
ALPHA MCD PLAYER SERVICE MANUAL

Master Clock

The DAC master clock is provided by the crystal oscillator circuit based around X2, and the second harmonic of this clock is filtered by X3, and amplified through the inverter Z7. This strong clock is then used to override the clock on board the mech in order to make it possible to reduce jitter.

The Alpha MCD takes SPDIF data directly from the KSK2000A mechanism.

This data is decoded by Z9 (CS8412), into CLOCK, WORD SELECT, and DATA to be input into the DAC (CS4327).

Since the DAC master clock is used to re-clock the mech the clock, data, and word select signals into the DAC will all be cleaned up by the input latches of the DAC, which is synchronised directly to the master clock. The DAC then outputs left and right analogue signals into the two stage analogue filter section.

Mute & Remote Bus.

The mute circuit is based around the relay, and operates from the on/ off switch. On switch-on, there is a short delay, to prevent any clicks etc. which may be produced while the MCD is powering up appearing on the audio outputs. The mute at all other times is provided by the muting capabilities of the DAC itself.

The MCD remote bus is basically a buffer-filter which removes the carrier from the RC-5 code, and dumps what is left on the remote in to the PIC micro. There is no automatic override of the IR receiver, so there is a 0 ohm resistor which can be removed to disable the front panel remote capability.

CXP50716-073Q Microprocessor.

This Sony supplied micro basically does it all. It drives the LCD display directly, takes commands from the front panel buttons, and also from the remote control.

However, our own PIC micro is also used in the MCD as a translator between NEC and RC-5 control codes. It also handles commands taken from the remote bus.

The Sony micro requires a code to be hard wired to it. This is done using diodes D1, D2, D3, D12, D17, D19, D21, D22, and D23. These are used to interconnect pins on the micro. (XCHECK4, XCHECK3, XCHECK2, XCHECK1, PH1, PH2, PH3, and PH4.

The micro is also charged with completing the control loop for the mech.

Analogue Filter.

The analogue filter is split into two stages, one with gain, and one without. The first stage (Z4B & Z5B) is a simple active filter, used to remove extraneous signals from the audio waveform. The second stage (Z4a & Z5A) of the filter is the gain stage, used to boost the audio to the required output level.

Digital Output.

The digital output is basically the raw SPDIF data multiplied up using the digital output transformer (T1). This data is available on the rear panel via a phono connector (SK6).

Audio Outputs.

There are two pairs of audio outputs on the rear panel. There are connected directly together, and the second pair is provided to assist when using the unit in a multi-room system environment.

Power Supplies

The main power supply on the MCD is a 9 volt supply from Z206. This is the power for the KSK2000A mechanism, which in its' turn supplies P5V M to the display board.

The analogue supplies are +/- 15V from Z204 & Z205 respectively, and 5 volts from Z208.

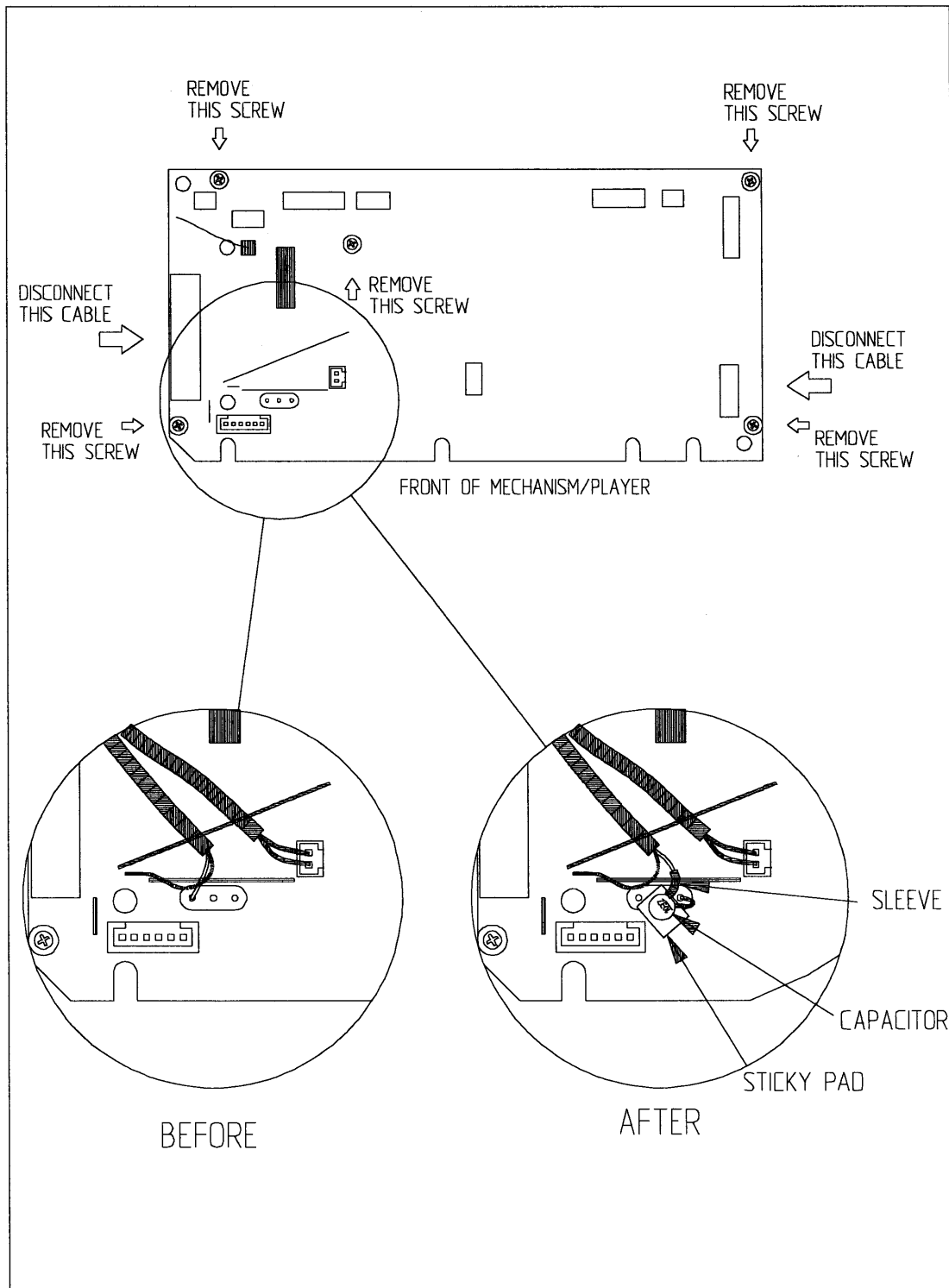
There is also a 5 volt DAC supply from Z207, a 5 volt backlight supply from Z3, a 5 volt clock supply from Z6, and a 5 volt backup supply from Z11.

