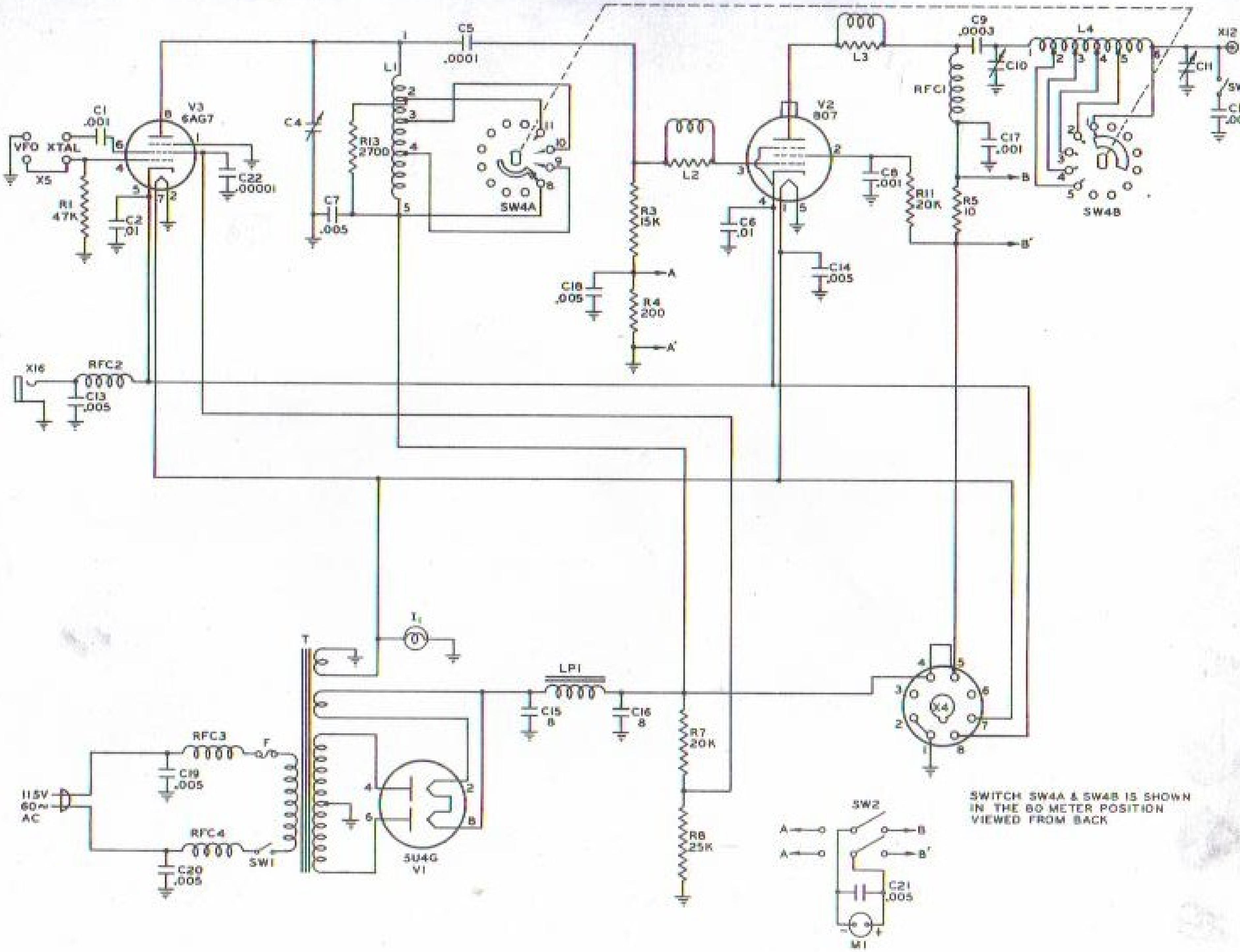


SWITCH SW4A & SW4B IS SHOWN
