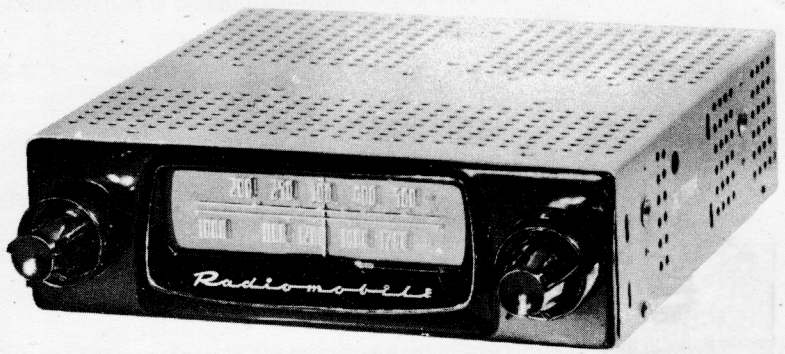
SMITHS Radiomobile

SERVICE MANUAL

MODEL 22X

MANUALLY TUNED CAR RADIO



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BRANCHES AT AUCKLAND & CHRISTCHURCH

MANUALLY TUNED MODEL 22X

GENERAL DESCRIPTION

The models series 20X comprise a manually tuned, high sensitivity superhet. car-radio receiver which, apart from a separate loudspeaker, is a self-contained unit.

The receiver proper comprises three valves, ECH.81, Frequency Changer; EBF.80, I.F. Amplifier, Detector and A.G.C. Diodes; and **ECL83** 1st L.F. Amplifier and Power Output. The aerial circuit is coupled to the Hexode grid of the ECH.81 by an efficient tuned circuit, giving maximum signal transfer with freedom from spurious responses. The oscillator circuit is externally coupled to the mixer section of the valve.

The I.F. is fed via a permeability tuned transformer to the pentode I.F. Amplifier, a similar transformer coupling this stage to the Detector and A.G.C. Diodes, the D.C. component of the rectified signal being fed back over the first two stages and providing an efficient A.G.C.

The A.F. component is fed via the volume control to the first L.F. Amplifier, the output of which drives the Output stage.

The H.T. supply is derived from a non-synchronous vibrator and a full-wave metal rectifier, these being contained at the rear of the receiver proper. The supply to these equipments is 12 volt D.C., obtained from the car battery.

SPECIFICATION

The information given applies to all models unless otherwise stated

PHYSICAL:	Height:	2 inches	(5.08 *cm.*)
	Width:	7 inches	(17.78 *cm.*)
	Depth:	$7\frac{1}{8}$ inches	(18.10 *cm.*)
	Weight:	7 lb.	(3.07 *Kg.*)
VALVES:	ECH81—Frequency Changer EBF80—I.F. Amplifier, Detector and A.G.C. **ECL83**—1st L.F. Amplifier and Power Output.		
WAVEBANDS:	20X/22X—Medium Waves 187-575 metres (1605-525 Kc/s)		
L.T. SUPPLY:	12 volt battery; either pole earthed		
CONSUMPTION:	2.5 Amps		
FUSE:	5 Amp		
SCALE ILLUMINATION:			
LAMP:	14 V. .14 Amp		
AERIAL INPUT:	The aerial trimmer provides adjustment over a range of total input capacity from 33-70 pfd.		
INTERMEDIATE FREQUENCY:	470 K/cs.		

OPERATION

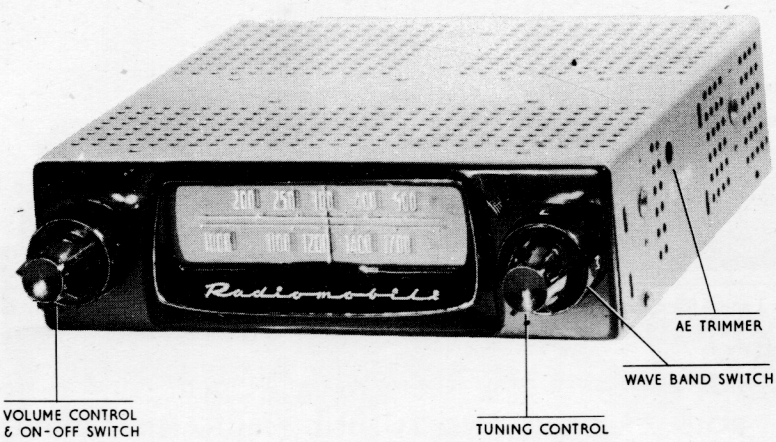


FIG. 1—GENERAL VIEW OF UNIT

THE COMBINED VOLUME CONTROL AND ON/OFF SWITCH switches on the receiver when turned clockwise, and progressive rotation of this control increases the volume. When turned fully anti-clockwise, the receiver is turned off.

