

### REGENTONE RT50 tape recorder

**T**HE RT50 is a three-speed portable tape recorder, using half track working on standard  $\frac{1}{4}$  in. magnetic tape. It can accommodate high-level inputs (radio, pickup, amplifier speaker terminals) or low-level inputs (m.c. microphone, variable reluctance cartridge, radio diode) and mixing of two input signal is possible providing that impedance matching and correct level balancing has taken place externally to the unit. It can also be used as a straight-through amplifier.

The tape recorder can be divided into three main units: (1) the tape deck carrying the three motors, spool carriers, speed selector, motor control push buttons, record and overload indicators, heads, power pack; (2) the printed circuit board; (3) the control panel.

The drive is obtained from an induction type motor, the spindle of which directly engages a rubber wheel which in turn drives a heavily constructed flywheel. The tape is driven by friction between a brass bush on the flywheel and a rubber pressure wheel which is mechanically engaged on Play and Record. The fast forward motor is partially energised under these two conditions and provides a take-up tension on the forward spool.

The socket Sk1 is used for the micro-

phone or diode input and is selected by the microphone button. The signal passes from Sk1 and contacts 5 and 6 of switch 5R to contacts 1 and 2 of switch 4F, then to the grid of V1A.

Sk2 is used when a larger signal is available and this is attenuated by R1/R2. The signal passes from Sk2 via the radio input selector button and contacts 5 and 6 of 5R, to contacts 1 and 2 of 4F, then to the V1A grid.

Mixing of these two inputs can be achieved by pushing both the input selector buttons. Pushing the button marked "Amp" and one of the selector buttons enables the tape recorder to be used as a straight-through amplifier for that function.

#### Record

In the Record position, the input signal is amplified by V1A and passed to V1B for further amplification. The signal developed across R8 is fed via C6 to VR1, which acts as a level control, and then via R16, C19 (which tends to pass only the high frequencies and therefore gives a measure of treble boost) to the V2A grid, via contacts 3 and 2 of switch 5R. This action renders the tone correction circuit inoperative.

The signal appearing at the V2A anode is passed via C10, R7 and contacts 6 and 5 of 5F, through the recording head and contacts 5 and 4 of 4F to earth. At the same time, V2B acts as a bias oscillator (53 kc/s), tuned by L1, C15.

The output of this circuit is fed via C17, R27 through the Record head as bias. The circuit is made oscillatory by connecting C16, R26 to the V2B grid via contacts 3 and 2 of 5F. At the same time, oscillator power is fed from point 4 of L1 to the erase head, one side of which is permanently earthed.

#### Playback

In the Playback position, the signal from the head is passed to the V1A grid via contacts 5 and 6 of switch 4F. At the same time, the oscillator is muted by C16, R26 being open circuited to the grid via contacts 3 and 2 of 5F,



while the erase head is shorted out by contacts 2 and 3 of 4R.

The signal at the V1A anode is coupled to the V1B grid for further amplification and is then passed to the volume control VR1. Tone correction is provided by the bass control VR2 and the treble control VR3. The signal is passed from VR3 via contacts 1 and 2 of 5R to the V2A grid, where it is further amplified and passed via C10 to contacts 1 and 2 of 5F and then to the grid of the output valve V2B.

Negative feedback from the secondary of the output transformer is fed via R20, R35, C11 and gives an increase in the bass frequencies on playback.

#### Indicators

The recording level indicator is the left-hand neon, located under the transparent plastic housing and this should flash occasionally on peaks while recording. The neon is set by VR5, as described under "Service Notes" (page 4). The overload indicator (right-hand neon) is adjusted to flash only when the audio level at the V2A anode exceeds the preset level as determined by VR4.

