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Bang & Olufsen

BEOGRAM 1102 - 1902

TYPE 5715 - 5711



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Telephone 4332
AUDIO EQUIPMENT SPECIALISTS

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DK - 7600 STRUER
DENMARK

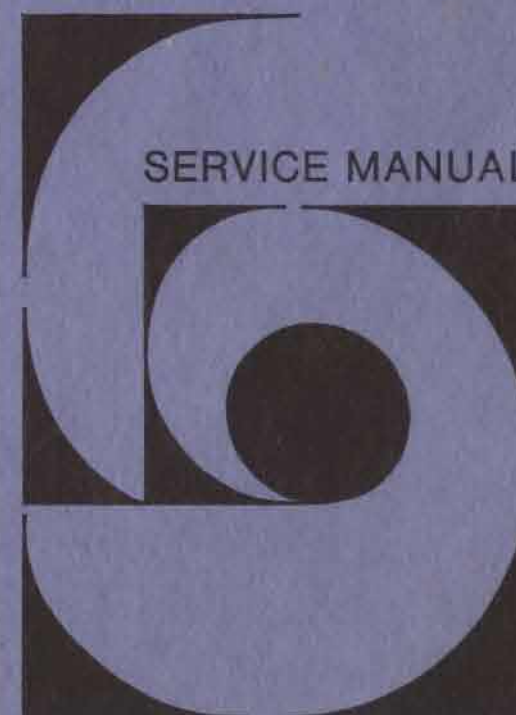
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SERVICE MANUAL



INTRODUCTION

Beogram 1102 and 1902 are developed on the basis of earlier record players using radial pickup arms: Beogram models 3400, 1900, and 1100. Like Beogram models 4002 and 6000, they employ a tacho-controlled DC motor and associated electronics. The turntable is driven by a flat belt. The PC unit has position numbers, printed on the component side. This service manual is complete with description, parts list and circuit diagram.

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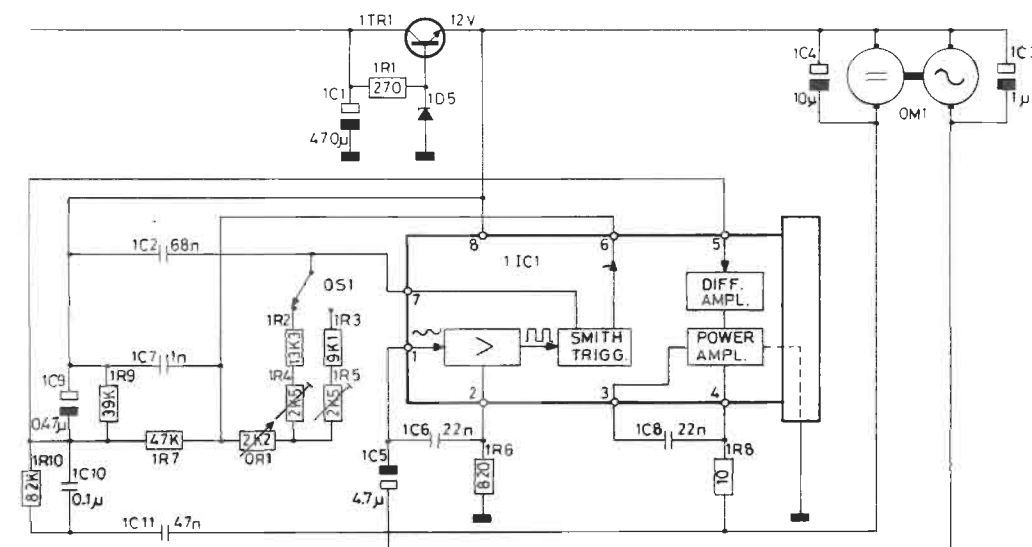
TECHNICAL DATA	BEOGRAM 1102	BEOGRAM 1902
Type No.	5715	5711
Sound system	Stereo, matrix	Stereo, matrix
Output DIN	2 x 6 mV/47 kohms	2 x 6 mV/47 kohms
Speeds	33 - 45 rpm	33 - 45 rpm
Tonearm	Radial	Radial
Automatic record-size	Yes, 17 and 30 cm	Yes, 17 and 30 cm
Automatic pickup movement	Yes	Yes
Automatic speed selection	Yes	Yes
Wow and flutter, DIN	< ± 0.09%	< ± 0.06%
Wow and flutter, WRMS	< ± 0.045%	< ± 0.03%
Rumble DIN unweighted	> 42 dB	> 43 dB
Rumble DIN weighted	> 62 dB	> 63 dB
Speed deviation	< 0.05%	< 0.05%
Speed control range	> ± 3%	> ± 3%
Stylus pressure range	0 - 2 gram	0 - 2 gram
Tracking error	0.126°/cm	0.126°/cm
Lift system	Mechanical	Mechanical
Antiskating	Yes, automatic	Yes, automatic
Motor	Servo controlled DC	Servo controlled DC
Drive system	Flat belt	Flat belt
Turntable	30 cm 0.5 kg	30 cm 0.8 kg
Dust cover	Hinged	Hinged
Power supply	220 (110 - 130 - 240) volts	220 (110 - 130 - 240) volts
Frequency	50 - 60 Hz	50 - 60 Hz
Power consumption	8 watts	8 watts
Dimensions W x H x D	44 x 8.5 x 33 cm	44 x 8.5 x 33 cm
Weight	6 kg	6 kg
Pickup	MMC 3000	MMC 4000
Stylus	Diamond Spherical	Elliptical naked diamond
Radius of curvature	15 μm	5 x 17 μm
Frequency range	20 - 20.000 Hz +2 -3 dB	20 - 25.000 Hz ± 1.5 dB
Channel separation 1000 Hz	> 20 dB	> 25 dB
400 - 10.000 Hz	> 15 dB	> 20 dB
Channel difference	< 2 dB	< 1.5 dB
Intermodulation	< 1%	< 1%
Recommended stylus pressure	1.2 gram	1 gram
Compliance	25 x 10 ⁻⁶ cm/dyn.	30 x 10 ⁻⁶ cm/dyn.
Effective tip mass	0.5 mg	0.4 mg

