

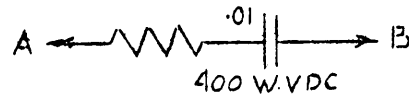
KW2000A

For Service Manuals
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2. Insert following section 2 - 4 (2)

2 - 4 (2) Band Pass I.F. alignment

- (a) Allow the transceiver to warm up for at least $\frac{1}{2}$ hour and set FUNCTION switch to LSB and tune to the 3.6 mc/s calibration signal.
- (b) Make a swamping tool consisting of a .01 mfd 400 WVDC capacitor in series with a 1k ohm $\frac{1}{2}$ watt resistor.



- (c) Connect the swamping tool from pin 4 of IFT 2 to earth (see Fig 2 - 5)
- (d) Adjust the bottom core of IFT 2 for a maximum "S" meter reading
- (e) Transfer the swamping tool from pin 6 of IFT 2 to earth.
- (f) Adjust the top core of IFT 2 for a maximum "S" meter reading.
- (g) Transfer the swamping tool from pin 4 of IFT 3 to earth.
- (h) Adjust bottom core of IFT 3 for a maximum "S" meter reading
- (i) Transfer the swamping tool from pin 6 of IFT 3 to earth.
- (j) Adjust the top core of IFT 3 for a maximum "S" meter reading
- (k) This completes the bandpass I.F. alignment of the receiver and transmitting sections.

KW 2000^A SINGLE SIDEBAND TRANSCEIVER

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The KW 2000^A is a complete unit enabling transmission and reception of single-side-band and CW on all amateur bands between 1.8 mc and 30 mc. Reception of amplitude modulated signals is also possible. Separate power units for operation on 200-240v A.C. and 12v D.C. make the equipment suitable for 'fixed' or 'mobile' stations where a compact (13½ x 11 x 6) installation is required.

CIRCUIT DESCRIPTION:

TRANSMITTER:

The carrier is generated by V16 which is frequency controlled by one of two crystals depending upon the sideband to be transmitted. This signal of approx. 455 kc is fed to a balanced modulator using two silicon diodes D1 and D2 with the amplified output of the microphone. The resulting output of the balanced modulator, being double sideband suppressed carrier, is amplified by V3, before being fed to the mechanical filter, which removes one side-band. The single sideband suppressed carrier signal of 455 kc is mixed in V4 with the output of a variable frequency oscillator (V11 2.5-2.7 mc) to provide the second transmitter I.F. of 2.955 mc to 3.155 mc. The final output frequency is now obtained by the use of a second balanced mixer which combines the second I.F. with the output of a crystal oscillator V10.

After amplification by V7 the signal is fed to the power amplifier V8'. The power amplifier is designed to match an 80 ohm coaxial line.

RECEIVER:

The received signal is amplified by V6, then mixed in V9 with the output of V10. Output of V9 at the first I.F. frequency of 2.955 to 3.155 mc is fed to the second receiver mixer V19. This mixer is also fed from the VFO V11 (2.5 - 2.7 mc) resulting in an output frequency of approximately 455 Kc. After passing through the mechanical filter the 455 Kc I.F. signal is amplified by two I.F. stages V12 and V13 and fed to the product detector V15b. The audio frequency output of the product detector is amplified and taken to the loudspeaker or headphones. Being a transceiver certain components and valves are used on transmit and receive, these are: the crystal oscillator V10, the VFO V11, the mechanical filter and the carrier oscillator V16. The panel meter serves as an 'S' meter on receive and measures P.A. cathode current on transmit.

INDEPENDENT RECEIVER AND/OR TRANSMITTER TUNING

A very useful feature is the ability to vary the receiving or transmitting frequency plus or minus ten kilocycles from the main dial indication by the use of front panel controls. These same controls also permit operation on both transmission and reception plus or minus ten kilocycles from the main dial indication.

VOICE CONTROLLED OPERATION:

A signal from the microphone passing through the microphone amplifier is applied to the voice operated relay circuit and causes the VOX relay to close, thus changing automatically from receive to transmit. The VOX control is also equipped with an anti-trip circuit. When receiving, sound from the loudspeaker may operate the VOX relay. This is eliminated by the anti-trip circuit which samples part of the receiver output and applies it in opposition to the action of the voice operated relay.

MANUAL OPERATION:

In addition to the VOX facility, normal manual operation is provided either by a switch on the microphone, front panel control or by a remote switch.

CW OPERATION:

CW operation is accomplished by the keying of a tone oscillator (V15a) of approximately 900 c/s. Normal manual operation or break-in is possible when equipped with VOX. The microphone should be unplugged when using CW.

AM OPERATION:

The transmission of AM is not possible with this transceiver. Reception of AM may be obtained by the use of the exalted carrier technique.

POWER SUPPLIES:

The A.C. mains supply contains the loudspeaker in the same unit, and is designed to match the KW 2000. Other power supplies may be used providing the stated voltages and current ratings are adhered to.

Operation from 12v D.C. requires a special power supply and a suitable specially designed unit of small physical size is available. When using this supply a separate loudspeaker is required.

SECTION 1

SETTING UP THE KW 2000 WITH A.C. POWER SUPPLY

Adjust the two mains selectors at the rear of the A.C. PSU to suit the supply voltage. Plug the power connector into the rear of the transceiver, insert the three pin L.S. plug into appropriate socket as indicated. A co-axial cable from the aerial should be connected to the antenna socket by means of a Belling L734 plug. Connect mains lead to the supply voltage.

1 - 2

SETTING UP RECEIVER:

- (a) Turn switch adjacent to the microphone socket to LSB or USB. This will complete the mains circuit. The other two panel switches should be at EXT MOX and IRT OFF.
- (b) Select the required band, this will be the panel indication plus the tuning dial reading i.e. assuming 14.2 mc is selected and the main tuning dial indicates seventy kilocycles, the received or transmitted frequency will be 14.270 mc/s. Approximately one kilocycle steps are indicated on the skirt of the main tuning control.
- (c) Set the pre-selector to the band selected, advance the RF gain to maximum and the AF gain to a comfortable level. Signals will be received and the pre-selector may be adjusted for maximum indication on the 'S' meter.

1 - 3
'S' METER

Remove the aerial and adjust the meter zero potentiometer on the rear of the chassis for zero indication. Restore the aerial.

1 - 4
RECEIVER OPERATION:

It may be necessary to switch sidebands, i.e. switch to USB from LSB, depending on which sideband the station being received is transmitting. Either sideband may be used for reception of AM signals. Interference on AM signals may be eliminated by suitable choice of sideband.

1 - 5
IRT

Switching to IRT (independent receiver tuning) enables the receiver frequency to be varied plus or minus ^{eight} ~~ten~~ kilocycles from the main dial indication, by the rotation of the 'IRT TUNE' control.

1 - 6
SETTING UP TRANSMITTER:

Select the band and frequency as in 1-2 (b). Set pre-selector and 'PA TUNE' to the appropriate indication. 'PA LOAD' fully clockwise and MIC GAIN anti-clockwise. Switch to 'INT MOX' and adjust the PA bias control on the rear of the A.C. PSU for an indication on the panel meter of ⁵⁰ ~~25~~ mA. Switch to EXT MOX or VOX, and the FUNCTION switch to 'TUNE' and slowly advance the 'MIC GAIN' (this control the amount of tone inserted when on 'TUNE'). Note that the meter reading increases. Adjust 'PA TUNE' for resonance i.e. minimum indication on meter at the same time increasing the PA loading. The 'MIC GAIN' should be advanced until the PA is drawing the desired current ¹²⁰ ~~75~~ mA in a fully loaded condition.

The amount of tone inserted by advancing the 'MIC GAIN' has a bearing upon the off resonance current drawn by the PA. The recommended "fully loaded" condition is with the MIC GAIN advanced to give ¹³⁰100mA plate current ¹²⁰off resonance and the PA loaded and resonated to give 75mA on minimum dip. Decrease the MIC GAIN to zero and note that the PA current drops to zero.

1 - 7

OPERATION OF TRANSMITTER:

- (a) If the microphone is fitted with a switch this may be used for changing from receive to transmit. Alternatively an external switch may be used and connected via the non-reversible socket at the rear. In this case it is necessary to switch to 'EXT MOX'. In the absence of a microphone switch and an external switch, it will be necessary to switch to 'INT MOX' for transmission and to return the switch to 'EXT MOX' for reception.
- (b) If the transceiver is equipped with VOX, switch to the VOX panel indication, speech into the microphone will now be sufficient to change from receive to transmit. The setting up of the VOX will be dealt with later
- (c) Put the transceiver to transmit by one of the above methods and advance the microphone gain to the desired level. Speech into the microphone will cause the PA current to increase accordingly. The peaks of the meter movement should indicate 50 mA ^{maximum with an average reading} ~~approximately~~ of 100 mA.

(d) When changing frequency the pre-selector should be adjusted accordingly, and peaked for maximum PA current.

1 - 8
ITT

Switching to ITT (independent transmitter tuning) enables the transmitter frequency to be varied plus or minus ^{six} ~~ten~~ kilocycles from the main dial indication by the rotation of the 'IRT TUNE' control. This frequency change is automatically switched out when receiving. Switching to IRTT enables transmission and reception plus or minus ^{six} ~~ten~~ kilocycles from the main dial indication.

1 - 9
CW OPERATION (MANUAL CONTROL)

Plug key into jack socket at the rear of the transceiver and switch to transmit by one of the manual methods (para 1-7 (a) Tuning of the transmitter is carried out as in paragraph on setting up transmitter, but leaving 'MIC GAIN' set for the fully loaded condition of the P.A. Switch to either sideband. The transceiver is now set up for CW operation and is keyed in the normal way.

1 - 10
BREAK IN CW OPERATION:

When voice control is fitted, transmission of CW is achieved by merely pressing the key while in the receive condition. The 'MIC GAIN' controls the amount of carrier as before.

1 - 11

SETTING FOR VOX CONTROLS:

To adjust the sensitivity of the VOX circuit, switch to VOX and speak into the microphone at normal level and adjust VOX sensitivity until the relays operate cleanly (this control is entirely independent of the 'MIC GAIN' control).

1 - 12

ANTI-TRIP:

To set the level of the anti-trip, tune in a signal on the receiver and adjust 'AF GAIN' for a normal loudspeaker audio level. The microphone should be at the usual operating position. If the VOX circuits are actuated by the audio from the loudspeaker adjust the 'ANTI-TRIP' level until the relays cease to operate.

1 - 13

DELAY TIME:

The 'delay' or 'hold' time of the VOX circuit may be varied by adjustment of the delay control. It will be found that these adjustments 'overlap' each other and it will be necessary to carry out the adjustments several times before reaching the desired settings.

1 - 14

OPERATION WITH A LINEAR AMPLIFIER:

Switch to 'LINEAR' at the rear of the transceiver, and connect the socket marked 'LINEAR' to the input of the linear amplifier via a short length of co-axial cable and a Belling L734 plug. An external change-over relay is required. ^{with most Linear Amplifiers except the KW 500} The receiver connection on the relay is taken to the 'antenna' socket on the transceiver and the transmitter connection to the output of the linear.

Provision for energising the external relay is made in the transceiver, and a connection is brought out to the pin on the L.S. socket adjacent to the 'key' jack socket at the rear of the KW 2000. This connection is taken to chassis on transmit when using the VOX facility. If VOX is not provided in the transceiver an external switch must be used to control the external relay on transmit.

