FERGUSON

RADIO

'Felicity' 389RG

'Futurama' 601RG

SERVICE MANUAL

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MODELS 389RG & 601RG

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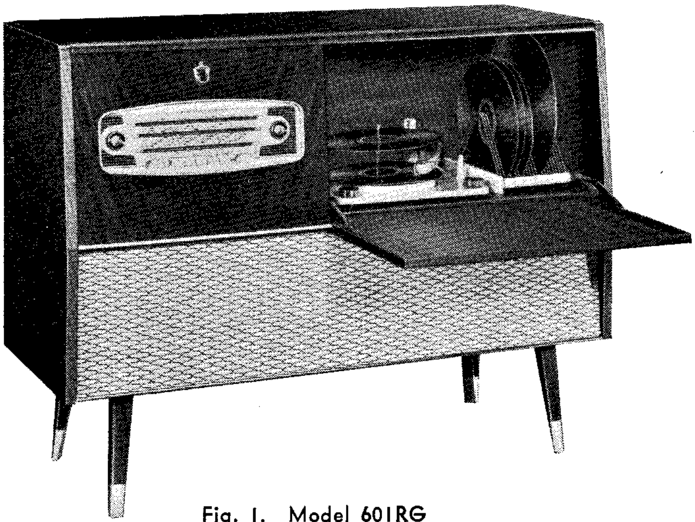


Fig. 1. Model 601RG

Fig. 2. Model 389RG

1. SPECIFICATION

1.1. GENERAL

Models 389RG and 601RG are fitted with similar AM/FM receiver chassis. A 5-valve circuit is employed with a selenium bridge rectifier for HT supply. Piano-key waverange switching and separate AM and FM tuning controls are provided. Internal aerials are fitted as well as sockets for external aerials and earth connection. Provision is made for fitting an additional amplifier and control panel to allow stereophonic records to be reproduced by means of a suitable pick-up cartridge and external loudspeakers.

Model 601RG is fitted with a tuning indicator operative on both AM and FM.

1.2. MAINS SUPPLY

AC mains 200-250 V, 50 c/s. For operation on 60 c/s mains, a special motor pulley may be obtained from the record-changer manufacturer.

1.3. WAVEBAND COVERAGE

Long Wave—1160-1940 metres
Medium Wave—188-545 metres
VHF/FM—88-101 Mc/s

1.4. RECORD CHANGER

B.S.R. Monarch UA8, 4-speed, automatic record-changer, with turnover crystal pick-up cartridge type TC8M.

1.5. VALVES

- ECC85 VHF amplifier and mixer oscillator
- ECH81 AM frequency changer and FM IF amplifier
- EF89 AM and FM IF amplifier
- EABC80 AM and FM detector and audio amplifier
- EL84 Audio output

A tuning indicator, type EM81, is incorporated in Model 601RG.

1.6. OUTPUT POWER

3 Watts.

1.7. LOUDSPEAKER

389RG—Permanent magnet, 8" diameter loudspeaker with a speech coil impedance of 3Ω.

601RG—Permanent magnet, 9" x 5" elliptical loudspeaker with a speech coil impedance of 3Ω.

An extension loudspeaker, if used with either model, should have a speech coil impedance of 3Ω.

1.8. CABINET DIMENSIONS

389RG—33½" wide x 34" high x 15½" deep.

601RG—42½" wide x 37" high x 17" deep.

The manufacturers reserve the right to vary specifications or use alternative materials as may be deemed necessary or desirable at any time.

2. INSTALLATION AND OPERATION

2.1. MAINS VOLTAGE ADJUSTMENT

This takes the form of a shorting plug and socket panel mounted on the mains transformer, and provides the following tappings :—

200-210V, 220-230V, and 240-250V.

2.2. VHF/FM AERIAL

The high sensitivity of this receiver enables the internal VHF aerial to be used where a reasonably good signal is available. It should, however, be noted that sufficient signal input to obtain satisfactory limiting action is necessary to ensure discrimination against interference.

Improved reception may be obtained with a simple indoor aerial consisting of two 30 in. lengths of insulated wire connected to the receiver through a 75Ω twin feeder. The half-wave dipole thus formed should be installed as high as possible and at right angles to the direction of the transmitter. Various positions should be tried for best results. Tilting the aerial may effect an improvement.

MULTIPATH PROPAGATION

Individual cases of multipath propagation can occur anywhere within the service area of an FM transmitter and cause severe audio distortion. Such cases are fortunately rare and the AM rejection provided by the receiver materially reduces the effect except where reception conditions are very poor.

When a high proportion of the signals are received indirectly from the transmitter via reflections, the phase differences, due to the various path lengths, produce both amplitude and phase modulation of the direct signal. The effect of this spurious modulation is extremely unpleasant, producing severe "break-up" at the higher audio frequencies.

Due to the nature of the distortion, the cause may not be immediately evident and could be mistaken for a receiver fault. If the effect is more noticeable on only one of the three VHF stations, it can be assumed that the distortion is caused by reception conditions. It is unlikely that all stations will be equally affected.

Re-orientation of the receiver when using the internal aerial may effect some improvement, but in most cases an efficient external aerial will be needed. The improved directional response of a full-sized aerial with reflector will usually be effective in reducing the pick-up of reflected signals, provided it is carefully orientated.

3. THE CIRCUIT

3.1. A.M. RECEPTION

When switched to receive the Medium or Long waverange, HT is fed to the triode anode of the frequency changer **V2** by **S1B** (contacts 4 and 5) and the supply to the VHF tuner unit is disconnected (contacts 5 and 6).

On MW, **L8** is short-circuited by **S2A-B** (contacts 8 and 9) and the ferrite-rod aerial **L9** is tuned by **C21** with trimmer **C22.** The signal is fed to the heptode control grid of **V2** via **C19** and **S1A** (contacts 7 and 8).