THE MANUAL TUNING CONTROL provides variable station selection.

THE WAVEBAND SWITCH is concentric with the tuning control, and its two positions are marked M and L for instant identification.

THE TUNING SCALE is calibrated in metres and Mcs/10 for the 22X.

SERVICING

NOTE CAREFULLY
1. Ensure that PK screws removed during servicing are ALL replaced.
2. Pilot Lamp is replaceable by removing knobs and escutcheon only.

ALIGNMENT

For expeditious and accurate servicing, the test equipment and complete set of trimming tools supplied by S. Smith & Sons (Radiomobile) Ltd., are recommended.

During alignment the input to the receiver must be progressively reduced, such that the output does not exceed 200 Mw. (0.8 volts across a 3.5 non-inductive load).

I.F. ALIGNMENT

The power unit sub-chassis must be detached from case (5 PK screws on underside) for access to cores of L5 and L9, (Fig. 6) access to L3, L4 and L8 being obtained through holes in front plate assembly. (See Fig. 2).

Set Volume control to maximum, Wavechange Switch to Medium Wave and set tuning carriage so that cores are fully withdrawn from their coils.

Apply signal at 470 Kc/s modulated 30% at 400 cycles, between the grid of V1 (through a 0.1 mfd.) and chassis. Align cores of L9, L8, L5 and L4 in that order, for maximum output. Repeat until no further improvement results.

I.F. SENSITIVITY

With an input of 87 db below 1 volt (40 uV) the output must be greater than 200 mW.

R.F. ALIGNMENT

The requisite dummy aerial, comprising a 22 pfd. series and a 47 pfd. shunt condenser, must be used.

M.W. ALIGNMENT

Wave-Change switch to M.W., and tuning carriage set to the fully withdrawn position.

OPERATION	FREQ. Kc/s.	CARRIAGE POSITION	ADJUST FOR MAX. OUTPUT
1	1620	Fully out	TC3 and TC1
2	520	Fully in	L6 Core — See
3	1100	Tune to Frequency	L2 Core — Fig. 3
4	550		L2 Ferrox rod where fitted

Repeat operations 3 and 4 for optimum output. Seal rod in position with special wax. (Radiomobile Part No. P9648x0000)

M.W. SENSITIVITY

Input 15 uV modulated 30% at 400 cycles, output to be not less than 200 mW (97 dB. below 1 Volt).

POINTER DRIVE AND TUNING MECHANISM DRIVES

Should it be necessary to replace the drive cords, this may be easily effected in the manner shown in Figs. 3 and 5

NOTE: Fig. 2a shows the simple method employed for retention of pointer drive pulley assembly when scale plate assembly requires to be removed.

Check tuning calibration at approximately 250 metres and reset pointer if necessary.