IN THE 80 METER POSITION
VIEWED FROM BACK

FIG. 7

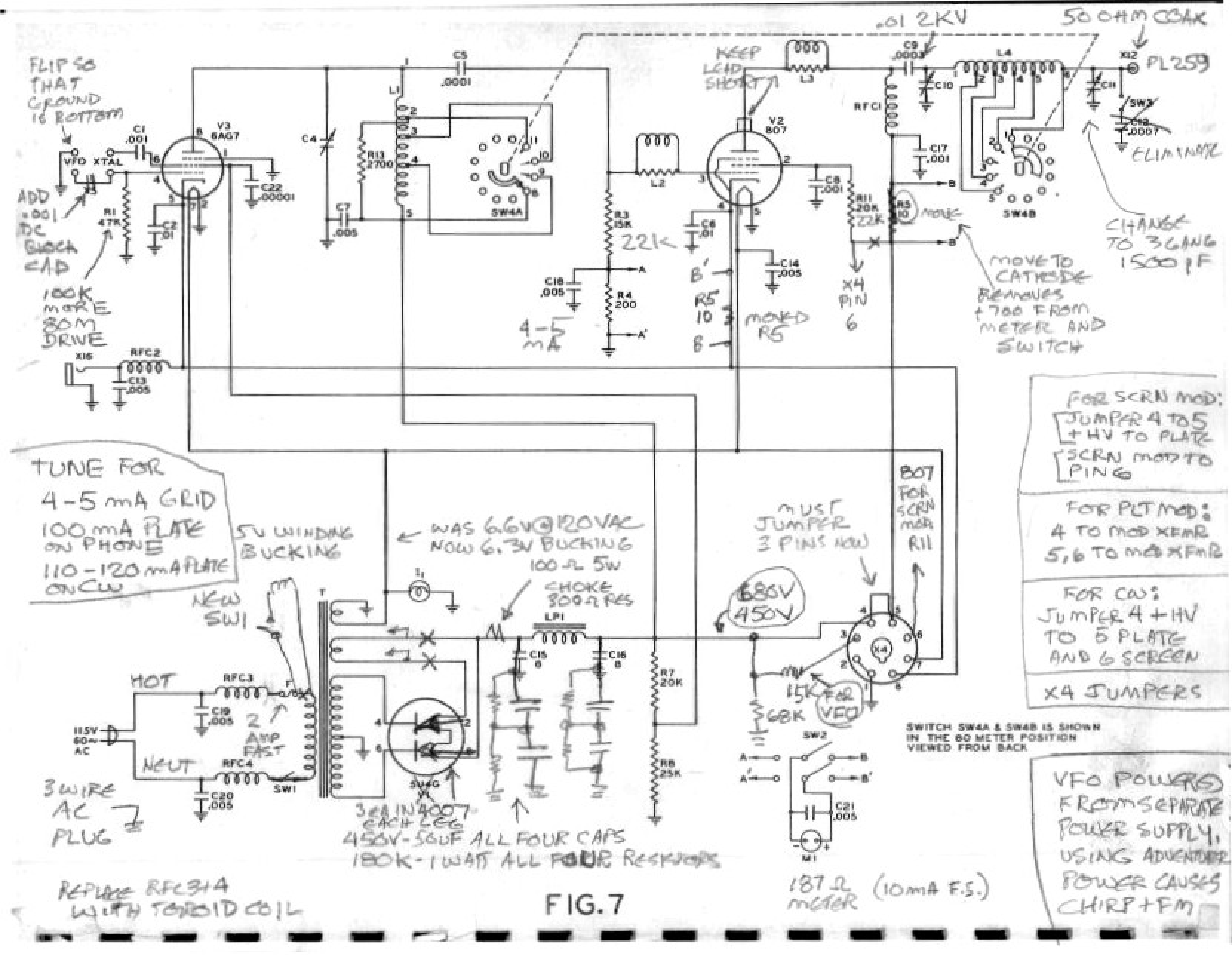
