SERVICE DATA FOR THE DYNATRON CHASSIS

T.69b and LF.59b

AS USED IN THE "ETHER CONQUEROR" SERIES OF RADIOGRAMOPHONES AND "MERLIN" CONSOLES.

Manufactured by: DYNATRON RADIO LIMITED,
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SERVICE DATA FOR DYNATRON CHASSIS T.69b and LF.59b.

It should rarely be required to make any major adjustments and all minor possibilities should be first thoroughly investigated. Faulty valves are the most common cause of trouble and substitution with a known good valve is the best method of testing.

CIRCUIT. A block schematic circuit is appended showing general functioning of the receiver. The first valve of the Tuner unit is an RF amplifier, coupled by a tuned transformer to the frequency changer (Mazda TH.41) the triode section of which is a tuned anode feedback oscillator. The oscillator is arranged to operate at a frequency at all times 473 Kc/s higher than the signal circuits, except in the case of S.W.1 band, in which it is 473 Kc/s lower. The next two stages (intermediate frequency 473 Kc/s) have special transformers giving four positions of selectivity by means of tapped tertiary windings in conjunction with specially chosen damping resistors. The very high sensitivity on the short wave ranges is deliberately reduced on medium and long waves by modification of V3 bias resistor - the static voltage on the cathode of this valve will be seen to change as the wave-change switch is operated. A separate duo-diode valve is used for signal and AVC rectification. The AVC diode has no delay bias, so there is no impairment of quality from this source. The detector output is fed via a whistle filter to the volume control, the latter being switched across the pick-up socket when gramophone reproduction is required. The whistle filter is designed to give a sharp dip in the response curve at 9 Kc/s, the output above this frequency being allowed to rise again. The frequency adjustment will be described in detail in another section of these notes so that a Service Engineer can reset to any desired frequency between the limits of 8.5 Kc/s and 12 Kc/s as may be necessary by alteration in the international allocation of wavelengths, which are at present based on a 9 Kc/s separation of stations. An HL 41 valve operated as audio amplifier is the last valve on the tuner chassis. This feeds into a special bass control circuit giving at 50 c/s a 12 db increase, or a 6 db decrease in bass response as required by the user. When working on gramophone the selectivity switch also functions as treble control as follows:-

30 Kc/s position - no change in output
15 Kc/s position - 10 db fall at 7000 c/s
10 Kc/s position - 15 db fall at 7000 c/s
5 Kc/s position - 20 db fall at 7000 c/s

This will reduce scratch when using a sapphire pick-up on old recordings. It should be noted that the response at 6000 c/s is unaffected by the position of the bass control, and no difference in output is caused at 100 c/s by the position of the treble control.

Turning to the Amplifier chassis LF.59b, another HL.41 audio amplifier valve follows and is fed into a phase-splitter stage driving the pushpull output valves. Negative feedback is taken from the secondary of the output transformer, thus including this component in the improvement of quality given by the feedbank.

The power unit is covential except that extra smoothing is provided, and paper condensers are used after the rectifier and chokes. This gives an added factor of safety.

GENERAL PLAN LAYOUT. (Trimmers, iron cores, resistors, condensers etc)., see drawings appended herewith.

I.F.ALIGNMENT. This is carried out in the factory using special instruments giving a visual display of the resppnse curves, the iron cores are then thoroughly sealed and no further adjustments should be necessary. It is strongly urged that they should not be altered. If the selectivity switch gives trouble the contacts may be found to require attention. (Carbon-tetra-chloride is a satisfactory cleaning fluid. It is recommended that a minute quantity of pure vaseline be dissolved in the carbon-tetra-chloride as a residue permanent lubricant). N.B. The I.F. frequency is 473 Kc/s.

ADJUSTMENT OF GEARS. If, after long service, play develops in the spindles of the gear drive mechanism this should be carefully taken up in the following manner. Slacken off the lock nut very slightly and screw in the bush until the spindle runs freely but without shake or end play. Check again after locking nut is re-tightened. Excessive play on these spindles has been found to produce an electrical 'ticking' noise on S.W.1 band as the knob is turned.

