



# GRUNDIG TK124 TAPE RECORDER

sintered bearings, bearing washers and for all spindles (P).

Shell Vaseline grease for the two fly-wheel bearings (Q).

Shell Vaseline for all sliders and areas of friction (R).

**Slider switch contacts.** Fit top deck to stabilise the printed circuit when checking the slider switch. The operating lever should be central in the switch operating fork. If necessary bend the adjustment arm.

**Fitting, adjustment and bias setting of heads.** Remove the head base bracket before changing the heads. The new erase head is pushed back as far as possible before tightening the mounting screw. The record/playback head and its screen are held by two screws to the head mounting bracket. If the head adjustment screw is over-tightened this will deform the head mounting bridge, making it impossible to obtain correct alignment with a replacement head. In such cases the adjustment lug in the head base bridge must be bent back before the new head is fitted. To align the head azimuth, use a mono alignment tape.

First fully re-spool the tape in both directions. Connect a milli-voltmeter and oscilloscope to the hi-Z output socket. The adjustment screw is now turned until maximum output is obtained from the high frequency recording of the test tape. Do not over-tighten otherwise the head mounting bridge will be deformed.

**HF bias setting.** In order to measure HF signals a capacitive potential divider with a ratio of 1000:1 is required (Grundig type VST24 is suitable). Voltage levels are read on the millivolt range of the meter. Variable controls and trimmers should be

set to their mid-position before adjustment. HF bias frequency is 52-58kHz.

**Erase and record current.** Adjust R1 for 41V measured across erase head and C20 to provide 82V across record head.

If an electronic voltmeter is not available approximate readings can be obtained across the heads with an Avo 8 switched to the 100V AC range. Bias 60V, erase 50V.

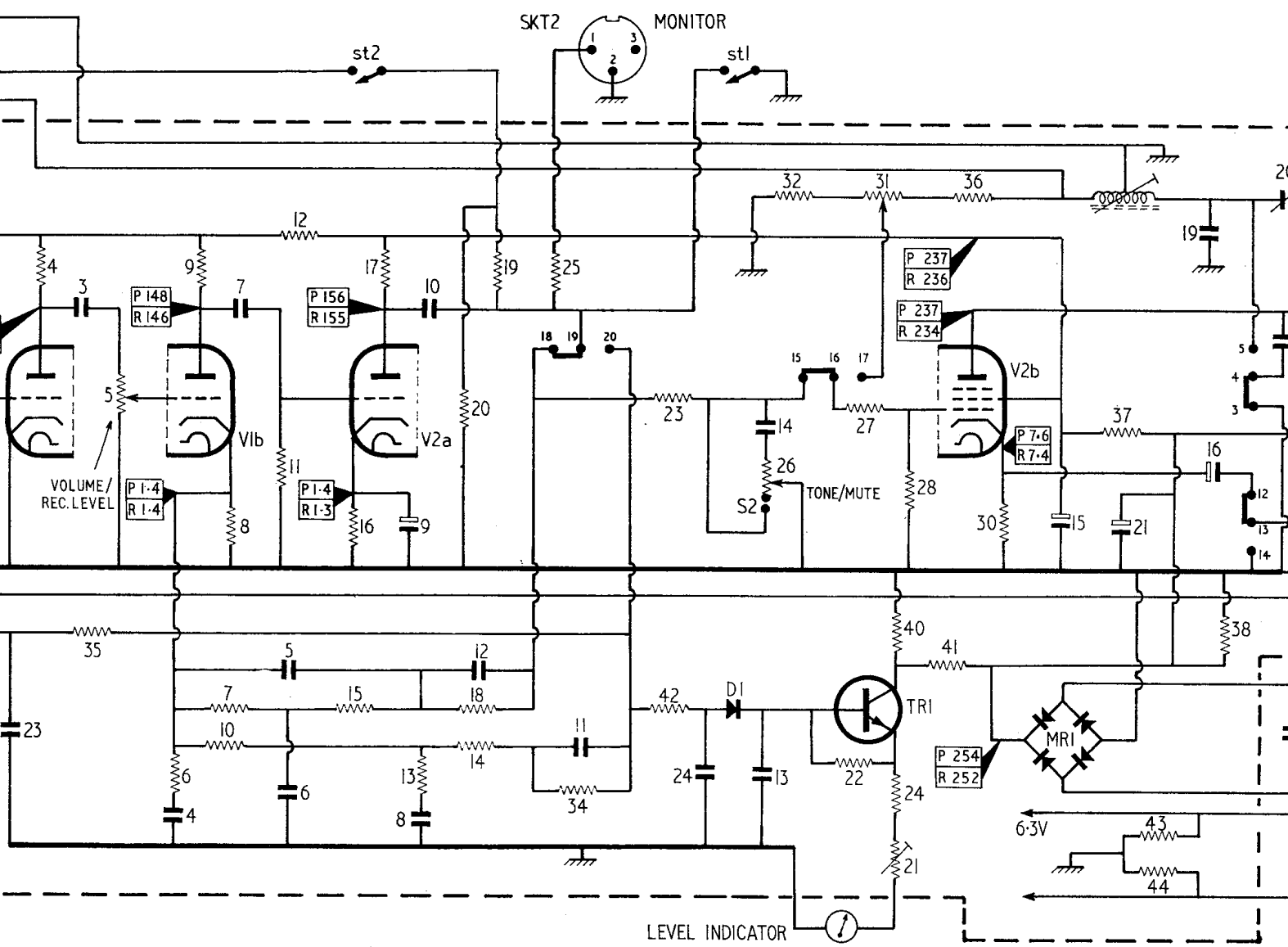
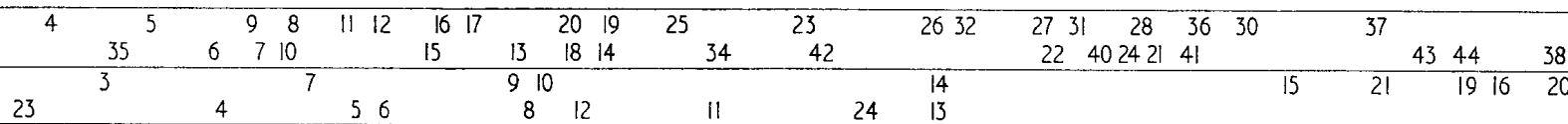
**Playback amplifier.** Input levels are quoted prior to a potential divider.

