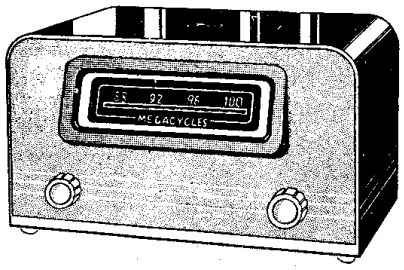
MODEL 1252

SERVICE MANUAL

4 VALVE F.M. ADAPTOR UNIT FOR A.C. MAINS



MODEL 1252

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Part No. 95025 Printed in England March 1956

SPECIFICATION

Physical

Height 6¼ inches)
Depth 7 inches) Approx. overall
Length 11½ inches)

Mains Supply

195 - 255 volts A.C. only
50 - 60 c.p.s.

Consumption

30 watts.

Intermediate Frequency

10.7 Mc/s

Wave Ranges

87.5 - 100 Mc/s

Valves

V1	ECC85	R.F. Amplifier and frequency Changer
V2	EBF80	I.F. Amplifier
V3	EF85	I.F. Amplifier
V4	EABC80	Ratio Detector and Audio Frequency Amplifier.

Fuses

2 1 Amp fuses.

Pilot Lamp

1 6.8 volt 0.3 Amp.

Output

Connected to the pick-up sockets of an A.M. receiver or the input sockets of an audio amplifier. Audio output 1-2 volts for an input of 100 uV. Provision for attenuation of output by 10 dB.

CIRCUIT DESCRIPTION

R.F. Amplifier and Frequency Changer

V1 (ECC85) is a double triode valve. One triode V1A operates as a grounded grid R.F. amplifier, the F.M. aerial being coupled to the cathode via transformer L1/L2. A tuned circuit L4/VC1 fed from the anode of V1A passes the signal to the grid of the other triode section B. This acts as a self-oscillating frequency changer, the oscillator circuit being tuned by L6/VC2.

V1B section is coupled to the control grid of V2 (EBF80) by the first I.F. transformer (IFT1). This transformer is in two sections (A and B), the first section is mounted on the VHF unit and the second section mounted on the main chassis. L8 acts as the coupling coil between the two sections.

L9 is an R.F. choke in the heater circuit of V1.

I.F. Amplifier

V2 (EBF80) a pentode valve amplifies at the intermediate frequency of 10.7 Mc/s. The anode is coupled to the grid of V3 via the I.F. transformer IFT2.

V3 (EF85) is a second I.F. amplifier and has the I.F./discriminator transformer in the anode circuit.

Ratio Detector and Audio Amplifier

V4 (EABC80) a triple diode triode operates as a ratio detector and audio amplifier. The F.M. discriminator is a ratio detector of the unbalanced variety, R21 being the load resistor and C31 being the stabilising capacitor. R15 and C28 form the de-emphasis circuit to compensate partially for the treble boost applied at the transmitter.

The output from the ratio detector is passed to the grid of the triode section via R15, C29 and is biased by R19.

Audio output is taken from the anode of V4. High or low output is obtained by the connecting of C29 to either R16 or R17.

H.T. and Heater Supplies

H.T. is obtained from the mains transformer via the metal rectifier (connected bridge fashion) which is of contact type. The voltage from the rectifier is smoothed and filtered by C34, R23 and C33. The valve heaters and pilot lamp are fed from the secondary on the mains transformer.

INSTALLATION

Important Note It is not advisable to install an F.M. receiver against a party wall on the other side of which there might be a television receiver. It should be installed on the opposite side of the room. The second harmonic of the F.M. oscillator falls in Band III and interference can be caused to a television receiver in close proximity.

F.M. Aerial

General

In the majority of cases for the best possible performance from this instrument, either an outdoor or indoor dipole with co-axial feeder cable should be installed.

In high signal strength and/or low interference areas, satisfactory results may be obtained by utilizing a simple dipole. This can be made from a length of twin moulded mains lead with one end opened apart so that two 2ft. 6 ins. arms are formed. This "T" shaped arrangement should be installed with "T" arms horizontal, at right angles to the direction of the transmitter and attached to a picture rail or skirting board. Re-siting and/or tilting may be necessary for best results.

In areas of low signal strength, high interference or reflected signals, it is advisable to instal an external H type or multi-array F.M. aerial. Reflected or ghost signals can cause distortion on F.M.receivers.

Local conditions may greatly affect V.H.F./.F.M. reception, i.e., height above sea level, type of building in which the aerial is installed, local surroundings, etc. and these must be considered on installation.