STATIC VOLTAGE TESTS. Taken with wave-change switch in S.W.1 position (except for V3 cathode voltage),oscillator section of the gang condenser should be shorted out by a crocodile lead whilst voltages are taken. A tabulated list of average readings is given on the circuit diagram. All readings are taken on anAVO Model 7 for service purposes.

WHISTLE FILTER ADJUSTMENT.(Factory set at 9 K/cs. If adjustment is required, inject B.F.O. output at desired rejection frequency between pin 2 of V.5.in tuner and earth. With the wave-change switch in any radio position, connect output meter across external loud speaker terminals (internal loud speaker disconnected). If desired,a 15 ohm 10W resistor may be used instead of an output meter,joining it in series with an AVO meter set to an AC current range. Carefully slacken off nut of iron dust core brass stem using tubular hexagonal 4 BA spanner and turn the stem with screwdriver passed through spanner,adjusting for minimum output. (At least 30db down on the output at 1 Kc/s).After tightening the locking nut, test again as the adjustment is critical

and movement of the nut may turn the core slightly. Slight adjustment of RP 1 may be necessary, and this must be done in conjunction with the adjustment of the iron core. For position of RP 1 see pictorial plan.

WINDINGS.	D.C.RESISTANCE (approximate).		
Coil	Resistance	Coil	Resistance
CK 30/4) CK 30/4B)	700 ohms	CK 30/11) CK 30/11A)	125 ohms
CK 30/4A	570 ohms	CK 30/12	400 ohms
OP 30/2B) OP 30/2C)	Primary 75 + 105 ohms. Secondary overall 1 ohm. Tap 0.33 ohms.		
T 28/3A) T 28/3B)	Primary 10 ohms, 11 ohms, 12 ohms. Secondary 80 ohms + 90 ohms (H.T.winding 350v-0-350v)		
GREEN L.W. M.W.	Primary 75 ohms + 75 ohms. Secondary 20 ohms. Primary 15 ohms + 15 ohms. Secondary 3 ohms.		
WHITE L.W. M.W.	Primary 1.5 ohms. Secondary 6.5 ohms. Primary 0.5 ohms. Secondary 1 ohm.		
RED L.W. M.W.	Primary 10 ohms. Secondary 20 ohms. Primary 1.5 ohms. Secondary 1.5 ohms.		

Resistance of shortwave windings are not given as they are too low to be read on an ordinary ohm-meter.

OSCILLATOR VOLTAGE. If a valve volt-meter is available a check on the oscillator volts may disclose any failure of the receiver to work on a particular wave-band. Approximate voltage readings between pin 5 of TH 41 and chassis are as follows:-

L.W.	7	-	12 volts
M.W.	10	-	14 volts
S.W.2.	4.5	-	8 volts
S.W.1.	2	-	5 volts

Replacement of the TH 41 may be necessary if the oscillator volts are low or zero over part of the scale.

HUM. Hum not caused by defective smoothing condensers is probably due to faulty valves (heater-cathode leakage most likely), or due to unequal ageing of the PP3/250's causing unbalance.

A.V.C.VOLTAGE. Using a valve-voltmeter, an input of 0.1 volts R.F. unmodulated applied to the aerial terminal through a standard dummy aerial will produce about 30 volts A.V.C. on M.W. and L.W. measured at 1 m/c and 200 K/s respectively. On S.W.1 and 2 it is less, producing about 20 volts measured at 15 m/cs and 6 m/cs respectively. Set valve-voltmeter to D.C. and measure between C31 and chassis.

SETTING UP POINTER. It is important for calibration and padding that the pointer is perfectly straight and correctly set. This is best done by removing the scale and setting the gang at maximum engagement.

The pointer should then be set perfectly horizontal, so that when the glass is replaced the pointer is parallel with the horizontal black line. The pointer is now rotated by the tuning knob and checked that it is concentric with the band expansion scale. A final check on the straightness of the pointer is to set it on the red diamond of the Light Programme (L.W. scale) when the pointer should pass exactly through the word MUNICH (405 metres on the M.W.scale

FUSES. A 1½ amp fuse is fitted in each mains lead and this rating should not be exceeded. A further H.T. safety fuse of 500 m.a. is located directly beneath the amplifier chassis and is situated between the H.T. centre tap and earth. It is deliberately made inaccessible with the chassis in position, because a failure of this fuse means a breakdown of the H.T. line, and the chassis should be removed for investigation. If it had been made accessible from the outside, fuses could have been replaced without investigation, possibly causing further damage.