KW 2000 COMPONENTS

CONDENSERS

C	VALUE	C	VALUE	C	VALUE
1	100	46	.01 uf 400v	91	1000
2	2200	47	750 compression	92	1000
3	25 uf	48	120	93	1000
4	2200	49	5000	94	1000
5	.01 150v	50	.04 uf 1500v	95	1000
6	.47 uf	51	1000	96	.01 uf 400v
7	.01 uf 150v	52	5000	97	.01 uf 400v
8	.01 uf 400v	53	5000	98	.01 uf 150v
9	.01 uf 400v	54	5000	99	150
10	22	55	1800	100	150
11	47	56	10 variable	101	.01 uf 150v
12	3-30 trimmer	57	350 variable	102	150
13	470	58	410X2 gang	103	.01 uf 400v
14	470	59	5000	104	.01 uf 150v
15	.01 uf 150v	60	255	105	.01 uf 400v
16	3-30 trimmer	61	110 compression	106	1000
17	.01 uf 400v	62	470	107	390
18	.01 uf 400v	63		108	.1 uf
19	.01 uf 150v	64	3000	109	820
20	220	65	470	110	255
21	1000	66	.01 uf 400v	111	10
22	.01 uf	67	.01 uf 150v	112	1800
23	1000	68	1000	113	1000
24	1000	69	220	114	3-30 trimmer
25	.01 uf 150v	70	60	115	2200
26	150	71	2200	116	3-30 trimmer
27	.01 uf 400v	72	820	117	1000
28	150	73	250	118	.1 uf
29	1000	74	110	119	100
30	150	75	.01 uf 400v	120	390
31		76	.01 uf 400v	121	500
32	150	77	5000	122	1000
33	2200	78	30	123	1000
34	500	79	200 variable	124	.01 uf 400v
35	.01 uf 150v	80	3-30 trimmer	125	.01 uf 400v
36	2200	81	660	126	10 pf
37	.01 uf 400v	82	12	127	1800
38	1000	83	1000	128	8 uf
39	220	84	470	129	.01 uf 400v
40	261X3 gang	85	30	130	.01 uf 400v
41	.01 uf 400v	86	.01 uf 150v	131	.1 uf
42	220	87	30	132	25 uf 400v
43	750 compression	88	.01 uf 400v	133	.01 uf
44	255	89	1000	134	150
45	20	90	1000		

KW 2000 COMPONENTS

CONDENSERS

C	VALUE
135	.01 uf 150v
136	.01 uf 400v
137	5000
138	1000
139	1000
140	1000
141	1 uf
142	.01 uf 400v
143	750 compression
144	2200
145	25 uf
146	27 pf
147	10 pf
148	470 pf
149	2200
150	1000 pf poly
151	25x25 Ely.
152	
153	
154	.01 uf 400v
155	1000
156	100 pf
157	5 pf
158	8/50 pf trimmer
159	.1 uf
160	.01 150v
161	.01 150v
162	250 pf comp.trim.
163	220 pf
164	500 pf s/m
165	1800
166	1000
167	1000
168	5 uf 15v w.Ely.
169	.02 uf
All values in pf unless otherwise stated	

RESISTORS

R	VALUE	R	VALUE	R	VALUE
1	1k	44	1.5k	87	100k
2	100k	45	68k	88	3.3k
3	220k	46	47k	89	150k
4	180k	47	100k	90	180k
5	1m	48	270	91	150k
6	2.2k	49	100k	92	220k
7	470k	50	47k	93	470-10% 2w
8	180k	51	4.7k	94	2.2k
9	1m Pot	52	6.8k	95	1 meg. ohm Pot
10	470k	53	1k Pot	96	2.5k ± 5% 10v
11	2.2k	54	47k	97	1m
12	15k	55	4.7k	98	2.2m
13	22k	56	22k	99	1m pot
14	100 pt	57	100k	100	4.7k 10% 2w
15	270	58	680	101	1k pot
16	270	59	270	102	100 pot
17	100k	60	68k	103	100k
18	4.7k	61	47k	104	5m Pot
19	22k	62	47k lw.	105	5.6m
20	470	63	1k Pot	106	10m
21	47k	64	10 ohms	107	10m
22	4.7k	65	33k	108	2.7k lw
23	100k	66	270	109	2.2k
24	220	67	4.7k	110	47k 2w
25	220	68	1k	111	1m Pot
26	220	69	47k	112	1m Pot
27	100k	70	4.7k	113	220k
28	4.7k	71	270	114	100k
29	22	72	33k	115	47k
30	100k	73	470k	116	270
31	100k	74	470k	117	68k
32	220	75	250k Pot	118	470k
33	100k	76	2.2k	119	4.7k
34	100k	77	3.3m	120	6.8k ±5% 5w
35	100	78	330k	121	6.8k ±5% 5w
36	47k	79	100k	122	2.7k 2w ± 10%
37	100k	80	2.2k	123	100k
38	100k	81	680	124	62 ohm.Hi Stal
39	33k	82	47k	125	2.2k
40	1.5k	83	100k	126	100k
41	47k	84		127	220k
42	100	85	100k	128	1.5k
43	6.8k	86		129	1 meg. ohm
				130	100 ohm

All resistors $\frac{1}{2}$ watt \pm 10% unless otherwise stated.

SECTION 2

SERVICE INSTRUCTIONS

D A N G E R

EXTREME CARE MUST BE TAKEN WHEN SERVICING THIS EQUIPMENT ESPECIALLY IF ANY COVERS ARE REMOVED, SINCE POTENTIALS AS HIGH AS 900 VOLTS ARE PRESENT.

2 - 1

GENERAL

This section covers maintenance and service of the KW 2000A SSB transceiver. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component ageing, alignment normally will be necessary only if frequency determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- (1) Disconnect all power and external connections
- (2) Remove the two rear feet and the two 4BA set screws from the bottom of the cabinet
- (3) The front feet may be left on

GENERAL - Cont'd

- (4) From the rear, push the transceiver chassis forward until the front panel protrudes from the cabinet about an inch
- (5) Grasping the front panel at the edges, slide the transceiver out of the cabinet.

NOTE

Valve filaments and pilot lamps are connected in a series parallel arrangement for 12v operation. When making valve or lamp replacements, be sure that rated filament current are the same as the original units.

TROUBLE ANALYSIS

- (1) Most cases of trouble can be traced to defective valves. Many valve checkers cannot duplicate the conditions under which the valves work in the transceiver. Substitution of new valves will sometimes clear an obscure case of valve trouble. Intermittent trouble conditions in valves can usually be discovered by lightly tapping the envelope. Occasionally valve pins or socket terminals will become dirty or corroded causing an intermittent condition. When this situation is suspected, remove the valve and apply a few drops of contact cleaner to the valve pins. Replace the valve and work it up and down in the socket a few times. Shorted valves or capacitors will often cause associated resistors to overheat and crack, blister or discolour.

TROUBLE ANALYSIS - Cont'd

- (1) Making the measurements listed in Tables 5-2 and 5-3 will help to isolate this type of trouble to a particular stage or component.
- (2) A logical process of elimination in conjunction with a study of the main schematic diagram and block diagram will aid in isolating trouble. For example --

RECEIVER

- (3) If the receiver S METER functions properly, and there is no audio output, then the fault will either be in the CARRIER OSCILLATOR (V16) the PRODUCT DETECTOR (V15b) or the AF AMP and OUTPUT VALVES (V17)
- (4) If no signal is received and all valves and voltages appear to be correct, the HF CRYSTAL OSCILLATOR (V10) the VFO (V11) CARRIER OSCILLATOR (V16) may be suspected.

~~TRANSMITTER~~ These may be tested by checking the operation of the transmitter section, since these oscillators are common to both transmitter and receiver sections of the KW 2000

TRANSMITTER

- (5) No RF signal passes through the transmitter section until the operator speaks into the microphone, presses the key or puts the FUNCTION switch to TUNE. This means that with no input signal, all stages except the CARRIER OSC the VFO and the HF CRYSTAL OSC are quiescent.

TROUBLE ANALYSIS - Cont'd

- (6) Should no output be obtained from the transmitter section when the FUNCTION switch is at TUNE or when speaking into the microphone with the FUNCTION switch at LSB or USB and the CONTROL switch at INT MOX, then the fault can be isolated to the stages before or after the BALANCED MODULATOR. By shorting one side of the primary of IFT 1 to chassis the BALANCED MODULATOR will be unbalanced. If under this condition RF output is obtained, the fault must be in the stages before the BALANCED MODULATOR.
- (7) If by unbalancing the BALANCED MODULATOR, output is obtained, then the fault can be still further isolated, by putting the FUNCTION switch to TUNE, this should cause a 1400 cps tone to be heard in the loudspeaker, this indicates that the TONE OSC (V15a) is working. If RF output is obtained in the TUNE position, and there is no output on LSB or USB with speech, then either the MIC AMP (V1a) or the microphone is at fault; also check microphone plug.
- (8) In carrying out the above checks, the transceiver should be set up as in the operating instructions.

SIGNAL TRACING PROCEDURES

Table 2 - 1 lists significant test points, normal signal test points and normal signal levels. Fig 2 - 1 shows location of adjustments. Voltages given in the tables are nominal and may vary plus or minus 20 per cent.

2 - 3

SIGNAL TRACING PROCEDURES

A signal generator with an accurately calibrated output attenuator must be used to provide the RF signal source indicated. Be careful each time to set signal generator to frequency shown in table. Oscillator output voltages must be measured with a valve voltmeter and RF probe.

- (1) For audio measurements, use an audio oscillator as the signal source and an a-c VVM or audio wattmeter to monitor receiver output. Set AF GAIN at maximum, and terminate the 3 ohm AUDIO output with a three ohm resistive load.
- (2) Oscillator injection voltages are measured with VVM with an RF probe.
- (3) To check RF signal levels, connect D.C. VVM to the receiver AVC line. Set RF GAIN fully clockwise. Static D.C. voltage on the AVC line should be approximately 0.6 volt. Connect the RF signal generator to the point indicated in the table, and vary the generator dial to produce maximum AVC voltage, and compare with the value listed in the table.

2 - 4

VOLTAGE & RESISTANCE MEASUREMENTS

Tables 2 - 2 (1) (2) list voltage measurements with the transceiver on receive and transmit respectively. Table 2 - 3 lists resistance measurements. Voltages and resistances given in the tables are nominal and may vary plus or minus 20 per cent.

VOLTAGE & RESISTANCE MEASUREMENTS - Cont'd

- (1) Set RF GAIN F.C. wave change switch 3.5, IRT off. Function switch LSB. AF GAIN FC. For voltage measurements in transmit condition set CONTROL switch to INT. MOX.
- (2) Resistance measurements are made with all external cables disconnected. Resistance of less than one ohm are listed as zero.

- (3) It is recommended that a meter with a resistance of at least 20,000 ohms volts be used such as the AVO 8. Complete alignment of the receiver section requires the use of a signal generator covering 1.8 - 30 mc. Put the TR LIN switch to LIN. Plug the signal generator into the receiver socket (Rx) Tune the signal generator to 3.6 mc, adjust the output for 50 uV unmodulated. Tune the transceiver to 3.6 mcs. Figures 2 - 1 and 2 - 2 show the location of adjustments.

(1) 455 kc I.F. ALIGNMENT

- (a) Set FUNCTION switch to LSB and tune to the 3.6 mc signal for maximum S meter reading.
- (b) Adjust the top and bottom cores of IFT4 and the core of L27 for a peak S meter reading. Repeat IFT4 and L27 adjustments.

(2) BAND-PASS I.F. ALIGNMENT

- (a) ~~Set FUNCTION switch to LSB and tune to the 3.6 mc signal.~~

(2) BAND-PASS I.F. ALIGNMENT - Cont'd

- (b) Make a swamping tool by connecting a .01 uf capacitor in series with a 1000 ohm resistor and connecting crocodile clips to the two remaining leads.
- (c) Connect the swamping tool from pin 4 of IFT 2 to earth.
See FIG. 2 - 5
- (d) Adjust the bottom core of IFT 2 for an increase in S meter reading.
- (e) Transfer the swamping tool to pin 6 of IFT 2 and earth
- (f) Adjust the top core of IFT 2 for an increase in S meter reading.

This completes bandpass I.F. alignment for the receiver section.

(3) HF CRYSTAL OSCILLATOR ADJUSTMENT

- (a) If the HF crystal oscillator RF injection voltages are lower than specified in Table 2 - 1, connect a VVM with RF probe to pin 3 of the 2nd Tx mixer V5.
- (b) Dissolve the fixative retaining the cores in their coils (L20, 21, 22, and 25). This can best be done by applying a little acetone to the coils, leave for one minute and carefully move the coils to and fro.
- (c) Adjust the cores and compression trimmers on each band in the order indicated in FIG 2 - 2 for a peak in VVM reading.
For the bands with more than one 200 kc segment adjust for equal output on each segment.

(4) R.F. CIRCUIT ALIGNMENT

- (a) Set FUNCTION switch to LSB and tune the transceiver to 3.5 mc.
- (b) Check the position of the pointer on the PRE-SELECTOR. With the condenser fully unmeshed the pointer should be vertical.
- (c) Set the PRE-SELECTOR so that the pointer is at the lower edge of the 80m segment.
- (d) Adjust the core in L1 and L6 (see FIG 2 - 1) for a peak S meter reading.
- (e) Change frequency on the transceiver and signal generator to 1.8 mc.
- (f) Set the PRE-SELECTOR to the lower edge of the 160m segment
- (g) Adjust C143 and C43 (see FIG 2 - 2) for peak S meter reading
- (h) Change frequency to 23.7 mc
- (i) Set the PRE-SELECTOR to the upper edge of the 10m segment
- (j) Adjust the core in L5 and L10 for peak S meter reading
- (k) Adjust the cores on 21.2 L4 and L9, 14.3 L3 and L8, 7.1 L2 and L7, with the PRE-SELECTOR tuned to the centre of the respective segments.

(5) VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT

- (a) Set the transceiver up on 3.6 mc USB. Tune the signal generator to 3.6 mc. Tune for zero beat on USB.
- (b) Switch to LSB, the transceiver should remain in zero beat. If it does not, adjust the link coil on the VFO coil by inserting a probe through the lower hole in the VFO box, and carefully moving the link until zero beat is obtained.

(5) VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT - Cont'd.

(c) Switch back to USB and check for zero beat.

(6) VFO DIAL CALIBRATION AND IRT

(a) Set the transceiver up on 3.7 mc USB

(b) Turn the IRT switch to IRT and adjust the IRT TUNE control to 0.

(c) Temporarily switch on the 100 kc calibrator by shorting pin 9 of the VOX socket to earth.

