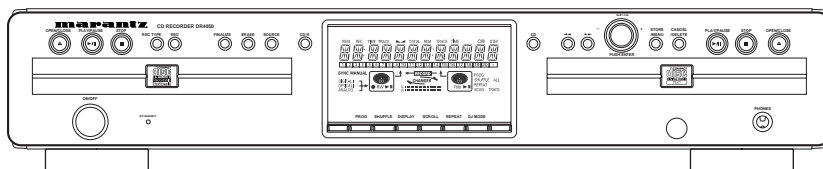


Service Manual

DR4050/F1N, /N1G, /N1B, /U1B

CD Recorder



DR4050

REMARK : This service manual explains them by extracting specifications designed for the model DR4050 only. The explanation for CD-R module (Loader : CDL4009' + CD-R Main board) is not mentioned on this service manual.

The CD-R module information is described in the service manual of CD-R modules < 2nd line Service Manual : 3104 125 40110 >.

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Please use this service manual with referring to the user guide (D.F.U) without fail.
修理の際は、必ず取扱説明書を準備し操作方法を確認の上作業を行って下さい。

marantz®

DR4050

MARANTZ DESIGN AND SERVICE

Using superior design and selected high grade components, **MARANTZ** company has created the ultimate in stereo sound. Only original **MARANTZ** parts can insure that your **MARANTZ** product will continue to perform to the specifications for which it is famous.

Parts for your **MARANTZ** equipment are generally available to our National Marantz Subsidiary or Agent.

ORDERING PARTS :

Parts can be ordered either by mail or by Fax.. In both cases, the correct part number has to be specified.

The following information must be supplied to eliminate delays in processing your order :

1. Complete address
2. Complete part numbers and quantities required
3. Description of parts
4. Model number for which part is required
5. Way of shipment
6. Signature : any order form or Fax. must be signed, otherwise such part order will be considered as null and void.

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MARANTZ AMERICA, INC.
440 MEDINAH ROAD
ROSELLE, ILLINOIS 60172
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PHONE : 630 - 307 - 3100
FAX : 630 - 307 - 2687

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FAX : +31 - 40 - 2735578

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CEP 04698-970
SAO PAULO, SP, BRAZIL
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SUPERSCOPE TECHNOLOGIES, INC.**
MARANTZ PROFESSIONAL PRODUCTS
2640 WHITE OAK CIRCLE, SUITE A
AURORA, ILLINOIS 60504 USA
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FAX : 630 - 820 - 8103

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TECHNICAL AUDIO GROUP PTY, LTD**
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BALMAIN, NSW 2041,
AUSTRALIA
PHONE : 61 - 2 - 9810 - 5300
FAX : 61 - 2 - 9810 - 5355

CANADA

LENBROOK INDUSTRIES LIMITED
633 GRANITE COURT,
PICKERING, ONTARIO L1W 3K1
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AUSTRALIA

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MT. WAVERLEY VIC 3149
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THAILAND

MRZ STANDARD CO.,LTD
746 - 754 MAHACHAI ROAD.,
WANGBURAPAPIROM, PHRANAKORN,
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#03-02 OLIVINE BUILDING
SINGAPORE 368357
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FAX : +65 858 6078

NEW ZEALAND

WILDASH AUDIO SYSTEMS NZ
14 MALVERN ROAD MT ALBERT
AUCKLAND NEW ZEALAND
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FAX : +64 - 9 - 8463554

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6 TH FL NO, 148 SUNG KIANG ROAD,
TAIPEI, 10429, TAIWAN R.O.C.
PHONE : +886 - 2 - 25221304
FAX : +886 - 2 - 25630415

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NO. 33, JALAN SULTAN ISMAIL,
50250 KUALA LUMPUR, MALAYSIA
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FAX : +60 3 - 2458180

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営業本部 〒150-0022
東京都渋谷区恵比寿南1-11-9

KOREA

MK ENTERPRISES LTD.
ROOM 604/605, ELECTRO-OFFICETEL, 16-58,
3GA, HANGANG-RO, YONGSAN-KU, SEOUL
KOREA
PHONE : +822 - 3232 - 155
FAX : +822 - 3232 - 154

SHOCK, FIRE HAZARD SERVICE TEST :

CAUTION : After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom.

Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before it is return to the user/customer.

Ref. UL Standard No. 1492.

In case of difficulties, do not hesitate to contact the Technical Department at above mentioned address.

1. Technical Specifications

1.1 General

Mains voltage	: 220 - 240V/60Hz (/N1B,/N1G)
	: 100V/50-60Hz (/F1N)
	: 120V/60Hz (/U1B)
Power consumption	: 20W

1.2 Input/output

1.2.1 Line output (CDR & CD)

Output level\	: 2Vrms at 0dB
Output resistance	: 200Ω

1.2.2 Line input

Input sensitivity	: 500mVrms
Input impedance	: 50kΩ
Max. input voltage	: 2.5Vrms

1.2.3 Digital output (CDR & CD)

Format	: AES/EBU format according IEC958 (consumer format)
Sampling frequency	: 44.1kHz
Output resistance	: 75Ω

1.2.4 Digital input

Format	: AES/EBU format according IEC958 (consumer format)
Sampling frequency	: 32 to 48kHz
Input resistance	: 75Ω

1.2.5 Optical input

Format	: AES/EBU format according IEC958 (consumer format)
Sampling frequency	: 32 to 48kHz

1.3 Audio performance

1.3.1 Cinch analog output (CDR play-back)

Output voltage	: 2Vrms ± 2dB (0dB signal)
Frequency range F.R.	: 20Hz < F.R.< 20kHz
Amplitude linearity	: ± 0.3dB (typical ± 0.1dB)
Channel unbalance	: < 0.3dB at 1kHz (typical ± 0.2dB)
Output resistance	: 200Ω
Phase non-linearity	: < 0.2 deg at 1kHz
Outband attenuation	: 50dB above 30kHz
Channel separation	: > 90dB at 1kHz (typical 110dB), >85dB between 20Hz and 20kHz (typical >93dB)
S/N-ratio A-weighted	: > 98dB (typical 100dB)
S/N-ratio unweighted	: > 95dB (typical 98dB)
Dynamic range	: > 92dB at 1kHz (typical 96dB), > 90dB between 20Hz and 20kHz (typical 96dB)
THD+N	: >85dB between 20Hz and 20kHz (typical 91dB)

1.3.2 Cinch analog input/output (monitor path CDR)

Measured with Audio precision system one.	
Input voltage is 1Vrms.	
Output voltage	: 2Vrms ± 2dB (0dB signal)

Frequency range F.R.	: 20Hz < F.R.< 20kHz
Amplitude linearity	: ± 0.3dB (typical ± 0.1dB)
Channel unbalance	: < 0.3dB at 1kHz (typical ± 0.2dB)
Output resistance	: 200Ω
Phase non-linearity	: < 0.2 deg at 1kHz
Outband attenuation	: 50dB above 30kHz
Channel separation	: > 90dB at 1kHz (typical 98dB), > 85dB between 20Hz and 20kHz (typical >92dB)
S/N-ratio A-weighted	: > 90dB (typical 88dB)
Dynamic range	: > 85dB at 1kHz (typical 90dB)
THD+N	: > 80dB between 20Hz and 20kHz (typical 82dB)
Intermodulation THD	: > 80dB

1.3.3 Cinch analog output (CD play-back)

Output voltage	: 2Vrms ± 2dB (0dB signal)
Frequency range F.R.	: 20Hz < F.R.< 20kHz
Amplitude linearity	: ± 0.3dB (typical ± 0.1dB)
Channel unbalance	: < 0.3dB at 1kHz (typical ± 0.2dB)
Output resistance	: 200Ω
Phase non-linearity	: < 0.2 deg at 1kHz
Outband attenuation	: 50dB above 30kHz
Channel separation	: > 90dB at 1kHz (typical 100dB), >85dB between 20Hz and 20kHz (typical >93dB)
S/N-ratio A-weighted	: > 98dB (typical 100dB)
S/N-ratio unweighted	: > 94dB (typical 98dB)
Dynamic range	: > 92dB at 1kHz (typical 96dB), > 90dB between 20Hz and 20kHz (typical 96dB)
THD+N	: > 82dB between 20Hz and 20kHz (typical 85dB)

1.3.4 Headphone output (all functions)

Output voltage	: 3Vrms (0dB)/8-2000Ω
S/N	: > 80dB
THD+N	: > 78dB
Channel separation	: > 60dB between 20Hz and 20kHz

1.4 Laser device

Material	: GaAlAs
Wave length	: between 780 and 800nm (at 25°C)
Laser output	: 1mW max. during reading, 20mW max. during writing
Class	: 3B

1.5 Dimensions and weight

Number and height of feet	: 4x13mm foiled
Apparatus tray closed (WxDxH)	: 440x305x75mm (without feet)
Weight without packaging	: 3.8kg
Weight with packaging	: 6.0kg

2. Warnings and Servicing Hints

GB WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.



NL WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen.
Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

F ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

D WARNUNG

Alle IC und viele andere Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD).
Unvorsichtige Behandlung bei der Reparatur kann die Lebensdauer drastisch vermindern.
Sorgen sie dafür, das Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

I AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevita potrebbe essere fortemente ridatta in caso di non osservazione della piu grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

GB

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

D

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten.
Der Originalzustand des Gerats darf nicht verändert werden.
Für Reparaturen sind Original-Ersatzteile zu verwenden.

NL

Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt terug gebracht en dat onderdelen, identiek aan de gespecificeerde worden toegepast.

I

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati pezzi di ricambiaggio idetici a quelli specificati.

F

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.



**CAUTION
VARO!
VARNING
ADVERSEL
DANGER
VORSICHT**

INVISIBLE LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM.
AVATTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE LASER SÄTTEILYLLE ÄLÄ KÄTBO SÄTTEESEN.
OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD BETRÄKTA EJ STRÅLEN.
USYNLIG LASERSTRÅLNING VED ÅBNING. UNDGÅ UNSÆTTELSE FOR STRÅLING.
INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
UNSICHTBARE LASERSTRALUNG WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.

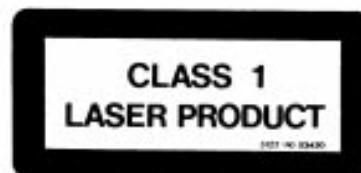
SHOCK, FIRE HAZARD SERVICE TEST:

CAUTION: After servicing this appliance and prior to returning to customer, measure the resistance between either primary AC cord connector pins (with unit NOT connected to AC mains and its Power switch ON), and the face or Front Panel of product and controls and chassis bottom,
Any resistance measurement less than 1 Megohms should cause unit to be repaired or corrected before AC power is applied, and verified before return to user/customer.
Ref.UL Standard NO.1492.

NOTE ON SAFETY:

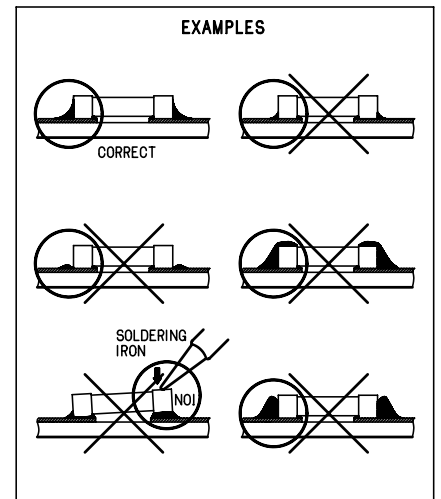
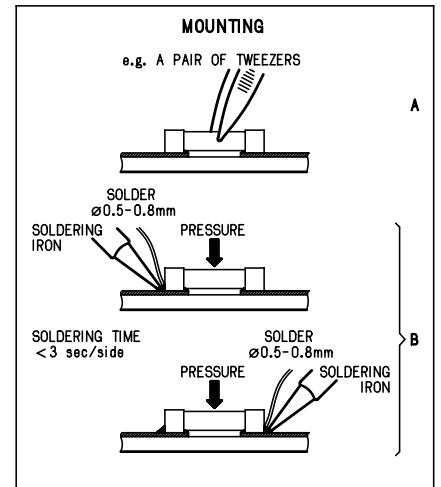
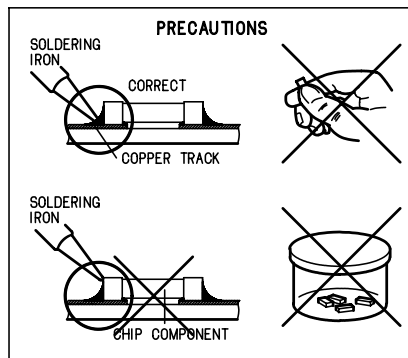
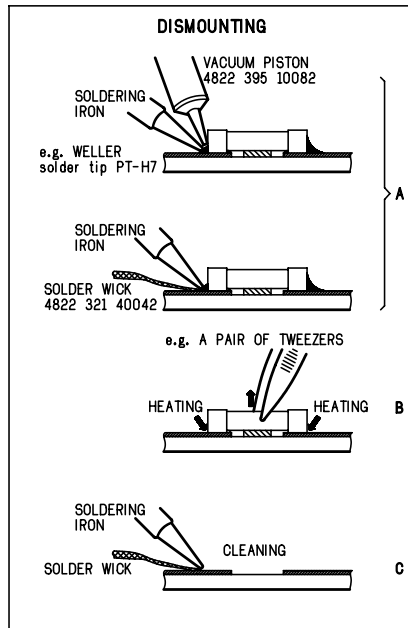
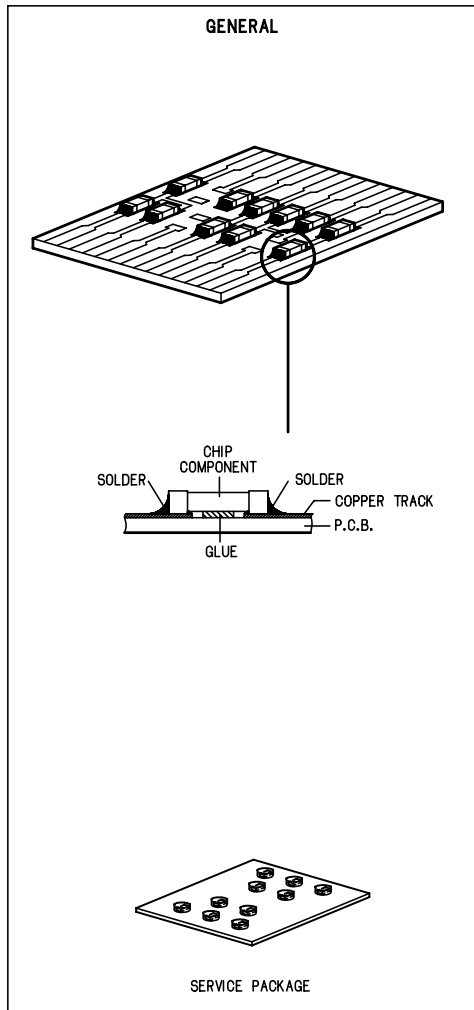
Symbol ▲ : Fire or electrical shock hazard. Only original parts should be used to replace any part with symbol ▲
Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne."



SERVICING HINTS

In the set, chip components have been applied. For disassembly and assembly check the figure below.



SAFETY GUIDELINES FOR THE PROFESSIONAL SERVICE TECHNICIAN

Important

Proper service and repair is important to the safe, reliable operation of all Philips equipment. The service procedures recommended by Philips and described in this service manual are effective methods of performing service operations. Some of these service operations require the use of tools specially designed for the purpose. The special tools should be used when and as recommended.

It is important to note that this manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Philips could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Philips has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Philips must first satisfy himself thoroughly that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

Safety Checks

After the original service problem has been corrected, a complete safety check should be made. Be sure to check over the entire set, not just the areas where you have worked. Some previous servicer may have left an unsafe condition, which could be unknowingly passed on to your customer. Be sure to check all of the following:

Fire and Shock Hazard

1. Be sure all components are positioned in such a way as to avoid the possibility of adjacent component shorts. This is especially important on those units which are transported to and from the service shop.
2. Never release a repaired unit unless all protective devices such as insulators, barriers, covers, strain reliefs, and other hardware have been installed according to the original design.
3. Soldering and wiring must be inspected to locate possible cold solder joints, solder splashes, sharp solder points, frayed leads, pinched leads, or damaged insulation (including the ac cord). Be certain to remove loose solder balls and all other loose foreign particles.
4. Check across-the-line components and other components for physical evidence of damage or deterioration and replace if necessary. Follow original layout, lead length, and dress.
5. No lead or component should touch a resistor rated at 1 watt or more. Lead tension around protruding metal surfaces or edges must be avoided.
6. Critical components having special safety characteristics are identified with a \blacktriangle by the Ref. No. in the parts list and enclosed within a broken line* (where several critical components are grouped in one area) along with the safety symbol \blacktriangle on the schematic diagrams and/or exploded views.

Replacement parts without the same safety characteristics may create shock, fire, or other hazards.

7. When servicing any unit, always use a separate isolation transformer for the chassis. Failure to use a separate isolation transformer may expose you to possible shock hazard, and may cause damage to servicing instruments.
8. Many electronic products use a polarized ac line cord (one wide pin on the plug). Defeating this safety feature may create a potential hazard to the servicer and the user. Extension cords which do not incorporate the polarizing feature should never be used.

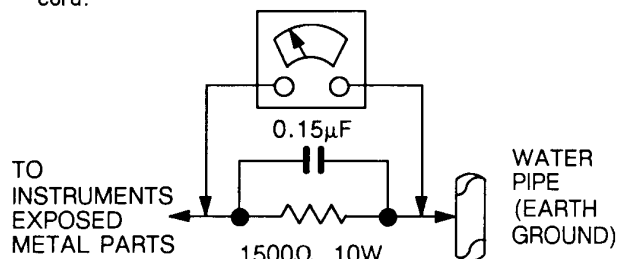
Fire and Shock Hazard (Continued)

9. After reassembly of the unit, always perform an ac leakage test or resistance test from the line cord to all exposed metal parts of the cabinet. Also, check all metal control shafts (with knobs removed), antenna terminals, handles, screws, etc. to be sure the unit is safe to operate without danger of electrical shock.

* Broken line: 

Leakage Current Cold Check

1. Unplug the ac line cord and connect a jumper between the two prongs of the plug.
2. Turn on the power switch.
3. Measure the resistance value between the jumpered ac plug and all exposed cabinet parts of the receiver, such as screw heads, antennas, and control shafts. When the exposed metallic part has a return path to the chassis, the reading should be between 1 megohm and 5.2 megohms. When the exposed metal does not have a return path to the chassis, the reading must be infinity. Remove the jumper from the ac line cord.



Leakage Current Hot Check

1. Do not use an isolation transformer for this test. Plug the completely reassembled unit directly into the ac outlet.
2. Connect a 1.5k, 10W resistor paralleled by a 0.15µF capacitor between each exposed metallic cabinet part and a good earth ground such as a water pipe, as shown above.
3. Use an ac voltmeter with at least 5000 ohms/volt sensitivity to measure the potential across the resistor.
4. The potential at any point should not exceed 0.75 volts. A leakage current tester may be used to make this test; leakage current must not exceed 0.5 milliamperes. If a measurement is outside of the specified limits, there is a possibility of shock hazard. The receiver should be repaired and rechecked before returning it to the customer.
5. Repeat the above procedure with the ac plug reversed. (Note: An ac adapter is necessary when a polarized plug is used. Do not defeat the polarizing feature of the plug.)

Parts Replacement

1. Many electrical and mechanical parts in Philips equipment have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. The use of a substitute part which does not have the same safety characteristics as the Philips recommended replacement part shown in this service manual may create shock, fire, or other hazards. Under no circumstances should the original design be modified or altered without written permission from Philips. Philips assumes no liability, express or implied, arising out of any unauthorized modification of design. Servicer assumes all liability.
2. All ICs and many other semiconductor parts are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce the life of the part drastically.

LASER NOTE:

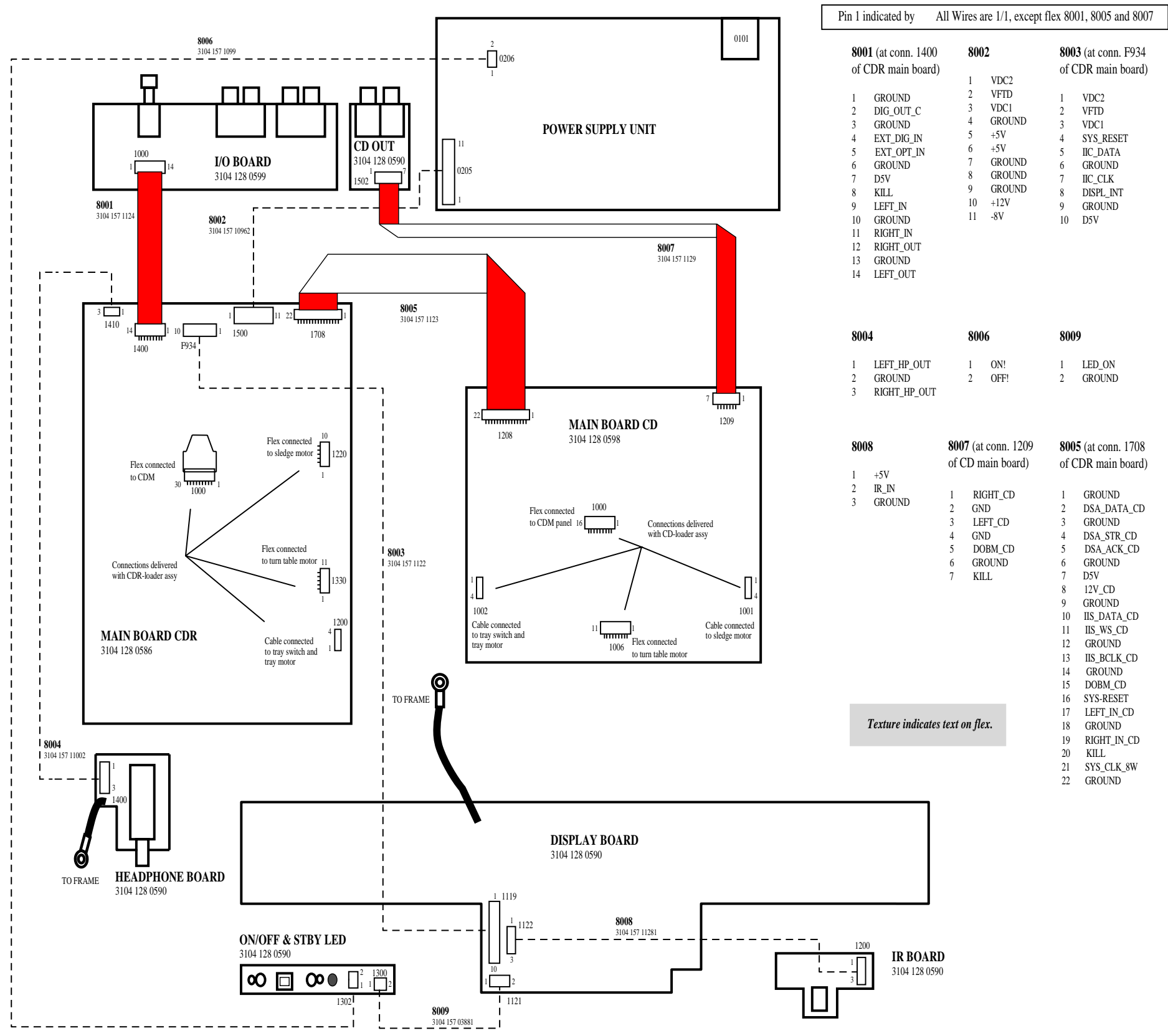
DANGER - Invisible laser radiation when open. AVOID DIRECT EXPOSURE TO BEAM.

CAUTION - Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CAUTION - The use of optical instruments with this product will increase eye hazard.