### CAPACITORS

|     |        |    |
|-----|--------|----|
| C1  | 100KpF | BI |
| C2  | 16μF   | BI |
| C3  | 22KpF  | BI |
| C4  | 3K3pF  | BI |
| C5  | 47pF   | BI |
| C6  | 560pF  | BI |
| C7  | 10KpF  | BI |
| C8  | 390pF  | BI |
| C9  | 22μF   | BI |
| C10 | 100KpF | BI |
| C11 | 4K7pF  | BI |
| C12 | 1K2pF  | BI |
| C13 | 150KpF | AI |
| C14 | 1K5pF  | AI |
| C15 | 50μF   | AI |
| C16 | 100μF  | BI |
| C17 | 1KpF   | AI |
| C19 | 3K9pF  | AI |
| C20 | 60pF   | AI |
| C21 | 50μF   | AI |
| C22 | 220KpF | —  |

### C23

|     |          |
|-----|----------|
| C24 | RESISTOR |
| R1  | RESISTOR |
| R2  | RESISTOR |
| R3  | RESISTOR |
| R4  | RESISTOR |
| R5  | RESISTOR |
| R6  | RESISTOR |
| R7  | RESISTOR |
| R8  | RESISTOR |
| R9  | RESISTOR |
| R10 | RESISTOR |
| R11 | RESISTOR |
| R12 | RESISTOR |
| R13 | RESISTOR |
| R14 | RESISTOR |
| R15 | RESISTOR |
| R16 | RESISTOR |
| R17 | RESISTOR |
| R18 | RESISTOR |
| R19 | RESISTOR |



**Fitting, adjustment and bias setting of heads.** Remove the head base bracket before changing the heads. The new erase head is pushed back as far as possible before tightening the mounting screw. The record/playback head and its screen are held by two screws to the head mounting bracket. If the head adjustment screw is over-tightened this will deform the head mounting bridge, making it impossible to obtain correct alignment with a replacement head. In such cases the adjustment lug in the head base bridge must be bent back before the new head is fitted. To align the head azimuth, use a mono alignment tape.

