PORTADISC

SERVICE MANUAL

HHb

FIRST WE LISTEN

2

SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

This appliance is classified as a CLASS 1 LASER product, the CLASS 1 LASER product marking is on the rear of the unit inside the battery compartment.

This equipment fully complies with 21 CFR 1040.10 and 1040.11

CAUTION: Invisible laser radiation when the unit is disassembled, avoid exposure to beam.

CONTENTS

Removing The Top And Bottom Panels

Instructions are best carried through in the following order:

a)   Slide off the plastic battery cover

b)   Remove the 4 screws (A) ~ fig.1

fig.1

c)   Remove the 2 screws (B) ~ fig.2

fig.2

d) Remove the 2 screws (C) ~ fig.3

fig.3

e) Remove the top panel. *Caution: Disconnect speaker connector (D) before fully separating the top panel from the machine ~ fig.4*
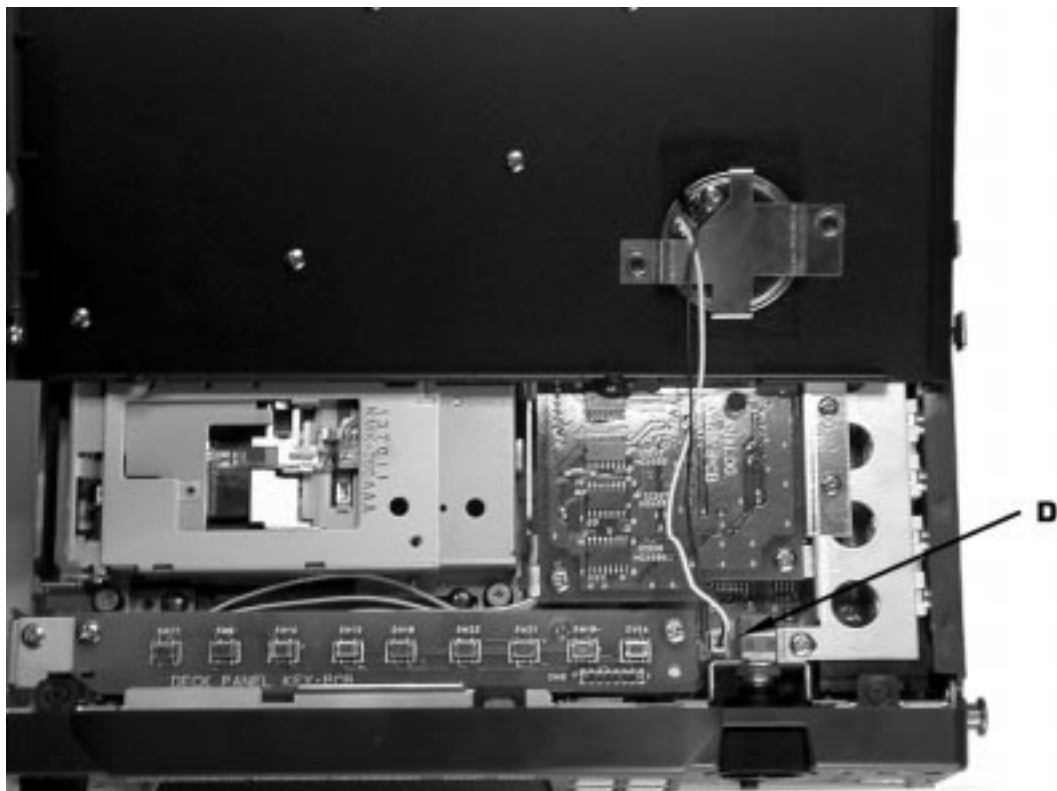
fig.4

f) Remove the bottom panel

Removing The Front Panel

a)   Remove the dual concentric record level knob (A) by pushing through from behind the front panel ~ fig.5

b)   Remove the phone level knob (B)~ fig.5

fig.5

c)   Remove 2 screws (C) ~ fig.6

fig.6

d) Remove 2 screws (D) ~ fig.7
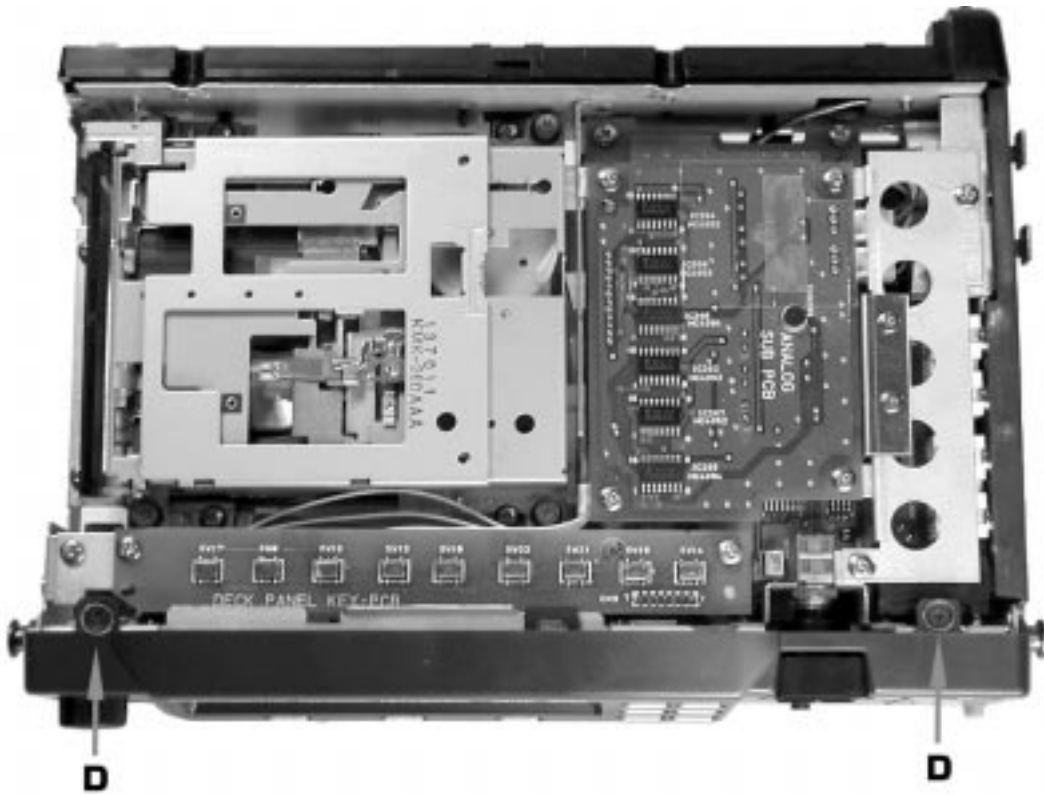
fig.7

e) Lift tab (F) ~ fig.6, then remove the front panel. *Caution: Disconnect ribbon cable (1) before fully separating the front panel from the machine ~ fig.8*
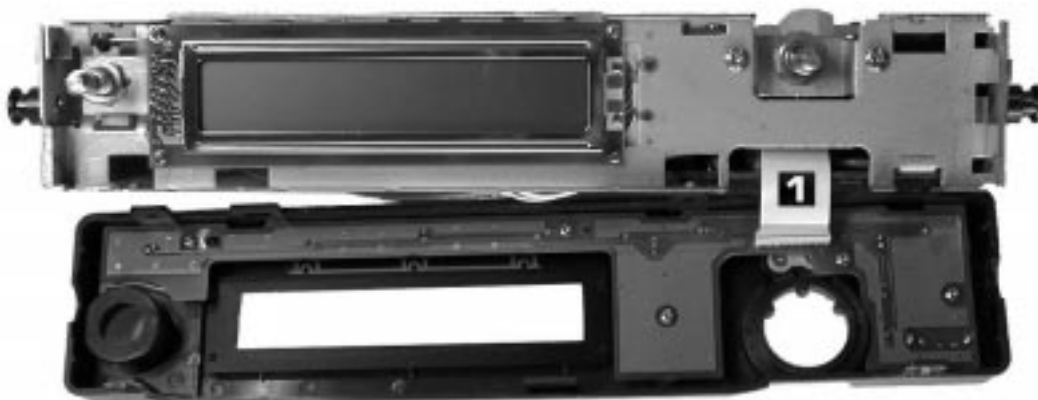
fig.8

Removing The Main CPU Circuit Board

a)   Remove 4 screws (A) ~ fig.9

b)   Remove the SPDIF optical protector plugs if connected

c)   Lift up the CPU board carefully as the board is still attached by several cables

fig.9

d)   Disconnect 8 cables (1 - 8) and remove the board ~ fig.10

fig.10

Removing The MD Mechanism

a)   Remove 4 screws (A) ~ fig.11
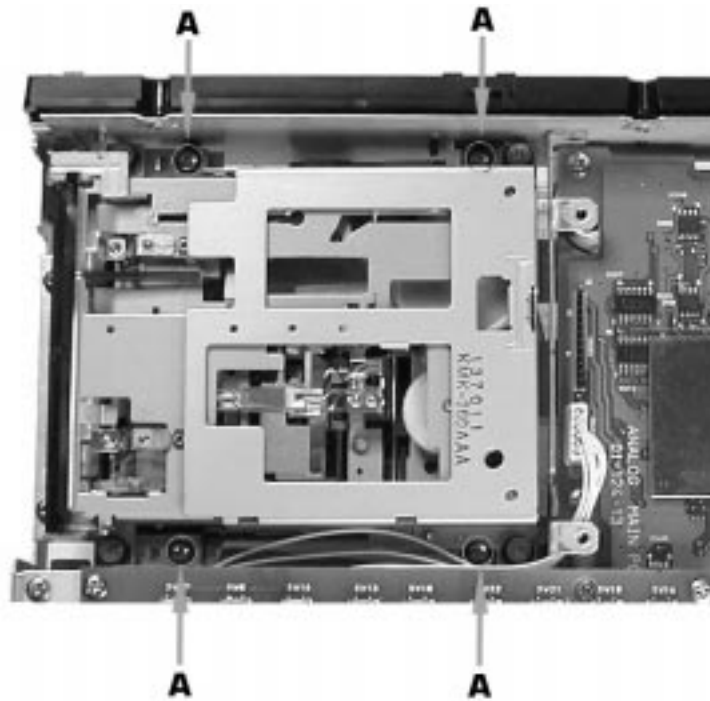
fig.11

