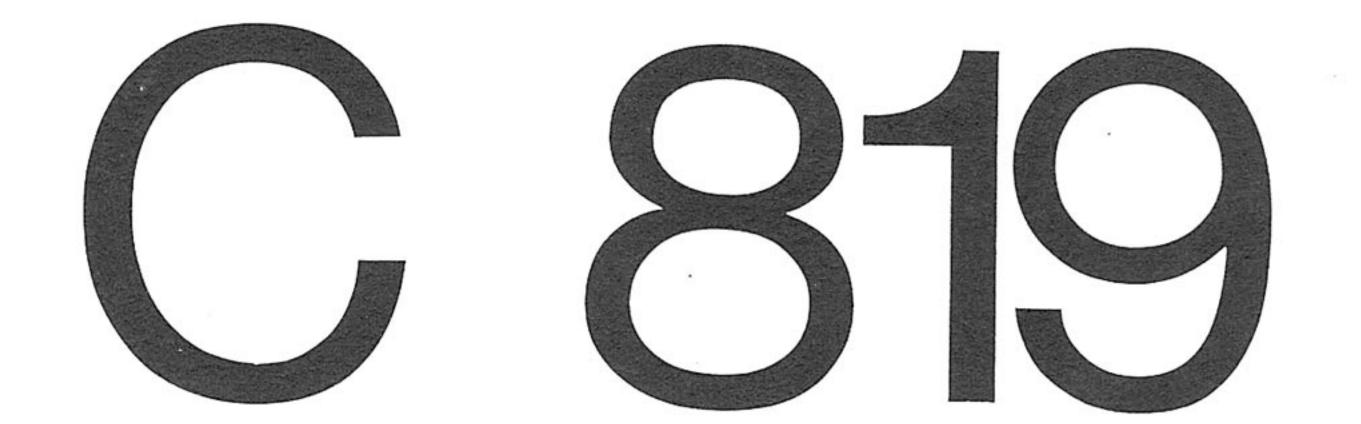


Edition July 1978





Service - Manual

N. 19 N. 19 N. 18

Dual Gebrüder Steidinger 7742 St.Georgen/Schwarzwald

www.hifiengine.com

Contents

Technical Data Mechanical Part

Page

· ~90		
1		Removing the top and the bottom covers
2		Removing the front panel
З		Removing the cassette drive
4		Motor
5		Drive belt
6		Wow
7		Pressure roller lever
8		Break plate
9	a)	Coupling
9	b)	Torque of the Coupling pulley
10		Contacts
11		Memory switch
12		Record/Playback slide switch
13		Record lever
14	2	Record/Playback head, erase head
15		Cleaning
16		Lubrication
		Electronic alignment
		Alignment positions
		A CONTRACTOR OF

Circuit diagram Replacement parts with exploded views

Technical Data

.

The Dual C 819 meets or surpasses the requirements of DIN

•

Eraser at 1000 Hz

< 1.0 %

< 2.8 %

< 1.5 %

*

> 70 dB

.

93

.

45 500 on Hi-Fi home studio equipment.

Tape speed	4.75 cm/s
Deviation from correct speed	<± 1 %
Wow open pan pitch fluctuations close pan W.R.M.S! According to DIN playback only According to DIN record/playback	<± 0.07 % <± 0.10 % <± 0.14 %
Frequency response (as refered to DIN tolerances)	

Fe-tape	20-15000 Hz
Cr02-tape	20-16000 Hz
FeCr-tape	20-16000 Hz

Harmonic distortion

K 3 at 333 Hz (related to 0 dB VU 200 nWb/m) Fe-tape Cr02-tape FeCr-tape

Rumble weighted signal to noise ratio

	with Dolby	without Dolby
Fe	> 64 dB	> 57 dB
Cr02	> 64 dB	> 57 dB
FeCr	> 64 dB	> 61 dB

Channel Separation at 1000 Hz Between stereo channels > 40 dB

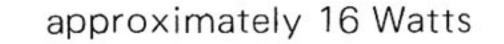
Oscillator frequency (push-pull oscilla	ator) 100 kHz
Inputs (sensitivity for 0 dB) Microphone (1/4" coax.jack) Receiver/Amplifier (DIN-Jack) Receiver/Amplifier (RCA-Jack)	0.26 mV/ 2 kOhm 0.50 mV/ 6.3 kOhm 40 mV/580 kOhm
Input Overdrive (DIN Jack) (MIC Jack)	40 dB 50 dB
Outputs (controllable) Receiver/Amplifier (DIN-Jack) Receiver/Amplifier (RCA-Jack)	0—580 mV/5.5 kOhm 0—580 mV/2.0 kOhm
Headphones (volume controllable) (1/4" coax jack)	4–2000 Ohm
Fast wind time for C 60 cassette	< 65 sec.
Tape Control (photo electric) Turn of	ff time $<$ 0.6 sec.
Complement 6 Integrated circuits 39 Transistors 1 Photo transistor 27 Diode 2 LED's	
Line Voltage	100 - 125 V/200 - 240 V

Between opposite channels

Line Frequency

2





> 70 dB

50/60 Hz

Mechanical Parts

Fig. 1

General Notes

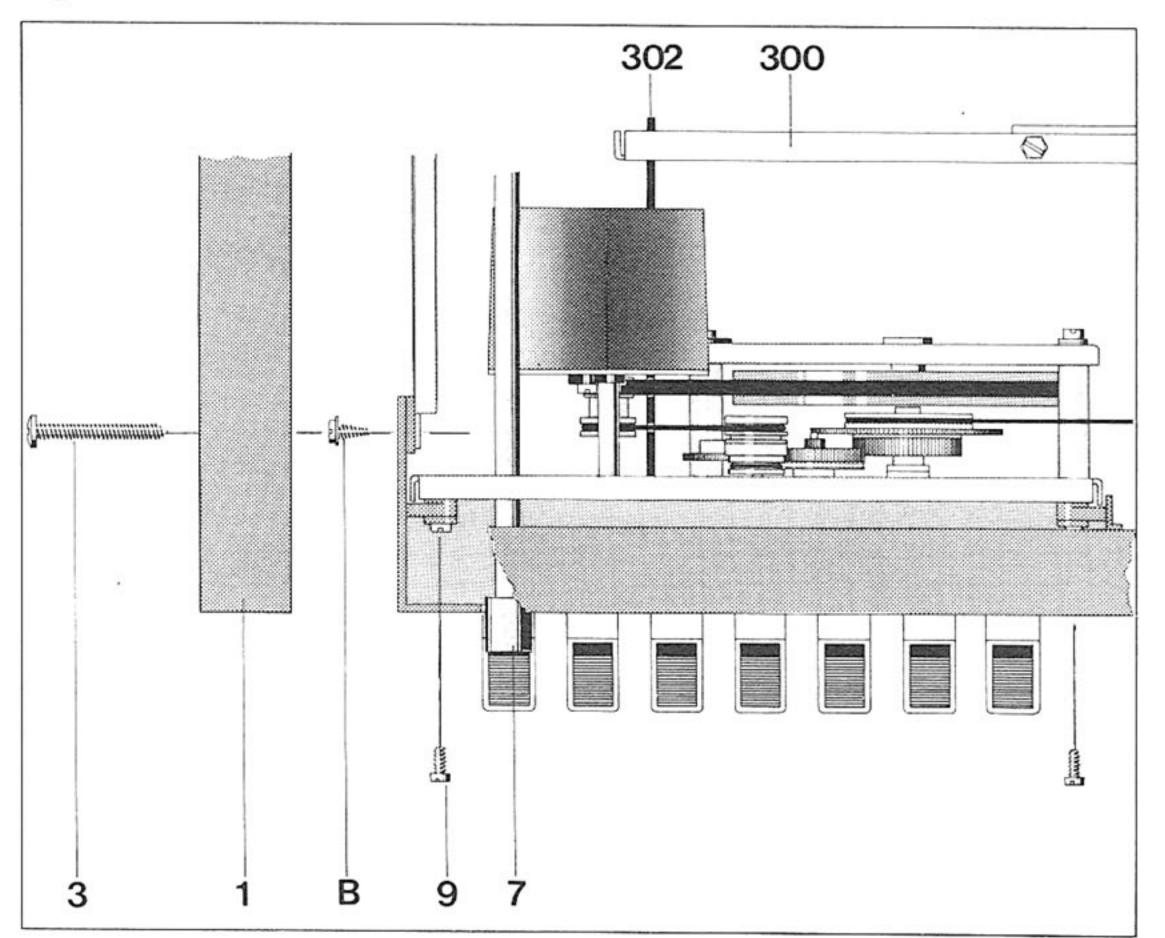
The Position numbers that are given refer to the following replacement parts list and exploded diagrams.

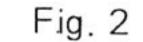
Removing the top and bottom covers. 1.

Remove the 2 countersunk lenticular head screws (25) from the back side and take off the top cover (25). Remove the 5 hex head self-tapping screws (20) from the bottom of the device, and take off the bottom cover (27) by pushing in the direction of the rear side of the device.

2. Removing the front panel

Draw off the 2 knobs marked PHONES (33). Loosen the 2 set screws (35/37) and take off the 2 knobs (34/36). Using a box wrench (SW 7) remove the 5 hex nuts (18). Remove the front panel (19)





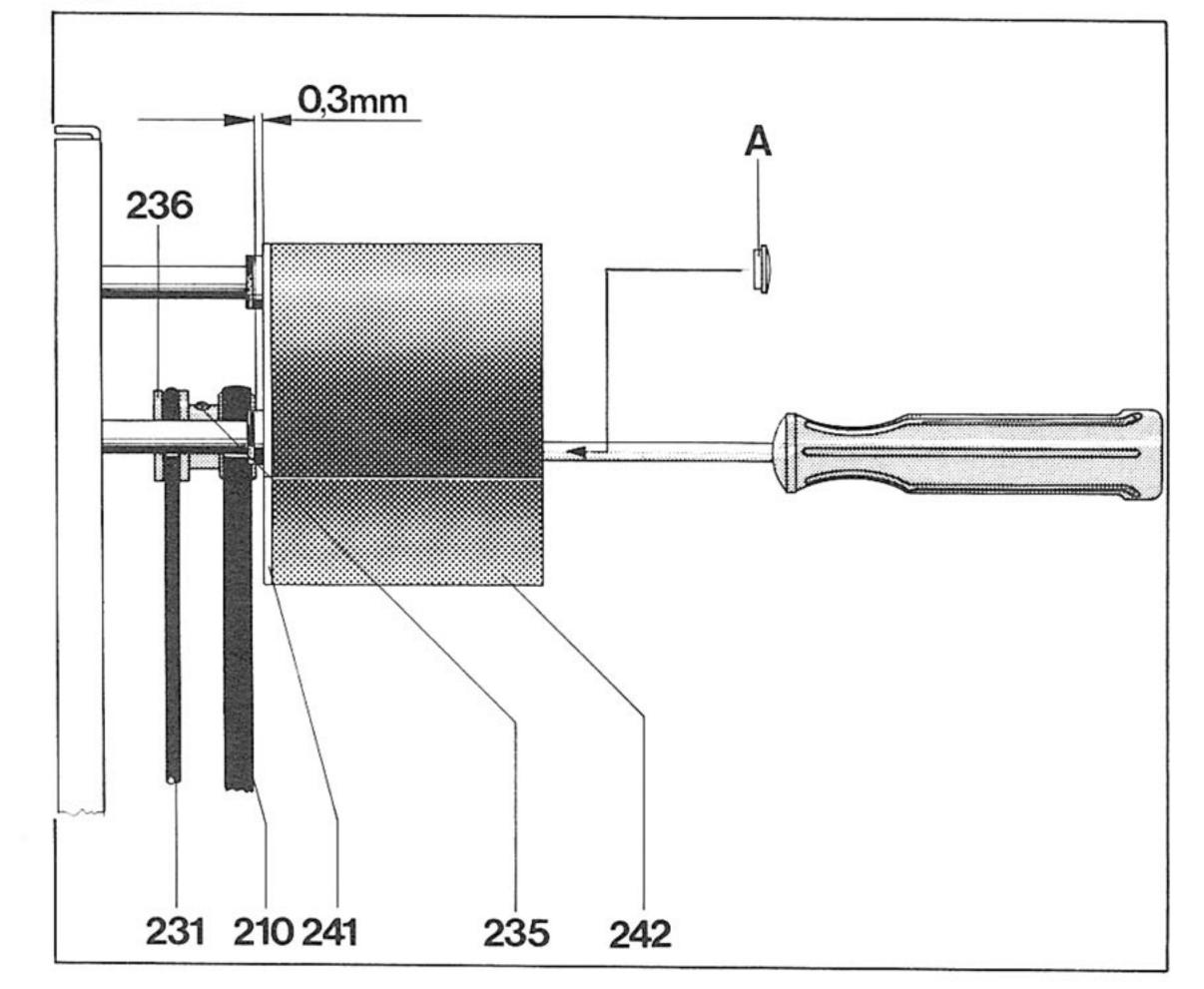
3. Removing the cassette drive

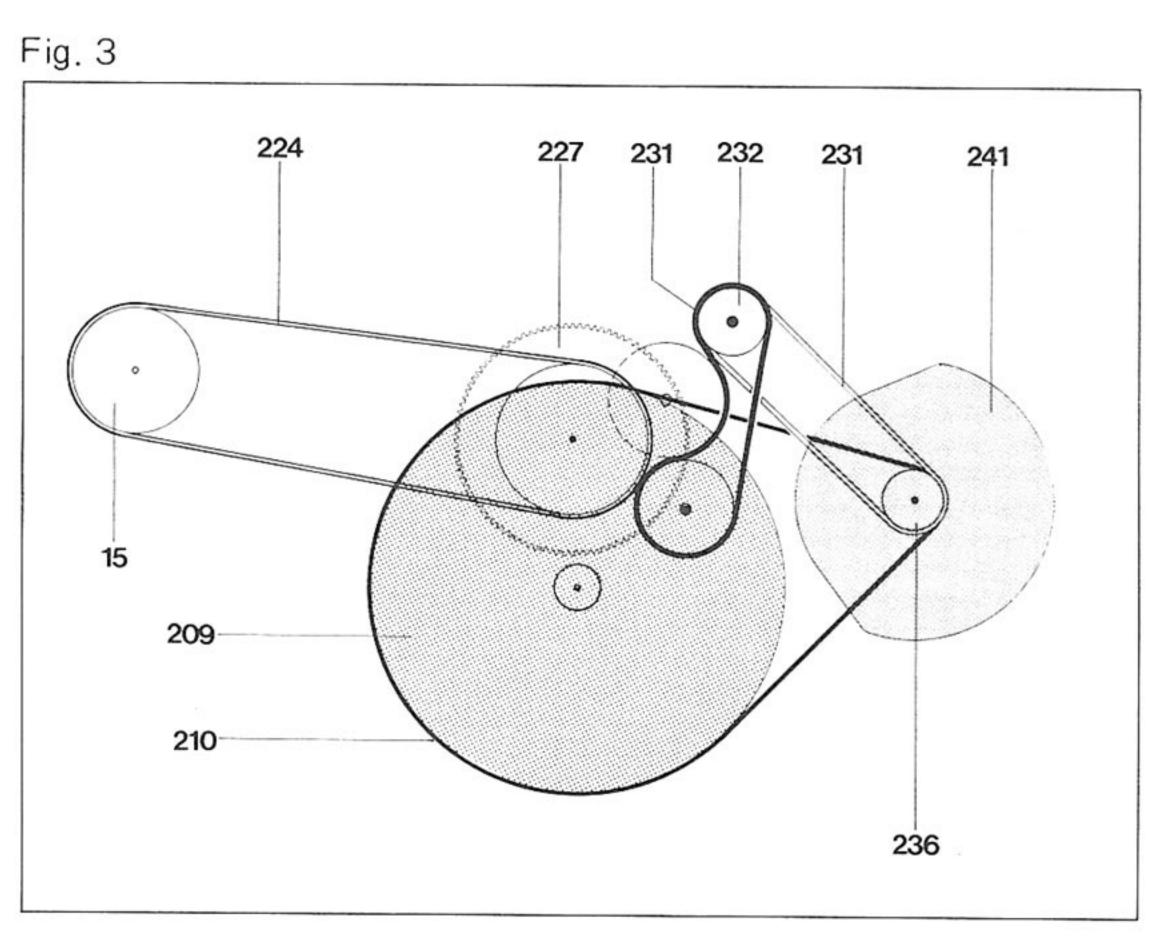
- a) Open the binding spring (6) and take off the switch lever (7). Remove the 2 lenticular head screws (3) and take off the side part (1).
- b) Unscrew the 2 hexagonal self-tapping screws (B) with which the front part is fastened.
- Take off the counter belt (224) from the counter (15). Un-C) solder the connecting wire at the memory contact. Pull out the plug connectors.
- Remove the 4 machine screws (9) and hangout the coupling d) lever (302) from the record lever (300). Remove the cassette drive. Hangout the coupling lever (302) from the base of the record key.

