

Fig. 1

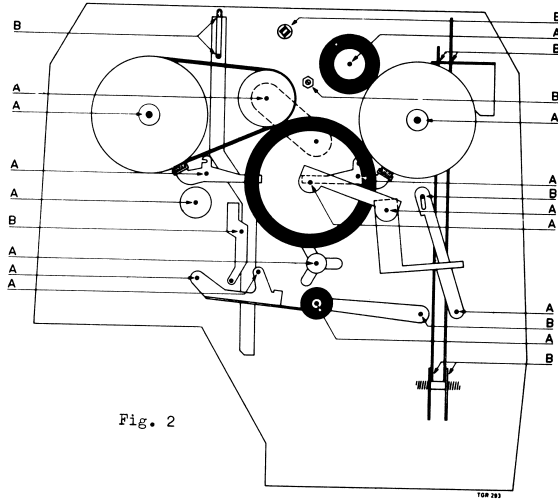
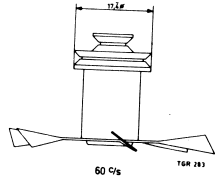
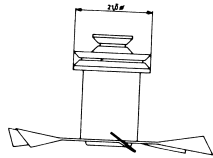


Fig. 2



60 C/s



50 C/s

Fig. 3

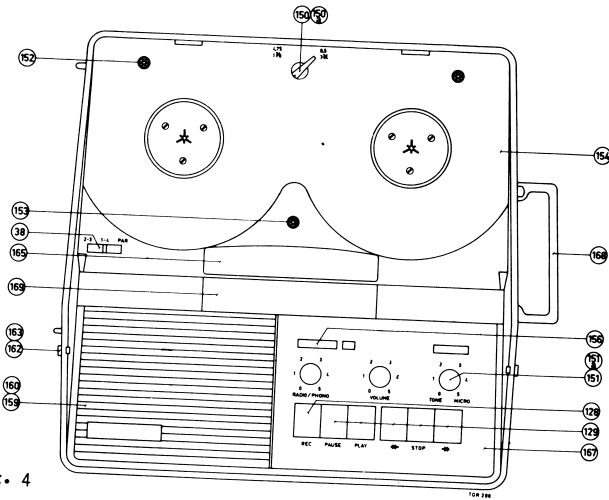


Fig. 4

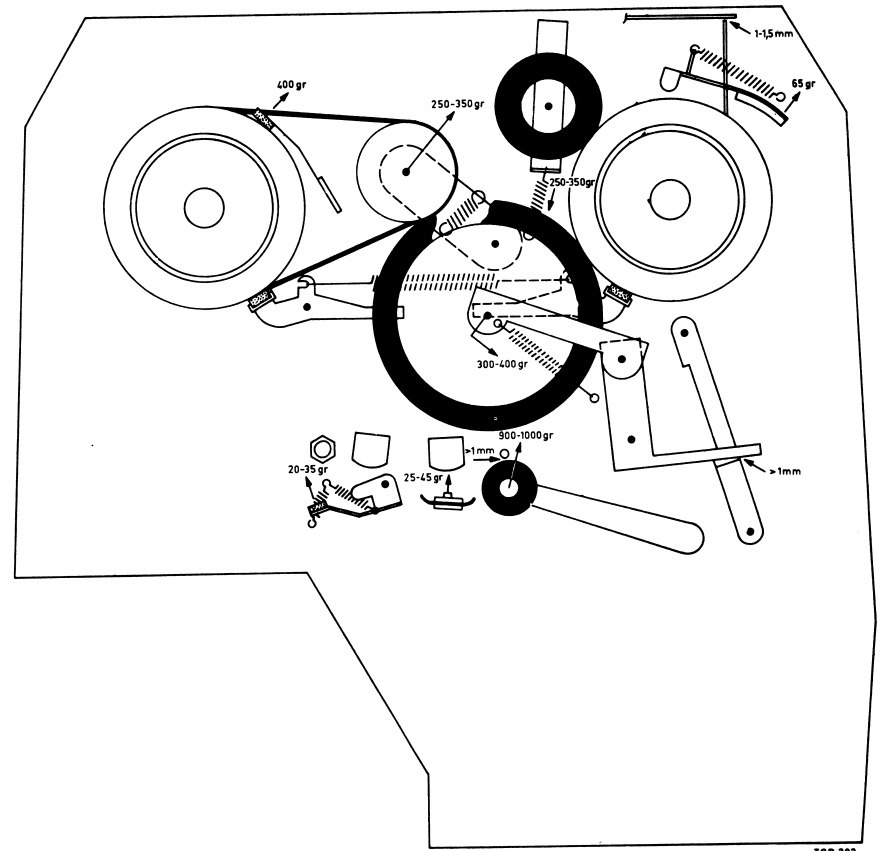


Fig. 5

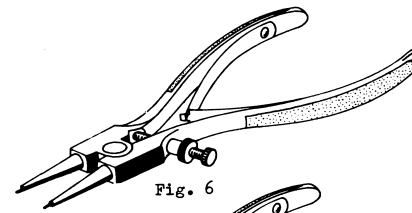


Fig. 6

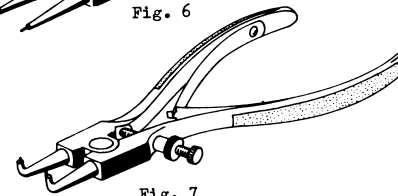


Fig. 7

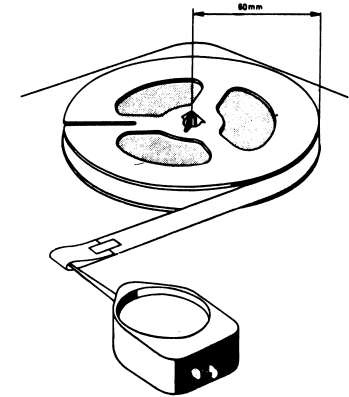


Fig. 8

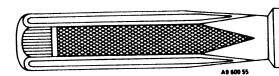
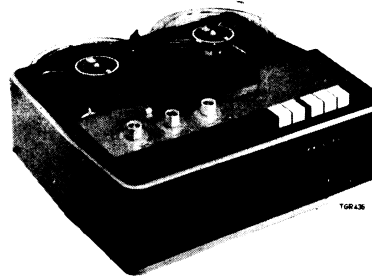


Fig. 9

# PHILIPS *Service*

## RECORDERS

### EL3548A/00



Power consumption : 60 W  
 Mains voltage : 110-127-220-245 V 50 c/s  
 Dimensions : 380 x 370 x 170 mm  
 Weight : 8,5 kg  
 Max. diameter of the reel : 7"  
 Connecting wire for connection to radio : EL 3768-03  
 Microphone : EL 3781-00  
 Loudspeaker : AD 3700X  
 Sensitivities : Microphone  
 1 mV 1 kΩ  
Diode  
 3 mV 20 kΩ  
P.U.  
 150 mV 500 kΩ

Loudspeaker output power: 2,2 Watt  
 Line output voltage : 1 Volt over 20 kΩ  
 Valves:  
 Modulation indicator : EL87  
 Pre-amplifier and output valve : EOL82  
 Transistors:  
 Pre-amplifier : OC58  
 Pre-amplifier : OC58  
 Pre-amplifier : AC126  
 Pre-amplifier : OC44  
 Oscillator : OC79

#### Maintenance

After approximately 500 operating hours it is advisable to clean the apparatus and to lubricate the various points.

#### Clean with white spirit or alcohol

Tape guides, erasing heads, recording/playback head, Capstan, Pressure roller, driving cords, tread of idler wheels, motor pulley and reel discs, brake blocks.

#### Clean with a brush

Felt pad against the left-hand tape guide; felt pad against the recording/playback head.

Lubricate lightly with X100 Multigrade 80-40 oil (see A in fig. 2)

Lower and upper bearing of the motor, bearing of intermediate wheels, bearing of reel discs, pressure roller bearing, upper fly-wheel bearing, bearing of the pulley, rotation points of the various brackets, brakes, etc.

#### Grease with Shell Alvania EP2 (see B in fig.2)

Guides of the brackets 102 and 103, rotation points of the brackets 102 and 103, guide of the standby brake bracket, the brackets of the push-button unit, teeth of the cord changer.

#### Lubricate with switch oil 971/71

The sliders of the switches SK1.

#### Replacement of various Parts fig. 4

Replacement of the following parts is facilitated by removing the mounting plate for the heads after the three screws 19 have been loosened.

- . Fly-wheel
- . Intermediate wheel
- . Pressure roller lever
- . "Pause" control bracket
- . Right-hand brake bracket
- . Operating bracket for brakes
- . Cord damping brush
- . Bracket for rewind roller

#### Taking the apparatus out of the case:

- . Pull the knobs pos.150 and 151 from the shaft.
- . Loosen the screws pos.152 and 153 .
- . Then press carefully the top cover pos. 154 upwards from the sides.
- . Attention should be paid to the wire to the loudspeaker.
- . The upper part of the tape recorder can then be repaired.
- . For repairs to the under side, e.g. to the printed wiring, it will suffice to remove only the bottom plate.
- . For this the screws pos.155 must be loosened.