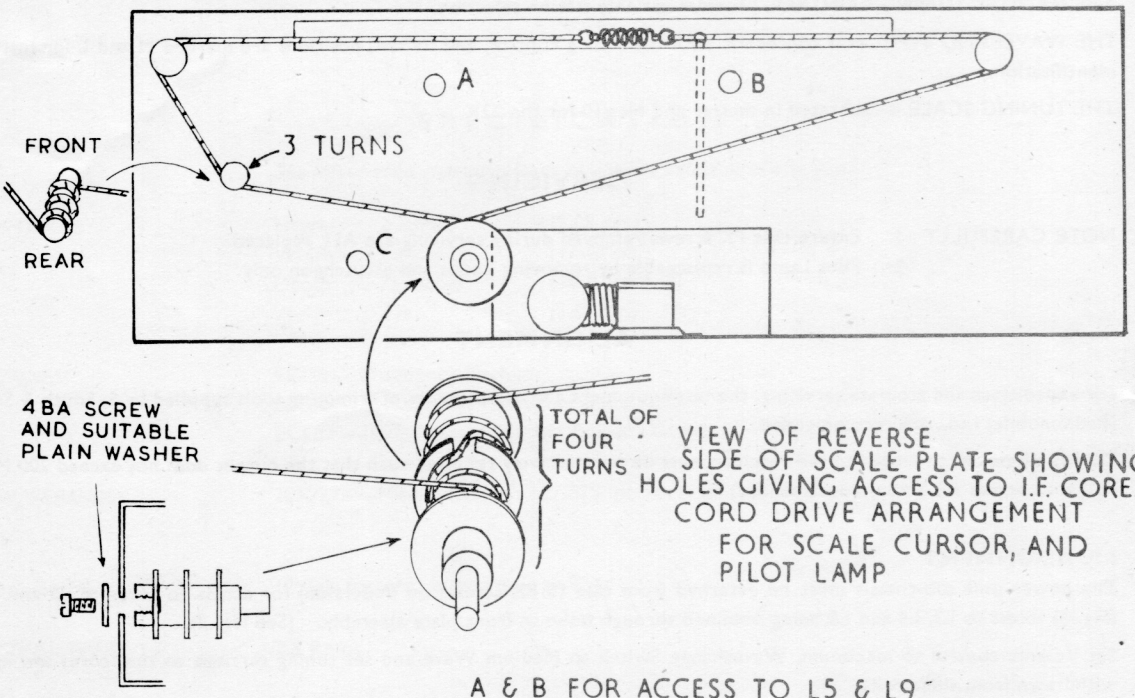
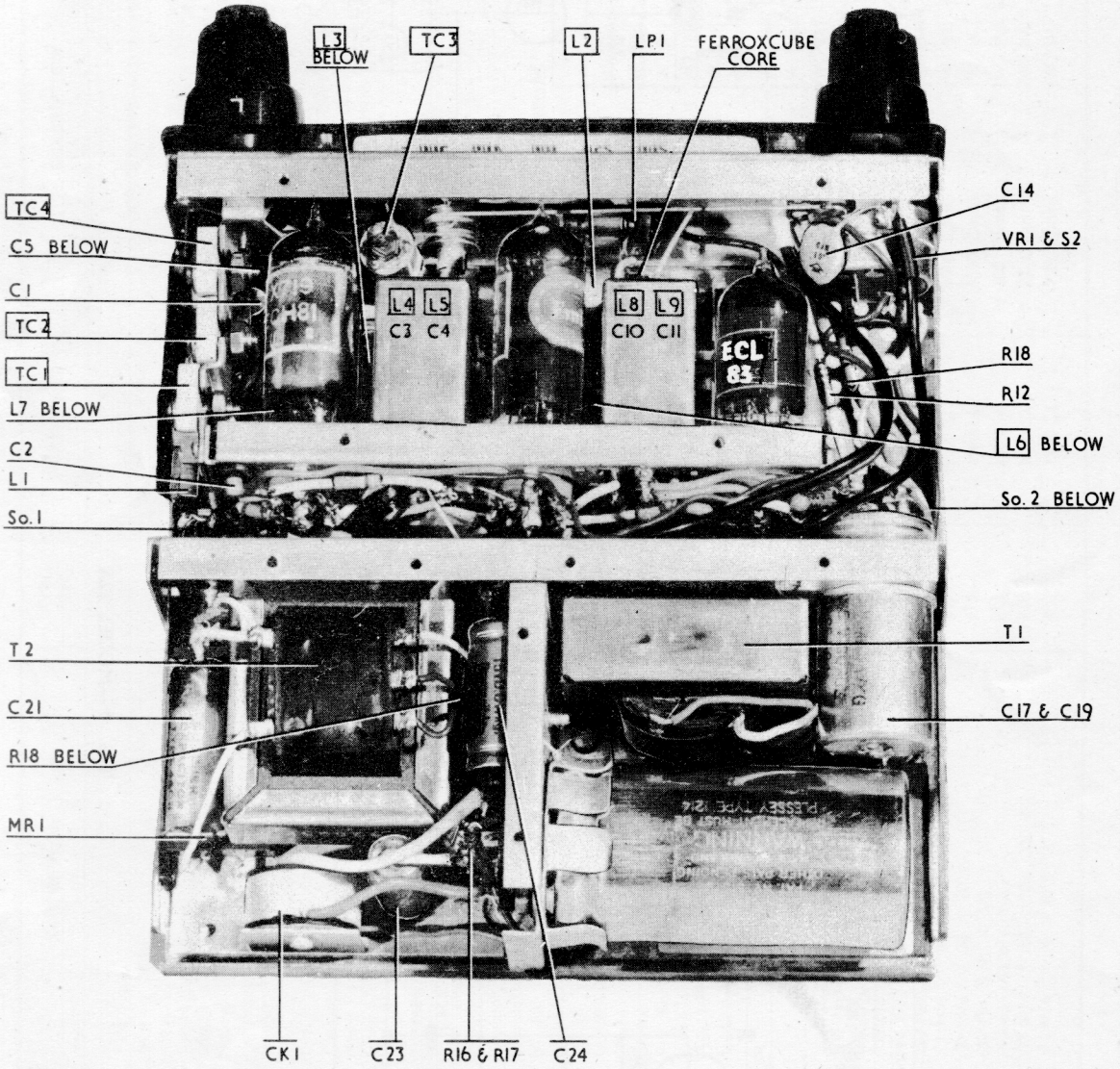


