

Specification

TAPE DECK : Thorn type DB42

TAPE SPEEDS : $3\frac{1}{2}$ and $1\frac{1}{2}$ in/sec

WOW AND FLUTTER : Better than 0.2% RMS

MAXIMUM SPOOL SIZE : $5\frac{1}{2}$ inch

PLAYING TIME (four tracks) :

Long play tape (1,200ft) :

4 hours at $3\frac{1}{2}$ in/sec, 8 hours at $1\frac{1}{2}$ in/sec

Double play tape (1,800ft) :

6 hours at $3\frac{1}{2}$ in/sec, 12 hours at $1\frac{1}{2}$ in/sec

FAST WIND TIME : $2\frac{1}{2}$ minutes, in either direction, for 850 feet of tape

POWER SUPPLY : 200-250 volts AC 50 c/s

POWER CONSUMPTION : 60 watts

AUDIO OUTPUT POWER : 3 watts speech and music

FREQUENCY RANGE : 60—10,000 c/s ($3\frac{1}{2}$ in/sec)
60—6,000 c/s ($1\frac{1}{2}$ in/sec)

SIGNAL TO NOISE RATIO : 40db

POSITION INDICATOR : Digital type with reset button

MAGNETIC HEADS : Standard quarter-track (stacked)
one Record/Play, one Erase

INPUT SOCKETS : Microphone (MIC) 1.5mV into $10M\Omega$; radio (RAD) 1.5V into $68K\Omega$, and pickup (PU) 75mV into $3.3M\Omega$

OUTPUT SOCKETS : Low level (RAD) 500mV at $22K\Omega$, and external loudspeaker 3 watts at 3Ω . Note: When the latter is used, the internal loudspeaker is automatically muted

AUXILIARY SOCKET : See inside page for details

DIMENSIONS (overall) :

2210— $14\frac{1}{8}$ in. x $12\frac{1}{2}$ in. x $7\frac{1}{8}$ in. approx.

6208— $14\frac{3}{8}$ in. x $12\frac{3}{4}$ in. x $7\frac{1}{4}$ in. approx.

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

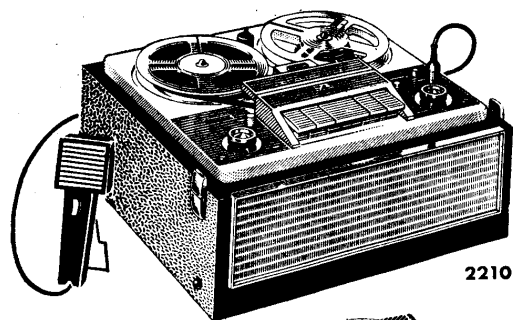
BRC

BRITISH RADIO CORPORATION LIMITED

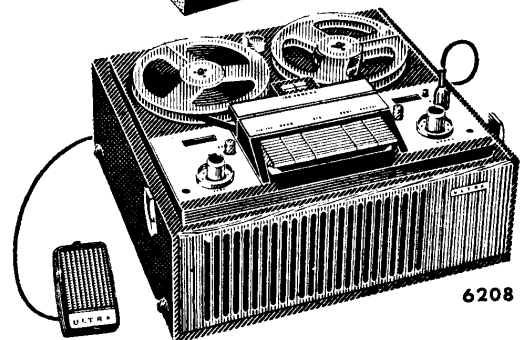
service manual

Price: One Shilling & Sixpence

HMV 2210 & ULTRA 6208



2210



6208

2-SPEED 4-TRACK RECORDERS

For servicing information on the tape deck please refer to the Thorn DB42 Tape Deck 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