Subject to change without notice

ELECTRICAL DESCRIPTION

The turntable is driven by a tacho-controlled DC motor. In principle the circuit is identical to the tacho control in Beogram 4002 - 6000 type 5511 to 5514.

A generator in the motor furnishes an AC voltage whose frequency is dependent on the motor speed. This AC voltage is via 1C5 fed to pin 1 of 1IC1. The AC voltage is converted into a square wave which is passed on to a Schmitt trigger. The frequency of the square wave, dependent on the motor speed, controls one of the output levels of the Schmitt trigger, the other output level is controlled from a variable time constant consisting of 1C2, 1R2, 1R4, and 0R1 for 33 r.p.m., and 1C2, 1R3, 1R5, and 0R1 for 45 r.p.m.

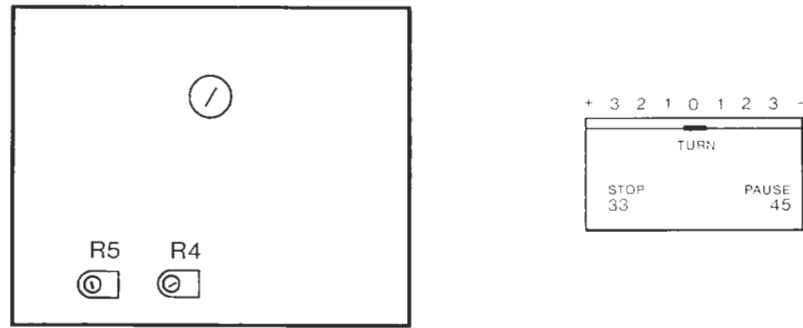


The output signal of the Schmitt trigger (pin 6) is integrated across 1R9 - 1C9 and fed to pin 5 which is differential amplifier. The integrated signal at pin 5 will be a DC voltage which varies with the motor speed. This DC voltage is fed via the differential amplifier. The power amplifier is connected as a variable resistor to chassis potential. 1C11 - 1C10 - 1R10 provide negative feedback for the power amplifier, preventing "overregulation".

1R8 is connected as current limiter in series with the motor to prevent the motor from catching when starting up.

ADJUSTMENTS

Speed adjustment

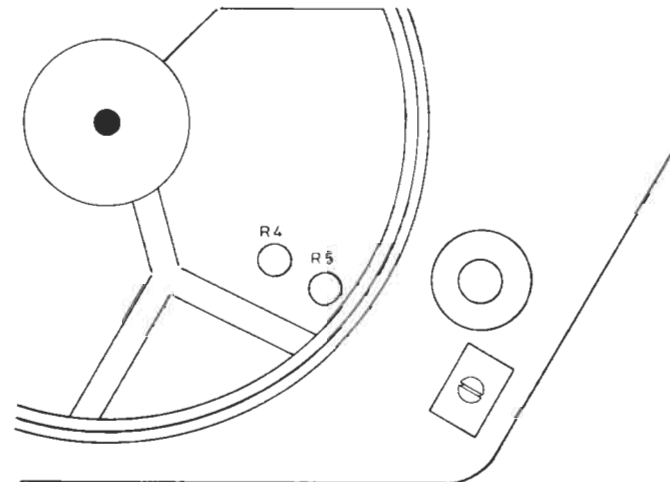


Set the scale for speed adjustment to 0.
 Adjust 33 rpm with potentiometer 1R4.
 Adjust 45 rpm with potentiometer 1R5.

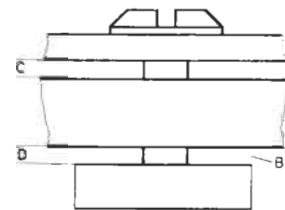
Speed can be checked in more than one way.