Two spare fuses (1½ amp) are supplied with this instrument and are located clipped to the inside of the lid of the fuse box which is screwed to the right hand side of the cabinet (viewed from the back).

BAND EXPANSION SCALE. This ancillary scale is situated around the tuning knob. It expands the 13, 16, 19, 25, 31 and 49 metre bands. N.B. The calibration is in mega-cycles and is used in conjunction with the frequency calibration (m.c.s.) of the S.W.bands 1 and 2, marked on the inside of the blue and green arcs. A logger scale 0 - 100 used in conjunction with the heavy black arc on the outside of the scale numbered 0 - 32 is provided for the logging of stations which fall outside the normal broadcast bands.

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DYNATRON RADIO LIMITED,
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ADDITIONAL OPERATING INSTRUCTIONS ADDED TO MODELS FROM SERIAL NUMBER 1651 ONWARDS.

Band Expansion Scale.

An ancillary band expansion scale is situated around the tuning knob, which makes the actual logging of shortwave stations possible within their respective bands.

The wave bands expanded are the 13, 16, 19, 25, 31 and 49 metre bands. Each band has been individually calibrated with a black dot, which travels the length of its particular scale.

Looking at this ancillary band expansion scale it is found to consist of seven scales. The outside one being arbituary units from 0 - 100; the second is marked 6.0 to 6.225 m/cs (49 metre band); the third 9.5 to 10 m/cs (31 metre band); the fourth 11.75 to 12.05 m/cs (25 metre band); the fifth 15.0 to 15.5 m/cs (19 metre band); the sixth 17.6 to 18.3 m/cs(16 metre band) and the seventh 21 to 22 m/cs (13 metre band). It should be noted that these scales (with the exception of the first) are calibrated in mega-cycles because shortwave stations usually give their position in the band in terms of mega-cycles in preference to metres.

To log a station, note which wave-range the wave change switch is indicating (green or blue, SW.1 or SW.2), then read the mega-cycle calibration situated on the inside of the appropriate arc (SW.1 is marked 10 to 30 m/cs and SW.2 is marked 4 to 10 m/cs, reading from right to left), finally logging the actual position in mega-cycles of the station on the relative scale of the band expansion scale around the tuning knob i.e. if a station is received in the 16 metre band, this will fall somewhere between 17.6 and 18.3 m/cs as indicated by the main scale pointer on the inner calibration in mega-cycles on the blue arc (SW.1). Turning to the 17.6 to 18.3 m/cs expanded scale around the tuning knob, the actual frequency can be read from the position of the black dot on this expanded scale.

The outer scale of the band expansion scale (numbered 0 to 100) can be used in conjunction with the heavy black arc (numbered 0 to 32), which is the outer scale on the main dial, for shortwave 'logging' of stations which do not fall within one of the band expanded scales. This scale represents the number of revolutions of the tuning knob required for the pointer to travel the full length of the main scale. Each of these revolutions can be split into 100 divisions by means of an arrow, which travels round the outer scale on the band expansion scale for accurate logging.

