna relay to the terminal board is shown schematically in *figure 3*.

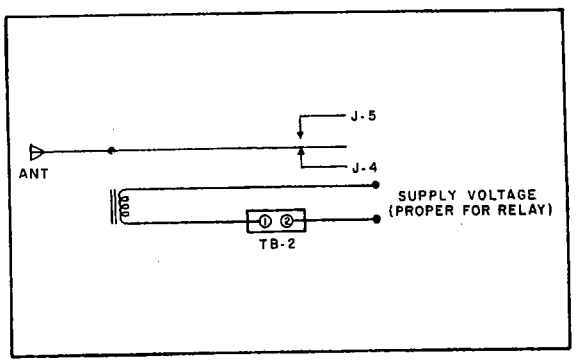

FIGURE 3. CONNECTING ANTENNA RELAY

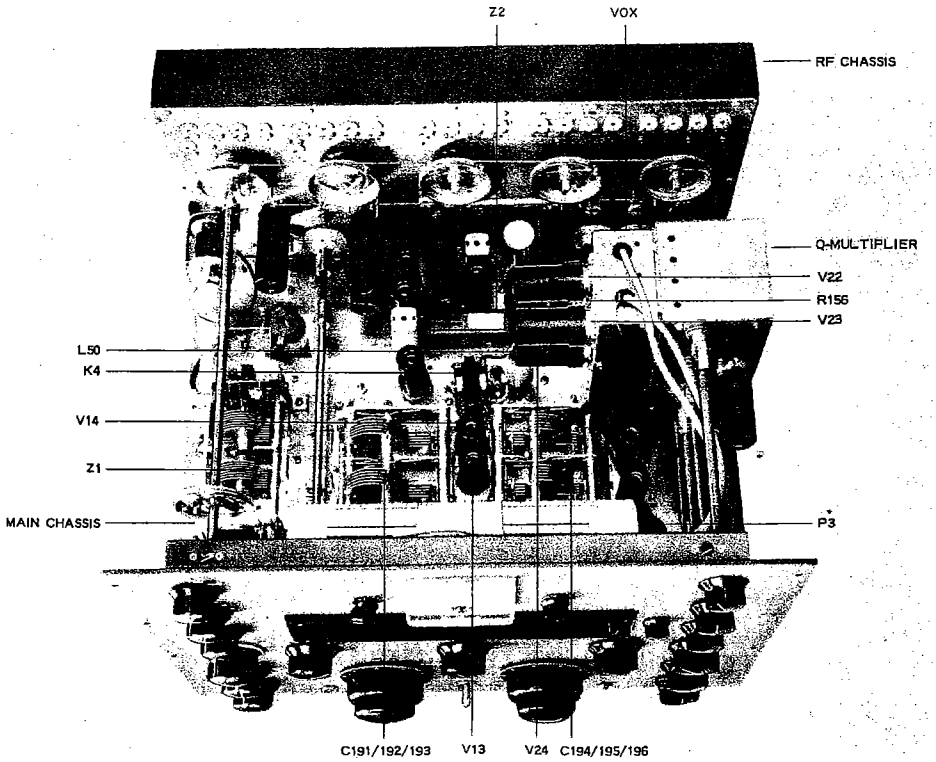

FIGURE 4. COSMOPHONE "35" – TOP VIEW

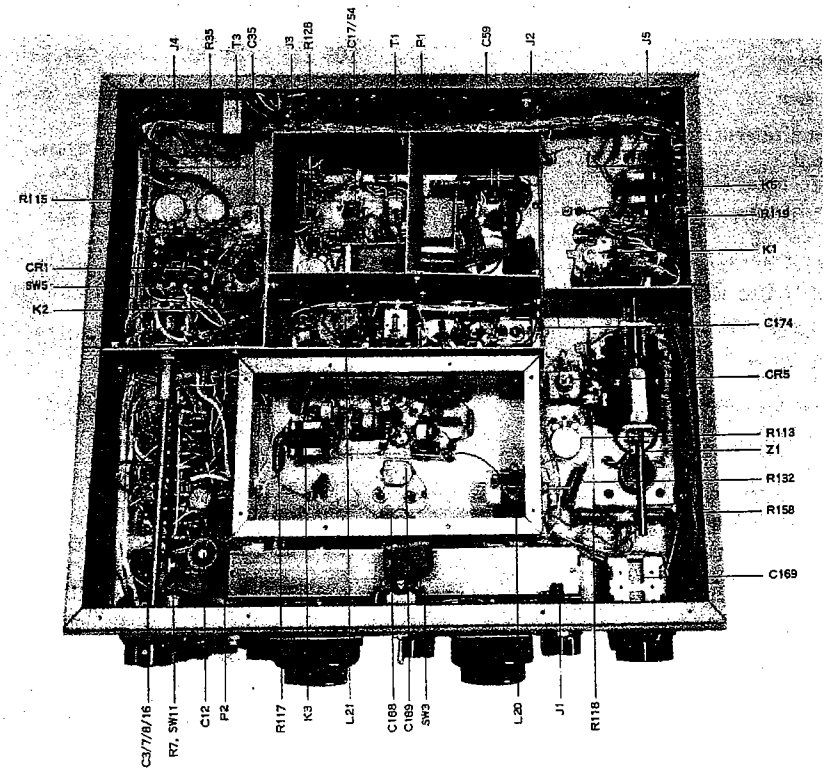

FIGURE 5. COSMOPHONE "35" – BOTTOM VIEW

1.3 INTERNAL ARRANGEMENT

When viewed from the top, with the VFO cover and variable IF shield removed *(figure 4)*, it will be seen that the unit is made up of a main chassis and three subchassis. The RF-chassis is at the rear of, and extends upward from the main chassis. This strip has the receive and transmit RF circuitry mounted upon it as well as five bandswitch pulleys. Another, much smaller chassis, extends upward from the right side of the main chassis near the center. This is the Q-multiplier chassis. It has the components of the Q-multiplier circuitry mounted on it. The third subchassis, the vox subchassis, is mounted on the Q-multiplier chassis. It serves to mount the components of the vox and antitrip circuits. A cord, extends from the bottom of the vox chassis and plugs into a receptacle on the main chassis. By unplugging the cord and removing the hardware that attaches the vox chassis to the Q-multiplier chassis, the vox chassis can readily be removed from the unit. The portions of a variable frequency oscillator that are located on the top of the main chassis are covered by two shields (*not shown on figure 4*). When the shields are removed, the variable condensers associated with the TUNE A and TUNE B controls are visible. The components mounted on top of the chassis are identified by their reference symbols that are silkscreened on the chassis. Some of the major components are further identified in *figure 4*. *Figure 5* is a bottom view of the unit. Some of the major components seen from this aspect are also identified on this figure.

1.4 PERFORMANCE AND CHARACTERISTICS

Table I lists, in tabular form, the pertinent information relative to the performance and characteristics of the Cosmophone "35".

TABLE I
PERFORMANCE AND CHARACTERISTICS

Item	Description	
Frequency Range	Band (meters)	Range (MC)
	10	28.0 – 28.6
	10	28.5 – 29.1
	10	29.1 – 29.7
	11	26.9 – 27.5
	15	21.0 – 21.6
	20	14.0 – 14.6
	40	6.9 – 7.5
	80	3.5 – 4.1
Emission	SSB, CW, AM	
Line Input	105-120 volts AC, 50-60 cps, 330 watts	
Power Output	35 watts	
Power Requirements		
Filament	6.3 volts AC or DC at 13 amps.	
Low Voltage, Plate	300 volts DC	160 ma
Low Voltage, Plate (regulated)	210 volts DC	45 ma
High Voltage, Plate	600 volts DC	100 ma
Bias (regulated)	–150 volts DC	25 ma
Number of Tubes Used	24	
Impedances		
RF		
Receiver Input	nominally 35 to 100 ohms	
Transmitter Output	nominally 35 to 100 ohms	
AF		
Microphone Input	high impedance	
Speaker Output	3.2 ohms	
Frequency Stability, overall	500 cps	
Selectivity	3.1 KC/6 DB, 6.6 KC/60 DB	
Receiver Sensitivity	1 microvolt at 6 DB S/N ratio	
Dial Accuracy	±1 KC after calibration	
Tuning Knob Ratios	20:1 and 100:1	
Size	17" wide x 12" high x 15" deep	
Weight	Cosmophone "35" – 57¾ pounds, 66 pounds (pkgd.)	
	Power Supply "PS-35" – 35½ pounds, 41 pounds (pkgd.)	

SECTION II
THEORY OF OPERATION

2.1 TRANSMITTER BLOCK DIAGRAM

The transmitter *(refer to block diagram, figure 6)* takes audio signals from the microphone through speech amplifier and cathode follower stages to a balanced modulator where they are mixed with the injection from a 455 KC oscillator to produce a fixed IF signal. The oscillator output is brought to the balanced modulator through a phase inverter. From the balanced modulator the fixed IF signal is passed through a grounded grid stage to a mechanical filter where one sideband is removed. The now, SSB IF signal, is amplified and then mixed with the injection from a variable frequency oscillator (VFO) in an intermediate mixer to produce a variable IF. The VFO output is brought to the intermediate mixer through a cathode follower stage. The SSB variable IF signal is then brought to a set of balanced mixers where it is heterodyned with the output of a high frequency oscillator to produce the desired RF signal. The RF signal is passed to the antenna through a driver, an output amplifier, and a final tank.

A portion of the AF signal is passed from the output of the speech amplifier to a VOX amplifier, a VOX rectifier, and then to a relay amplifier.

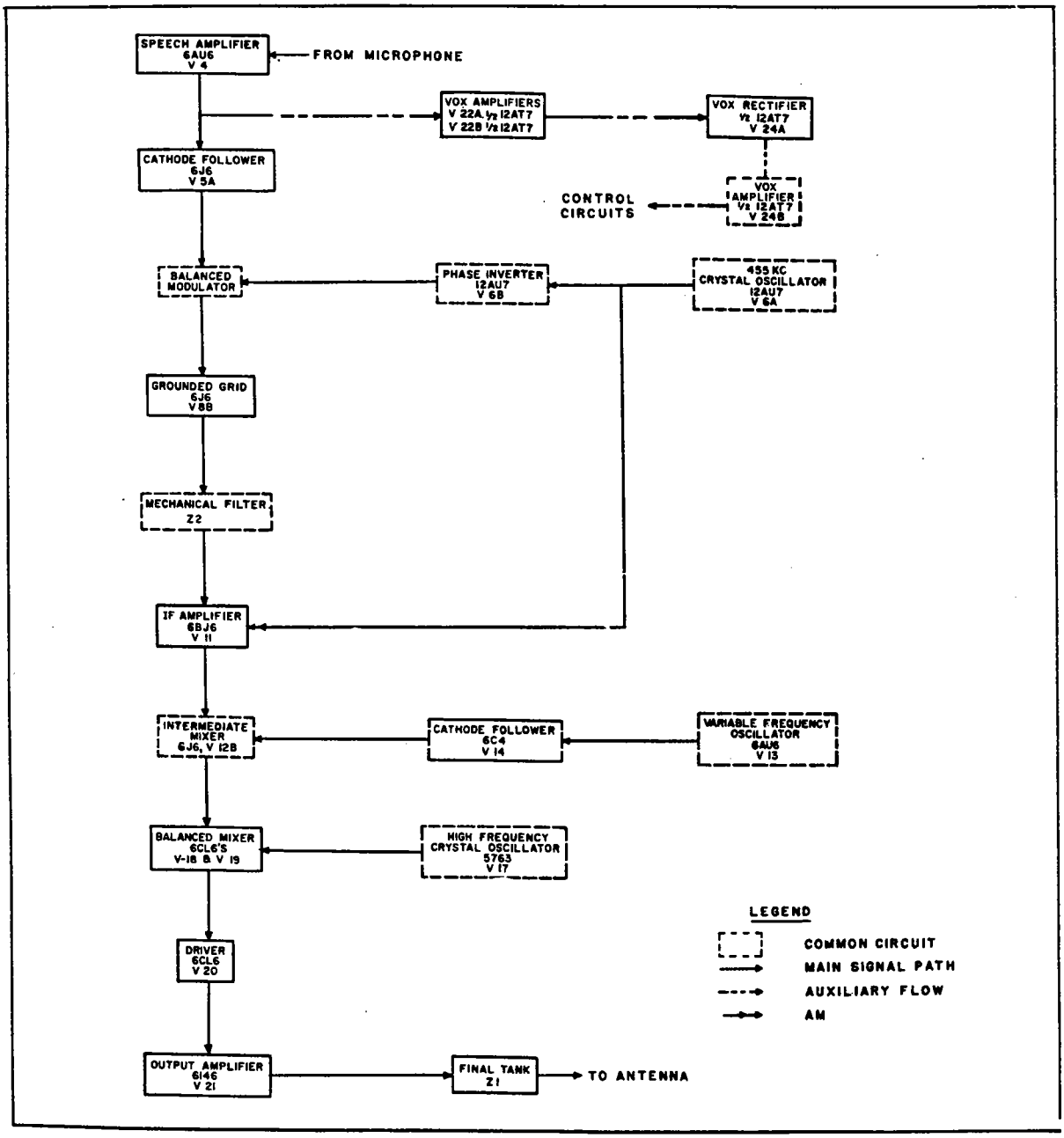

FIGURE 6. TRANSMITTER BLOCK DIAGRAM

2.2 RECEIVER BLOCK DIAGRAM

The receiver *(refer to block diagram, figure 7)* receives RF signals from the antenna, amplifies them in an RF amplifier, and then passes them to a pentagrid mixer where they are mixed with the injection from a high frequency crystal oscillator (the same high frequency crystal oscillator as used in the transmit circuitry) to produce a variable IF signal. The variable IF signal is passed to an intermediate mixer (the same intermediate mixer as used in the transmit circuitry) where it is mixed with the injection from a variable frequency oscillator (the same VFO as used in the transmit circuitry) to produce the fixed IF. The VFO output is brought to the intermediate mixer through a cathode follower stage (the same cathode follower as used in the transmit circuitry). The fixed IF is then passed through an amplifier stage to a mechanical filter (the same mechanical filter as used in the transmit circuitry). From the filter the signal is amplified again before being passed through a cathode follower to a balanced detector (the same circuit that acted as a balanced modulator in the transmit circuitry). In the balanced detector it is mixed with the injection from a 455 KC oscillator (the same 455 KC oscillator as used in the transmit circuitry) to produce an AF signal. The 455 KC oscillator output is brought to the balanced detector through a phase inverter (the same phase inverter as used in the transmit circuitry). The AF signal is then passed to the speaker through three stages of audio amplification.