#### Motor

- . Take the apparatus out of the case.
- . Put the apparatus upside down.
- . Attention should be paid to the reset key of the programme indicator.
- . Unsolder the motor connections.
- . Loosen the nuts pos. 6 and remove the motor.
- . Take the cord from the motor pulley.
- . Mounting is done in the reverse order.

#### Modification from 50 to 60 c/s and vice versa

From 50-60 c/s fig. 1

#### Mechanical

- . Take the apparatus out of the case.
- . Dismantle the motor.
- . Remove the pulley, pos.56
- . Fit a 60 c/s-pulley, code no. WY 876 10.
- . Make sure that the height of this pulley is the same as that of the 50 c/s-pulley.

#### Electrical

- . Solder the wire from the motor to the transformer, from point 2 to point 3
- . Solder the wire from the motor to the transformer, from point 5 to point 4

From 60 c/s - 50 c/s

The mechanical modification is identical to the 50-60 c/s modification, with the exception that a 50 c/s pulley (WY 855 10) is mounted instead of a 60 c/s pulley. fig. 3

#### Electrical:

- . Solder the wire from the motor to the transformer, from point 3 to point 2
- . Solder the wire from the motor to the transformer, from point 4 to point 5

#### Driving cord

- . Take the apparatus out of the case.
- . Loosen the screws pos. 19 by three turns.
- . Take the cord from the motor pulley
- . Lift the fly-wheel and remove the cord by passing it underneath the fly-wheel.
- . The cord is put into position again in the reverse order.
- . Make sure that the cord does not come into contact with grease.

#### Dismantling of the right-hand reel disc

- . Take the apparatus out of the case.
- . Loosen the three screws pos. 17 .
- . Remove the circlip
- . After the large idler wheel is slightly pushed backwards the entire reel disc can be pulled from the shaft.
- . This assembly can be dismantled after the retaining nut pos. 125 has been removed.
- . For the correct mounting order, see fig. 16 .

#### Push button unit

- . Dismantling of the complete unit facilitates repairs to the push-button unit.
- . The push-button unit can be easily dismantled as follows.
- . Take the apparatus out of the case.
- . Loosen the two screws 19 .
- . After this the complete push-button unit can be removed from the apparatus.

Erasing head

The height of the erasing head must be adjusted so that the tracks are fully erased and the tracks which are not be erased are attenuated by a maximum of 1.5 dB.

Insert a tape into the apparatus. Adjust the height by means of the three screws so that the upper core protrudes 0.1 mm above the top edge of the tape, fig. 13. The front of the head must be parallel to the tape.

Checking

Record a frequency of 1000 c/s, 100 % modulated, onto a tape of approx. 3 m. in length (track 3, position 2-3).

This is represented by the horizontally shaded part in fig.

Reverse the tape and erase a piece of tape of 1 m. in position 1-4. Then switch to position 2-3 and erase a further piece of tape of 1 m. Depress the stop-key.

The erased tracks are vertically shaded in fig. 12. Now the tape has been provided with three recordings; one where the lower side has been erased, one where the upper side has been erased, and one which has not been erased.

Reverse the tape, play back the recordings and measure the output voltage at the diode output with a valve voltmeter.

The difference in output voltage between V1-V2 and V1-V3 must not be more than 1.5 dB. Should the difference between V1 and V2 be too great then the head must be adjusted slightly lower.

Should the difference between V1 and V3 be too great then the head must be adjusted slightly higher.

After this the check must be repeated.

Erase the recording of track 3 and play back the erased track. No sound at all is then permitted.

Adjustment of the switches

SK1 Recording switch

Press the recording button. Push a pin of ± 1,5 mm. thickness into the hole of the switch (see fig. 10).

If this is not possible, then the adjusting lever 219 must be so bend that the pin can be easily pushed through the switch.

Checking: Press the stop button.

Here too it must be possible to push the pin easily through the switch.

SK3 Playback switch

Press the playback button.

Push a pin of ± 1,5 mm. thickness into the hole of the switch (see fig. 10).

If this is not possible, then the adjusting lever 216 must be so bend that the pin can be easily pushed through the switch.

Checking: Press the stop button.

Here too it must be possible to push the pin easily through the switch.

SK4 Track selector switch

In each position of this switch it should be possible to push a pin of 1,5 mm. thickness through the hole of the switch.

This can be adjusted by shifting the control unit pos. 37.

Adjustment of the Recording Play-Back head Fig.11

- Put the apparatus into position "stop".

- With the aid of the screws A and B adjust the head (without screening cap 48) perpendicularly and to the correct height.

- Insert a double play tape (e.g. EL 3915/80) into the apparatus.

- Push the pressure roller lever forwards, and check whether the tape is pulled against the head without touching the tape guide.

- Hold the bracket 36 with the pressure felt by hand.

If necessary tighten the tape a little by manually turning the right-hand reel disc anti clockwise.

Should the tape be caught at the upper or lower lip of the tape guide C, then the height of the head must be readjusted by means of the screws A and B.

- After having adjusted the head to the correct height it is necessary to adjust the air gap perpendicularly.

- Insert the test tape WT 939 15 into the apparatus.

- Switch on the apparatus and put it into position "play-back".

- Connect a valve voltmeter to BU6. Terminate in 5,6 Ω.

- Adjust to maximum output voltage on track 1-4 with screw B. Call this value "A". Then adjust the output voltage of track 2-3 to maximum. Call this value "B". Switch back to track 1-4 measure the output voltage. Call this value "C". The head is correctly adjusted when the difference between "A" and "C" is < 2 dB. Should the difference between "A" and "C" be > 2 dB then track 1-4 must be readjusted to maximum. Switch over to 2-3 and call this output voltage "D".

The difference between "B" and "D" must not be more than 2 dB.

SPARE PARTS OF THE CABINET

20	VT 610 07	Knob of track selector
128	208 00172	Push button - red -
129	208 00173	Push button - white -
150	215 00684	Knob of speed selector
150a	WT 766 21	Mounting spring for pos. 150
151	215 00683	Knob
151a	WRB 903 UW/ 7/32"	Clamping ring for pos. 151
152	WRB 801 UV/ 4x8	Screw
153	222 00123	Screw
154	215 00679	Upper part of case
155	999/4x8	Screw
156	VT 550 14	Lens
157	214 00847	Bottom plate
158	208 00175	Ring around bottom plate
159	208 00169	Loudspeaker grill
160	222 00122	Self tapping screw
161	215 00681	Lid of case
164	215 00682	Lid of flex compartment
165	208 00171	Cover plate above heads
166	VU 960 00	Rubber foot
167	208 00184	Indication plate
168	208 00174	Handle
169	215 00708	Cover plate above pressure roller

Remark : The torque of the brakes and the winding friction must be measured as given in fig. 8 For this it is necessary that a full 5" (13 cms) reel is used. Make a loop at the end of the tape by means of the piece of adhesive tape. The hook of the spring tension meter can then be passed through this loop.

Adjustments : Fig. 5

Brake : When the brakes are released, the brake block must be 1 mm from the reel disc. The following survey gives the brake forces in the stop position.

The left-hand reel disc

Rotation, anti clockwise 75-95 gr  
Rotation, clockwise 40-50 gr

The right-hand reel disc

40-50 gr  
75-95 gr

This must be measured as shown in fig. 8

Fly-wheel : The vertical play of the fly-wheel must amount to 2.2 mm. This play can be adjusted by means of the nylon screw 85 on the underside of the apparatus.

Motor Pulley : The height of the motor pulley must be adjusted so that the groove in the fly-wheel is located just between the two grooves in the motor pulley.

Speed Selector lever :

Cord-Changer : The height of the cord-changer must be so adjusted with collar screw 81 that the beginning or the end resp. of the groove is at the same height as the cord groove in the pulley.

Idler wheel : In position "play-back" the idler wheel 28 must be pulled against the fly-wheel and the driving ring with a force of approx. 300-400 grams.

Commanding lip for idler wheel: during play-back the distance between lip A and bracket 96 must be approx. 1 mm.

Recommended Tools

Slotted Nut Driver Fig. 9

Supplementary to the tool bag 968/0X a new tool has been designed.

The part on the left serves for turning slotted nuts which are used for fitting the recording/play-back head.

The part on the right serves for positioning cords and springs.

The tool is to be used in combination with the handle from the above-mentioned tool bag.

Code numbers:

A9 600 55	Handle
A9 600 54	Slotted Nut Driver

Winding friction of right-hand reel disc: In position "play-back" the winding friction must be 20-30 grams, measured with a full 5" reel as shown in fig. 8

Brake felt pad of the right-hand reel disc: In position "fast re-winding" the brake force for the right-hand reel disc must be 6-8 grams. This must be measured with a full 5" reel as shown in fig. 8

Rapid stop : When the rapid stop key is not depressed, the distance between the brake shoe and reel disc must be approx. 1 mm. In the depressed position, the pressure roller must be released from the capstan by approx. > 1 mm. In this position the brake force for the left-hand reel disc must be approx. 70 grams. This again must be measured with a full 5" reel as given in fig. 8.

Re-winding Pulley 68 : In position "fast re-winding" the re-winding idler wheel must be pressed against the motor pulley with a force of 220 to 250 grams.

Pressure roller 105 : In position "play-back" the pressure roller must press against the capstan with a force of 800-1200 g. The force by which the tape is pulled through the apparatus must be 500 gr.