(d) Tune to zero beat. Turn the IRT switch to OFF. Adjust R53 (located on the bottom of the VFO box - see FIG 2 - 3) for zero beat.

(e) Check the tracking of the VFO at each 100 kc point. If it is overtracking at 3.5 mc reduce the capacity of C.80 by inserting a probe through the hole in the top of the VFO and turning the Philips trimmer anticlockwise.

(f) Reset the VFO dial at 3.7 mc and adjust the core of L26 (see FIG 2 - 3) for zero beat. Repeat the above adjustments until the tracking is correct.

(g) If the VFO is undertracking, increase the capacity of C.80 by turning the Philips trimmer clockwise. Re-adjust L26 at 3.7 mc for zero beat. Repeat until the tracking is correct.

(7) S METER ZERO ADJUSTMENT

(a) Set the transceiver to the middle of any band, peak the PRE-SELECTOR

(b) Set RF GAIN to maximum, and short Rx co-axial socket to earth, the TR LIN switch should be at LIN.

(c) Set S ZERO control (R101) so that S METER reads zero.

(8) S METER CALIBRATION

- (a) Set the transceiver up on 21.4 mc. Tune the signal generator to 21.4 mc. Set the output to 50 uV. Adjust the transceiver for maximum S METER indication.
- (b) Adjust the S METER sensitivity control (R99 see FIG 2 - 1) for S9 on the meter.
- (c) Increase the generator output to 5 mV
- (d) Adjust the S METER linearity control (R102 slider potentiometer located near the key socket) so that the S METER reads S9 + 40 db.
- (e) Repeat the above adjustments until the S METER calibration is correct at S9 and S9 + 40 db.

This completes the alignment of the receiver section of the KW 2000.

ALIGNMENT PROCEDURE TRANSMITTER SECTION

Complete alignment of the transmitter section requires the use of a 100w 75 ohm dummy load, a 0-5 mA milliammeter, a signal generator covering 1.8 - 30 mc, and a VVM with RF probe.

(1) SETTING UP PROCEDURE

- (a) Put the TR LIN switch to LIN. Plug the dummy load into the coaxial socket marked TR LIN. Plug the signal generator tuned to 3.6 mc with an output of 50 uV unmodulated into the coaxial socket marked Rx.
- (b) Connect the 0-5 mA milliammeter in series with the purple bias lead and RFC 5 (connected to the grid of the power amplifier via an APC). This must be done with the power off.
- (c) Set the transceiver up on 3.6 mc with the FUNCTION switch at LSB and the CONTROL switch at EXT MOX.

(2) BAND PASS I.F. ALIGNMENT

- (a) Tune the transceiver to the 3.6 mc signal and adjust the PRE-SELECTOR for maximum indication on the S METER
- (b) Connect the swamping tool as described in 2 - 5 (2) (b) to pin 4 of IFT 3 and earth
- (c) Turn the MIC GAIN control fully anti-clockwise
- (d) Turn the FUNCTION switch to TUNE. This puts the transceiver into the transmit condition. The TONE OSCILLATOR at 1400 c/s will be heard in the loudspeaker.

(2) BAND PASS I.F. ALIGNMENT Cont'd

- (e) Slowly advance the MIC GAIN control until the PA CATHODE current rises to ⁷⁵~~50~~ mA. Adjust the PA TUNE control for a dip in PA current.
- (f) Adjust the bottom core of IFT 3, backing off the MIC GAIN control to maintain a cathode current of ⁷⁵~~50~~ mA.
- (g) Turn the MIC GAIN control fully anti-clockwise
- (h) Transfer the swamping tool to pin 6 of IFT 3 and earth
- (i) Advance the MIC GAIN control until ⁷⁵~~50~~ mA of cathode current flows
- (j) Adjust the top core of IFT 3 for an increase in cathode current
- (k) Turn the MIC GAIN control fully anti-clockwise. Remove the swamping tool.

This completes the band-pass alignment for the transmitter section.

2 - 6

R.F. CIRCUIT ALIGNMENT 80 and 10m

- (a) Set the transceiver up on 3.6 mc as in 2 - 6 (1) a to c and 2 - 6 (2) (a)
- (b) Advance the MIC GAIN control until cathode current of ⁷⁵~~50~~ mA flows. Check that the PA TUNE control is still at dip.
- (c) Adjust the core of L11 (see Fig 2 - 2) for an increase in PA cathode current. Reduce the MIC GAIN control while doing this to maintain a cathode current of ⁷⁵~~50~~ mA.
- (d) Turn the MIC GAIN control fully anti-clockwise. Turn the FUNCTION switch to USB
- (e) Change frequency on the transceiver and signal generator to 28.5 mc
- (f) Tune in the 28.5 mc signal for maximum S METER reading, peak the PRE-SELECTOR
- (g) Turn the FUNCTION switch to TUNE. Advance the MIC GAIN control for PA cathode current of ⁷⁵~~50~~ mA.
- (h) Adjust L15 by closing or opening the coil, for a peak in PA cathode current

(4) NEUTRALISING 10m

- (a) After carrying out the RF circuit alignment on 28.5 mc advance the MIC GAIN control until an indication of GRID current is obtained.

(4) NEUTRALISING 10m - Cont'd

(b) Rock the PA TUNE control either side of resonance and adjust C56 (PA NEUTRALISING CONDENSER) for an equal rise in GRID current either side of resonance. This adjustment must be done very rapidly, as heavy anode current is being drawn.

(c) Turn the MIC GAIN control fully anti-clockwise, and turn the FUNCTION switch to USB

(5) RF CIRCUIT ALIGNMENT AND NEUTRALISING 15m

(a) Change frequency on the transceiver and signal generator to 21.4 mc

(b) Tune in the 21.4 mc signal and adjust the PRE-SELECTOR for peak S meter reading.

(c) Turn the FUNCTION switch to TUNE. Advance the MIC GAIN control for PA cathode current of ⁷⁵~~50~~ mA

(d) Adjust the core of L14 for a peak in PA cathode current

(e) Adjust the PA TUNE control for a dip in PA cathode current

(f) Advance the MIC GAIN control until an indication of PA GRID current is obtained.

(g) Rock the PA TUNE control either side of resonance, and adjust C61 (see FIG 2 - 2) for equal GRID current either side of resonance. It may be necessary to readjust L14 to keep it on resonance as C61 is adjusted

(5) RF CIRCUIT ALIGNMENT AND NEUTRALISING 15 m - Cont'd

- (h) Turn the MIC GAIN control fully anti-clockwise and return the FUNCTION switch to USB.

(6) RF CIRCUIT ALIGNMENT AND NEUTRALISING 20m

- (a) Change frequency on the transceiver and signal generator to 14.3 mc.
- (b) Tune in the 14.3 mc signal and adjust the PRE-SELECTOR for peak S meter reading.
- (c) Carry out the procedure outlined in 2 - 6 (5) c to g adjusting the core of L13 for resonance and C162 for neutralising.
- (d) Turn the MIC GAIN control fully anti-clockwise and the FUNCTION switch to USB.

(7) RF CIRCUIT ALIGNMENT 40m

- (a) Change frequency on the transceiver and signal generator to 7.1 mc.
- (b) Tune in the 7.1 mc signal and adjust the PRE-SELECTOR for peak S meter reading.
- (c) Turn the FUNCTION switch to TUNE. Advance the MIC GAIN control for PA cathode current of ⁷⁵~~50~~ mA.
- (d) Adjust the core of L12 for a peak in PA cathode current
- (e) No neutralising adjustments are necessary on 40, 80 and 160m.
- (f) Turn the MIC GAIN control fully anti-clockwise and the FUNCTION switch to USB.

(8) BALANCED MODULATOR CARRIER BALANCE

- (a) To balance the balanced modulator, load the transceiver up on 3.6 mc in the TUNE position. Return the FUNCTION switch to USB, turn the CONTROL switch to INT MOX (this will switch the transceiver to transmit) Turn the MIC GAIN control fully anticlockwise and connect the VVM with RF probe across the dummy load.
- (b) Adjust R14 and C12 (see Fig. 2 -1) in turn for a VVM reading of 0.2 volt or less.
- (c) Switch the FUNCTION switch back and forth between USB and LSB positions and check that the carrier is balanced at less than 0.2 volt indication on the VVM. If the carrier is not balanced to less than 0.2 volt for either sideband, repeat step (b) until VVM indication is less than 0.2 volt for either sideband.

(9) ITT AND IRTT

No adjustment is necessary on ITT and IRTT as this has been set up under 2 - 5 (6). RLY 2 switches the IRT voltage between receive and transmit.

This completes the alignment of the transmitter section of the KW 2000.

TABLE 2 - 1

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V 17 Pin 3	1700 c.p.s.	8.6 volts	1.5w AF o/p
V 17 Pin 1	1700 c.p.s.	200m volts	1.5w AF o/p
V156 Pin 8	Carrier Oscillator Injection (BFO)		1.5-2.0v RF each osc.
V 12 Pin 1	455 kc/s	50m volts	2.5v AVC
V 13 Pin 1	455 kc/s	750u volts	4.0v AVC
V 19 Pin 1	VFO injection		0.3 - 0.5v R.F.
V 19 Pin 5	455 kc/s	1.5m volts	4.0v AVC
V 18 Pin 7	455 kc/s	1.5m volts	4.0v AVC
V 19 Pin 7	3055 kc/s	1.5m volts	4.0v AVC
V 5 Pin 3	H.F. Osc injection	All Bands	0.8 - 2.0v R.F.
V 9 Pin 7	3055 kc/s	750 uv	4.0v AVC
V 6 Pin 7	3.6 mc/s	1 m volt	4.0v AVC
V 6 Pin 2	3.6 mc/s	100 uv	4.0v AVC
ANT	3.6 mc/s	50u volts	4.0v AVC

Generator output voltage means the terminated 75 ohm output.

N.B. General radio sig. gens. have a termination of 10 ohm and therefore require a matching device. The standard K.W. matching device has an attenuation of 6db.

S.G. terminated 75 ohm injection via 0.01uf. Frequency 3.6 mc/s.

TABLE 2 - 2 (1)
VOLTAGE MEASUREMENTS RECEIVE CONDITION

VALVE PIN CONNECTIONS									
	1	2	3	4	5	6	7	8	9
V1	175	0	2.8	0	0	95	0	0.9	6.3v AC
V2	-	-	-	-	0	185	-55	0	6.3v AC
V3	0	-55	0	6.3	12.6	0	250	250	0
V4	250	-55	0	6.3	6.3	250	-55	0	12.6 AC
V5	250	-55	0	12.6v AC	12.6v AC	250	-55	0	6.3v AC
V6	.35	-.23	-	6.3v AC	0	0	250	42	0
V7	-	-55	0	6.3v AC	0	-	250	250	0
V8	0	6.3v AC	0	0	-58	0	0	0	800 T.C.
V9	-1	1.2	6.3	12.6	250	52	0	-	-
V10	-2.5	0	6.3v AC	0	230	0	170	-	-
V11	115	0	78	6.3vAC	12.6v AC	72	1.2	4.5	4.2
V12	-.1	0	6.3	12.6	215	145	2.6	-	-
V13	-.05	0	6.3	12.6	215	150	2.5	-	-
V14	0	-.3	12.6	6.3	4	-	-.43	-	-
V15	175	0	2.6	6.3	6.3	135	-1	.6	12.6
V16	100	-.55	0	0	0	100	0	3.4	6.3v AC
V17	0	20	0	6.3	12.6	240	250	1	70
V18	180	0	2.4+	6.3	6.3	180	0	2.4	12.6
V19	-.05	1.2	6.3	12.6	250	52	0	-	-
V20	150v	-	-	-	+50v	-	0	-	-
V21	80	0	1.6	6.3	6.3	240	*.05	50	12.6
V22	-65	0	12.6	6.3	85	50	0	-	-

Ext max. LSB RF Gain (fully clockwise)

Freq. 3.6 mc/s AF Gain (fully counter clockwise)

+ Dependant on Smeter zero position

* Vox sens FC

TABLE 2 - 2 (2)
VOLTAGE MEASUREMENTS - TRANSMIT CONDITION

VALVE PIN CONNECTIONS

	1	2	3	4	5	6	7	8	9
V1	170	0	0.4	0	0	90	0	0.8	6.3v AC
V2	-	-	-	-	0	150	0	2.6	6.3v AC
V3	1.0	0	1.0	6.3AC	12.6	0	55	.55	0
V4	170	0	1.5	6.3AC	6.3	170	0	1.45	12.6 AC
V5	210	0	1.7	12.6v AC	12.6v AC	210	0	1.7	6.3v AC
V6	0	-55	-	6.3AC	0	0	235	235	0
V7	0	0	3	6.3AC	0	-	235	200	0
V8	0	6.3v AC	225	0	-50*	0	0	0	Top Cap750
V9	-55	0	6.3AC	12.6 AC	170	235	-55	-	-
V10	-2.5	0	6.3v AC	0	210	0	160	-	-
V11	110	0	75	6.3v AC	12.6v AC	70	1.2	4	4
V12	-55	0	6.3v AC	12.6v AC	240	235	.03	-	-
V13	-55	0	6.3v AC	12.6v AC	240	240	.03	-	-
V14	-58	-58	12.6v AC	6.3v AC	3.5	-	-58	-	-
V15	165	0	2.5	6.3v AC	6.3v AC	165	-55	0	12.6v AC
V16	100	-.5	0	0	0	100	0	3.5	6.3v AC
V17	0	20	0	6.3v AC	12.6v AC	210	230	1	70
V18	165	0	2	6.3v AC	6.3v AC	165	-7*	2.0	12.6v AC
V19	-55	0	6.3v AC	12.6v AC	245	240	-55	-	-
V20	150	-	-	-	150	-	0	-	-
V21	75	0	1.5	6.3v AC	6.3v AC	135	.15	.95*	12.6v AC
V22	0	0	12.6v AC	6.3v AC	225	220	52	-	-

*Dependant on P.A. Bias Pot.