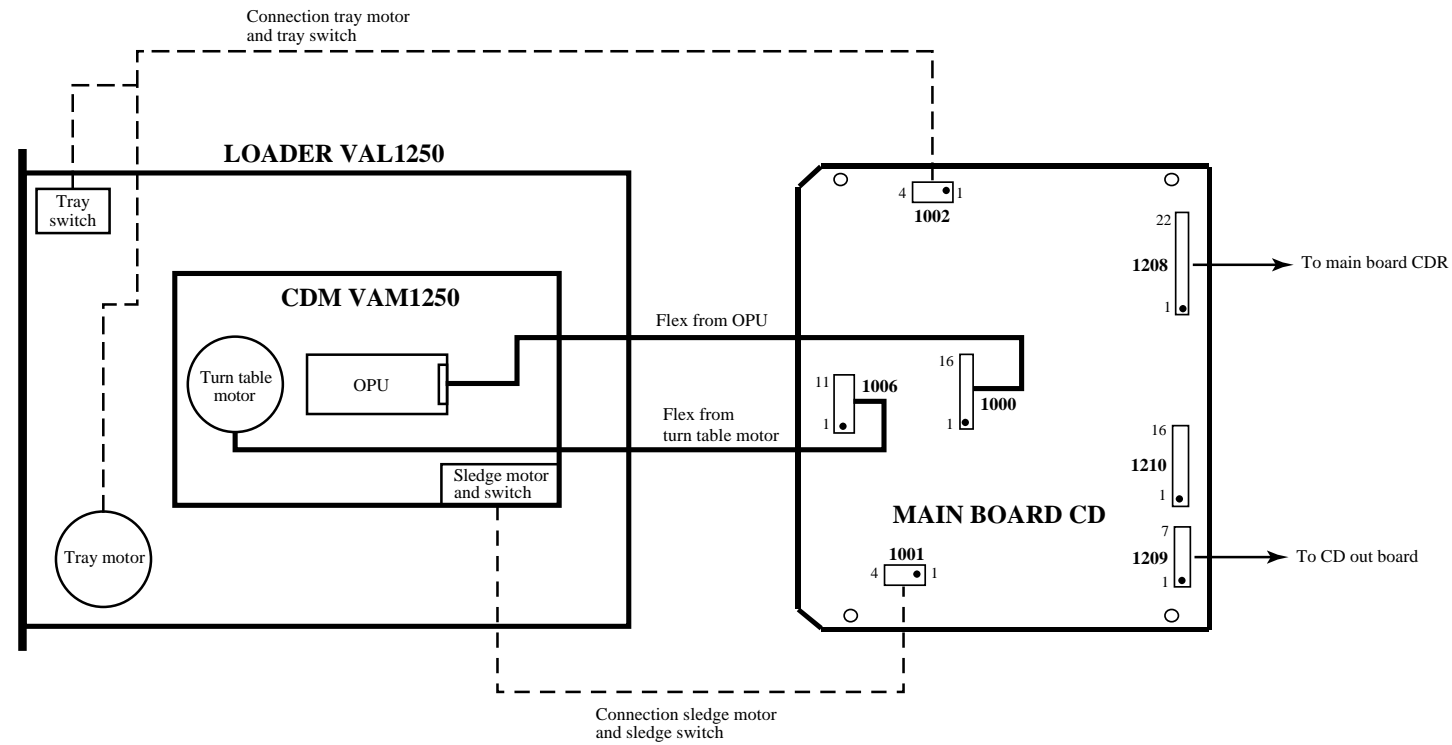
3. Mechanical instructions

Wiring diagram



Wiring CD

WIRING DIAGRAM CD LOADER VAL1250



CONNECTOR 1006

- 1 HALL +
- 2 W-
- 3 W+
- 4 V+
- 5 HALL-
- 6 U+
- 7 V-
- 8 U-
- 9 UCOIL
- 10 VCOIL
- 11 WCOIL

CONNECTOR 1002

- 1 HOMESW
- 2 SGND
- 3 TRAY+
- 4 TRAY-

CONNECTOR 1001

- 1 HOMESW
- 2 SGND
- 3 SL-
- 4 SL+

CONNECTOR 1000

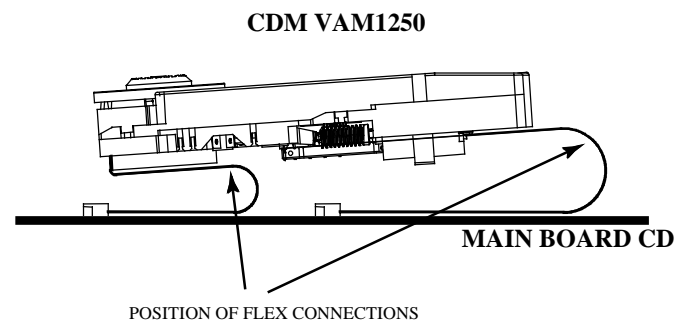
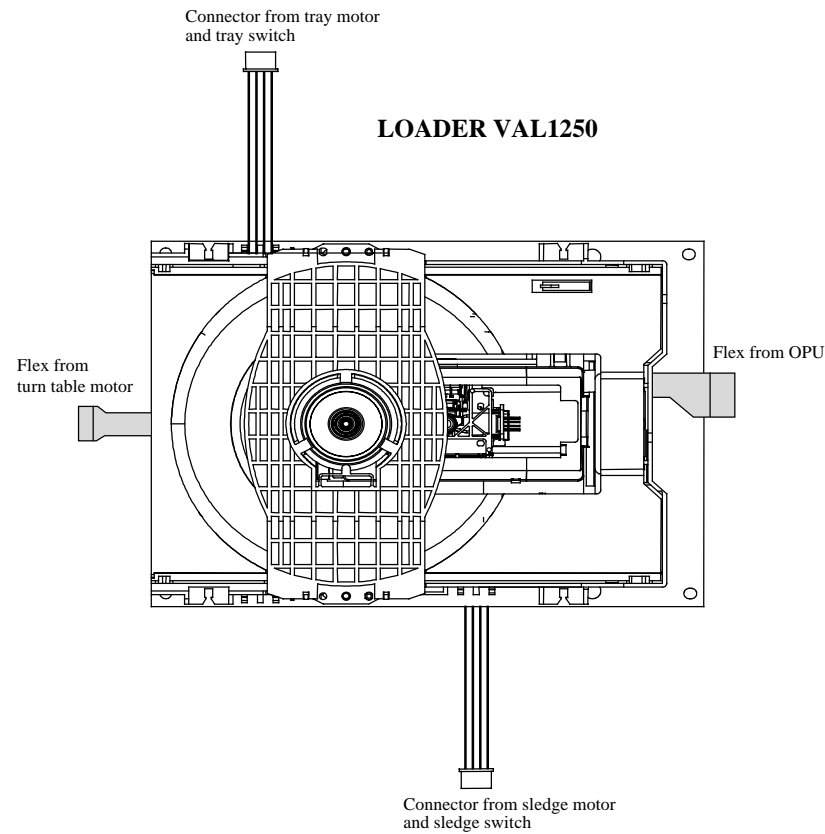
- 1 VSUB
- 2 HFGND
- 3 VDD
- 4 RF
- 5 LDON
- 6 R2
- 7 R1
- 8 D4/D3
- 9 D2
- 10 D1
- 11 FTC
- 12 RW
- 13 FOC+
- 14 FOC-
- 15 RAD+
- 16 RAD-

CONNECTOR 1209

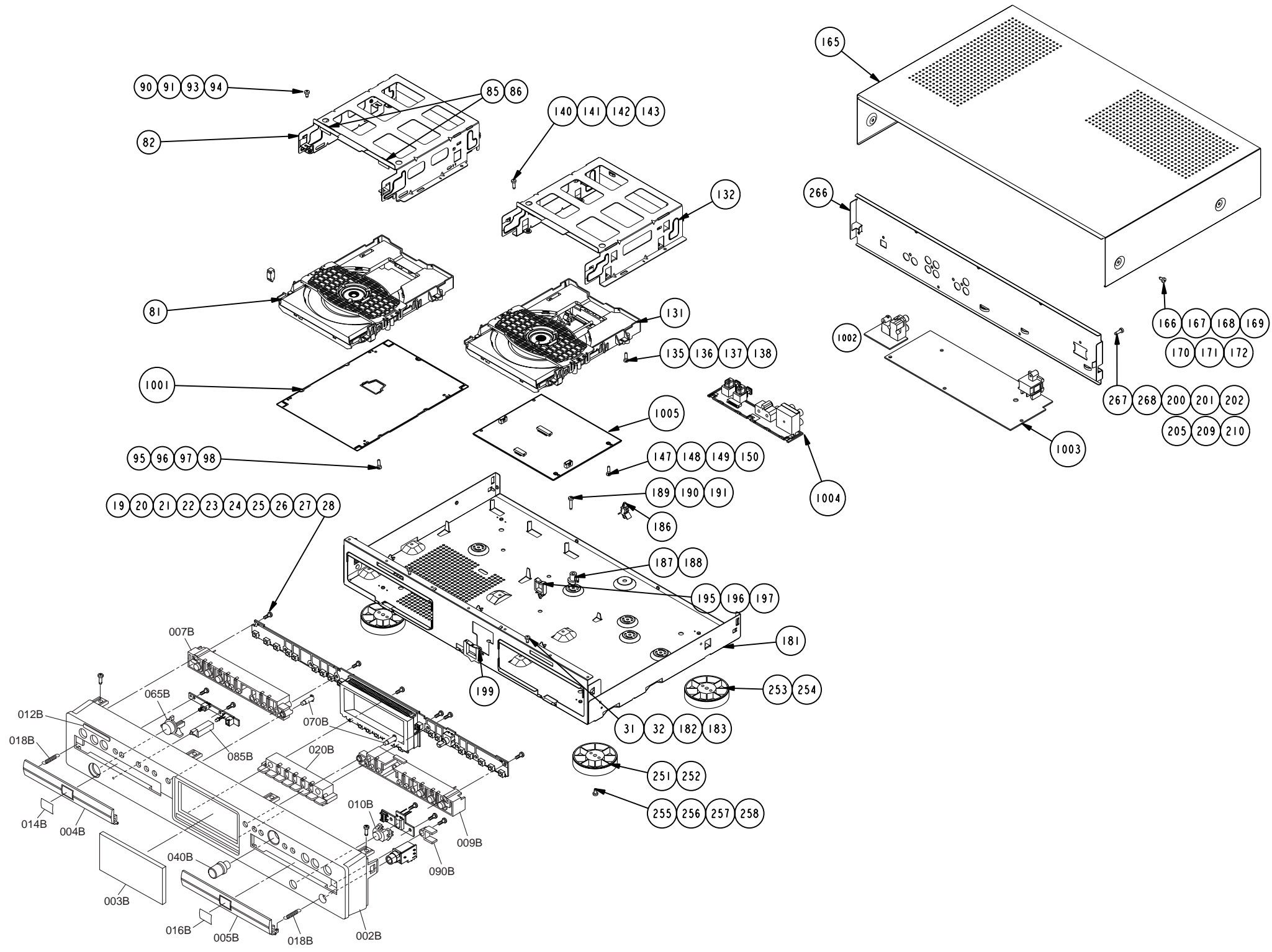
- 1 AUDIO R (RIGHT_CD)
- 2 GND
- 3 AUDIO L (LEFT_CD)
- 4 GND
- 5 DOBM5_CD (DOBM_CD)
- 6 GND
- 7 KILL

CONNECTOR 1208

- 1 GND
- 2 CRIN (SYS_CLK_8W)
- 3 KILL
- 4 AUDIO R (RIGHT_IN_CD)
- 5 GND
- 6 AUDIO L (LEFT_IN_CD)
- 7 DSA_RST (SYS_RESET)
- 8 DOBM (DOBM_CD)
- 9 GND
- 10 SCLK (I²S_BCLK_CD)
- 11 GND
- 12 WCLK (I²S_WS_CD)
- 13 DATA (I²S_DATA_CD)
- 14 GND
- 15 +12V
- 16 +5V
- 17 GND
- 18 DSA_ACK (DSA_ACK_CD)
- 19 DSA_STROBE (DSA_STR_CD)
- 20 GND
- 21 DSA_DATA (DSA_DATA_CD)
- 22 GND



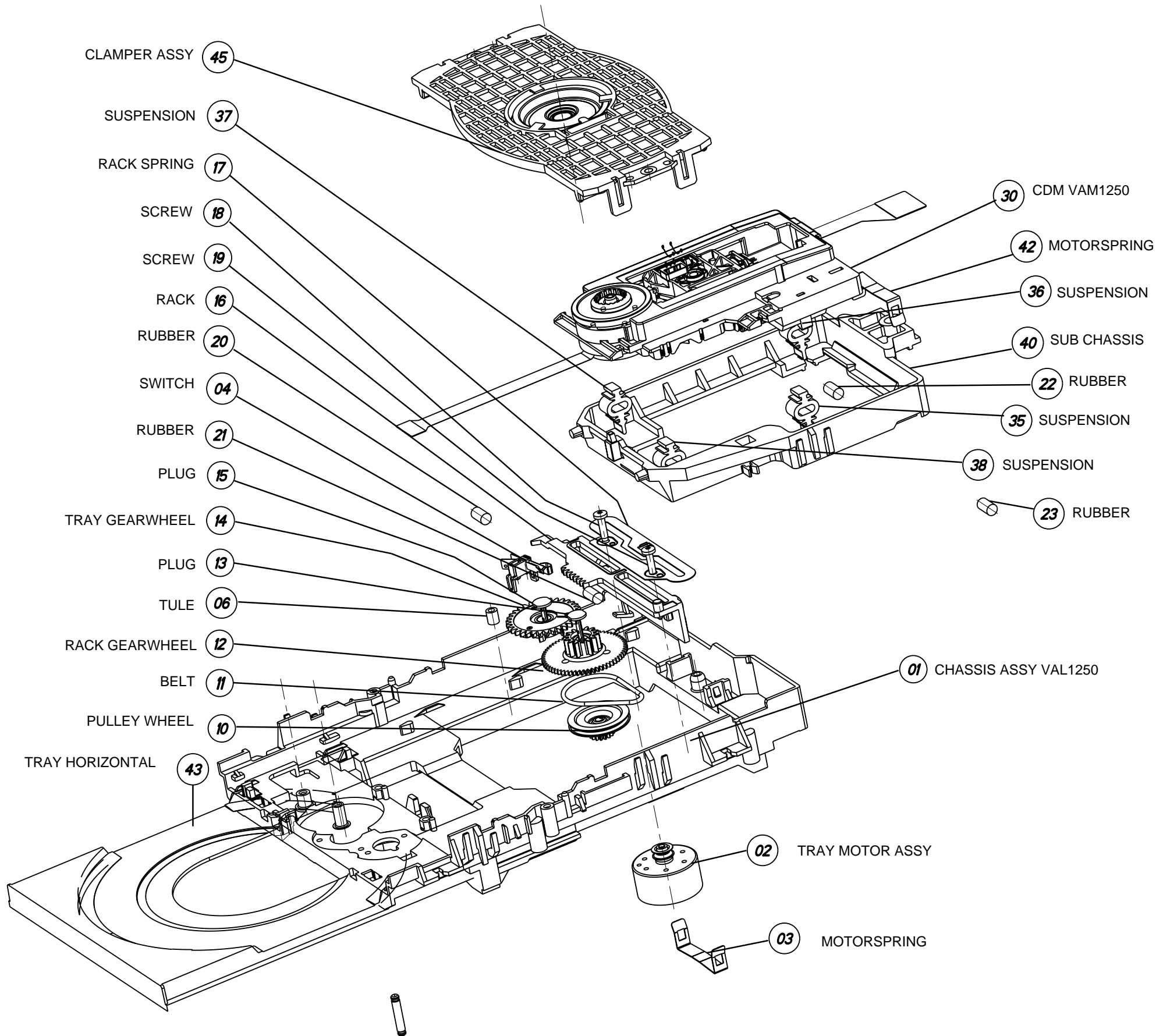
Exploded view



POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)
002B	GLD	9965 000 07435	FRONT PANEL (GOLD)	435W248110
002B	BLK	9965 000 07436	FRONT PANEL (BLACK)	435W248010
003B		9965 000 07447	WINDOW	435W158010
004B	GLD	9965 000 07448	ESCUTCHEON CDR (GOLD)	435W063110
004B	BLK	9965 000 07449	ESCUTCHEON CDR (BLACK)	435W063010
005B	GLD	9965 000 07450	ESCUTCHEON CD (GOLD)	435W063120
005B	BLK	9965 000 07451	ESCUTCHEON CD (BLACK)	435W063020
007B	GLD	9965 000 07452	BUTTON CDR (GOLD)	435W270110
007B	BLK	9965 000 07453	BUTTON CDR (BLACK)	435W270010
009B	GLD	9965 000 07454	BUTTON CD (GOLD)	435W270120
009B	BLK	9965 000 07458	BUTTON CD (BLACK)	435W270020
010B	GLD	9965 000 07459	LENS IR (GOLD)	435W355110
010B	BLK	9965 000 07460	LENS IR (BLACK)	435W355010
012B		9965 000 07461	BADGE MARANTZ	185J251010
014B	GLD	9965 000 07462	LABEL CDR (GOLD)	435W861110
014B	BLK	9965 000 07463	LABEL CDR (BLACK)	435W861010
016B	GLD	9965 000 07464	LABEL CD (GOLD)	435W861120
016B	BLK	9965 000 07465	LABEL CD (BLACK)	435W861020
018B		9965 000 07466	SPRING FOR ESCUTCHEON	435W115010
020B		9965 000 07470	BUTTON MODE	435W270050
040B	GLD	9965 000 07471	JOG KNOB (GOLD)	435W154110
040B	BLK	9965 000 07472	JOG KNOB (BLACK)	435W154010
065B	GLD	9965 000 07473	BUTTON POWER (GOLD)	435W270130
065B	BLK	9965 000 07474	BUTTON POWER (BLACK)	435W270030
070B		9965 000 07475	BUTTON LENS	435W270040
085B		9965 000 07476	LENS FOR LED	435W355030
090B		nsp	HOLDER FOR HEADPHONE	435W271010
251		4822 462 42129	FOOT	QP46242129
252		4822 462 42129	FOOT	QP46242129
253		4822 462 42129	FOOT	QP46242129
254		4822 462 42129	FOOT	QP46242129
▲ 301	/N	4622 004 50290	MAINS CORD (EURO)	462200450290
▲ 301	/U	3104 128 92560	MAINS CORD (NAFTA)	QW12892560
▲ 301	/F	3104 128 92620	MAINS CORD (JPN)	QW12892620
318	/N, /U	3139 228 86260	REMOTE CONTROL ASSY RC282924/02	QT22886260
309	/N	3104 125 23840	USER GUIDE(N)	435W851310
309	/U	3104 125 23850	USER GUIDE(U)	435W851250
309	/F	3104 125 23860	USER GUIDE(F)	435W851110
▲ 1003		3122 427 22020	POWER SUPPLY UNIT	312242722020
8001		3104 157 11240	CWAS FLEX 1MM 14 100 32S	QW15711240
8005		3104 157 11230	CWAS FLEX 1MM 22 320 32S	QW15711230
8007		3104 157 11320	CWAS FLEX 1.25MM 7 300 32S	QW15711320

Exploded view CD

EXPLODED VIEW CD LOADER VAL1250

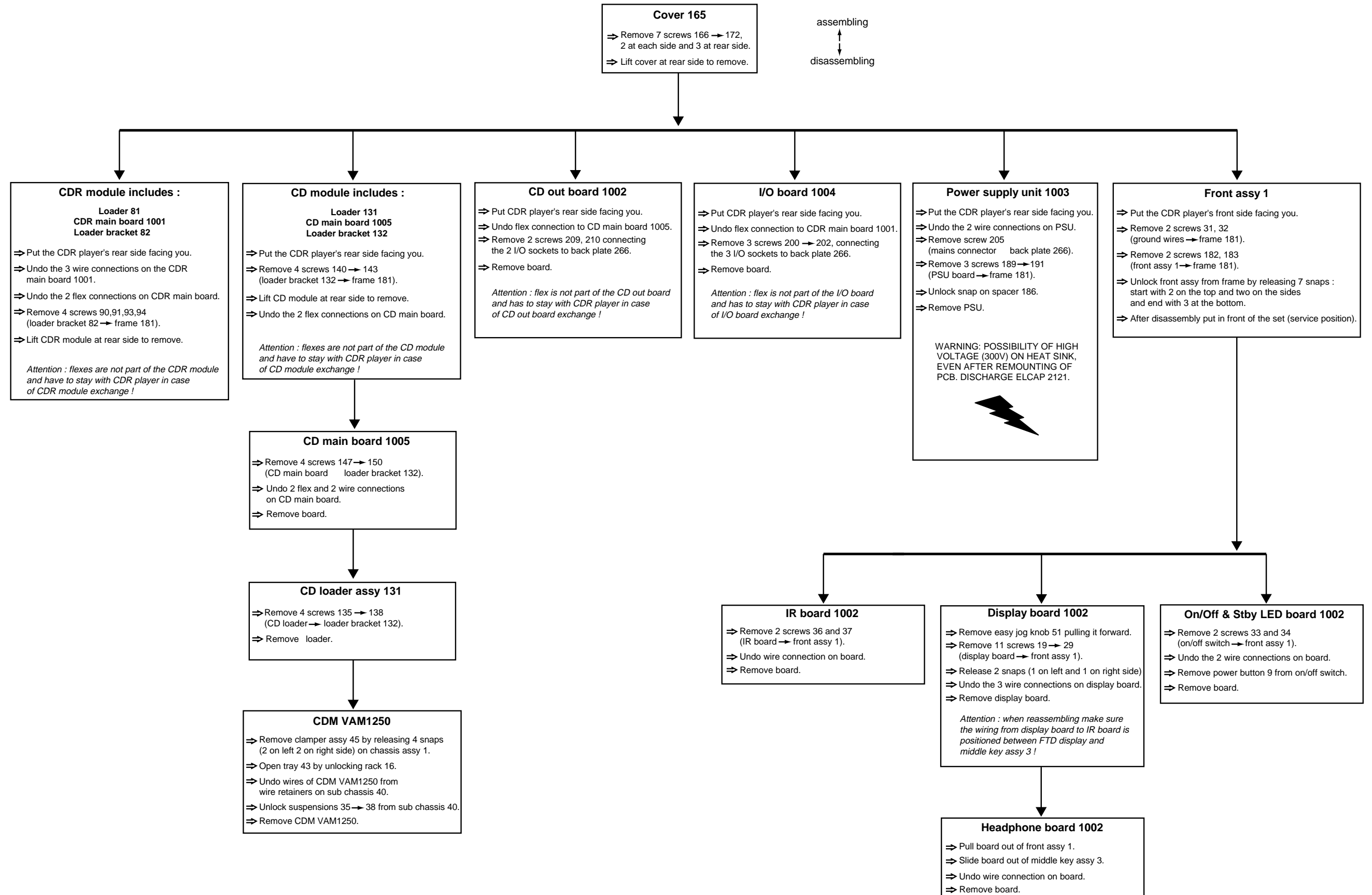


POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)
01		3104 147 14100	CHASSIS ASSY LOADER VAL 1250	QW14714100
02		4822 361 11131	TRAY MOTOR ASSY	QP36111131
03		4822 492 11709	MOTOR SPRING	QP49211709
04		3139 198 80010	SWITCH	QT19880010
06		4822 532 13097	TULE	QP53213097
10		4822 528 11295	PULLEY, WHEEL	QP52811295
11		4822 358 10266	BELT, DRIVING	QP35810266
12		4822 522 10739	RACK GEAR WHEEL	QP52210739
13		4822 535 10588	PIN, PLASTIC	QP53510588
14		4822 522 10741	TRAY GEAR WHEEL	QP52210741
15		4822 535 10588	PIN, PLASTIC	QP53510588
16		4822 402 11221	RACK	QP40211221
17		4822 492 11711	RACK, SPRING	QP49211711
20		4822 466 12131	CUSHION RUBBER	QP46612131
21		4822 466 12131	CUSHION RUBBER	QP46612131
22		4822 466 12131	CUSHION RUBBER	QP46612131
23		4822 466 12131	CUSHION RUBBER	QP46612131
30		9305 022 25001	CDM VAM 1250	QE02225001
35		3104 144 02030	SUSPENSION	QW14402030
36		3104 144 02030	SUSPENSION	QW14402030
37		3104 144 02030	SUSPENSION	QW14402030
38		3104 144 02030	SUSPENSION	QW14402030
40		3104 144 05870	SUB-CHASIS	QW14405870
42		4822 492 11709	MOTOR SPRING	QP49211709
43		4822 418 10421	TRAY HORIZONTAL	QP41810421
45		3104 147 13910	CLAMPER ASSY VAL 1250	QW14713910
8001		3104 148 01310	LED ASSY 4P	QW14801310

