TAPE RECORDER

SERVICE INFORMATION FOR THE

PHILIPS N4308

Stella ST9123A

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ces

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N4308 ST9123A

CONTENTS

		Page No.
A	— INTRODUCTION	1
B	— SPECIFICATION	1
C	— ACCESSORIES	1
D	— OPERATION	1
E	— DISMANTLING	2
F	— MECHANICAL DESCRIPTION	4
G	— MECHANICAL REPLACEMENTS	4
H	— MECHANICAL ADJUSTMENTS	5
I	— ELECTRICAL ADJUSTMENTS AND MEASUREMENTS	7
J	— CLEANING AND LUBRICATION	11
K	— SPARE PARTS LIST	13

A—INTRODUCTION

These models, utilizing an electrically similar chassis, are four-track, two speed, mains-operated, tropicalized tape recorders, employing ten transistors and three diodes. Recording facilities include signal input mixing, loudspeaker or headphone monitoring and a meter-type recording level indicator. Provision is made for using the recorder as a microphone, radio, or pick-up amplifier and, when used in conjunction with the 'Stereo' pre-amplifier EL3787A/00A etc., Stereo playback/Multiplay/Duoplay is also possible.

B—SPECIFICATION

Recording/playback system	Monophonic, 4-track, left to right
Tape speeds	3¾ and 1⅞ i.p.s.
Maximum reel diameter	7 in.
Maximum playing time	Over 12 hrs. at 1⅞ i.p.s. (17 hrs. with D.P. tape)
Fast wind/rewind time	3 mins. for 1,200 ft. of tape
Modulation level indicator	Moving coil meter type
Microphone	Moving coil type N8301
Frequency response	3¾ i.p.s.: 60-14,000Hz
	1⅞ i.p.s.: 80-8,000Hz
Wow and flutter	±0.25% at 3¾ i.p.s.
Signal to noise ratio	Better than 45dB
Semi-conductors	T1 BC109B/BC148B
	T2 BC109B/BC148B
	T3 BC109B/BC148B
	T4 BC108/BC148A
	T5 BC108/BC148A
	T6 AC187/01
	T7 AD162
	T8 AD161
	T9 AC125
	T10 BC108A
	X1, X2 BY126/OF160
	X3 OA95
Input/output sockets	
Inputs: Skt1—Radio (diode)	Pins 1/4 and 2—2mV into 20KΩ (with EL3768/03 connecting lead—150mV via 1.5MΩ)
Pick-up	Pins 3 or 5 and 2—100mV into 1MΩ
Skt2—Microphone	Pins 1/4 and 2—0.2mV into 2kΩ
Outputs: Skt1—Line (diode)	Pins 3, 5 and 2—750mV across 20kΩ
Skt3—Stereo	For use with EL3787A/00A Stereo pre-amplifier
Skt4—Ext. L.S.	Impedance 4 or 8Ω, 4 watts
Skt5—Headphones	Pins 4 and 1/2
Power output	4 watts
Loudspeaker	6 in. × 4 in. elliptical, 8Ω
Mains voltage	110, 127, 200-250 volts a.c. 50Hz (adaptable to 60Hz)
Mains consumption	40 watts approx.
Weight	17¾ lb. (N4308) 17¼ lb. (ST9123A)
Dimensions	N4308—16½ in. × 11¾ in. × 5⅞ in.
	ST9123A—16 in. × 11½ in. × 6⅜ in.

C—ACCESSORIES

Recording lead with 5-pin DIN plug at each end ..	EL3768/14
Connection box/extension lead for two microphones	N6206
Slide synchroniser	EL1995
Stereo pre-amplifier	EL3787A/00A
Continuous tape loop	EL1907/52 or CE10
Tape splicing kit	SK10

D—OPERATION

1. Record

Depress on/off switch 205, and select the required speed and track. The level of recording may be controlled as follows. Depress Record key 207 and adjust the appropriate controls so that the modulation level indicator pointer almost reaches the red section of the scale during the loudest passages. To commence recording, hold the Record key fully depressed, then depress Play key 210. On completion of recording, depress Stop bar 212. When recording from a source other than a microphone, it may be necessary to include some form of attenuation in the connection to avoid overloading the input stages. The lead type EL3768/14 should be used whenever the input source employs a 5-pin DIN diode output socket. On all other occasions, the input signal should be applied to pin 3 or 5 of input socket Skt1, or the lead type EL3768/03 supplied with the recorder should be used. This lead incorporates a series resistor, 1.5MΩ, in the red conductor, but under certain conditions, depending on the amplitude of the input signal, the value of this resistor may be altered to obtain satisfactory recordings. The connections of this lead are: Red—recording input; White—line output; Black—common earth (screening), see Fig. 1.

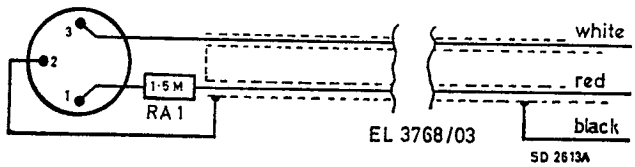


Fig. 1 Radio/Pick-up Connecting Lead

2. Monitoring

Monitoring during recording can be carried out using the internal loudspeaker or headphones, with the volume and tone controls operative. Acoustic feedback can be avoided by moving the microphone further away from the recorder or by reducing the volume.

3. Playback

Select the required track operation and depress Play key 210. The volume and tone controls can be adjusted as necessary. To terminate 'Playback' depress Stop bar 212.

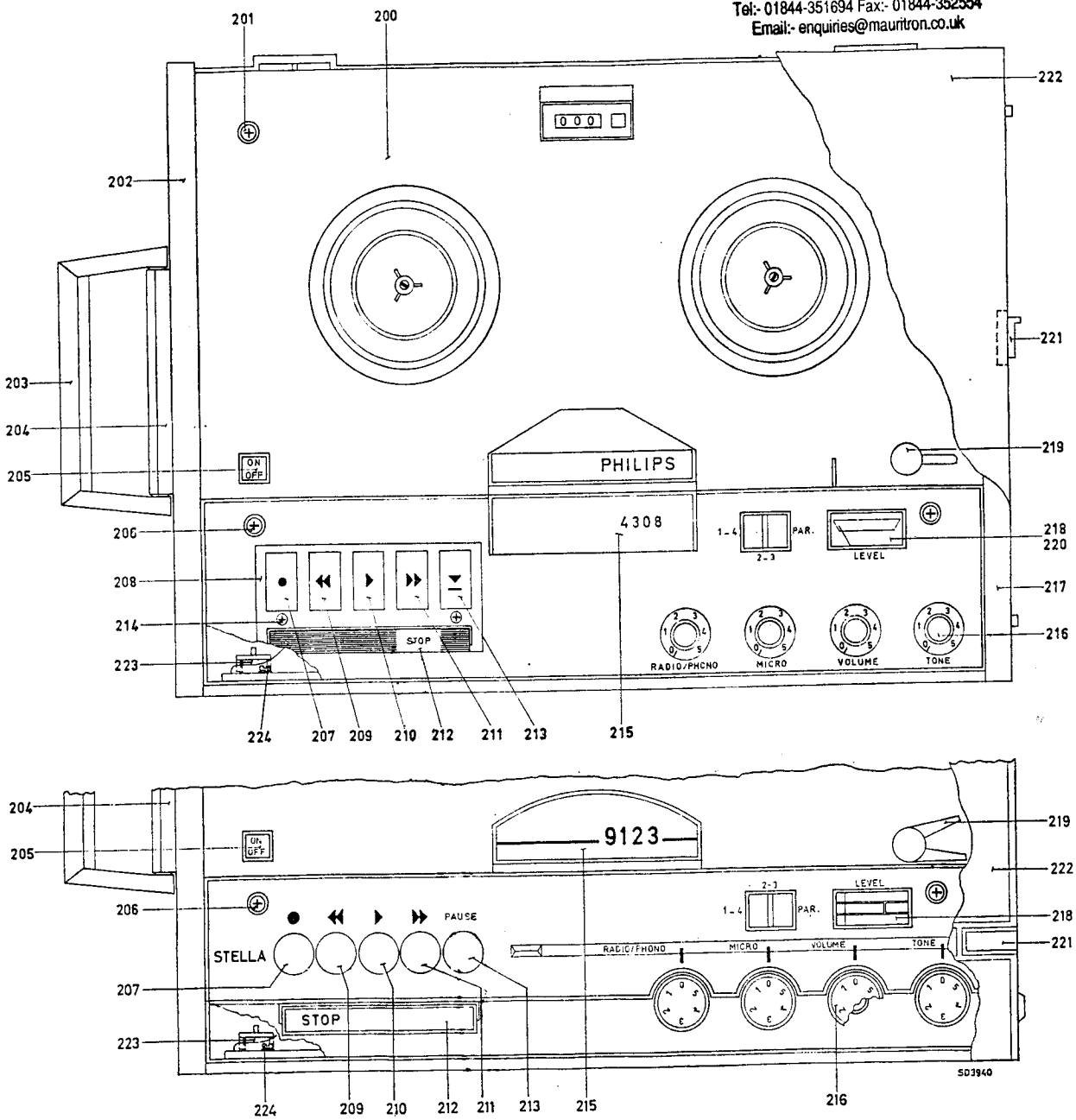


Fig. 2 Top View

4. P.A.
Set the tape speed to 3¾ i.p.s. and the track switch to '1—4' or '2—3' (not 'PAR'). Switch on the recorder, depress the Record key and adjust the modulation level as in para. D1 above, further control of volume being obtained by means of the volume control. Acoustic feedback can be avoided as stated in para. D2 above.

5. Pause
When Pause key 213 is depressed, the tape transport is interrupted. It can be resumed by depressing the Pause key again.

6. Forward wind and rewind
Depress the key indicated to give the required direction of tape transport. Stop with the Stop bar.

7. Resetting the rev. counter
This device may be reset at any time by depressing the button at the side of the viewing window.

E—DISMANTLING

1. Case removal (See Fig. 2)
Remove lid 222, pull off the four control knobs 216, speed change knob 219 and undo the four (some models have five) ornamental screws 201 and 206. Take off cover plate 200, disconnect the speaker leads and case screening lead (these are usually slide-on connectors but in some cases may be soldered) and lift out chassis. The chassis can be operated out of the cabinet, providing normal care is taken to keep the chassis level and a speaker of correct impedance is connected. Re-assemble in the reverse order.

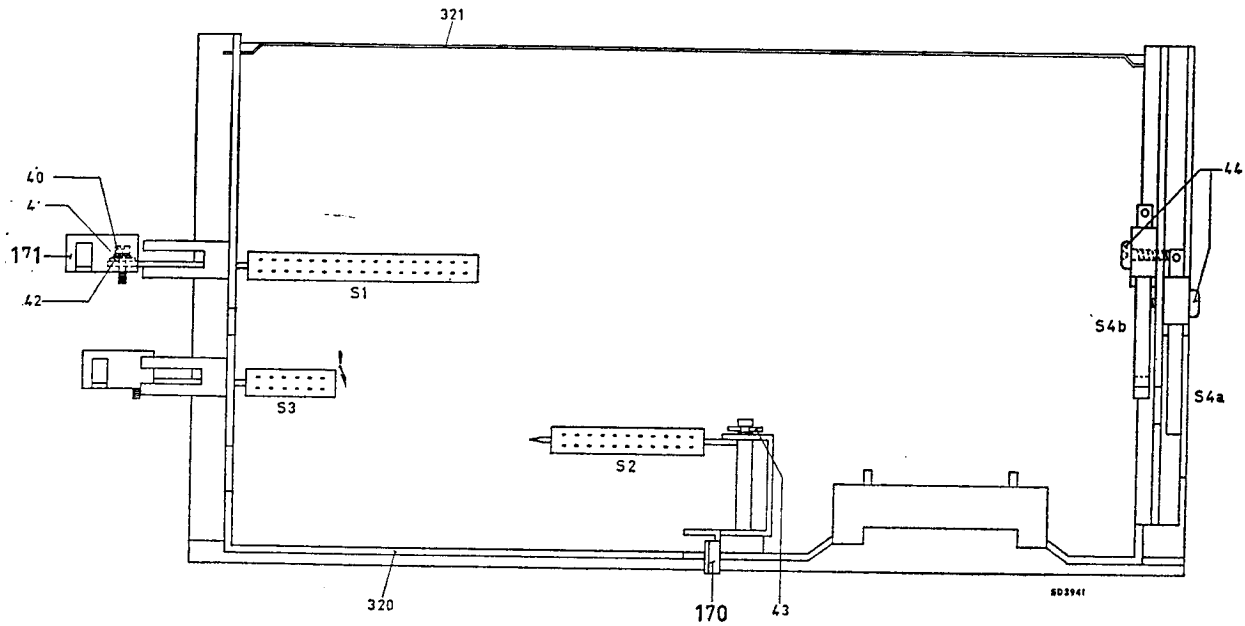


Fig. 3 Switch Location

2. Printed panel removal

Access to the printed panel may be obtained, after setting the track switch to the 'PAR' position and the tape speed to $1\frac{7}{8}$ i.p.s., by undoing the four screws securing the printed panel frame to the chassis. The frame and printed panel can be removed to the extent of the connecting leads, taking care not to bend or deform the switch blades of S4(b). When refitting the printed panel frame, ensure that the switch operating levers are correctly engaged with the switch sliders and that S4(a) and S4(b) operate properly.

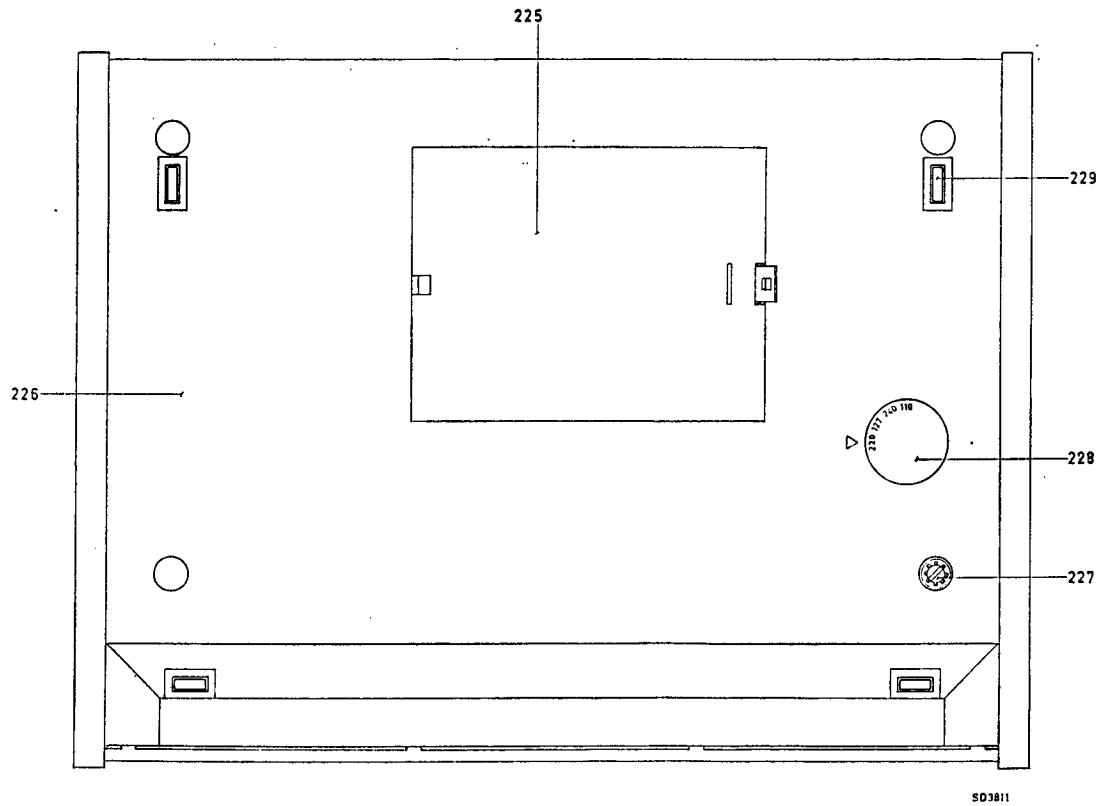


Fig. 4 Underside View

F—MECHANICAL DESCRIPTION

1. Drive mechanism (See Fig. 21 in pocket)
When the machine is switched on, the dual standard (50 or 60Hz) motor 144 drives the two pulleys 115 and pulley 124 (which is mechanically coupled to pulley 130) by means of main drive belt 118. Pulley 130 drives the flywheel with flywheel drive belt 112. The two pulleys 115, when engaged with either L.H. or R.H. turntable 52, provide a slipping drive for fast wind or rewind purposes. The flywheel speed is changed by moving speed selector knob 219 to its alternative position; quadrant 137 rotates derailing gear 129 which moves belt 112 into one or other of the two grooves in pulley 130. Protusions on quadrant 137 close contacts of S4(a) in the 3¾ i.p.s. and S4(b) in the 1⅞ i.p.s. positions.

2. Playback
When Play key 210 is depressed, play strip 113 moves backward, causing intermediate lever 63 to pivot and lever arm 64 moves pressure roller lever 62 towards the heads and capstan. A spring-loaded pressure felt, 67, on bracket 58, then presses the tape against the record/playback head 72 (inside screening cover 71). Brake bracket 101 and 'Z' bracket 116 are released by play strip 113 which also sets the Play/stop switch S3 to the 'Play' position by moving S3 operating arm 96.
Drive wheel 141 is driven by motor 144 via belt 139. Friction coupling from drive wheel 141 to friction disc 54 is achieved by the four friction blocks 55 and through felt ring 51, take-up drive to R.H. turntable 52 is provided.
Tape tension is maintained by the friction imposed by felt ring 51, fitted between L.H. turntable 52 and friction disc 54. This disc is held stationary by the action of the four friction blocks 55 inside friction wheel 56, which is pegged to the chassis. Drag is also imposed on the L.H. turntable in driving rev. counter 131 by belt 133.
Depressing Stop bar 212 releases the Play key and allows springs 143, 61 and 60 to return pressure roller lever 62 and bracket 58 to their rest position and brake bracket 101 and 'Z' bracket 116 to the 'on' position. S3 is also put in the 'Stop' position by spring 93.

3. Record
To record, Record key 207 and Play key 210 are depressed together. The action of the Play key is described in para. F2 above. Depressing the Record key moves switch S1, via S1 operating arm 95, to the 'Record' position. On depressing Stop bar 212, both Play and Record keys are released, spring 94 assisting in returning S1 to the 'Playback' position.

4. Pause
The Pause key provides a rapid stop (or start) facility during recording or playback. Depressing the Pause key moves pause strip 100 backward, bringing brake block 99 into contact with the L.H. turntable. At the same time, a projection on pause strip 100 engages the end of pressure roller lever 62, withdrawing slightly the pressure roller from the capstan and the pressure felt from the head. Pressing the Pause key again releases the pause strip and restores normal operation. Interlocks on wind actuator 98 prevent the Pause key operating in the Fast Wind positions and vice versa.

5. Forward wind
Depressing Forward wind key 211 moves forward wind strip 103 backward. Control bracket 114 pivots, moving wind actuator 98 and 'Z' bracket 116 to the right. R.H. pulley 115 is brought into contact with R.H. turntable 52 and both brakes are released. Tape tension during transport is maintained as described in para. F2 above. On depressing the Stop bar, the Forward wind key is released and the mechanism reverts to the 'Stop' position, assisted by springs 142 and 123.

6. Rewind
Depressing Rewind key 209 moves rewind strip 103 backward. Control bracket 114 pivots, moving wind actuator 98 and 'Z' bracket 116 to the left. L.H. pulley 115 is brought into contact with L.H. turntable 52 and both brakes are released. Tape tension during transport is maintained by felt ring 51 fitted between L.H. turntable 52 and friction disc 54. On depressing the Stop bar, the Rewind key is released and springs 142 and 123 assist in restoring the mechanism to the 'Stop' position.

7. Track selection
Track selector switch S2 is set to the required position by track selector knob 125 and S2 operating arm 170.

G—MECHANICAL REPLACEMENTS

1. R.H. turntable assembly (See Fig. 21 in pocket)
Loosen screw 50 to remove turntable 52. Remove the circlip and washer(s) from the bottom of the turntable spindle and withdraw the rest of the assembly from its bearing, at the same time slipping drive belt 139 from the end of the motor spindle. If friction blocks 55 are removed or replaced, ensure that they are replaced correctly, see Fig. 5. Re-assemble in the reverse order. Vertical play of the turntable should be between 0.1-0.3mm., adjusted by fitting washers between the underside of the turntable bearing and the retaining circlip.

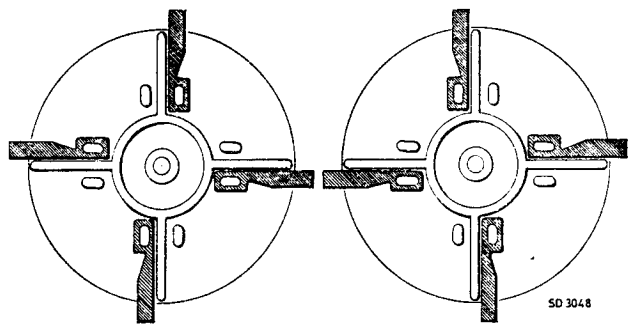


Fig. 5 Friction Blocks

2. L.H. turntable assembly (See Fig. 21 in pocket)
Detach rev. counter drive belt 133. Remove the circlip and pulley 109, then the second circlip and washer(s) from the bottom of the turntable spindle, after which the assembly can be withdrawn from its bearing. If necessary, friction blocks 55 should be replaced as shown in Fig. 5. Re-assemble in the reverse order.

N4308 ONLY

3. Keys 207, 209, 210, 211 (See Figs. 2, and 21 in pocket)
Remove bracket 85 of the Stop bar by first pressing it back, then lifting it up. Take care that springs 86 do not fall off the bracket prongs. Remove wire spring 84, straighten tag M on bracket and lift out key with bracket attached.

4. Pause key 213 (See Figs. 2, and 21 in pocket)
Bend the tags of the bracket on which the key is fitted slightly apart.

Remove springs 84 and 87. When pause strip 100 is pressed back, the pause key with bracket can be lifted out.
NOTE.—Code numbers given in the N4308 Spare Parts List are for keys complete with brackets.

ST9123A ONLY

5. All keys (207, 209, 210, 211; See Figs. 2, and 21 in pocket)
The moulded push-button part of the key is detachable by pushing downwards and lifting off towards the rear. Re-assemble in the reverse order.

6. Erase head 76 (See Fig. 21 in pocket)
In recorders with 'AH' factory coding, the erase head is a plug-in replacement and its socket is secured with a single screw on the L.H. side. In recorders with 'WR' factory coding and where a replacement erase head has been fitted, the erase head mounting lug is fitted underneath the L.H. tape guide. To remove, take off nut 8, L.H. tape guide 73, bracket 74 and L.H. pressure spring 75. Re-assemble in the reverse order. The height of the erase head can be adjusted with shims (code number 4822 532 30095) as described in para. H1.

7. Record/playback head 72 (See Fig. 21 in pocket)
Loosen screw 5 and remove head screening cover 71. Undo two screws securing the head to head mounting plate 79. Record/playback head 72 can be removed after unsoldering the connecting leads. Re-assemble in the reverse order. Adjustment is described in para. I1.

8. Flywheel 110 (See Fig. 21 in pocket)
Detach cable form support 301, undo two screws 22 and remove flywheel bearing bracket 303 together with operating arms 95 and 96, for S3 and S1. Take off flywheel drive belt 112 and remove flywheel 110. Re-assemble in the reverse order.

9. Switch replacement (See Fig. 6)
NOTE: All switch sliders must be withdrawn from the switch by the SQUARED end and reinserted POINT end first. Failure to observe this procedure will result in damage to the switch slider contacts.
Remove the slider of the switch to be replaced (see above). Prise apart the two sections of the stator with a screwdriver blade as shown in Fig. 6. The stator halves can be unsoldered and removed separately from the printed panel.

