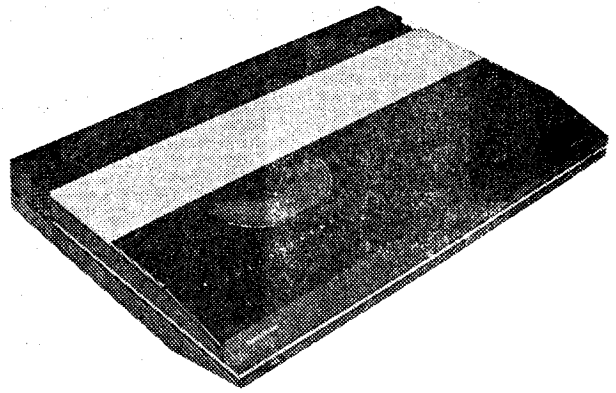


# Bang & Olufsen



## Beogram CDX Type 5121/22/23/25

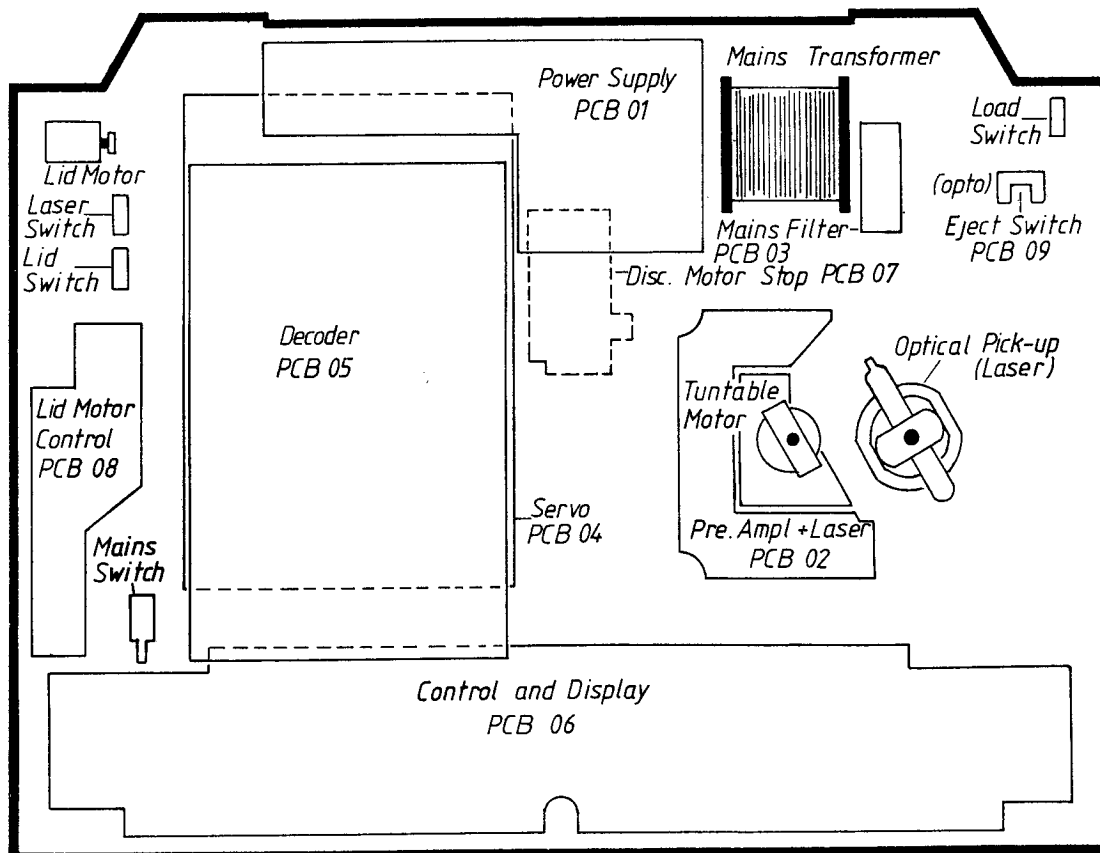
1056

For Service Manuals Contact  
MAURITRON TECHNICAL SERVICES  
8 Cherry Tree Rd, Chinnor  
Oxon OX9 4QY  
Tel:- 01844-351894 Fax:- 01844-352554  
Email:- enquiries@mauritron.co.uk



01 Power Supply .....	page 1-4	06 Control and Display .....	page 1-17
02 Pre. Ampl. & Laser .....	page 1-13	07 Motor Stop .....	page 1-15
03 Mains Filter .....	page 1-4	08 Motor Control .....	page 1-16
04 Servo .....	page 1-5, 1-8	09 Eject Switch .....	page 1-16
05 Decoder .....	page 1-9, 1-12		

BOTTOM WIEV



## CAUTIONS

The light pin is much more sensitive to static charge than a MOS IC. Careless treatment during servicing may reduce life expectancy drastically. For this reason care should be taken that during servicing the potentials of the aids and yourself equal the potential of the mechanism.

The CD-mechanism is provided with self-lubricating bearings and should thus NOT be lubricated.

### Attention:

To prevent adjustments in the mechanism from changing, no screws other than those mentioned should be loosened.

Ensure that the player is not resting on the shaft of the turntable motor or the light pin during repairs and measurements.

## Symbol for Safety Components



When replacing components with this symbol components with identical part numbers are to be used. The new component must be fitted in the same way as the one replaced.

**CLASS 1  
LASER PRODUCT**

For order to make the product work when placed in service position, see page 7 dismantling.

## DIAGRAM EXPLANATION

The respective diagrams are named, e.g. SERVO 1. The cable connections between the diagrams are described by the name of the diagram to which the connection goes, as well as by the socket and pin number (or a designation) on the diagram in question.

## System of co-ordinates

The most closely written diagrams and PCB drawings are provided with a system of co-ordinates.

The position numbers with attached co-ordinate designation can be found at the top of the diagram pages and next to the PCB drawings.

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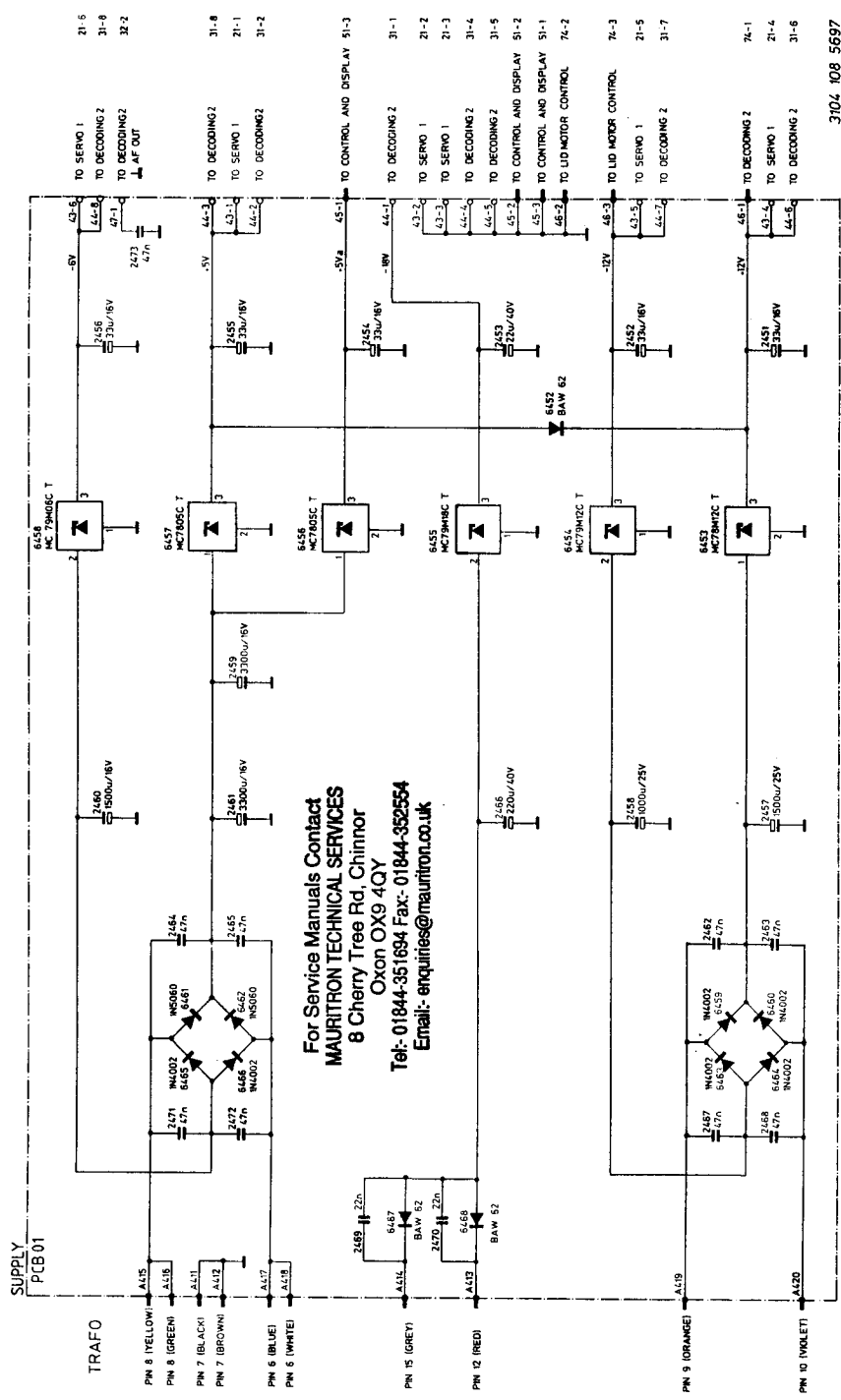
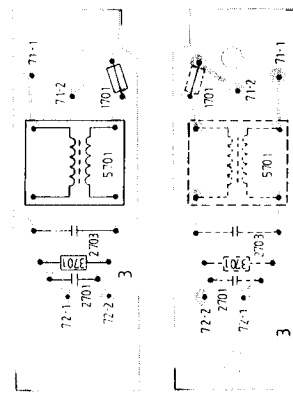
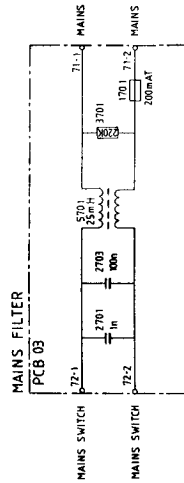


Semi-conductors



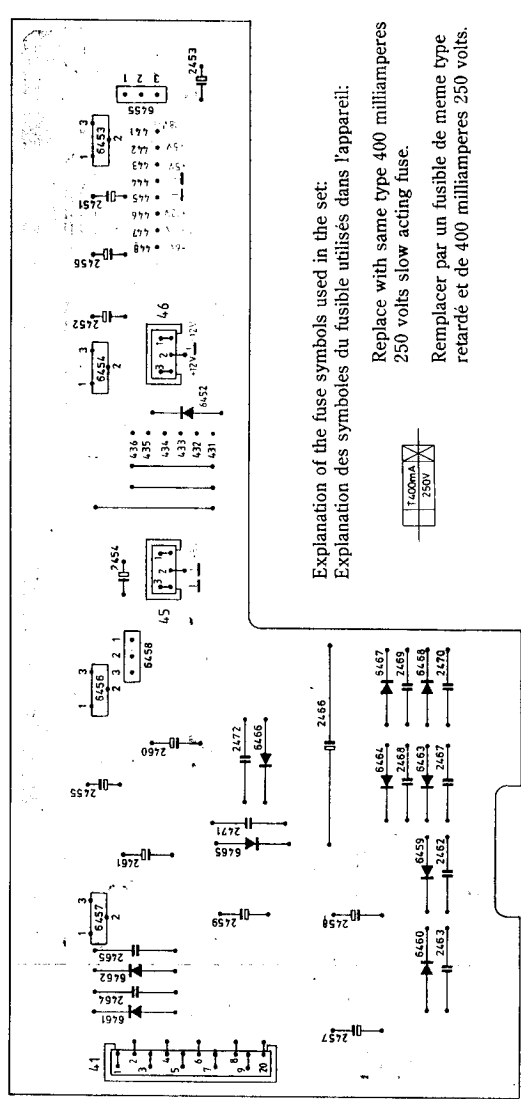
6453	8340049	105	MC78M12C
6454	8340356	105	MC79M12C
6455	8340814	105	MC79M18C
6456	8340065	105	MC7805C
6457			
6458	8340815	105	MC79M064
6452	8300359	209	BAW 62
6459-	8300023	209	1N4002
6460			
6461	8300436	209	1N5060
6462			
6463-	8300023	209	1N4002
6466			
6467	8300359	209	BAW 62
6468			

Diodes



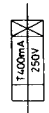
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3104 108 5697



Explanation of the fuse symbols used in the set.  
 Explanation des symboles du fusible utilisés dans l'appareil:

Replace with same type 400 milliampères  
 250 volts slow acting fuse.  
 Remplacer par un fusible de même type  
 retardé et de 400 milliampères 250 volts.



1-5

1-5

Bang & Olufsen

SERVO 1

The schematic diagram for PCB 04 is organized into a grid with vertical labels A through G and horizontal labels 1 through 10. It details the electrical connections for various components, including integrated circuits, resistors, capacitors, and transistors. Key functional blocks include:

- TRACK DETECTOR:** Located in the upper right quadrant, it features a 6208/2101 IC, a 6208/2101 IC, and a 6208/2101 IC, along with several resistors and capacitors.
- FOCUS SERVO:** Located in the lower right quadrant, it includes a 6208/2101 IC, a 6208/2101 IC, and a 6208/2101 IC, with associated passive components.
- TURNTABLE MOTOR AMPLIFIER:** Located in the lower left quadrant, it features a 6208/2101 IC, a 6208/2101 IC, and a 6208/2101 IC, with associated passive components.
- CONTROL AND DISPLAY:** Located in the center, it includes a CPU, ADDRESS REGISTER, CONTROL TIMING, and SERVO μP, along with various I/O ports and registers.

Component values and part numbers are specified throughout the diagram. Power supply rails for +5V, +12V, and -12V are indicated. Connections to other PCBs (e.g., PCB 41-1, PCB 42-1, PCB 43-1, PCB 44-1, PCB 45-1, PCB 46-1, PCB 47-1, PCB 48-1, PCB 49-1, PCB 50-1, PCB 51-1, PCB 52-1, PCB 53-1, PCB 54-1, PCB 55-1, PCB 56-1, PCB 57-1, PCB 58-1, PCB 59-1, PCB 60-1) are shown at the top and bottom edges.

ALL CAPACITORS AND RESISTORS ARE CHIP-COMPONENTS UNLESS SPECIFIED OTHERWISE  
TO SUPPLY PCB 43-6 MEANS CONNECTED TO THE SUPPLY PCB CONNECTOR 43 PORT 6

35480 E7/8

SERVO 8005165 - PCB4

1201	C3	2208	H2	2228	E2	2237	M	2249	G4	2256	H3	2266	G3	3305	B4	3310	B4	3318	B4	3318	B4	3318	C4	3320	E3
2203	B4	2211	H3	2210	E2	2219	M	2240	M	2251	D4	2267	C4	3307	D4	3312	B4	3317	B4	3317	B4	3317	C4	3320	E3
2205	B2	2214	H3	2236	E2	2244	M	2256	G4	2264	D4	2268	G4	3308	B4	3314	B4	3320	B4	3320	B4	3320	E3	3320	E3
2207	E3	2215	H3	2238	E2	2246	M	2258	G4	2266	D4	2270	G4	3310	B4	3316	B4	3322	B4	3322	B4	3322	E3	3322	E3
3221	F3	3220	E3	3240	E2	3251	H2	3263	H2	3271	H2	3279	H2	3287	H2	3295	H2	3303	H2	3311	H2	3319	H2	3327	H2
3223	F3	3232	E2	3243	E3	3252	H2	3265	H2	3274	H2	3282	H2	3290	H2	3298	H2	3306	H2	3314	H2	3322	H2	3330	H2
3226	E3	3234	C3	3246	E2	3254	E2	3268	E2	3276	E2	3284	E2	3292	E2	3300	E2	3308	E2	3316	E2	3324	E2	3332	E2
3228	D4	3305	D4	3312	G4	3320	G4	3341	C5	3350	H3	3357	G4	3363	G4	3372	H4	3380	H4	3388	H4	3396	H4	3404	G3
3229	D3	3306	D4	3313	F4	3321	H4	3342	C5	3351	H3	3358	G4	3364	G4	3373	H4	3381	H4	3389	H4	3397	H4	3405	G3
3230	D4	3307	E4	3315	E3	3323	H4	3344	C5	3353	G3	3360	G4	3366	G4	3375	H4	3383	H4	3391	H4	3399	H4	3407	G3
3231	C4	3311	G4	3340	C5	3349	C5	3356	G3	3362	A4	3368	A4	3374	H4	3383	H4	3391	H4	3399	H4	3407	G3	3415	G2
3232	G2	3394	E4	3399	D4	3407	H3	3413	H4	3421	H2	3429	H2	3437	H2	3445	H2	3453	H2	3461	H2	3469	H2	3477	H2
3233	D4	3395	E4	3399	D4	3407	H3	3413	H4	3421	H2	3429	H2	3437	H2	3445	H2	3453	H2	3461	H2	3469	H2	3477	H2
3234	D4	3396	E4	3399	D4	3407	H3	3413	H4	3421	H2	3429	H2	3437	H2	3445	H2	3453	H2	3461	H2	3469	H2	3477	H2
3235	D4	3397	F3	3395	E4	3399	D4	3407	H3	3413	H4	3421	H2	3429	H2	3437	H2	3445	H2	3453	H2	3461	H2	3469	H2
3236	D4	3398	E4	3396	E4	3399	D4	3407	H3	3413	H4	3421	H2	3429	H2	3437	H2	3445	H2	3453	H2	3461	H2	3469	H2
3237	E3	3247	E3	3257	G4	3267	E3	3277	E3	3287	E3	3297	E3	3307	E3	3317	E3	3327	E3	3337	E3	3347	E3	3357	E3
3238	E3	3247	E3	3257	G4	3267	E3	3277	E3	3287	E3	3297	E3	3307	E3	3317	E3	3327	E3	3337	E3	3347	E3	3357	E3
3239	G3	3249	G3	3259	G4	3269	E3	3279	E3	3289	E3	3299	E3	3309	E3	3319	E3	3329	E3	3339	E3	3349	E3	3359	E3
3240	G3	3249	G3	3259	G4	3269	E3	3279	E3	3289	E3	3299	E3	3309	E3	3319	E3	3329	E3	3339	E3	3349	E3	3359	E3
3241	G3	3249	G3	3259	G4	3269	E3	3279	E3	3289	E3	3299	E3	3309	E3	3319	E3	3329	E3	3339	E3	3349	E3	3359	E3
3242	E3	3250	G4	3260	E3	3270	E3	3280	E3	3290	E3	3300	E3	3310	E3	3320	E3	3330	E3	3340	E3	3350	E3	3360	E3
3243	E3	3250	G4	3260	E3	3270	E3	3280	E3	3290	E3	3300	E3	3310	E3	3320	E3	3330	E3	3340	E3	3350	E3	3360	E3

