"His Master's Voice"

SERVICE MANUAL

"His Master's Voice" products are made to a standard of design and quality approved by The Gramophone Co. Ltd., registered proprietor of the trade mark.

VHF RADIO MODEL 1377

BRITISH RADIO CORPORATION LTD.

SERVICE DEPOTS

LONDON

Eley's Estate, Angel Road, Edmonton, N.18
Telephone EDMonton 3060

BIRMINGHAM

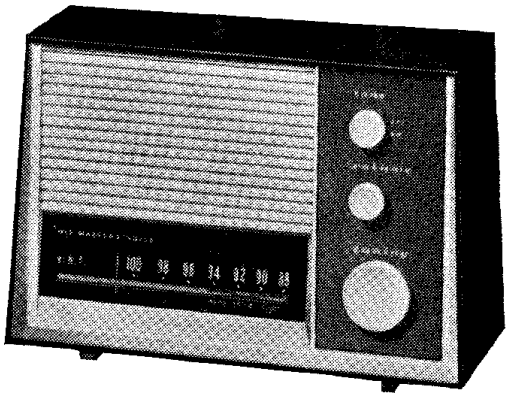
24 Sheepcote Street, 15. Telephone Midland 5291

MANCHESTER

Derby Street, Cheetham, 8
Telephone: Deansgate 8484

GLASGOW

160/162 Battlefield Road, S.2
Telephone: Langside 9251/2/3/4



GENERAL SPECIFICATION

Mains Supply

AC or DC mains 200–250 volts (50–60 cps AC).

Power Consumption

45 watts.

Frequency Coverage

VHF 87.5–100.5 Mc/s.

Loudspeaker

Permanent magnet unit 7 in. x 4in., 3Ω speech coil.

Cabinet Dimensions

13½ in. wide by 9 in. high by 5¾ in. deep.

Valves

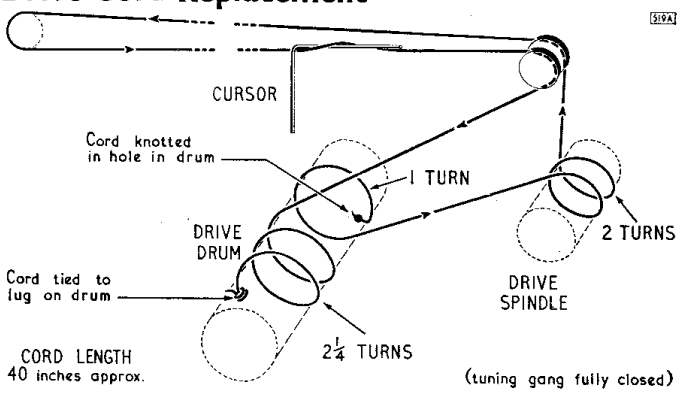
V1A, V1B	UCC85	RF amplifier; Self oscillating mixer
V2	UF 89	IF amplifier
V3	UF80	IF amplifier
V4	UABC80	Detector, audio amplifier
V5	UL84	Audio output
V6	UY85	Rectifier

SERVICE NOTES

Chassis Removal

Remove cabinet back and detach aerial socket from cabinet. Unplug output transformer connections (order for replacement — top to bottom — White, Blue, Orange, Red, Black) and pull off front control knobs. Remove the three chassis securing screws, one at each end of the chassis and one in the top left hand corner of the cabinet. Slide chassis out of side grooves.