F.M. Aerial Connection

Indoor or Outdoor

(a) When using either an indoor or outdoor dipole aerial with co-axial feeder cable the inner lead must be soldered to the thin pin of the F.M. aerial plug and the braided screening soldered to the thick pin.

(b) When using a length of twin moulded mains lead opened apart at one end to approximately 2ft.6ins. each arm, the leads at the other end should each be soldered to a pin of the F.M. aerial plug.

(c) When using a 40-inch length of insulated lead, one end must be soldered to the thin pin of the F.M. aerial plug provided.

Internal

To use the internal F.M. aerial, simply connect the link provided from the mains aerial socket to the F.M. AE socket at the rear of the receiver.

Note - When an aerial external to the receiver is fitted, the internal aerial link should be removed and stored in a linen bag and tied to the card back for safe keeping.

Earth

The receiver to which the adaptor is connected should be connected to an efficient earth. A copper rod or plate buried in moist ground provides the best earth.
Do not use a gas pipe, telephone earth or a hot water pipe, as an earth.

DISMANTLING

Removal of Chassis

1. Remove panel at the back of cabinet (four screws).
2. Remove the front control knobs(pull-off type).
3. Unscrew bottom bolt and withdraw chassis.

Removal of VHF Unit

1. Remove the screen (3 screws) surrounding the unit.
2. Unsolder the three braided leads from the gang capacitor.
3. Unsolder L4 and L6 from VC1 and VC2 respectively.
4. Unsolder Screened lead from L8.
5. Unsolder brown lead from condenser tag (feed through type) on screen.
6. Unsolder R4 and R2 from condenser tag (feed through type) on screen.
7. Unsolder C1 from aerial socket.
8. Remove the four screws on top of chassis and remove unit.

ALIGNMENT

Important Note

Distortion can result from mis-alignment especially in the discriminator transformer. When distortion is thought to be due to mis-alignment, the I.F. stages should be checked for symmetrical response and bandwidth, but care should be taken first to ensure that the fault does not lie in the A.F. stage.

F.M. Alignment

General

Before commencing re-alignment always allow approximately 10 minutes. Screened leads must always be used for connecting the test equipment.

If it is found that the cores in the R.F. and I.F. coils have become locked and are unadjustable, they should be freed by the careful application of one or two drops of high grade penetrating oil. The use of a small pointed brush to direct the oil on to the cores will prevent the oil from spreading. If on the other hand the cores are excessively free a length of cotton thread can be screwed into the former with the cores to prevent movement after adjustment.

I.F. and Ratio Detector Alignment

Apparatus Required

1. Oscilloscope (with a sensitivity of 1 cm for .1 volt input and a frequency response of 20 cycles to 3 Mc/s approx).
2. Sweep Generator
3. Diode Probe
4. Microammeter (0 - 500 mA).
5. Valve Voltmeter.

Operation

1. Screw out core of L15 (TR1) until it is just protruding from the former.
2. Screw in core of L13 (TR1) about 7 turns from position when top of core is flush with former.
3. Connect oscilloscope (with gain at maximum) to test point 'B' via suitable diode probe. Set sweep period to approx. 5 mS.

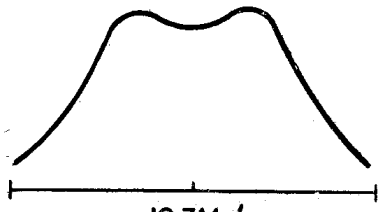


FIG 1.

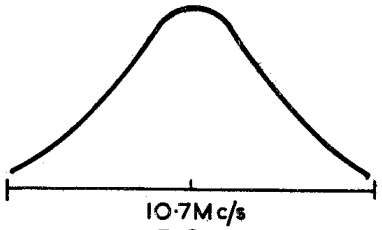


FIG 2.

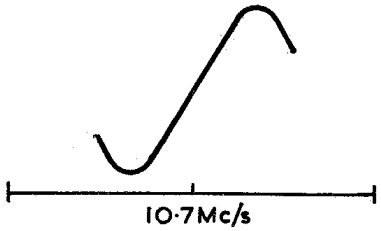


FIG 3.

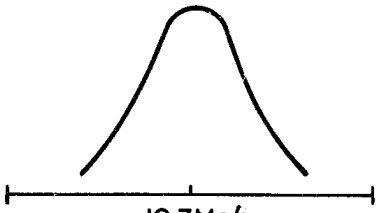


FIG 4.