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ALPHA MCD PLAYER MODIFICATIONS

1. Remove the top cover of the unit by undoing the 4 side screws and 2 screws along the rear edge of the top cover.
2. Locate the PCB (printed circuit board) on top of CD mechanism.
3. Unscrew five screws and detach two cables, as indicated on figure 1.
4. Lift the PCB off its locating pegs, move it forwards by about 5mm and fold the front edge upwards, to expose the underside of the PCB.
5. Refer to figure 2 ('Before') and desolder the red cable from the left hand hole of X201.
N.B. The tracks on this PCB are very fragile and are easily damaged by excess heat from a soldering iron.
6. Refer to figure 3 ('After') and place the supplied sticky pad into the position shown.
7. Place the supplied 10nF capacitor onto the sticky pad and solder one of its leads into the right hand pin of X201. Crop the excess lead.
8. Trim the other lead of the capacitor to about 10mm length and tin it with solder.
9. Slide the sleeving over the free end of the red piece of cable and solder this wire to the free lead of the capacitor.
10. Slide the sleeving down to cover the exposed wire.
11. Ensure that there are no shorts or blobs of solder.
12. Relocate the PCB onto the mechanism and replace the five screws and two leads.
13. Test the unit.
14. Refit the top cover.

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PARTS LIST

Ref No	Description	Part No.
BL1	MCD BACKLIGHT	L802ML
C1	MLC 10N 50V X7R 10% SM	2C310
C2	MLC 10N 50V X7R 10% SM	2C310
C3	MLC 10N 50V X7R 10% SM	2C310
C4	MLC 10N 50V X7R 10% SM	2C310
C5	MLC 10N 50V X7R 10% SM	2C310
C6	MLC 10N 50V X7R 10% SM	2C310
C7	MLC 10N 50V X7R 10% SM	2C310
C8	MLC 10N 50V X7R 10% SM	2C310
C9	MLC 10N 50V X7R 10% SM	2C310
C10	MLC 10N 50V X7R 10% SM	2C310
C11	CERD 10N 100V 20%	2A310
C12	MLC 10N 50V X7R 10% SM	2C310
C13	MLC 10N 50V X7R 10% SM	2C310
C14	MLC 10N 50V X7R 10% SM	2C310
C15	ELST 22U 63V	2N622
C16	ELST 22U 63V	2N622
C17	ELST 100U 25V	2N710
C18	ELST 100U 25V	2N710
C19	ELST 22U 20V OSCON	2P622
C20	MLC 10N 50V X7R 10% SM	2C310
C21	PPRO 680P 5% 63V RA	2D168
C22	PPRO 680P 5% 63V RA	2D168
C23	PPRO 680P 5% 63V RA	2D168
C24	PPRO 680P 5% 63V RA	2D168
C25	ELST NON POLAR 10UF 35V	2U610
C26	ELST NON POLAR 10UF 35V	2U610
C27	PPRO 100P 63V 5% RA	2D110N
C28	PPRO 100P 63V 5% RA	2D110N
C29	PPRO 100P 63V 5% RA	2D110N
C30	PPRO 100P 63V 5% RA	2D110N
C31	MLC 10N 50V X7R 10% SM	2C310
C32	MLC 10N 50V X7R 10% SM	2C310
C33	ELST 1M0 25V	2N810
C34	MLC 10N 50V X7R 10% SM	2C310
C35	PPRO 680P 5% 63V RA	2D168
C36	ELST 3M3 25V	2N833
C37	ELST 10U 50V	2N610
C38	ELST 100U 25V	2N710
C39	ELST 100U 25V	2N710
C40	ELST 100U 25V	2N710
C41	PPRO 680P 5% 63V RA	2D168
C42	ELCAP 0F1 5V MEMORY BACKUP	2X010

C43	ELST 1M0 25V	2N810
C44	ELST 1M0 25V	2N810
C45	ELST 1M0 25V	2N810
C46	ELCAP 0F1 5V MEMORY BACKUP	2X010
C47	ELST 1M0 25V	2N810
C48	ELST 1M0 25V	2N810
C49	ELST 10U 50V	2N610
C50	ELST 10U 50V	2N610
C51	ELST 1M0 25V	2N810
C52	MLC 22P 100V NPO 5% SM	2C022
C53	MLC 100P 100V NPO 5% SM	2C110
C54	CERD 10N 100V 20%	2A310
C55	MLC 47P 100V NPO 5% SM	2C047
C57	MLC 33P 100V NPO 5% SM	2C033
C58	ELST 10U 50V	2N610
C59	ELST 10U 50V	2N610
C60	ELST 1U0 50V 20% RA	2N510
C61	MLC 10N 50V X7R 10% SM	2C310
C62	MLC 10N 50V X7R 10% SM	2C310
C63	MLC 22P 100V NPO 5% SM	2C022
C64	PPRO 680P 5% 63V RA	2D168
C65	ELST 100U 25V	2N710
C66	ELST 100U 25V	2N710
C67	ELST 22U 20V OSCON	2P622
C68	MLC 47N 50V X7R 10% SM	2C347
C69	ELST 470U 25V RA	2N747
C70	MLC 47N 50V X7R 10% SM	2C347
C71	ELST 10U 50V	2N610
C72	MLC 470P 100V NPO 5% SM	2C147
C73	MLC 10N 50V X7R 10% SM	2C310
C74	CERD 6P8 63V 20% RA	2A006
C76	MLC 10N 50V X7R 10% SM	2C310
CS4327	IC STEREO	5G4327
D1	SSDIODE 1N4148 75V	3A4148
D2	SSDIODE 1N4148 75V	3A4148
D3	SSDIODE 1N4148 75V	3A4148
D4	ULTRAFAST RECTIFIER DIODE UF4003 1A	3B4003F
D5	ULTRAFAST RECTIFIER DIODE UF4003 1A	3B4003F
D6	ULTRAFAST RECTIFIER DIODE UF4003 1A	3B4003F
D7	ULTRAFAST RECTIFIER DIODE UF4003 1A	3B4003F
D8	ULTRAFAST RECTIFIER DIODE UF4003 1A	3B4003F
D9	ULTRAFAST RECTIFIER DIODE UF4003 1A	3B4003F
D10	ULTRAFAST RECTIFIER DIODE UF4003 1A	3B4003F
D11	ULTRAFAST RECTIFIER DIODE UF4003 1A	3B4003F
D12	SSDIODE 1N4148 75V	3A4148