1. Stroboscope disc and a lamp connected to the mains. This check has an inherent uncertainty of approx. 2% since the mains frequency deviates by approx: ± 1 Hz at 50 Hz.
2. Stroboscope disc and stroboscope lamp. This gives an accuracy corresponding to the tolerance of the stroboscope lamp, usually much better than that of the mains frequency.

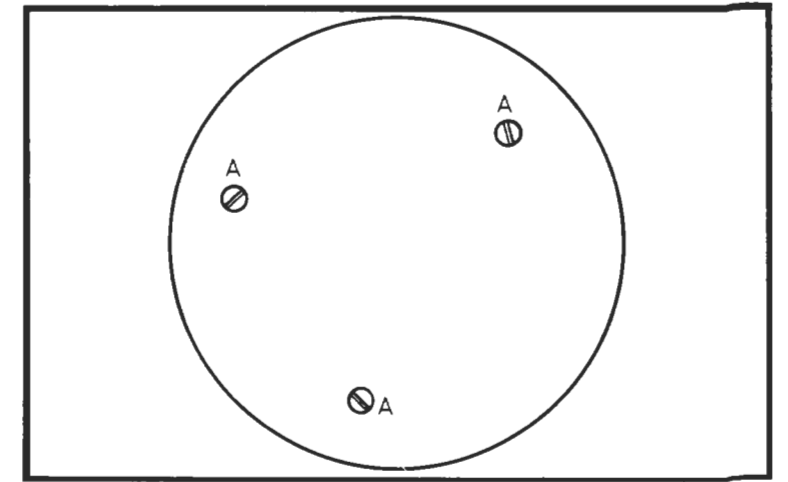
NB. 1R4 und 1R5 may be adjusted from above.
 Dismount the turntable and the black washer on the flywheel.
 See fig. 1.



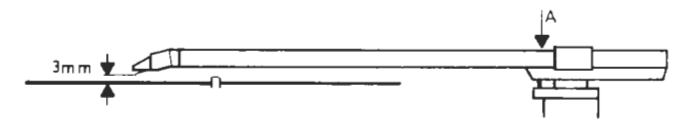
Chassis Height



Place the turntable and two weight-wise normal LP records on it.
 The chassis should then float freely from all three transit bushings (see points B).
 The turntable should likewise be parallel with the cover plate.
 Adjustments are performed with screws A.



Pickup Height



Put a record on the turntable.
 Place the pickup arm above the run-off groove.
 Adjust the screw A until the distance from the stylus to the record is 3 mm.
 Adjustment is performed with a counterbalance weight inserted.

Pickup Arm Balance



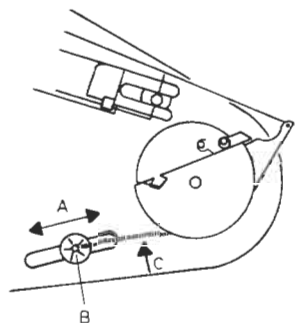
Set the stylus-force adjustment slider to the 0 position.
 Adjust screw A until the pickup arm is only just in balance.
 Thereafter set the stylus force to the recommended value.

Pickup Parallelism



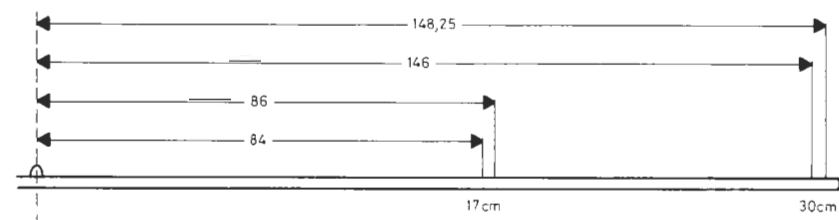
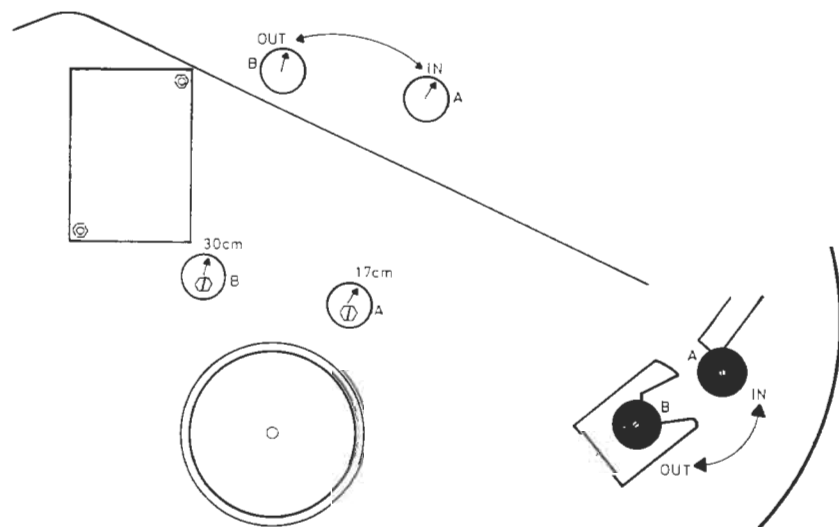
With screws C and D adjust so that distances A and B are identical and the plane portion of the pickup is parallel with the top side of the record.
 Adjustment is performed with a counterbalance weight inserted.