Semi-conductors

17	20	32	42	102	103	136	209	218

Transistors

6230	8320285	20	BC 549C	6239	8320108	20	BC 548B
6231*	8320239	32	BD 135	6240*	8320240	32	BD 136
6232*	8320240	32	BD 136	6241*	8320239	32	BD 135
6233	8320378	17	BD 635	6242	8320104	20	BC 558B
6234	8320632	17	BC 636	6243	8320108	20	BC 548B
6236	8320108	20	BC 548B	6244	8320104	20	BC 558B
6238	8320089	42	BF 494	6213	8340346	136	HEF 4070B
6201A	8340843	136	MAB 8440	6214	8340157	102	LM 324
6202	8340782	136	HEF 4094B	6215			
6205	8340317	102	LM 339	6216	8340301	101	TCA 240
6208	8340048	103	MC 1458	6217	8340048	103	MC 1458
6209				6218	8340141	103	µA 741
6211A	8340340	102	HEF 4053	6253	8300359	209	BAW 62
6212	8340157	102	LM324	6259			
6247-	8300359	209	BAW 62	6260	8300489	218	BAT 85
6250	8300169	209	BZX79/CSV1	6261	8300354	209	BZV46/2V0
6251	8300438	209	BZX79/C2V4	6262			
6252							

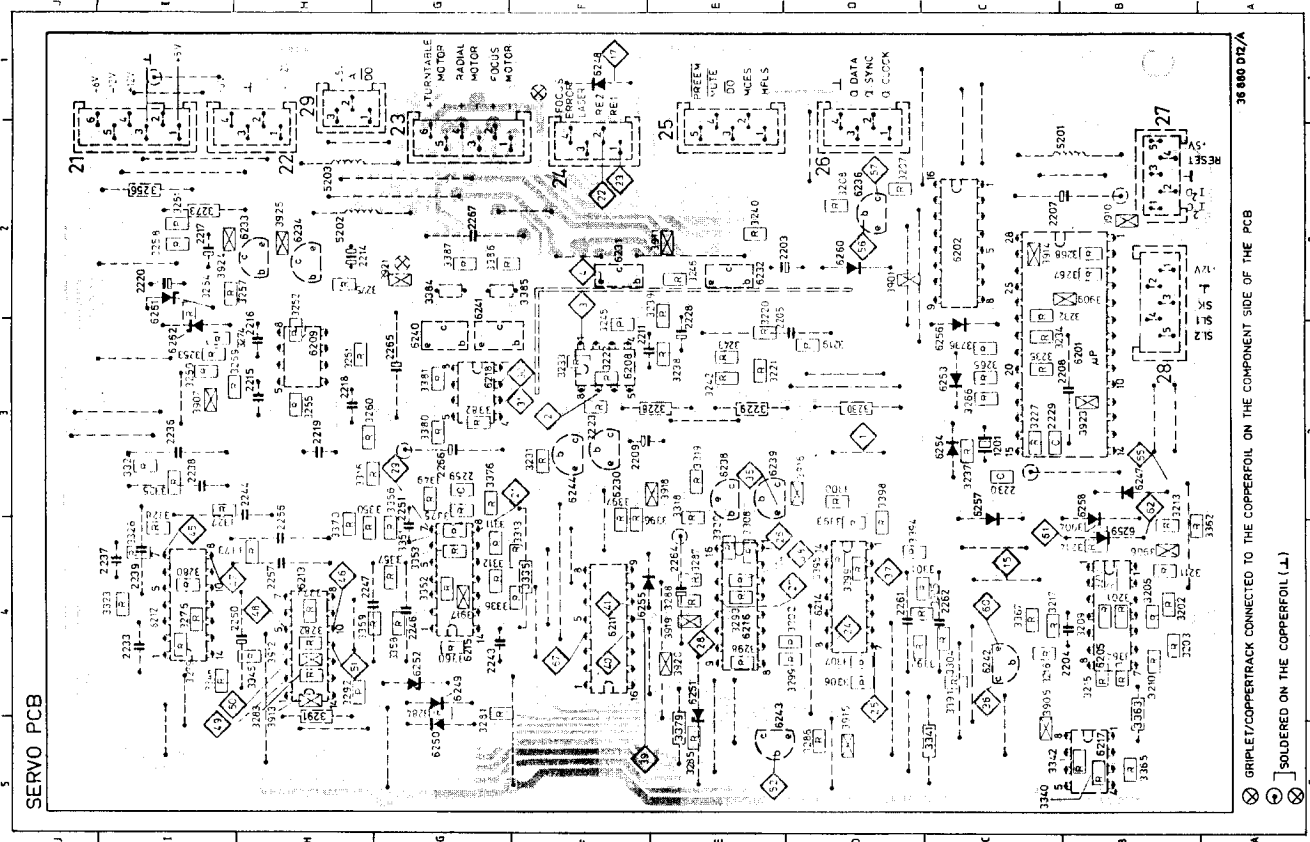
IC's

6201A	8340843	136	MAB 8440
6202	8340782	136	HEF 4094B
6205	8340317	102	LM 339
6208	8340048	103	MC 1458
6209			
6211A	8340340	102	HEF 4053
6212	8340157	102	LM324
6247-	8300359	209	BAW 62
6250	8300169	209	BZX79/CSV1
6251	8300438	209	BZX79/C2V4
6252			

Diodes

6253	8300359	209	BAW 62
6259			
6260	8300489	218	BAT 85
6261	8300354	209	BZV46/2V0
6262			

\* Specially selected or adapted sample.



SERVO PCB

36 880 DT/A

⊗ GRIPLET/COPPERTRACK CONNECTED TO THE COPPERFOIL ON THE COMPONENT SIDE OF THE PCB

⊙ SOLDERED ON THE COPPERFOIL (L1)

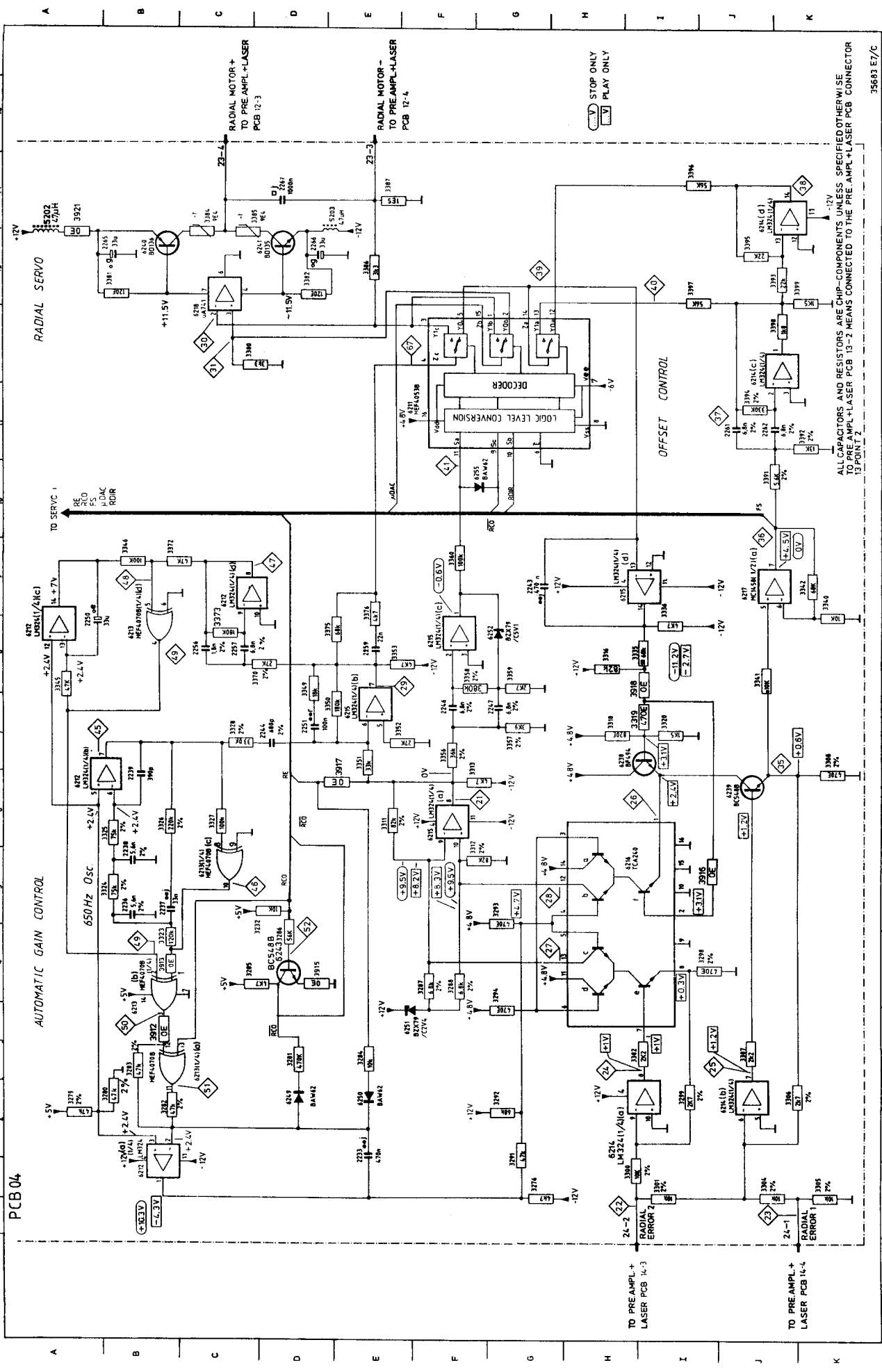
SERVO 8005165 - PCB4

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SERVO 2

3901 A13



TO SERVO 1  
 RC  
 FS  
 DAC  
 ROIR

STOP ONLY  
 PLAY ONLY

RADIAL MOTOR +  
 TO PRE-AMPL+ LASER  
 PCB 12-3

RADIAL MOTOR -  
 TO PRE-AMPL+ LASER  
 PCB 12-4

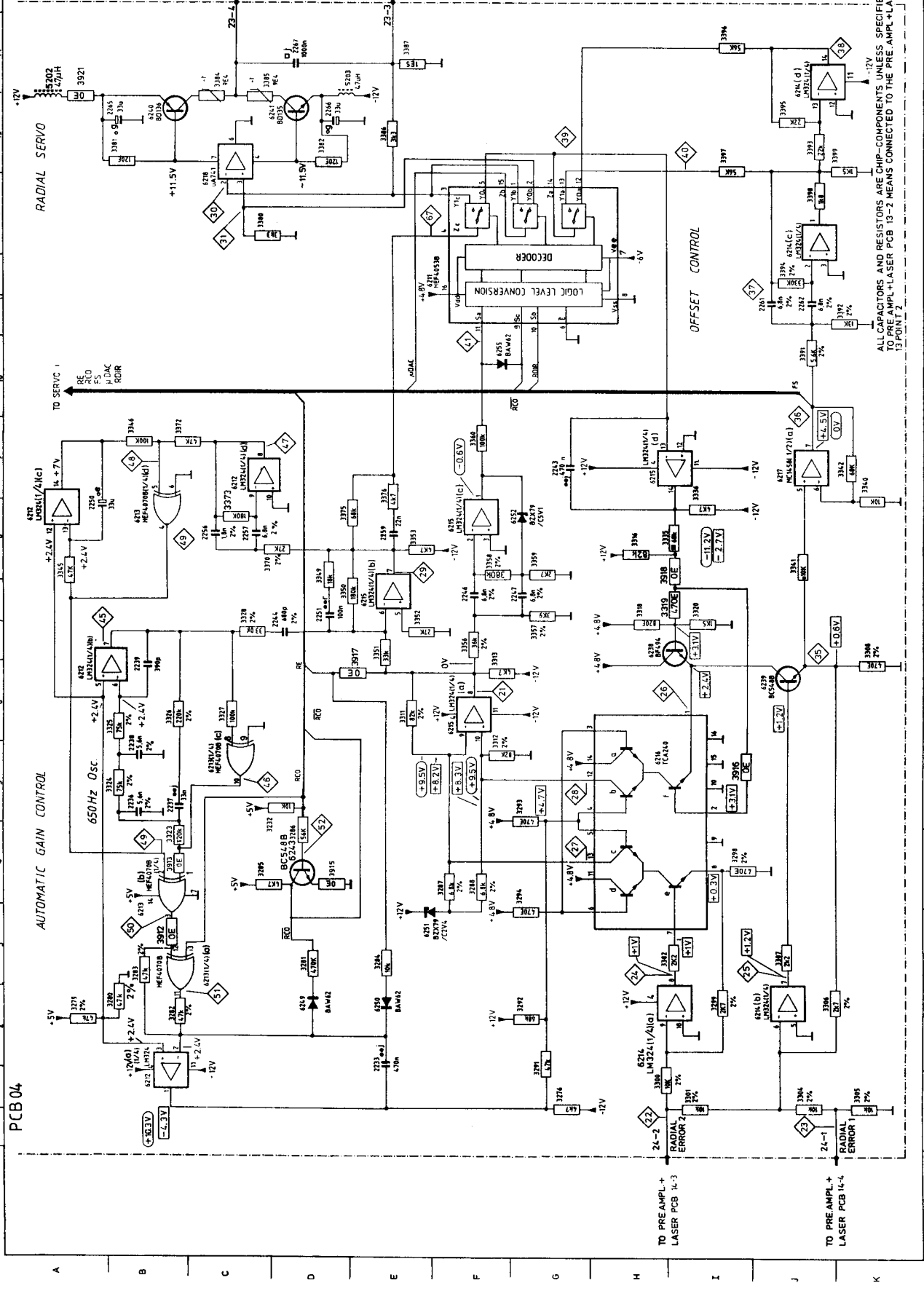
TO PRE-AMPL+ LASER PCB 14-3

TO PRE-AMPL+ LASER PCB 14-4

TO PRE-AMPL+ LASER PCB 13-2

ALL CAPACITORS AND RESISTORS ARE CHIP-COMPONENTS UNLESS SPECIFIED OTHERWISE TO PRE-AMPL+ LASER PCB 13-2 MEANS CONNECTED TO THE PRE-AMPL+ LASER PCB CONNECTOR 13 POINT 2

