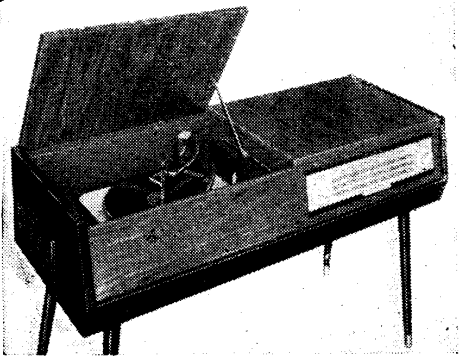


"TRADER" SERVICE SHEET
1521

ALBA 6301 & 6401

Radiograms for Operation On A.C. Mains Supply



Appearance of the Alba 6401

be replaced by an external F.M. aerial using the same input sockets. Two extra sockets are provided for the connection of an external A.M. aerial and earth. The chassis is designed to operate from A.C. mains supply only of 190-260V.

Two identical audio channels are used for playing stereophonic recordings which drive speakers mounted one on each side of the

cabinet. The volume of each channel is adjustable independently to achieve balance, but the controls are friction-coupled so that after balance is obtained, the operation of one knob controls the volume from both channels. For radio reception or playing monaural recordings, the two audio channels operate in parallel.

Release dates and original prices: 6301

ALBA models 6301 and 6401 are A.M./F.M. stereophonic radiograms incorporating the BSR UA14 automatic record player. They are dissimilar only in appearance and in the size of the speaker units employed. Waveband ranges are 87-100Mc/s (F.M.), 194-550m (M.W.) and 1,100-2,000m (L.W.). Waveband and gram changeover switching is by means of a four-position, press-button unit.

A ferrite rod aerial is provided for A.M. reception and a built-in dipole, comprising a metal foil strip for one arm and the gram compartment lid hinge for the other arm, is terminated in a plug for connection to the F.M. aerial sockets. The built-in dipole may