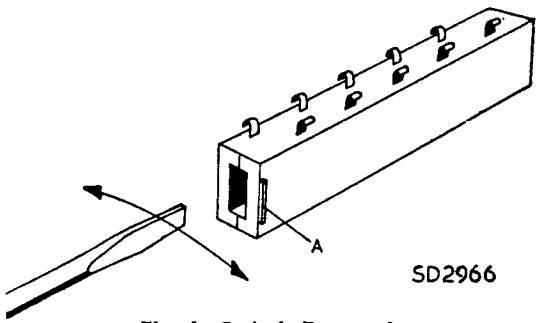


Fig. 6 Switch Removal

10. Socket mounting plate
The socket mounting plates incorporating Skt1 with Skt4 and Skt2 with Skt3 can be removed by squeezing in the springy tags on the inside of the mounting bracket and pressing out the socket mounting plates.

H—MECHANICAL ADJUSTMENTS

1. Erase head 76 (See Fig. 21 in pocket)
In recorders with 'AH' factory coding, the erase head mounting is such that the head cores are at a fixed distance from head mounting plate 77 and non-adjustable. In recorders with 'WR' factory coding and where a replacement erase head has been fitted, the head height can be adjusted by inserting or removing shims (code number 4822 532 30095) from underneath the head mounting lug. The distance between head mounting plate 77 and the top edge of the upper head core should be 19.8mm. (See Fig. 7).

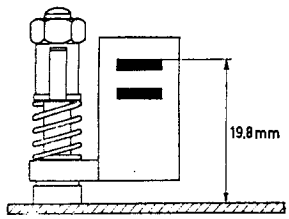


Fig. 7 Erase Head SD3819

2. Tape guides (See Fig. 21 in pocket)
(*a*) L.H. tape guide 73 should be adjusted so that the upper core of erase head 76 protrudes 0.1mm. above the top edge of the tape as shown in Fig. 8.
(*b*) R.H. tape guide 83 should be adjusted so that in the 'Play' position the tape leaves the capstan without catching or twisting.

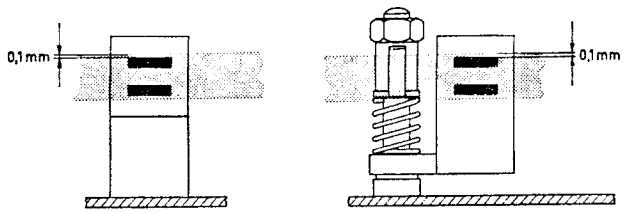


Fig. 8 SD3888

3. Record/playback head 72
For this adjustment, see para. I1.

4. Pressure roller lever 62 (See Fig. 21 in pocket)
In the 'Play' position, pressure roller lever 62 should be spaced at least 0.5mm. away from stop A; adjust by bending stop B on play strip 113, see Fig. 9. Pressure arm 58 should press against head

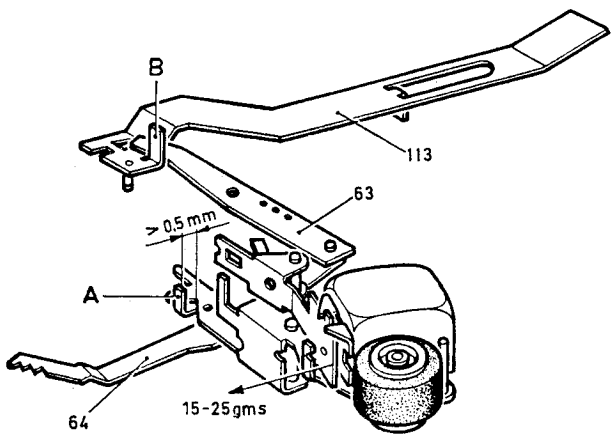


Fig. 9 SD3813

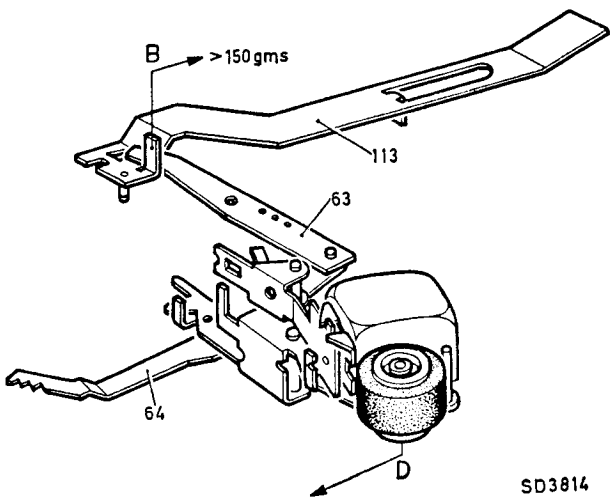


Fig. 10

screening cover 71 with a force of 15-25 grams; if necessary, replace spring 60. Pressure roller 70 should press against the capstan with a force of 700-900 grams, measured at D as shown in Fig. 10. If incorrect, replace spring 61. At the moment of switching from 'Play' to 'Stop', the residual force of the pressure roller lever, measured at B on play strip 113, should be at least 150 grams. If necessary, replace spring 61.

In the 'Pause' position, pressure roller 70 should lie parallel with the capstan and should be spaced 0.5-1.0mm. away from it. If necessary, adjust by bending tag C on pause bracket 88, shown in Fig. 11.

5. Pulleys 115 (See Fig. 21 in pocket)

In the 'Forward wind' or 'Rewind' positions, the lower edge of the contact surface of pulley 115 should be 0.1-0.5mm. above the lower edge of the relevant turntable. If necessary, insert shims underneath washer 122.

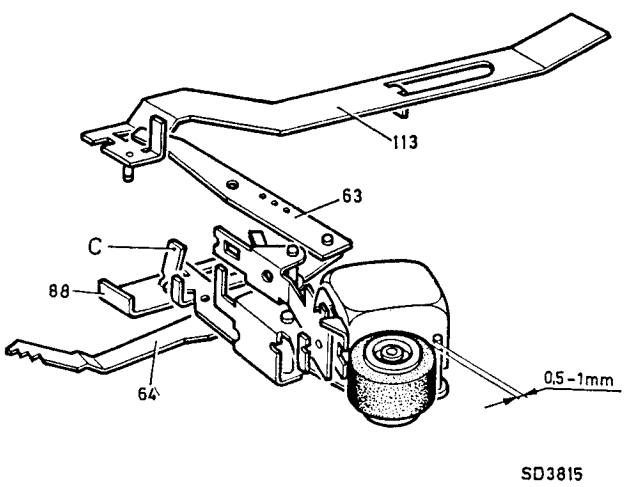


Fig. 11

6. Clutch assemblies (See Fig. 21 in pocket)

With the mains switch off and the Forward wind key depressed, the force necessary to overcome the friction in the L.H. turntable clutch assembly should be 15-25 grams. With the Rewind key depressed, the force necessary to overcome the friction in the R.H. turntable clutch assembly should also be 15-25 grams; both measurements are taken using an empty 5 in. spool, as shown in Fig. 12. The wind-on time for 1,200 ft. of L.P. tape should be 3 mins. or less. If necessary, the friction surfaces of the turntables and the friction blocks can be cleaned as described in para. J1(*b*) or the friction blocks can be replaced. To ensure that they are replaced correctly, refer to Fig. 5.

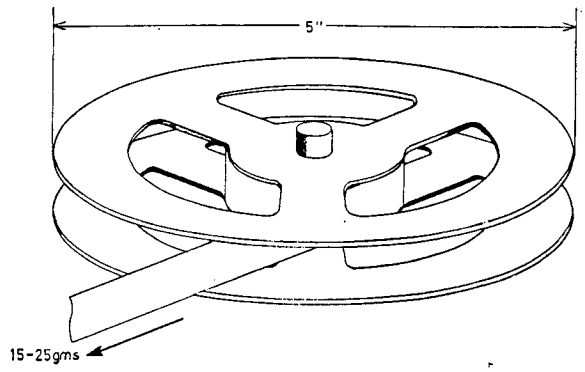


Fig. 12

7. Brakes (See Fig. 13)

Set the recorder to the 'Stop' position. Press the L.H. brake shoe 120 to the left, as in Fig. 13. Bend tag A so that in this position of brake shoe 120, the clearance between R.H. turntable 52 and R.H. brake shoe 117 is 0.5-1.0mm.

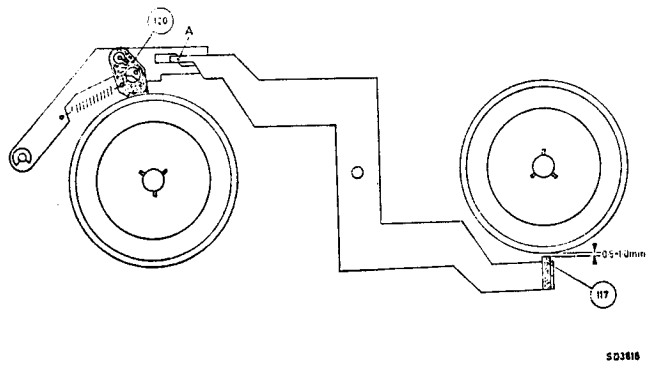


Fig. 13

8. Switches

Place the recorder upright on its front edge, protecting the printed panel from damage.

(*a*) Track selector switch S2 (See Fig. 3). If necessary, bend S2 operating arm at A so that in track position '2-3', the switch slider is positioned as shown in Fig. 14.

(*b*) Play/stop switch S3 (See Fig. 3). Depress the Record key and, if necessary, bend the tags of S3 operating arm 95 so that the switch slider is in the position shown in Fig. 15.

(*c*) Record/playback switch S1 (See Fig. 3). Set the recorder to the 'Stop' position and, if necessary adjust the tags on S1 operating arm 96 so that the switch slider is in the position shown in Fig. 15.

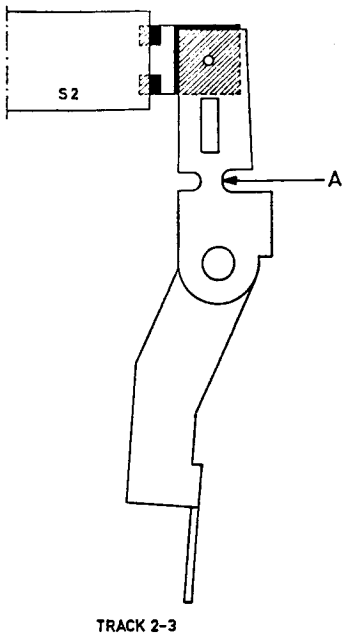


Fig. 14

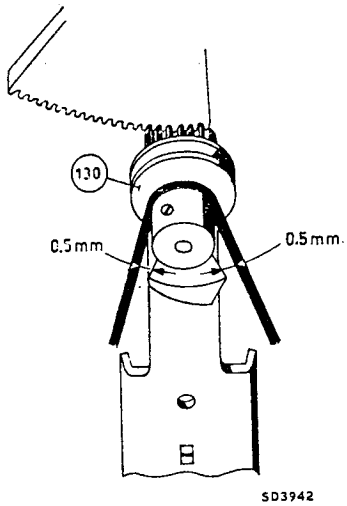


Fig. 16

9. **Speed change mechanism** (See Fig. 16)

In either position, derailing cam 129 should be at least 0.5mm. from belt 112. If necessary, adjust pulley 130 on its shaft.

10. **Conversion from 50Hz to 60Hz operation and vice versa**

To convert from 50 to 60Hz operation, transfer main drive belt 139 from groove A to groove B of the motor pulley, see Fig. 17. To convert from 60 to 50Hz operation, reverse the above procedure.

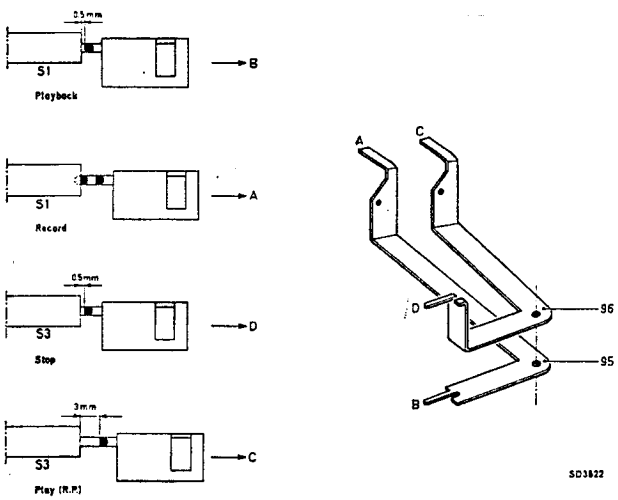


Fig. 15

I—ELECTRICAL ADJUSTMENTS AND MEASUREMENTS

All measurements should be carried out with a mains input voltage of 240V a.c., 50Hz.

1. **Record/playback head 72** (See Fig. 21 in pocket)

(*a*) *Height adjustment*

With the recorder in the 'Stop' position, remove head screening cover 71. Position the head with screws 9 and 10 so that the head face is parallel to the tape and the height is such that the tape will pass smoothly through the jaws of the head tape guide. Proceed by unhooking spring 60 and place a reel of new D.P. tape in the machine. Hold the tape taut across tape guides 73 and 83, then push pressure roller 70 towards head 72 by hand, checking that as the tape approaches the head it does not foul the jaws of the head tape guide. Pressure pad 67 should not touch the tape during this operation. Re-adjust the height of the head as necessary until this condition is met, ensuring that the head face remains parallel to the tape.

NOTE: The head tape guide is accurately manufactured and should this guide become misaligned, damaged or excessively worn, the record/playback head should be replaced.

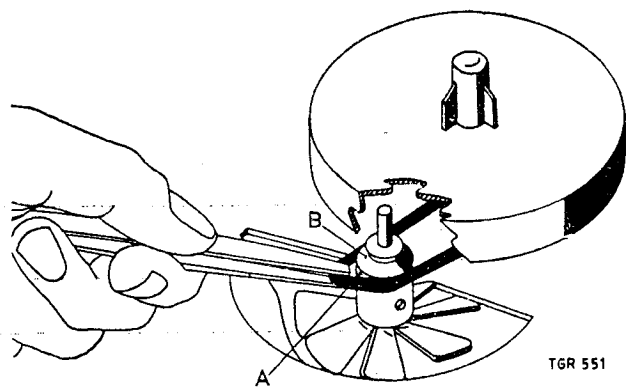


Fig. 17

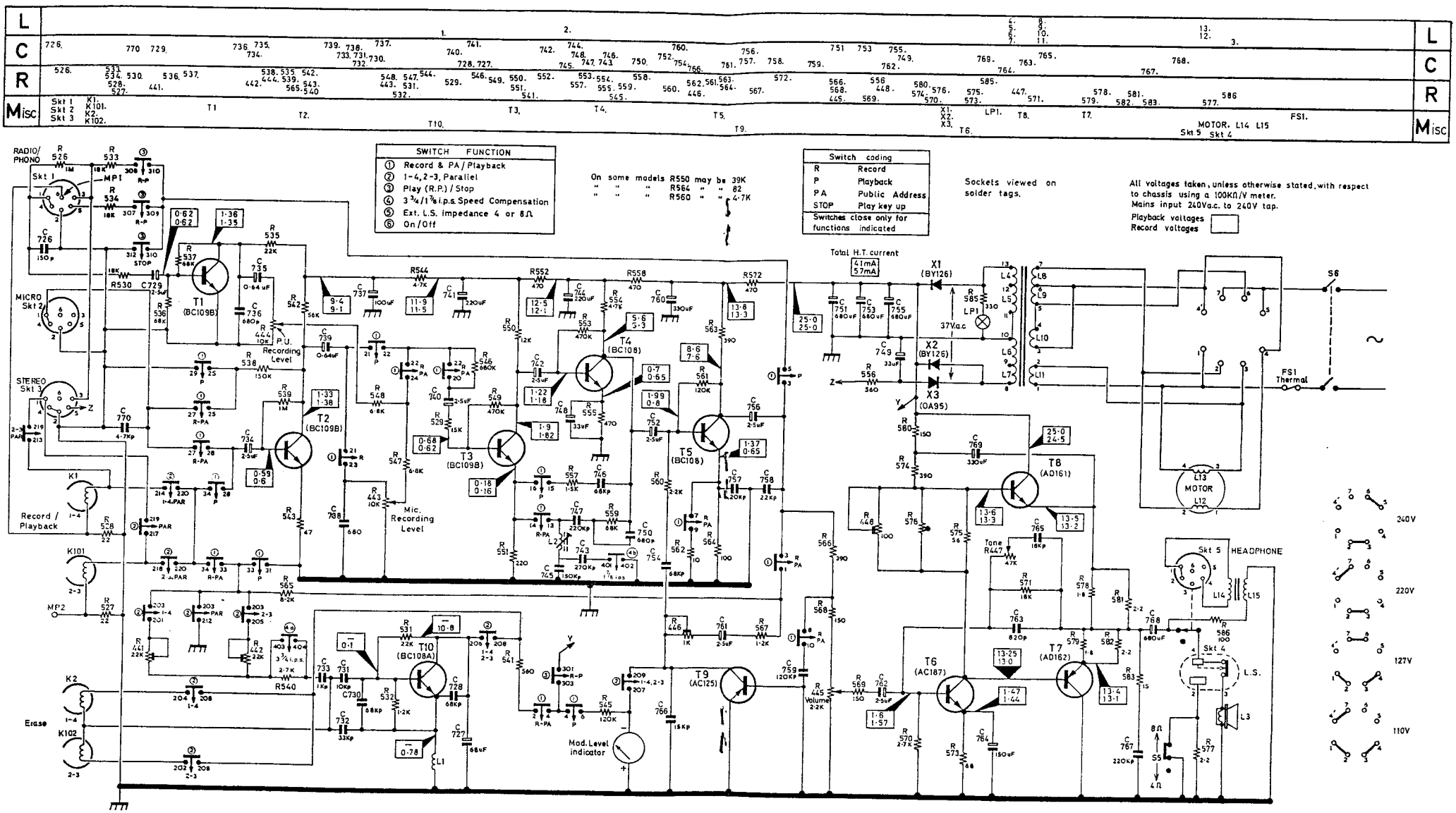
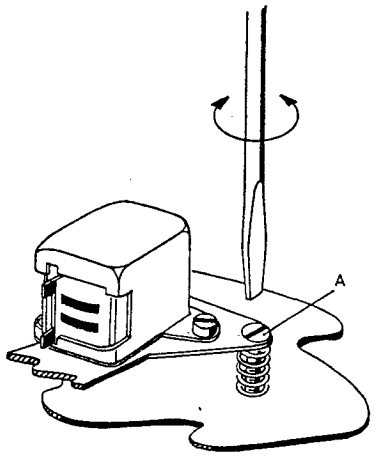


Fig. 18 CIRCUIT DIAGRAM



SD3817

Fig. 19

(*b*) *Azimuth adjustment* (See Fig. 19)

When the head has been set for correct height as above, the core gap must be adjusted perpendicularly using a FULL TAPE WIDTH azimuth test recording of 8kHz. A four-track recording made on another machine is NOT suitable. With head screening cover 71 in position, place the test tape in the machine and switch to 'Playback'. Connect an a.c. millivoltmeter to pins 3 (or 5) and 2 of Skt 1 and proceed as follows:

Track 1—adjust screw A for max. voltage and note the reading (Output 1).

Track 3—adjust screw A for max. voltage and note the reading (Output 11).

Track 1—without further adjustment note the reading (Output III).

If the difference between Outputs I and III is less than 2dB, the adjustment is in order; if not, proceed further:

Track 1—adjust screw A for max. voltage and note the reading (i.e. Output I).

Track 3—without further adjustment note the reading (Output IV).

If the difference between Outputs II and IV is less than 2dB, the adjustment is acceptable; if not, the head should be replaced and the height and azimuth setting repeated.

Finally, repeat the adjustment procedure given in para. 1(a) above to ensure that the tape does not foul the jaws of the head tape guide.

2. Playback amplifier

(*a*) *Adjusting d.c. bias of the output transistor pair*

With no signal input and volume control R445 turned to minimum adjust R448 so that the quiescent current through the output pair of transistors (T7/T8) is 5 - 7mA. This can be measured as a voltage of 6mV across either R578/R581 or R579/R582.

(*b*) *Sensitivity*

Replace loudspeaker L3 with an 8Ω 3W resistor and put the loudspeaker impedance switch S5 in the 8Ω position. Depress the Play key and apply a 1kHz signal at 30mV, via a 22kΩ resistor, to MP1 (for tracks 1-4) and MP2 (for tracks 2-3). Connect an a.c. millivoltmeter as indicated, for (i) and (ii) below.

(i) Loudspeaker output: with volume and tone controls fully clockwise, the voltage across the 8Ω resistor should be 470-800mV.
(ii) Line output: with volume and tone controls fully anti-clockwise, the voltage between tags 3 and 2 (5 and 2), Skt1 should be 45-80mV.

(*c*) *Frequency response*

(i) Loudspeaker output: connect an 8Ω resistor as given in para. 2(*b*) above and turn volume and tone controls fully clockwise. Apply a 1kHz signal, via a 22kΩ resistor, to MP1 and MP2 in turn (for tracks 1-4 and 2-3 respectively) at such a level that the voltage, measured with an a.c. millivoltmeter, across the 8Ω resistor is 244mV. When the frequency is varied (keeping the generator output constant), the voltages (±2dB) should be as given in the table below.

(ii) Line output: turn the volume control fully anti-clockwise and apply a 1kHz signal, via a 22kΩ resistor, to MP1 and MP2 in turn (for tracks 1-4 and 2-3 respectively) at such a level that the voltage, measured with an a.c. millivoltmeter, between tags 3 and 2 (5 and 2), Skt1 is 77.5mV. When the frequency is varied (keeping the generator output constant), the voltages (±2dB) should be as given in the table below.

Frequency (kHz)	L.S. Output (mV)	Line Output (mV)
0.125	975	387
1.0	244	77.5
6.3	153	52
12.5	136	47

3. Record amplifier

(*a*) *Sensitivity*

Set the track selector switch to '1-4' and depress the Record key only. Apply a 1kHz signal at 85mV direct to pin 3, Skt1, turn Radio/Phono record level control R444 to maximum and volume control R445 to minimum. The voltage measured with an a.c. millivoltmeter at MP1 should be 2.2-3.8mV. Repeat in track position '2-3', measuring the voltage at MP2.

(*b*) *Recording bias current*

The recording bias current should be 18mV, measured as a voltage, but may be set within the limits 10-25mV.
Switch to 'Record', set the track selector switch to '1-4' and adjust R441 so that a voltage of 18mV, measured with an a.c. millivoltmeter, is obtained at MP1. Similarly, in track position '2-3', the same reading should be obtained at MP2 by adjusting R442. Check the overall frequency response and if necessary make further adjustments to the bias current to obtain the response required. Reducing the bias current will increase the treble response; conversely, increasing the bias current will reduce the treble response. Should the value of bias current be below the lower limit specified, it will cause distortion at high modulation levels; if above the upper limit, it will result in poor treble response. If, after adjustment, the level of bias current is outside the range specified above, a defect in the record/playback head or in the amplifier circuitry should be suspected.

4. Modulation level indicator calibration

Set the track selector switch S2 to track '1-4' (or '2-3'), turn Radio/Phono record level control R444 to maximum and depress the Record key only. Apply a 1kHz signal to pin 3, Skt1, adjusting the level so that a voltage of 3mV, measured with an a.c. millivoltmeter, is present at MP1 (or MP2). The pointer of the modulation level indicator may be adjusted with R446 so that it registers on the division between the red and black sectors of the scale. Remove the input signal and switch to 'Record'; the meter pointer should be deflected up to a maximum of 1mm., due to bias current.

5. Overall frequency response

Depress the Record key only and apply a 1kHz signal, via a 22KΩ resistor, to pin 1, Skt1, so that the voltage at MP1 (MP2), measured with an a.c. millivoltmeter, is 0.3mV. Maintaining this voltage reading, switch to 'Record' and record some frequencies between 60Hz and 14kHz. When played back, the output voltages of the recorded frequencies, measured between pins 3 and 2 (5 and 2) Skt1, should not differ by more than 6dB.

6. Correction coil L2 (adjusted only on replacement)

Depress the Record key only and apply a 1kHz signal to pin 3, Skt1, so that a voltage of 0.775mV, measured with an a.c. millivoltmeter, is present at MP1, with the track selector switch S2 set to position '1-4'. Change the input signal frequency to 14kHz. The voltage at MP1 should now read 3.5mV; adjust correction coil L2 for this reading, then seal it with locking paint.