35683 E7/C





## DECODER 8005166 - PCB5

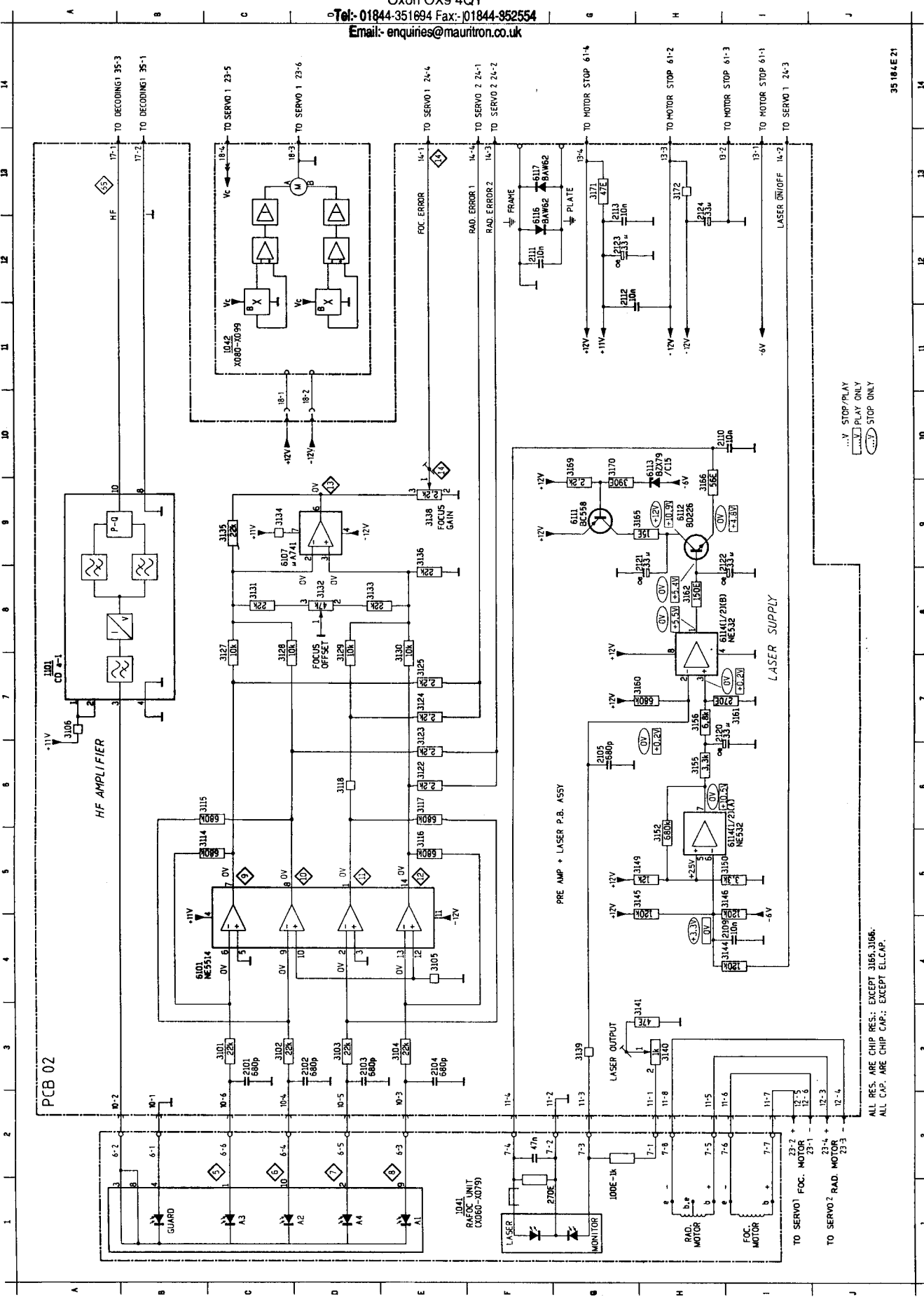
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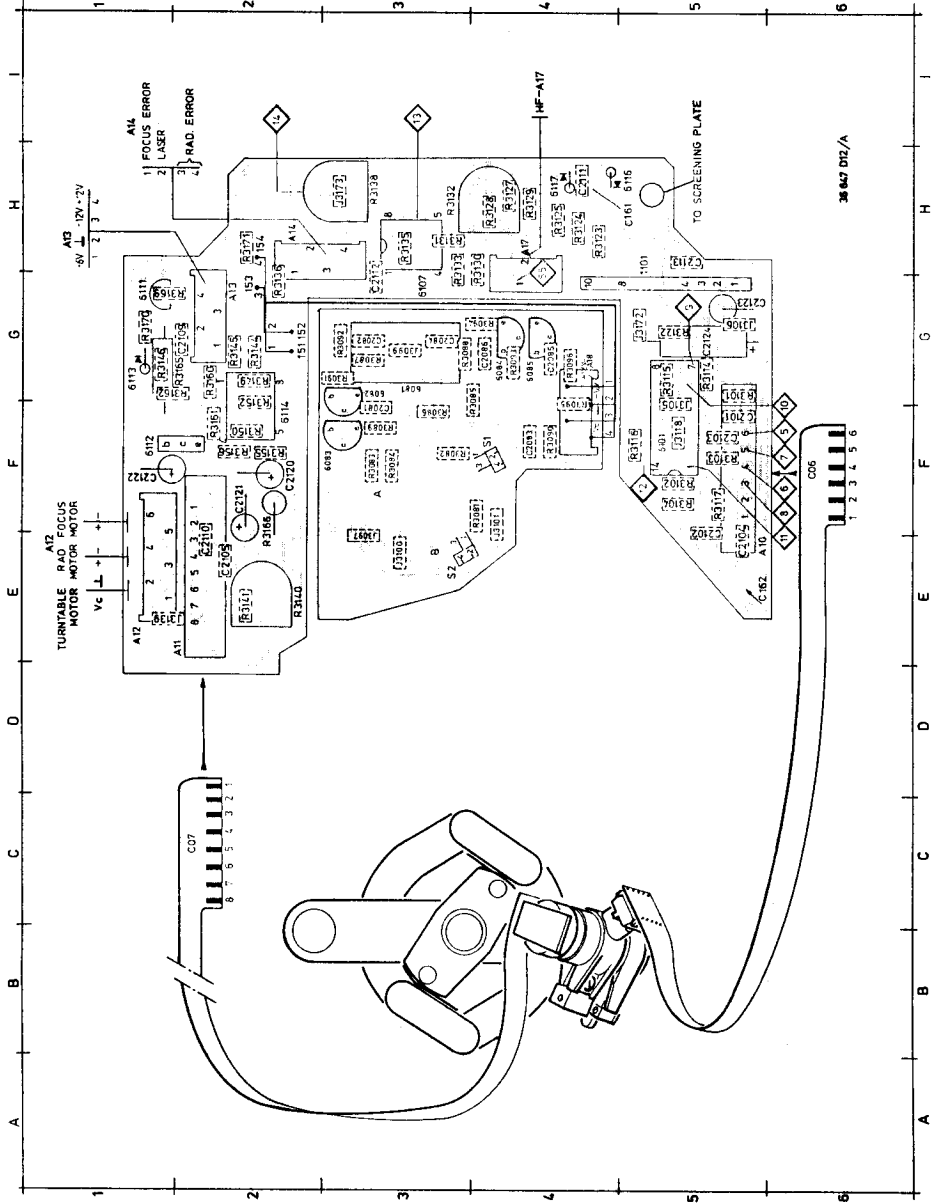
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- 2101 C 3 2105 G 6
- 2102 D 3 2109 I 4
- 2103 E 3 2110 H 0
- 3101 C 3 3105 E 4
- 3102 C 3 3106 A 7
- 3103 D 3 3108 B 5
- 3104 E 3 3115 G 6
- 3105 E 5 3123 E 7
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- 3108 D 6 3127 C 8
- 3109 E 8 3134 C 9
- 3110 E 8 3135 C 9
- 3111 E 8 3136 E 9
- 3112 E 8 3138 E 9
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- 3119 E 8 3148 H 3
- 3120 E 8 3149 G 5
- 3121 E 8 3150 I 5
- 3122 E 8 3152 H 6
- 3123 E 8 3156 H 7
- 3124 E 8 3160 G 7
- 3125 E 8 3161 I 7
- 3126 E 8 3162 H 8
- 3127 C 8 3165 G 9
- 3128 C 8 3166 H 9
- 3129 C 8 3167 H 9
- 3130 C 8 3168 I 9
- 3131 C 8 3169 G 9
- 3132 C 8 3170 G 9
- 3133 C 8 3171 G 9
- 3134 C 8 3172 H 3
- 3135 C 8 3173 H 3
- 3136 E 9 3174 H 3
- 3137 E 9 3175 H 3
- 3138 E 9 3176 H 3
- 3139 E 9 3177 H 3
- 3140 H 3 3178 H 3
- 3141 C 3 3179 H 3
- 3142 I 4 3180 H 3
- 3143 G 5 3181 H 3
- 3144 I 4 3182 H 3
- 3145 G 5 3183 H 3
- 3146 H 3 3184 H 3
- 3147 H 3 3185 H 3
- 3148 H 3 3186 H 3
- 3149 G 5 3187 H 3
- 3150 I 5 3188 H 3
- 3151 I 5 3189 H 3
- 3152 H 6 3190 H 3
- 3153 H 6 3191 H 3
- 3154 H 6 3192 H 3
- 3155 H 6 3193 H 3
- 3156 H 7 3194 H 3
- 3157 H 7 3195 H 3
- 3158 H 7 3196 H 3
- 3159 H 7 3197 H 3
- 3160 G 7 3198 H 3
- 3161 I 7 3199 H 3
- 3162 H 8 3200 H 3
- 3163 H 8 3201 H 3
- 3164 H 8 3202 H 3
- 3165 G 9 3203 H 3
- 3166 H 9 3204 H 3
- 3167 H 9 3205 H 3
- 3168 I 9 3206 H 3
- 3169 G 9 3207 H 3
- 3170 G 9 3208 H 3
- 3171 G 9 3209 H 3
- 3172 H 3 3210 H 3
- 3173 H 3 3211 H 3
- 3174 H 3 3212 H 3
- 3175 H 3 3213 H 3
- 3176 H 3 3214 H 3
- 3177 H 3 3215 H 3
- 3178 H 3 3216 H 3
- 3179 H 3 3217 H 3
- 3180 H 3 3218 H 3
- 3181 H 3 3219 H 3
- 3182 H 3 3220 H 3
- 3183 H 3 3221 H 3
- 3184 H 3 3222 H 3
- 3185 H 3 3223 H 3
- 3186 H 3 3224 H 3
- 3187 H 3 3225 H 3
- 3188 H 3 3226 H 3
- 3189 H 3 3227 H 3
- 3190 H 3 3228 H 3



ALL RES. ARE CHIP RES.: EXCEPT 3165, 3166.  
ALL CAP. ARE CHIP CAP.: EXCEPT EL.CAP.

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Semi-conductors

17	20	32	102

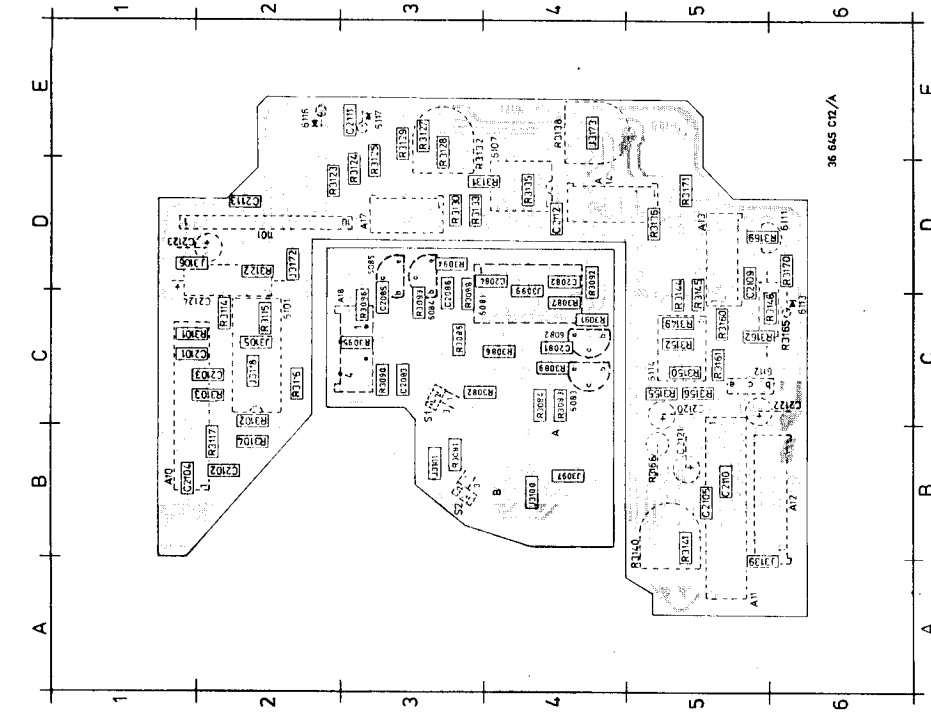
1101	G5	3089	F3	3132	H4	6085	G4
2083	G3	3090	F4	3133	H3	6101	G5
2084	F4	3092	G3	3138	H2	6111	G1
	F3	3095	G4	3138	H3	6112	F1
	G4	3094	F2	3139	E2	6113	G1
2085	G4	3096	G4	3140	E2	6116	H5
2101	F5	3098	G4	3141	E2	6116	H4
2102	F5	3099	G3	3144	G2	6117	
2103	F5	3100	F5	3145	G2		
2105	G2	3102	F5	3149	G2		
2109	G2	3103	F5	3150	F2		
2111	H4	3105	G5	3155	F2		
	G5	3106	G5	3156	F2		
2113	G5	3114	G5	3160	G2		
2120	F2	3116	F5	3162	G2		
2122	F1	3117	F5	3165	G1		
	G5	3118	F5	3166	F2		
2123	G5	3119	F5	3170	G1		
3084	G5	3120	H4	3171	H2		
3085	F3	3125	H4	3172	G5		
3084	F3	3127	H4	3173	H3		
3086	F3	3128	H4	6082	G3		
3087	G3	3130	H4	6083	G4		
3088	G3	3131	H4	6084	G4		

IC's

6082	8320378	17	BC 635
6083	8320632	17	BC 636
6084	8320378	17	BC 635
6085	8320632	17	BC 636
6111	8320104	20	BC 558
6112	8320296	32	BD 226
6081	8340157	102	LM 324

Diodes

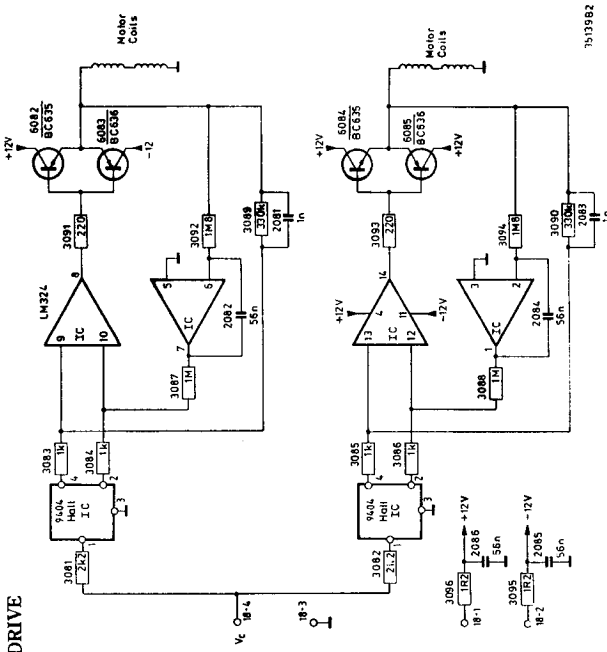
6101	8340813	136	NE 5514
6107	8340141	103	μA 741
6114	8340313	103	NE 532N
9404	3351000		Hall IC
6113	8300313	209	BZX79/C15
6116	8300359	209	BAW 62
6117			



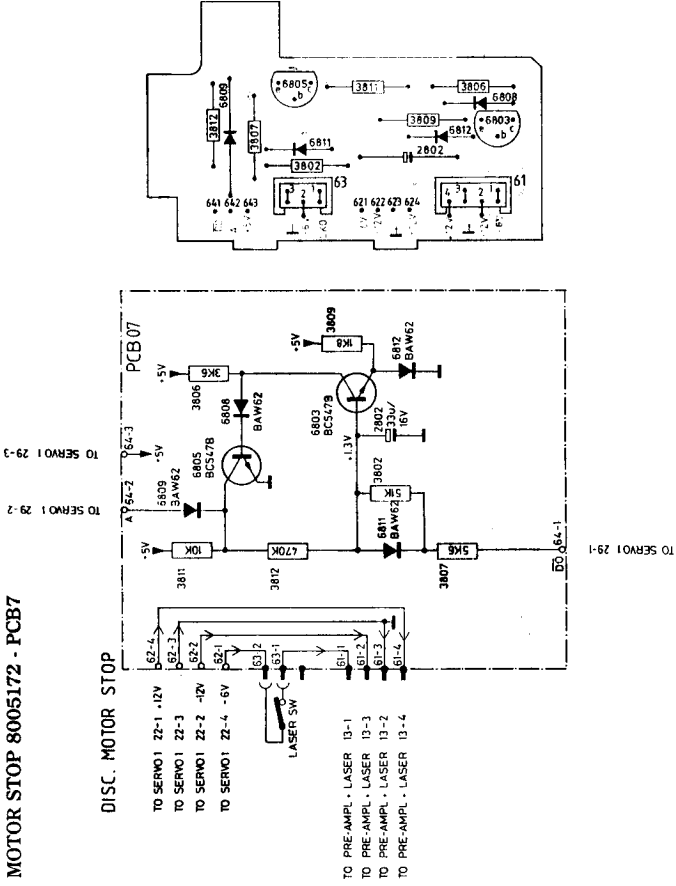
103	136	209

1101	D2	C4	3089	C3	3132	E3	6085	G2
2083	C3	C4	3090	E3	3133	D4	6101	G5
2084	C3	C3	3092	D5	3138	D5	6111	D6
	C3	C3	3095	E4	3138	D5	6112	D6
2085	C3	C3	3094	D5	3139	D5	6113	C6
2101	C1	C1	3096	D5	3141	D5	6116	C6
2102	E1	E1	3098	D4	3144	D5	6116	C6
2103	E1	E1	3099	D4	3144	D5	6117	E3
2105	C5	C5	3102	C2	3149	C5	6085	C6
2109	D5	D5	3103	C1	3150	C5	6101	G5
2111	D2	D2	3105	C2	3155	C5	6111	D6
	D4	D4	3106	D1	3156	C5	6112	D6
2113	C1	C1	3114	D1	3160	C5	6113	C6
2120	D1	D1	3116	D2	3162	C5	6116	C6
2122	D1	D1	3117	D2	3165	C5	6116	C6
	D1	D1	3118	D1	3166	D5	6117	E3
2123	D1	D1	3166	D2	3170	D5	6085	C6
3084	C4	C4	3127	D2	3171	D5	6101	G5
3086	C4	C4	3128	D2	3172	D5	6111	D6
3087	C4	C4	3130	D2	3173	D5	6112	D6
3088	C4	C4	3131	D2	3174	D5	6113	C6

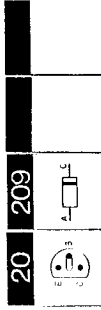
DISC MOTOR DRIVE



MOTOR STOP 8005172 - PCB7



Semi-conductors



Transistors

6803	8320097 20	BC 547C
6805		

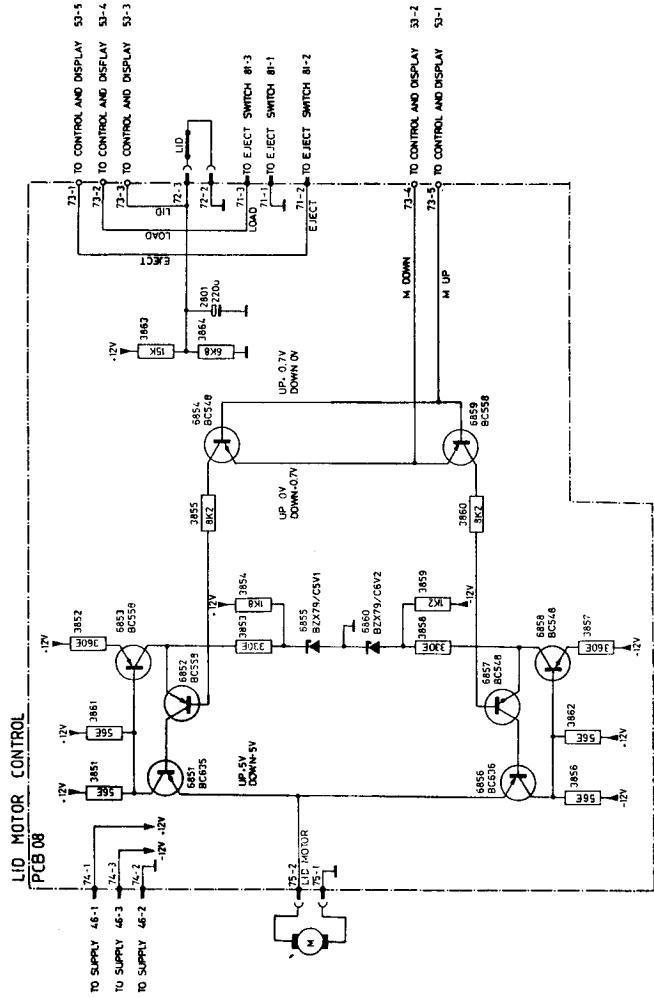
Diodes

6808	8300359 209	BAW 62
6809		
6811	8300359 209	BAW 62
6812		

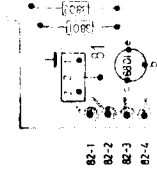
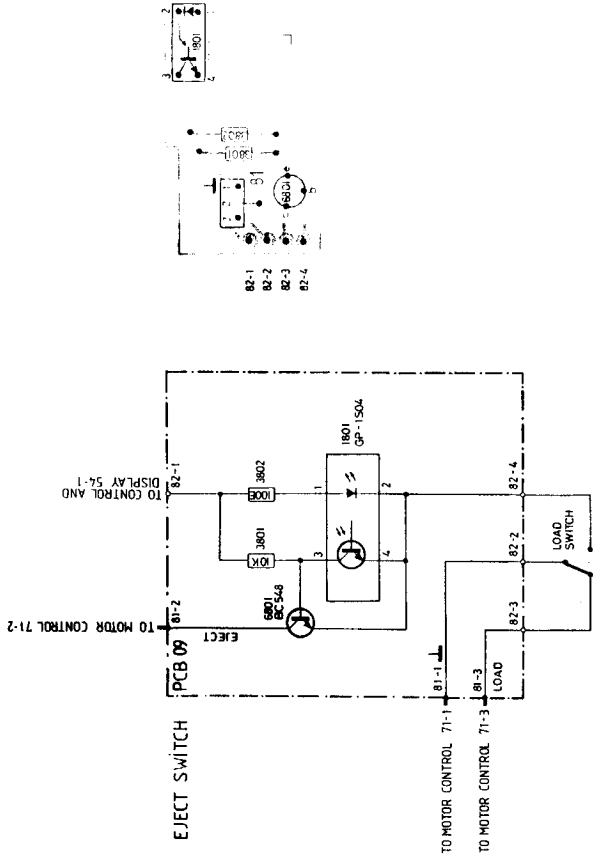
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MOTOR CONTROL 8005170 - PCB8



EJECT SWITCH 8005174 - PCB9



Transistors

6801	8320108 20	BC 548B
------	------------	---------

Opto.

1801	8330156	GP-1S04
------	---------	---------

Switch survey

When the top lid is closed, the switches are in the following positions:

- LOAD is off
- LASER is on
- LID is on
- EJECT pin 12 of IC6078 is high

When the button EJECT is pressed, the following things happen:

- LOAD goes on, then EJECT pin 12 of IC6078 goes low as long as the button is pressed. As the lid opens, LASER goes off, and when the lid is in its upper position, LID goes off.