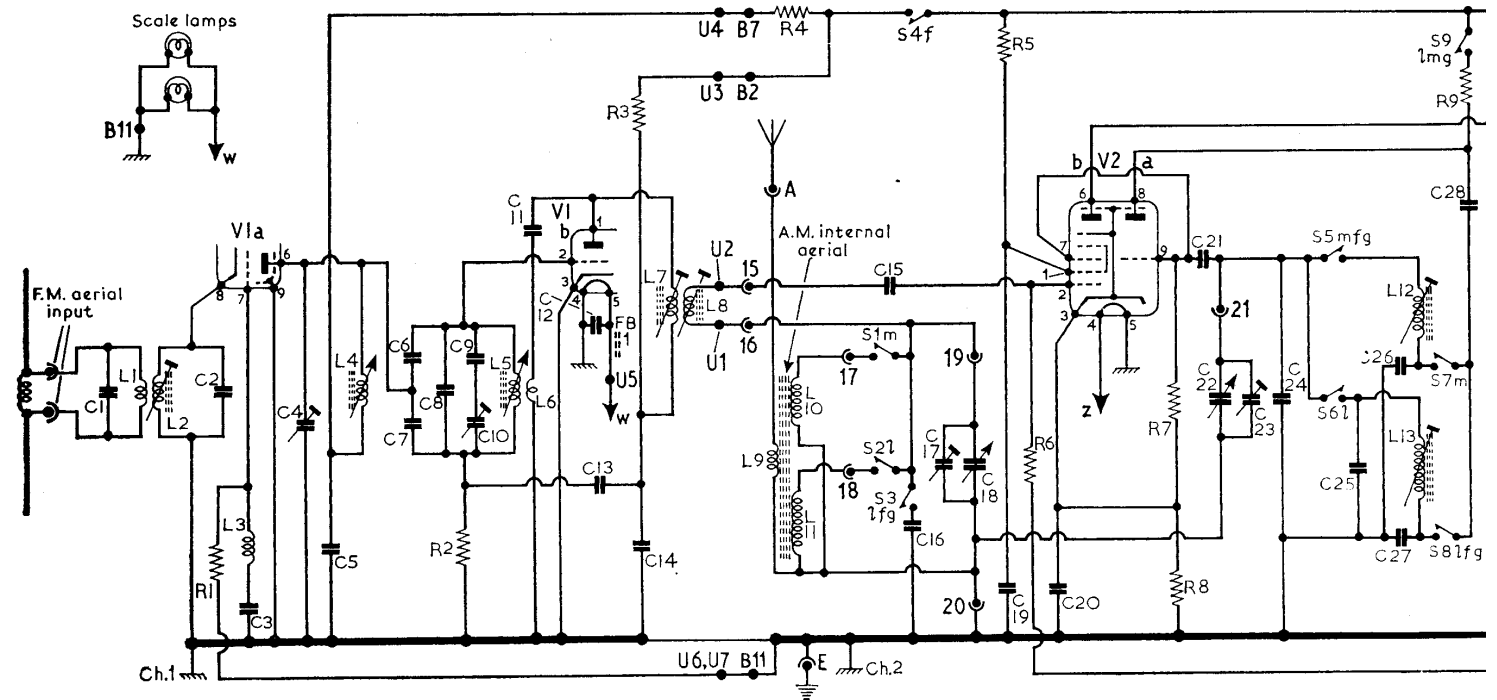
Resistors

R1	270kΩ	F4
R2	1MΩ	F5
R3	22kΩ	F4
R4	10kΩ	C1
R5	22kΩ	B1
R6	1MΩ	B2
R7	100kΩ	B2
R8	150Ω	B2
R9	33kΩ	B1
R10	470Ω	C1
R11	82kΩ	C1
R12	470Ω	C2
R13	27kΩ	C2
R14	100kΩ	C1
R15	1MΩ	C2
R16	330kΩ	C1
R17	10kΩ	C1
R18	500kΩ	A1
R19	10MΩ	C1
R20	500kΩ	A1
R21	10MΩ	D1
R22	220kΩ	C1
R23	220kΩ	D1
R24	680kΩ	C2
R25	680kΩ	C2
R26	10kΩ	C2
R27	10kΩ	C2
R28	130Ω	C2

Capacitors

C1	45pF	F5
C2	15pF	F5
C3	0.001μF	F5
C4	—	F4
C5	0.001μF	F4
C6	10pF	F5
C7	13.5pF	F5
C8	12.5pF	F5
C9	8.2pF	F5
C10	—	F4
C11	23pF	F5
C12	0.001μF	F5
C13	8pF	F5
C14	75pF	F5
C15	100pF	B2
C16	138pF	B1
C17	—	B2
C18	—	B1

C19	0.05μF	B1
C20	0.05μF	B2
C21	50pF	B1
C22	—	B1
C23	—	B2
C24	15pF	B1
C25	193pF	B1
C26	481pF	C1
C27	238pF	C1
C28	0.001μF	B1
C29	0.05μF	B2
C30	200pF	B2
C31	200pF	B2
C32	12pF	B2
C33	0.01μF	C2
C33a	0.1μF	C2
C34	0.01μF	C2
C35	30pF	C2
C36	47pF	C2
C37	200pF	C2
C38	200pF	C2
C39	100pF	C2
C40	500pF	C2
C41	0.002μF	C1
C42	0.005μF	C1
C43	4μF	C1
C44	0.1μF	C1
C45	0.01μF	C1
C46	0.01μF	C1



Circuit diagram of Alba models 6301 and 6401 stereophonic radiograms. On F.M., V2a is inoperative and V2b becomes fed to V2 which operates as a normal frequency changer stage. The two audio channels are identical.

August 1959 £57 4s 9d, 6401 March 1960 £51 13s 4d. Purchase tax extra.

VALVE ANALYSIS

Valve voltages given in the table col. 5 were derived from information supplied by the manufacturer. They were measured on the 400V and 10V ranges of a model 7 Avometer.