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D13	RECTIFIER 1N4003F 1A 200V	3B4003
D14	RECTIFIER 1N4003F 1A 200V	3B4003
D15	RECTIFIER 1N4003F 1A 200V	3B4003
D16	RECTIFIER 1N4003F 1A 200V	3B4003
D17	SSDIODE 1N4148 75V	3A4148
D18	SSDIODE 1N4148 75V	3A4148
D19	SSDIODE 1N4148 75V	3A4148
D20	SSDIODE 1N4148 75V	3A4148
D21	SSDIODE 1N4148 75V	3A4148
D22	SSDIODE 1N4148 75V	3A4148
D23	SSDIODE 1N4148 75V	3A4148
D24	SSDIODE 1N4148 75V	3A4148
D25	RECTIFIER 1N4003F 1A 200V	3B4003
D26	SSDIODE 1N4148 75V	3A4148
D27	ZENER 4V7 400MW	3C04704
D28	SSDIODE 1N4148 75V	3A4148
D29	SSDIODE 1N4148 75V	3A4148
D30	SSDIODE 1N4148 75V	3A4148
D31	SSDIODE 1N4148 75V	3A4148
DAC	IC STEREO	5G4327
DISP1	ALPHA MCD LCD	E812MC
EL1	LCD and Backlight clip	E834PM
EL3	LCD and Backlight clip	E834PM
F1	INS COVER PCB FUSEHOLDER	F022
F1	FUSE 20mm 160mA T S504160mA	C11166
F1	FUSEHOLDER 20mm PCB	8S004
F2	INS COVER PCB FUSEHOLDER	F022
F2	FUSEHOLDER 20mm PCB	8S004
F5	SPARE FUSEHOLDER	F062
F5	FUSE 20mm 160mA T S504160mA	C11166
HS1	HEATSINK TO220 CLIP 30	F007
HS2	HEATSINK CLIP TO220 13/8.6 DC/W	F006
HS2	HEATSINK TO220 8.6 DEGC/W	F008
HS3	HEATSINK TO220 CLIP 30	F007
L1	33UH IND SM 1812 180mA	7B033
L2	2U2H INDUCTOR	7D922
L4	33UH IND SM 1812 180mA	7B033
L8	27mH INDUCTOR	7D327
LED1	LED GREEN 5MM	3D001
PCB	PRINTED CIRCUIT BOARD	L836PB
Q3	TRANS LF SS N SM BC847B	4A847
Q4	TRANS LF SS N SM BC847B	4A847
Q5	TRANS LF SS N SM BC847B	4A847
Q6	TRANS LF SS N SM BC847B	4A847
Q9	TRANS LF SS P SM BC857B	4A857B

R1	RESISTOR SM W4 3K3 2%	1A233
R2	RESISTOR SM W4 3K3 2%	1A233
R3	RESISTOR SM W4 1K0 2%	1A210
R4	RESISTOR SM W4 1K0 2%	1A210
R5	RES CF 1W 5R6 5%	1E856
R6	RESISTOR SM W4 1K0 2%	1A210
R7	RESISTOR SM W4 1K0 2%	1A210
R8	RESISTOR SM W4 1K0 2%	1A210
R9	RESISTOR SM W4 1K0 2%	1A210
R10	RESISTOR SM W4 1K0 2%	1A210
R11	RESISTOR SM W4 1K0 2%	1A210
R12	RESISTOR SM W4 1K0 2%	1A210
R13	RESISTOR SM W4 1K2 2%	1A212
R14	RESISTOR SM W4 1K2 2%	1A212
R15	RESISTOR SM W4 1K2 2%	1A212
R16	RESISTOR SM W4 4K7 2%	1A247
R17	RESISTOR SM W4 4K7 2%	1A247
R18	RESISTOR SM W4 4K7 2%	1A247
R19	RESISTOR SM W4 4K7 2%	1A247
R20	RESISTOR SM W4 4K7 2%	1A247
R21	RESISTOR SM W4 1K0 2%	1A210
R22	RESISTOR SM W4 22K 2%	1A322
R23	RESISTOR SM W4 22K 2%	1A322
R24	RESISTOR SM W4 22K 2%	1A322
R25	RESISTOR SM W4 100K 2%	1A410
R26	RESISTOR SM W4 100R 2%	1A110
R27	RESISTOR SM W4 330R 2%	1A133
R28	RES MF FU W3 5% 10R NFR25	1G010
R30	RES MF FU W3 5% 10R NFR25	1G010
R31	RESISTOR SM W4 1K0 2%	1A210
R32	RESISTOR SM W4 4K7 2%	1A247
R33	RESISTOR SM W4 100R 2%	1A110
R34	RESISTOR SM W4 100K 2%	1A410
R35	RESISTOR SM W4 470R 2%	1A147
R36	RES MF FU W3 22R 5% NFR25	1G022
R37	RES MF FU W3 5% 10R NFR25	1G010
R38	RES MF W4 390R 1%	1H139
R39	RES MF W4 220R 1%	1H122
R40	RES MF W4 220R 1%	1H122
R41	RES MF W4 2K4 1%	1H224
R42	RES MF W4 1K0 1%	1H210
R43	RES MF W4 330R 1%	1H133
R44	RES MF FU W3 3R3 5% NFR25	1G833
R45	RES MF FU W3 3R3 5% NFR25	1G833
R46	RES MF W4 2K4 1%	1H224

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R47	RES MF W4 2K4 1%	1H224
R48	RES MF FU W3 22R 5% NFR25	1G022
R49	RES MF W4 100R 1%	1H110
R50	RESISTOR SM W4 3K9 2%	1A239
R51	RESISTOR SM W4 3K9 2%	1A239
R52	RESISTOR SM W4 3K9 2%	1A239
R53	RESISTOR SM W4 3K9 2%	1A239
R54	RESISTOR SM W4 3K9 2%	1A239
R55	RESISTOR SM W4 3K9 2%	1A239
R56	RESISTOR SM W4 10k 2%	1A310
R57	RESISTOR SM W4 10k 2%	1A310
R58	RESISTOR SM W4 4K7 2%	1A247
R59	RESISTOR SM W4 4K7 2%	1A247
R60	RESISTOR SM W4 3K9 2%	1A239
R61	RESISTOR SM W4 3K9 2%	1A239
R62	RESISTOR SM W4 4K7 2%	1A247
R63	RESISTOR SM W4 4K7 2%	1A247
R64	RESISTOR SM W4 22R 2%	1A022
R65	RESISTOR SM W4 220K 2%	1A422
R66	RESISTOR SM W4 100R 2%	1A110
R67	RESISTOR SM W4 47R 2%	1A047
R68	RESISTOR SM W4 120R 2%	1A112
R69	RESISTOR SM W4 120R 2%	1A112
R72	RESISTOR SM W4 10k 2%	1A310
R73	RESISTOR SM W4 10k 2%	1A310
R74	RESISTOR SM W4 4K7 2%	1A247
R75	RESISTOR SM W4 470R 2%	1A147
R76	RESISTOR SM W4 100R 2%	1A110
R77	RESISTOR SM W4 100K 2%	1A410
R78	RESISTOR SM W4 1K2 2%	1A212
R81	RESISTOR SM W4 1K0 2%	1A210
R84	RESISTOR SM W4 100K 2%	1A410
R85	RESISTOR SM W4 10k 2%	1A310
R88	RES MF FU W3 22R 5% NFR25	1G022
R89	RESISTOR SM W4 220R 2%	1A122
R90	RESISTOR SM W4 10k 2%	1A310
R91	RESISTOR SM W4 10k 2%	1A310
R92	RESISTOR SM W4 10k 2%	1A310
R93	RESISTOR SM W4 1K5 2%	1A215
R94	RESISTOR SM W4 1K8 2%	1A218
R95	RESISTOR SM W4 1K8 2%	1A218
R96	RESISTOR SM W4 1K0 2%	1A210
R97	RESISTOR SM W4 10k 2%	1A310
R98	RESISTOR SM W4 10k 2%	1A310
R99	RESISTOR SM W4 10k 2%	1A310

