Fig. 10 DC voltages during transmit/receive in the SSB mode, no signal received or transmitted, R-113 in CW position.

Pin # / Device	1 (emitter, source)	2 (base, gate)	3 (collector, drain)	4	5	6	7	8	9
V-1	150	0		0	150		0		
V-2	0	3.5	12.6H	0	0	0	245		
V-3	-.6	150/.9	0	6.3H	240	155/25	0		
V-4	2.5	0	2.5	6.3H	0	0	240	160	0
V-5	0	30	12.6H	6.3H	150	150	30		
V-6	6.0/200	0	0	6.3H	0		250	200/250	0
V-7	0	0	0	6.3H	225/215	140/200	2.9/200		
V-8	250	-60	0/200	6.3H	12.6H	-60	250	0	
V-9	250	-60	0/200	6.3H	12.6H	-60	250	0	
V-10	250	-60	0/200	6.3H	12.6H	-60	250	0	
V-11	0	150/2.0	0	6.3H	210/225	170/150	0		
V-12	0	0	12.6H	0	210/225	180/120	150/1.3		
V-13	0	-65	-60	0	0	0	-65	-63	6.3H
V-14	250	13.0	13.0	12.6H	0	13.0	-1.0	0	45
V-15	0	0	0	12.6H	225/205	100/200	1.7/200		
V-16	-2.0	4.0	0	6.3H	130	150	0		
V-17	24/22	0	24/22	0	6.3H		220	200	24/22
V-18	75	-.5	0	0	12.6H	110	0	1.1	6.3H
V-19	190/250	-.5/-6.0	0	6.3H	0	100	0	1.2	0
Q-5	0	0/.7	18.0/.1						
Q-6	0	0	60						
Q-7	3.7	4.1	12						
Q-8	0	0	10						
Q-9	7.8/7.0	8.5/7.7	17.0/15.0						
Q-10	6.0/7.0	6.8/7.8	17.0/15.0						
Q-11	18.0/.6	0	10.0/7.0						
Q-12	10.0/7.0	6.0/5.0	18.0/15.0						
Q-13	18.0/4.0	0	18.0/15.0						
Q-14	0	0	-12.5						
Q-15	-13.0	-12.5	6.0/5.0						
J-2	250	0	0/200	0	150/0	0	12.6H	0	
J-11	0	0	150/0	0	12.6H	0	0	0	0

Fig. 11 Resistance Chart

Function switch in the SSB position. Power supply disconnected, all controls CCW.

Pin # / Device	1 (emitter, source)	2 (base, gate)	3 (collector, drain)	4	5	6	7	8	9
V-1	10K	0		0	10K		0		
V-2	3.3M	inf.	H	0	150K	150K	350K		
V-3	4.5M	1K	0	H	10K	2.2M	0		
V-4	330	0	330	H	0	0	10K	40K	
V-5	1M	inf.	H	H	350K	120K	inf.		
V-6	20K	68K	0	H	0		10K	20K	0
V-7	660K	0	0	H	10K	40K	20K		
V-8	10K	30K	20K	H	H	30K	20K	0	
V-9	10K	30K	20K	H	H	30K	20K	0	
V-10	10K	30K	20K	H	H	30K	20K	0	
V-11	2.5M	136	0	H	10K	13K	0		
V-12	2.5M	0	H	0	10K	9K	68		
V-13	1M	15K	32K	0	0	2.5M	50K	45K	H
V-14	10K	2.2M	2.2M	H	0	2.2M	22M	0	6K
V-15	2M	0	0	H	10K	13K	20K		
V-16	2.2M	1K	0	H	250K	10K	22K		
V-17	4K	4K	4K	0	H	10K	10K		4K
V-18	350K	6.8M	0	0	H	250K	0	3.3K	H
V-19	10K	5M	0	H	0	110K	22K	820	1M
J-2	10K	250K	20K	0	0	inf.	H	0	
J-11	0	0	0	0	H	0	0	0	0

IX. SERVICE DATA

We will check and factory align your TR-6 for a nominal fee of $10.00 plus transportation charges if the set has not been tampered with. If repairs are necessary, an additional charge will be made. Units that have been tampered with or misaligned will be repaired on a time and material basis only.

A. REMOVING TOP COVER

> WARNING: Extreme caution should be taken when the top and bottom covers of the TR-6 are removed. High voltage is present at several points which could cause a lethal electrical shock.

1. Remove the three top screws on each side of the TR-6.
2. Remove cover by first pulling up on the rear and then on the front of the cabinet.

B. REMOVING BOTTOM COVER

1. Remove the six bottom screws from the sides of the TR-6.
2. Lift TR-6 chassis out of bottom cover.

C. TUBE REPLACEMENT

In general, most trouble in radio equipment of good design is due to tube failure. The best method of finding defective tubes is by direct substitution. It is best not to rely too heavily on tube checkers.

The TR-6 has been designed so that, with the exception of V-6, V-8, V-9, and V-10, tubes can be replaced without need for realignment. These tubes are to be replaced with the same brand as originally supplied. Realignment of L-17, C-243, and C-276 is necessary. See Section X.

To replace the 6JB6 tubes it is necessary to remove the top of the final amplifier cage. To do this, remove the sheet metal screws holding the PA cover to the cage. A disc-handle is provided on the cover to facilitate removal. To replace the PA cover, simply reverse the process. Be sure the parasitic suppressors do not short to the cage.

D. TROUBLESHOOTING

Careful consideration has been given in the design of the TR-6 to keep maintenance problems to a minimum. However, it is quite possible that some problem will arise which cannot be cured by tube substitution.

If this occurs, we suggest that you either return your unit to your dealer, or write direct to our Customer Service Department describing your problem in detail. Include full information concerning external connections, control settings, tubes substituted, etc. Always disclose your serial number when requesting service information. Do not return equipment to the factory without prior authorization.

In case of malfunction, first check power supply fuse, filament fuse in TR-6, and between pins 1 and 2 of the TR-6 power jack (J-3) for continuity. The voltage and resistance charts (figs. 10, 11) should be valuable in isolating minor problems.

No attempt should be made to service the TR-6 unless one is thoroughly familiar with electronic circuitry and servicing technique.

CARE SHOULD BE TAKEN NOT TO DISTURB THE LEAD DRESS IN THE TR-6 SINCE SEVERAL CIRCUITS ARE QUITE CRITICAL IN THIS REGARD.

Fig. 12 AC voltages (values given are approximate)

A. During SSB transmitting

Pin #	Device	Voltage (volts RMS)	Frequency (MHz)	Remarks
2	V-18	.003	audio	ALC threshold, R-175 in CW position
8	V-18	.04	audio	ALC threshold
1	V-15	.03	9	ALC threshold
1	V-15	.25	9	Function switch on "CW", R-100 in CW position
1	J-11	.05	9	ALC threshold
1	V-7	.12	9	ALC threshold
1	V-7	.55 ± .15	4.9-5.5	
2	V-4	.25	13.9-14.5	ALC active
2	V-4	1.0 ± .3	35.5-39.5	
7	V-4	3.5	49.4-54.0	ALC active
2	V-8	40	49.4-54.0	ALC active
	J-4	100	49.4-54.0	ALC active

B. During SSB receiving

Pin #	Device	Voltage (volts RMS)	Frequency (MHz)	Remarks
	J-4	1×10^{-5} typ.	49.4-54.0	Calibrator signal
	J-4	1×10^{-7} typ.	49.4-54.0	AVC threshold
	J-4	1×10^{-5} typ.	49.4-54.0	S-meter on S-9
gate	Q-13	1×10^{-5}	49.4-54.0	AVC threshold
gate	Q-13	6×10^{-6}	13.9-14.5	AVC threshold
source	Q-13	1.4 ± .4	35.5-39.5	
1	V-3	1×10^{-4}	13.9-14.5	AVC threshold
1	V-3	5×10^{-5}	9	AVC threshold
2	V-3	.55 ± .15	4.9-5.5	
1	J-11	3×10^{-5}	9	AVC threshold
1	V-11	.001	9	AVC threshold
1	V-12	.03	9	AVC threshold
7	V-13	.65	9	S-meter up-scale
5	V-16	3.5	audio	S-meter up-scale

X. ALIGNMENT INSTRUCTIONS

A. Alignment of the TR-6 will require the following equipment:

1. An alignment tool (General Cement #8273 or #8276) and a screwdriver (3/16").
2. Two alignment loads, each consisting of a .001 uf 500 V capacitor in series with a 1 K ohm 1/2 watt resistor. Alligator clips on each end of the series combination will be found convenient.
3. A signal generator covering 14 to 58 MHz with an adjustable output attenuator.
4. A sensitive RF voltmeter or a 6 meter receiver.
5. A 37.5 MHz crystal and a 39.0 MHz crystal inserted into their proper sockets (see figure 15).
6. An inductance probe consisting of pieces of copper and ferrite respectively, approximately 1/2" by 1/8" DIA attached to each end of an insulating handle.
7. A receiver capable of receiving WWV.
8. A 50 ohm non-reactive load capable of handling the TR-6 RF output power power (200 W).