## SERVICE SNAPS

### REGENTONE RT50

**Valves:** One ECC83, ECL82 and EZ80.

**Neon Indicators:** Two CC11L.

**Electrolytics:** 8+8+8 $\mu$ F, 350V; 16+16 $\mu$ F, 450V; 25 $\mu$ F, 12V; 50 $\mu$ F, 25V.

**Volume Control:** 470k $\Omega$ .

**Treble Control:** 100k $\Omega$ .

**Bass Control:** 470k $\Omega$ .

**Frequency Response:** 100 c/s-20 kc/s (amplifier) 100 c/s to 15 kc/s (tape). H.f. compensation on record, bass compensation on playback. Tone controls—approximately 20dB at 150 c/s and 5 kc/s.

**Input Level:** 3mV r.m.s. for full output at 1 kc/s.

**Power Output:** 3 watts.

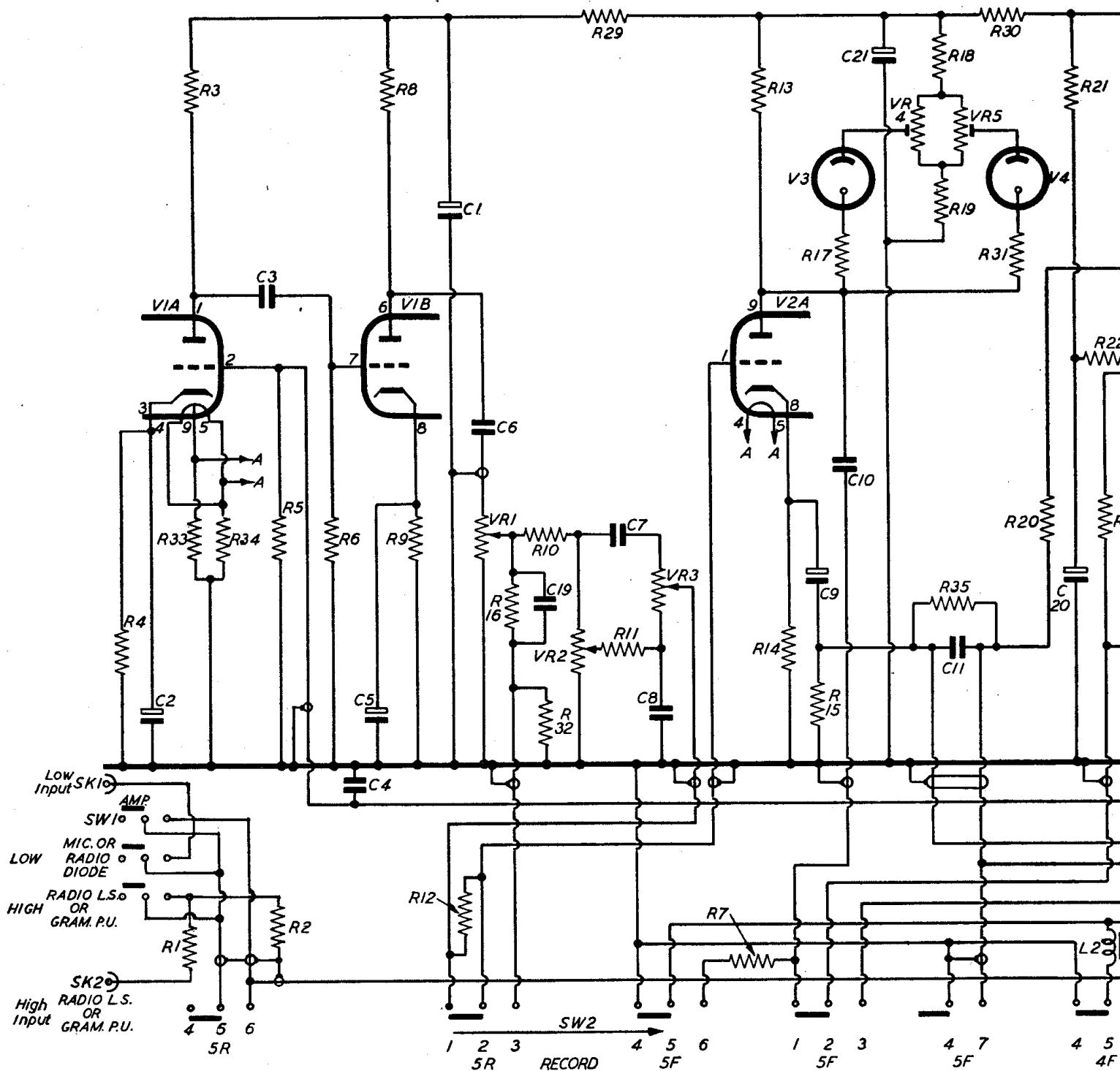
**Power Consumption:** 130VA on fast forward, 90VA on record or playback, 30VA on amplifier.