On LW, the inductance of the ferrite-rod aerial is supplemented by the loading coil **L8** and a fixed LW trimmer **C23** is switched in parallel with **C22** and the tuning capacitor **C21.**

When an external aerial is used, the signal is developed across **C20** in the low potential end of the aerial tuned circuit. **R5,** in parallel with **C20,** prevents modulation hum by limiting the grid circuit impedance of **V2** at low frequencies. The AGC control voltage is applied through **R6.**

The triode section of **V2** functions as a tuned grid oscillator. **L10, L11** provide feedback coupling, and on MW **L10** is tuned by **C30** (ganged with **C21**) and the MW oscillator trimmer **C29.** For LW reception, **C32,** the LW trimmer, and **C31** are connected in parallel with **L10** via **S3A** (contacts 2 and 3).

The first 470 Kc/s IF transformer **L14, C36** and **L15, C37** couples the signal to **V3** control grid. **V3** functions as the IF amplifier and the signal is coupled to the AM detector by the second IF transformer **L16, C40** and **L17, C41.** One of the diode sections of **V4** is used as a detector and **R14, C44** form the IF filter together with the capacitance of the screened lead to the volume control **R21.** The volume control is the diode load and is switched into circuit by **S1A** and **S4A** (contacts 4 and 5). The audio signal developed across **R21, R22** is coupled via **C50** to the grid of the triode section of **V4** the audio amplifier. The DC voltage developed across the diode load is fed through **R16** and decoupled by **C16** providing AGC bias to the grid circuits of **V2** and **V3.** On the 601RG, the AGC voltage is also applied to control the tuning indicator **V6.**

The triode section of **V4** is resistance capacitance coupled by **R23, C51** and **R24,** via the tone control **R25, C52** to output stage, **V5. R26** is a grid stopper and **C61** in **V5** anode-grid circuit prevents instability should the output stage be subjected to overload conditions. The output transformer **T1** in the anode circuit has a hum neutralizing tapped primary. Negative feedback is taken from the secondary and injected across **R22** in the low potential end of the volume control circuit.

3.2. VHF/FM RECEPTION

With the receiver switched to VHF/FM, the HT to **V2** triode section is broken by **S1B** (contacts 4 and 5) and the same switch (contacts 5 and 6) connects the supply to the VHF tuner unit.

The tuner unit utilises a double-triode valve **V1A and B. V1A** functions as an earthed-grid RF amplifier and the 75Ω aerial feeder is coupled into the cathode circuit by **L1, L2. L2** is broadly tuned by **C4** and the control grid is effectively earthed to RF by **C3. R1** is the grid leak and AGC feed resistor.

The anode load **L3** is capacitively tuned by trimmer **C2** and is tunable over the band by means of an adjustable aluminium slug core.

V1B functions as a self-oscillating mixer with inductive coupling between anode and grid circuits provided by **L4, L5.** The grid winding **L4** is fitted with an aluminium slug core mechanically ganged with the core of **L3** to provide variable tuning. The tuning capacitance is made up by a pre-set capacitor **C9** plus **C8** and **C7,** which have compensating temperature co-efficients to reduce oscillator drift, and **C5, C6** in series. The junction of **C5, C6** provides a point of injection for the signal voltage developed across **L3.**

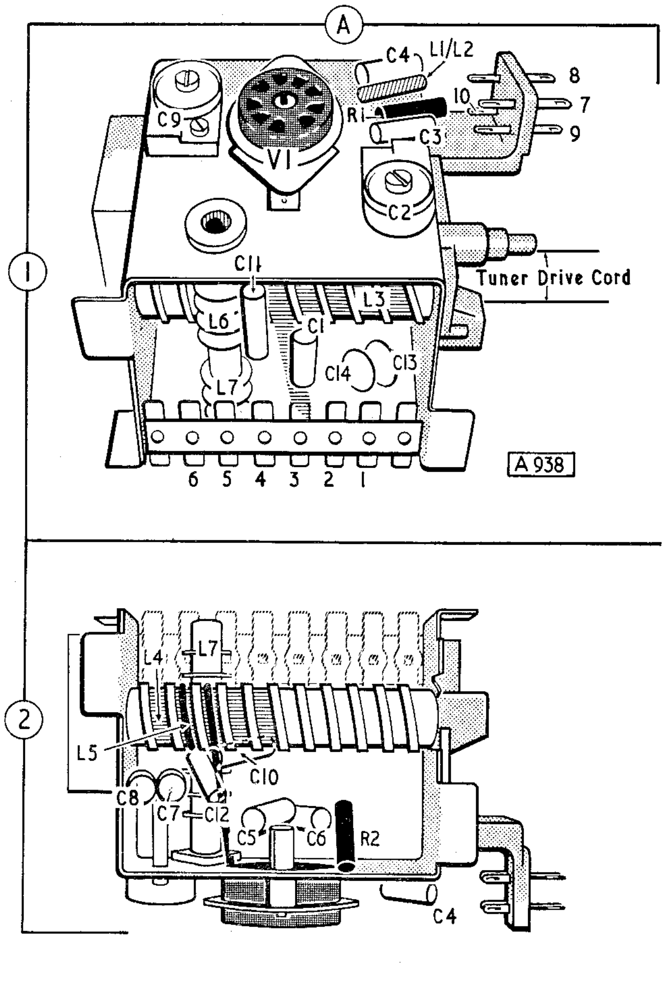
Additive mixing takes place and the resulting 10.7 Mc/s IF is developed across **L6** in **V1B** anode circuit. **L6** is tuned by **C12** which also serves as the anode coupling capacitor for the oscillator feed-back coil.

A small proportion of the IF output is also developed across **C11** and provides IF feedback to **V1B** grid which increases the impedance of the oscillator circuits which shunt **L6.**

L6 and **L7** tuned by **C17,** form the first 10.7 Mc/s IF transformer which couples the output of the tuner to the heptode control grid of **V2** operating as an IF amplifier. The second 10.7 Mc/s IF transformer **L12, C34** and **L13, C35** is included in **V2** anode circuit and couples the signal to **V3** control grid, which provides a further stage of IF amplification. The grid is returned to the AGC line through the secondary of the 470 Kc/s IF transformer. The AGC line is common to both AM and FM circuits, but with the receiver switched to VHF/FM, one side of **R16** is connected directly to chassis through **S2B** and **S3B** (contacts 4 and 5). Therefore, the grid circuit of **V3** is returned to chassis through **R16** and **C16** in parallel, and on signals strong enough to drive **V3** into grid current, **C16** charges and provides a negative bias which reduces the gain of the valve. This voltage is also applied to **V2** and **V1A** via the AGC line.