When mounting proceed in reverse order.

4. Motor

- a) Exchange





When exchanging the motor (241), first remove the motor belt (231) and the flat belt (210) from the drive pulley (236). Turn the motor with its shield counter clockwise (bayonet socket) and remove the motor (241).

Now remove the shield (242) and unsolder the connecting leads from the conductor plates. Loosen the set screw (235) and take off the driving pulley (236). Unscrew the mounting plate from the motor (241) and mount it on the new motor.

Place the drive pulley (236) on to the shaft of the new motor. Set a clearance of approximately 0.3 mm between the driving pulley (236) and the mounting plate, then tighten the driving pulley (236) (Fig. 2). Solder the connecting leads to the conductor plate (red = +). Place the shield (242) over the motor.

Place the motor with its shield in the device and affix it in place by turning it in a clock-wise direction. Fit the flat belt (210) and the motor belt (231) on to the drive pulley (236).

b) Motor speed – tape speed

Measurement procedure is the same as that is described under 6 wow. Remove the white cap (A) from the cover. Now the tape speed can be adjusted on the rear side of the motor using an insulated screwdriver (Fig. 2).

The speed is correctly adjusted when a maximum deviation of -0.3 ± 0.3 % is measured.

5. Drive Belts

3

To change defective drive belts proceed as follows (See Fig. 3) belt diagram): the motor belt (321) can be removed or changed without more ado.

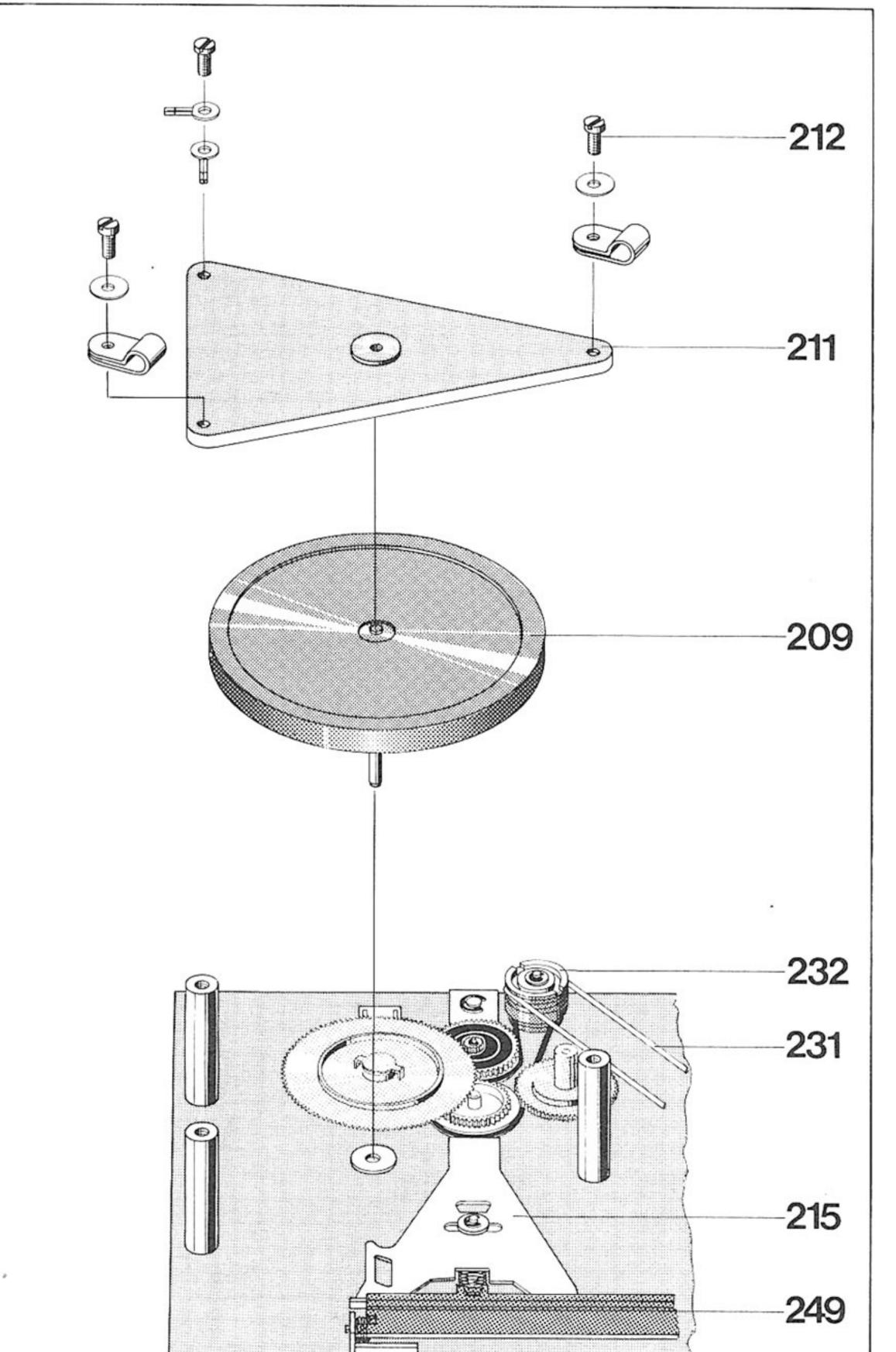
Remove the 3 machine screws (212) as well as the cable clamp and ground lead. Remove the bottom board (211). Now can you replace the flat belt (210) and the counter belt (224). Draw out the flywheel (209) from the bearing bush.



IMPORTANT: The polyethylene washer (165) on the front side of the unit will fall out.

Now the take-up belt (321) can be replaced. Having completed mounting the belts, now proceed to fit the polyethylene washer (165) on to the shaft of the flywheel (209). Further, it is advisible to press fast forward or reverse wind key and clean the capstan and the drive belt with a cloth soaked in methylated spirit.

Fig. 4



6. Wow

Measure with a Wow meter (E. G. Woelke ME 101 or ME 104 or Franz EMT 420 A) and Wow test cassette 3150.

Setting of Test Instrument:

0.3 % measurement range, weighted.

- ATTENTION: To avoid incorrect measurement caused by a jamming tape travel, it is recommended to operate forward and reverse wind with the test cassette inserted.
- Typical values for reproduction with C 819 Dual-Cassette Deck: $\pm 0.08 0.12$ %.

Individual higher effection should not be weighted because they are the results of bad tape-head contact caused by detrition, dust or felt particles.

- If necessary, check the following points:
- a) Clean pressure roller and capstan
- b) Check pressure roller for free movement
- c) The take-up torque, which is adjusted at the coupling, should be 55 ± 10 pcm. Slightly fluctuating values have no influence on the Wow. At the same time the torque on the non-driven side should be 2 6 pcm. A higher or varying value suggests

that the bearing of the left winding gear (226) is defective.

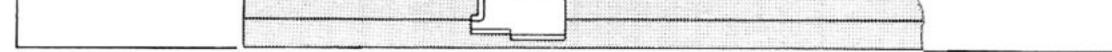
d) Replace flat belt

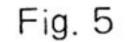
e) Replace flywheel

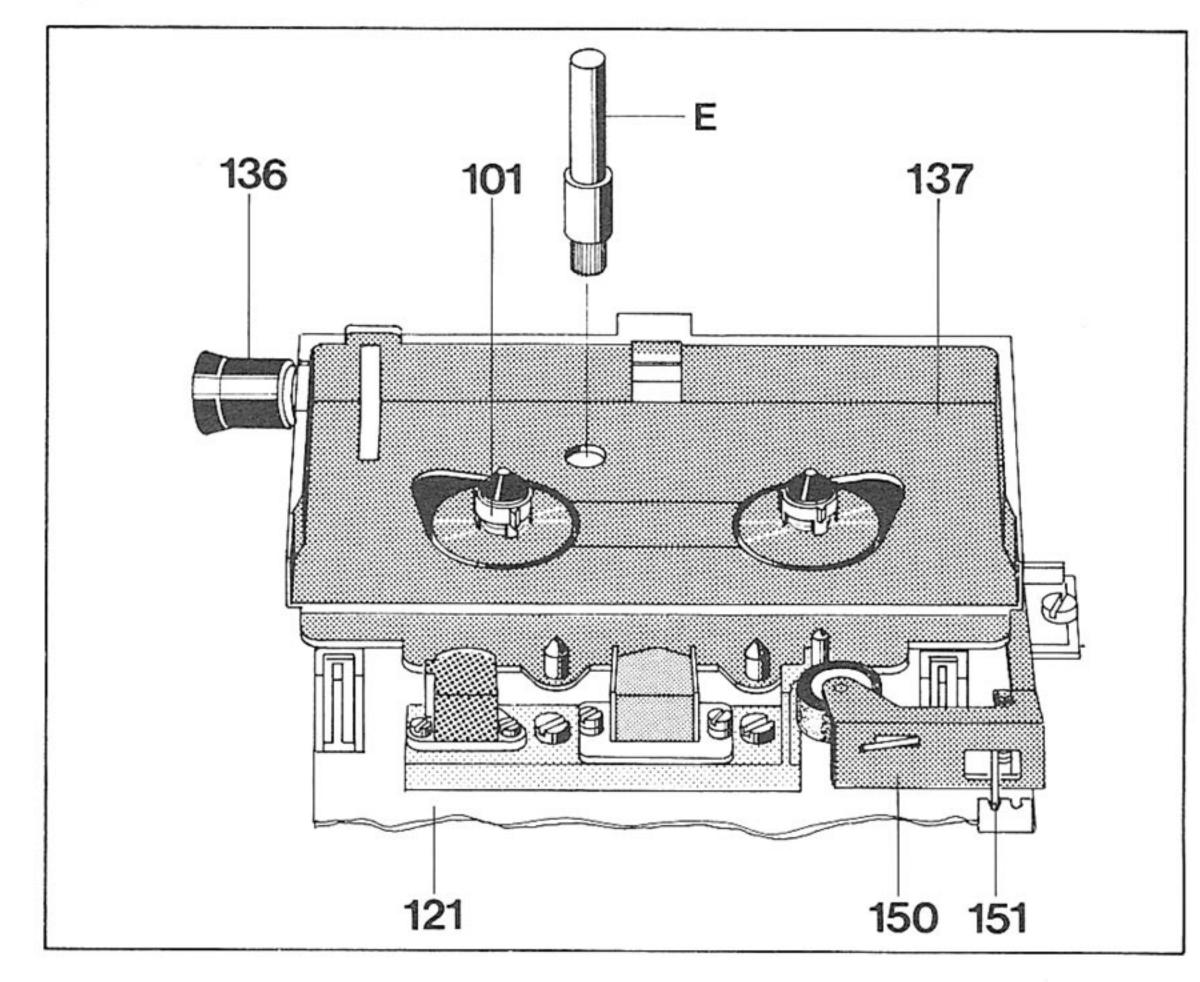
7. Pressure Lever

The pressure lever can be removed as follows:

Unhook the V-spring (151) (mark the hooked position). Remove the machine screw (155) and retaining angle (154). After loosening the lock washer (152) the pressure lever (150) in the V-spring (151) can be removed. When mounting proceed in reverse order whereby you must be careful to hook the V-spring (151) to the same position as at removal. With the "Pause" button disengaged "device switched to play", the pressure roller should be pressed by the V-spring (151) to the capstan with the force of 350 ± 50 p. If necessary, this must be adjusted by repositioning the V-spring (151). With "Pause" button engaged and the start button completely pressed, clearance between the capstan and the pressure roller should be 0.4 - 1 mm. This may be adjusted by lightly bending the pressure lever (150) (Fig. 5).







8. Brake Plate

When replacing the rubber sleeves (133) on brake plate (131) you must consider the following:

By fast forward and reverse there must be clearance on the non-driven side of 0.1 - 0.2 mm between the rubber sleeve and the brake drum of the drive assembly (101). If necessary bend the lobe of the brake plate (131) slightly. With the machine turned off both brake drums show a braking torque of >50 pcm.

9. a) Coupling

4

To ensure satisfactory winding the winding torque of the coupling must be correct. The tape tension during winding should be 55 ± 10 pcm. This should be measured using a measurement cassette (Dual-part-nr. 232 797).

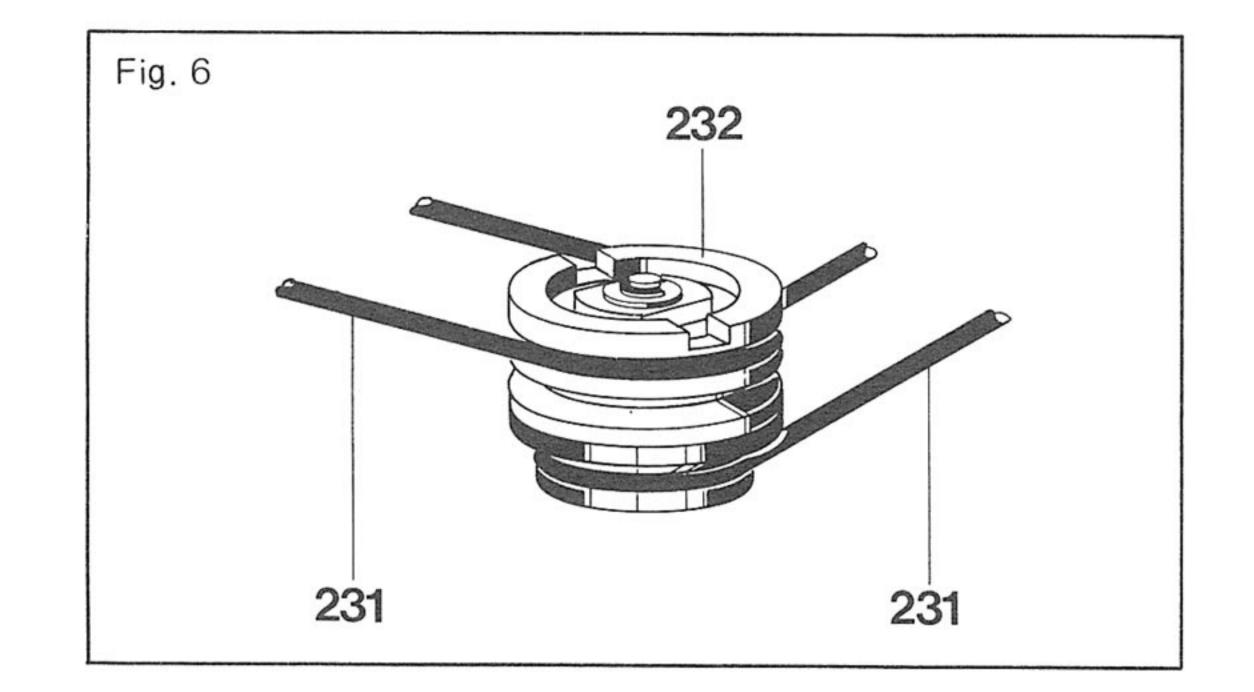
A readjustment of the entire device can be done as follows:

1) Pull out the power cord!

2) Press the fast reverse key (<<).