Drive Cord Replacement



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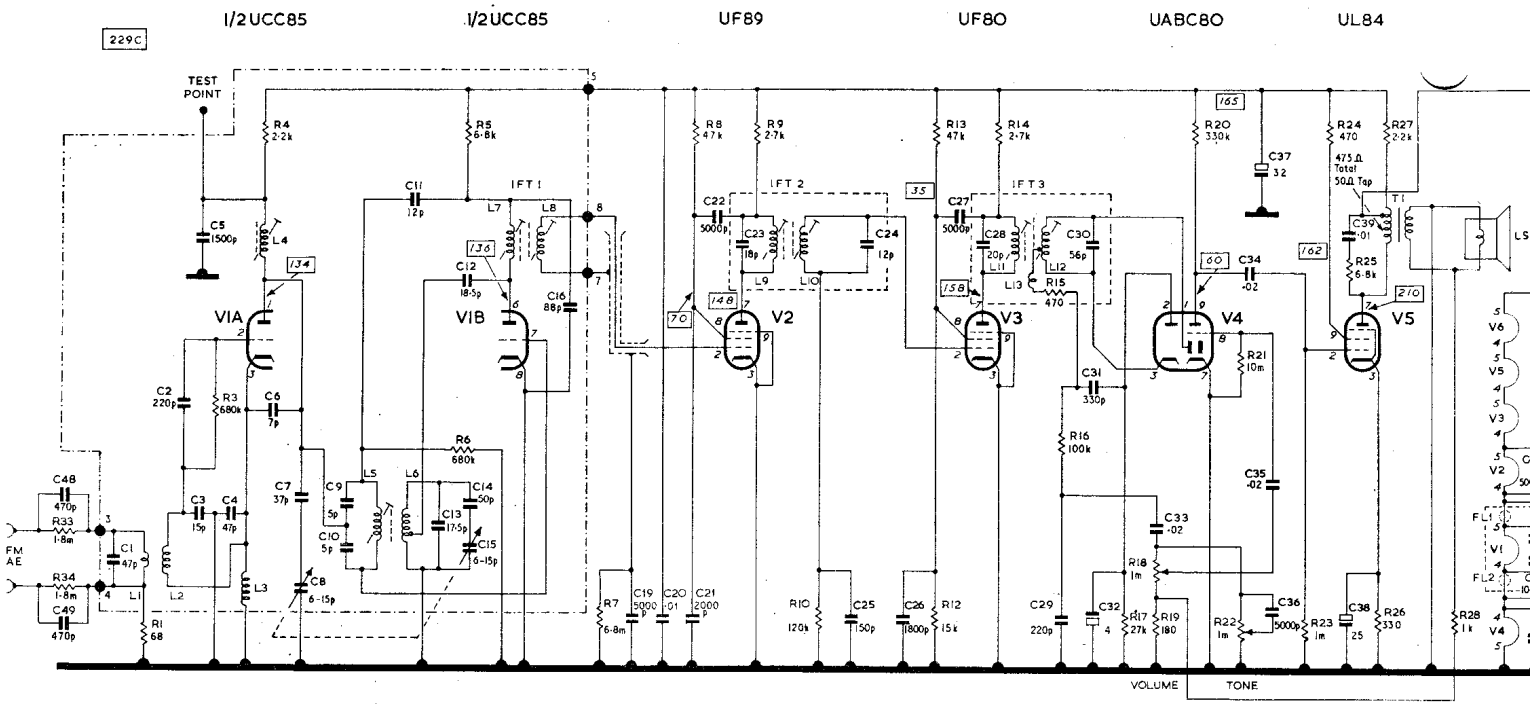


Circuit diagram of Model 1377. Figures in rectangles are voltage readings taken with a 20,000 Ω/Volt meter. DC resistance readings are shown against inductances where these are 1 Ω or greater.

CIRCUIT DESCRIPTION

The VHF tuner unit employs a double triode valve, **V1A** and **B** type UCC85. The 75 ohm aerial feeder is coupled to the grid and cathode circuits of **V1A** by **L1, L2. L2** is tuned by **C3, C4** with the junction between the two capacitors returned to chassis. The signal is therefore injected at the grid of **V1A** via **C2** and at the cathode across **L3. V1A** anode circuit is tuned by **L4** and variable capacitor **C8;** neutralising is effected by **C6.**

V1B functions as a self-oscillating mixer with inductive coupling between anode and grid circuits provided by **L5** and **L6.** The anode winding is tuned by **C13, C14** and the variable capacitor **C15,** ganged with **C8.** The junction of **C9** and **C10,** series connected across the grid coil **L5,** provides a point of injection for the signal voltage developed across **L4.** Additive mixing takes place and the resulting 10.7 Mc/s intermediate frequency is developed across **L7** in **V1B** anode circuit.