Dismantling

DISMANTLING INSTRUCTIONS

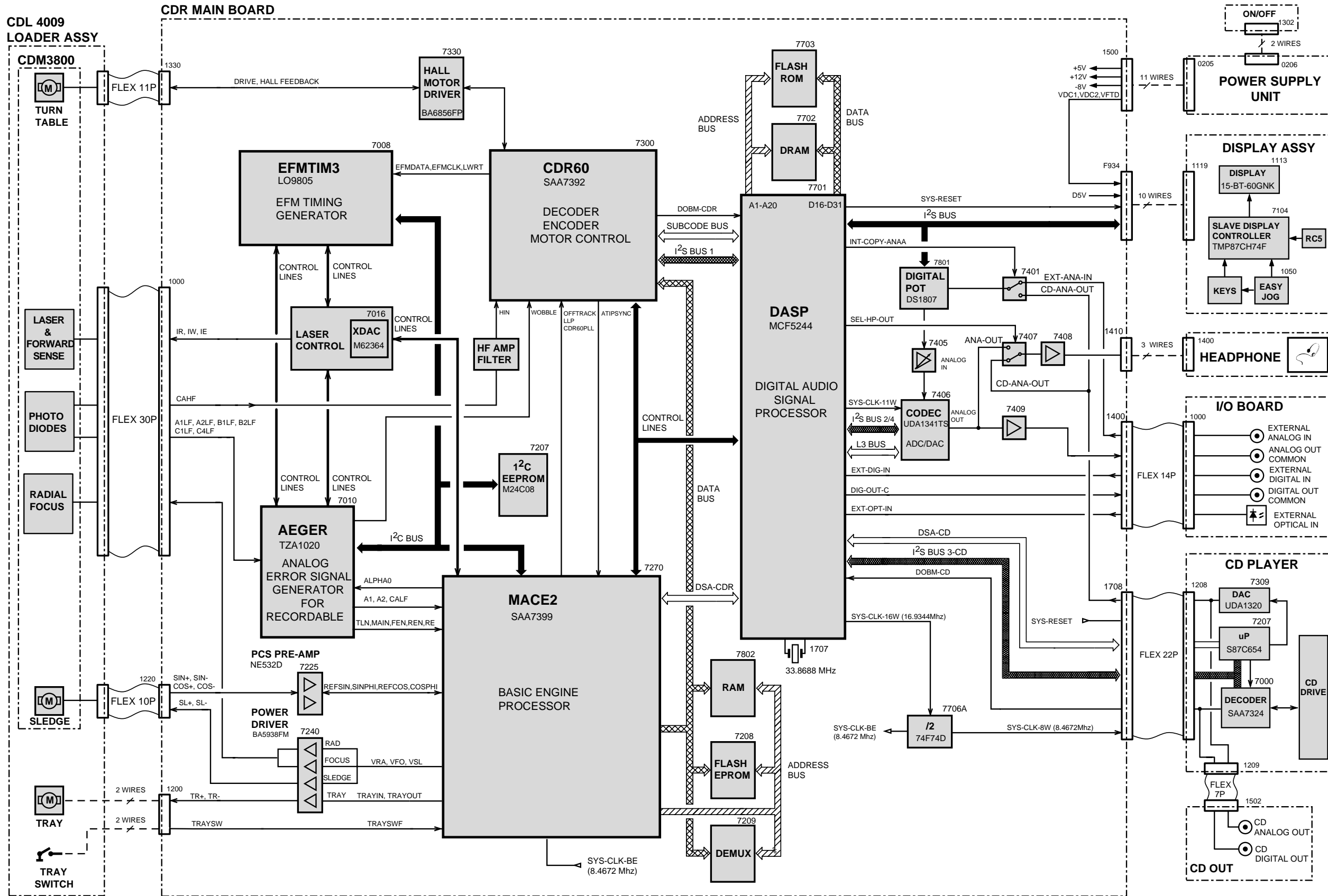
See exploded views for item numbers



4. Electrical and circuit diagrams

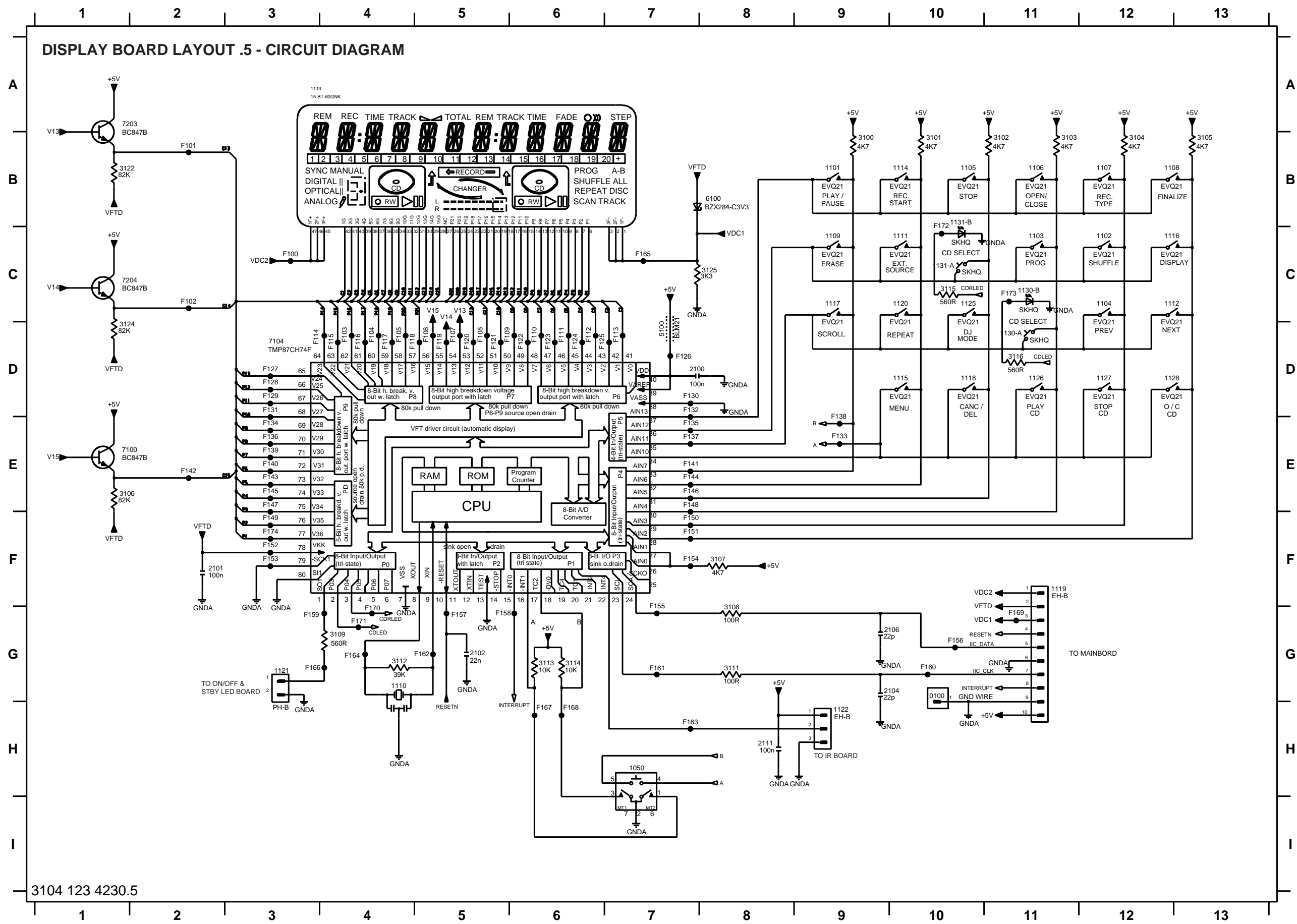
Blockdiagram

OVERALL BLOCK DIAGRAM



Display

DISPLAY BOARD LAYOUT .5 - CIRCUIT DIAGRAM



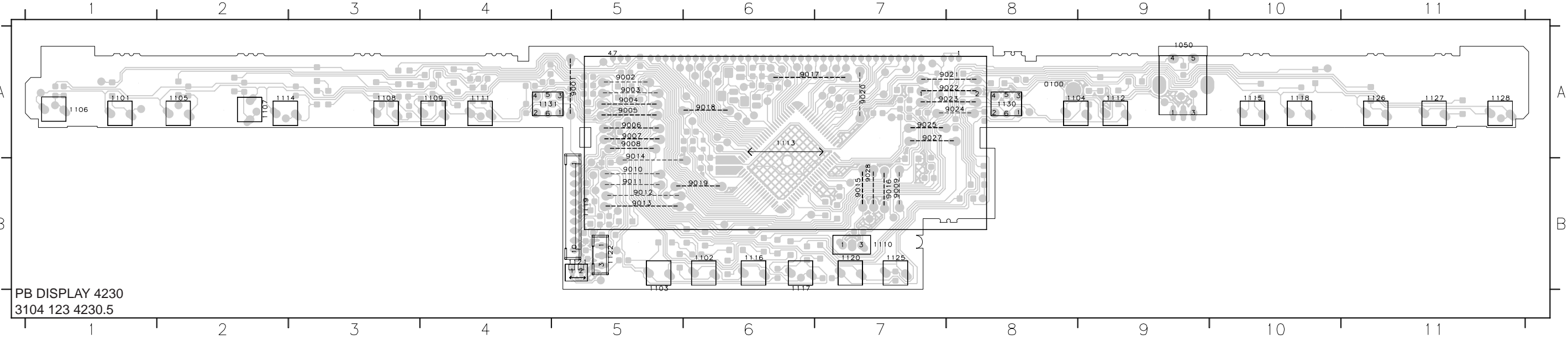
- 0100 G10
- 1050 H7
- 1101 B9
- 1102 C12
- 1103 C11
- 1104 C12
- 1105 B10
- 1106 B11
- 1107 B12
- 1108 B12
- 1109 C9
- 1110 G4
- 1111 C10
- 1112 C12
- 1113 A3
- 1114 B10
- 1115 D10
- 1116 C12
- 1117 C9
- 1118 D10
- 1119 F11
- 1120 C10
- 1121 G3
- 1122 H9
- 1125 C10
- 1126 D11
- 1127 D12
- 1128 D12
- 1130-A D11
- 1130-B C11
- 1131-A C10
- 1131-B B10
- 2100 D7
- 2101 F2
- 2102 G5
- 2104 G10
- 2106 G10
- 2111 H8
- 3100 B9
- 3101 B10
- 3102 B11
- 3103 B11
- 3104 B12
- 3105 B13
- 3106 F1
- 3107 F8
- 3108 G8
- 3109 G4
- 3111 G8
- 3112 G4
- 3113 G6
- 3114 G6
- 3115 C10
- 3116 D11
- 3122 B1
- 3124 C1
- 3125 C8
- 5100 D7
- 6100 B8
- 7100 E1
- 7104 D3
- 7203 A1
- 7204 C1
- F100 C3
- F101 B2
- F102 C2
- F103 D4
- F104 D4
- F105 D4
- F106 D5
- F107 D5
- F108 D5
- F109 D5
- F110 D6
- F111 D6
- F112 D7
- F113 D7
- F114 D3
- F115 D4
- F116 D4
- F117 D4
- F118 D4
- F119 D5
- F120 D5
- F121 D5
- F122 D6
- F123 D6
- F124 D6
- F125 D6
- F126 D7
- F127 D3
- F128 D3
- F129 D3
- F130 D7
- F131 D3
- F132 D7
- F133 E9
- F134 E3
- F135 E7
- F136 E3
- F137 E7
- F138 E9
- F139 E3
- F140 E3
- F141 E7
- F142 E2
- F143 E3
- F144 E7
- F145 E3
- F146 E7
- F147 E3
- F148 E7
- F149 E3
- F150 E7
- F151 E3
- F152 E3
- F153 E3
- F154 E7
- F155 E3
- F156 E7
- F157 E7
- F158 G5
- F159 G3
- F160 G10
- F161 G10
- F162 G4
- F163 G10
- F164 G4
- F165 G10
- F166 G4
- F167 G4
- F168 G4
- F169 G3
- F170 G4
- F171 G4
- F172 B10
- F173 C11
- F174 F3
- F147 E3
- F148 E7
- F149 F3
- F150 F7
- F152 F3
- F153 F3
- F154 F7
- F155 G7
- F156 G10
- F157 G5
- F158 G5
- F159 G3
- F160 G10
- F161 G10
- F162 G4
- F163 G10
- F164 G4
- F165 G10
- F166 G4
- F167 G4
- F168 G4
- F169 G3
- F170 G4
- F171 G4
- F172 B10
- F173 C11
- F174 F3

3104 123 4230.5

Display

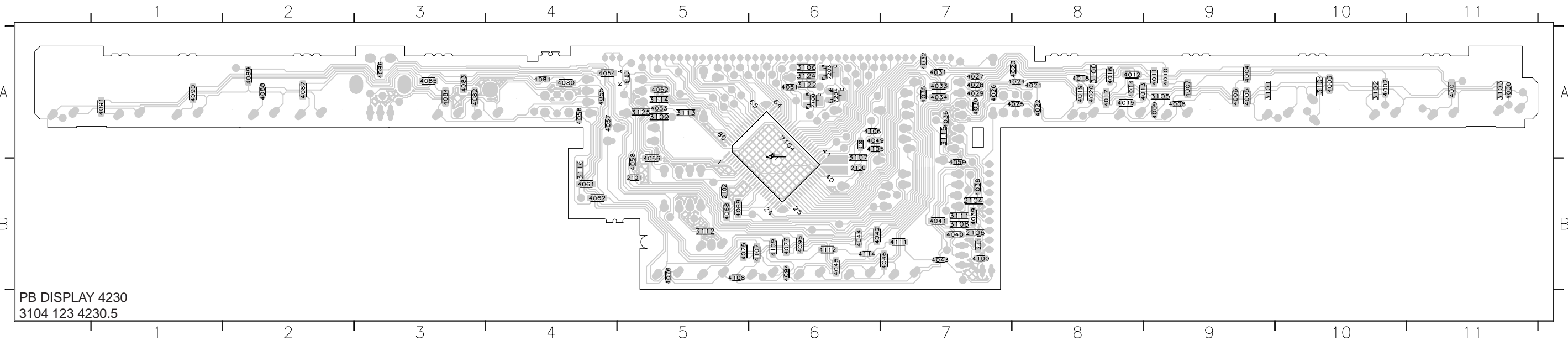
DISPLAY BOARD CDR775 LAYOUT.5 TOP VIEW

0100 A8 1101 A1 1104 A8 1107 A3 1110 B7 1113 A6 1116 B6 1120 B5 1123 B5 1127 A1 1131 A4 1301 B9 1401 A3 1500 A2 2300 B9 9002 A5 9005 A5 9008 A5 9011 B5 9014 A5 9017 A6 9020 A7 9023 A8 9027 A7
1050 A9 1103 B5 1106 A1 1109 A4 1112 A9 1115 A10 1118 A10 1121 B5 1126 A1 1130 A8 1300 B11 1400 B3 1501 B1 5500 B2 9001 A5 9004 A5 9007 A5 9010 B5 9013 B5 9016 B7 9019 B6 9022 A8 9025 A7 9030 B2



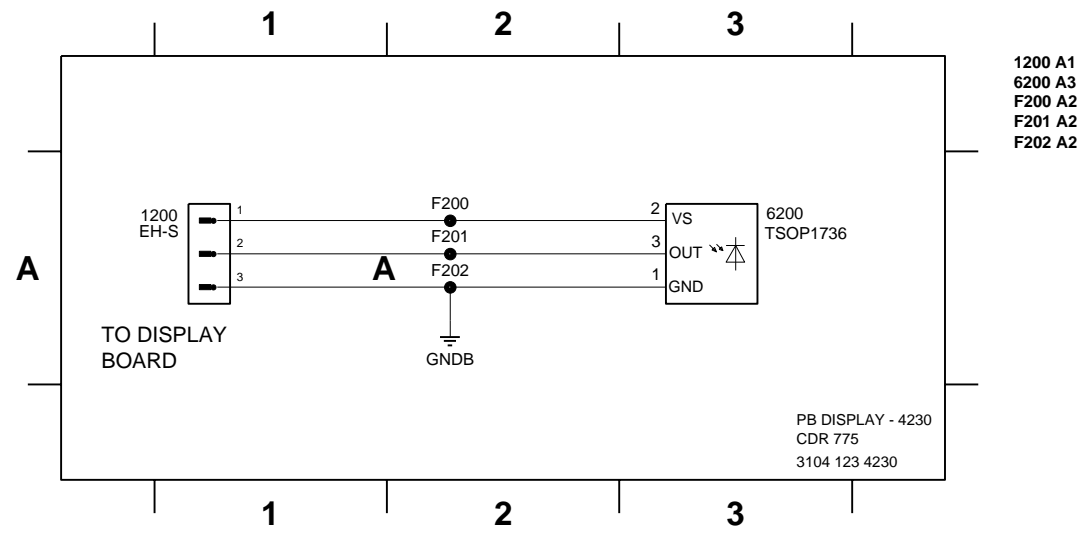
DISPLAY BOARD CDR775 LAYOUT.5 BOTTOM VIEW

2100 B6 2106 B7 2501 B10 3100 A8 3104 A10 3108 B7 3113 A5 3122 A6 3501 B11 3999 B8 4003 A10 4007 A9 4011 A9 4015 A8 4019 A8 4023 A8 4027 A7 4031 A7 4035 A7 4040 B7 4044 B6 4051 A6 4055 A4 4059 B7 4068 B5 4077 B6 4083 A3 4087 A2 4091 A1 4100 B7 4108 B5 4114 B6 7104 A6 7501 B10
2101 B5 2111 B7 2502 B10 3101 A9 3105 A9 3109 B7 3114 A5 3124 A6 3502 B11 4000 A11 4004 A9 4008 A9 4012 A8 4016 A8 4017 A8 4018 A8 4022 A8 4026 A7 4030 A7 4034 A7 4039 B7 4043 B7 4046 B6 4049 A6 4054 A4 4058 B5 4066 B5 4076 B5 4082 A3 4086 A3 4090 A1 4095 B6 4107 B6 4112 B6 7100 A6 7500 B11
2102 B5 2400 B9 2503 B11 3102 A10 3106 A6 3111 B7 3115 A7 3125 A5 3503 B10 4001 A11 4005 A9 4009 A9 4013 A8 4014 A8 4015 A8 4019 A8 4023 A8 4027 A7 4031 A7 4035 A7 4040 B7 4044 B6 4051 A6 4055 A4 4059 B7 4068 B5 4077 B6 4083 A3 4087 A2 4091 A1 4100 B7 4108 B5 4114 B6 7104 A6 7501 B10
2104 B7 2401 B9 2504 B11 3103 A11 3107 A6 3112 B5 3116 B4 3500 B10 4002 A10 4006 A9 4010 A9 4011 A9 4015 A8 4019 A8 4023 A8 4027 A7 4031 A7 4035 A7 4040 B7 4044 B6 4051 A6 4055 A4 4059 B7 4068 B5 4077 B6 4083 A3 4087 A2 4091 A1 4100 B7 4108 B5 4114 B6 7104 A6 7501 B10

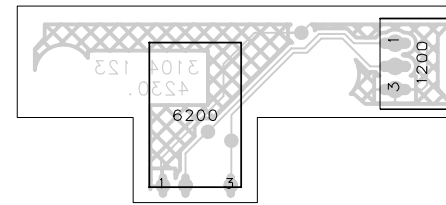


R on/off

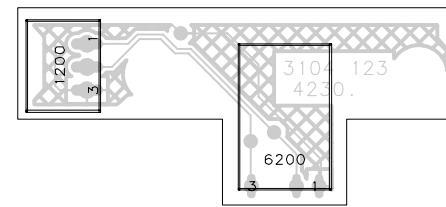
IR BOARD CDR775 - CIRCUIT DIAGRAM



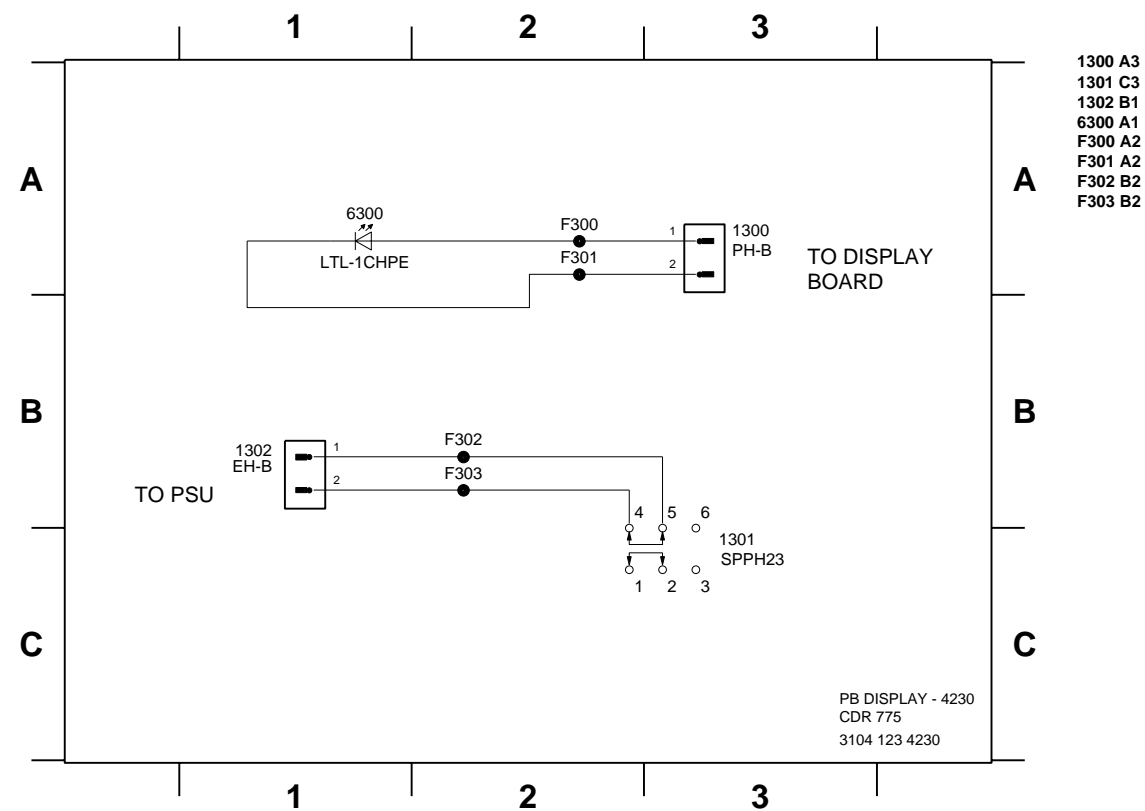
IR BOARD - FRONT VIEW



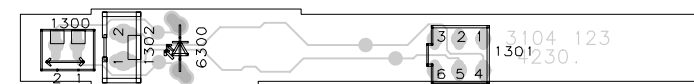
IR BOARD - BACK VIEW



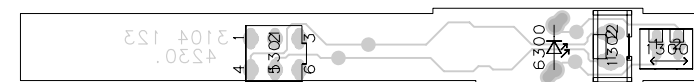
ON/OFF & STBY LED BOARD CDR775 - CIRCUIT DIAGRAM



ON/OFF & STBY LED BOARD - FRONT VIEW

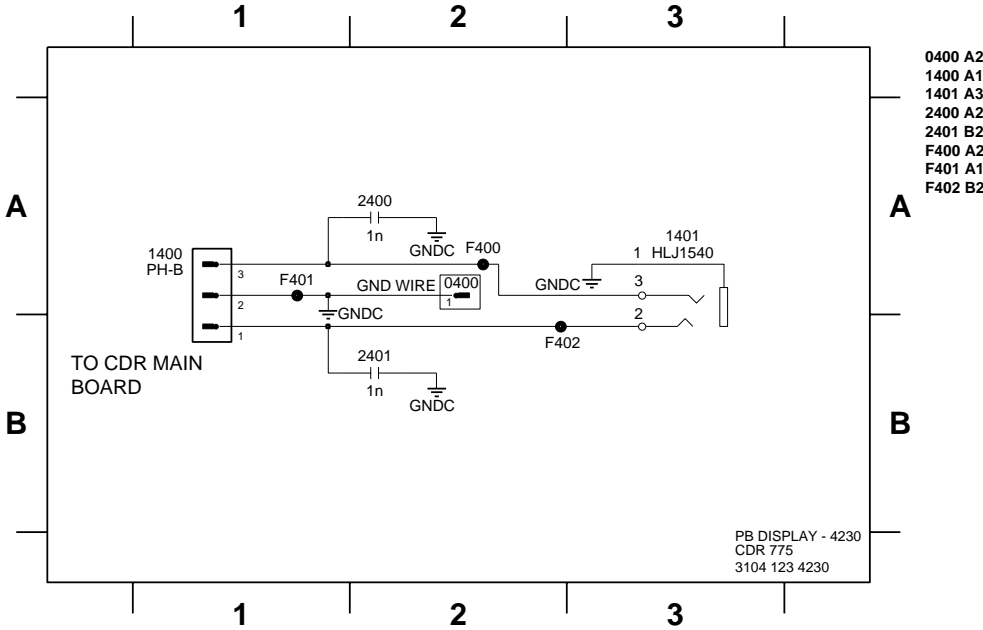


ON/OFF & STBY LED BOARD - BACK VIEW



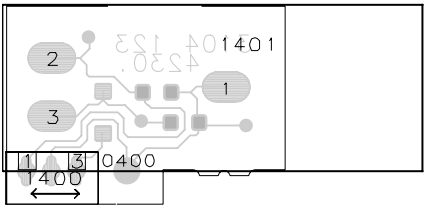
HPCD out

HEADPHONE BOARD CDR775 - CIRCUIT DIAGRAM

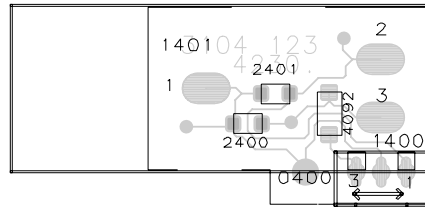


- 0400 A2
- 1400 A1
- 1401 A3
- 2400 A2
- 2401 B2
- F400 A2
- F401 A1
- F402 B2

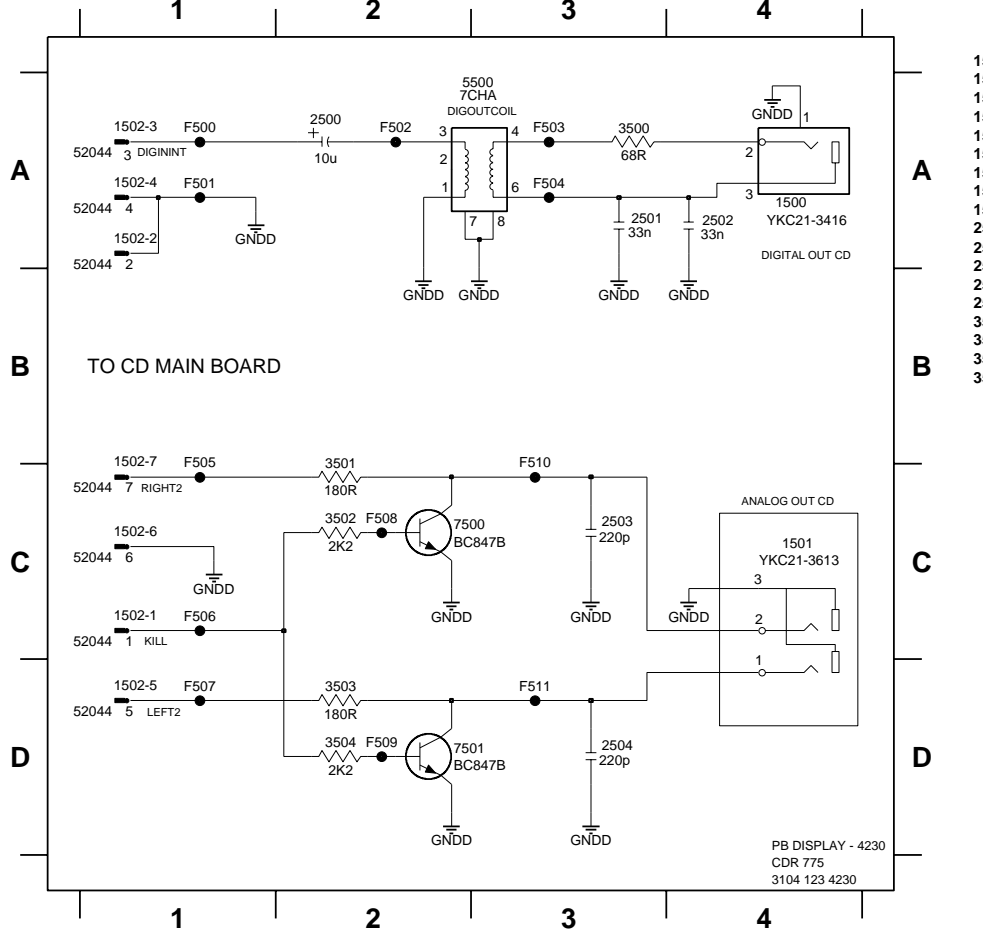
HEADPHONE BOARD - TOP VIEW



HEADPHONE BOARD - BOTTOM VIEW

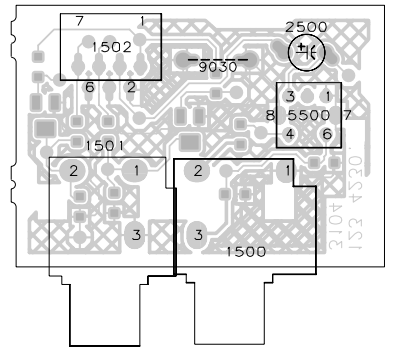


CD OUT BOARD CDR775 - CIRCUIT DIAGRAM

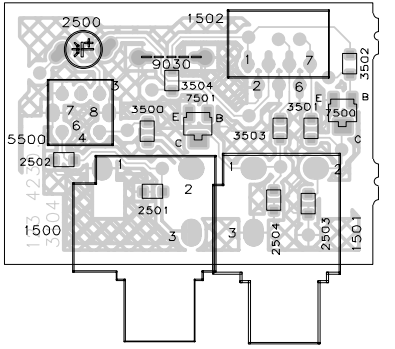


- 1500 A4
- 1501 C4
- 1502 A1
- 1502 A1
- 1502 A1
- 1502 C1
- 1502 C1
- 1502 C1
- 1502 D1
- 2500 A2
- 2501 A3
- 2502 A4
- 2503 C3
- 2504 D3
- 3500 A3
- 3501 C2
- 3502 C2
- 3503 D2
- 3504 D2
- 5500 A2
- 7500 C2
- 7501 D2
- F500 A1
- F501 A1
- F502 A2
- F503 A3
- F504 A3
- F505 C1
- F506 C1
- F507 D1
- F508 C2
- F509 D2
- F510 C3
- F511 D3