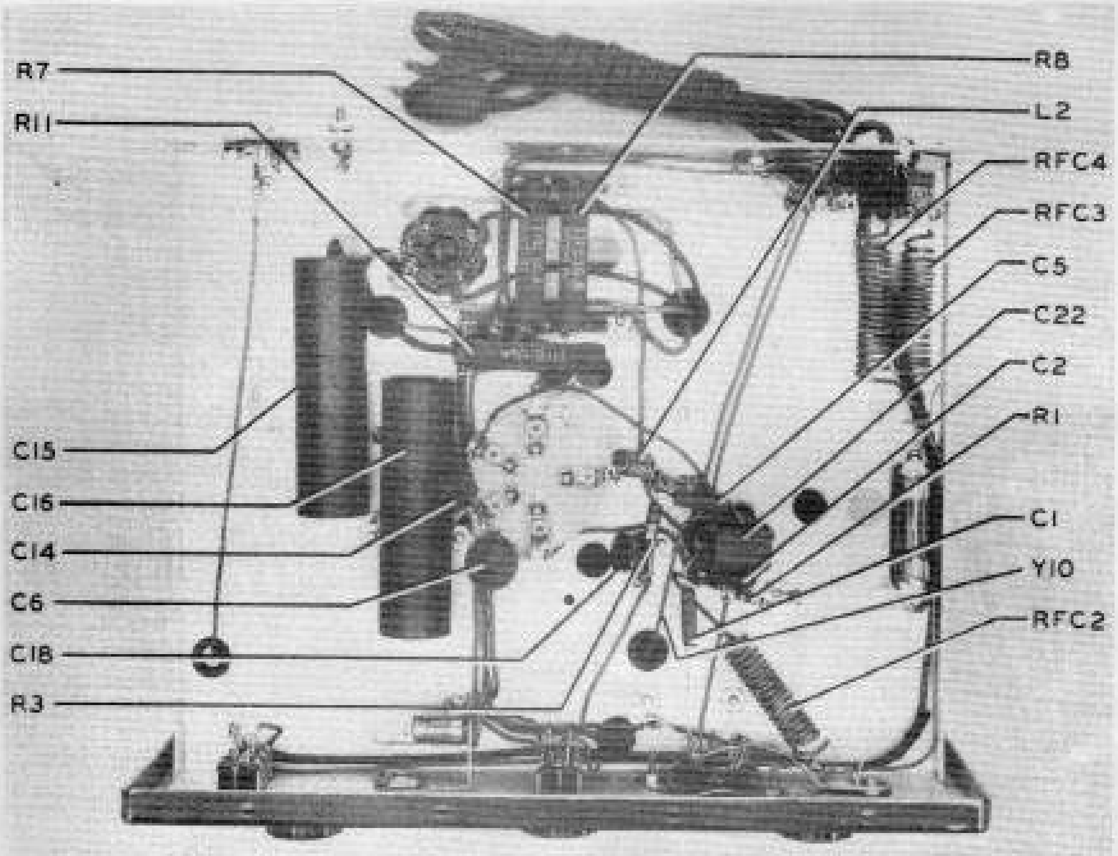
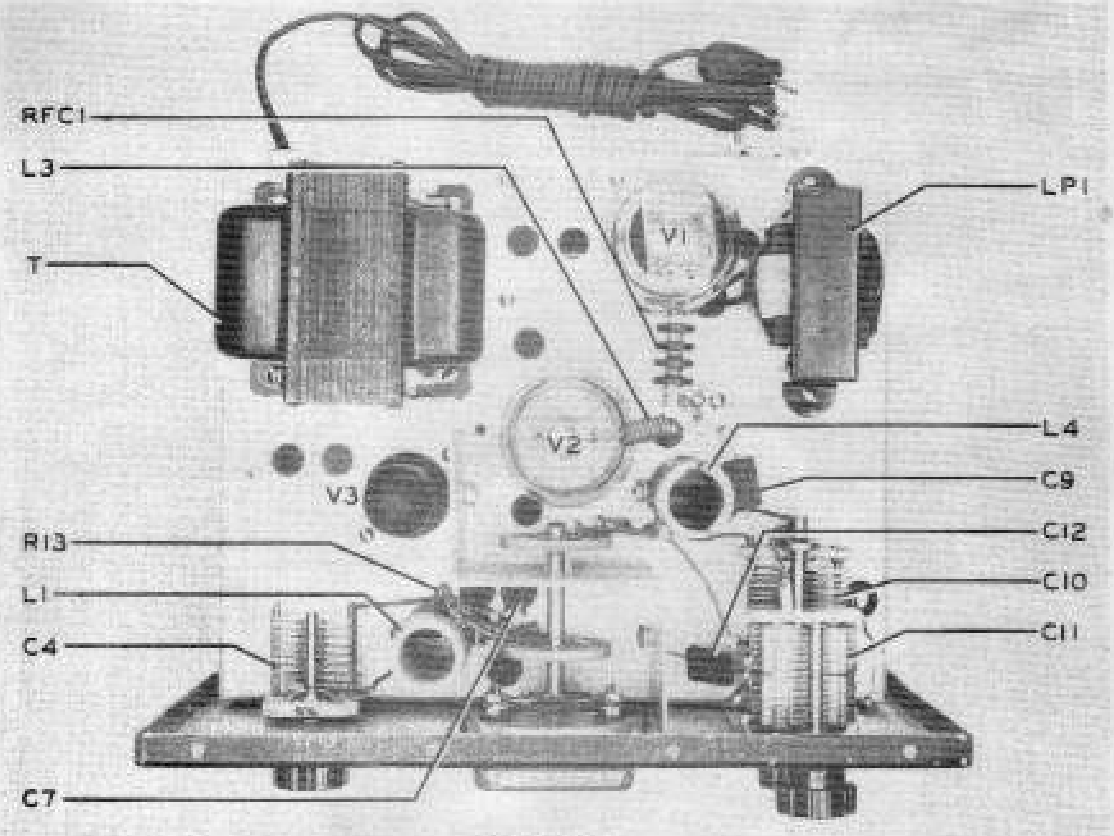