7. D.C. voltages

Switch to 'Record'

Stage	Collector	Base	Emitter
T1	1.35	0.62	—
T2	1.38	0.6	—
T3	1.82	0.62	0.16
T4	5.3	1.18	0.65
T5	7.6	0.8	0.65
T6	13.0	1.57	1.44
T7	—	13.0	13.1
T8	24.5	13.3	13.2
T10	10.8	0.1	0.78

Switch to 'Playback'

Stage	Collector	Base	Emitter
T1	1.36	0.62	—
T2	1.33	0.59	—
T3	1.9	0.68	0.18
T4	5.6	1.22	0.7
T5	8.6	1.99	1.37
T6	13.25	1.6	1.47
T7	—	13.25	13.4
T8	25	13.6	13.5
T10	—	—	—

8. Sensitivity checks

Set the track selector switch S2 to position '1-4'.

(*a*) Switch to 'Playback', apply a 1kHz signal at 30mV to MP1, via a 22kΩ resistor.

(*b*) Depress Record key only. Apply a 1kHz signal at 70mV to pin 1, Skt1, via a 1MΩ resistor.

Using an a.c. millivoltmeter, the following voltages (±2dB) should be obtained:

Stage	(a) Playback (mV)		(b) Record (mV)	
	Base	Collector	Base	Collector
T1	—	—	0.3	3.5
T2	0.34	4.5	—	—
T3	1.5	0.5	0.45	0.35
T4	0.5	20	0.35	96
T5	20	65	95	1250
T6	2	850	—	—
T7	850	—	—	—
T8	830	60	—	—
T10	—	—	*7700	*6600
L.S.	690	—	—	—

* Switch to 'Record'

J—CLEANING AND LUBRICATION

1. Cleaning

(*a*) *Record/playback and erase heads, etc.*

The magnetic heads, tape guides and capstan should be cleaned at regular intervals if optimum performance is to be maintained. Remove cover 215, Fig. 2, for access to these parts, which can be cleaned with a soft cloth wrapped around a wooden stick and moistened with methylated spirits or industrial alcohol. Metal objects should not be allowed to come into contact with the magnetic head faces.

(*b*) *General*

After approximately 500 hours of service, it is advisable to clean the following parts with methylated spirits or industrial alcohol:

Magnetic head faces

Tape guides

Capstan and pressure roller

Drive belts

Grooves in flywheel and pulleys

All friction driven surfaces

Brake shoes and braking surfaces of turntables

Clean the inside of both turntables with a soft dry brush and if necessary clean or replace pressure felt 67.

2. Lubrication

All machines are fully lubricated during manufacture and further attention should normally be required only after a long period of service. If this is the case, or upon replacement of any mechanical component, lubrication may be applied SPARINGLY as indicated below. It is emphasised that excessive lubricant will hinder rather than help the operation of the instrument, particularly if grease or oil is accidentally deposited on any driving surface.

(*a*) Using a suitable motor bearing lubricant, lubricate the upper and lower bearings of the motor.

(*b*) Using a light oil, such as Shell Tellus 33, lubricate the following positions:

Turntable spindles

Pulley spindles

Pressure roller spindle

Upper and lower flywheel bearings

(*c*) Using a light grease, preferably containing graphite, lubricate the sliding surfaces of the various control strips, brackets and switch operating mechanisms.

(*d*) Using a light grease, such as Shell Alvania 2, lubricate the ball bearings 150 and brake bracket 116.

(*e*) A suitable lubricant, such as "Electrolube" No. 2A, should be applied to the sliders of switches S1, S2 and S3.

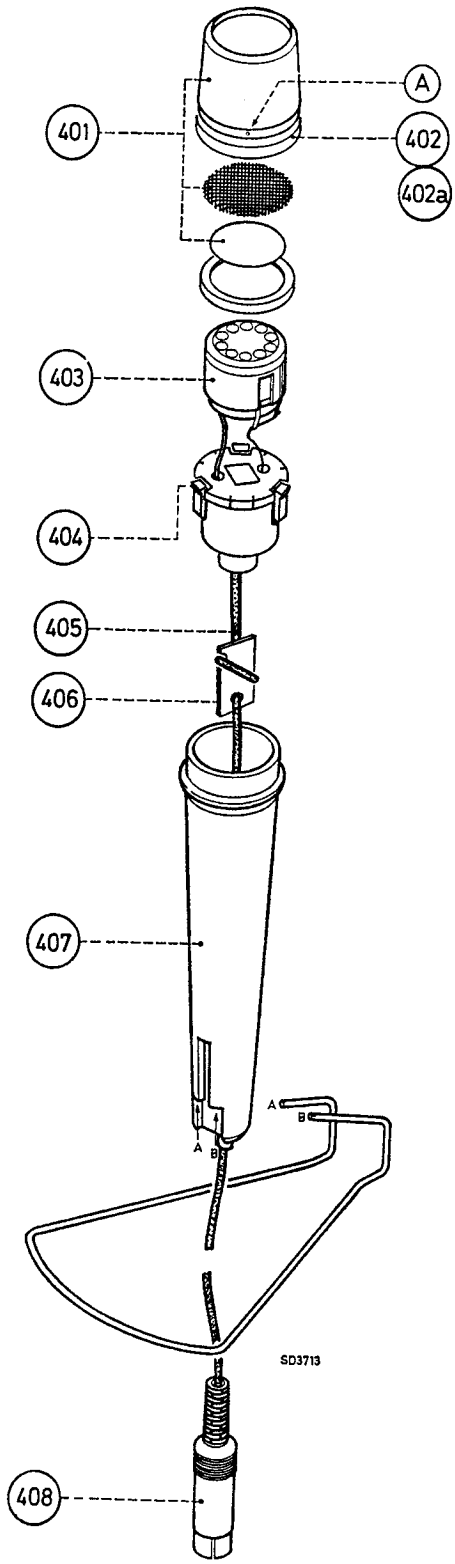


Fig. 20 Microphone — Type N8301/00

K — SPARE PARTS LIST

SUPPLY OF SPARE PARTS: To ensure correct interpretation of requirements please include the following information on orders for spare parts.

1. The full type number recorded on the type number plate, including any suffix. **Do not use any commercial abbreviation which may be misleading.**
2. Whenever possible, quote the serial number of the recorder. In some machines the components have been changed during production
3. **Always give a brief description** and colour where applicable.
4. Quote part number.

If it is necessary to return components, always include full identification on the accompanying advice note.

CABINET ASSEMBLY

		N4308	ST9123A
200	Top plate complete	443.30151	443.30157
201	Ornamental screw 4×25 mm. ...	502.10863	502.10863
202	L.H. side panel, wood	443.50137	443.50137
203	Handle	498.30047	498.30047
	Leaf spring of handle	492.61325	492.61325
204	Handle hinge	403.50465	403.50465
205	Knob of ON/OFF switch	410.20749	410.20797
206	Ornamental screw ... 4×35mm.	502.10864	4×50 502.10911
207	Record key, complete with bracket	410.20755	* 410.20796
208	Escutcheon for keys	459.20117	—
209	Fast rewind key, complete with bracket	410.20752	* 410.20796
210	Playback key, complete with bracket	410.20754	* 410.20796
211	Fast wind key, complete with bracket	410.20751	* 410.20796
212	Stop bar	410.20748	410.20795
213	Pause key, complete with bracket...	410.20753	* 410.20796
	Spring for keys (5)	—	492.40316
214	Screw 2.6×6 mm.	502.10862	502.10862
214	Nut 2.6 mm.	505.10324	505.10324
215	Head cover	443.60277	443.60289

* Key only

		N4308	ST9123A
216	Knob (4)	413.40392	413.40411
	Circlip for knob, item 216 (4) ...	532.10284	532.10284
	Ring under knob	—	532.60444
217	R.H. side panel, wood	443.50136	443.50136
218	Meter	347.10033	347.10038
219	Speed selector knob	411.50151	411.50175
220	Lamp screen	691.30028	—
221	Lock complete	444.60147	—
or	Lock	417.50043	403.50514
	Spring for lock	492.50792	492.50701
222	Lid complete	443.30152	443.30158
223	Leaf spring, speaker mounting ...	429.61288	429.61288
224	Screw 3×5 mm.	502.10558	502.10558
225	Lead compartment cover	443.60266	443.60288
226	Lower case section complete ...	443.50135	443.50144
227	Screw 4×6 mm.	502.10046	502.10046
227	Washer 4.3 mm.	532.10333	532.10333
228	Voltage adaptor	272.10079	272.10079
229	Foot (4)	462.40014	462.40014

MECHANICAL ASSEMBLY

1	Self tapping screw 5N×$\frac{1}{8}$"	502.30042	50	Screw 3×5 mm.	502.10865
2	Circlip 2.3mm.	530.70043	51	Felt ring for turntable	532.50691
3	Screw 3×6 mm.	502.10673	52	Turntable (2)	528.10195
4	Circlip 3.2 mm.	532.70123	53	Shaft of L.H. turntable	535.80394
5	Screw 2.6×5 mm.	502.10034	54	Friction disc	528.20125
6	Solder tag	290.30058	55	Friction block	466.40025
7	Screw 2×5 mm.	502.10679	56	Friction wheel	691.20012
8	Nut 4 mm.	505.10326	57	Washer 3.2 mm.	532.50689
9	Screw 2.6×5 mm.	502.10034	58	Pressure arm	403.50474
10	Screw 2.6×20 mm.	502.10093	59	Pivot bracket (N4308)	403.50481
11	Washer	532.30095	59	Pivot bracket (ST9123A)	403.50515
12	Screw 4×2 mm.	502.10674	60	Tension spring	492.30631
13	Circlip 6 mm.	530.70126	61	Tension spring	492.30628
14	Screw 2.6×5 mm.	502.10034	62	Pressure roller lever complete	403.40034
15	Circlip 4 mm.	530.70124	63	Intermediate lever	403.50468
16	Circlip 3 mm.	530.70115	64	Lever arm	403.50469
18	Washer 3.2 mm.	532.50689	65	Wire spring	535.90572
19	Washer 4 mm.	532.10333	66	Torsion spring	492.61289
20	Circlip 3.2 mm.	530.70123	67	Pressure felt	403.50473
22	Screw 4×5 mm.	502.30006	68	Washer 4.2 mm.	310.40003
23	Screw 3×8 mm.	502.10689	69	Washer 2.5 mm.	532.50266
24	Solder tag	290.30061	70	Pressure roller	528.70034
25	Washer 4.1 mm.	530.80088	71	Screening cover	462.50121
26	Screw 4×65 mm.	502.10056	72	Record/playback head	249.10047
27	Washer 4 mm.	532.10333	73	L.H. tape guide	532.20251
28	Circlip 6 mm.	530.70127	74	Bracket for item 73	403.50147
29	Screw 3×6 mm.	502.10664	75	L.H. pressure spring	492.50314
30	Washer 4 mm.	530.80006	75a	R.H. pressure spring	492.50625
36	Screw 4×40 mm.	502.10696	76	Erase head	249.40033
37	Washer 4.3 mm.	532.10333	77	Headplate with flywheel bearing	403.50471
40	Screw 2×5 mm.	502.10026	78	Spacer 4.1×6×14 mm.	532.20427
41	Washer 4 mm.	530.80006	79	Head mounting plate	403.50489
42	Washer 4.3 mm.	532.10333	80	Pressure spring	492.50684
43	Circlip 2.3 mm.	530.70043	81	Right-angled lever	403,50472
44	Self tapping screw 4N×$\frac{1}{16}$"	502.30001	82	Tension spring	492.30629

83	R.H. tape guide	532.20243
84	Wire spring	492.61291
85	Stop bracket	403.50482
86	Pressure spring	492.50655
87	Tension spring	492.30634
88	Pause bracket	403.50478
89	Wire spring	492.60362
90	Tension spring	492.30259
91	Release bracket	403.30136
92	Mains switch complete (N4308)	276.10287
92	Mains switch complete (ST9123A)	276.10313
93	Tension spring	492.30633
94	Tension spring	492.30632
95	Operating arm for S3	403.50477
96	Operating arm for S1	403.50475
97	Washer 7.5 mm.	532.10272
98	Wind actuator	403.50151
99	Pause brake shoe	466.40023
100	Pause strip	403.50479
101	L.H. brake bracket	403.10096
102	Record strip	403.50476
103	Fast wind strip	403.50466
104	Ball $\frac{3}{16}$"	520.40017
105	Leaf spring	492.61292
106	Pin	535.90552
107	Locking plate	403.30135
108	Torsion spring	492.40301
109	Pulley	528.80107
110	Flywheel	528.60051
111	Thrust bearing	462.70354
112	Belt, speed change	358.30024
113	Play strip	403.50467
114	Control bracket	403.50129
115	Pulley	528.80146
116	'Z' bracket	403.50437
117	R.H. brake shoe	466.40069
118	Main drive belt	358.30014
119	Tension spring	492.30416
120	Brake shoe	466.40071
121	Washer 1.5 mm.	532.50268
122	Washer 2.2 mm.	532.50692
123	Tension spring	492.30263
124	Pulley	528.80108
125	Track selector knob (N4308)	411.50152
125	Track selector knob (ST9123A)	411.50176
126	Brush	479.30026
127	Ball	520.40005
128	Leaf spring	492.60356
129	Derailing cam	522.30464
130	Pulley	528.80109
131	Rev. counter	349.50028
132	Pulley	528.80106
133	Rev. counter drive belt	358.30023
134	Motor pulley 50-60Hz	705.15062
135	Grommet	325.80066
136	Spacer	532.20429
137	Speed selector segment	522.30795
138	Wire spring	492.60355
139	Drive belt for item 141	358.30095
140	R.H. turntable spindle	535.80393
141	Drive wheel	691.20014
142	Torsion spring	492.40119
143	Tension spring	492.30267
144	Motor 50Hz + pulley 50-60Hz	361.70133
or 144	Motor 60 Hz	361.70135
145	Spacer	532.20428
146	Bearing	520.30187
147	Washer 4.1 mm.	532.50286
148	Washer	532.50006
149	Washer 3.2 mm.	532.50689
150	Ball	520.40005
151	Washer 5.2 mm.	532.50301
170	Operating arm for S2	403.10097
171	Operating bracket for S1, S3	403.50483

ELECTRICAL

LAMP, FUSE, METER

LP1	Lamp	134.40032
FS1	Fuse	252.20007
ME	Modulation level indicator meter (N4308)	347.10033
ME	Modulatioh level indicator meter (ST9123A)	347.10038

SWITCHES

S1	Record/playback switch	277.30389
S2	Track selector switch	277.30388
S3	Play/stop switch	277.30391
S4a, S4b	Speed compensation switches	278.90007
S5	Loudspeaker impedance switch	277.20067
S6	Mains switch (N4308)	276.10287
S6	Mains switch (ST9123A)	276.10313

TRANSFORMERS AND COILS

L1	Oscillator coil	157.50578
L2	Correction coil	156.10325
L3	Loudspeaker	240.20035
L4-11	Mains transformer	145.30066
L14/15	Headphone isolating transformer	140.60166

SEMI-CONDUCTORS, ETC.

T1	Transistor	BC109B or BC149B
T2	,,	BC109B or BC149B
T3	,,	BC109B or BC149B
T4	,,	BC108 or BC148A
T5	,,	BC108 or BC148A
T6	,,	AC187/01
T7	,,	AD162
T8	,,	AD161
T9	,,	AC125
T10	,,	BC108A
X1, X2	Diode	BY126 or OF160
X3	,,	OA95

SOCKETS, ETC.

Connection plate with sockets Skt1 & Skt4	267.20098
Connection plate with sockets Skt2 & Skt3	267.20099
Headphone socket Skt5	267.40043
Mains voltage selector	272.10079

CAPACITORS

		Value uF	Volts	
C726	Pin up	4.7KpF		904/P4K7
C727	Elco	68	16	124.20377
C728	Polyester	68KpF		121.40057
C730	Polyester	68KpF		121.40057
C731	Polyester	10KpF		121.40047
C732	Polyester	33KpF		121.40054
C733	Pin up	1KpF		C322.DC/P1K
C734	Elco	2.5	64	124.20204
C735	Elco	0.64	64	124.20092
C736	Pin up	680pF		120.20103
C737	Elco	100	16	124.20385
C738	Pin up	680pF		120.20103
C739	Elco	0.64	64	124.20092
C740	Elco	2.5	64	124.20204
C741	Elco	220	16	124.20395
C742	Elco	2.5	64	124.20204
C743	Polyester	270KpF		121.40187
C744	Elco	220	16	124.20395
C745	Polyester	150KpF		121.40104
C746	Polyester	68KpF		121.40057
C747	Polyester	220KpF		121.40079
C748	Elco	33	40	124.20037
C749	Elco	33	40	124.20037
C750	Pin up	680pF		120.20103
C751	Elco	680	40	124.20413
C752	Elco	2.5	64	124.20204
C753	Elco	680	40	124.20413
C754	Polyester	68KpF		121.40057
C755	Elco	680	40	124.20413
C756	Elco	2.5	64	124.20204
C757	Polyester	120KpF		121.40183
C758	Polyester	22KpF		121.40045
C759	Polyester	120KpF		121.40183
C760	Elco	330	16	124.20153
C761	Elco	2.5	64	124.20204
C762	Elco	2.5	64	124.20204
C763	Pin up	820pF		120.20105
C764	Elco	150	6.3	124.20387
C765	Polyester	18KpF		121.40019
C766	Polyester	15KpF		121.40049
C767	Polyester	220KpF		121.40079
C768	Elco	680	40	124.20413
C769	Elco	330	16	124.20153
C770	Polyester	47KpF		904/P4K7

RESISTORS

		Value Ω	Watt.	
R441	Pre-set	22K		100.10086
R442	Pre-set	22K		100.10086
R443	P.U. level	10K log.		101.30204
R444	Mic. level	10K log.		101.30204
R445	Volume	2.2K log.		101.30202
R446	Pre-set	1K		100.10021
R447	Tone	47K Log.		101.30185
R448	Pre-set	100		100.10073
R526		1M	¼	110.50187
R527		22	⅛	110.61063
R528		22	¼	110.61063
R529		15K	⅛	902/A15K
R530		18K	⅛	110.61141
R531		22K	⅛	902/A22K
R532		1.2K	⅛	110.61109
R533		18K	⅛	110.61141
R534		18K	⅛	110.61141
R535		22K	⅛	902/A22K
R536		68K	⅛	110.61156
R537		68K	¼	110.61156
R538		150K	¼	902/A150K
R539		1M	¼	110.50187
R540		2.7K	⅛	110.61118
R541		560	¼	110.51101
R542		56K	⅛	902/A56K
R543		47	⅛	902/A47E
R544		4.7K	⅛	110.61125
R545		120K	⅛	902/A120K
R546		680K	¼	110.50183
R547		6.8K	⅛	110.61129
R548		6.8K	¼	110.61129
R549		470K	¼	110.50178
R550		12K	⅛	902/A12K
	or	39K	⅛	902/A39K
R551		220	⅛	110.61089
R552		470	⅛	902/A470E
R553		470K	¼	110.50178
R554		4.7K	⅛	110.61125
R555		470	¼	902/A470E
R556		560	⅛	902/A560E
R557		1.5K	⅛	110.61112
R558		470	⅛	902/A470E
R559		6.8K	⅛	110.61129
R560		2.2K	⅛	110.61118
	or	4.7K	⅛	110.61125
R561		120K	⅛	902/A120K
R562		10	⅛	110.61054
R563		390	⅛	110.61096
R564		100	⅛	110.61081
	or	82	¼	110.51078
R565		8.2K	⅛	110.61132
R566		390	⅛	110.61096
R567		1.2K	⅛	110.61109
R568		150	¼	902/A150E
R569		150	⅛	902/A150E
R570		2.7K	⅛	110.61118
R571		18K	⅛	110.61141
R572		470	¼	902/K470E
R573		68	¼	902/A68E
R574		390	⅛	110.61096
R575		56	⅛	902/A56E
R576	N.T.C.			116.30077
R577	Wirewound	2.2	2	113.60028
R578		1.8	⅛	116.60007
R579		1.8	⅛	116.60007
R580		150	⅛	902/A150E
R581		2.2	⅛	116.60002
R582		2.2	⅛	116.60002
R583		15	⅛	902/A15E
R585		330	1	111.50165
R586		100	⅛	110.61081

ACCESSORIES

(Supplied with the Recorder)

MICROPHONE ASSEMBLY

	Microphone complete	N8301/00
401	Cap assembly	447.10107
402	Ornamental ring	532.20332
402a	Cover plate	466.80223
403	Capsule	EL6072/10
404	Retaining piece assembly	310.20139
405	Flex	322.10013
406	Relief plate	466.90346
407	Housing	447.10108
408	Plug	264.40018
	Stand	462.10069
	Stand clamp	256.90042

LEAD ASSEMBLY

	Connecting lead—complete	**EL3768/03**
	3-pole plug	264.40018
	Lead—2 yards	926.KA/800AC8
RA1	Resistor	88.305.80A/1M5

TAPE, ETC.

Spool with tape	LP18
Spool—empty	ER18
Index box	ET4742/00
Library rack	256.97001

R	406 405 600 601 533 536 570 542 535 531 543 537 540 534 550 528 530 546 552 527 529 538 554 539 549 544 548 556 547 551 572 557 526 558 545 532 564 553 560 571 405 561 559 438 555 406 562 565 563 568 569 567 566 577 580 577 581 574 575 576 579 578	R
C	801 730 731 728 733 727 751 740 744 746 747 742 737 732 738 741 746 726 754 729 734 735 739 748 752 736 750 755 753	C
MISC.	T404 Skt 4 L407 FS1 D453 D451 D452 D454 S5 T428 T427 T429 T426 L409 Motor F1 F2 S2 Skt 2 S3 Skt 1 S4 MP2 Skt 3 S1 T431 D434 D435 D437 D436 T432 T430 K2 Erase ME 408 L439 K1 Record/ Playback T433a T433b T438 T437 D442 D441	MISC.