NOTE: If the S-meter does not read upscale in cases where the instructions call for adjustment by S-meter readings, use an audio voltmeter at the speaker terminals instead. The bottom cover of the TR-6 should be in place during alignment, whenever this is possible.

B. Before alignment is attempted the cathode lead of the final amplifier tubes should be disconnected where it passed through the partition under the chassis (RFC-2).

C. BE SURE POWER IS DISCONNECTED BEFORE THIS IS ATTEMPTED, OR SERIOUS ELECTRICAL SHOCK WILL RESULT.

D. Let the TR-6 warm up preferably for as much as 30 minutes before the alignment procedure is started.

E. Receiver IF alignment

With the antenna disconnected, adjust T-11 and T-12 tops and bottoms for maximum audio noise output.

F. Filter matching transformers

1. Tune in a crystal calibrator signal and tune the VFO for maximum S-meter reading (on USB; SSB mode).
2. Tune the VFO for a higher pitched signal until the S-meter drops 3 S-units (15 dB).
3. Adjust T-13 and T-16 for maximum S-meter reading.

G. 9 MHz Oscillator Alignment

1. Tune in a calibrator signal for maximum S-meter reading (on USB, SSB).
2. Tune the VFO for a lower pitched signal until the S-meter drops 4 S-units (20 dB).
3. Adjust C-130 for zero beat.

NOTE: If an LSB filter is installed, the S-meter should read the same on USB and LSB when the signal is tuned for zero beat. Adjust C-130 until this is the case.

H. Receiver VIF alignment

1. Tune in a calibrator signal at 50.2 MHz.
2. Place an alignment load across C-224.
3. Adjust C-223 for maximum S-meter reading.
4. Move the alignment load to C-223.
5. Adjust C-224 for maximum S-meter reading.

I. Receiving Traps

1. Tune the signal generator to 57.75 MHz and connect its output to the antenna jack of the TR-6.
2. Increase the output voltage of the generator until a spurious signal can be received on the TR-6 at 50.25 MHz.
3. Adjust R-207 and C-120 for minimum S-meter reading.

NOTE: The following alignment has been carefully made in the factory and should not be realigned unless there is strong evidence of misalignment.

4. Move the signal generator to 55.25 MHz to receive a spurious signal on the TR-6 at 50.25 MHz.
5. Using the inductance probe determine if L-23 is tuned for minimum S-meter reading. The inductance of L-23 can be changed slightly by squeezing.

J. Receiver Front end alignment

1. Connect an alignment load each from the drain of Q-12 and the gate of Q-13 to ground, and a carbon resistor across J-4 (50 ohms).
2. Tune in a crystal calibrator signal at 51.7 MHz.
3. Tune T-17 top for maximum S-meter reading.

NOTE: Of the two possible peaks, select the one with the slug screw further <u>inside</u> the can.

4. Tune L-10 for maximum S-meter reading.
5. Remove the two alignment loads, and connect one alignment load in parallel with C-187.
6. Tune T-17 bottom for maximum S-meter reading

NOTE: Of the two possible peaks, select the one with the slug screw further out of the can.

7. Peak L-15 for maximum S-meter reading.
8. Connect the output of a signal generator in parallel with the alignment load, and tune the signal generator to 14.2 MHz.
9. Switch off the calibrator and adjust C-149 for minimum S-meter reading.
10. Disconnect the hot side of the signal generator output, switch on the calibrator and adjust L-15 for maximum S-meter reading.
11. Repeat steps 8, 9, and 10 of this paragraph until both conditions appear to be met simultaneously.

NOTE: In some units, 2 peaks are possible in L-10, L-15. Select the peak that makes the alignment screw stick out further above the chassis.

K. Calibrator alignment

1. Connect the antenna jacks of a WWV receiver and the TR-6 to each other and an antenna.
2. Receiving WWV adjust C-245 until the calibrator signal from the TR-6 zero beats with the WWV carrier.

L. VFO Adjustment

The permeability tuned VFO was carefully adjusted at the factory and should require no further alignment. If it does not appear to track from one end of its range to the other, it should be returned to our plant for realignment. Maximum calibration error is 1 KC when calibrated to the nearest 100 KC point.

If you notice the same error from one end of the band to the other, and you cannot correct it with the movable dial index, the main dial may be slipped on its shaft enough to bring the corrector back into range.

M. Driver and Mixer Tuned Circuits

1. It is assumed that paragraphs B,C, and D of this section have been read and followed.
2. Temporarily remove C-277.
3. Connect a sensitive RF voltmeter or a 6 meter receiver to the antenna jack of the TR-6 to monitor the TR-6 output.
4. Tune the TR-6 to 50.2 MHz.
5. Switch the function switch to "CW" and advance the XMTR GAIN control just enough to read the output signal of the TR-6.
6. With the C-208 control (driver tune) on "5", adjust L-17,L-18, for maximum output from the TR-6.

NOTE: The following alignment has been carefully made in the factory and should not normally require realignment.

7. For alignment of the increment coils mounted on S1CF and S1DR, a complete set of range crystals is required.
8. Leaving the PTO dial on .200 and C-208 in its center position, start in the 53.5 position of the range switch by peaking L-17,L-18. Moving the range switch successively to the lower ranges, the associated increment coils are adjusted by bending them towards the wafer for less inductance and vice versa. The inductance probe described under 6 of paragraph A of this section applied to L-17, L-18 in every instance, should prove helpful. The tracking of L-18 is less critical due to the provisions of C-208.

CAUTION: The increment coils on S1CF are connected to 250 V. Use an insulated bending tool.

N. Transmitter VIF Alignment

1. It is assumed that steps 1 through 5 of paragraph M have been performed.
2. Connect an alignment load from pin 2, V-4 to ground.
3. Peak T-10 top for maximum output from the TR-6.
4. Place the alignment load from pin 5, V-7 to ground, and peak T10 bottom.

CAUTION: 250 V present at pin 5, V-7.

O. Transmitter IF and Carrier Balance Alignment

1. It is assumed that steps 1 through 5 of paragraph M have been performed.
2. Adjust T-14 for maximum output from the TR-6.
3. Turn the XMTR GAIN control counter-clockwise and alternately adjust C-127 and R-185 for minimum output from the TR-6.

P. Range Oscillator Alignment

1. It is assumed that steps 1 through 5 of paragraph M have been performed.
2. Switch the TR-6 to a frequency in the 53.0 MHz range.
3. Adjust L-22 for maximum output from the TR-6.

Q. Transmitter IF Neutralization

1. Feed a signal consisting of at least two audio tones into the microphone jack of the TR-6. (In lieu of anything else, plug in your microphone and talk into it.)
2. Disable the VOX by turning R-198 counter-clockwise; do not activate push to talk.
3. Adjust C-168 until minimum audio is heard in the speaker or headphones.

NOTE: If this adjustment requires more than one turn at C-168, the alignment described in paragraph P should be repeated.

R. RF Power Amplifier Neutralization

1. Disconnect power and reconnect RFC-2, C-277.
2. Reconnect power and tune up as described in Section VI, on 50.2 MHz.
3. Set C-208 (DRIVER TUNE control) to center range "5".
4. Reduce drive by R-100 (XMTR GAIN control), and readjust L-17, L-18 for max. RF output.
5. Adjust C-276 so that maximum output and plate current dip occur simultaneously. Care should be taken to insure that drive is kept below saturation level during this adjustment.
6. Readjust L-17, L-18 to make sure they are still peaked.

NOTE: In case of severe misalignment, step R may be preceded by minimizing RF-feed-through in the respective amplifier stages with the DC cathode leads broken (R-236 disconnected from C-273 or RFC-2 disconnected from C-274 respectively).