A Q-multiplier connection is made at the second IF amplifier.

A portion of the IF signal is amplified by a grounded grid stage and then rectified to produce AVC voltage.

As it leaves the first audio amplifier, a portion of the AF signal is passed to an antitrip amplifier, to an antitrip rectifier, and thence to a relay amplifier (the same relay amplifier as used in the transmit circuitry).

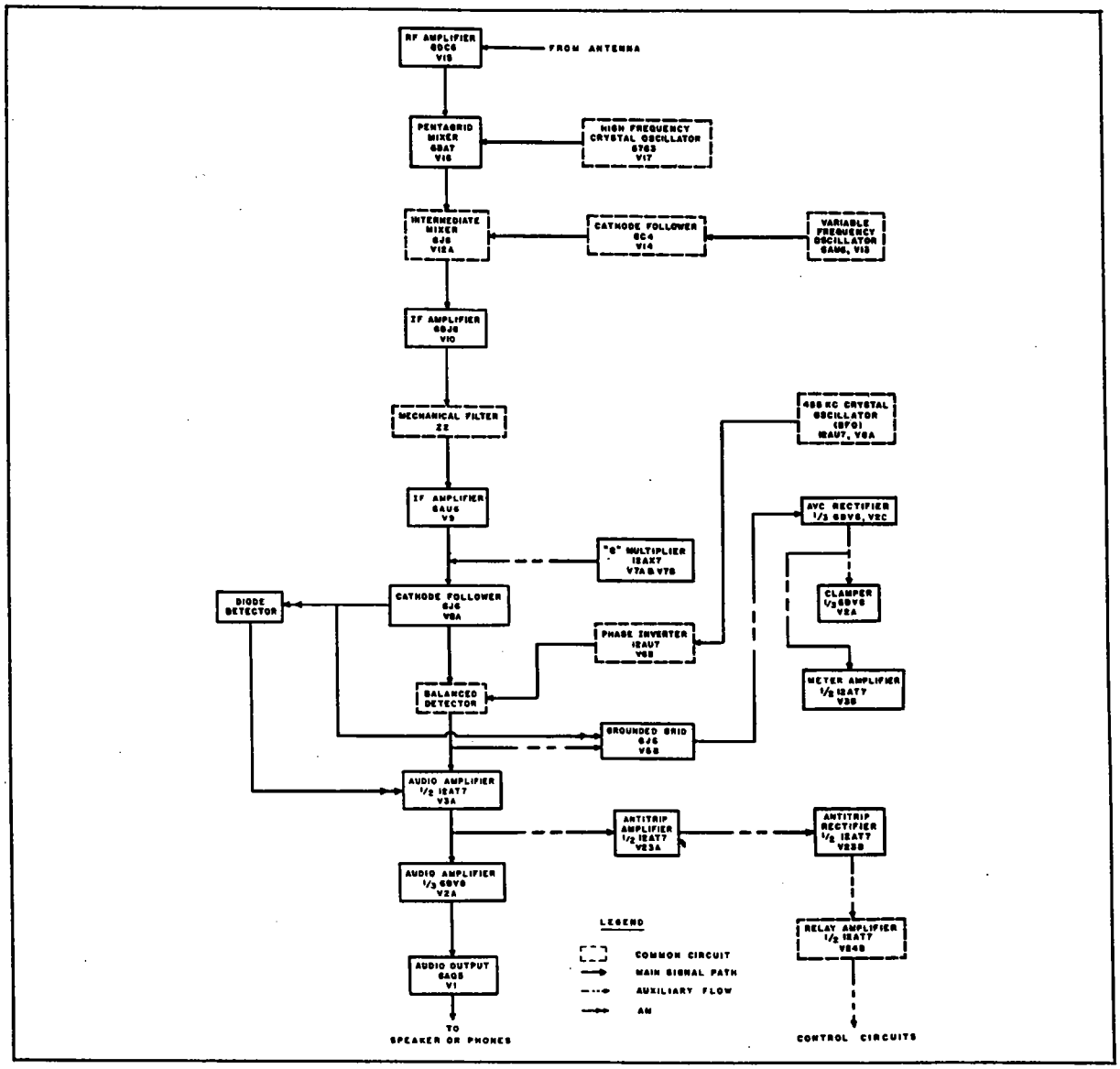

FIGURE 7. RECEIVER BLOCK DIAGRAM

2.3 TRANSMITTER CIRCUITRY *(refer to block and schematic diagrams, figures 6 and 14)*

2.3.1 AF AND SIDEBAND GENERATION

Input audio signals from a microphone are brought into the unit through a jack (J-2) at the rear of the unit. These signals are impressed upon the control grid (pin 1) of a 6AU6 pentode speech amplifier (V4). The amplified audio signal leaves the plate (pin 5) where a portion of it is carried to the antitrip circuitry (refer to paragraph 2.5 for a discussion of the antitrip circuitry). The main signal path is through a variable resistor (R18) to the grid (pin 5) of a 6J6 cathode follower stage (V5A). Variable resistor, R18, is manually operated from the front panel where it is designated TRANS AUDIO. Cathode follower output is taken from the cathode (pin 7) and brought through a switching arrangement to a dual diode balanced modulator CR1, a 1N35. In the balanced modulator the audio signal is mixed with a signal emanating from a 455 KC Pierce crystal oscillator, one half of a 12AU7 (V6A), that has two crystals (Y1 and Y2) in its grid circuit. Mixing is of such a nature that upper and lower sidebands are produced while the carrier is suppressed. The oscillator signal is fed to the balanced modulator through a phase inverter, the other half of the 12AU7 (V6B).

2.3.2 IF

The output from the balanced modulator, now fixed IF, returns through the switching arrangement and is passed on to the cathode (pin 7) of a grounded grid stage, one half of a 6J6 (V8B). The signal is then passed from the plate (pin 2) of the grounded grid stage to the mechanical filter (Z2). The mechanical filter has a bandpass of approximately 3 KC. Which sideband the filter will pass and which will be rejected, depends upon which crystal was selected in the 455 KC oscillator (V6A). Selection of the lower frequency crystal places the center frequency of the double sideband (generated in the balanced modulator) on the lower slope of the mechanical filter, permitting the upper sideband to pass through the filter, while the lower sideband is rejected by the filter. If the upper frequency crystal is selected, the center frequency of the double sideband is placed on the upper slope of the mechanical filter permitting the lower sideband to pass while the upper sideband is rejected by the filter. The, now, SSB signal, that is passed by the filter, is passed on to the grid (Meg) of a 6BJ6 IF amplifier (V11) where the signal is amplified to make up the losses incurred in passing through the filter and to provide sufficient signal strength for the next stage. The signal is brought from the plate (pin 5) of the IF amplifier through a coupling transformer (T2) to the grid (pin 5) of an intermediate mixer, a 6J6 (V12B). In the intermediate mixer the fixed IF signal is translated to a variable IF signal whose range is varied by the variable frequency oscillator (VFO). The VFO, a 6AU6 (V13), is an electron coupled Colpitts oscillator whose frequency of oscillation is determined by the tuned grid circuit composed of L20, C185, C186, C187 and either C188 and C193 or C196 and C189. Relay K3 selects either C196 or C193. When channel "A" is being used relay K3 selects C188 and C193 and when channel "B" is being used it selects C196 and C189. The output of the VFO is taken from the plate (pin 5) and coupled through capacitor C180 to the grid (pin 6) of a 6C4 (V14) cathode follower. From the cathode (pin 7) of the cathode follower the signal is injected into the cathode (pin 7) of the intermediate mixer, a 6J6 (V12). The plate circuit of the intermediate mixer is made up of two tuned circuits coupled together by a small capacitor (C173). The first circuit consists of L2, C174, and C175 plus either C191 or C194. Relay K2 selects which of the capacitors (C191 or C194) is used. The choice of capacitors is dependent upon whether the operation is on channel "A" or "B". The second tuned circuit is composed of L3, C137 and either C192 or C195. The choice of capacitors is dependent upon the action of relay K4 and the action of relay K4 is determined by selecting either channel "A" or "B". VFO capacitor C193 and intermediate mixer plate tuning capacitors C191 and C192 are ganged together to form channel "A". VFO capacitor C196 and intermediate mixer plate tuning capacitors C194 and C195 are ganged together to form channel "B". From the second of these tuned circuits, the variable IF signal is connected, by relay K1h, to the grid circuit of one of the 6CL6s (V19) in the balanced mixer.

2.3.3 RF

The signal is translated to its final operating frequency in the balanced mixers (V18 and V19) that serve as a second transmitter mixer. The signal is beat together with the injection from a high frequency crystal oscillator, a 5763 (V17). The oscillator is equipped with eight crystals, (Y3 through Y10), in its control grid circuit (pins 8 and 9). Three crystals cover the 10 meter band and the remaining five crystals are used, one each, for each of the other bands. Its plate circuit has more than one possible tank that can be selected. The oscillator output is applied to the cathode (pin 1) of the balanced mixers and beat together with the RF signal. A plate tank circuit in the mixer selects the difference frequency between the oscillator output and the RF signal. Five of these plate tank circuits have been incorporated to cover the band range of the unit. The bandswitch automatically selects the proper plate tanks for both the oscillator and mixer as well as the proper oscillator crystal. The crystal oscillator voltage is injected into the balanced mixers in such a way that it is supplied in phase to both mixers. The oscillator signal is thereby annulled in the push-pull plate tank of the mixers. A variable condenser, C138, is used to peak the mixers and is the manually operated control designated TRANS PEAK on the front panel. The signal is passed from the balanced mixers to the grid (pin 2 and 9) of a 6CL6 (V20) driver. The driver is a single-tuned Class A amplifier whose correct plate tank circuit is also automatically selected by the bandswitch. The output from the plate (pin 6) of the driver is passed to the control grid (pin 5) of a 6146 (V21) output amplifier that operates Class AB1. The signal leaves the plate (plate cap) of the output amplifier and is passed through a final tank (Z1) to the transmit antenna jack (J5) on the rear

of the unit. The final tank is multiband and covers the complete range of the transmitter without bandswitching. The final tank is manually tunable from the front panel where it is designated FINAL TANK. A variable capacitor, C169, is an antenna tuning device and is manually tuned from the front panel where it is marked ANT TUNING.

2.3.4 AM AND CW

If AM transmission is used some carrier from the 455 KC oscillator (V6A) is fed around the grounded grid and mechanical filter stages to the IF amplifier (V11) to give a carrier-plus-one-sideband signal. The amount of carrier inserted is regulated by a variable resistor, R46, a screwdriver-operated control on the front panel that is designated CARRIER. In CW operation the carrier and the speech amplifier (V4) are biased to off.

2.3.5 TRANSMITTER DISABLING

When the unit is switched from transmit to receive, certain of the transmitter stages are biased to cutoff by the application of a high negative voltage to their grids. The circled points designated "X" on the schematic diagram *(figure 14)* are at ground potential when the unit is in the transmit position. In the receive position these points are connected to a –150 volts bus through a 47,000 ohm resistor, R90. The –150 volts serves to cut off the following transmitter stages; cathode follower V5A, grounded grid V8B, IF amplifier V11, and intermediate mixer V12B. The final amplifier stage, V21, is cut off in a similar manner. The grounding or biasing off action is accomplished through relay contacts K1c and K1b of relay K1.

2.4 RECEIVER CIRCUITRY *(refer to block and schematic diagrams, figures 7 and 14.)*

2.4.1 RF

Input RF signals are brought into the unit from the receiver antenna jack (J2) at the rear of the unit. From the antenna jack the signal is coupled to the grid (pin 1) of an RF amplifier, a 6DC6 (V15). The amplifier is bandswitched to the operating frequency by means of switching in various inductances and trimmer capacitors. The correct combination of inductance and capacitance, is as was in the transmit circuitry, selected by the bandswitch on the front panel. Two variable capacitors, C86 in the grid circuit and C103 in the plate circuit, provide peaking. They are gang-tuned and manually operated from a single front panel control designated RCVR PEAK. A variable capacitor, C85, in the grid circuit permits trimming and is manually operated from the front panel where it is designated RCVR ANT TRIM. AVC voltage is applied to the grid of this stage while its RF gain is controlled by varying the cathode voltage. A variable resistor, R138, serves as the RF gain control and is manually operated from the front panel where it is designated RCVR RF GAIN.