b)   Ensure cables (3) and (4) are disconnected ~ fig.10

c)   Lift out the MD mechanism

Removing The Analog Main & Sub Circuit Boards

a) Remove 4 screws (A) ~ fig.12
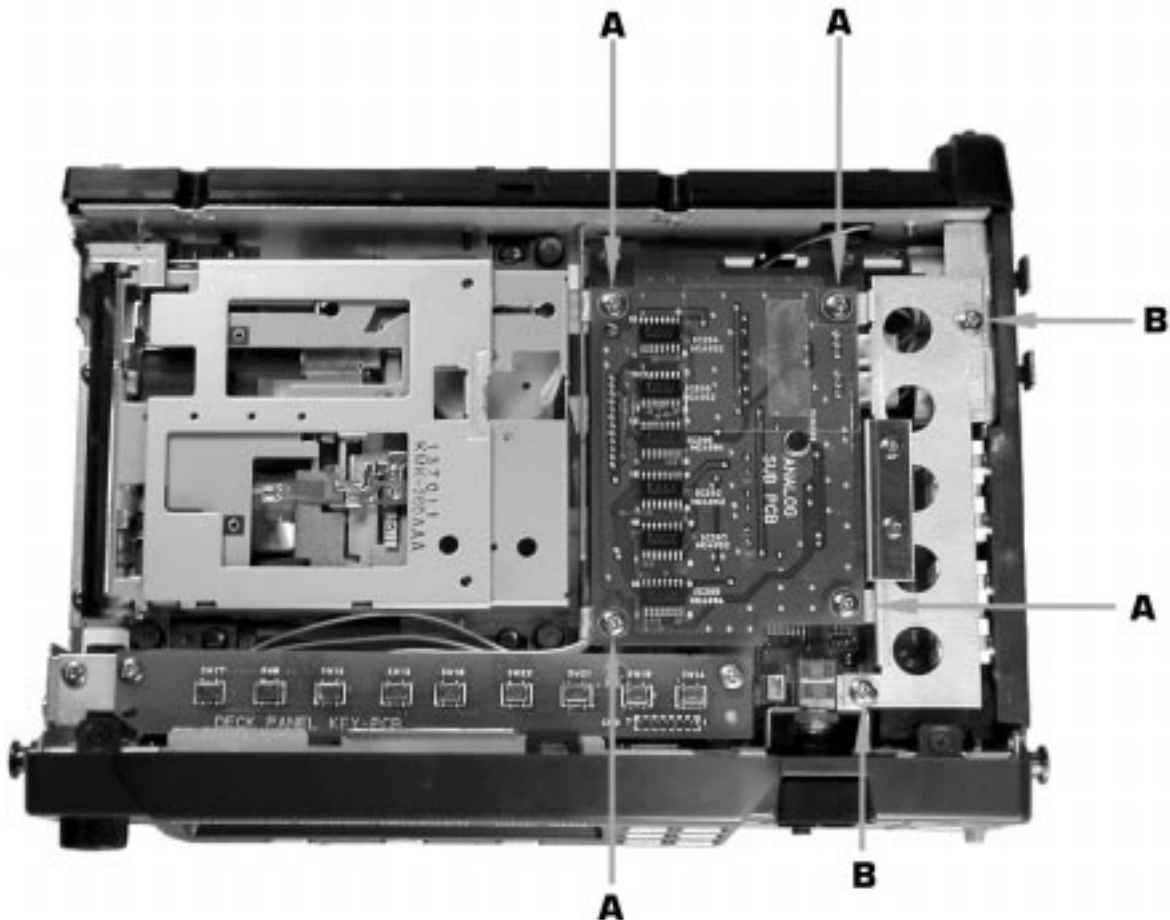
fig.12

b) Disconnect the XLR input cables, (9) and (10) ~ fig.13

c) Remove the Analog Sub pcb

d) Remove 2 screws (B) to remove the metal shield plate ~ fig.12

e) Remove the Record Level Pot locking nut and washer (C) ~ fig.13

f) Disconnect cable, (11) ~ fig.13

g) Remove 3 screws (D) ~ fig.13
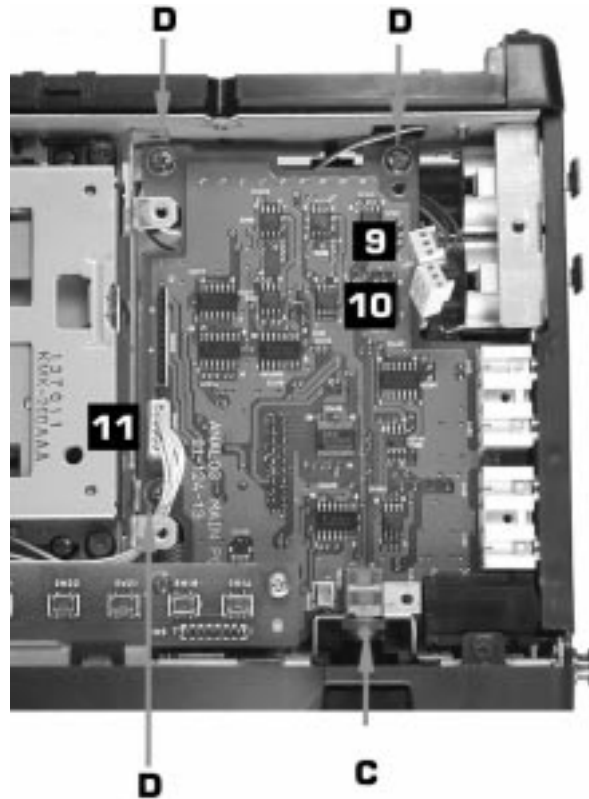
fig. 13

h)   Remove 5 screws (E) ~ fig. 14

i)   Remove the connector side panel (F) ~ fig. 14

j)   Lift out the Analog Main pcb.

fig. 14
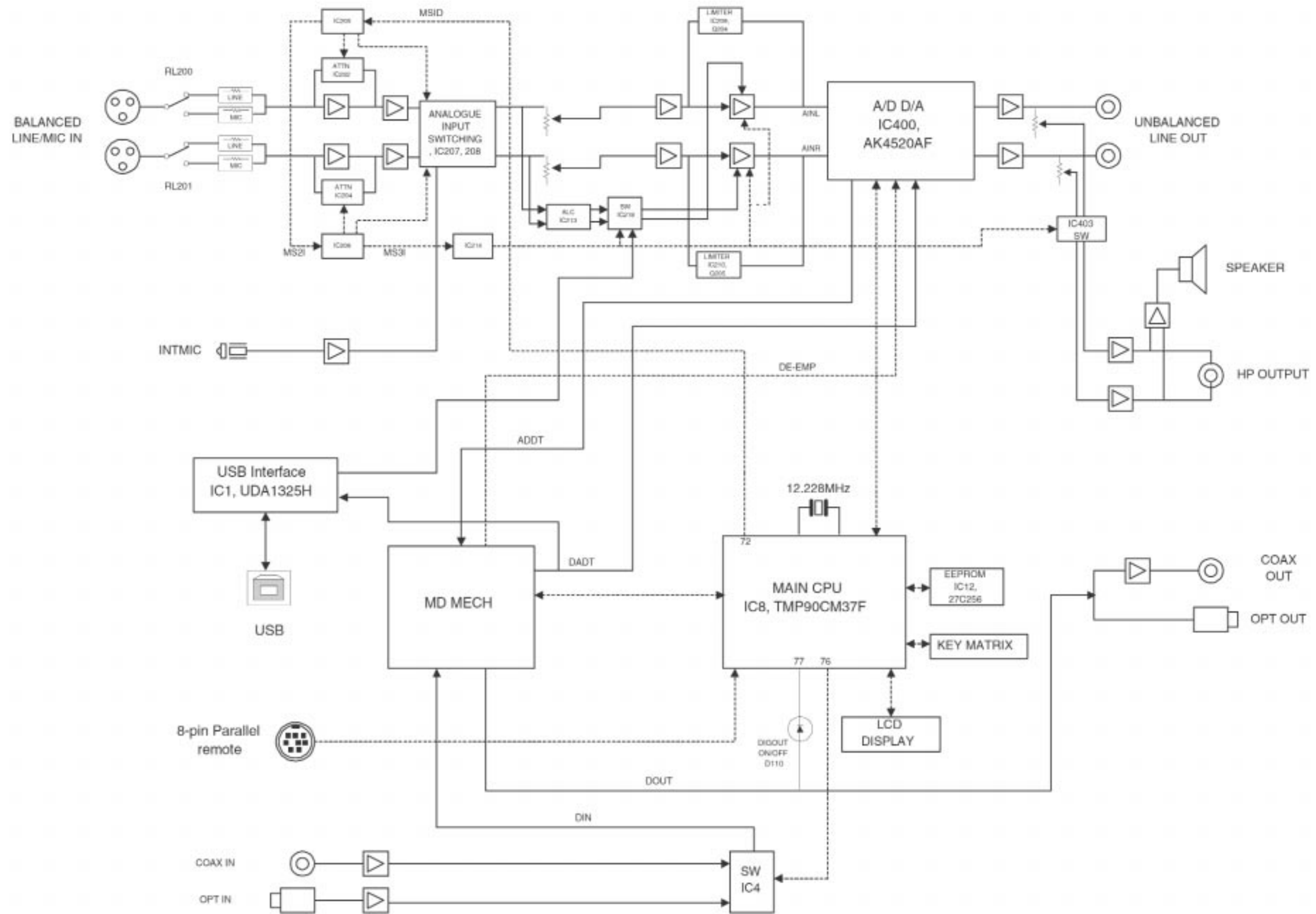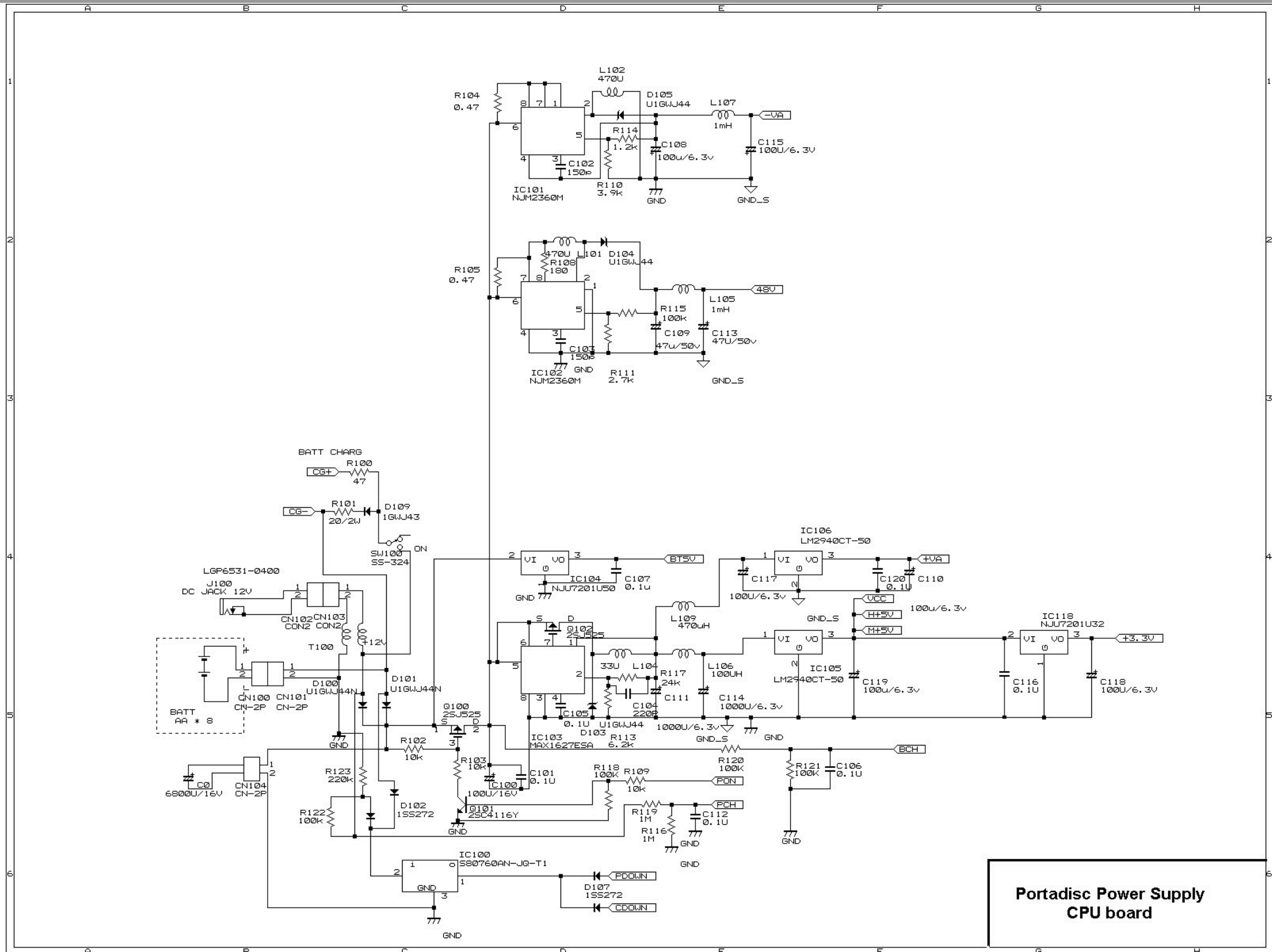
Portadisc CPU