First fully re-spool the tape in both directions. Connect a milli-voltmeter and oscilloscope to the hi-Z output socket. The adjustment screw is now turned until maximum output is obtained from the high frequency recording of the test tape. Do not over-tighten otherwise the head mounting bridge will be deformed.

**HF bias setting.** In order to measure HF signals a capacitive potential divider with a ratio of 1000:1 is required (Grundig type VST24 is suitable). Voltage levels are read on the millivolt range of the meter. Variable controls and trimmers should be

set to their mid-position before adjustment. HF bias frequency is 52-58kHz.

**Erase and record current.** Adjust R31 for 41V measured across erase head and C20 to provide 82V across record head.

If an electronic voltmeter is not available approximate readings can be obtained across the heads with an Avo 8 switched to the 100V AC range. Bias 60V, erase 55V.

**Playback amplifier.** Input levels are quoted prior to a potential divider of

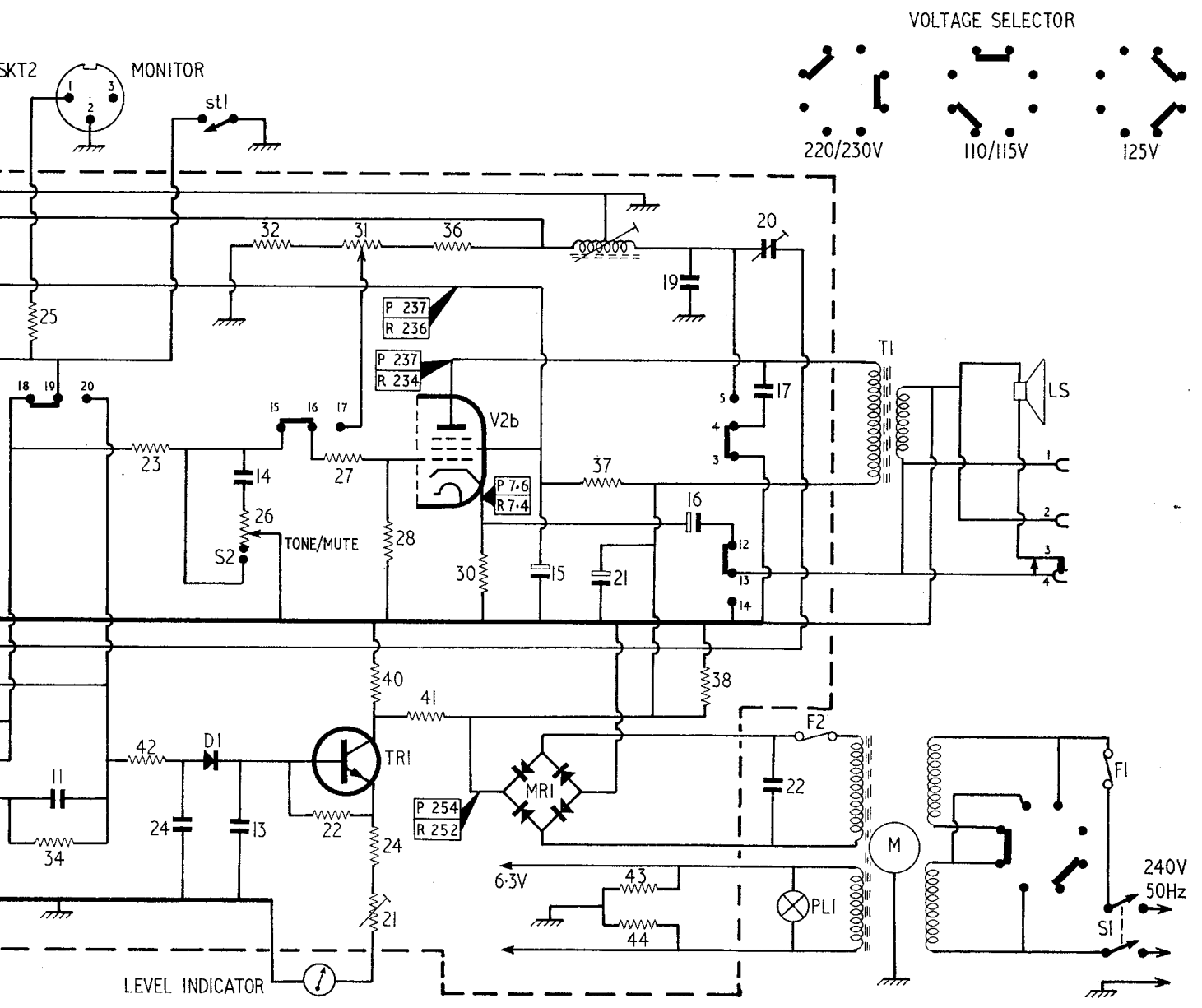
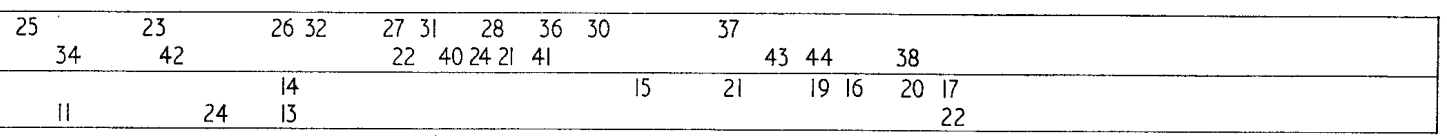
1000/10Ω (TN 5). The 10Ω resistor is in parallel to the head system.