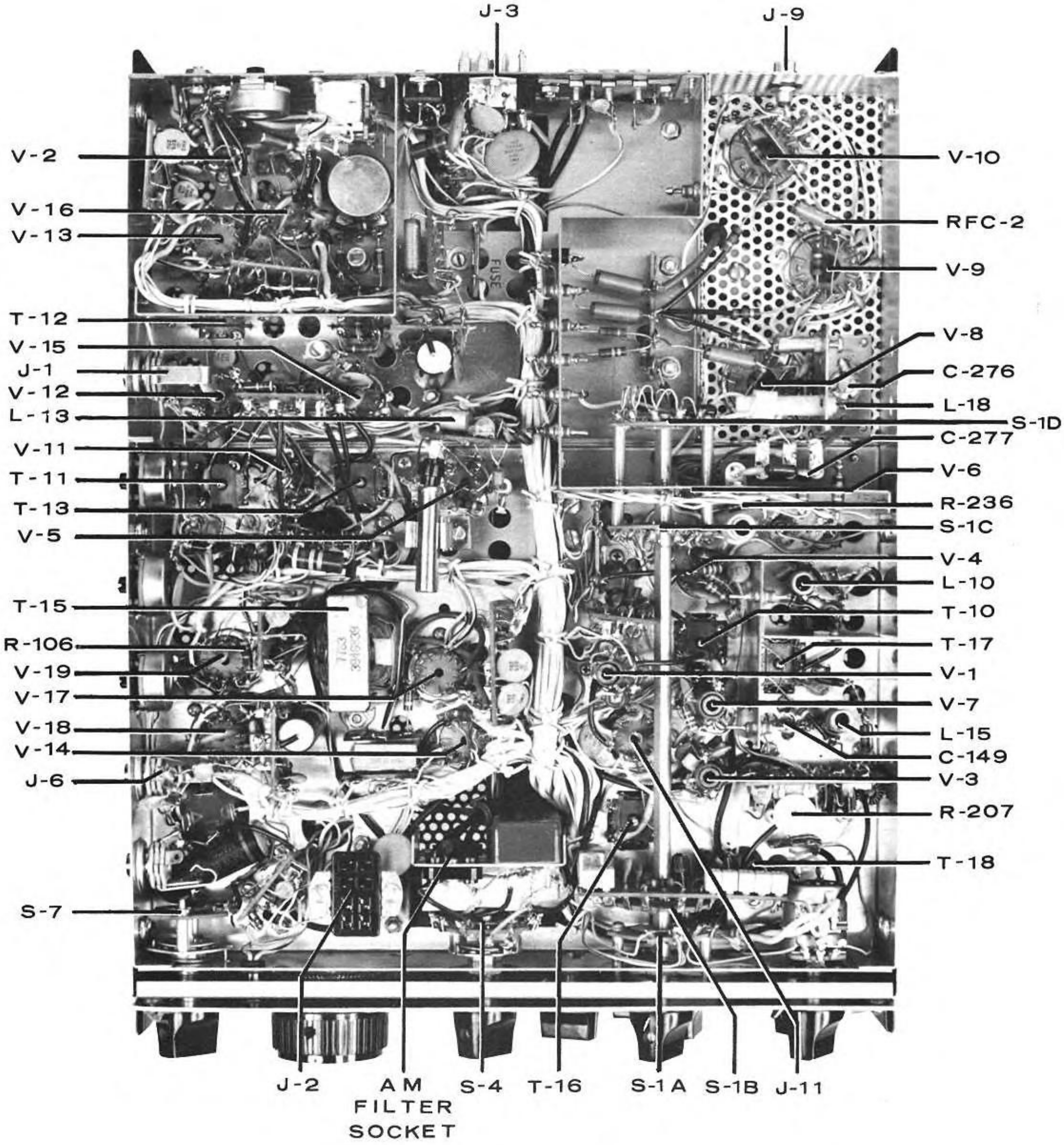


FIG.13–BOTTOM VIEW

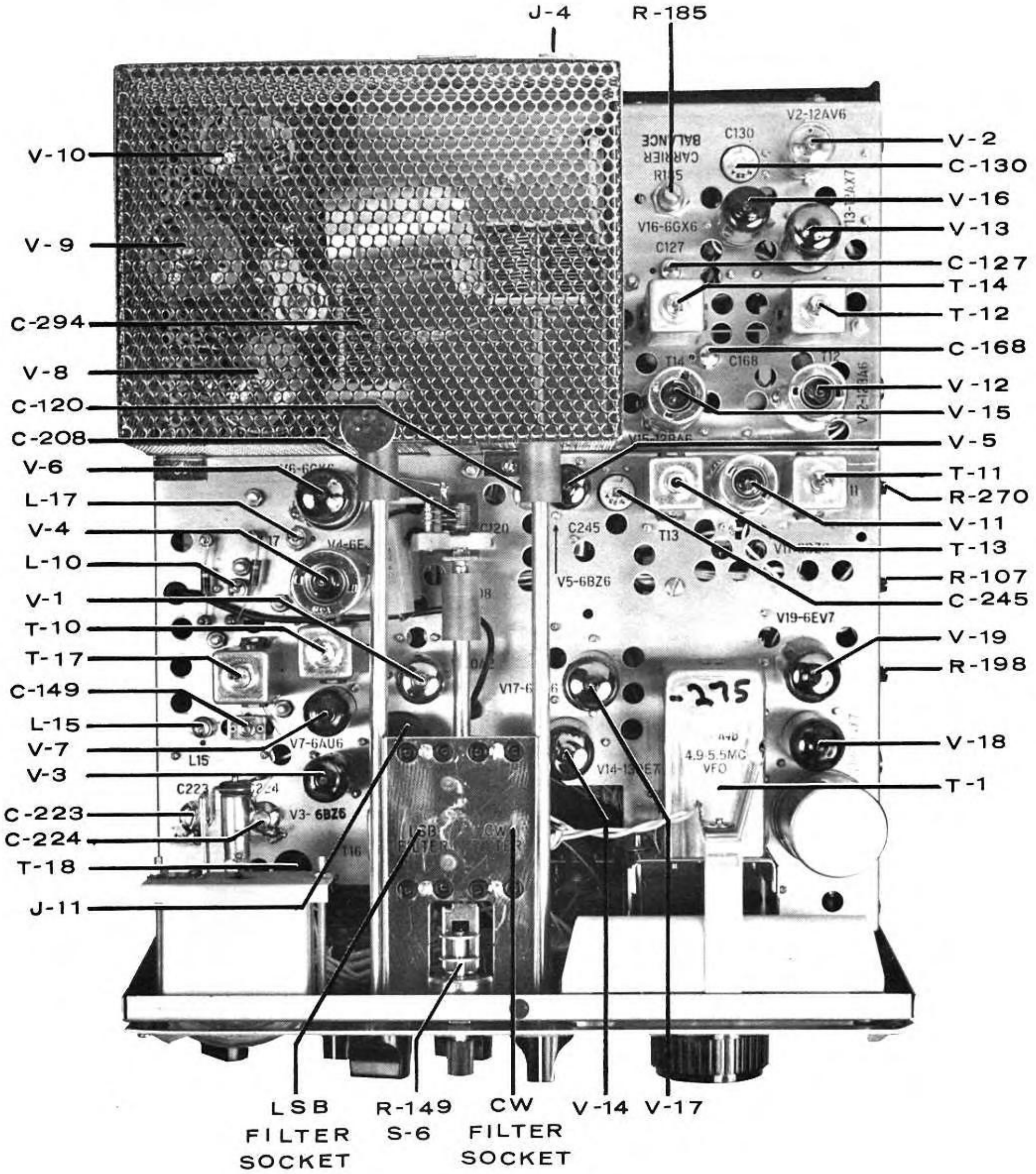


FIG. 14 — TOP VIEW

XI - TR6 - Electrical Parts List

Meters

Plate current meter 0-5 mA movement
S-meter 0-5 mA movement

Relays

K-1 DPDT & SPST T/R relay
K-2 SPST carrier oscillator relay

Switches

S-1 Range switch. 3 single function wafers, 1 double function wafer. 10 positions
S-2 Function switch. 2 double function wafers. 4 positions
S-3 Dim-bright switch. SPST slide switch
S-4 Filter switch. 1 double function wafer. 4 positions
S-5 Power switch. SPST ganged to R-176
S-6 Meter switch. SPST ganged to R-149
S-7 AGC switch. 1 single function wafer. 4 positions

Jacks

J-1 Key jack
J-2 Remote VFO connector
J-3 Power connector
J-4 Antenna jack
J-5 Headphones jack
J-6 Microphone jack
J-7 Receiver 14 MHz VIF input/output jack
J-8 External receiver mute jack
J-9 External AM jack
J-10 Transmitter 14 MHz VIF output jack
J-11 Noise blanker jack