The signal developed in the anode circuit of **V3** is coupled to the ratio detector by a tuned transformer **L18, C42** and **L19, C43** with a tertiary winding **L20.** Two of the diode sections of **V4** are connected in a ratio-detector circuit with **C49** as the stabilising reservoir capacitor and **R19** the detector load. On the 601RG, the control voltage for the tuning indicator **V6** is taken from **R19.**

C45 and **C46** are the IF filtering capacitors. **C47** couples the signal to the volume control and audio amplifier via **C48, R17** the FM de-emphasis circuit, and **S1A** (contacts 5 and 6) and **S4A** (contacts 4 and 5).



Ref.	Location
C1	A1
C2	A1
C3	A1
C4	A1
C5	A2
C6	A2
C7	A2
C8	A2
C9	A1
C10	A2
C11	A1
C12	A2
C13	A1
C14	A1
R1	A1
R2	A2
L1, L2	A1
L3	A1
L4	A2
L5	A2
L6	A1
L7	A1

Fig. 3. VHF/FM Tuner Unit, showing location of components.

4. ALIGNMENT DATA

4.1 AM CIRCUITS

IF Alignment. Switch the receiver to MW, turn gang to minimum capacitance position and volume control to maximum. Inject a **470 Kc/s** modulated signal through a 0.1μF capacitor at the grid of **V3** (pin 2) and adjust **L17** and **L16** for maximum output.

Inject the signal at the control grid of **V2** (pin 2) via 0.1μF capacitor and adjust **L15** and **L14** for maximum output. Do not make any further adjustment to **L17** or **L16**.

Throughout alignment, adjust input signal level to maintain output at approximately 50mW.

RF Alignment. MW must be aligned first. Signals to be injected via a loop loosely coupled to the ferrite-rod aerial. Input level to be adjusted to maintain output at approximately 50mW.

1. With the tuning gang at maximum capacitance, set cursor to the marker at the extreme right-hand end of the scale.
2. Switch to MW, inject **1,400 Kc/s** signal and set cursor to the alignment marker near the 200-metre calibration point. Adjust **C29** and **C22** for maximum output.
3. Set the cursor to the marker at approximately 500 metres, inject **580 Kc/s** signal and adjust **L10** and the adjusting ring on the ferrite-rod aerial for maximum output.
4. Repeat 2 and 3 until no further improvement results.
5. Switch to LW, inject **223 Kc/s** signal, set cursor to the alignment marker near 1,300 metres and adjust **C32** and **L8** until no further improvement results.

4.2. FM CIRCUITS

The following alignment procedure is based on the use of an FM signal generator with IF and Band II coverage and an output impedance of 75Ω. Carrier deviation should be set to 25 Kc/s, and throughout alignment the signal input to the receiver should be adjusted to maintain an audio output of 100mW. The sequence of adjustments must be strictly observed.

IF Alignment. Switch the receiver to VHF and allow to warm up for at least ten minutes. Set the volume control to maximum.

Adjustment	Signal Frequency	Point of Injection
L19, L18	10.7 Mc/s	**V3** control grid (pin 2 via .01μF)

With signal generator output of 20mV, adjust **L19** followed by **L18**, for maximum audio output. This should be approximately 100mW.

Adjustment	Signal Frequency	Point of Injection
L13, L12	10.7 Mc/s	**V2** control grid (pin 2 via .01μF)

Adjust **L13, L12** for maximum audio output reducing input level as required so that the audio output does not exceed 100mW.

Adjustment	Signal Frequency	Point of Injection
L7, L6	10.7 Mc/s	Junction **R3** and **L3** (Tag 3 on VHF tuner via 500pF).

Using a non-metallic trimming tool, adjust **L7** and **L6** for maximum audio output, reducing input level as necessary.

RF Alignment. Rotate tuning control to bring cursor to the left-hand end of the scale and check that the cursor coincides with the marker provided.

1. Adjust tuning control to set cursor to 91 Mc/s on scale.
2. Slacken off the locking screws of the FM drive drum, and without altering the position of the cursor, rotate the drum spindle in an anti-clockwise direction until the internal stop in the tuner prevents any further rotation. The slotted end to the spindle facilitates this adjustment.
3. Tighten up drum to spindle.
4. Rotate tuning control to bring cursor to 99 Mc/s.
5. Inject **91 Mc/s** frequency-modulated signal at the aerial sockets and adjust the oscillator trimmer **C9** for maximum output. A non-metallic trimming tool must be used.
6. Slacken off drive drum locking screws and, whilst holding the drum spindle to keep the tuner on 91 Mc/s, rotate the tuning control to bring the cursor to 91 Mc/s on tuning scale.
7. Adjust **C2** for maximum output (91 Mc/s signal).
8. Check calibration over the band and if necessary repeat 1 to 5.