Output voltages are measured at pins 3-2 SKT1.

**Control Position:** Volume control to maximum and switch off output stage by tone control (S2). Turn selector switch to "Start."

**Sensitivity.** An input level of 40mV at 1kHz should produce 56mV. For deviations in excess of 1dB check ECC83.

| CAPACITORS |        | RESISTORS |      |
|------------|--------|-----------|------|
| C1         | 100KpF | R1        | 10K  |
| C2         | 16μF   | R2        | 10M  |
| C3         | 22KpF  | R3        | 180K |
| C4         | 3K3pF  | R4        | 150K |
| C5         | 47pF   | R5        | 500K |
| C6         | 560pF  | R6        | 2K2  |
| C7         | 10KpF  | R7        | 33K  |
| C8         | 390pF  | R8        | 4K7  |
| C9         | 22μF   | R9        | 220K |
| C10        | 100KpF | R10       | 180K |
| C11        | 4K7pF  | R11       | 1M   |
| C12        | 1K2pF  | R12       | 22K  |
| C13        | 150KpF | R13       | 33K  |
| C14        | 1K5pF  | R14       | 330K |
| C15        | 50μF   | R15       | 47K  |
| C16        | 100μF  | R16       | 1K5  |
| C17        | 1KpF   | R17       | 100K |
| C19        | 3K9pF  | R18       | 1M2  |
| C20        | 60pF   | R19       | 220K |
| C21        | 50μF   |           |      |
| C22        | 220KpF |           |      |
|            |        | R20       | 15K  |
|            |        | R21       | 50K  |
|            |        | R22       | 2M2  |
|            |        | R23       | 100K |
|            |        | R24       | 39K  |
|            |        | R25       | 220K |
|            |        | R26       | 1M   |
|            |        | R27       | 1K   |
|            |        | R28       | 2M2  |
|            |        | R30       | 270  |
|            |        | R31       | 50K  |
|            |        | R32       | 15K  |
|            |        | R34       | 1M   |
|            |        | R35       | 150K |
|            |        | R36       | 100K |
|            |        | R37       | 2K2  |
|            |        | R38       | 68K  |
|            |        | R40       | 15K  |
|            |        | R41       | 100K |
|            |        | R42       | 100K |
|            |        | R43       | 220  |
|            |        | R44       | 220  |



**Frequency response.** All frequencies are checked at a constant input level and refer to the 1kHz output level. At a frequency of 66Hz the output level will rise by: 14.6dB to 300mV and at 12kHz the output level should rise by 3.3dB to 82mV.

**Signal/noise level.** The noise level when playing back, without tape, must not exceed: 3mV. Volume control to minimum: 0.5mV.

**Recording amplifier.** Input signals are applied via a 100kΩ series resistor. This should be fitted close to the micro/diode socket. Input voltages are quoted prior to a potential divider (TN 1) or direct (TN 2). The recording currents are quoted as the potential drop across a 100Ω resistor (TN 3) parallel to the record/playback head. The output voltage should be measured across R20 (15kΩ). The HF generator is made inoperative by short-circuiting the erase head.