Semi-conductors



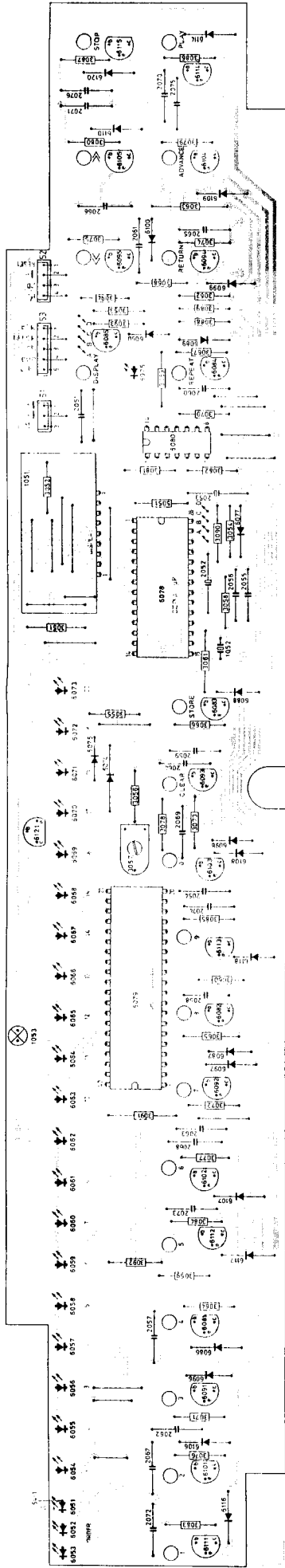
Transistors

6851	8320378 17	BC 635	6856	8320632 17	BC 636
6852	8320104 20	BC 558B	6857	8320108 20	BC 548B
6853			6858		
6854	8320108 20	BC 548B	6859	8320104 20	BC 558B
6855	8300169 209	BZK79/CSV1	6850	8300201 209	BZK79/C6V2

Diodes



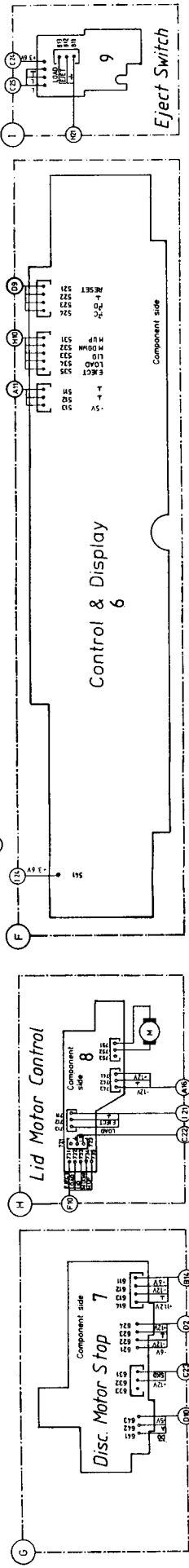
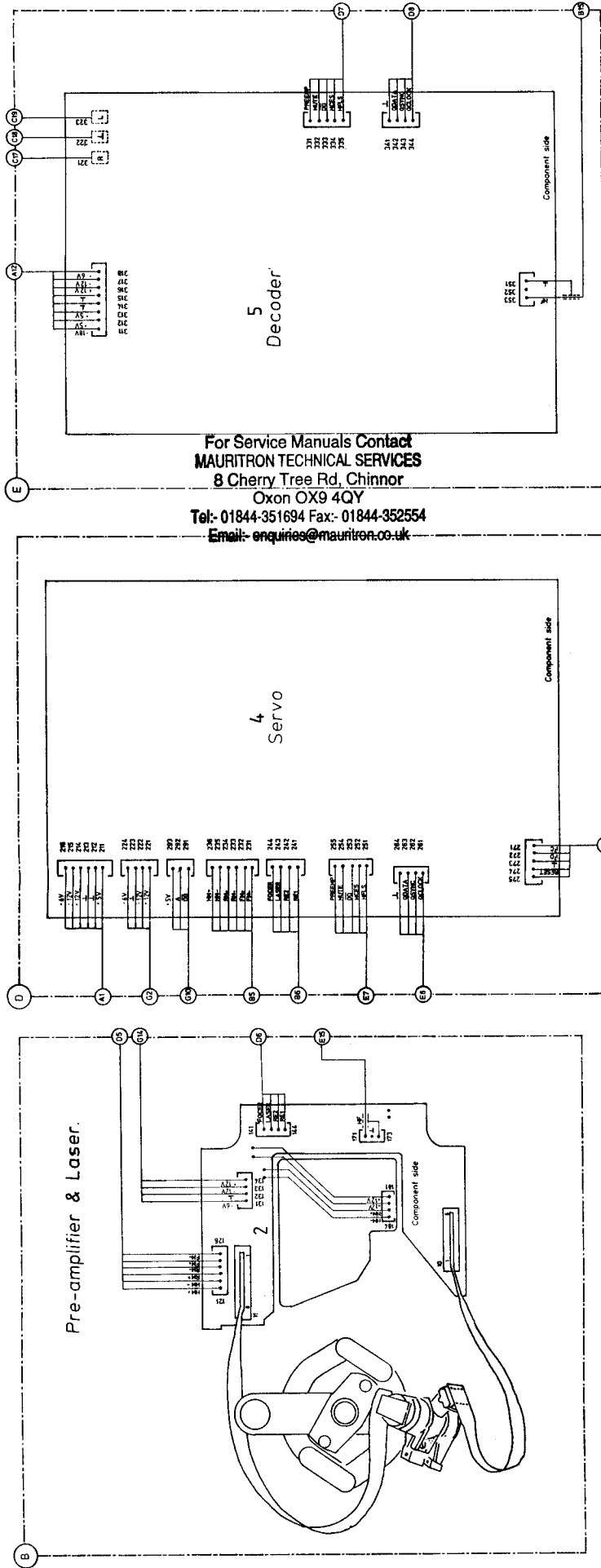
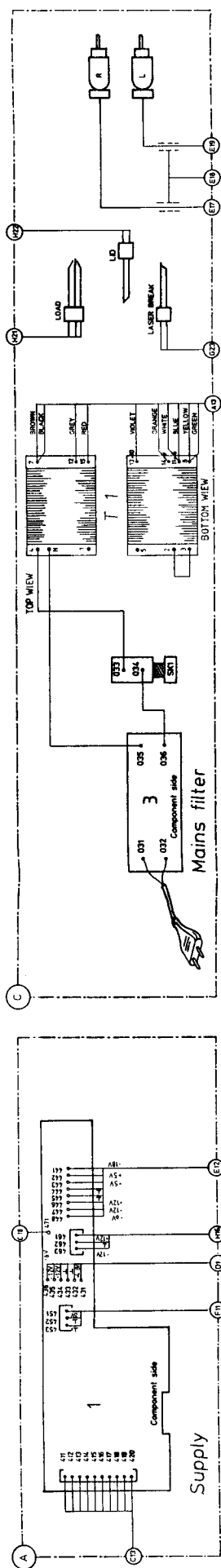
CONTROL AND DISPLAY 8005167 - PCB6



Semi-conductors

	20	42	124	136	209	230	
Transistors	6081-	8320281 42	BF 199				6111 8320281 42 BF 199
	6085						6115
	6091-	8320281 42	BF 199				6121 8320316 20 BC 327
	6095						
	6101	8320281 42	BF 199				
IC's	6105						
	6078A	8340844 136	MAB 8440				6080Δ 8340816 136 HEF 4071 BP
	6079A	8340467 124	MM 5450N				
	6051-	8330143 30	Red				6086- 8300359 209 BAW 62
	6053						6090
Diodes	6054-	8330144 230	Green				6096- 8300359 209 BAW 62
	6073						6100
	6074	8300023 209	1N4002				6106- 8300359 209 BAW 62
	6075						6110
	6076	8330143 230	Reed				6116- 8300359 209 BAW 62
Display	6077	8300359 209	BAW 62				6120
	1051	8330146	NSM 4000A				

WIRING DIAGRAM

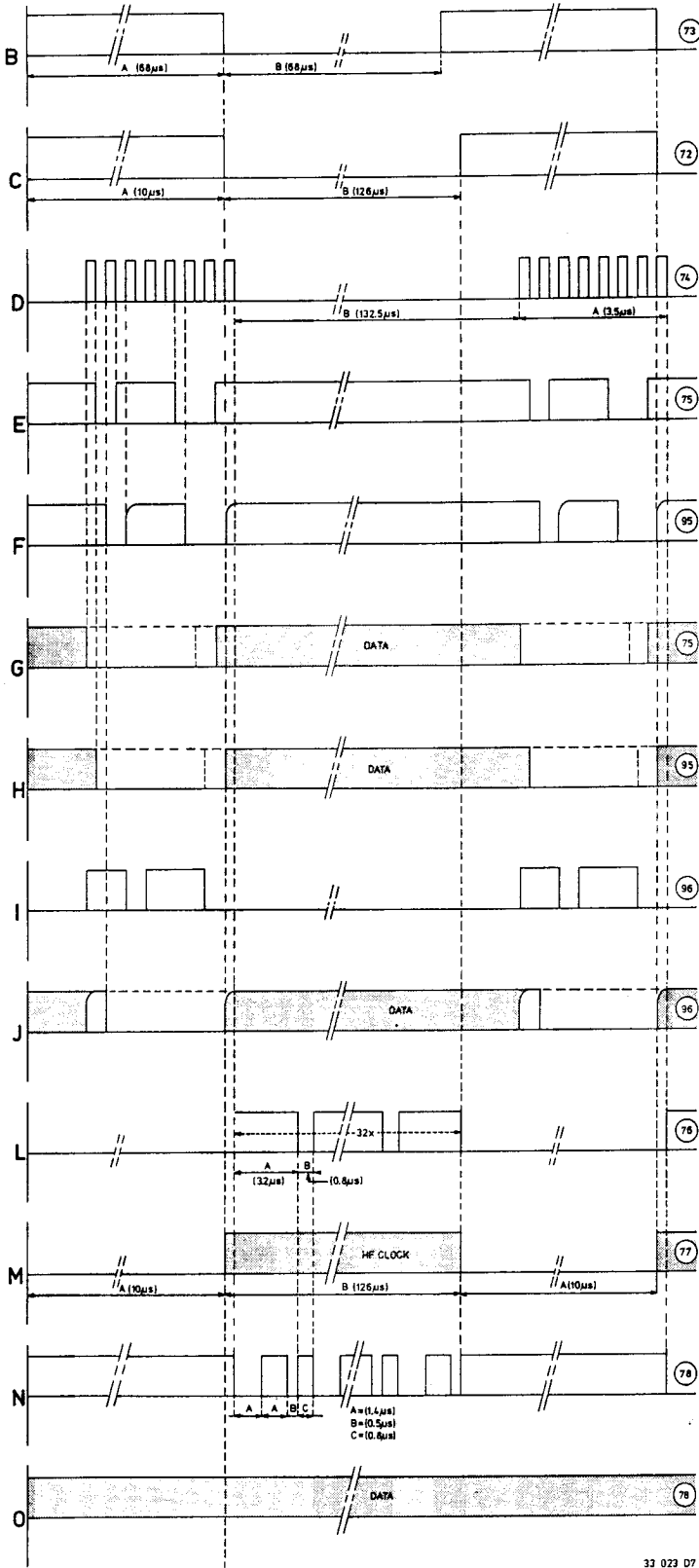


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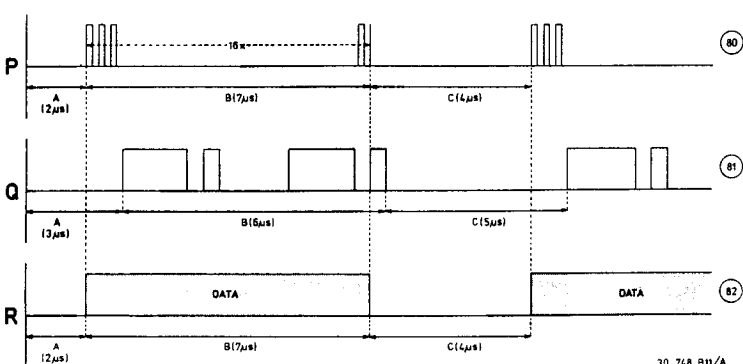
DECODING

Test Point	See	Position	Amplitude	f	Time base
71	A	pause/play	0-5 V	4,32 MHz	
72	C	pause/play	0-5 V		A = 10* $\mu$ s B = 126 $\mu$ s
73	B	pause/play*	0-5 V	7,35 KHz	A = 68 $\mu$ s B = 68 $\mu$ s
74	D	pause/play	5-0 V		A = 3,5 $\mu$ s B = 132,5 $\mu$ s
75	E	pause	5-0 V		A = 3,5 $\mu$ s B = 132,5 $\mu$ s
75	G	play	0-5 V	DATA	
76	L	pause/play	0-5 V		A = 3,2 $\mu$ s B = 0,8 $\mu$ s
77	M	pause/play	0-5 V		A = 10 $\mu$ s B = 126 $\mu$ s
78	N	pause	0-5 V		A = 1,4 $\mu$ s B = 0,5 $\mu$ s C = 0,8 $\mu$ s
78	O	play	5 V	DATA	
79	K	pause/play	0-5 V		A = 1,5 $\mu$ s B = 134,5 $\mu$ s
80	P	pause/play	0-5 V		A = 2 $\mu$ s B = 7 $\mu$ s C = 4 $\mu$ s
81	Q	pause/play	0-5 V		A = 3 $\mu$ s B = 6 $\mu$ s C = 5 $\mu$ s
81	R	play	0-5 V		A = 2 $\mu$ s B = 7 $\mu$ s C = 4 $\mu$ s
82		pause	5 V	DC	
82	S	play with Drop-out test record	0-5 V		
84	T	pause/play	0-5 V		A = 0,5 $\mu$ s B = 22,5 $\mu$ s
85	U	pause/play	0-5 V		A = 2 $\mu$ s B = 7,5 $\mu$ s
86	V	pause/play	0-5 V		A = 4 $\mu$ s B = 7,2 $\mu$ s
86	W	pause/play	0-5 V		DATA
87	V	pause/play	5 V		A = 4 $\mu$ s B = 7,2 $\mu$ s
87	W	play	5 V		DATA
90	X	pause/play	0-5		A = 3,2 $\mu$ s B = 2,4 $\mu$ s
91	Y	pause	0-5 V		A = 1,2 $\mu$ s B = 4,4 $\mu$ s
91	Z	play	0-5 V		A = 3,2 $\mu$ s B = 2,4 $\mu$ s
92	Y	pause	0-5 V		A = 1,2 $\mu$ s B = 4,4 $\mu$ s
92	Z	play	0-5 V		A = 3,2 $\mu$ s B = 2,4 $\mu$ s
93	T	pause/play	0-5 V		A = 0,4 $\mu$ s B = 5,5 $\mu$ s
94	A	pause/play	0-5 V	4,23 MHz	
95	F	pause	5-0 V		
95	H	play	5-0 V		
96	I	pause	0-5 V		
96	J	play	5-0 V		

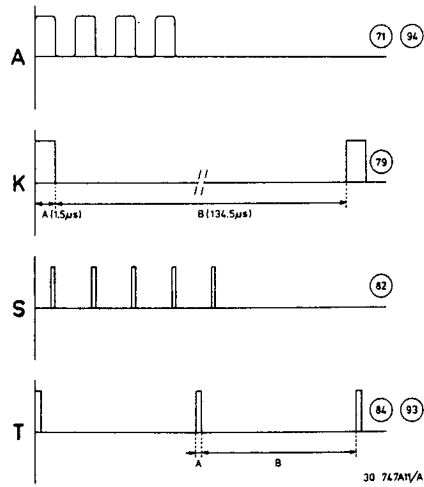
\* In pos. pause, signal is only present **after** the set was brought in play mode.



33 023 D7



30 748 B11/A



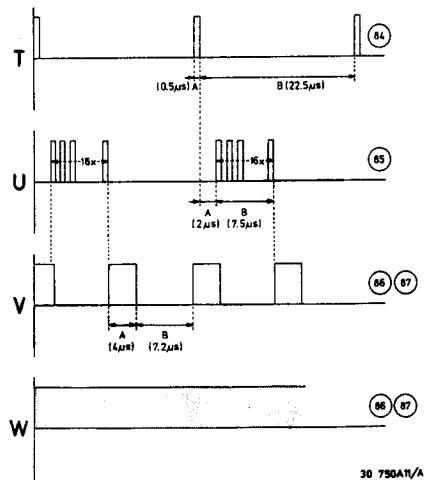
30 747A1/A

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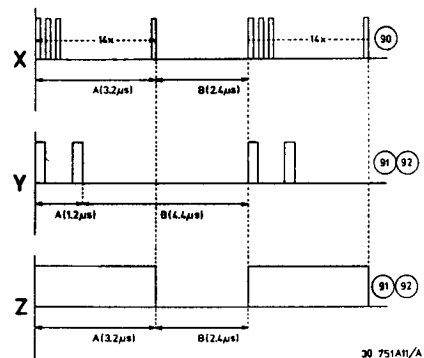
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Email:- enquiries@mauritron.co.uk



30 750A1/A

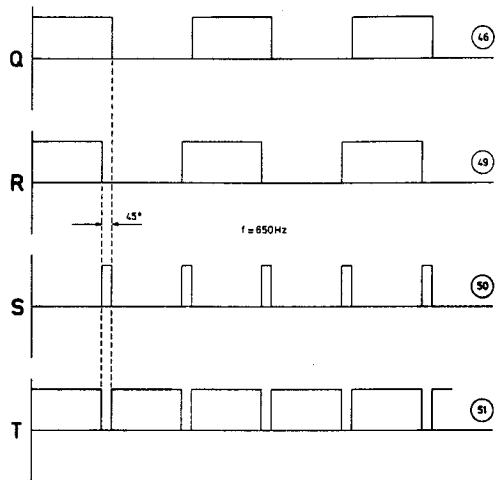
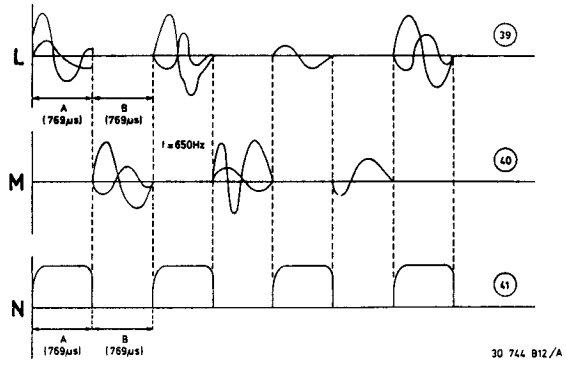
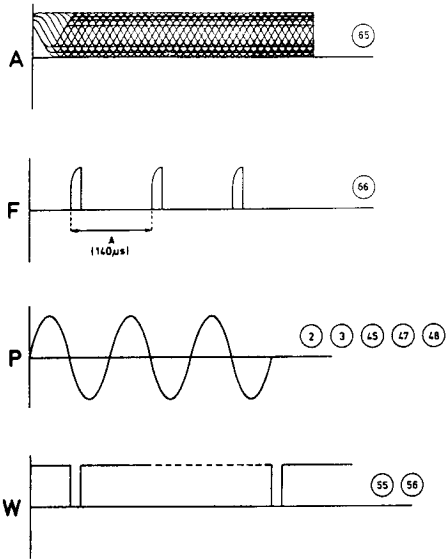


