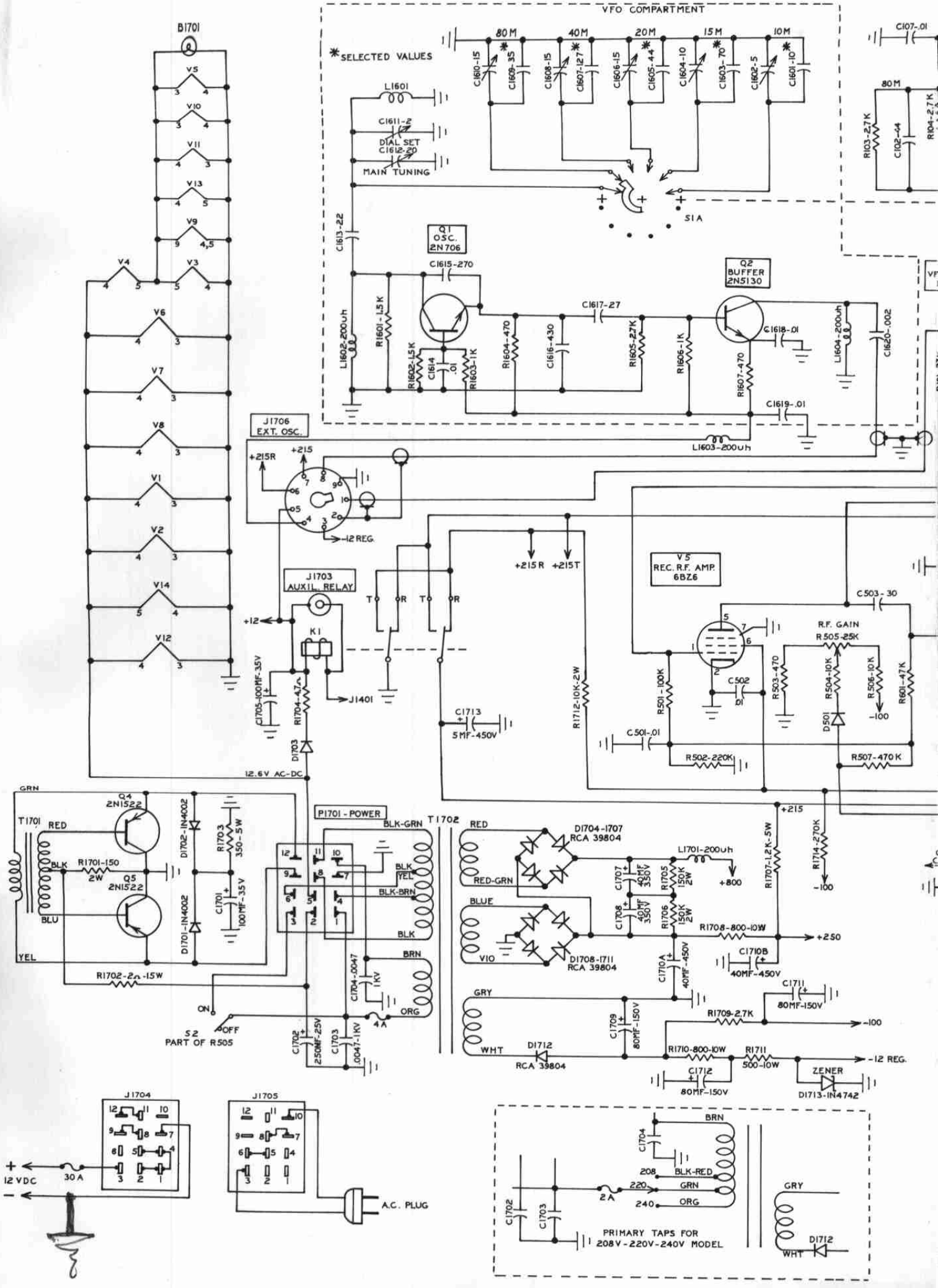

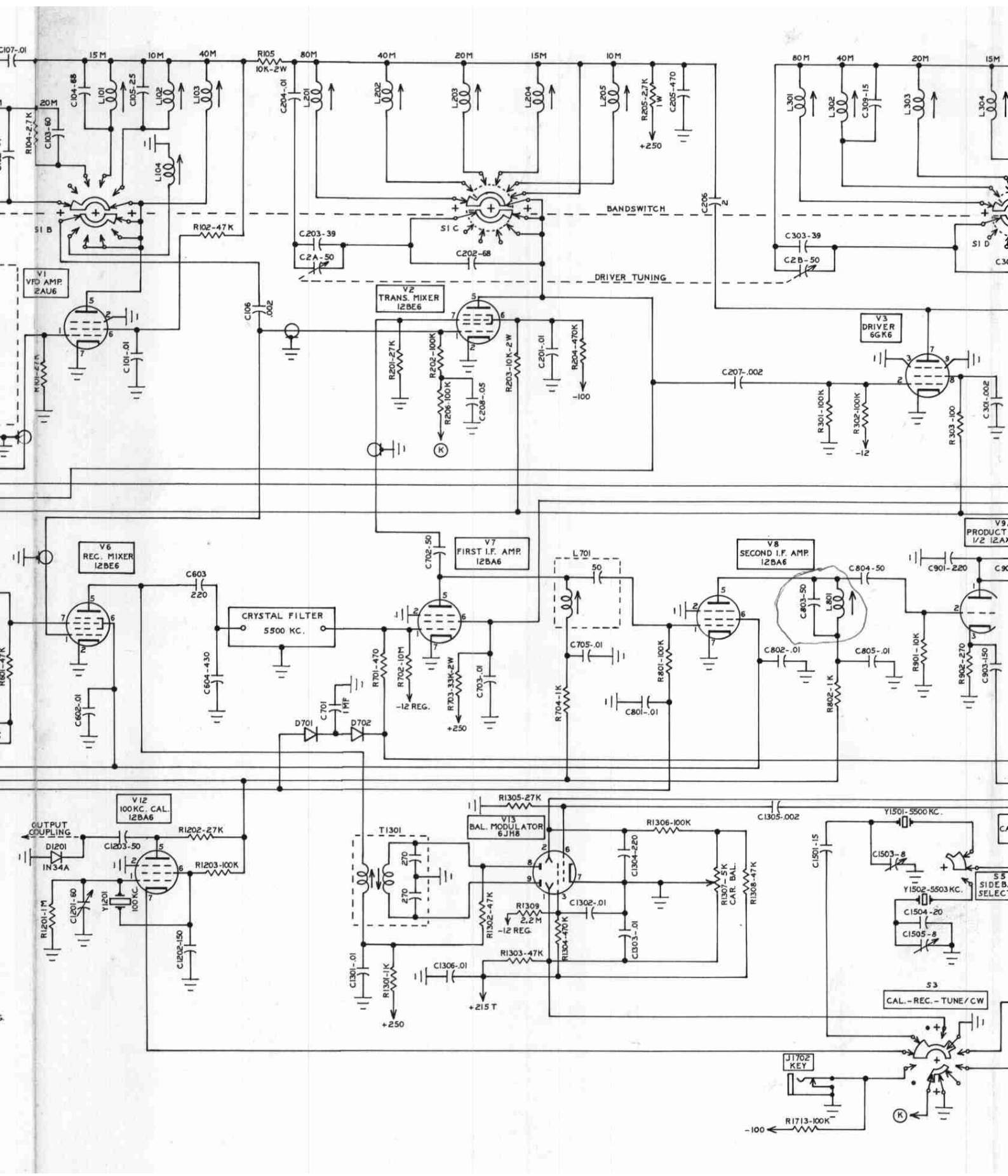