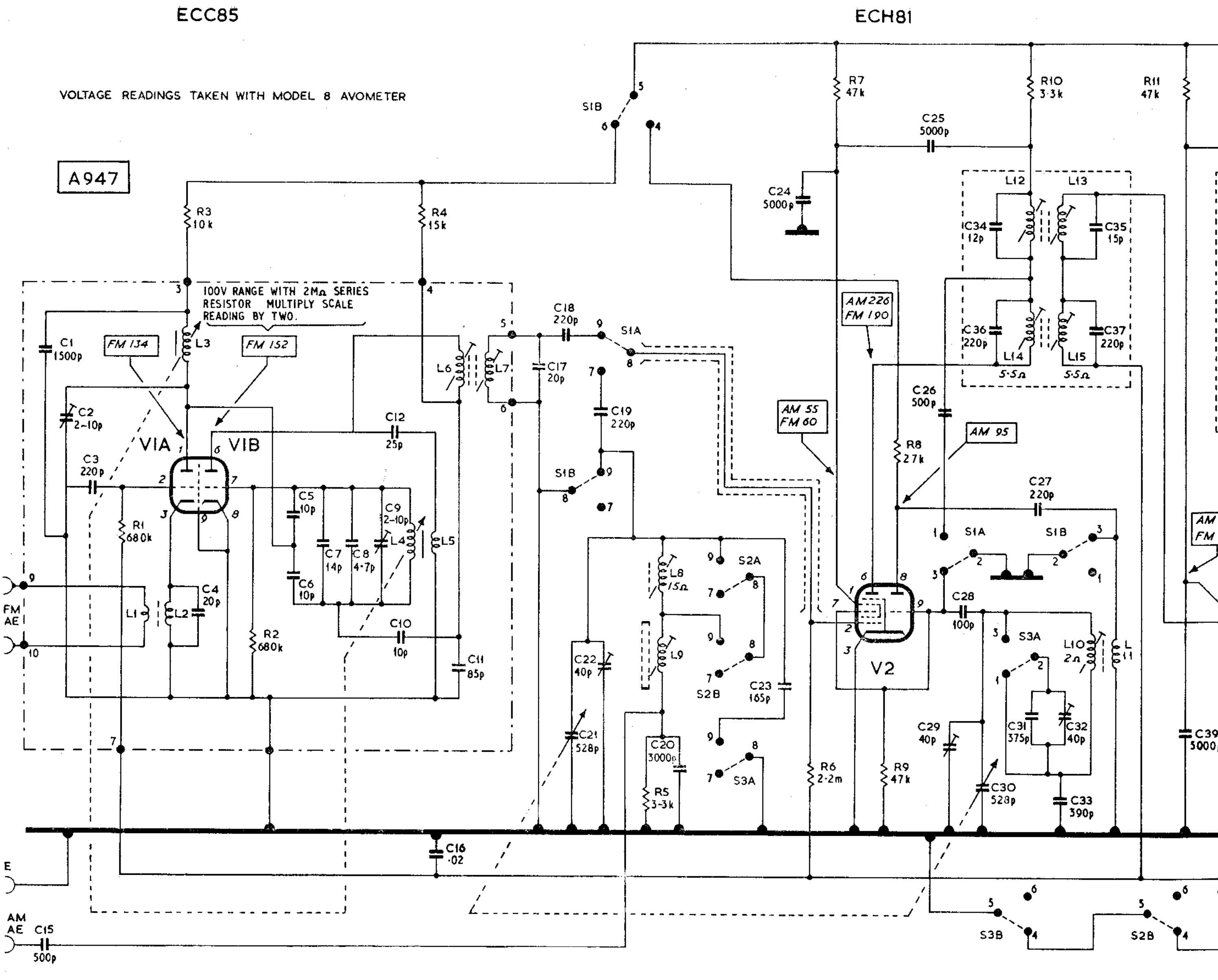


Fig. 4. Circuit Diagram of Model 601RG.

Model 389RG is identical except that V6 and associated components R33, R34, R35, C62 are deleted.

Figures adjacent to the valve electrodes denote pin connections. Those in rectangles indicate voltages measured with a 20,000 Ω/volt meter. DC resistance readings are shown against inductances where these are 1Ω or greater.

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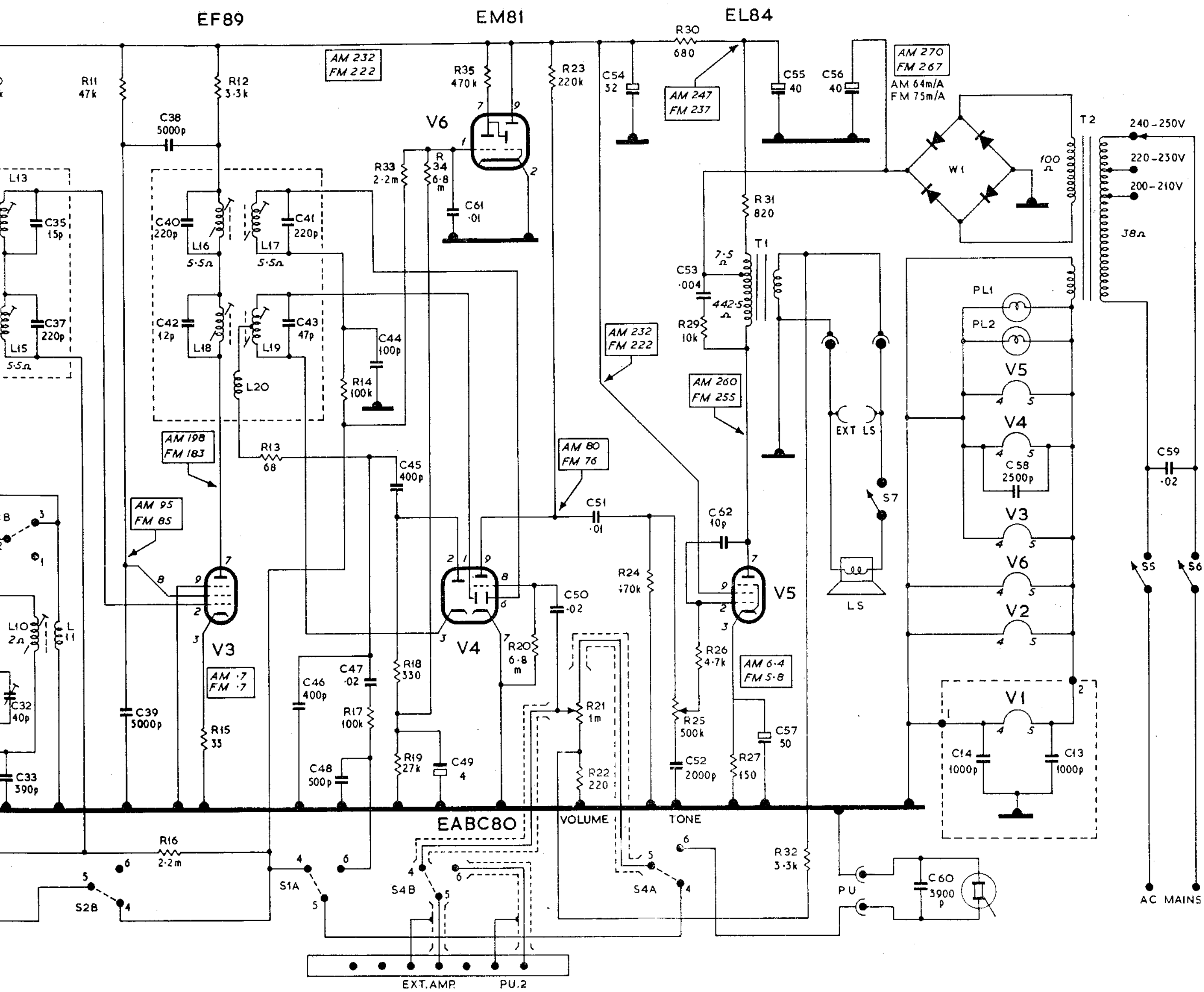
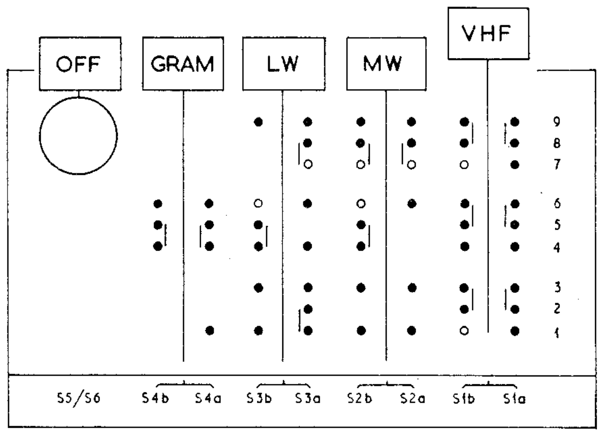