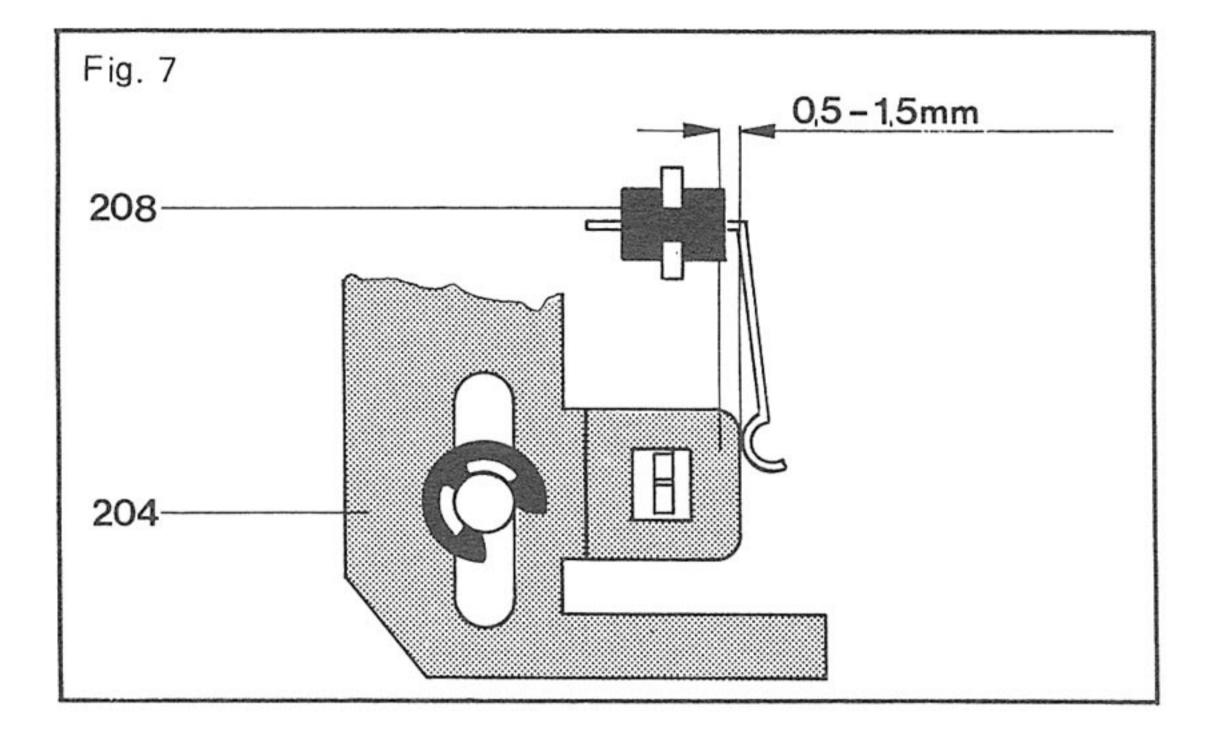


- 3) Turn the left catch (101) until one of the 2 adjustments holes becomes visible through hole in (B) of the cassette holder in (137) (Fig. 5). Then, using the special adjustment key (E), (Dual-part-nr. 203 933), adjust the take-up torque. When tuning clockwise the take-up torque will be increased, when counter clockwise the take-up torque will be reduced.
- b) Torque of the coupling Pulley to ensure satis fatory torque at winding the top part of the coupling roll (232) (round belt recess) is separated from the lower drive diameter of the take-up belt by a friction coupling.



Checking:

Insert the special torque measurement cassette (Dual-part nr. 238 600) in the cassette holder (137), and shut the holder. Press the fast-forward or the fast-reverse wind. Over a series of measurements open and close the cassette holder (137) so that the pointer returns to 0 on both scales. The torque should measure 70 - 130 pcm. Typical values for new drive pulleys are 90 - 120 pcm. If necessary hold the coupling pulley in (232) still. Adjust the friction coupling as necessary with the aid of a spanner-or flat-nosed pliers.



Warning: The main belt (231) must not have any slip or in any way be dirty.

 $0.1 \, \text{mN} = 1 \, \text{pcm}$

10.Contacts

a) Pause contact

When the pause button is pressed the pause contact (208) must touch in its full width and be moved to 0.5 - 1.5 mm.

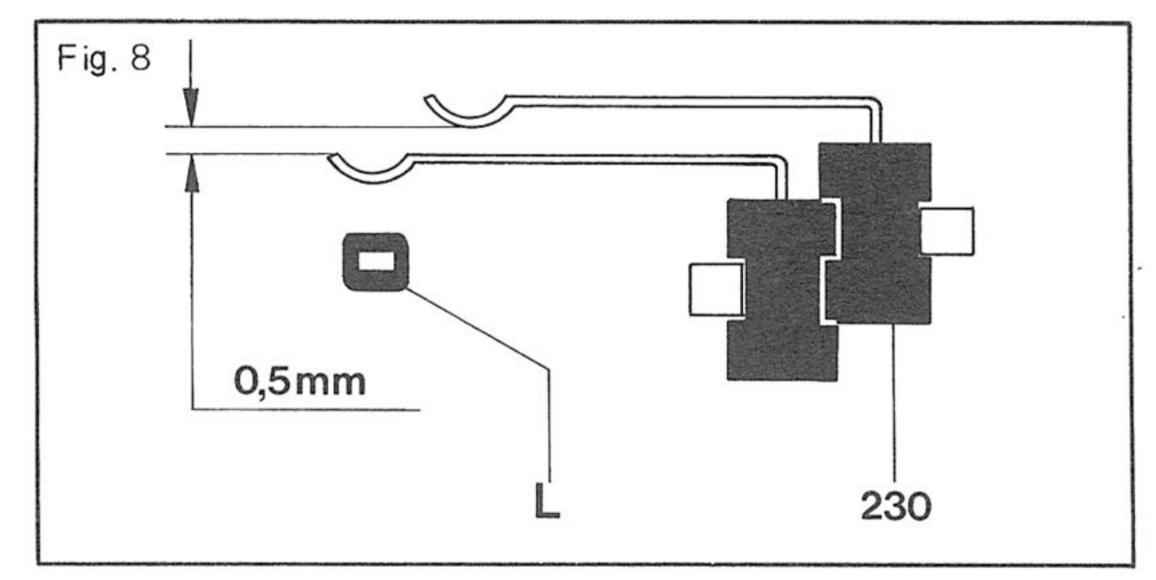
If necessary adjust the contact by bending.

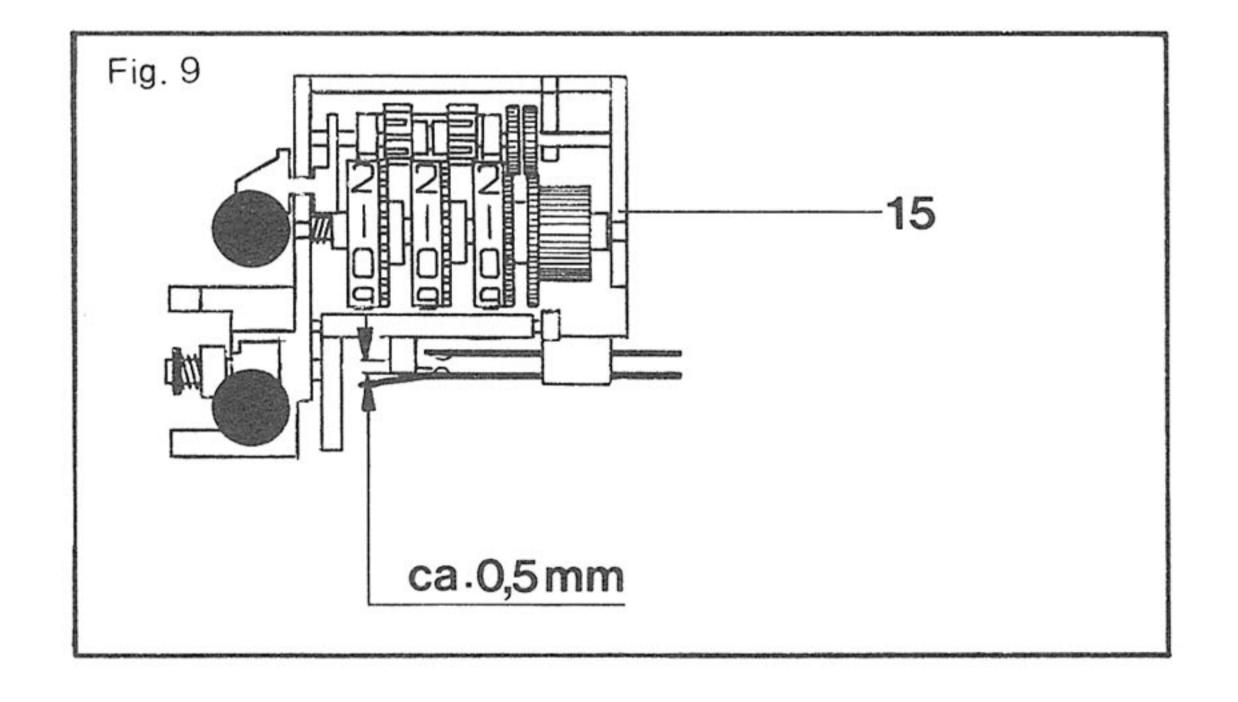
b) Contact set head plate assembly

When the device is in a neutral condition the contacts of the contact set (230) should be opened approximately 0.5 mm. When the playback button is pressed, all 3 contacts of the contact set (230) should be closed by the insulated lobe (L) of the head plate assembly (121). Any necessary adjustments should be done by bending the contacts.

11.Memory Switch

With the memory switch not pressed (device off or fast forward/backward), the clearance of these contacts should be approximately 0.5 mm (9). With the memory switch pressed and the counter setting of "000", the contact must be closed necessary adjustment of the contact should be done by bending the contact.



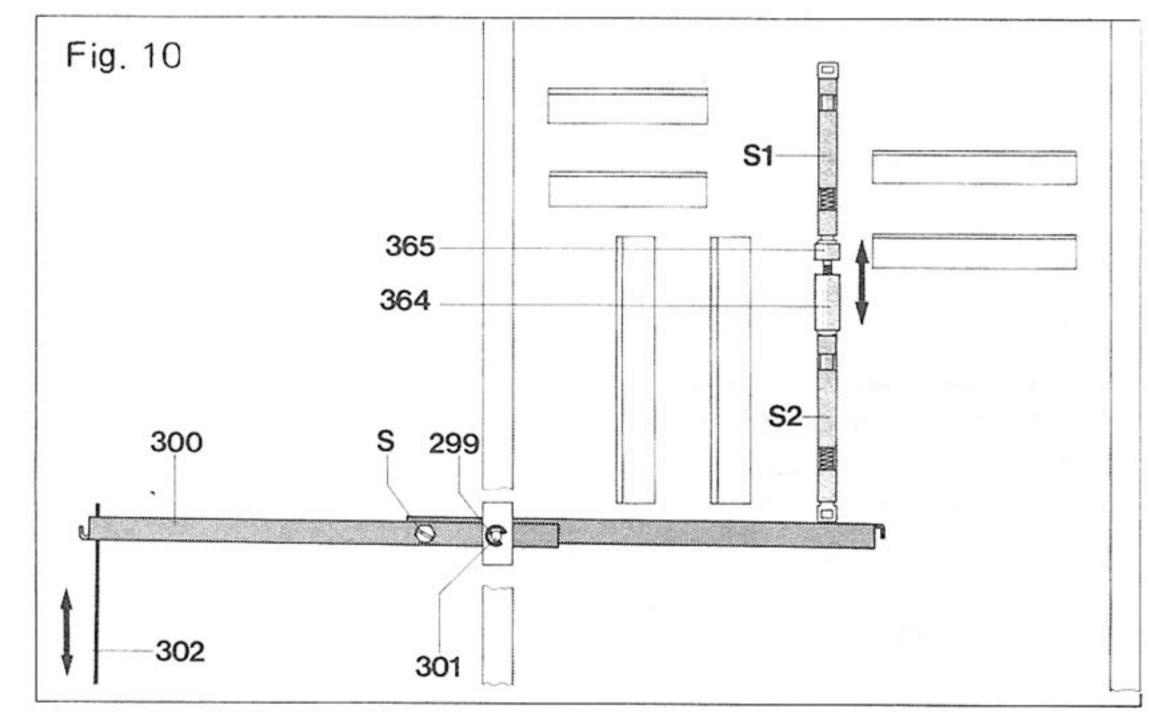


12. Record/Playback Slide Switches

The 2 slide switches (S 1/S 2) are coupled to one another by means of an adjusting screw (365) and bushing (364). In the neutral position, both switches must be at their innermost stops. Both switches should show a maximum of 0.1 mm play. Adjust the switches by turning the adjustment screw (365).

13. Record Lever

The 2 part record lever (300) must be so adjusted that the 2 switches (S 1/S 2) move to their stop when the record button is pressed. Adjust after loosening the screw (S). Tighten screw (S).



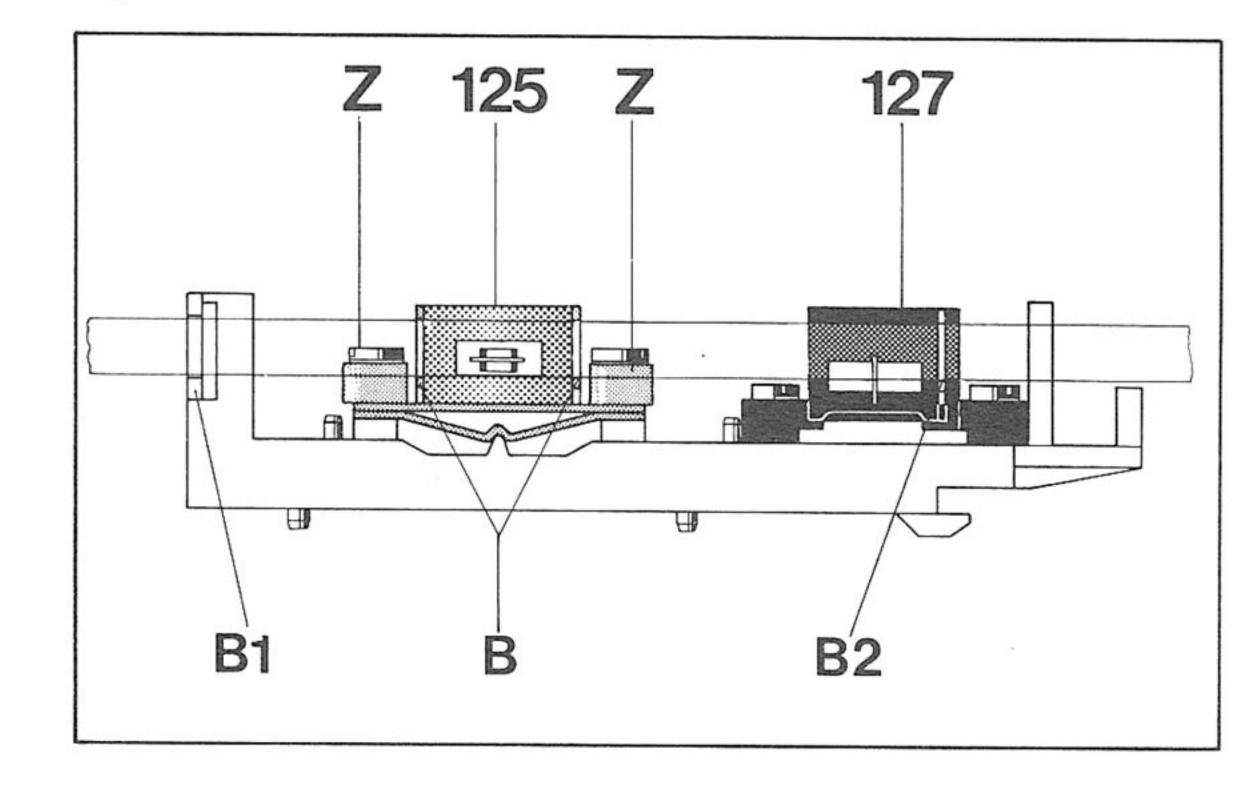


14. Record/Playback Head, Erase Head

When exchangeng or repairing the head unit (125) or the Record/Playback Head (126) the following preadjustment must be attend. The Record/Playback Head (126) should be fitted to the head unit with a retaining spring, and fastened by means of the sleeves and cheese head screws (Z), so that the tape guides (B) are lined up with the tape guides of the head unit tape guides (B 1) and with those of the erase head (B 2) (In Fig. 11). The precise adjustment (asmuth adjustment) should be made as described in the section ''electrical part''.