**Fast Forward Time:** 1 minute for 1,200 ft.

**Mains Input:** 200-250V, 50 c/s, a.c.

#### VALVE VOLTAGES

Valve	Record	Playback
V1A anode ..	166	158
V1A cathode ..	1.7	1.6
V1B anode ..	180	179
V1B cathode ..	1.9	1.8
V2A anode ..	190	175
V2A cathode ..	2.2	2.0
V2B anode ..	310	300
V2B screen ..	130	112
V2B cathode ..	5	6.8
V3 at VR4 slider ..	270	250
V4 at VR5 slider ..	175	163
V5 anode ..	300-0-300	
V5 cathode ..	345	330
Smoothed h.t. ..	320	300



**Switch Contacts**  
5R  
4 5 6

**Stop or Playback**  
Switch makes mic/radio input operative only through amplifier selector switch, when amplifier can be used straight through.

**Record**  
Switches grid to V1A mic/radio input selector switch.

1 2 3

Tone controls in.

Top compensation in.

**Note:** When deck is switched off, switch 5 is in the Playback position.

5F  
4 5 6

Osc. bias shunted. Record head connection earthed.

Bias and audio switched to head.

1 2 3

V2A anode to V2B grid of output valve.

V2B grid to oscillator coil for 53 kc/s oscillation.