*Dependant on 'S' meter sens. pot.

*Dependant on VOX sens. and anti-trip settings.

INT. MOX

MIC. INSERTED

LSB. Frequency 3.6 mc/s MIC GAIN fully counter clockwise

TABLE 2 - 3

RESISTANCE MEASUREMENTS

VALVE PIN CONNECTIONS

	1	2	3	4	5	6	7	8	9
V 1	200k	1 meg	Inf.	0	0	200k	470k	2.2k	0
V 2	-	-	-	-	0	30k	600k	2.2k	0
V 3	470	300k	470	0	0	0	40k	65k	0
V 4	20k	300k	230	0	0	20k	300k	220	0
V 5	15k	300k	230	0	0	15k	300k	220	0
V 6	47	750k	-	0	0	0	15k	120k	0
V 7	-	240k	100	0	0	-	15k	22k	0
V 8	0	0	15k	0	Inf.	0	0	0	Top Cap Inf.
V 9	40k	270	0	0	20k	100k	100k	-	-
V10	100k	0	0	0	20k	0	80k	-	-
V11	20k	68k	50k	0	0	40k	270	680	90k
V12	1 meg.	0	0	0	20k	50k	270	-	-
V13	1 meg.	0	0	0	20k	50k	270	-	-
V14	0	600k	0	0	1k	-	600k	-	-
V15	100k	150k	80k	0	0	75k	350k	680	0
V16	40k	100k	0	0	0	40k	100k	Inf.	0
V17	900k	470	470k	0	0	15k	15k	2.2k	250k
V18	18k	0	250	0	0	18k	650k	250	0
V19	60k	270	0	0	20k	100k	100k	-	-
V20	15k	-	-	-	-	-	0	-	-
V21	200k	200k	2.2k	0	0	30k	10 meg	10k	0
V22	9 meg	0	0	0	100k	200k	Inf.	-	-

All measurements are given in ohms unless otherwise specified.

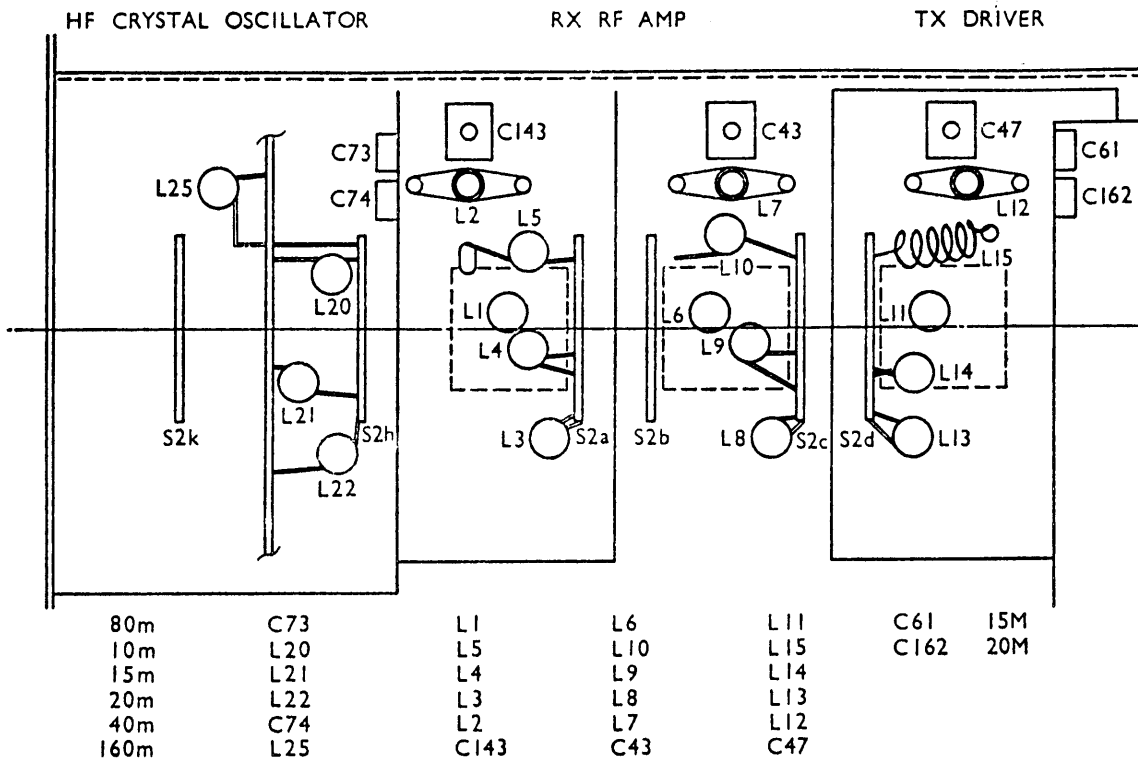


Fig. 2-2

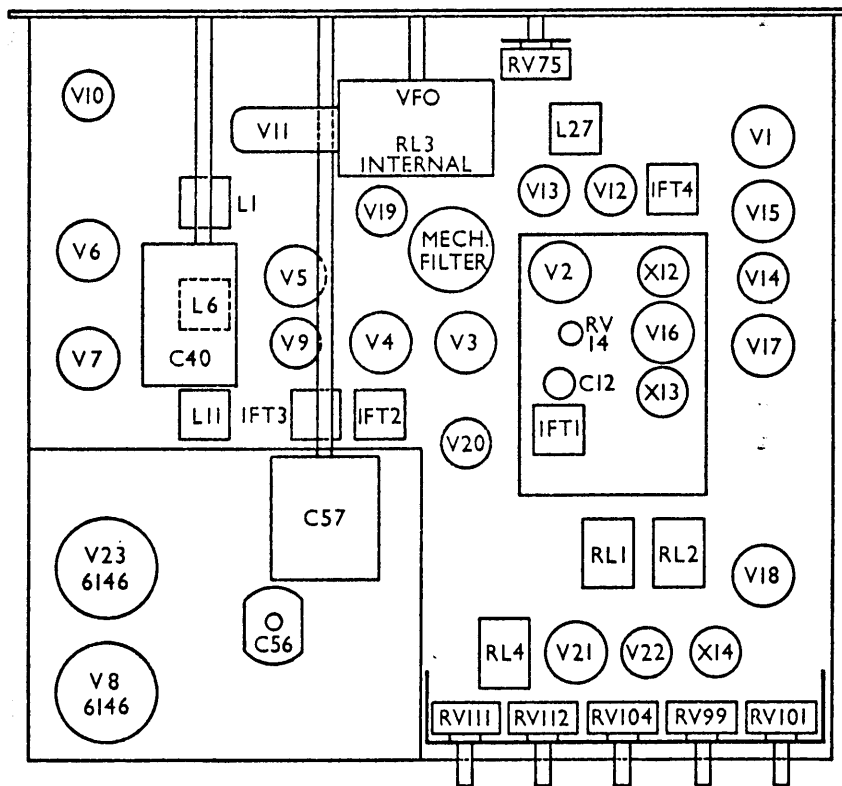


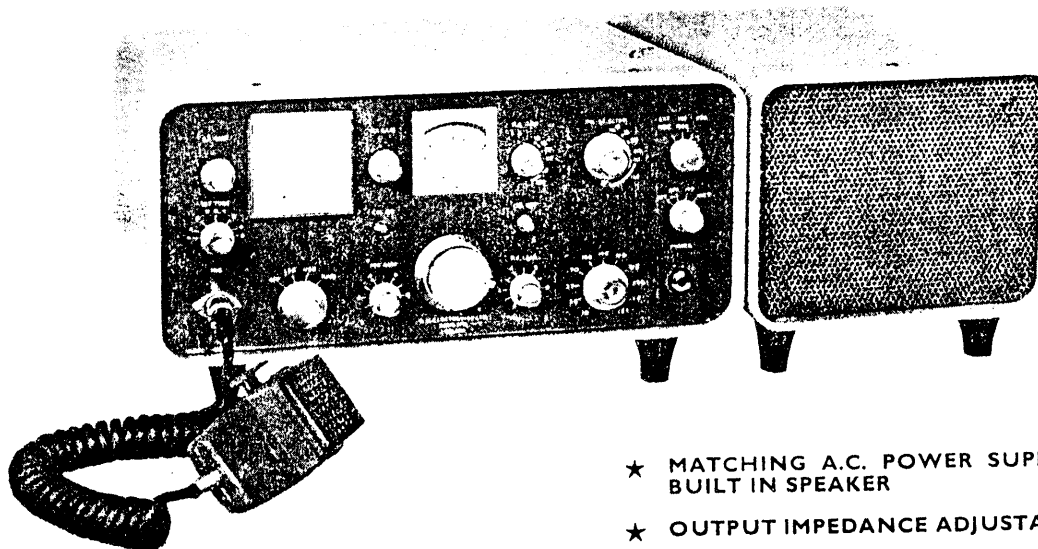
Fig. 2-1

KW ELECTRONICS presents

- ★ MECHANICAL FILTER PROVIDES PASS-BAND FOR SSB
- ★ NO EXTERNAL ANTENNA SWITCHING REQUIRED
- ★ INDEPENDENT TRANSMIT & RECEIVER FREQUENCIES OR TRUE TRANSCEIVER OPERATION
- ★ 180 WATT P.E.P. PROVIDES EFFECTIVE MOBILE POWER WHILST NOT OVER TAXING THE CAR BATTERY
- ★ 12 VOLT D.C. TRANSISTOR POWER SUPPLY
- ★ 6 BAND OPERATION
- ★ LIFT-UP INSPECTION LID

The **KW2000A** Sideband Transceiver

for Mobile and Fixed Station operation on all amateur bands 10-160 metres



- ★ SIDE-TONE MONITOR FOR CW
- ★ CRYSTAL CONTROLLED RECEIVER 1st MIXER
- ★ MATCHING A.C. POWER SUPPLY WITH BUILT IN SPEAKER
- ★ OUTPUT IMPEDANCE ADJUSTABLE
- ★ EASY TO INSTALL IN A VEHICLE FOR MOBILE OPERATION
- ★ LIGHTWEIGHT, ATTRACTIVE, ROBUST, EFFICIENT

FEATURES

The K.W. 2000A Transceiver is another KW design bringing the radio amateur, professional performance at less cost. The KW 2000A is engineered for optimum performance on upper and lower sideband with CW included. Reception of AM signals is possible by the 'exalted carrier' principle. Maximum flexibility is achieved by the KW I.R.T. and I.T.T. circuitry (Patent applied for). This provides a tuning facility ± 6 kcs from the frequency indicated on the dial for both 'transmit' and 'receive'. By the flick of a switch normal transceiver performance is possible whereby 'transmit' and 'receive' operation takes place on precisely the same frequency. The KW 2000A has built-in reliability—only best quality components are used. Each chassis is subject to inspection and test at every stage in production.

The construction of the KW 2000A is light and robust, an aluminium alloy chassis and panel being employed. The SSB generator and receiver filter incorporates a 2.1/2.6 kc mechanical filter. Particular attention has been given to the physical and electrical stability of the circuits. Selectable sidebands; voice control (CW break-in) is included.

K. W. ELECTRONICS LTD

Telephone: DARTFORD 25574

VANGUARD WORKS • 1 HEATH STREET • DARTFORD • KENT • ENGLAND

K. W. ELECTRONICS RESERVE THE RIGHT TO CHANGE PRICES AND SPECIFICATIONS WITHOUT NOTICE AND WITHOUT INCURRING OBLIGATION

SERVICE 00A-25 22040

KW 2000A SSB BAND TRANSCEIVER

Panel meter automatically changes over to read PA cathode current on transmit and 'S' meter signal report on receive. A.C. Power Supply Unit has built-in loudspeaker. For mobile operation, maximum economy of battery drain is achieved by the use of a Transistorized 12 volt Power Supply. Both Power Supply Units are fitted with a switch for reducing power on top band. Power output of the transmitter is sufficient to drive a large linear amplifier in grounded-grid whilst for mobile operation adequate power is obtained for very effective results without overtaxing the battery.

Bands covered: 1.8-2.0, 3.5-3.7, 3.7-3.9, 7.0-7.2, 14.0-14.2, 14.2-14.4, 21.0-21.2, 21.3-21.5, 28.0-28.2, 28.4-28.6, 28.6-28.8 mc/s.