FIG. 2A

TEMPORARY ATTACHMENT OF DRIVER PULLEY TO FACE PLATE.

FIG. 2



☐ INDICATES ADJUSTABLE COMPONENT

FIG. 3—TOPSIDE VIEW

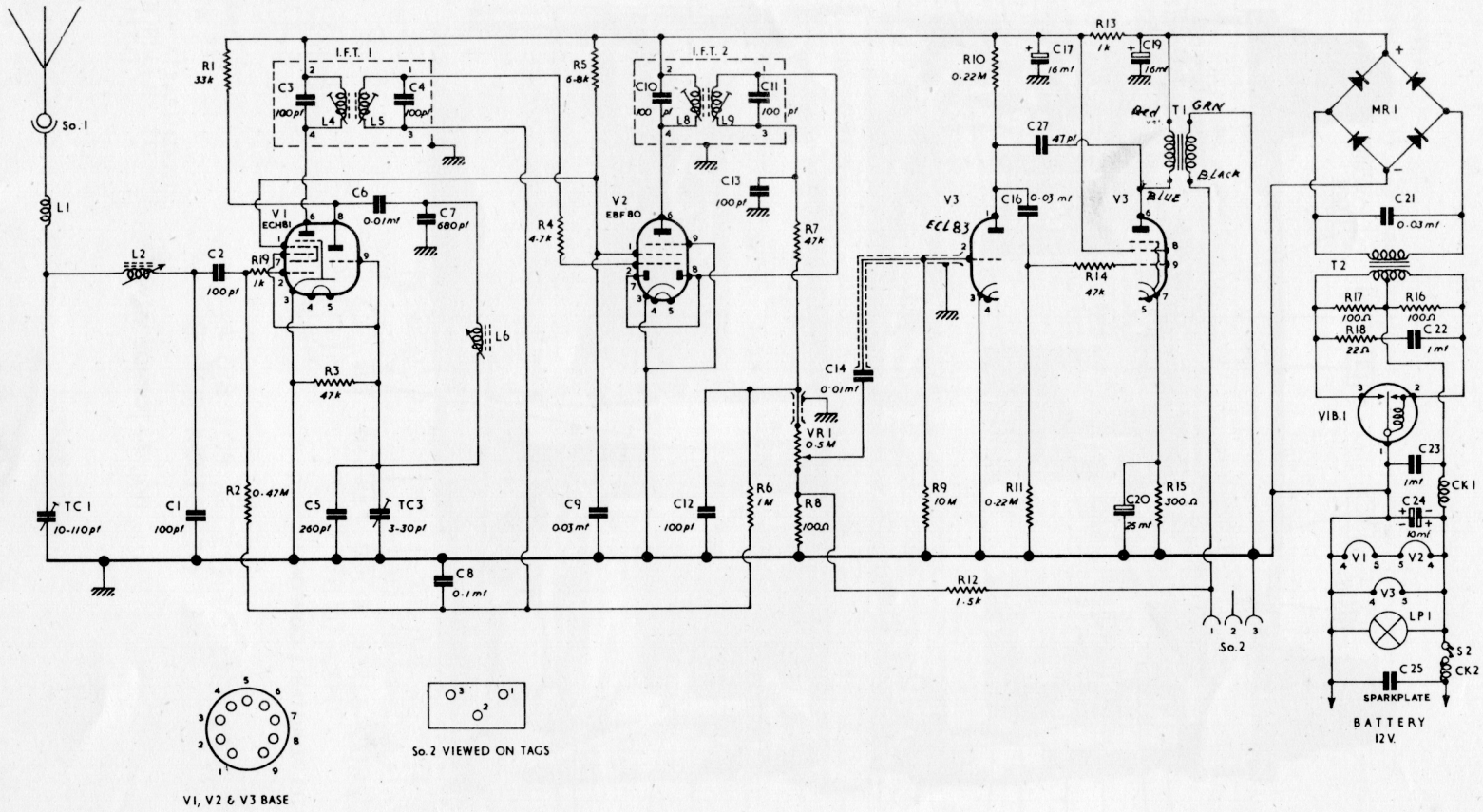


FIG. 4—MODEL 22X

MODEL 22X.

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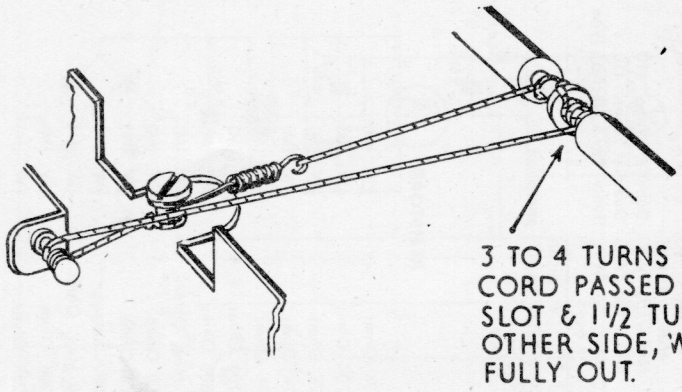
CIRC. REF.	PART No.	DESCRIPTION
	94883B.	Dial Scale.
	94884.	Backing Plate.
	94887AA22.	Mask.
	92470.	Centre Knob (Inner).
	92482.	Centre Knob (Outer).
	92526.	Spring Clip.
	92444.	Ferroxcube Rod.
	93702B.	Spacer.
	94881.	Clip.
	94882.	Clip.
	35967B.	Choke.
	RE.1072.	Metal Rectifier, 16 RD. 2-2-61.
	NU.1088.	Spire Nut SNU.1675
	VI.1122.	Vibrator 12V.
	VI.1123.	Vibrator 6V.
	LA.1121.	Dial Lamp, 14V.
	LA.1185.	Dial Lamp, 7.5V.
	TR.1043.	Output Transformer.
	TR.1036.	Vibrator Transformer, 12V.
	TR.1037.	Vibrator Transformer, 6V.
	1400-AD9.	ECL.83.
	1400-AD1.	ECH.81.
	1400-AD6.	EBF.80.
	HO.1046.	Lampholder.
	92459A.	Choke.
	92459C.	Choke.
	SO.328.	Vib. Socket, SP.4/US.
	CL.1124.	Vib. Clamp P.70178/3.
	HO.246.	Fuse Holder (complete).
	FU.1311.	Fuse, 5 amps.
		CONDENSERS
C1.	1500-R.	100 Pfd. S. Mica ± 2%.
C2.	1500-J4.	100 Pfd. Ceramicon N.750.
C12.	1500-J4.	100 Pfd. Ceramicon N.750.
C13.	1500-J4.	100 Pfd. Ceramicon N.750.
C5.	1500-S9.	260 Pfd. S.M. ± 2% LEM.
C6.	1500-T6.	.01 Mfd. + 80 — 20%.