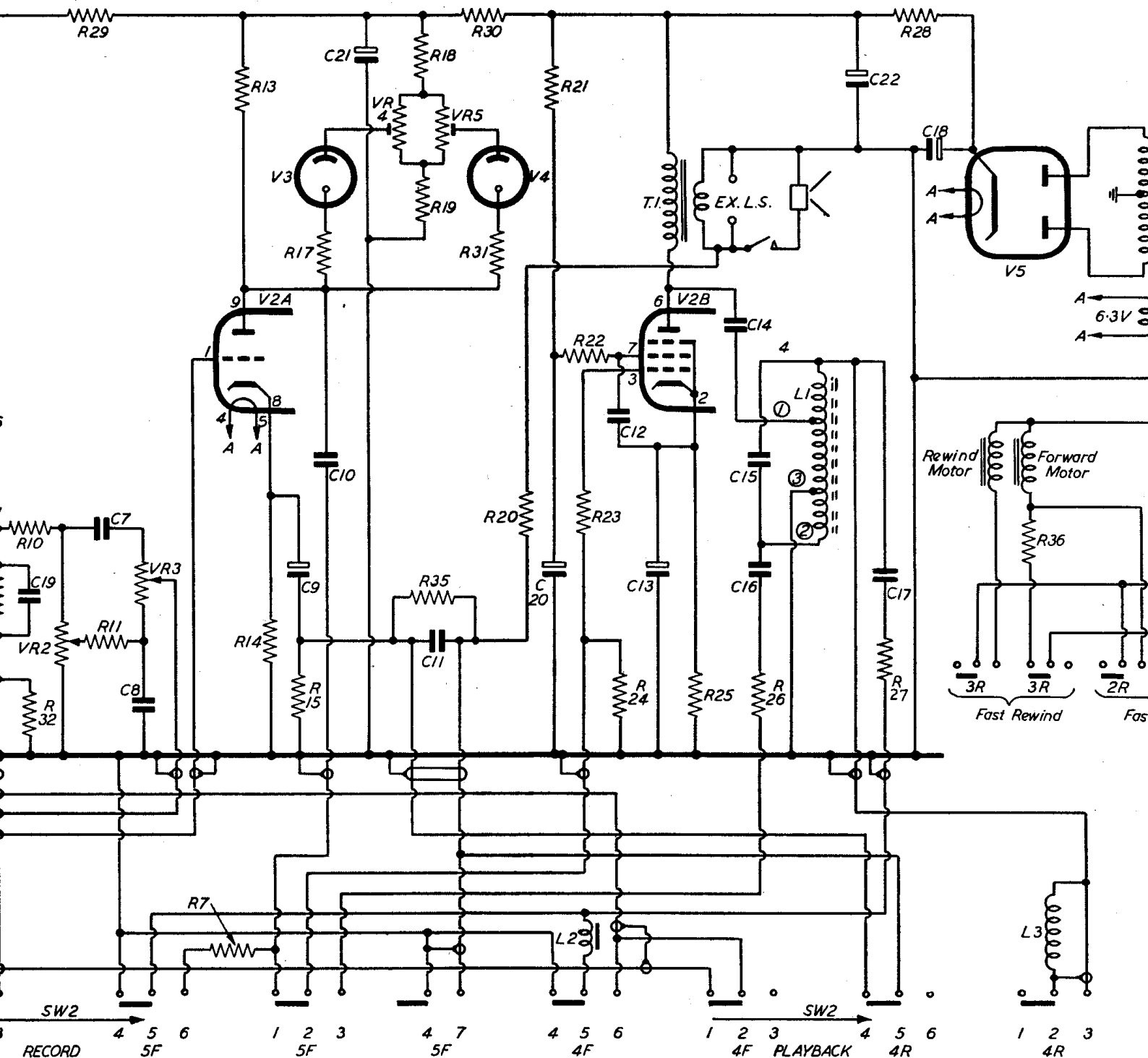
4 7

Bass compensation. Feedback to give C.C.I.R. standard on playback.

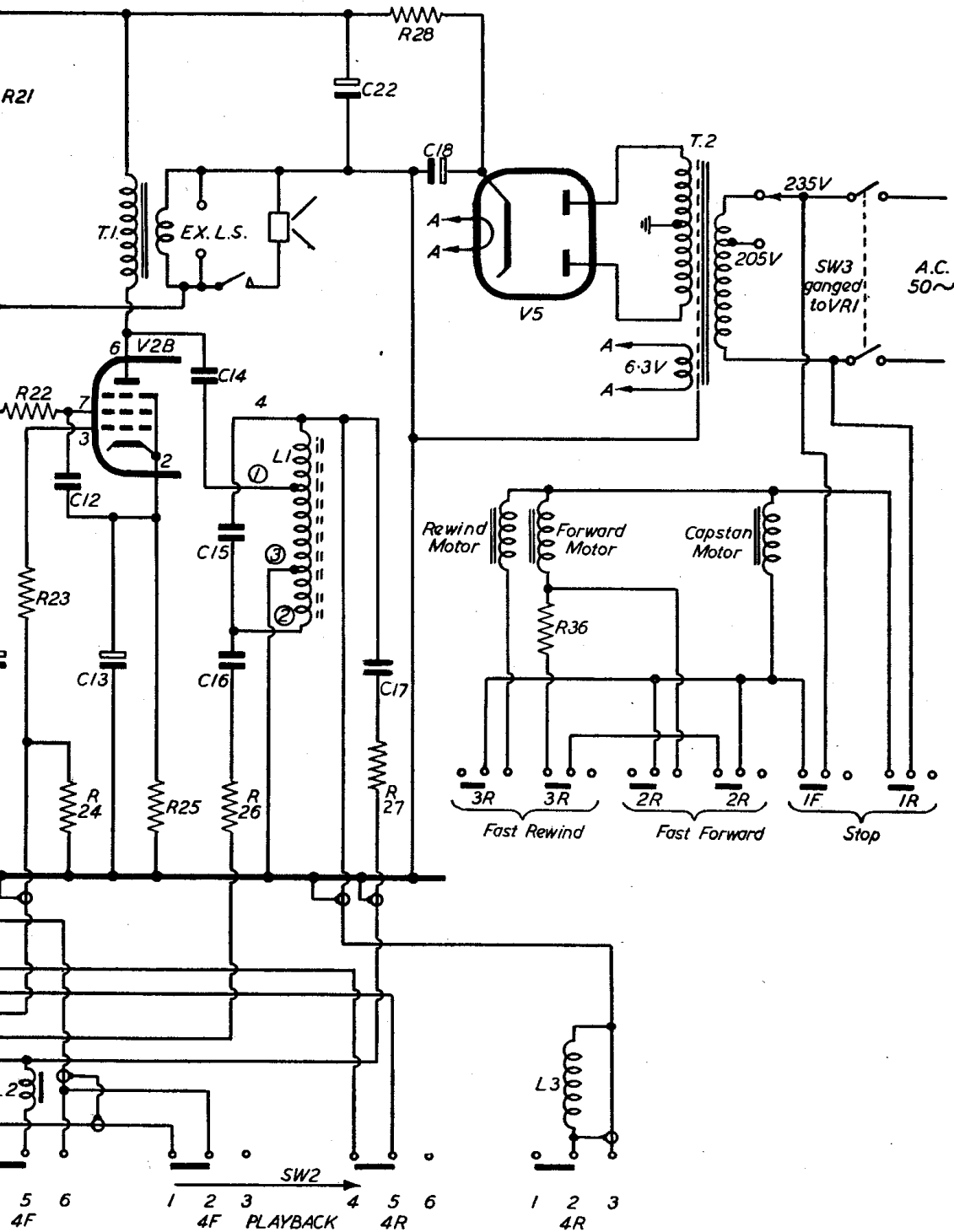
Feedback shunted to earth.