4. Inject 10.7 Mc/s deviated by ± 300 kc/s into the grid of V2 (EBF80).
5. Adjust L11 and L12 (IFT2) until double humped response curve similar to Fig.1 is obtained. Keep input as low as possible when making this adjustment. The separation between the two peaks should be set at approx. 300 kc/s.

NOTE An accurate marker pip should be injected at the appropriate sweep generator terminals.

6. Screw out core of L13 and reducing the input, adjust L13 until a response similar to Fig.2 is obtained. If the response is not symmetrical, SLIGHT readjustment of L11 and L12 may be of assistance in achieving this.
7. Remove the probe and connect audio output of converter to oscilloscope input and screw in core L15 until a waveform (similar to Fig.3) which is symmetrical about 10.7 Mc/s is obtained. (It will be necessary to reduce the sensitivity of the oscilloscope when making this adjustment).
8. — Transfer input of oscilloscope via probe to Test Point "B" and re-adjust L13 if necessary to give symmetrical response as Fig.2.
9. Connect sweep generator to test point 'A' and set gang capacitor to maximum (plates engaged). The input may have to be increased at this stage.
10. Adjust L10 (IFT1b) to give symmetrical response similar to Fig.4. Check that bandwidth is not less than 200 kc/s and not greater than 270 kc/s wide at 3 dB down.

NOTE On certain models a core may be found inserted into coils L7/L8 (IFT1a). This core is set in position when the model leaves the factory and should not be disturbed.

R.F. Alignment

1. Connect output of converter to valve voltmeter.

2. Unsolder earth end of resistor R5 which is accessible through cut-out in screening can on VHF unit (chassis top side view) and insert microammeter 0-500 uA in series with R5 to chassis (chassis positive).

3. Set gang capacitor to maximum (plates fully engaged).

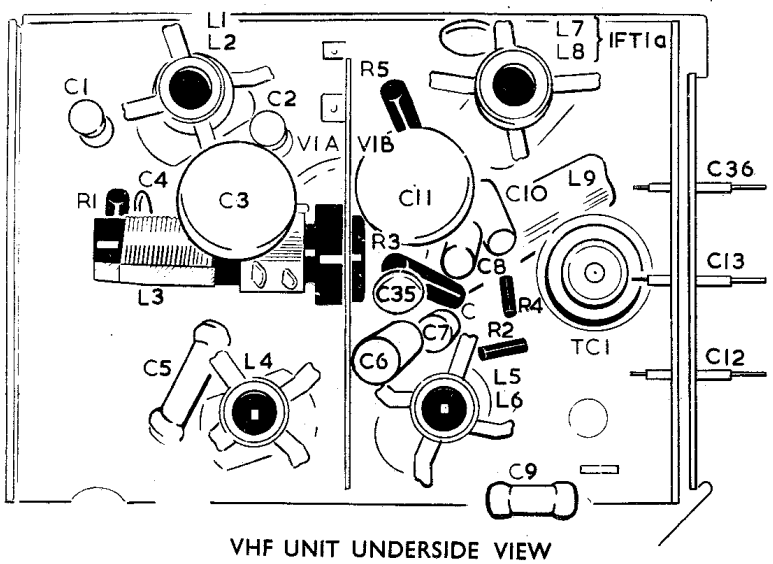
4. Adjust TC1 until shorting test point 'A' produces minimum change in microammeter reading.

5. Inject 87.5 Mc/s ± 15 kc/s deviation into F.M. aerial sockets (larger socket earthy) and adjust L5/6 and L4 in that order for maximum reading on valve voltmeter.

6. Set gang capacitor to minimum capacity (plates fully disengaged) tune in generator and check that frequency is approximately within ± ¼ Mc/s of 100 Mc/s.

7. Set Generator to 94.5 Mc/s ± 15 kc/s deviation, tune in receiver and repeak L4.

8. Repeat operations 3, 4, 5, 6 and 7.



VHF UNIT UNDERSIDE VIEW

CORD DRIVE

Use only the specified nylon cord (6370 x 0012) for the tuning drive. Length of cord 42 inches.

1. Make a small loop at one end and apply a little shellac to fasten knot. Set gang capacitor at maximum capacity.

2. Loop this end into anchor pin on the capacitor drive drum.

3. Pass cord through the adjacent hole in edge of drum and pass cord round groove of drum and take over pulley at top of cursor plate.