CIRCUIT DESCRIPTION

Operation on F.M.—R.F. transformer L1, L2 couples the signal from the F.M. aerial to the cathode of V1a which operates as R.F. amplifier. Coupling from V1a output to V1b grid forms a bridge circuit to prevent oscillator radiation. Coils L4 and L5 are permeability tuned and their cores are mechanically coupled to the main tuning gang. V1b

Valve Table

Valve	Anode (V)	Screen (V)	Cathode (V)
V1 ECC85	140§	—	—
V2a ECH81	230Δ	—	—
V2b ECH81	144	—	—
V3 EBF89	240	115	1.9
V4 EB91	230	105	1.8
V5 ECC83	240	80	—
V6 EL84	230	63	—
V7 EL84	—	—	—
V8 EZ81	252	250	6.9
	247	238	6.35
	252	250	6.9
	247	238	6.35
	—	—	306
	—	—	302

operates as first I.F. amplifier on F.M.; triode section V2a is inoperative. V3 is the second I.F. amplifier on F.M. and has the discriminator transformer L18, L19 and L20 connected in its anode. V4 a and b are the ratio detector diodes and the rectified audio output is developed across load capacitor C40.

After de-emphasis by R13 and C41 it is passed via C44 to the volume controls R18 and R20.

Operations on A.M.—Signals on M.W. and L.W. are coupled from the ferrite rod tuning coils L10 and L11 via C15 to the mixer grid V2 which now operates as frequency changer. S9 is closed and the triode section V2a, tuned by L12 (M.W.) and L13 (L.W.), generates the heterodyne signal. The intermediate frequency signal at 470Kc/s is developed across I.F. transformer primary L14 and via L15 is applied to the control grid of I.F. amplifier V3.

The detector diode in V3 is connected in the secondary winding of tuned-transformer L21, L22 and the audio is developed across load resistor R16. Coupling to the volume controls is again via C44.

Audio.—The two audio channels are identical and on radio reception or monaural recordings, operate in parallel. On radio, both volume controls receive the output from either the A.M. or F.M. detector which is then amplified by V5a (V5b) whose output is coupled to V6 (V7) which drives the left-

(Continued overleaf, col. 1)

C47	0.02μF	C1	L4	—	F5
C48	0.02μF	C2	L5	—	F5
C49	100μF	C1	L6	—	F5
C50	100μF	D1	L7	—	F5
C51	4,700pF	D2	L8	—	F5
C52	4,700pF	D2	L9	—	D2
C53	0.05μF	D1	L10	1.0	D2
C54	0.05μF	D1	L11	4.0	D2
C55	0.25μF	D1	L12	4.0	B1
C56	0.25μF	D1	L13	9.0	B1
C57	50μF	E3	L14	10.5	B2
C58	50μF	E3	L15	10.5	B2
C59	50μF	E3	L16	0.5	B2
			L17	0.75	B2
			L18	0.4	C2
			L19	0.25	C2
			L20	—	C2
			L21	10.5	C2
			L22	10.5	C2
			L23	3.0	—
			L24	3.0	—

Transformers*		
T1	f a 375.0	D2
	b 0.25	
T2	f a 375.0	D2
	b 0.25	
T3	f a 75.0	E3
	b 75.0	
	c 13.5	