C14.	1500-T6.	.01 Mfd. + 80 — 20%.
C7.	1500-Q7.	680 Pfd. S.M. ± 5%.
C8.	1500-T2.	.1 Mfd. 150 WV. Tub.
C9.	1500-T7.	.03 Mfd. + 50 —20% 300 V.
C16.	1500-T7.	.03 Mfd. + 50 —20% 300 V.
C17.	1500-T5.	16-16 Mfd. 350 WV. Electro BECCE with insulation.
C19.	1500-T5.	16-16 Mfd. 350 WV. Electro BECCE with insulation.
C20.	1500-E7.	25 Mfd. 12 WV. Hunts Type JB.26T.
C21.	1500-T4.	.03 Mfd. 300 VAC. ± 10% Dubulier Type 460B.
C22.	1500-T3.	1 Mfd. 150 WV. Dubulier Type 410.
C23.	1500-T3.	1 Mfd. 150 WV. Dubulier Type 410.
C24.	1500-T8.	10 Mfd. 15 WV. Hunts Rev. Electro Type JB.952T.
C27.	1500-T1.	47 Pfd. Ceramicon. Extra buffer for 6V. operation.
		RESISTORS
R1.	1300-N3.	33K Ohms. ½W. (M)
R2.	1300-N2.	470K Ohms. ½W. (M)
R3.	1300-F8.	47K Ohms. ½W. (M)
R7.	1300-F8.	47K Ohms. ½W. (M)
R14.	1300-F8.	47K Ohms. ½W. (M)
R4.	1300-Q4.	4700 Ohms. ½W. (M)
R5.	1300-S3.	6800 Ohms. 1W. (M)
R6.	1300-I8.	1 Meg. Ohms. ½W. (M)
R8.	1300-G.	100 Ohms. ½W. (M)
R16.	1300-G.	100 Ohms. ½W. (M)
R17.	1300-G.	100 Ohms. ½W. (M)
R9.	1300-K1.	10 Meg. Ohms. ½W. (M)
R10.	1300-H4.	220K Ohms. ½W. (M)
R11.	1300-H4.	220K Ohms. ½W. (M)
R12.	1300-S1.	1500 Ohms. ½W. (M)
R13.	1300-L6.	1000 Ohms. 1W. (M)
R15.	1300-S4.	300 Ohms. 1W. (M) ± 5%.
R18.	1300-S2.	22 Ohms. ½W. (M)
R19.	1300-C4.	1000 Ohms. ½W. (M)