2.4.2 IF

The RF output signal is brought from the plate (pin 5) of the RF amplifier to the grid (pin 7) of a 6BA7 (V16) pentagrid mixer where it is heterodyned with the output of a high frequency crystal oscillator, a 5763 (V17), (refer to the transmitter RF circuitry, paragraph 2.3.3, for additional information concerning the oscillator). Crystal oscillator output leaves the plate (pin 1) of the oscillator and is brought to the injector grid (pin 2) of the mixer. In the mixer the difference frequency between the oscillator output and the signal is selected by a plate tank circuit in the mixer. This difference frequency will always fall in the 2.2-2.8 MC range. The plate tank circuit is the same as used for the plate tank of the intermediate mixer (V12) in the transmit position with trimmer capacitor C102 replacing trimmer capacitor C137. This tank is ganged with the tank of the VFO (V13). These tanks are tuned by the TUNE A and TUNE B controls on the front panel (refer to paragraph 2.3.2 in the transmit circuitry for a discussion of the dual channel operation). The pentagrid mixer has AVC voltage applied to its grid (pin 7). The output from the mixer is brought to the grid (pin 6) of the intermediate mixer, a 6J6 (V12), where it is heterodyned with the output of the VFO, a 6AU6 (V13). The VFO output is brought to the cathode (pin 7) of the intermediate mixer through a cathode follower, a 6C4 (V14). The VFO and cathode follower stages are the same as used in the transmit circuitry and are discussed in paragraph 2.3.2. After this second mixing, the resultant frequency is approximately 455 KC, fixed IF. This signal is taken from the plate (pin 1) of the intermediate mixer and passed to the control grid (pin 1) of an IF amplifier, a 6BJ6 (V10), through a coupling transformer (T2). The amplifier has AVC voltage applied to its grid while RF gain is controlled by varying the cathode voltage. The amplified signal leaves the plate (pin 5) of the amplifier and is passed through the mechanical filter (Z2) where the selectivity of the filter removes adjacent signals. From the filter the signal is passed to the grid (pin 1) of a second IF amplifier, a 6AU6 (V9), where it is amplified again to provide additional gain so as to both overcome the insertion loss through the mechanical filter and to bring the signal up to a level sufficient for demodulation. The amplifier has AVC and RF gain control applied in the same manner as the first IF amplifier. The amplified output from the plate (pin 5) is coupled to the grid (pin 6) of a cathode follower, a 6J6 (V8A), through an interstage transformer (T1). A Q-multiplier stage, *(see figure 8)*, a 12AX7 (V7A and V7B), connects to the primary of the interstage transformer. This stage provides either a broad peak or sharp null, either of which can be selected by means of the front panel control designated PEAK OFF NULL. In the PEAK position the broad peak provides higher selectivity by decreasing the band width. In the NULL position, unwanted beat or heterodyne signals are removed. A variable capacitor, C37, in the Q-multiplier circuit is the manually operated front panel control designated FREQ while a variable resistor, R49, is the manually operated front panel control designated AMP. The AMP control increases or decreases the size of the notch or peak while the FREQ control moves the notch or PEAK in the passband.

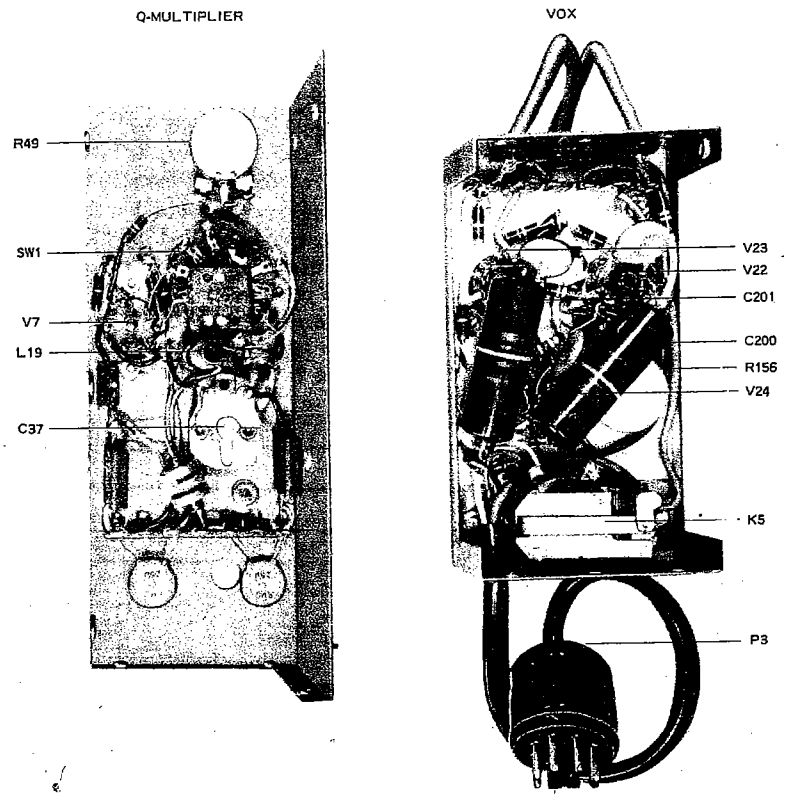

FIGURE 8. Q-MULTIPLIER AND VOX CHASSIS

2.4.3 AF

From the cathode follower the signal is taken from the cathode (pin 7) through a switching arrangement where it is switched to either a diode detector or balanced detector by means of the emission selector switch on the front panel. When the switch is set in the AM position the signal is passed to a 1N34A diode detector, (CR2). When the switch is in the SSB or CW position the signal is passed to the balanced detector (CR1), a 1N35. The balanced detector translates the signal to the audio range by heterodyning it with the output from a 455 KC crystal controlled bfo, 1/2 of a 12AU7 (V6A). The balanced detector, in combination with the bfo and phase inverter (V6B), was referred to as a balanced modulator in the transmit position. Selection of either upper or lower sidebands is accomplished, as was in the transmit position, by switching the crystals of the bfo. After detection, audio signals are passed to the grid (pin 2) of the first audio amplifier, 1/2 of a 12AT7 (V3A), where they are amplified and passed to the plate (pin 1). From the plate, a portion of the signal is brought to the antitrip circuitry (refer to paragraph 2.5 for an explanation of this circuitry). A variable resistor, R7, controls the amount of audio passed to the grid (pin 2) of the second audio amplifier, 1/3 of a 6BV8 (V2A). This resistor is manually operated from the front panel where it is designated RCVR AUDIO. From the plate (pin 3) of the second audio amplifier the signal is passed to the grid (pin 1 and 7) of the audio output stage, a 6AQ5 (V1). The output is taken from the plate (pin 5) and brought to both a phone jack (J1) on the front panel and a terminal board (TB1) on the rear apron of the unit. Speaker connection is made at the terminal board.

2.4.4 AVC AND RECEIVER DISABLING

A portion of all types of signals are brought to the cathode (pin 7) of a grounded grid stage, a 6J6 (V5B). The output from the grounded grid stage is taken from the plate (pin 1) to the plate (pin 6) of an AVC rectifier, 1/3 of a 6BV8 (V2B), rectified, and then taken from the plate through a portion of a switch (SW4a) and distributed through the switch as AVC. The switch is part of the meter switch on the front panel where it is designated METER. In three of the four switch positions AVC is applied. In the fourth position (RFVM) AVC is not applied. The receive circuits are disabled by biasing the AVC line and the circled points designated "R" on the schematic diagram to a high negative voltage during periods of transmission. The AVC line is biased to cutoff through relay contact K1g. Diode V2B, 1/3 of a 6BV8, serves to quickly discharge the AVC line as the unit is switched back to receive. Relay contact K1c grounds the circled points "R" during receive and connects them to the –150 volts through a 47,000 ohm resistor, R89, during transmit. The following tubes are cut off when transmitting; audio output V1, grounded grid V5B, cathode follower V8A, IF amplifier V9, IF amplifier V10, intermediate mixer V12A, RF amplifier V15, and pentagrid mixer V16.

2.5 VOX AND ANTITRIP CIRCUITRY

The VOX and antitrip circuits are shown schematically in *figure 9* and the locations of their folponents are shown in *figure 8*. These circuits operate in the following manner:

When transmitting, a portion of the speech amplifier output is brought through two stages of amplification in the VOX amplifiers, V22A and V22B, to a diode VOX rectifier, V24A, and converted to a DC signal. This DC signal is applied to the grid of a relay amplifier, V24B, causing it to conduct and thereby energize a relay coil (K5) whose contacts, when energized, cause the unit to be aligned in the transmit position. Control over the amount of VOX is regulated by a variable resistor (R139) in the input circuit to the first VOX amplifier. This resistor is manually operated from the front panel where it is designated VOX.

When receiving, a portion of the audio signal is taken from the first audio amplifier output and brought through an antitrip amplifier (V23A) to a diode antitrip rectifier (V23B) where it is converted into a DC signal that is opposite in polarity to the DC signal generated by the VOX rectifier. This signal, when present, is also applied to the grid (pin 7) of the relay amplifier (V24B). Thus, when receiving, any pickup by the microphone will be bucked and cancelled by the antitrip signal. The unit's control circuitry will therefore remain in the receive position. The antitrip level is regulated by a variable resistor (R148) in the input circuitry to the antitrip amplifier. This resistor is manually operated from the front panel where it is designated QT.

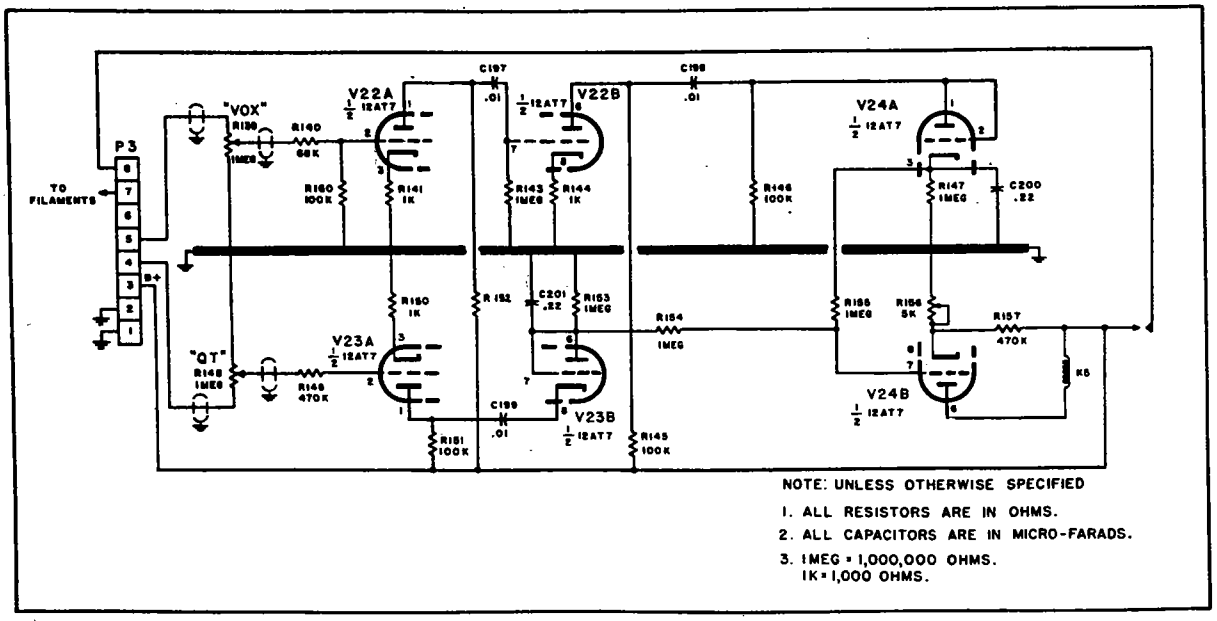

FIGURE 9. VOX AND ANTITRIP CIRCUITRY – SCHEMATIC DIAGRAM

2.6 METERING

The meter provides the facility for reading RF volts, plate and grid current, and also can be used as an S-meter. When reading RF volts a special circuit comes into play. This circuit is a logarithmic device that uses a 1N34 (CR4) to rectify the RF and a selenium rectifier (CR5) to give compression action. Using a circuit of this type makes it possible to note small amounts of carrier and still not pin the meter on voice peaks. The meter switch also has the function of removing or inserting AVC in the receive position. Table II which follows summarizes the action of the meter and meter switch in both the receive and transmit positions.

TABLE II
METER AND METER SWITCH ACTION

Operating Position	Meter Switch Position	Meter Reads	AVC Present
Receive	RFVM	No Reading	No
Receive	AVC	S-meter	Yes
Receive	GRID	No reading	Yes
Receive	PLATE	No reading	Yes
Transmit	RFVM	RF volts (V21)	–
Transmit	AVC	RF volts (V21)	–
Transmit	GRID	Grid current (V21)	–
Transmit	PLATE	Plate current (V21)	–

2.7 BANDSWITCHING, TUNING, AND DIAL CALIBRATION MECHANISMS

The bandswitching, tuning, and dial calibration mechanisms are shown in *figure 10.*

The bandswitching mechanism links five rotary switches (SW10, SW9, SW8, SW7 and SW6) on the rf subchassis with the bandswitch on the front panel and the frequency indicating dial drum. When the bandswitch is rotated it drives SW10 directly. The other rotary switches are indirectly driven by means of a pulley and string arrangement. The dial drum is driven by the bandswitch through a second pulley and string arrangement.

The dial pointers are moved by means of a string which is driven by a pulley from the VFO gear box.

The calibration knob moves the spring-loaded dial drum by means of an eccentric cam.