FLIP SO THAT GROUND IS BOTTOM
ADD .001 DC BLOCK CAP
100K MORE 80M DRIVE
VFO
XTAL
C1 .001
V3 6AG7
R1 47K
C2 .01
C22 .00001
C4
L1
C5 .0001
R13 2700
C7 .005
SW4A
.01 2KV
KEEP LEAD SHORT
L3
L2
V2 807
C9 .0003
C10
L4
C11
X12
50 OHM COAX
PL259
SW3
C12 .0007
ELIMINATE
CHANGE TO 3 GANG 1500 pF
RFC1
C17 .001
C8 .001
R11 20K 22K
R5 10
MOVE
SW4B
MOVE TO CATHODE REMOVES +700 FROM METER AND SWITCH
X4 PIN 6
R3 15K
22K
C18 .005
R4 200
4-5 mA
C6 .01
C14 .005
B'
R5 10
B
MOVED R5
X16
RFC2
C13 .005
TUNE FOR 4-5 mA GRID 100 mA PLATE ON PHONE 110-120 mA PLATE ON CW
5V WINDING BUCKING
WAS 6.6V@120VAC NOW 6.3V BUCKING
100 Ω 5W
CHOKE 300 Ω RES
LP1
C15 8
C16 8
NEW SW1
T
HOT
RFC3
C19 .005
2 AMP FAST
115V 60~ AC
NEUT
RFC4
C20 .005
SW1
3 WIRE AC PLUG
5U4G
3 ea 1N4007 EACH LEG
450V-56uF ALL FOUR CAPS
180K-1WATT ALL FOUR RESISTORS
R7 20K
R8 25K
680V 450V
MUST JUMPER 3 PINS NOW
807 FOR SCRN MOD R11
X4
15K FOR VFO
68K
SW2
C21 .005
M1
SWITCH SW4A & SW4B IS SHOWN IN THE 80 METER POSITION VIEWED FROM BACK
FOR SCRN MOD: JUMPER 4 TO 5 +HV TO PLATE SCRN MOD TO PIN 6
FOR PLT MOD: 4 TO MOD XFMR 5,6 TO MOD XFMR
FOR CW: JUMPER 4 + HV TO 5 PLATE AND 6 SCREEN
X4 JUMPERS
VFO POWERED FROM SEPARATE POWER SUPPLY, USING ADVENTURER POWER CAUSES CHIRP + FM
REPLACE RFC3+4 WITH TOROID COIL
187 Ω METER (10 mA F.S.)