15.Cleaning

Always clean unit when servicing or repairing it. For proper function of the unit the Record/Playback Head (126), the erase head (127), the pressure roller (150), the capstan must always be clean. The parts are best cleaned with a cotton cloth or cotton wool tip soaked in methylated spirit. Never use metal objects. The surface of the head should never be touched with bare fingers. Fig. 11



16. Lubrication

All bearing and sliding points of the unit are adequately lubricated at the works. Relubrication is normally not necessary for several years since most important parts are provided with oil retainers. The motor bearings are laid outh with long life oil retainers and are therefore never to be lubricated. Bearings and slide points should be lubricated sparingly rather than generously. It is important that no form of oil or grease reach the rubber surface and rubber belts as otherwise they will be destroyed. For the same reason these parts should not be touched unnecessarily. Chemical decomposition frequently takes place when lubricants of different types are used. To prevent lubrication failure we recommend the following original lubricants for lubrication purposes_x

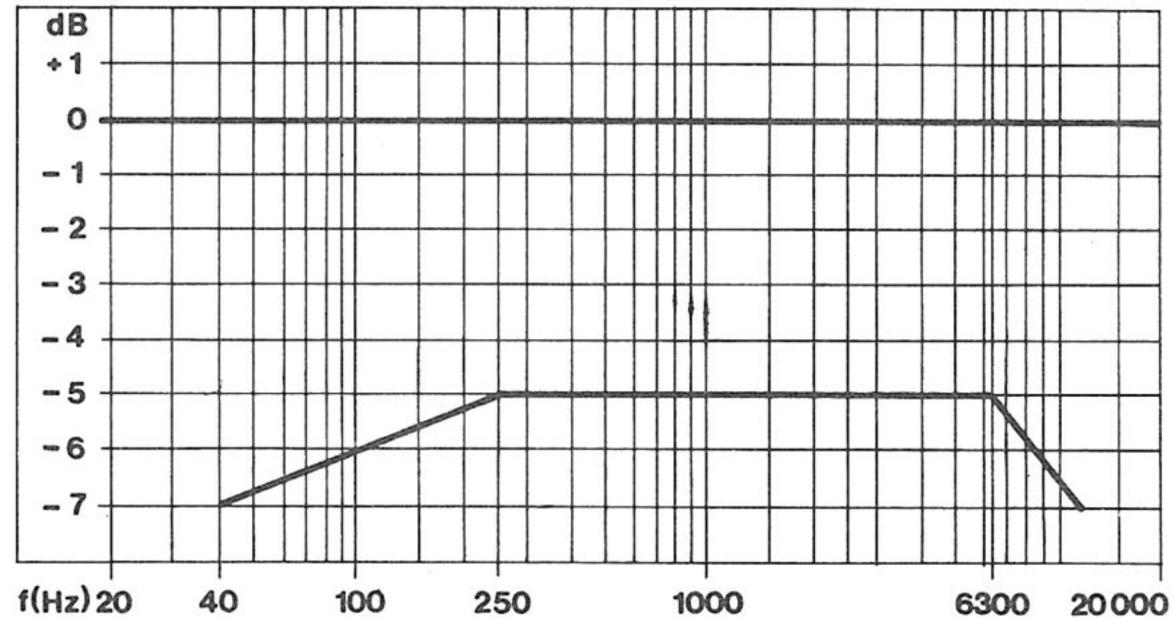
BP Visco-static 10 W/30	for all bearings
Isoflex PDP 40	for all sinter bearings
Shell Alvania Nr. 2	for all sliding points
Wacker Silicon Oil AK 100 000	for holder damping as well as for window bearings
Molycote Paste	for all contact surfaces of the key lever on the door

Safety Rules

Service work on electronic devices may be carried out by trained personnel. The device should be powered through an isolation transformer. Safety regulations in accordance with VDE 0860 H should always be observed. Among other things, the constructive characteristics of the device may not be altered in a way which would diminish its safety (e.g. covers, mechanically secure leads, creep and airways, etc.). New parts must be equivalent to original replacement parts. They must be installed correctly. After servicing it must be ensured that all external conducting parts

Fig. 12 Overall frequency response

6



can carry no line voltage.

Bottom Limit Frequency = 40 Hz Top limit frequency = 12,5 kHz



Electronic Alignment

Necessary Instruments and Test Cassettes

- 2 mV meters
- 1 AF oscillator
- 1 Oscilloscope
- 1 Frequency Counter
- 1 Test Cassette 400 Hz 20 dB, 10 kHz 20 dB
- 1 Test Cassette Fe₂0₃-Reference Medium section, Test Cassette Cr0₂ Hz Reference Medium section
- 1 Test Cassette 400 Hz Dolby Level 200 nWb/m

General Notes

Before adjustment the magnetic head and all ferrous components connecting the tape should be demagnetized.

When adjusting the coils 2 core positions are possible. However, the outer core position should always be chosen.

Readjustment must be carried out in the sequence stated. All controls should be in the mid-position except R 4132 and R 4132' which should be in the extreme right most positions.

R LINE OUTPUT LEVELS

Erase Head Voltage

Measured at the erase head (Cr) approximately 28 V.

HF-Wave Traps

Connect tube volt meter to test point 2 or 2' and align with L 4100 or 4100' for minimum.

Bias Switching

Fe, Record, 🕨

At measurement point 3 or 3' the following voltage change must be measured with respect to UHF. For Fe = 0 dB

For FeCr = $+2 dB \pm 0.5 dB$ For Cr = $+4.5 dB \pm 0.5 dB$

AF-Recording

Connect oscillator to input, the tube voltage meter and harmonic distortion meter (K 3) to output. The LINE/DIN level control (R 4109 and 4109') are open.

HF-magnetic bias

Insert the test cassette, Cr02- reference medium section.

Playback

Level and VU-Meters

Insert the test cassette for 400 Hz Dolby-Reference.

Set to Fe, Dolby NR, ► Adjust for 580 mV ±0.25 dB in each case. For track 1 use R 4116 at point 1 (output L) for track 2 use R 4116' at point 1' (output R).

Adjust the VU meter to 0 dB \pm 0.25 dB, using R 4145 for the left VU meter, and R 4145' to the right VU meter.

Magnetic Head Adjustment

Insert test cassette (section for gap adjustment, 10 kHz - 20 dB).

Connect the mV meters to output L and R (cinch-jack). If only one instrument is available then connect the outputs in parallel.

Fe, ▶

With the set screw on the left hand side of the magnetic head align for maximum voltage.

Attention: With parallel switched outputs secondary peaks will occur. Adjust for the maximum. The difference between the tracks should be at max. 4 dB.

Cr, Record, ▶

400 Hz and 10 kHz with -20 dB (VU-meter). Compare levels on reproduction. If there is no uniform level correct HF-bias. Any changes of the HF level can be measured directly on the head via capacity voltage divider (1 pf coupling capacity) or at measurement 3 or 3' with a tube volt meter.

For alignment of track 1 use R 4211. For alignment of track 2 use R 4211'. Less HF = treble comphasis = CCMMore HF = treble deemphasis = CM

Record-Level

Insert test cassette, CrO₂ reference medium section Cr, Record, ▶

Line/DIN level control (R 4109, R 4109') open. Record 400 Hz with 0 dB (VU meters) and then check playback level using the VU meter. Using R 4119 (left VU meter) and R 4119' (right VU meter) adjust so that the record level is equal to the playback level.

Harmonic Distortion

For 333 Hz, 0 dB recordings (as indicated by the VU meters) the harmonic distortion of playback should not exceed the following values:

For Fe₂O₃ tape K 3 < 2 % For CrO₂ tape K 3 < 4 %

Playback Frequency Response

Insert test cassette, 400 Hz -20 dB, 10 kHz -20 dB.

Fe,►

The output voltage at Output L and R should be referring to the 400 Hz -20 dB = 0 dB10 kHz = +4 dB to 3 dB.

When switching over Cr or FeCr the 10 kHz level should indicate a voltage step of 4 dB \pm 1 dB.

Background Noise

Screen amplifier. Make sure that the magnetic head is free of hum.

Fe, Pause, 🕨

Background noise at Output L and R 2 mV maximum, measured with 20 Hz filter (e.g. sennheiser FO 55, curve 2, 20 Hz – 3 dB) and RMS rectification of meter.

Observe polarity of power plug.

HF-Generator

Cr, Record, ▶

Regulate L 4200 at 100 kHz. Generator frequency measured with absorption frequency meter near the erase head or with an oscilloscope or frequency counter at the erase head across 1 MOhm series resistor. Frequency deviation occuring when

Signal-to-eraseratio (erasure)

Insert the test cassette, CrO₂ reference medium Cr, Record, ▶ Feed in 1 kHz, 0 dB (VU meter) Erasure (measured selectively) > 62 dB

Limiter

Turn R 4141 and 4141' completely to the left.

Record, Limiter

The Line/DIN level control (R 4109, 4109') are open. Feed in 400 Hz at +1 dB (VU meters) to the input. Slowly turn R 4141 and R 4141' clockwise until the respective VU meters show -1 dB. Momentary voltage increase of 20 dB (10 fold) at the input will cause the limiter to close and then open slowly. The time that it takes for the VU meters to show 10 dB again should be 4 - 6 conds.

MicrophoneConnection

The power supply at the mic jacks for or capacitor microphones should be U = 24 volts. (no load-running)

Overall Frequency Responses

The overall frequency responses for Fe₂O₃ and CrO₂ tapes must be within the specific tolerances, in accordance with DIN 45 500, sheet 4. The recordings are made at a level of approximately -26 dB

switching over to Fe or FeCr tape should not exceed 2 kHz.





Fig. 13 Alignment position and voltage switching

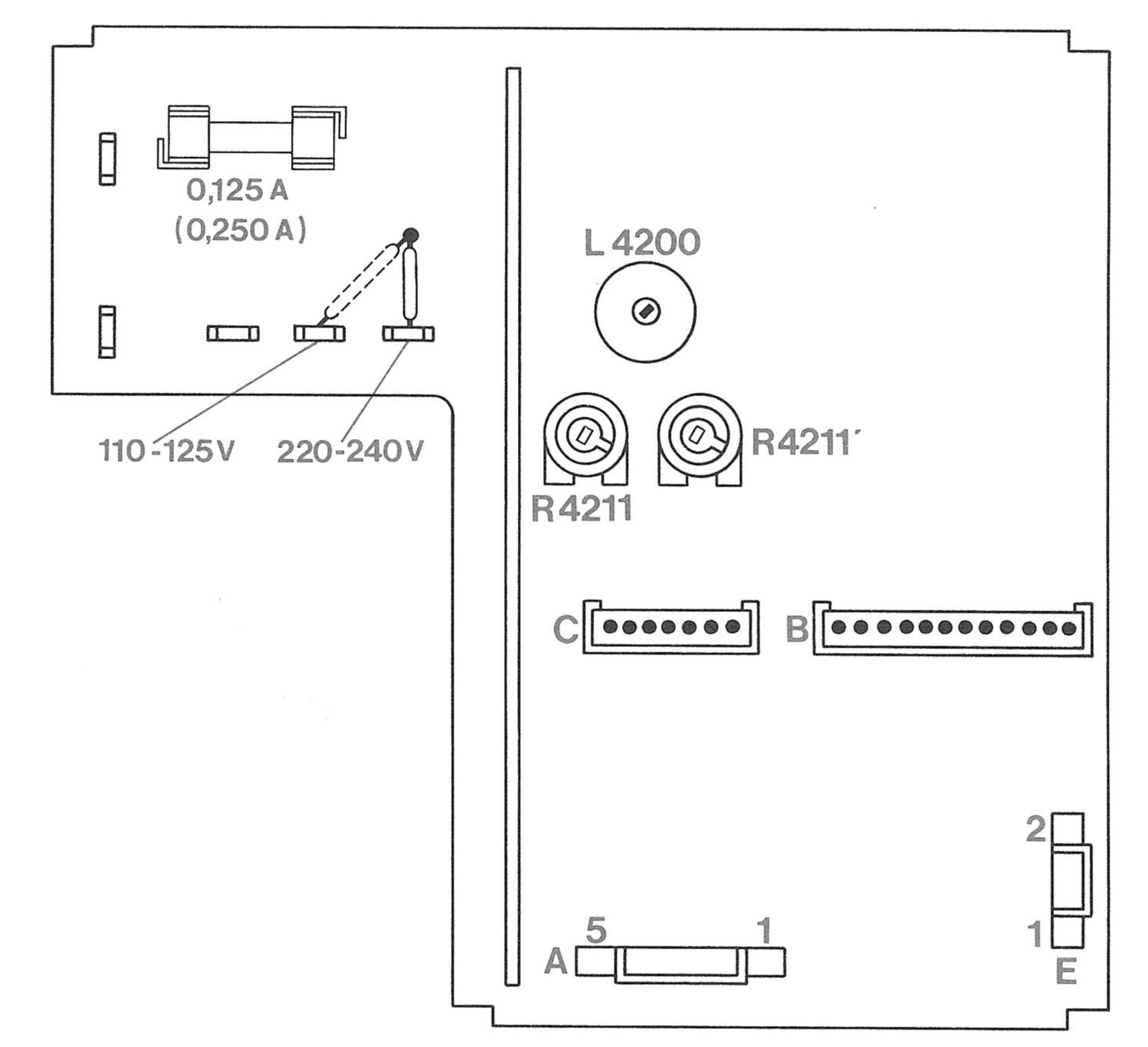
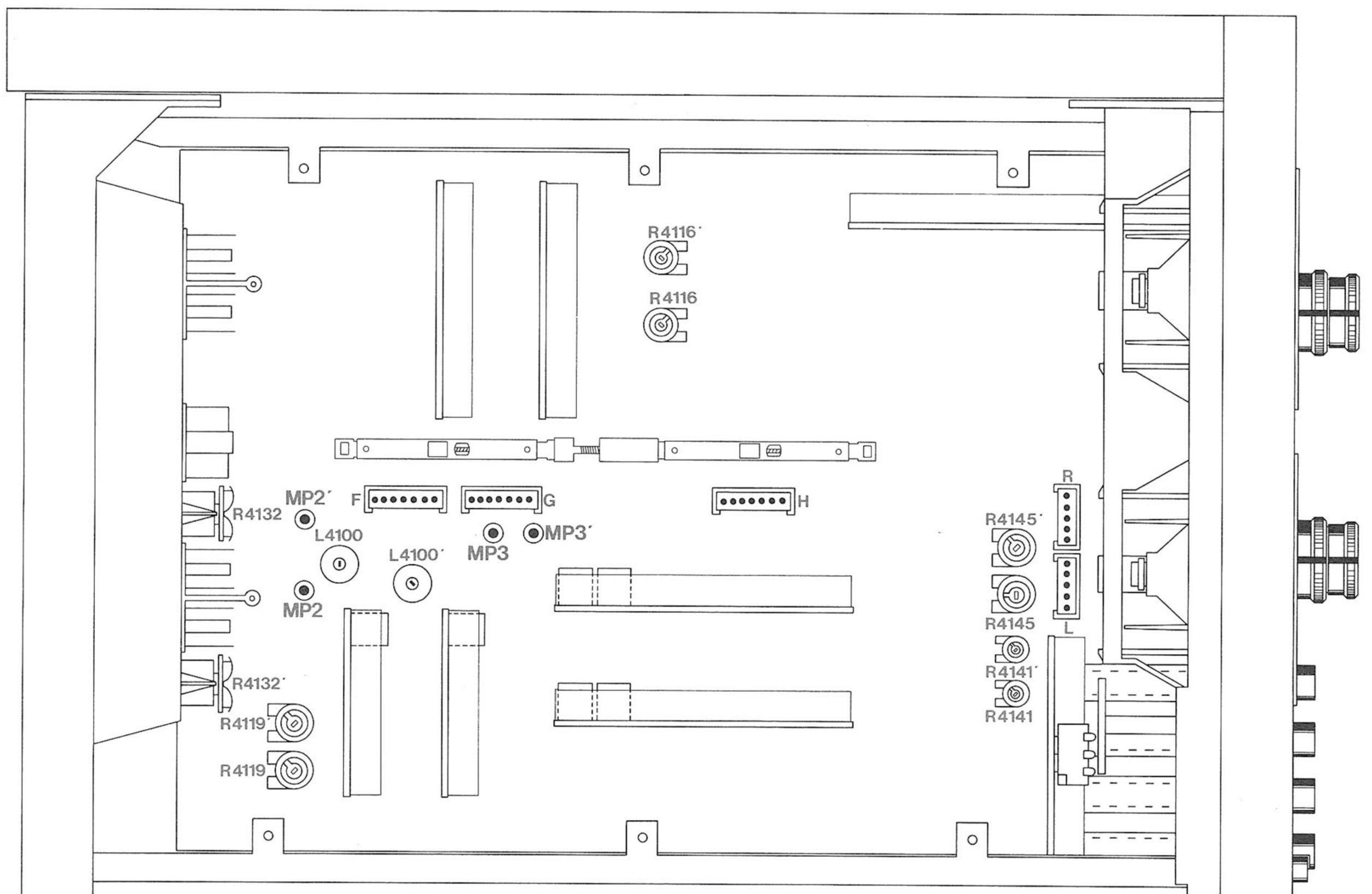