Physical dimensions: Transceiver 13½" x 5½" x 12½" deep (cabinet maximum dimensions) A.C. Power Supply 8" x 5½" x 12½" D.C. Power Supply 8" x 5" x 3½"
Weight: Transceiver 18 lbs approx; A.C. P.S.U. 25 lbs D.C. P.S.U. 6½ lbs.

Mic. input: High Impedance—3 pin socket for pressel switch

Power: SSB 180 watts p.e.p. CW 150 watts

Power Supply: 200-250 volts 45-65 cycles or 105-125 v A.C. Transistor Unit 12 volts D.C. Power requirements 12v @ 5.5A, 700v @ 240 m/a (average) 300 m/a peak, 200v @ 150 m/a, —90v 20 m/a, —20 to —50v @ 20 m/a.

Sidband Suppression: better than 45 db

Carrier Suppression: better than 50 db

Receiver Sensitivity: better than 1 microvolt for 500 mW output

Receiver Signal Noise: better than 1 microvolt 17 db S/N

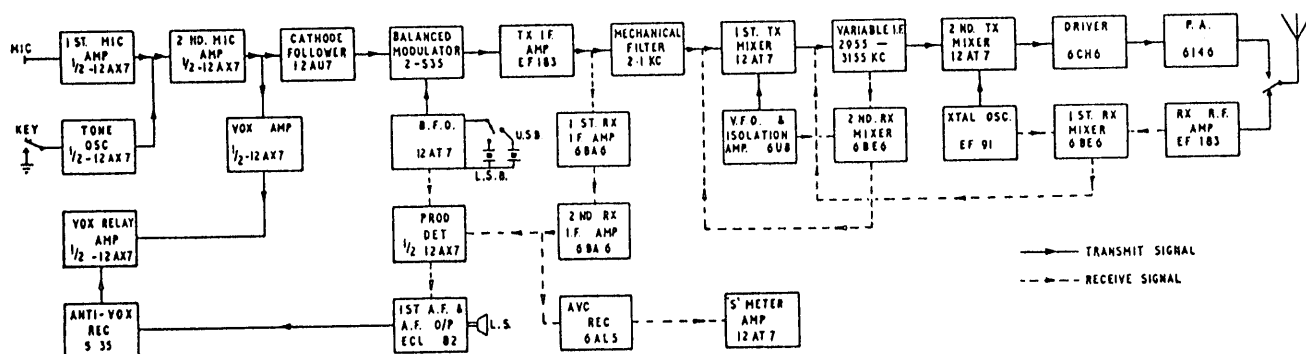
I.F. Selectivity: 2.1/2.6 kc at 6 db. 6 kc at 60 db.

Audio Output: 1.5watts; 3 ohms

Controls: VFO, Pre-selector, Wavechange, OFF-USB-LSB, Tune, EXT MOX—INT MOX—VOX, IRT Tune, IRT-OFF-ITT & IRTT, AF gain, RF gain, PA Load, PA Tune. At the rear, Antenna Switch, 'S' Meter Zero, VOX controls, Sockets for Antenna input, Ant Transceiver or Receiver. External MOX, Speaker, Power, Key jack; and at the front panel, microphone socket.

Tube Complement

EF183	—	RF amp on RX
6BE6	—	1st Mixer RX
6BE6	—	2nd Mixer RX
6BA6	—	1st IF amp RX
6BA6	—	2nd IF amp RX
6AL5	—	AVC rectifier
½12AX7	—	Product detector
ECL82	—	AF & output
2x6146	—	P.A.
6CH6	—	Driver
12AT7	—	2nd Mixer TX
12AT7	—	1st Mixer TX
6AM6	—	C.O.
EF183	—	TX I.F. amp
12AT7	—	BFO
2xOA79	—	Silicon diodes Balanced modulator
½12AX7	—	Tone oscillator
6U8	—	VFO
12AX7	—	Microphone amplifier
12AT7	—	'S' meter amplifier
12AT7	—	Cathode follower