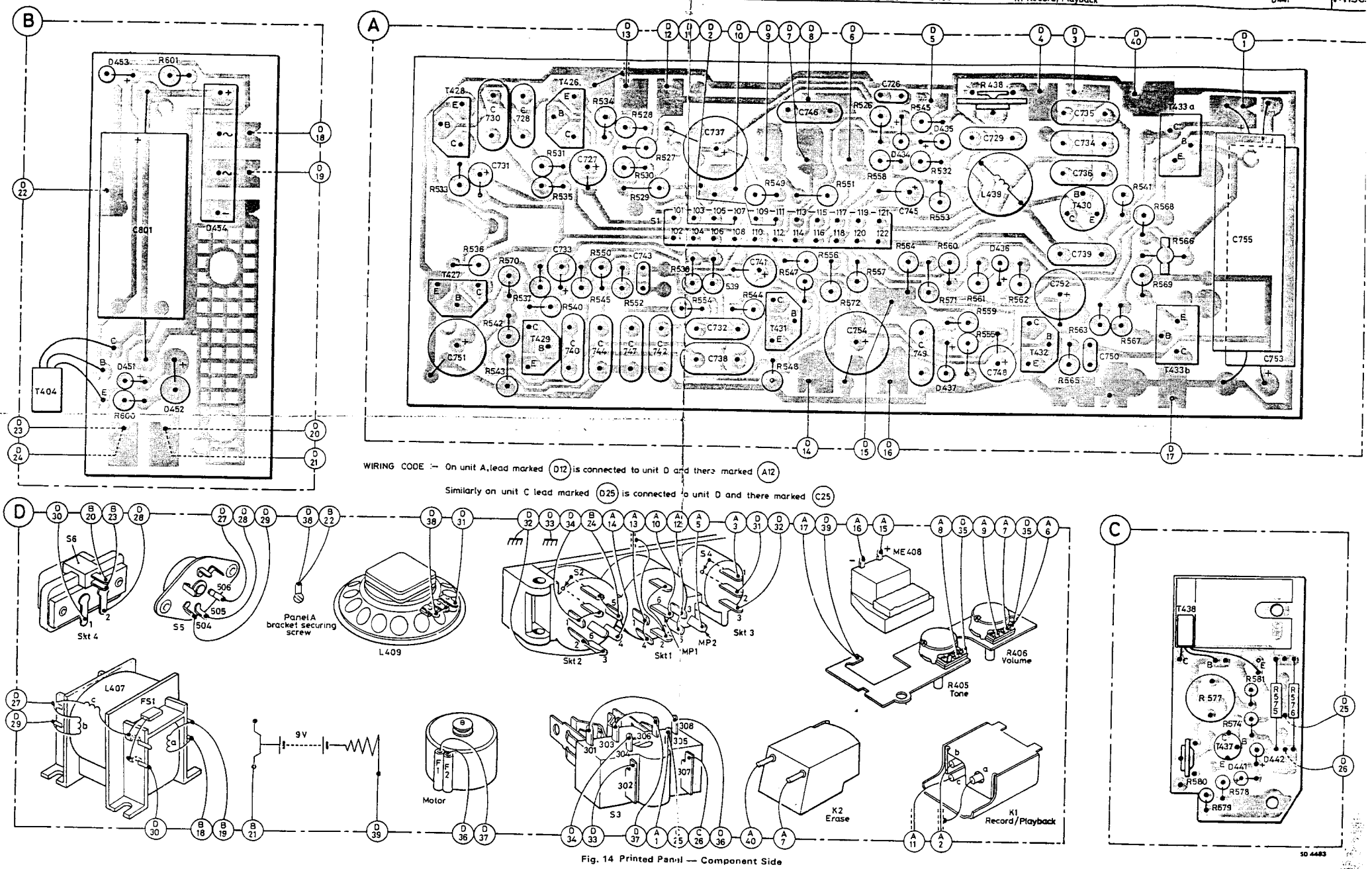
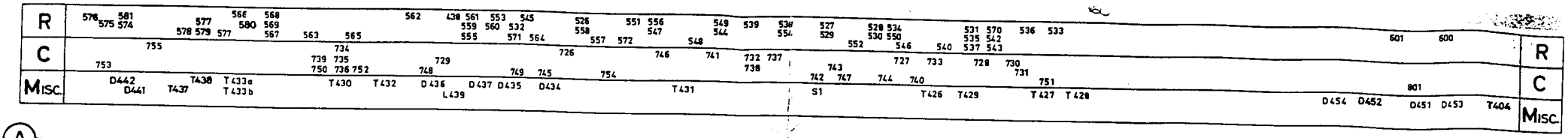
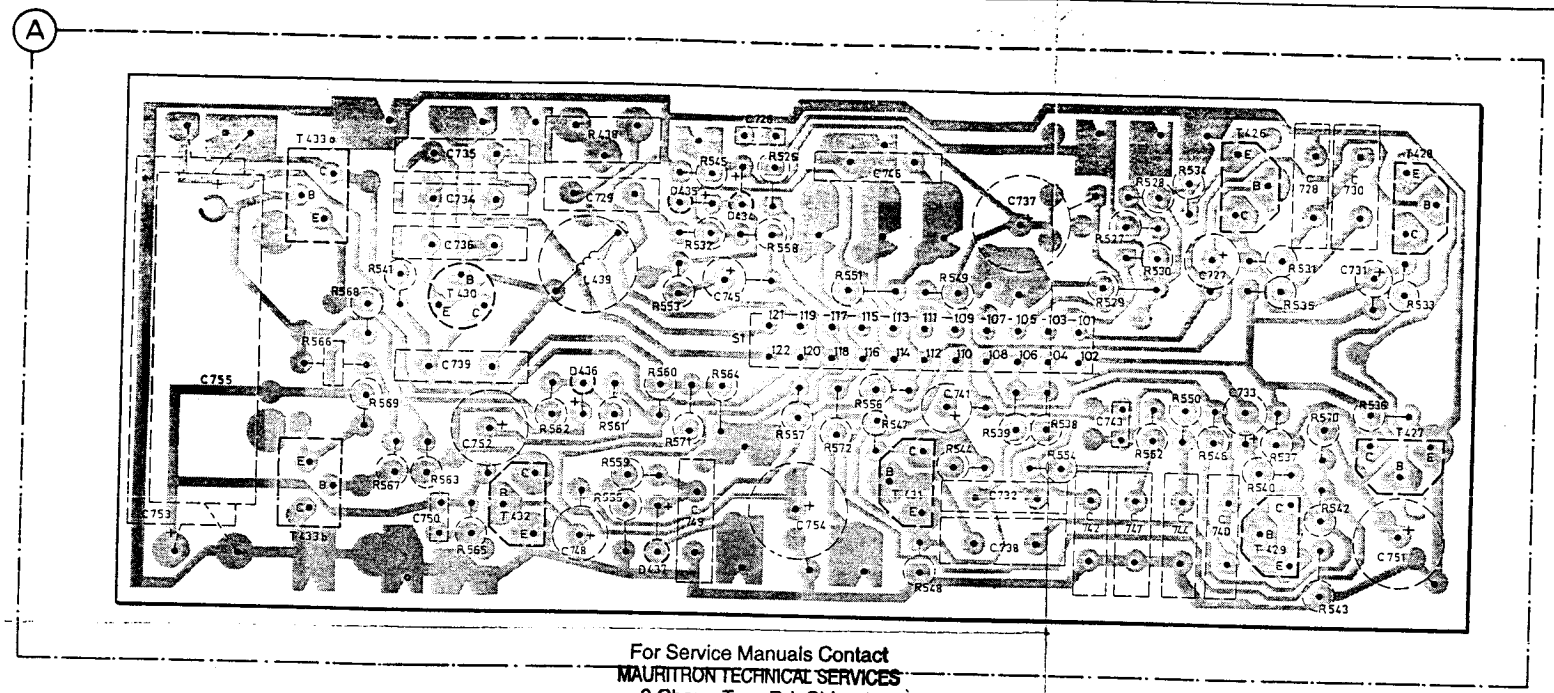
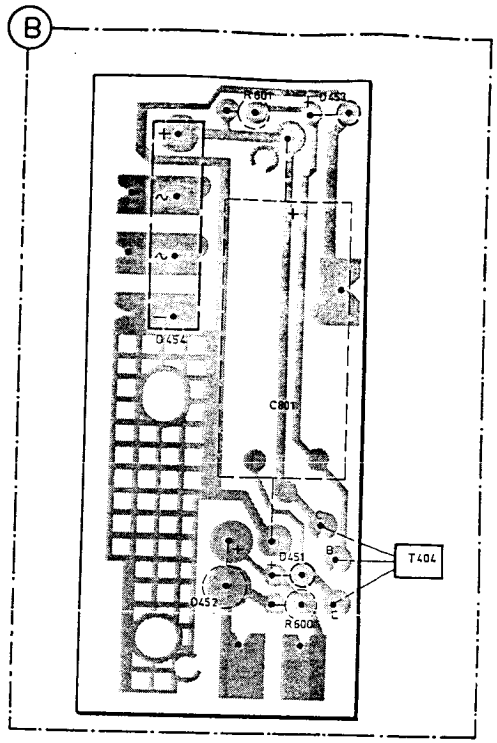
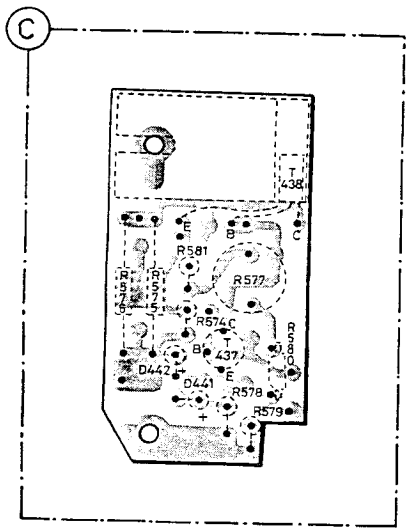


Fig. 14 Printed Panel — Component Side









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8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

Record Voltages			
	Collector	Base	Emitter
T404	12·2	10	10
T426	2·17	0·47	0·02
T427	0·02 *	0·5 *	0
T428	7·15	1·0 *	0·5 *
T429	2·05	0·55	0·77
T430	9·2	0·75	1·15
T431	3·7	0·66	0
T432	4·25	0·65	0
T433a	9·2	4·55	4·4
T433b	0	4·25	4·4
T437	9·0 †	2·6 †	2·5 †
T438	4·3 †	9·0 †	9·2

Playback Voltages			
	Collector	Base	Emitter
T404	12·5	10·2	10
T426	2·2	0·5	0·03
T427	0·05	0	0
T428	7·2	0	0
T429	1·6	0·6	0
T430	9·4	8·4	9·3
T431	4·0	0·86	0·4
T432	4·3	0·65	0
T433a	9·4	4·6	4·45
T433b	0	4·3	4·45
T437	9·0 †	2·6 †	2·5 †
T438	4·3 †	9·0 †	9·4

* Voltages vary marginally with level of recording input

† Voltages typical, marginal variations depending on setting of R580

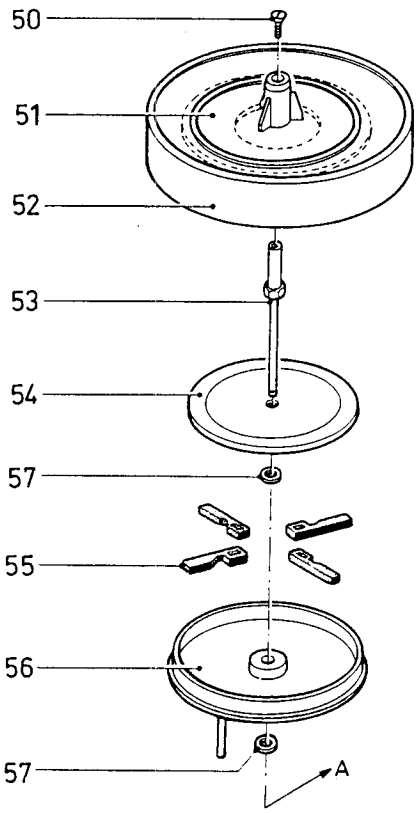
HT Voltages		
	Playback	Record
HT1	7·2	7·15
HT2	8·0	8·0
HT3	9·4	9·2

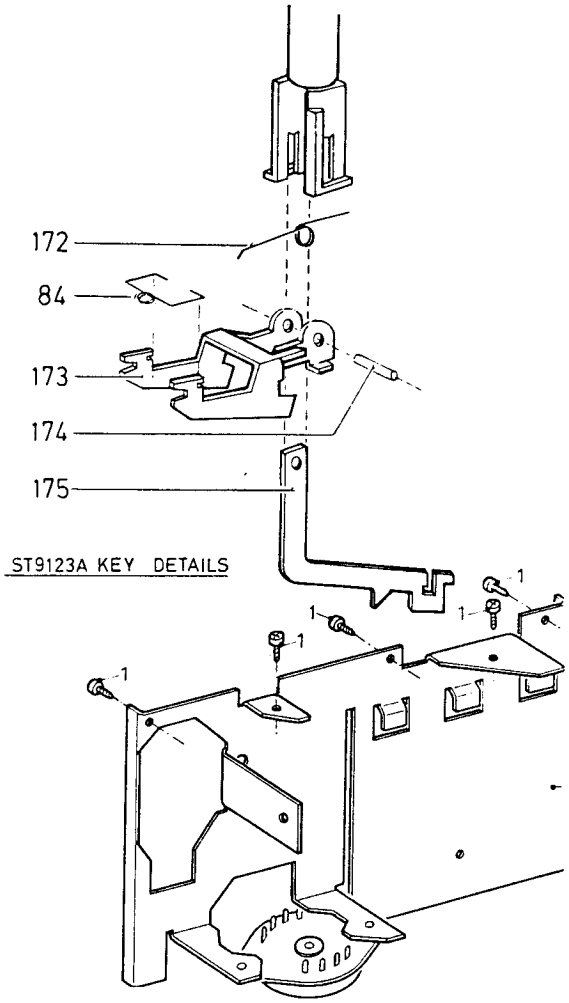
Approx. total battery current (recorder operating less cassette)	
Record	110 mA
Playback	83 mA
Fwd. wind and Rewind	120 mA

Resistance of coils	
Record/playback Head K1	(a-b) 30 Ω
" " "	(b-c) 36 Ω
Erase Head K2	1 Ω
Coil L439	46 Ω
Transformer L407	(a) 1·5 Ω
" "	(b) 625 Ω
" "	(c) 275 Ω

SD4484

Fig. 15 Printed Panel — Print Side





ST9123A KEY DETAILS

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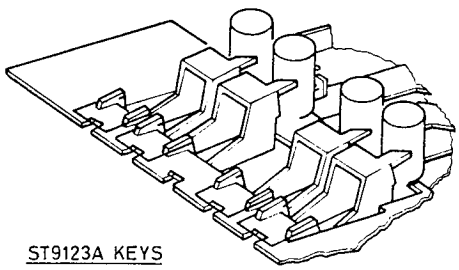
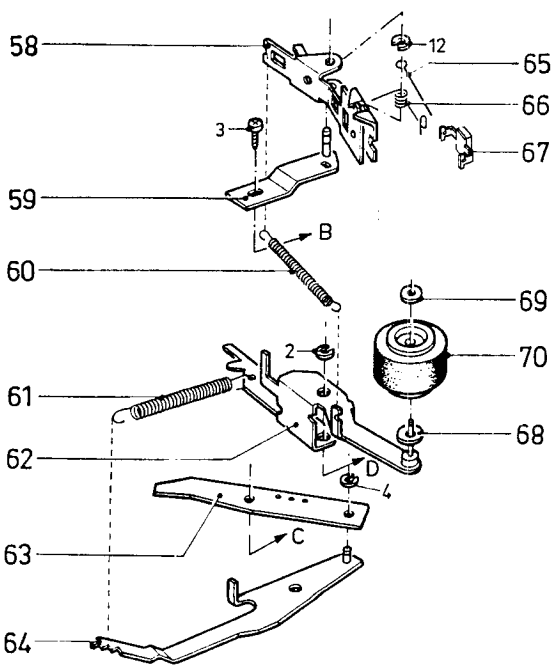
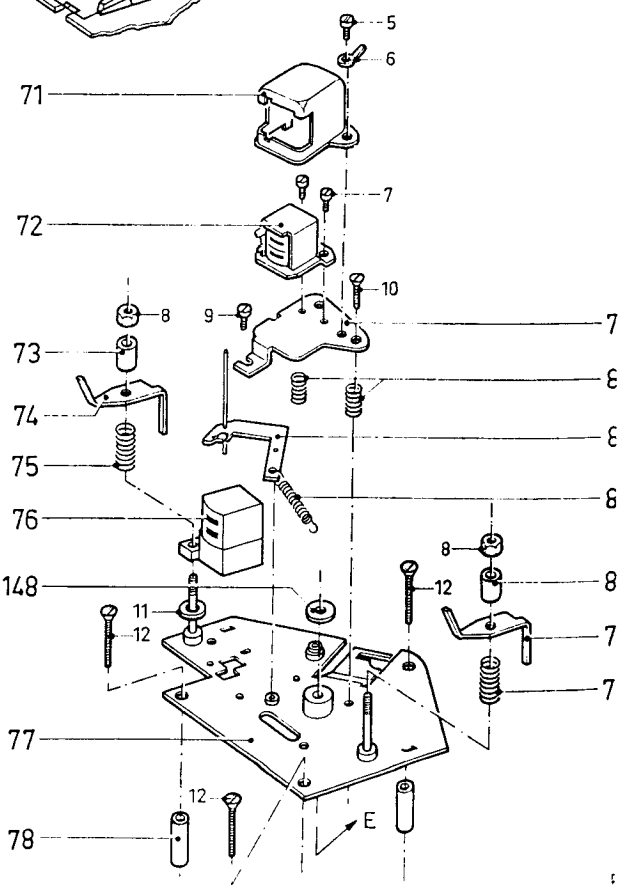
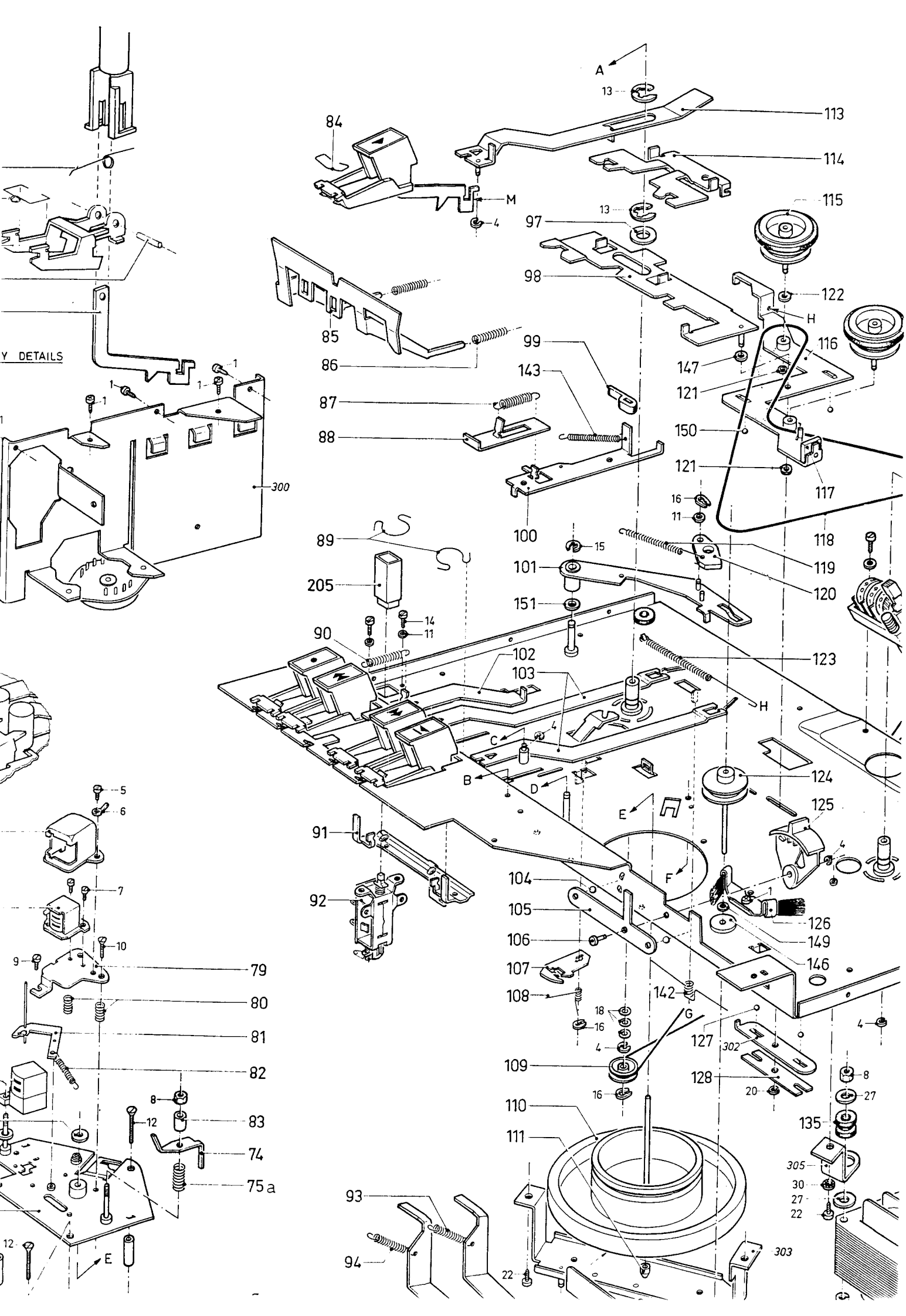


ST9123A KEYS






Y DETAILS
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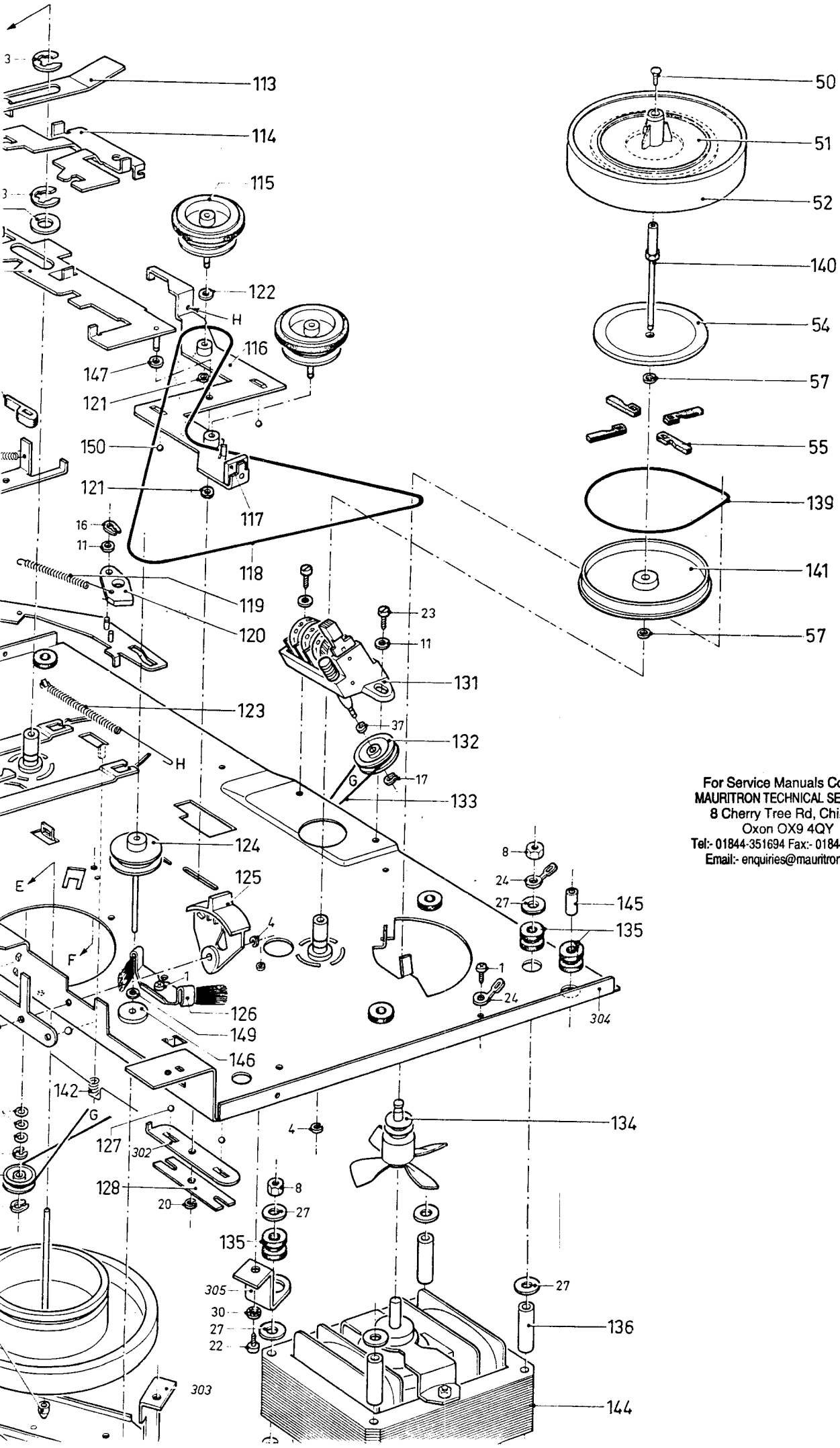