CD OUT BOARD - TOP VIEW

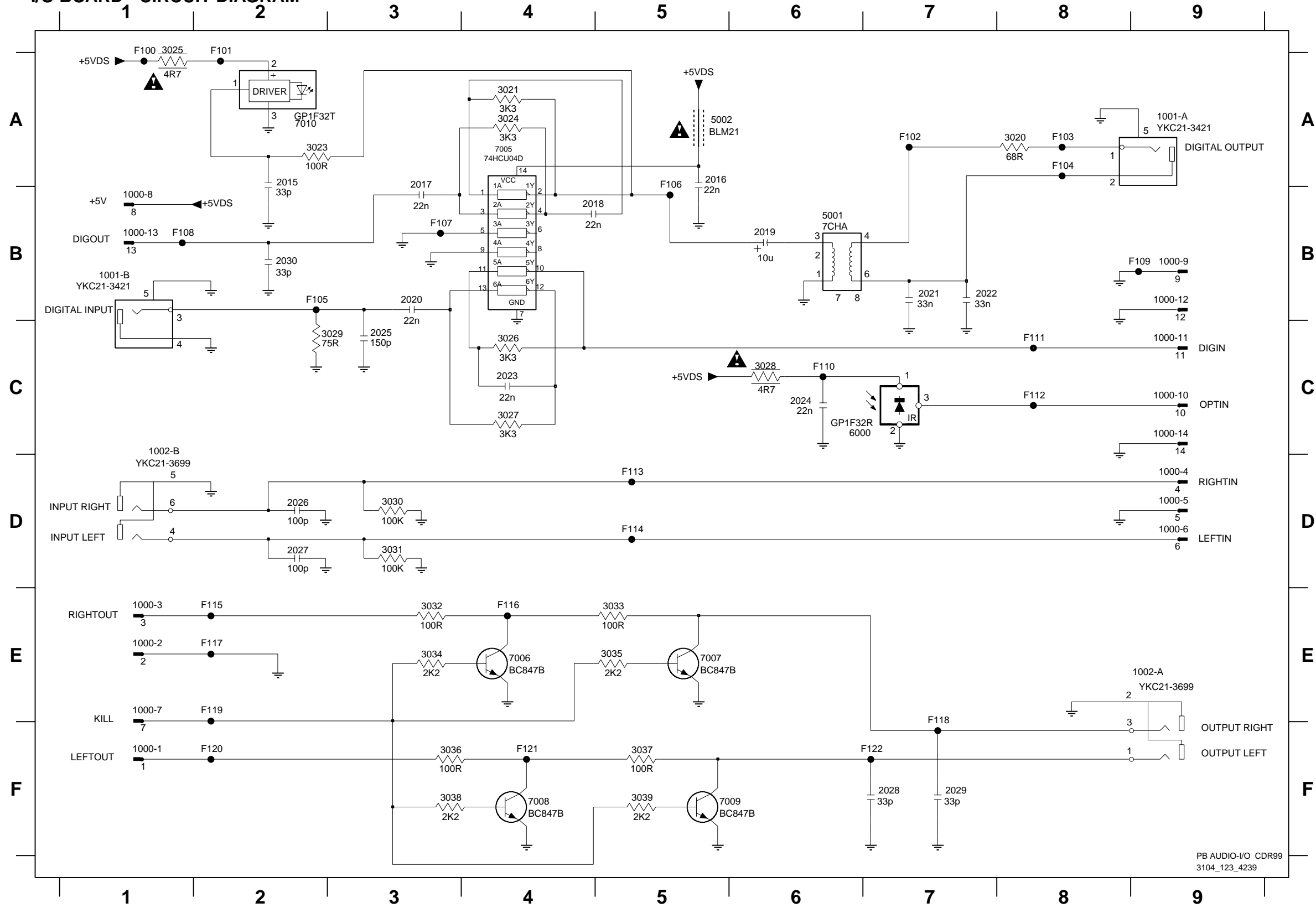


CD OUT BOARD - BOTTOM VIEW



I/O board

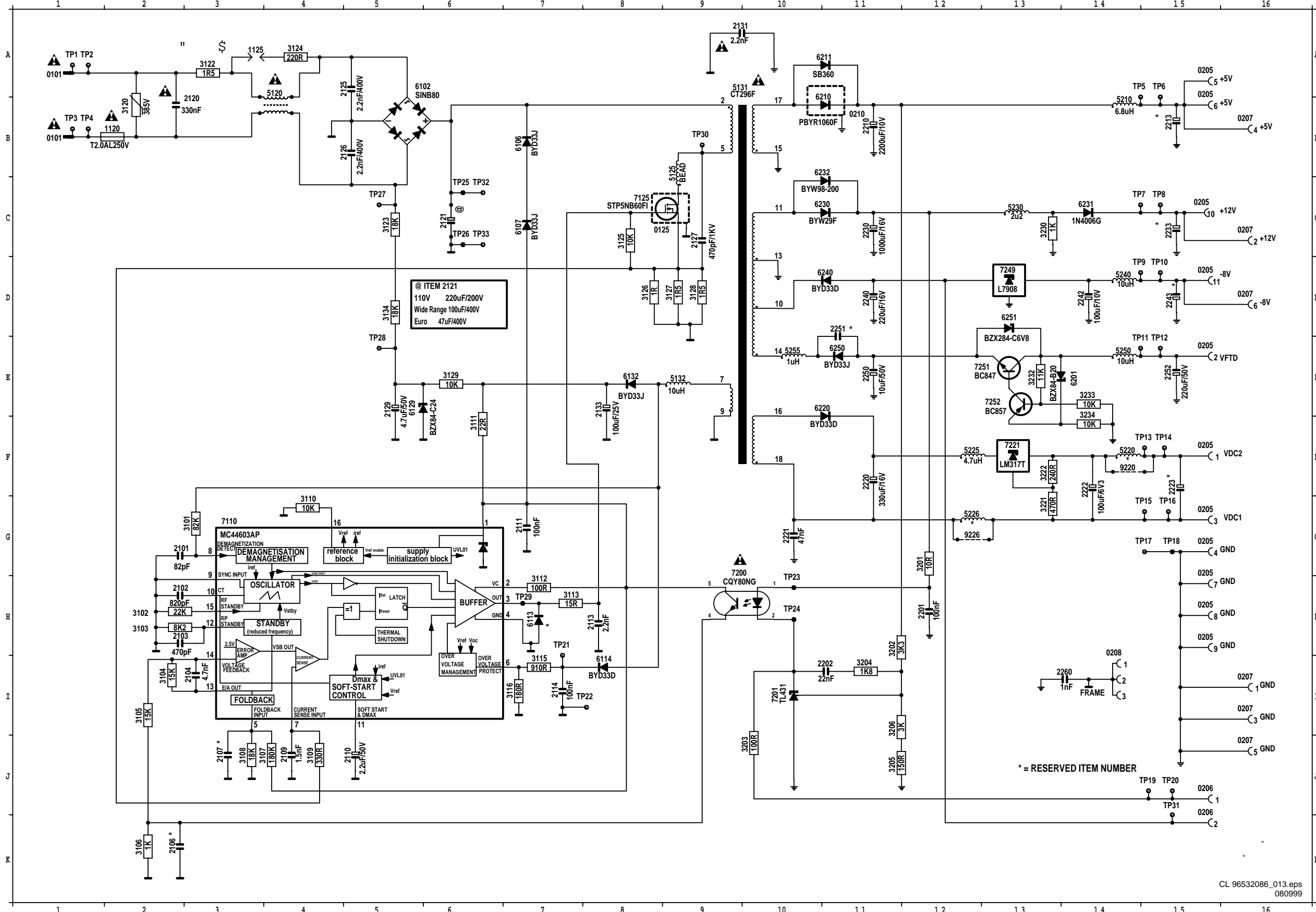
I/O BOARD - CIRCUIT DIAGRAM



- 1000-1 F1
- 1000-10 C9
- 1000-11 C9
- 1000-12 B9
- 1000-13 B1
- 1000-14 C9
- 1000-2 E1
- 1000-3 E1
- 1000-4 D9
- 1000-5 D9
- 1000-6 D9
- 1000-7 E1
- 1000-8 B1
- 1000-9 B9
- 1001-A A9
- 1001-B B1
- 1002-A E9
- 1002-B D1
- 2015 A2
- 2016 A5
- 2017 B3
- 2018 B4
- 2019 B6
- 2020 B3
- 2021 B7
- 2022 B7
- 2023 C4
- 2024 C6
- 2025 C3
- 2026 D2
- 2027 D2
- 2028 F7
- 2029 F7
- 2030 B2
- 3020 A8
- 3021 A4
- 3023 A2
- 3024 A4
- 3025 A1
- 3026 C4
- 3028 C6
- 3029 C3
- 3030 D3
- 3031 D3
- 3032 E3
- 3033 E5
- 3034 E3
- 3035 E5
- 3036 F3
- 3037 F5
- 3038 F3
- 3039 F5
- 3999 F9
- 5001 B6
- 5002 A5
- 6000 C7
- 7005 A4
- 7006 E4
- 7007 E5
- 7008 F4
- 7009 F5
- 7010 A2

PSU 99

0101 A 1	0205 G15	0205 C15	0207 H16	1120 B 2	2106 K 2	2114 L 7	2129 E 5	2213 B15	2233 C15	2252 E15	3105 L 2	3111 F 6	3122 A 3	3128 D 9	3204 H1	3232 E13	5132 E 9	5240 D14	6113 H 7	6211 A11	6250 E11	7221 F13
0101 B 1	0205 A15	0205 D15	0207 B16	1125 A 3	2107 J 3	2120 B 3	2131 A 9	2220 F11	2240 D11	2260 H4	3106 K 2	3112 H 7	3123 C 5	3129 E 6	3205 J11	3233 E14	5210 B14	5250 E14	6114 I 8	6220 E11	6251 D13	7249 D13
0125 C 8	0205 A15	0206 J15	0207 J16	2101 G 2	2109 J 4	2121 C 6	2133 E 8	2221 G10	2242 D14	3101 G 3	3107 J 4	3113 H 7	3124 A 4	3134 O 5	3206 I11	3234 F14	5220 F14	5255 E10	6129 E 5	6230 C11	7110 G 3	7251 E12
0205 F15	0205 G15	0206 J15	0207 D16	2102 H 2	2110 J 5	2125 A 5	2201 H12	2222 F14	2243 D15	3102 H 2	3108 J 3	3115 I 7	3125 C 8	3201 G12	3221 F13	5120 A 4	5225 F12	6102 A 6	6132 E 8	6231 C14	7125 C 8	7252 E12
0205 E15	0205 H15	0207 H16	0208 H14	2103 H 2	2111 G 7	2126 B 5	2202 H11	2223 F15	2250 E11	3103 H 2	3109 J 4	3116 I 7	3126 D 8	3202 H11	3222 F13	5125 B 9	5226 G12	6106 B 7	6201 E14	6232 B11	7200 G10	9220 F14
0205 G15	0205 H15	0207 C16	0210 B11	2104 I 3	2113 H 8	2127 C 9	2210 B11	2230 C11	2251 D11	3104 I 2	3110 G 4	3120 B 2	3127 D 9	3203 J10	3230 C13	5131 A 9	5230 C13	6107 C 7	6210 B11	6240 D11	7201 H10	9226 G12

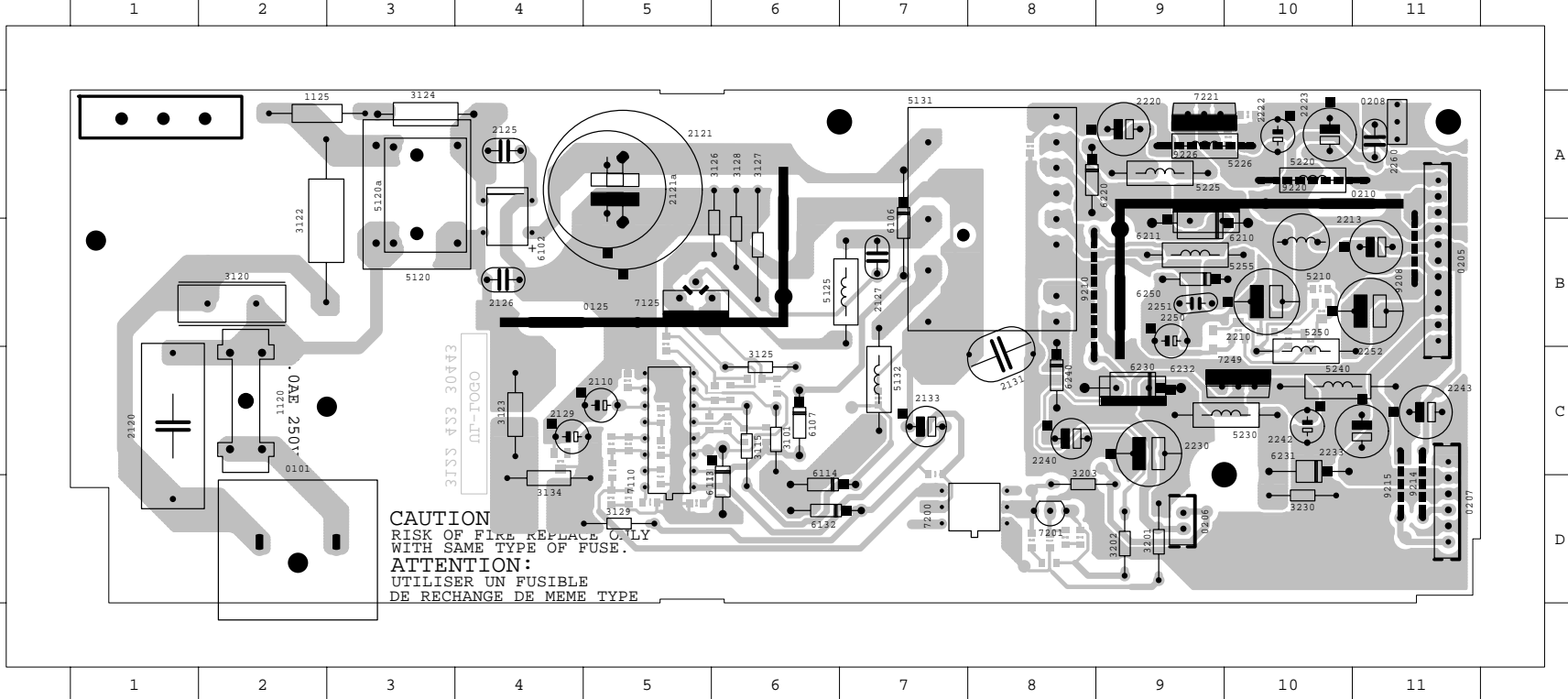


* = RESERVED ITEM NUMBER

PSU 99

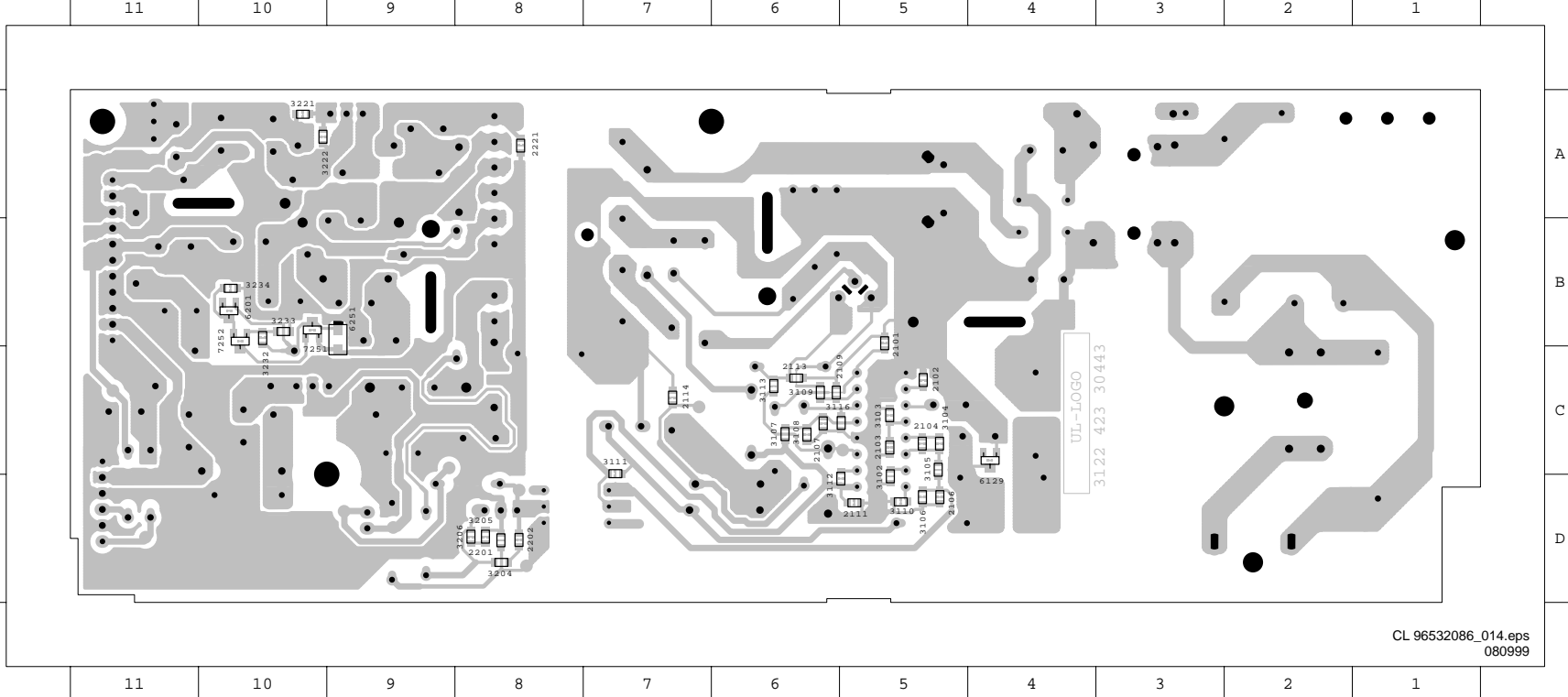
POWER SUPPLY UNIT 20PS317 - COMPONENT SIDE

0101 D 2	0208 A 11	2120 C 1	2127 B 7	2213 B 11	2233 C 11	2251 B 9	3120 B 2	3126 B 6	3201 D 9	5120a A 3	5220 A 10	5250 C 10	6113 D 6	6220 A 8	6250 B 9	7221 A 9	9215 D 11
0125 B 5	0210 A 10	2121 A 5	2129 C 4	2220 A 9	2240 C 8	2252 B 11	3122 B 2	3127 B 6	3202 D 9	5125 B 7	5225 A 9	5255 B 9	6114 D 6	6230 C 9	7110 C 5	7249 C 10	9220 A 10
0205 B 11	1120 C 2	2121a A 5	2131 C 8	2222 A 10	2242 C 10	2260 A 11	3123 C 4	3128 B 6	3203 D 8	5131 B 8	5226 A 9	6109 A 4	6132 D 6	6231 C 10	7125 B 5	9208 B 11	9226 A 9
0206 D 9	1125 A 2	2125 A 4	2133 C 7	2223 A 10	2243 C 11	3101 C 6	3124 A 3	3129 D 5	3230 D 10	5132 C 7	5230 C 10	6106 B 7	6210 B 6	6232 C 9	7200 D 8	9210 B 8	
0207 D 11	2110 C 5	2126 B 4	2210 B 10	2230 C 9	2250 B 9	3115 C 6	3125 C 6	3134 D 4	5120 A 3	5210 B 10	5240 C 10	6107 C 6	6211 B 9	6240 C 8	7201 D 8	9214 D 11	



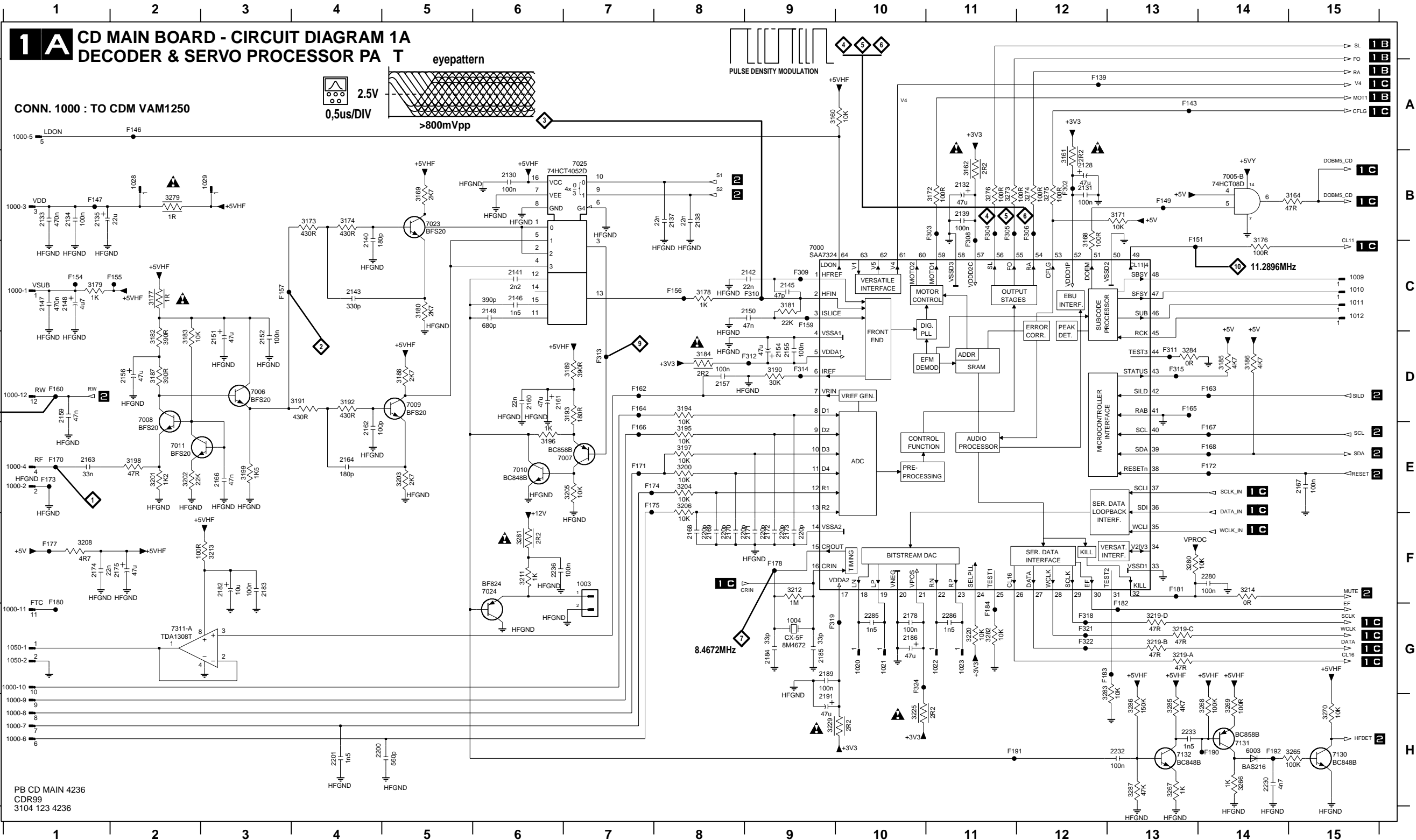
POWER SUPPLY UNIT 20PS317 - SOLDERING SIDE