**Set controls.** Record button depressed, selector switch to start, record level and tone control to maximum.

**Sensitivity.** The input sensitivity is checked at 1kHz. A potential drop of 3.4mV across 100Ω using (TN 3) should require an input level of: 192mV. Under these conditions the recording level meter pointer should indicate 7. Adjust by R21. Output at earphone socket 730mV.

**Frequency response.** The frequency response is measured by feeding a signal into the radio input using (TN 1). The level should be held constant at approximately 29mV and should be finally adjusted so that at 1kHz a potential drop of 0.5mV is obtained across (TN 3) rising to approximately 0.7mV at 66Hz and between 1.23 and 2.1mV at 12kHz.

**Hum/noise level monitoring.** Measured across monitoring socket via TN 4. Input terminated with 100kΩ resistor 9mV. Input short-circuited 5mV. With HF bias and erase current correctly set, the HF signal appearing across the output (input terminated with 100kΩ) should not exceed 300mV.

**Output stages.** Signal input across playback head via (TN 5). Volume and tone control to maximum, start button depressed.

**Amplification and distortion.** Adjust the input level at 333Hz to produce an output of 2.6V the total harmonic distortion factor should not exceed 5 per cent.

**Frequency response.** The input voltage should be adjusted to maintain a constant output level of 100mV measured across pins 3-2 SKT 1, at the frequencies used for the following tests. Output measured across the 5ohm loudspeaker load. 1kHz: 925mV, 66Hz 890mV, 12kHz: 1125mV.

**Hum/noise level.** The noise level must not exceed: Tone control maximum: 20mV. Volume control minimum: 3mV. The signal is applied to pins 1-2 SKT 1 using (TN 6). Playback levels are measured across pins 3-2 SKT 1. The total test lead and instrument capacity should be within 150±30pF.

**Test via tape.** Record button depressed and in manual position, recording level and tone control to maximum. Playback: Output stage switched off and volume control to maximum.

**Sensitivity.** A 333Hz full level recording must give a minimum playback level of 500mV.

**Hum/noise level.** The playback of an erased 66Hz recording (recording level control to minimum whilst erasing) should produce an output of not more than 3mV.

**Frequency response.** The maximum deviation of a recording made at 1/10th (-20dB) of the level required for a full level recording and referred to 1kHz should be: 66Hz +6-1dB, 6000Hz +4-2dB, 12000Hz +2-6dB.

**Distortion Factor.** A full level manual recording, at 333 Hz, must result in a harmonic distortion factor not exceeding 5 per cent.

**Wow/Flutter.** The weighted wow or flutter figures should not exceed +0.5 per cent.

**OPERATIONAL NOTES**

The machine design automatically meets all specifications as long as the components are not damaged, and all adjustments are reduced to a bare minimum. Motors are now fitted with an overload protection device which functions as follows (Fig. 2) (early motors shown in Fig. 3). The fan (1), the drive pulley (2) and the fast wind pulley (3) are fitted to the motor spindle