**Switch Contacts**  
4F  
4 5 6

1 2 3



5F	4 5 6	Osc. bias shunted. Record head connection earthed.	Bias and audio switched to head.	Switch Contacts	Stop or Record	Playback	4R
5F	1 2 3	V2A anode to V2B grid of output valve.	V2B grid to oscillator coil for 53 kc/s oscillation.	4F	Head earthed.	Head connected to V1A grid.	4 5 6 S
5F	4 7	Bass compensation. Feedback to give C.C.I.R. standard on playback.	Feedback shunted to earth.	4F	Grid to V1A to amplifier selector switch.	Playback grid disconnected from input sockets.	1 2 3 F f c
							Note: When positio



### COMPONENT LIST

Resistors	
R1	470kΩ
R2	4.7kΩ
R3	180kΩ
R4	4.7kΩ
R5	1MΩ
R6	1MΩ
R7	270kΩ
R8	180kΩ
R9	3.3kΩ
R10	100kΩ
R11	100kΩ
R12	1MΩ
R13	100kΩ
R14	1.8kΩ
R15	100Ω
R16	1MΩ
R17	220kΩ
R18	47kΩ
R19	220kΩ
R20	390Ω
R21	68kΩ
R22	3.3kΩ
R23	470Ω
R24	470kΩ
R25	270Ω
R26	10kΩ
R27	68kΩ
R28	1kΩ, 1W
R29	47kΩ
R30	4.7kΩ
R31	220kΩ
R32	220kΩ
R33	100Ω
R34	100Ω
R35	2.2kΩ
R36	1kΩ, 10W

All resistors 1-watt unless otherwise stated.