Pressure Felt Pad : Against recording/play-back head. In the position "play-back" the pressure felt pad must press against the recording/play-back head with a force of 25-40 grams.

Pressure Felt Pad : Against the left-hand tape guide. During play-back the pressure felt pad must be pressed against the left-hand tape guide with a force of 20-35 grams.

Cireclip Expanding Pliers

These pliers facilitate removal of the cireclips applied in this apparatus.

They are supplied in two versions viz. long nose pliers (see fig. 6 ) and off-set pliers (see fig. 7 ).

Code numbers:

A9 600 30	Cireclip Expanding Pliers (off-set)
A9 600 59	Cireclip Expanding Pliers

Spring Tension Meter

In order to measure the exact forces of the frictions and tensions of the springs, Central Service supplies two spring tension meters.

One has a range of 3-30 gr. Code No. A9 024 02  
The other 50-500 gr. Code No. A9 024 01

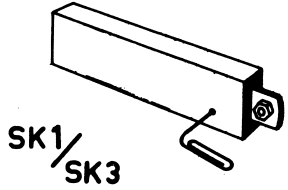


Fig. 10

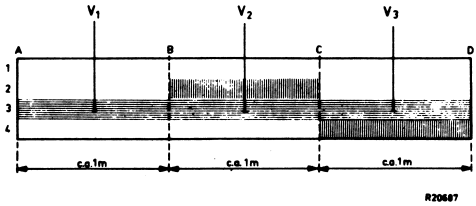


Fig. 12

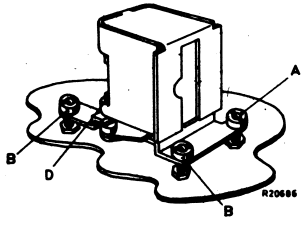


Fig. 11

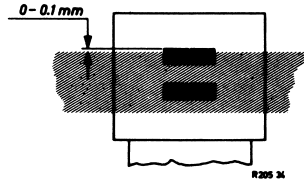


Fig. 13

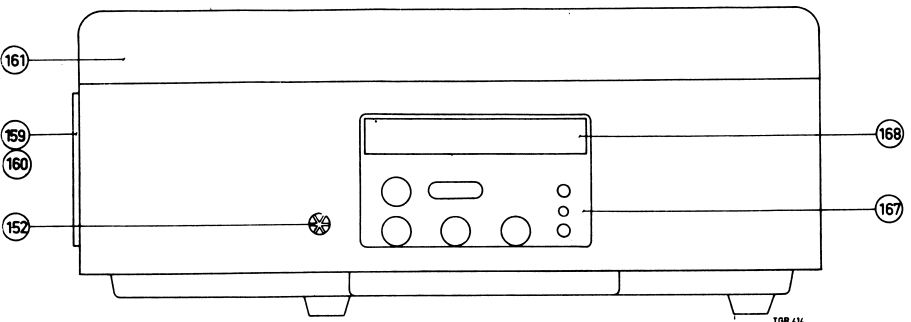
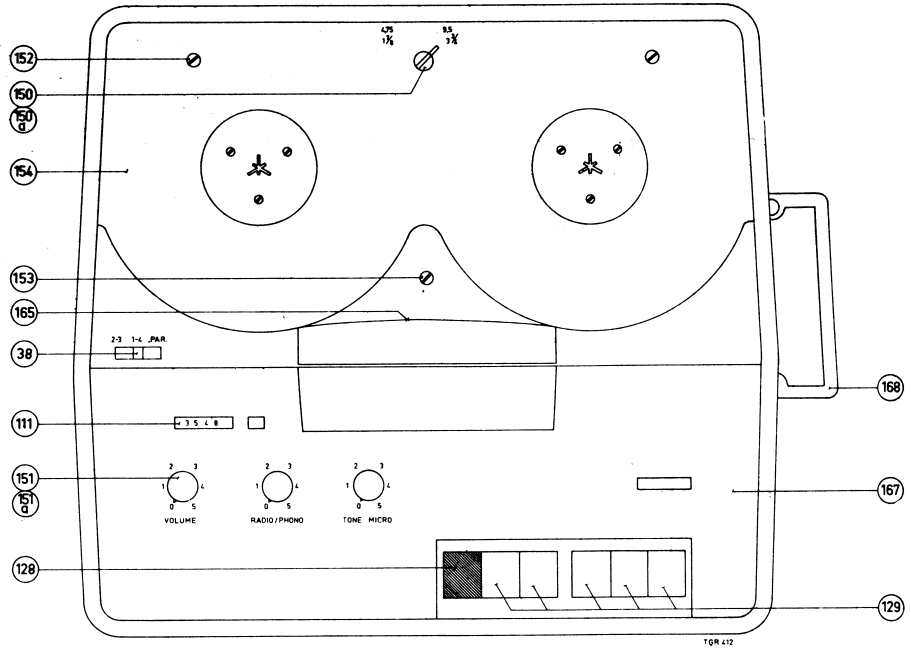
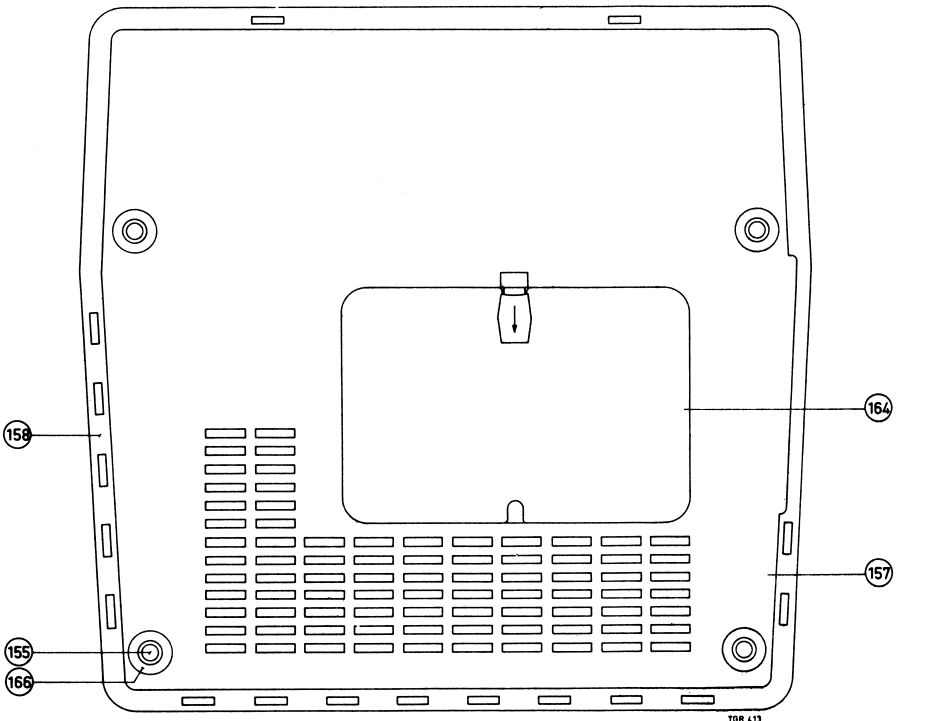


Fig. 14





Stage-Amplification "Recording"-p.u. 9.5 cm/sec.

- Put the track selector into position 1-4.
- Put the apparatus into position "recording" by depressing the recording key only.
- Turn R15 to maximum.
- Adjust R46 to 0.1 of its maximum (see table).
- Apply a signal of 140 mV, 1000 c/s, to the p.u. input.
- The following a.c. voltages must now be measured ( $\pm 10\%$ )

Base TS1	B1	0,27 mV
Collector TS1	K1	16,5 mV
Base TS3	B3	7,5 mV
Collector TS3	K3	10 mV
Emitter TS3	E3	7 mV
Base TS4	B4	10 mV
Collector TS4	K4	1,1 V
Top of R46		1,1 V
Sliding contact of R46		110 mV
Control grid B2a	point 1	90 mV
Anode B2a	point 9	1,1 V
Anode B2b	point 6	26 V
Top of R44		700 mV
Control B1	point 1	350 mV
Anode B1	point 9	4 V
BU5	point 4	15 mV
BU6		0,85 V

Stage Amplification "Play-back 9.5 cm/sec".

- Apply a signal of 1000 c/s to the headphone connection BU5, point 4 via a resistor of 47 k $\Omega$ .
- Adjust the amplitude of this signal to 270 mV.
- Switch the apparatus into position "play-back", track 1-4.
- Turn R46 to 0.1 of its maximum.
- The following a.c. voltages (see table) must now be measured ( $\pm 10\%$ ).

Base TS2	B2	0,57 mV
Collector TS2	K2	21 mV
Base TS3	B3	21 mV
Collector TS3	K3	12 mV
Emitter TS3	E3	20 mV
Base TS4	B4	12 mV
Collector TS4	K4	1,5 V
Top of R46		1,5 V
Sliding Contact of R46		150 mV
Control grid B2a	point 1	120 mV
Anode B2a	point 9	1,5 V
Anode B2b	point 6	35 V
BU6		1,1 V

MEASUREMENTS

The following voltages can be measured when the apparatus has been switched on. The voltages are to be measured with respect to the chassis by means of a moving coil meter of 40,000 $\Omega/V$  (P 817 01).