Coils*		
L1	—	F5
L2	—	F5
L3	—	F5

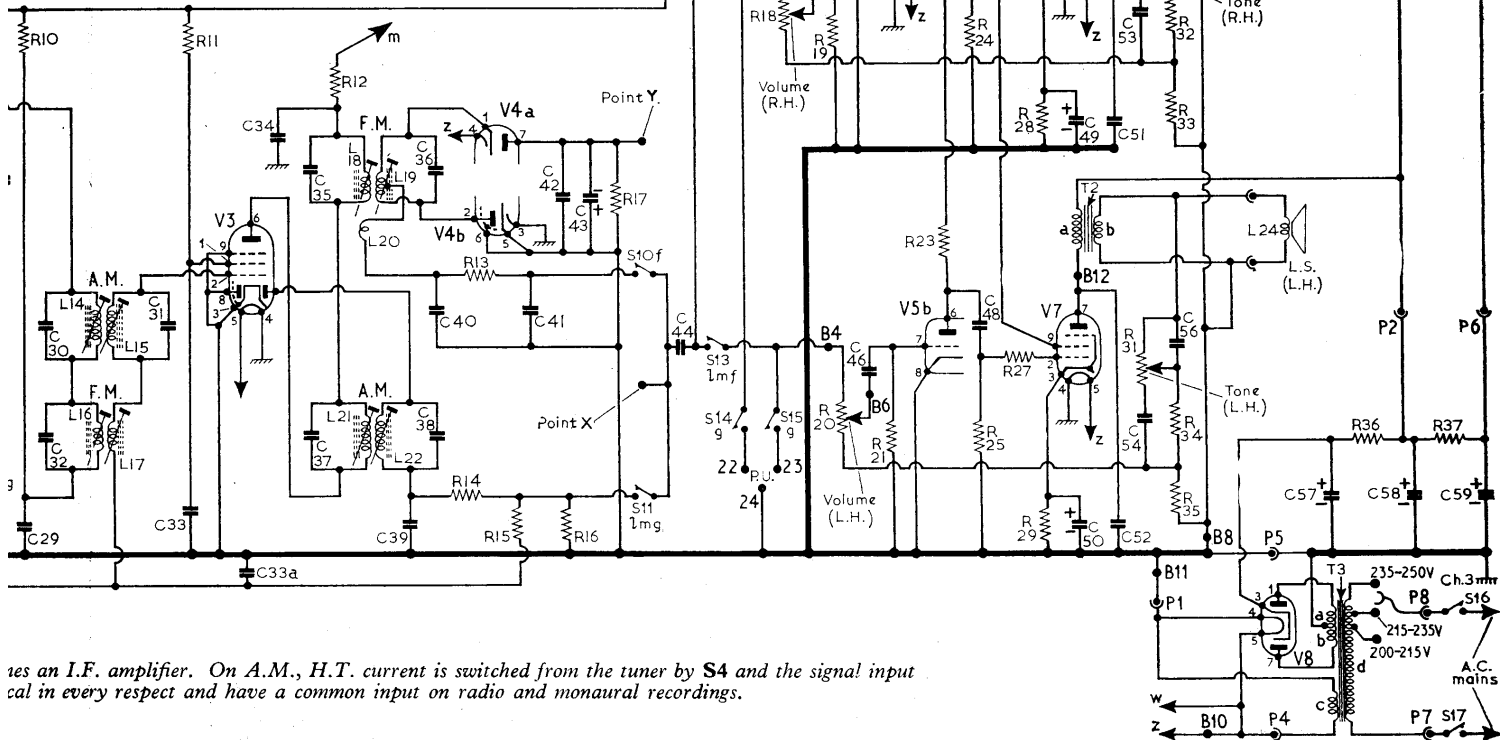
Miscellaneous		
FB1	—	F5
S1-S15	—	C1
S16, S17	—	D1