> An additional amplifier for the reproduction of stereophonic gramophone records may be connected to the points marked EXT. AMP. and PU.2. Full fitting instructions are supplied with the amplifier.



PIANO KEY SWITCH CONTACTS SHOWN IN VHF-FM POSITION. SWITCH VIEWED FROM UNDERSIDE OF CHASSIS.

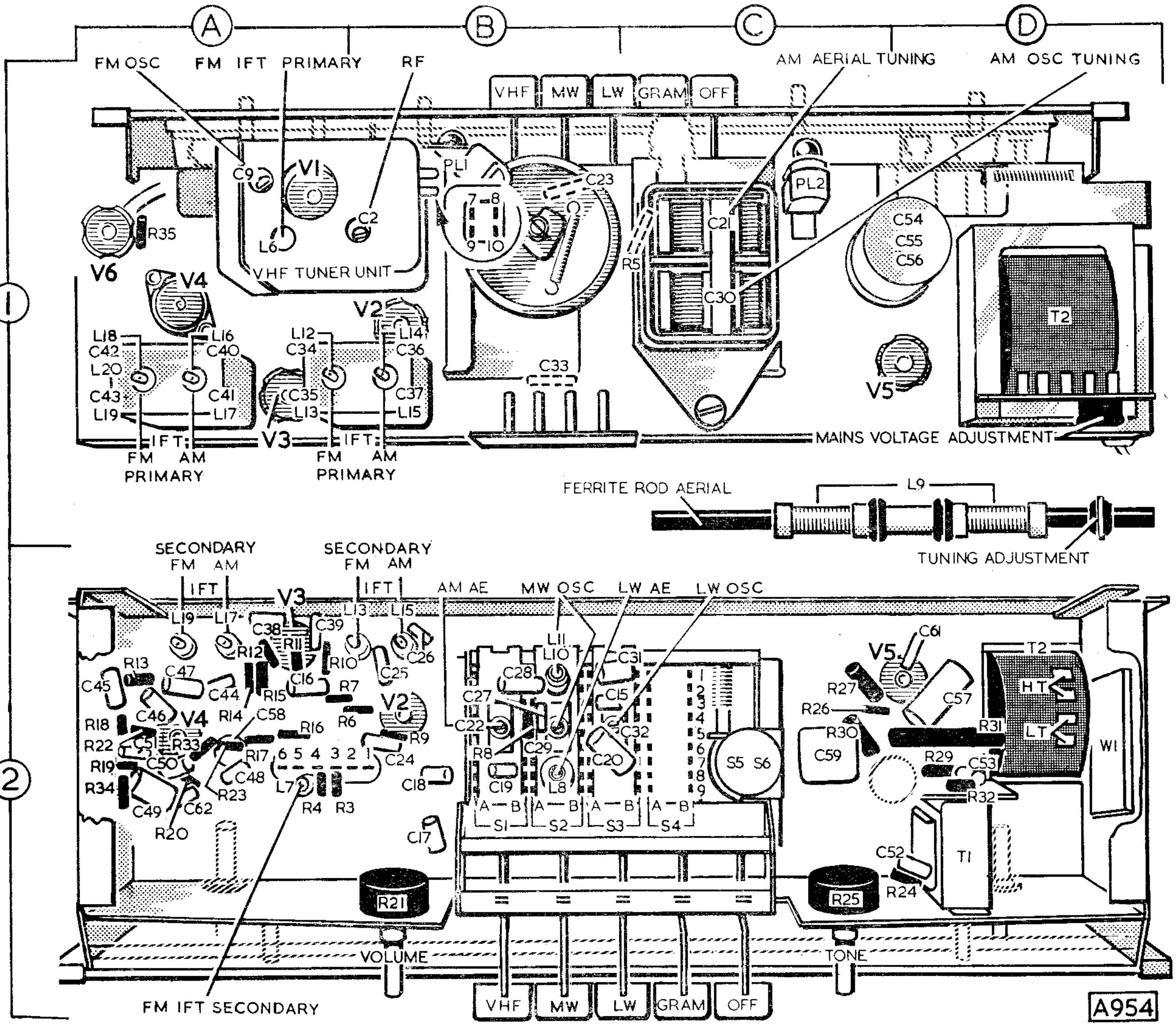


Fig. 5. 601RG Chassis, showing location of components. For easy reference, components requiring adjustment during ALIGNMENT are indicated outside the chassis area. The 389RG chassis is identical except that the tuning indicator (V6) and associated components are omitted.