2101 B 5	2106 D 5	2113 C 6	2221 A 8	3105 C 5	3109 C 6	3113 C 6	3206 D 8	3233 B 10	6251 B 9	TP2 D 2	TP6 C 11	TP10 D 11	TP14 A 11	TP18 B 11	TP22 B 7	TP26 B 5	TP30 B 7
2102 C 5	2107 C 6	2114 C 7	3102 D 5	3106 D 5	3110 D 5	3116 C 5	3221 A 10	3234 B 10	7251 B 10	TP3 D 3	TP7 C 11	TP11 A 11	TP15 A 11	TP19 C 9	TP23 D 8	TP27 C 4	TP31 D 9
2103 C 5	2109 C 6	2201 D 8	3103 C 5	3107 C 6	3111 C 7	3204 D 8	3222 A 10	6129 C 4	7252 B 10	TP4 C 2	TP8 D 11	TP12 B 11	TP16 A 11	TP20 D 9	TP24 D 8	TP28 C 5	TP32 A 4
2104 C 5	2111 D 5	2202 D 8	3104 C 5	3108 C 6	3112 D 5	3205 D 8	3232 B 10	6201 B 10	TP1 D 2	TP5 B 11	TP9 C 11	TP13 A 10	TP17 B 10	TP21 C 7	TP25 A 5	TP29 C 5	TP33 B 5



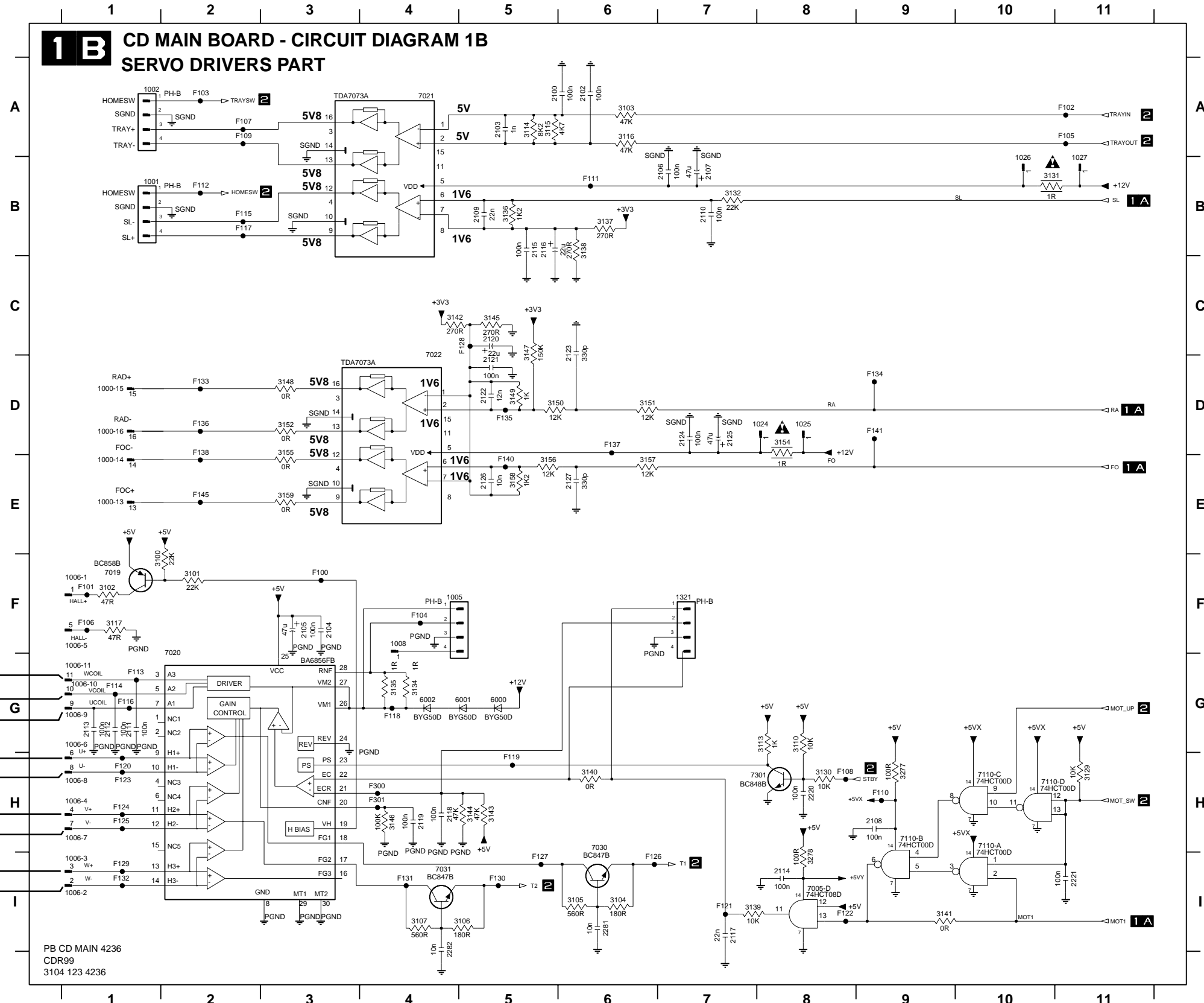
CD Diagram 1A

1000-1 C1	1000-7 H1	1020 G10	2130 B6	2139 B11	2148 C1	2159 D1	2169 F8	2183 F3	2232 H13	3164 B15	3178 C8	3187 D2	3196 E6	3205 E7	3219-C G13	3269 H14	3282 G11	7006 D3	7130 H15	F151 C13	F164 D7	F174 E7	F190 H14	F309 C9	F321 G12
1000-10 G1	1000-8 H1	1021 G10	2130 B6	2139 B11	2149 C6	2160 D6	2170 F8	2184 G9	2233 H13	3168 B12	3179 C1	3188 D5	3197 E8	3206 E8	3219-D G13	3270 H15	3283 G12	7007 E7	7131 H14	F154 C1	F165 D13	F175 E7	F191 H11	F310 C9	F322 G12
1000-11 G1	1000-9 H1	1022 G11	2131 B12	2140 C4	2150 C9	2161 D6	2171 F9	2185 G9	2236 F6	3169 B5	3180 C5	3189 D7	3198 E2	3208 F1	3220 G11	3271 H15	3284 D13	7008 E2	7132 H13	F155 C2	F166 E7	F177 F1	F192 H14	F311 D13	F324 G10
1000-12 D1	1003 F7	1023 G11	2132 B11	2141 C6	2151 D3	2162 E4	2172 F9	2186 G10	2280 F14	3171 B13	3181 C9	3190 D9	3199 E3	3211 F6	3225 H10	3274 B12	3285 H13	7009 D5	7311-A G2	F156 C8	F167 E14	F178 F9	F302 B12	F312 D9	
1000-2 E1	1004 G9	1028 B2	2133 B1	2142 C9	2152 D3	2163 E1	2173 F9	2189 G9	2285 G10	3172 B11	3182 D2	3191 D4	3200 E8	3212 F9	3229 H9	3275 B12	3286 H13	7010 E6	F139 A12	F157 C3	F168 E14	F180 G1	F303 B11	F313 D7	
1000-3 B1	1009 C15	1029 B3	2134 B1	2143 C4	2154 D9	2164 E4	2174 F1	2191 H9	2286 G11	3173 B4	3183 D2	3192 D4	3201 E2	3213 F3	3265 H15	3276 B11	3287 H13	7011 E2	F143 A13	F159 C9	F170 E1	F181 F13	F304 B11	F314 D9	
1000-4 E1	1010 C15	1050-1 G1	2135 B1	2145 C9	2155 D9	2166 E3	2175 F2	2200 H4	2200 H4	3160 A9	3174 B4	3184 D8	3193 D7	3202 E2	3214 F14	3266 H14	3279 B12	6003 H14	7023 B5	F146 A2	F171 E7	F182 G13	F305 B11	F315 D13	
1000-5 A1	1011 C15	1050-2 G1	2137 B8	2146 C6	2156 D2	2167 E14	2176 G10	2201 H4	2201 H4	3161 B12	3176 C14	3185 D14	3194 D8	3203 E5	3219-A G13	3267 H13	3280 F13	7000 C9	7024 F6	F147 B1	F172 E14	F183 G12	F306 B12	F316 D12	
1000-6 H1	1012 C15	2128 B12	2138 B8	2147 C1	2157 D8	2168 F8	2182 F3	2230 H14	3162 B11	3177 C2	3186 D14	3195 E8	3204 E8	3219-B G13	3268 H14	3281 F6	7005-B B14	7025 B7	F149 B13	F163 D14	F173 E1	F184 G11	F308 B11	F319 G9	



CD diagram 1B

1 B CD MAIN BOARD - CIRCUIT DIAGRAM 1B
SERVO DRIVERS PART



- 1000-13 E1 F100 F3
- 1000-14 E1 F101 F1
- 1000-15 D1 F102 A11
- 1000-16 D1 F103 A2
- 1001 B1 F104 F4
- 1002 A1 F105 A11
- 1005 F5 F106 F1
- 1006-1 F1 F107 A2
- 1006-10 G1 F108 H8
- 1006-11 G1 F109 A2
- 1006-2 I1 F110 H9
- 1006-3 I1 F111 B6
- 1006-4 H1 F112 B2
- 1006-5 F1 F113 G1
- 1006-6 G1 F114 G1
- 1006-7 H1 F115 B2
- 1006-8 H1 F116 G1
- 1006-9 G1 F117 B2
- 1008 F4 F118 G4
- 1024 D8 F119 H5
- 1025 D8 F120 H1
- 1026 B10 F121 I7
- 1027 B11 F122 I8
- 1321 F7 F123 H1
- 2100 A5 F124 H1
- 2102 A6 F125 H1
- 2103 A5 F126 I6
- 2104 F3 F127 I5
- 2105 F3 F128 C5
- 2106 B7 F129 I1
- 2107 B7 F130 I5
- 2108 H9 F131 I4
- 2109 B5 F132 I1
- 2110 B7 F133 D2
- 2111 G1 F134 D9
- 2112 G1 F135 D5
- 2113 G1 F136 D2
- 2114 I8 F137 D6
- 2115 B5 F138 D2
- 2116 B5 F140 E5
- 2117 I7 F141 D9
- 2118 H4 F145 E2
- 2119 H4 F300 H4
- 2120 C5 F301 H4
- 2121 D5
- 2122 D5
- 2123 C6
- 2124 D7
- 2125 D7
- 2126 E5
- 2127 E5
- 2220 H8
- 2221 I11
- 2281 I6
- 2282 I4
- 3100 F1
- 3101 F2
- 3102 F1
- 3103 A6
- 3104 I6
- 3105 I6
- 3106 I5
- 3107 I4
- 3110 G8
- 3113 G8
- 3114 A5
- 3115 A5
- 3116 A6
- 3117 F1
- 3129 H11
- 3130 H8
- 3131 B10
- 3132 B7
- 3134 G4
- 3135 G4
- 3136 B5
- 3137 B6
- 3138 B6
- 3139 I7
- 3140 H6
- 3141 I9
- 3142 C4
- 3143 H5
- 3144 H5
- 3145 C5
- 3146 H4
- 3147 C5
- 3148 D3
- 3149 D5
- 3150 D5
- 3151 D6
- 3152 D3
- 3154 D8
- 3155 E3
- 3156 E5
- 3157 E6
- 3158 E5
- 3159 E3
- 3277 H9
- 3278 I8
- 6000 G5
- 6001 G5
- 6002 G4
- 7005-D I8
- 7019 F1
- 7020 G2
- 7021 A4
- 7022 D4
- 7030 H6
- 7031 I4
- 7110-A H10
- 7110-B H9
- 7110-C H10
- 7110-D H11
- 7301 H8

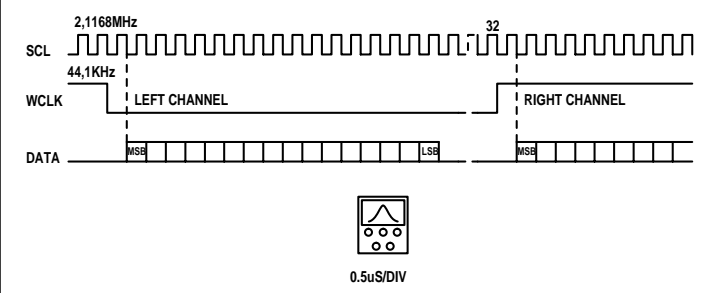
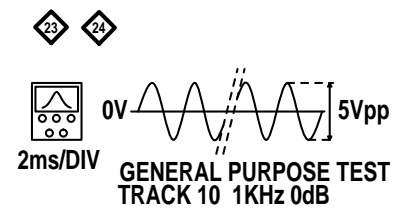
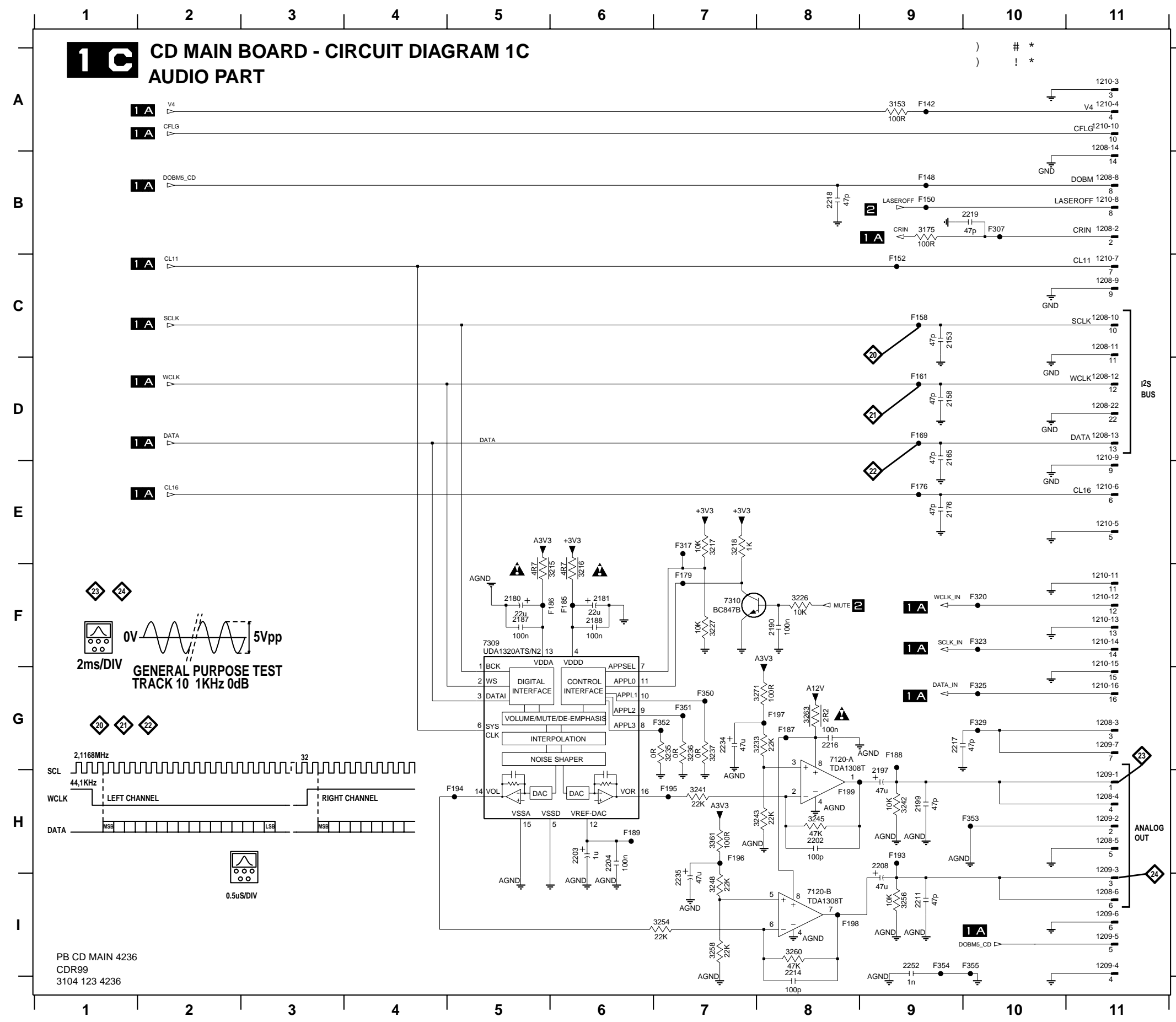
PB CD MAIN 4236
CDR99
3104 123 4236

Input conditions conn 1006 pin					Outputs conn 1006			Test points on driver			
6	8	4	7	3	2	9	10	11	18	17	16
U+	U-	V+	V-	W+	W-	UCOIL	VCOIL	WCOIL	HALL U	HALL V	HALL W
L	M	H	M	M	M	6V	0V	0V	0V	5V	0V
H	M	L	M	M	M	0V	6V	6V	6V	0V	0V
M	M	L	M	H	M	0V	6V	0V	0V	0V	5V
M	M	H	M	L	M	6V	0V	0V	6V	5V	0V
H	M	M	M	L	M	0V	0V	6V	5V	0V	0V
L	M	M	M	H	M	6V	6V	0V	0V	0V	5V

Input voltage	Level	Tolerance	Unit
H	2.8	0.1	V
M	2.5	0.1	V
L	2.2	0.1	V

CD diagram 1C

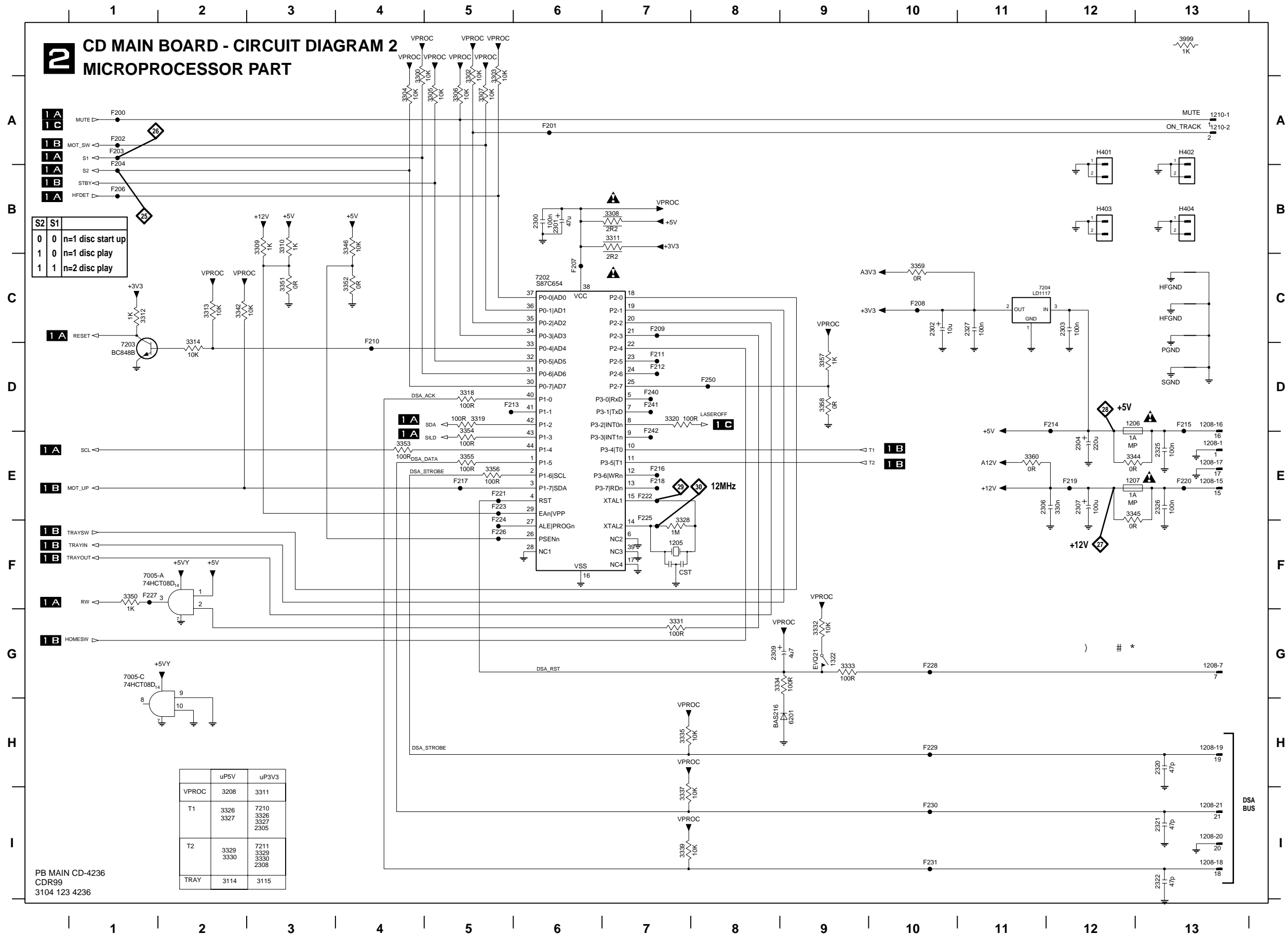
1C CD MAIN BOARD - CIRCUIT DIAGRAM 1C
AUDIO PART



PB CD MAIN 4236
 CDR99
 3104 123 4236

- 1208-10 C11
- 1208-11 C11
- 1208-12 D11
- 1208-13 D11
- 1208-14 A11
- 1208-2 B11
- 1208-22 D11
- 1208-3 G11
- 1208-4 H11
- 1208-5 H11
- 1208-6 I11
- 1208-8 B11
- 1208-9 C11
- 1209-1 H11
- 1209-2 H11
- 1209-3 H11
- 1209-4 I11
- 1209-5 I11
- 1209-6 I11
- 1209-7 G11
- 1210-10 A11
- 1210-11 F11
- 1210-12 F11
- 1210-13 F11
- 1210-14 F11
- 1210-15 F11
- 1210-16 G11
- 1210-3 A11
- 1210-4 A11
- 1210-5 E11
- 1210-6 E11
- 1210-7 C11
- 1210-8 B11
- 1210-9 D11
- 2153 C9
- 2158 D9
- 2165 D9
- 2176 E9
- 2180 F5
- 2181 F6
- 2187 F5
- 2188 F6
- 2190 F8
- 2197 H9
- 2199 H9
- 2202 H8
- 2203 H6
- 2204 H6
- 2208 H9
- 2211 I9
- 2214 I8
- 2216 G8
- 2217 G9
- 2218 B8
- 2219 B10
- 2234 G7
- 2235 I7
- 2252 I9
- 3153 A9
- 3175 B9
- 3215 F5
- 3216 F6
- 3217 E7
- 3218 E7
- 3226 F8
- 3227 F7
- 3233 G8
- 3235 G7
- 3236 G7
- 3237 G7
- 3241 H7
- 3242 H9
- 3243 H8
- 3245 H8
- 3248 I7
- 3254 I7
- 3256 I9
- 3258 I7
- 3260 I8
- 3263 G8
- 3271 G8
- 3361 H7
- 7120-A G8
- 7120-B I8
- 7309 F5
- 7310 F7
- F142 A9
- F148 B9
- F150 B9
- F152 C9
- F158 C9
- F161 D9
- F169 D9
- F176 E9
- F179 F7
- F185 F6
- F186 F5
- F187 G8
- F188 G9
- F189 H6
- F193 H9
- F194 H5
- F195 H7
- F196 H7
- F197 G8
- F198 I8
- F199 H8
- F307 B10
- F317 E7
- F320 F10
- F323 F10