30 751A1/A

## SERVO

Test point	See	Position	Amplitude	f	Time base
29	P	stop	0.3 Vp-p		
39	L	play	0-4 Vp-p		A = 769 $\mu$ s B = 769 $\mu$ s
40	M	play	0-4 Vp-p		A = 769 $\mu$ s B = 769 $\mu$ s
41	N	play	6 Vp-p		A = 769 $\mu$ s B = 769 $\mu$ s
45	P	stop	9 Vp-p	650 Hz	
46	Q	stop	0-5 V	650 Hz	A = 769 $\mu$ s B = 769 $\mu$ s
47	P	stop	1.5 Vp-p	650 Hz	
48	P	stop	1 Vp-p	650 Hz	
49	R	stop	0-5 V	650 Hz	
50	S	stop	0-5 V	650 Hz	
51	T	stop	5-0 V	650 Hz	
55	W	play	5-0 V		
56	W	play (with drop out test record)	5-0 V		
65	A	play	1 Vp-p		
66	F	play	0.25-2.5 V		A = 140 $\mu$ s

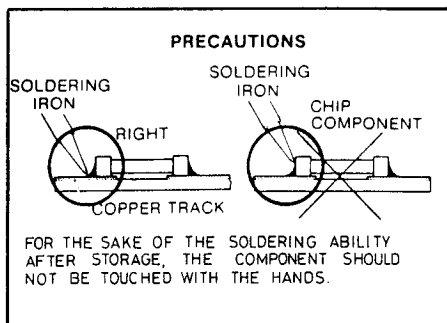
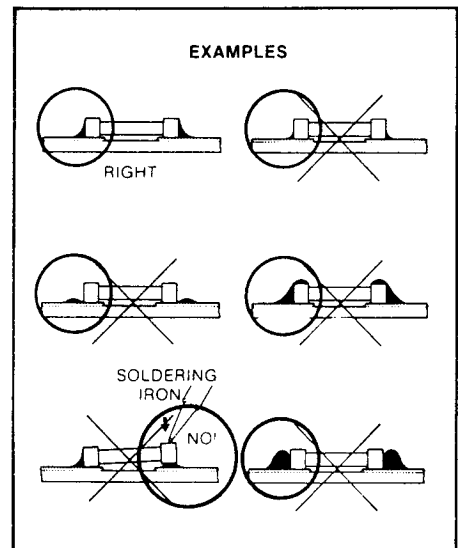
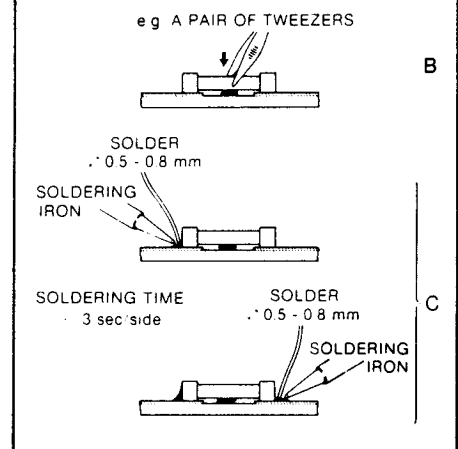
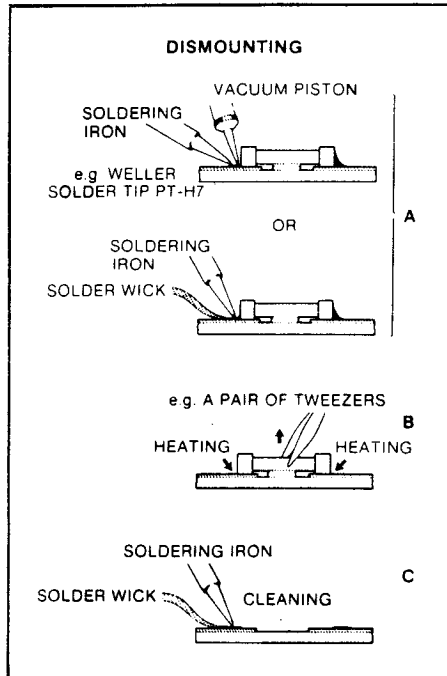
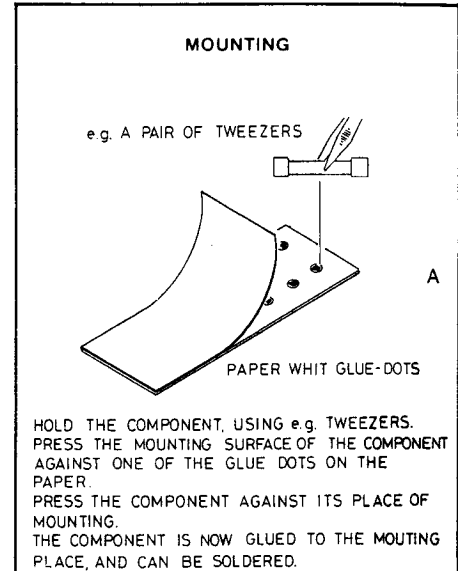
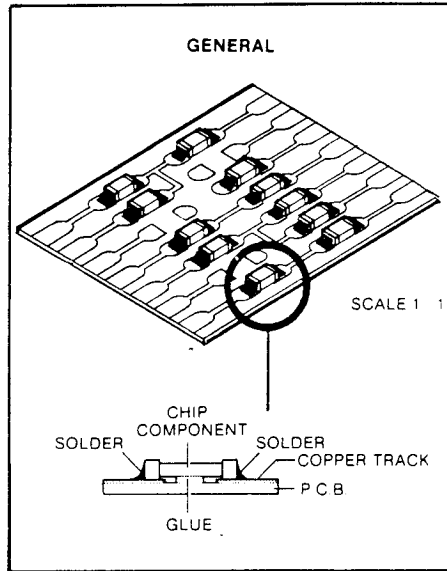
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## LIST OF ELECTRICAL PARTS

In the player chip components have been applied. For insertion and removal of chip components see the figure below



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### Chip capacitor


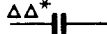
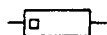







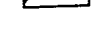


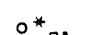

27pF	4000244	1.5nF	4000251
33pF	4000245	2.2nF	4000252
39pF	4000246	5.6nF	4000253
68pF	4000247	10nF	4000254
100pF	4000248	22nF	4000255
470pF	4000249	100nF	4000256
820pF	4000250		

### Chip resistor 2% 0,125W 1206

2.2 $\Omega$	5011216	13 k $\Omega$	5011242
3.3 $\Omega$	5011217	15 k $\Omega$	5011243
47 $\Omega$	5011269	18 k $\Omega$	5011244
82 $\Omega$	5011270	22 k $\Omega$	5011245
100 $\Omega$	5011218	24 k $\Omega$	5011246
120 $\Omega$	5011219	27 k $\Omega$	5011247
150 $\Omega$	5011220	33 k $\Omega$	5011248
390 $\Omega$	5011221	36 k $\Omega$	5011249
470 $\Omega$	5011222	47 k $\Omega$	5011250
560 $\Omega$	5011223	56 k $\Omega$	5011251
620 $\Omega$	5011224	68 k $\Omega$	5011252
680 $\Omega$	5011225	75 k $\Omega$	5011253
820 $\Omega$	5011226	82 k $\Omega$	5011254
		91 k $\Omega$	5011255
1 k $\Omega$	5011227	100 k $\Omega$	5011256
1.5 k $\Omega$	5011228	120 k $\Omega$	5011257
1.8 k $\Omega$	5011229	130 k $\Omega$	5011258
2.2 k $\Omega$	5011230	150 k $\Omega$	5011259
2.7 k $\Omega$	5011231	180 k $\Omega$	5011260
3.3 k $\Omega$	5011232	220 k $\Omega$	5011261
3.9 k $\Omega$	5011233	270 k $\Omega$	5011262
4.7 k $\Omega$	5011234	330 k $\Omega$	5011263
5.1 k $\Omega$	5011235	360 k $\Omega$	5011264
5.6 k $\Omega$	5011236	470 k $\Omega$	5011265
6.2 k $\Omega$	5011237	820 k $\Omega$	5011266
6.8 k $\Omega$	5011238		
7.5 k $\Omega$	5011239	1 M $\Omega$	5011267
8.2 k $\Omega$	5011240	5.6 M $\Omega$	5011268
10 k $\Omega$	5011241		

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Each parts number for chip component includes 10 pieces and glue dots.

	Carbon film 0.2 W 70°C 5%		Ceramic plate Tuning $\leq$ 120 pF NP.0 2% Others -20/+80%	*a = 2.5 V b = 4 V c = 6.3 V d = 10 V e = 16 V f = 25 V g = 40 V h = 63 V j = 100 V l = 125 V m = 150 V n = 160 V q = 200 V r = 250 V s = 300 V t = 350 V u = 400 V v = 500 V w = 630 V x = 1000 V A = 1.6 V B = 6 V C = 12 V D = 15 V E = 20 V F = 35 V G = 50 V H = 75 V I = 80 V
	Carbon film 0.33 W 70°C 5%		Polyester flat foil 10%	
	Metal film 0.33 W 70°C 5%		Metalized polyester flat film 10%	
	Carbon film 0.5 W 70°C 5%		Polyester flat foil small size (Mylar) 10%	
	Carbon film 0.67 W 70°C 5%		Polysterene film/foil 1%	
	Carbon film 1.15 W 70°C 5%		Tubular ceramic	
	Chip component		Miniature single	
			Subminiature tantalum $\pm$ 20%	

### Power Supply 8005168 - PCB1

2451	4200220	33 $\mu$ F 16V	2463	4010162	47 nF 50V
2452	4200220	33 $\mu$ F 16V	2464	4010162	47 nF 50V
2453	4200121	22 $\mu$ F 40V	2465	4010162	47 nF 50V
2454	4200220	33 $\mu$ F 16V	2466	4010169	220 $\mu$ F 25V
2455	4200220	33 $\mu$ F 16V	2467	4010162	47 nF 50V
2456	4200220	33 $\mu$ F 16V	2468	4010162	47 nF 50V
2457	4200642	1500 $\mu$ F 25V	2469	4010163	22 nF 100V
2458	4200612	1000 $\mu$ F 25V	2470	4010163	22 nF 100V
2469	4200641	3300 $\mu$ F 16V	2471	4010162	47 nF 50V
2460	4200642	1500 $\mu$ F 16V	2472	4010162	47 nF 50V
2461	4200641	3300 $\mu$ F 16V	2473	4030020	1 nF 30V
2462	4010162	47 nF 50V			

## Pre. Ampl. & Laser 8005173 - PCB2

P41	7220316	Plug 10 pol.			
3132	5370061	47 k $\Omega$ 20%	3146	5010047	120 k $\Omega$ 5% 1/4W
3138	5370006	2.2 k $\Omega$ 20%	3166	5020580	56 $\Omega$ 5% 1W
3140	5370050	1 k $\Omega$ 20%			
2120	4200414	33 $\mu$ F 16V	2123	4200414	33 $\mu$ F 16V
2121	4200414	33 $\mu$ F 16V	2124	4200414	33 $\mu$ F 16V
2122	4200414	33 $\mu$ F 16V			

1101	8005175	Thick film			
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## Mains Filter 8005169 - PCB3

A11	7220472	Plug 8pol.		A12	7220471	Plug 6pol.	
2701	4010123	1 nF 400V	2703	4100253	100 nF 250V		
1701	6600037	Fuse 200mA	7500214	Fuse holder			
	6600059	Fuse 400mA					
5451	6850162	Coil 2x25mH					
92T1	8013352	Transformer 5121/22/25	92F1	6609021	Thermal fuse 5121/22/25		
	8013372	Transformer 5123		6609022	Thermal fuse 5123		

## Servo 8005165 - PCB4

3228	5011280	150 k $\Omega$ SFR 16T	3335	5010062	68 k $\Omega$ 5% 1/4W
3229	5011278	2.7 k $\Omega$ SFR 16T	3341	5010935	10 k $\Omega$ 5% 1/4W
3230	5010135	18 k $\Omega$ 5% 1/4W	3363	5010935	10 k $\Omega$ 5% 1/4W
3256	5020761	4.7 $\Omega$ 5% 1/4W	3379	5010935	10 k $\Omega$ 5% 1/4W
3273	5020761	4.7 $\Omega$ 5% 1/4W	3384	5011277	9.4 $\Omega$ PTC 60V
3291	5011279	47 k $\Omega$ SFR 16T	3385	5011277	9.4 $\Omega$ PTC 60V
2203	4200632	10 $\mu$ F 10V	2237	4130302	33 nF 10% 63V
2204	4130224	100 nF 10% 63V	2238	4100114	5.6 nF 2% 63V
2205	4100048	27 nF 1% 63V	2239	4100042	390 pF 2% 630V
2207	4200640	33 $\mu$ F 40V	2243	4130293	470 nF 10% 63V
2208	4010159	47 nF 50V	2244	4100259	680 pF 2% 250V
2209	4200639	47 $\mu$ F 25V	2246	4100025	6.8 nF 2% 63V
2211	4130224	100 nF 10% 63V	2247	4100025	6.8 nF 2% 63V
2214	4200486	4.7 $\mu$ F 50V	2250	4200414	33 $\mu$ F 16V
2215	4100262	390 nF 10% 100V	2251	4130224	100 nF 10% 63V
2216	4130302	33 nF 10% 63V	2256	4100195	1.8 nF 2% 63V
2217	4200633	6.8 $\mu$ F 16V	2257	4100025	6.8 nF 2% 63V
2218	4130302	33 nF 10% 63V	2261	4100025	6.8 nF 2% 63V
2219	4130224	100 nF 10% 63V	2262	4100025	6.8 nF 2% 63V
2220	4200634	33 $\mu$ F 10V	2264	4200640	33 $\mu$ F 40V
2228	4200638	1 $\mu$ F 25V	2265	4200640	33 $\mu$ F 40V
2233	4130293	470 nF 10% 63V	2266	4200640	33 $\mu$ F 40V
2236	4100114	5.6 nF 2% 63V	2267	4130155	1000 nF 10% 100V

1201	8090022	6.000MHz			
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5201	6850160	Coil 47uH	5203	6850160	Coil 47uH
5202	6850160	Coil 47uH			

P21	7220257	Plug 6pol.	P26	7220255	Plug 4pol.
P22	7220255	Plug 4pol.	P27	7220256	Plug 5pol.
P23	7220257	Plug 6pol.	P28	7220256	Plug 5pol.
P24	7220255	Plug 4pol.	P29	7220254	Plug 3pol.
P25	7220256	Plug 5pol.			

2391066	Spring for TR	7200056	Socket for IC
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## Decoder 8005166 - PCB5

3574	5010066	1.8 k $\Omega$ 5% 1/4W	2583	5010065	100 $\Omega$ 5% 1/4W
3582	5010065	100 $\Omega$ 5% 1/4W	3595	5010066	1.8 k $\Omega$ 5% 1/4W
2501	4200646	22 nF 1% 63V	2580	4130293	0.47 $\mu$ F 10% 63V
2502	4200646	22 nF 1% 63V	2581	4130293	0.47 $\mu$ F 10% 63V
2504	4200121	22 $\mu$ F 40V	2593	4200121	22 $\mu$ F 40V
2507	4200121	22 $\mu$ F 40V	2601	4200648	5.1 nF 1% 63V
2513	4200121	22 $\mu$ F 40V	2602	4200649	15 nF 1% 63V
2515	4200426	1 $\mu$ F 50V	2603	4100146	2.2 nF 1% 63V
2517	4200121	22 $\mu$ F 40V	2605	4100146	2.2 nF 1% 63V
2518	4200647	150 $\mu$ F 6.3V	2606	4200650	1.2 nF 1% 63V
2519	4200121	22 $\mu$ F 40V	2608	4200121	22 $\mu$ F 40V
2558	2400121	22 $\mu$ F 40V	2624	4200121	22 $\mu$ F 40V
2566	4200648	5.1 nF 1% 63V	2625	4200121	22 $\mu$ F 40V
2567	4200649	15 nF 1% 63V	2627	4200121	22 $\mu$ F 40V
2568	4100146	2.2 nF 1% 63V	2628	4200121	22 $\mu$ F 40V
2570	4100146	2.2 nF 1% 63V	2630	4130293	0.47 $\mu$ F 10% 100V
2571	4200650	1.2 nF 1% 160V	2631	4130293	0.47 $\mu$ F 10% 100V
2573	4200121	22 $\mu$ F 40V			

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1504	8090047	4.2336MHz	1510	7600086	Relay
1507	7600086	Relay			

5501	6850161	Coil	5504	6850160	Coil 47uH
5503	6850160	Coil 47uH	5505	6850160	Coil 47uH

P31	7220328	Plug 8pol.	P35	7220254	Plug 3pol.
P33	7220256	Plug 5pol.	P36	7220257	Plug 6pol.
P34	7220255	Plug 4pol.			

Control and Display  
8005167 - PCB6

3057	5370006	2.2 k $\Omega$ 20%			
2051	4200645	1 nF 20% 50V	2064	4200643	8.2 pF 10% 50V
2052	4200364	47 $\mu$ F 10V	2065	4200643	8.2 pF 10% 50V
2053	4200364	47 $\mu$ F 10V	2066	4200643	8.2 pF 10% 50V
2054	4200645	1 nF 20% 50V	2067	4200643	8.2 pF 10% 50V
2055	4200644	27 pF 5% 50V	2068	4200643	8.2 pF 10% 50V
2056	4200644	27 pF 5% 50V	2069	4200643	8.2 pF 10% 50V
2057	4200643	8.2 pF 10% 50V	2070	4200643	8.2 pF 10% 50V
2058	4200643	8.2 pF 10% 50V	2071	4200643	8.2 pF 10% 50V
2059	4200643	8.2 pF 10% 50V	2072	4200643	8.2 pF 10% 50V
2060	4200643	8.2 pF 10% 50V	2073	4200643	8.2 pF 10% 50V
2061	4200643	8.2 pF 10% 50V	2074	4200643	8.2 pF 10% 50V
2062	4200643	8.2 pF 10% 50V	2075	4200643	8.2 pF 10% 50V
2063	4200643	8.2 pF 10% 50V	2076	4200643	8.2 pF 10% 50V

1052	8090022	6.000MHz	5051	6850160	Coil 47uH
1053	8230089	200mA - 5V			

P51	7220254	Plug 3pol.	P53	7220256	Plug 5pol.
P52	7220255	Plug 4pol.			

## Motor Stop 8005172 - PCB7

2802	4200414	33 $\mu$ F 16V			
P61	7220255	Plug 4pol.	P63	7220254	Plug 3pol.