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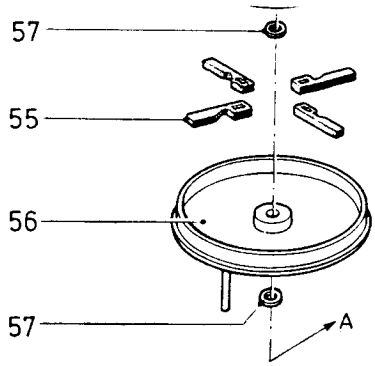
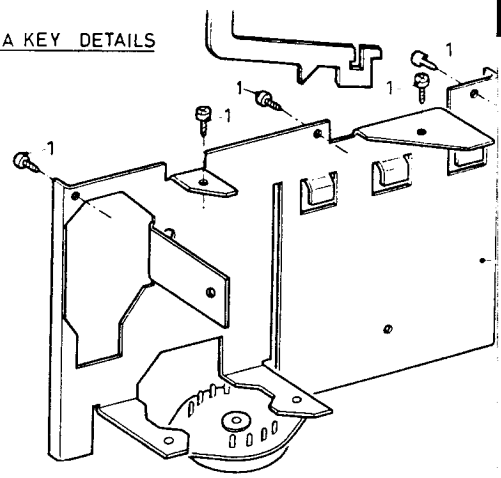
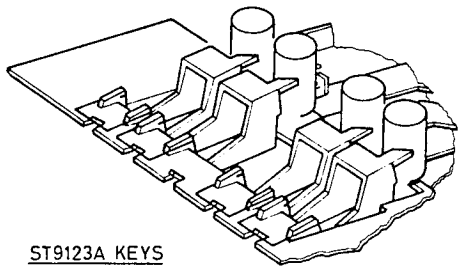
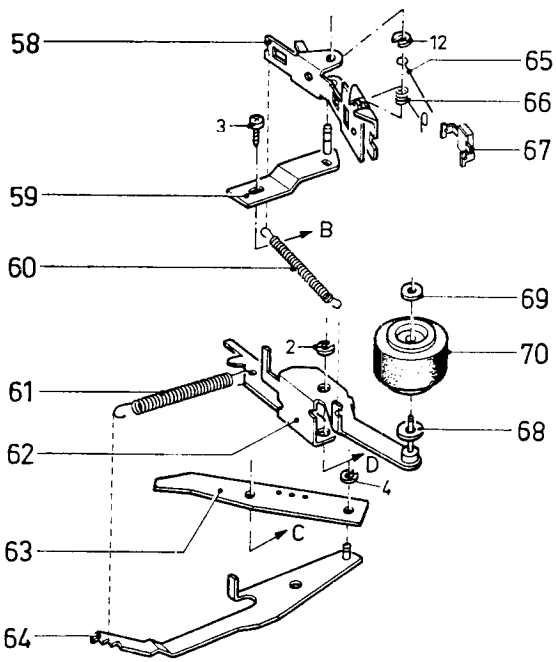


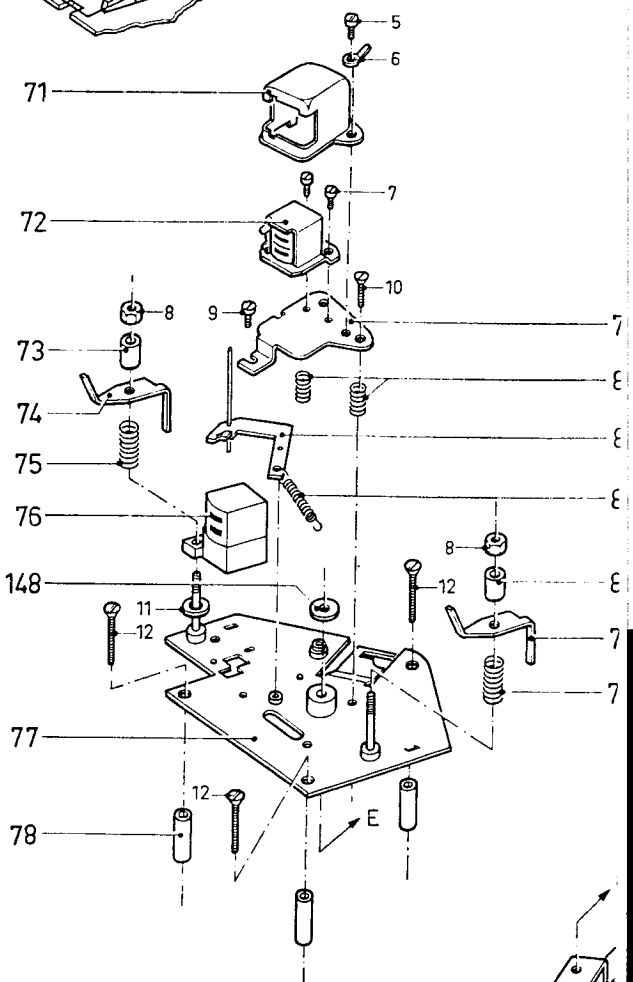
ST9123A KEY DETAILS

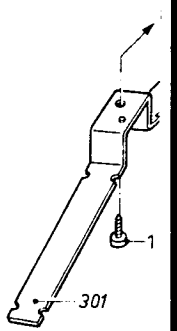




ST9123A KEYS







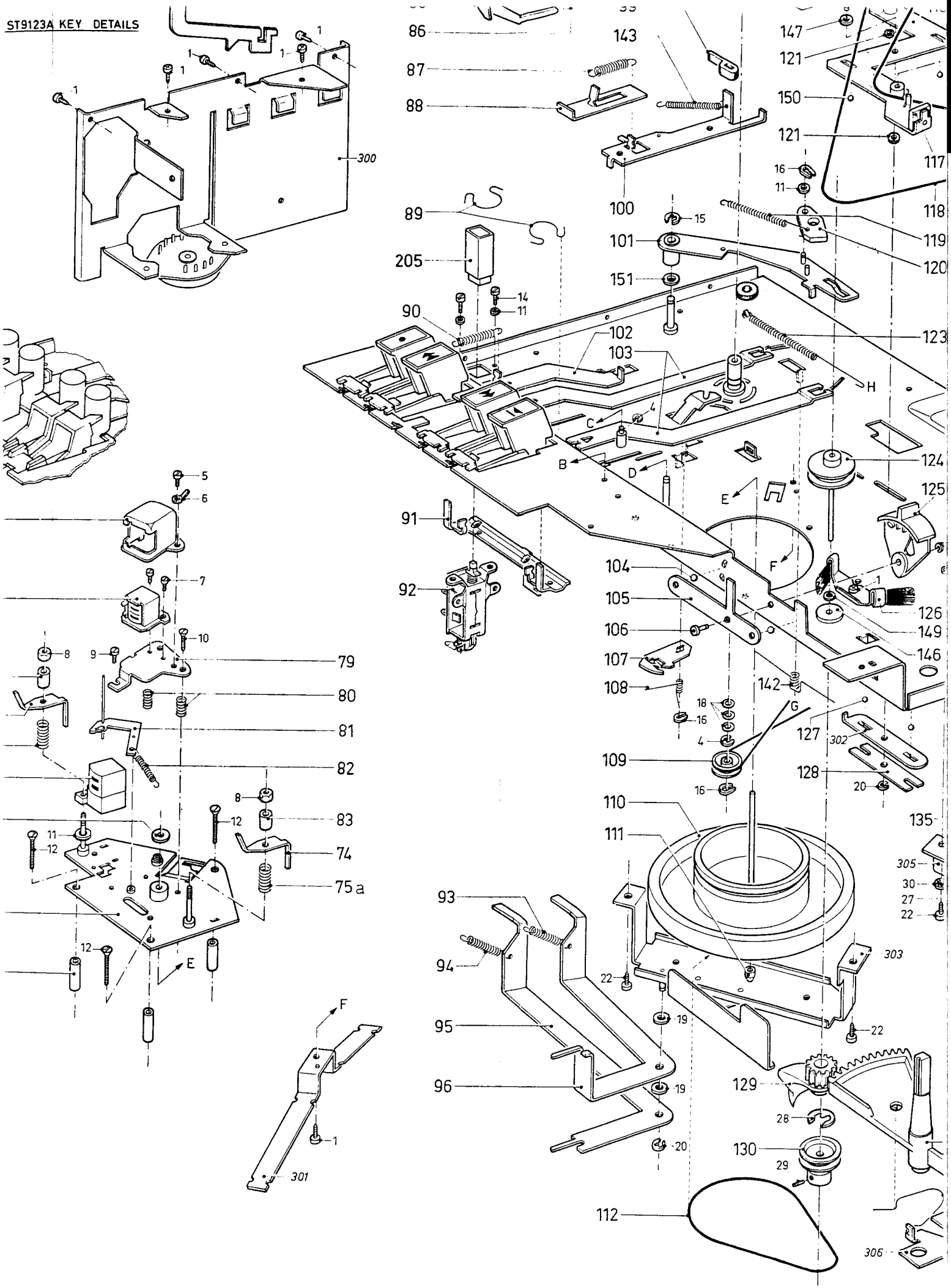
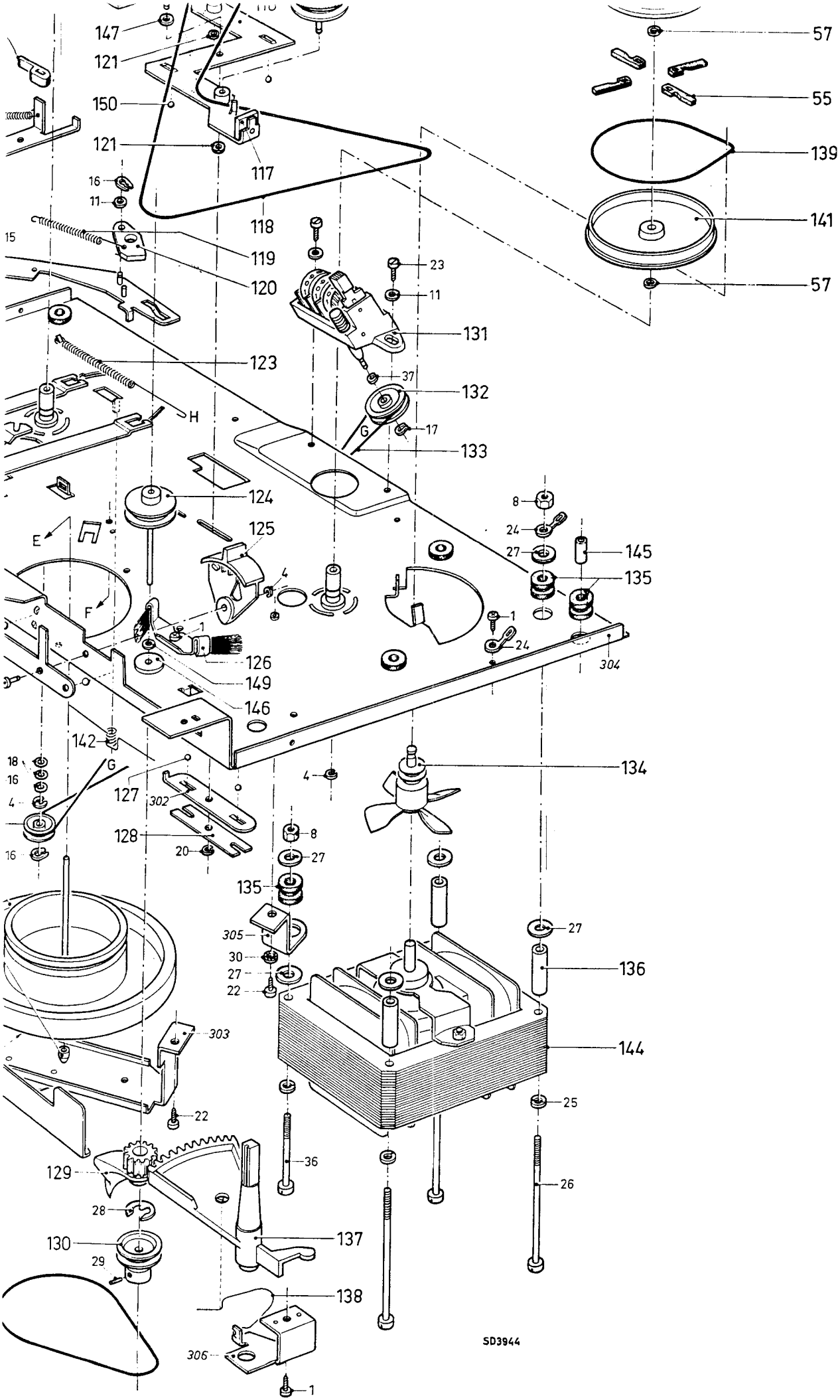


Fig. 21 N4308 & ST9123A — EXPLODED VIEW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304
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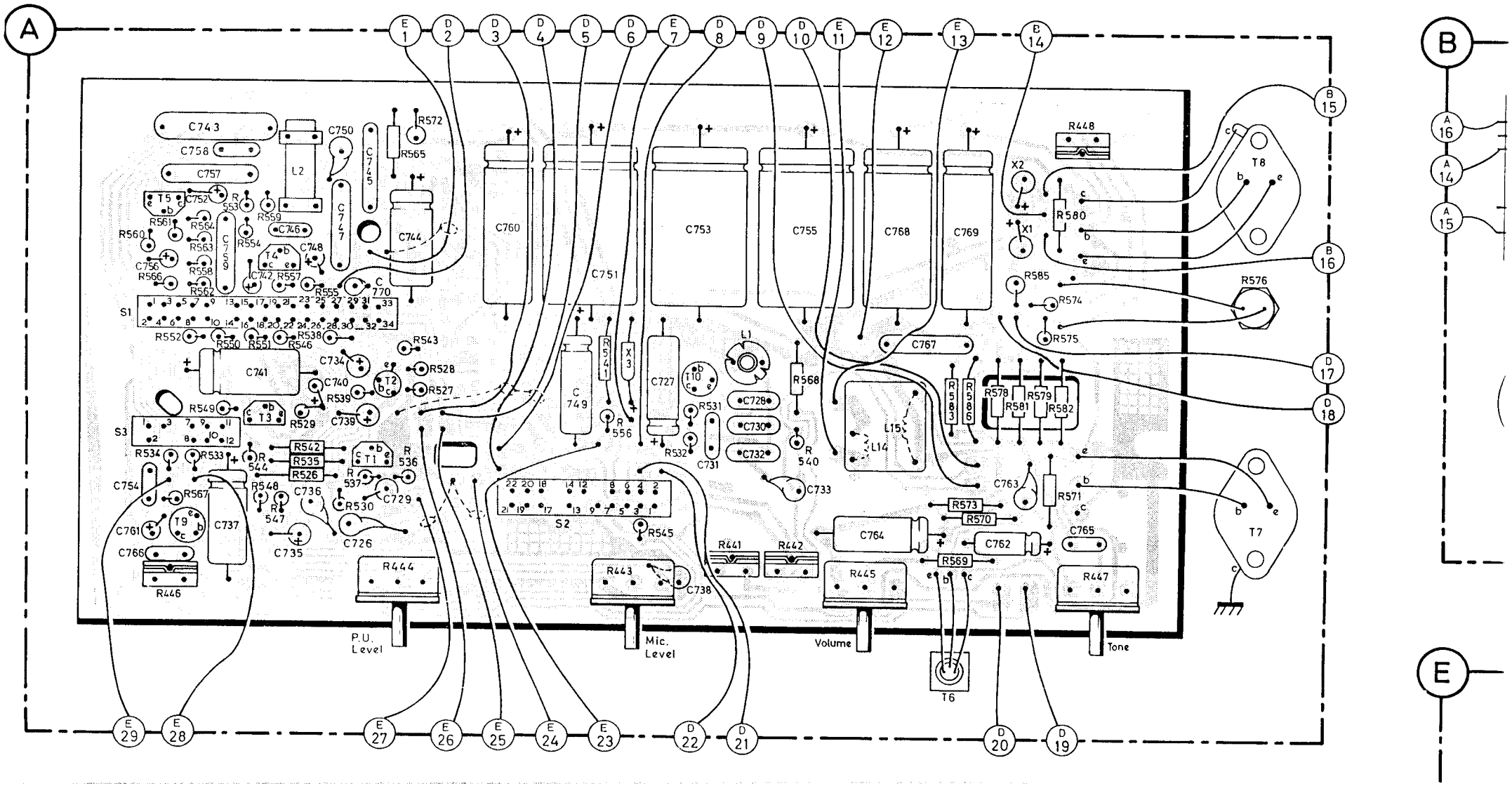
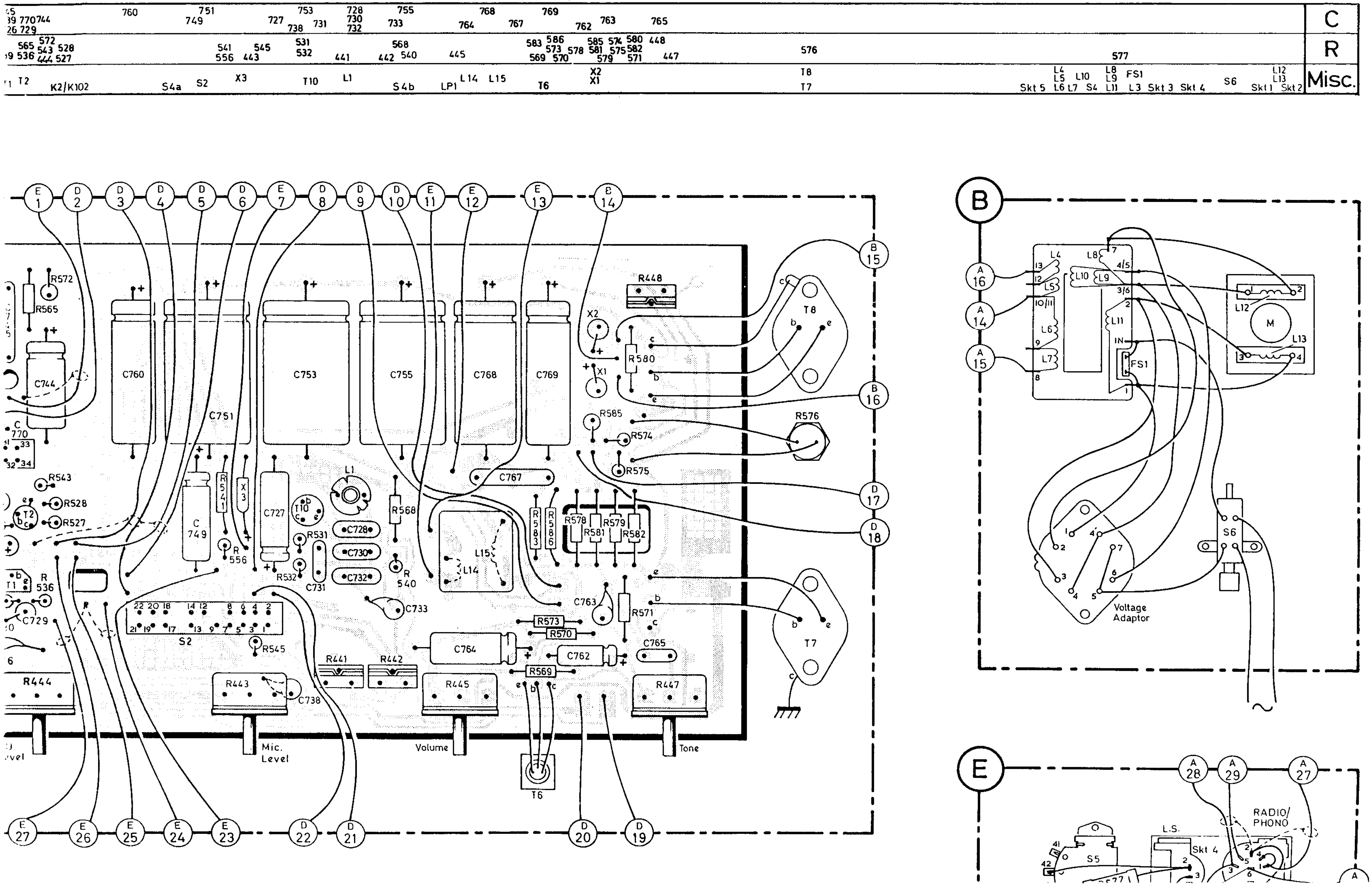
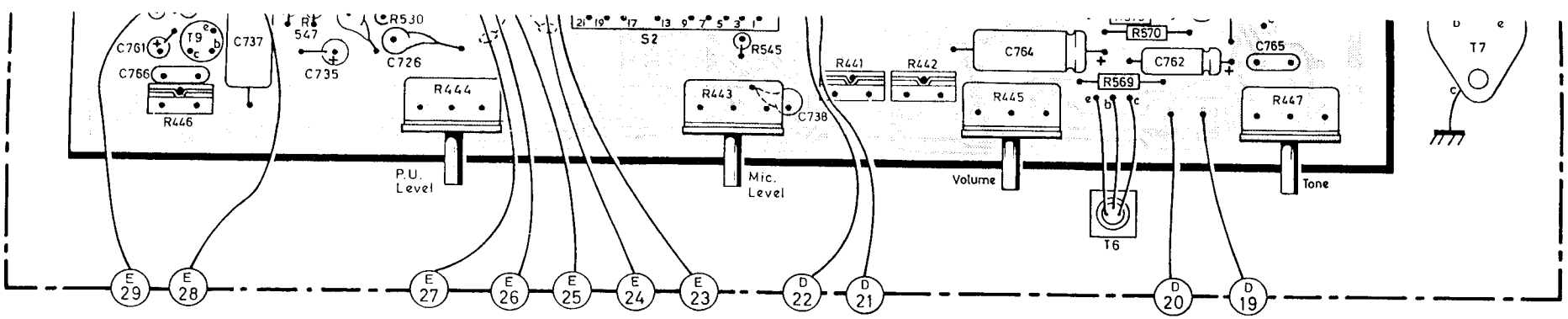
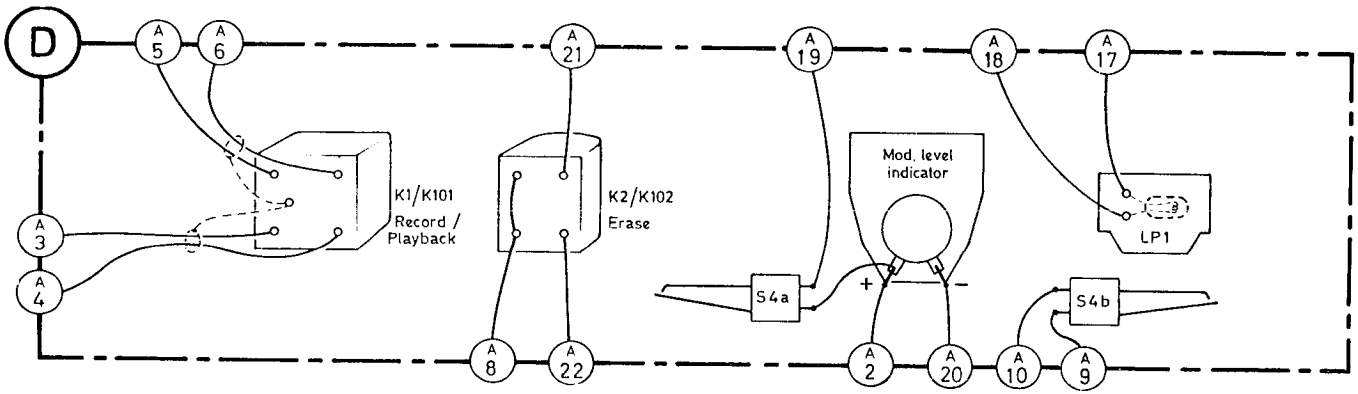
139
141
57
SD3944

C	754 761 766 756 743 752 757 758 759 737 742 741 746 736 748 747 735 750 740 734 745 739 726 770 744 729 760 751 749 727 753 738 731 728 730 732 755 733 768 764 767 769 762 763 765
R	560 561 566 564 567 558 552 562 549 553 554 559 551 557 546 529 542 555 538 548 539 565 536 572 543 528 534 446 533 563 550 544 547 526 535 530 541 556 545 443 531 532 441 568 442 540 445 583 569 586 573 570 578 585 581 579 574 575 580 582 571 448 447 576
Misc.	T5 T9 S3 S1 T3 T4 L2 K1/K101 T1 T2 K2/K102 S4a S2 X3 T10 L1 S4b LP1 L14 L15 T6 X2 X1 T8 T7




C
R
Misc.
B
E
Voltage Adaptor
RADIO/PHONO
L.S.
Volume
Tone
Mic. Level
S2
S5
S6
Skt 4
T6
T7
T8
R576
R448
R443
R444
R445
R447
C744
C751
C753
C755
C760
C764
C768
C769



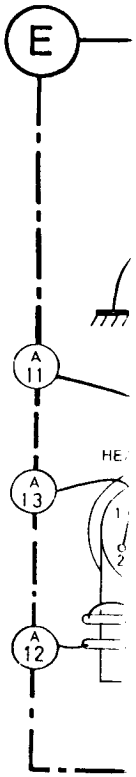


NOTES:

All sockets viewed on solder tags.
Add 200 to all contact numbers on S2.
Add 300 to all contact numbers on S3.