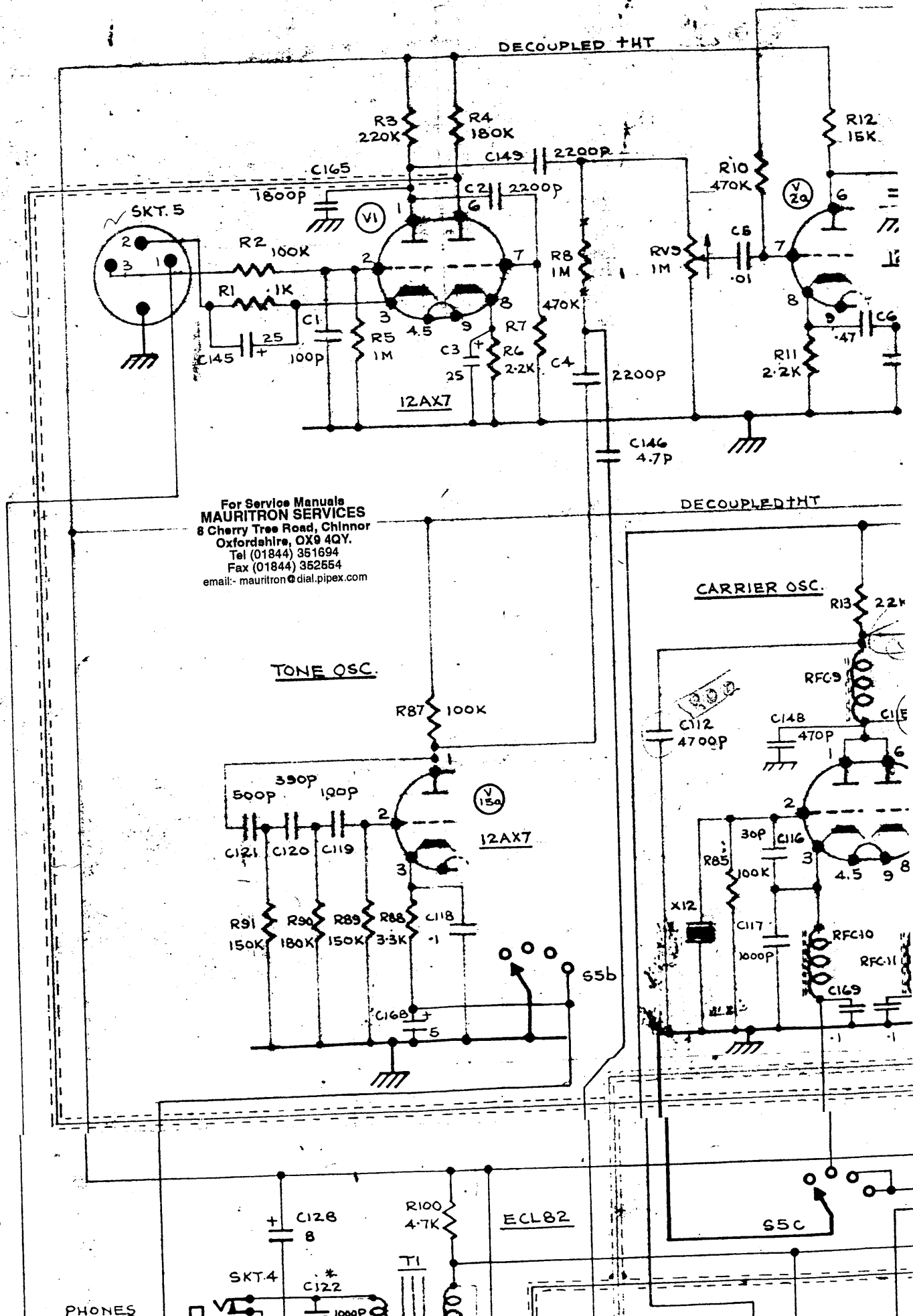


K.W. 2000

K.W. ELECTRONICS LTD

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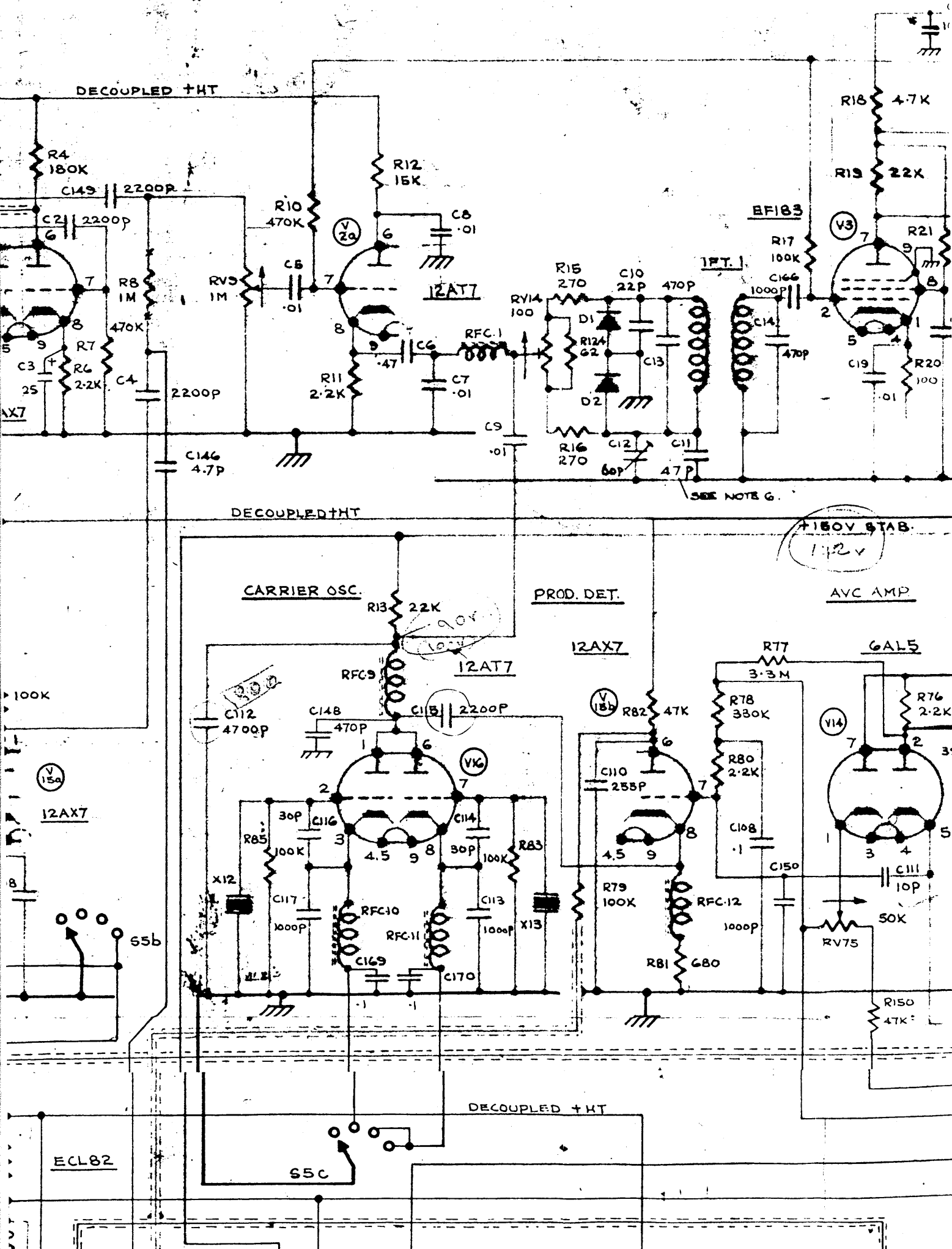
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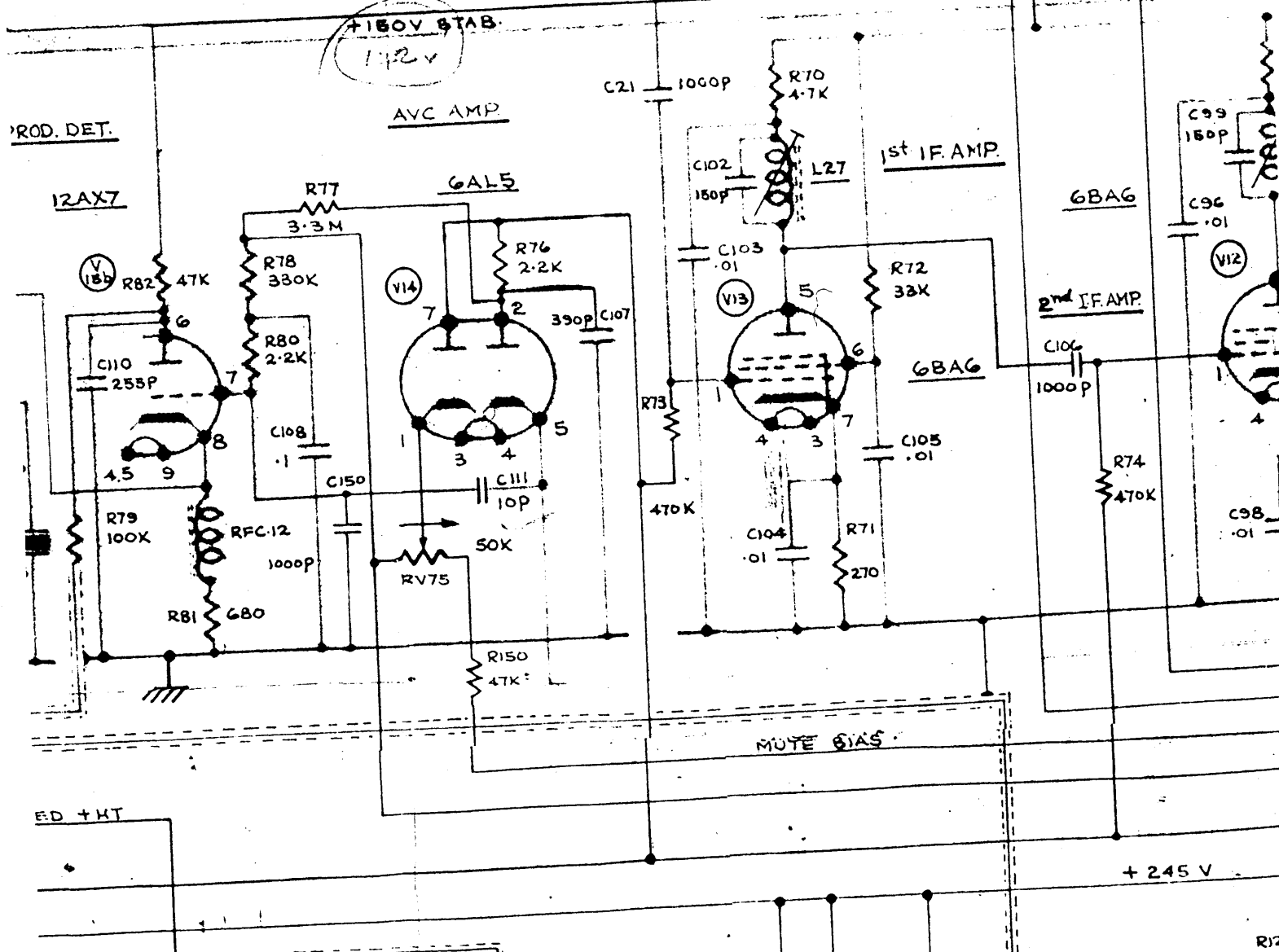
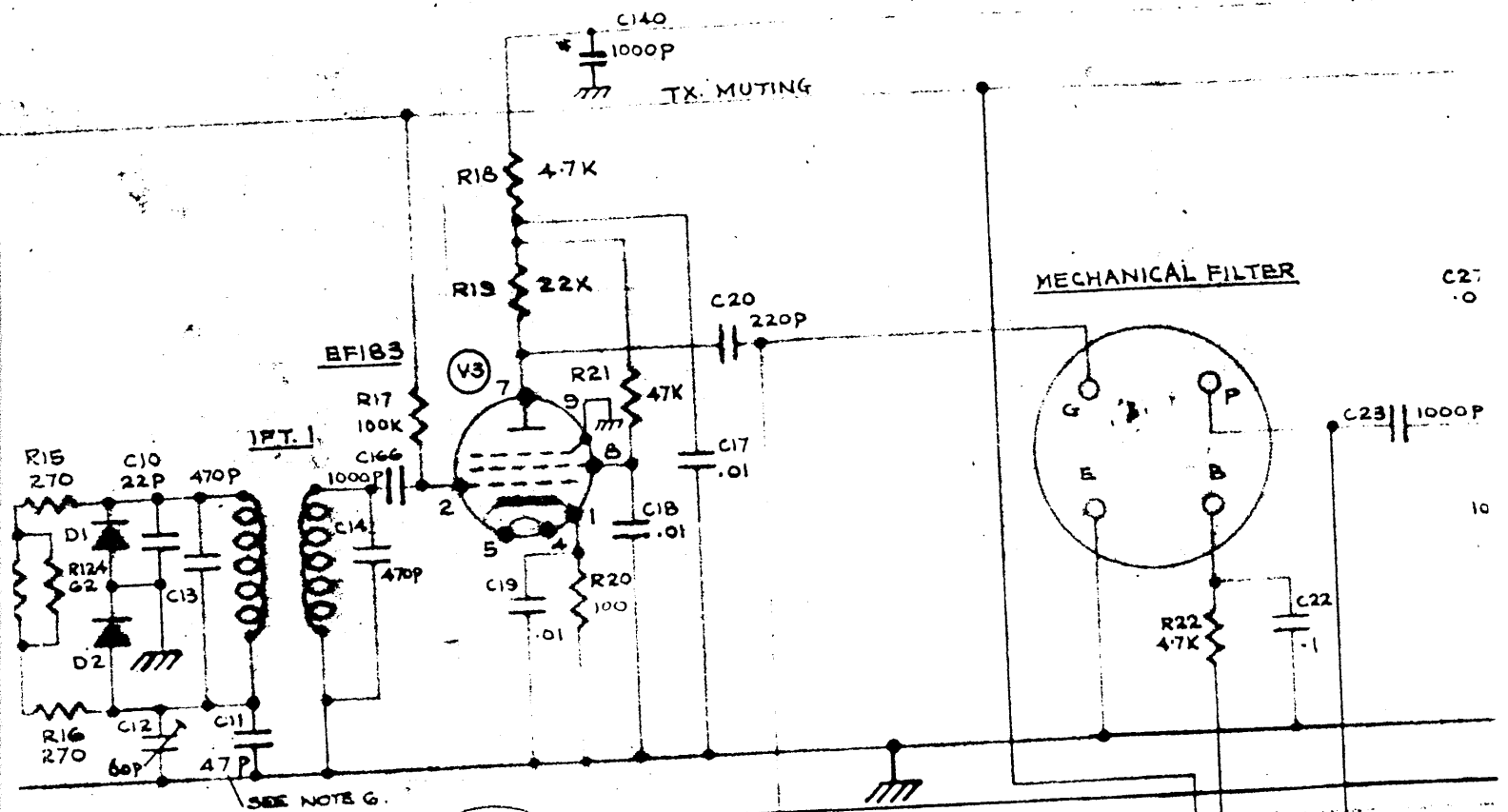
AMP

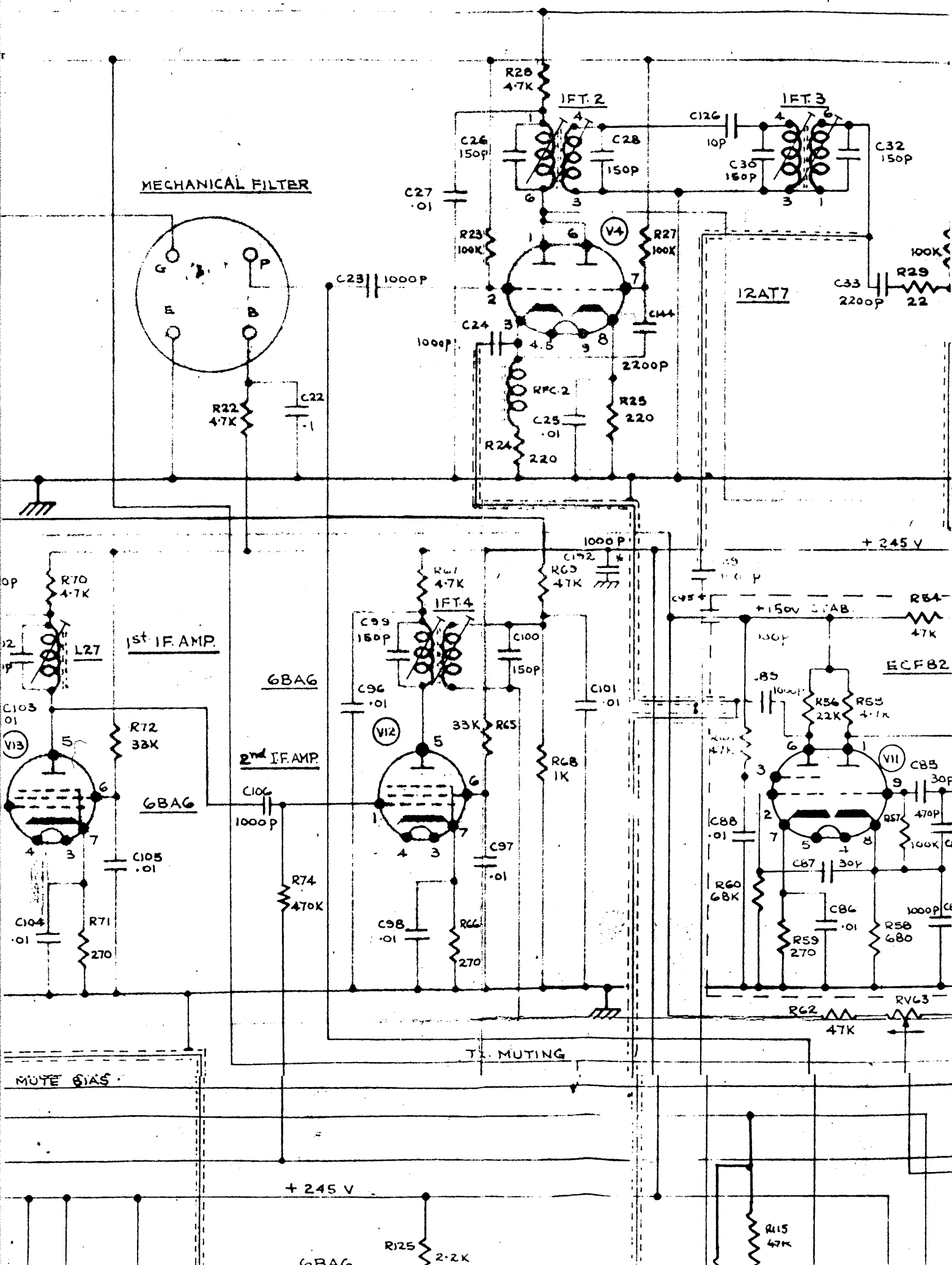
CATH. FOLLOWER

TX. IF AMP.



TX. IF AMP.

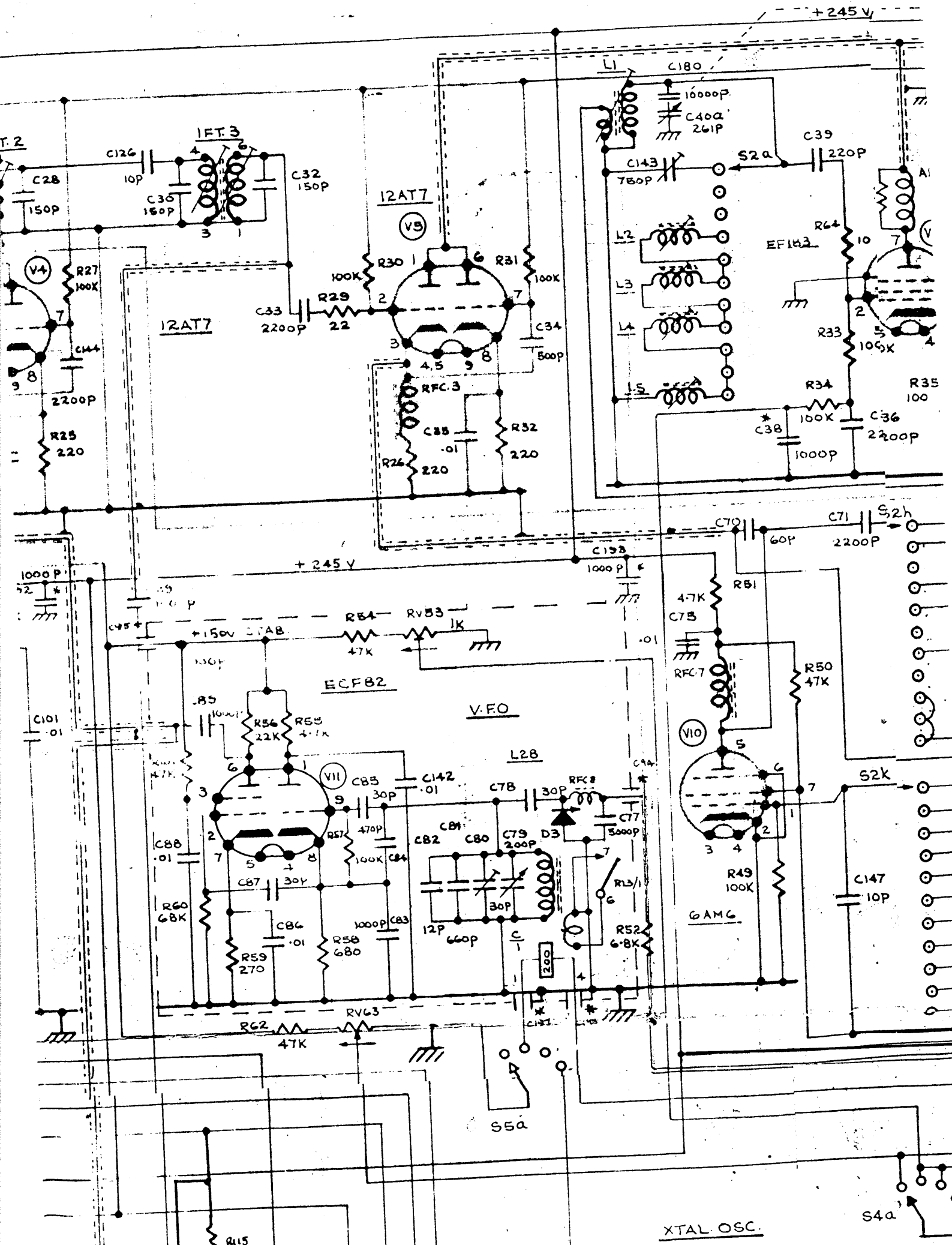




MIX.