FIG.7



R7
R11
C15
C16
C14
C6
C18
R3
R8
L2
RFC4
RFC3
C5
C22
C2
R1
C1
Y10
RFC2

FIG.5



RFC1
L3
T
V1
V2
V3
R13
L1
C4
C7
LP1
L4
C9
C12
C10
C11

FIG.6

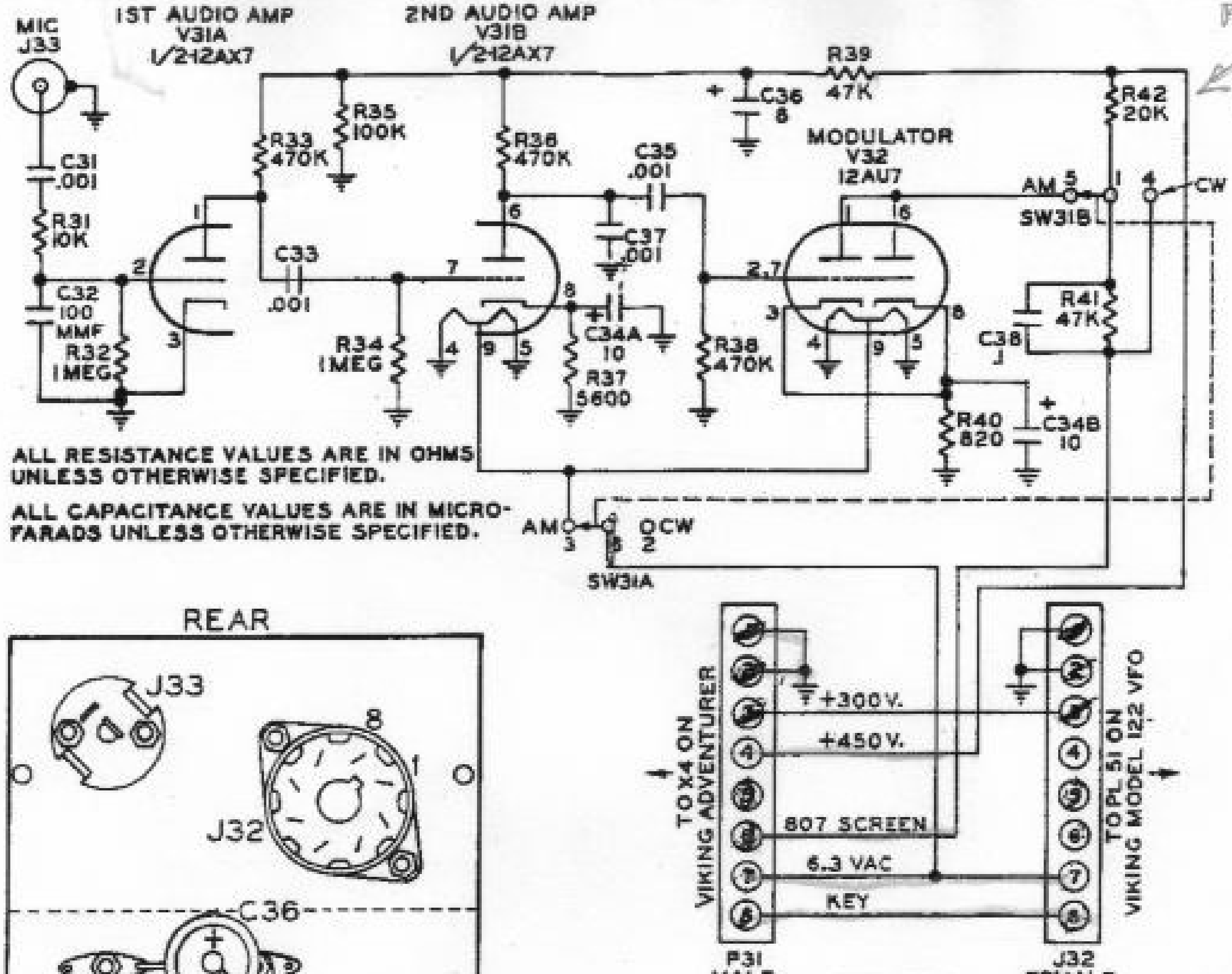


FIGURE 3

ADVENTURER MODULATOR SCHEMATIC

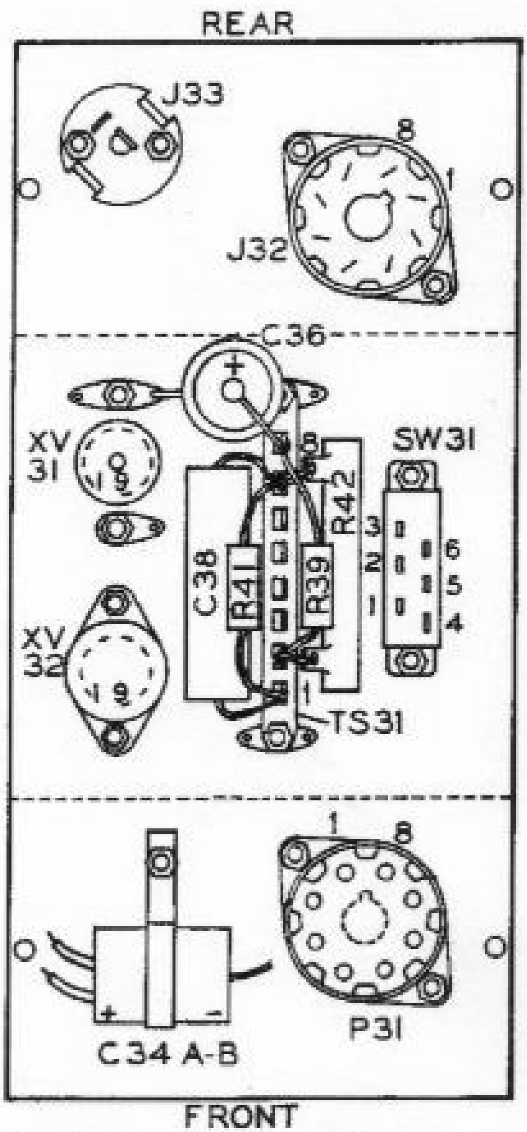


FIGURE 1, UNFOLDED VIEW OF INSIDE OF CHASSIS

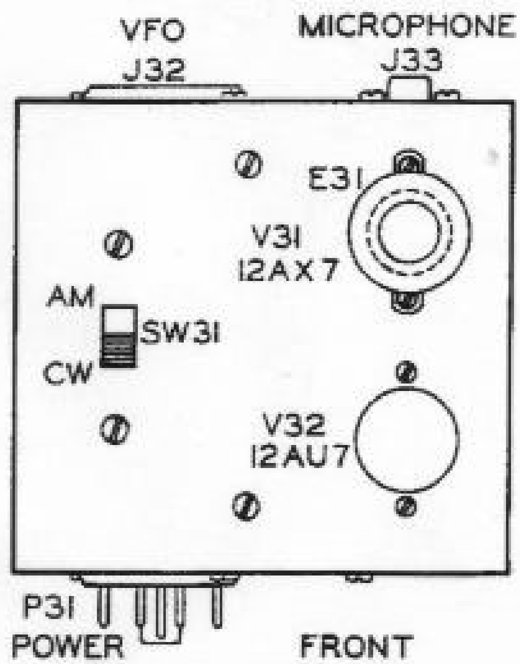
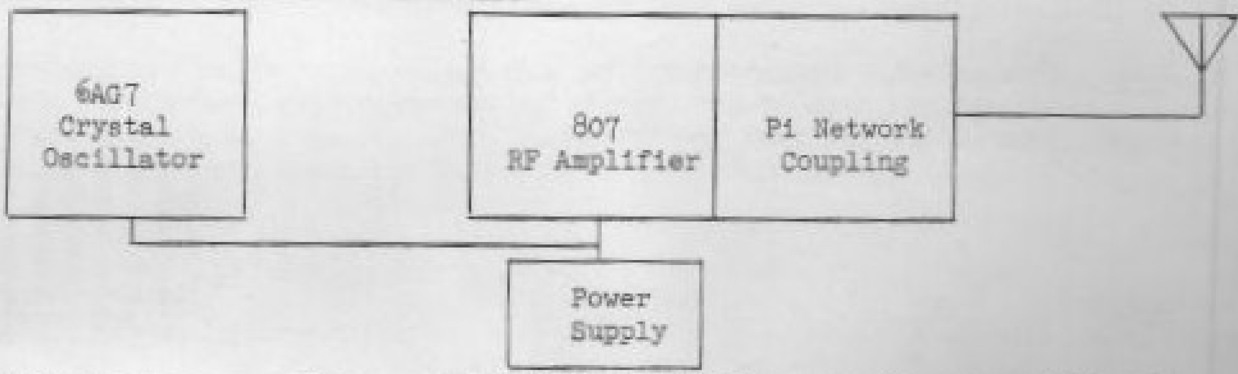