Anti-skating



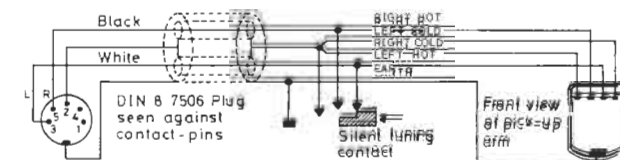
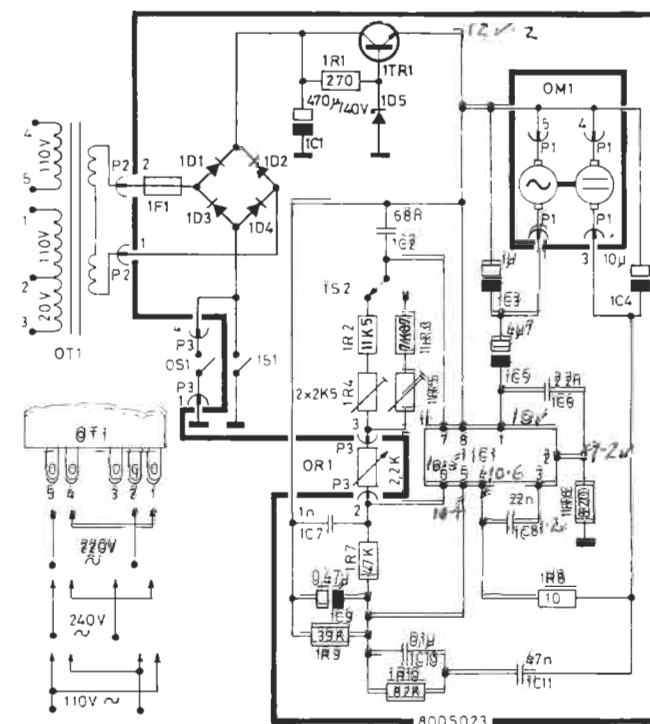
Put test record 3621004 on the turntable.
 Set stylus force to 1.2 grams with MMC 3000 and to 1 gram with MMC 4000.
 Play cut 1.
 Connect oscilloscope to right and left channels.
 Push arm B in direction of arrow A until the same amount of distortion is present in both channels (in case of distortion in left channel, slacken spring C; for right channel, tighten the spring).
 Check:
 Set stylus force to 1.4 grams with MMC 3000 and to 1.2 grams with MMC 4000.
 Again play cut 1 with oscilloscope connected to right and left channels; no distortion should occur.

Pickup Arm Landing



With "45" activated, adjust excentric A so that the pickup when travelling in automatically will lower into the field marked 17 cm in the sketch above. Excentric B should be adjusted so that the pickup lowers into the field marked 30 cm with "33" activated.

DIAGRAM



ELECTRICAL PARTS LIST

PC 1 8005023

1R1	5010000	270 Ohms 5% 1/8W
1R2	5020114	11K5 Ohms 1% 1/8W
1R3	5020116	7K87 Ohms 1% 1/8W
1R4	5370173	2K5 Ohms 20% 0,1W
1R5	5370173	2K5 Ohms 20% 0,1W
1R6	5010068	820 Ohms 5% 1/8W
1R7	5010045	47 KOhms 5% 1/8W
1R8	5100023	10 Ohms 10% 1W
1R9	5010060	39 KOhms 5% 1/8W
1R10	5010091	82 KOhms 5% 1/8W

TR-LIST

1TR1	8320266	33 TIP 31
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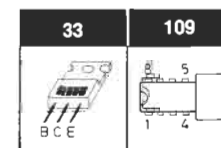
IC-LIST