CD diagram 2

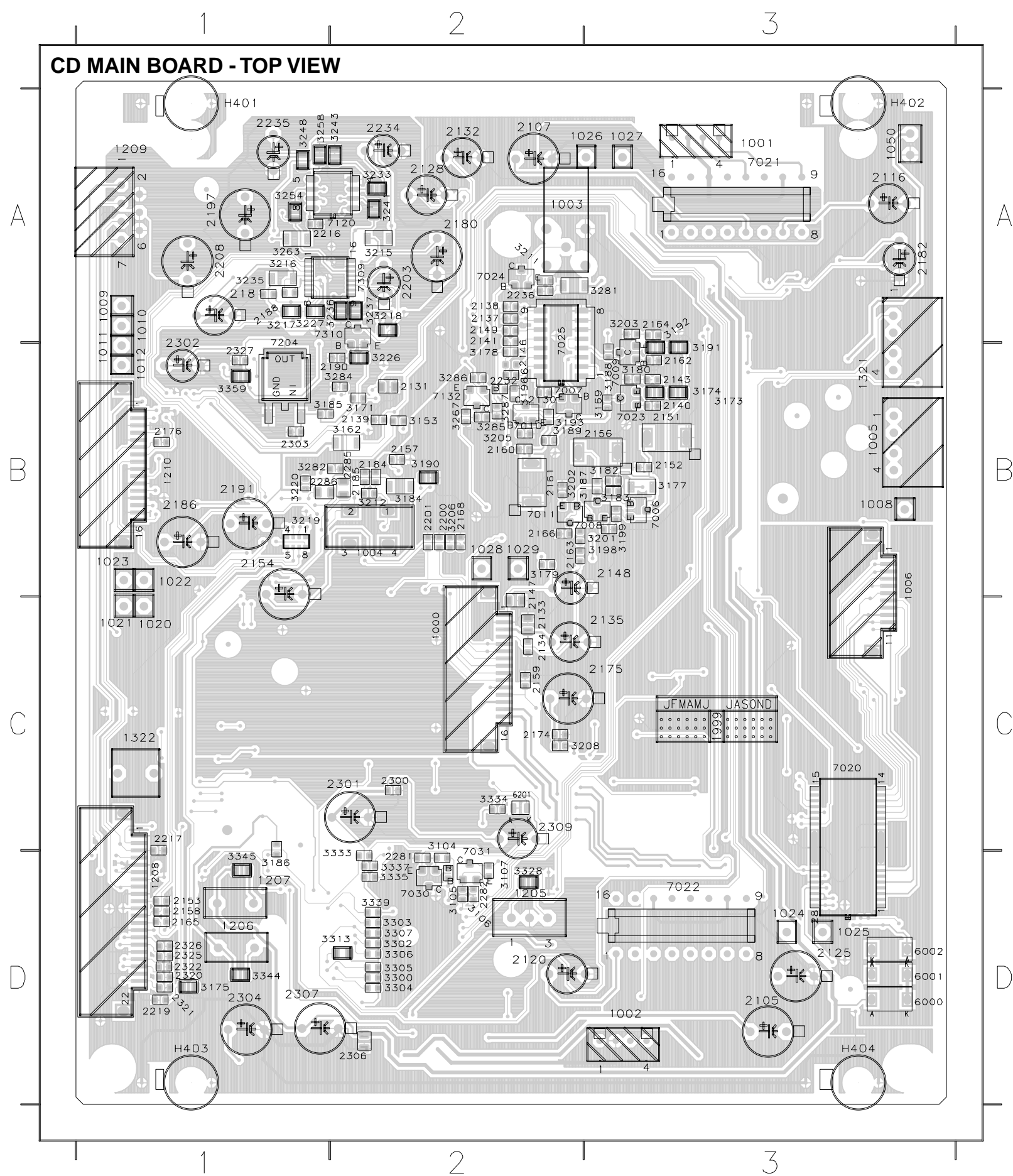


- 1205 F7
- 1206 D12
- 1207 E12
- 1208-1 E13
- 1208-15 E13
- 1208-16 D13
- 1208-17 E13
- 1208-18 H13
- 1208-19 H13
- 1208-20 H13
- 1208-21 H13
- 1208-7 G13
- 1210-1 A13
- 1210-2 A13
- 1322 G9
- 2300 B6
- 2301 B6
- 2302 C10
- 2303 C12
- 2304 E12
- 2306 E11
- 2307 E12
- 2309 G8
- 2320 H13
- 2321 H13
- 2322 H13
- 2325 E13
- 2326 E13
- 2327 C11
- 3300 A4
- 3302 A5
- 3303 A5
- 3304 A4
- 3305 A5
- 3306 A5
- 3307 A5
- 3308 B7
- 3309 B3
- 3310 B3
- 3311 B7
- 3312 C1
- 3313 C2
- 3314 D2
- 3318 D5
- 3319 D5
- 3320 D7
- 3328 F7
- 3331 G7
- 3332 G9
- 3333 G9
- 3334 G8
- 3335 H7
- 3337 I7
- 3339 I7
- 3342 C2
- 3344 E12
- 3345 E12
- 3346 B4
- 3350 F1
- 3351 C3
- 3352 C4
- 3353 E4
- 3354 E5
- 3355 E5
- 3356 E5
- 3357 D9
- 3358 D9
- 3359 C10
- 3360 E11
- 3999 A13
- 6201 H9
- 7005-A F1
- 7005-C G1
- 7202 C6
- 7203 D1
- 7204 C12
- H401 A13
- H402 A13
- H403 B12
- H404 B13

PB MAIN CD-4236
CDR99
3104 123 4236

	uP5V	uP3V3
VPROC	3208	3311
T1	3326 3327	7210 3326 3327 2305
T2	3329 3330	7211 3329 3330 2308
TRAY	3114	3115

CD top



1000	C
1001	A1
1002	A2
1003	A3
1004	A1
1005	A2
1006	A3
1007	A1
1008	A2
1009	A3
1010	A1
1011	A2
1012	A3
1013	A1
1014	A2
1015	A3
1016	A1
1017	A2
1018	A3
1019	A1
1020	A2
1021	A3
1022	A1
1023	A2
1024	A3
1025	A1
1026	A2
1027	A3
1028	A1
1029	A2
1030	A3
1031	A1
1032	A2
1033	A3
1034	A1
1035	A2
1036	A3
1037	A1
1038	A2
1039	A3
1040	A1
1041	A2
1042	A3
1043	A1
1044	A2
1045	A3
1046	A1
1047	A2
1048	A3
1049	A1
1050	A2
1051	A3
1052	A1
1053	A2
1054	A3
1055	A1
1056	A2
1057	A3
1058	A1
1059	A2
1060	A3
1061	A1
1062	A2
1063	A3
1064	A1
1065	A2
1066	A3
1067	A1
1068	A2
1069	A3
1070	A1
1071	A2
1072	A3
1073	A1
1074	A2
1075	A3
1076	A1
1077	A2
1078	A3
1079	A1
1080	A2
1081	A3
1082	A1
1083	A2
1084	A3
1085	A1
1086	A2
1087	A3
1088	A1
1089	A2
1090	A3
1091	A1
1092	A2
1093	A3
1094	A1
1095	A2
1096	A3
1097	A1
1098	A2
1099	A3
1100	A1

5. Diagnostic Software

5.1 Dealer mode

The purpose of the dealer mode is to prevent people taking out the CD inside the player at exhibitions, showrooms etc.. This mode disables the open/close function of the player. The dealer mode can be switched on and off pressing keys [OPEN/CLOSE] and [STOP] of the CDR player simultaneously while switching on the unit. The dealer mode is stored in the flash memory and can only be changed by executing the above actions.

5.2.2 Requirements to perform the test

- Working keyboard to start up the test.
- Working local display to check the output messages.

5.2 Dealer diagnostics

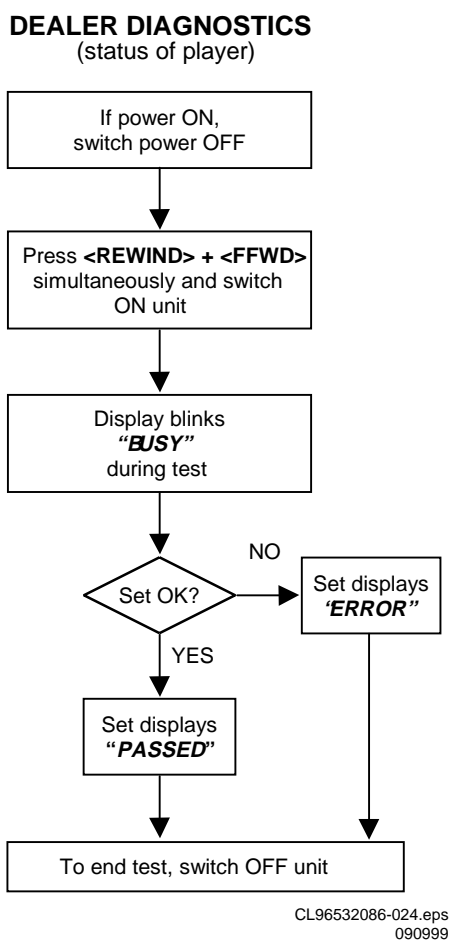


Figure 5-1

5.2.1 Description

The intention of the dealer diagnostics is to give an indication of the CDR player status. An inexperienced, even non-technical dealer will/can perform the test. Tests are executed automatically without need for external tools or disassembly of the unit. This test checks the CDR main board using the same tests as the electrical service diagnostics program. Only the result of the test, "PASSED" or "ERROR", will be shown on the display. Pressing keys [F FWD] and [REWIND] simultaneously while switching on the unit, starts the test. Switching off the unit ends the test.

5.3 Electrical service diagnostics

ELECTRICAL SERVICE DIAGNOSTICS
(software versions, test for defective components)

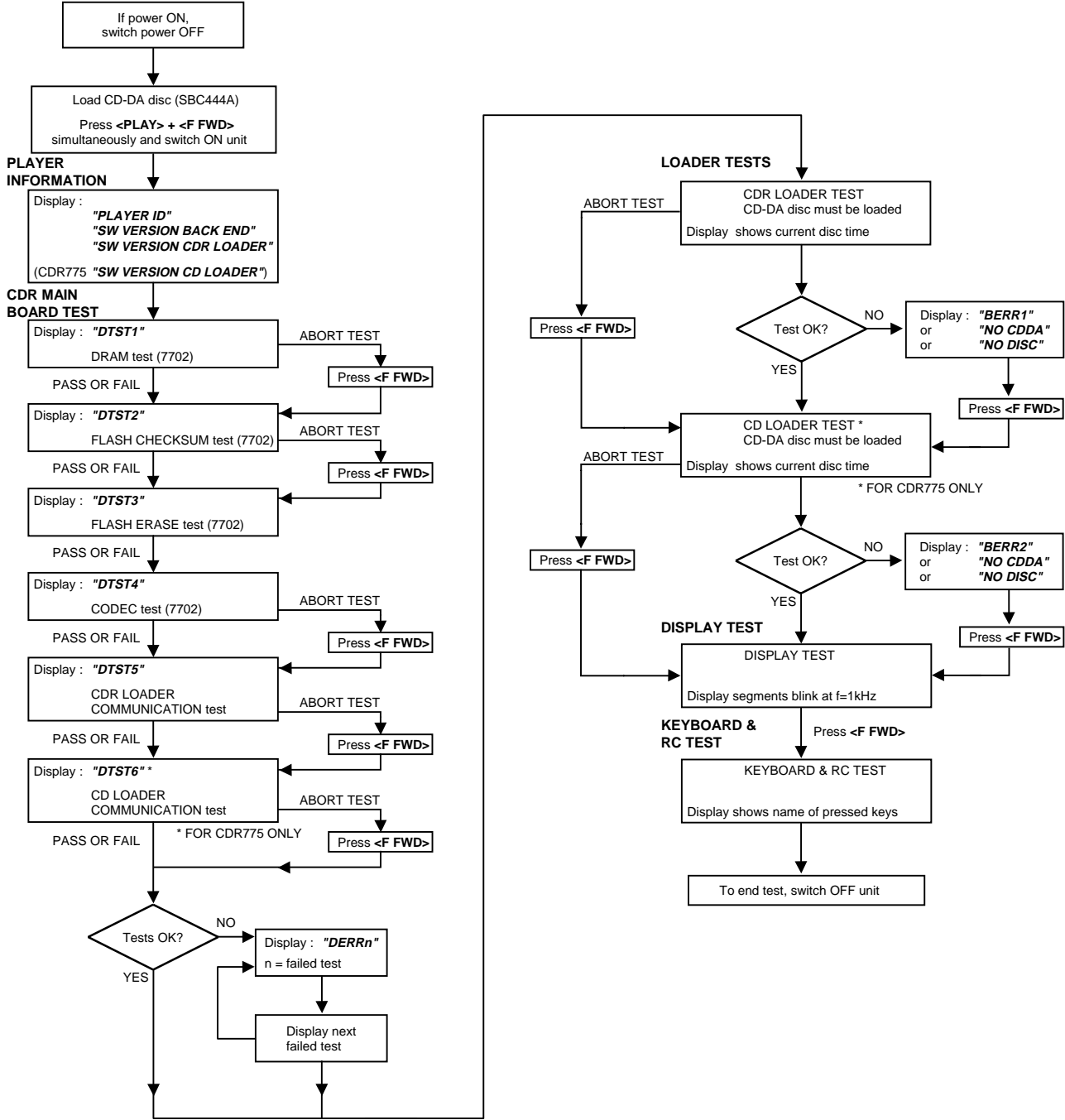


Figure 5-2

5.3.1 Description

The intention of the electrical service diagnostics is to show the software versions present in the player and to direct the dealer towards defective internal units. The units are : the CDR main board, the CDR loader, the CD loader in case of a CDR775 and the keyboard/display board. A sequence of tests is executed automatically. Some of the tests can be aborted or skipped without the result being taken into account. External tools or disassembly of the unit is not necessary to get the diagnostic information. Pressing keys [PLAY/PAUSE] and [F FWD] simultaneously while switching on the unit, starts the test. Switching off the unit ends the test.

5.3.2 Requirements to perform the test

- Working keyboard to start up the test.
- Working local display to check the output messages.
- A CD-DA disc with a minimum of 3 tracks in all trays to perform the disc test.

5.3.3 Description of the tests

Player information

In this part of the test the following important information can be checked without removing the cover :

- Recorder ID.
- SW-version back end of player.
- SW-version CDR loader.
- SW-version CD loader (only for CDR775).

CDR main board test

[F FWD] key. The message "DERRn" will be displayed with n indicating the faulty test number.

If one of the tests is aborted with the [F FWD] key, no error message will be displayed for this test. The flash data erase test ("DTST3") can not be aborted !

The CDR main board test consists out of :

DRAM test

Display : "DTST1". The DRAM used for buffer management is tested by writing, reading and verifying test patterns.

Flash checksum test

Display : "DTST2". This test checks the checksum of the player's SW stored in the flash.

Flash data erase

Display : "DTST3". During this test, all temporary information (CDtxt) in the flash is erased.

CODEC (ADC/DAC) test

Display : "DTST4". This test checks the CODEC IC by writing, reading and verifying test patterns. The test is not applicable for CDR950.

CDR communication test

Display : "DTST5". The communication between the host processor (DASP) and the CDR loader via the DSA-R-bus is tested.

CD communication test

Display : "DTST6"). The communication between the host processor (DASP) and the CD loader is tested. The test is only applicable for CDR775.

Loader tests

These tests determine if the CDR loader and the CD loader in case of a CDR775 work correctly. A CD-DA disc with a minimum of 3 tracks needs to be inserted in both loaders. A

disc test is executed to check focus control, disc motor control, radial control and jump grooves control. The disc test is performed by audio play-back of 5 seconds at the beginning, middle and end of the disc.

CDR loader test

During the test, the current disc time is shown. In case of an error the message "BERR1" will be displayed and the [F FWD] key must be pressed to continue with the following test. Pressing the [F FWD] key also aborts this test.

CD loader test

For CDR775 only. During the test, the current disc time is shown. In case of an error the message "BERR2" will be displayed and the [F FWD] key must be pressed to continue with the following test. Pressing the [F FWD] key also aborts this test.

Display test

All segments will blink at a frequency of 1 Hz. Pressing the [F FWD] key will start the next test because the user has to check for himself if all segments work properly.

Keyboard and remote control tests

The test will give the user the ability to test every key without executing the function assigned to it. Therefore, the user needs to press every key on the keyboard and the remote control. The display will show the name of the key being pressed. Pressing more than one key at once will give an unpredictable result except for the service combinations : [PLAY/PAUSE] + [STOP], [PLAY/PAUSE] + [F FWD], [F FWD] + [REWIND], [ERASE] + [RECORD], [PLAY/PAUSE] + [RECORD], [OPEN/CLOSE] + [PROGRAM].

5.4 Mechanical service diagnostics

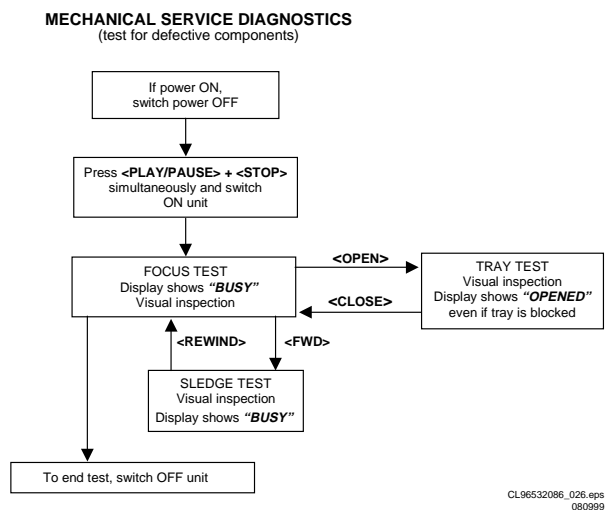


Figure 5-3

5.4.1 Description

No external tools are required to perform this test. The cover needs to be removed because the user has to check the movements of the tray, focus and sledge visually. Pressing keys [PLAY/PAUSE] and [STOP] simultaneously while switching on the unit, starts the test. Switching off the unit ends the test. In case of a CDR775, one can check the CD loader mechanics in the same way by pressing the above key combination on the CD player keys.

5.4.2 Requirements to perform the test

- Working keyboard to cycle through the tests and to start up the test.
- Working local display to check the output messages.

5.4.3 Description of the tests

Focus control test

The focussing lens is continuously moving up and down. The display reads "BUSY".

Sledge control test

After pressing [F FWD] the sledge continuously moves up and down. Pressing [REWIND] stops the sledge at the position it is in and the focus control test resumes. The display reads "BUSY".

Tray control test

This test starts from within the focus control test routine. Pressing [OPEN/CLOSE] moves the tray in or out. In the tray open position one can initiate focus and sledge tests by pressing [F FWD]. One has to stop these tests pressing [REWIND] before it is possible to close the tray again. Depending on the action the display reads "OPEN", "OPENED", "CLOSE" or "BUSY".

5.5 DC-erase service mode

5.5.1 Description

This test is initiated by pressing [ERASE] and [RECORD] simultaneously while switching on the unit. The player will erase a complete CD-RW disc (including PMA and ATIP lead out area) at speed N=2. The display shows the countdown of the remaining time required for the operation to complete. The format is "ER mm:ss", where "mm" are the remaining minutes and "ss" the remaining seconds. After completion the message "PASSED" is shown, and the player has to be switched off and on again to start up in normal operating mode. Switching off the unit before completion of the test, leaves the disc in an unpredictable state. In such case only a complete DC-erase procedure can recover the CD-RW disc.

5.5.2 Requirements to perform the test

- Functional CDR player.
- A CD-RW audio disc must be present in the tray.

DC ERASE SERVICE MODE (erasure of complete CD-RW)

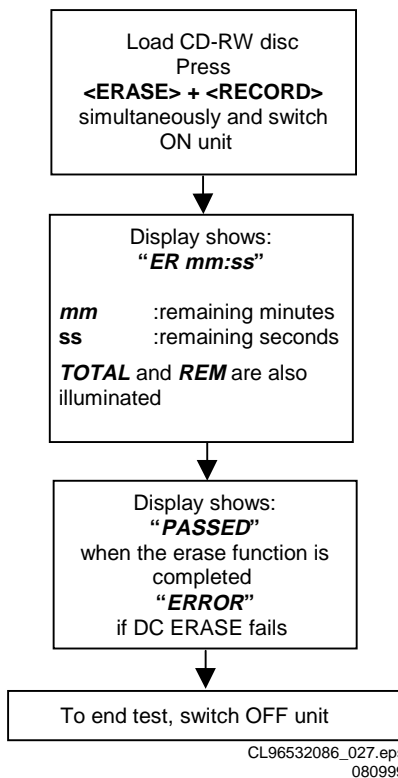
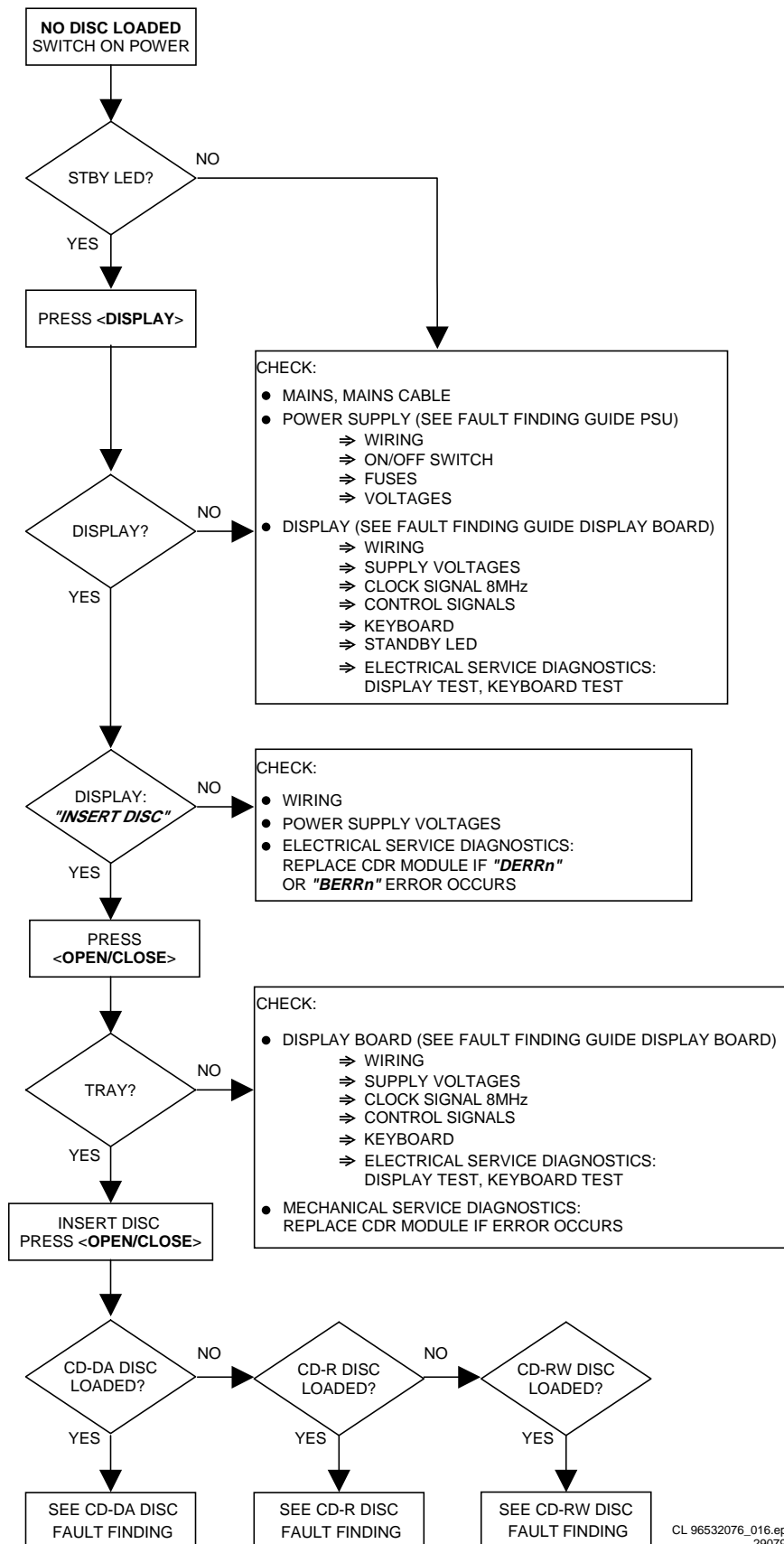