FIGURE 2. TOP VIEW

JOHNSON VIKING ADVENTURER CIRCUIT DESCRIPTION



The 6AG7 operates as a pierce crystal oscillator with an electron coupled tank. This is capacity coupled to the grid of the 807 amplifier through coupling condenser C5. Since more than adequate drive for the 807 is available on the lower frequencies R13 is added across the coil to reduce the drive on these frequencies. The oscillator becomes an amplifier or frequency multiplier when a VFO is used.

The final amplifier uses an 807 with a band-switched pi network plate circuit. This network will match unbalanced antenna impedances in the range of 50 to 600 ohms and will also tune out a wide range of inductive or capacitive reactance.

GROUNDING:

Before attempting to tune the transmitter and load it either into a dummy load or an antenna, the chassis should be grounded. This is necessary, not only as a safety precaution, but to insure that the chassis be at zero RF potential for effective TVI suppression and for efficient antenna loading.

The ground connection should be made from the screw provided on the back of the chassis, using a heavy conductor wire (#16 or larger) to a good earth ground. This wire should be as short as possible and may be to a water pipe, a copper rod driven into the ground approximately 6 ft. or similar earth connection. If the transmitter chassis becomes "hot" with RF under operating condition try different lengths of ground wire and/or different grounds until this is eliminated.

A rough check on the effectiveness of the transmitter ground may be made by touching the chassis while watching the amplifier plate current with the transmitter operating into an antenna. A change in the current upon touching the chassis is indicative of an ineffective ground. A neon bulb may under some conditions glow when touched to the chassis, thus indicating that the chassis is at high RF potential.

TUNING PROCEDURE:

CAUTION: UNDER SOME ANTENNA LOADING CONDITIONS, IT MAY BE POSSIBLE TO DOUBLE IN THE AMPLIFIER STAGE THUS PRODUCING OUTPUT ON THE SECOND HARMONIC FREQUENCY RATHER THAN THE DESIRED FUNDAMENTAL FREQUENCY. SUCH OPERATION SHOULD BE AVOIDED, PARTICULARLY ON 80 METERS, TO PREVENT OUT-OF-BAND OPERATION. "AMPLIFIER" TUNING SHOULD BE CAREFULLY CHECKED FOR TWO PLATE CURRENT DIP POINTS ON THE TUNING DIAL. IF TWO DIP POINTS ARE FOUND WITHIN THE 0 TO 100 DIAL CALIBRATION, THE LOWER NUMBER DIAL SETTING

(LOWER FREQUENCY) SHOULD BE USED. IN ADDITION BE CERTAIN THAT "AMPLIFIER" TUNING DIAL IS SET AT "O" WHEN THE CAPACITOR IS AT FULL MESH POSITION!

The tuning of the Viking Adventurer is the same for all bands. Refer to the table below for the approximate dial settings and crystal (or VFO) frequency for the various settings of the bandswitch. With the meter switch in the "grid" position, close the key and tune the "oscillator" for maximum grid current as indicated by the milliammeter. Then with the meter in the "plate" position, tune the "amplifier" for minimum plate current (plate current "dip"). Next the coupling should be increased in small increments, retuning the amplifier to minimum plate current after each change of the coupling control. The coupling should be increased to the point where the "dipped" plate current is 110 milliamperes. If proper loading is not obtained when the coupling has been rotated 180 degrees to coupling position #10, turn it back to #1, move the coupling to "MAX" and proceed as above, "dipping" the amplifier tuning to minimum after each adjustment of coupling. Note: Dipping the amplifier to minimum plate current must always be the last tuning adjustment.