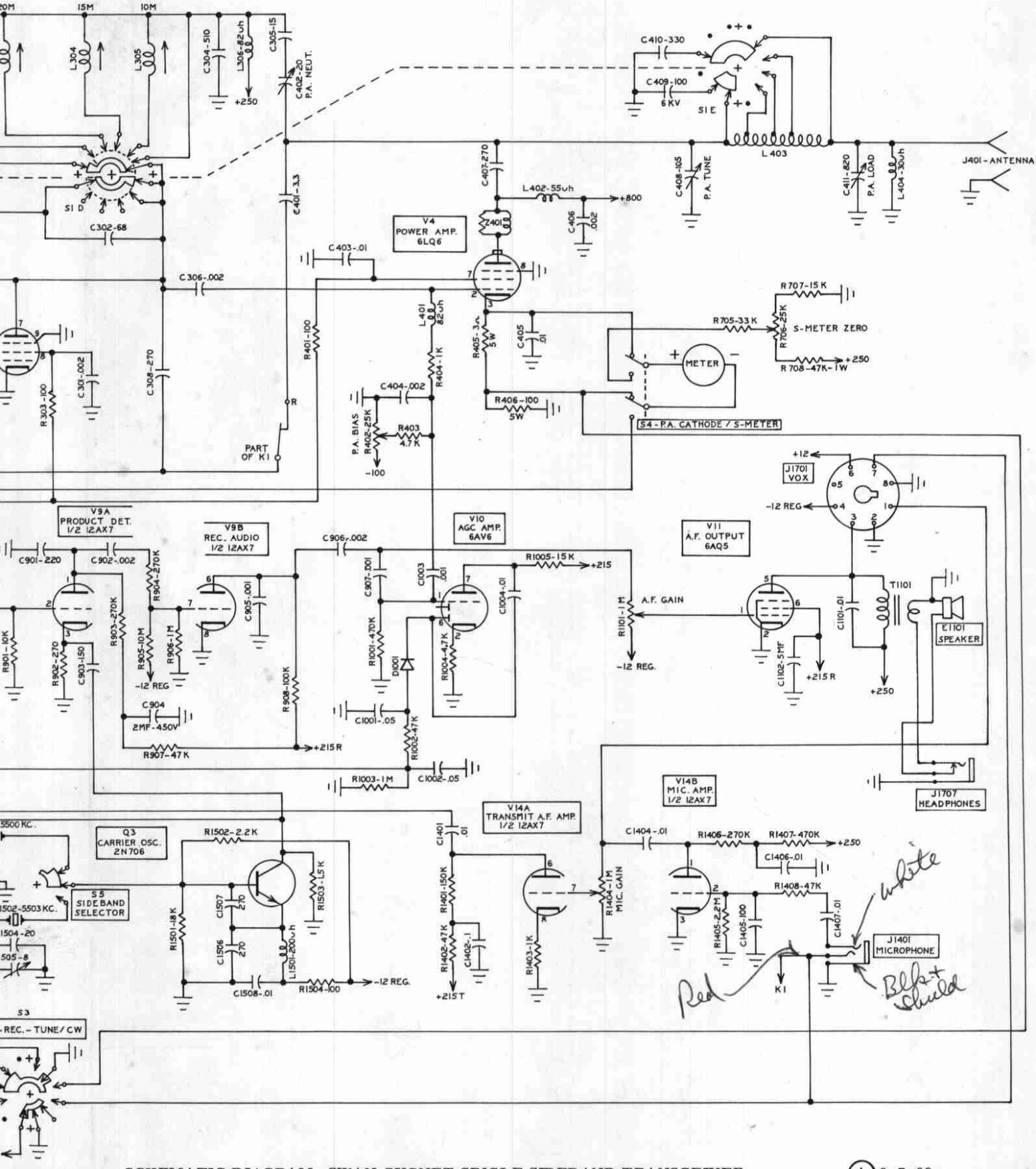

SCHEMATIC DIAGRAM, SWAN CYGNET SINGLE SIDEBAND TRANSCEIVER
SWAN ELECTRONICS CORPORATION, OCEANSIDE.