1IC1	8340108	109 1003C2
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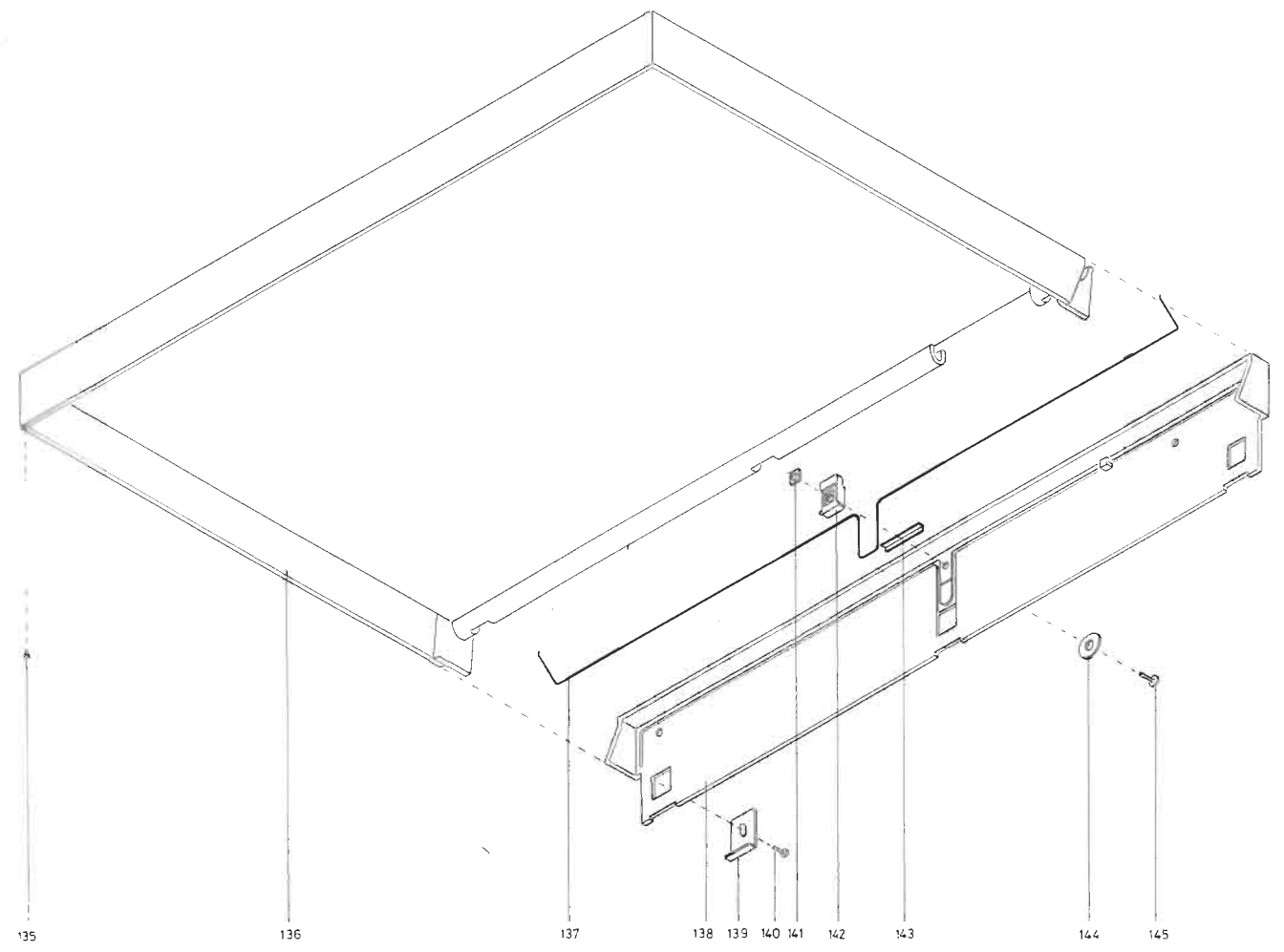