*Approximate D.C. resistance in ohms

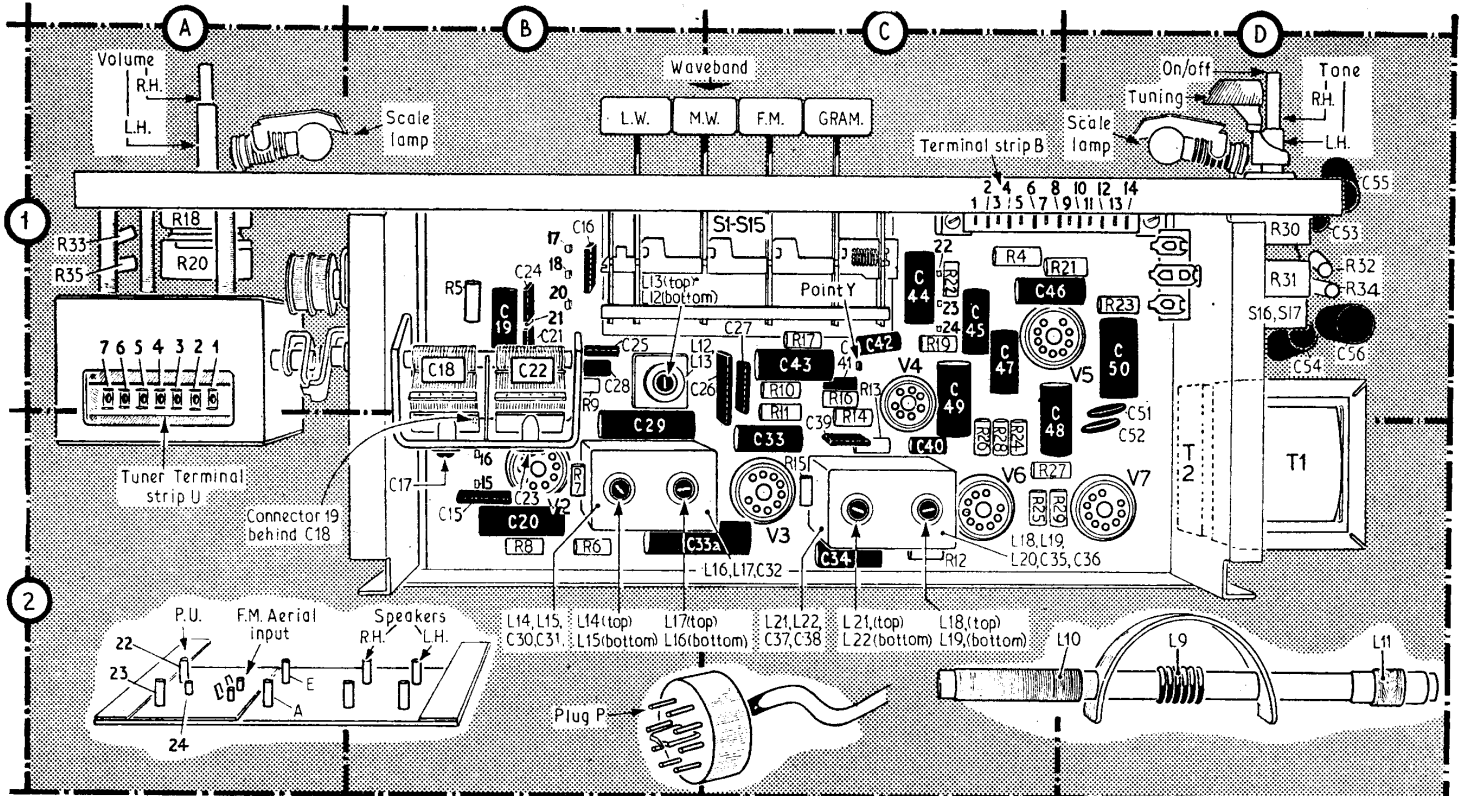
*Receiver switched to A.M.
 †Receiver switched to F.M.
 §Measured at point U4.
 ‡Measured at point U3.
 †No readings given.

operates as a self oscillating mixer, the components C6, C7, C8, C9, C10 and L5 comprising the oscillator tuned circuit. Inductive feedback coupling from anode to grid is provided by C11 and L6.

The resultant intermediate frequency which appears in V1b anode is at 10.7Mc/s and is passed by I.F. transformer L7, L8 to the control grid of V2b. Heptode section V2b



uses an I.F. amplifier. On A.M., H.T. current is switched from the tuner by S4 and the signal input is identical in every respect and have a common input on radio and monaural recordings.



Plan view of the chassis. The F.M. tuner unit is shown in location A1, with its terminal strip numbered as in the circuit diagram. Plug P connects the main chassis to the power unit. The ferrite rod aerial (D2) is shown to the right of its correct position.

Circuit Description—continued

hand (right-hand) speaker. Tone controls R30 and R31 are ganged.

With a monaural recording, an identical signal is received at points 22 and 23 from the pickup. When a stereophonic recording is played the two separate cartridge elements are energized independently by the two signals which are present in the record groove. The two pickup inputs are fed in at points 22 and 23 and operate the right-hand and left-hand audio channels respectively.

CIRCUIT ALIGNMENT

Equipment Required.—An A.M. signal generator 30 per cent modulated at 400c/s and capable of being switched to C.W.; an output meter with an impedance of 3 ohms; a 3 ohm dummy load resistor; a 0.50 μ A meter with a 100k Ω resistor in series; a 0.01 μ F capacitor; a non-metallic screwdriver trimming tool and a hexagonal trimming tool for the tuner I.F. coils.

A.M. Alignment

First check that both audio channels are operating correctly, then connect the output

meter in place of one speaker speech coil and the 3 ohms dummy load in place of the other. Set both volume controls to maximum and the tone controls fully clockwise.

Input from the signal generator should be maintained as low as possible to prevent A.G.C. action. Where two peaks occur, the one with the core nearer to its end of the former is correct.