R100	RESISTOR SM W4 2K7 2%	1A227
R101	RESISTOR SM W4 1K0 2%	1A210
R102	RESISTOR SM W4 100K 2%	1A410
R103	RESISTOR SM W4 33K 2%	1A333
R104	RESISTOR SM W4 33K 2%	1A333
R105	RESISTOR SM W4 33K 2%	1A333
R106	RESISTOR SM W4 33K 2%	1A333
R107	RESISTOR SM W4 0R0 2%	1A000
R109	RES MF FU W3 22R 5% NFR25	1G022
R110	RES MF FU W3 22R 5% NFR25	1G022
RLY1	RELAY 960 OHM 51SB12T	A205
RX1	REMOTE CONTROL RECEIVER SBX1610-62 38KHZ	B2103
SH1	PHONO EMC SHIELD	E808MC
SK1	RIVET	HP007
SK1	RIVET	HP007
SK1	IEC MAINS 2-PIN PCB	8A014
SK2	25-WAY FFC CONN HORIZ	8K8125
SK3	10-WAY FFC CONN HORIZ	8K8110
SK4	10-WAY FFC CONN VERT	8K8010
SK5	PHONO SKT 4-WAY EMC GOLD	8D225
SK6	PHONO SKT SINGLE EMC	8D220
SK7	MIN JACK DUAL 3.5mm HSJ1002-01-1020	8D302
SK10	2 way vertical skt	8K7002
SK11	2 way vertical skt	8K7002
SW1	TACT SWITCH 2-PIN LOW PROF	A1504
SW2	TACT SWITCH 2-PIN LOW PROF	A1504
SW201	SW PUSH	A1014
SW3	TACT SWITCH 2-PIN LOW PROF	A1504
SW6	TACT SWITCH 2-PIN LOW PROF	A1504
SW7	TACT SWITCH 2-PIN LOW PROF	A1504
SW8	TACT SWITCH 2-PIN LOW PROF	A1504
SW9	TACT SWITCH 2-PIN LOW PROF	A1504
SW10	TACT SWITCH 2-PIN LOW PROF	A1504
SW11	TACT SWITCH 2-PIN LOW PROF	A1504
SW12	TACT SWITCH 2-PIN LOW PROF	A1504
T1	DIGITAL OUTPUT COUPLER K	7E015
T2	Mains common mode choke	7E030
T201	ALPHA 7 CD MAINS TRANSFORMER	L811TX
X1	CER RESON CST4.19MG 4.19MHZ	7W002
X2	CRYSTAL 11.2896MHZ PARALLEL	7X011
X2	GROMMET 8 I/D X 6.5 THK	F021
X3	CRYSTAL 33MHZ PARALLEL	7X033
Z1	IC CD CXP50716-873Q MICRO	5H50716
Z2	IC SOCKET 18 PIN 0.3"	8S018
Z2	IC CMOS MICRO PIC16C54XT/P	5H16C54X

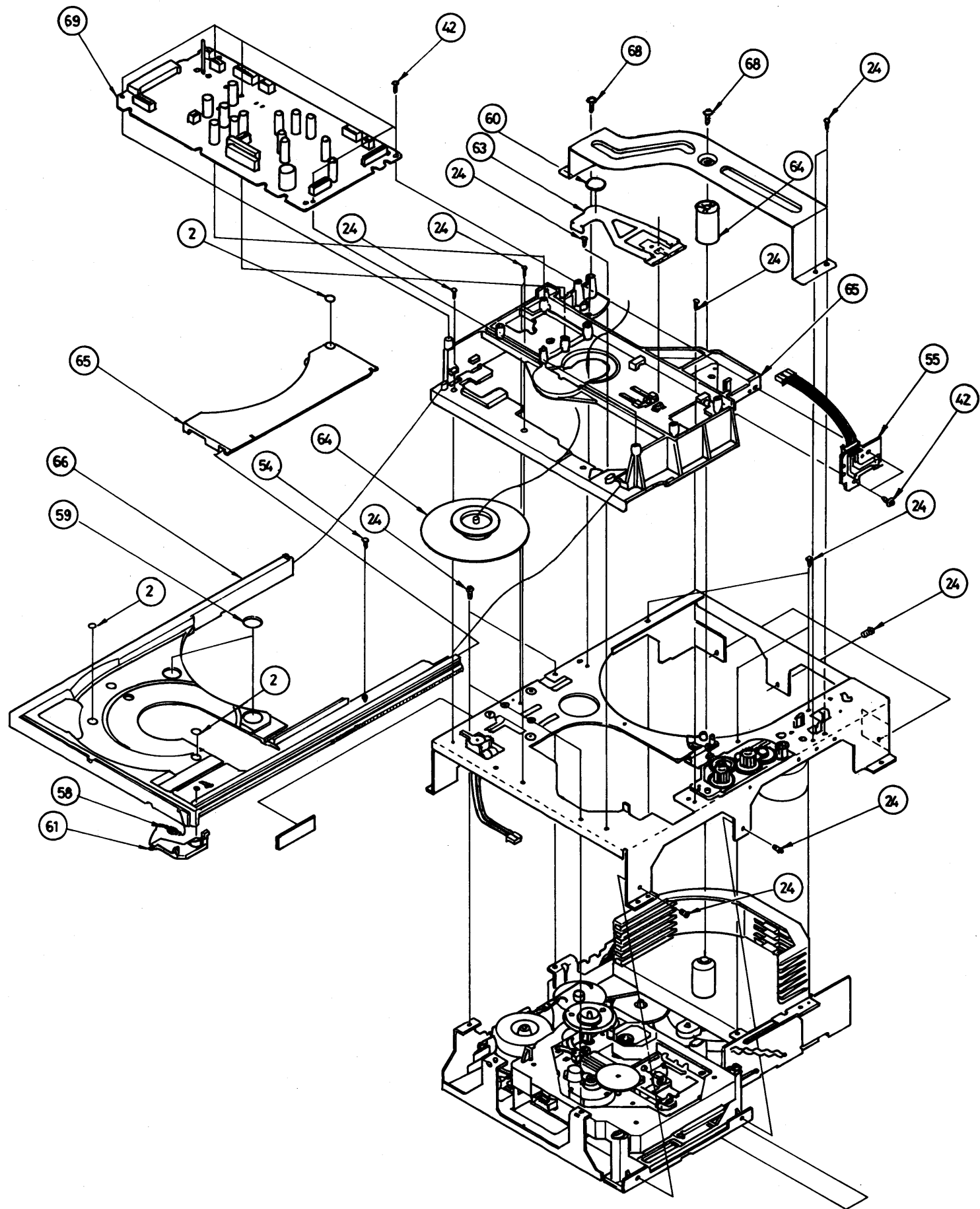
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Z3	IC VREG POS 7805	5D7805
Z4	IC AUDIO DUAL SM 4560D	5B4560M
Z5	IC AUDIO DUAL SM 4560D	5B4560M
Z6	IC VREG POS 78L05	5D78L05
Z7	IC HCMOS SM 74HCU04	5K7404
Z8	IC HCMOS SM 74HCU04	5K7404
Z9	IC CMOS CS8412 SPDIF RX	5G8412
Z10	IC STEREO	5G4327