Figure 5-4

6. Faultfinding trees

6.1 CDR-Module



CL 96532076_016.eps
290799

Figure 6-1

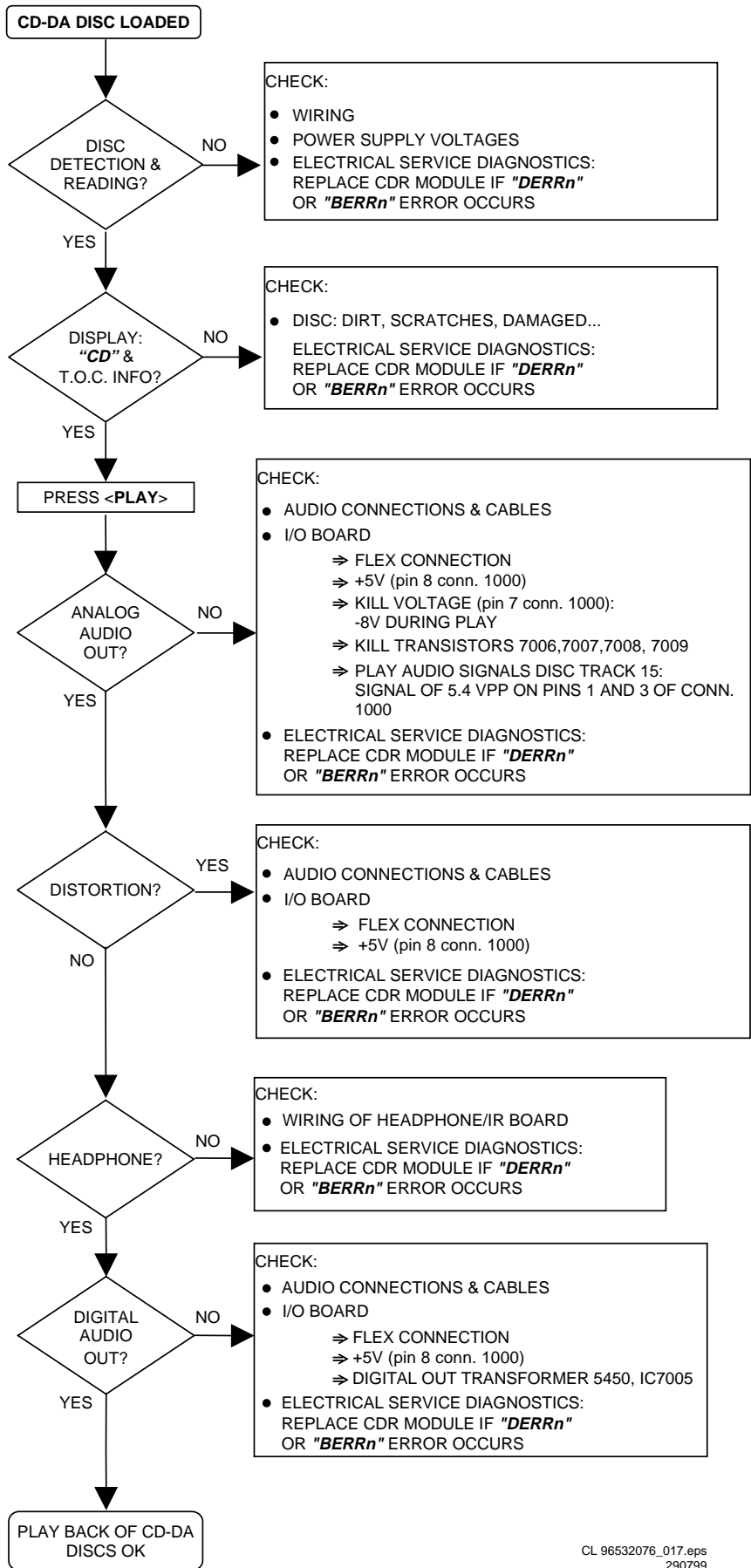


Figure 6-2

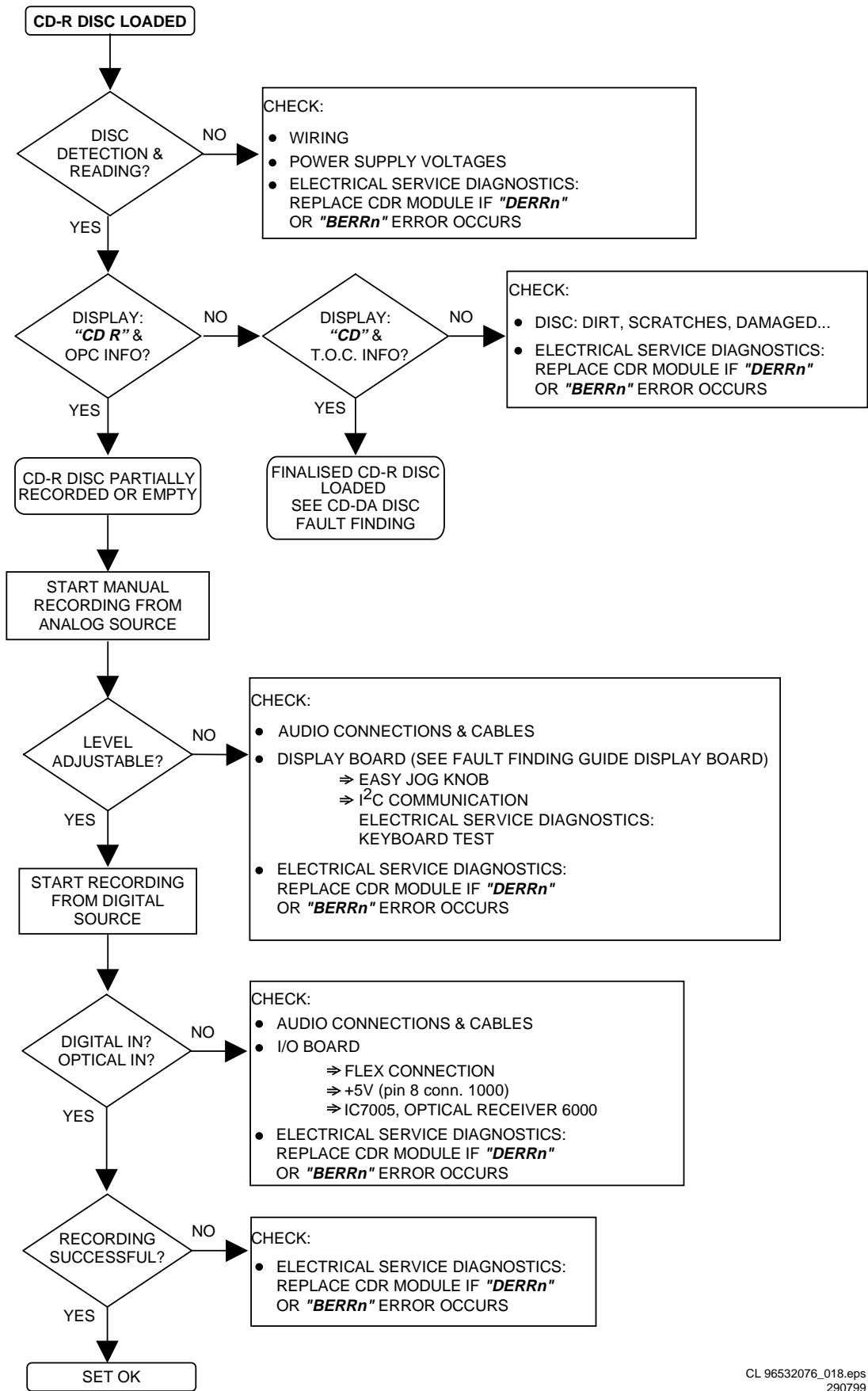


Figure 6-3

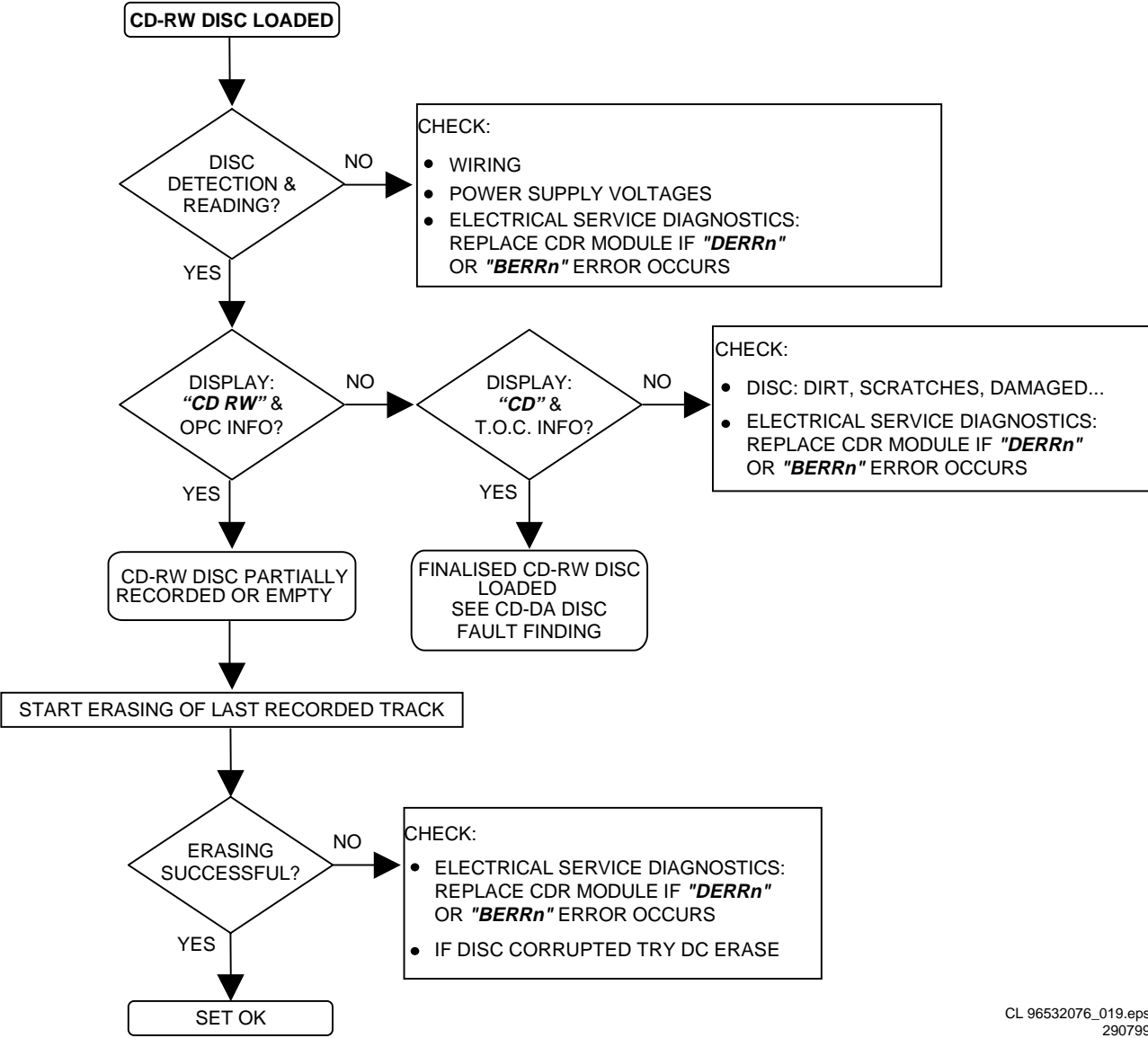


Figure 6-4

6.2 CD Module

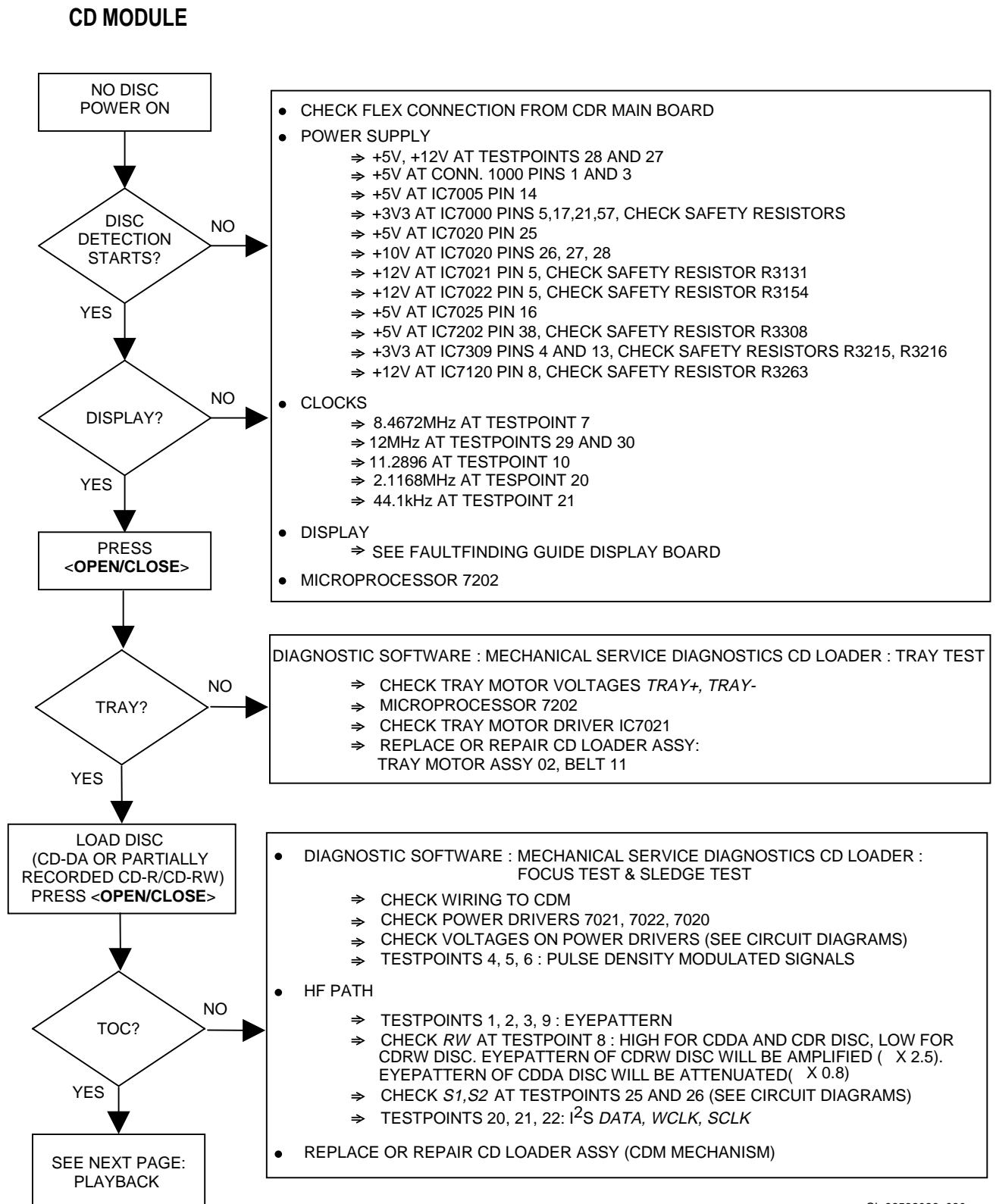
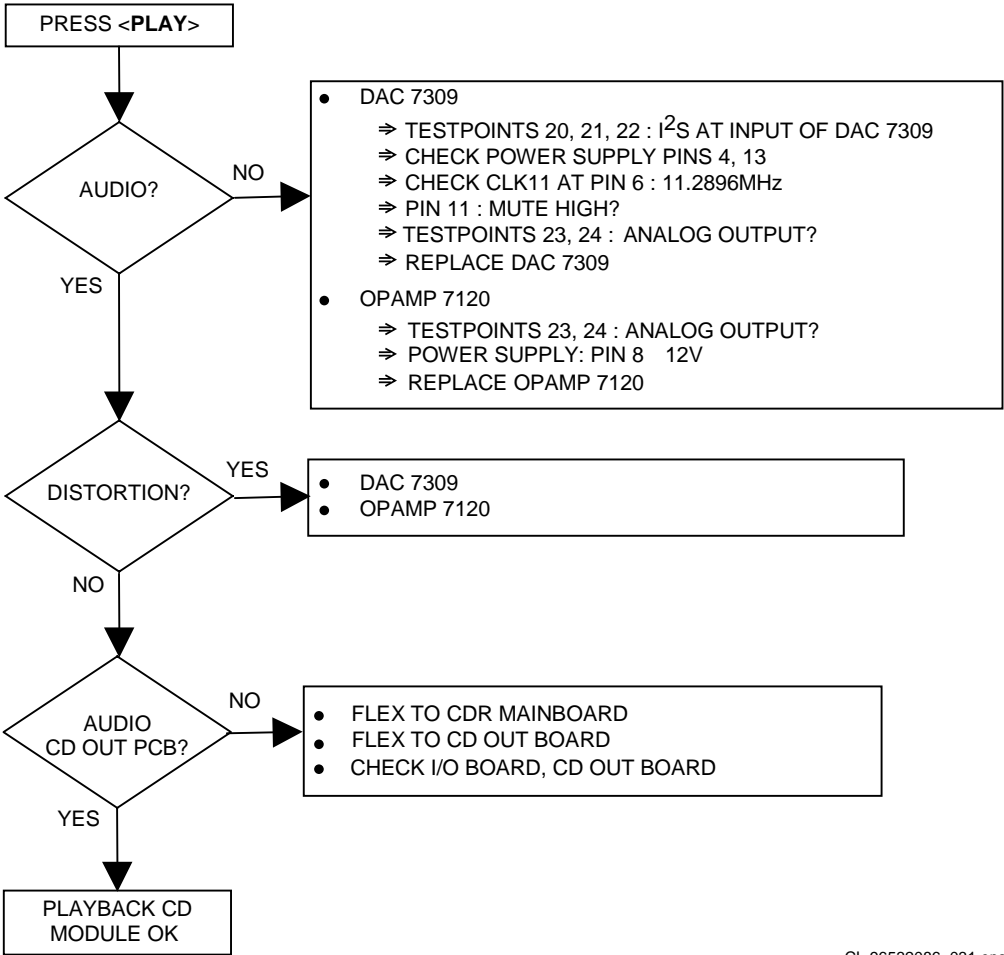


Figure 6-5

CD MODULE PLAYBACK



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080999

Figure 6-6

7. Faultfinding Guide

7.1 Display Board

7.1.1 Description of display board

General description

The display board has three major parts : the FTD (Fluorescent Tube Display), the display controller TMP87C874F and the keyboard. The display controller is controlled by the DASP master processor on the CDR main board. The communication protocol used is I2C. So all the information between DASP and display controller goes via the SDA or I2C DATA and SCL or I2C CLK lines. Communication is always initiated by the DASP on the CDR main board. Unlike the previous generations of CDR players, the interrupt generated by the display controller at key-press or reception of remote control is not used. Instead, the DASP polls the display controller for these events.

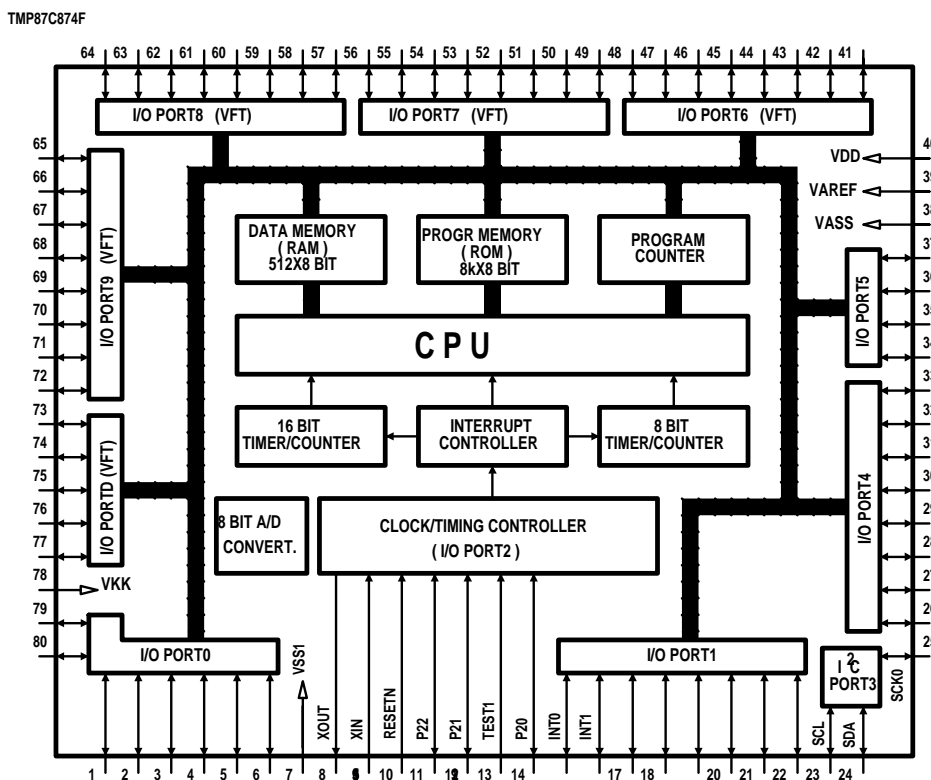
Display controller TMP87C874F

TMP87C874F (IC7104) is a high speed and high performance 8-bit single chip microprocessor, containing 8-bit A/D conversion inputs and a VFT (Vacuum Fluorescent Tube) driver. In this application, its functions are :

- slave microprocessor.
- FTD driver.
- generates the square wave for the filament voltage required for an AC FTD.
- generates the grid and segment scanning for the FTD.
- generates the scanning grid for the key matrix.
- input for remote control.

All the communication runs via the serial bus interface I2C. The display controller uses an 8MHz resonator as clock driver.

BLOCK DIAGRAM



PIN DESCRIPTIONS

INT0	external interrupt input 0
INT1	external interrupt input 1
RESETN	reset signal input, active low
SCL	I2C-bus serial clock input/output
SDA	I2C-bus serial data input/output
TEST	test pin, tied to low
VAREF	analog reference voltage input
VASS	analog reference ground
VDD	+5V
VKK	VFT driver power supply
VSS	ground
XIN, XOUT	resonator connecting pins for high-frequency clock

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Figure 7-1

7.1.2 Test instructions

Supply voltages

The display board receives several voltages via connector 1119 (and connector 1121 for CDR570/930).

- VFTD : -38V ±5% measured at pin 2 of conn. 1119.
- VDC1-VDC2 : 3V8 ±5% measured between pin 1 and 3 of conn. 1119.
- +5V +5V ±5% measured at pin 10 of conn. 1119 (pin 4 of conn. 1121 for CDR770).

Voltages VFTD, VDC1 and VDC2 are produced in the power supply unit and sent to the display board via the CDR main board. The +5V voltage is produced on the CDR main board as D5V.

Clock signal

As clock driver for the display controller, a resonator of 8 MHz (1110) is used. The signal can be measured at pins 8 and 9 of the display controller : 8 MHz ±5%.

Control signals

RESET

The reset signal comes via pin 4 of conn. 1119 from the DASP master processor on the CDR main board (SYS_RESET). The reset is low active. It should be kept low during power up for at least 3 machine cycles with supply voltage in operating range and a stable clock signal (1 machine cycle = 12 x 1/Fc (8 MHz) sec.). During normal operation, the reset should be high (3V3). The high signal is 3V3 because the DASP operates on 3V3.

I2C DATA/I2C CLK

These lines connect to the DASP master processor via respectively pin 5 and pin 7 of conn. 1119 (pin 5 of conn. 1119 and pin 1 of conn. 1121 for CDR570/930). When there is no communication, they should have the high level (+5V). The oscillogram below gives an indication of how these signals should look like.

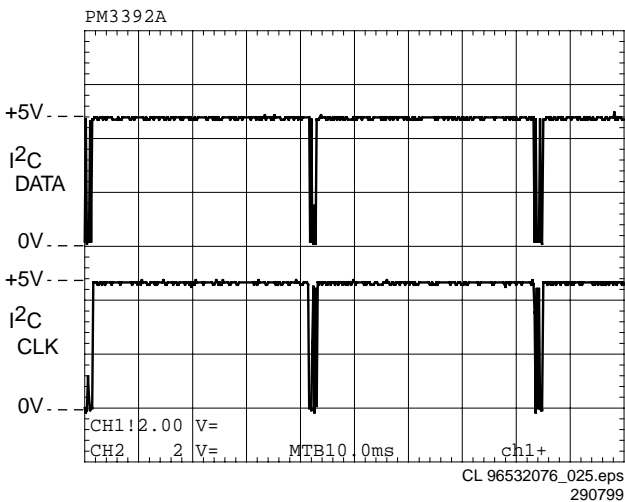


Figure 7-2 'I2C signals'

FTD drive lines

Filament voltage

Should measure 3.8V ±10% (=VDC1-VDC2) between pins 1-2-3 and pins 45-46-47 (pins 1-2 and pins 48-49 for CDR770) of the FTD (1113).

Grid lines

Level and timing of all grid lines, G1-->G15, can be checked either at the FTD itself or at the display controller. Grid lines G13, G14 and G15 each have an extra current amplifier in line : T7203 for G13, T7204 for G14 and T7100 for G15. A typical grid line signal shows in the oscillogram below.

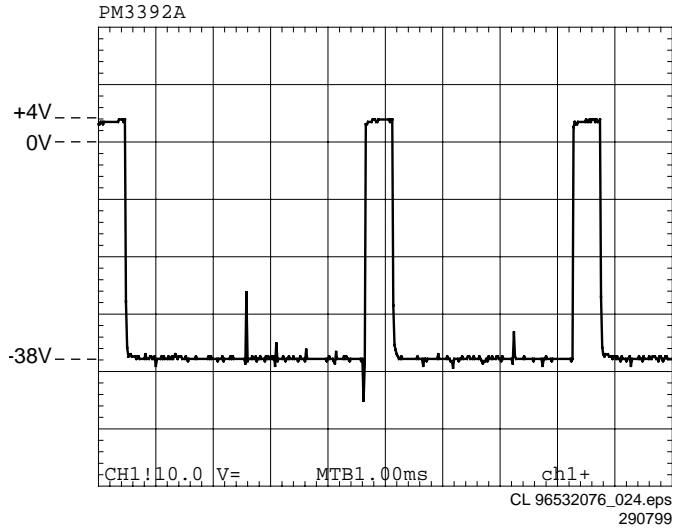


Figure 7-3 'Gridline'

Segment lines

Level and timing of all segment lines, P1-->P21 (P1-->P20 for CDR770), can be checked either at the FTD itself or at the display controller. The data on these segment lines however, depends on the characters displayed. The oscillogram below shows a segment line with data. A segment line without data maintains a -38V level.