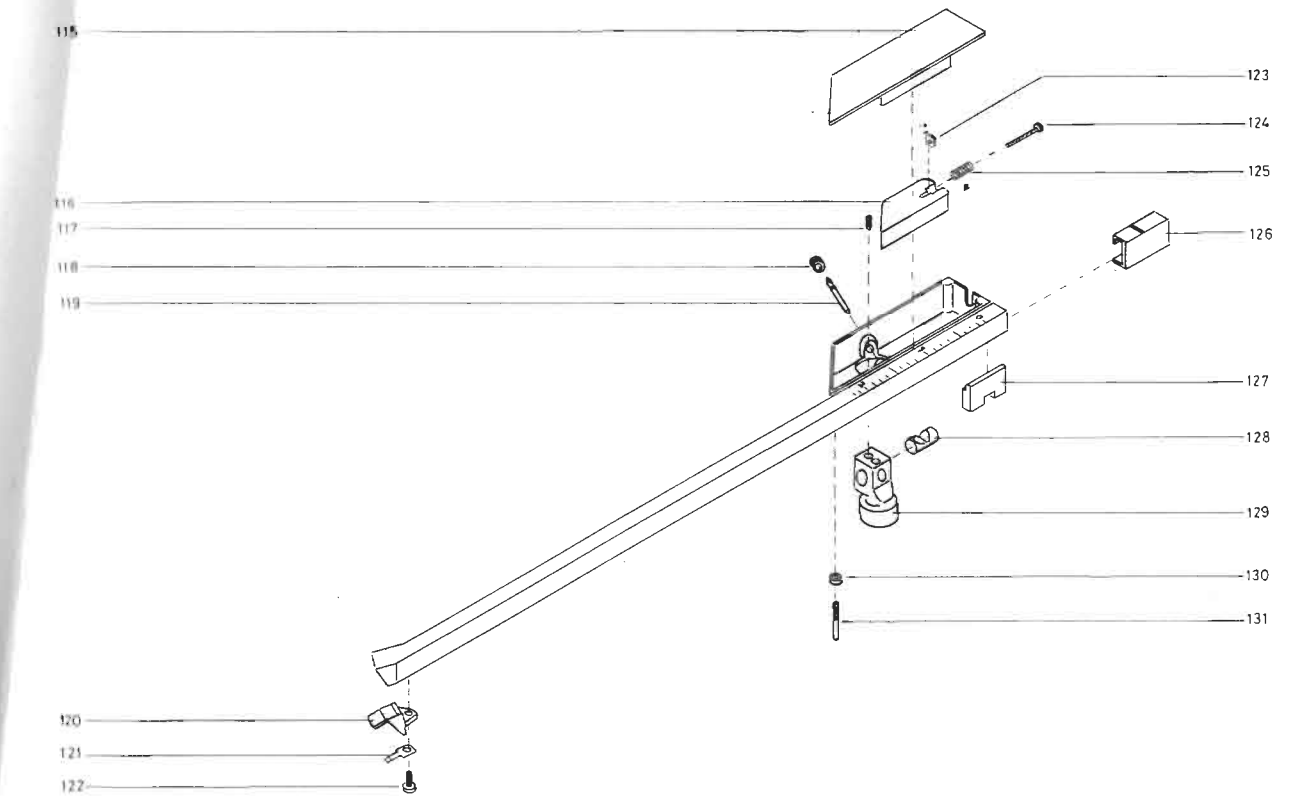
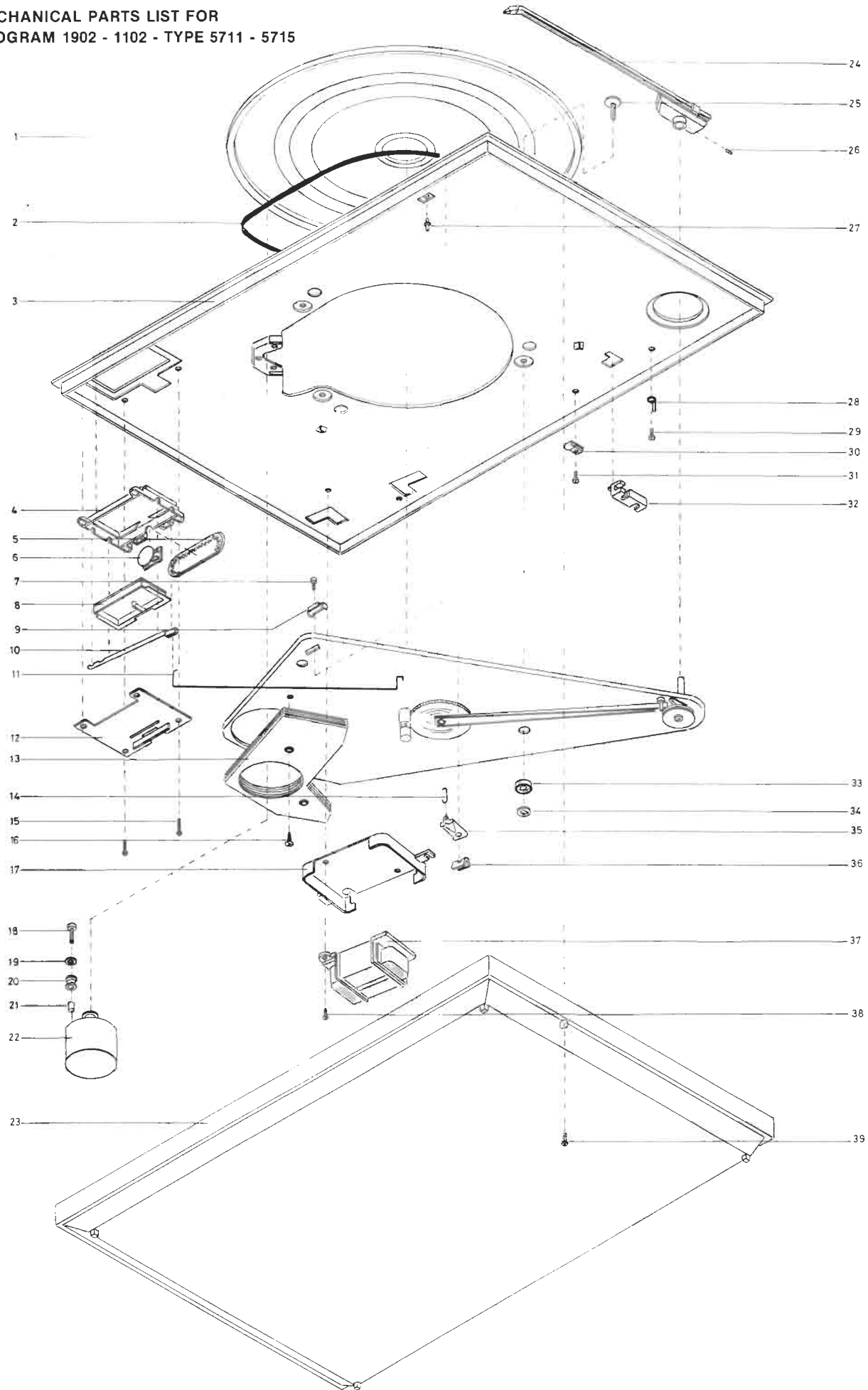
DIODE-LIST