4. Proceed in the direction indicated on the drawing around pulley at the other end of the cursor plate.

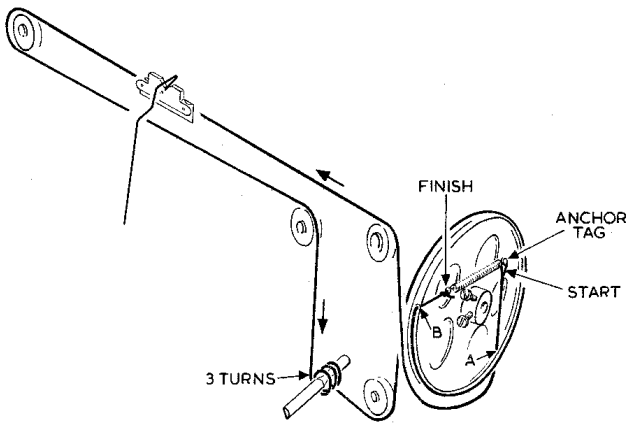
5. After passing cord around pulley take cord back to the first end of cursor plate and take around pulley close to back plate.

7. Pass cord around adjacent pulley and up through chassis onto drive drum groove.

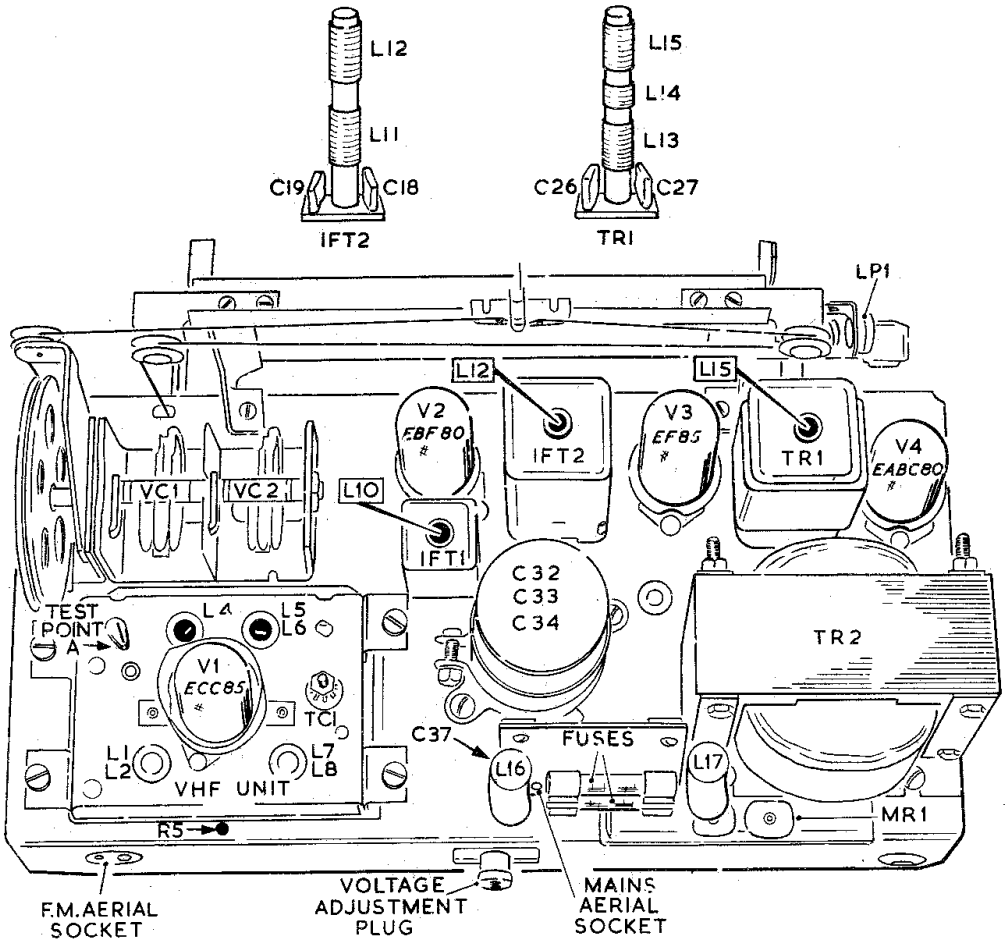
8. Take cord a complete turn around drum and then pass through hole and fix to spring with a small loop.