+1	185 V	$\pm 10\%$
+2	154 V	$\pm 10\%$
-1	-22 V	$\pm 10\%$
-2	-19 V	
-3	-15 V	
-4	-10 V	

The voltages of the transistors are as follows:

	Collector	Emitter
TS1	K1 = 4.45 V	E1 = 1.45 V
TS2	K2 = 4.45 V	E2 = 1.45 V
TS3	K3 = 9.5 V	E3 = 2 V
TS4	K4 = 8.3 V	E4 = 3.2 V

The above voltages must be measured with a moving coil meter, 40,000  $\Omega/V$  (P 817 01). Unless mentioned otherwise all voltages have a tolerance of 20 %.

ELECTRICAL PARTS LIST

TS1	0C58	C6	C 426 AM/B100
TS2	0C58	C7	909/W10
TS3	AC126	C9	909/W10
TS4	0C44	C10	909/W200
TS5	0C79	C11	C 426 AM/B100
B1	EM87	C16	909/W10
B2	ECL82	C17	AC 5483/50+32+32
GR1	0A70	C18	C 435 CF/G64
GR2	WRE 981 21/860	C19	909/X3,2
Z1	974/63	C20	C 426 AM/B100
SK1	WY 885 29	C30	C 426 AM/B100
SK2	WY 849 09	C31	C 436 CE/G160
SK3	215 00688	C36	909/W100
SK4	WY 885 31	C40	906/V10K
SK5	WY 849 09		
SK6	A3 786 80	R5	E 097 AC/500K
T1	JR 148 04	R15	916/GL20K
T2	JR 148 03	R16	916/GL20K
L1	WT 562 35	R23	E 097 AC/1K
L2	WT 562 31	R31	E 097 AD/5K
C1	909/W10	R33	E 097 AD/50K
C2	909/W10	R44	E 097 AD/50K
C3	909/W200	R46	916/GL20K
C4	909/W10	R56	E 097 AD/50K
C5	C 426 AM/B100	R58	E 097 AD/50K

ADJUSTMENT OF R5

- Switch the apparatus into position "RECORDING", track 1-4, speed 1 7/8"/sec. by depressing the recording key.
- Apply a signal of 1000 c/s, 24 mV  $\pm 0.5$  dB, to BU2, point s or q.
- Connect a valve voltmeter to BU5, point 4.
- Turn R15 to maximum and R16 to minimum.
- Adjust the voltmeter reading to 3 mV with R5.

ADJUSTMENT OF R23

- Switch the apparatus into position "PLAYBACK" track 1-4, speed 1 7/8"/sec.
- Turn R15 - R16 and R46 to minimum.
- Connect a valve voltmeter to the diode output BU4, point 3.
- Apply a signal of 1000 c/s to BU5, point 4, via a resistor of 100 k $\Omega$ . Adjust the amplitude so that the valve voltmeter shows a reading of 90 mV.
- Change the frequency to 10000 c/s and keep the input voltage the same as with 1000 c/s.
- Adjust the voltmeter reading to 90 mV with R23.

ADJUSTMENT OF R33

- Switch the apparatus into position "PLAYBACK", track 1-4, speed 3 3/4"/sec.
- Turn R15- R16 and R46 to minimum.
- Connect a valve voltmeter to the diode output BU4, point 3.
- Apply a signal of 1000 c/s via a resistor of 100 k $\Omega$ . Adjust the amplitude so that the voltmeter shows a reading of 58 mV.
- Change the frequency to 60 c/s.
- Adjust the output voltage to 700 mV  $\pm 0.5$  dB with R33.

ADJUSTMENT OF L1

- Apply a signal of 10000 c/s, input voltage 24 mV, to the P.U. input BU2, point s or q.
- Connect a valve voltmeter to headphone output BU5 point 4.
- Turn R15 to maximum and R16 to minimum.
- Depress the recording key.
- Switch the apparatus to key 1-4, speed 1 7/8"/sec.
- Adjust the output voltage to 20 mV with the core of L1.

ADJUSTMENT OF L3

- Connect a valve voltmeter to the headphone output BU5, point 4.
- Switch the apparatus into position "RECORDING" track 1-4.
- Adjust the voltmeter reading to maximum with the core of L3.

ADJUSTMENT OF R56/R58 - BIASING CURRENT

The biasing current ought to be readjusted after the recording/playback head has been replaced.

- For this switch the apparatus to 3 3/4"/sec., track 1-4 (2-3).
- Record signals of 1000 and 15000 c/s, input voltage 11 mV on BU2, point 3. Volume control R15 at maximum.
- Play this recording back and measure the output voltage at the diode output BU4, point 3. The difference between the output voltages of 1000 and 15000 c/s should not be more than 6 dB.
- Should the difference be greater, then reduce the current with R56 (R58).
- Make a recording of 1000 c/s, input voltage 110 mV.
- When playing back the distortion should not amount to more than 5 %.
- Should it be more, then the biasing current must be increased.
- Thus a compromise must be made between frequency response and distortion.
- The biasing current can be measured as voltage at the headphone output. BU5, point 4 or 5 for K1 or K101 resp.
- This voltage can vary between 60 and 110 mV.

ADJUSTMENT OF R44

- Switch the apparatus to 9.5 cm/sec., track 1-4.
- Turn R15 to maximum.
- Connect a valve voltmeter to the headphone output BU5, point 4.
- Depress the recording key.
- Apply a signal of 1000 c/s to the P.U. input BU2 point 5 and adjust the amplitude so that the voltmeter shows a reading of 15 mV.
- Adjust R44 so that the modulation indicator shows exactly 100 %.

1	988/3	Ring 3 mm	76	WT 479 80
2	993/M3	Nut M3	77	WT 892 17
3	987/3	Toothed ring	78	VT 610 06
4	984/3	Retaining clip	79	WT 940 03
			80	214 00842
6	993/M4	Nut M4	81	WT 646 99
7	988/4	Ring 4 mm	82	WT 046 74
8	984/4	Retaining clip	83	215 00686
9	985/4	Cerclip	84	B 020 AD/8
10	A9 868 66.1	P.V.C. washer	85	VT 590 01
11	988/5	Ring 5 mm	86	214 00848
12	984/5	Retaining clip	87	WT 741 93
13	985/5	Cerclip	88	VT 610 05
14	984/6	Retaining clip	89	WT 036 53
15	999/2.6x8	Screw M2.6x8	90	215 00676
16	999/3x6	Screw M3x6	91	WT 837 60
17	998/3x10	Screw M3x10	92	WT 742 00
18	999/3x10	Screw M3x10	93	WT 742 13
19	999/4x8	Screw M4x8	94	WT 897 36
20	999/4x50	Screw M4x50	95	WT 837 53
21	999/3x15	Screw M3x15	96	WT 046 83
22	990/4.5x50	Spacer	97	WT 032 34
23	988/6	Washer	98	WT 832 07
24	984/6	Retaining clip	99	215 00685
25	WT 897 43	Bracket with shaft for idler (wheel)	100	WT 837 70
26	WT 742 02	Tension spring	101	WT 760 37
27	WT 837 71	Intermediate bracket	102	WT 837 61
28	WT 888 90	Idler wheel	103	WT 837 59
29	WT 857 19	Erasehead	104	P5 515 93/304
30	WT 924 52	Nut	105	WT 881 66
31	WT 730 47	Pressure spring	106	P5 515 93/304
32	WT 458 58	Tape guide	107	WT 731 03
33	WT 046 73	Tape guide bracket	108	971/67
34	WT 741 98	Tension spring	109	WT 837 63
35	WY 820 38	Pressure pad (felt)	110	WT 742 06
36	WT 837 68	Lever	111	215 00689
37	WT 885 15	Selector	112	WT 496 63
38	VT 610 07/FY	Selector knob	113	WT 742 10
39	212 00388	Bracket	114	214 00843
40	WT 741 77	Tension spring	115	VT 575 02
41	WT 479 12	Stop roll	116	WT 279 55
42	VT 575 02	Turntable	117	WT 065 56
43	WHB 950 WK/5.2x9x0.5	Plastic washer	118	WT 890 91
44	WY 849 09	Switch SK2 - SK5	119	208 00164
45	WY 885 13	Turntable-lower part-	120	WT 890 78
46	VU 950 03	Driving belt	121	WT 575 03
47	WT 851 82	Bearing of flywheel	122	WT 889 99
48	WT 857 72	Mu-metal screen	123	WT 730 93
49	WT 924 58	Slotted nut	124	WY 885 42
50	WT 857 24	Recording playback head	125	220 00306
51	WT 730 96	Pressure spring	126	WT 824 25
52	WT 924 52	Nut		
53	WT 458 58	Tape guide	128	208 00172
54	WT 065 72	Tape guide bracket	129	208 00173
55	WT 730 89	Pressure spring	130	WT 307 54
56	WT 885 10	Motorpulley 50 c/s	131	WT 307 56
57	WY 876 10	Motorpulley 60 c/s	132	WT 307 54
58	WT 837 75	Bracket with pressure felt	133	WT 307 53
59	WT 742 12	Tension spring	134	WT 307 52
60	WT 837 76	Control bracket	135	WT 307 55
	WHB 905 TU/8x1	Grommet		
61	JW 315 70	Motor	136	WT 731 00
62	WT 742 05	Tension spring	137	WT 742 08
63	WT 279 62	Brake shoe	138	WT 824 07
64	WT 837 55	Left hand brake	139	WT 934 53
65	WT 837 67	Bracket with brake cork	140	WT 741 81
66	WT 742 11	Tension spring	141	WT 681 22
67	WT 837 56	Control bracket for brake	142	WT 741 25
68	WT 883 10	Rewind pulley	143	WT 801 28
69	WT 046 82	Control bracket for "pause-stop"	144	WT 032 39
70	WT 837 58	Bracket with shaft for re-wind pulley	145	WT 741 25
71	214 00841	Lever	146	VU 984 00
72	WT 742 01.	Tension spring	147	214 00849
73	WT 741 97.	Tension spring		215 00687
74	WT 496 63	Drive belt		