BRITISH RADIO CORPORATION LTD

SERVICE DEPOTS

LONDON: Eley's Estate, Angel Rd., Edmonton, N.18
Tel: EDM 3060

Ansafone Spares Ordering Service
Tel: EDM 6332

BIRMINGHAM: 24 Sheepcote St., 15. Tel: Midland 5291

GLASGOW: 160/162 Battlefield Rd., S.2.
Tel: Langside 9251/2/3/4

Replacement Parts

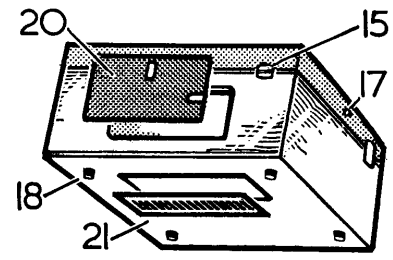
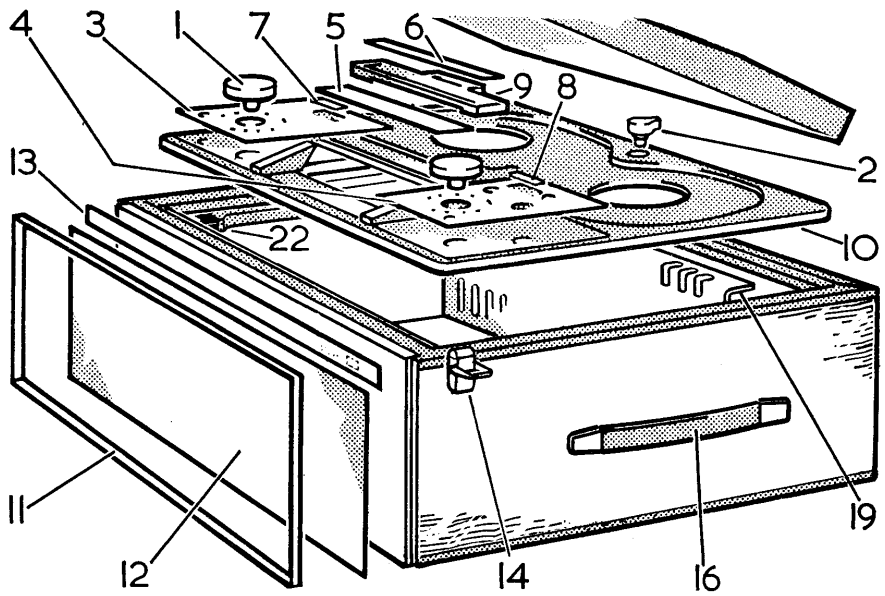
CABINET ASSEMBLIES

- Cabinet (including lid)
- Trade Mark transfer on lid
- 1. Off/On Tone or Volume knob (clip 3L3-012)
- Felt washer
- 2. Tape speed switch knob (clip 3L3-027; felt washer 8F7-001)
- 3. Off/On Tone escutcheon
- 4. Volume control escutcheon
- 5. Piano key escutcheon plate
- 6. Head cover trim
- 7. Record level indicator window
- 8. Tape position indicator window
- 9. Head cover (outer clip 8L3-004; inner clip 3L3-065)
- 10. Top cover (screw SB04FS06/N)
- 11. Speaker grille trim
- 12. Speaker grille
- 13. Emblem plate
- 14. Lid catch assembly (screw SW04RP06/N)
- 15. Lid hinge assembly (screw SW04RP06/N)
- 16. Handle assembly (inc. fittings)
- 17. Foot on cabinet side (insert 8A8-005/22)
- 18. Foot on cabinet base (pin 8A8-118/G)
- 19. Storage compartment division panel (screw SZ06RP06; washer 8L6-003)
- 20. Storage compartment lid
- 21. Ventilation grille
- 22. "U" clip securing tape deck (screw SJD8MP16)

2210

6208

8A0-051	8M3-280
0X0-594	—
3C0-103-3	8C0-025/3
8F7-007	—
5Z7-241/9	5Z7-241/9
8A4-020/48/B	8A4-020/46/B
8A4-020/48/A	8A4-020/46/A
8A4-020/48/D	8A4-020/46/D
8A4-020/48/C	8A4-020/46/C
2Z6-454	2Z6-454
2Z6-453	2Z6-453
2Z6-668/4	2Z6-668/4
2Z6-665/6	2Z6-665/6
0X0-917	—
8A4-066	—
8A6-021	8A6-019
0X0-583	8A9-010/2
0X0-325	8A9-009/1
0X0-918	8A9-008/12
0X0-519	8A8-005/1/Blk
8A0-031/C	8A8-004
8A1-621/1	8A1-021/7
8M5-009/1	8M5-009/1
8A4-067/1	8A4-067/1
8L2-005	8L2-005