9. Shellac loop to ensure that knot does not slip, and fix spring to anchor pin.

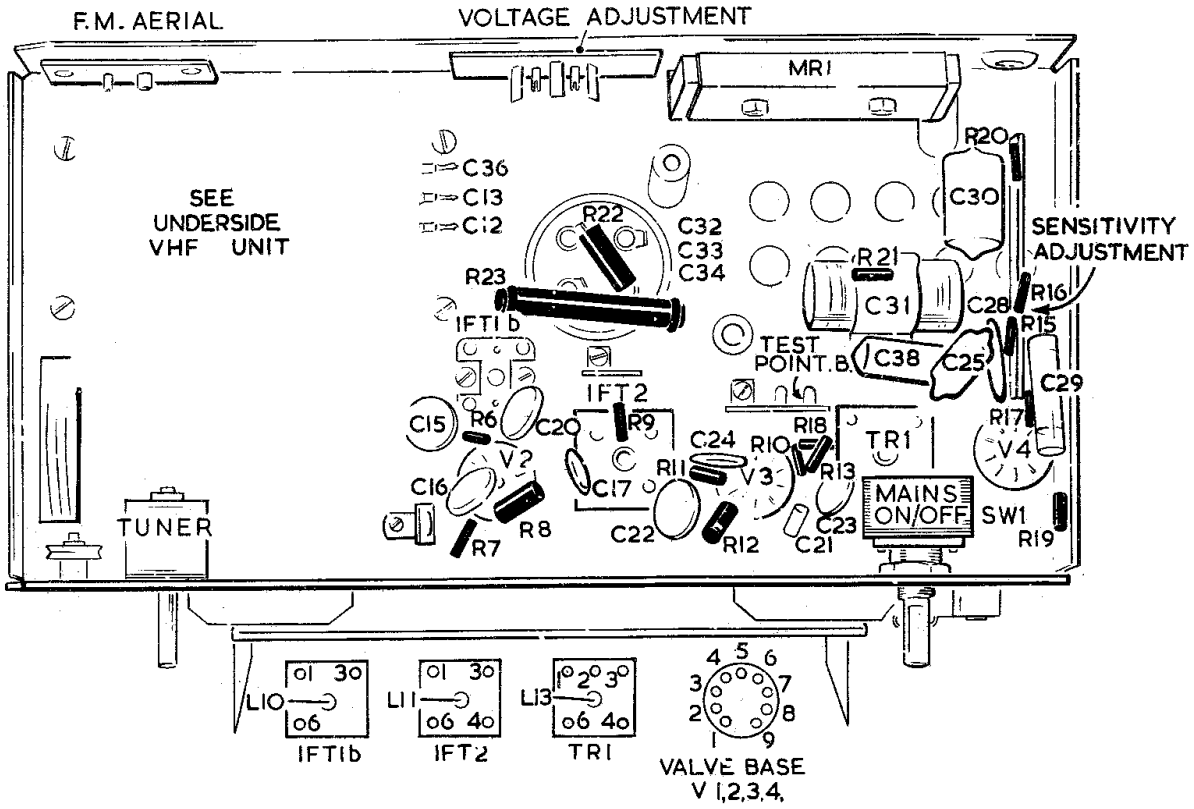
10. Fix cord drive under clips in cursor, set to maximum capacity and calibrate same.