Portadisc Power Supply CPU board

17

Portadisc Analog inputs
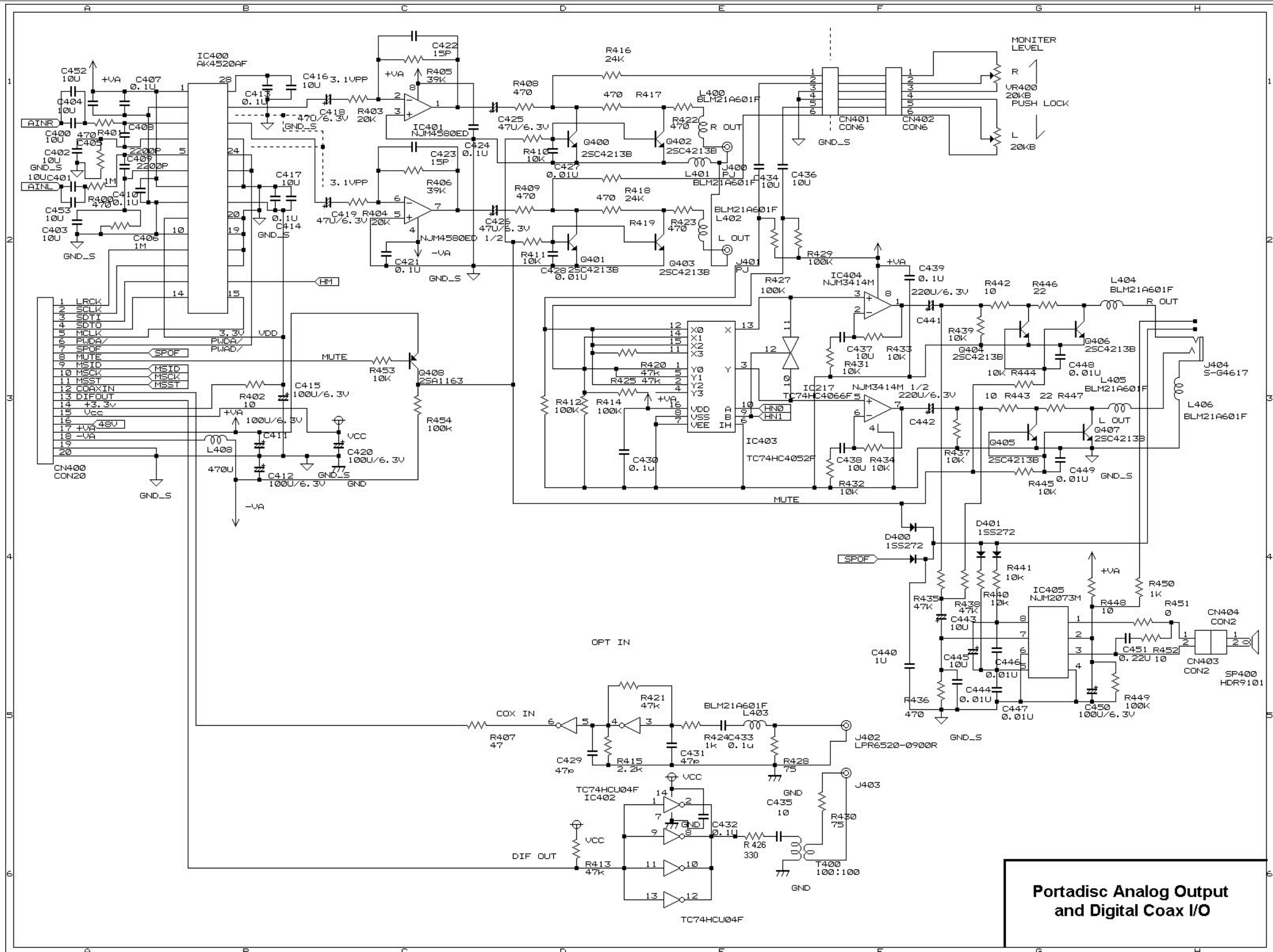
Portadisc Analog Output and Digital Coax I/O