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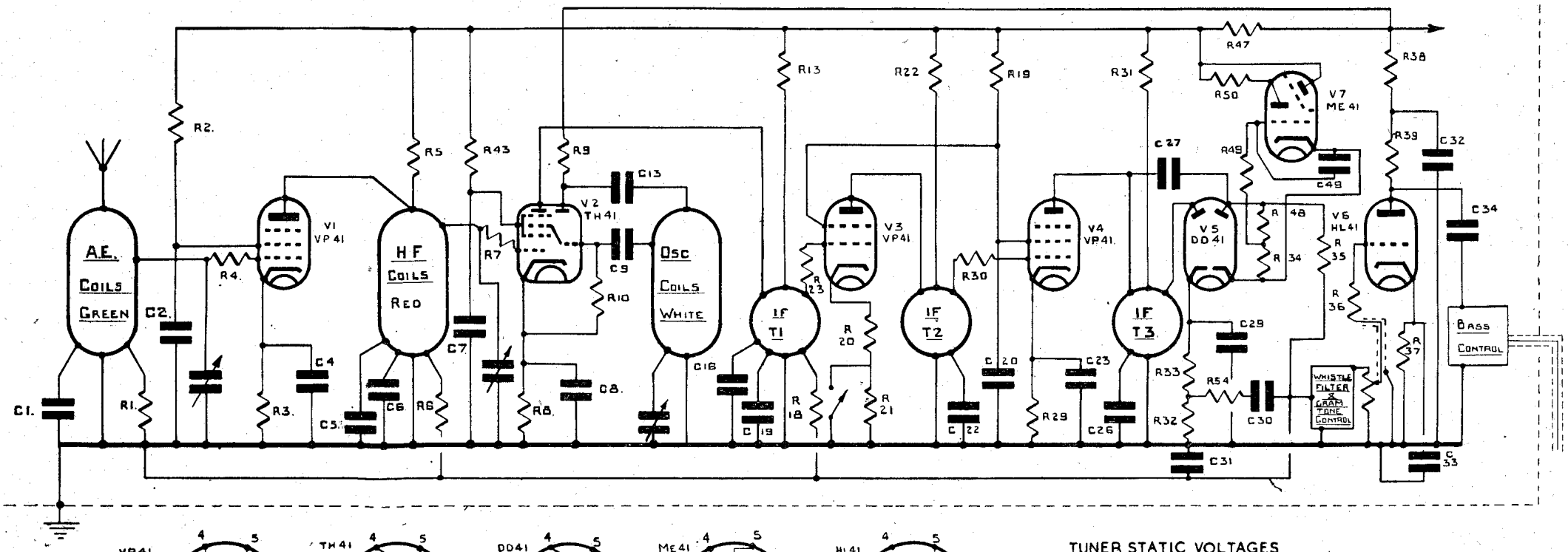
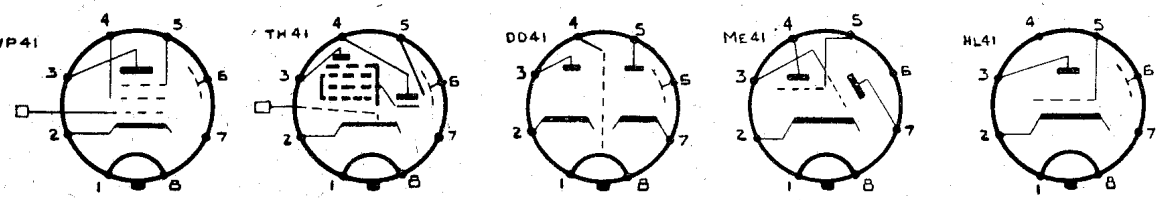