Flywheel
Speed switch mechanism (complete)
Gear section
Belt shifter
Leaf spring
Bearing screw
Mounting bracket
Control mechanism for recording (switch)
Bearing screw
Version spring
Tension spring
Nylon pressure piece
Control bracket
Idler wheel
Brake felt for righthandturntable
Tension spring
Tension spring
Bracket with shaft
Righthand brake bracket
Control bracket
Mounting bracket
Damping brush (roller)
Control mechanism for pressure (switch)
Control mechanism for playback (switch)
Torsion spring
Winding bracket
Rewinding bracket
Washer
Pressure roller
Washer
Pressure spring
Ball
Pressure roller lever
Tension spring
Counter
Driving belt
Tension spring
Control mechanism for pause
Turntable
Felt pad
Guide bracket
Righthand turntable-lower part-
Bearing
Driving disc
Friction disc
Metal disc with feltring
Pressure spring
Driving wheel
Nut
Mask
Push button - red -
Push button - white -
Bracket - winding -
Bracket - stop -
Bracket - rewinding -
Bracket - playback -
Bracket - pause -
Bracket - recording -
Pressure spring
Tension spring
Stop bracket
Locking bracket
Tension spring
Tension spring
Bracket
Bracket
Tension spring
Damping strip
Control mechanism