CPU PCB
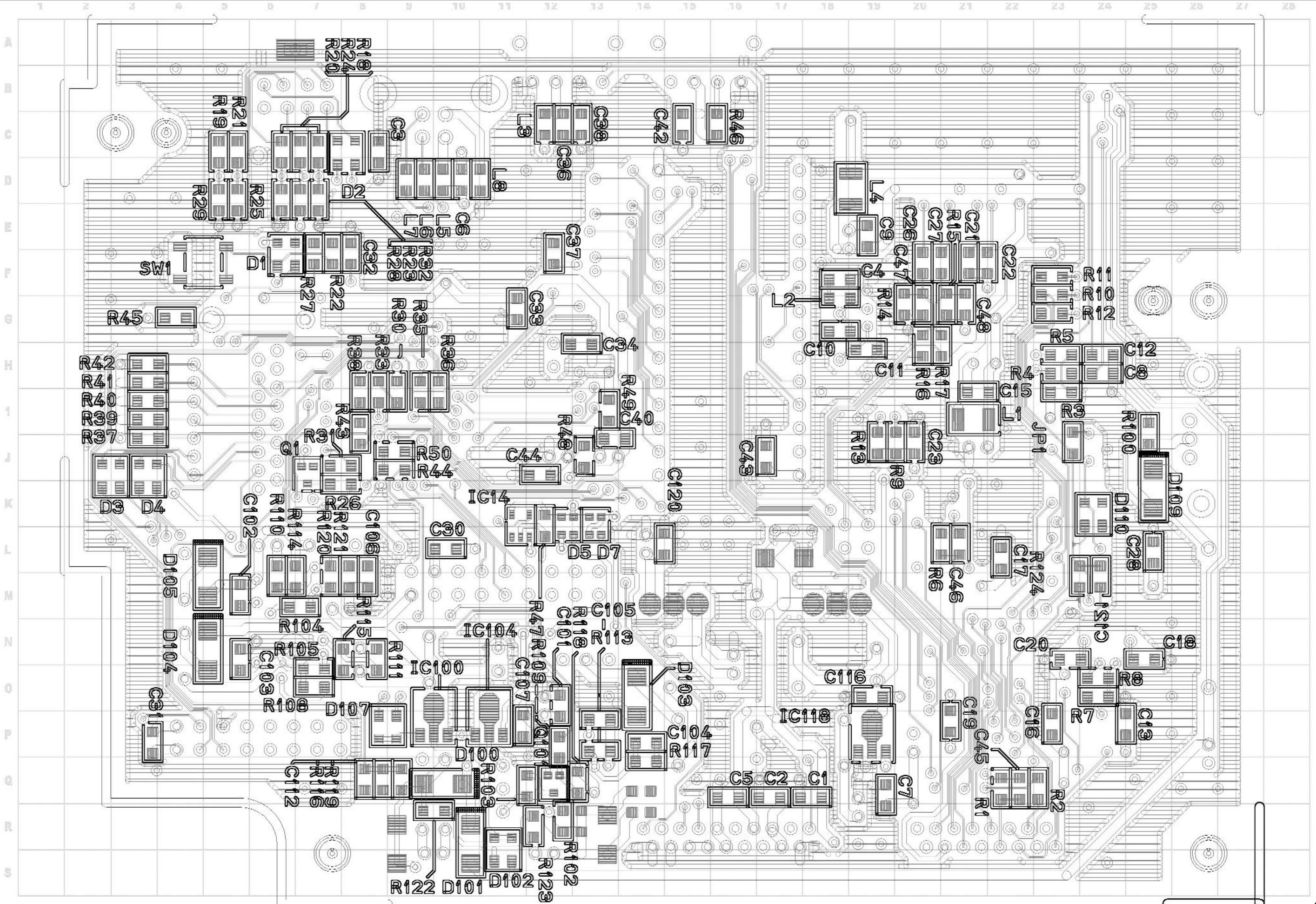
01123-13

ANALOG MAIN PCB

PHN200

ANALOG
SUB PCB

IC204
HC4052

IC208
HC4052

IC206
HC4094

IC202
HC4052

IC207
HC4052

IC205
HC4094
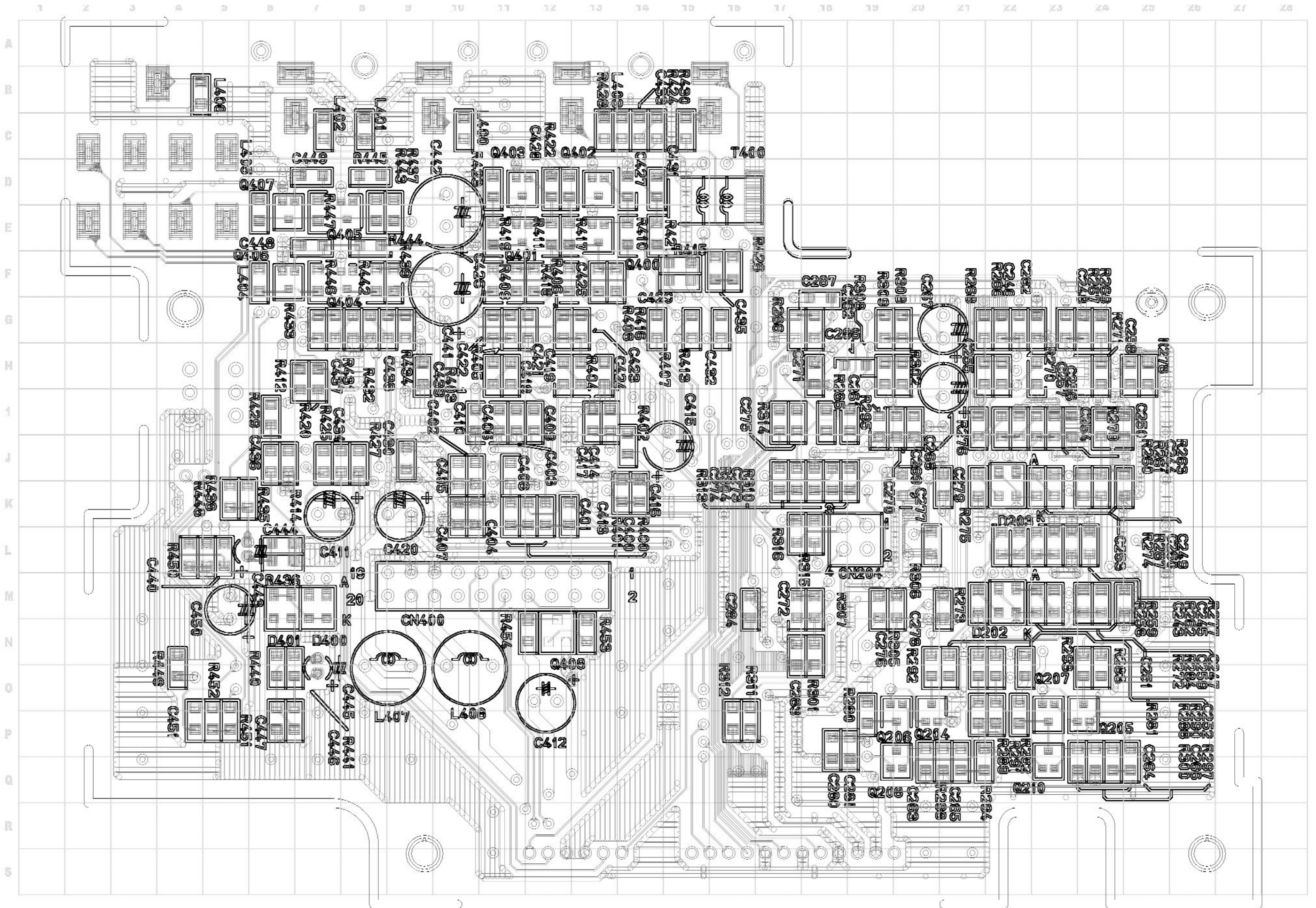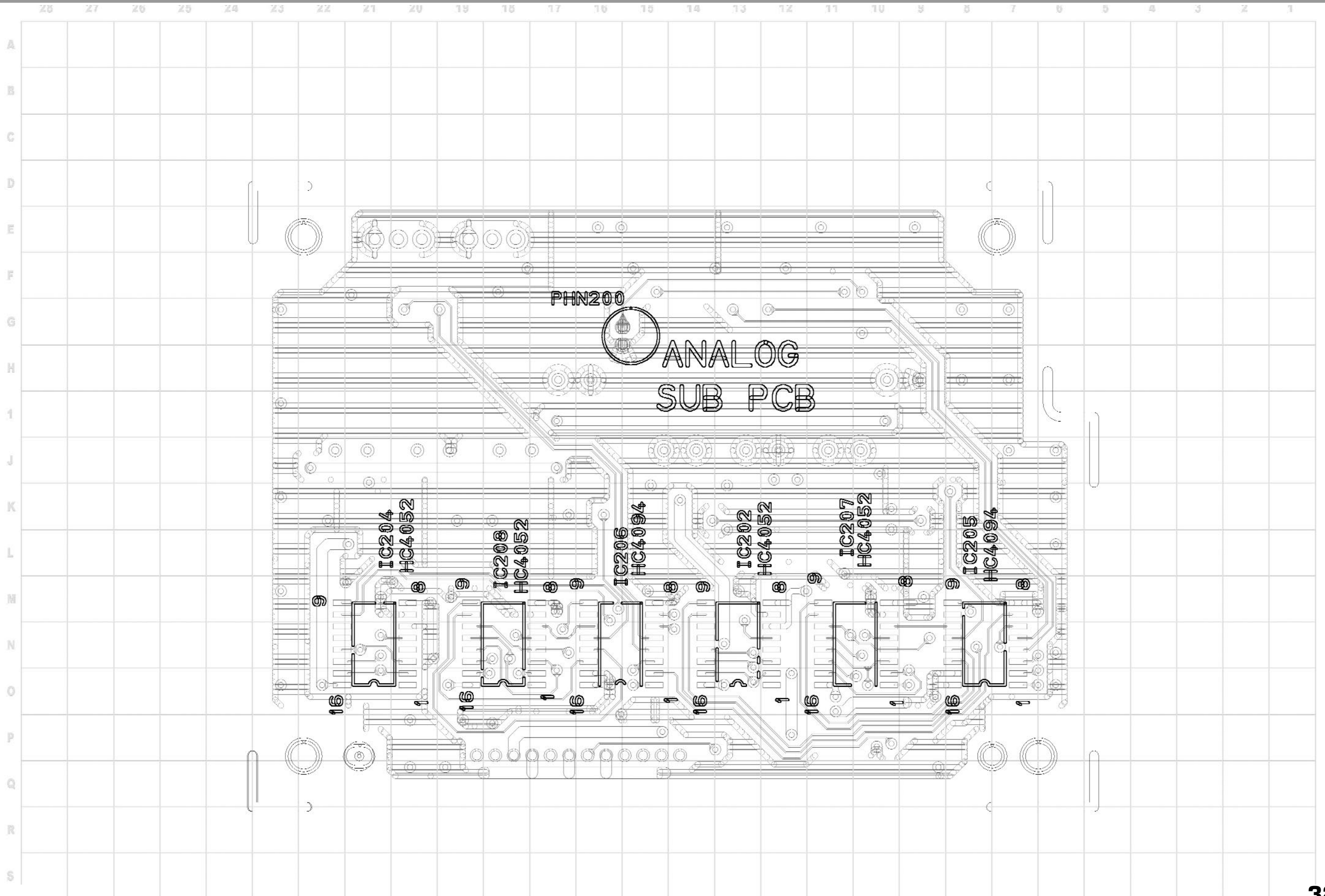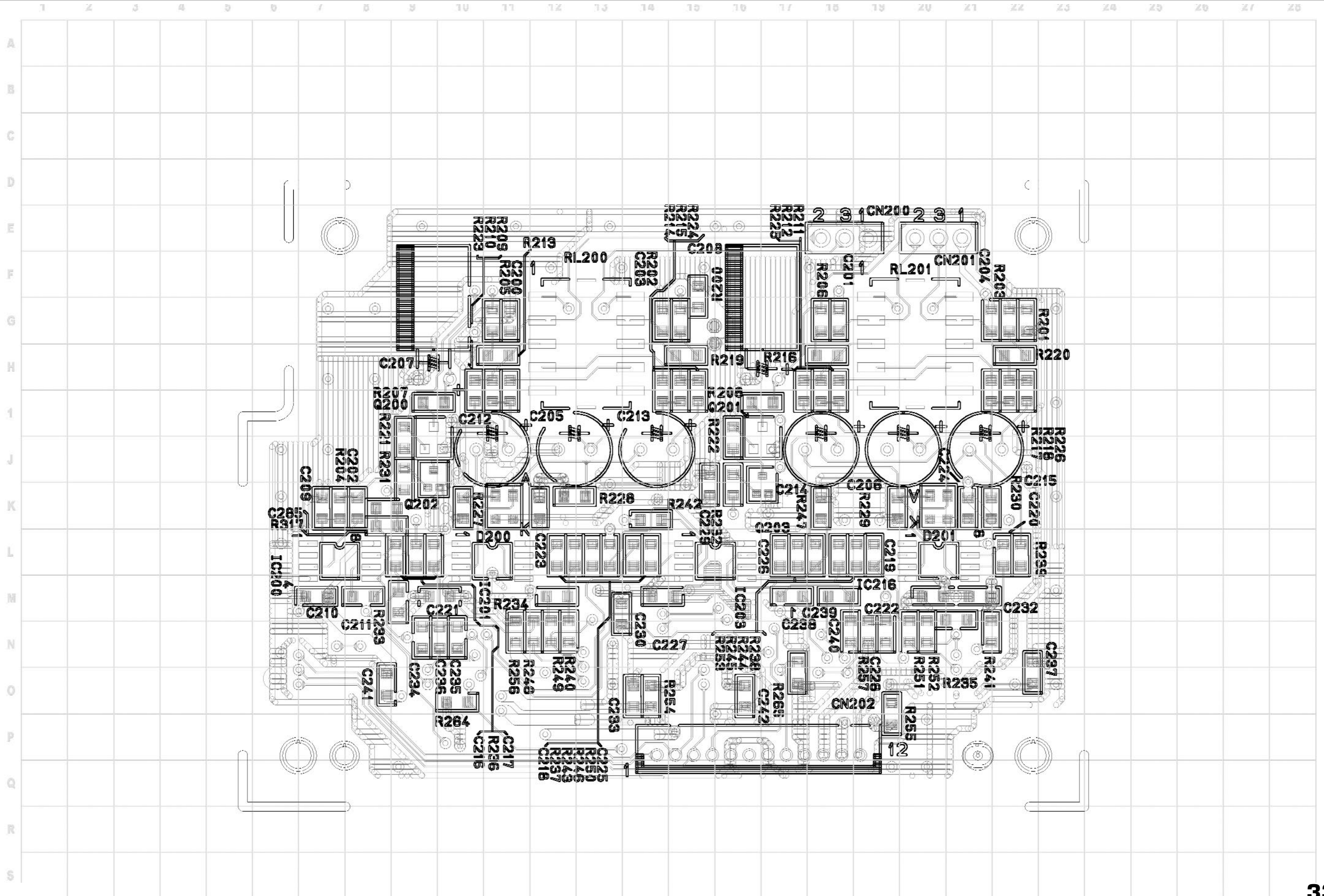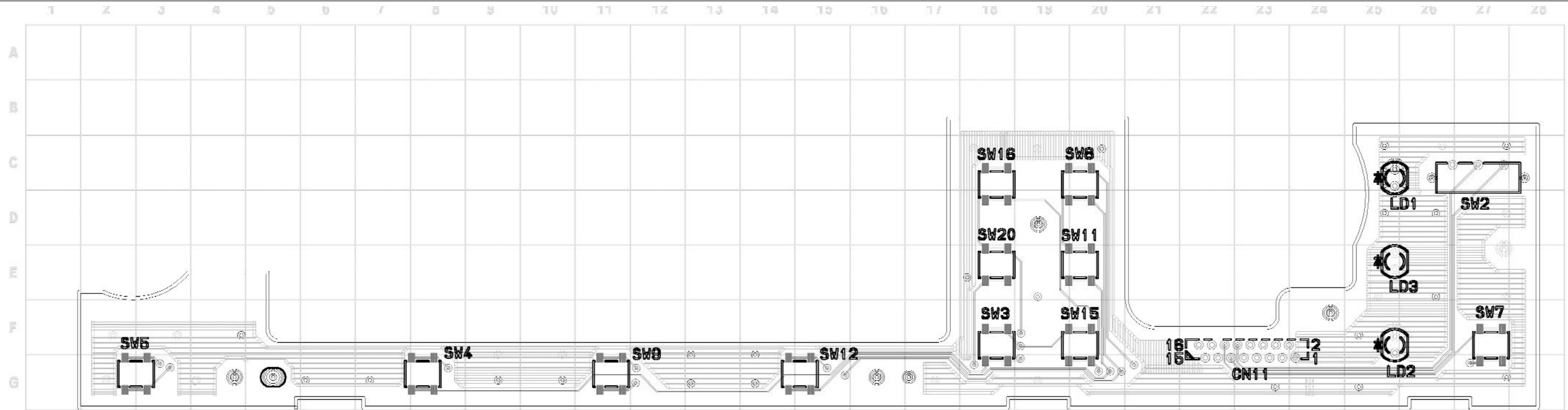
FRONT PANEL KEY-PCB   L1 PARTS SIDE

FRONT PANEL KEY-PCB   L2 SOLDER SIDE

VR PCB

DC-JACK

J100

SW17   SW6   SW10   SW13   SW16   SW22   SW21   SW19   SW14

DECK PANEL KEY-PCB   01-127-14   CN9 7   1

7   CN9   1
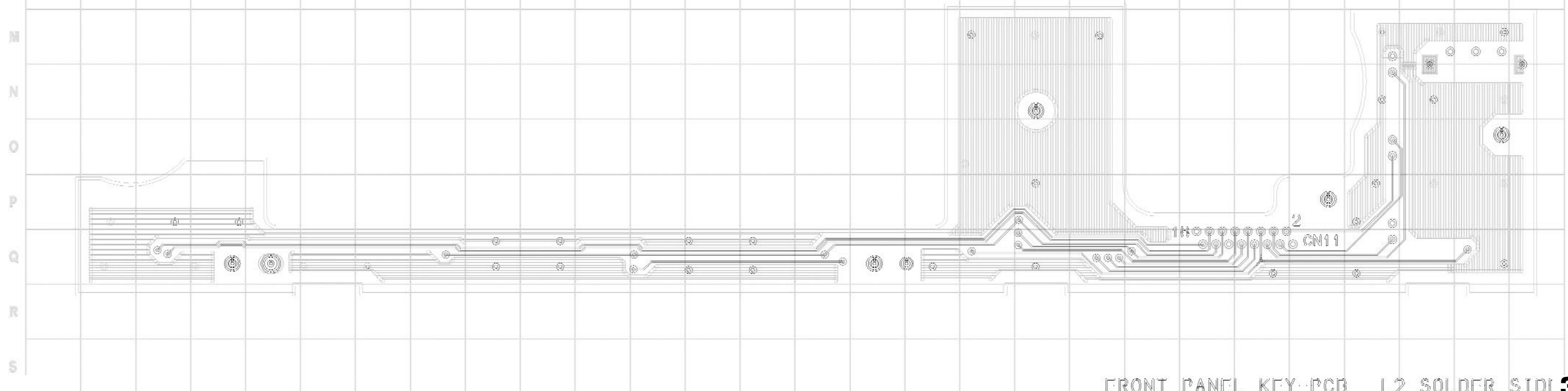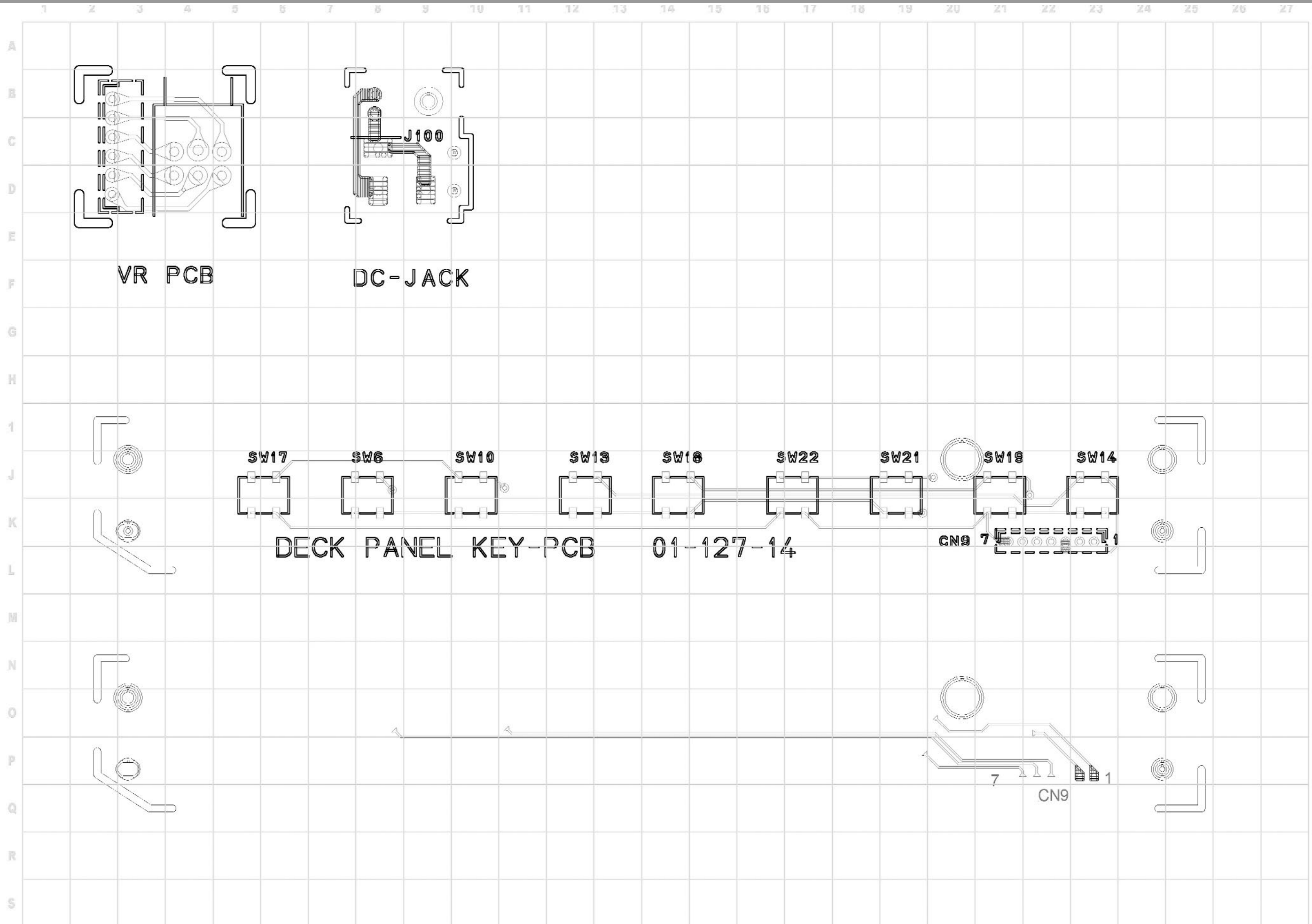
There are 4 types of reset function which may be used to eliminate abnormal behaviour in the Portadisc. If having implemented all the 4 reset types, and the MDP500 has not returned to normal behaviour, then investigate the possibility of a fault or misalignment in the machine.