WIRING CODING

On unit A, lead marked (E 1) is connected to unit E and there marked (A 1). Similarly, on unit D, lead marked (A 5) is connected to unit A and there marked (D 5).



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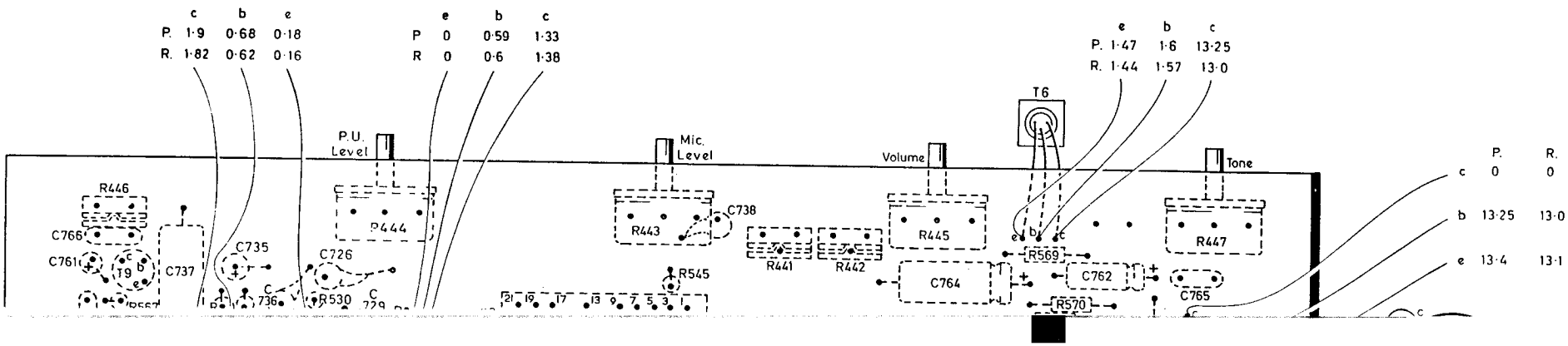
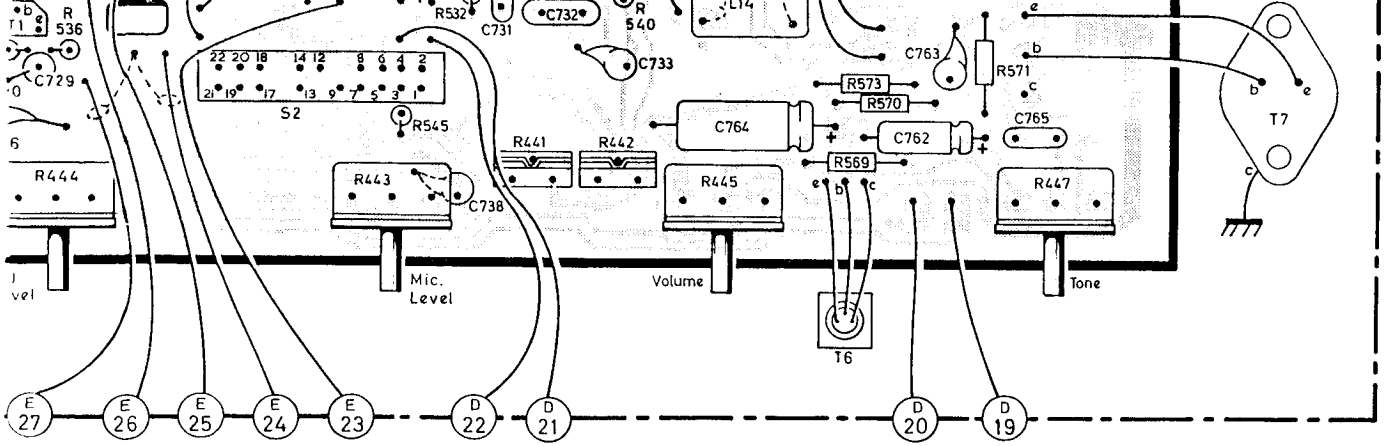
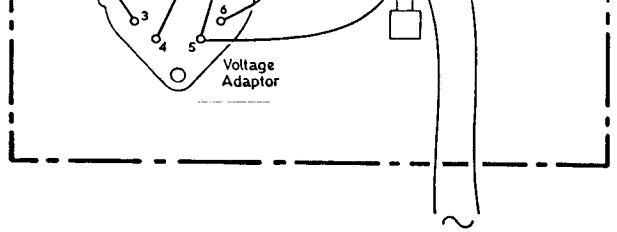
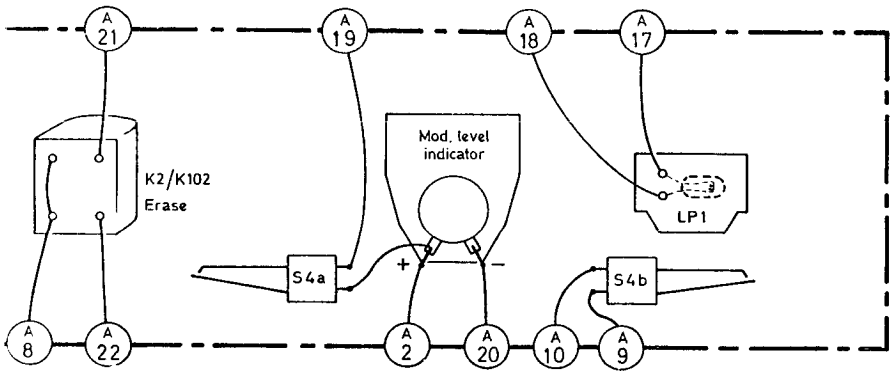




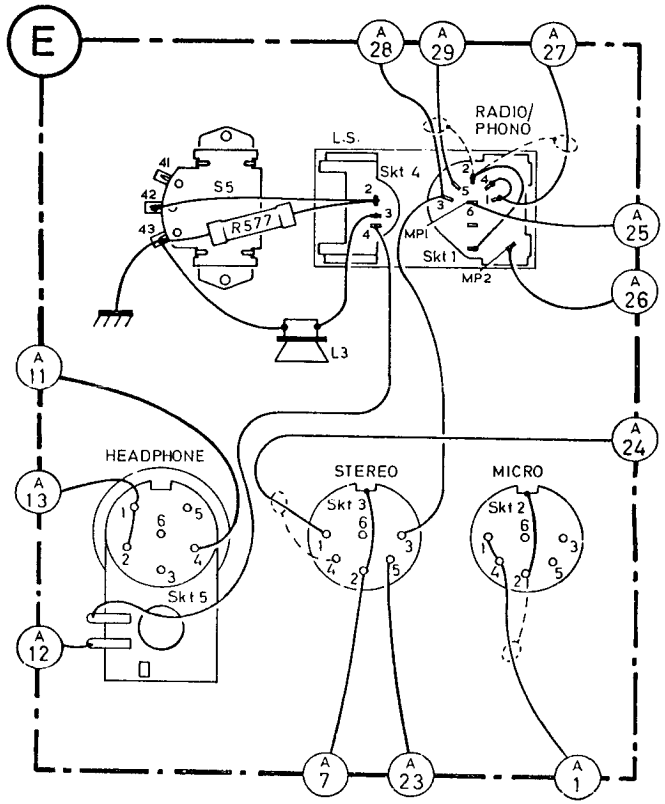


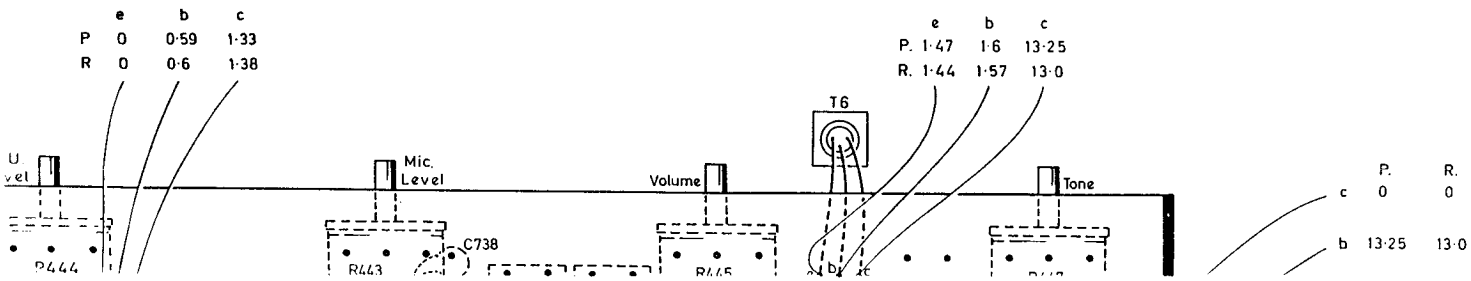


NOTES:
All sockets viewed on solder tags.
Add 200 to all contact numbers on S2.
Add 300 to all contact numbers on S3.

WIRING CODING

On unit A, lead marked (E 1) is connected to unit E and there marked (A 1). Similarly, on unit D, lead marked (A 5) is connected to unit A and there marked (D 5).





Coil	Resistances >1Ω
L1	32
L2	5

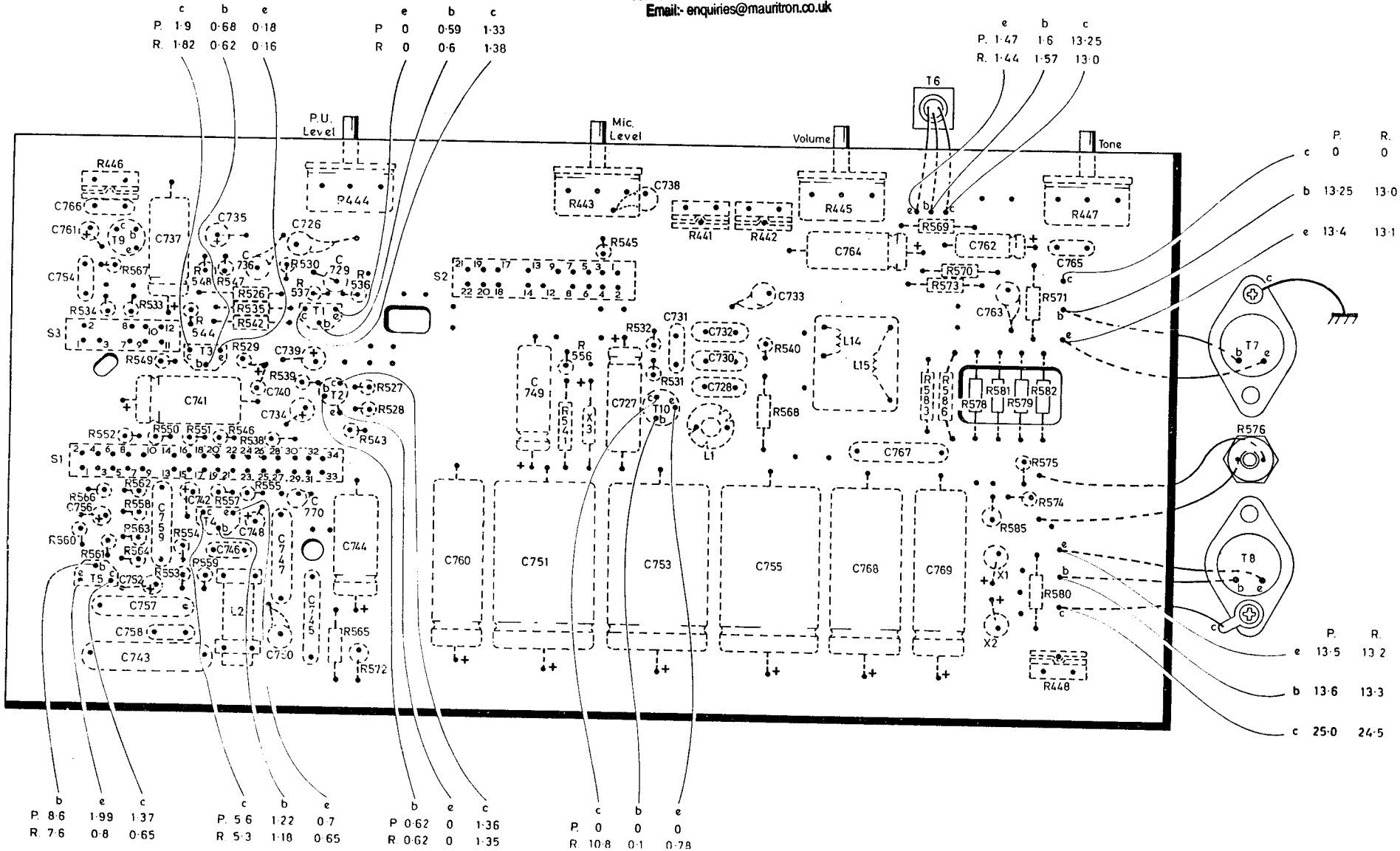
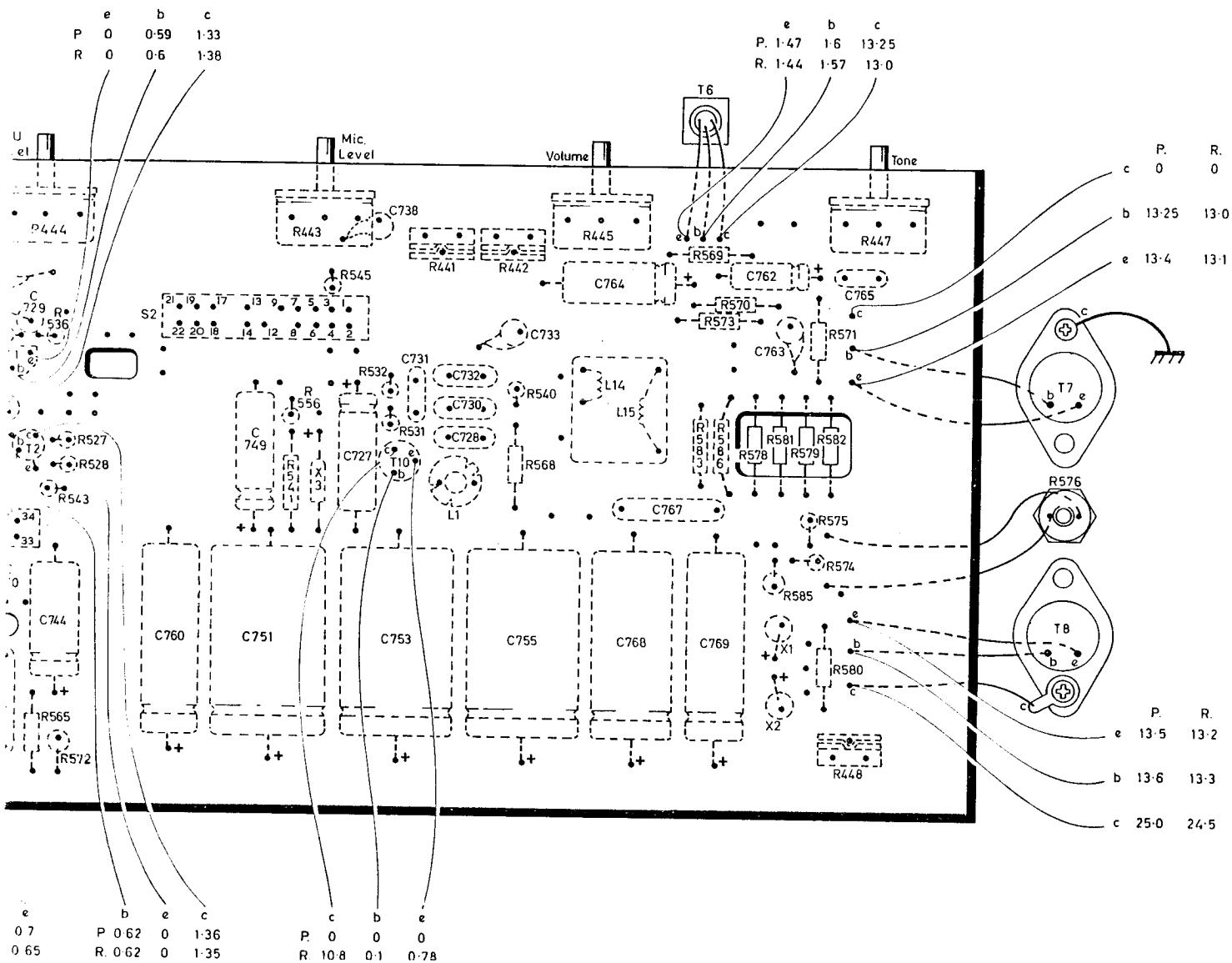


Fig. 22 N4308 & ST9123A — PRINTED PANEL and WIRING DIAGRAM



Coil	Resistances >1Ω
L1	32
L2	5
L3	6
L5	2
L6	2
L8	120
L9	19
L10	23
L11	110
L12	46
L13	46
L14	24

All voltages taken with respect to chassis using a 100KΩ/V meter. Mains input 240V a.c. to 240V tap.

SD3949

Fig. 22 N4308 & ST9123A — PRINTED PANEL and WIRING DIAGRAM

TAPE RECORDER

SERVICE INFORMATION FOR THE

PHILIPS

N4308/55

The N4308/55 is similar to the N4308, for which service information (CES 753) has been published, except for the following mechanical and electrical differences:

1. Belt drive system

The belt drive system is changed for greater efficiency. Drive wheel 141 is not now driven by belt 139 from motor pulley 134, instead a longer belt 139 couples pulley 124 to drive wheel 141, see diagram.

2. Electrical

On some models a voltage-dependent-resistor is connected across the output of the low-voltage secondary windings of the mains transformer; i.e. from the anode of X1 to the anode of X2.

Note: Due to the change in para. 1 above and the different motor pulley fitted, it is no longer possible to change from 50 to 60Hz operation and vice versa by fitting belt 118 in an alternative pulley groove. The motor and motor pulley should be changed for the required mains frequency operation.

SPARE PARTS LIST

(differences only)

MECHANICAL ASSEMBLY

115	Pulley, R.H.	528 80428
124	Pulley	528 80426
134	Motor pulley, 50Hz	528 50091
134	Motor pulley, 60Hz	528 50092
139	Drive belt for drive wheel 141	358 30096
144	Motor, 50Hz	361 70237
144	Motor, 60Hz	361 70238
146	Bearing	

ELECTRICAL

RESISTOR

R588	V.D.R...	116 20009

ces

COMBINED ELECTRONIC SERVICES LIMITED

604 PURLEY WAY · WADDON · CROYDON · CR9 4DR

TELEPHONE: 01-686 0505 (Recorded messages after business hours) TELEX: 262308

NOVEMBER, 1971 (Please quote CES 1568 when ordering further copies) CES 1568

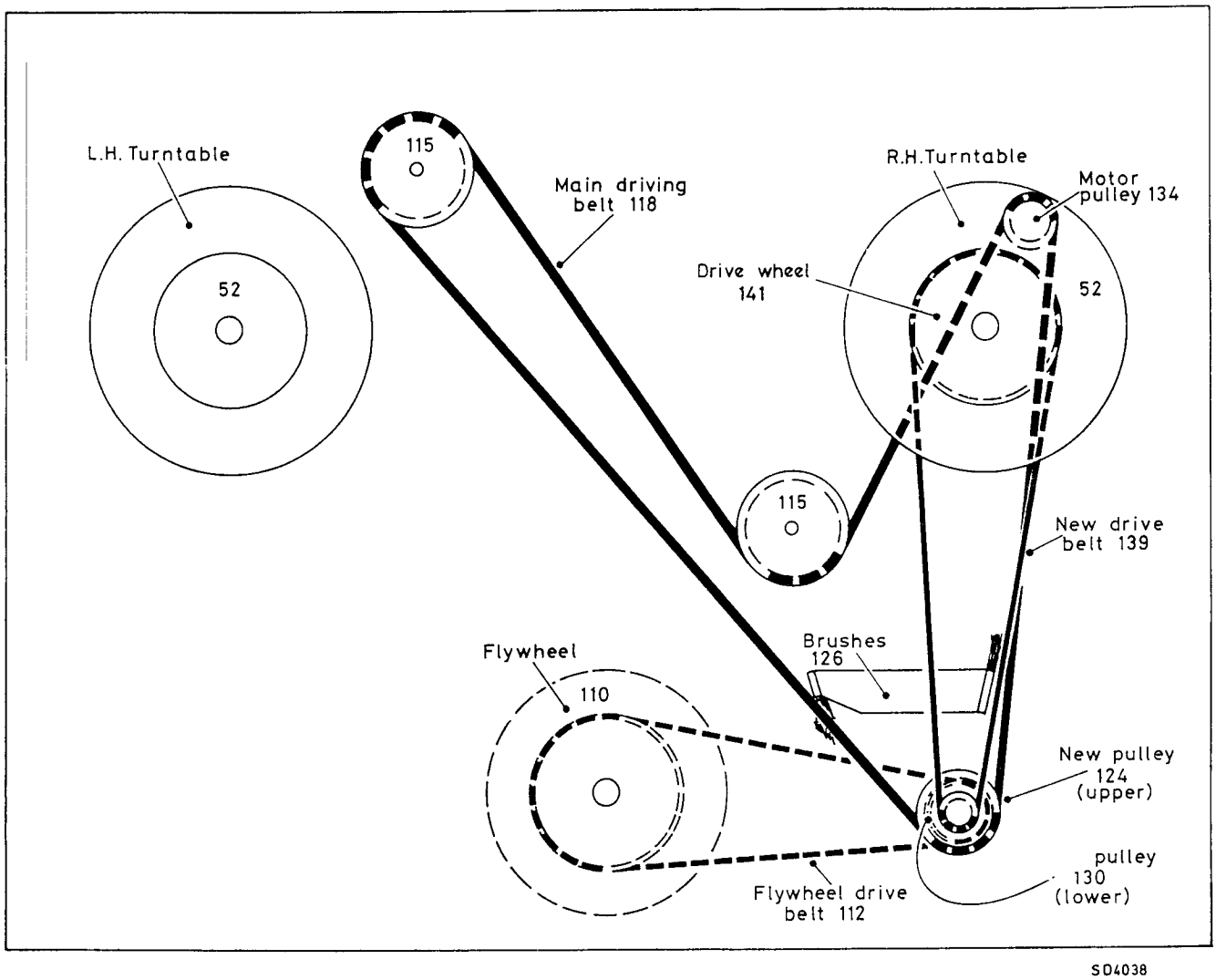
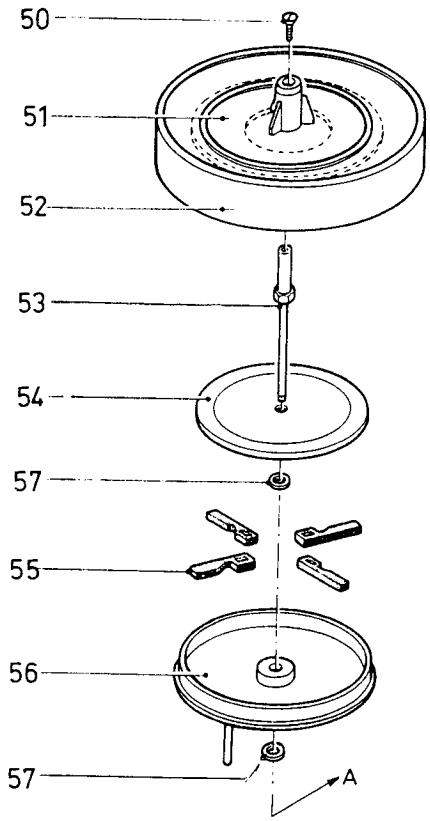

L.H. Turntable
52
115
Main driving belt 118
R.H.Turntable
Motor pulley 134
Drive wheel 141
52
115
New drive belt 139
Flywheel
110
Brushes 126
New pulley 124 (upper)
pulley 130 (lower)
Flywheel drive belt 112
SD4038