Capacitors	
C1	8μF, 350V
C2	25μF, 12V
C3	0.01μF
C4	220pF
C5	25μF, 12V
C6	0.01μF
C7	0.001μF
C8	0.01μF
C9	25μF, 12V
C10	0.01μF
C11	0.5μF
C13	50μF, 25V
C14	0.001μF
C15	0.0022μF
C16	220pF
C17	220pF
C18	16μF, 450V
C19	470pF
C20	8μF, 350V
C21	8μF, 350V
C22	16μF, 450V

Variable Resistors	
VR1	470kΩ
VR2	470kΩ
VR3	100kΩ
VR4	220kΩ
VR5	220kΩ

Valves	
V1	ECC83
V2	ECL82
V3	CC11L
V4	CC11L
V5	EZ80

Switch contacts	Stop or Record	Playback
5 6	Head earthed.	Head connected to V1A grid.
2 3	Grid to V1A to amplifier selector switch.	Playback grid disconnected from input sockets.

4R	4 5 6	1 2 3
	Straight feedback.	Erase head connected, functional only when oscillator is on.

Note: When deck is switched off, switch 4 is in the Record position.

# Servicing Notes

## Removal of Chassis

To gain access to either the underside of the tape deck or the printed circuit board, first remove all plugs from the side-control panel, then remove the four screws securing the template and tape deck to the cabinet.

Lift the tape deck from the cabinet, taking care not to lift by the template as this can easily be damaged. Unscrew the two wing nuts securing the side-control panel to the cabinet and disconnect the internal speaker.

Pull the mains lead through the cabinet. Lift the complete tape deck and control panel from the cabinet. To reassemble, reverse the above procedure.

## Removal of Circuit Board

Unscrew the two 4BA nuts holding the rubber mounted brackets on the printed

circuit board to the motors. Unsolder the two earth leads (black) from each end of the board, the blue lead from the board to the push-button switch, the h.t. supply lead (red) and the heater leads (brown).

The board can then be lifted up and towards the front of the deck to obtain access to the components.

## Neon Adjustment

On no account should the variable resistors VR4 and VR5 be altered. If any alteration is required, the following procedure should be adopted.

1. Disconnect the end of R27 at L2 to remove r.f. bias voltage from the head.

2. Unsolder the red lead to the record-playback head, and insert a 100Ω resistor in series with this lead and the spare tag.

3. Connect a valve voltmeter across the ends of this resistor.

4. Set volume control to maximum output.

5. Inject a 1 kc/s signal to socket Sk1.

6. Adjust the signal generator output until the voltage on the meter is reading 5mV. Then adjust VR5 (left-hand neon) until the neon just glows. This is the correct position for recording.

7. Increase the signal generator output until the voltage on the meter reads 10mV, then adjust VR4 (right-hand neon) until the neon glows. This is the condition for overloading.

*Alternative Method:* Neon adjustment can be carried out using an oscilloscope, as follows:

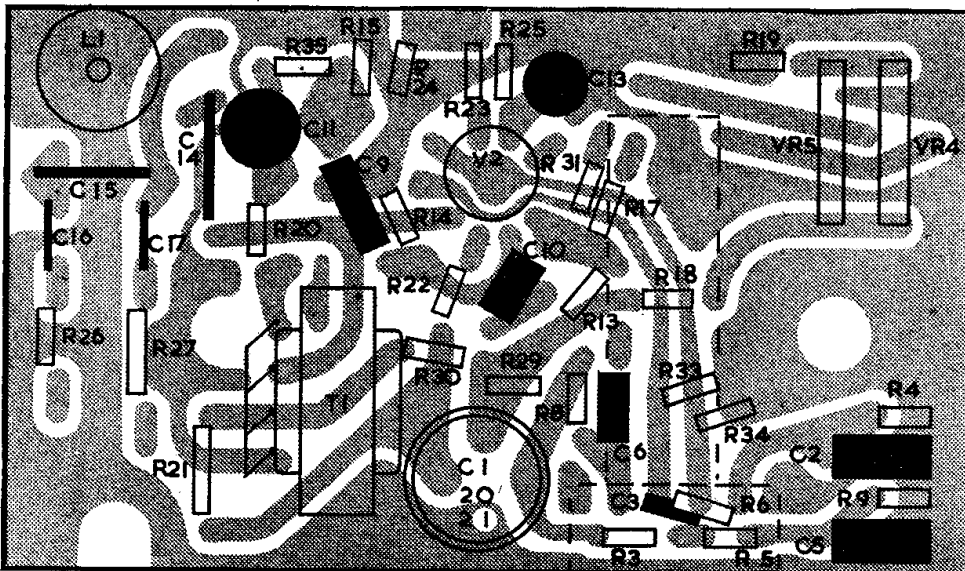
Disconnect the screened lead which is connected to the circuit board at the lower end of R27 and insert a 1kΩ resistor in the red lead on the replay head. Connect the oscilloscope input across the 1kΩ resistor. The audio current can now be observed as a voltage on the screen and the setting-up procedure follows the same sequence as already described. The figures, however, in this case would be 150mV d.a.p. (left-hand neon) and 300mV d.a.p. (right-hand neon).