The four reset types are listed below:

1) F1 +F2 reset. Resets factory defaults
2) F1 +F3 reset. Resets factory defaults, user set-ups, clock
3) Power reset. Remove all power from machine. Remove external dc supply and batteries. Re-connect power and power on.
4) System reset. Remove bottom panel. Locate and press SW1 on the main pcb.

Entering Test Mode

There are two test modes.

1) Switch Test Mode
2) Mechanism Alignment Test Mode

When ejecting a disc, always ensure that the disc has stopped rotating by pressing STOP. In addition, please be aware that the record protection tab on a mini-disc is not detected in test mode, therefore it is possible to overwrite recorded material.

Switch Test Mode

Hold down the F1 and Display buttons whilst simultaneously pressing the power switch. The Portadisc will appear to have booted up in normal operation mode. Wait for about 5 seconds then press the Mark button. The MDP500 has now entered 'SWITCH Test Mode'. This enables the engineer to check the operation of each of the switches on the machine.

Each button has a unique test code as listed in the following table:

BUTTON	CODE	BUTTON	CODE
F1	K03	PAUSE	K02
F2	K09	KEYHOLD	K13
F3	K0B	OPEN	K10
LIGHT	K01	EDIT	K11
DISPLAY	K10	AMS BACK	K0F
INPUT	K12	AMS FFWD	K0E
MARK	K07	<<	K0C
SYSTEM	K05	PLAY	K0D
SETUP	K04	>>	K0A
RECORD	K08	STOP	K06

To exit from 'SWITCH Test Mode', press the POWER button until POWER DOWN appears in the display.

Mechanism Alignment Test Mode

Hold down the F1 and Display buttons whilst simultaneously pressing the power switch. The Portadisc will appear to have booted up in normal operation mode. Wait for about 5 seconds then press the STOP button. Then press the LIGHT button. TEMP ADJUST will be displayed.

Exit Alignment test mode by pressing SETUP then powering down.

Note: *The above procedures should be followed exactly otherwise spurious display information may result.*

Tools For Alignment

Oscilloscope; MD-LPM1 laser power meter; voltmeter; Sony test disc TDYS-1; Continuously recorded disc (see end of this section for details on how to create one of these discs).

Button Operation During Alignment Test Mode

BUTTON	FUNCTION
AMS BACK	Cycles back through the various alignment pages and used to adjust parameter values
OPEN	Ejects the disc
AMS FFWD	Cycles FFWD through the various alignment pages and used to adjust parameter values
PLAY	Spindle servo ON
>>	Used to manually traverse the sled assembly towards the outer diameter
STOP	Stops rotation of the disc. This should always be pressed before ejecting the disc. Also turns off laser.
<<	Used to manually traverse the sled assembly towards the inner diameter
DISPLAY	Toggles between the various test mode displays (see below)
F1	YES
F3	NO

The Alignment Modes

Select the alignment mode by using the AMS BACK and FFWD buttons. Enter the alignment mode by pressing F1. Exit the alignment mode by pressing F3.

ALIGNMENT MODE	DESCRIPTION
TEMP ADJUST	Temperature compensation offset
LDPWR ADJUST	Laser Power adjustment
LDPWR CHECK	Laser Power check
EFBAL ADJUST	Traverse adjustment
FBIAS ADJUST	Focus Bias adjustment
FBIAS CHECK	Focus Bias check
CPLAY MODE	Continuous playback mode
CREC MODE	Continuous record mode
EEP MODE	Do not use

Test Mode Diisplays

The display button is used to toggle through the following display pages:

a) Alignment Mode b) Error rate display c) Address display d) Auto gain display e) IVR display

The Auto gain and IVR displays are not used during servicing.

1. Error Rate Display

C1 = XXXX AD = XX

C1 indicates the data error rate

AD indicates the address error rate

2. Address display

h = header address; s = sub-code Q channel address; a = ADIP (address in pre-groove) address.

If '—' is displayed, then the address can not be read.

The header address (h) is the unique address of each data block and is contained within the data itself.

The sub-code Q channel (s) contains the address information extracted from the sub-code data. This should be the same as the header address.

The ADIP address (a) is the unique address pre-stamped on a recordable disc using modulated wobble.

3. Auto Gain Display

AG F=XX T=XX

F indicates acquired Focus Auto Gain value

T indicates acquired Tracking Auto Gain value

Temperature Compensation Offset Adjustment

This adjustment saves the temperature data as a $25^{o}C$ reference for the alignment process.

· It is not necessary to perform this alignment unless the laser assembly is replaced
· Perform this adjustment just after turn on in an ambient temperature of between 22 to $28^{o}C$.

a) Use the AMS buttons to locate the TEMP ADJUST page, then press F1 to select.

b) Ensure that TEMP = XX where XX falls within the range 'E0-EF', 'F0-FF', '00-0F', '10-1F', '20-2F'.

c) Press F1 to SAVE (SAVE will briefly be displayed) or press F3 to exit without saving.

Laser Power Adjustment

This adjustment requires the use of a laser power meter. It is highly recommended that the SONY MD-LPM1 Mini-disc Laser Power Meter (Part No. 9-948-310-40) is used for this adjustment as it allows for more accurate and reliable adjustment. This meter is built in to a minidisc case so that the meter can be loaded using the MD loading mechanism.

a)   Insert the laser power meter. Use the << and >> buttons to position the laser so that it is approximately in the middle of the photo sensor of the power meter.

b)   Use the AMS buttons to locate the LDPWR ADJUST page, then press F1 to select. The display should show 'LD 0.9mW $XX'.

c)   Use the AMS buttons to adjust for a laser power of between 0.80 to 0.96mW. Press F1 to save.

d)   The display should now show 'LD 7.0mW $XX'. Use the AMS buttons to adjust for a laser power of between 6.8 to 7.2mW. Press F1 to save. Note: Do not perform the emission with 7mW for more than about 15 seconds continuously.

e)   The display should now return to the LDPWR ADJUST page. Use the AMS buttons to locate the LDPWR CHECK page. Press F1 to cycle through the various powers and check that the readings are correct. Press F3 to exit.

Traverse Adjustment

a)   Connect 1 channel of an oscilloscope to TE (Tracking error) and VC (Voltage reference for servo).
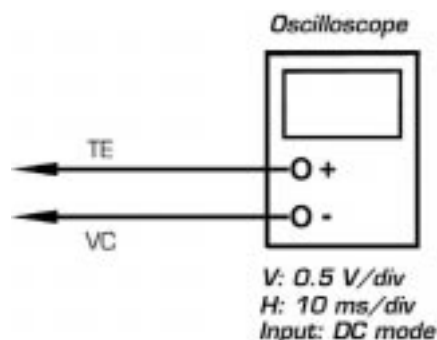
The location of the TE and VC test points are shown in the following diagram:
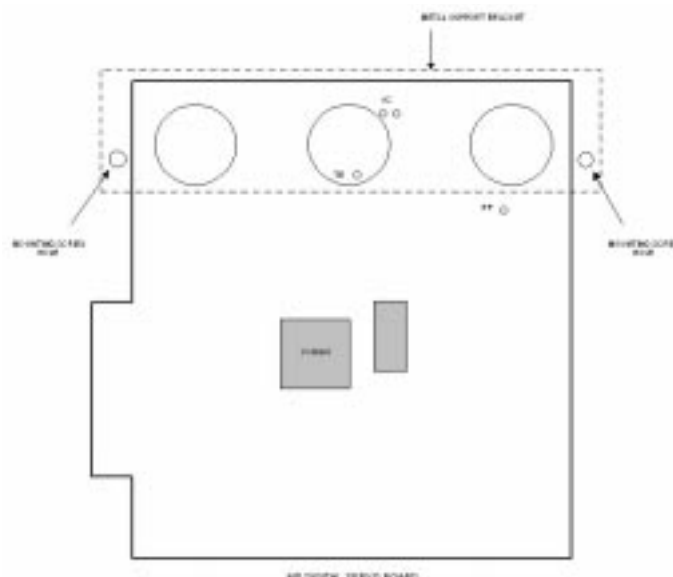
b) Load a recordable 74 mini-disc into the machine and use the << or >> buttons to move the optical lens to about the middle of the disc.

c) Use the AMS buttons to locate the EFBAL ADJUST page, then press F1 to display 'EFBAL MO-R'.

d) Press F1 again to turn on the laser, focus servo and spindle servo. 'EFB = XX MO-R' will be displayed. Use the AMS buttons to adjust for minimum tracking offset so that A = B as shown in the picture below.

e) Press F1 to save the adjustment setting. The display will then show 'EFBAL MO-P'.

f) Press F1 again to turn on the laser, focus servo and spindle servo. 'EFB = XX MO-P' will be displayed. Use the AMS buttons to adjust for minimum tracking offset so that A = B as shown in the picture above.

g) Press F1 to save the adjustment setting. The display will then show 'EFBAL MO-W'.

h) Press F1 again to turn on the laser, focus servo and spindle servo. 'EFB = XX MO-W' will be displayed. Use the AMS buttons to adjust for minimum tracking offset so that A = B as shown in the picture above. Caution: This adjustment sets the tracking offset during the record process, therefore do not use any disc where you want to preserve the data.

i) Press F1 to save the adjustment setting. The display will then show 'EFBAL CD'.

j) Load test disc TDYS-1 or a pre-mastered high quality disc (CD pits and lands).

k) Press F1 again to turn on the laser, focus servo and spindle servo. 'EFB = XX CD' will be displayed. Use the AMS buttons to adjust for minimum tracking offset so that A = B as shown in the picture above.

l) Press F1 to save the adjustment setting. The display will then show 'EFBAL ADJUST'.

m) Eject the disc.

Focus Bias Adjustment

a) Load a 'continuously recorded disc'. Refer to 'Creating a Continuously Recorded Disc' below.

b) Use the AMS buttons to locate the CPLAY MODE page.

c) Press F1 to display CPLAY MID. As soon as 'C1 = XXXXAD =XX' is displayed, press F3.

d) Use the AMS buttons to locate the FBIAS ADJUST page.

e) Press F1 to display 'XXXX/XX a=XX'. The first 4 digits indicate the C1 error rate, the next 2 digits indicate ADER (address error rate) and the a=XX indicates the focus bias value.

f) Use the forward AMS button to adjust for a focus bias value which produces an average C1 error rate of 220. The C1 error rate will vary quite considerably.

g) Press the F1 button to save and to display 'XXXX/XX b=XX'.

h)   Use the backward AMS button to adjust for a focus bias value which produces an average C1 error rate of 220.

i)   Press the F1 button to save and to display 'XXXX/XX c=XX'.

j)   Check that the C1 error rate is less than 50 and ADER is less than 2.

k)   Press the F1 button to save and to display 'XX-XX-XX (XX)'. If the (XX) value is more than 20, then press F1. If the (XX) value is less than 20, press F3 and repeat the adjustment from step (b).