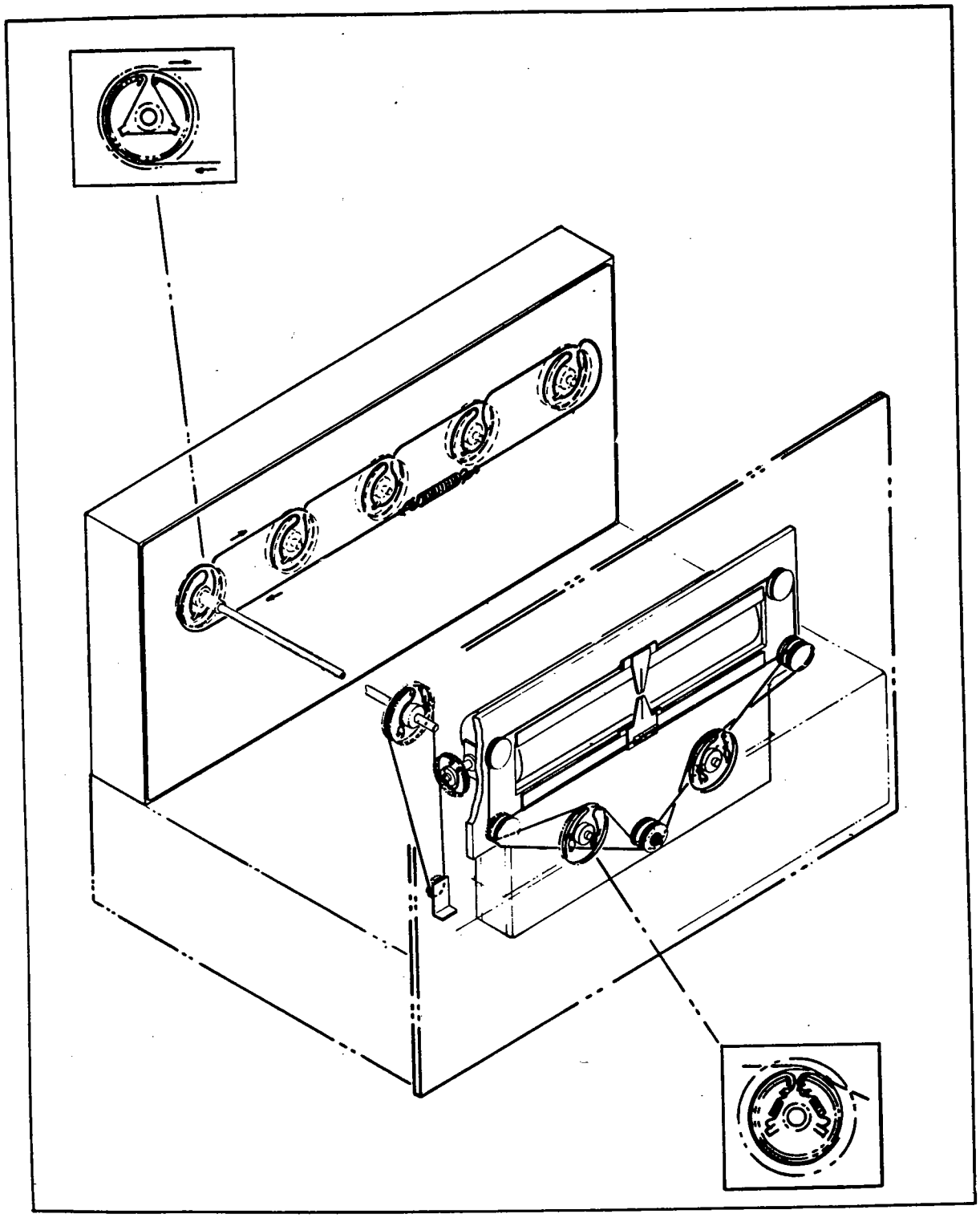

FIGURE 10. BANDSWITCHING AND TUNING MECHANISMS

SECTION III
OPERATION

3.1 INSPECTION PRIOR TO INITIAL OPERATION

The Cosmophone "35" has been carefully packaged to prevent any shipping damage. However, before commencing to operate for the first time, the following procedure should be observed:

a. Note the general appearance of the unit and inspect for obvious signs of shipping damage such as dents or large scratches
b. Check to see that the plastic meter cover on the front panel has not been cracked or damaged.
c. Operate the controls on the front panel to make sure that all controls are capable of free movement and do not bind.
d. Open the top cover by loosening the two dzus fasteners on the front edge of the cover:
   (1) Remove cardboard filler from around tubes and check to see that all tubes are secured in their sockets and are unbroken.
   (2) Check to see that all tube shields are in place.
   (3) Check to see that the plug for the vox subassembly is secured in its socket on the main chassis.
e. Close and secure the cover.

3.2 PRE-OPERATING PROCEDURE

Prior to operating, the following procedure should be followed:

a. Place the front panel controls in the following positions:
   (1) RCVR AUDIO to the OFF position.
   (2) VOX RCVR TRANS toggle switch to the RCVR position.
b. Throw the power supply toggle switch to the OFF position.

CAUTION

Never turn power supply on without first connecting it to the Cosmophone "35".

c. Connect voice coil of a loud speaker (nominally 3.2 ohm speaker) to terminals 2 and 3 on terminal board TB-1 at the rear of the unit. Terminal 3 is ground.
d. Connect receiving antenna (nominally 52 ohms impedance) to connector J4 at the rear of the unit.
e. Connect transmitting antenna (nominally 52 ohms impedance) to connector J5 at the rear of the unit.

CAUTION

Since 150 volts appears across the key, a keying relay should be used to prevent the possibility of shock hazard.

f. Connect a high impedance microphone to jack J2 at the rear of the unit.
g. For CW operation plug key into jack J3 at the rear of the unit, refer to *figure 11* for the wiring of the key connection.

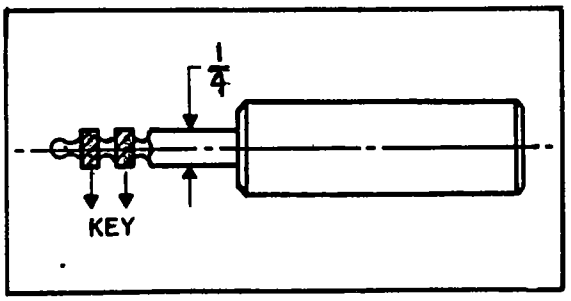

FIGURE 11. KEY CONNECTION

h. An auxiliary set of normally opened contacts (labeled TB2) are available at the rear of the unit. These can be used to control an external antenna relay *(see figure 3)*.
i. If using phones, insert connection in phone jack (J1) at the front of the unit.
j. Connect unit to power supply, using interconnecting cable.
k. Connect line cord from power supply to 115 volt source.

3.3 RECEIVER OPERATION

To operate the receiver proceed as follows:

a. Energize the receiver by advancing the RCVR AUDIO control on the front panel from the OFF position (it is not necessary to operate the power supply toggle switch, the RCVR AUDIO control is in parallel with this toggle switch).

WARNING

Lethal voltages are now present within the unit. Observe the necessary precautions for handling high voltage.

b. Place the bandswitch on the desired band.
c. With the emission selector switch on the front panel select the desired type of reception, upper or lower SSB or AM, or CW.
d. Place METER switch on AVC.

NOTE

AVC may be turned off by placing the meter switch in the RFVM position. In the PLATE and GRID positions the S-meter is disabled, although AVC is still present.

e. Advance the RCVR RF GAIN control on the front panel to the MAX position.

NOTE

Due to the inherent amount of gain in the Cosmophone "35", it will not be necessary, under normal operating conditions, to advance the gain to its maximum setting. It may be found to be desirable to operate with the gain slightly reduced.

f. Set the RCVR PEAK control on the front panel for a maximum reading of the S-meter.
g. Set the RCVR ANT TRIM control on the front panel for a maximum reading of the S-meter.

NOTE
This control is effective only on the high frequency bands.

h. Using the TUNE SELECTOR on the front panel, select either the RA TA, RB TA, RATB, or RBTB position.

NOTE
In the RA TA position the receiver and transmitter will operate on the same frequency as selected by the TUNE A control on the front panel. The frequency will be indicated on the upper red frequency scale by the pointer riding above the scale. In the RB TA position the receiver will *not* necessarily operate on the same frequency as the transmitter. The TUNE B control on front panel will now govern the frequency of the receiver while the transmitter frequency will be governed by the TUNE A control. The receiver frequency will be indicated by the pointer riding over the green lower scale. In the RA TB position the opposite tuning arrangement from the RB TA position discussed above will take place. In the RB TB position the receiver and transmitter will operate on the same frequency as selected by the TUNE B control on the front panel and which will be indicated on the lower green frequency scale by the pointer riding above the scale.

i. Adjust the RCVR AUDIO control on the front panel for a comfortable listening level.
j. Set the Q-MULTIPLIER controls as follows:
(1) With the selector switch in the PEAK position set the AMP control to a point just before oscillations are heard and then adjust the FREQ control for the best reception.
(2) With the selector switch in the NULL position adjust the AMP and FREQ controls for maximum null.
k. Dial Calibration
To calibrate the unit for upper sideband operation proceed as follows:
(1) Set the emission selector switch to the upper (UP) sideband (SSB) position.
(2) Couple in a 100 KC calibration oscillator to the receiving antenna.
(3) Zero beat the oscillator at the nearest 100 KC dial calibration point by tuning the appropriate main tuning control.
(4) Position the drum with the calibration knob to the right of the escutcheson so that the dial on the drum is moved to the point where the dial reading corresponding to the known zeroed frequency is aligned with the scale pointer.
(5) Adjust the skirt of the tuning knob by holding the knob stationary and, at the same time, sliding the skirt so that it reads zero.

NOTE
The unit should be recalibrated whenever bands are switched and when going from upper to lower sidebands or vice versa.

3.4 TRANSMITTER OPERATION

3.4.1 CW TUNE UP

To operate the transmitter proceed as follows:
a. Energize the unit by advancing the RCVR AUDIO control on the front panel from the OFF position.

WARNING
Lethal voltages are now present in the unit. Observe the necessary precautions for handling high voltage.

b. Place the bandswitch on the desired band.
c. Calibrate dial as outlined in step k of paragraph 3.3 above.
d. Place the METER switch in the PLATE position.
e. Place the emission switch in the CW position.
f. Place the TUNE SELECTOR switch in the desired position and tune to the desired frequency by means of the TUNE A and TUNE B controls (see paragraph h of the receiver operation for an explanation of these controls).
g. Set the red dot on the FINAL TANK control so as to coincide with the band selected by the band selector switch.

NOTE
Always tune final tank to proper band before inserting carrier.

h. With a screwdriver, advance the carrier insertion potentiometer (CARRIER) on the front panel so that meter reads approximately 100 ma.

CAUTION
Prolonged periods of excessive plate current may result in damage to the 6146 final tube.

i. Place the VOX RCVR TRANS toggle switch in the TRANS position.
j. Adjust the TRANS PEAK control for maximum reading of the meter and note meter reading.

CAUTION

If meter reads in excess of approximately 100 ma readjust the CARRIER control so that the meter will read approximately 100 ma. Damage to the 6146 final tube may result if it is subjected to excessive plate current for prolonged periods.

k. Place the METER switch in the AVC position.
l. Adjust the FINAL TANK control for maximum meter reading.
m. Adjust the ANT TUNING control for maximum meter reading.
n. Readjust the FINAL TANK control for maximum meter reading.

3.4.2 SSB OPERATION

Tune up as for CW and proceed as follows for SSB operation:

a. Place the emission switch in either LOW or UP SSB position.
b. Place the METER switch in the GRID position.
c. Adjust the transmit audio level by setting the TRANS AUDIO control so that grid current will only be drawn (as indicated on the meter) on occasional speech peaks.
d. Place the METER switch in the AVC position.

3.4.2.1 SWITCHING SIDEBANDS

When it is desired to switch sidebands from lower to upper or vice versa and still retain the *same* fundamental frequency it is necessary to move the dial 3.1 KC (approximately 3 dial divisions). When going from upper (UP) to lower (LOW) sideband move the dial 3.1 KC *up*. When going from lower (LOW) to upper (UP) sideband move the dial 3.1 KC *down*.

When transmitting and receiving on the same frequency, a convenient method of accomplishing the 3.1 KC shift is to make use of the dual channel arrangement and use the channel you are operating on to hold the initial spot in the band and the other channel to make the 3.1 KC shift. Assume that you are transmitting at some frequency (designated X) with the TUNE SELECTOR in the RATA position (channel A) and the emission selector switch in the LOW SSB position. You now desire to transmit on the upper sideband. Proceed as follows:

a. Place the emission selector switch to the UP SSB position.
b. Place the TUNE SELECTOR in the RBTB position (channel B).
c. Move the TUNE B dial 3.1 KC below frequency X.

3.4.3 AM OPERATION

Tune up as for CW and proceed as follows for AM operation:

a. Place the emission switch in either LOW or UP AM position.
b. With a screwdriver, adjust the carrier insertion potentiometer (CARRIER) so that the meter reads 60 ma when set in the PLATE position.
c. Plate the METER switch in the AVC position.
d. Adjust the transmit level by setting the TRANS AUDIO control so that the meter needle flicks approximately 1/16 of an inch on voice peaks.

3.4.4 VOX OPERATION

To operate in the VOX position proceed as follows:

a. Place the VOX RCVR TRANS toggle switch in the VOX position.
b. Adjust VOX control for desired sensitivity (see paragraph 4.1.9).
c. With the RCVR AUDIO control set at the desired listening level, adjust the QT control so that sounds picked up from the speaker do not turn the transmitter on.

SECTION IV
MAINTENANCE

4.1 ALIGNMENT AND ADJUSTMENT PROCEDURES

The paragraphs that follow present the following alignment and adjustment procedures:

a. Alignment of the 455KC IF strip, transmitter and receiver.
b. S-meter zero set adjustment.
c. Q-multiplier adjustment.
d. Receiver variable IF alignment.
e. Receiver RF circuitry alignment.
f. Transmitter variable IF alignment.
g. Transmitter RF alignment.
h. Neutralization of the final transmitter amplifier.
i. Vox adjustment.
j. Carrier balance alignment.