A797

When ordering replacement components please quote Model number and, where possible, include the description or function given with the part number

CHASSIS ASSEMBLY —applicable to both models

Recorder unit assembly (RB42)	2Z6-740	Microphone socket (pillar 7116/10; screw SZ4HP06)	26495
Printed board assembly	19305/1	Voltage selector	8F6-005
Supply board assembly	PC 16/1	Voltage selector cover	8B1-004
Loudspeaker retaining nut	0L6-005	Mains transformer spacer (screw SZ6HP06; washer WD/12L2)	26557
Recording tape with metal 'stop' foil	8D5-008	Clip securing C20, C21 (clamp screw SB0CC06; nut NFHB04)	21124
Recording tape spool	1Z3-289	Clip securing printed board (screw SZ04HP03)	48547
Microphone assembly { Model 2210	8M3-163	Printed board bracket (screw SZ06HP04)	26476
{ Model 6208	8M3-283	Speed-change switch (nut NFHB06)	26522
Socket panel assembly	8M2-004/2	Record/play switch assembly	26469
Input socket screen	8B1-003	Record/play switch spring	26504
Phono plug	3Z0-398	Record/play switch lever	26485
Radio connecting lead assembly	3Z0-392	Sup/amp switch (screw SZ06HP03)	26423
Record level indicator valveholder	26505	Sup/amp switch screen	26558
Record level indicator insulating collar	26646	Screw securing rectifier W2	SZ04HP04
Record level indicator mounting spring	8B5-006	Mains lead clamp (screw SZ04HP06)	8LA-001
V1 valveholder	8F2-003	Volume control earthing clip	26772
V2 valveholder	8F2-004	Top cover mounting grommet	26762
V1 screening can	30434		
V1 valve retainer	18152		
V2 valve retainer	18152/2		
Microphone socket screen (screw SZ4HP03)	26751		

Component Details

CAPACITORS

All 350 volts DC working, 20% tolerance, unless otherwise stated

Ref.	Value	Tolerance	Rating	Function	Part No.
C1	.04uF		150V	V1A grid coupling	4M77
C3	.005uF		400V	V1B grid coupling	4M69
C4	.005uF		400V	V2A grid coupling	4M69
C5	8uF	Elec.	275V	V1A-B HT smoothing	13222/25/P23
C6	100pF	10%	}	Part record	1M26
C7	100pF	10%		equalization	5M38
C8	330pF	10%			5M39
C9	820pF	10%			5M40
C10	.05uF		150V	Replay bass boost	5M40
C11	.04uF			V2A anode DC blocking	5M41
C12	220pF			Part low frequency	
C13	50pF	10%		attenuator	2M46
C14	.022uF	5%		Part tone control circuit	4M78
C15	3900pF			Record/Play head tuning	
C16	.003uF			and bias feed (record)	4M83
C17	50uF	Elec.	12V	Part oscillator tuning	4M79
C18	100pF		500V	Oscillator grid leak bias	4M80
C19	.01uF		400V	Oscillator anode coupling	4M81
C20	50uF	Elec.	300V	V2B cathode bypass	13228/27
C21	50uF	Elec.	300V	Record level indicator	
C22	680pF	10%		feed decoupling	4M82
C23				V3 grid time constant	4M71
C24	0.1uF	-20+80%	200V	HT smoothing	13238/16
C25	450uF	Elec.	35V	HT reservoir	
C26	0.1uF	-20+80%	200V	Part 1 1/2 in/sec record	
C27	450uF	Elec.	35V	equalization	5M42
C28	.01uF		400V	'Pause' solenoid click	
C29	.01uF	5%	400V	suppression	5M43
				'Pause' solenoid	
				reservoir	13229/57X
				'Stop' solenoid click	
				suppression	5M43
				'Stop' solenoid	
				reservoir	13229/57X
				Part R5 noise suppression	4M71
				Part oscillator tuning	5M44