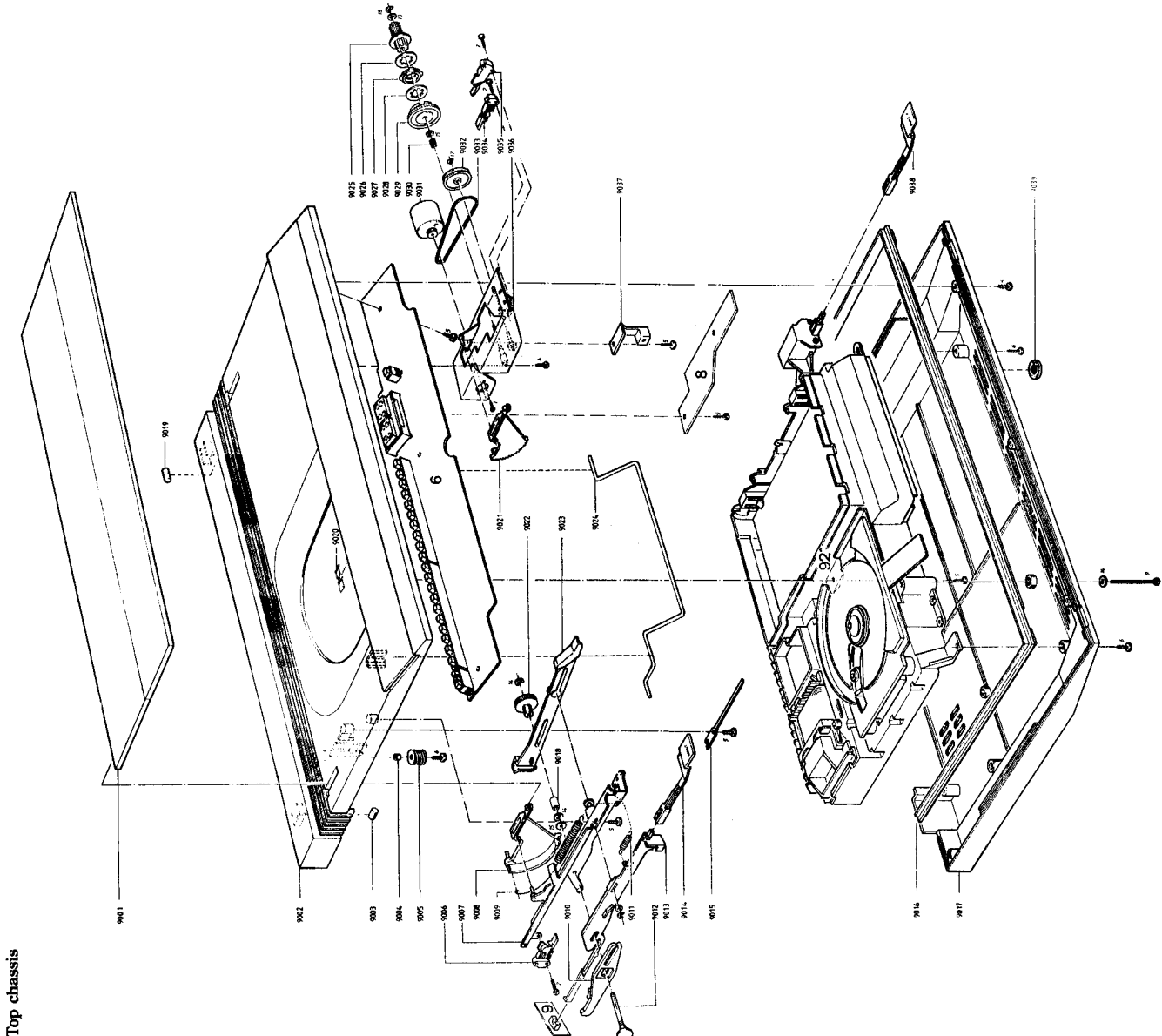
## Motor Control 8005170 - PCB8

2801	4200122	220 $\mu$ F 10V			
P71	7220254	Plug 3pol.	P74	7220254	Plug 3pol.
P72	7220254	Plug 3pol.	P75	7220254	Plug 3pol.

## Eject Switch 8005174 - PCB9

P82	7220254	Plug 3 pol.			
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**LIST OF MECHANICAL PART**  
Top chassis



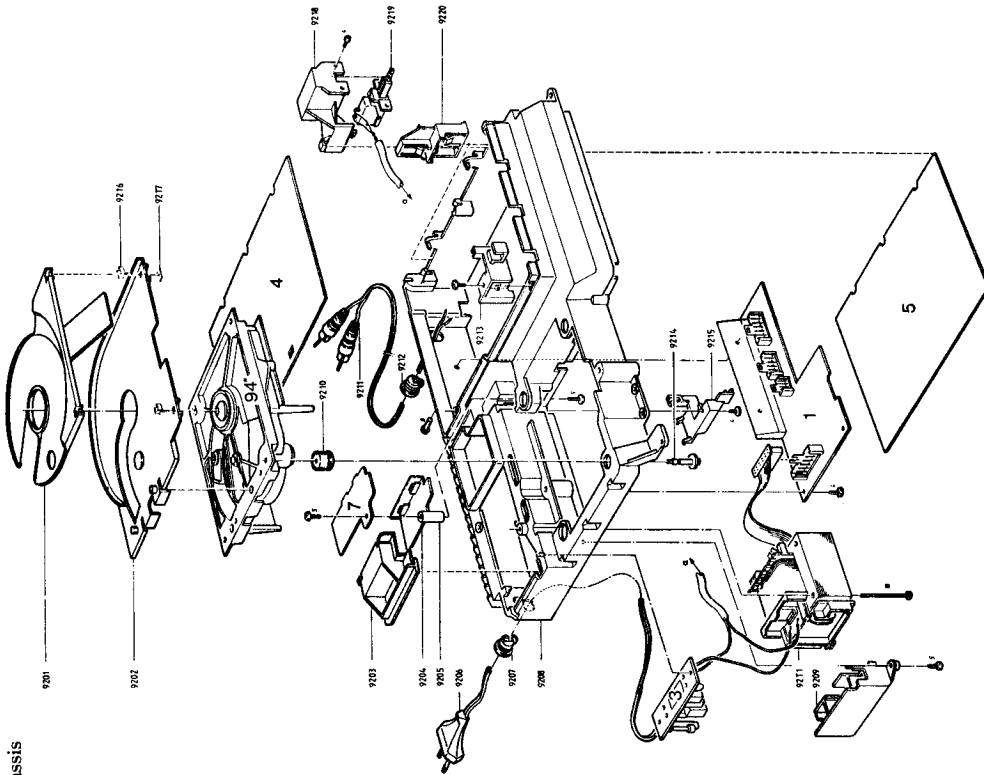
06Modul 8005167 Control PCB

08Modul 8005170 Motor Control PCB

9001	3162248	Dust cover
9002	3430353	Cabinet
9003	3341052	Plug
9004	2930094	Bushing
9005	2709006	Worm
9006	7400320	Switch
9007	3124103	Mount, plate
9008	3030089	Hinge, plate
9009	2810202	Spring, long
9010	2854113	Arm
9011	2810201	Spring, short
9012	2834092	Shaft
9013	2854112	Arm
9014	2854116	Arm
9015	2815018	Leaf spring
9016	3430354	Frame
9017	3454403	Bottom
9018	2930095	Bushing
9019	3341052	Plug
9020	3370151	Window
9021	3030090	Hinge, plate
9022	2700043	Gear wheel
9023	2854114	Arm
9024	2514053	Bracket
9025	2700045	Gear wheel
9026	2802045	Ring
9027	2802046	Ring
9028	2802045	Ring
9029	2700044	Gear wheel
9030	2812109	Spring
9031	8400143	Motor
9032	2722037	Pulley
9033	2732078	Belt
9034	7400320	Switch
9035	7400320	Switch
9036	3174102	Mount, plate
9037	3152508	Holder
9038	2854115	Arm
9039	3035045	Foot
9040	3370151	Window

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Main chassis



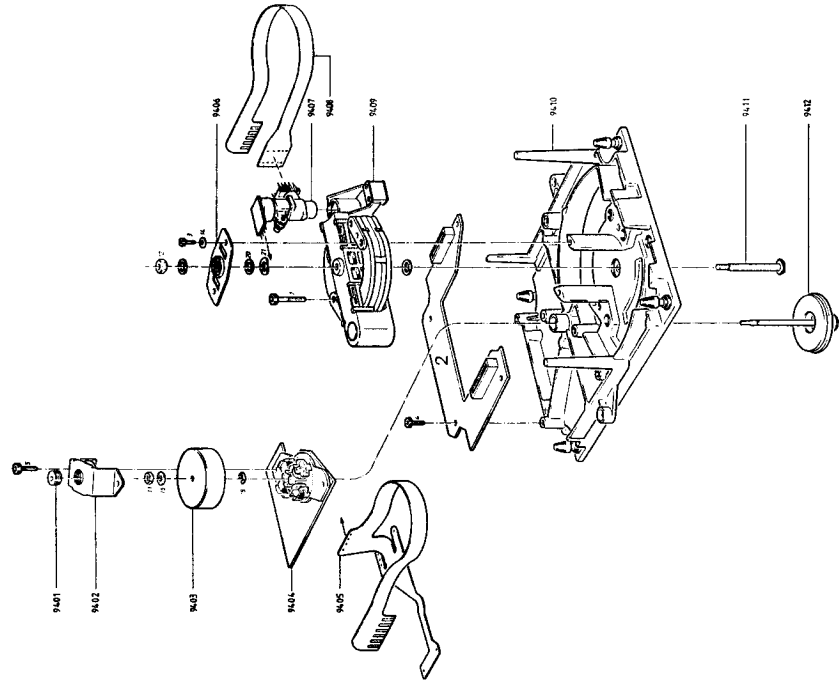
01	Modul 8005168	Supply PCB
03	Modul 8005169	Main Filter PCB
04	Modul 8005165	Servo PCB
05	Modul 8005166	Decoder PCB
07	Modul 8005166	Motor stop PCB
09	Modul 8005174	Eject Switch PCB
9201	3458401	Disc plate
9202	3458399	Top plate
9203	3162249	Cover
9204	3152491	Holder
9205	2938244	Distance bushing
9206	6271102	Mains cable 5122/22
9207	6270251	Mains cable 5123
9208	6271091	Mains cable 5125
9209	2641119	Holder
9210	3114259	Chassis

9209	3131263	Housing	9215	3152490	Holder
9210*	2938239	Rubber bushing	9216	3030094	Hinge
9211	6270274	Signal lead	9217	2395051	Locking plate
9212	2641119	Holder	9218	3131262	Housing
9213	3152489	Holder	9219	7400321	Switch
9214	2039077	Screw	9220	3152488	Holder

92T1	8013352	Transformer 5121/22/25	92F1	6609021	Thermal fuse 5121/22/25
	8013372	Transformer 5123		6609022	Thermal fuse 5123

\*Upon replacement see servicetips page 8-1

Mechanism



02Modul 8005173 Pre. ampl. laser

9401	2072107	Adjustment screw	9407*	8330149	Light pin
9402	2510154	Bracket	9408	6141141	Flex print
9403	2871000	Rotor	9409	3131272	Housing
9404	3351000	Stator	9410	3114260	Chassis
9405	6141142	Flex print	9411	2038093	Bearing screw
9406	2905114	Spring	9412	2726153	Platter

\*Upon replacement see service tips page 8-2

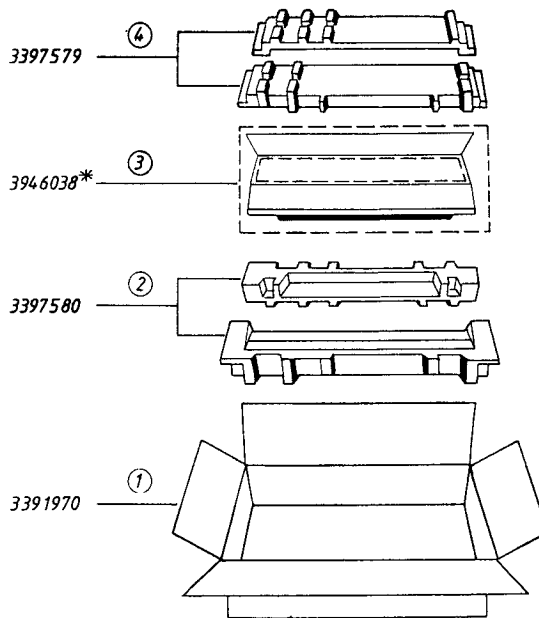
## Parts not shown

3397579	Foam packing, upper	3634028	Laser simulator
3397580	Foam packing, bottom	3634029	Mirror
3391970	Wrapper	3634030	Glass disc
3629107	Blade T6 short	3634031	Test disc
3629037	Blade T8 short	3634032	Disc hold-down
3629102	Blade T10 long	3505412	Owner's Manual DK
3629038	Blade T10 short	3505413	Owner's Manual S
3629103	Blade T20 short	3505414	Owner's Manual SF
3629109	Screw driver T6	3505415	Owner's Manual GB
3629108	Screw driver T8	3505416	Owner's Manual D
3629047	Screw driver T10	3505417	Owner's Manual NL
3629104	Screw driver T20	3505418	Owner's Manual F
3634027	Support		

## Screws, washers, etc.

1	2034073	Screw 2x3 DIN 84	11	2380129	Nut M2.5
2	2034074	Screw AM 2x3 DIN 7985	12	2380016	Nut M4
			13	2622348	Washer 2.2
3	2036058	Screw 2.5x6	14	2622218	Washer 3.2
4	2013126	Screw 2.9x8	15	2622390	Washer 4.3
5	2013127	Screw 2.9x9.5	16	2622035	Washer 2.7
6	2013130	Screw 2.9x13	17	2390094	Locking ring 1.5
7	2039078	Screw 2.9x18	18	2390001	Locking ring 2.5
8	2038220	Screw 3x12 DIN 84	19	2390002	Locking ring 3.0
9	2013131	Screw 2.9x45	20	2622399	Washer 3.5
10	2043036	Screw 4x35	21	2623002	Washer 3.5

## Packing procedure



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*\*Foile 3946038 is sold by the metre*

## Lubrication

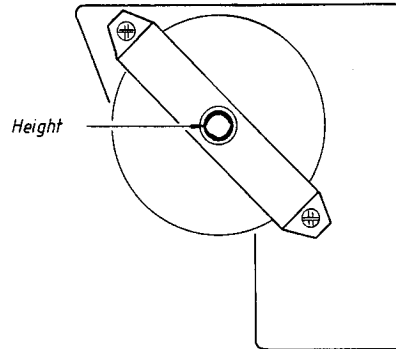
1. Arm 9011 sliding surface towards 9013  
 Bracket 9007 sliding surface towards 9013  
 Silocone paste P4
2. Arm 9008 sliding surface towards 9007 Isoflex PDL250

## MECHANICAL ADJUSTMENTS

## Height setting of the turntable

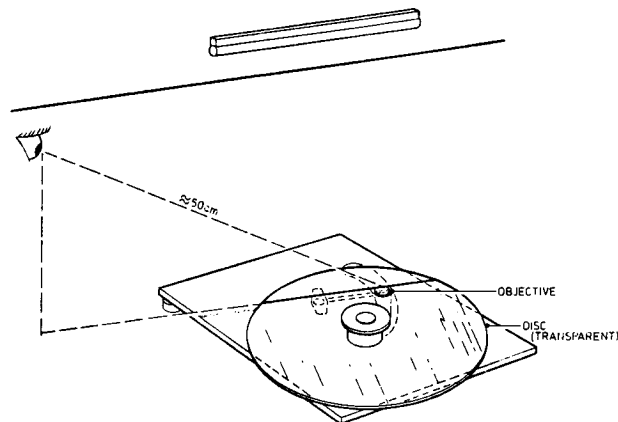
For this alignment the unit should be in the position of normal end use. The servicing supports 3634027 can be used here. Playback track 1 of disc 3634031. (Disc without defects). Connect a DC voltmeter between the *negative* of the focus motor and earth of the preamplifier print.

Adjust the height of the turntable with bearing screw in such a way, that the voltage is  $0\text{ V} \pm 100\text{ mV}$ . Seal hereafter the screw with sealing paint.



## Checking the angle setting

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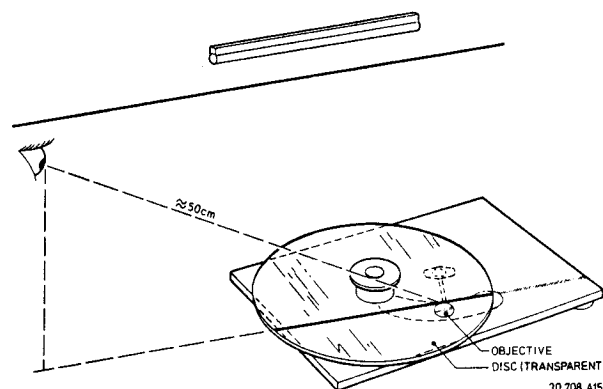
Place mirror 3634029 on the objective and glass disc 3634040 (with disc hold-down 3634032) on the turntable.

Locate the unit under a light source and under this light source a straight line should run (e.g. fluorescent tube with grid). Set the arm to mid-position. Turn the unit until the arm is parallel to the line under the light source (see fig.).

Look in the direction and in the prolongation of this line to its reflection on glass discs and mirror.

These lines should not be more than 4 mm apart:

Position the set in such a way that one line runs across the centre of the mirror. When the other line remains inside the mirror's surface, the distance is  $\leq 4\text{ mm}$ .





Rotate the CD mechanism through 90° relative to the previous position. The arm must be kept in mid-position (see fig.). Repeat the previous measurement.

### Adjusting the angle setting

With respect to the adjustment of the angle between disc and light path, the factory has looked for a compromise between minimum angle deviation and minimum arm friction.

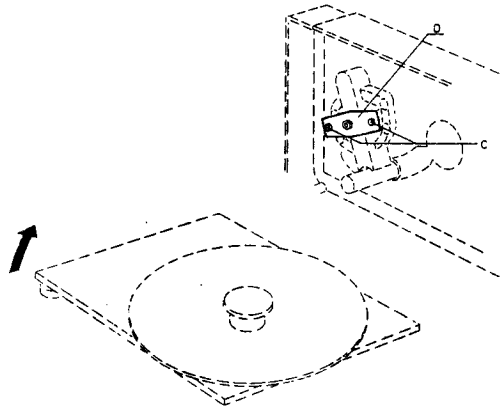
In the measurements show that the angle falls outside the tolerance given, the angle should *not* be adjusted for minimum deviation, but just within tolerance. The new setting should lie between the "old" setting and the optimum setting.

After adjustment, the friction of the arm should be checked. This is done by means of a spring-pressure gauge which is connected to the counterweight. The friction of the arm, measured over the total scanning deflection, is not allowed to exceed 30 mN.

When the friction appears to be too high, the angle should be reset to its old value. Then replace the arm by a new one and check the angle once more.

Adjustment of the angle is performed as follows:  
Place the set on the servicing supports 3634027.