2nd T.X. MIX.

RF. AMP

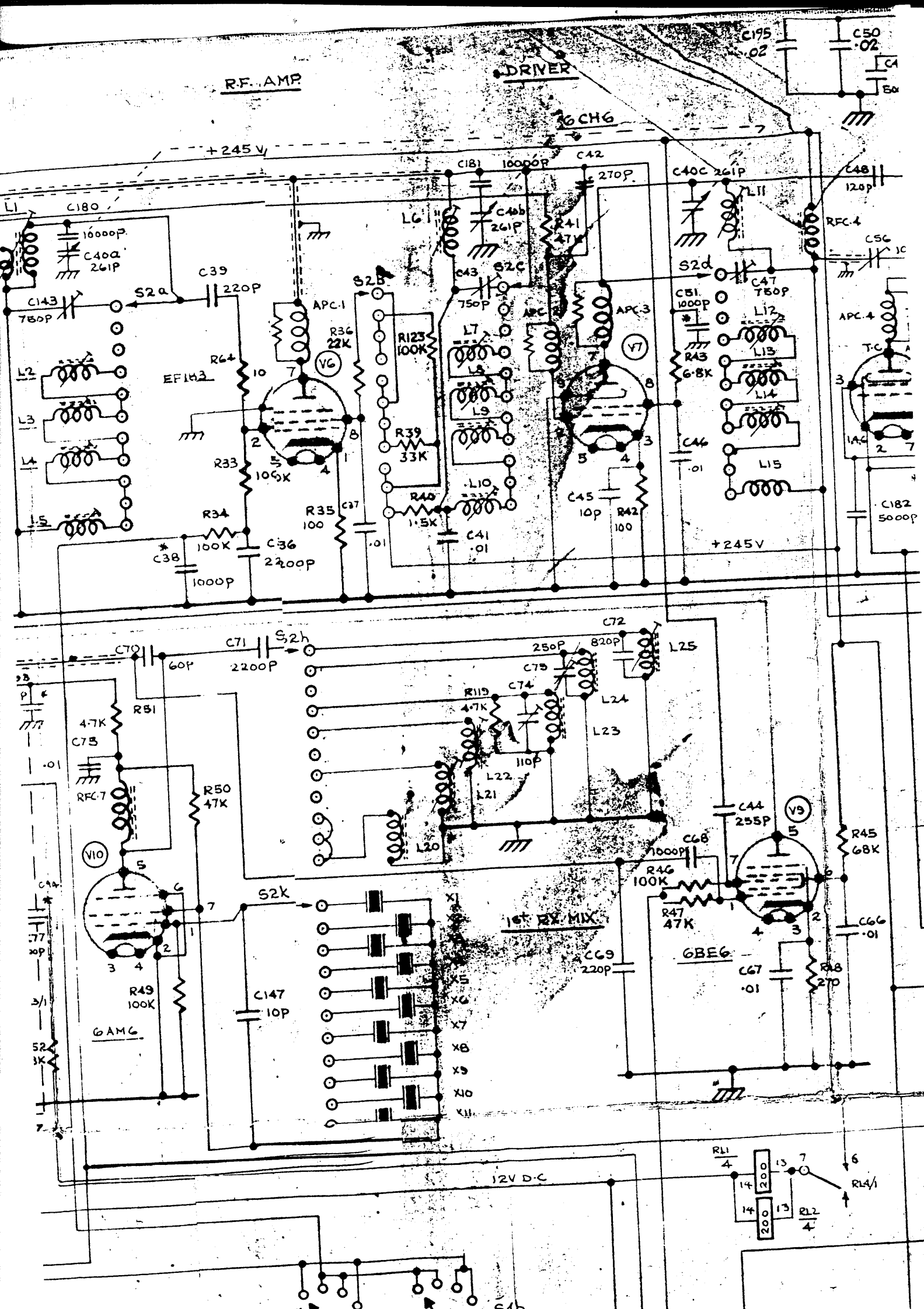


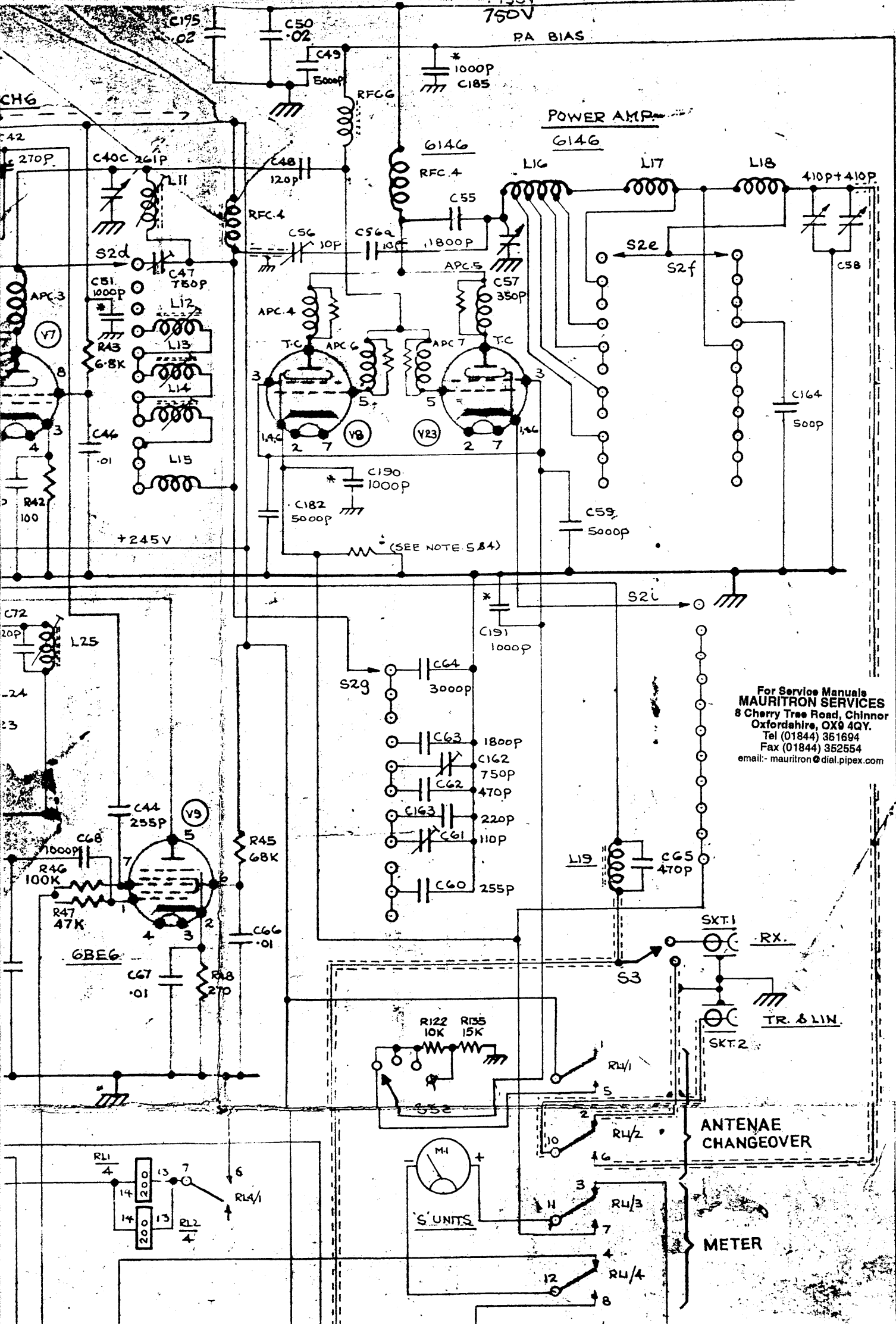
RF AMP

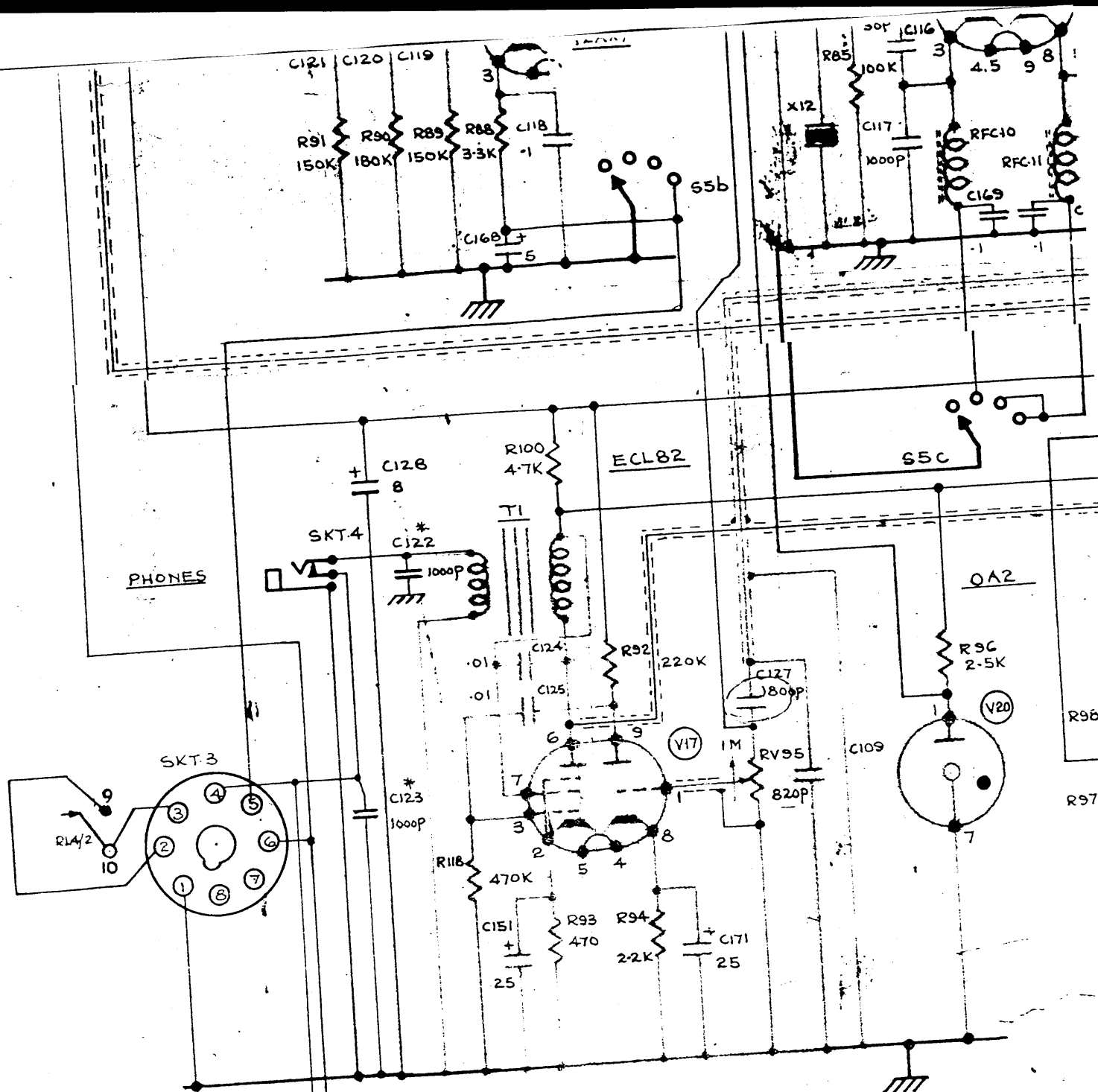
DRIVER

6CH6

+245V







SKT.3. SOCKET CONNECTIONS.

1. EARTH.
2. & 3. THESE VOX RELAY
CONTACTS SHORT ON
TRANSMIT FOR CONTROL
OF AN EXTERNAL UNIT.
4. EXTERNAL LOUDSPEAKER
5. KEY.
6. EXTERNAL MOX.
7. N/C.
8. N/C.