(A) 8-7-69

TROUBLESHOOTING

The information contained in Figures 4, 5, and 6, together with the voltage and resistance chart and troubleshooting guide should be sufficient for most troubleshooting by the average licensed amateur radio operator.

VOLTAGE AND RESISTANCE CHART

TUBE TYPE	R = Rec. T = Trans.	Socket Pin Numbers 1	2	3	4	5	6	7	8	9
V1 12BA6 VFO Amp.	R Volts	-.6	0	0	12.6AC	45	45	0	-	-
	T Volts	-.6	0	0	12.6AC	50	50	0	-	-
	Ohms	1.2K	0	0	0.2	*	*	0	-	-
V2 12BE6 Trans. Mixer	R Volts	-1.2	0	0	12.6AC	250	-2	0	-	-
	T Volts	-1.0	0	0	12.6AC	250	135	0	-	-
	Ohms	100K	0	0	0.2	*	11K	35K	-	-
V3 6GK6 Driver	R Volts	0	-6.7	0	0	6.3AC	NC	255	0	0
	T Volts	0	-6.7	0	0	6.3AC	NC	265	225	0
	Ohms	10	100K	0	0	0.3	NC	*	0.2	0
V4 6LQ6 Pwr. Amp.	R Volts	NC	-75	0	12.6AC	6.3AC	-75	0	0	NC
	T Volts	NC	-75	0	12.6AC	6.3AC	-75	225	0	NC
	Ohms	NC	6K	1.0	0.1	0.3	6K	0.1	0	NC
V5 6BZ6 Rec. R. F.	R Volts	0	0	6.3AC	0	255	115	0	-	-
	T Volts	0	0	6.3AC	0	255	0	0	-	-
	Ohms	1.1M	0	0.1	0	14K	40K	0	-	-
V6 12BE6 Rec. Mixer	R Volts	0	0	0	12.6AC	250	100	-.5	-	-
	T Volts	0	0	0	12.6AC	265	0	-.5	-	-
	Ohms	100K	0	0	0.1	11K	40K	45K	-	-
V7 12BA6 1st I. F.	R Volts	-1.8	0	0	12.6AC	210	48	0	-	-
	T Volts	-1.8	0	0	12.6AC	220	50	0	-	-
	Ohms	500	0	0	0.1	15K	50K	0	-	-
V8 12BA6 2nd I. F.	R Volts	-1.7	0	0	12.6AC	205	105	0	-	-
	T Volts	-1.7	0	0	12.6AC	225	0	0	-	-
	Ohms	110K	0	0	0.1	15K	40K	0	-	-
V9 12AX7 Det. A. F.	R Volts	55	-1	0	0	0	145	-.25	0	6.3AC
	T Volts	-3	-1.6	0	0	0	0	-.25	0	6.3AC
	Ohms	400K	11K	300	0	0	125K	1M	0	0.2
V11 6AQ5 A. F. Output	R Volts	-9	0	0	6.3AC	237	215	NC	-	-
	T Volts	-9	0	0	6.3AC	262	0	NC	-	-
	Ohms	500K	0	0	0.2	10K	12K	NC	-	-
V13 6JH8 Bal. Mod.	R Volts	0	0	0	6.3AC	0	-1.4	0	0	0
	T Volts	45	45	75	6.3AC	0	-1.4	0	100	100
	Ohms	2K	75K	500K	0.2	0	35K	0	75K	75K

NOTE: (1) Voltage Measurements made with 20,000 ohm per volt meter, or with VTVM.
(2) Voltage figures are D.C. unless otherwise specified. (3) REC. GAIN full on, clockwise.
(4) Transmit Measurements made by pressing Mic. Button, using dummy load. (*) Varies.