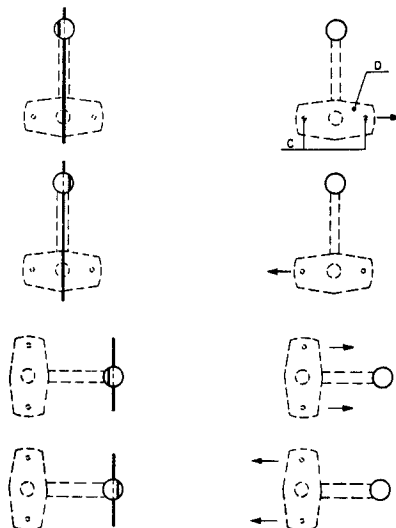
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Loosen screws C (see fig.) until bearing plate D can be shifted. Correct the angle setting by shifting the bearing plate in the direction indicated on the figure. Tighten screws C ensuring that the setting does not drift. Double check the angle setting in two directions.

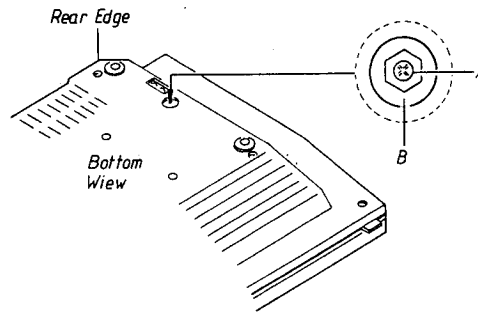
### ATTENTION!

After setting the angle, the height setting of the turntable should be checked.



## Height adjustment of lid

Before undertaking the height adjustment the set must be *fully* assembled, and the adjustment is made through a hole in the bottom plate of the set.



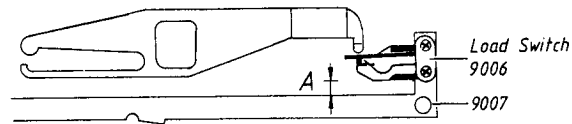
Loosen holding screw A.

Adjust the bushing B, using a 6 mm hexagon spanner, until the lid is flush with the upper edge of the control panel ( $\pm 0.5$  mm).

Tighten the screw A.

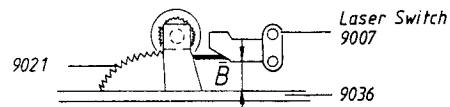
In case the adjustment is not within the tolerance range, this may cause failure of function in the eject system.

## Load Switch



When fastening the load switch 9006, make sure the distance A between the lower part of the switch and the bracket 9007 is 3.4 mm.

## Laser Switch



When fastening the laser switch 9034 make sure the distance B between the lower part of the switch and the bracket 9036 is 6.8 mm.

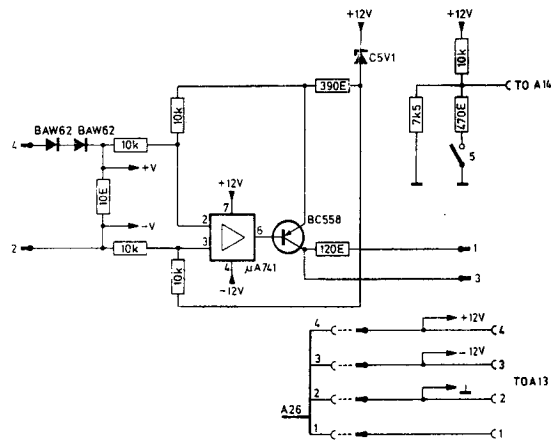
## Spring 9009

When fitting spring 9009 in the bracket 9007, **always** mount the spring in the middle hole.

## ELECTRICAL ADJUSTMENT Laser power supply

Since the light pin is very sensitive to static charges, care should be taken that during measurements and adjustments of the laser power supply the potentials of aids and yourself equal the potential of the CD mechanism.

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### Check

The laser simulator PCB 3634028 should be used here. Take the flex PCB out of socket A11 and connect the switch simulator PCB with the socket. Remove plug A13 and insert it in the socket on the simulator PCB. Connect the plug with 4 wires to socket A13. Take out plug A14 and insert the plug with 1 wire in socket A14.

Set the switch on the simulator PCB in the OFF position and the mains switch in the ON position. Turn trimming resistor 3140 clockwise (max. R) and measure the voltage between points +V and -V on the simulator PCB. The voltage should be  $\leq 15$  mV.

#### Check of laser supply control:

Set the switch on the simulator PCB in the ON position and measure the voltage between points +V and -V on the simulator PCB.

Resistor 3140 clockwise (max. R):

$$U +V -V = 225 \text{ mV} \pm 45 \text{ mV.}$$

Resistor 3140 counterclockwise (min. R):

$$U +V -V = 750 \text{ mV} \pm 150 \text{ mV.}$$

Set resistor 3140 in mid-position.

This is a preliminary adjustment. After the simulator PCB has been removed the laser current must be adjusted.

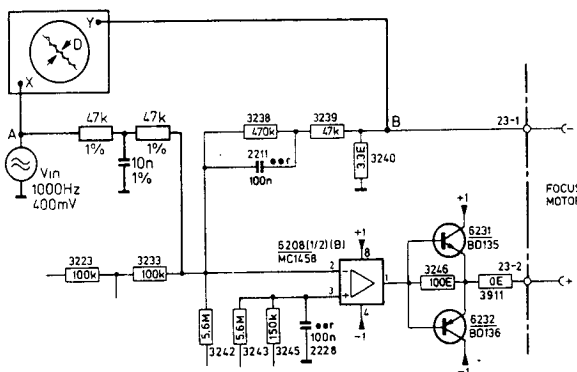
### Adjusting the laser supply

Play track 1 of test disc 3634031 (disc without defects).

Connect a DC voltmeter across resistor 3308 on the servo PCB (= on emitter of transistor 6239 and ground).

Adjust the laser power supply with resistor 3140 until the voltage across resistor 3308 is  $575 \pm 75$  mV.

## Adjusting the focus bandwidth



Make a measuring arrangement according to the figure. Play track 1 of test disc 3634031 (disc without defects).

Adjust trimming resistor 3138 on PRE.AMPL. + LASER PCB for a 180° phase difference between signals A and B.

This corresponds with a minimum distance D in the Lissajous pattern.

$$R = 47 \text{ k}\Omega - 1\%$$

$$C = 10 \text{ nF} - 1\%$$

## Focus offset

Trimming resistor 3132 should be in mid position.

## Motor-control check (Hall)

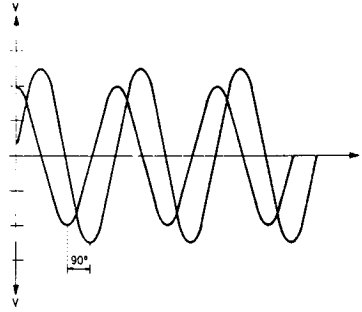
1. Disconnect the wire from PRE.AMPL. + LASER PCB to connector A18 pin 4 on the Hall motor control.
2. Connect channel A of a dual-beam oscilloscope to the emitter of transistor 6082, 6083 and channel B to the emitter of transistor 6084, 6085.  
Position of oscilloscope: 2 V/div – 10 ms/div.
3. Switch the set on.
4. Apply a *negative* voltage to pin 4 of connector A18.  
The voltage may *not* be applied until *after* the circuit has been connected to power supply voltage. Start from 0 V and slowly proceed to -5V. Now the motor should run.  
When the motor runs the voltage can be brought to approx. -2.5 V.  
The motor should continue to run then.
5. The oscilloscope should display sinusoid signals now (see fig. A).  
After approx. 2 s they should lie symmetrically round the 0-axis and be shifted 90° relative to each other.  
The maximum ratio of the amplitudes of these 2 signals is allowed to be 1:2.
6. The amplitude depends on the applied voltage.  
The V-in/V-out pp ratio should lie between 1:2 and 1:3.
7. Determine at which V-in the motor runs at 600 rpm.  
At 600 rpm the frequency of V-out is 30 Hz.  
At this speed V-in should lie between -1.5V and 3.7V.

*Conclusion:*

When all these conditions are present motor and PCB may be considered on order.

If points 4, 5 and 6 are not correct, the fault should most probably be found in the electronics.

If points 4, 5 and 6 are correct and the voltage to be applied at point 8 is e.g. -4.5 V to obtain a motor speed of 600 rpm, there will most probably be something wrong mechanically E.g. the bearing friction is too high.



Check of the AGC and  
offset circuits

(See SERVO PCB).

Play track 1 of test disc 3634031 (Disc without defects).

The voltage between pin 1 of IC6212 and  $\perp$  should be  $-4 \text{ V} \pm 2 \text{ V}$ .

The voltage between pin 14 of IC6215 and  $\perp$  should be  $-2.5 \text{ V} \pm 2 \text{ V}$ .

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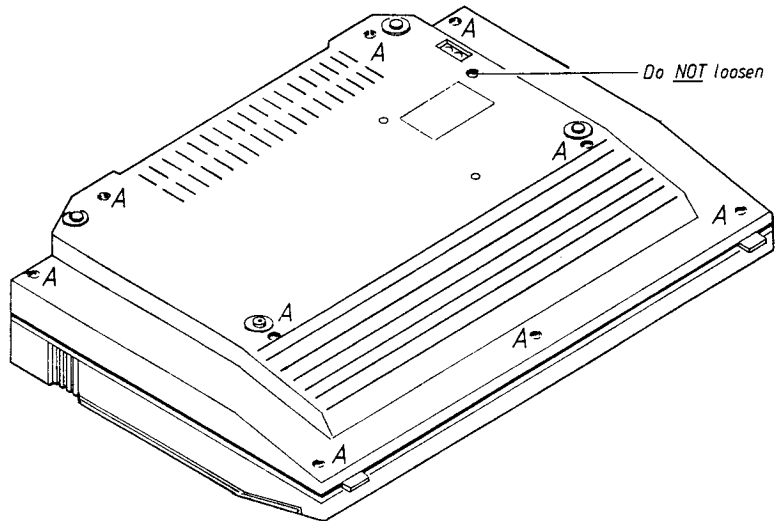
## TECHNICAL SPECIFICATIONS

Frequency range	3-20,000 Hz $\pm$ 0.3 dB
Signal-to-noise ratio	>96 dB
Dynamic range	>96 dB
Harmonic distortion	0.003% at 0 dB
Channel separation	>94 dB 20-20,000 Hz
Channel difference	<0.5 dB
Converter system	14 bit, oversampling 176.4 kHz
Low pass filter	Digital + analogue
Damping >20,000 Hz	>50 dB
Output	2 V RMS at 0 dB
Power supply	Type no. 5121: 220 V
	Type no. 5122: 240 V
	Type no. 5123: 120 V
	Type no. 5125: 240 V
Power frequency	50-60 Hz
Power consumption	25 watts
Dimensions W x H x D	42 x 7.5 x 31 cm (16 <sup>1</sup> / <sub>2</sub> " x 3" x 12 <sup>3</sup> / <sub>16</sub> "
Weight	6 kg (13.2 lbs)

**Subject to change without notice**

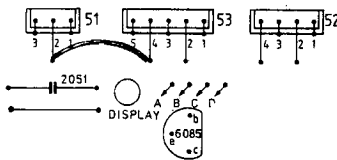
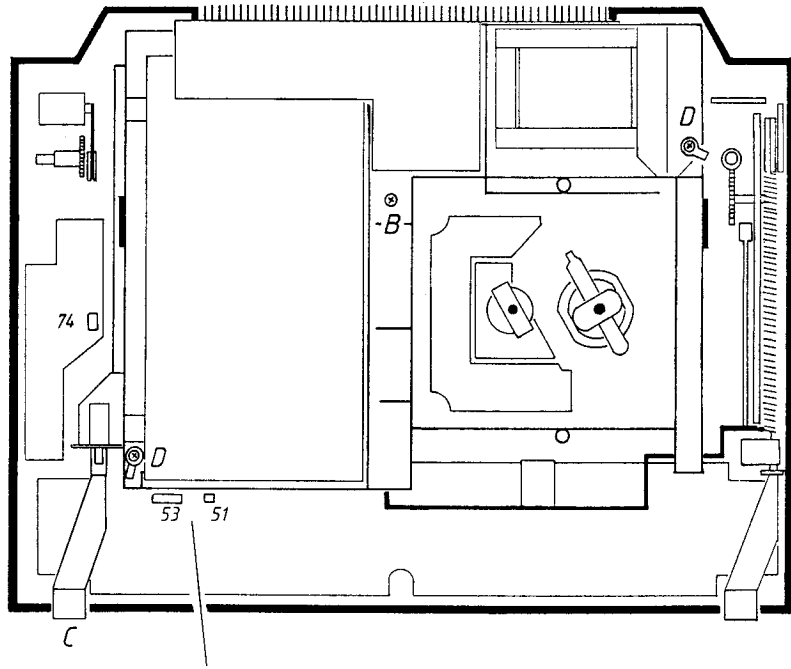
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## DISMANTLING Bottom



Remove the screws A.

## Top plate



### Top Plate

Remove the screw B.

Remove the PLAY button C.

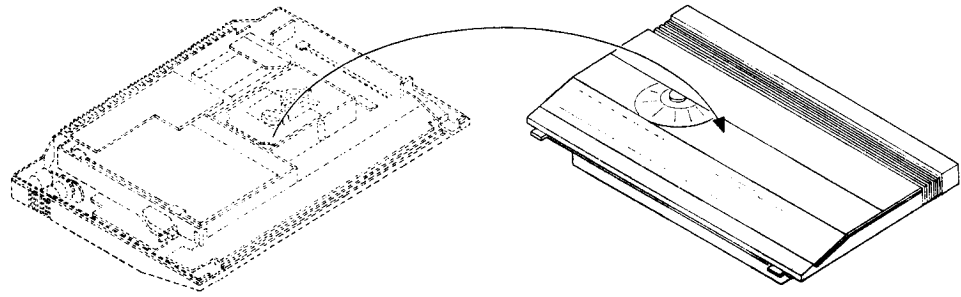
**NB! The ON/OFF switch must be in position OFF when removing the button in order to avoid damaging the switch.**

Remove the two ground connections D.

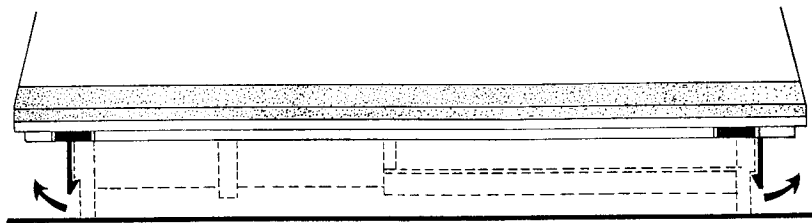
Remove plug 74 on the lid motor control PCB.

Then introduce a short-circuit from socket 53 pin 4 to 51 pin 1 ground on the control and display PCB.

**NB! When plug 74 is removed and a short-circuit has been introduced between 53 pin 4 and ground, the dust cover functions cannot be operated.**

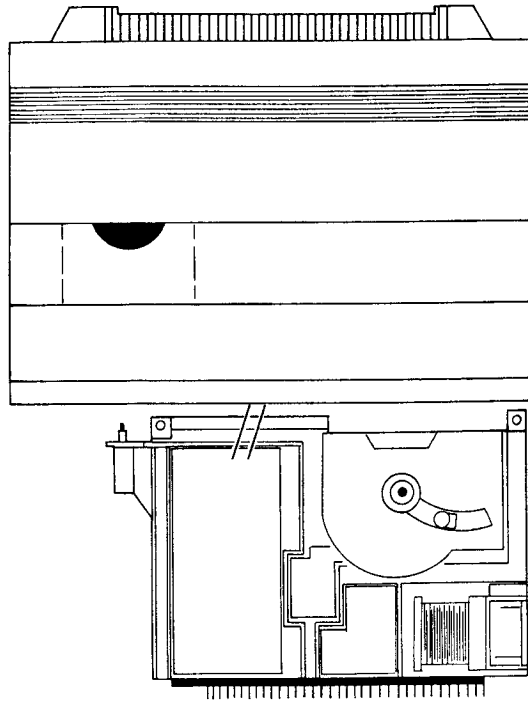


Turn over the set while supporting the chassis frame.



Tip out the two plastic tags.  
Carefully lift off the top plate.  
NB! Be aware of the cable connection between the top plate and the chassis frame.

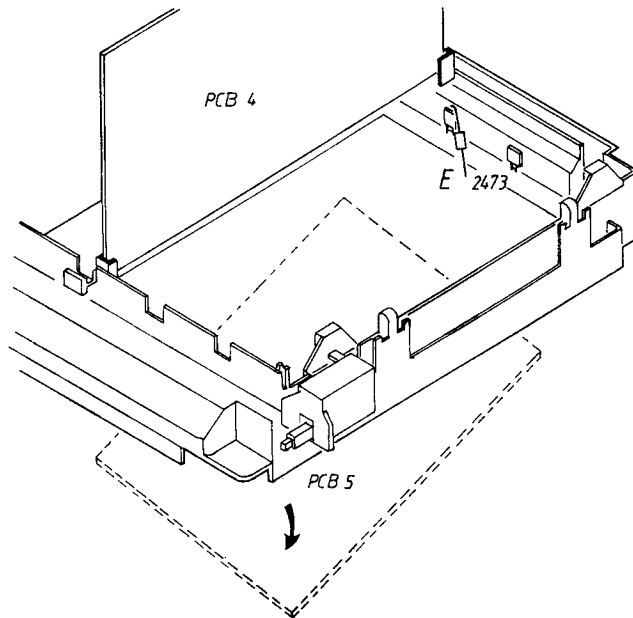
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Place the top plate in front of the chassis frame as illustrated.

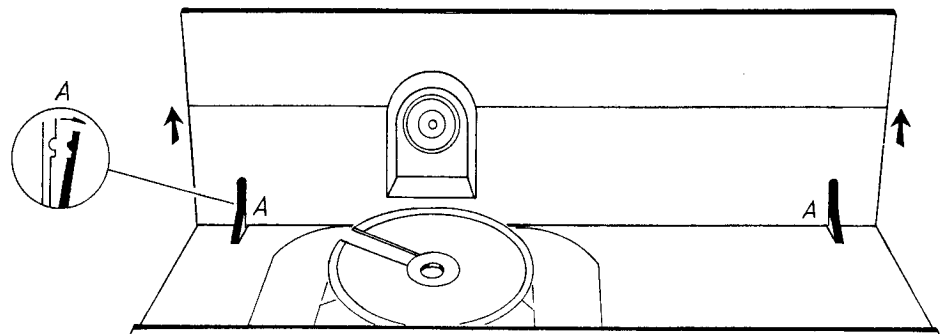


PCB4 and PCB5.