TUNER T69B

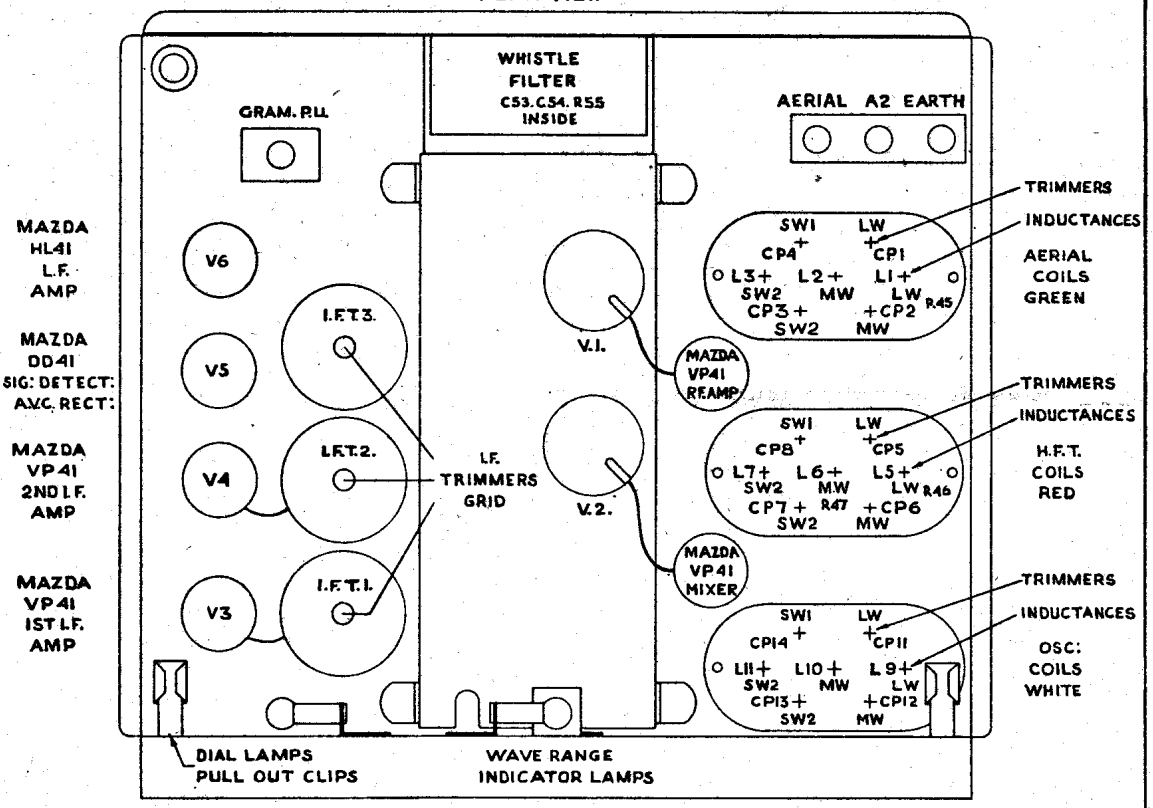
SIMPLIFIED BLOCK BASIC CIRCUIT

TUNER STATIC VOLTAGES

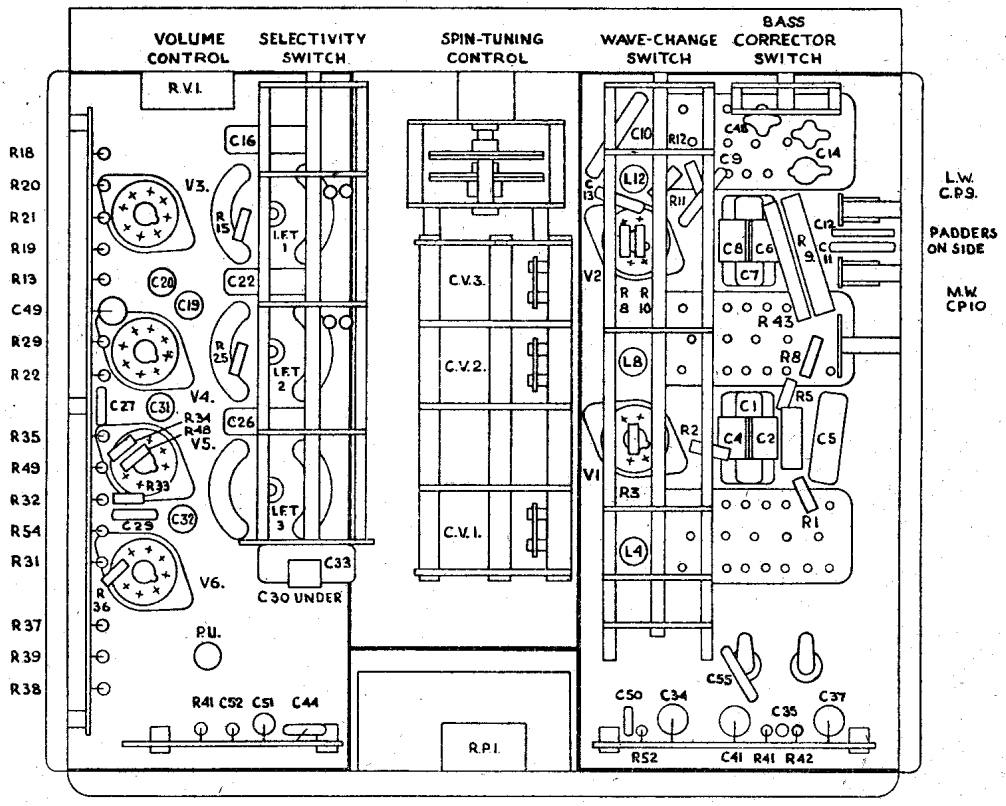
HT. RED	205V.
HT. YELLOW	275V.
HEATERS	4·1 V.
V1. CATHODE	2·2V.
V2. CATHODE	2·7V.
V3 CATHODE S W	1·5 V.
V3. CATHODE M&L	6·7 V.
V4. CATHODE	1·8 V.