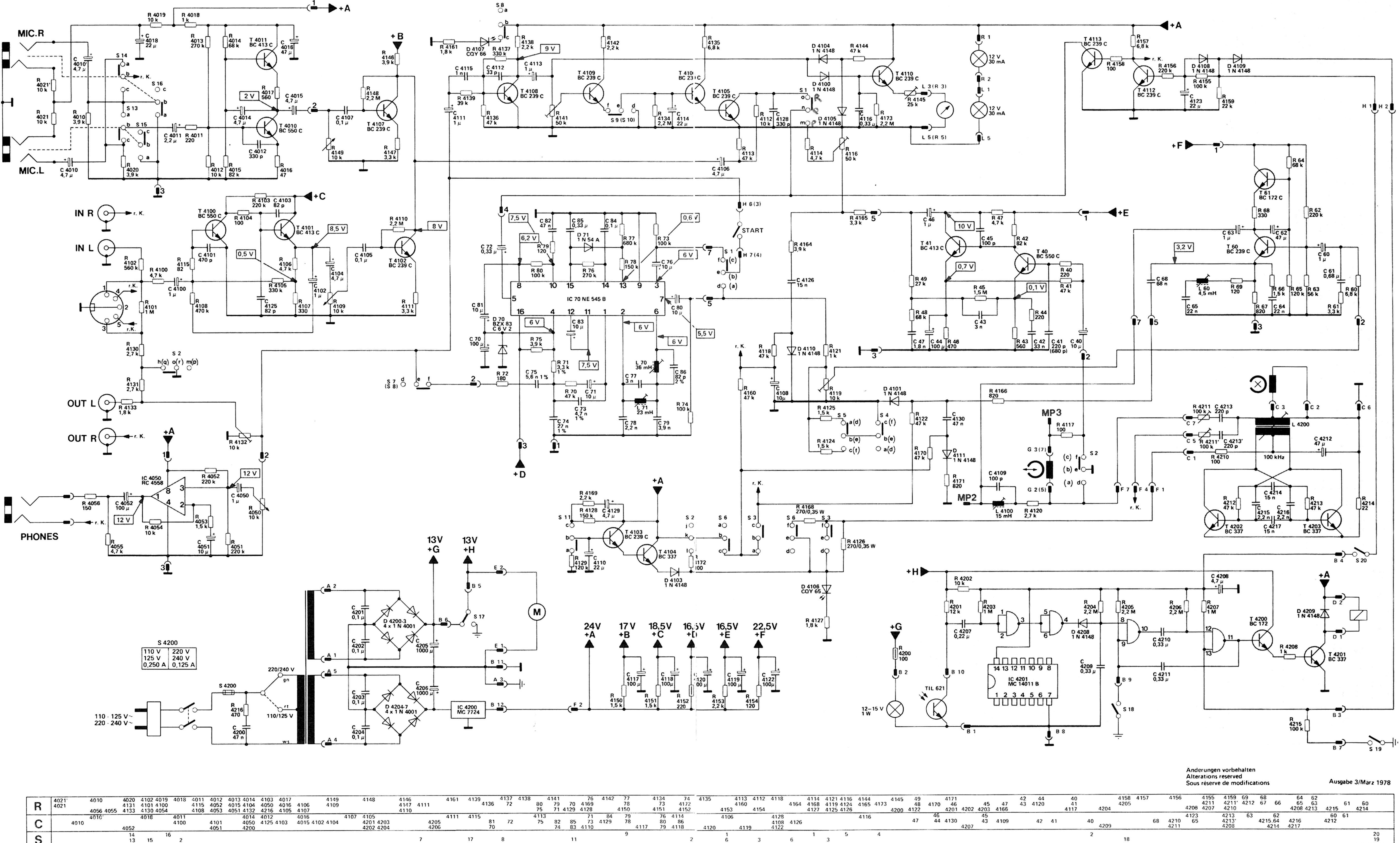
Fig. 14 Alignment positions





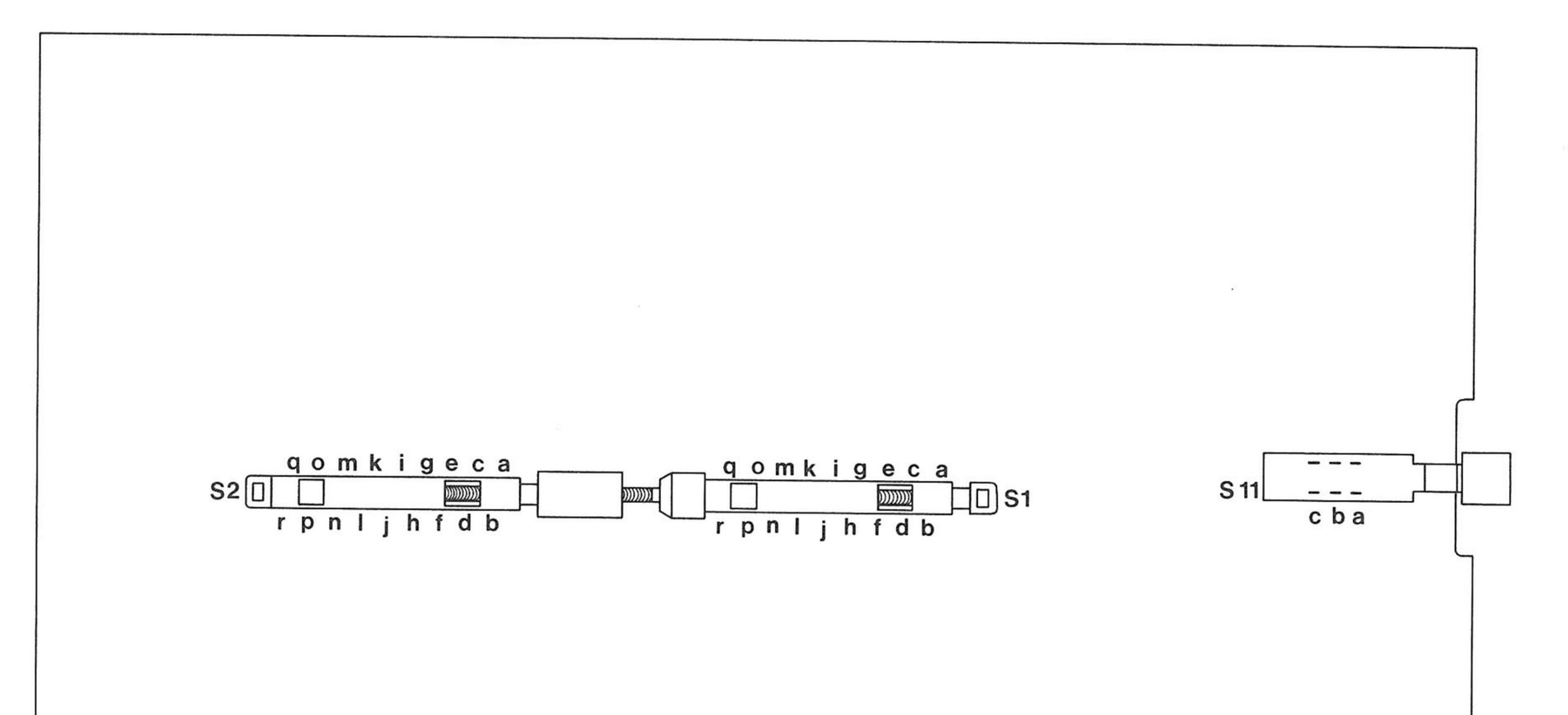
8

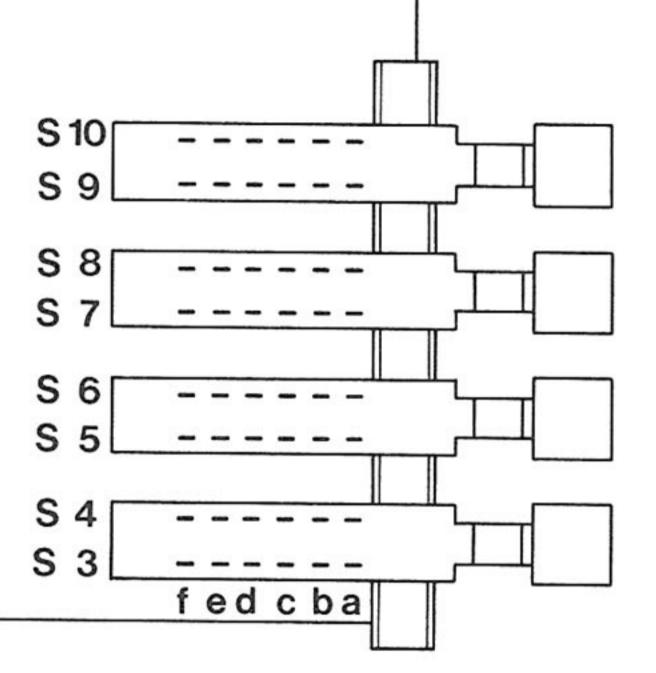
www.hifiengine.com



R	4021 [°] 4021	4010 4056 4055	4020 4131 4133	4102 40 4101 41 4130 40	100	4011 4115 4108	4012 4052 4053	4013 4014 4015 4104 4051 4132	4103 4050 4216	4016	4106 4107	41 41
С	4010	4010'	4052	4018	4011 4100		4101 4051	4014 4050 4200	4012 4125		4016 4015 4102	2 4 1
S			14 13	15	16 2							

4	135		160	1112 1154	4118	4164	4168	4121 4 4119 4 4125 4	124	4144 4165 4173	4145		4170	4171 46 4201	4202 4	45 203	47 4166	42 43	44 4120		40 41 4117	4204	4158 4205	4157	415	-	4155 4211 4207	4159 4211 4210		68 67	66	64 62 65 63 4208 4213	4215	61	60 4214
•	4120	1106	4119		4128 4108 4122					4116		47	46 44	4130	4207	45 43	4109		42	41		40 4209		6	3 421 421	4123 0 65 1	3	4213 4213 4208	63	4215 42		4216 4217	60 4212	61	
		1 6		3		6	1	3	5	4												2	18												20 19





S 1 A/W-Schalter S 2 A/W-Schalter S 3 Fe-Schalter S 4 Fe-Schalter S 5 Cr-Schalter S 6 Cr-Schalter S 7 Dolby-Schalter S 8 Dolby-Schalter S 9 Limiter-Schalter S 10 Limiter-Schalter S 11 Fa-Ed-Schalter S 13 Mic-Schalter L S 14 Mic-Schalter R S 15 Mic-Schalter L S 16 Mic-Schalter R S 17 Motor-Schalter

REC/REP switch S 1 S2 REC/REP switch S3 Fe switch S4 Fe switch S 5 Cr switch S6 Cr switch S 7 Dolby switch S 8 Dolby switch S 9 Limiter switch S 10 Limiter switch S 11 Fa-ed switch S 13 Mic switch L S 14 Mic switch R S 15 Mic switch L S 16 Mic switch R S 17 Motor switch

× 0

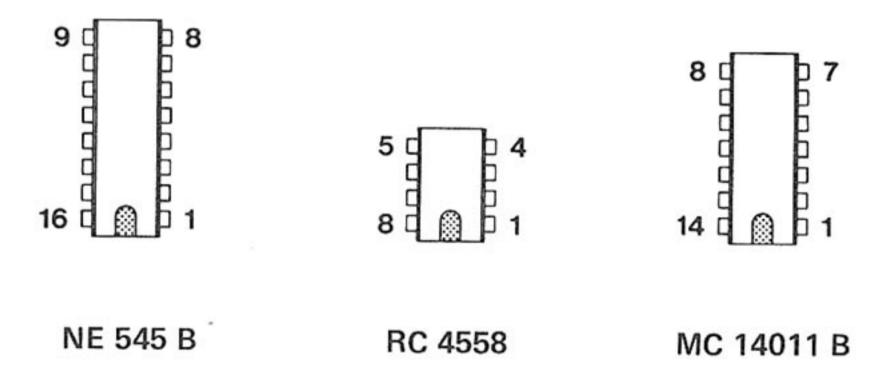
- S 1 ENR/REP commutateur
- S 2 ENR/REP commutateur
- S 3 Fe commutateur
- S4 Fe commutateur
- S 5 Cr commutateur
- S 6 Cr commutateur
- Dolby commutateur S 7
- S 8 Dolby commutateur
- S 9 Limiter commutateur
- S 10 Limiter commutateur
- S 11 Fa-ed commutateur
- S 13 Mic commutateur L
- S 14 Mic commutateur R
- S 15 Mic commutateur L
- S 16 Mic commutateur R

S 18 Pause-Schalter S 19 Memory-Schalter S 20 Memory-Unterdrückung

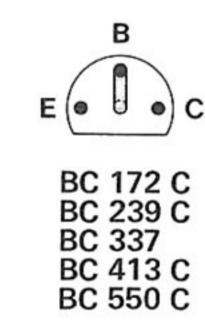
S 18 Pause switch S 19 Memory switch S 20 Memory suppression

S 17 Moteur commutateur S 18 Pause commutateur S 19 Memory commutateur S 20 Memory suppression

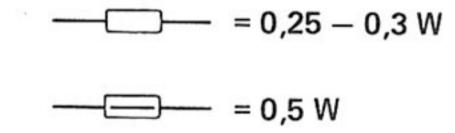
IC von der Bestückungsseite gesehen IC as seen from the top side IC vu du côté éléments



Transistoren von der Anschlußseite gesehen Transistors as seen from the connecting side Transistors vus du côté des connexions



Belastbarkeit der Widerstände **Resistor loading capacity** Capacité admissible de charge des résistances



Gezeichnete Schalterstellung: MIC L, RECORD, FeCr, DOLBY, LIMITER, START

Spannungen gemessen ohne Signal in Stellung: RECORD, FeCr, DOLBY, LIMITER, START mit Digitalvoltmeter ($R_i > 1 M\Omega$) gegen Masse.

Show switch position: MIC L, RECORD, FeCr, DOLBY, LIMITER, START

11

Voltages measured without signal in position: RECORD, FeCr, DOLBY, LIMITER, START with digital voltmeter ($R_i > 1 M\Omega$) to ground.