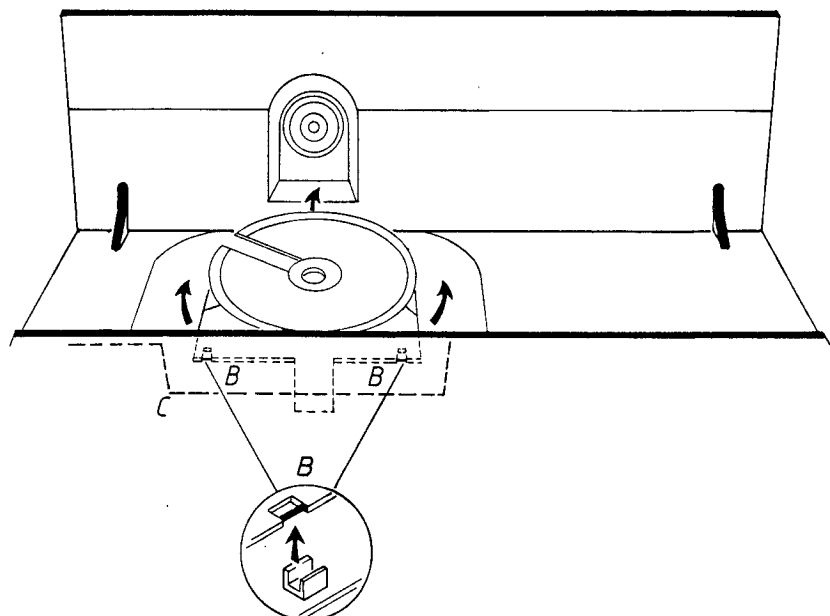
Tip up PCB4 and place in service position.  
PCB5 cannot be tipped up until the capacitor E is desoldered.

Replacement of dust cover



Tip out the hinges A in both sides as illustrated.  
The dust cover may now be pushed upwards.

Replacement of disc platter



Lift out the disc platter from the two clips B.  
Pull the disc platter towards the dust cover. It is thereby disengaged.  
NB! When mounting the disc platter, the tongue must be placed under the eject bar.

## SERVICE TIPS

In order to prevent loose metal objects from getting in the CD mechanism it will be necessary to see to a clear repair station. Before the player is being used or service, the transportation screws should be removed. These screws have to be reapplied after servicing.

**Ensure that the player is not resting on the shaft of the turntable motor or the light pin during repairs and measurements.**

The player consists of various MOS ICs. Since MOS ICs are generally very sensitive to overload and overvoltage, servicing operations should be performed with the utmost care.

In the player chip components have been applied. For insertion and removal of chip components see page 2-1.

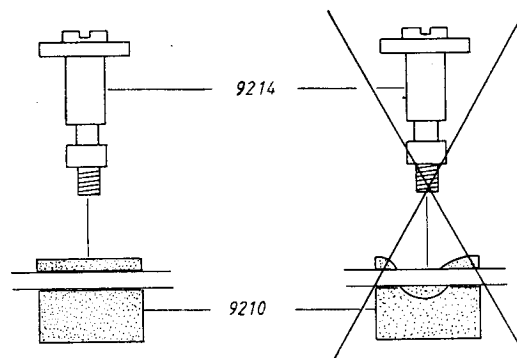
**When the top part with the lid mechanism has to be demounted for repair, a loose hold-down should be employed.**

Part no. for the disc hold down is 3634032.

For normal function of the set, when the top part is demounted the lid on the top part have to be closed.

## Rubber bushing

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When replacing rubber bushings (pos. 9210) make sure the rubber is not stuck in the hole in the chassis.

## Mechanism

Servicing the Radial and Focusing unit pos. 9409.

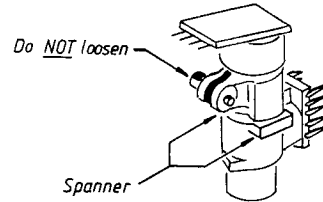
- Take the two flex PCBs out of the connectors on the preamplifier PCB.
- Disassemble the *defective* RAFOC unit by removing the 4 bolts no. 7 and shaft item number 9411.
- Remove shaft item number 9411 of the new RAFOC unit. Pay attention to the 3 intermediate washers item number 20 and spring washer item number 21 they should assume the same positions after assembly.

Mount the Radial and Focusing unit.

- Loosen the 4 bolts no. 7 until the bottom plate can be removed. Do not remove bolts no. 7 (they hold the new Radial and Focusing unit together).
- Mount the new Radial and Focusing unit on frame 9410. Ensure that the 3 intermediate washers 20 and spring washer 21 are positioned correctly before fixing shaft item number no. 7.
- Check that the arm moves freely and the angle setting as well (see check and possible adjustment of angle setting).

## Replacing light-pin

- For replacing the light pin it is not necessary to remove the Radial and Focusing unit.



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The light pin can be removed by turning it anticlockwise by means of an open-ended spanner of 12 mm and afterwards pulling it out of the arm. During mounting, the light pin must be pushed into the arm as far as possible, and turned clockwise.

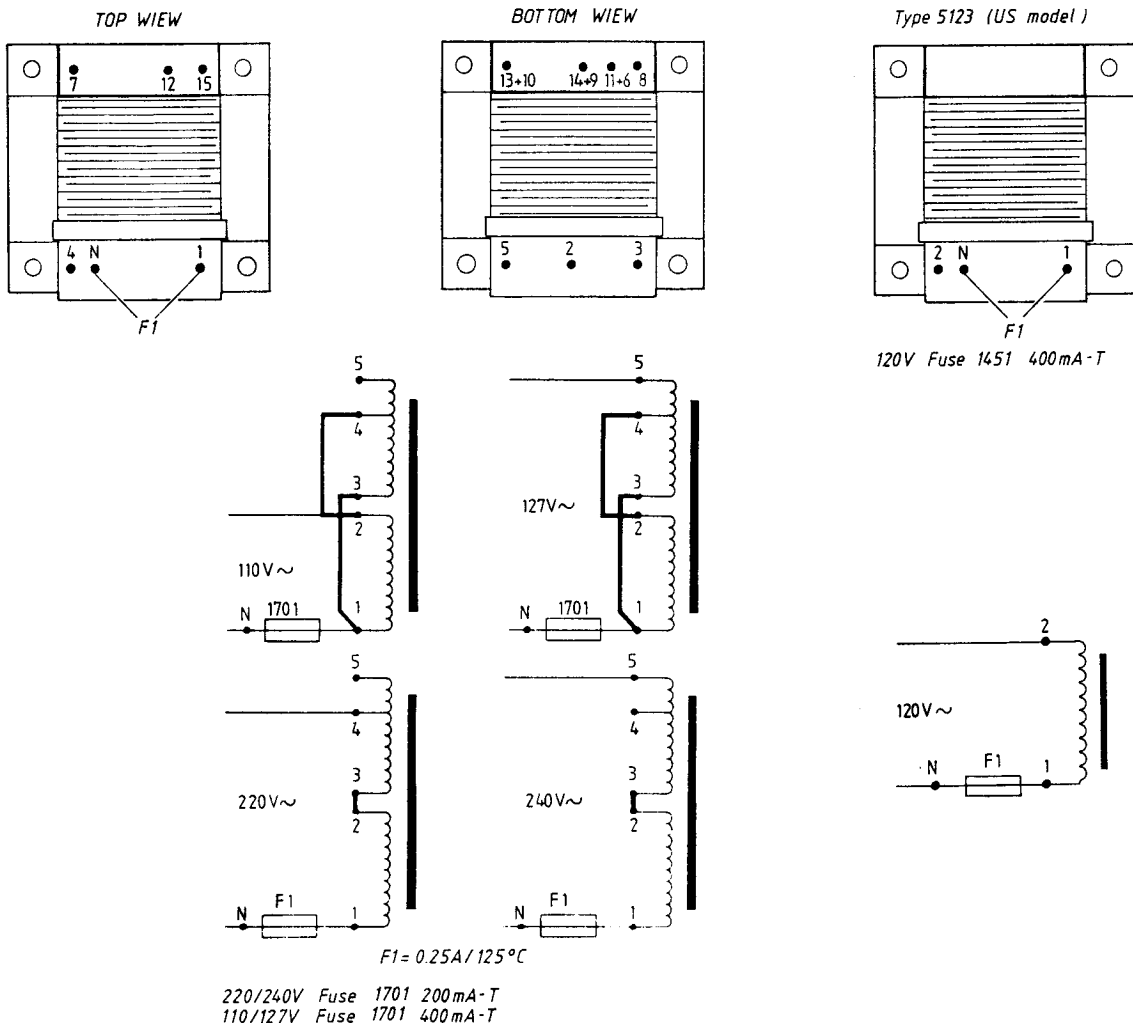
The CD-mechanism is provided with self-lubricating bearings and should thus not be lubricated.

### Attention:

To prevent adjustments from changing, no screws other than those mentioned above should be loosened.

The light pin is much more sensitive to static charge than a MOS IC. Careless treatment during servicing may reduce life expectancy drastically. For this reason care should be taken that during servicing the potentials of the aids and yourself equal the potential of the mechanism.

## Mains Transformer Wiring



## INSULATION TEST

Each set **must** be insulation tested after having been dismantled. The test is to be made when the record player has been reassembled completely and is ready for delivery to the customer (with the transis screws tightened).

Make the insulation test as follows:

Short-circuit the two pins of the mains plug and connect one of the terminals of the insulation tester.

Set the mains switch in position ON.

Connect the other terminal of the insulation tester to one of the two screws placed on the heat sink on the back of the unit.

## NOTE!

To avoid ruining the set it is essential that both insulation tester terminals are in really good mechanical contact.

Now slowly turn the voltage control of the insulation tester until a voltage of 15.2 kV is obtained. Hold it there for 1 second, then turn the voltage down again.

**At no point during the testing procedure any flashovers are permissible.**

## TROUBLE SHOOTING GUIDE CDX

### General checkpoints

In the detailed troubleshooting method which follows a number of general conditions, required for proper functioning of the player, will not be repeated.

Before starting the detailed troubleshooting method these general points should be checked.

- a: Ensure that disc and objective are clean (remove dust, fingerprints, etc.) and use undamaged discs.
- b: Check whether all power supply voltages are presents and have the correct level.

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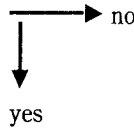
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TO PAST INTO SERVICE MANUAL: BEOGRAM CD X

03-86

3538642

## TROUBLE SHOOTING GUIDE FOR BEOGRAM CDX



Before starting trouble shooting, place the CD in service position

Place a compact disc in the player and press play:

1.  
Lid closes?

→ Check all switches - OK? → Repair switches

↓  
Check that 6IC6078 pin 24 goes high and pin 25 stays low → Check control and display circuit

↓  
Check motor control circuit (PCB8), and lid mechanism

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2.  
Disc starts turning?

→ Does laser emit light? → Does 4IC6202 pin 6 supply a low level? → Check functions around 4IC6202, 4IC6201, control and display circuit

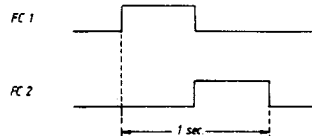
↓  
Does laser emit sufficient light? (see service man. page. 5-1) → Check laser supply unit (PCB 02) Check laser.

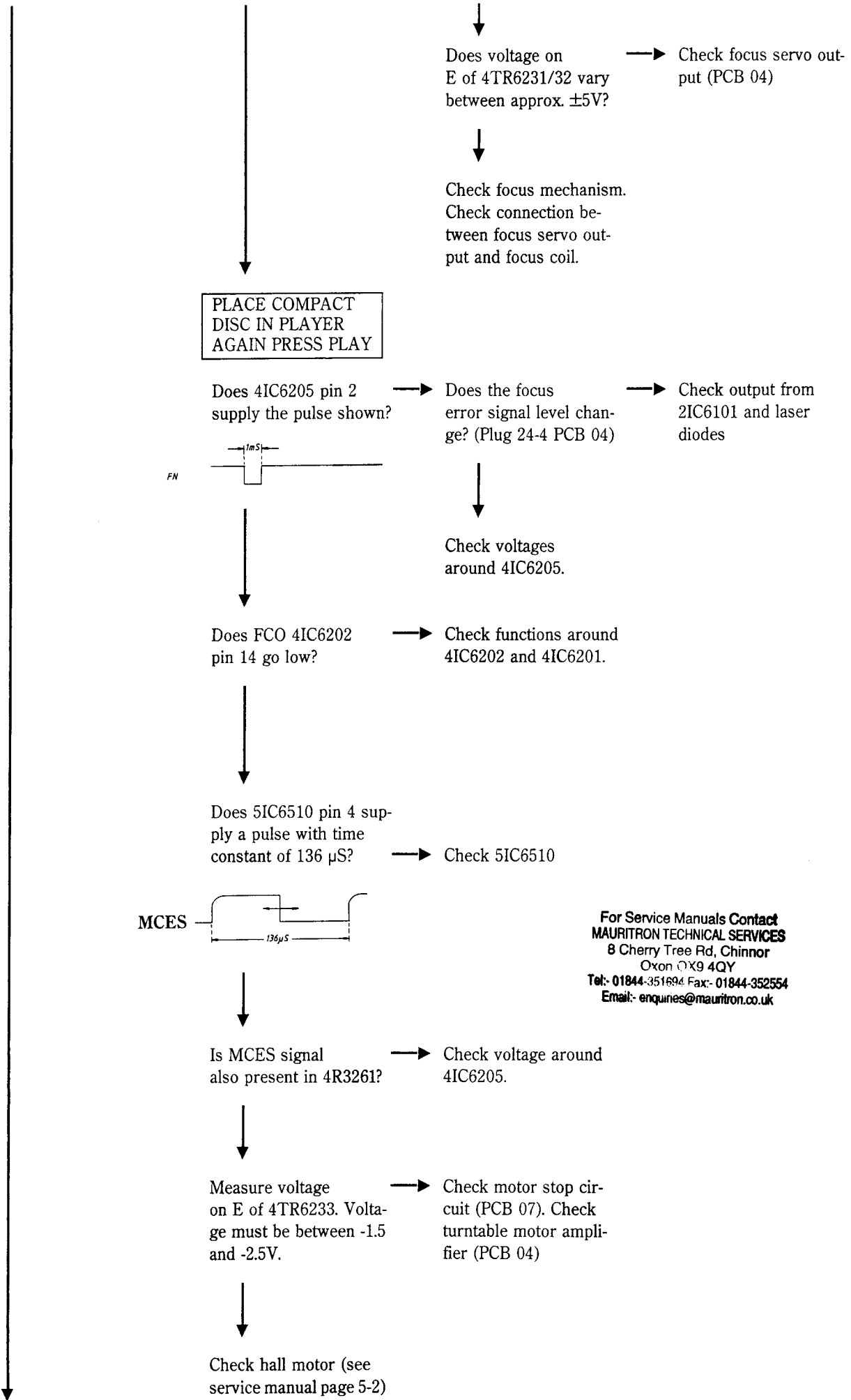
↓  
Is laser angle correct in relation to disc? (see service manual page 4-2).

↓  
**REMOVE COMPACT-DISC. PRESS PLAY.**

↓  
Note if laser moves up and down approx. 3 times. Does the laser move?

→ Does 4IC6202 pins 12 and 13 supply the pulses shown? → Check functions around 4IC6202





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CAN ONLY BE MEASURED WHILE COMPACT DISC TURNS

3.

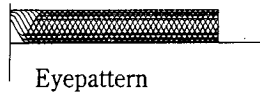
IF DISC STOPS TURNING, ACTIVATE PLAY AGAIN

COMPACT DISC  
STARTS TURNING

(In some cases the disc  
stops again)

Do green digits  
light?

→ Can an eyepattern  
signal (approx. 1 Vpp)  
be measured in test  
point 65 (5IC6501  
pin 7)?



↓  
Do HFLS, HFL and  
 $\overline{DO}$  (5IC6508) go high?  
If no constant high signal  
is measured it is  
probably due to radial  
servo circuit being defective.

↓  
Does  $\overline{RCO}$   
(4IC6211 Pin 9) go  
high? Must remain constantly high.

→ Does laser move  
towards center of disc  
when starting up?  
(lead in area)

↓  
Check h.f. amplifier

→ Check automatic gain  
control and offset control,  
as follows:  
Measure voltage on pin  
14 of 4IC6215, voltage  
must be  $-2.7V \pm 2V$ .  
If this is kept the offset  
control circuit is declared  
OK.  
If not check offset control.  
Measure voltage of pin  
1 of 4IC6212 to be  $-4.3V \pm 2V$ .  
If this is kept the automatic  
gain control circuit is  
declared OK.  
If not, check gain control.  
If voltages are measured  
in both circuits beyond  
the tolerances indicated,  
faults must be found in  
circuits with influence  
on both control circuits,  
e.g. 650 Hz OSC or servo  
signal paths loop.

→ Check radial servo output  
(PCB 04).  
Check control signals  
for radial start up, e.g.  
 $\mu$ DAC, RDIR, and RCO  
4IC6211.  
If OK

↓  
Try manually to lead laser  
to spot on the disc  
where there is certainly  
a signal. Hold laser  
around this spot while  
simultaneously measuring  
HFLS (5IC6508 pin 1):  
Is it now possible to  
measure pulses on  
HFLS. If not, check  
drop-out HF level detector  
(PCB05).

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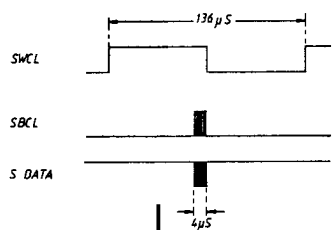
Does P-data (5IC6501 pin 5) go low?

→ Is the PLL circuit locked in? (5IC6501 pin 22 must change from approx. 1.8MHz in stop mode to 4.3 MHz in play mode).

→ Check eye-pattern  
Check functions around 5IC6501.

Check functions around 5IC6501.

Are Q-data transmitted from 5IC6501 pins 2, 3, 4 to 4IC6201 pins 26, 27, 1?



→ Check functions around 5IC6501, 5IC6504, 4IC6201.

Check functions around display IC (6IC6078)

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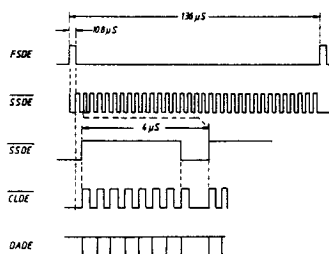
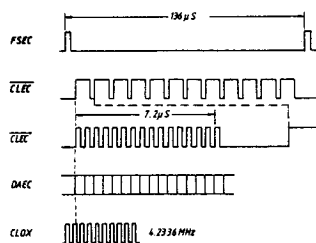
In order to see the signal sequences in an oscilloscope it is necessary to trigger on the signal shown at the top of the oscillogram.

The signals within each oscillogram must synchronize in order to consider the signal communication between the IC's to be OK.

Is signal present on the output of CD player?

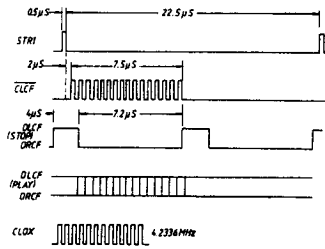
→ Is the UNEC flag between 5IC6510 and 5IC6514 low? (Data from ERCO to CIM OK?)

→ Check data transmission between DEMOD and ERCO. Are they OK?

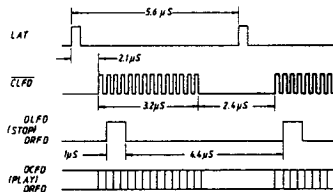


↓  
Check data transmission  
between ERCO/RAM.

↓  
Check data transmission  
between CIM and FIL.  
Are they OK?



↓  
Check data transmission  
between FIL and DAC.  
Are they OK?



↓  
Check functions around  
analogue output

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