- 1.—Switch to M.W. and fully mesh the tuning gang. Connect the signal generator between tag 2 on the tuner terminal strip U and chassis (location reference A1). Short-circuit the oscillator section C18 of the tuning gang.
- 2.—Feed in a 470kc/s modulated signal and adjust the cores of L14, L15 (B2) and L21, L22 (C2) for maximum output. Repeat these adjustments until no further improvement can be obtained.
- 3.—Check that with the tuning gang fully meshed the shorter leg of the cursor lines up with the extreme L.H. hole in the scale backing plate. The shorter leg of the cursor is used for calibration in conjunction with holes punched into the scale backing plate. Disconnect the signal generator from the tuner terminal strip and connect it across coupling coil L9 on the ferrite rod. Remove the short-circuit from C18.
- 4.—Set the cursor to the second hole from the left (500m), feed in a 600kc/s signal and adjust L12 (B1) and L10 (C2) for maximum output. Adjust L10 by sliding its former along the ferrite rod.

Note: On M.W. and L.W. R.F. alignment the tuning of oscillator coils L12 (M.W.) and L13 (L.W.) should be re-checked after each adjustment to their respective aerial coils.

- 5.—Set the cursor to the extreme R.H. calibration hole (200m). Feed in a 1,500kc/s signal and adjust C23 and C17 on the tuning gang unit (C2) for maximum output.
- 6.—Re-check calibration at 200m and 500m and repeat operations 4 and 5 if necessary.
- 7.—Switch to L.W. and set the cursor to the third calibration hole from the left (1,500m). Feed in a 200kc/s signal and

adjust L13 (B1) and L11 on the ferrite rod for maximum output.

- 8.—Disconnect the signal generator and check that the calibration is correct with the receiver tuned to the B.B.C. Light programme at 1,500m.

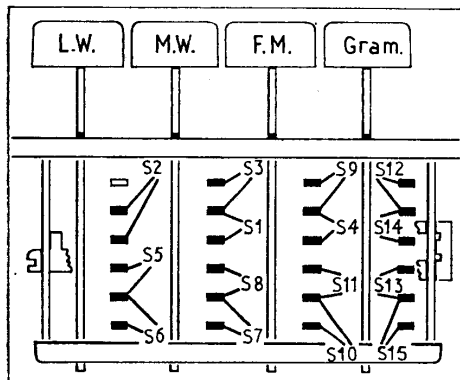
F.M. Alignment

- 1.—Connect the signal generator between tag 2 on the tuner terminal strip and chassis. Connect the 0.50 μ A meter in series with the 100k Ω resistor between point Y (C1) and chassis (meter nearest to chassis).
- 2.—Feed in a 10.7Mc/s unmodulated signal and adjust the cores of L16, L17 (B2) and L18 (C2) for maximum output on the μ A meter. Note the reading obtained.
- 3.—Connect the μ A meter and resistor between S10 (point X) and chassis and adjust the core of L19 (C2) to give a reading which is half that obtained in operation 2.
- 4.—Repeat operations 2 and 3.
- 5.—Connect the signal generator via the 0.01 μ F capacitor to tag 4 on the tuner terminal strip U. Reconnect the meter and resistor to point Y. Feed in 10.7Mc/s unmodulated signal and adjust L7 and L8 (F5) for maximum output.
- 6.—Rotate the tuning gang to minimum capacitance and check that the grub screw on the tuner spindle rests against the front stop. Tune the receiver to a local station and check that the calibration is reasonably accurate. An error of plus or minus $\frac{5}{16}$ in is permissible. Adjust C4 and C10 (F4) if necessary.

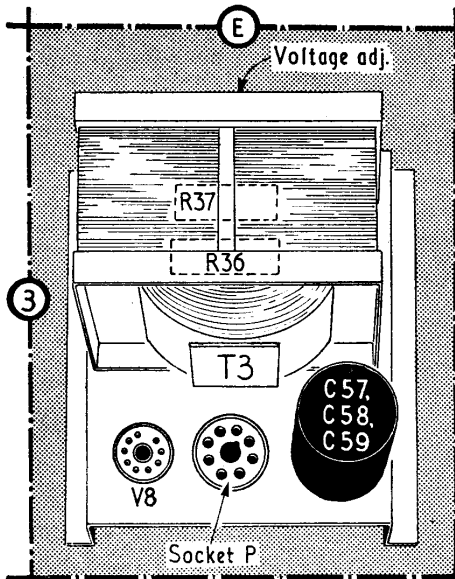
GRAM UNIT

The gram unit is the BSR UA14 four-speed automatic record changer with a TC8S stereo cartridge. Stylus types are TC8G (78 r.p.m.) and TC8RS (L.P.).