Dessin de la position du commutateur: MIC L, RECORD, FeCr, DOLBY, LIMITER, START

Tensions sans signal mesurées en position: RECORD, FeCr, DOLBY, LIMITER, START



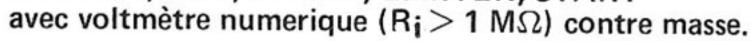
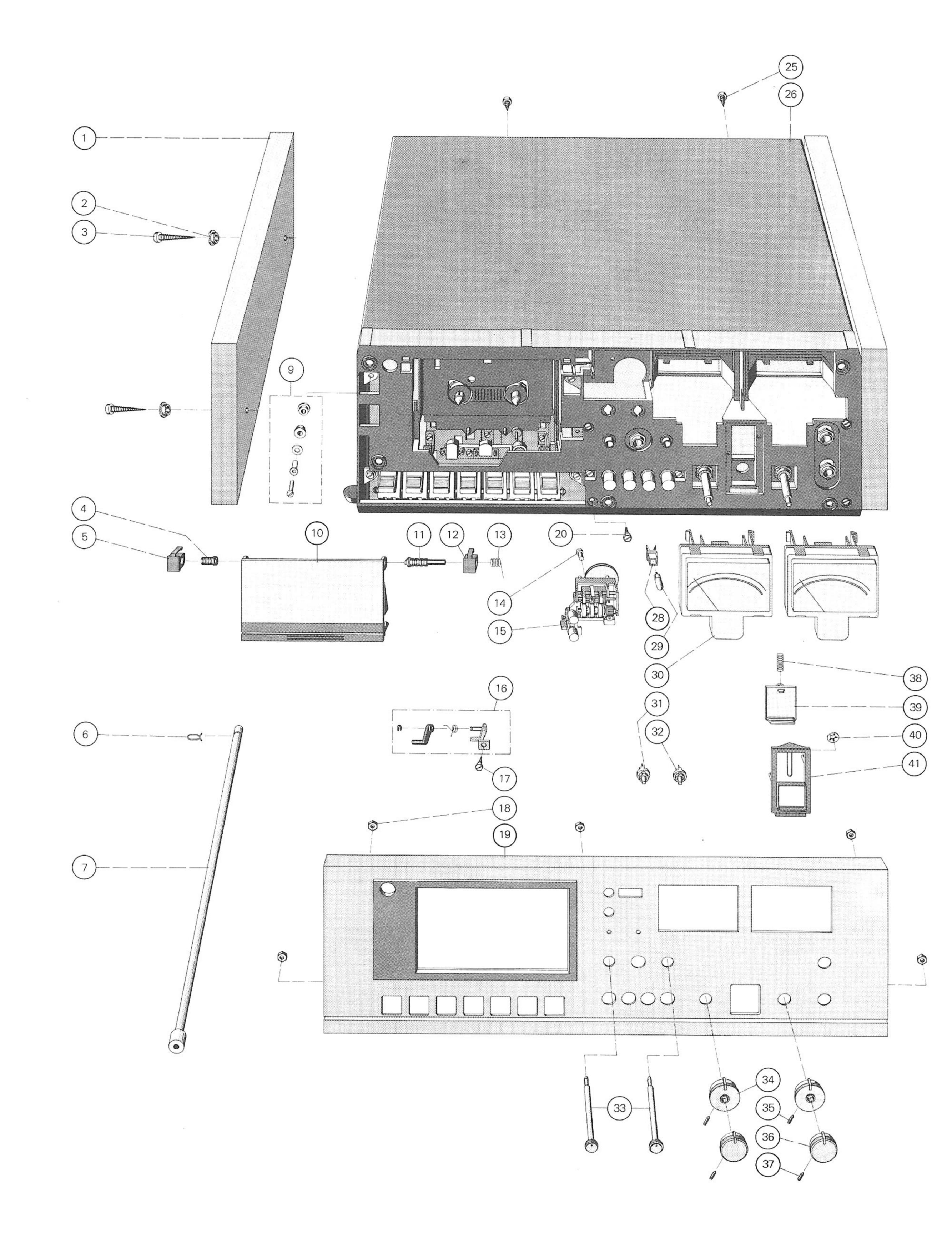




Fig. 16 Exploded view 1







Replacement parts

Pos.	Part.No.	Qty.	Description		Pos.	Part.No.	Qty.	Description	
1	245 421	1	Side wall		136	245 431	1	Cone cpl.	
2	241 044	4	Bush		137	245 432	1	Cassette holder cpl.	
3	243 310	4	Fillister screw		138	235 042		Luminous window	
4	243 298	2	Bearing		139	235 105		Spindle	
5		200.0	Spindle left		140	210 147	2	Lock washer	4
6	238 668		Spring Binding		141	243 231	. 7	V-spring	-
7	243 314		Switch lever cpl.		→142	245 434	7	Key	
	210 011	· ·	ovinteri lever epi.		143	243 230	1	Felt unit	
9	245 768	4	Fixing parts		143	210 472	2		
10	245 422	1.0	Window cpl.		201 - B12227-1262	1. 10.0.585 (COLOR (MO) COLOR (10.01)	2	Machine screw	M 3 x 4
11	243 297		 A statistical statist Statistical statistical statisteps statistical statistical statistical statistical statisti		145	245 435	'	Key board compl.	
12	243 297		Spindle right						
	A REPORT CLARKE MACHINES		Bearing		149	235 107	1	Leaf spring	
13	243 303		V-spring		150	235 459	1	Pressure lever cpl.	
14	210 480		Machine screw	M 3 × 6	151	235 157	1	V-spring	
15			Counter cpl.		152	210 144	1	Lock washer	1,9
16	243 305		Bearing		153	235 080	1	Gear shifting gate	
17	226 448		Sheet metal screw	BZ 2,9 x 6,5	154	235 244	1	Stop angle	
18	210 366		Hex nut		155	210 472	1	Machine screw	M 3 x 4
19	245 424	1 ° 3	Front trimplate metalic		156	244 537	1	Tape travel unit compl.	
	245 425	1	Front trimplate metalic bro	own	157	242 893		Phototransistor TIL 621-II/I	11
20	227 467	12	Sheet metal screw	BZ 2,9 x 6,5	158	226 287	1	Socket of lamp	
					159	209 443			12 1/1 1/1
25	218 055	2	Fillister screw	BZ 2,9 x 9,5	160	243 224	1	Lamp Rearing angle	12 V/1 W
26	243 335		Top-cover	_,_ ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,,		Same and Same and Same		Bearing angle	1
27	243 278		Bottom Cover		161	209 962		Solder lug	
28	230 955		Lamp socket		162	210 472		Machine screw	M 3 x 4
-> 29	226 393	1	1 - Carl	– 15 V/30 mA	163	244 889		Micro switch	
30	245 426		Recording level meter asser		164	210 486	2	Machine screw	M 3 x 8
31	245 427		LED red cpl.	поту	165	210 556	1	Washer polyathylen	2,4/6/0,5
32	245 428				201	235 284	1	Lever	
			LED green cpl.		202	235 283	1	Lift-Lever	
33	243 313		Knob-phones		204	235 1 10	1	Pause lever cpl.	
34	243 329	1 1 1 1 1 1	Knob "right"		205	235 142	1	Tension spring	
35		1 2 3	Set screw	M 3 x 6	207	210 145	10	Lock washer	
36	243 330		Knob ''left''		208	243 265	1	Contact	
37	210 226		Set screw	M 3 x 6	209	244 890	1	Large flywheel cpl.	
38	216 737	1	Compression spring		210	244 895	1	Top strap	
39	243 281	1	Slide		211	235 044		Bottom plate	
40	200 444	1	Spring washer		212		3	Machine screw	
41	243 280	1	Cover			210 100			
* * *	243 020	1	Shipping carton		215	235 475	1	Top lever	
* * *	243 017		Operating instruction		216	210 145	10	Lock washer	
			operating motion		217	235 147	1	Coupling cpl.	
101	235 457	2	Driver assembly		218	210 142	2	Lock washer	
102	210 145		Lock washer	2,3	219	235 106	1	Intermediate gear	
103	243 200		Plate cpl.	2,5	220	210 142	2	Lock washer	1,2
104	210 472		Machine screw	M 3 x 4	221	210 619	1	Washer	2,7/8/1
105	243 259		Cap	IVI S X 4	222	210 145	10	Lock washer	2,3
106	235 017	2			223	235 025	1	Coupling unit	
107	210 472		Support Machine scrow		224	243 263	1	Counter strap	
107			Machine screw	M 3 x 4	225	210 145	10	Lock washer	2,3
108			Rubber sleeve		226	235 472	1	Winding gear left cpl.	_,0
	235 354		Stop spring cpl.		227	245 346	1	Winding gear right cpl.	
110			Washer	M3x3	228	235 150		Compression spring	
111	210 469		Machine screw	M 3 x 3	229	235 070		Winding spindle	
112		1 1	Tension spring		230	243 264		Contact set	
113			Stop lever		230	243 238	2	Strap	
114			Lock washer	2,3	231	245 250	1 1		
115			Tension spring					Coupling roll cpl.	
116	243 209	1	Record lever		233	243 237		Washer	
117	243 221	1	Eject lever		234	210 142	2	Lock washer	1,2
118	210 145	10	Lock washer	2,3	235	230 559		Set screw	M 2,5 x 3,5
					236	245 767	1	Drive pulley cpl.	
121	245 429	11	Head mounting plate assem	nbly	240	245 770	1	Motor fixing parts	
122	211 306	3	Ball	φ3,5	241	245 769	1	Motor cpl.	
123			Compression spring	¥ 0,0	242	243 244	1	Motor shield	
124	A LEADER MAN AND A REAL		Ball	φ2	243	243 257	1	Release	
125	245,430	1 1	Head unit cpl.	ψz	244	245 771	1	Tension magnet cpl.	
126	245 786		Record/playback		245	210 149	1	Lock washer	6
120	235 455				246	200 495	1	Cap	0
		1	Erase head		247	243 256		Spring	
128	210 485		Machine screw	AM 3 x 7	248	226 845		V-spring	
129	235 155		Compression spring		249	243 258		Flap	
130	235 156		Wire spring		243	270 200	'	iup	
131	235 074	1	Brake plate						
132	210 147	2	Lock washer	4	299	210 145	10	Lock washer	2,3
133	200 650	2	Rubber sleeve		300	243 291	2	Record lever	
134	219 842	11	Fillister screw	B22×65	301	200 528	11	Spindle	

	B 2,2 x 6,5	301 302		Spindle Lever for coupling	
	 Fillister screw Leaf spring 				

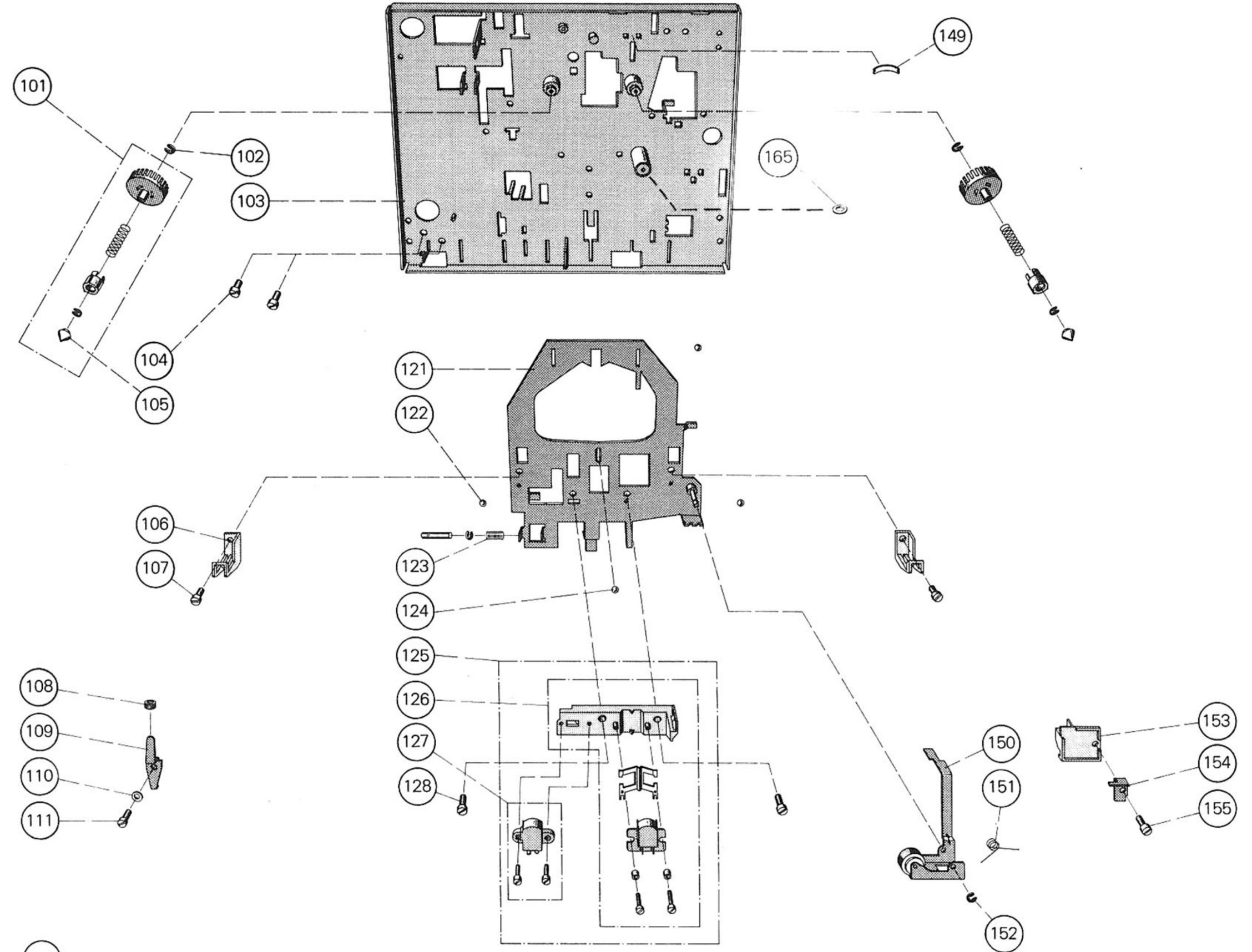
13

.

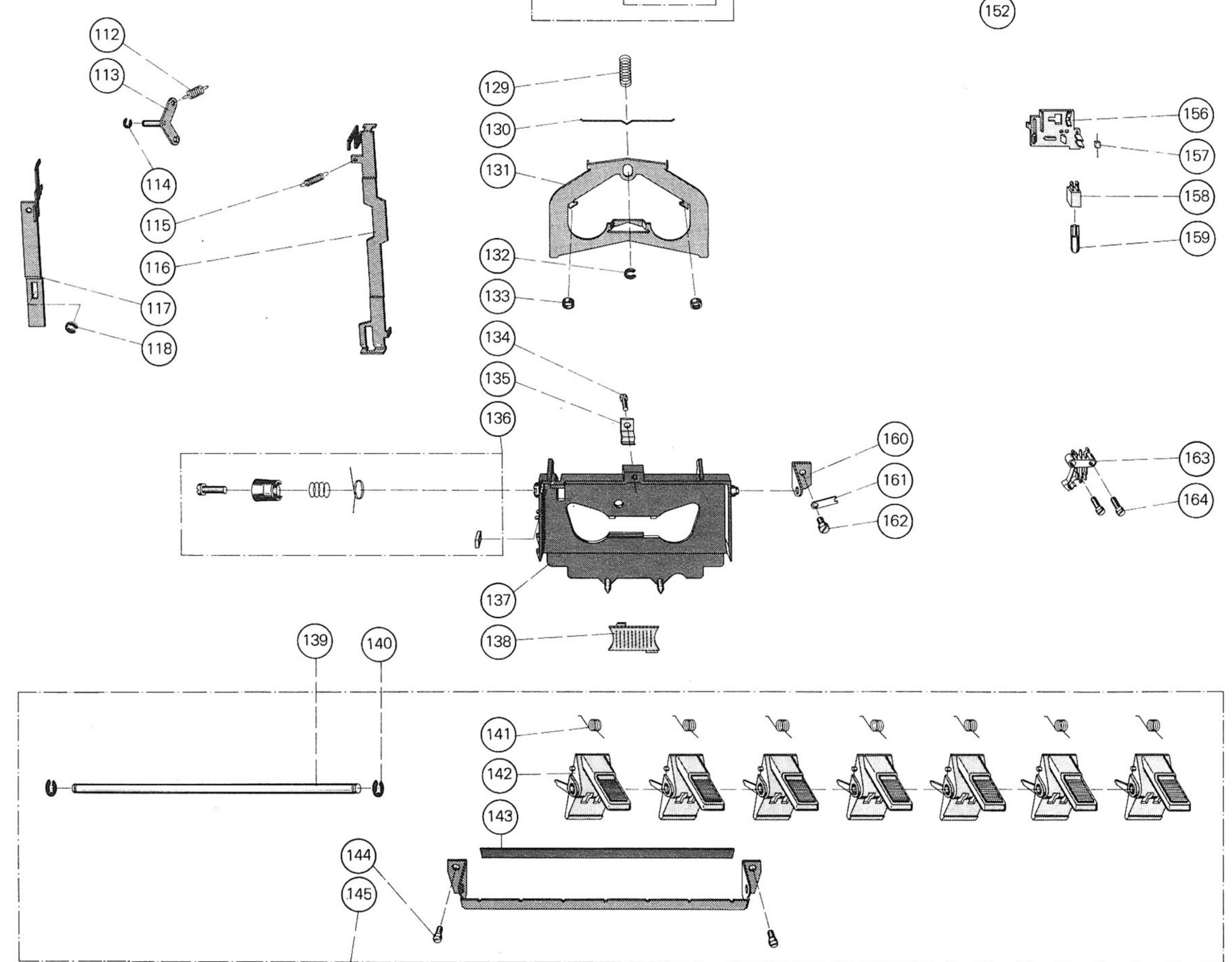


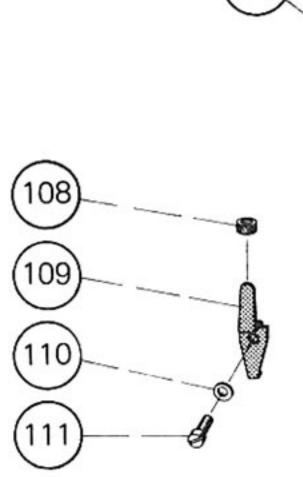
.