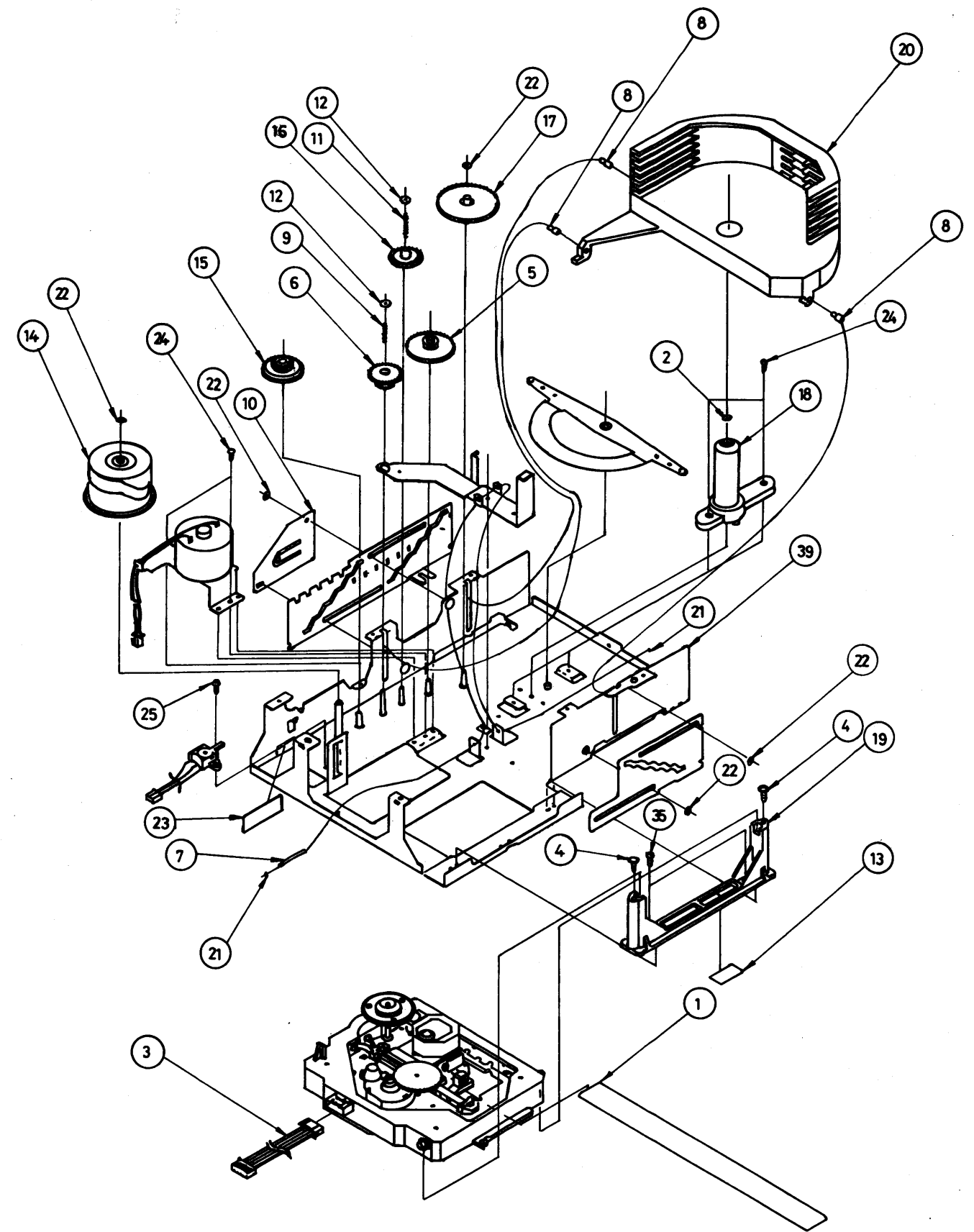
Z11	IC VREG POS 78L05	5D78L05
Z12	IC COMPARITOR SM DUAL LM393A	5M393AD
Z204	IC VREG POS LM317T	5D317T
Z205	IC VREG POS LM337T	5D337
Z206	IC VREG POS LM317T	5D317T
Z207	IC VREG POS LM317T	5D317T
Z208	IC VREG POS 7805	5D7805