Ref.	Location	Ref.	Location	Ref.	Location	Ref.	Location	Ref.	Location
R3	A2	R24	D2	C23	B1	C45	A2	L8	B2
R4	A2	R25	C2	C24	B2	C46	A2	L9	D1
R5	C1	R26	C2	C25	B2	C47	A2	L10	B2
R6	A2	R27	C2	C27	B2	C48	A2	L11	B2
R7	A2	R29	D2	C28	B2	C49	A2	L12	A1
R8	B2	R30	C2	C29	B2	C50	A2	L13	A2
R9	B2	R31	D2	C30	C1	C51	A2	L14	B1
R10	A2	R32	D2	C31	B2	C52	D2	L15	B2
R11	A2	R33	A2	C32	B2	C53	D2	L16	A1
R12	A2	R34	A2	C33	B1	C54 }		L17	A2
R13	A2			C34	A1	C55 }	D1	L18	A1
R14	A2	C2	B1	C35	A1	C56 }		L19	A2
R15	A2	C9	A1	C36	B1	C57	D2	L20	A1
R16	A2	C15	B2	C37	B1	C58	A2	T1	D2
R17	A2	C16	A2	C38	A2	C59	C2	T2	D1
R18	A2	C17	B2	C39	A2	C61	D2		
R19	A2	C18	B2	C40	A1	C62	A2		
R20	A2	C19	B2	C41	A1			S1-S6	B2
R21	B2	C20	B2	C42	A1			W1	D2
R22	A2	C21	C1	C43	A1	L6	A1	PL1	B1
R23	A2	C22	B2	C44	A2	L7	A2	PL2	C1

CAPACITORS

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

Ref.	Value	Rating	Function	Part No.
C 1	1500 pF	750V	V1A HT decoupling	
C 2	2—10 pF	Pre-set	L3 tuning	Z13903
C 3	220 pF	750V	V1A grid coupling	
C 4	20 pF	5%	L2 tuning	
C 5	10 pF	±0.5pF P100 750V	FM osc/mixer signal injection (C5, C6)	C100H75/F13
C 6	10 pF	±0.5pF P100 750V		
C 7	14 pF	10% P100 750V	Part L4 tuning & temperature compensating (C7, C8)	C140S75/F13
C 8	4.7 pF	±0.5pF N750 750V		C47XH75/F14
C 9	2—10 pF	Pre-set	FM oscillator trimmer	Z13903
C10	10 pF	±0.5pF P100 750V	FM oscillator balancing	C100H75/F13
C11	85 pF	2.5%	FM mixer IF feedback	Y85OR35/SU4
C12	25 pF	5%	V1B anode coupling	
C13	1000 pF	−20%+80%	V1 heater RF bypass (C13, C14)	
C14	1000 pF	−20%+80%		
C15	500 pF	500V	AM aerial isolating	
C16	.02uF	150V	AGC decoupling	
C17	20 pF	5%	L7 tuning	
C18	220 pF	750V	V2 IF coupling (FM)	
C19	220 pF	750V	V2 signal coupling (AM)	
C20	3000 pF	5%	AM aerial coupling	
C21	528 pF†	Variable	AM aerial tuning	Z25115
C22	4—40 pF	Pre-set	MW aerial trimmer	Z13920
C23	165 pF	5%	LW aerial trimmer	S/N45753
C24	5000 pF		V2 HT decoupling & neutralizing (C24, C25)	
C25	5000 pF			
C26	500 pF	500V	IF bypass	
C27	220 pF	750V	V2 osc. anode coupling	
C28	100 pF	750V	V2 osc. grid coupling	
C29	4—40 pF	Pre-set	MW oscillator trimmer	Z13920
C30	528pF†	Variable	AM oscillator tuning	Z25115
C31	375 pF	2%	LW oscillator trimmer (C31, C32)	45752
C32	4—40 pF	Pre-set		Z13920
C33	390 pF	2%	AM oscillator padder	Y391R35
C34	12 pF	5%	L12 tuning	
C35	15 pF	5%	L13 tuning	
C36	220 pF	2%	L14 tuning	
C37	220 pF	2%	L15 tuning	
C38	5000 pF		V3 HT decoupling and neutralizing (C38, C39)	
C39	5000 pF			
C40	220 pF	2%	L16 tuning	
C41	220 pF	2%	L17 tuning	
C42	12 pF	5%	L18 tuning	
C43	47 pF	5%	L19 tuning	
C44	100 pF	750V	Part IF filter (AM)	
C45	400 pF	10%	Part IF filter (FM) (C45, C46)	
C46	400 pF	10%		
C47	.02 uF	150V	Audio coupling (FM)	
C48	500 pF	500V	FM de-emphasis	
C49	4 uF	Electro. 100V	Ratio detector stabiliser	Z13210
C50	.02 uF	150V	V4 grid coupling	
C51	.01 uF	150V	V5 CG coupling	
C52	2000 pF		Part tone control	
C53	.004 uF	350V AC	Tone correction	
C54	32 uF	Electro. 275V (C54–C56)	HT smoothing & reservoir	Z13200
C55	40 uF			
C56	40 uF			
C57	50 uF	Electro. 25V	V5 cathode bias	Z13202
C58	2500 pF	−20%+80%	V4 heater bypass	
C59	.02 uF	350V	AC mains RF bypass	
C60	3900 pF		Pick-up shunt	
C61	10 pF	5%	Phase correction	
C62*	.01 uF	5% 150V	V6 grid decoupling	

* 601RG only.

† Swing value.