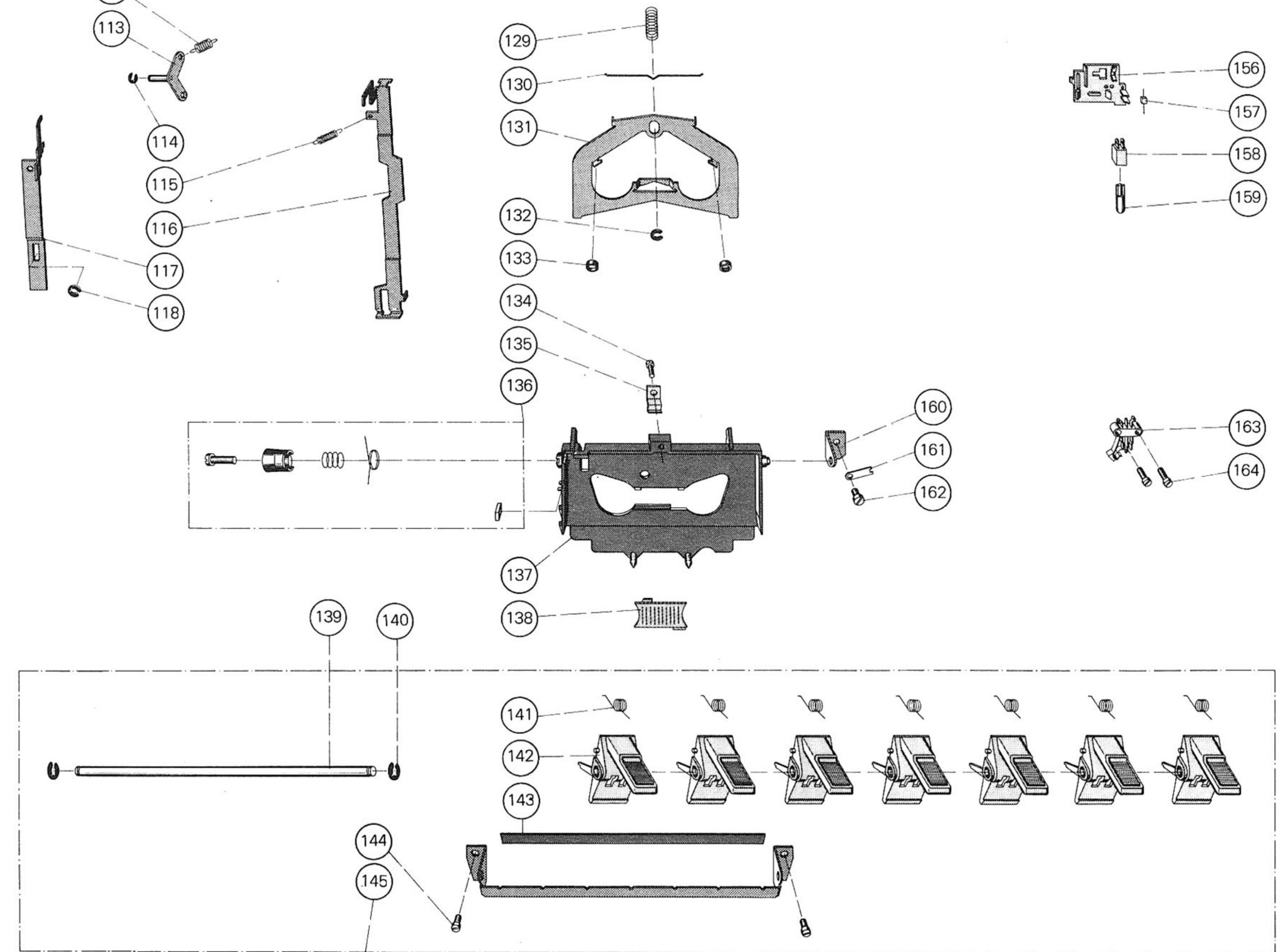
Fig. 17 Exploded view 2











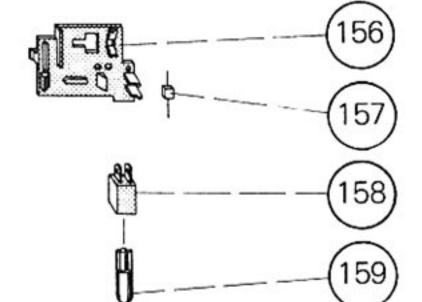
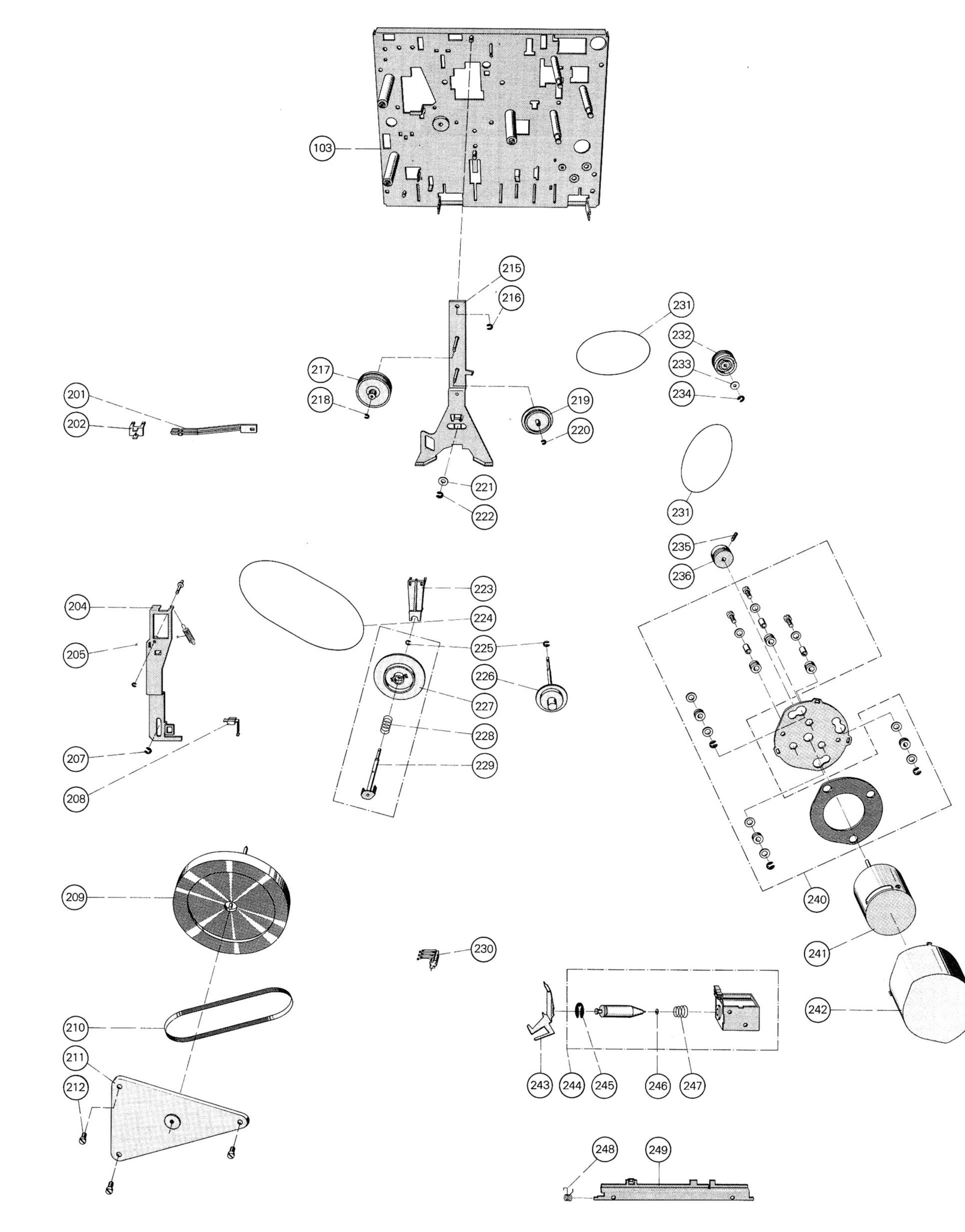




Fig. 18 Exploded view 3





15

.

Pos.	Part.No.	Qty.	Description	Pos.	Part.No.	Qty.			
303 304 305 306 307	240 333 243 022 237 821 210 473 227 467	4 4 1 2 12	Clamp Sheet screw with washer 3,5 x 9,5 Power switch Machine screw Sheet screw 2,9 x 6,5	321 322 323 C 4050	229 869 240 880 243 286 222 213	1 1 3 2	Spring strip 3-pole Headphone jack Distance part Elytic 1,0 μF/50 V		
308 309	245 772 218 155	1 4	Power transformer Screw	C 4051 C 4052	226 449 226 455	2 2	Elytic 10 μ F/25 V Elytic 100 μ F/25 V		
310 C 60 C 61 C 62 C 63 C 63 C 65 C 65	245 773 222 213 235 619 226 453 222 213 223 039 235 622 229 529	2 2 1 1 1 1	Record amplifier Record amplifier cpl. Elytic 1 μ F/ 50 V Foil 0,68 μ F/100 V/5 % Elytic 47 μ F/ 16 V Elytic 1 μ F/ 50 V Foil 22 nF/250 V/5 % Foil 22 nF/250 V/5 % Foil 68 nF/100 V/5 %	R 4050 R 4051 R 4052 R 4053 R 4054 R 4055 R 4056	AND STREET, DO NOT COMPANY OF THE	2 4 2 2 2 1	Trimmer 10 k Ω / lin. 220 k Ω /0,25 W/5 % 220 k Ω /0,25 W/5 % 1,5 k Ω /0,25 W/5 % 10 k Ω /0,25 W/5 % 4,7 k Ω /0,25 W/5 % 150 Ω /0,25 W/5 %		
L 60	235 533	1	10 PA				Power unit		
R 60 R 61 R 62 R 63 R 64 R 65 R 65 R 65 R 65 R 65 R 65 R 65 R 65	239 398 227 251 223 258 225 592 235 535 228 740 235 661 229 952 223 207 226 479		$\begin{array}{cccccccc} 6,8 & & & & \& \Omega \ /0,30 \ \text{W/5} \ \% \\ 3,3 & & & \& \Omega \ /0,30 \ \text{W/5} \ \% \\ 220 & & & \& \Omega \ /0,30 \ \text{W/5} \ \% \\ 56 & & & \& \Omega \ /0,30 \ \text{W/5} \ \% \\ 68 & & & \& \Omega \ /0,30 \ \text{W/5} \ \% \\ 120 & & & \& \Omega \ /0,30 \ \text{W/5} \ \% \\ 820 & & & \Omega \ /0,30 \ \text{W/5} \ \% \\ 330 & & & \Omega \ /0,30 \ \text{W/5} \ \% \\ 120 & & & & \Omega \ /0,30 \ \text{W/5} \ \% \\ \end{array}$	330 331 332 333 334 335 336 337 338 339	243 191 226 514 242 844 243 190 238 117 209 917 243 750 237 548	1 2 1 1 1 1 1 1 1	Power unit cpl. Pflug Spring strip 12-pole Spring strip 7-pole Spring strip 5-pole Spring strip 2-pole Spring strip 5-pole IC-holder 14-pole Fuse 209719 25 A/250 V Main cable Sleeve		
T 60 T 61	235 921 209 862	1	BC 239 C BC 172 C Dolby amplifier	C 4200 C 4201 C 4202 C 4203	226 459 226 459	444	Foil47nF/250 V/20 %Foil0,1 μ F/100 V/5 %Foil0,1 μ F/100 V/5 %Foil0,1 μ F/100 V/5 %		
315 316			Dolby amplifier IC-holder 16-pole	C 4203 C 4204 C 4205 C 4205 C 4206	226 459 234 828	4 1 1	Foil 0,1 μ F/100 V/5 % Foil 0,1 μ F/100 V/5 % Elytic 1000 μ F/ 16 V Elytic 1000 μ F/ 40 V		
C 70 C 71 C 72 C 73 C 74 C 75 C 76 C 76 C 77 C 78 C 79 C 80	235 573 235 662 235 524 235 523 235 525 235 573 235 527 235 513 235 528 235 573	5 1 1 1 5 1 1 5	Elytic100 μ F/25 VElytic10 μ F/16 VElytic0,33 μ F/35 VFoil4,7nF/63 V/2,5 %Foil27nF/63 V/2,5 %Foil5,6nF/63 V/2,5 %Elytic10 μ F/16 VFoil3nF/63 V/5 %Foil3,9nF/63 V/5 %Foil3,9nF/63 V/5 %Elytic10 μ F/16 V	C 4207 C 4208 C 4209 C 4209 C 4210 C 4211 C 4212 C 4213 C 4213 C 4215 C 4216	222 499 222 219 226 460 226 460 226 460 226 454 235 569 235 681	1 1 3 3 3 1 2 1 3 3 1	Foil $0,22 \ \mu F/100 \ V/5 \ \%$ Elytic $4,7 \ \mu F/ \ 25 \ V$ Foil $0,33 \ \mu F/100 \ V/5 \ \%$ Foil $0,33 \ \mu F/100 \ V/5 \ \%$ Foil $0,33 \ \mu F/100 \ V/5 \ \%$ Foil $0,33 \ \mu F/100 \ V/5 \ \%$ Foil $0,33 \ \mu F/100 \ V/5 \ \%$ Foil $220 \ p F/630 \ V/5 \ \%$ Foil $15 \ n F/160 \ V/5 \ \%$ Foil $2,2 \ n F/160 \ V/5 \ \%$ Foil $2,2 \ n F/160 \ V/5 \ \%$ Foil $15 \ n F/ \ 63 \ V/5 \ \%$		
C 81 C 82 C 83 C 84 C 85 C 86	222 500 235 573 226 459	1 5 1 1	Elytic10 μ F/16 VFoil47nF/250 V/5%Elytic10 μ F/16 VFoil0,1 μ F/100 V/5%Foil0,33 μ F/100 V/5%Ceramic82pF/63 V/2%	D 4200 D 4201 D 4202 D 4203 D 4203 D 4204 D 4205	227 344 227 344	8 8 8 8 8 8	1 N 4001 1 N 4001 1 N 4001 1 N 4001 1 N 4001 1 N 4001		
D 70 D 71	226 725 226 443	1	BZX 83 C 6 V 2 1 N 54 A	D 4206 D 4207 D 4208	227 344 227 344	8 8 2	1 N 4001 1 N 4001 1 N 4001 1 N 4148		
L 70 L 71	235 516 235 517		10 PA 10 PA	D 5209	223 906	2	1 N 4148		
R 70 R 71 R 72 R 73 R 73 R 74 R 75 R 75 R 76 R 77 R 78 R 79 R 80	227 251 235 656 223 897 223 897 227 252 226 481 223 895 223 260	1 1 2 1 1 1 1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	L 4200 R 4200 R 4201 R 4202 R 4203 R 4203 R 4204 R 4205 R 4205 R 4206 R 4207 R 4208 R 4200 R 4210	239 386 239 381 211 202 224 603 240 657 240 657 240 657 224 603 239 376 223 219	1 1 1 2 3 3 2 1 2 2	Alternator $ \begin{array}{ccccccccccccccccccccccccccccccccccc$		
C 70	235 532	1	NE 545 B Headphone amplifier	R 4211 R 4212 R 4213		2 2 2	Trimmer 100 k Ω / lin. 47 k Ω /0,25 W/5 % 47 k Ω /0,25 W/5 % 22 Ω /0.25 W/5 %		

320 245 774 1 Headphone amplifier cpl.	R 4214	223 219	2	22	Ω/0,25 W/5 %
--	--------	---------	---	----	--------------