After this, the screened lead can be reconnected to R27 and the bias level can be checked after the audio gain has been reduced to minimum. The bias should read between 2.5-3.5V d.a.p.

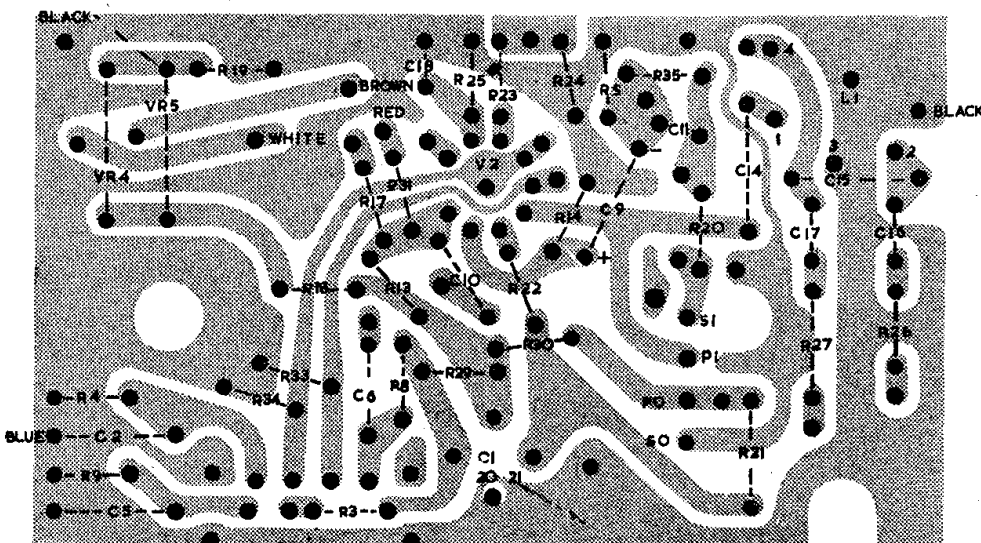
## Oscillator Frequency

The amplitude of the oscillator bias can be checked as follows:

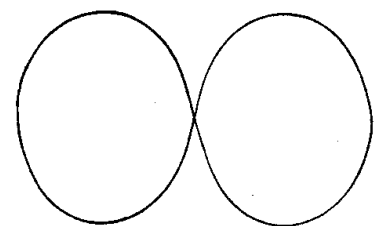
Unsolder the red lead of the record-playback head and insert a 100Ω resistor. Connect a valve voltmeter across the ends of this resistor. Check that the reading is 100mV minimum, and does not exceed 130mV maximum.



Printed circuit board, top side, showing layout of components.



Underside view of printed circuit board showing component locations.



Bias frequency pattern.

The bias frequency may be checked by feeding the output of a signal generator (26.5 kc/s) to the X plates of the oscilloscope and feeding the bias frequency (which exists across the record-playback head) to the Y plates. The pattern displayed should look like that of Fig. 1.

## Amplifier Gain

When used as a straight-through amplifier, with the volume, treble and bass controls set at maximum, the gain can be checked by injecting a 1 kc/s signal and with the input voltage at 1.8mV, the output voltage across a 3Ω load should be 2.5V.