Bulbs

B-1 VFO indicator light NE2E
B-2 VFO main dial light #47
B-3 Meter light #47

Tubes

V-1 OA2 high voltage regulator
V-2 12AV6 sidetone generator
V-3 6BZ6 2nd RCVR mixer
V-4 6EJ7 2nd XMTR mixer
V-5 6BZ6 (RCA) calibration generator
V-6 6GK6 (Sylvania) transmitting driver
V-7 6AU6 1st transmitter mixer
V-8, V-9, V-10 6JB6 (Sylvania, matched) XMTR output amplifier
V-11 6BZ6 1st receiver IF amplifier

Tubes

V-12 12BA6 2nd receiver IF amplifier
V-13 12AX7 (Sylvania) AGC generator
V-14 13DE7 AM-modulator
V-15 12BA6 XMTR IF amplifier
V-16 6GX6 product detector
V-17 6GK6 RCVR output amplifier
V-18 12AX7 (RCA) microphone amplifier
V-19 6EV7 VOX amplifier

Transistors

Q-1 MPF 102 variable frequency oscillator
Q-2 2 N 3858 VFO buffer
Q-5 2 N 3394 T/R switch
Q-6 2 N 3877 light switch
Q-7 2 N 3394 range oscillator
Q-8 2 N 3394 VFO switch
Q-9 2 N 3663 range buffer
Q-10 2 N 3663 VIF buffer
Q-11 TIS 88 1st RCVR RF amplifier
Q-12 TIS 88 2nd RCVR RF amplifier
Q-13 MPF 102 1st RCVR mixer
Q-14 2N5365 AVC amplifier
Q-15 2 N 3394 AVC amplifier

Diodes

D-1 1 N 714 low voltage regulator
D-10 B5G5 2nd ANTIVOX rectifier
D-11, D-12, D-13, D-14 1 N 541 balance modulator
D-15 1 N 4148 VOX rectifier
D-16 B5G5 1st ANTIVOX rectifier
D-17 1 N 4148 pulse rectifier
D-18 1 N 4148 T/R switch
D-19 1 N 270 RF-rectifier
D-20 1 N 4148 AVC switch
D-21 1 N 270 RF-rectifier
D-22 1 N 4148 AVC switch

Fixed Coils and RF Chokes

RFC-1 Driver plate choke
RFC-2 XMTR cath supply choke
RFC-3 RCVR supply choke
RFC-4 Grid choke
RFC-5 Plate power choke
RFC-6 Plate supply choke
RFC-7 Antenna choke
RFC-8 Driver suppressor
RFC-9 RFC-10, RFC-11 XMTR suppressor
RFC-12 Screen choke
RFC-13 250V supply choke
RFC-14 Cathode tuning choke
RFC-15 Isolation choke
RFC-16 Screen Choke

Tuned Coils

L-1 VFO tank coil
L-2 VFO output coil
L-10 Antenna coil
L-11 Trap coil
L-12 thru L-16 RCVR 50 MHz bandpass coils
L-17 Mixer coil
L-18 Driver coil
L-19 Final coil
L-20 1st 14 MHz receiver bandpass coil
L-21 2nd 14 MHz receiver bandpass coil
L-22 Crystal oscillator coil
L-23 Calibrator peaking coil

Coil Assemblies

T-1 VFO
T-10 14 MHz bandpass (double tuned)
T-11 1st RCVR IF transformer (double tuned)
T-12 2nd RCVR IF transformer (double tuned)
T-13 2nd Filter match transformer (single tuned, 2 windings)
T-14 XMTR IF transformer (single tuned, 2 windings)
T-15 Output transformer (untuned)
T-16 1st Filter match transformer (single tuned, 2 windings)

Crystals and Crystal Filters

X-1 100 KHz
X-2 35.5 MHz (not supplied)
X-3 36.0 MHz
X-4 36.5 MHz
X-5 37.0 MHz (not supplied)
X-6 37.5 MHz (not supplied)
X-7 38.0 MHz (not supplied)
X-8 38.5 MHz (not supplied)
X-9 39.0 MHz (not supplied)
X-10 39.5 MHz (not supplied)
X-11 9.0 MHz

USB Filter
LSB Filter (not supplied)
AM Filter (not supplied)
CW Filter (not supplied)

Capacitors	Value	Location on Schematic	Physical Location
1	Selected	Q-1	VFO
2	.01	Q-2	VFO
3	10	Q-1	VFO
4	390	Q-2	VFO
5	.01	Q-1	VFO

Capacitors	Value	Location on Schematic	Physical Location
6	Selected	Q-1	VFO
7	.01	Q-1	VFO
8	10	Q-1	VFO
9	47	Q-2	VFO
10	90	Q-2	VFO
11	.005	Q-2	VFO
12	.01	Q-1	VFO
100	.01 Z5U 500V	V-11	IF board
101	.005 Z5U 500V	V-11	V-11 socket
102	500 mica DM15	V-11	V-11 socket
103	35 in can	V-11	T-11
104	35 in can	V-12	T-11
105	.001 1KV Z5U	V-12	V-12 socket
106	.005 500V Z5U	V-12	V-12 socket
107	.005 500V Z5U	V-12	V-12 socket
108	35 in can	V-12	T-12
109	100 mica DM15	V-16	DET board
110	.005 500V Z5U	V-13a	V-13 socket
111	68 N 750	V-16	V-13/V-16 sockets
112	.005 500V Z5U	V-13a	DET board
113	.02 100V	V-12	AVC board
114	.005 500V Z5U	V-13a	DET board
115	.47 100V	V-13a	S-7
116	.47 100V	V-13b	ALC board
117	1.5 gimmick	V-15	T-13
118	.001 1KV Z5U	V-18a	J-6
119	.001 1KV Z5U	V-16	V-16 socket
120	1-6 var	Q-11	Top chassis near V-5
121	.005 Z5U 500V	V-19b	VOX board
122	.005 Z5U 500V	V-2	V-2 socket
123	1000 DM20 mica	V-15	V-11 socket
124	.01 Z5U 500V	V-15	V-15 socket
125	.005 Z5U 500V	V-15	V-15 socket
126	.001 Z5U 1KV	V-15	V-15 socket
127	1-8 var	V-15	Top chassis BFO compt.
128	.005 Z5U 500V	V-15	T-14
129	470 1KV Z5U	V-16	V-16 socket
130	2-25 var	V-16	Top chassis BFO compt.
131	470 1KV Z5U	V-16	DET board
132	150 mica DM15	V-16	V-16 socket
133	.01 500V Z5U	V-16	V-16 socket
134	.0015 Z5U 1KV	V-16	DET board
135	10 µf elyt 25V	V-17	AUD board
136	.01 500V Z5U	V-17	AUD board
137	470 Z5U 1KV	V-18a	MIC board
138	.001 Z5U 1KV	V-18a	AUD board
139	.47 100V	V-18b	AUD board
140	.005 500V Z5U	V-19a	V-18 socket

Capacitors	Value	Location on Schematic	Physical Location
141	.01 500V Z5U	V-19a	VOX board
142	.01 500V Z5U	V-19	AUD board
143	.1 200V	V-19b	VOX board
144	.02 100V	V-19	AVC board
145	10μf elyt 25V	V-19a	can
146	.01 Z5U 500V	V-12	IF board
147	.005 Z5U 500V	V-16 htr.	V-16 socket
148	.001 feedthrough	V-10 htr.	Final shield
149	8-60 var	Q-13	Conv. compt. top chass.
150	3.3 gimmick	Q-11	Conv. compt.
151	.001 feedthrough	V-10	Final shield
152	.0024 1KV Z5U	V-12	T-11
153	.001 1KV Z5U	V-8	J-9
154	.01 500V Z5U	V-1	J-3
155	.001 Z5U 1400V	V-10	J-3
156	.001 Z5U 1400V	V-10	J-3
157	.001 Z5U 1KV	V-10	J-3
158	.01 Z5U 500V	V-10	J-3
159	.001 1KV Z5U	V-10	J-3
160	.001 1KV Z5U	Q-1	J-2
161	3.3 gimmick	V-10	MTR board
162	100 mica DM15	V-10	MTR board
163	.005 Z5U 500V	V-10	MTR board
164	.001 Z5U 1400V	Q-1	J-2
165	220 in can	V-15	T-14
166	.001 Z5U 1KV	Q-10	BUF board
167	.005 500V Z5U	V-13b	V-13 socket
168	8 var	V-15	Chassis top near V-15
169	.001 1KV Z5U	V-18a	J-6
170	.01 25V	Q-10	BUF board
171	.005 Z5U 500V	V-11 htr.	V-11 socket
172	Selected	V-15	V-16 socket
173	.005 Z5U 500V	V-13 htr.	V-12 socket
174	.005 Z5U 500V	V-6	V-6 socket
175	.001 Z5U 1KV	V-7	V-7 socket
176	68 N 750 disc	V-18a	V-18 socket
177	.005 500V Z5U	V-7	V-7 socket
178	.005 500V Z5U	V-7	V-4 socket
179	.01 500V Z5U	V-3	OSC board
180	500 JL	V-2	Sidetone board
181	500 JL	V-2	Sidetone board
182	500 JL	V-2	Sidetone board
183	500 JL	V-2	Sidetone board
184	220 Z5U 1KV	V-2	Sidetone board
185	68 N 750	V-2	V-2/V-13 sockets
186	feedthrough	Q-13	Conv. shield
187	3.3 gimmick	Q-11	Conv. compt.
188	.47 pf gimmick	Q-13	Conv. compt.
189	220 Z5U 1KV	V-14	V-14 socket
190	.001 Z5U 1KV	V-3	MIX board