TROUBLESHOOTING CHART

DEFECT	POSSIBLE CAUSE
PA IDLING CURRENT UNSTABLE	1. Defective Power Amplifier Tube (V4) 2. Defective BIAS control and/or associated components. 3. Defective bias power supply.
INABILITY TO LOAD PER OPERATION INSTRUCTIONS	1. Antenna not resonant at operating frequency. 2. Defective transmission line. 3. Defective antenna loading coil(s). 4. Tubes V1 through V4 defective.
INSUFFICIENT SIDEBAND SUPPRESSION	1. Carrier Oscillator (Q3) operating on incorrect frequency. 2. Crystal filter defective or mistuned. 3. Carrier Oscillator (Q3) operating on incorrect frequency.
MICROPHONICS IN TRANSMITTER	1. Tubes V13 and/or V14 defective. 2. IF transformer L701 defective or incorrectly adjusted. 3. Microphone defective.
LOW RECEIVER SENSITIVITY	1. Tubes V5 through V10 defective. 2. Incorrect adjustment of the transmitter Pi-Network. 3. IF transformer L801 incorrectly adjusted or defective. 4. K1 relay contacts defective.
INSUFFICIENT CARRIER SUPPRESSION	1. Tube V13 defective. 2. Transformer T1301 defective or mistuned. 3. Carrier Oscillator (Q3) operating on incorrect frequency.

ALIGNMENT

The alignment procedures presented in this section are routine touch-up procedures for all tuned circuits and other adjustments. It is recommended that the procedures be performed in the order presented. However, if complete realignment is not required (as may be the case when just one tube is replaced), perform just those procedures required.

Refer to Figures 4, 5, and 6 for component placement.

RECEIVER ALIGNMENT:

Receiver alignment involves only the adjustment of the First and Second IF coils. The R.F. coils which affect receiver performance are also used in transmit mode. Their adjustment is covered under "Transmitter Alignment.

1) After allowing approximately five minutes for warm-up tune the receiver to the middle of any band and at a "clear" frequency.

2) Adjust the P.A. TUNE, P.A. LOAD, and DRIVER front panel controls for maximum background noise.

3) Adjust IF coils L701 and L801 for maximum background noise. Repeat the adjustments several times.

TRANSMITTER POWER AMPLIFIER BIAS:

1. Switch Meter to P.A. CATH.

2. After allowing approximately five minutes for warm-up, key the transmitter with the microphone switch. Without speaking into the microphone, adjust the CAR. BAL. control for a minimum power amplifier current.

3. Again key the transmitter with the microphone switch, and without speaking into the microphone, adjust the P.A. BIAS control on the rear panel for a power amplifier current of 30 to 50 ma.

TRANSMITTER ALIGNMENT:

The alignment of transmitter circuits involve the adjustment of tuned circuits in the VFO Amplifier, V1, the Transmit Mixer, V2, and Driver stage, V3. It is recommended that a dummy load be connected to the antenna jack during this series of adjustments.

*NOTE: The 28 mc band should be peaked in the normally used portion of the band, as indicated by the optional frequencies. Power output will drop off somewhat when operating more than 500 KC away from the frequency at which the coils are peaked.

ORDER OF PROCEDURE:

(1) Start first by adjusting 7 mc band. Set tuning Dial and Driver control as indicated by Tuning Chart.

(2) Set P.A. LOAD control to 11 o'clock.

(3) Press Mic. Button. Check idling current. It should be between 30 and 40 ma. when CAR. BAL. control is nulled. Adjust P.A. Bias control, if required.

(4) With Mic. Button pressed, adjust "CAR. BAL." control for slight increase in meter reading, 50 to 60 ma. Adjust P.A. TUNE to resonance, (dip).

(5) Adjust coils as indicated by chart for maximum meter reading. When reading goes higher than 80 ma., or so, adjust "Car. Bal." for 60 ma. again.

(6) Adjust coils carefully for maximum peak. Exercise caution with "Car. Bal." control. Do not exceed 100 ma. reading for more than a few seconds. Be sure P.A. Tune" control is resonated, (adjusted for "dip" in meter reading).