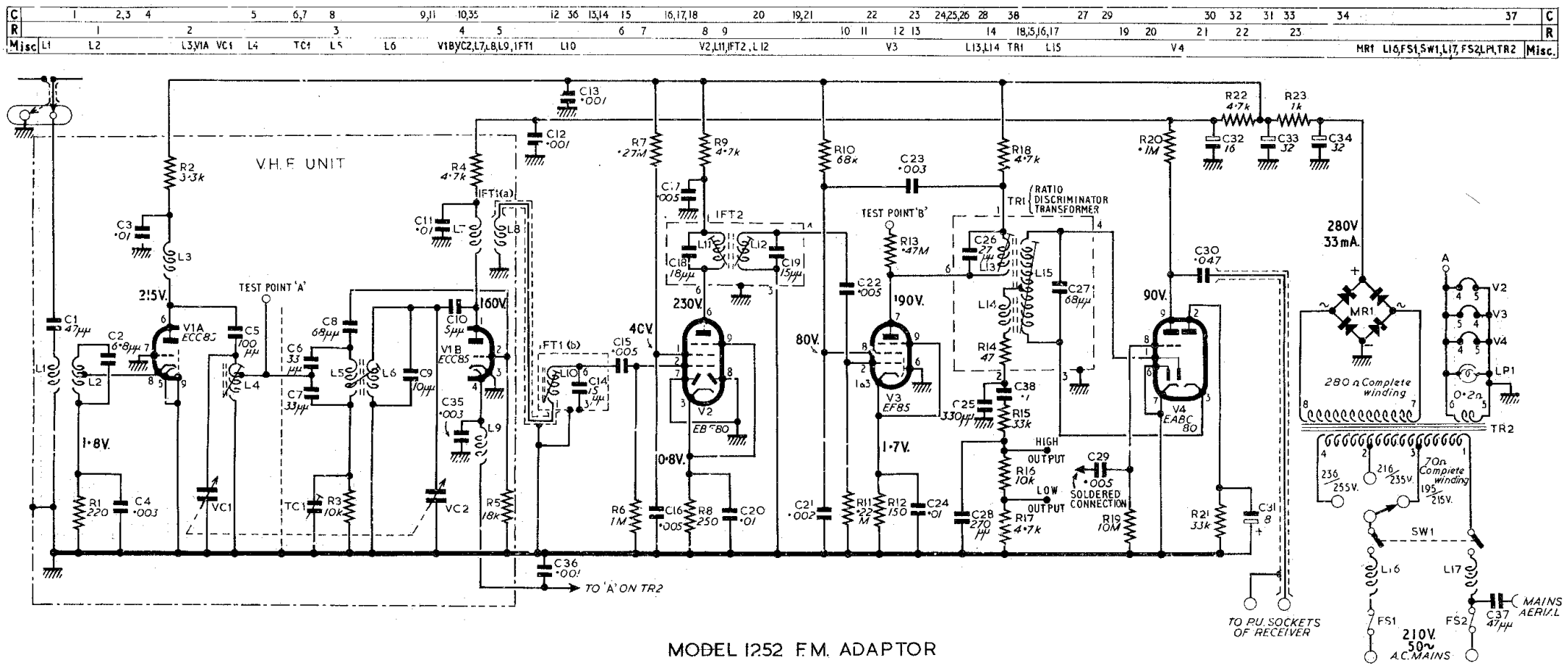
CORD DRIVE



CHASSIS TOPSIDE VIEW



CHASSIS UNDERSIDE VIEW



MODEL 1252 F.M. ADAPTOR

TECHNICAL PUBLICATIONS DIVN. TP 6496/1

MODEL 1252 F.M. ADAPTOR CIRCUIT DIAGRAM

SPARE PARTS LIST

PART No.	DESCRIPTION	No. PER INST
	INSTRUCTIONS	
94313	Instruction Card	1
	CONTROL KNOBS	
94028B	Knob "Tuning"	1
94028B	Knob "ON/OFF"	1
47042	Springs - securing knobs	2
	CHASSIS ASSEMBLY	
94043C	Chassis Assy. Complete	1
200028P	Screw)securing	1
28769	Square Washer)chassis to	1
201502	Spring Washer)cabinet	1
93965B	VHF Chassis Assy.only	1
94038	Spacers) securing VHF	4
200040D	Screws) chassis to	8
201804	Washers) main chassis	4
94037	Brackets only on VHF chassis	4
59119CA	Rivets - securing brackets	8
94039A	Screen cover for VHF chassis	1
12619	P.K. Screws - securing screen	3
	TUNING DETAILS	
94041A	Tuning Scale	1
94024	Clips - securing scale to cabinet	4
8602	Screws - securing clips to cabinet	4
94017	L.H. Mask for scale	1
94018	R.H. Mask for scale	1
12619	P.K. Screws - securing masks	3
94016	Scale backing plate	1
12619	P.K. screws - securing front of plate	2
94021	L.H. Bracket) supporting	1
94022	R.H. Bracket) backing plate	1
12619	P.K. Screws - securing brackets to chassis	4
94031A	Pointer Assembly	1
6370x0012	Drive Cord	42"
31079	Spring for drive cord	1
94019A	Pulley and bracket Assy. - top L.H. of backing plate	1
94020A	Pulley and bracket Assy. - top R.H. of backing plate	1
12619	P.K. Screws - securing pulley Assys. to backing plate only	2
8777	P.K. Screws - securing pulley Assys. to backing plate and brackets	2
94026A	Pulley and bracket Assy. on gang	1
200040F	Screws - securing pulley Assy. to gang	2
36218A	Drive Drum	1
13387	Screws - securing drum	2
4505	Pulley under chassis	1
2856	Circlips - securing pulley	1
94029	Tuning Spindle	1
64017	Washer) securing spindle	1
2856	Circlips) to bracket	1
94027	Bracket for tuning spindle	1
12619	P.K. Screws - securing bracket	2