4.1.1 ALIGNMENT OF 455KC IF STRIP, TRANSMITTER AND RECEIVER

To align the 455KC IF strip, transmitter and receiver, proceed as follows:

a. Prepare unit to operate on receive.
b. Connect a vacuum tube voltmeter from the AVC bus to ground.
c. Set the front panel controls in the following positions:
   (1) RCVR RF GAIN control fully clockwise.
   (2) Q-multiplier PEAK OFF NULL control to OFF.
   (3) Emission selector switch to AM-UP.
   (4) Meter selector switch to AVC.
d. Connect a low impedance signal generator to pin 6 of V12 and adjust the frequency of the signal generator until a maximum AVC voltage reading is indicated on the meter.
e. Using an insulated tuning tool, adjust both slugs of IF transformers T1 and T2 for maximum AVC voltage. If AVC voltage rises above 4.2 volts, reduce the signal generator output.
f. Check this alignment by adjusting the signal generator output until the AVC voltage is 4.2 volts, the signal generator output should be a nominal 400 microvolts.

4.1.2 S-METER ZERO SET ADJUSTMENT

To zero adjust the S-meter proceed as follows:

a. Repeat steps a, b, and c in paragraph 4.1.1 above.
b. Set the RCVR RF GAIN control fully clockwise.
c. Adjust resistor R128 until the S-meter reads zero.

4.1.3 Q-MULTIPLIER ADJUSTMENT

a. Repeat steps a, b, c, and d in paragraph 4.1.1 above.
b. Rock the signal generator until it is centered in the IF passband.
c. Set the Q-multiplier FREQ control midway. Capacitor C37 (inside the Q-multiplier chassis) should then be meshed 90°. Remove the cover from the Q-multiplier chassis and note the position of C37. If it is not meshed approximately 90°, rotate the FREQ control so that it is properly positioned, and then reposition the FREQ control knob so that it is set in the center position.
d. Place the PEAK OFF NULL control in the PEAK position.
e. Set the AMP control in its center position.
f. Adjust slug L19 for peak in output as indicated on the S-meter.

4.1.4 RECEIVER VARIABLE IF ALIGNMENT

To align the receiver variable IF proceed as follows:

a. Repeat steps a, b, and c in paragraph 4.1.1 above.
b. Set the bandswitch to the 80 meter band position and the TUNE SELECTOR switch to the RA TA position.
c. Rotate the TUNE A control until the frequency as indicated by the pointer on the dial scale is 3.5 MC.
d. Connect a low impedance signal generator to pin 7 of V16 and adjust the signal generator frequency for maximum AVC voltage as read on the S-meter (signal generator frequency will be approximately 2.8 MC). Adjust the level of the signal generator so that the AVC voltage will be below 4.2 volts.
e. Adjust capacitors C174 and C102 for maximum AVC voltage.
f. Check the alignment of the variable IF and 455 KC IF stages by adjusting the signal generator output until the AVC voltage is 4.2 volts. The signal generator output should be a nominal 2,000 microvolts.

4.1.5 RECEIVER RF CIRCUITRY ALIGNMENT

To align the receiver RF circuitry proceed as follows:

a. Repeat steps a, b, and c in paragraph 4.1.1 above.
b. Connect a low impedance signal generator to the receiver antenna connector (J4) at the rear of the unit.
c. Set the front panel controls in the following positions:
   (1) Set the RCVR ANT TRIM control in the mid position.
   (2) Set the TUNE SELECTOR switch in the RATA position.
   (3) Rotate the TUNE A control fully clockwise to the high frequency end.
   (4) Set the RCVR PEAK control fully clockwise.
d. Set the signal generator frequency for maximum output and adjust capacitors for maximum output. Refer to Table III, a receiver RF alignment table, which lists the approximate signal generator frequency for each band that will produce maximum output and the reference symbol numbers of the capacitors to be adjusted for each band.

TABLE III
RECEIVER RF ALIGNMENT

Band (in Meters)	Approx. Signal Generator Frequency (in MC)	Ref. Symbols of Capacitors
80	4.1	C87 and C104
40	7.5	C88 and C105
20	14.6	C89 and C106
15	21.6	C90 and C107
10 & 11	29.7	C91 and C108

4.1.6 TRANSMITTER VARIABLE IF ALIGNMENT

To align the transmitter variable IF proceed as follows:

a. Attach a dummy load and set up the unit to transmit CW at 3.5 MC.
b. Using the meter on the unit in the RFVM position adjust C137 for maximum output.

4.1.7 TRANSMITTER RF ALIGNMENT

a. Set up the unit to transmit CW with the tuning knob rotated fully clockwise (the high end of the band).
b. Rotate the TRANS PEAK control fully clockwise, except for the first two 10 and the 11 MC bands (for these bands the TRANS PEAK is an adjustment).
c. Using the meter on the unit in the RFVM position adjust the necessary components for maximum output on the meter for each band (refer to Table IV, a transmitter RF alignment table, which lists the reference symbols or titles of the items to be adjusted for each band).

TABLE IV
TRANSMITTER RF ALIGNMENT

Band (in Meters)	Components to be Adjusted	Band (in Meters)	Components to be Adjusted
80	L22 and C139	11	TRANS PEAK control and C160
40	L23 and C140	10 (29.7 MC)	C143 and C163
20	L24 and C141	10 (29.1 MC)	TRANS PEAK control and C162
15	C159 and C142	10 (28.6 MC)	TRANS PEAK control and C161

4.1.8 NEUTRALIZATION OF FINAL TRANSMITTER AMPLIFIER

To neutralize the final transmitter amplifier proceed as follows:

a. Set up unit to transmit CW on 15 meters.
b. Remove screen and plate voltage from the final amplifier (V21). Screen voltage may be removed by opening the connection to pin 11 on the female end of the power cable or by unsoldering the screen lead from feedthrough capacitor (C157) in the RF deck. Plate voltage may be removed by removing V503 a 5R4GY from the power supply, or by opening the connection to pin 9 on the power cable.
c. Connect the RF probe from a vacuum tube voltmeter between the plate of the final amplifier and ground. (If an RF probe is not available a grid dipper or absorption wave meter may be used as an RF indicator by coupling either of them to the final tank coil).
d. Adjust neutralizing capacitor (C166, minimum vacuum tube voltmeter reading.

NOTE

Do not rotate the FINAL TANK control more than a few degrees.

CAUTION

Disconnect the vacuum tube voltmeter before plate and screen voltages are applied again.

4.1.9 VOX ADJUSTMENT

To adjust the VOX proceed as follows:

a. Set up unit to transmit on SSB in any band and throw the emission selector switch to the VOX position.
b. Rotate the following controls to their extreme counterclockwise positions:
   (1) VOX
   (2) QT
   (3) RCVR RF GAIN
   (4) RCVR AUDIO
   (5) TRANS AUDIO
c. Screwdriver adjustment R156 in the VOX subchassis must be adjusted for smooth vox operation. Adjust the potentiometer in the following manner:

WARNING

The final tank components have high voltage present.

Turn the potentiometer fully counterclockwise (the unit should now be in transmit) and then slowly turn the potentiometer clockwise until the unit just switches to receive (an indication that the receive point has been reached is the clicking of the relay).

4.1.10 CARRIER BALANCE ALIGNMENT

To align the carrier balance proceed as follows:

a. Set up the unit to transmit in CW and connect a dummy load.

b. Place the meter switch in the RFVM position.
c. Place the emission selector switch in the SSB-UP position.
d. Adjust R35 and C35 for minimum meter reading. Note this reading.
e. Place the emission selection switch in the SSB-LOW position.
f. Adjust R35 and C35 for minimum meter reading.
g. Note the difference between the two meter readings and readjust R35 and C35 so that the meter reads midway between the two readings.

4.2. SERVICING DATA

Servicing data in the form of voltage and resistance measurements and a table of the electron tube complement is furnished.

4.2.1 VOLTAGE MEASUREMENTS

Table V, lists the voltage measurements taken from the pins of the electron tubes to ground. Measurements in both the transmit and receive positions of the unit are provided. All measurements were taken with a vacuum tube voltmeter. An input voltage of 118 V ac was recorded at the time of measurement. All of the controls were set at their full counterclockwise positions, the band selector switch was in the 80 meter position, the Q-MULTIPLIER was in the OFF position, the TUNE SELECTOR was in the RATA position, and the emission switch was in the CW position.

TABLE V
VOLTAGE MEASUREMENTS

Reference Designation of Tube	R (receive) or T (transmit) Position	Pin No. 1	Pin No. 2	Pin No. 3	Pin No. 4	Pin No. 5	Pin No. 6	Pin No. 7	Pin No. 8	Pin No. 9	Plate Cap
V1	R	.07	18	0	6 ac	258	265	.07	–	–	–
	T	−136	0	0	6 ac	276	271	−133	–	–	–
V2	R	2.7	0	100	6 ac	0	220	−1.2	.8	−22	–
	T	2.7	−155	104	6 ac	0	−13	.05	.85	−22	–
V3	R	96	0	1.6	6 ac	6 ac	220	−.09	34	0	–
	T	96	0	1.7	6 ac	6 ac	0	−95	0	0	–
V4	R	0	0	0	6 ac	24	38	.7	–	–	–
	T	0	0	0	6 ac	24.2	38	.7	–	–	–
V5	R	71	265	0	6 ac	−150	0	1.9	–	–	–
	T	270	225	0	6 ac	0	−127	5.3	–	–	–
V6	R	31	−2.2	.18	6 ac	6 ac	202	0	12	0	–
	T	32	−2.3	.18	6 ac	6 ac	202	0	12.8	0	–
V7	R	0	−.79	−8	6 ac	6 ac	216	0	5.5	0	–
	T	0	−.78	−8	6 ac	6 ac	10	.85	0	0	–
V8	R	275	260	0	6 ac	−150	0	5.8	–	–	–
	T	275	85	0	6 ac	0	−150	2.4	–	–	–
V9	R	0	22	0	6 ac	270	190	2.2	–	–	–
	T	−140	0	0	6 ac	270	270	0	–	–	–
V10	R	.9	1.3	0	6 ac	265	115	2.2	–	–	–
	T	−150	0	0	6 ac	285	0	0	–	–	–
V11	R	−145	0	0	6 ac	270	270	0	–	–	–
	T	0	1.8	0	6 ac	250	105	2.1	–	–	–
V12	R	270	270	0	6 ac	−135	0	9.4	–	–	–
	T	250	280	0	6 ac	0	−135	13	–	–	–
V13	R	−6	0	0	6 ac	220	110	.15	–	–	–
	T	−6.2	0	0	6 ac	230	115	.15	–	–	–
V14	R	221	0	6 ac	0	221	13	22	–	–	–
	T	230	0	6 ac	0	230	135	23	–	–	–
V15	R	0	1	6 ac	0	260	120	1	–	–	–
	T	−145	0	6 ac	0	280	280	0	–	–	–
V16	R	90	−17	.6	6 ac	0	0	−4	0	275	–
	T	100	−18	.6	6 ac	0	0	−143	0	280	–
V17	R	190	0	0	0	6 ac	135	.7	10.5	10.5	–
	T	210	0	0	0	6 ac	140	.72	10.5	10.5	–
V18	R	6	0	185	6 ac	0	270	0	185	[illegible]	–
	T	6.2	0	185	6 ac	0	280	0	190	0	–
V19	R	6	0	185	6 ac	0	270	0	185	.011	–
	T	6.2	0	190	6 ac	0	280	0	190	.011	–
V20	R	6.5	0	245	6 ac	0	245	0	245	0	–
	T	7	0	245	6 ac	0	245	0	245	0	–
V21	R	0	6 ac	220	0	−145	0	0	0	0	570
	T	0	6 ac	230	0	−45	0	0	0	0	620
V22	R	59	0	1	6 ac	6 ac	110	0	1.6	0	–
V23	R	106	0	5.6	6 ac	6 ac	0.35	0.35	0.1	0	–
V24	R	0.8	0.8	5	6 ac	6 ac	250	2	−7.4	0	–

4.2.2 RESISTANCE MEASUREMENTS

Table VI, lists the resistance measurements taken from the pins of the electron tubes to ground. All measurements were taken in the receive position with a vacuum tube voltmeter, the power plug was disconnected. All controls were set at their full counterclockwise positions, the band selector switch was in the 80 meter position, the Q-MULTIPLIER was in the OFF position, the TUNE SELECTOR was in the RATA position, the emission switch was in the CW position, and the METER switch was in the AVC position.

TABLE VI
RESISTANCE MEASUREMENTS

Reference Designation of Tube	Pin No. 1	Pin No. 2	Pin No. 3	Pin No. 4	Pin No. 5	Pin No. 6	Pin No. 7	Pin No. 8	Pin No. 9
V1	300K	500	0	0	9K	10K	30K	–	–
V2	1600	100K	100K	0	0	500K	400K	1400	2200
V3	110K	1 MEG	1000	0	0	100K	900K	1500	0
V4	0 *1 MEG	0	0	0	500K	1 MEG	1000	–	–
V5	150K	20K	0	0	170K	1 MEG	1500	–	–
V6	400K	1 MEG	220	0	0	180K	14K	10K	0
V7	OPEN	2.2 MEG	1500	0	0	110K	2.2 MEG	10K	0
V8	9K	150K	0	0	60K	15	1800	–	–
V9	800K	400	0	0	10K	50K	400	–	–
V10	600K	150	0	0	10K	150K	150	–	–
V11	400K	150	0	0	10K	60K	150	–	–
V12	10K	8.5K	0	0	1 MEG	1.1 MEG	12K	–	–
V13	47K	0	0	0	150K	250K	32	–	–
V14	150K	–	0	0	–	40K	1140	–	–
V15	500K	35	0	0	6.2K	85K	35	–	–
V16	60K	22K	120	0	0	0	600K	0	9K
V17	150K	OPEN	0	0	0	200K	32	100K	100K
V18	150	220K	20K	0	0	9K	0	18K	220K
V19	150	220K	18K	0	0	9K	0	18K	220K
V20	220	50K	13K	0	0	9K	0	13K	50K
V21	0	0	100K	0	17K	0	0	0	–
V22	250K	40K	900	0	0	125K	1 MEG	900	0
V23	130K	470K	900	0	0	400K	400K	100K	0
V24	100K	100K	700K	0	0	30K	1 MEG	2K	0

* With microphone connected

4.2.3 ELECTRON TUBE COMPLEMENT

Table VII, lists the reference designation, tube type, and function of each electron tube.