(7) Switch to 3.5 mc band, and repeat steps (1) through (6), following the tuning chart carefully. Follow this procedure through for each of the other bands.

POWER AMPLIFIER NEUTRALIZATION:

Perform the power amplifier neutralization adjustment on 20 meters and in the following manner.

(1) After allowing approximately two minutes for warm-up, tune the transmitter to approximately 14.250 mc as described in the OPERATION section of this handbook.

(2) Position the "P.A. LOAD" control to the 9 o'clock position.

(3) Set Meter Switch to PA CATH.

(4) Key the transmitter with the microphone switch, and without speaking into the microphone, adjust the CAR. BAL." control on the rear panel for a power amplifier current of approximately 100 ma. Adjust the "DRIVER" control for peak. Quickly adjust "CAR. BAL." to 100 ma. again if it increased to a higher reading.

(5) With the Mic. Button still pressed, rotate the P. A. TUNE control through its range from 9 o'clock to 3 o'clock. You will note a pronounced "dip" in meter reading at resonance. Observe any tendency for the meter to "peak" above the 100 Ma. plateau on either side of resonance. If there is such a peak, adjust C402, the P. A. Neutralizing trimmer to suppress the peak. When properly neutralized, the meter reading will hold steadily at 100 Ma. except for the sharp dip at resonance, but there will be no peak above the 100 Ma. level.

(6) Key the transmitter with the microphone switch and re-adjust the CAR. BAL. control for minimum power amplifier current. Minimum power amplifier current should be between 30 and 40 Ma. If not, repeat the transmitter power amplifier bias adjustment on page

CARRIER BALANCE ADJUSTMENT:

Several times during the preceding adjustments, the CAR. BAL. control has been adjusted for varying reasons. Be sure that this control is adjusted for exact null before operating.

VFO CALIBRATION:

A trimmer capacitor is provided for each VFO range. These adjustment capacitors are available through the top of the VFO compartment. It is recommended that an insulated adjusting tool be used when performing the following adjustments.

NOTE

Dial tracking has been factory set by "pruning" the VFO inductor, L1401 Dial tracking adjustments will not normally be required.

1) After allowing approximately five minutes for warm-up, tune the receiver near 3800 KC. Using a frequency standard or a 100 KC crystal calibrator as an accurate signal source, tune the signal for zero beat and note the corresponding dial reading. If the 3800 KC signal does not zero beat at 3800 on the dial, adjust the 80 Meter trimmer until it does.

2) In a similar manner, check each of the other bands in the normally used portion of the band. For example: 7200 kc., 14,200 or 14,300. 21,300 or 21,400. 28,700 or whichever portion of 10 meters is normally used. Accuracy in other parts of the bands will be quite good, but remember that the Cygnet is not to be considered a frequency standard. Be cautious when operating near band edges. FCC regulations require that every amateur radio station have a means available for measuring his transmitting frequency.

If a frequency meter or frequency counter is available, the information contained in the following table can be used to perform direct VFO and Carrier Oscillator frequency measurements.

VFO AND CARRIER OSCILLATOR FREQUENCIES

Tuning Dial	V1 Injection Frequency	Q1 Osc. Frequency	Q3 Osc. Carrier Frequency
3500 KC	9000 KC	9000 KC	5500 KC
4000 KC	9500 KC	9500 KC	5500 KC
7000 KC	12,500 KC	(1/2) 6250 KC	5500 KC
7300 KC	12,800 KC	(1/2) 6400 KC	5500 KC
14,000 KC	8500 KC	8500 KC	5500 KC
14,350 KC	8850 KC	8850 KC	5500 KC
21,000 KC	15,500 KC	(1/2) 7750 KC	5500 KC
21,450 KC	15,950 KC	(1/2) 7975 KC	5500 KC
28,000 KC	22,500 KC	(1/2) 11,250 KC	5500 KC
29,700 KC	24,200 KC	(1/2) 12,100 KC	5500 KC