MISCELLANEOUS

Ref.	Function and Description	Part No.
LS	(389RG) 8" diameter, PM, 3Ω speech coil	Y16003/10
LS	(601RG) 9" x 5" elliptical, PM, 3Ω speech coil	Y16016/1
PL1, PL2	Pilot lamps, 6.5V, 0.3A.	33755
S1—S6	Piano-key switch assembly	X25149
W1	HT rectifier	Z10508

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	Rating	Function	Part No.
R 1	680 KΩ		V1A grid leak	
R 2	680 KΩ		V1B grid leak	
R 3	10 KΩ	10%	V1A anode feed	
R 4	15 KΩ	10%	V1B anode feed	
R 5	3.3 KΩ		AM aerial shunt	
R 6	2.2 MΩ		V2 hep. grid leak	
R 7	47 KΩ	10%	V2 SG HT feed	
R 8	27 KΩ	10%	V2 osc. anode load	
R 9	47 KΩ	10%	V2 osc. grid leak	
R10	3.3 KΩ		V2 hep. anode feed	
R11	47 KΩ	10%	V3 SG HT feed	
R12	3.3 KΩ		V3 anode HT feed	
R13	68 Ω		L20 series	
R14	100 KΩ		IF filter (AM)	
R15	33 Ω		V3 negative feedback	
R16	2.2 MΩ		AGC decoupling	
R17	100 KΩ		FM de-emphasis and IF filter	
R18	330 Ω	10%	Ratio detector load (R18, R19)	
R19	27 KΩ	10%		
R20	6.8 MΩ		V4 triode grid leak	
R21	1 MΩ	Log. Pot.	Volume control	Z13069/1
R22	220 Ω	10%	Negative feedback injection	
R23	220 KΩ		V4 triode anode load	
R24	470 KΩ		V5 grid leak	
R25	500 KΩ	Log. Pot.	Tone control	Z13069/5
R26	4.7 KΩ		V5 grid stopper	
R27	150 Ω	10% ½ W.	V5 cathode bias	
R29	10 KΩ	10%	Tone correction	
R30	680 Ω	10% ½ W.	HT smoothing (R30, R31)	
R31	820 Ω	10% 1 W.		
R32	3.3 KΩ		Negative feedback series	
R33*	2.2 MΩ		Tuning indicator feed (AM)	
R34*	6.8 MΩ		Tuning indicator feed (FM)	
R35*	470 KΩ		V6 anode load	

* 601RG only.

INDUCTORS AND TRANSFORMERS

Ref.	Function and Description	Part No.
L 1, L 2	VHF aerial input transformer	Z10475
L 3	VHF amplifier tuning	
L 4	VHF oscillator tuning	
L 5	VHF oscillator feedback	
L 6, L 7	1st FM IF transformer	Y10474
L 8	LW loading	Y25154
L 9	Ferrite-rod aerial	Y25424
L10	AM oscillator tuning	Y25153 (L10, L11)
L11	AM oscillator feedback	
L12, L13	2nd FM IF transformer	X25651 (L12–L15)
L14, L15	1st AM IF transformer	
L16, L17	2nd AM IF transformer	X25144 (L16–L20)
L18, L19, L20	Ratio detector transformer	
T 1	Audio output transformer	Z14586
T 2	Mains transformer	Y17020

6. VOLTAGE AND CURRENT MEASUREMENTS

Measurements were taken with a Model 8 Avometer on a number of receivers and the figures given are an average. The receivers were switched to MW with the gang fully open for the AM readings.

For an input of 225V AC the 220-230 tap was used, and the Avometer switched to 1,000V range wherever practicable.

6.1. GENERAL MEASUREMENTS

	AM	FM
Total HT current	64mA	75mA
HT voltage (unsmoothed)	270V	267V
HT voltage (1st section smoothing)......	247V	237V
HT voltage (2nd section smoothing)	232V	222V

6.2. AM VALVE MEASUREMENTS

Ref.	Valve Type		Anode Volts	Anode mA	Screen Volts	Screen mA	Cathode Volts
V1	ECC85		—	—	—	—	—
V2	ECH81	Heptode	226	1.5	55	3.6	—
		Triode	95	—	—	—	—
V3	EF89		198	8.2	95	3	0.7
V4	EABC80		80	0.7	—	—	—
V5	EL84		260	37	232	4.3	6.4

6.3. FM VALVE MEASUREMENTS

Ref.	Valve Type		Anode Volts	Anode mA	Screen Volts	Screen mA	Cathode Volts
V1	ECC85	A	134	6.5	—	—	—
		B	152	4	—	—	—
V2	ECH81	Heptode	190	5	60	3	—
		Triode	—	—	—	—	—
V3	EF89		183	8	8.5	3	0.7
V4	EABC80		76	0.7	—	—	—
V5	EL84		255	35	222	3.7	5.8

7. MECHANICAL DETAILS

7.1. REMOVING THE CHASSIS

The cabinet back should first be removed, and loudspeaker, pick-up, and aerial and earth plugs disconnected from their sockets. Free the ferrite-rod aerial from its mounting bracket and disconnect the mains lead to the record-changer at the terminal block provided.

On Model 601RG it is also necessary to release the tuning indicator from its retaining spring.

The chassis is secured by four self-tapping screws and when these are freed, it may be withdrawn complete with scale and all control knobs. (Access is obtained from the front of the cabinet to two of the 389 RG chassis securing screws, these being located in the roof of the record compartment.)

7.2. AM DRIVE CORD REPLACEMENT

Allow 4 ft. 3 in. of nylon braided cord and starting with the tuning gang fully open, proceed as follows :—

Knot one end of the cord and anchor in the slot provided in the drive drum at the end nearest the gang. Wind the cord one turn in a clockwise direction round the drum and continue as shown in the accompanying diagram. Before winding the final turns round the drum, ensure that the tensioning pulley is exerting tension on the cord. When the winding is completed, the end of the cord must be secured round the moulded peg in the top of the drum and tucked into the groove provided. A little cellulose adhesive should be applied to the two turns round the peg.

With the gang fully closed, fit the cursor so that it is aligned with the markers at the right-hand end of the scale with its tip riding on the outside of the guide loop.