TABLE VII
ELECTRON TUBE COMPLEMENT

Ref. Designation	Tube Type	Function
V1	6AQ5	Receiver audio output
V2A	1/3 6BV8	Receiver audio amplifier
V2B	1/3 6BV8	Receiver AVC clamp
V2C	1/3 6BV8	Receiver AVC rectifier
V3A	1/2 12AT7	Receiver audio amplifier
V3B	1/2 12AT7	Receiver meter amplifier
V4	6AU6	Transmitter speech amplifier
V5A	1/2 6J6	Transmitter audio cathode follower
V5B	1/2 6J6	Receiver AVC grounded grid amplifier
V6A	1/2 12AU7	Receiver and Transmitter 455 KC crystal oscillator
V6B	1/2 12AU7	Receiver and Transmitter 455 KC phase inverter
V7A	1/2 12AX7	Receiver Q-multiplier
V7B	1/2 12AX7	Receiver Q-multiplier
V8A	1/2 6J6	Receiver IF cathode follower
V8B	1/2 6J6	Transmitter IF grounded grid amplifier
V9	6AU6	Receiver IF amplifier
V10	6BJ6	Receiver IF amplifier
V11	6BJ6	Transmitter IF amplitier
V12A	1/2 6J6	Receiver intermediate mixer
V12B	1/2 6J6	Transmitter intermediate mixer
V13	6AU6	Receiver and Transmitter VFO
V14	6C4	Receiver and Transmitter VFO cathode follower
V15	6DC6	Receiver RF amplifier
V16	6BA7	Receiver pentagrid mixer
V17	5763	Receiver and Transmitter high frequency crystal oscillator
V18	6CL6	Transmitter balanced mixer
V19	6CL6	Transmitter balanced mixer
V20	6CL6	Transmitter driver
V21	6146	Transmitter output amplifier
V22A	1/2 12AT7	Transmitter VOX amplifier
V22B	1/2 12AT7	Transmitter VOX amplifier
V23A	1/2 12AT7	Receiver antitrip amplifier
V23B	1/2 12AT7	Receiver antitrip rectifier
V24A	1/2 12AT7	Transmitter VOX rectifier
V24B	1/2 12AT7	Receiver and Transmitter relay amplifier

SECTION V
ACCESSORIES

5.1 POWER SUPPLY PS-35

The accessory power supply *(refer to figures 12 and 13)* is designed to supply all voltages required for the operation of the Cosmophone "35". It is supplied with an interconnecting cable (W502) whose connectors mate with a power connector (P1) on the rear apron of the Cosmophone "35" and a power connector (P503) on the rear of the power supply. A line cord has been built into the power supply and a nominal 115 volt 60 cycle source is required.

The following voltages and currents are provided by the power supply:

a. 600 V DC at 100 milliamperes
b. 300 V DC at 170 milliamperes
c. 210 V DC (regulated) at 50 milliamperes
d. −150 V DC (regulated) at 20 milliamperes
e. 6.3 V AC at 14 amperes

A toggle switch (SW501) on the power supply is in parallel with the power switch (RCVR AUDIO) on the Cosmophone "35". When used with the Cosmophone "35", this switch should be in the OFF position, permitting power to be controlled at the "35". The switch is a convenience to be used only when the power supply is applied to other uses. When using the supply for other purposes it is necessary that the regulated B+ be loaded down between 30 and 50 milliampers, otherwise regulator tubes V4 and V5, OB2s, will draw excessive current. This can be prevented by removing the OB2s from the supply. For this reason the power supply toggle switch should never be in the ON position without being interconnected to the Cosmophone "35".

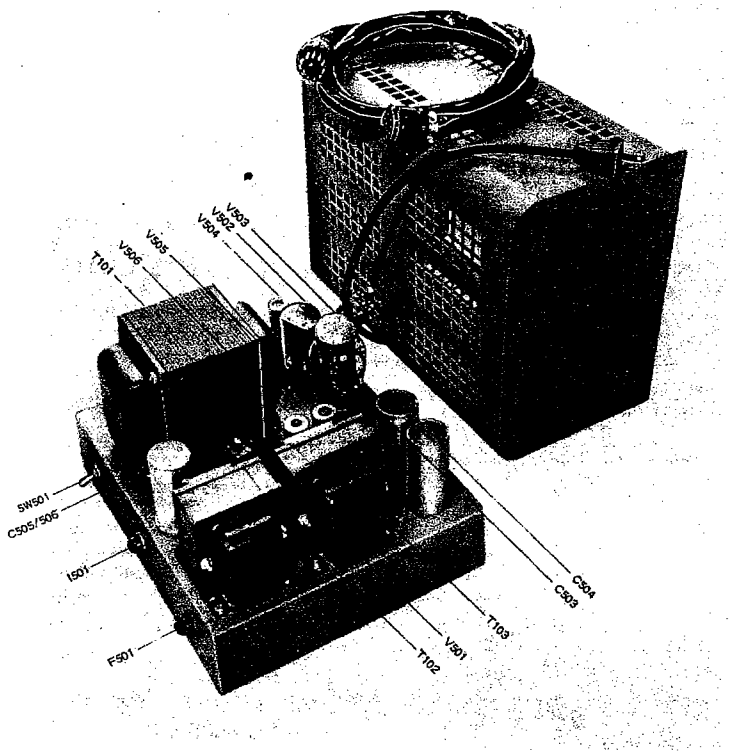

FIGURE 12. POWER SUPPLY PS-35

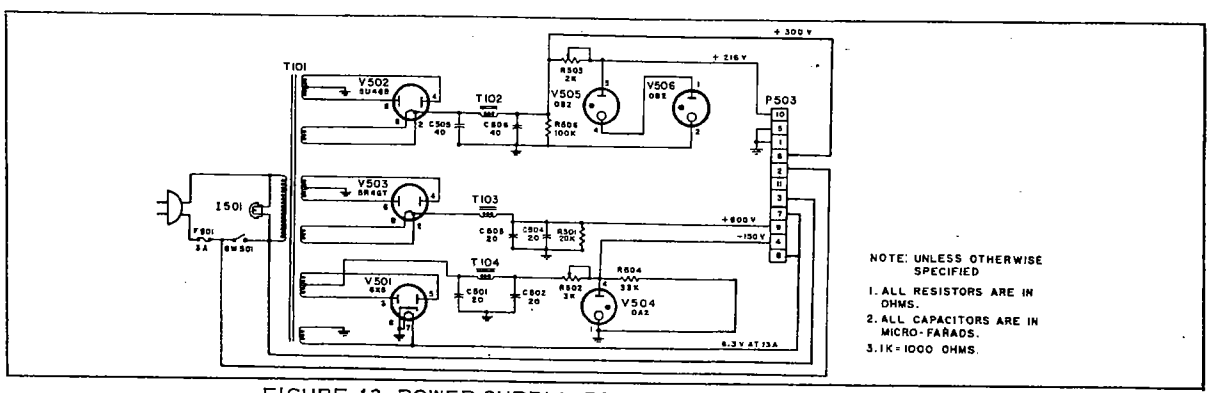

FIGURE 13. POWER SUPPLY PS-35 – SCHEMATIC DIAGRAM

SECTION VI

PARTS LIST, COSMOPHONE "35"

ITEM	DESCRIPTION	COSMOS PART NO.
C1	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C2	Not used	
C3	CAPACITOR, Dry Electrolytic: 5 mf	834-EC-0940
C4	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C5	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C6	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1290
C7	CAPACITOR, Dry electrolytic: 20 mf	p/o C3
C8	CAPACITOR, Dry electrolytic: 5 mf	p/o C3
C9	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C10	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C11	CAPACITOR, Fixed ceramic: 100 mmf	834-EC-2980
C12	CAPACITOR, Dry Electrolytic: 20 mf	834-EC-2090
C13	CAPACITOR, Fixed ceramic: 560 mmf	834-EC-3100
C14	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C15	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C16	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C17	CAPACITOR: Dry electrolytic: 20 mf	834-EC-0960
C18	CAPACITOR, Dry electrolytic: 5 mf	p/o C3
C19	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C20	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C21	CAPACITOR, Dry electrolytic: 4 mf	834-EC-0950
C22	CAPACITOR, Fixed ceramic: 100 mmf	834-EC-2980
C23	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C24	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C25	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C26	CAPACITOR, Fixed mica: 25 mmf	834-EC-1060
C27	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C28	CAPACITOR, Fixed mica: 220 mmf	834-EC-1080
C29	CAPACITOR, Fixed mica: .001 mmf	834-EC-1340
C30	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C31	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C32	CAPACITOR, Dry electrolytic: 4 mf	834-EC-2110
C33	CAPACITOR, Fixed mica: 3300 mmf	834-EC-1140
C34	CAPACITOR, Fixed mica: 3300 mmf	834-EC-1140
C35	CAPACITOR, Variable mica: 15-130 mmf	834-EC-0980
C36	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C37	CAPACITOR, Variable air: 50 mmf	834-EC-0100
C38	CAPACITOR, Fixed mica: .001 mmf	834-EC-1480
C39	CAPACITOR, Fixed mica: .003 mmf	834-EC-1150
C40	CAPACITOR, Fixed mica: 470 mmf	834-EC-1110
C41	CAPACITOR, Fixed mica: .0047 mmf	834-EC-1100
C42	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C43	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C44	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C45	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C46	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C47	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C48	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C49	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C50	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C51	CAPACITOR, Fixed mica: .001 mf	834-EC-1346
C52	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C53	CAPACITOR, Fixed mica: 100 mmf	834-EC-2260
C54	CAPACITOR, Dry electrolytic: 20 mf	p/o C17
C55	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C56	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C57	CAPACITOR, Fixed mica: 100 mmf	834-EC-2260
C58	CAPACITOR, Fixed mica: 220 mmf	834-EC-1080
C59	CAPACITOR, Fixed paper: .47 mmf	834-EC-2270
C60	CAPACITOR, Fixed ceramic: 10 mmf	834-EC-3120
C61	CAPACITOR, Fixed ceramic: .1 mmf	834-EC-1220
C62	CAPACITOR, Fixed ceramic: .1 mmf	834-EC-1220
C63	CAPACITOR, Fixed ceramic: .1 mmf	834-EC-1220
C64	CAPACITOR, Fixed ceramic: .1 mmf	834-EC-1220
C65	CAPACITOR, Fixed mica: .001 mmf	834-EC-1340
C66	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C67	Not used	
C68	CAPACITOR, Fixed mica: 330 mmf	834-EC-1070
C69	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C70	CAPACITOR, Fixed mica: 330 mmf	834-EC-1070
C71	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C72	CAPACITOR, Fixed ceramic: .1 mmf	834-EC-1220
C73	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C74	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C75	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C76	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C77	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C78	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C79	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C80	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C81	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C82	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C83	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C84	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190

ITEM	DESCRIPTION	COSMOS PART NO.
C85	CAPACITOR, Variable air: 30 mmf	834-EC-1351
C86	CAPACITOR, Variable air: 50 mmf	834-EC-0100
C87	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C88	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C89	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C90	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C91	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C92	CAPACITOR, Fixed ceramic: 2380 mmf	834-EC-1010
C93	CAPACITOR, Fixed ceramic: 2380 mmf	834-EC-1010
C94	CAPACITOR, Fixed ceramic: 2380 mmf	834-EC-1010
C95	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C96	CAPACITOR, Fixed ceramic: 2 mmf	834-EC-2950
C97	CAPACITOR, Fixed ceramic: .01 mmf	834-EC-1190
C98	CAPACITOR, Fixed ceramic: .01 mmf	834-EC-1190
C99	CAPACITOR, Fixed mica: 100 mmf	834-EC-2260
C100	CAPACITOR, Fixed ceramic: .01 mmf	834-EC-1190
C101	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C102	CAPACITOR, Variable mica: 15-130 mmf	834-EC-0980
C103	CAPACITOR, Variable air: 50 mmf	834-EC-0100
C104	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C105	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C106	CAPACITOR, Variable ceramic: 8-30 mmf	834-EC-1330
C107	CAPACITOR, 5-30 ceramic: 5-30 mmf	834-EC-1330
C108	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C109	CAPACITOR, Fixed ceramic: 2380 mmf	834-EC-1010
C110	CAPACITOR, Fixed ceramic: 2380 mmf	834-EC-1010
C111	CAPACITOR, Fixed ceramic: 20 mmf	834-EC-1230
C112	CAPACITOR, Fixed mica: 30 mmf	834-EC-1120
C113	CAPACITOR, Fixed mica: 100 mmf	834-EC-2260
C114	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C115	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C116	CAPACITOR, Fixed ceramic: 56 mmfd	834-EC-2930
C117	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C118	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C119	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C120	CAPACITOR, Fixed ceramic: 25 mmf	834-EC-3150
C121	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C122	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C123	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C124	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C125	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C126	CAPACITOR, Fixed ceramic: 2380 mmf	834-EC-1010
C127	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C128	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C129	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C130	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C131	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C132	CAPACITOR, Fixed ceramic: 15 mmf	834-EC-3180
C133	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C134	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C135	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C136	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C137	CAPACITOR, Variable mica: 15-130 mmf	834-EC-0980
C138	CAPACITOR, Variable air: 0-50 mmf	834-EC-0100
C139	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C140	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C141	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C142	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C143	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330