Disassembly Diagram

General ASSY



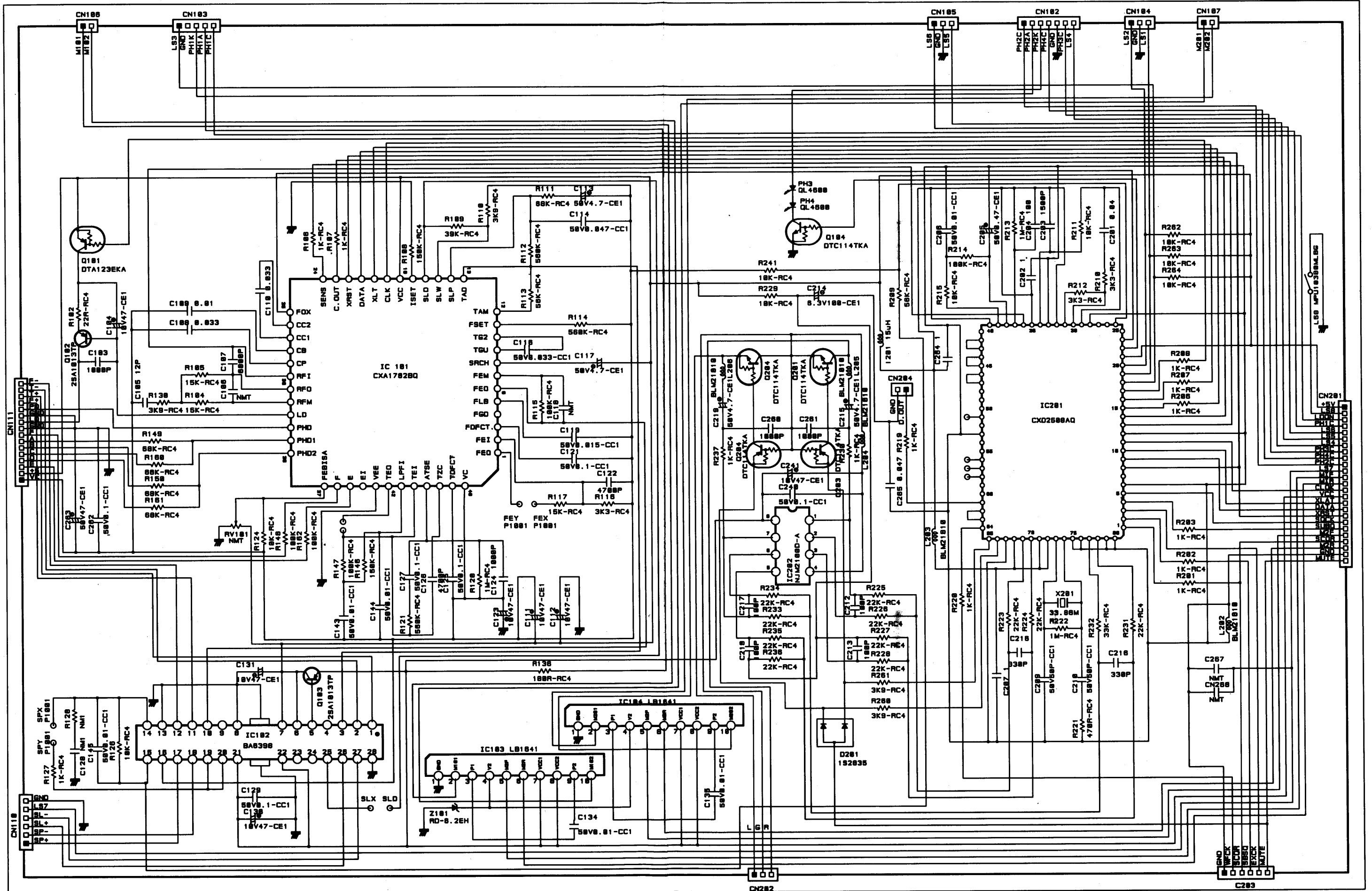
Elevator ASSY



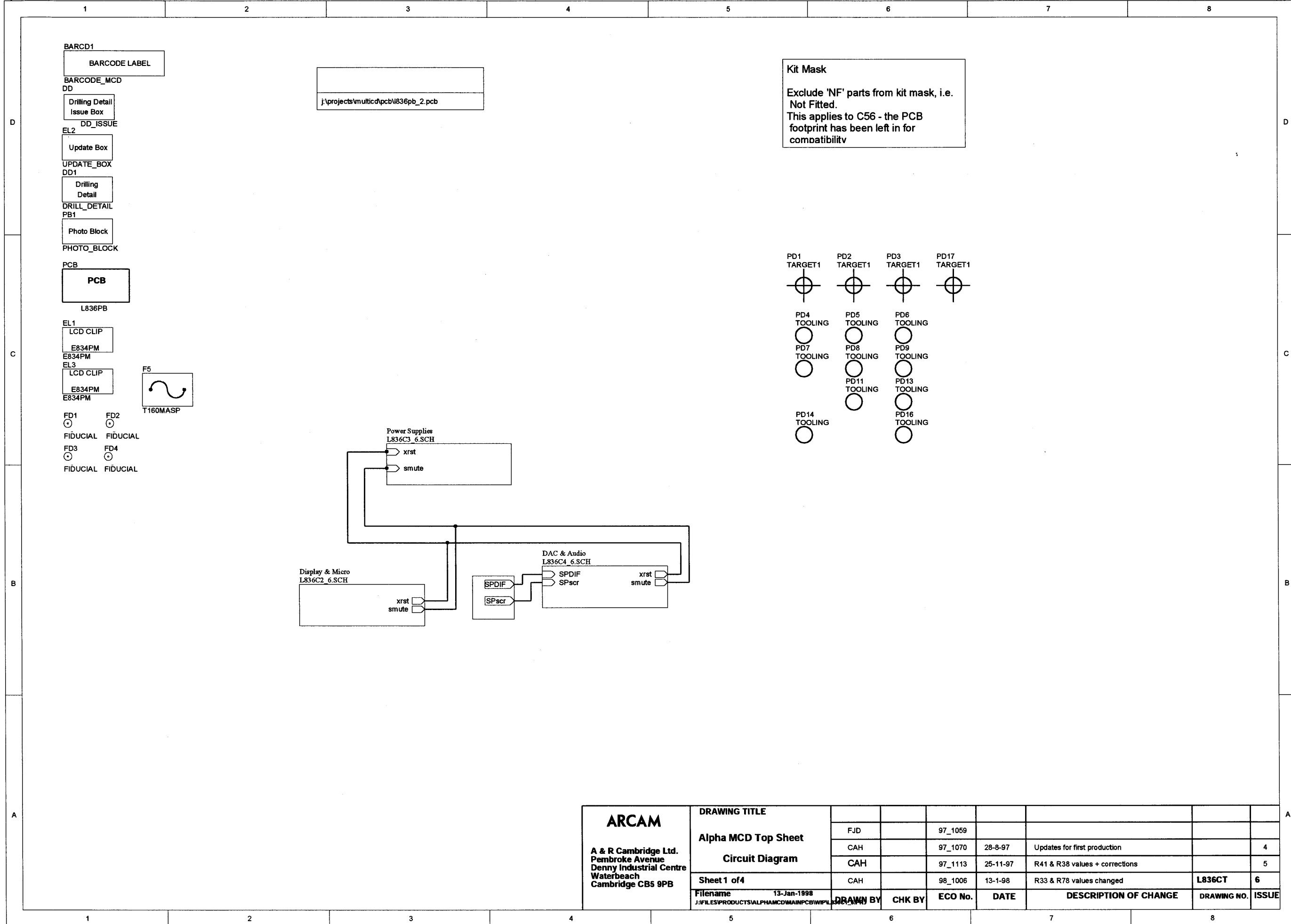
Schematic Diagram

SCHEMATIC DIAGRAM

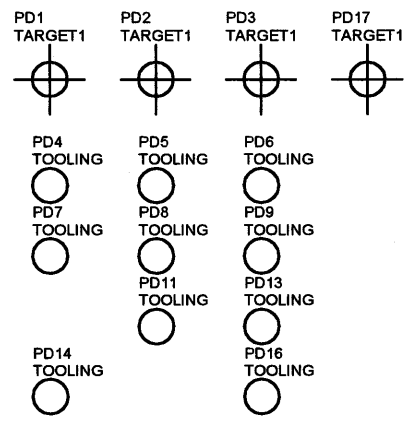
(KSK-2000A)