MISCELLANEOUS

Ref.	Description	Part No.
S1a-f	Record/Play switch (return spring 26504)	26469
S2a-c	Muting switch	26417
S3a-b	Mains On/Off switch	with R18
S4	Speed compensation switch (nut NF6)	26522
S5a-f	Amplifier/Superimpose switch	26523
S6-7	Track selector switch (push-button 0X0-850)	26472/2
S8	'Pause' switch (included in microphone assy.)	
LS	Loudspeaker, 7in x 3 1/2in—3Ω impedance (nut 0L6-005)	16009/5
W1	Record level rectifier	26484
W2	HT rectifier	8E9-002
W3	Auxiliary HT rectifier	26513
SKT1	Microphone input socket	26495
SKT2	Radio input socket	} Socket strip 26497
SKT3	PU input socket	
SKT4	Radio output socket	
J1	Extension LS jack	
SKT5-P5	Mains voltage adjustment	8F6-005
SKT6	Auxiliary socket (9 pin)	8F2-002
SOL1	'Pause' solenoid	26731
SOL2	'Stop' solenoid	26730

RESISTORS

All 1/2 watt carbon, 20% tolerance, unless otherwise stated

Ref.	Value	Tolerance	Rating	Function	Part No.
R1	68KΩ	10%		Radio input and part pickup attenuator	2A05
R2	3.3MΩ			Part pickup attenuator	8A54
R3	10MΩ			V1A grid leak	6A15
R4	220KΩ	10%	Low noise	V1A anode load	8A55
R5	1MΩ	Log. Pot.		Volume control	30656/21
R6	2.2KΩ	10%	1/2W	V1B cathode bias and NFB injection	3A87
R7	220KΩ			V1B anode load	1A95
R8	10MΩ			V2A grid leak	1A90
R9	68KΩ		1/2W	HT smoothing	5A24
R10	100KΩ			V2A anode load	1A44
R11	68KΩ	10%	}	Part record	2A05
R12	100KΩ	10%		equalization	1A68
R13	100KΩ	10%			1A68
R14	220KΩ	10%		Replay bass boost	5A61
R15	220KΩ		}	Radio output attenuator	1A95
R16	22KΩ				4A93
R17	220KΩ	10%		Constant current record signal feed	5A61
R18	1MΩ	Lin. Pot.		Tone control	30656/22
R19	10KΩ		1/2W	V2B grid stopper	7A24
R20	22KΩ			Oscillator grid leak	1A56
R21	140Ω	10%	1/2W	V2B cathode bias	8A56
R22	330KΩ			W1 stand-off	8A57
R23	10MΩ			V3 grid leak and W1 load	6A15
R24	100KΩ			V3 anode load	5A34
R25	5.6KΩ		1/2W	HT smoothing	9A17
R26	200Ω	Preset		Heater balance	13187/2/AB1
R27	220KΩ			Record/Play signal stand-off	5A62
R28	220KΩ	10%		Part 1 1/2 in/sec record equalization	5A57
R29	10Ω			Part 'Pause' solenoid click suppression	2A46
R30	75Ω	10%	2W	'Pause' solenoid hold-on	9A18
R31	10Ω			Part 'Stop' solenoid click suppression	2A46
R32	820Ω			'Stop' solenoid feed	9A19
R33	2.2MΩ			Part R5 noise suppression	7A90
R34	500Ω		1W	Oscillator load (superimpose)	9A20

INDUCTORS AND TRANSFORMERS

Ref.	Description	Part No.
L1	Bias osc. coil assembly	8D0-002
T1	Audio output transformer	26487
T2	Mains transformer	26555

Servicing Notes

ACCESS FOR SERVICING. To gain access to the top of the tape deck for routine cleaning, etc., first pull of the control knobs, speedchange knob and moulded head cover, then remove seven screws securing the moulded top cover.

NOTE : The projecting sockets on the underside of the head cover locate on two pins set in the head plate assembly.