A small proportion of the IF output is developed across **C16** and provides positive feedback to **V1B** grid circuit through **C11** and **L5/L6.** This has the effect of increasing the impedance of the oscillator circuits which shunt **L7.**

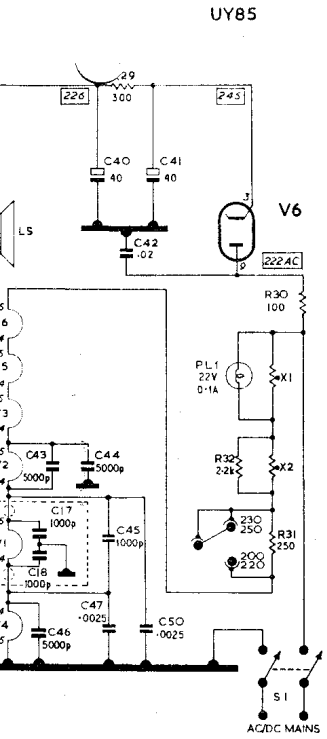
L7 and **L8** form the first IF transformer which couples the tuner unit output to the first IF amplifier **V2,** UF89. The signal developed in **V2** anode circuit is then coupled to **V3** grid via **IFT 2. V3,** type UF80, functions as an additional IF amplifier with a partial limiting action due to the low screen grid voltage provided by the potential divider **R12/R13** and the grid bias produced by **C25** and **R10.**

The ratio detector transformer **L11, L12** and **L13** is connected in **V3** anode circuit. Two of the diode sections of **V4,** UABC80, function as the ratio detector with **R17** the detector load and **C32** the stabilising capacitor. **R15,** in series with the transformer tertiary winding **L13,** contributes to effective AM rejection.

The audio output is fed to the grid of the triode section of **V4** via **C33** and the volume control **R18. V4** is RC coupled to the output stage **V5,** UL84, by **R20, C34** and **R23.** The output transformer **T1** in **V5** anode circuit, incorporates a tapped primary winding for hum cancellation and **C39, R25** across the main winding provide tone compensation.

A negative feedback voltage is fed from the secondary of the output transformer through **R28** and injected in **V4** grid circuit across **R19.**

ALIGNMENT DATA



IF Circuits

The following procedure is based on the use of a signal generator providing Band II coverage, also 10.7 Mc/s AM (30% modulated) and 10.7 Mc/s FM (25 Kc/s deviation) signals, at an output impedance of 75Ω. Throughout alignment the signal input to the receiver should be adjusted to maintain an audio output of about 100mW.

Remove the chassis from the cabinet.

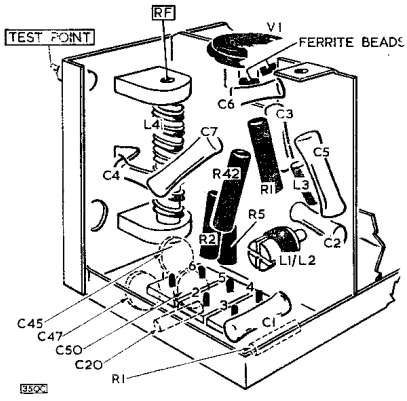
1. Switch the receiver on and allow to warm up for at least ten minutes. Set the Volume control 90° back from maximum and the Tone control to maximum treble.
2. Inject 10.7 Mc/s FM signal via 400pF capacitor to **V2** control grid (tag 2) and adjust **L11** (lower), **L10** (lower) and **L9** (upper) for maximum output.
3. AM rejection check.
   (*a*) Switch generator to 10.7 Mc/s AM and tune **L12** (upper) for minimum output.
   (*b*) Switch generator to 10.7 Mc/s FM and check that FM output has been retained.

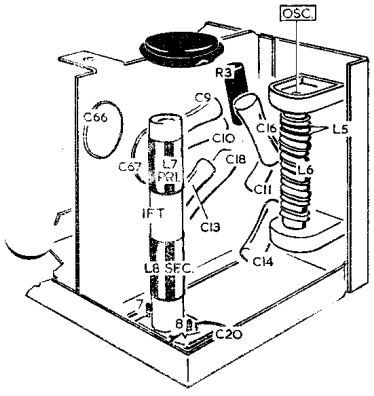
   Note: If maximum AM rejection does not coincide with maximum FM output, **L12** should be tuned for maximum rejection at the expense of a slight reduction in FM output.
4. Unscrew the core of **L8** in the VHF tuner unit so that it protrudes from the former by approximately $\frac{3}{8}$ in. This can be seen with unit cover in position.
5. Inject 10.7 Mc/s FM signal to the tuner test point (projecting tag over gang). Adjust **L7** for maximum output and then peak **L8.**