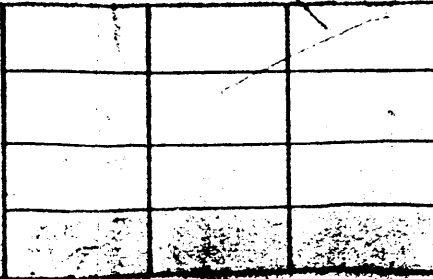
A.F. AMP/OP

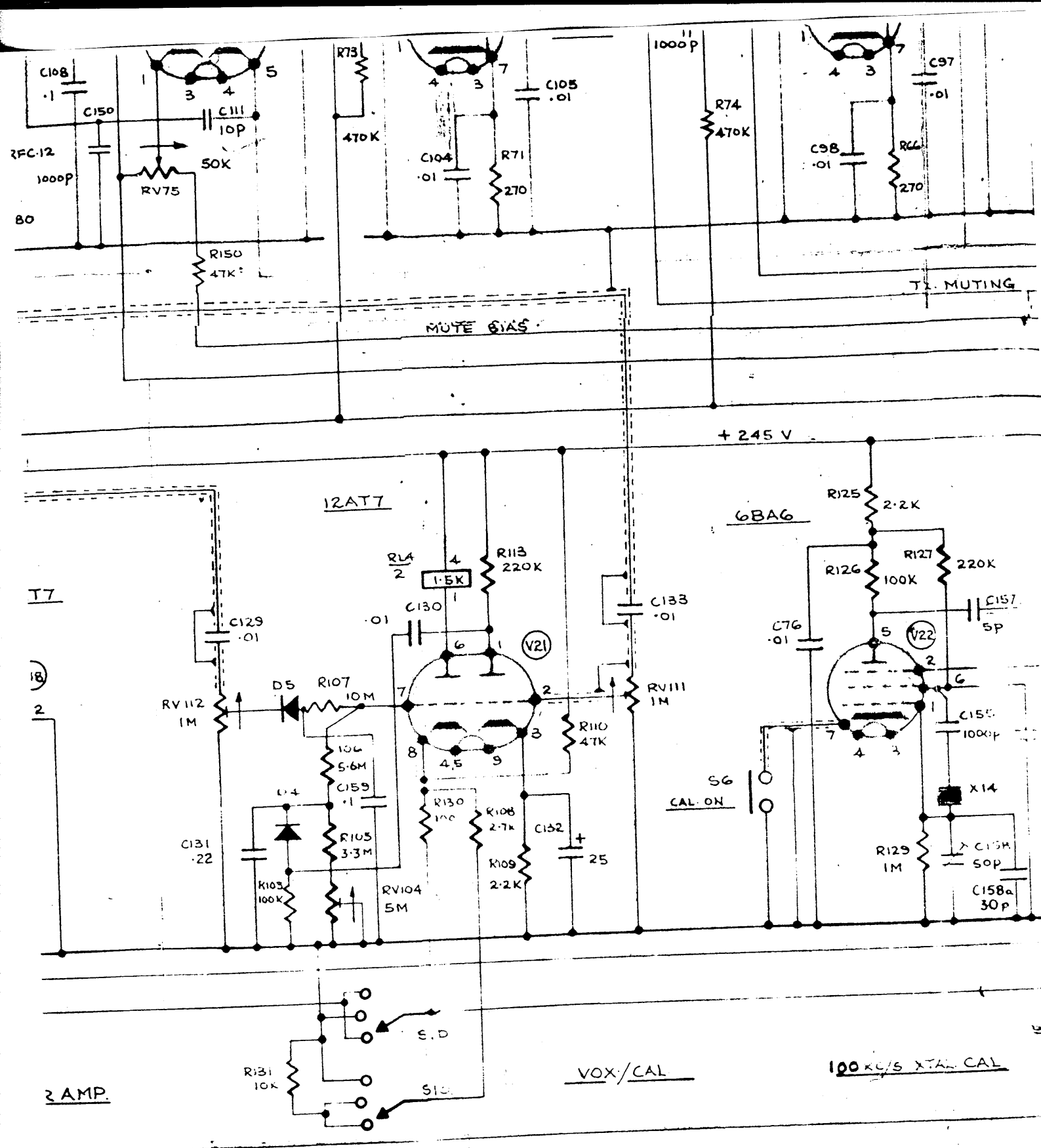
POTENTIOMETERS

- RV. 9 - MIC GAIN
- " 53 - I.R.T. SET
- " 63 - I.R.T. TUNE
- " 75 - RE. GAIN
- " 95 - AF. GAIN
- " 99 - 'S' SENSITIVITY.
- " 14 - CARRIER BALANCE
- " 101 - 'S' ZERO
- " 102 - 'B' L.N.
- " 104 - DELAY
- " 111 - VOX. SEN.
- " 112 - ANTI. VOX.

CAPACITOR

- C57 - PA. TUNE
- C40 - PRE-BEL
- C79 - TUNE
- C58 - PA. LOAD

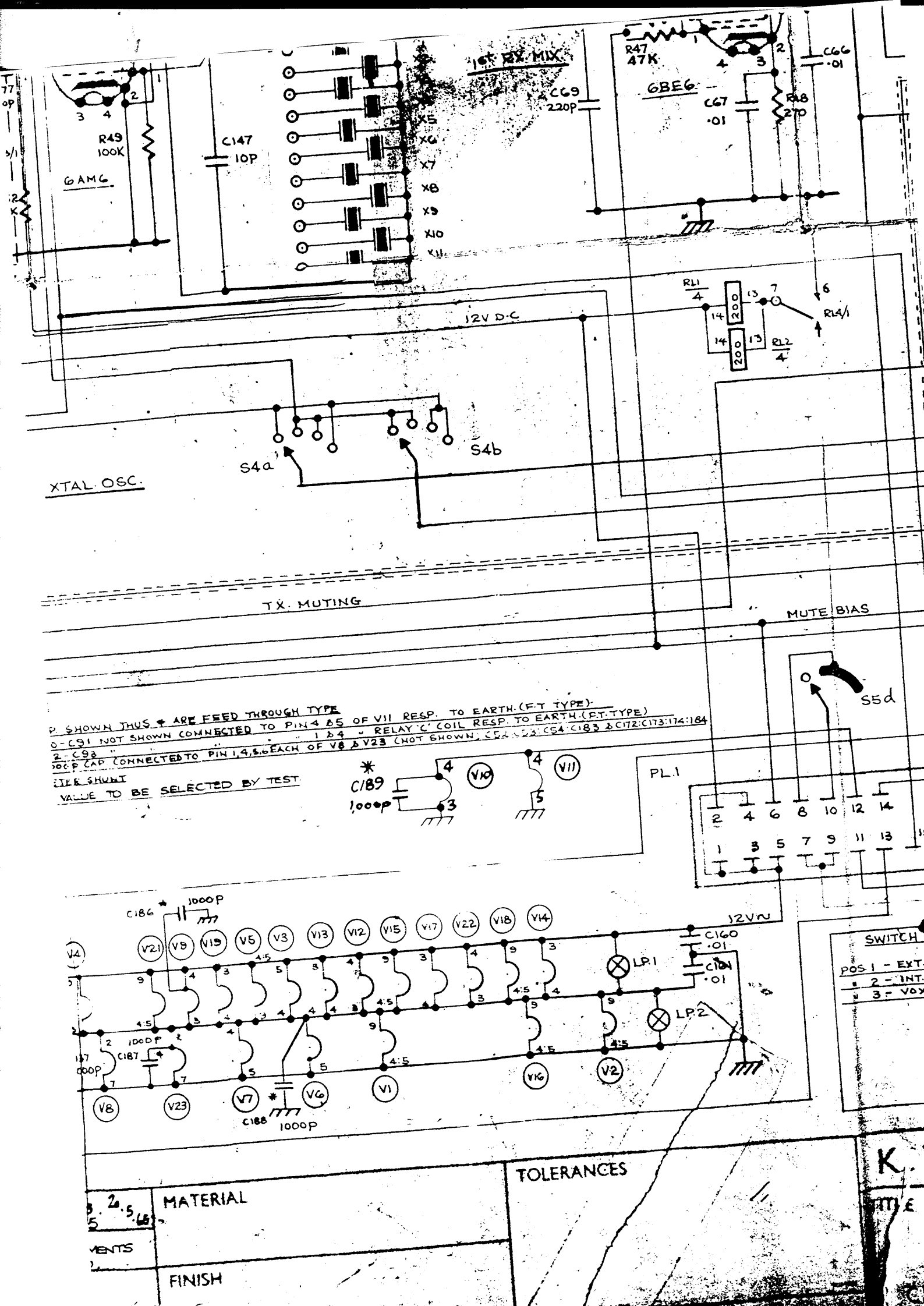


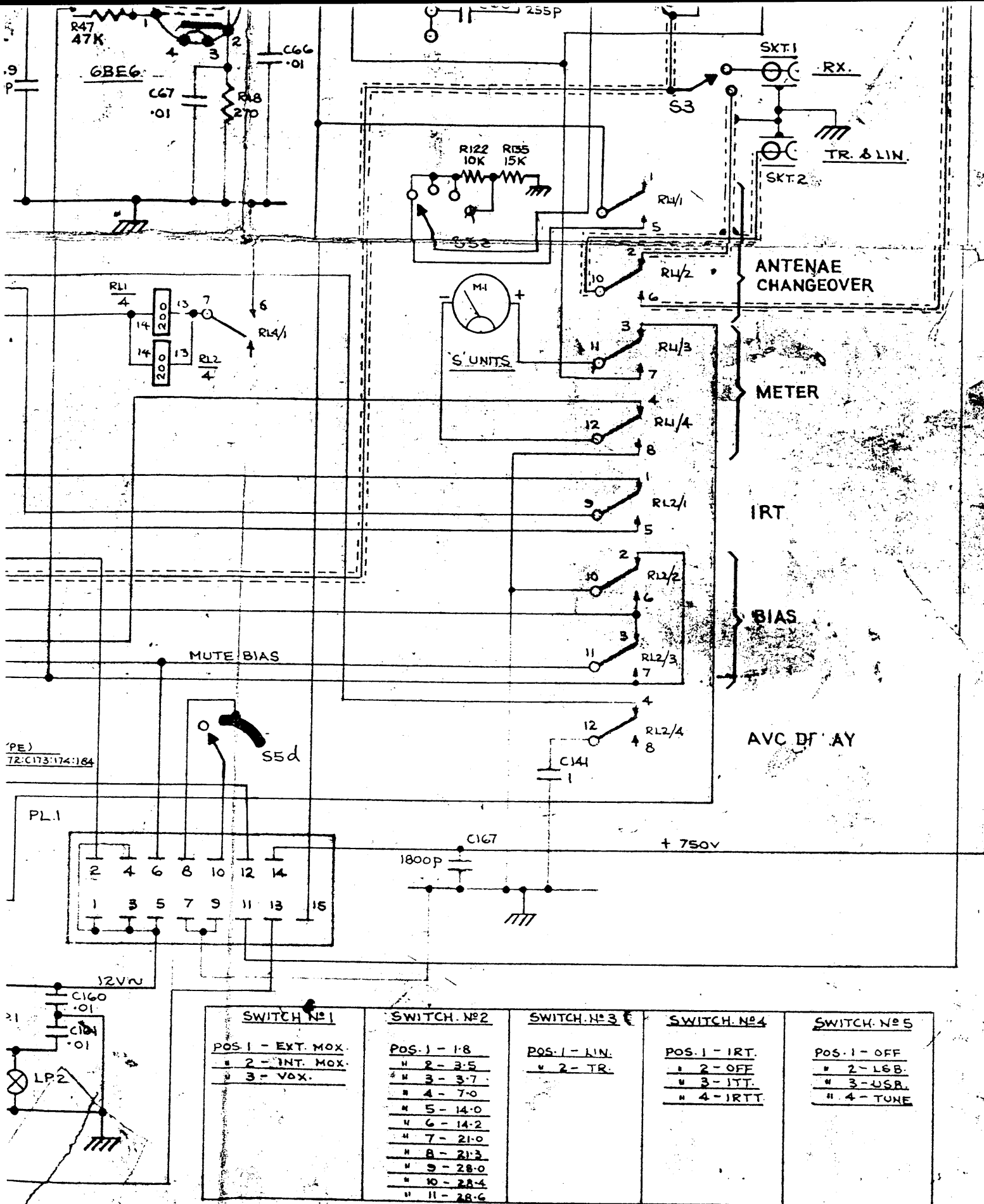


		7		
		6	17-9-65	CIRCUIT AMENDED TO R.T. 8-9-65. AMEND
		5	9-7-65	R37, R38 DELETED. AMEND! SHT. 4029
		4	27.5.65	CONNECTIONS F SOCKET SGT 3.



7			3	20.5.65	C50 WAS 03 J. C15 R98 WAS 2.2M.
6	17-9-65	CIRCUIT AMENDED TO MARKED-UP PRINT R.T. 8-9-65. AMEND! SHT. 4041.	2	6.5.65.	CHANGED TO INCORPORATE REQUESTED ON
5	9-7-65	R37, R38 DELETED. SWITCH S26 REWIRED. AMEND! SHT. 4029.	1	22.1.65	
		CONNECTIONS FOR AN. SHT. 1000 1010	ISSUE	DATE	





K. W. ELECTRONICS DARTFORD KENT

DRG. No

D9004

CIRCUIT DIAGRAM - KW2000A