1D1 - 1D4	8300023	1N 4002
		1N 4003
1D5	8300029	ZPD 12 5%
		BZX 79C 12V
		BZX 83C 12V

1F1	6600028	315 mA-T 250V
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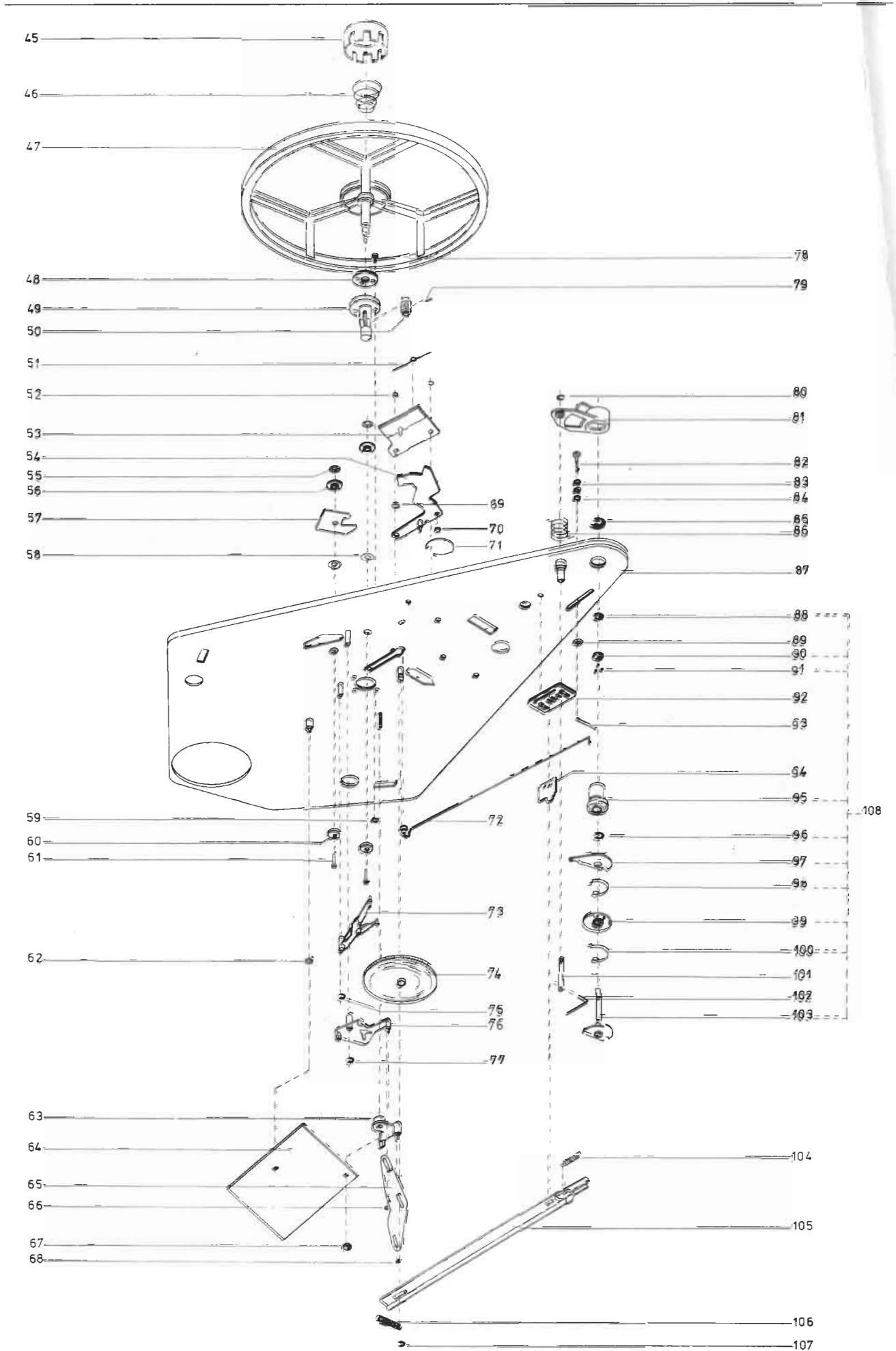
MECHANICAL PARTS LIST FOR
BEOGRAM 1902 - 1102 - TYPE 5711 - 5715