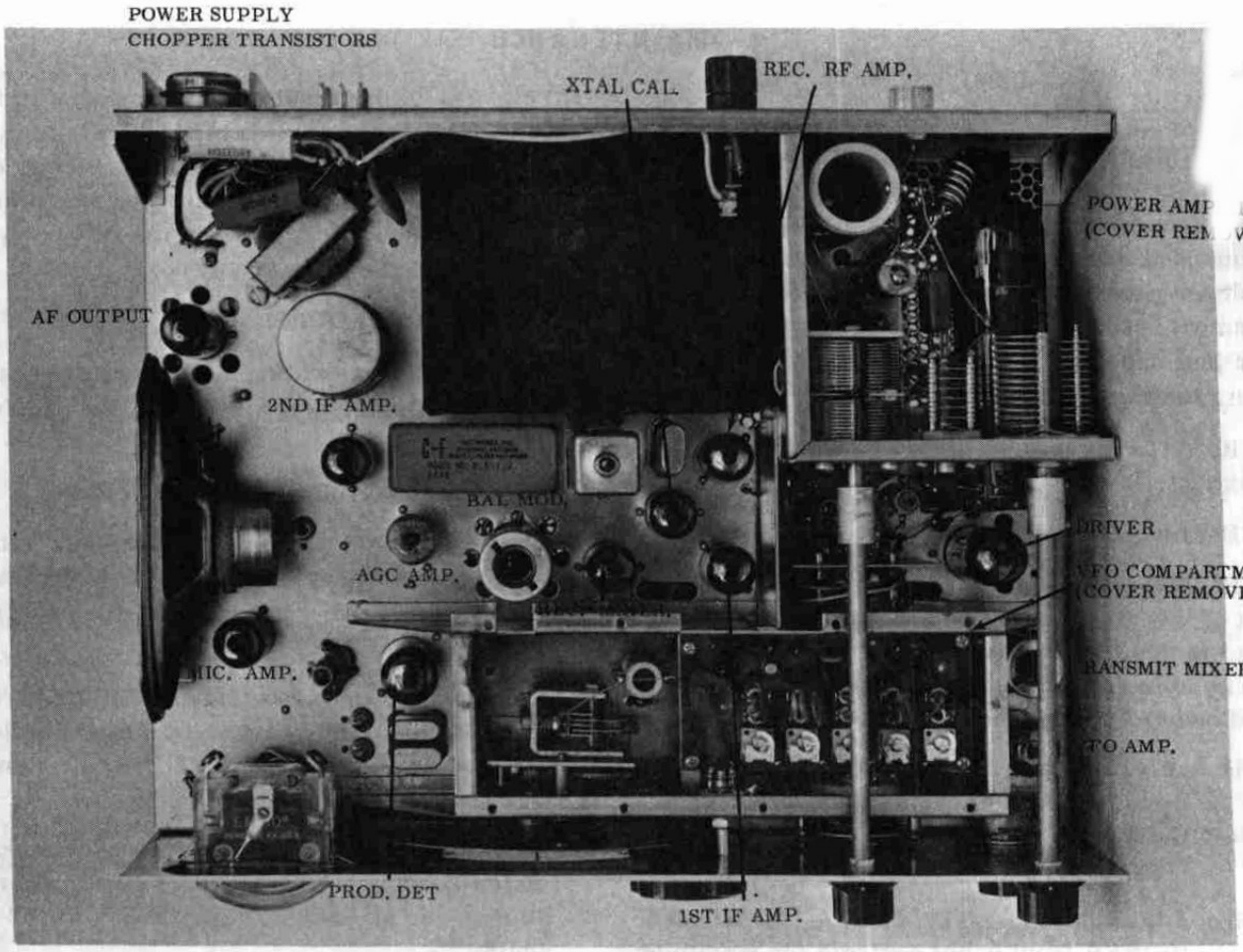

FIGURE 5. TOP VIEW, SWAN CYGNET MODEL 270