Capacitors	Value	Location on Schematic	Physical Location
191	1.0 gimmick	Q-13	MIX board
192	1-7 var	Q-11	Conv. compt. top chassis
193	5.0 NPO	Q-7	OSC board
194	68 N 750	V-18b	V-18 socket
195	.001 Z5U 1KV	Q-2	Light board
196	.001 Z5U 1KV	V-10	MTR board
197	1.0 gimmick	V-11	V-11 socket
198	.001 Z5U 1KV	V-2	V-2 socket
199	.005 Z5U 500V	V-16	V-16 socket
200	.001 Z5U 1KV	V-10	J-3
201	10µf elyt 250V	V-17	Can
202	.01 Z5U 500V	V-11	IF board
203	1.5 gimmick	V-15	T-13
204	.001 1KV Z5U	V-5	CAL board
205	.02 100V	V-19	Near AVC board
206	.001 Z5U 1KV	Q-13	MIX board
207	500 mica DM15	V-8	Final compt.
208	8 pf var	V-6	Front control
209	6.8 tubular N 1500	Q-13	MIX board
210	.01 25V	Q-13	MIX board
211	.001 Z5U 1KV	V-7	Near V-6
212	.001 Z5U 1KV	V-3	J-11
213	.001 Z5U 1KV	V-19b	V-10 socket
214	.001 feedthrough	Q-2	Conv. shield
215	.001 Z5U 1KV	Q-8	J-2
216	.01 25V	Q-13	MIX board
217	.33 gimmick	V-5	CAL board
218	.01 25V	Q-9	MIX board
219	39 NPO	V-11	V-11 socket
220	6.8 NPO	V-5	CAL board
221	470 Z5U 1KV	Q-11	Conv. compt.
222	.01 Z5U 500V	V-10	ALC board
223	3-10 N 470 var	Q-13	Top chassis conv. compt.
224	3-10 N 470 var	V-3	Top chassis conv. compt.
225	.001 feedthrough	Q-11	Conv. compt.
226	10 NPO	V-3	V-3/V-7 sockets
227	27 NPO	V-3	V-3 turret
228	.001 Z5U 1KV	V-3	V-3 turret
229	.005 Z5U 500V	V-3	V-3 socket
230	.005 Z5U 500V	V-4	V-4 socket
231	.02 100V	V-7	V-7 turret
232	.005 Z5U 500V	V-4	V-4 socket
233	.02 100V	Q-5	AUD board
234	.005 Z5U 1KV	V-3	V-3 socket
235	.001 Z5U 1KV	Q-9	MIX board
236	.001 Z5U 1KV	Q-9	MIX board
237	.01 25V	Q-11	MIX board
238	.01 25V	Q-5	MIX board
239	20µf elyt 250V	V-1	Can
240	.02 100V	V-2	BFO compt.

Capacitors	Value	Location on Schematic	Physical Location
241	100 mica DM15	V-6	V-4 socket
242	.005 500V Z5U	V-6 htr.	V-6 socket
245	5-25 NPO	V-5	Top chassis near V-5
246	.001 Z5U 1KV	V-5	CAL board
247	100 mica DM15	V-5	CAL board
248	.001 feedthrough	V-6	Final shield
250	.001 Z5U 1KV	V-6	Final compt. V-6 socket
251	.005 Z5U 500V	V-6	V-6 socket
252	.001 Z5U 1KV	V-10	Final compt.
253	.001 Z5U 1KV	V-9	Final compt.
254	.001 Z5U 1KV	V-9	Final compt.
255	.001 Z5U 1KV	V-8	Final compt.
256	.001 Z5U 1KV	V-8	Final compt.
257	.001 Z5U 1KV	V-10	Final compt.
258	.01 25V	V-5 htr.	V-5 socket
259	25 NPO	V-6	Final compt.
260	.001 feedthrough	V-6	Final shield
261	500 mica DM15	V-6	Final compt.
262	.001 1KV Z5U	V-10	J-8
263	60μf elyt 250V	V-1	Can
264	390 Y5E 1KV	V-8	Final compt.
265	.01 25V	Q-5	AUD board
266	5 NPO	Q-10	BUF board
267	.01 Z5U 500V	V-19b	Sidetone board
268	390 disc Y5E 1KV	V-9	Final compt.
269	.005 Z5U 500V	V-4	V-4 socket
270	.05 100V	V-3	MIX board
271	.001 1KV Z5U	V-19b	VOX board
272	390 Y5E 1KV	V-10	Final compt.
273	.001 1KV Z5U	V-6	Near V-6 socket
274	.001 feedthrough	V-10	Final shield
275	.001 feedthrough	V-8	Final shield
276	1-6 var	V-8	Final compt.
277	10 NPO	V-6	Final compt.
278	.001 2 KV	V-10	Final
279	1.5 2KV	V-8	Final
280	.001 1KV Z5U	V-8	Final compt.
281	.001 Z5U 1KV	V-9	Final compt.
282	.001 Z5U 1KV	V-10	Final compt.
283	.001 Z5U 1400V	V-10	Final
284	68 N 750	V-16	V-16 socket
285	.005 1400V Z5U	V-10	J-3
286	.001 feedthrough	V-13b	Final shield
287	.001 feedthrough	V-13b	Final shield

Capacitors	Value	Location on Schematic	Physical Location
288	.005 500V Z5U	Q-7	OSC board
289	.005 500V Z5U	Q-7	OSC board
290	6.8 NPO	Q-7	OSC board
291	39 NPO	V-7	T-10
292	33 NPO	V-7	T-10
293	360 var	V-10	Final
294	29 var	V-10	Final
295	20 NPO	Q-12	Conv. compt.
296	.01 25V	Q-12	MIX board
297	8.0 NPO	Q-7	OSC board
298	.33 gimmick	Q-11	Conv. compt.
299	1.0 gimmick	Q-11	Conv. compt.
300	.001	Q-12	Conv. compt.
301	.1	V-13a	AVC board
302	250 uf elyt 50V	V-17	AUD board
303	.02 100V	V-3	J-11
304	.02 100V	V-18	V-18 socket
305	.001	V-3	MIX board
Resistors			
1	560 1/4W	Q-1	VFO
2	100 1/4W	Q-1	VFO
3	560 1/4W	Q-2	VFO
4	1M 1/4W	Q-1	VFO
5	330 1/4W	Q-1	VFO
6	100 1/4W 10%	Q-2	VFO
7	22K 1/4W 10%	Q-2	VFO
8	6.8K 1/4W 10%	Q-2	VFO
100	500K var	V-8	Front control
101	22K	V-19a	V-19 socket
102	100K	V-19a	VOX board
103	820	V-19a	V-19 socket
104	100K	V-19	VOX board
105	6.8M	V-19	VOX board
106	3.3M	V-19	VOX board
107	100K var	V-19b	Side control
108	3.3M	V-19b	VOX board
109	3.3K	V-18b	MIC board
110	2K 5W 10%	V-1	Top chassis
111	3.3K	V-1	VOX-MIC boards
112	1.5K 7W 10%	V-1	Top chassis
113	10K var	V-13a	Front control
114	1M	V-19	V-19 socket
115	1M	V-14	V-14 socket
116	68 1W 10%	V-10	S-3
117	330K	V-5	CAL board
118	1.5K	V-13b	DET board/V-13
119	68K	V-6	V-6 socket
120	100	V-17	V-17 socket
121	330	Q-13	MIX board