1	2726111	Turntable 1902	20	2938137	Rubber Bushing
	2726113	Turntable 1102	21	2930074	Bushing
2	2732037	Drive belt	22	8400093	Motor
3	3458169	Top plate complete 1902		2722022	Pulley
	3458171	Top plate complete 1102	23	3454172	Bottom plate
	3412261	Cabinet, teak, 1902 - 1102	24	2850084	Pickup arm complete
	3412263	Cabinet, rosewood, 1902 - 1102		8954390	Pickup MMC 3000, 1102
	3412264	Cabinet, oak, 1902 - 1102		8954410	Pickup MMC 4000, 1902
	3412265	Cabinet, white, 1902 - 1102		3302230	Cap for Pickup
	3412266	Cabinet, black, 1902 - 1102	25	2046910	Transport screw
4	3320048	Holder	26	2072707	Threaded pin AM 3 x 6
5	2700020	Belt for fine adjustment	27	3341013	Stopper
6	5390014	Potentiometer	28	7530005	Solder tag
	6273763	Set of wires with socket	29	2038208	Screw AM 3 x 5 DIN 84
7	2042209	Screw AM 4 x 10 DIN 84	30	2515024	Clamp
8	2775575	Square knob	31	2038203	Screw AM 3 x 5 DIN 84
9	2640031	Clamp	32	2515024	Clamp
10	2854042	Gear Lever	33	2938100	Bushing
11	2570051	Switch arm	34	2622228	Washer
12	3152236	Holder	35	2815007	Leaf spring
*13	3342038	Counterweight	36	2640032	Clamp
14	2514028	Hook	37	8013180	Mains transformer
15	2039905	Screw AM 3 x 12 DIN 7985		6273762	Set of wires with socket
16	2015010	Screw 3.5 x 16		5020087	Fuse resistor
17	3172075	Insulating piece	38	2043005	Washer
18	2039905	Screw 3 x 12 DIN 7985	39	2043207	Screw AM 4 x 6 DIN 7985
19	2622272	Washer			

45	3014036	Adaptor	75	2390002	Locking ring
46	2818051	Spring	76	2853056	Release
47	2794072	Flywheel	77	2390002	Locking ring
	2622264	Cover washer	78	2038220	Screw AM 3 x 12 DIN 84
	2620071	Felt washer	79	2361048	Locking pin
48	2905075	Bearing ring	80	2390002	Locking ring
49	3150037	Bearing bushing	81	2623033	Lifting clamp
50	2700023	Gear-Wheel	82	2992073	Pin
51	2819141	Friction spring	83	2622013	Washer
52	2390002	Locking ring	84	2620067	Washer (felt)
53	3014037	Friction plate	85	2938141	Locking ring
54	3014031	Arm positioning guide	86	2812082	Spring
55	2395030	Locking ring	87	3110017	Chassis
56	2938088	Washer		2938129	Transport bushing
57	3014033	Arm positioning guide	88	2390033	Locking ring
58	2622198	Washer	89	2395030	Lock disc
59	2380013	Nut M3	90	2938114	Bushing
60	2803005	Eccentric	91	2917017	Ball
61	2992048	Pin	92	7459014	Contact (silent)
62	2622263	Rubber washer		7530072	Solder tag
63	2853047	Release	93	2810089	Spring
64	8005023	PC unit	94	7459015	Contact (slide valve)
	7220132	Plug 5/4 - contact	95	2938135	Pile bearing
	7220133	Plug 4 - contact	96	2390033	Locking ring
	7220134	Plug 2 - contact	97	2851095	Arm
	7400115	Micro switch	98	2819106	Spring
	7459016	Switch	99	2750018	Clutch disc
65	2851097	Switch arm	100	2819107	Spring
66	2390066	Locking ring	101	2850093	Lifting bar
67	2380016	Nut M4	102	2530326	Bracket
68	2390066	Locking ring	103	2938142	Pile
69	2622136	Washer	104	2810090	Spring
70	3035020	Plastic Foot	105	2852032	Lifting arm
71	2819075	Spring	106	2810082	Spring
72	2850092	Arm	107	2390002	Locking ring
73	2853055	Hammer Complete	108	2938136	Pickup bearing complete
74	3017011	Cam-lifting wheel			

* Not included in Beogram 1102, Type 5715



Bang & Olufsen

115 3162093 Cover
116 3342034 Counterweight
117 2070400 Threaded pin M2 x 3
118 2905071 Pointed bearing
119 2834056 Shaft
120 7200037 Socket with wires
121 2816143 Chassis spring
122 2033007 Screw
123 2380068 Nut

124 2034913 Screw
125 2812072 Spring
126 3190064 Pointer
127 3342033 Counterweight
128 3151137 Holder for shaft
129 3152207 Holder for arm
130 2938096 Bushing
131 2072098 Lifting screw

135 3010007 Stop
136 3164292 Dust cover
137 2819128 Spring
138 3452261 Back part
139 2530312 Bracket
140 2039010 Screw 3 x 6 DIN 7985

141 2380103 Nut
142 2572020 Friction Piece
143 2530328 Bracket
144 2624034 Washer
145 2042946 Screw AM 4 x 10 DIN 963
3164241 Dust cover complete

PARTS NOT SHOWN

6271101 Mains lead with plug
6270182 Pickup lead with plug
3535055 Instruction diagramme
3391463 Outer carton
3391464 Top/bottom insert
3397263 Foam packing
3397264 Lid insert
3917025 Foam for arm 15 x 3.5 x 1 cm