V1. ANODE	205 V.
V2. ANODE	205 V.
V3. ANODE	205 V.
V4. ANODE	205 V.
V5. ANODE	105 V.
V1. SCREEN	150 V.
V2. SCREEN	105 V.
V3. V4. SCREEN	135 V.
V2. OSC ANODE	40 V.

PLAN VIEW

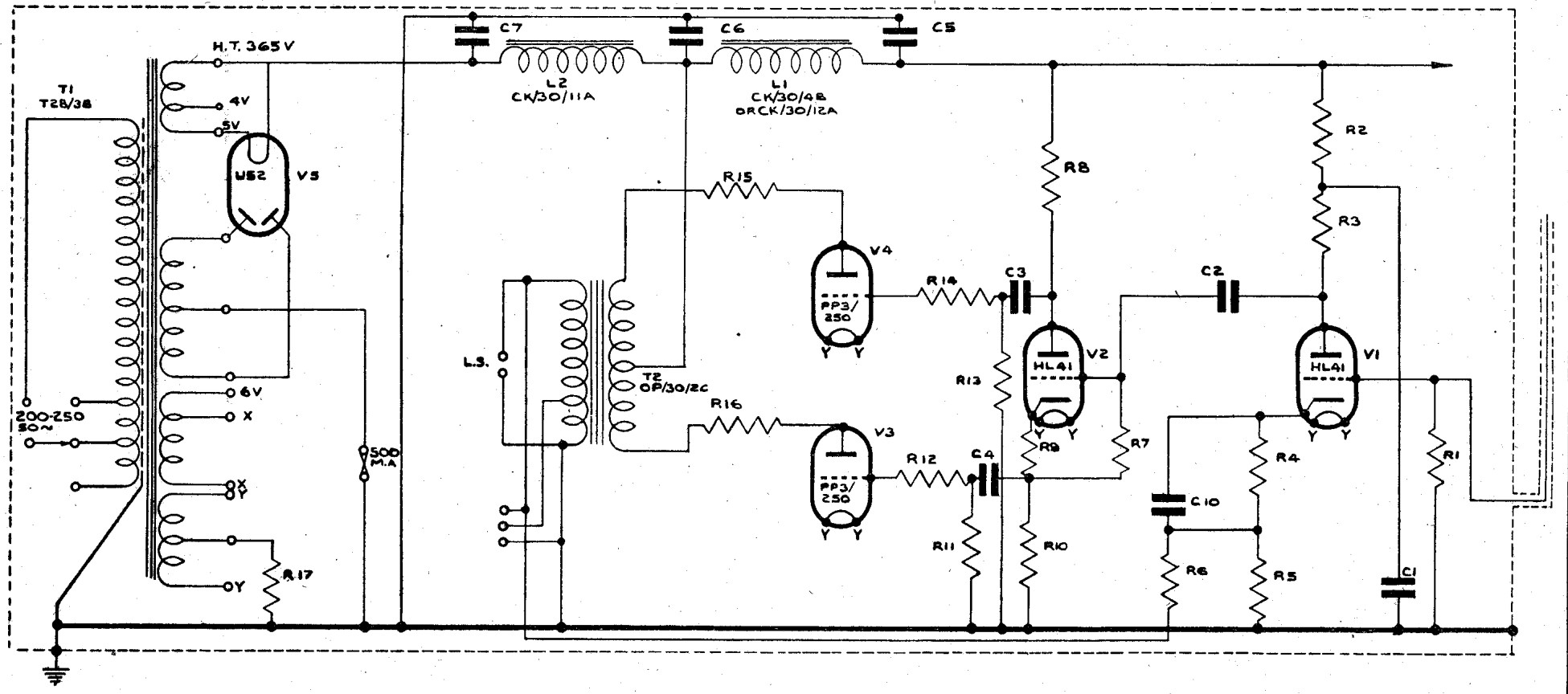


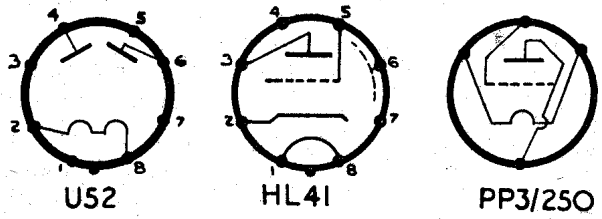
UNDERSIDE VIEW



R.	VALUE.	WT.	R.	VALUE.	WT.	R.	VALUE.	WT.
R1	100K	1/4	R20	220Ω	1/4	R39	47K	1/4
R2	22 K	1/4	R21	10K	1/4	R40		
R3	220Ω	1/4	R22	1K	1/4	R41	220K	1/4
R4	47Ω	1/4	R23	47Ω	1/4	R42	47K	1/4
R5	1K.	1/4	R24			R43	27K	1
R6	100K	1/4	R25	33Ω	1/4	R44		
R7	47Ω	1/4	R26	47Ω	1/4	R45	100K	1/4
R8	220Ω	1/4	R27	15Ω	1/4	R46	100K	1/4
R9	47K	2	R28			R47	2.K	3
R10	47K.	1/4	R29	22.0Ω	1/4	R48	27K	1/4
R11	22Ω	1/4	R30	47Ω	1/4	R49	2·2M	1/4
R12	100Ω	1/4	R31	1K	1/4	R50	1M	1/4
R13	1K	1/4	R32	47K	1/4	R51	47K	1/4
R14			R33	47K	1/4	R52	100K	1/4
R15	33Ω	1/4	R34	100K	1/4	R53	56K	1/4