The relationship between the C1 error rate and the focus bias values a, b and c are shown in the graph below.
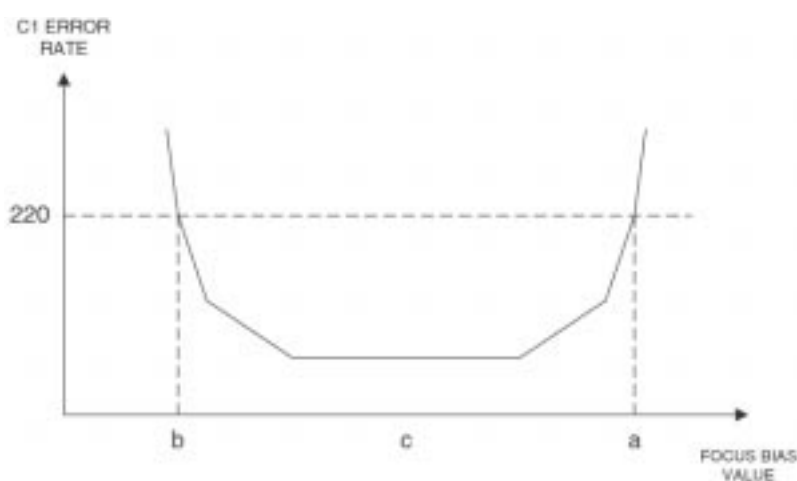
Error Rate Confirmation

1. CD (Pre-mastered) Error rate check

a)   Load test disc TDYS-1

b)   Use the AMS buttons to display the CPLAY MODE

c)   Press F1 to display CPLAY MID. The display will change to show the C1 error rate.

d)   C1 error rate should be below 20.

e)   Press F3 to stop.

2. MO Error rate check

a)   Load a continuously recorded disc.

b)   Use the AMS buttons to display the CPLAY MODE

c)   Press F1 to display CPLAY MID. The display will change to show the C1 and ADER error rates.

d)   C1 error rate should be below 50 and ADER below 2.

e)   Press F3 to stop.

Creating A Continuously Recorded Test Disc

A continuously recorded disc should only be created using a well-aligned machine. This disc is required for performing focus and error rate checks and adjustments.

1. Insert a fresh blank disc.

2. Use the AMS buttons to locate the CREC MODE page.

3. Press F1 to display CREC MID. The display will show the starting address of '0300' and recording will commence automatically.

4. After 5 minutes, press F3 to stop recording.

5. Press OPEN to eject the disc.

AK4520A 20Bit ADC/DAC
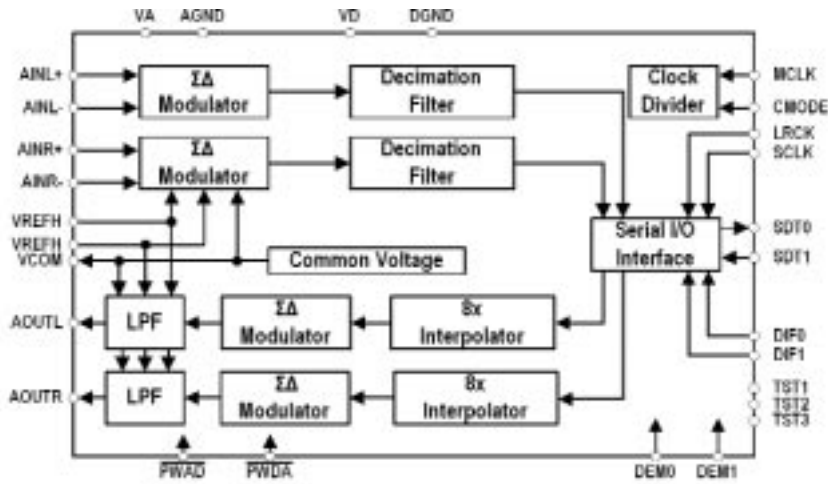
74HC4052 Analogue Multiplexer/Demultiplexer
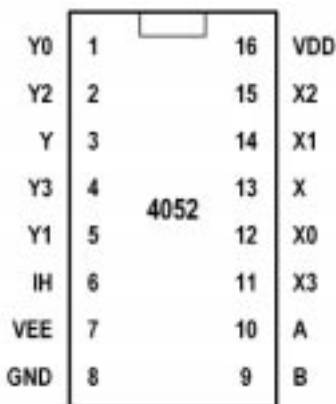
Function Table

CONTROL INPUT		COMMON OUTPUTS	
B	A	X	Y
0	0	X0	Y0
0	1	X1	Y1
1	0	X2	Y2
1	1	X3	Y3

IH = Inhibit, When IH is low, outputs are ON.

74HC4066 CMOS Quad Bilateral Switch
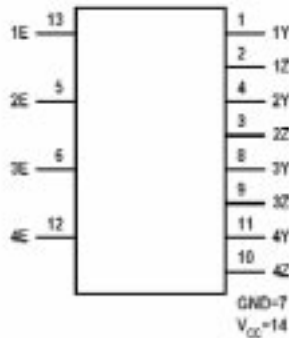
INPUT nE	SWITCH
L	Off
H	On

NOTE:
H = High Level
L = Low Level

BA3308F ALC
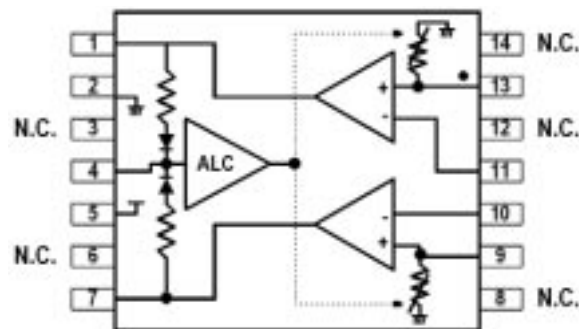
NJM2360
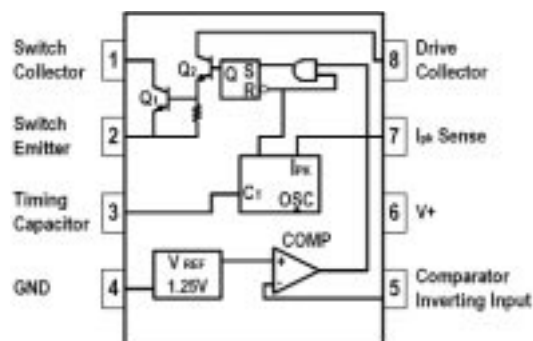
Main Frame

No.	Part Name	Part Code	No.	Part Name	Part Code
1/1	Front Panel (ABS)	40-031-01	1/44	Screw top / bott rear - black	4 off CS M2.6x6
1/2	Battery housing (ABS)	43-055-01	1/45	Screw battery case	4 off RH M3x6
1/3	Battery Cover (ABS)	43-056-02	1/46	Screw PCB & brackets	21 off RH M3x4
1/4	Connector panel (ABS)	44-015-02	1/47	Screw screen -ext jack	4 off RH M2.6x6
1/5	Knob,Headphone-Level	51-047-04	1/48	Screw front panel	4 off CS M2.6x4
1/6	Knob, Rec-Level[R]	51-048-14	1/49	Screw LCD PCB	4 off RH M2x6
1/7	Knob, Rec-Level[L]	51-049-14	1/50	AC Adapter 100-230 Volt	MDP500ACADA
1/8	Knob-Rec	51-050-14	1/51	Rechargeable Battery	MDP500B
1/9	Keytop-Pause	51-051-14	1/52	Battery caddy	MDP500BC
1/10	Keytop-Power	51-052-04	1/53	Soft case & strap	MDP500CASE
1/11	Keytop-S-(a) light,mark	51-053-04a	1/54	Instruction Manual	MDP5000PMAN
1/12	Keytop-S-(b) disp, syst	51-053-04b	1/55	MD Mechanism	KMK-260AAA
1/13	Keytop-S-(c) input, set	51-053-04c	1/56	Electro Capacitor, CO	ECOS1CP153BB
1/14	Keytop-F F1-F3	51-054-03	1/57	LCD Module	L2462B1J000
1/15	Keytop-Deck (play etc)	51-055-02	1/58	CN5 Conn	AXP416618
1/16	Knob-Lock	51-056-03	1/59	CN6 socket conn	AXM116215
1/17	LCD-Display window	55-011-04	1/60	XLR Connector	XLM-3-31-PCS
1/18	Cover-Top (ABS)	58-010-02a	1/61	Speaker	S36G04K-3
1/19	Cover-Top (silicon)	58-010-02b	1/62	CPU PCB UNIT complete	91-113-00
1/20	Cover-MD slot (ABS)	58-011-13	1/63	ANALOG MAIN PCB UNIT	91-114-00
1/21	Chassis, complete	41-016-11	1/64	ANALOG SUB PCB UNIT	91-115-00
1/22	Cover-Upper	43-053-02	1/65	FRONT KEY PCB UNIT	91-116-00
1/23	Cover-Bottom	43-054-22	1/66	TOP KEY PCB UNIT	91-117-00
1/24	Bracket-Deck	46-040-13	1/67	EXT DC PCB bare	01-129-04
1/25	Bracket-Analog sub pcb	46-041-03	1/68	DC INPUT JACK	LGP6531-0400
1/26	Bracket-Record VR	46-042-04	1/69	CN102 (2-pin conn)	53253-0210
1/27	Bracket-Deck PCB	46-044-03	1/70	PHONE LEVEL PCB bare	01-128-04
1/28	Bracket Lock (1)	46-045-04	1/71	Gang VR400 (monitor level)	RKO97121T
1/29	Bracket Lock (2)	46-046-04	1/72	CN402 (6-pin conn)	53253-0610
1/30	Terminal (1) Battery +	59-079-03	1/73	FRONT KEY PCB bare	01-126-03
1/31	Terminal (2) Battery -	59-080-04	1/74	Slide Switch REC SW2	SSST010600
1/32	Screw mech retaining	59-083-04	1/75	Tact Switch 11 of	PT-007-C12B
1/33	O Ring P3 - mech	Dia 2.5mm	1/76	LED (red) record	TLR-226
1/34	Bushing - mech	C3ONG79-1	1/77	LED (yellow) pause	TLY-226
1/35	Bracket-Speaker	46-043-04	1/78	LED (green) charge	TLG-226
1/36	Rubber Foot	TM182-816	1/79	Connector	52806-1610
1/37	Screw MD slot - selftap	2 off RH M3x6	1/80	TOP KEY PCB bare	01-127-04
1/38	Screw top cover - selftap	8 off RH M3x5	1/81	Tact Switch 9 off	PT-007-C12B
1/39	Screw batt term - selftap	2 off RH M3x5	1/82	CN9 (7-pin conn)	53253-0710
1/40	Screw front panel PCB -st	5 off RH M2.6x6	1/83	Cable CN401-2 phones level	08-044-04
1/41	Screw lock bracket - selftap	4 off CS M2x6	1/84	Cable CN8-9 CPU - Deck Key	08-046-04
1/42	Screw case top / bott - black	4 off CS M3x6	1/85	Cable CN102-103 Ext DC I/p	08-047-04
1/43	Screw XLR panel - black	5 off RH M2.6x8	1/86	Cable CN403-speaker	08-048-04

Main Frame (continued)

No.	Part Name	Part Code
1/87	Cable CN101-battery	08-049-04a
1/88	CN104-C0 (capacitor)	08-049-04b
1/89	Cable CN200, 201-XLR	08-050-04
1/90	Cable CN6-LCD	08-051-04
1/91	FFC Cable CN1 to mech	UL20624-19
1/92	FFC Cable CN2 to mech	UL20624-16
1/93	FFC Cable CN10 to CN11	UL20624-16