Fig. 1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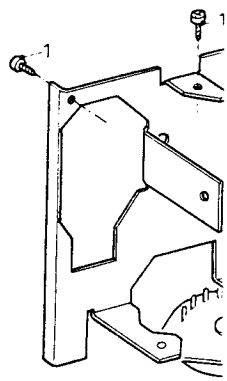
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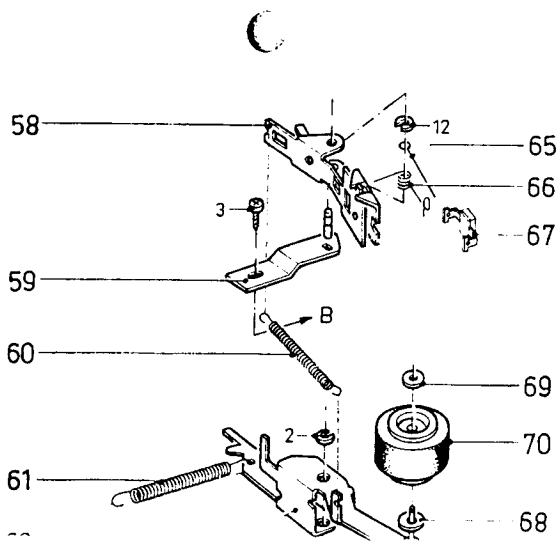
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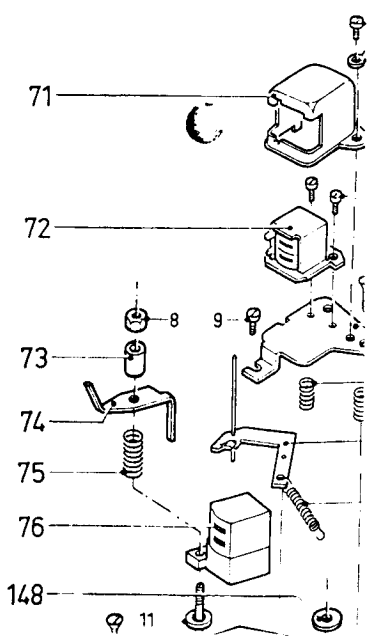
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For Service Manuals Contact
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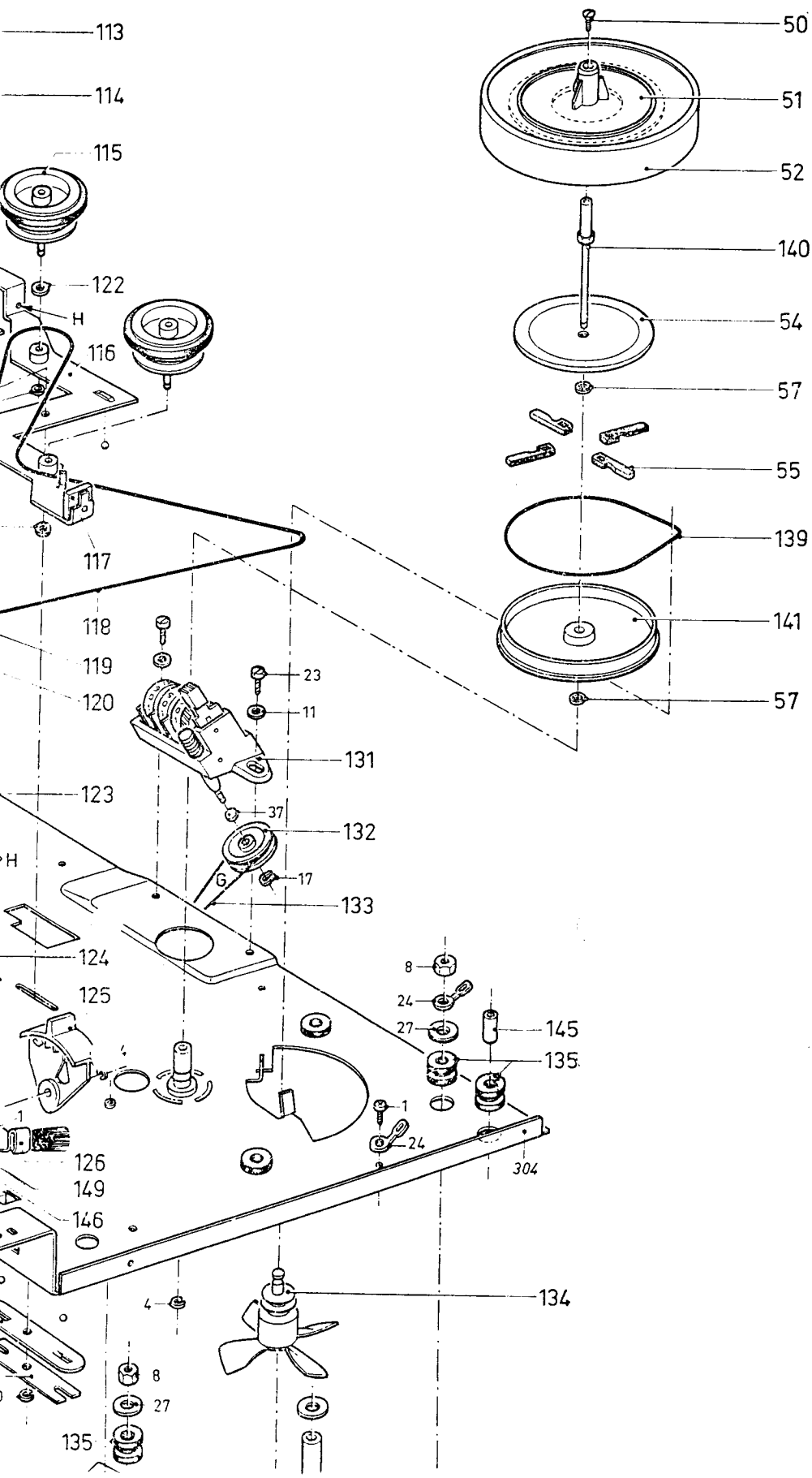
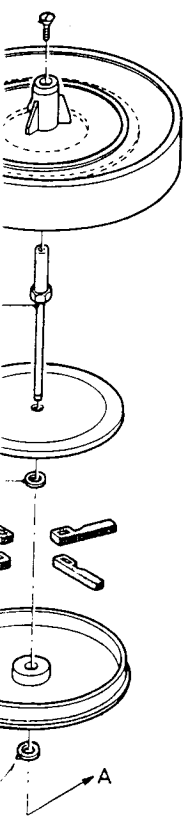
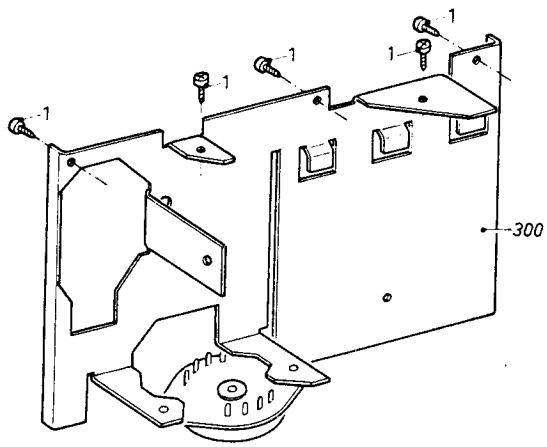
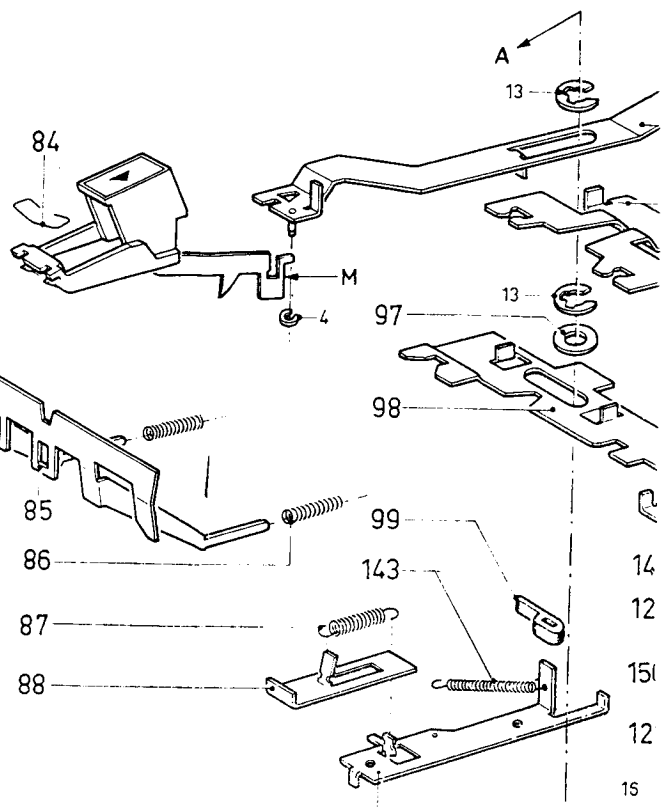
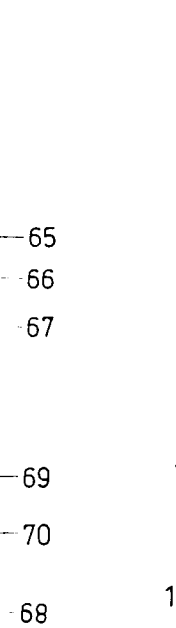
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

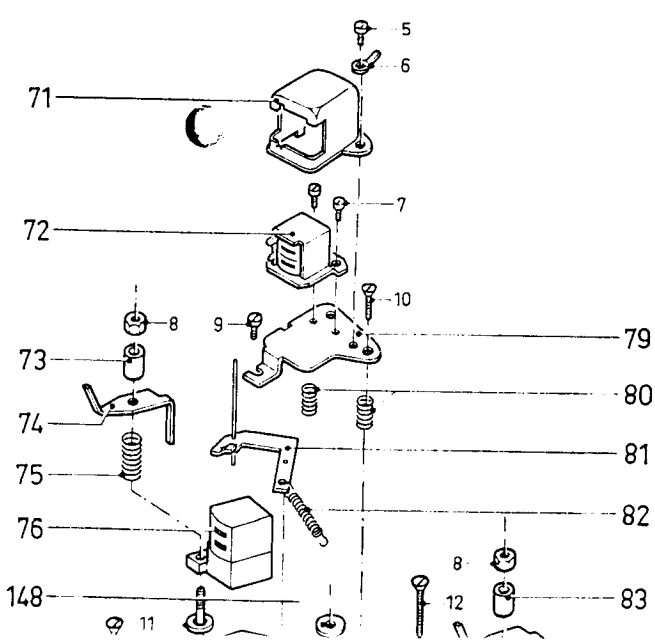












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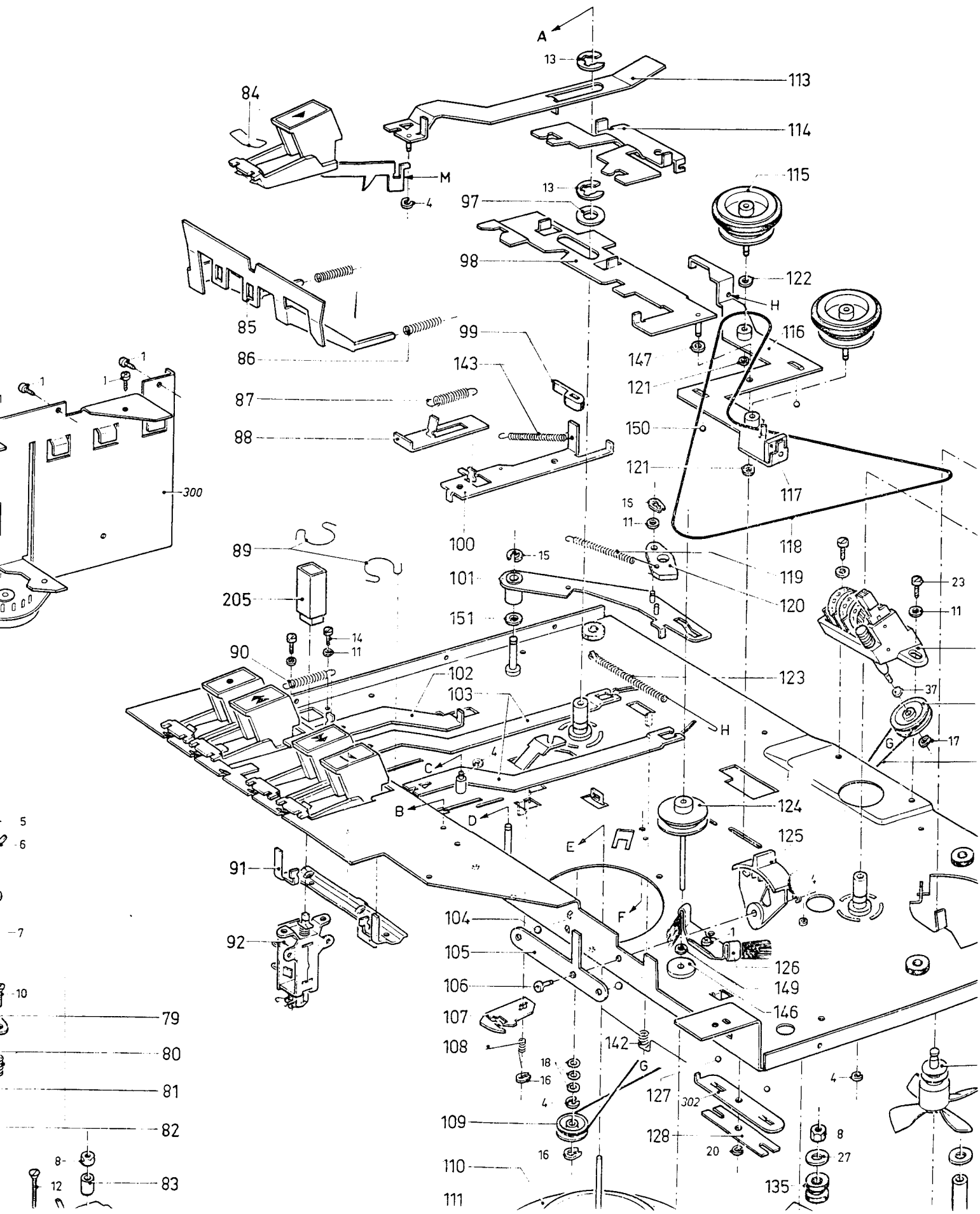

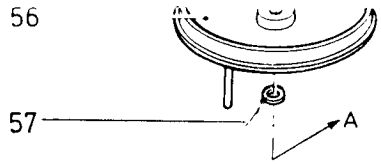
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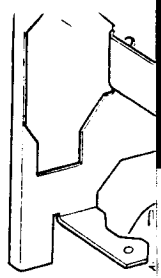

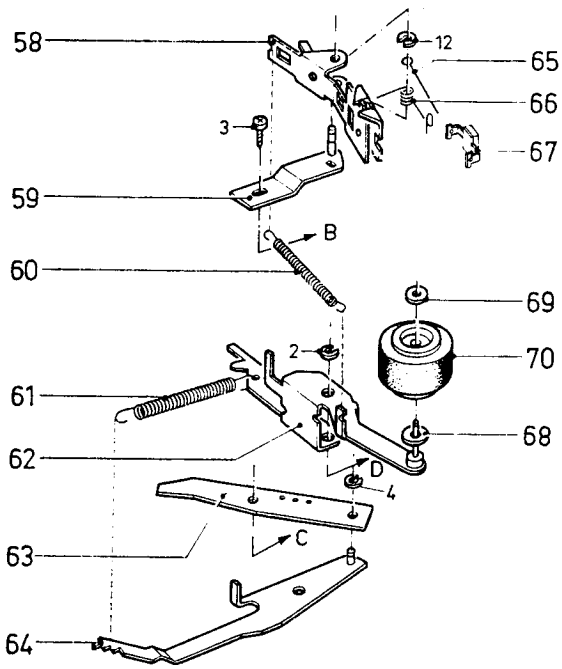
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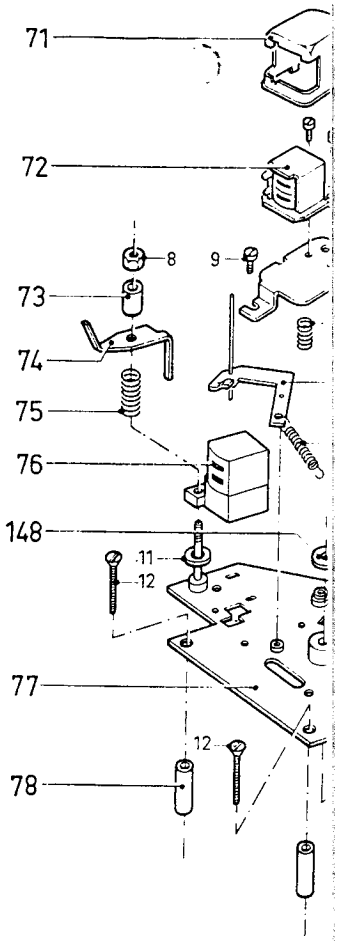
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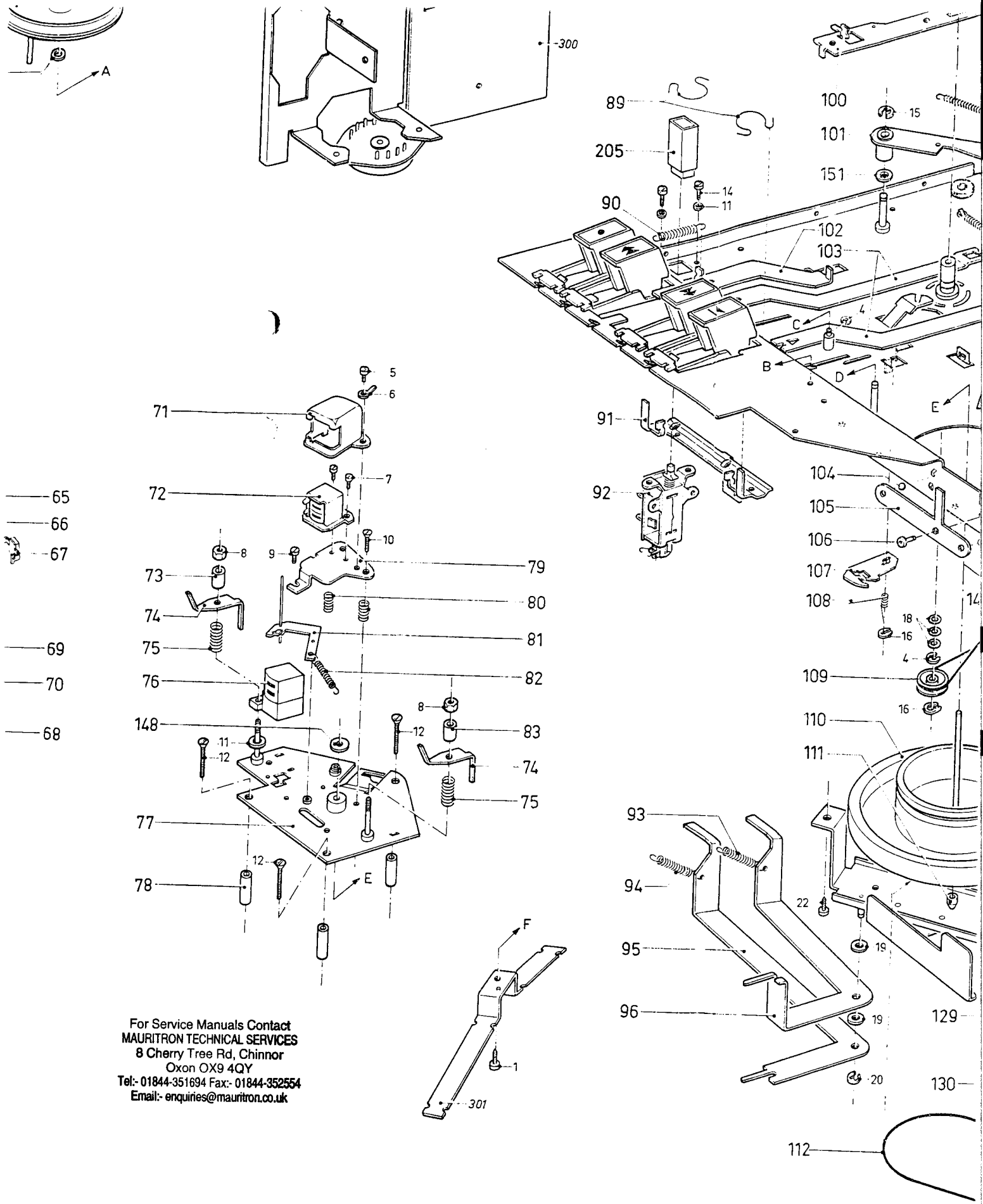

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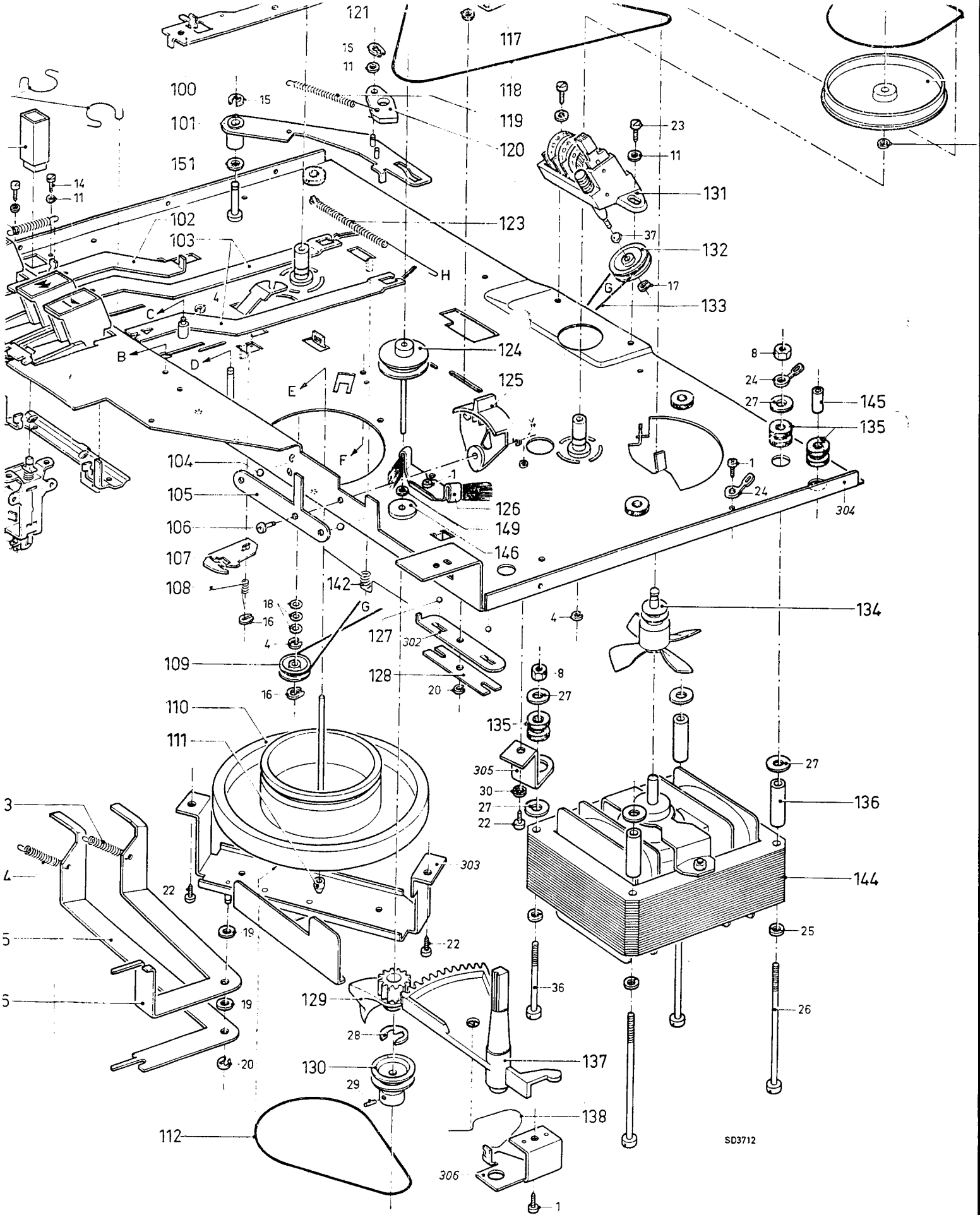
EXPLODED VIEW