Resistors	Value	Location on Schematic	Physical Location
122	10	Q-7	OSC board
123	1M	V-2	V-2 socket
124	500K var	V-2	Rear control
125	330K	V-2	V-2 socket
126	330K	V-2	SIDET board
127	330K	V-2	SIDET board
128	330K	V-2	SIDET board
129	150K	V-2	V-2 socket
130	3.3M	V-2	SIDET board
131	1.5K	V-2	V-2/SIDET board
132	1K	V-3	OSC board
133	470	Q-9	MIX board
134	33	Q-9	MIX board
135	68K	V-19b	AVC board
136	1M	V-15	ALC board
137	6.8K	V-15	T-14
138	470 ½W 5%	V-15	BFO compartment
139	150	V-15	BFO compartment
140	12K 3W 10%	Q-1	V-1 turret
141	2.2M	V-16	BFO compartment
142	1M	V-19b	VOX board
143	680K	V-19	VOX board
144	68	V-12	IF board
145	68	V-12	IF board
146	1M	Q-13	Conv. compartment
147	150K	V-2	V-2 socket
148	270	V-17	Near IF board
149	10K var	V-10	Front control
150	330K	Q-8	Light board
151	330	Q-13	Conv. shield
152	10K	Q-7	OSC board
153	10K	Q-7	OSC board
154	330	Q-7	OSC board
155	1K	Q-7	OSC board
156	10K	Q-9	MIX board
157	10K	Q-9	MIX board
158	1.5K	V-16	DET board
159	150 2W 10%	V-8	Final cage
160	150 2W 10%	V-9	Final cage
161	150 2W 10%	V-10	Final cage
162	1M	V-10	Final cage
163	100	V-17	VOX-MIX boards
164	68K	Q-6	Light board
165	1M	Q-6	Light board
166	Filament Fuse	V-10	Near MTR board
167	12K 3W 10%	V-1	V-1 turret
168	100	Q-7	OSC board
169	1M	V-3	MIX board
170	560	Q-10	BUF board
171	10K	Q-10	BUF board
172	10K	Q-10	BUF board

Resistors	Value	Location on Schematic	Physical Location
173	10	Q-10	BUF board
174	100	Q-10	BUF board
175	500K var	V-18	Front control
176	500K log var	V-16	Front control
177	10	Q-9	MIX board
178	330	Q-9	MIX board
179	330	Q-10	BUF board
180	10	Q-10	BUF board
181	100K	Q-14	AMP board
182	10	Q-7	OSC board
183	180	V-13a	DET board
184	1K	Q-2	Light board
185	200 var	V-15	BFO compt. - top chassis
186	2.2M	V-16	BFO compt.
187	1K	V-16	BFO compt.
188	1.5K	V-16	DET board
189	2.2K	V-16	DET board
190	220K	V-16	DET board
191	1M	V-8	Final compt.
192	150	V-17	AUD board
193	100	Q-12	Conv. compt.
194	47K	V-18a	MIC board
195	6.8M	V-18a	MIC board
196	6.8M	V-19b	SIDET board
197	330K	V-18a	MIC board
198	500 var	V-19a	Side control
199	330K	V-18b	MIC board
200	470 ½W 5%	V-15	BFO compt.
201	100	Q-11	Conv. compt.
202	330	Q-11	MIX board
203	100	Q-13	MIX board
204	100	Q-9	MIX board
205	33K	Q-5	AUD board
206	330K	Q-5	AUD board
207	5K lin var	Q-12	MIX board
208	1.5K	V-15	T-13/IF board
209		V-11	T-13
210	120	V-15	IF board
211	10K 1W 10%	V-15	IF board
212	47K 1W 10%	V-15	IF board
213	Selected	V-10	ALC board
214	100	V-8	Final compt. V-8
215	100	V-9	Final compt. V-9
216		V-3	T-16
217	1K	V-3	OSC board
218	330K	V-7	V-7 turret
219	330K	V-7	V-7 turret
220	2.2M	V-7	AVC board/J-1
221	330	V-4	V-4 socket
222	33K	V-4	V-4 socket
223	2.2M	V-3	V-7 turret

Resistors	Value	Location on Schematic	Physical Location
224	100	V-15	T-14
225	1K	V-3	V-3 turret
226	1K	V-4	S1CF
227	1M	V-5	V-5 socket
228	68	V-5	C-45
229	1K	V-5	CAL board
230	100K	V-5	CAL board
231	10K	V-5	CAL board
232	47 1/4W 10%	V-6	V-6 socket
233	100	V-10	Final compartment V-10
234	10K	V-6	Final compartment V-6
235	100	Q-2	VFO out board
236	150	V-6	V-6 socket
237	330	V-7	V-7 turret
238	33K	V-7	V-7 turret
239	1K	V-7	T-10
240	100	V-6	Final shield
241	330	V-19	SIDET board
242	100	V-8	Final compartment V-8
243	100	V-9	Final compartment V-9
244	100	V-10	Final compartment V-10
245	2 ½W 5%	V-10	ALC board
246	1.5K	V-13b	Final compartment
247	22K	V-13b	Final compartment
248	220K	V-13b	Final compartment
249	220K	V-11	AVC board/V-11
250	68	V-11	IF board/V-11
251	8.2K	V-11	IF board
252	47K	V-11	IF board
253	1.5K	V-11	IF board/T-11
254	68K	V-12	AVC board
255	12K	V-12	IF board
256	39K	V-12	IF board
257	1.5K	V-12	IF board/T-12
258	33K	V-13a	DET board/T-12
259	36K ½W 5%	V-13a	DET board
260	680K	V-13a	DET board
261	33K	V-13a	DET board
262	33K	V-13a	AVC board
263	2.2M	V-13a	AVC board
264	33K	V-13a	AVC board
265	1M	V-13b	ALC board
266	10K	V-19b	AVC board
267	22M	V-14	V-14 socket
268	15K 2W 10%	V-14	V-14 socket
269	22M	V-14	V-14 socket
270	200 var	V-17	Side control
271	470	V-17	IF board
272	750 5W 10%	V-8	Near V-14
273	330K	V-14	AUD board

Resistors	Value	Location on Schematic	Physical Location
274	10	Q-7	OSC board
275	330K	V-8	AUD board
276	10K	V-2	BFO compt.
277	100	Q-13	Conv. compt.
278	100	Q-13	MIX board
279	100K	Q-13	MIX board
280	6.8M	Q-14	AMP board
281	33K	Q-15	AMP board
282	10K	Q-15	AMP board
283	2.2K	Q-15	AMP board
284	4.7K	Q-15	AMP board
285	22K	Q-15	AMP board
286	47K 2W 10%	V-12	AMP board
287	220 1W 10%	Q-6	S4
288	22M	V-11	AMP board
289	100K	V-18	V-18 socket
290	33K	Q6	Lightboard
291	100 ohm	V-3	MIX board
292	100 ohm	V-1	J-3
293	100 ohm	V-3	J-3
294	100 ohm	V-6	Final Shield

Note: All capacitors ceramic discs, unless otherwise noted.
All capacities from .001 to .47 in μf, all capacities from .5 to 1000 in pf, unless otherwise noted.
All resistors ½W, 10% unless otherwise noted.