PART No.	DESCRIPTION	No. PER INST.
94014A	VC1 and VC2 twin gang tuning capacitor	1
200040F	Screws - securing gang to supporting bracket	3
94040	Bracket - supporting gang	1
12619	P.K. Screws - securing bracket to chassis	2
	LAMP FITTINGS	
35421D	LP1 Pilot Lamp	1
44615A	Lamp Holder	1
94023	Bracket for Lampholder	1
8777	P.K. Screw - securing bracket	1
	VALVES & VALVEHOLDERS	
ECC85	V1 Double Triode R.F. Amplifier, Mixer and Oscillator	1
EBF80	V2 1st I.F. Amplifier	1
EF85	V3 2nd I.F. Amplifier	1
EABC80	V4 Ratio Detector and A.F. Amplifier	1
39250E	Valveholder for V1	1
39250N	Valveholders for V2, 3 and 4	3
59119AA	Rivets securing all holders	8
93999A	Screen for V1	1
59119CA	Rivets - securing screen	2
	METAL RECTIFIER	
94035	MR1 H.T. Rectifier	1
200042M	Screws)	2
201804	S.P.Washers) securing	2
200404	Nuts) MR1	2
	FUSES AND FUSEHOLDERS	
38825D	FS1) Fuse	1
38825D	FS2) 1 Amp	1
94033A	Fuse panel Assy.	1
	P.K. Screws - securing Assy.	2
	TAGS, PANELS, PLUGS & SOCKETS	
94033A	Fuse panel assy.	1
12619	P.K. Screws - securing panel	2
47006A	Mains Adjustment Panel	1
59119AD	Rivets - securing mains panel	4
44562B	Plug for mains panel	1
44564A	Aerial panel	1
59119AD	Rivets - securing aerial panel	2
44562A	Aerial plug	1
44562A	Aerial plug on mains/aerial lead	1
3475G	Yellow plug on mains/aerial lead	1
39675FD	7 way tag strip	1
39675AC	3 way tag strip	1
39678	2 way tag strip	1
12619	P.K. Screws - securing strips	4
20334A	Stand off insulator tag	1
12619	P.K. Screw - securing tag	1

PART No.	DESCRIPTION	No. PER INST.
3475A	Small red plug) on chassis	1
3475B	Small black plug) wiring	1
11802	Spade tags on mains lead	2
92274A	Small feed thro' tag on VHF chassis	1
59007CC	Rivet securing tag	1
38190M	Clip for large electrolytic capacitor (C32-33-34)	1
47019	Insulation)	1
200040K	Screw) securing clip	1
201804	S.P.Washer) to C32-33-34	1
200404	Nut)	1
10606	P.K. Screws - securing clip to chassis	2
19810	Clip for small electrolytic capacitor (C31)	1
49009	Insulation) securing	1
12619	P.K. Screw) clip	1
40764A	Fibre cleat	1
11805	P.K. Screw) securing	1
201304	Washer) cleat	1
16755	Rubber grommets for 5/16" holes	1
56147	Rubber grommets for $\frac{3}{8}$" holes	2
39799B	Red Rubber sleeve on mains lead.	1
36892G	Black rubber sleeve on chassis wiring	2

SWITCH

94015A	SW1 Mains On/Off Switch	1
201824	Washer for switch	1

RESISTORS

33362DJ	R1	220 Ω	¼w	20%	1
33362DR	R2	3.3 kΩ	¼w	20%	1
33362DU	R3	10 kΩ	¼w	20%	1
33362DS	R4	4.7 kΩ	¼w	20%	1
33362GL	R5	18 kΩ	¼w	20%	1
33362EG	R6	1 MΩ	¼w	20%	1
33362NE	R7	270 kΩ	¼w	10%	1
33360AX	R8	250 Ω	¼w	20%	1
33362DS	R9	4.7 kΩ	¼w	20%	1
33362BZ	R10	68 kΩ	¼w	10%	1
33362EC	R11	220 kΩ	¼w	20%	1
33360DH	R12	150 Ω	¼w	20%	1
33362EE	R13	470 kΩ	¼w	20%	1
37802DE	R14	47 Ω	¼w	20%	1
33362DX	R15	33 kΩ	¼w	20%	1
33362DU	R16	10 kΩ	¼w	20%	1
33362DS	R17	4.7 kΩ	¼w	20%	1
33362DS	R18	4.7 kΩ	¼w	20%	1
33362EN	R19	10 MΩ	¼w	20%	1
33362EA	R20	100 kΩ	¼w	20%	1
33362DX	R21	33 kΩ	¼w	20%	1
33363DS	R22	4.7 kΩ	½w	20%	1
33373DN	R23	1 kΩ	1w	20%	1