Chassis Removal. Remove control knobs and covers as described. Remove two dome-headed screws from each side of the mechanism top plate. Remove pocket cover and then two screws securing storage compartment backing to main chassis. The complete assembly (less loudspeaker) can now be lifted from the cabinet. To disconnect the loudspeaker pull the connecting leads from the loudspeaker tags.

Precautions should be taken to avoid the risk of damage to the motor fan blades when the chassis and tape deck assembly is placed on the test bench.

HEATER BALANCE. The humdinger (R26) has been set during manufacture and should not be altered unless a valve change is made. If readjustment becomes necessary, the procedure given below must be carefully followed. Whilst setting the adjustment, the chassis must be electrostatically screened particularly around V1.

Take off the tape spools and set the instrument to 'Record' with the tone control set to minimum and the record level control set to maximum. Connect a sensitive valve-voltmeter between the junction of C10/C11 and chassis. Place a shorting lead across R20 to prevent the oscillator functioning and plug in a screened dummy microphone connector with a 1,000 pF capacitor strapped across pins 4 and 5.

Allow the machine to warm up for 10 minutes, then adjust R26 for minimum reading on the valve-voltmeter (approximately 50 mV).

DEMAGNETIZATION. It is important that there is no residual magnetism in the heads or the capstan spindle. This condition, which may arise if magnetized objects are brought near these components or if an ohmmeter is connected to the head windings, will lead to an increase in background noise on 'Play'. Suitable instruments for providing a demagnetizing field are available from a number of manufacturers.

HEAD ADJUSTMENT. Provision is made on the head mounting for vertical (height) and horizontal (azimuth) adjustment. Adjustment only becomes necessary where the manufacturing settings have been disturbed. The height adjustment is made by turning the mounting screws to compress the leaf spring on which the head is mounted; the azimuth adjustment is achieved by complementary adjustments to the mounting screws.

Record/Play head height setting—The height of the Record/Play head may be set visually so that the upper edge of the top track head gap is level with the upper edge of the tape; with the tape motion keys at neutral, thread the tape so that it runs behind the tape guide (on the right of the Record/Play head) to give sufficient tape contact on the head for observing the height setting. Whilst making the adjustments, ensure that the tape is taut by turning the take-up spool by hand. Finally, return the tape to its normal 'run' before operating the mechanism. The track positioning should then be checked by making recordings at peak level and 'developing' the tape with 'Indicord' magnetic ink.

Azimuth adjustment—To readjust, play back a standard four-track azimuth tape with an output meter connected. Adjust the Record/Play head for maximum output, using the volume control to keep the output level as low as possible.

Erase Head—Ensure that the gap is visually at right-angles to the tape motion and make final adjustments to obtain complete erasure on a tape recording previously made on the same machine.

AUXILIARY SOCKET (SKT 6)

The socket provides connections for BRC Tape Recorder Accessories, used to adapt the recorder for the following facilities: Playback of stereo tapes, slide projector synchronization and second track dubbing. Also enables a Foot Switch to be used for dictation and a Stethoset type earpiece to be fitted for monitoring purposes. The Auxiliary socket is also used to connect a Remote Pause Switch (20ft. lead) to operate pause control at a distance without using microphone. The pin connections are as follows:

1 Chassis earth. 2 Auxiliary 'Pause' switch contact for remote 'Pause.' 3 Auxiliary HT providing -32V DC at 50mA. 4 Radio output. 5 Compensated unbiased Record/Replay signal output. 6 as 5 via 220K Ω stand-off. 7 Earth return for leads connected to pins 4, 5, 6, 8 and 9. 8 & 9 Unselected Record/Play head.

The lateral position of the heads may also be adjusted to bring them into correct contact with the tape. This adjustment however, should be necessary **only** when replacement heads are fitted. When the correct position has been found, the brass clamp screws must be tightened to lock the head on the clamp before reassembly onto the head plate. The correct settings are as follows:—

Record/Play head—Adjust for 0.1 inch between head face and front edge of head clamp.

Erase head—The face should protrude .035 inch from front edge of head clamp.