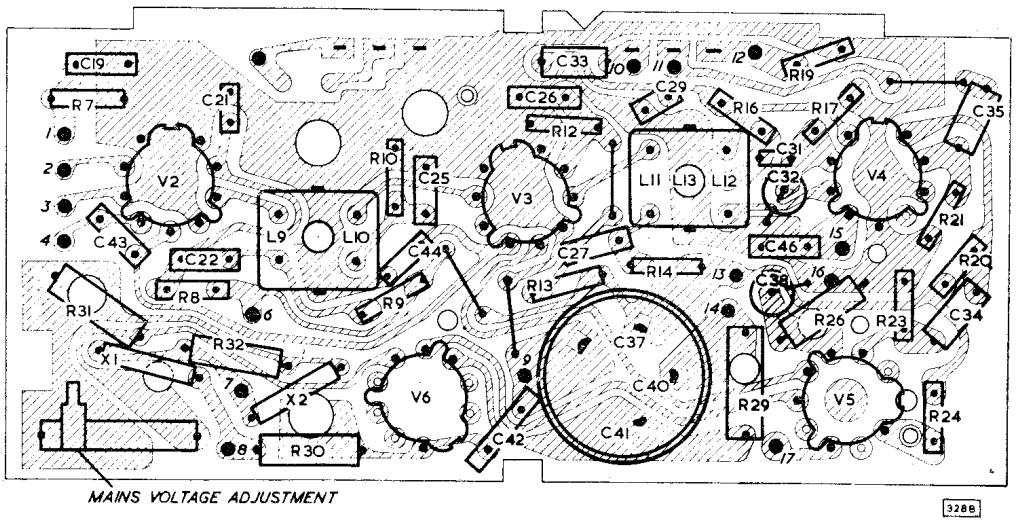
RF Circuits

Replace the chassis in its cabinet and check that the cursor coincides with the right-hand edge of the scale opening with the tuning gang at maximum capacitance.

1. Adjust tuning control to set cursor to 91 Mc/s on scale.
2. Inject 91 Mc/s FM signal at the aerial sockets and tune in signal by adjusting **L5/L6.** If two peaks occur within the tuning range, that obtained with the core nearest the top end of the coil former should be chosen.
3. Adjust **L4** for maximum audio output with core towards bottom of coil former.
4. Check calibration over range.







1. To tag A7 on Tuner Unit
2. To tag A8 on Tuner Unit
3. To Tuner Unit chassis
4. To tag A1 on Tuner Unit and junction C45-47
6. To tag A5 on Tuner Unit also HT and C20
7. 8. } To scale lamps
9. To on/off switch
10. To R18 (Volume control)
11. To slider of R18 (Volume control)
12. Through R28 to secondary OPT and R18 (Volume Control)
13. Through R27 to primary OPT
14. To tap on primary OPT and to C39
15. To tag A6 on Tuner Unit and to C18
16. From OPT secondary to chassis
17. From V5 anode to OPT primary and R25

Printed Board

Excessive heat can loosen the bond between the copper conducting circuits and the insulating board; consequently, particular care is necessary if any connections must be soldered to the 'wiring' side of the panel. For this reason, when replacing a resistor or capacitor, cut out the faulty component so that as much as possible of the original lead-out wires remain for connecting the new component, soldering to the ends of the wires instead of to the printed conductors. Use a small low-consumption iron and do not apply the bit for longer than is necessary to produce a sound joint.

The electrolytic capacitors are secured on the board by clip lugs which also make electrical connections to the panel. To remove these, use a heavier type iron and apply heat and pressure to the lugs—not to the printed circuit—so that when the solder melts, the lug is pressed clear of the connecting point. In some cases a small stiff-haired brush will assist in breaking the connection.

If a section of printed conductor is damaged or fused, scrape off the damaged portion and restore the connection with a jumper wire on the component side of the panel. Should it become necessary, however, to solder directly to a printed conductor, use a 60/40 resin cored solder and, with a low-consumption iron, make the joint quickly to avoid overheating. DO NOT USE A CORROSIVE TYPE FLUX.

CAPACITORS

Electrolytics excepted, tolerance ±20% unless otherwise stated.
Where no working voltage is given, this should be taken as 350 Volts.