CAPACITORS

38117DE	C1	47 μF	750V	20%	1
38117XZ	C2	6.8 μF	750V	10%	1
38109B	C3	.01 μF	500V	+80-20%	1
38125A	C4	3000 μF	300V	+80-20%	1
38117DG	C5	100 μF	750V	20%	1
38126B	C6	33 μF	750V	5%	1
38126B	C7	33 μF	750V	5%	1
38117DF	C8	68 μF	750V	20%	1
38117DA	C9	10 μF	750V	20%	1
38116LX	C10	5 μF	750V	20%	1
38109B	C11	.01 μF	500V	+80-20%	1
38120D	C12	1000 μF	500V	+80-20%	1
38120D	C13	1000 μF	500V	+80-20%	1

PART No.	DESCRIPTION	No. PER INST.
38004B	C14 15 μF 350V 10%	1
38109D	C15 5000 μF 500V +80-20%	1
38109D	C16 5000 μF 500V +80-20%	1
38109D	C17 5000 μF 500V +80-20%	1
38006RG	C18 18 μF 350V 5%	1
38006B	C19 15 μF 350V 10%	1
38109B	C20 .01 μF 500V +80-20%	1
38122A	C21 2000 μF 350V 20%	1
38109D	C22 5000 μF 500V +80-20%	1
38109C	C23 3000 μF 500V +80-20%	1
38109B	C24 .01 μF 500V +80-20%	1
38000BK	C25 330 μF 350V 10%	1
38006ZC	C26 27 μF 350V 2%	1
38006YC	C27 68 μF 350V 2%	1
38000JX	C28 270 μF 350V 10%	1
38267B	C29 5000 μF 500V 25%	1
38137A	C30 .03 μF 500V 20%	1
38199A	C31 8 μF 200V Elect.	1
19810	Clip for C31	1
49009	Insulation	1
12619	P.K. Screw - securing clip	1
38150N	C32 16 μF) Triple 350V C33 32 μF) Electrolytic C34 32 μF)	1
38109M	Clip for C32-33-34	1
47019	Insulation	1
200040K	Screw) securing clip	1
201804	S.P.Washer) to C32-33-	1
200404	Nut) 34	1
10606	P.K. Screws - securing clip to chassis	2
38125A	C35 3000 μF 300V +80-20%	1
38120D	C36 1000 μF 500V +80-20%	1
38106DE	C37 47 μF 750V 20%	1
38525EA	C38 0.1 μF	1
35480B	TC1 3-30 μF Trimmer	1
94014A	(VC1 Twin gang tuning) (VC2 Capacitor)	1
200040F	Screws - securing gang to supporting bracket	3
94040	Bracket - supporting gang	1
12619	P.K.Screws - securing bracket to chassis	2

INDUCTORS

46810AN	L1 & L2	Aerial Coil	1
40981Y	L3	V1a anode choke	1
94001		Screening supporting L3	1
46810AL	L4	R.F. Coil	1
93973A	Dust iron core for L4		1
	L7 & L8	See IFT1	-
92805H	L9	V1b Heater choke	1
40989X	L10	1st I.F. Grid coil & Can Assy.	1
200060F	Screws) securing		2
201806	S.P. Washers) L10 Assy.		2
	L11 & L12	See IFT2	-
	L13 L14 & L15	See TR1	-
92609C	L16	Filter Choke	1
92609C	L17	Filter Choke	1
46810AQ	IFT1	1st I.F.Transformer	1
46551AN	IFT2	2nd " "	1
13517	P.K. Screws - securing IFT2		2
46553	Dust iron cores for IFT2		2
46551AM	TRL	Ratio Detector Transformer	1
13517	P.K. Screws - securing TR1		2
46553	Dust iron cores for TR1		2
92850C	TR2	Mains transformer	1
10606	P.K. Screws - securing TR2		4

1. In the event of the V.H.F. Unit needing replacement, it should be noted that these are pre-aligned at the factory. The following adjustments only will, therefore, be necessary after fitting the new Unit.

   (1) The pointer should be set to the frequency of the local 'Home Service' transmissions.

   (2) Adjust L5/6 for maximum output of the 'Home Service' programme.

   (3) Adjust L4 for maximum output.

   (4) Finally, ensuring before-hand that the station is accurately tuned in, adjust L10 slightly for maximum output if necessary.

2. In cases where re-alignment becomes necessary and calibration at 100 Mc/s is outside limits (± 250 kc/s) the 'tuning wire' accessible through hole in screening can, should be adjusted in conjunction with L5/6 at 88 Mc/s.