CPU Unit

No.	Part Name	Part Code
2/1	CPU board 4 layer	01-123-03
2/2	IC8 (microprocessor)	TMP90CM37F
2/3	IC1	UDA1325H
2/4	IC2	TC74HC00F
2/5	IC3	TC74LVX4245FS
2/6	IC4	TC74HC153F
2/7	IC5	AT24C16N-10SI
2/8	IC9	TC74HC373F
2/9	IC10	NJU6355EM
2/10	IC11 (Optical RX)	TORX173
2/11	IC12 (Eeprom software)	M27C256B-12FI
2/12	IC13 (Optical TX)	TOTX173
2/13	IC14	TC7S14F
2/14	IC100	S80760AN-JQ-T1
2/15	IC101, 102	NJM2360M
2/16	IC103	MAX1627ESA
2/17	IC104	NJU7201U50
2/18	IC105, 106	LM2940CT-5.0
2/19	IC118	NJU7201U32
2/20	Q100, 102	2SJ525
2/21	Q101	2SC4116Y
2/22	D1,2,3,4,102, 107	1SS272
2/23	D5, D7,D8	1SS383
2/24	D100,101,103-105,109	U1GWJ44
2/25	USB Socket	USB-212-T
2/26	Mini DIN Socket (remote)	TCS7588-01-201
2/27	IC Socket 28 way	AXS 102811K
2/28	CN1 (19-way conn)	52806-1910
2/29	CN2, CN10 (16-way conn)	52806-1610
2/30	CN6 (16-way conn)	AXL216801
2/31	CN7 (20-way conn)	Z-282-20FD
2/32	CN8 (7-pin conn)	53253-0710

No.	Part Name	Part Code
2/33	CN12 (4-way conn)	Z-282-04FD
2/34	CN101 - 104 (2-pin conn)	53253-0210
2/35	Slide charge switch (SW100)	SS324F-B12H6.5
2/36	Tact reset switch (SW1)	PT-007-C12B
2/37	Back up Battery	MI2020/H1B
2/38	Crystal 22.5792MHz	HCM49S
2/39	Crystal 48 MHz	HC-49/US
2/40	Crystal 32.768 MHz	FTS-26
2/41	X3 (12.228M) Resonator	12.2MTJ0C4
2/42	Toroidal Coil, T100	TF0804S-201Y1R6
2/43	L9, L101, 102 470 uH	RCH875 471K
2/44	L104 33uH	RCH875 330K
2/45	L105, 107, L109 1mH	RCH875 102K
2/46	L106 100mH	RCH875 101K
2/47	Chip Coil L1, 4 47uH	LQH3C470K04
2/48	Chip Coil L2 3.3uH	LQG21N3R3K
2/49	Chip EMIFIL L3, 5, 6, 7, 8	BLM21A601F
2/50	Resistor metal oxide 20W 2W	R101RS14AB3D
2/51	E Capacitor 6.3V 47u C14,24	OJ-UTCXM470M
2/52	E Capacitor 16V 100u C39,41, 49,100,108,110,115,117-9	1C-UTES101M
2/53	E Capacitor 50V 47u C109,113	1H-UTES470M
2/54	E Cap 6.3V 1000u C111,114	OJ-UTESM102M

Analog Main Unit

No.	Part Name	Part Code
3/1	ANALOG MAIN PCB	01-124-03
3/2	IC209, 210	NJM2068M
3/3	IC211, 212	NJM2121M
3/4	IC213	BA3308F
3/5	IC214	TC74HC4094F
3/6	IC215	NJM2122M
3/7	IC217	TC74HC4066F
3/8	IC218, 403	TC74HC4052F
3/9	IC400 (AD/DA)	AK4520A-VF
3/10	IC401	NJM4580ED
3/11	IC402	TC74HCU04F
3/12	IC404	NJM3414M
3/13	IC405	NJM2073M
3/14	Q204-208, 210	2SC4116Y
3/15	Q400-407	2SC4213B
3/16	Q408	2SA1163
3/17	D202, 203	1SS272
3/18	Audio Pin Jack Line OP	LPR6520
3/19	Audio Pin Jack Dig I/O	LPR6520
3/20	Headphone Jack	S-G4617 #3
3/21	CN203 (12-way conn)	LPC-12FDS
3/22	CN204 (4-pin conn)	HKP-04M1
3/23	CN400 (20-pin conn)	HKP20M1
3/24	CN401 (6-pin conn)	53253-0610
3/25	CN403 (2-pin conn)	53253-0210
3/26	Record Lvl Pot. VR200	RK0972220
3/27	Toroidal Coil, T400	TF0804S-201
3/28	Chip EMIFIL, L400-406	BLM21A601F
3/29	Inductor, L407,408 470uH	RCH875 471K
3/30	E Cap 10V 220u C441-2	1A-UTCX221M
3/31	E Cap 6.3V 10u C443,445	0J-UTCXS100M
3/32	E Cap 6.3V 100u C267,268 411,412,415,420,450	0J-UTCXM101M

Analog Sub Unit

No.	Part Name	Part Code
4/1	ANALOG SUB PCB	01-125-04
4/2	IC200	NJM2110M
4/3	IC201, 203, 216	NJM2122M
4/4	IC202, 204, 207, 208	TC74HC4052F
4/5	IC205, 206	TC74HC4094F
4/6	Q200, 201	2SA1163
4/7	Q202, 203	2SC4116Y
4/8	D200, 201	1SS272
4/9	RL200, 201 Relay	ATQ219SA
4/10	Condenser Mic.	KUB2823
4/11	CN200, 201 (Inputs)	5530-03A
4/12	CN202 (12-pin conn)	LPC-12T5M
4/13	E Cap 50V 22u C205-6,212-5	IH-UTCXM220M
4/14	E Cap 50V 100u C207,208	1H-UTES101M
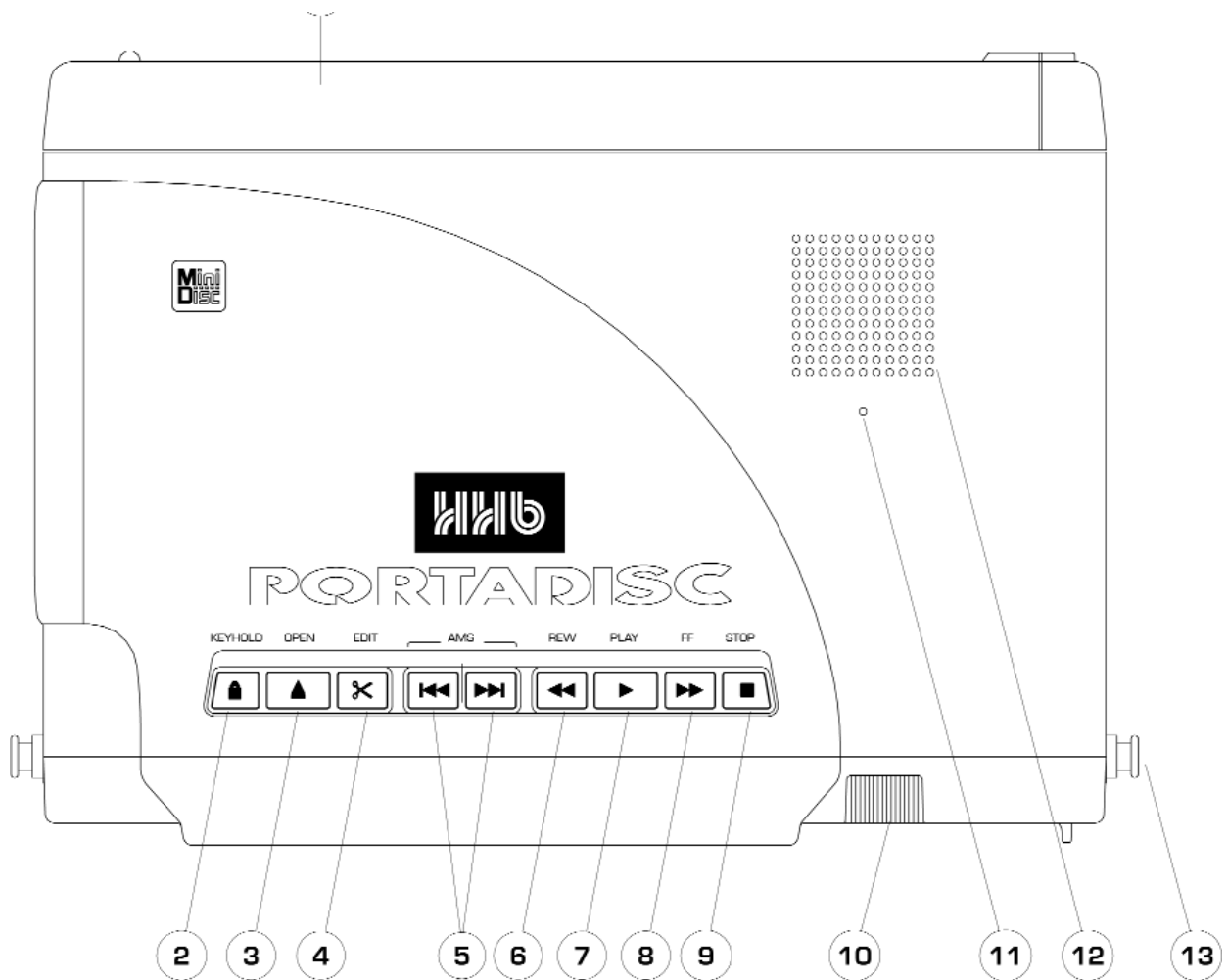
1 BATTERY COMPARTMENT
This cover slides off (from right to left in this view) and underneath is the battery caddy, holding 8 x AA batteries.

2 KEYHOLD
Use this button to avoid any accidental operation during recording. Each time you press the button for more than two seconds, the hold function changes from 'Key Hold ON' to 'Key Hold OFF' and vice versa. The following buttons can still operate even when the keyhold function is on: KEY HOLD, LIGHT, MARK, DISPLAY and POWER. The remote control connection will not be affected by this function; i.e., it is always enabled.

3 OPEN
Press this button to eject the MD disc. This function is disabled during recording.

4 EDIT
Use this button to enter the different edit modes.

5 AMS
Use the ⏮ button to move back one or more tracks and the ⏭ button to move forward one or more tracks. These buttons are also used in editing and naming.

6 REWIND
Rewinds the track during playback.

7 PLAY
Use this button to start playing back the track.

8 FAST FORWARD
Fast forwards the track during playback.

9 STOP
Use this button to stop the playback or recording operation.

10 RECORD VOLUME CONTROL
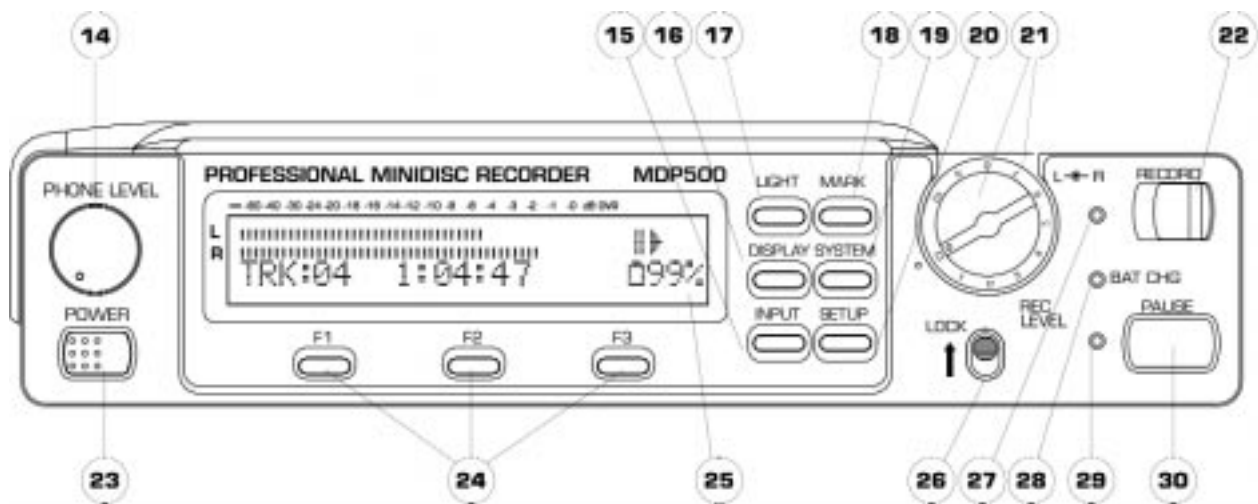Dual concentric control for independent left and right level adjustment.

11 INTERNAL MONO MICROPHONE

12 MONITOR SPEAKER

13 SHOULDER STRAP ATTACHMENT POINTS

55

14 PHONE LEVEL
Adjusts the volume level for the headphones and monitor speaker. The control will pop out if you press it. The monitor speaker will not function during recording or when the headphones are connected.