Ref.	Value	Tol.	Volts	Function and Part No.
C1	47pF	5%		L1 tuning
C2	220pF			V1A grid coupling
C3	15pF	5%		L2 tuning
C4	47pF			
C5	1500pF			V1A anode decoupling
C6	7pF	±½pF		Part V1A neutralising C070H35
C7	37pF	5%		VHF amplifier padder
C8	6—15pF	Variable		VHF amplifier tuning 29325
C9	5pF	±½pF		Oscillator/mixer signal injection
C10	5pF			C050H35
C11	12pF	2½%		Part V1B positive feedback C120R35
C12	18pF			Oscillator feedback
C13	17.5pF			Part L6 tuning 175XH35
C14	50pF	5%		Oscillator padder C500G35
C15	6—15pF	Variable		Oscillator tuning 29325
C16	88pF	2.5%		Part V1B positive feedback
C17	1000pF	+80%—20%		V1 heater decoupling
C18	1000pF			
C19	5000pF		500V	V2 grid bias
C20	10000pF		500V	HT decoupling
C21	2000pF	10%	500V	V2 SG decoupling and neutralising
C22	5000pF			
C23	18.5pF			L9 tuning
C24	12pF			L10 tuning
C25	150pF			V3 grid bias
C26	1800pF	10%	500V	V3 SG decoupling and neutralising
C27	500pF			
C28	20pF			L11 tuning
C29	220pF			FM de-emphasis
C30	56pF			L12 tuning
C31	330pF			IF bypass
C32	4μF	Elec	100V	Ratio det stabiliser 13221/4X
C33	.02μF		150V	Audio coupling
C34	.02μF		150V	V5 grid coupling
C35	.02μF		150V	V4 grid decoupling
C36	5000pF		500V	Tone control
C37	32μF	Elec.	275V	HT smoothing 13237/8
C38	25μF	Elec.	25V	V5 cathode bypass 13225/1
C39	10000pF			Tone compensation
C40	40μF	Elec.	275V	HT smoothing 13237/8
C41	40μF	Elec.	275V	HT reservoir
C42	.02μF		350V AC	Mains RF bypass
C43	5000pF		500V	V2 heater decoupling
C44	5000pF		500V	V2/V3 heater decoupling
C45	0025μF			V1 heater decoupling
C46	5000pF		500V	V4 heater decoupling
C47	.0025μF			V1 heater decoupling
C48	470pF		1750V	Aerial discharge
C49				
C50	.0025μF			V1 heater decoupling

RESISTORS

All carbon types unless otherwise stated. Where no tolerance or power rating is given for fixed resistors, these should be taken as 20% and ¼ Watt respectively.

Ref.	Value	Tol.	Rating	Function and Part No.
R1	68Ω	10%		Dipole aerial load
R2	No component			
R3	680KΩ	10%		V1A grid leak
R4	2.2KΩ			V1A HT decoupling
R5	6.8KΩ			V1B HT feed
R6	680KΩ			V1B grid leak
R7	6.8KΩ	10%		V2 grid leak
R8	47KΩ	10%		V2 SG HT feed
R9	2.7KΩ	10%		Part V2 neutralising
R10	120KΩ	10%		V3 grid leak
R11	No component			
R12	15KΩ			V3 SG pot. divider
R13	47KΩ	10%		
R14	2.7KΩ	10%		Part V3 neutralising
R15	470Ω			Ratio det. tertiary series
R16	100KΩ	10%		IF filter
R17	27KΩ	10%		Ratio detector load
R18	1MΩ	Log. Pot.		Volume control 13147/12
R19	180Ω	10%		Neg. feedback injection
R20	330KΩ	10%		V4 triode anode load
R21	10MΩ	10%		V4 triode grid leak
R22	1MΩ	Log. Pot.		Tone control 13147/16
R23	1MΩ	10%		V5 grid leak
R24	470Ω	10%		V5 SG HT feed
R25	6.8KΩ	10%		Tone correction
R26	330Ω	10%	½W	V5 grid bias
R27	2.2KΩ	10%	½W	Part HT smoothing
R28	1KΩ	10%		Neg. feedback series
R29	300Ω	10%	6W	Part HT smoothing 301SW06
R30	100Ω	5%	3W	V6 current limiter 101GW03
R31	250Ω	5%	3W	Mains ballast 251GW03
R32	2.2KΩ	10%	½W	X2 shunt
R33	1.8MΩ			Aerial discharge
R34				