CORD & PULLEY ARRANGEMENT
FOR TUNING COILS.

FIG. 5

NOTE: Ensure that *All* P.K. screws removed during servicing are replaced.

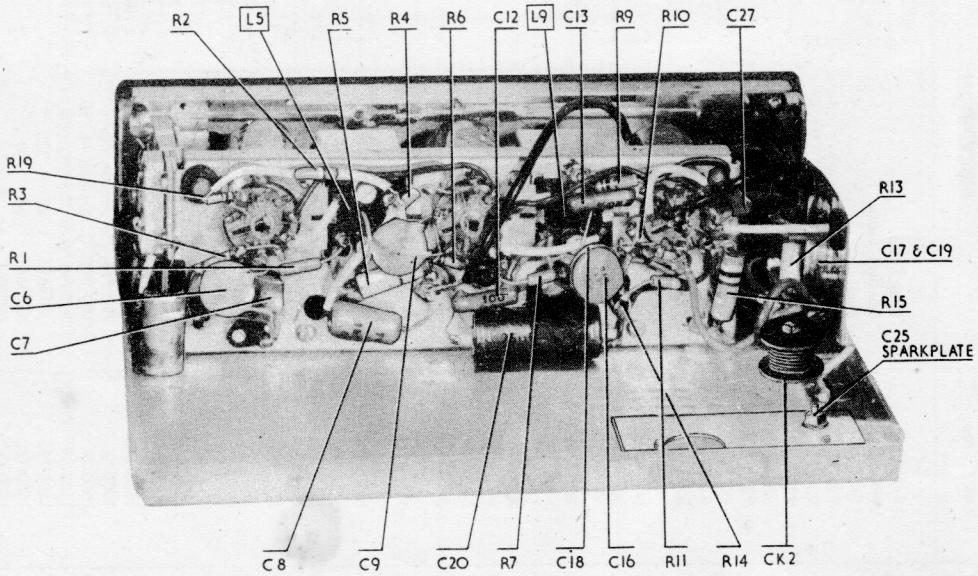


FIG. 6—UNDERSIDE VIEW OF VALVE CHASSIS