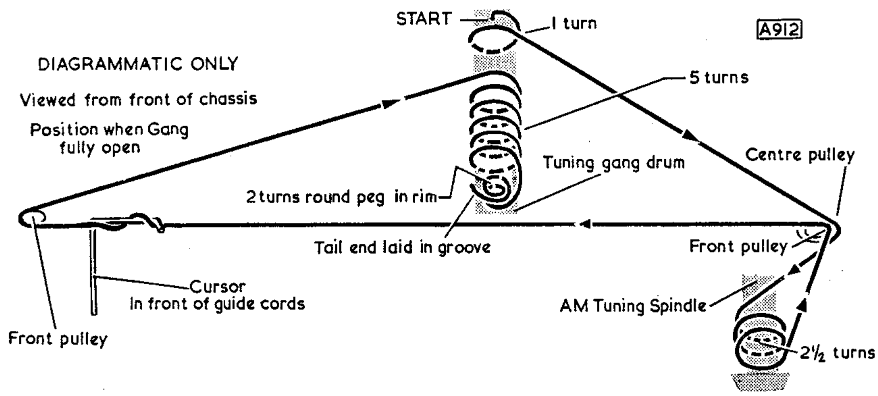


Fig. 6. The arrangement of the AM Drive Cord.

7.3. FM DRIVE CORD REPLACEMENT

Cursor Drive. Allowing 4 ft. 3 in. of nylon braided cord, tie one end to the self-tapping screw in the FM drive drum. Arrange the cord as shown in the diagram, finishing with one complete turn round the drum. Attach the tension spring to the end of the cord and anchor to the peg moulded in the drum so that the cord is under sufficient tension to ensure that the drive is free from any backlash.

With the tuning spindle fully anti-clockwise, fit the cursor so that it is aligned with the marker at the left-hand end of the scale with its tip riding within the guide loop.

Tuner Drive. The arrangement of the tuner unit drive cord is clearly shown in the diagram, but the following points should be noted :—

If a replacement cord is required, fit service replacement Z17223 which comprises a length of cord with tuning slugs already fitted. Difficulty will otherwise be found in fitting the slugs to a length of cord with sufficient accuracy to ensure satisfactory tracking.

The tuning cores must be inserted with the closed and open ends of the cores in their correct positions as indicated in the diagram.

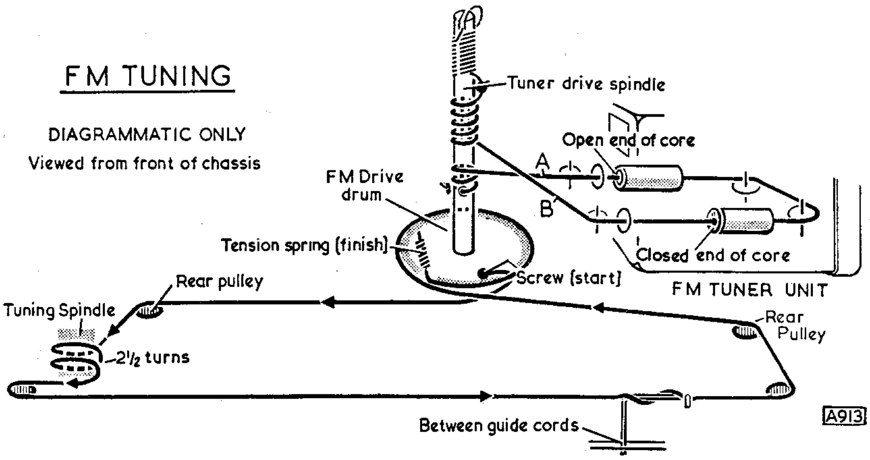


Fig. 7. The arrangement of the FM Drive Cord.

Check that the cursor is correctly positioned on the cursor drive cord and untie the knot in cord " A ", preparatory to threading it through the hole in the FM drive spindle. The cord should then be re-knotted 1 in. beyond the spindle when cord " B " is pulled out to its limit. Pull the knot up against spindle and, with the drum locking screw slackened off to allow the spindle to be rotated separately, turn the spindle clockwise to take up any slack.

Attach the tension spring to cord " B " at approximately 4 in. from the tuner unit pulley. Tighten up the drive drum locking screws and rotate the tuning control one turn clockwise. Cord " B " may then be wound round the tuner drive spindle in an anti-clockwise direction and the tension spring anchored in the slot in the spindle as shown in the diagram. The cord must be under sufficient tension to ensure freedom from backlash.

The unit should then be re-aligned as described in *RF Alignment (FM)*. After alignment, check that at extremes of cursor sweep, at least one turn of cord remains around the spindle.

7.4. STYLUS REPLACEMENT

To replace worn stylus, slacken screw at rear of stylus—do not attempt to remove screw—one turn being sufficient to slacken. Ease stylus out in a forward direction. The LP stylus (coloured red) should be replaced with type TC8R. The 78 r.p.m. stylus (coloured green) should be replaced with type TC8G.

8. SPARE PARTS MECHANICAL

DESCRIPTION	PART No.
Aerial Adjusting Ring (MW)	Z10566
Aerial Plug (FM)	Z9291
Cabinet (389)	V17811
Cabinet (601)	V18178
Cabinet Back (389)	N25605
Cabinet Back (601)	N25622
Control Knob (Tuning)	Z17007/1
Control Knob (Tone, Volume)	Y25157
Control Knob Clip	45931
Drive Drum (AM)	Z10483
Drive Drum Spring Clip	37309
Drive Drum Cord Tensioning Spring	Z10486
Drive Drum (FM)	W17032
Drive Drum Cord Tensioning Spring	Z9528
Drive Drum Torsion Spring	Z17257
Loudspeaker Plug	Z4450/3
Mains Transformer Adjustment Plug	Z6802
Pilot Lampholder	Z13305/2
Scale (389)	N25600
Scale (601)	N25571
Scale Clip	37330
Scale Cursor (AM)	Z25126
Scale Cursor (FM)	Z25127