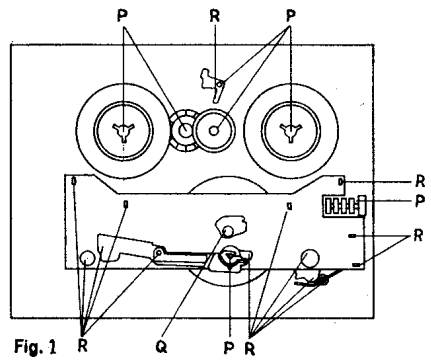
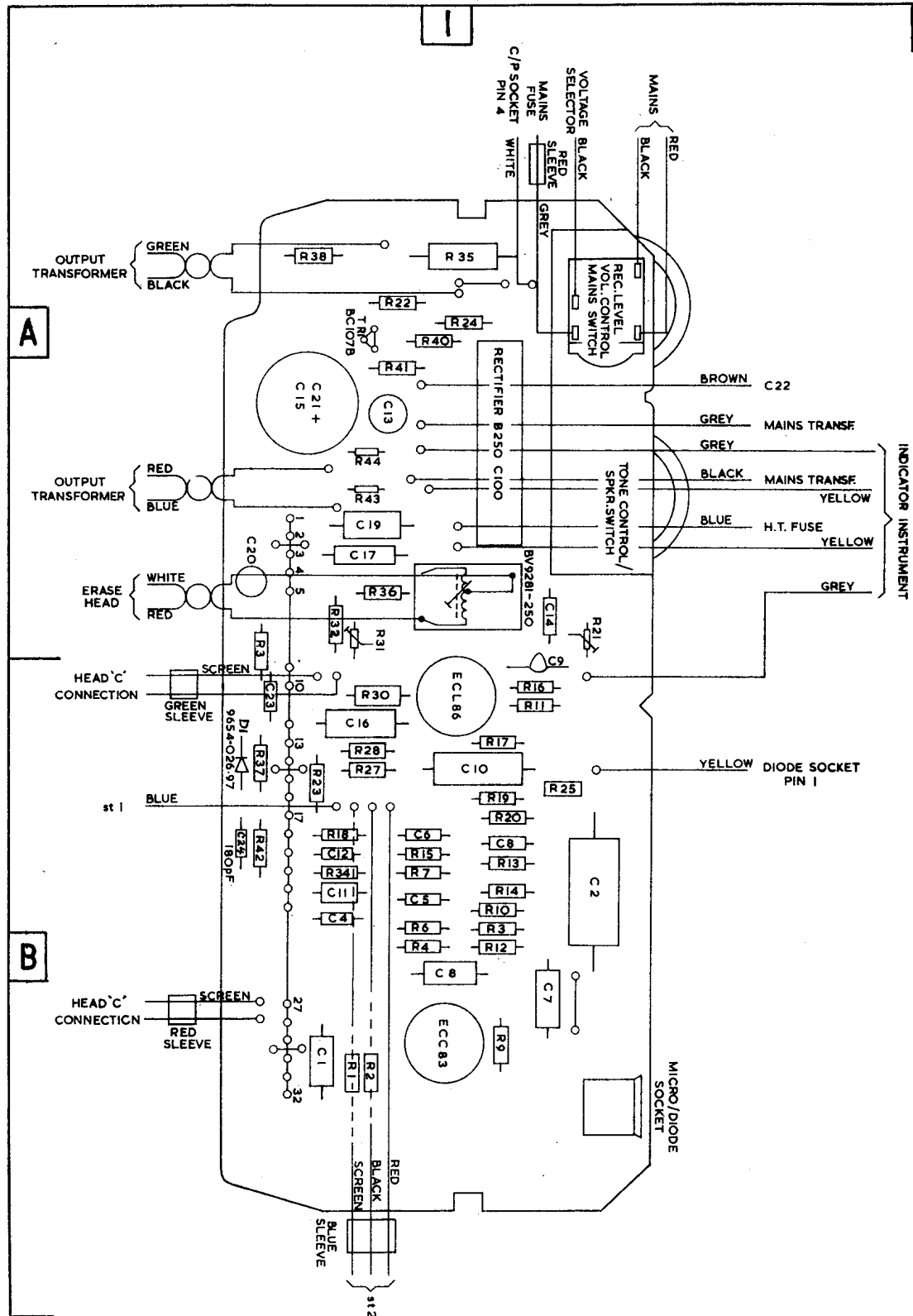


Fig. 1



# TUNGSRAM

## VALVES & SEMICONDUCTORS

BRITISH TUNGSRAM RADIO WORKS LTD  
WEST RD . LONDON N17. ORN . 01-808 4884

# For Service and Quality

under spring tension. The tension is such that the maximum expected torque is transferred without slip. A washer (4) (Fig. 2a) is soldered into the drive pulley. Later versions are fitted with a fuse ring (5) against which the spring exerts pressure. The solder of the fuse ring melts at 96 deg C. If the motor is stalled and its temperature rises, then the spring pushes away the soldered washer or compresses the soft metal of the fuse ring. This releases the stalling force. The motor can then rotate and cool down. If the fuse ring melts then only a new fuse ring need be inserted. The compression spring

and pulley groove must be cleared of any metal residue.

To convert the old version to the new type, fit a new drive pulley (2), fuse ring (5) and washer (7). If the recorder was not originally fitted with an overload protection, then the shorter compression spring (6) is also required. The flywheel drive belt must be parallel to the main chassis. The height of the drive pulley (2) may be adjusted as follows. To lower the pulley remove washer (9) and add another washer (8). To raise the pulley, remove washer (8) and fit a second washer (9). Pulleys of motors without a fan are raised or lowered by changing the numbers of washers fitted. One washer must always be adjacent to grip ring (23). To check the sound channel alignment remove the pressure band.