15 INPUT
Changes the following input related settings:
- Input source: MIC, LINE, DIGITAL, INT MIC, OFF
- Options for MIC: MIC-Att, BASSCUT, LIMITER, PHANTOM
- Options for LINE: LIMITER
- Options for DIGITAL: COAXIAL, OPTICAL, USB input connections

16 DISPLAY
Changes the display menu through disc time, level margin, time & date.

17 LIGHT
Illuminates the display back light for a few seconds. Hold it down for more than two seconds in order for it to be continuously lit. Press it again to switch off the light.

18 MARK
Marks the track number manually during record mode and play/pause mode.

19 SYSTEM
Changes the following system settings: REC MODE, TRACK-INCREMENT, THRESHOLD LEVEL, AUTO-START/CUT, AUTO-PAUSE, PRE-RECORD, HEADPHONE MONITOR, OVERWRITE MODE, REPEAT MODE, DIGITAL OUTPUT and AUTO POWER DOWN.

20 SETUP
Changes the following setup options: OPEN SETUP, SAVE SETUP, CLOCK/DATE SETUP, DATE FORMAT, PEAK HOLD METER and DISPLAY CONTRAST. Use this button to save and recall set-ups. OPEN SETUP consists of five user set-ups, which can be used to store all the menu settings on the recorder, and three recording presets – MIC REC, LINE REC and DIGI REC.

21 REC LEVEL
Adjusts the analog recording level manually for mic and line inputs. This control does not affect the signal level when the AGC function is set to 'ON'. The outer control adjusts the left hand channel and the inner control adjusts the right hand channel. A friction lock between the two controls allows them to move together but also be adjusted individually.

22 RECORD
Slide this button to the right to enter record mode.

23 POWER
Press this button for one second to power ON and press for more than one second then release to power OFF. This button does not turn the power off during recording and TOC operations.

24 F1, F2, F3
Selects the parameters according to the corresponding set-up functions on the display above.

25 LCD DISPLAY
Shows level metering, disc information, timing information and all the menu select and control displays.

26 REC LEVEL LOCK
Mechanically locks the REC LEVEL knob position in order to avoid accidental adjustment. Slide this button up to lock.

27 REC INDICATOR
This LED will light up red in record mode and blink in record pause mode.

28 BAT CHG INDICATOR
This LED will light up green when charging the NiMH rechargeable batteries.

29 PAUSE INDICATOR
This LED will light up yellow in pause mode.

30 PAUSE BUTTON
Use this button to pause the record or playback operation. Pressing this button before pressing the record button will put the recorder into record pause mode, ready for recording.
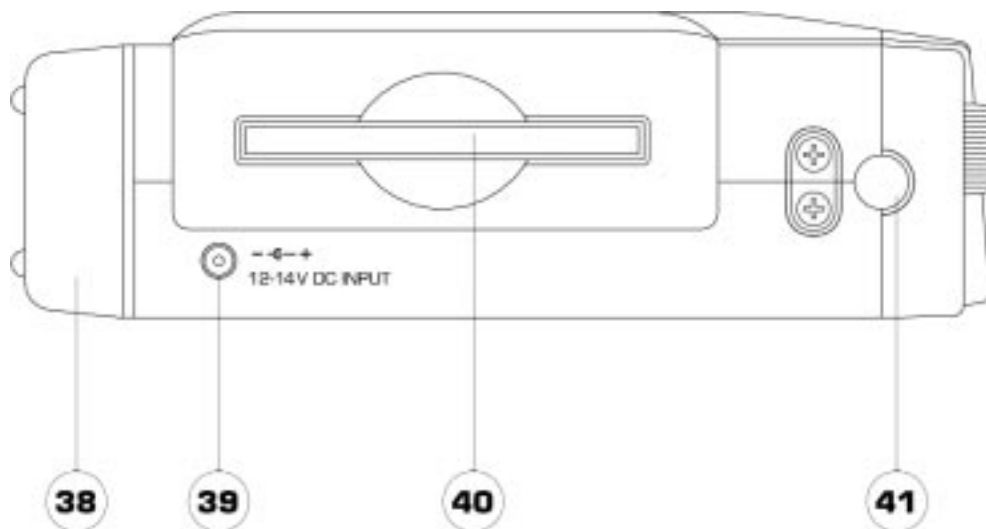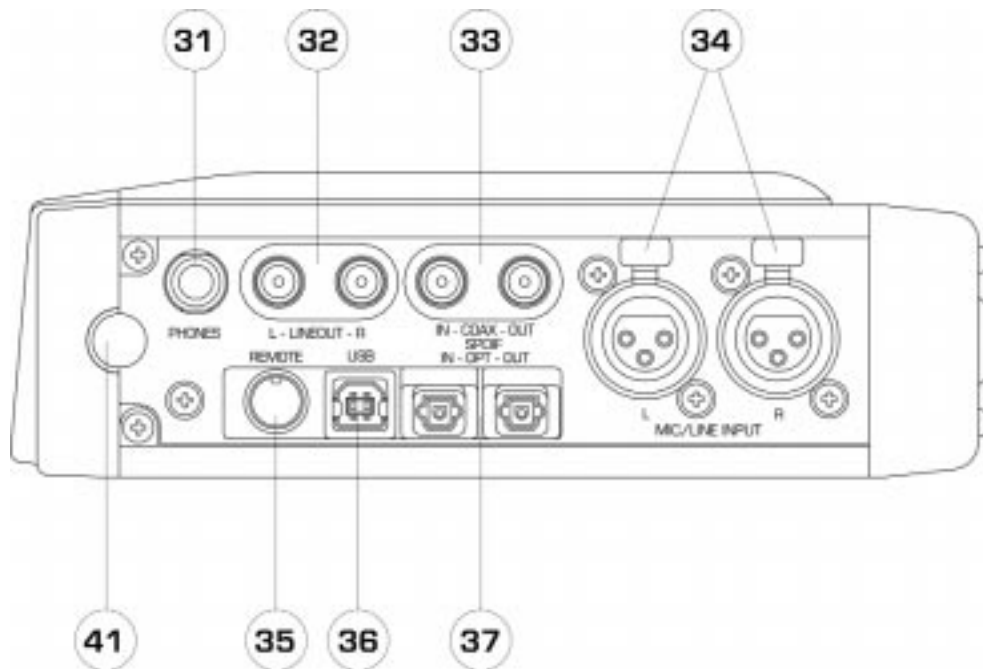
31   PHONES SOCKET
1/4" jack socket for headphone connection.

32   LINE OUT LEFT AND RIGHT CONNECTORS
(Unbalanced RCA phono.) To send analog output signals to other equipment.

33   COAXIAL I/O CONNECTORS
(Unbalanced RCA phono.) SPDIF digital coaxial connectors.

34   MIC/LINE CONNECTORS
(Balanced XLR.) To connect either MIC or LINE inputs.

35   REMOTE CONNECTOR
Parallel remote control connector.

36   USB CONNECTOR
USB interface port for a compatible computer.

37   OPTICAL I/O CONNECTORS
(TOSlink.) SPDIF digital optical connectors.

38   BATTERY COMPARTMENT

39   DC INPUT CONNECTOR
To connect the standard accessory AC adaptor, or an optional car adaptor. DC12-14V.

40   MINIDISC SLOT
A disc must be inserted into this slot with the arrow on the disc casing facing into the recorder.

41   SHOULDER STRAP ATTACHMENT POINTS

57
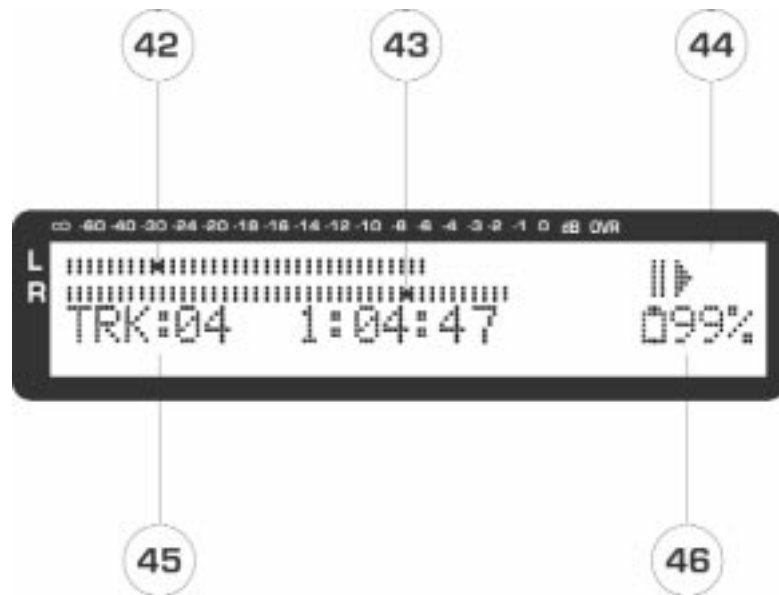
42-3 LEVEL INDICATOR
The bar meter shows the audio level in playback and record. (42) left hand channel (43) right hand channel.

44 RECORD/PLAYBACK MODE INDICATOR
The icons indicate pause, play and record modes.

45 DISPLAY MODE INDICATOR
Displays the track number, record/play time, remaining time, total recorded time, level margin, date and time.

46 BATTERY INDICATOR
Indicates the battery capacity remaining or whether the unit is connected to an external power source (DC IN).

GENERAL

Format . . . . MiniDisc digital audio system

Disc . . . . MiniDisc

Recording method . . . . Magnetic field variation overwrite

Reading method . . . . Non contact optical pickup

Laser . . . . Semiconductor laser (wavelength 780nm)

Record/playback time

Stereo mode . . . . 80 minutes max

Mono mode . . . . 160 minutes max

Rotation speed . . Approx 400-900rpm Constant Linear Velocity

Sampling frequency 44.1kHz

(with internal SRC to cater for 32kHz and 48kHz source signals)

Coding . . . . ATRAC Ver 4.5

Modulation system . . . . . . EFM (Eight to Fourteen Modulation)

Channels 2

Power requirement . . . . 12-14V DC

Power consumption . . . . Approx 4.5W record, 3.5W playback

Weight with batteries . . . . 2.0kg / 4lbs 7oz

Weight without batteries . . . . 1.8kg / 3lbs 15oz

Dimensions (WxHxD) . . 225 x 57 x 180mm/10 x 2.2 x 7.1 ins

Internal speaker power 250mW

AUDIO

Frequency response . . . . 10Hz to 20kHz, - 0.5dB

Wow & flutter . . . . Below measurable limits

Signal to noise ratio (playback) . > 89dB bandwidth 22Hz to 22kHz

Dynamic range (line input) . . . . > 96dB

Microphone EIN . . . . > 122dB A-weighted

THD & N @ 1kHz ref 0dBFS . < 0.02% bandwidth 22Hz to 22kHz

I/O CONNECTIONS

Analog connectors

Balanced mic/line input

Connector type . . XLR 3: Pin 2 + Hot; pin 3 - Cold; Pin 1 Ground

Mic input level for 0dBFS (level control at max) . . . . . . -52dBu

Line input level for 0dBFS (level control at max) . . . . -2dBu

Phantom power (mic inputs) . . . . +48V, 7mA

Unbalanced line output

Connector type . . . . RCA phono

Output level . . . . +8dBu @ 0dBFS into >10k

Headphone output

Connector type . . . . 1/4" stereo jack

Impedance 32

Output power 15mW

Remote control . . . . Parallel

Connector type . . . . 8-pin mini DIN

Digital connectors

Coaxial digital input . . . . SPDIF

Connector type . . . . RCA phono

Input impedance 75

Input level . . . . 0.5V p-p

Optical digital input . . . . SPDIF

Connector type . . . . TOSlink

Coaxial digital output . . . . SPDIF

Connector type . . . . RCA phono

Output impedance 75

Output level . . . . 0.5V p-p

Optical digital output . . . . SPDIF

Connector type . . . . TOSlink

USB (Ver 1) input / output

Connector . . . . Type B

Interface . . . . Windows 98/2000, Mac OS

ACCESSORIES

The following accessories are included as standard . . . .

Soft case, carrying strap, battery caddy with 8 x NiMH

rechargeable batteries, spare battery caddy, AC adaptor/charger,

HHB MD80 MiniDisc, operating instructions, quick reference guide

NOTE: The specifications and design of this product are subject
to change without notice, due to improvements.

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