R16	47Ω	1/4	R35	470K	1/4	R54	27K	1/4
R17	15Ω	1/4	R36	1K	1/4	R55	1K	1/4
R18	100K	1/4	R37	100K	1/4	RP1	5K	—
R19	22K	1/4	R38	47K	1/4			

C.	VALUE.	WKG	C.	VALUE.	WKG	C.	VALUE.	WKG
C1	·1μfd	350	C20	·1μfd	350	C39		
C2	·1μfd	350	C21	·0002		C40		
C3			C22	·1μfd	350	C41	·005μfd	
C4	·1μfd	350	C23	·1μfd	350	C42		
C5	·1μfd	350	C24	·0002μfd		C43		
C6	·1μfd	350	C25	·0002μfd		C44	·003μfd	
C7	·1μfd	350	C26	·1μfd	350			
C8	·1μfd	350	C27	·0001μfd				
C9	·0001μfd		C28	·0002μfd				
C10	·003μfd		C29	·0001μfd		C48	20 PF	
C11	·00048μfd		C30	·1μfd	350	C49	·01μfd	1000
C12	·0002μfd		C31	·1μfd	350	C50	·001μfd	350
C13	·0001μfd		C32	1μfd	450	C51	·002μfd	350
C14	70PF		C33	50μfd	12	C52	·001μfd	350
C15			C34	·1μfd	500	C53	·004μfd	
C16	·1μfd	350	C35	·00015μfd		C54	·002	
C17	·0002μfd		C36			C55	·0005μfd	
C18	·0002μfd		C37	·005μfd				
C19	·1μfd	350	C38					