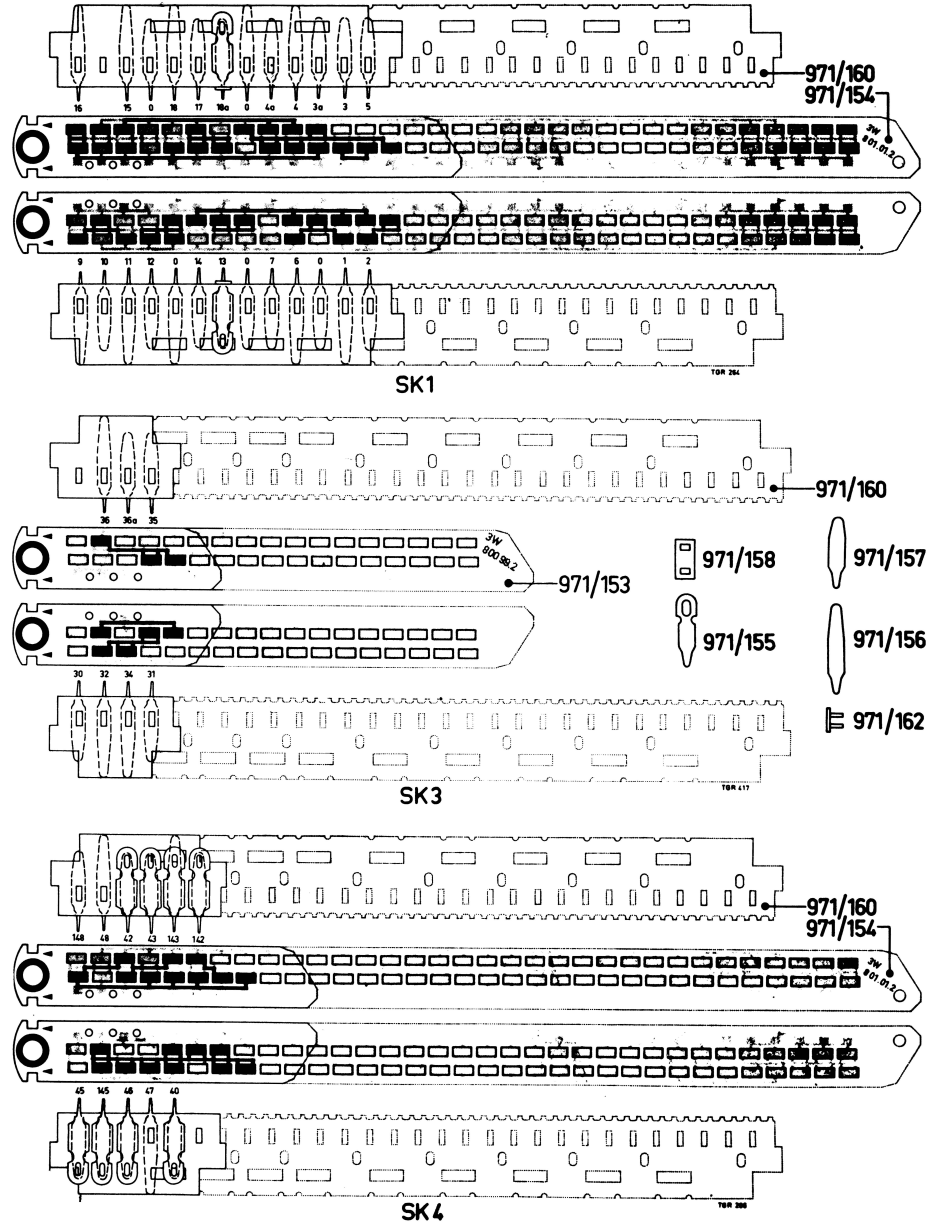


Fig. 19

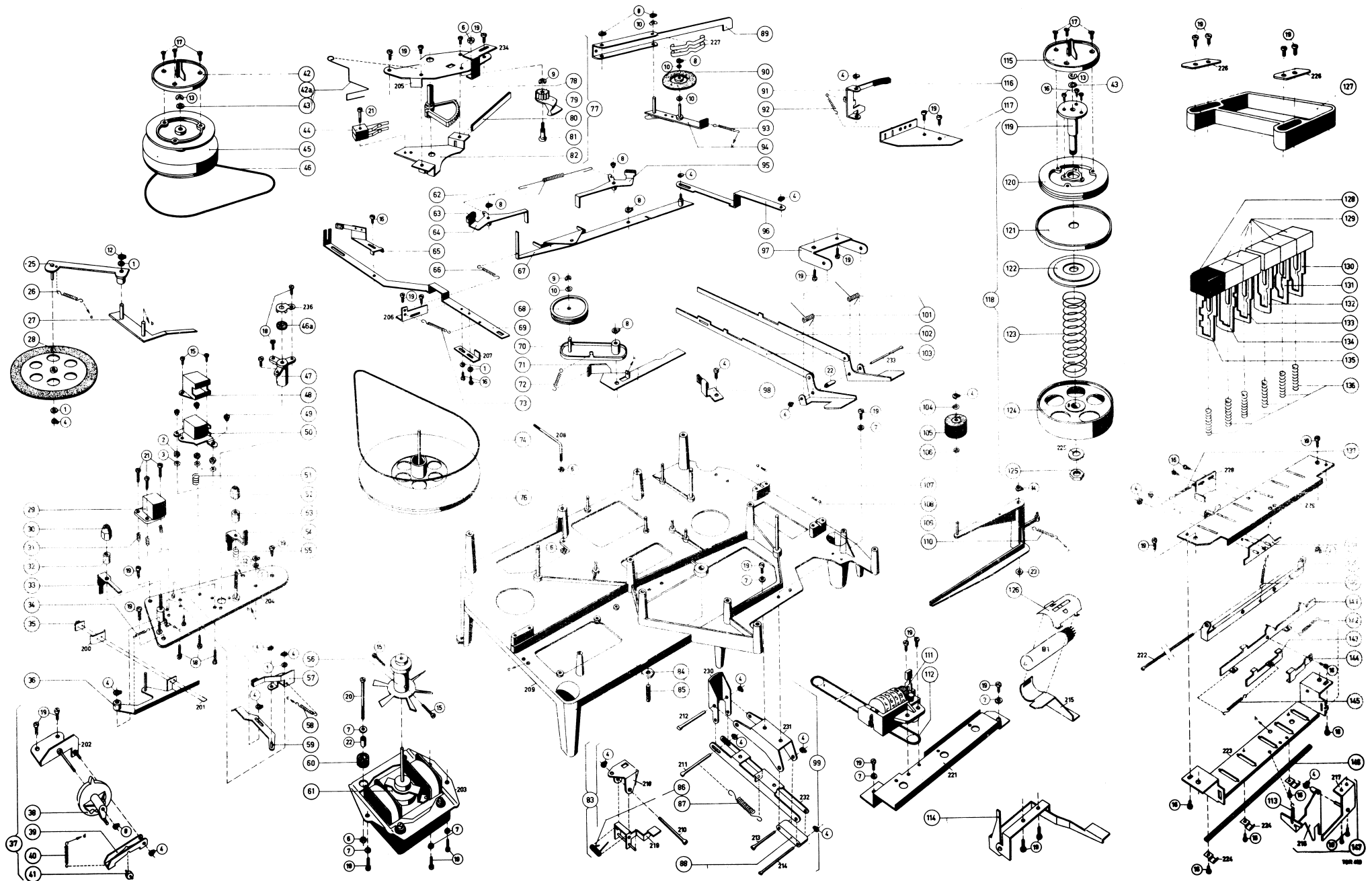
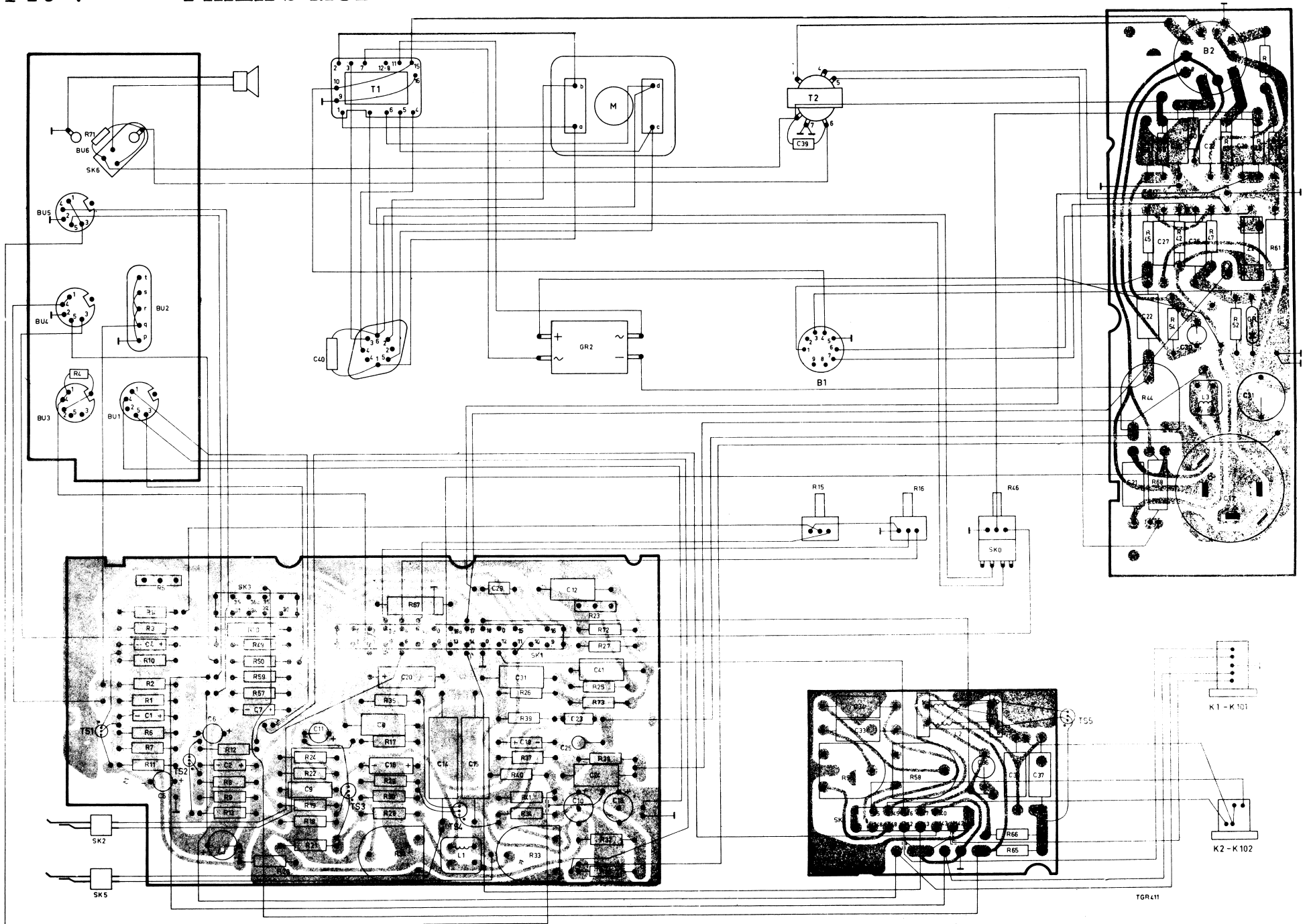


Fig. 16



R:	4.	1.	2.	3.	6.	7.	8.	9.	10.	11.	5.	16.	14.	15.	49.	50.	17.	57.	18.	19.	73.	51.	58.	22.	24.	28.	23.	25.	26.	33.	30.	27.	29.	30.	31.	34.	58.	35.	56.	27.	40.	41.	72.	67.	46.	70.	48.	52.	95.	94.	54.	55.	39.	80.	62.	63.	44.	61.	45.	42.	38.	88.	32.	47.	88.	71.	20.	52.
C:	1.	2.	5.	4.	6.	7.	29.	8.	9.	14.	11.	15.	41.	13.	16.	21.	24.	19.	20.	33.	34.	12.	67.	46.	70.	48.	52.	95.	94.	54.	55.	39.	80.	62.	63.	44.	61.	45.	42.	38.	88.	32.	47.	88.	71.	20.	52.	28.	36.	37.	38.	30.	35.	13.	23.	25.	31.	22.	18.	48.	74.	26.	27.	39.	3.			