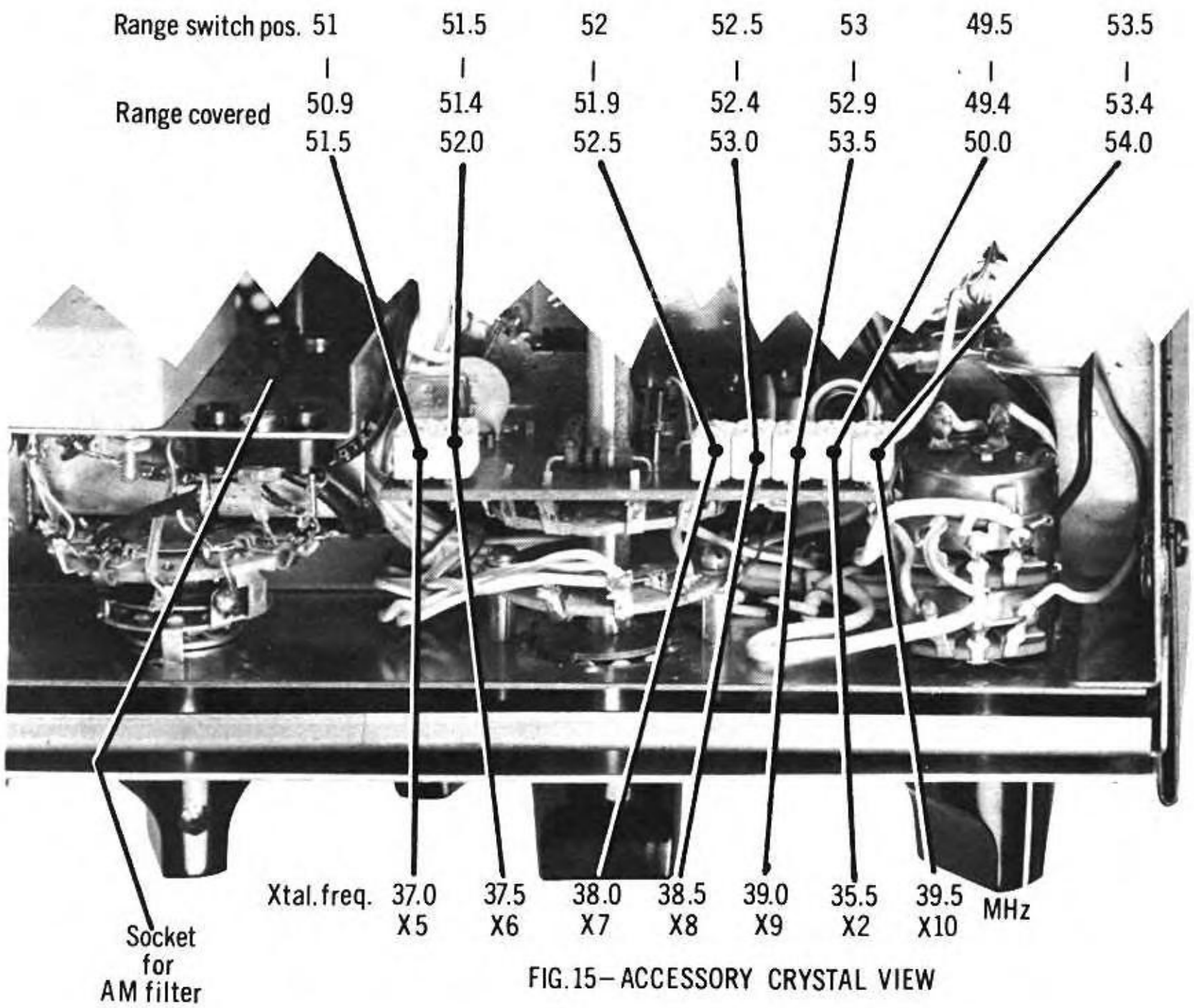


FIG. 15– ACCESSORY CRYSTAL VIEW

XII. ACCESSORY INFORMATION

This section lists and gives information on accessories for the TR-6.

A. MS-4

Drake Model MS-4 matching speaker recommended. See section V,A.3.

B. POWER SUPPLIES

Drake Models AC-4, DC-4, and DC-24 recommended. See section II, D.

C. RV-6

The Drake Model RV-6 remote VFO allows separation of transmitting and receiving frequency by as much as 600 KHz. Either the receiving frequency or the transmitting frequency or both may be controlled by the remote VFO, or the RV-6 may be switched off for normal transceiver operation.

D. FF-1

The Drake Model FF-1 fixed frequency adapter allows crystal controlling either the transmitting or the transceiving frequency (switch selected) of the TR-6. The FF-1 is a very compact unit which mounts underneath the TR-6 cabinet and plugs into the RV-6 socket (J-2) without increasing the overall height of the transceiver.

E. 9-NB

The Drake Model 9-NB noise blanker is the most effective weapon yet against most types of noise. It is especially effective on automobile ignition noise. The 9-NB mounts inside the TR-6 cabinet and connects into the TR-6 circuitry by means of a plug and mating jack on top of the TR-6 chassis (J-11).

The 9-NB incorporates a 10 KHz wide IF filter in its circuitry. This filter may be utilized for AM reception by placing a 220 ohm resistor across the AM filter terminals on the TR-6. The TR-6 comes with this resistor already installed.

Note that the 9-NB must not be used in mobile installations where the positive battery terminal is grounded.

F. IF FILTERS

The following accessory IF filters are available for the TR-6:

AM filter: 6 KHz bandwidth (at 6 dB).
CW filter: .3 KHz bandwidth (at 6 dB).
LSB filter: specifications identical to the USB filter supplied with the TR-6 (see section II, B).

Sockets for plugging in the accessory filters are provided in the TR-6. The sockets are labeled so that the filter switch on the front panel will give correct indication.

G. RANGE CRYSTALS

Accessory plug-in crystals are available for those ranges for which crystals are not supplied with the TR-6.

Figure 15 shows the proper socket location for each accessory crystal.

H. MMK-3

The MMK-3 mobile mounting unit aids in mounting the TR-6 in an automobile. (See section V, D.)

I. 2-M CONVERTER

The Drake Model SC-2 2 meter receiving converter is designed for use with the TR-6. Refer to figure 7 and Section IV, paragraph C, 5.

J. TV-1000-LP

The TV-1000-LP is a low pass filter designed to eliminate interference in difficult TVI cases. The TR-6 can be used on frequencies up to 52 MHz when a TV-1000-LP has been installed.

XIII. INTERFERENCE TO OTHER SERVICES CAUSED BY OPERATING THE TR-6

In locations where an RF signal is radiated with a power of several hundred watts in the immediate vicinity of a receiving installation which works with received signals of 1/10 of a billionth of a watt of power, interference is possible. The situation just described is typical for a ham transmitter being operated in a neighborhood of TV watchers. The problem intensifies with decreasing difference between ham transmitter and TV receiver frequencies (e.g. 6 meter transmitter and low channel TV receiver). In the following, causes of interference and possible cures will be discussed.

Three different causes of TVI can be distinguished. The first one can be identified by the term "harmonic radiation" and is cuased by a faulty ham transmitter. The second one to be called "fundamental overload", is caused by a faulty TV receiver. The third kind to be identified as "third source interference", is caused by a non-linear device within close range of both the ham transmitter and TV receiver.

A. HARMONIC RADIATION

This interference is caused by spurious radiation from the ham transmitter, the spurious frequency being within or near the passband of either the TV receiver's front end or possibly some other stage (I.F., video). This spurious radiation is especially strong at the harmonics of the transmitter fundamental frequency, but other spurious output can be generated in transmitters employing mixers or frequency multipliers in the signal path. Harmonics can also be generated in faulty transmitting antennas or diode-type output monitors.

The TR-6 has been designed to minimize this type of interference so that it can be considered essentially TVI-proof in all but extreme fringe areas of a TV station. If TVI is encountered in such areas, the Drake TV-1000-LP filter should be installed at the TR-6 antenna jack. This filter suppresses all radiation above 52 MHz and thus protects all TV channels from this kind of interference.

B. FUNDAMENTAL OVERLOAD

This interference is caused by the fundamental output of the ham transmitter penetrating into the TV receiver's front end or possibly some other stage due to insufficient protection. If a sufficiently strong signal appears across a non-linear device in the TV receiver (usually the RF stage or a mixer), it may:

1. desensitize the TV receiver so that the wanted signal is suppressed. If the audio stages are affected, envelope detection takes place causing audio interference.

2. generate harmonics of the transmitter frequency which in turn fall within or near the passband of the TV receiver's front end or possibly some other stage, causing interference.

3. mix with some other strong signal (local BC or TV station) also present in the front end of the TV receiver, which is called "intermodulation". The intermodulation products then affect the TV receiver's front end or other stages.

The cure for this type of interference is to prevent the transmitter's signal from penetrating into the TV receiver. In the most common case, namely front end overload, a Drake TV-300-HP filter should be installed at the antenna terminals of the TV receiver. This filter suppresses all signals below 52 MHz and thus protects the TV receiver's front end from overload by transmitters operating below 52 MHz.

In the case of radiation into the IF, video or audio stages of the TV set, the interference must be eliminated by proper shielding, RF bypassing or traps at the affected circuitry.