Spare fuse

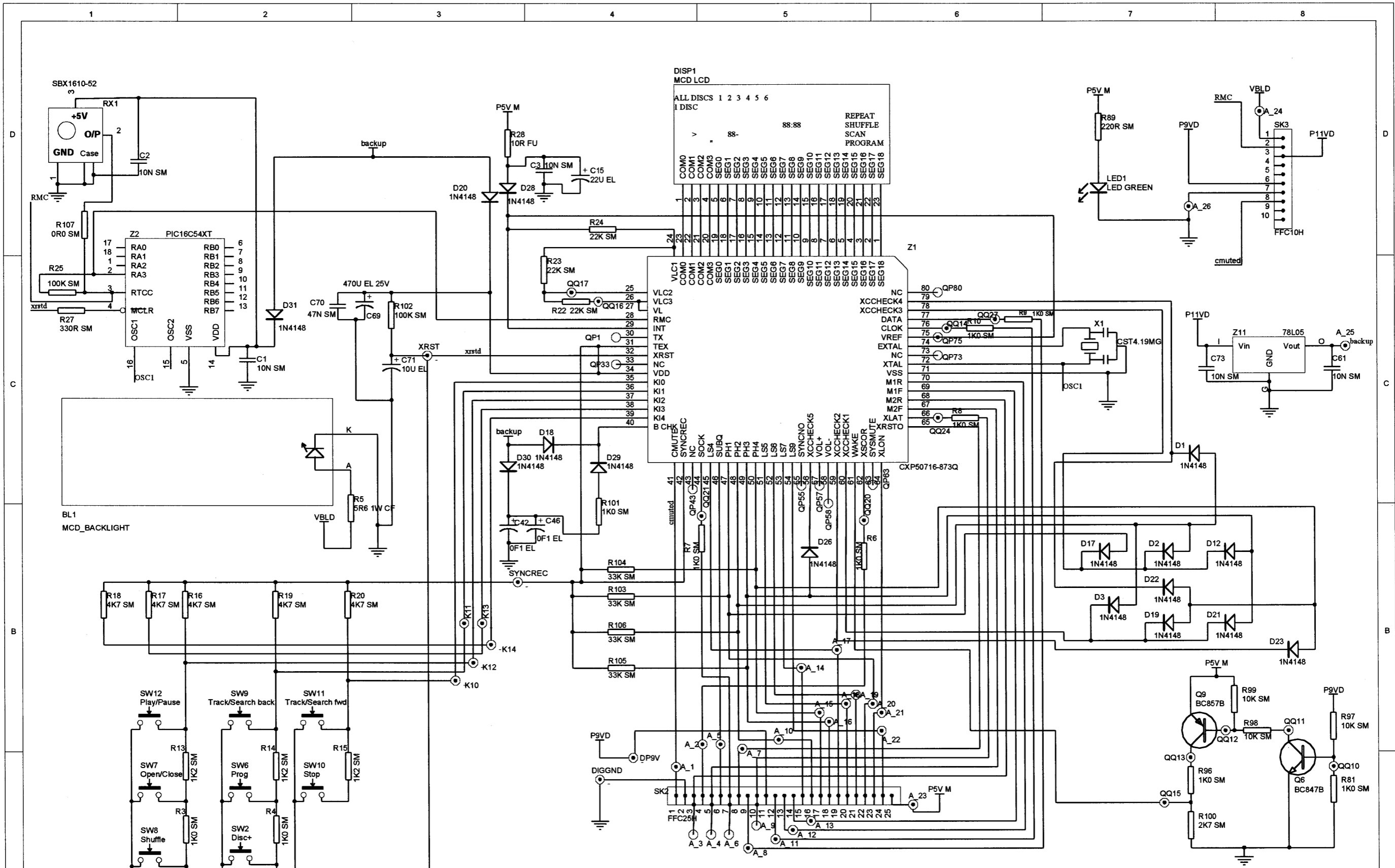


Kit Mask
 Exclude 'NF' parts from kit mask, i.e. Not Fitted.
 This applies to C56 - the PCB footprint has been left in for compatibility

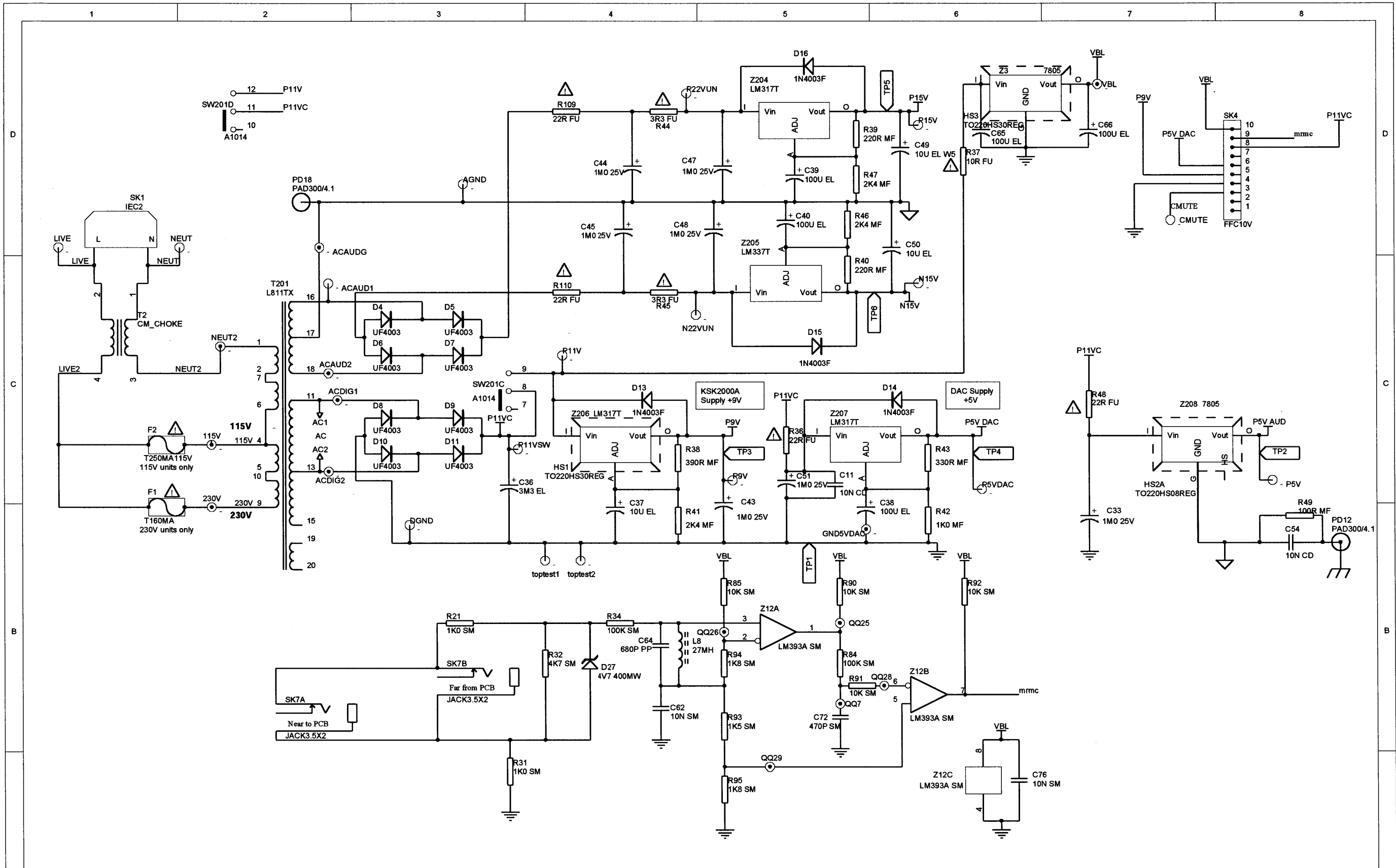


- BARCD1
Barcode LABEL
- BARCODE_MCD
DD
Drilling Detail Issue Box
DD_ISSUE
- EL2
Update Box
- UPDATE_BOX
DD1
Drilling Detail
- DRILL_DETAIL
PB1
Photo Block
- PHOTO_BLOCK
- PCB
L836PB
- EL1
LCD CLIP
E834PM
- EL3
LCD CLIP
E834PM
- F5
T160MASP
- FD1 FIDUCIAL
- FD2 FIDUCIAL
- FD3 FIDUCIAL
- FD4 FIDUCIAL