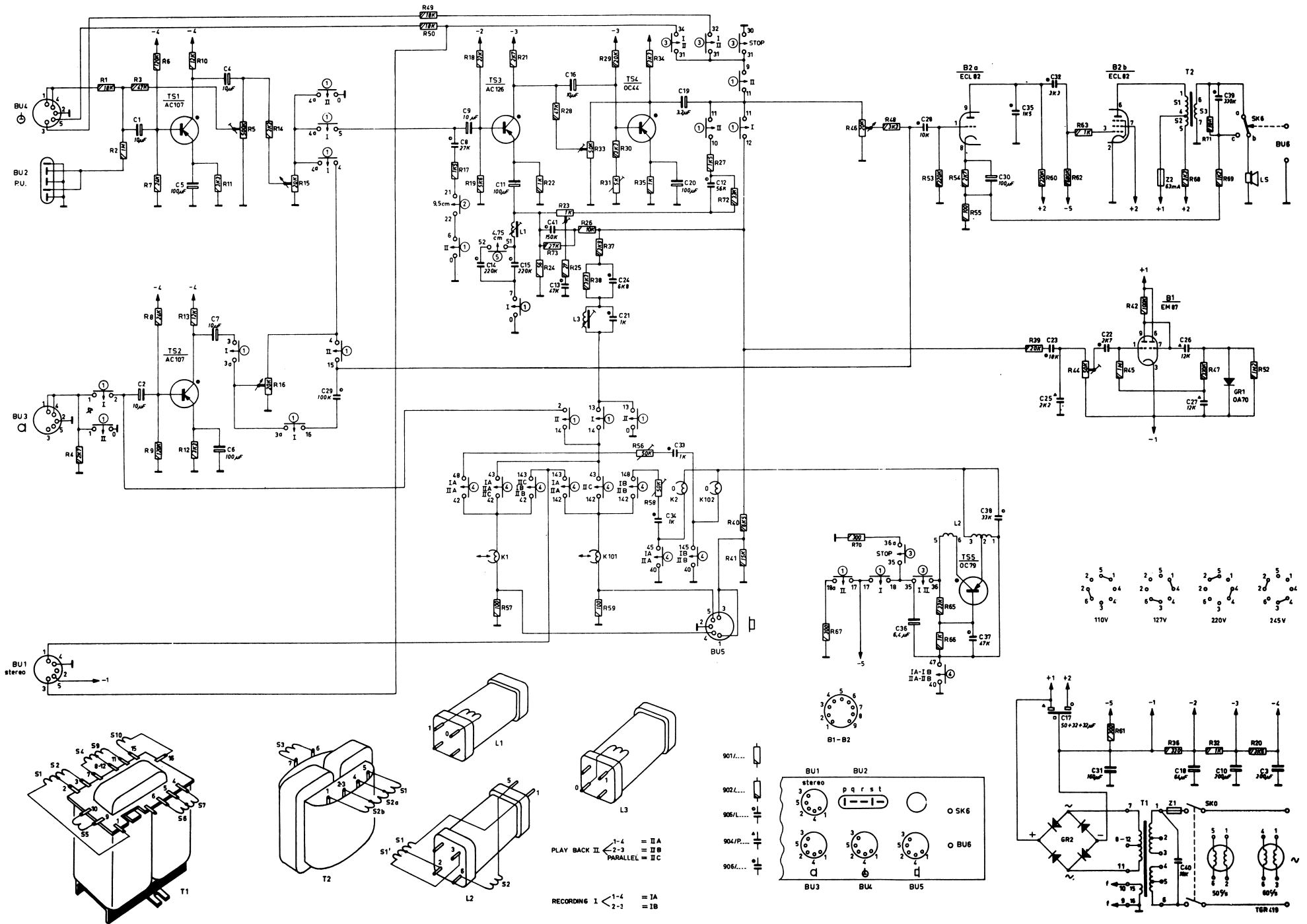


Fig. 18

TROUBLE SHOOTING

<u>PHENOMENON</u>	<u>POSSIBLE CAUSE</u>	<u>REMEDY</u>		
1. Apparatus does not work at all.	1. a. Defective thermal fuse on main transformer. b. Interrupted mains flex/plug.	1. a. Trace the fault, if any, and fuse. b. Check by means of an Ohm-meter.		
2. Apparatus does not work.	2. a. Belt has run off the pulley. b. Faulty motor.	2. a. Position the belt and check the position of the brush. b. Check the motor bearing or replace the motor.		
3. Apparatus does not work electrically.	3. a. Blown fuse.	3. a. Trace the fault and replace the fuse.	12. Distortion during recording.	12. a. Tape is not properly pressed against the recording/playback head. b. Too low a biasing current. c. Fault in amplifier.
4. Apparatus does not wind fast.	4. The winding idler wheel is slipping on the pulley or right-hand reel disc.	4. Degrease with methylated spirits.		12. a. Check the pressure felt against recording/playback head. b. Readjust the biasing current c. Locate the fault and repair.
5. Apparatus does not rewind.	5. a. Rewinding belt has run off the pulley. b. Rewinding wheel is not properly pulled against the motor pulley.	5. a. Reposition the belt. b. Readjust.	13. Low sensitivity and distortion during recording.	13. No biasing current.
6. Apparatus brakes poorly or not at all.	6. a. Brake spring has come undone. b. Brake shoe is greasy or dirty.	6. a. Reposition and check the brake force. b. Degrease with methylated spirits.	14. The tape is wound insufficiently taut during fast rewinding.	14. Insufficient pressure of.
7. Apparatus does not record.	7. a. Fault in amplifier. b. Recording/playback head with short circuit winding. c. Too great a biasing current.	7. a. Locate the fault and repair. b. Replace the head. c. Readjust the biasing current	15. The tape is wound insufficiently taut during fast winding.	15. a. Counter belt has run off the pulley. b. Insufficient pressure of pressure felt against the left-hand tape guide.
8. Apparatus does not playback.	8. a. Fault in amplifier. b. Interrupted loud-speaker switch.	8. a. Locate the fault and repair. b. Repair or replace.	16. Poor reproduction.	16. a. Worn pressure felt for b. Dirty tape. c. Groove in tape guide of d. Dirty recording/playback head.
9. Wow	9. a. Greasy driving belt. b. Flywheel does not run smoothly. c. Winding friction of right-hand reel disc is too great. d. Brake of rapid stop rubs against left-hand reel disc. e. Pressure roller does not run smoothly. f. Capstan is bent.	9. a. Degrease with methylated spirits. b. Clean and lubricate the bearing. c. Clean the friction and adjust the spring pressure, if necessary. d. Readjust the brake block e. Replace pressure roller + shaft. f. Replace the flywheel.	17. Hum during playback.	17. Mu-metal screening does not properly fit to the recording/playback head.
10. Loop forming after switching on "playback" 1.	10. Incorrect winding friction of the right-hand reel disc.	10. Clean the friction and adjust the spring pressure.	18. The tape is erased poorly or not at all.	18. a. Dirty erase head. b. Incorrect height of erase head. c. Tape is incorrectly positioned against the erase head.
11. Noise during playback.	11. a. Fault in amplifier. b. Magnetised recording/playback head.	11. a. Locate the fault (transistor) and repair. b. Switch the apparatus a few times on and off in position "recording".		18. a. Clean the erase head with methylated spirits or alcohol. b. Adjust the height. c. Check to see that the pressure felt pad against the left-hand tape guide.

# PHILIPS *Service*

## INFORMATION

### RECORDERS



6-3-1964	EL 3548A/00	Bc 461
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. The accompanying diagrams contain some modifications which have been made to obtain improved reproduction of high notes. The modified part are : R8-R9-R74 and C18-C25-C35-C42.

. Adjusting R31

- . Set the apparatus to "reproduction".
- . Connect a voltmeter between collector and emitter of TS3.
- . Adjust the voltage between collector and emitter to 7.5 V by means of

Note : During this measurement the volume control should be set to minimum.

- +1 in fig. 20 has to be 185 V.

LIST OF MECHANICAL PARTS, 1964

Delete

Item 100 WT 837 70 Control mechanism

Add

Item 127 4822 208 00174 Handle  
On pages 6-7 this part is indicated as item 168.

LIST OF ELECTRICAL PARTS,

Z1	A3 425 53	Fuse on supply transformer
L3	WT 562 30	Choke
	4822 215 00873	Loudspeakerconnection

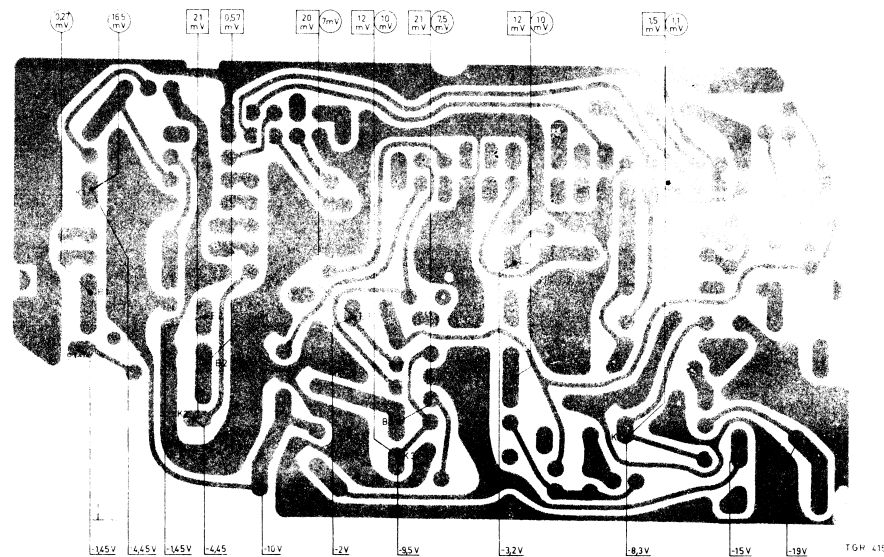
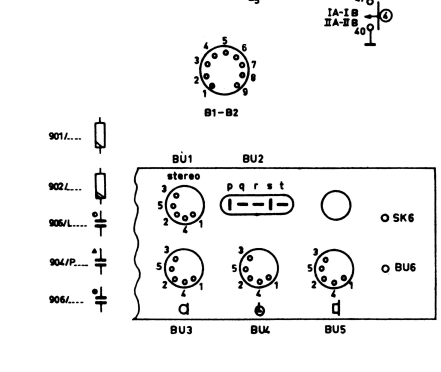
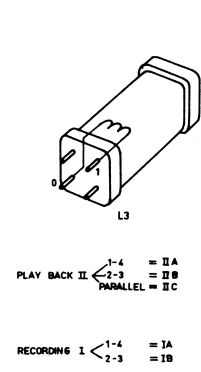
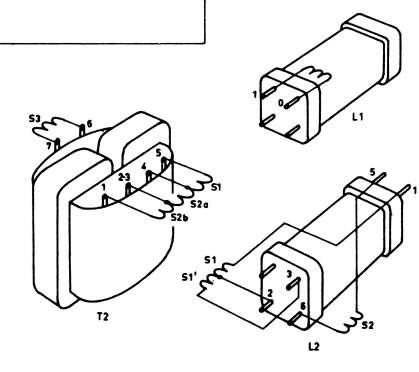
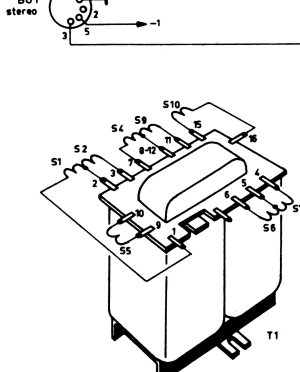
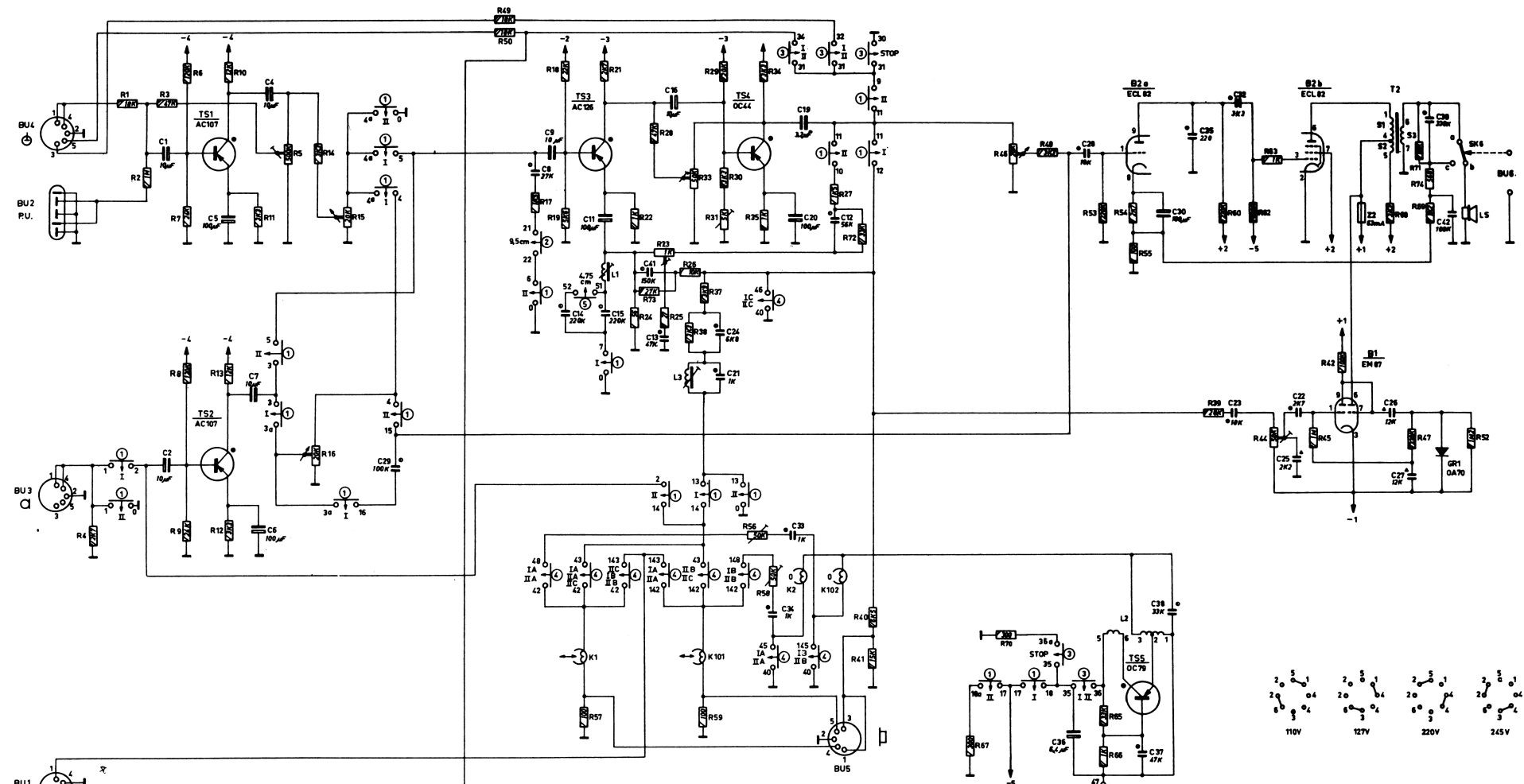