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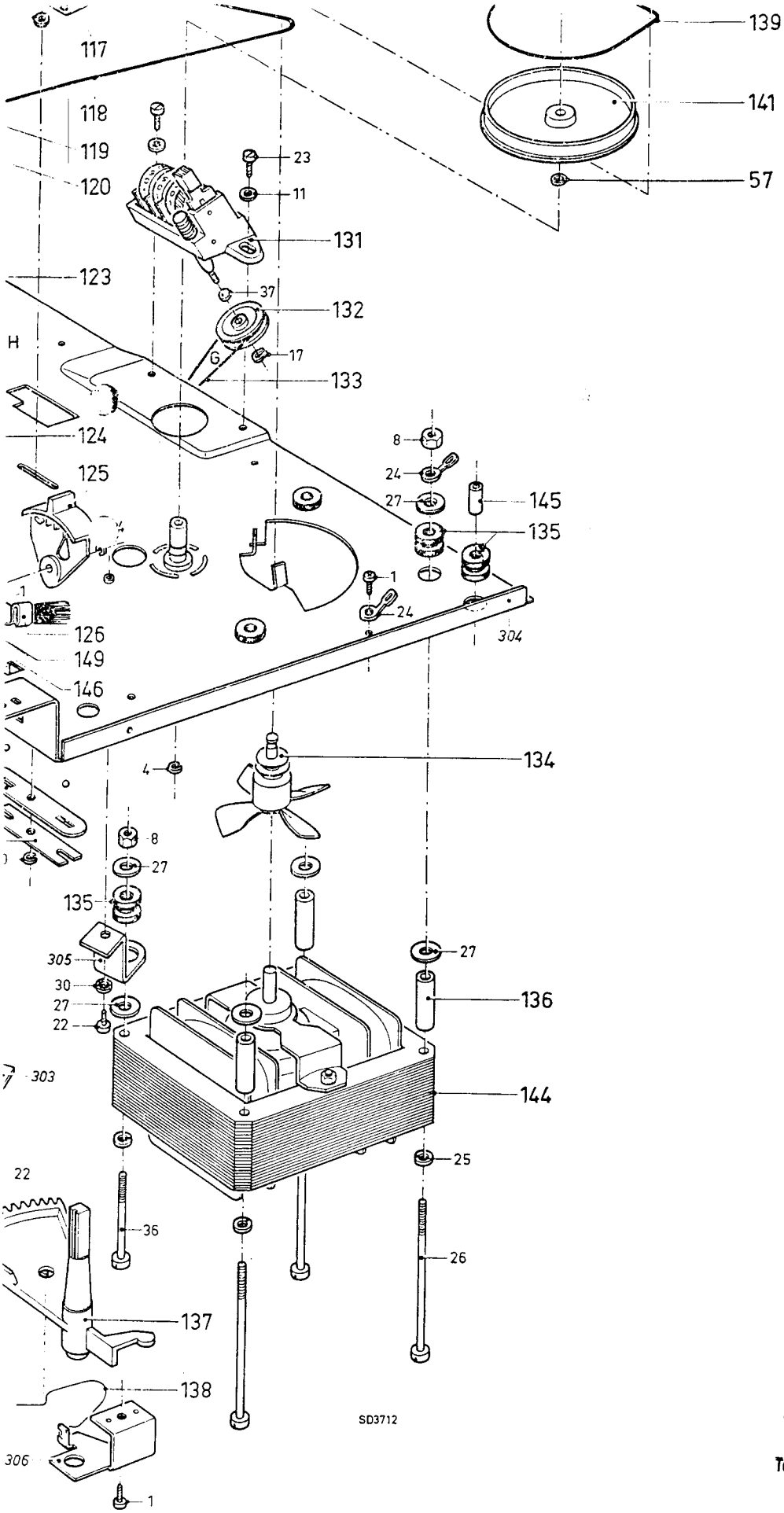

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SPARE PARTS LIST

SUPPLY OF SPARE PARTS: To ensure correct interpretation of requirements please include the following information on orders for spare parts.

1. The full type number recorded on the type number plate, including any suffix. **Do not use the commercial abbreviation which may be misleading.**
2. Whenever possible, quote the serial number of the recorder. In some recorders the components have been changed during production.
3. **Always give a brief description** and colour where applicable.
4. Quote part number.

If it is necessary to return components, always include full identification on the accompanying advice note.

Posn. No.		
	MECHANICAL ASSEMBLY	
1	Self tapping screw 5N × 3/16"	502.30042
2	Circlip 2.3	530.70043
3	Screw 3×6	502.10673
4	Circlip 3, 2	532.70123
5	Screw 2, 6×5	502.10034
6	Soldering tag	290.30058
7	Screw 2×5	502.10679
8	Nut M4	505.10326
9	Screw 2, 6×5	502.10034
10	Screw 2, 6×20	502.10093
11	Ring 4	532.30095
12	Screw 4×2	502.10674
13	C'rclip 6	530.70126
14	Screw 2, 6×5	502.10034
15	Circlip 4	530.70124
16	Circlip 3	530.70115
18	Ring 3, 2	532.50689
19	Ring 4	532.10333
20	Circlip 3.2	530.70123
22	Screw 4×5	502.30006
23	Screw 3×8	502.10689
24	Soldering tag	290.30061
25	Ring 4, 1	530.80088
26	Screw 4×65	502.10056
27	Ring 4	532.10333
28	Circlip 6	530.70127
29	Screw 3×6	502.10664
30	Ring 4	530.80006
36	Screw 4×40	502.10696
37	Circlip 4, 3	532.10333
40	Screw 2×5	502.10026
41	Ring 4	530.80006
42	Ring 4, 3	532.10333
43	Circlip 2, 3	530.70043
44	Self tapping screw 4N × 3/16"	502.30001
50	Screw M3×5	502.10865
51	Friction ring felt	532.50691
52	Turntable	528.10183
53	Shaft of left-hand turntable	535.80394
54	Friction disc	528.20125
55	Brake shoe	466.40025
56	Friction disc left-hand	691.20012
57	Ring 3, 2	532.50689
58	Bracket—complete	403.50474
59	Bracket	403.50481
60	Tension spring	492.30631
61	Tension spring	492.30628
62	Pressure roller lever—complete	403.40034
63	Bracket	403.50468
64	Bracket	403.50469
65	Wire spring	535.90572
66	Torsion spring	492,61289
67	Pressure felt	403.50473
68	Ring 4.2	310.40003
69	Ring 2, 5	532.50266
70	Pressure roller	528.70034
71	Screening cover	462.50121
72	Recording/playback head	249.10047
73	Tape guide, left	532.20251
74	Bracket	403.50147
75	Pressure spring	492.60352
76	Erase head	249.40033
77	Head plate with flywheel bearing	403.50471
78	Spacer 4.1×6×14 mm.	532.20427
79	Head mounting plate	403.50489
80	Pressure spring	492.50684
81	Bracket	403.50472
82	Tension spring	492.30629
83	Tape guide, right	532.20243
84	Wire spring	492.61291
85	Bracket	403.50482
86	Pressure spring	492.50655
87	Tension spring	492.30634
88	Bracket	403.50478
89	Wire spring	492.60362

90	Tension spring	492.30259
91	Bracket	403.30136
92	Mains switch, complete	276.10287
93	Tension spring	492.20533
94	Tension spring	492.30532
95	Bracket	403.50477
96	Bracket	403.50475
97	Ring 7, 5	532.10272
98	Bracket	403.50151
99	Brake shoe	466.40323
100	Bracket	403.50479
101	Brake bracket	403.10096
102	Bracket	403.50476
103	Bracket	403.50466
104	Ball $\frac{3}{16}$"	520.40317
105	Leaf spring	492.61292
106	Pin	535.90552
107	Bracket	403.30135
108	Torsion spring	492.40301
109	Pulley	528.80107
110	Flywheel	528.60051
111	Thrust bearing	462.70354
112	Cord	358.30024
113	Bracket	403.50467
114	Bracket	403.50129
115	Pulley	528.80146
116	"Z" bracket	403.50437
117	Brake shoe	466.40069
118	Cord	358.30014
119	Tension spring	492.30416
120	Brake shoe	466.40071
121	Ring 1, 5	532.50268
122	Ring 2.2	532.50692
123	Tension spring	492.30263
124	Pulley	528.80108
125	Track selector knob	411.50152
126	Cord brush	479,30026
127	Ball	520.40005
128	Leaf spring	492.60356
129	Speed selector	522.30464
130	Pulley	528.80109
131	Counter	349.50028
132	Pulley	528.80106
133	Counter cord	358.30023
134	Motor pulley 50—60Hz	528.50028
135	Grommet	325.80066
136	Spacer	532.20429
137	Speed selector segment	522.30795
138	Wire spring	492.60355
139	Cord	358.30095
140	Shaft of turntable, right-hand	535.80393
141	Friction disc, right-hand	691.20014
142	Torsion spring	492.40119
143	Tension spring	492.30267
144	Motor 50Hz+pulley 50—60Hz	361.70133
or 144	Motor 60Hz	361.70135
145	Spacer	532.20428
146	Bearing	520.30187
147	Ring 4, 1	532.50286
148	Ring	532.50006
149	Ring 3, 2	532.50689
150	Ball	520.40005
151	Ring 5, 2	532.50301
170	Bracket	403,10097
171	Bracket	403.50483

CASE ASSEMBLY

200	Top plate—complete	443.30151
201	Ornamental screw 4×25	502.10863
202	Side panel, left, wood	443.50137
203	Handle	498.30047
	Leaf spring of handle	492.61325
204	Bracket of handle	403.50465
205	Knob of on-off switch	410.20749
206	Ornamental screw 4×35	502.10864
207	Recording button, complete with bracket	410.20755
208	Ornamental frame	459.20117
209	Fast rewind button, complete with bracket	410.20752
210	Playback button, complete with bracket	410.20754
211	Fast wind button, complete with bracket	410.20751
212	STOP button	410.20748
213	PAUSE button, complete with bracket	410.20753
214	Screw 2.6×6	502.10862
214	Nut M2.6	505.10324
215	Head cover	443.60277
216	Knob	413.40392
	Circlip of knob, item 216	532.10284
217	Side panel, right, wood	443.50136
218	Indication meter	347.10033
219	Speed selector knob	411.50151
220	Print, complete with lamp	691.30028
221	Lock, complete	444,60147
222	Lid complete	442.30152
223	Leaf spring of speaker mounting	429.61288
224	Screw 3×5	502.10558
225	Lid of lead stowage compartment	443.60266
226	Lower case section, complete	443.50135
227	Screw 4×6	502.10046
227	Ring 4.3	532.10333
228	Voltage adapter	272.10079
229	Foot	462.40014

PROVISIONAL SERVICE INFORMATION FOR THE

PHILIPS

N4308

TAPE RECORDER

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ces

COMBINED ELECTRONIC SERVICES LIMITED

QUEENSWAY · WADDON FACTORY ESTATE · CROYDON · CR9 · 4DR

TELEPHONES
Spare part orders: 01-686 7311 General service enquiries: 01-688 7722
After business hours: Recorded messages on both lines Telex 262308

AUGUST, 1968 (Please quote CES 698 when ordering further copies) CES 698

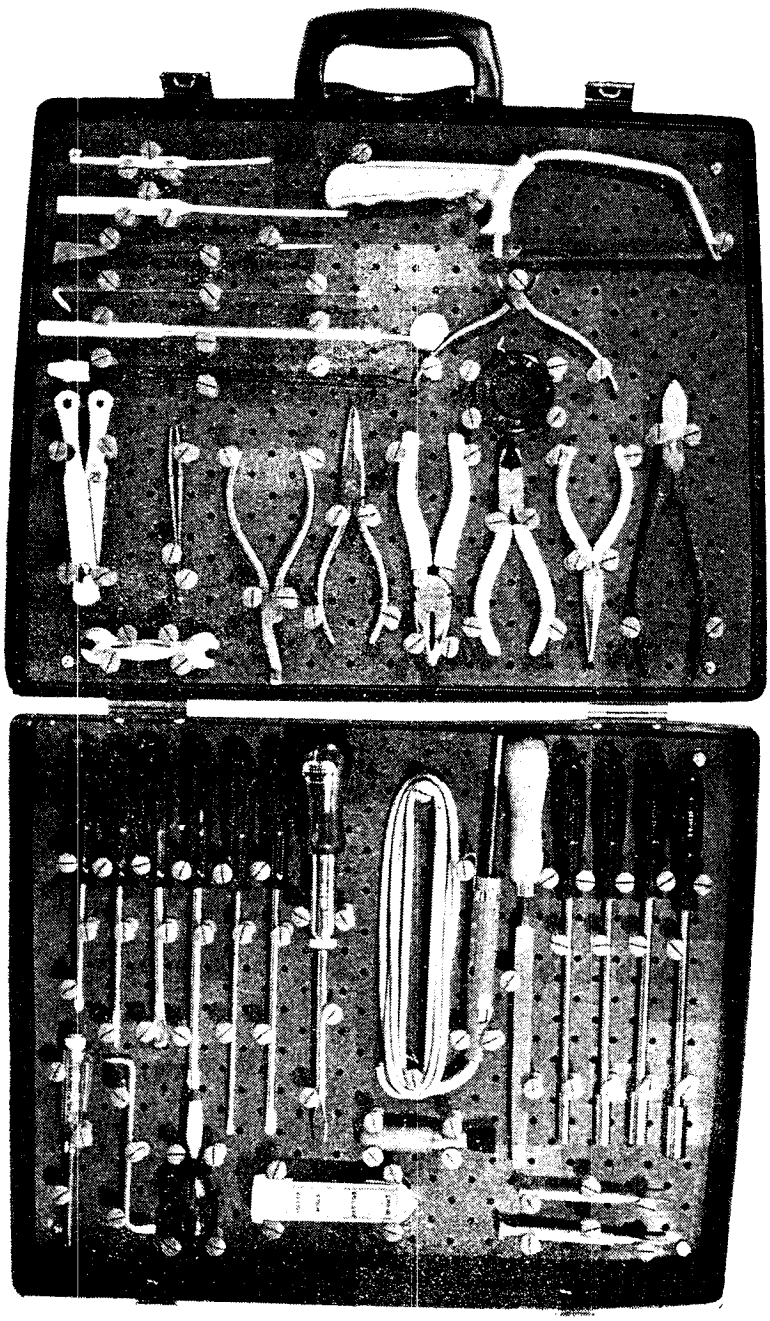
PHILIPS
service aids

The Philips Universal Tool Case incorporates a special tool retention method which enables an extensive range of differing types of tools to be carried. The tools, which may be arranged in an almost infinite variety patterns, are held firmly for transit but can be easily extracted and replaced when required for use.

Provision is also made for the storage of manuals, Philips skin-packed components, etc. in a separate compartment.

case is available empty, enabling users' tools to be fitted, but an Electronic ool Set can also be supplied separately, required. This tool set, comprising 41 tools, is shown fitted into the case in the illustration.

ll details of these two products and all other Philips Service Aids will be forwarded, on request.



SPARE PARTS LIST

(For Cabinet and Mechanical spare parts, see overleaf)

ELECTRICAL ASSEMBLY

Mains voltage selector		272.10079
Print switch SK1		277.30389
Print switch SK2		277.30388
Print switch SK3		277.30391
Switch SK4a, SK4b		278.90007
Switch SK5		277.20067
Connecting plate with BU4 and BU1		267.20098
Connection plate with BU2 and BU3		267.20099
Headphone socket BU5		267.40043
Potentiometer	R443-10kΩ log.	101.30204
Potentiometer	R445—2.2kΩ log.	101.30202
Potentiometer	R444—10kΩ log.	101.30204
Potentiometer	R447—47kΩ log.	101.30185
Preset potentiometer	R441—22kΩ	100.10086
Preset potentiometer	R442—22kΩ	100.10086
Preset potentiometer	R446—1kΩ	100.10021
Preset potentiometer	R448—100Ω	100.10073
Transformer	T1	145.30066
Oscillator coil	T3	157.50578
Correction coil	T4	156.10325
Loudspeaker	L.S.	240.20035
Lamp LA (without print)		134.40032
Fuse Z1		252.20001
Modulation meter	ME	347.10033
C737—100uF—16V		124.20078
C741, C744-220uF—16V		124.20082
C760, C769-330uF—16V		124.20153
C751, C753, C768, C755-680uF—40V		124.20413
C749, C748-33uF—40V		124.20087
C727-68uF—16V		124.30377
C764-150uF—6.3V		124.20387
C735—0.64uF—64V		124.20092
C734,C729, C740—2.5uF—64V C742, C752, C756, C761, C762		124.20095

R562—10Ω—¼W		110.60054
R585—330Ω—1W		111.50165
R576—NTC—47Ω		116.30077
R577—2.2Ω—2W		113.60028
R578, R579	1.8Ω—¼W	116.60007
R581, R582	2.2Ω—¼W	116.60032

SEMI-CONDUCTORS

TS1	BC109 or BC149B
TS2	BC109 or BC149B
TS3	BC109 or BC149B
TS4	BC108 or BC148A
TS5	BC108 or BC148A
TS6	AC187/01
TS7	AD162
TS8	AD161
TS9	AC125
TS10	BC107A
GR1	BY126
GR2	OA95
GR3	BY126

ACCESSORIES

LEAD ASSEMBLY

	Connecting lead—complete	EL3768/03
	3-pole plug	264.40018
	Lead—2 yards	926.KA/803AC8
RA1	Resistor	88.305.80A/1M5

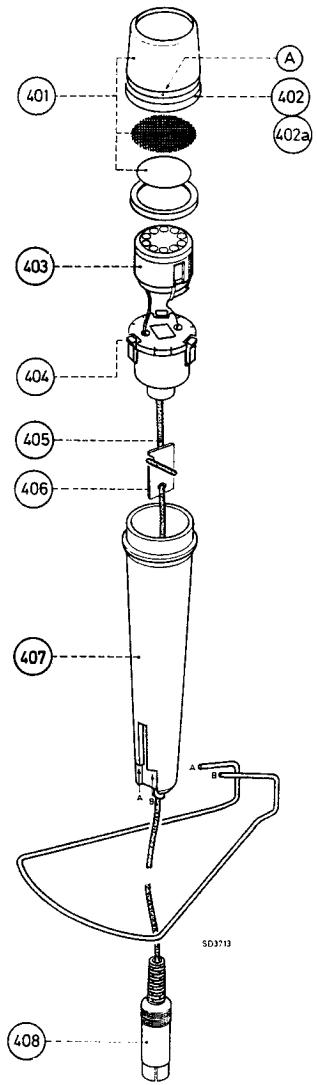
TAPE, ETC.

*Spool with tape	LP18
Spool—empty	ER18
Index box	ET4742/00
Library rack	256.97001

*** Supplies of magnetic tape (or tape cassettes as applicable) should be obtained from the General Sales Division of Philips Electrical Ltd.**

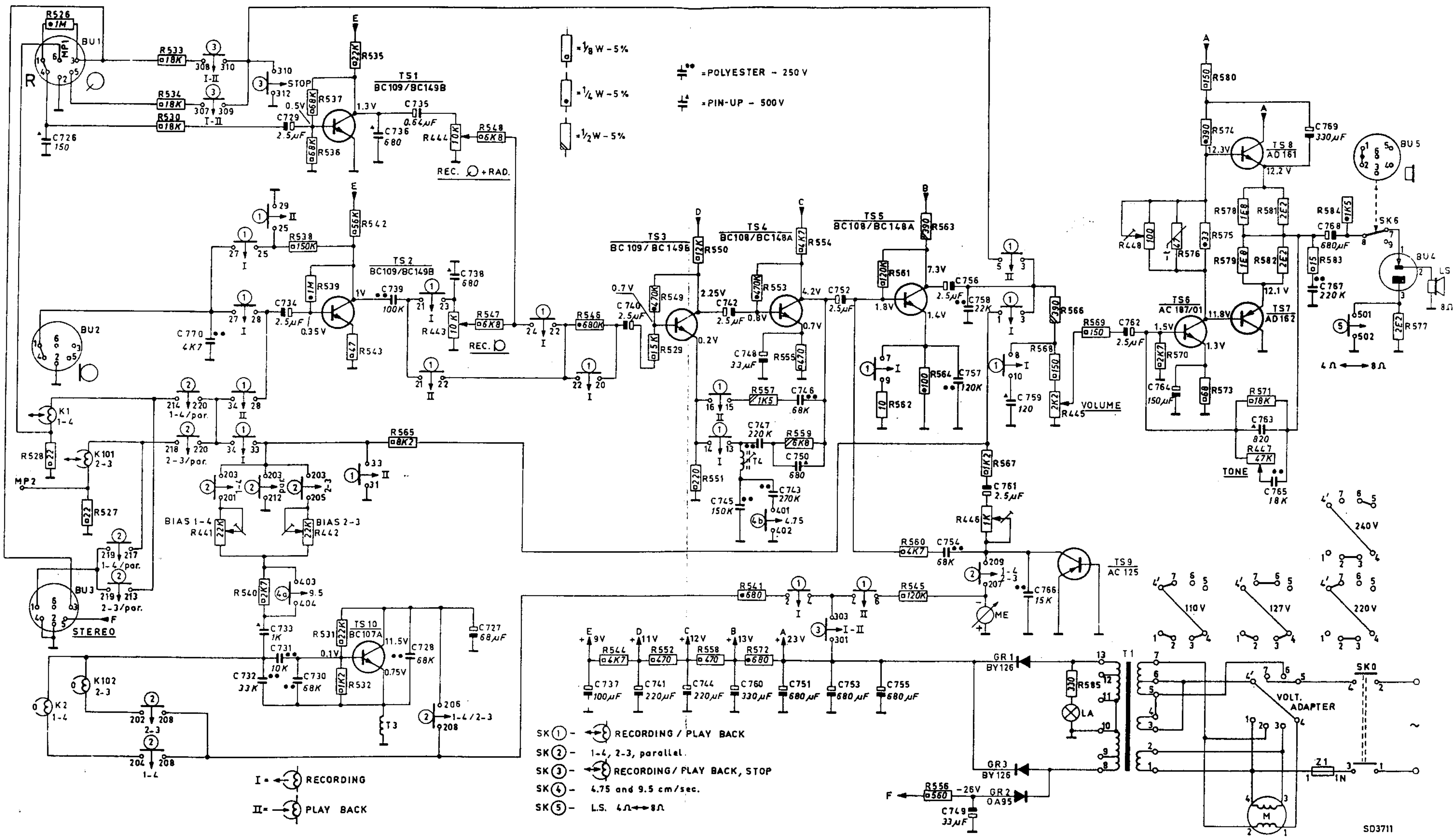
MICROPHONE ASSEMBLY

	Microphone complete	N8301/00
401	Cap assembly	447.10107
402	Ornamental ring	532.20332
402a	Cover plate	466.80223
13	Capsule	EL6072/10
404	Retaining piece assembly	310.20139
405	Flex	322.10013
406	Relief plate	466.90346
407	Housing	447.10108
408	Plug	264.40018
	Stand	462.10069
	Stand clamp	256.90042



Microphone — Type N8310/00

R	528.526. 527. 441. 540. 538. 537.442.532.542. 565. 444. 548. 546. 544. 552. 558.551. 541.557.555. 554. 561.560. 563.556. 567. 568. 566.569. 448. 570. 580.574.573.581.571. 583. 577.
R	533.534.530. 531.536.539. 535. 443. 547. 529.549. 550. 572.553.559. 562.545.564. 446. 445.585. 576. 575.578.579.582.447. 584.
C	726. 770 732.734.733.731.729.730. 739.736.735.728. 738 727. 737.740.741. 748.744.747.745.760.747.743.750.746.751.752.753. 755. 754.749.757.758.761.759.766. 762. 764. 763.765. 769.767.768.



CIRCUIT DIAGRAM

Note: Headphone socket BU5 not connected.