Pickup Arm Adjustments.—The pickup arm fitted to the BSR UA14 record changer may be adjusted for dropping position, height and stylus pressure. To assist in identifying the adjustments, a sketch of part of the pickup arm is shown in col. 4 where it is drawn as seen when viewed from the front of the record changer unit with the pickup arm in its raised position.



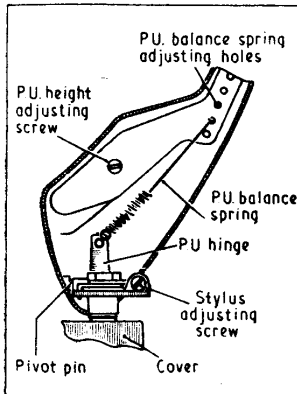
The press-button switch contacts as seen from the same angle as the chassis illustration above.



The power unit and smoothing components as seen from above.

Stylus Dropping Position.—The dropping position of the stylus on the record is adjusted by means of the stylus adjusting screw which is located at the pivot end of the pickup arm as shown in the sketch below. Access to the screw is obtained by raising the pick-up arm. Using a stack of 10in records, adjust the stylus to drop $\frac{1}{16}$ in from the edge of the record. When this adjustment is correct for 10in records, the dropping positions for 12in and 7in are also correct.

Pick-up Arm Height.—The pickup arm



A view of part of the B.S.R. pick-up arm drawn as seen from the front of the gram unit with the arm in its raised position.

height should be adjusted so that with a stack of 10 average thickness records on the turntable, the point of the stylus clears the top record by $\frac{1}{16}$ in. Turning the pickup height adjusting screw clockwise will raise the stylus, turning it anti-clockwise will lower the stylus.

Stylus Pressure.—Stylus pressure may be adjusted by repositioning the pickup balance spring in one of the various adjusting holes which are provided.

GENERAL NOTES

Dismantling (6301).—Remove the centre cabinet back cover (two screws). Pull out the aerial, pickup and loudspeaker plugs from the socket panel and remove the two screws securing the panel to the cabinet.

Remove the right-hand back cover. Take out the octal plug P from the power unit and pass it through the hole in the cabinet to the main chassis compartment. Open the door at the front of the cabinet

and remove the two screws securing the chassis from beneath.

Pull off the four front control knobs. Withdraw chassis complete with socket panel and power plug, from the rear.

To withdraw the power unit, remove four self tapping screws securing it to the cabinet bottom.

Dismantling (6401).—Slacken the two back cover clips and remove back cover.

Pull out the aerial, pickup and loudspeaker plugs from the socket panel and remove the two screws securing the panel to the cabinet.

Remove four bolts securing the power unit to the cabinet, withdraw the power unit and pull out the octal plug P connecting it to the chassis.

Pull off four front control knobs.

Remove two chassis securing screws from beneath the cabinet and withdraw the chassis and socket panel from the rear.