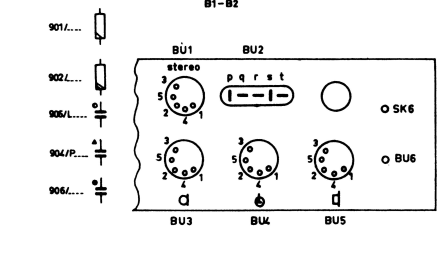
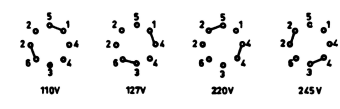
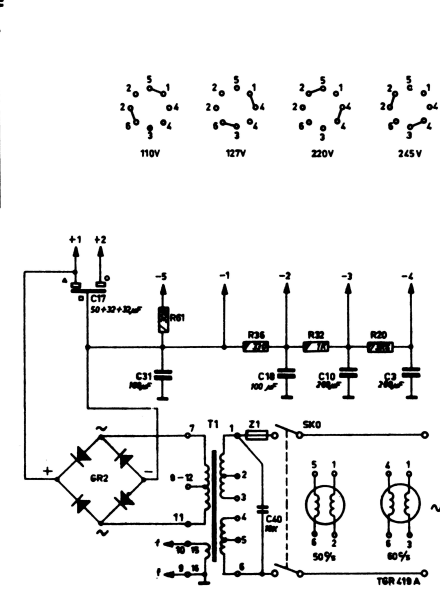
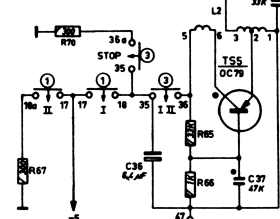
Fig. 20

R:	4,	1,	2,	3,	6, 7, 8, 9, 12, 12,	11,	5,	16,	14,	15,	46, 50,	17, 57, 16, 16,	73, 71,	58, 22, 24, 28, 23, 25, 26, 33, 36,	27, 29, 30, 31, 34, 38, 35, 56,	27, 40, 41, 72,	67, 48, 70,	46,	53, 65, 66, 54, 55,	38, 60,	63, 63, 44,	61, 46,	42, , 36, 68, 37, 68, 75, 76,	38, 53,
C:	1,	2,	5,	4,	6, 7,	29,						6, 8, 9, 14, 11, 15,	41,	13, 16,	21, 24,	19, 20, 23, 34, 32,			28, 36, 37, 38, 39,	35,	71, 32, 25, 31,	22, 18,	40, 16, 26, 27,	30, 34, 2,



PLAY BACK II  
 1-4 = IA  
 2-3 = IB  
 PARALLEL = IC

RECORDING I  
 1-4 = IA  
 2-3 = IB





# PHILIPS *Service* INFORMATION

27-1-1965	EL 3548A-00	Bc 518a
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This information substitutes Bc 518.

Switch SK3, as shown in the Service Notes, has not been applied in the production of the EL 3548A-00. The accompanying drawing shows what the correct switch looks like.

From number 2/64 and up, a new switch, SK3, has been fitted (see Fig. 2).

Code number : 4822 215 00688.

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16-2-1965	EL 3548A-00	Bc 541
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In the electric circuit :

R39 has been cancelled,  
R75 has been added, in series with C42,  
R75 is 68 Ω, code number 902/68.

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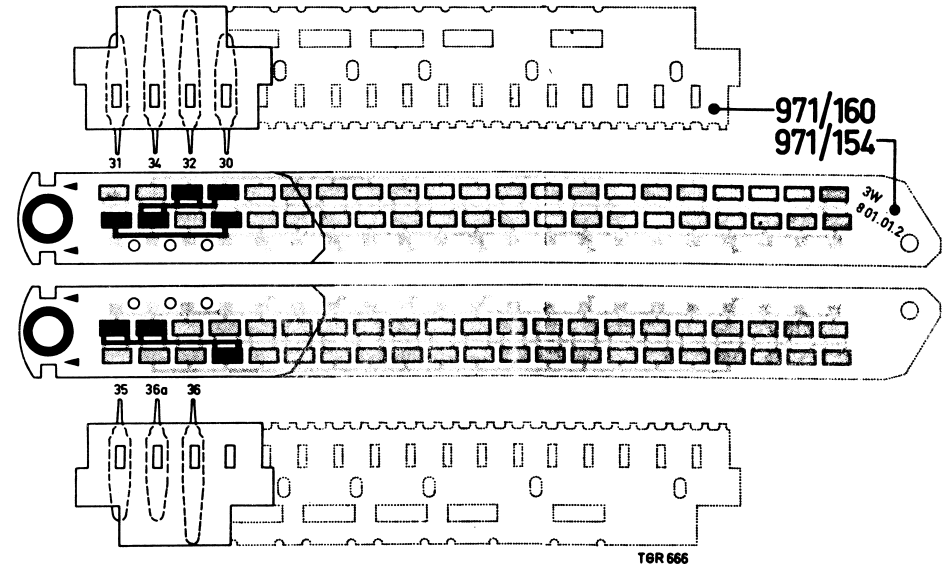


Fig. 1

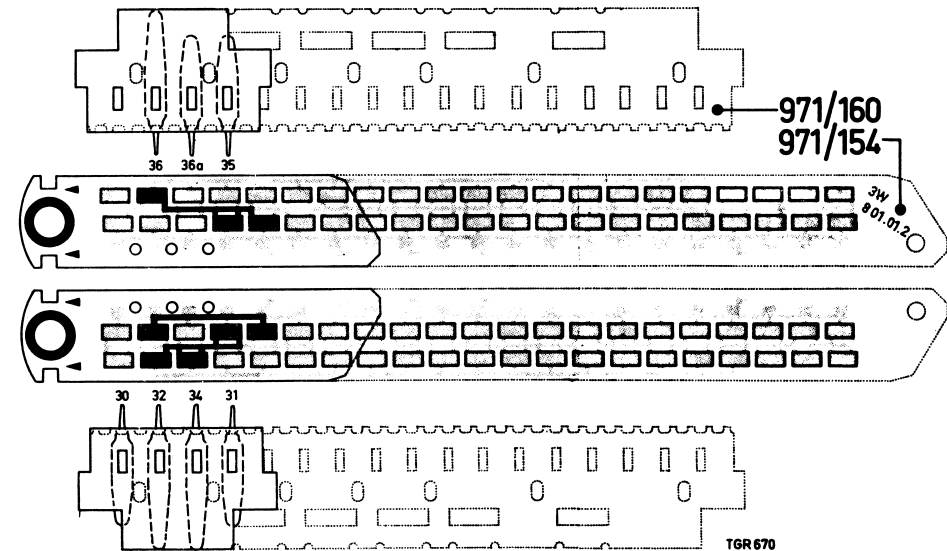


Fig. 2