MICROPHONE. *Due to the possibility of damage to the crystal element, it is suggested that no servicing is carried out on the microphone. In the event of any fault developing in this component, it should be returned to the nearest service depot.*

Circuit Notes

POWER SUPPLIES. The motor is permanently connected to the 240-250V tap on T2 primary to maintain the correct supply voltage at all mains input voltages. A separate winding, in T2 secondary, supplies 25 volt AC to bridge rectifier W3 which has its positive side connected to chassis, thus providing a supply of —32.5V DC. This supply is used to operate the 'Stop' and 'Pause' solenoids and is also taken to the accessory socket (SKT6) for external use. The solenoids are operated by the discharge of the reservoir capacitors which give a high initial energizing current. The 'Pause' solenoid is subsequently 'held on' by the current through feed resistor R30. The main HT supply is provided by a full-wave selenium rectifier (W2) and the parallel heater chain is balanced to chassis by potentiometer R26, across T2 heater winding.

REPLAY. The appropriate head winding is selected by track-selector switches S6/S7. The head output voltage is switched by S1a and S5a to V1A grid, the other side of the head winding being returned to chassis by S1b. The amplified signal at V1A anode is fed via R5 (volume control) to the grid of V1B which, with V2A, provides two further stages of amplification. A frequency selective negative feedback loop, switched by S1c, from V2A anode to V1B cathode, gives bass boost playback equalization. V2A output is fed to the radio output socket (SKT4) via S1c, attenuator R15/R16 and S1d, also via C11 to tone control R18. From the tone control the signal is switched by S1e to V2B grid via grid stopper R19. V2B operates as the audio output stage, with the Erase head short-circuited by S1f. The secondary of T1 is connected in the return circuit of V2B cathode to provide negative feedback.

RECORD. V1A grid is switched to the input sockets by S5a and S1a. Switch contacts are incorporated in the microphone socket to break the radio and pickup input circuit when the microphone is in use. V1A output is fed via the record level control (R5) to V1B grid.

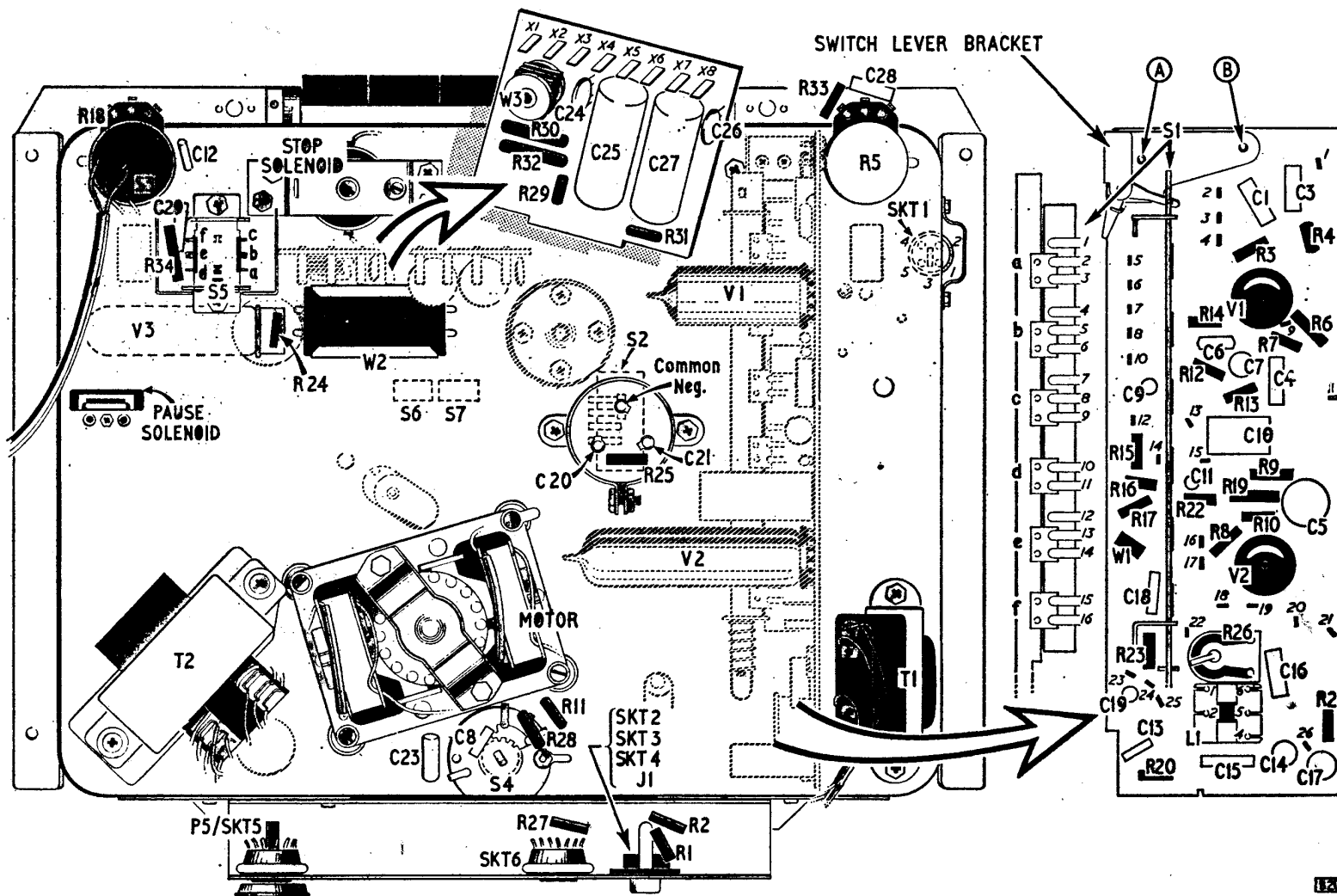
Treble boost recording equalization is provided by a frequency selective negative feedback circuit connected between V2A anode and V1B cathode via S1c (contacts 7 and 8). When the mechanism is switched to the lower speed ($1\frac{1}{2}$ in/sec) R28 and C23 are added to the circuit by the speed compensation switch (S4).