16

www.hifiengine.com

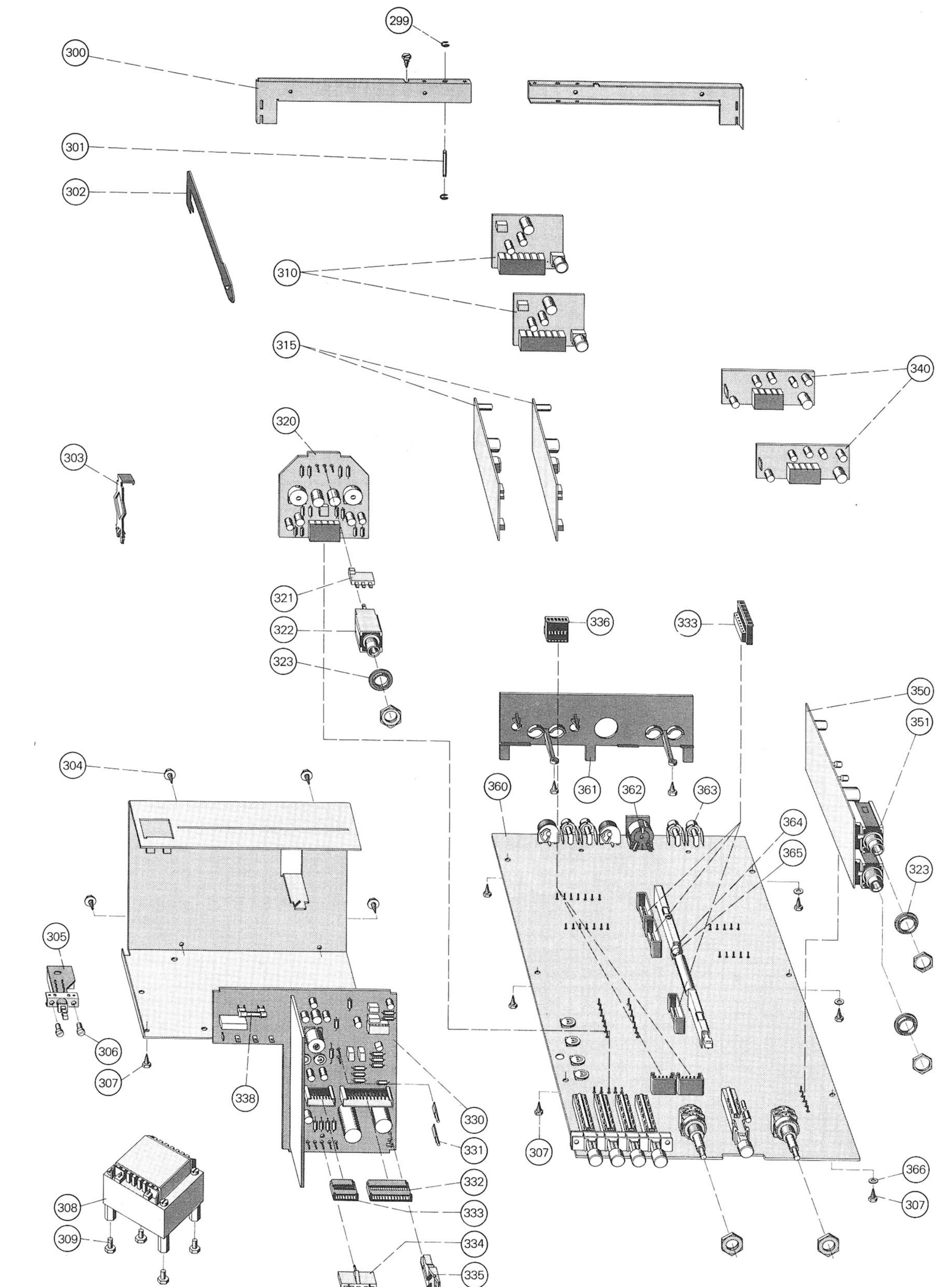
Pos.	Part.No.	Qty.	Descri	ption	Pos.	Part.No.	Qty.		Descripti	on
R 4215 R 4216		1	100 470		S 1 S 2 S 3	235 504 235 504 245 785	2 2 4	Switch Switch Contact housin		
Г 4200	The second se	1		BC 172 C	S 5	245 785	4	Contact housir Contact housir	ng cpl.	(FE) (CR)
4201	226 870 220 537	1 2		BC 337/25 BC 337/16	S 7 S 9	245 785 245 785	4	Contact housir Contact housir		(Dolby) (Limiter)
4203		2		BC 337/16	S 11	242 858	1	Switch	ig cpi.	(Fade Edit)
4200 4201	242 854 240 843	1		MC 7724 CT MC 140 11 BCP	C 4100 C 4101 C 4102	230 826	8 2 8	Elytic Elytic Elytic	1 470 1	μF/ 50 V pF/500 V/10 % μF/ 50 V
			Reproduction amplif	ier	C 4103 C 4104		2	Ceramic	82	pF/500 V/10 %
340	245 777	2	Reproduction amplif	ier cpl.	C 4104	and the particular strength of the second str	4 4	Elytic Foil	4,7 0,1	μF/ 25 V μF/100 V/5 %
40 41	235 573 220 591	1	Elytic 10 Ceramic 220		C 4106 C 4107	222 219 226 459	4	Elytic Foil	4,7 0,1	μ F/ 25 V μ F/100 V/5 %
42	222 498	1	Foil 3	3 nF/250 V/5 %	C 4108	226 449	1	Elytic	10	μF/ 25 V
43 44	235 527 228 763	1	Foil : Elytic 10	3 nF/63V/5 % D μF/6V	C 4109 C 4110	226 451	2 1	Foil Elytic	100 22	pF/630 V/10 % μF/ 25 V
45 46	216 667 222 213	1	Ceramic 100 Elytic		C 4111 C 4112	222 213 216 405	8 2	Elytic Ceramic	1 33	μF/ 50 V pF/500 V/10 %
46 47	235 617	1	Foil	1,8 nF/160 V/2,5 %	C 4113	222 213	8	Elytic	1	μF/ 50 V
40	226 477	2	220	Ω/0,30 W/5 %	C 4114 C 4115	226 450 226 434	2 2	Elytic Foil	22 1	μF/ 16 V nF/ 63 V/5 %
41	226 489	1	47	k Ω /0,30 W/5 %	C 4116 C 4117		2 5	Foil Elytic	0,3 100	$\mu F/100 V/5 \%$ $\mu F/25 V$
43	228 738	1	82 560	Ω /0,30 W/5 %	C 4118	226 455	5	Elytic	100	μF/ 25 V
44 45		2	220 1	Ω /0,30 W/5 % ,5 M Ω /0,30 W/5 %	C 4119 C 4120		5 5	Elytic Elytic	100 100	μF/25V μF/25V
46	223 259	1	470	Ω /0,30 W/5 %	C 4122 C 4123	226 455	5 1	Elytic Elytic	100	μF/ 25 V
47 48	227 253 235 535		4 68	,7 k Ω /0,30 W/5 % k Ω /0,30 W/5 %	C 4125	216 404	2	Ceramic	22 82	μF/ 25 V pF/500 V/10 %
49 50	226 492 239 378	1	27 39	kΩ/0,30 W/5 %	C 4126 C 4128	and the state of the	2	Foil Ceramic	15 330	nF/ 63 V/2,5 % pF/500 V/20 %
			39		C 4129	222 219	1	Elytic	4,7	μ F/ 25 V
40 41	226 898 226 825			BC 550 C BC 413 C	C 4130 D 4100		2	Foil	47	nF/250 V/5 %
			Mic-amplifier		D4101	223 906	13			1 N 4148 1 N 4148
350	and a second concernant of	1	Mic-amplifier cpl.		D 4103 D 4104	warmen and a strend of 2				1 N 4148 1 N 4148
351	242 837	2	Mic-jack		D 4105 D 4108	223 906	13			1 N 4148
4010 4011		6 2	Elytic Elytic	4,7 μF/ 25 V 2,2 μF/ 50 V	D 4109	223 906	13			1 N 4148 1 N 4148
4012	223 278	2	Ceramic 33	30 pF/500 V/10 %	D 4110 D 4111	223 906 223 906				1 N 4148 1 N 4148
4014 4015		6 6	Elytic Elytic	4,7 μF/ 25 V 4,7 μF/ 25 V					~	
4016 4018		2	Elytic	47 μ F/ 25 V 22 μ F/ 25 V	L 4100	226 406	2		S	L 2550/FI 11 A 5
					R 4100 R 4101	239 371 224 603	2 2		4,7 1	$k\Omega/0,25$ W/5 % M $\Omega/0,25$ W/5 %
4010 4011	239 384 240 561	2 2	2	3,9 k Ω /0,25 W/5 % 20 Ω /0,25 W/5 %	R 4102	239 775	2	239475	560	$k\Omega/0,25$ W/5 %
4012 4013	211 202	5		10 k Ω /0,25 W/5%	R 4103 R 4104		2 2		220 100	kΩ/0,25 W/5 % Ω/0,25 W/5 %
4014	224 735	4		70 k Ω /0,25W/5% 88 k Ω /0,25W/5%	R 4105 R 4106		2 2		330 4,7	$k\Omega/0,25$ W/5 % $k\Omega/0,25$ W/5 %
4015 4016		2 2		B2 k Ω /0,25 W/5% 47 Ω/0,25 W/5%	R 4107	239 385	2		330	Ω /0,25 W/5 %
4017	240 571	2		50 Ω /0,25 W/5 %	R 4108 R 4109		2	Trimmer	470	k Ω /0,25 W/5 %
4018 4019		2 5		1 k Ω /0,15 W/5 % 10 k Ω /0,25 W/5 %	R 4110 R 4111	240 657 220 526	2			$M\Omega/0,25$ W/5 %
4020 4021	239 384 211 202	2 5		3,9 k Ω /0,25 W/5 %	R 4112	211 202	2		3,3 10	k Ω /0,25 W/5 % k Ω /0,25 W/5 %
				10 k Ω /0,25 W/5 %	R 4113 R 4114		11 2		47 4.7	k Ω /0,25 W/5 % k Ω /0,25 W/5 %
4010 4011	226 898 226 825	2		BC 550 C BC 413 C	R 4115	239 373	2	Τ	82	$\Omega/0,25$ W/5 %
		-		DC 413 C	R 4116 R 4117	229 911 239 386	2 2	Trimmer	100	Ω /0,25 W/5 %
000	045 330		Base plate		R 4118 R 4119	239 367 226 498	11	Trimmor	47	$k\Omega/0,25$ W/5 %
360 361	245 779 245 780	1	Base plate cpl. Rear wall		R 4119	226 498 239 382	2 2	Trimmer	2,7	k Ω /0,25 W/5 %
362	233 601	1	Mounting jack	5-pole	R 4121 R 4122	239 376 239 367	2		1 47	k Ω /0,25 W/5 % k Ω /0,25 W/5 %
363 364	235 572 240 331	4	Mounting jack Bush	Cynch	R 4124	239 394	4		1,5	k Ω /0,25 W/5 %
365 366	240 330	1 3	Screw Washer	3,2/8/1	R 4125 R 4126	239 394 216 683	4		1,5 270	k Ω /0,25 W/5 % Ω /0,25 W/5 %
000	2110/3	5	**031101	5,2/0/1	R 4127	239 380	4		1,8	$k\Omega/0,25$ W/5 %

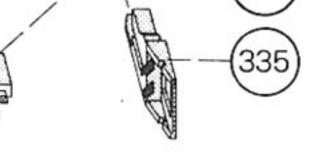
17

8C



Fig. 19 Exploded view 4





1

.





Pos.	Part.No.	Qty.		Descripti	on	Pos.	Part.No.	Qty	Description
R 4128	240 629	1		150	k Ω /0,25 W/5 %	R 4157	239 398	1	6,8 kΩ/0,25 W/5 %
R 4129	239 402	1		120	$k\Omega$ /0,25 W/5 %	R 4158	239 386	1	100 Ω/0,25 W/5 %
R 4130	239 382	4		2,7	k Ω /0,25 W/5 %	R 4159	239 387	1	22 kΩ/0,25 W/5 %
R 4131	239 382	4		2,7	$k\Omega/0,25$ W/5 %	R 4160	239 367	111	47 kΩ/0,25 W/5 %
R 4132	242 846	2	Trimmer	10	$k\Omega/lin.$	R 4161	239 380	4	1,8 kΩ/0,25 W/5 %
R 4133	239 380	4		1,8	$k\Omega/0,25$ W/5 %	R 4164	220 526	4	3,3 kΩ/0,25 W/5 %
R 4134	240 657	4		2,2	M Ω /0,25 W/5 %	R 4165	Contraction and the second	2	3,9 kΩ/0,25 W/5 %
R 4135	239 398	2		6,8	kΩ/0,25 W/5 %	R 4166	240 575	4	820 Ω/0,25 W/5 %
R 4136	239 367	11		47	kΩ/0,25 W/5 %	R 4168		2	270 Ω/0,25 W/5 %
R 4137	239 399	2		330	kΩ/0,25 W/5 %	R 4169		1	4,7 kΩ/0,25 W/5 %
R 4138	239 370	2		2,2	$k\Omega/0,25$ W/5 %	R 4170	240 677	2	47 kΩ/0,25 W/5 %
R 4139	239 378	2		39	kΩ/0,25 W/5 %	R 4171	김 승규는 정말 것 그 가장님을 가셨다.	2	820 Ω/0,25 W/5 %
R 4141	229 911	2	Trimmer	50	kΩ	R 4172	240 553	1	100 Ω/0,25 W/5 %
R 4142	239 370	3		2,2	kΩ/0,25 W/5 %	R 4173	240 657	2	2,2 MΩ/0,25 W/5 %
R 4144	239 367	11		47	kΩ/0,25 W/5 %	T 4100	226 898	2	BC 550 C
R 4145	223 786	2	Trimmer	25	$k\Omega/lin.$	T 4101	226 825	2	BC 413 C
R 4146	239 384	2		3,9	$k\Omega/0,25$ W/5 %	T 4102	235 921	18	BC 239 C
R 4147	220 526	4		3,3	$k\Omega/0,25$ W/5 %	T 4103	235 921	18	BC 239 C
R 4148	240 657	4		2,2	$M\Omega / 0,25 W / 5 \%$	T 4104	224 726	1	BC 337
R 4149	242 839	1	Trimmer			T 4105	235 921	18	BC 239 C
R 4150	239 394	1		1,5	$k\Omega/0,25$ W/5 %	T 4106	235 921	18	BC 239 C
R 4151	239 394	1	54 - C	1,5	kΩ/0,25 W/5 %	T 4107	235 921	18	BC 239 C
R 4152	220 156	1		220	Ω /0,50 W/5 %	T 4108	235 921	18	BC 239 C
R 4153	239 370	3		2,2	$k\Omega/0,25$ W/5 %	T 4109		18	BC 239 C
R 4154	240 555	1		120	Ω /0,25 W/5 %	T 4110		18	BC 239 C BC 239 C
R 4155	239 404	1		100	kΩ/0,25 W/5 %	T 4112		18	BC 239 C BC 239 C
R 4156	224 550	1		220	kΩ/0,25 W/5 %	T 4113		18	BC 239 C BC 239 C

.

.

19

Modification reserved!

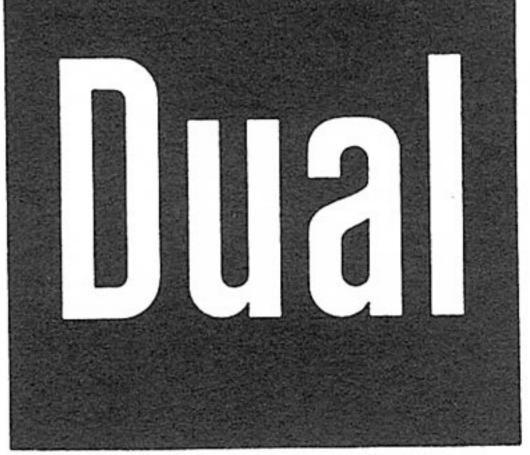
· . .

3

.







.

Dual Gebrüder Steidinger 7742 St.Georgen/Schwarzwald

1

920 552-2 4/0778

Printed in Germany by Dual