Approximate dial readings for the oscillator and amplifier under no load conditions are given in the following table:

Output frequency (Band-switch setting)	Crystal or VFO Frequency	Oscillator Tuning	Amplifier Tuning	Coupling Control	Switch
80 meter band	80 meters	40	40	1	Min
40 meter band	80 or 40 meters	35	70	1	Min
20 meter band	40 meters	50	75	1	Min
15 meter band	40 meters	40	90	1	Min
10 meter band	40 meters	50	85	1	Max

Note: The coupling switch should be at "MAX" on the ten meter band.

The following step by step tuning is given as a further help in learning to tune the Viking Adventurer properly:

1. First make sure the power cord is plugged in to a 115 volt A.C. outlet, the key plugges into the key socket and, if the amplifier is to be loaded, the antenna or dummy antenna is connected. As explained previously a good ground should always be connected when testing or operating the transmitter.
2. Turn the bandswitch to the desired band.
3. Set the oscillator, amplifier, and coupling controls to their approximate positions as indicated in the above table and plug the crystal into the crystal socket.
4. Turn the power switch on and allow approximately 30 seconds for the tubes to warm up before closing the key. (If the key has a shorting switch, check to be sure it is open.)
5. Place the meter switch in the "grid" position, close the key and tune the oscillator for maximum grid current indicated by the meter. Caution: Do not hold the key down for long periods of time without tuning the amplifier to resonance as indicated in Step #6.
6. Switch the meter to "plate" and dip the amplifier (tune the amplifier to minimum plate current).
7. Load the amplifier into the antenna (or dummy load) by increasing the coupling in small steps, dipping the amplifier after each coupling adjustment, until the "dipped" plate current is 110 milliammeters. Always "dip" the amplifier tuning after any other tuning adjustment.

VIKING ADVENTURER PI-NETWORK TUNING, HARMONIC SUPPRESSION AND ANTENNA SYSTEMS

The pi tuning/coupling network in the Viking Adventurer is designed to load the final amplifier into antenna resistances of nominally 50 to 600 ohms throughout the frequency range of the transmitter. In addition, it is capable of "tuning out" series antenna reactances up to several hundred ohms to complete a good match to most unbalanced antenna systems.

When the transmitter is well grounded and properly tuned, the higher harmonic suppression is excellent, generally much better than with other conventional methods of antenna coupling. This should be of interest to amateurs afflicted with TVI or other high frequency interference problems. In some cases when operating on the higher frequencies a low pass filter such as the Johnson 250-20 may be necessary for additional harmonic attenuation.

To obtain proper tuning, coupling and harmonic suppression with any transmitter antenna coupling system, the part of the circuit designed to operate at RF ground potential must be at RF ground potential. A "room full of RF" is evidence that a high RF potential exists on something in or near the room. In many cases the source of RF is the transmitter's chassis and power cord. This condition is very undesirable for several reasons. Three objectionable factors which obviously affect the loading of the transmitter when poor grounds are involved are:

a. The impedance that the output terminal of the transmitter looks into includes not only the true antenna to ground impedance as presented by the antenna feedline but also the transmitter chassis to ground impedance. This additional impedance in some cases will raise the apparent antenna impedance to such a high value that it cannot be loaded by the pi network.

b. Part of the transmitter's power is lost in the ground system due to radiation of the ground lead, power cord or cabinet. This power is quickly dissipated in surrounding objects and contributes nothing to effective radiated power except to distort the antenna's normal field pattern.

c. It is conventional, in designing a transmitter, to bypass harmonics or any possible sources of stray high frequency currents to the chassis on the assumption the chassis will be kept as near ground potential as possible. When a high impedance is presented to these currents at the chassis they are able to radiate to some extent rather than be passed harmlessly to ground.

With the transmitter chassis well grounded, correctly designed antenna systems having relatively "flat" unbalanced feeder systems, can easily be loaded by following the tuning instructions given, provided the antenna terminal impedances fall within the range of the pi network. Feeding a balanced system with a feedline over a quarter of one wavelength long, may prove to be surprisingly successful if the transmitter chassis is held at ground potential. The transmission line between the transmitter and antenna will tend to assume a partial balance at the antenna. Some standing waves will result but may not be excessive.

Antennas having random lengths, random feed points and various types of feed lines will exhibit widely different resistance and reactance characteristics. It is well to remember that the feedline is a very important part of the system. A common example of the random antenna is a horizontal wire fed by a single wire feed line. The feed line in this case actually becomes part of the radiating system. An antenna of this type can, in most instances, be fed by the pi network directly but there are critical dimensions where the antenna series reactance (inductive or capacitive) becomes too high and the antenna resistance can become either too high or too low to be matched by the pi network.