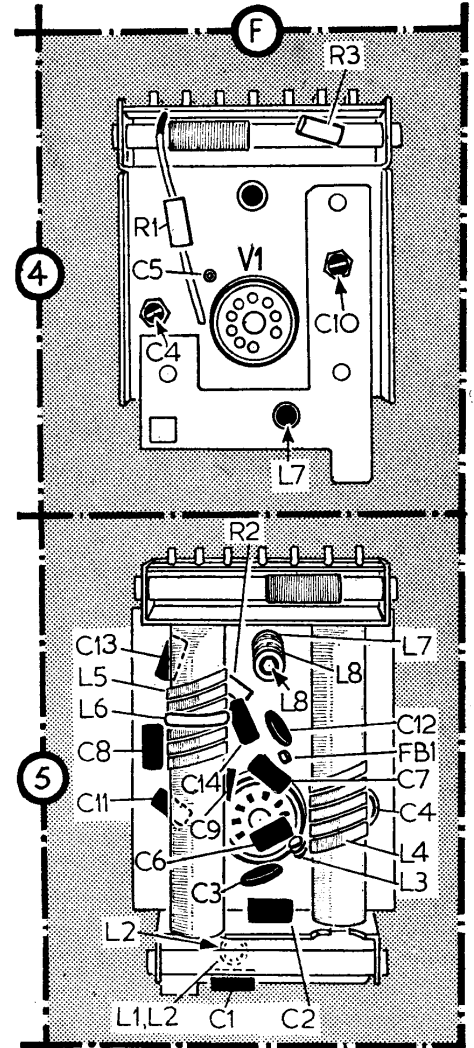
Balancing the Audio Channels.—For stereophonic reproduction the two volume controls should be correctly balanced. The two controls are friction coupled (the "outer" control knob binds on the "inner" control spindle) and to adjust one channel in relation to the other, one knob should be held while the other is rotated. Adjustment for balance should be made using a non-stereo recording to give the effect of the sound emanating from the centre of the radiogram.

Scale Lamps.—Two scale lamps are wired in parallel with the valve heaters. They are 6.5V 0.3A round M.E.S. fitting.

Drive Cord Replacement.—About 48ins of nylon braided glass yarn is required for a new drive cord. Fully mesh the tuning gang. Tie one end of the cord to the tension spring and anchor the spring to the screw in the scale backing plate located near the bottom right-hand small pulley. Take the free end of the cord across the scale backing plate passing below the press-button keys and over the lower left-hand small pulley.

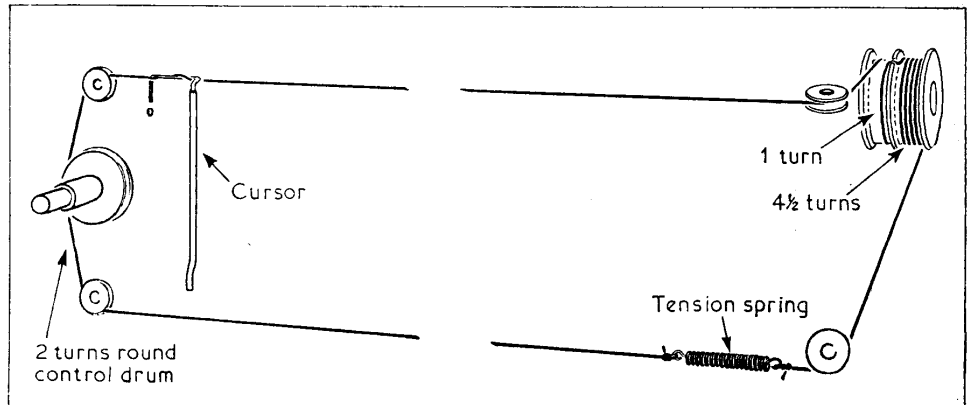
Make two turns clockwise round the control drum and continue over the upper left-hand small pulley, across the top of the scale backing plate, round the upper right-hand small pulley to the brass drive drum. The drive drum is made in two sections. When the tuning gang is fully meshed the opening in the centre partition of the drum should be at the top, as shown in our diagram below. Make one turn clockwise in the left-hand (inner) section, pass the cord through the opening and then make $4\frac{1}{2}$ turns clockwise in the right-hand (outer) section.

Lead away from the drive drum through the scale backing plate round the lower right-hand small pulley and tie the end of the cord to the other end of the tension spring. Remove the tension spring from its temporary anchorage. Attach the cursor to make its small end line up with the extreme left-hand hole in the scale backing plate.



Rear (upper) and front (lower) views of the F.M. tuner unit.

Switches.—S1-S15 are the waveband and "Gram" changeover switches. They are housed in a four-position interlocking press-button unit shown in location reference C1. A diagram is given in col. 1. In the circuit diagram, suffix letters l, m, f and g included in the switch numbers mean respectively L.W., M.W., F.M. and "Gram" and indicate, in individual cases, the position in which the switch is closed. S16 and S17 are mains on/off switches which are ganged with the tone controls.



Drawing of the scale drive assembly as it appears when the tuning gang is at maximum