V2A output is fed to the appropriate head winding, via C10, C11 and series resistor R17. The head winding is returned to chassis through S1b, its polarity now being reversed. Part of the signal developed at V2A anode is rectified by W1 and fed to grid of V3, the record level indicator, this circuit having a fast rise and slow decay characteristic.

Power for erasing and recording bias is supplied by V2B which is connected as a modified Hartley oscillator when the instrument is switched to Record. The oscillator is tuned to approximately 55Kc/s and the erase power is fed to the Erase head from the top of L1 via S5d and S6/S7. The record bias is coupled to the record feed line by C13.

MUTING. (S2a-c)—When the mechanism is in the fast wind and off positions (with Amplifier/Superimpose switch at normal) V2A output is shorted to earth by S2a. When switching from 'record' to any other function, S2b causes the oscillator output to decay, thus ensuring that the heads are not left partially magnetized. Under the same conditions S2c breaks the 'Pause' solenoid circuit to prevent accidental application of the 'Pause' brake.

AMPLIFIER/SUPERIMPOSE. S5a connects the input circuits, when the instrument is used as a straight through amplifier, while at the same time S5f modifies the feedback circuit to reduce bass boost. Switch sections S5d-e are used to isolate the Erase head and also to connect C29 to chassis from the Record/Play head feed line, thereby reducing the bias to the Record/Play head. This is done to avoid partial erasure of original recorded signals whilst superimposing.



CHASSIS LAYOUT

COMPONENT LOCATION. V3, R24, SKT1, S2 and S6/7 are located on the tape deck top plate.

NOTE: Accurate positioning of the switch lever bracket on the printed board is necessary for correct switch operation. In cases where the bracket has been removed, the following procedure should be followed for refitting. With the printed board in position on the base plate and the screws "A" and "B" slackened, adjust the printed board relative to the switch lever so that the switch lever arm just touches the baseplate; the screw holes in the printed board are oversize to allow for adjustment. Finally, tighten screws "A" and "B."