In the "Start" position, the tape must run freely through the tape guide. To adjust loosen the two screws and re-set bearing. The pressure roller must be in line with the centre of the tape and also the axes of the capstan shaft and pressure roller must be parallel. In the "Start" position and without tape, the pressure roller must rotate at its lowest level. Lift the roller and check that it returns to the original position after three to six rotations. If necessary, loosen screw and re-adjust the pressure roller plate.

The roller pressure against the capstan shaft should be  $600\text{gm} \pm 10$  per cent (21 ozs.). Correct by means of screw. The idler wheel must rotate in its uppermost position during fast rewind. Bend the idler wheel spindle bracket to correct. In the "Start" position, the idler wheel should clear the right-hand clutch by at least 0.5 mm (0.02in.). It should also clear the motor pulley by 1-2mm (0.04in.-0.08in.). Bend the spring locating lug to correct. The height of clutches are adjusted to wind the tape centrally between the flanges. The maximum per-

missible deviation is  $\pm 0.3\text{mm}$  (0.012in.). To correct, add or remove washers. Disconnect the recorder from the mains and select "Start".

The following clutch braking momentums must now be obtained. Left: Full spool 15grms, empty spool 45grms. Right: Full spool 15grms, empty spool 25grms. If the clutch frictions differ, select different locating points for the three felt friction discs. Non-symmetrical felt disc location is permissible. The brake rings must clear the clutches in the "Start" position by at least 0.8mm (0.032in.). They must also clear their end stops by at least 0.6mm (0.024in) when selecting "Stop". To correct the brake adjustment bend the end stops.

The pressure between clutch and fast wind pulley must be: Left-hand clutch 180-300grms (6.3-10.5ozs), Right-hand clutch 120-300grms (4.2-10.5ozs).

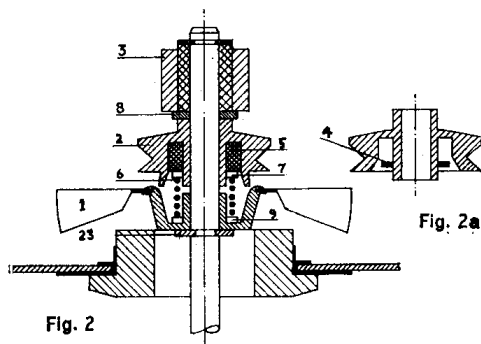


Fig. 2

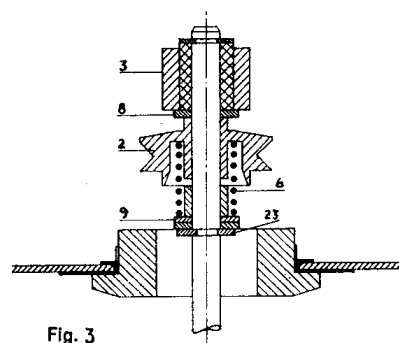
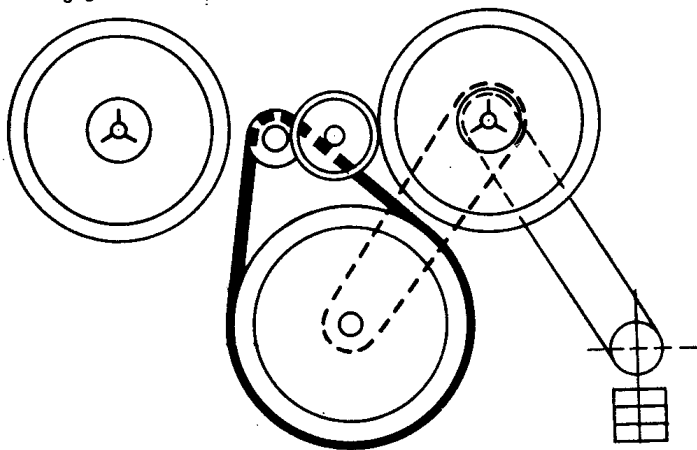


Fig. 3



Figs. 2 and 3, motor overload protection, drive pulley cross-section. Left, belt drive. Right, test networks (TN 1-6)