C. THIRD SOURCE INTERFERENCE

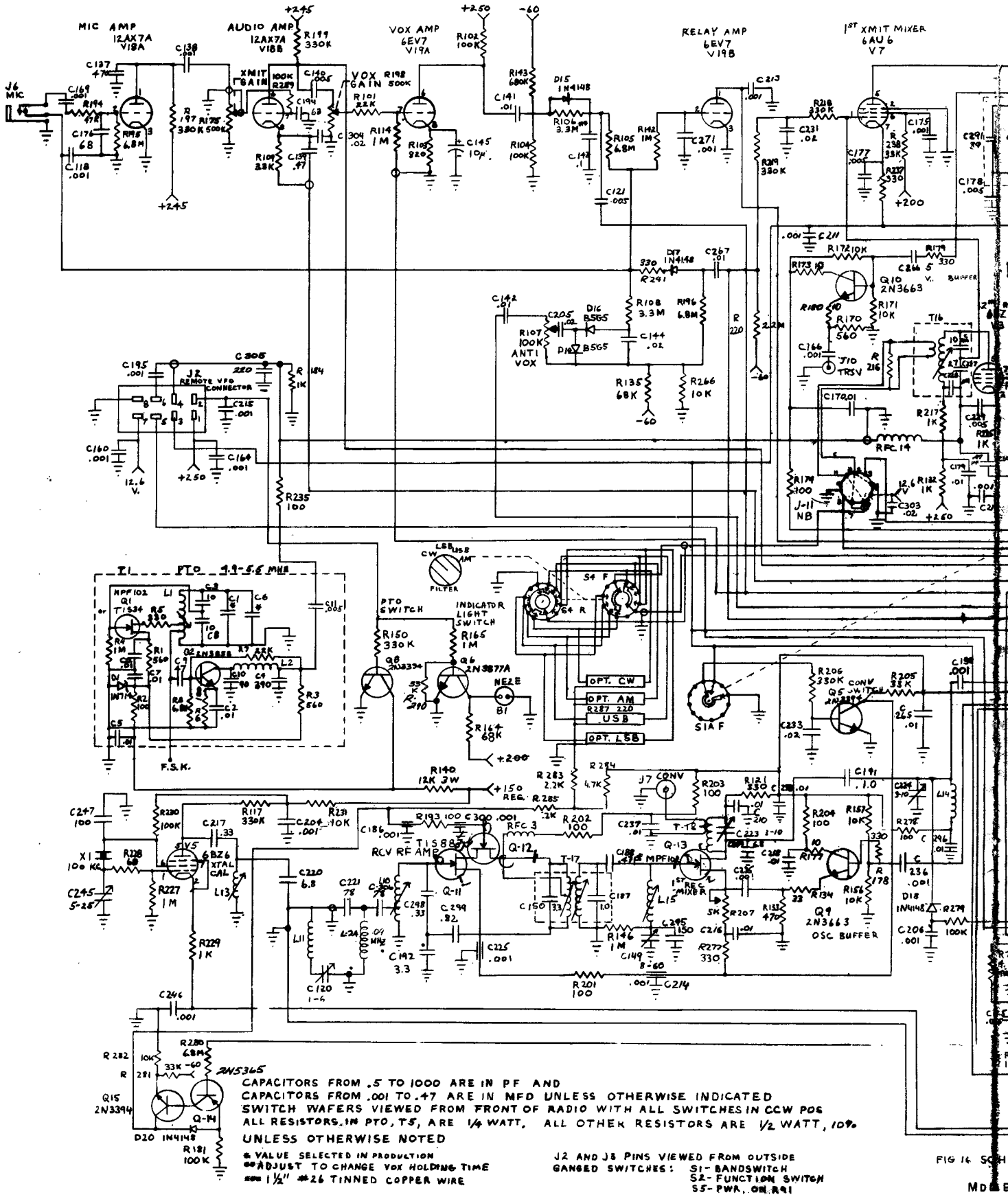
This interference is also caused by the fundamental output of the ham transmitter. If this signal is allowed to appear across any non-linear device, it will generate harmonics or intermodulation products, as the case may be. These products are reradiated to a TV receiver and thus are a potential cause of TVI.

Such non-linear devices can include: rusty drainpipes, defective telephone wiring or rusty antenna installations, transistor radios (including car radios), TV sets connected to any antenna, crystal sets, field strength meters employing diodes, and a variety of other sources.

A TV receiver employing semiconductor devices in its front end can cause this kind of interference even (and especially) with the set turned off. Cases are known where discarded TV receivers stored in basements a block away with rabbit ears extended caused TVI in an entire neighborhood.

The cure for this kind of interference is to eliminate the non-linear device after it has been tracked down (which usually is the hardest part of the job). In the case of a TV receiver, the installation of a Drake TV-300-HP at the interfering TV set is recommended.

J 310



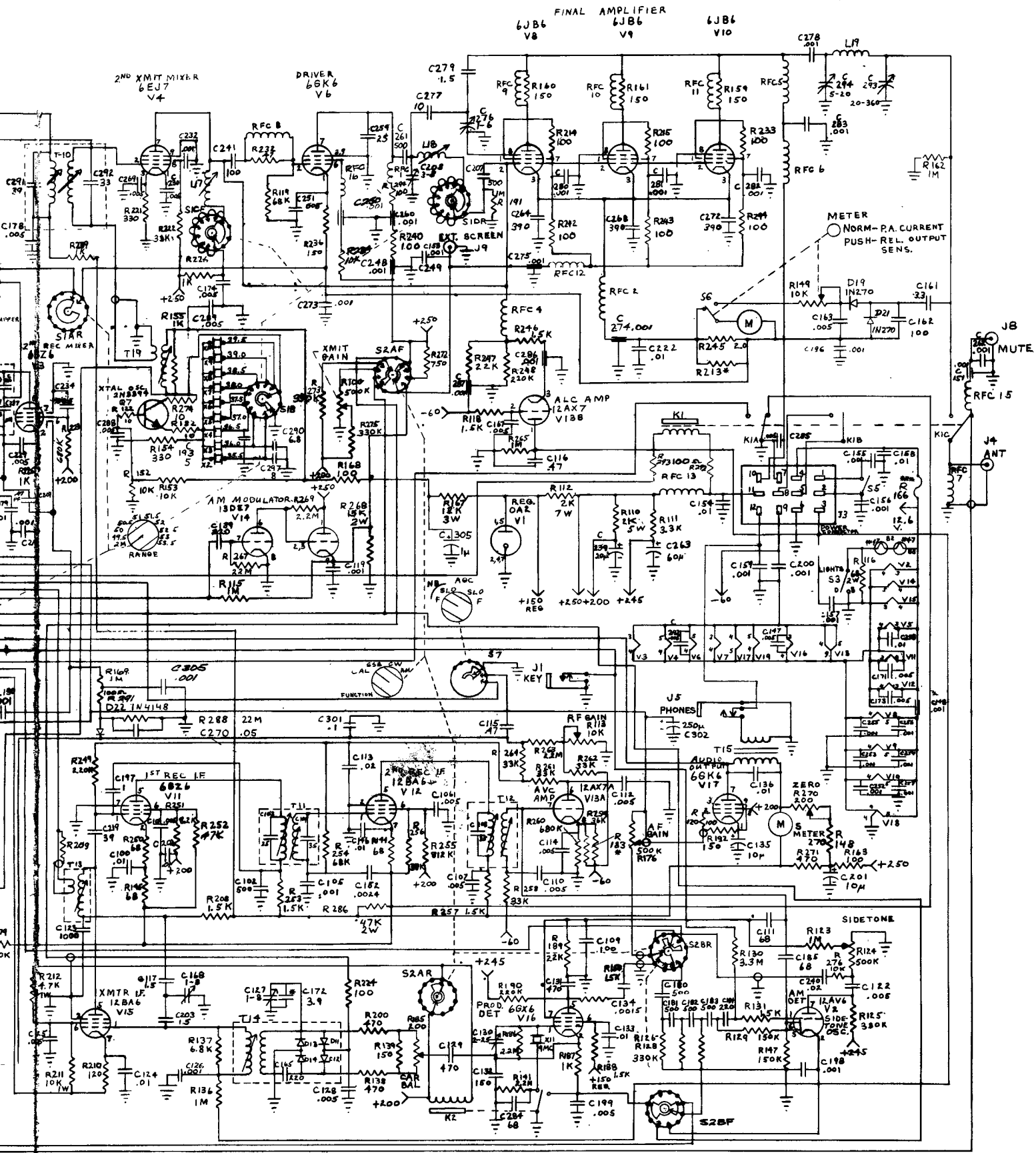
CAPACITORS FROM .5 TO 1000 ARE IN PF AND
CAPACITORS FROM .001 TO .47 ARE IN MFD UNLESS OTHERWISE INDICATED
SWITCH WAFERS VIEWED FROM FRONT OF RADIO WITH ALL SWITCHES IN CCW POS
ALL RESISTORS IN PTO, T5, ARE 1/4 WATT, ALL OTHER RESISTORS ARE 1/2 WATT, 10%
UNLESS OTHERWISE NOTED

% VALUE SELECTED IN PRODUCTION
** ADJUST TO CHANGE VOX HOLDING TIME
*** 1½" #26 TINNED COPPER WIRE

J2 AND J8 PINS VIEWED FROM OUTSIDE
GANGED SWITCHES: S1- BANDSWITCH
S2- FUNCTION SWITCH
S5- PWR. ON R91

FIG 14 SCH

MDL E



16 SCHEMATIC DIAGRAM

MODEL TR-6 TRANSCEIVER 01-770