ITEM	DESCRIPTION	COSMOS PART NO.
C144	CAPACITOR, Fixed ceremic: 2380 mmf	834-EC-1010
C145	CAPACITOR, Fixed ceramic: 2380 mmf	834-EC-1010
C146	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C147	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C148	CAPACITOR, Fixed ceramic: 1 mmf	834-EC-1280
C149	CAPACITOR, Fixed mica: 24 mmf	834-EC-1130
C150	CAPACITOR, Fixed, ceramic: .01 mf	834-EC-1190
C151	CAPACITOR, Fixed ceramic: 56 mmf	834-EC-2930
C152	CAPACITOR, Fixed ceramic: 27 mmf	834-EC-3190
C153	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C154	CAPACITOR, Fixed ceramic:.001 mf	834-EC-1250
C155	CAPACITOR, Fixed ceramic:2380 mmf	834-EC-1010
C156	CAPACITOR, Fixed ceramic:2380 mmf	834-EC-1010
C157	CAPACITOR, Fixed ceramic:2380 mmf	834-EC-1010
C158	CAPACITOR, Variable air: 50 mmf	834-EC-0100
C159	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C160	CAPACITOR, Variable ceramic: 8-50 mmf	834-EC-1000
C161	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C162	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C163	CAPACITOR, Variable ceramic: 5-30 mmf	834-EC-1330
C164	Not used	
C165	CAPACITOR, Fixed ceramic: 27 mmf	834-EC-3190
C166	CAPACITOR, Variable air; 1-8 mmf	834-EC-2960
C167	CAPACITOR, Fixed ceramic: 500 mmf	834-EC-3390
C168	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C169	CAPACITOR, Variable air: 400 mmf	834-EC-1370
C170	CAPACITOR, Fixed ceramic: 6 mmf	834-EC-2970
C171	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C172	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C173	CAPACITOR, Fixed ceramic: 2 mmf	834-EC-2950
C174	CAPACITOR, Variable mica: 15-130 mmf	834-EC-0980
C175	CAPACITOR, Fixed ceramic: 50 mmf	834-EC-3130
C176	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C177	Not Used	
C178	CAPACITOR, Fixed ceramic: .001 mf	834-EC-1250
C179	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C180	CAPACITOR, Fixed mica: 100 mmf	834-EC-2260
C181	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C182	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C183	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C184	CAPACITOR, Fixed mica: 100 mmf	834-EC-1180
C185	CAPACITOR, Fixed mica: 365 mmf	834-EC-1170
C186	CAPACITOR, Fixed mica: 1410 mmf	834-EC-1160
C187	CAPACITOR, Temperature compensating	--
C188	CAPACITOR, Variable ceramic: 3-12 mmf	834-EC-0990
C189	CAPACITOR, Variable ceramic: 3-12 mmf	834-EC-0990
C190	CAPACITOR, Fixed ceramic: 10 mmf	834-EC-3300
C191	CAPACITOR, Variable air: 1 section 140 mmf	834-EC-1500
C192	CAPACITOR, Variable air: 1 section 140 mmf	p/o C191
C193	CAPACITOR, Variable air: 1 section 325 mmf	p/o C191
C194	CAPACITOR, Variable air: 1 section 140 mmf	834-EC-1500
C195	CAPACITOR, Variable air: 1 section 140 mmf	p/o C194
C196	CAPACITOR, Variable air: 1 section 325 mmf	p/o C194
C197	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C198	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C199	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C200	CAPACITOR, Fixed paper: .22 mf	834-EC-2861
C201	CAPACITOR, Fixed paper: .22 mf	834-EC-2861
C202	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C203	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C204	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C205	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C206	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C207	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C208	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C209	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C210	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C211	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C212	CAPACITOR, Fixed ceramic:2380 mmf	834-EC-1010
C213	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C214	CAPACITOR, Fixed ceramic:2380 mmf	834-EC-1010
C215	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C216	CAPACITOR, Fixed ceramic:2380 mmf	834-EC-1010
C217	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C218	CAPACITOR, Fixed ceramic:2380 mmf	834-EC-1010
C219	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C220	CAPACITOR, Fixed ceramic: .01 mf	834-EC-1190
C221	CAPACITOR, Fixed ceramic:2380 mmf	834-EC-1010
C222	CAPACITOR, Fixed ceramic: 100 mmf	834-EC-2980
C223	CAPACITOR, Fixed ceramic: .1 mf	834-EC-1220
C224	CAPACITOR, Fixed mica: 270 mmf	834-EC-3530
C225	CAPACITOR, Fixed mica: 270 mmf	834-EC-3530
CR1	CRYSTAL, Diode: 1N35	834-ECR-1510
CR2	CRYSTAL, Diode: 1N34A	834-ECR-1520
CR3	Not Used	
CR4	CRYSTAL, Diode: 1N34A	834-ECR-1520
CR5	RECTIFIER, Selenium	834-ECR-3070
K1	RELAY, Armature: 8PDT and 2PST-NO	834-EK-1730
K2	RELAY, Armature: DPDT	834-EK-1740
K3	RELAY, Armature: DPDT	834-EK-1740
K4	RELAY, Armature: DPDT	834-EK-1740
K5	RELAY, Armature: SPST-NO	834-EK-2810
K6	RELAY, Armature: DPDT	834-EK-1740
L1	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L2	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L3	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L4	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L5	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L6	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L7	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L8	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L9	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L10	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L11	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L12	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L13	CHOKE, Radio frequency: 6 mh	834-EL-1750
L14	CHOKE, Radio frequency: 6 mh	834-EL-1750
L15	CHOKE, Radio frequency: 6 mh	834-EL-1750
L16	CHOKE, Radio frequency: 6 mh	834-EL-1750
L17	CHOKE, Radio frequency: 6 mh	834-EL-1750
L18	CHOKE, Radio frequency: 6 mh	834-EL-1750
L19	CHOKE, Radio frequency: 163 uh	834-EL-0370
L20	COIL, Radio frequency: 12.8 uh	834-EL-0170
L21	COIL, Radio frequency: variable if	834-EL-1790
L22	COIL, Radio frequency: 80 meters	834-EL-0140
L23	COIL, Radio frequency: 40 meters	834-EL-0120
L24	COIL, Radio frequency: 20 meters	834-EL-1001
L25	COIL, Radio frequency: 15 meters	834-EL-1800
L26	COIL, Radio frequency: 11 & 10 meters	834-EL-1810
L27	COIL, Radio frequency: 80 meters	834-EL-0150
L28	COIL, Radio frequency: 40 meters	834-EL-0130
L29	COIL, Radio frequency: 20 meters	834-EL-2130
L30	COIL, Radio frequency: 15 meters	834-EL-1820
L31	COIL, Radio frequency: 11 & 10 meters	834-EL-1830
L32	Not Used	
L33	COIL, Radio frequency: 80 & 40 meters	834-EL-1840
L34	COIL, Radio frequency: 20 meters	834-EL-1850
L35	COIL, Radio frequency: 15 meters	834-EL-1860
L36	COIL, Radio frequency: 11 & 10 meters	834-EL-1870
L37	COIL, Radio frequency: 80 meters	834-EL-0150
L38	COIL, Radio frequency: 40 meters	834-EL-0130
L39	COIL, Radio frequency: 20 meters	834-EL-1880
L40	COIL, Radio frequency: 15 meters	834-EL-1890
L41	COIL, Radio frequency: 11 & 10 meters	834-EL-1900
L42	COIL, Radio frequency: 80 meters	834-EL-0180
L43	COIL, Radio frequency: 40 meters	834-EL-2120
L44	COIL, Radio frequency: 20 meters	834-EL-2090
L45	COIL, Radio frequency: 15 meters	834-EL-2100
L46	COIL, Radio frequency: 11 & 10 meters	834-EL-2110
L47	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L48	CHOKE, Radio frequency: 6 mh	834-EL-1750
L49	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
L50	COIL, Radio frequency: variable if	834-EL-1790
L51	CHOKE, Radio frequency: 6 mh	834-EL-1750
L52	CHOKE, Radio frequency: 27 mh	834-EL-3510
L53	CHOKE, Radio frequency: 6 mh	834-EL-1750
L54	CHOKE, Radio frequency: 2.5 mh	834-EL-1760
P1	CONNECTOR, Receptacle: 11 male contacts	834-EP-1720
P2	CONNECTOR, Receptacle: 8 female contacts	834-EXV-2060
P3	CONNECTOR, Plug: 8 male contacts	834-EP-2790
R1	RESISTOR, Fixed composition: 10 ohms, 2w	834-ER-0510
R2	RESISTOR, Fixed composition: 560 ohms, ½w	834-ER-0860
R3	RESISTOR, Fixed composition: 330,000 ohms, ½w	834-ER-0700
R4	RESISTOR, Fixed composition: 10,000 ohms, ½w	834-ER-0790

ITEM	DESCRIPTION	COSMOS PART NO.
R5	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R6	RESISTOR, Fixed composition: 1,800 ohms, ½w	834-ER-3350
R7	RESISTOR, Variable: 0-100,000 ohms, spst switch	834-ER-0450
R8	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R9	RESISTOR, Fixed composition: 1,000 ohms, ½w	834-ER-0780
R10	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R11	RESISTOR, Fixed composition: 3,300 ohms, 1w	834-ER-0820
R12	RESISTOR, Fixed composition: 1,000 ohms, 2w	834-ER-0520
R13	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R14	RESISTOR, Fixed composition: 470,000 ohms, ½w	834-ER-0680
R15	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R16	RESISTOR, Fixed composition: 12,000 ohms, 1w	834-ER-0620
R17	RESISTOR, Fixed composition: 150,000 ohms, 2w	834-ER-0550
R18	RESISTOR, Variable: 0-1 meg	834-ER-0440
R19	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R20	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R21	RESISTOR, Fixed composition: 1,000 ohms, ½w	834-ER-0780
R22	RESISTOR, Fixed composition: 1,500 ohms, ½w	834-ER-0830
R23	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R24	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R25	RESISTOR, Fixed composition: 390,000 ohms, ½w,	834-ER-2910
R26	RESISTOR, Fixed composition: 1,500 ohms, ½w	834-ER-0830
R27	RESISTOR, Fixed composition: 220,000 ohms, ½w	834-ER-0470
R28	RESISTOR, Fixed composition: 470,000 ohms, ½w	834-ER-0680
R29	RESISTOR, Fixed composition: 12,000 ohms, ½w	834-ER-0730
R30	RESISTOR, Fixed composition: 1,000 ohms, ½w	834-ER-0780
R31	RESISTOR, Fixed composition: 220,000 ohms, ½w	834-ER-0470
R32	RESISTOR, Fixed composition: 1,000 ohms, ½w	834-ER-0780
R33	RESISTOR, Fixed composition: 10,000 ohms, 1w	834-ER-0640
R34	RESISTOR, Fixed composition: 10,000 ohms, 1w	834-ER-0640
R35	RESISTOR, Variable: 0-2000 ohms	834-ER-0460
R36	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R37	RESISTOR, Fixed composition: 220 ohms, ½w	834-ER-0810
R38	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R39	RESISTOR, Fixed composition: 10,000 ohms, ½w	834-ER-0790
R40	RESISTOR, Fixed composition: 10,000 ohms, ½w	834-ER-0790
R41	RESISTOR, Fixed composition: 2.2 meg, ½w	834-ER-0670
R42	RESISTOR, Fixed composition: 180,000 ohms, ½w	834-ER-0720
R43	RESISTOR, Fixed composition: 10,000 ohms, ½w	834-ER-0790
R44	RESISTOR, Fixed composition: 1,500 ohms, ½w	834-ER-0830
R45	RESISTOR, Fixed composition: 2.2 meg, ½w	834-ER-0670
R46	RESISTOR, Variable: 0-5,000 ohms	834-ER-2760
R47	RESISTOR, Fixed composition: 10,000 ohms, ½w	834-ER-0790
R48	RESISTOR, Fixed composition: 1,800 ohms, 1w	834-ER-0650
R49	RESISTOR, Variable: 0-5,000 ohms	834-ER-0480
R50	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R51	RESISTOR, Fixed composition: 1,000 ohms, ½w	834-ER-0780