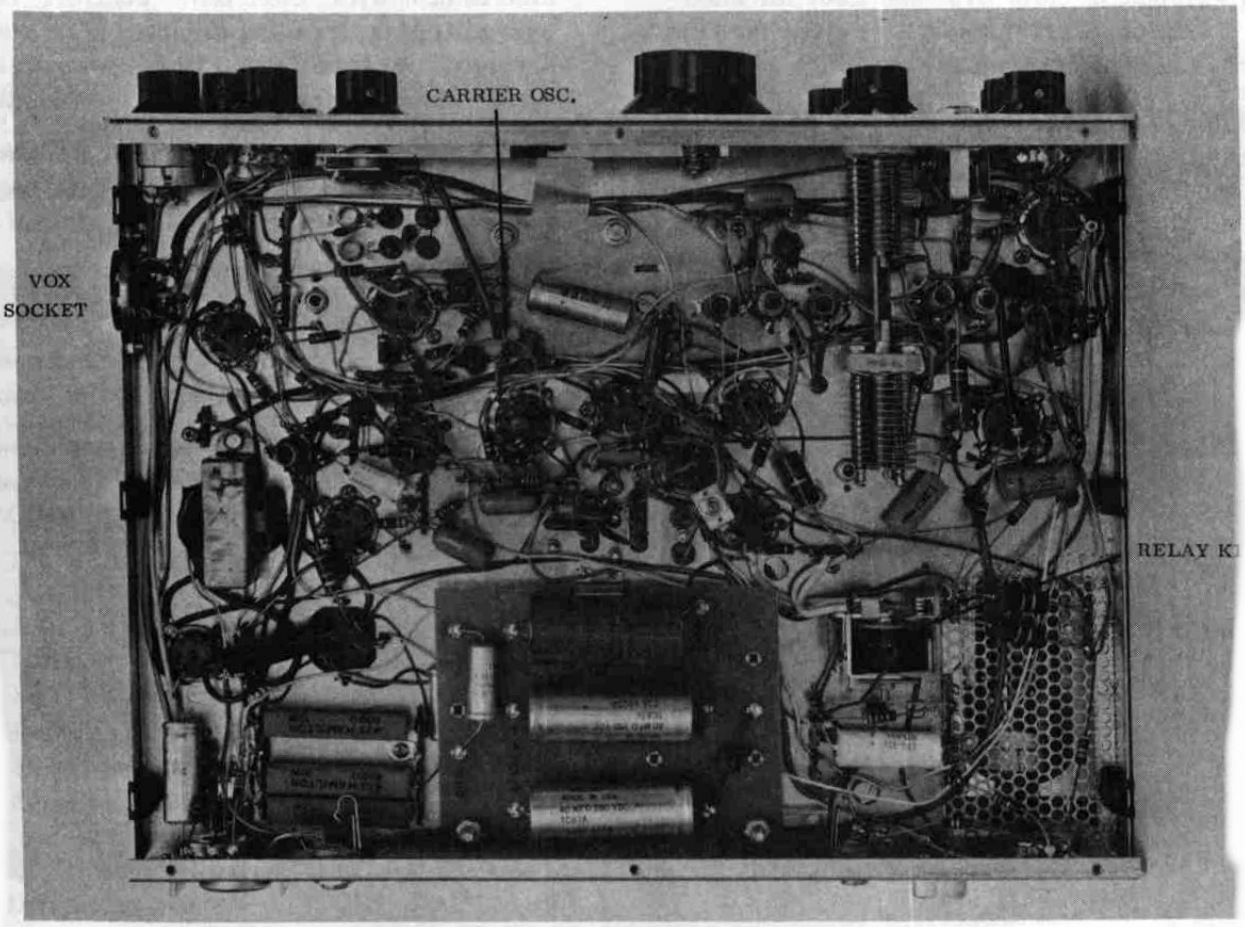

FIGURE 6. BOTTOM VIEW, SWAN CYGNET MODEL 270