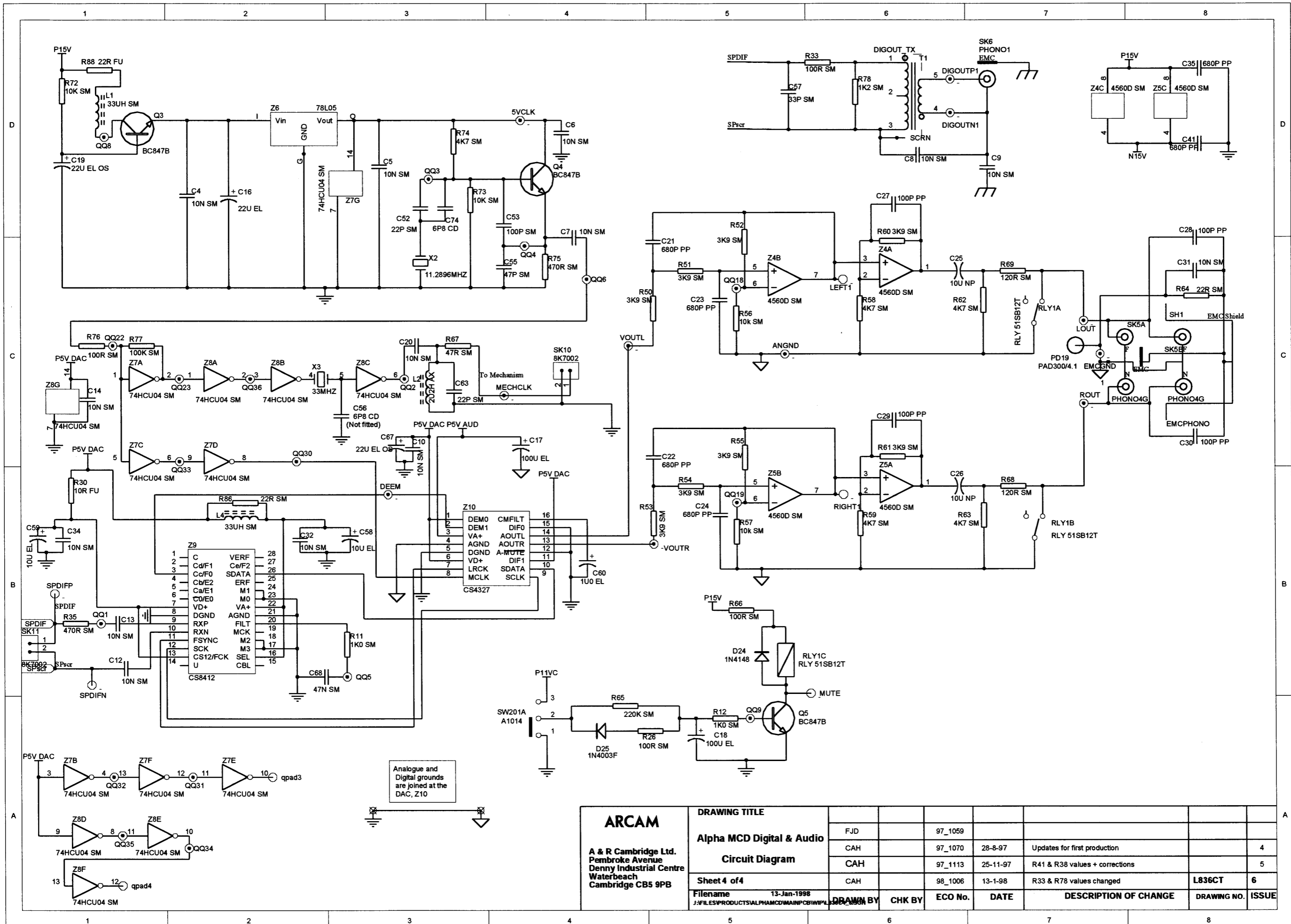
ARCAM A & R Cambridge Ltd. Pembroke Avenue Denny Industrial Centre Waterbeach Cambridge CB5 9PB	DRAWING TITLE								
	Alpha MCD Top Sheet								
	Circuit Diagram		FJD	97_1059					
	Sheet 1 of 4		CAH	97_1070	28-8-97	Updates for first production			4
	Filename: J:\FILES\PRODUCTS\ALPHAMCD\MAINPCB\WIP\... 13-Jan-1998		CAH	97_1113	25-11-97	R41 & R38 values + corrections			5
		CAH	98_1006	13-1-98	R33 & R78 values changed			L836CT 6	
		DRAWN BY	CHK BY	ECO No.	DATE	DESCRIPTION OF CHANGE	DRAWING NO.	ISSUE	



ARCAM A & R Cambridge Ltd. Pembroke Avenue Denny Industrial Centre Waterbeach Cambridge CB5 9PB		DRAWING TITLE							
		Alpha MCD Display Circuit Diagram							
Sheet 2 of 4		CAH	97_1059						
Filename		13-Jan-1998	CAH	97_1070	28-8-97	Updates for first production			4
J:\FILES\PRODUCTS\ALPHA\MCD\MAIN\PCB\WIP\DISP1.CAD		CAH	97_1113	25-11-97	R41 & R38 values + corrections				5
DRAWN BY		CHK BY	ECO No.	DATE	DESCRIPTION OF CHANGE		DRAWING NO.	ISSUE	
					R33 & R78 values changed		L836CT		6



ARCAM A & R Cambridge Ltd. Pembroke Avenue Denny Industrial Centre Waterbeach Cambridge CB5 9PB	DRAWING TITLE							
	Alpha MCD Power Supplies		FJD	97_1059				
	Circuit Diagram		CAH	97_1070	28-8-97	Updates for first production		4
	Sheet 3 of 4		CAH	97_1113	25-11-97	R41 & R38 values + corrections		5
	Filename 13-Jan-1998		CAH	98_1006	13-1-98	R33 & R78 values changed	L836CT	6
	J:\FILES\PRODUCTS\ALPHAMCD\MAINPCB\WIP\...		DRAWN BY	CHK BY	ECO No.	DATE	DESCRIPTION OF CHANGE	DRAWING NO.



ARCAM A & R Cambridge Ltd. Pembroke Avenue Denny Industrial Centre Waterbeach Cambridge CB5 9PB		DRAWING TITLE							
		Alpha MCD Digital & Audio							
		Circuit Diagram							
Sheet 4 of 4		CAH	97_1070	28-8-97	Updates for first production				4
		CAH	97_1113	25-11-97	R41 & R38 values + corrections				5
		CAH	98_1006	13-1-98	R33 & R78 values changed			L836CT	6
Filename	J:\FILES\PRODUCTS\ALPHAMCD\MAINPCB\WIP\PCB.DWG	13-Jan-1998							
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