ITEM	DESCRIPTION	COSMOS PART NO.
R52	RESISTOR, Fixed composition: 390 ohms, ½w	834-ER-0900
R53	RESISTOR, Fixed composition: 330,000 ohms, ½w	834-ER-0700
R54	RESISTOR, Fixed composition: 470,000 ohms, ½w	834-ER-0680
R55	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-760
R56	RESISTOR, Fixed composition: 150,000 ohms, 2w	834-ER-0550
R57	RESISTOR, Fixed composition: 12,000 ohms, ½w	834-ER-0730
R58	RESISTOR, Fixed composition: 330,000 ohms, ½w	834-ER-0700
R59	RESISTOR, Fixed composition: 1,500 ohms, ½w	834-ER-0830
R60	RESISTOR, Fixed composition: 150 ohms, ½w	834-ER-0880
R61	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R62	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R63	RESISTOR, Fixed composition: 150 ohms, ½w	834-ER-0880
R64	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R65	RESISTOR, Fixed composition: 1,500 ohms, ½w	834-ER-0830
R66	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R67	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R68	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R69	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R70	RESISTOR, Fixed composition: 12,000 ohms, 1w	834-ER-0620
R71	RESISTOR, Fixed composition: 82,000 ohms, ½w	834-ER-0770
R72	RESISTOR, Fixed composition: 150 ohms, ½w	834-ER-0880
R73	RESISTOR, Fixed composition: 10 ohms, ½w	834-ER-3550
R74	RESISTOR, Fixed composition: 5,600 ohms, ½w	834-ER-3160
R75	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R76	RESISTOR, Fixed composition: 12,000 ohms, ½w	834-ER-0730
R77	RESISTOR, Fixed composition: 22,000 ohms, 2w	834-ER-0920
R78	RESISTOR, Fixed composition: 22,000 ohms, ½w	834-ER-0540
R79	RESISTOR, Fixed composition: 120 ohms, ½w	834-ER-0890
R80	RESISTOR, Fixed composition: 47,000 ohms, 1w	834-ER-0910
R81	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R82	RESISTOR, Fixed composition: 47 ohms, ½w	834-ER-0970
R83	RESISTOR, Fixed composition: 1,500 ohms, ½w	834-ER-0830
R84	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R85	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R86	RESISTOR, Fixed composition: 1,000 ohms, 2w	834-ER-0520
R87	RESISTOR, Fixed composition: 220,000 ohms, ½w	834-ER-0470
R88	RESISTOR, Fixed composition: 150 ohms, 1w	834-ER-0850
R89	RESISTOR, Fixed composition: 220,000 ohms, ½w	834-ER-0470
R90	RESISTOR, Fixed composition: 33 ohms, ½w	834-ER-3170
R91	RESISTOR, Fixed composition: 10,000 ohms, 2w	834-ER-0660
R92	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R93	RESISTOR, Fixed composition: 10,000 ohms, ½w	834-ER-0790
R94	RESISTOR, Fixed composition: 68 ohms, ½w	834-ER-3290
R95	RESISTOR, Fixed composition: 180 ohms, ½w	834-ER-3370
R96	RESISTOR, Fixed composition: 180 ohms, ½w	834-ER-3170

ITEM	DESCRIPTION	COSMOS PART NO.
R97	RESISTOR, Fixed composition: 220 ohms, ½w	834-ER-0810
R98	RESISTOR, Fixed composition: 4,700 ohms, 2w	834-ER-0610
R99	RESISTOR, Fixed composition: 1,000 ohms, 2w	834-ER-0520
R100	RESISTOR, Fixed composition: 150 ohms, ½w	834-ER-0880
R101	RESISTOR, Fixed composition: 82 ohms, ½w	834-ER-3200
R102	RESISTOR, Fixed composition: 150 ohms, ½w	834-ER-0880
R103	RESISTOR, Fixed composition: 47 ohms, 2w	834-ER-3600
R104	RESISTOR, Fixed composition: 2,700 ohms, 2w	834-ER-3230
R105	RESISTOR, Fixed composition: 2,700 ohms, 2w	834-ER-3230
R106	RESISTOR, Fixed composition: 3,300 ohms, 2w	834-ER-3220
R107	RESISTOR, Fixed composition: 2,700 ohms, 2w	834-ER-3230
R108	RESISTOR, Fixed composition: 4,300 ohms, 1w	834-ER-3240
R109	RESISTOR, Fixed composition: 220 ohms, ½w	834-ER-0810
R110	RESISTOR, Fixed composition: 0.39 ohms, ½w	834-ER-0930
R111	RESISTOR, Fixed composition: 12,000 ohms, ½w	834-ER-0730
R112	RESISTOR, Fixed composition: 1,500 ohms, ½w	834-ER-0830
R113	RESISTOR, Variable: 0-2,000 ohms	834-ER-0460
R114	RESISTOR, Fixed composition: 5,000 ohms, 5w	834-ER-0530
R115	RESISTOR, Variable:0-2,000 ohms	834-ER-0460
R116	RESISTOR, Fixed composition: 2,200 ohms, 2w	834-ER-0580
R117	RESISTOR, Fixed composition: 9,000 ohms, 5w	834-ER-0690
R118	RESISTOR, Fixed composition: 3,000 ohms, 5w	834-ER-3310
R119	RESISTOR, Fixed composition: 17,500 ohms, 5w	834-ER-3360
R120	RESISTOR, Fixed composition: 68,000 ohms, ½w	834-ER-0750
R121	RESISTOR, Fixed composition: 2,200 ohms, 2w	834-ER-3050
R122	RESISTOR, Fixed composition: 12,000 ohms, 2w	834-ER-2900
R123	RESISTOR, Fixed composition: 470 ohms, ½w	834-ER-2880
R124	RESISTOR, Fixed composition: 100,000 ohms, 2w	834-ER-3560
R125	RESISTOR, Fixed composition: 470 ohms, ½w	834-ER-2880
R126	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R127	RESISTOR, Fixed composition: 1,000 ohms, ½w	834-ER-0780
R128	RESISTOR, Variable:0-2,000 ohms	834-ER-0460
R129	RESISTOR, Fixed composition: 2.2 meg, ½w	834-ER-0670
R130	RESISTOR, Fixed composition: 180 ohms, ½w	834-ER-3370
R131	RESISTOR, Fixed composition: 560 ohms, ½w	834-ER-0860
R132	RESISTOR, Fixed composition: 560 ohms, ½w	834-ER-0860
R133	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R134	RESISTOR, Fixed composition: 220,000 ohms, ½w	834-ER-0470
R135	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R136	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R137	RESISTOR, Fixed composition: 30,000 ohms, 5w	834-ER-0500
R138	RESISTOR, Variable:0-1,000 ohms	834-ER-0490
R139	RESISTOR, Variable: 0-1 meg	834-ER-2770
R140	RESISTOR, Fixed composition: 68,000 ohms, ½w	834-ER-0750
R141	RESISTOR, Fixed composition: 1,000 ohms, ½w	834-ER-0780
R142	RESISTOR, Fixed composition: 220,000 ohms, ½w	834-ER-0470
R143	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R144	RESISTOR, Fixed composition: 1,000 ohms, ½w	834-ER-0780
R145	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R146	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R147	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R148	RESISTOR, Variable: 0-1 meg	834-ER-2770
R149	RESISTOR, Fixed composition: 470,000 ohms, ½w	834-ER-0680
R150	RESISTOR, Fixed composition: 1,000 ohms, ½w	834-ER-0780
R151	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R152	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R153	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R154	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R155	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
R156	RESISTOR, Variable:0-5,000 ohms	834-ER-2760
R157	RESISTOR, Fixed composition: 470,000 ohms, ½w	834-ER-0680
R158	RESISTOR, Fixed composition: 3,000 ohms, 5w	834-ER-3310
R159	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R160	RESISTOR, Fixed composition: 100,000 ohms, ½w	834-ER-0740
R161	RESISTOR, Fixed composition: 47,000 ohms, ½w	834-ER-0760
R162	RESISTOR, Fixed composition: 1 meg, ½w	834-ER-0710
SW1	SWITCH, Rotary: 1 section, 2 poles, 3 positions	834-ESW-0311
SW2	SWITCH, Rotary: 1 section, 1 pole, 4 positions	834-ESW-0341
SW3	SWITCH, Toggle: 3 positions	834-ESW-0400
SW4	SWITCH, Rotary: 1 section, 3 poles, 4 positions	834-ESW-0321
SW5	SWITCH, Rotary: 3 sections, 6 poles, 5 positions	834-ESW-0331
SW6	SWITCH, Rotary: 2 sections, 2 poles, 8 positions	834-ESW-0271
SW7	SWITCH, Rotary: 1 section, 1 pole, 8 positions	834-ESW-0281
SW8	SWITCH, Rotary: 3 sections, 3 poles, 8 positions	834-ESW-0291
SW9	SWITCH, Rotary: 3 sections, 3 poles, 8 positions	834-ESW-0301
SW10	SWITCH, Rotary: 2 sections, 2 poles, 8 positions	834-ESW-2081
T1	TRANSFORMER, Intermediate frequency	834-ET-0260
T2	TRANSFORMER, Intermediate frequency	834-ET-0260
T3	TRANSFORMER, Audio frequency	834-ET-0250
V1	TUBE, Electron: 6AQ5	834-EV-1950
V2	TUBE, Electron: 6BV8	834-EV-2611
V3	TUBE, Electron: 12AT7	834-EV-1960
V4	TUBE, Electron: 6AU6	834-EV-1940
V5	TUBE, Electron: 6J6	834-EV-1970
V6	TUBE, Electron: 12AU7	834-EV-1980
V7	TUBE, Electron: 12AX7	834-EV-1990
V8	TUBE, Electron: 6J6	834-EV-1970
V9	TUBE, Electron: 6AU6	834-EV-1940
V10	TUBE, Electron: 6BJ6	834-EV-2000
V11	TUBE, Electron: 6BJ6	834-EV-2000
V12	TUBE, Electron: 6J6	834-EV-1970
V13	TUBE, Electron: 6AU6	834-EV-1940
V14	TUBE, Electron: 6C4	834-EV-2620
V15	TUBE, Electron: 6DC6	834-EV-2050
V16	TUBE, Electron: 6BA7	834-EV-2040
V17	TUBE, Electron: 5763	834-EV-2020
V18	TUBE, Electron: 6CL6	834-EV-2010
V19	TUBE, Electron: 6CL6	834-EV-2010
V20	TUBE, Electron: 6CL6	834-EV-2010
V21	TUBE, Electron: 6146	834-EV-2030
V22	TUBE, Electron: 12AT7	834-EV-1960
V23	TUBE, Electron: 12AT7	834-EV-1960
V24	TUBE, Electron: 12AT7	834-EV-1960
Y1	CRYSTAL Unit: quartz, 453.2 kc (approx	834-EY-1380
Y2	CRYSTAL Unit: quartz, 456.8 kc (approx)	834-EY-1390
Y3	CRYSTAL Unit: quartz, 6.3 mc	834-EY-1400
Y4	CRYSTAL Unit: quartz, 9.7 mc	834-EY-1410
Y5	CRYSTAL Unit: quartz, 16.8 mc	834-EY-1420
Y6	CRYSTAL Unit: quartz, 11.9 mc	834-EY-1430
Y7	CRYSTAL Unit: quartz, 14.85 mc	834-EY-1440
Y8	CRYSTAL Unit: quartz, 15.4 mc	834-EY-1450
Y9	CRYSTAL Unit: quartz, 15.65 mc	834-EY-1460
Y10	CRYSTAL Unit: quartz, 15.95 mc	834-EY-1470
Z1	TANK, Final	834-EZ-1050
Z2	FILTER, Mechanical	834-EZ-1570

SECTION VII

PARTS LIST, POWER SUPPLY PS-35

ITEM	DESCRIPTION	COSMOS PART NO.
C501	CAPACITOR, Dry electrolytic: 20 mf 350 V	834-EC-6000
C502	CAPACITOR, Dry electrolytic: 20 mf 350 V	834-EC-6000
C503	CAPACITOR, Dry electrolytic: 20 mf 600 V	834-EC-6010
C504	CAPACITOR, Dry electrolytic: 20 mf 600 V	834-EC-6010
C505/ C506	CAPACITOR, Dry electrolytic: two sections, 40 mf 450 V	834-EC-6020
F501	FUSE, Cartridge: 3 amp	834-EF-6040
I501	LAMP, Neon glow	834-EI-6050
P503	CONNECTOR, Receptacle	834-EP-6150
R501	RESISTOR, Fixed wire wound: 20,000 ohms, 25w	834-ER-6090
R502	RESISTOR, Variable wire wound: 0-3,000 ohms; 10w	834-ER-6100
R503	RESISTOR, Variable wire wound: 0-2,000 ohms, 10w	834-ER-6110
R504	RESISTOR, Fixed composition: 33,000 ohms, 2w	834-ER-6120
R505	RESISTOR, Fixed composition: 100,000 ohms, 2w	834-ER-6130
SW501	SWITCH, Toggle	834-ES-6140
T101	TRANSFORMER, Power	834-ET-6160
T102	REACTOR, Filter: 10 henries at 200 ma	834-ET-6170
T103	REACTOR, Filter: 15 henries at 150 ma	834-ET-6180
T104	REACTOR, Filter: 7 henries at 50 ma	834-ET-6190
V501	TUBE, Electron: 6X5GT	834-EV-6250
V502	TUBE, Electron: 5U4GB	834-EV-6260
V503	TUBE, Electron: 5R4GY	834-EV-6270
V504	TUBE, Electron: 0A2	834-EV-6280
V505	TUBE, Electron: 0B2	834-EV-6290
V506	TUBE, Electron: 0B2	834-EV-6290

HOW TO RETURN MATERIAL OR EQUIPMENT:

If, for any reason, you wish to return material or equipment, whether under the guarantee or otherwise, *FIRST NOTIFY US*, giving full particulars including the information requested below. Failure to secure our advice prior to the forwarding of any material, or failure to provide full particulars may cause unnecessary delay in handling of your merchandise.

Address all correspondence to: COSMOS INDUSTRIES, INC.,
31 – 28 QUEENS BLVD.,
LONG ISLAND CITY 1, N. Y.

Provide the following information:

a. Name and serial number of unit.
b. Date of delivery of equipment.
c. Date placed in service.
d. Number of hours in service.
e. Serial number of the mechanical filter.
f. Cause of trouble, if known.
g. Cosmos part number and name of part thought to be defective.
h. Other pertinent remarks.

HOW TO ORDER REPLACEMENT PARTS:

To order replacement parts, direct your order as indicated below and furnish the following information:

Address all orders to: COSMOS INDUSTRIES, INC.,
31 – 28 QUEENS BLVD.,
LONG ISLAND CITY 1, N. Y.

Provide the following information:

a. Cosmos part number and description.
b. Name and serial number of unit.
c. Serial number of the mechanical filter.
d. Quantity required.