INDUCTORS AND TRANSFORMERS

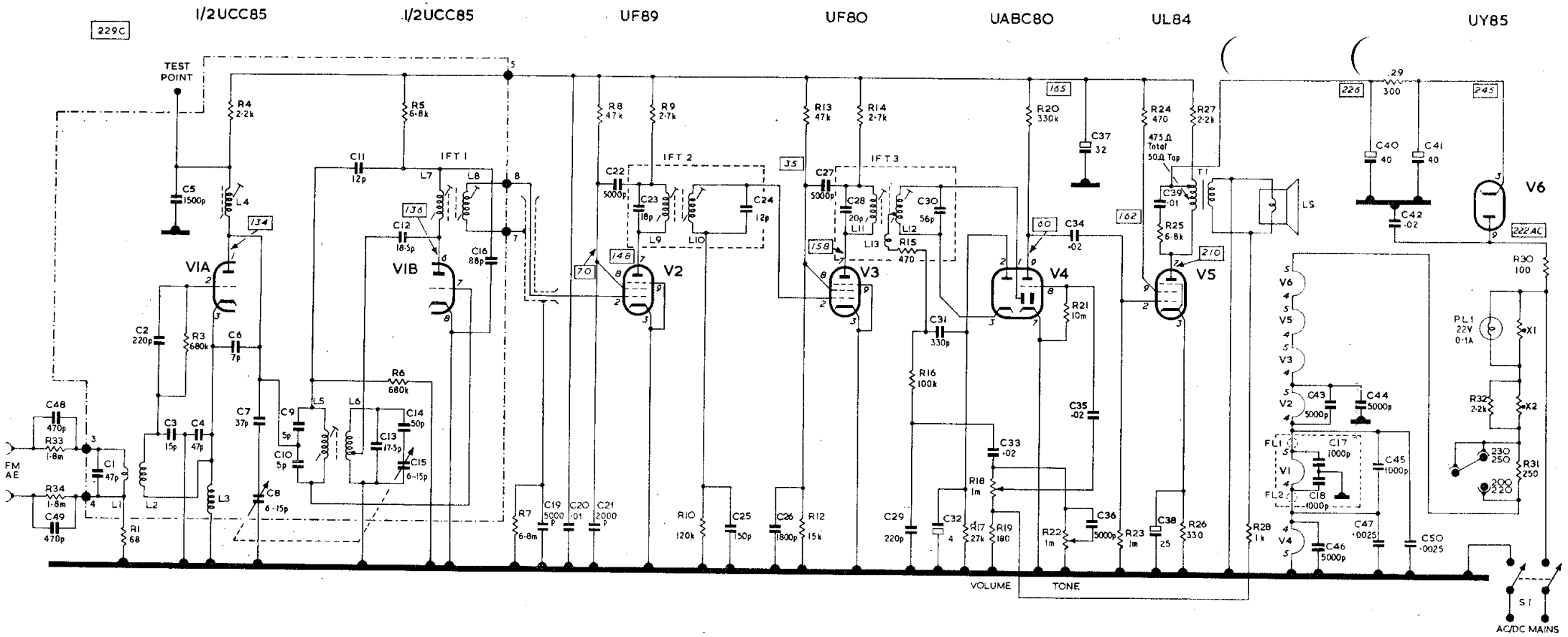
Ref.	Function	Part No.
L1	Aerial input transformer	29232
L2		
L3	RF choke	29380
L4	VHF amplifier tuning	25835
L5	Oscillator tuning	29230
L6	Oscillator feedback	
L7	1st IFT	29233
L8		
L9	2nd IFT	29323
L10		
L11	Ratio detector transformer	29322
L12		
L13		
T1	Output transformer	29334

MISCELLANEOUS

Ref.	Description and Function	Part No.
PL1	Pilot lamp 22V 0.1A	33765
S1	On/Off switch	13147/16
X1/X2	Varistor V1010	4558/7
LS	PM loudspeaker, 7 in. x 4 in., 3Ω speech coil	16011/6

SPARE PARTS

Description	Part No.
Aerial socket	Z29079
Cabinet	
Colour scheme A (light grey and white)	V33033/1
Colour scheme B (dark grey and white)	V33033/4
Cabinet back	W33026
Control knobs:	
Tuning (spring 47409)	X32439/1
Volume (spring 37309)	Y32440/2
Tone on-off (spring 37309)	Y32440/4
Control panel:	
Red for cabinet A	Y33061/1
Green for cabinet B	Y33061/2
Cursor	Z33058
Drive drum	Y29434
Reflector	Y33059
Scale	
for cabinet A	N33215/1
for cabinet B	N33215/2



Circuit diagram of Model 1377. Figures in rectangles are voltage readings taken with a 20,000 Ω/Volt meter. DC resistance readings are shown against inductances where these are 1 Ω or greater.