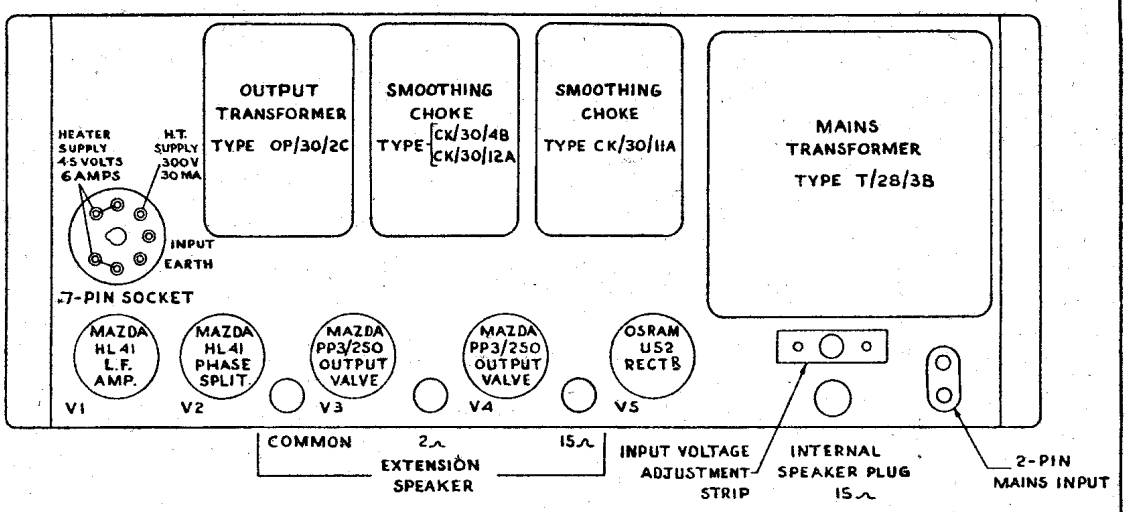
KEY TO VALVE BASES

AMPLIFIER STATIC VOLTAGES

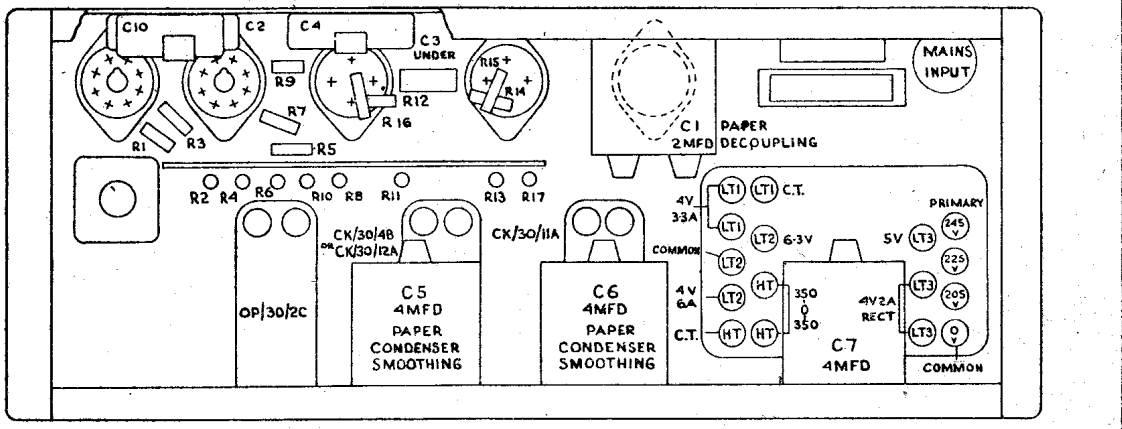
A.C. ON TRANSFORMER SECONDARY	350 350V.	V3. CATHODE	41V.
D.C. AFTER RECTIFIER	365 V.	V4. CATHODE	41V.
D.C. AFTER 1ST. CHOKE	355 V.	V1. ANODE	130V.
D.C. AFTER 2ND. CHOKE	350V.	V2. ANODE	215 V.
RECTIFIER HEATER	5 V.	V3. ANODE	350V.
V1 & V2. HEATER	4.1 V.	V4. ANODE	350V.
V3 & V4. HEATER	4.1 V.		
V1. CATHODE	2.5 V.		
V2. CATHODE ACROSS R.9.	2.5 V.		

SIMPLIFIED BLOCK BASIC CIRCUIT

PLAN VIEW



UNDERSIDE VIEW



C.	VALUE.	WKG.	R.	VALUE.	WT.	R.	VALUE	WT.
C1	2 µfd	400	R1	2MEG	1/4	R10	47K	1/4
C2	·1 µfd	500	R2	47K	1/4	R11	100K	1/4
C3	·1 µfd	500	R3	47K	1/4	R12	10K	1/4
C4	·1 µfd	500	R4	1·5K	1/4	R13	100K	1/4
C5	4 µfd	450	R5	47Ω	1/4	R14	10K	1/4
C6	4 µfd	400	R6	470Ω	1/4	R15	47Ω	1/2
C7	4 µfd	400	R7	·1M	1/4	R16	47Ω	1/2
C10	50 µfd	12	R8	47K	1/4	R17	450Ω	4
			R9	1·5K	1/4			