Several things can be tried in an effort to bring the antenna system into the tuning range of the pi network:

a. Change the length of the feeder line between the antenna and transmitter experimentally 1/8 to 1/4 wavelength.
b. Change the point of connection of the feedline to the antenna 1/8 to 1/4 wavelength.
c. Change the antenna length 1/8 to 1/4 wavelength. Antennas shorter than 1/8 wavelength (antenna and feeder) may be difficult to load. They present a high capacitive reactance to the transmitter output terminals. Effective antenna lengths in the vicinity of 1/2 wavelength will in general exhibit characteristics of high resistance, high reactance (inductive or capacitive), or both when end fed.
d. "Load" the antenna feeder by placing an inductor or capacitor in series to cancel out the reactance of the antenna feeder. This may require considerable cut and try and will affect only the reactive component of the antenna impedance. However, it can prove useful in some cases.

It is difficult to specify antennas that will be suitable for any installation because of the different requirements. An antenna that has been found satisfactory on all bands is a single wire 75 ft. long measured from the transmitter antenna terminal. As much of this antenna should be kept clear of other objects such as trees, buildings, power lines, etc., and as high as possible. The ground lead is part of the system and therefore should be no longer than necessary. In cases where a long ground is unavoidable, when operating on a second or third floor of a building for example, it may be necessary to adjust the overall length of the antenna to compensate for this additional length. Adjustments in antenna length in steps of 2 to 3 feet can be easily made to compensate for the affects of surrounding objects and ground lead length to bring this antenna into the tuning range of the pi-network.

Antennas fed with a non-radiating transmission line usually give better results since the entire antenna will be high and can be erected so that it is away from trees, buildings, etc. An antenna of this type that will work well with the Viking Adventurer and that is easy to construct and erect is the Half-Wave doublet antenna. This antenna consists of a straight wire one-half wavelength long with a 50-70 ohm coaxial transmission line connected to the center. The transmission line length is not critical. However, since this is an unbalanced line feeding a balanced antenna, some standing waves will be present which might make it necessary to adjust the length of the coaxial line to bring it into the tuning range of the pi-network.

A complete discussion on antennas cannot be made here, and since this is one of the most important elements in a transmitting system, reference should be made to the Amateur Handbook, the Antenna Handbook or similar publications on antennas for more detailed information on antennas and transmission lines.

VFO EXCITATION:

The Johnson Adventurer is designed for VFO input as well as crystal operation. The VFO input is to the left of the crystal socket on the front panel and requires a two pin plug (Millen type 37412 or equivalent). If one side of the transmission line from the VFO is grounded such as the shield on a coaxial line, this ground side should be connected to the top pin of the VFO input socket. The output of the VFO should have a 50 to 150 mmfd isolation capacitor in the grid lead (bottom VFO pin) to avoid placing a DC short on the input grid.

If the Johnson Viking Model 240-122 VFO is used, a 10K ohm 4 watt resistor should be connected between pins #3 and #4 on the power socket (this may be two 20K ohm 2 watt resistors in parallel, two 5000 ohm 2 watt resistors in series or a single 10K 4 watt resistor). R51, the 18K 2 watt resistor in the VFO, should be changed to a 20K ohm 10 watt resistor. These changes are required for correct operating voltages and power dissipation for the VFO. The lead from pin 8 of PL51 should be changed at the key jack J50 so that it will be connected to the ungrounded side of C69 (at key jack). After these changes have been made, the VFO power plug may be inserted in the socket at the rear of the transmitter and the RF output from the VFO connected to the VFO socket (the center coaxial conductor to the bottom VFO input pin). Since the keying circuit is connected to the VFO keying circuit through the power plug the key should be plugged into the VFO. This keys both the VFO and the transmitter.

MODULATION:

To modulate the Viking Adventurer Transmitter for phone operation, 25 watts of audio power is required. This should be applied to the transmitter with a modulation transformer having a secondary impedance of 4000 ohms. The jumper wire between pins 4 and 5 of the power socket X4 should be removed so that the B+ to the final is fed through the modulation transformer by connecting to this socket with an octal plug. Refer to the amateur handbook for further information on speech amplifiers and modulators and their adjustment.

CAUTION: UNDER SOME ANTENNA LOADING CONDITIONS, IT MAY BE POSSIBLE TO DOUBLE IN THE AMPLIFIER STAGE THUS PRODUCING OUTPUT ON THE SECOND HARMONIC FREQUENCY RATHER THAN THE DESIRED FUNDAMENTAL FREQUENCY. SUCH OPERATION SHOULD BE AVOIDED, PARTICULARLY ON 80 METERS, TO PREVENT OUT-OF-BAND OPERATION. "AMPLIFIER" TUNING SHOULD BE CAREFULLY CHECKED FOR TWO PLATE CURRENT DIP POINTS ON THE TUNING DIAL. IF TWO DIP POINTS ARE FOUND WITHIN THE 0 TO 100 DIAL CALIBRATION, THE LOWER NUMBER DIAL SETTING (LOWER FREQUENCY) SHOULD BE USED. IN ADDITION BE CERTAIN THAT "AMPLIFIER" TUNING DIAL IS SET AT "0" WHEN THE CAPACITOR IS AT FULL MESH POSITION!