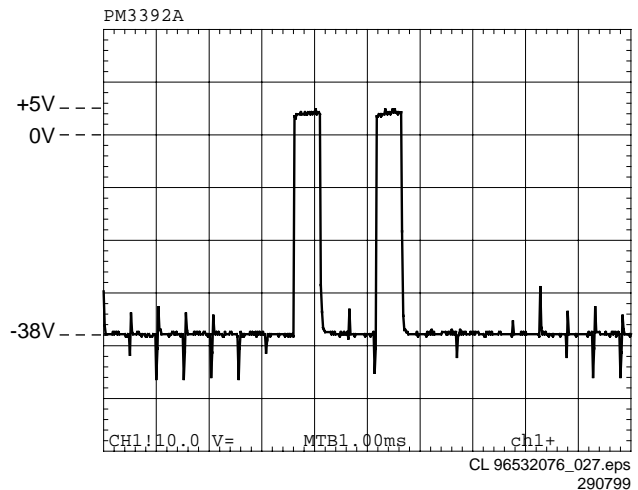


Figure 7-4 'Segment line'

Key matrix lines

The lines connected to pins 34, 35, 36 and 37 of the display controller act as matrix scanners. Without a key pressed, they maintain a low level. As soon as a key is pressed, the scanning line connected to that key puts out a scanning signal, which should look like the oscillogram below. This scanning signal goes via the pressed key to I/O port 4 of the display controller (pins 28 to 33). The display controller can now determine which key has been pressed. Without a key pressed, pins 28 to 33 of the display controller maintain a high level (+5V).

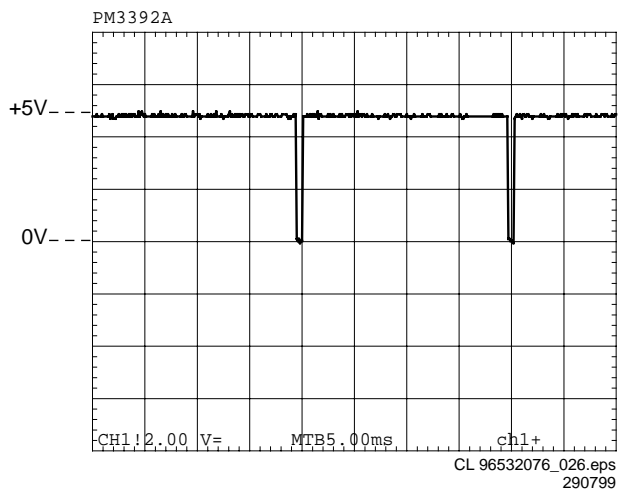


Figure 7-5 'Key matrix scan line'

Easy jog knob

Rotary operation

The easy jog knob (1050) incorporates a whole heap of user control possibilities in just one knob. Without the knob being operated, pin 1 and 3 of the knob (and thus pin 16 and 17 of the display controller), maintain the +5V level. Turning the knob clockwise briefly connects pin 1 to GND followed by pin 3.

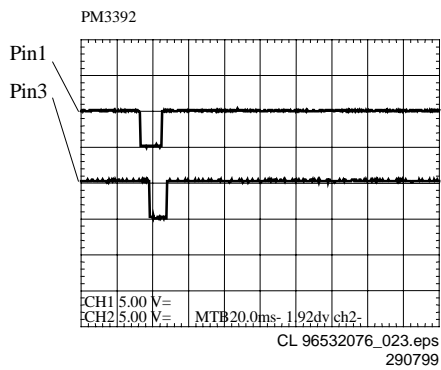


Figure 7-6 'Turn clockwise'

Turning the knob anti-clockwise briefly connects pin 3 to GND followed by pin 1.

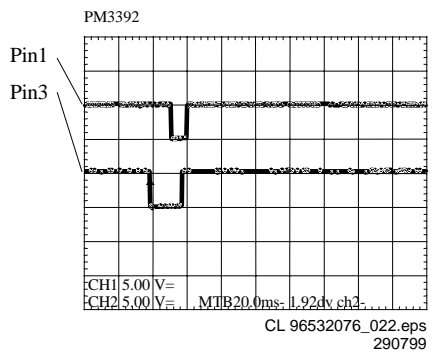


Figure 7-7 'Turn anti-clockwise'

The pulses created this way arrive at pin 16 and 17 of the display controller. The first pulse to arrive tells the controller the direction of the rotation. Counting the pulses reveals the amount of rotation. Combining and decoding this information, the display controller will execute the appropriate task.

Push button operation

This button connects to the key matrix lines and thus the operation is identical to the ordinary keys. Without being pressed, pin 4 of the easy jog maintains the low level, pin 5 the high level. When pressed the scanning signal goes through the closed contact of pins 4 and 5, and can be checked at both pins.

IR receiver - remote control

In the CDR570/930 the IR receiver TSOP1736 (6101) is mounted on the display board. In the CDR770 that same IR receiver (6200) is mounted on a small board together with the headphone socket. In the CDR775 the IR receiver (6200) is mounted on its own small board. In all versions the IR receiver connects to the display controller. The signal coming from the receiver can be checked at pin 22 of the display controller. This signal is normally high (+5V). When the remote control is being operated, pulses mixed in with the +5V can be measured. The oscillogram gives an indication of how the signal looks like with the RC being operated.

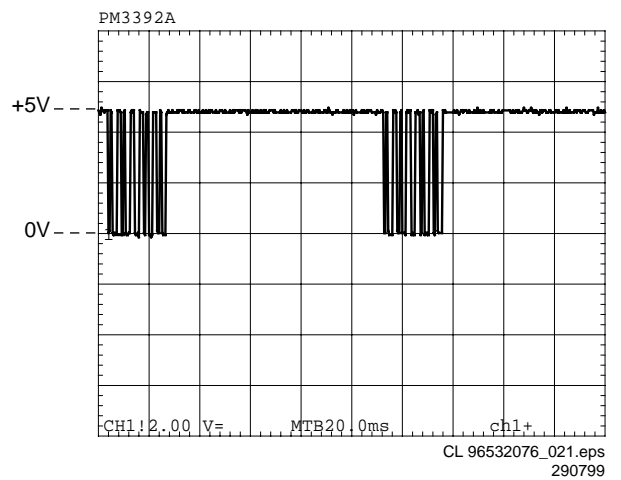
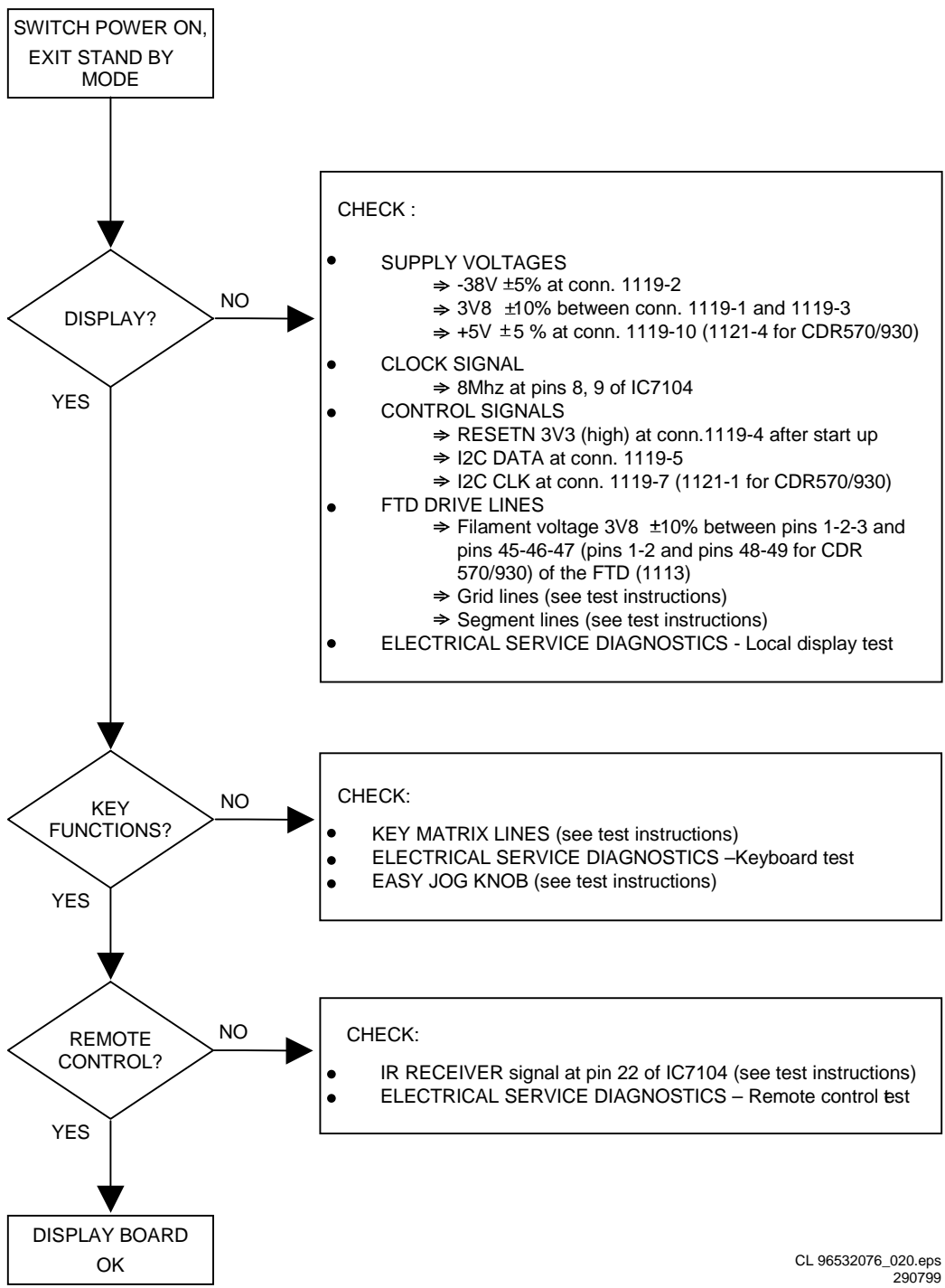


Figure 7-8 'IR receiver signal'

7.1.3 Display board troubleshooting guide



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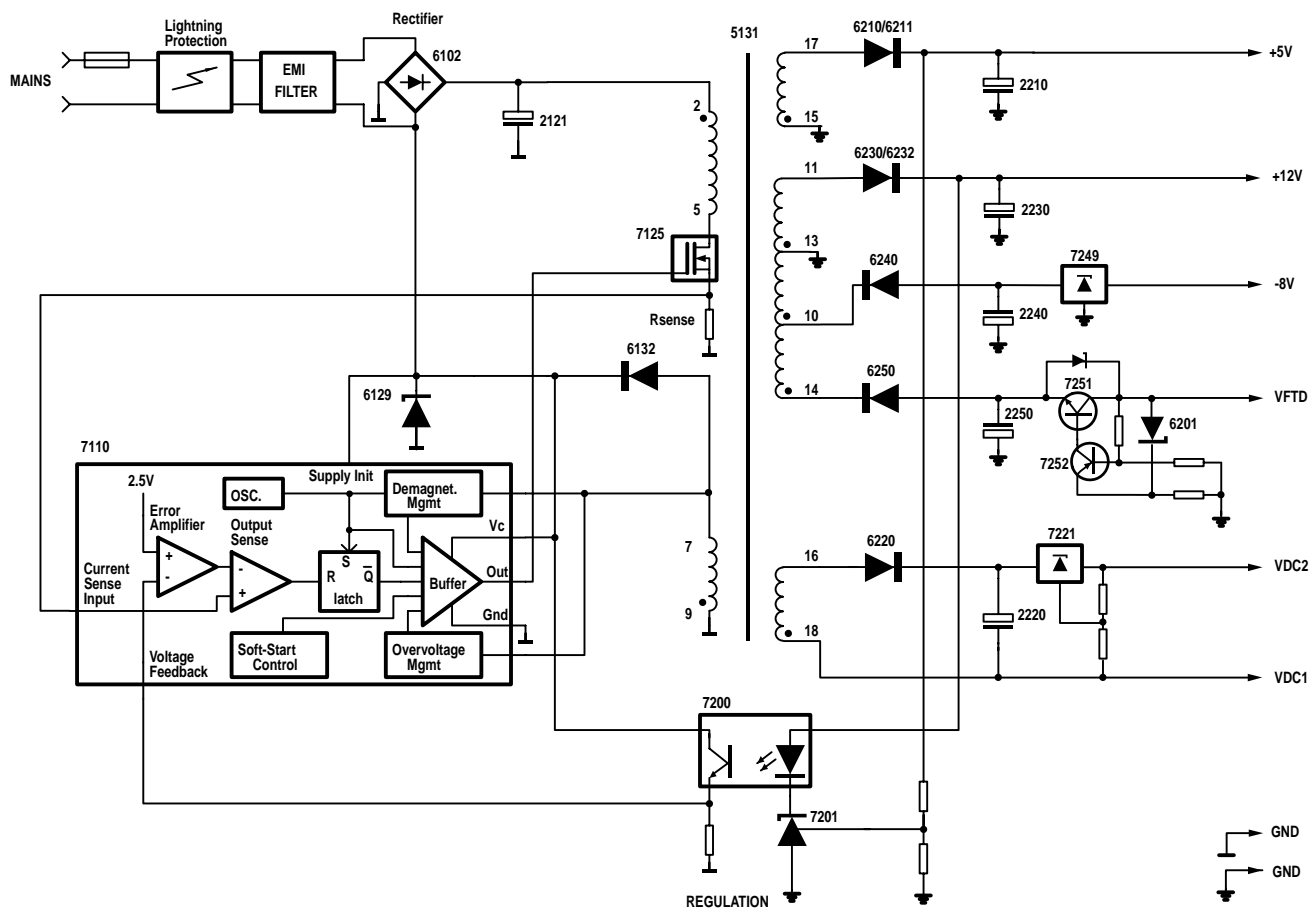
Figure 7-9 'Display board troubleshooting'

7.2 Power Supply Unit 20PS317

7.2.1 Description of PSU 20PS317

MOSFET 7125 is used as a power switch controlled by the controller IC7110. When the switch is closed, energy is transferred from mains to the transformer. This energy is supplied to the load when the switch is opened. Through control of the switch-on time, the energy transferred in each

cycle is regulated so that the output voltages are independent of load or input voltage variations. The controlling device MC44603 is an integrated pulse width modulator. A clock signal initiates power pulses at a fixed frequency. The termination of each output pulse occurs when a feedback signal of the inductor current reaches a threshold set by the error signal. In this way the error signal actually controls the peak inductor current on cycle-by-cycle basis.



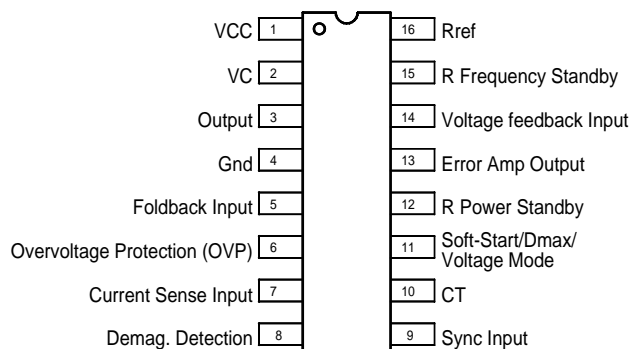
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Figure 7-10 'Blockdiagram PSU 20PS317'

Description of controller MC44603

The MC44603 is an enhanced high performance controller that is specifically designed for off-line and DC-to-DC converter applications. This device has the unique ability of automatically changing operating modes if the converter output is overloaded, unloaded or shorted. The MC44603 has several distinguishing features when compared to conventional SMPS controllers. These features consist of a foldback facility for overload protection, a standby mode when the converter output is slightly loaded, a demagnetization detection for reduced switching stresses on transistor and diodes, and a high current totem pole output ideally suited for driving a power MOSFET. It can also be used for driving a bipolar transistor in low power converters. It is optimised to operate in discontinuous mode but can also operate in continuous mode. Its advanced design allows use in current mode or voltage mode control applications.

Pin connections



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Figure 7-11

Pin function description

Pin	Name	Description
1	VCC	This pin is the positive supply of the IC. The operating voltage range after start-up is 9.0 to 14.5 V.
2	VC	The output high state (VOH) is set by the voltage applied to this pin.
3	Output	Peak currents up to 750 mA can be sourced or sunk, suitable for driving either MOSFET or bipolar transistors.
4	Gnd	The groundpin is a single return, typically connected back to the power source.
5	Foldback Input	The foldback function provides overload protection.
6	Overvoltage Protection	When the overvoltage protection pin receives a voltage greater than 2.5V, the device is disabled and requires a complete restart sequence.
7	Current Sense Input	A voltage proportional to the current flowing into the power switch is connected to this input.
8	Demagnetisation Detection	A voltage delivered by an auxiliary transformer winding provides to the demagnetisation pin an indication of the magnetisation state of the flyback transformer. A zero voltage detection corresponds to complete core saturation.
9	Synchronisation Input	The synchronisation input pin can be activated with either a negative pulse going from a level between 0.7V and 3.7V to Gnd or a positive pulse going from a level between 0.7V and 3.7V up to a level higher than 3.7V. The oscillator runs free when Pin 9 is connected to Gnd.
10	C _T	The normal mode oscillator frequency is programmed by the capacitor C _T choice together with the R _{ref} resistance value. C _T , connected between Pin 10 and Gnd, generates the oscillator sawtooth.
11	Soft-Start/Dmax/Voltage-Mode	A capacitor, resistor or a voltage source connected to this pin limits the switching duty-cycle. This pin can be used as a voltage mode control input. By connecting Pin 11 to Ground, the MC44603 can be shut down.
12	RP Standby	A voltage level applied to the RP Standby pin determines the output power level at which the oscillator will turn into the reduced frequency mode of operation (i.e. standby mode). An internal hysteresis comparator allows to return in the normal mode at a higher output power level.
13	E/A Out	The error amplifier output is made available for loop compensation.
14	Voltage Feedback	This is the inverting input of the Error Amplifier. It can be connected to the switching power supply output through an optical (or other) feedback loop.
15	RF Standby	The reduced frequency or standby frequency programming is made by the RF Standby resistance choice.
16	R _{ref}	R _{ref} sets the internal reference current. The internal reference current ranges from 100µA to 500µA. This requires that $5.0k\Omega \leq R_{ref} \leq 25k\Omega$.

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Figure 7-12

Block diagram of MC44603

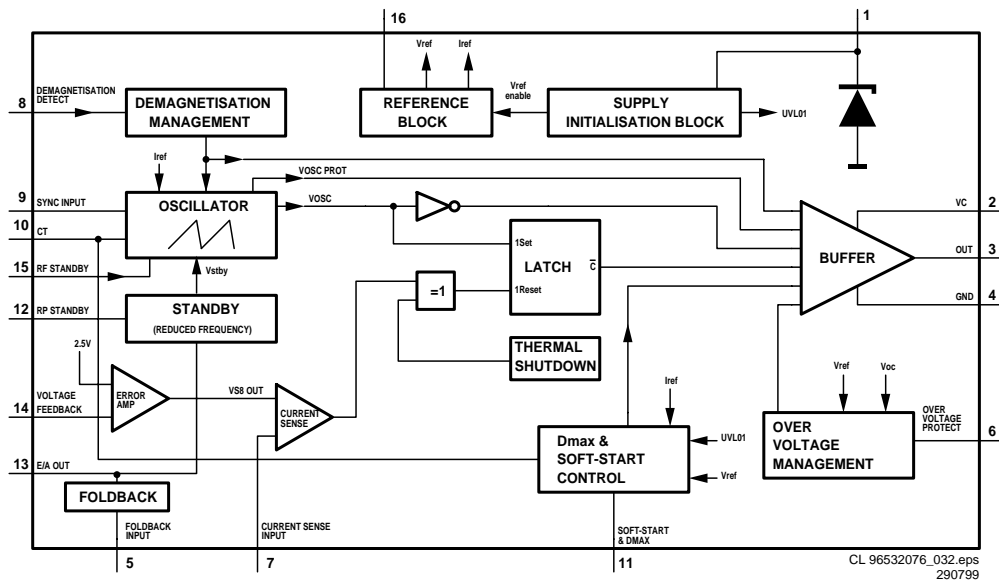


Figure 7-13

Operating description of MC44603

The input voltage V_{cc} (pin 1) is monitored by a comparator with hysteresis, enabling the circuit at 14.5V and disabling the circuit below 7.5V. The error amplifier compares a voltage V_{fb} (pin 14) related to the output voltage of the power supply, with an internal 2.5V reference. The current sense comparator compares the output of the error amplifier with the switch current I_{sense} (pin 7) of the power supply. The output of the current sense comparator resets a latch, which is set every cycle by the oscillator. The output stage is a totem pole, capable of driving a MOSFET directly.

Start up sequence of PSU 20PS317

t1: Charging the capacitors at V_{cc}
 C2129 will be charged via R3123 and R3134, C2133 and C2111 via R3129. The output is switched off during t1.

t2: Charging of output capacitors
 When the input voltage of the IC exceeds 14.5V, the circuit is enabled and starts to produce output pulses. The current consumption of the circuit increases to about 17mA, depending on the external loads of the IC. At first, the capacitors at the V_{cc} pin will discharge because the primary auxiliary voltage, coming from winding 7-9 is below the V_{cc} voltage. At some moment during t2, the primary auxiliary voltage reaches the same level as V_{cc} . This primary auxiliary voltage now determines the V_{cc} voltage.

t3: Regulation
 The output voltage of the power supply is in regulation.

t4: Overload
 When the output is shorted, the supply voltage of the circuit will decrease and after some time drop below the lower threshold voltage. At that moment, the output will be disabled and the process of charging the V_{cc} capacitors starts again. If the output is still shorted at the next t2 phase, the complete start-and stop sequence will repeat. The power supply goes in a hiccup mode.

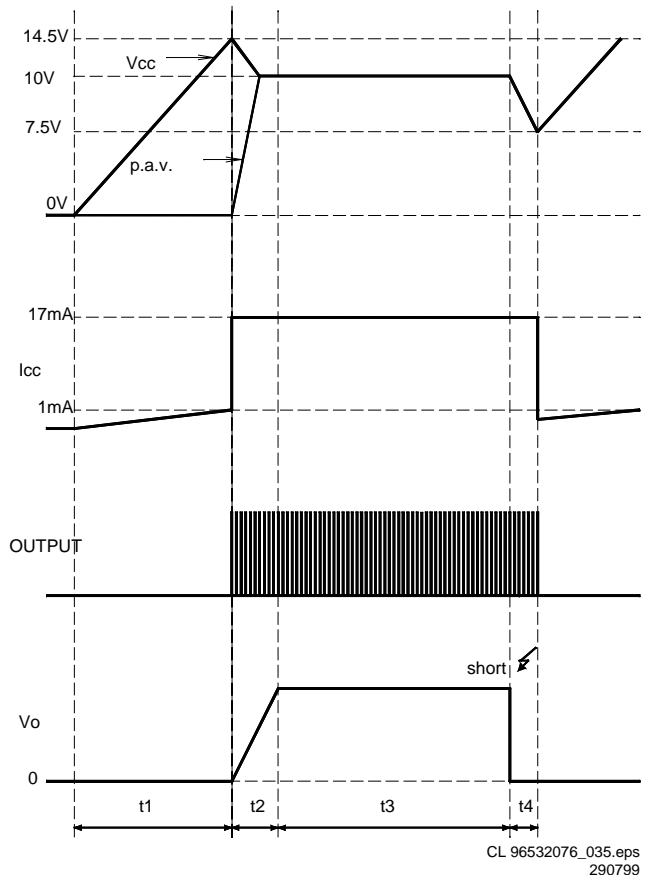


Figure 7-14 'Start-up sequence'

Regulation of PSU 20PS317

Figure 8-14 shows the most relevant signals during the regulation phase of the power supply. The oscillator voltage ramps up and down between V_1 and V_2 . The voltage at the current sense terminal is compared every cycle with the output of the error amplifier V_{comp} . The output

is switched off when the current sense level exceeds the level at the output of the error amplifier.

TimeON phase : A drain current will flow from the positive supply at pin 2 of the transformer through the transformer's primary winding, the MOSFET and Rsense to ground. As the positive voltage at pin 2 of the transformer is constant, the current will increase linearly and create a ramp dependent on the mains voltage and the inductance of the primary winding. A certain amount of energy is stored in the transformer in the form of a magnetic field. The polarity of the voltages at the secondary windings is opposite to the primary winding so that the diodes are non-conducting in this phase.

TimeDIODE phase : When the MOSFET is switched off, energy is no longer supplied to the transformer. The inductance of the transformer now tries to maintain the current which has been flowing through it at a constant level. The polarity of the voltage from the transformer therefore reverses. This results in a current flow through the transformer's secondary winding via the now conducting diodes, electrolytic capacitors and the load. This current is also ramp shaped but decreasing.

TimeDEAD phase : when the stored energy has been supplied to the load, the current in the secondary windings stops flowing. At this point, the drain voltage of the MOSFET will drop to the voltage of C2121 with a ringing caused by the drain-source capacitance with the primary inductance.

The oscillator will start a next cycle which consists of the above described three phases. The time of the different phases depends on the mains voltage and the load.

TimeDEAD is maximum with an input of 400VDC and a minimum load. It will be zero with an input of 100VDC and an overload.

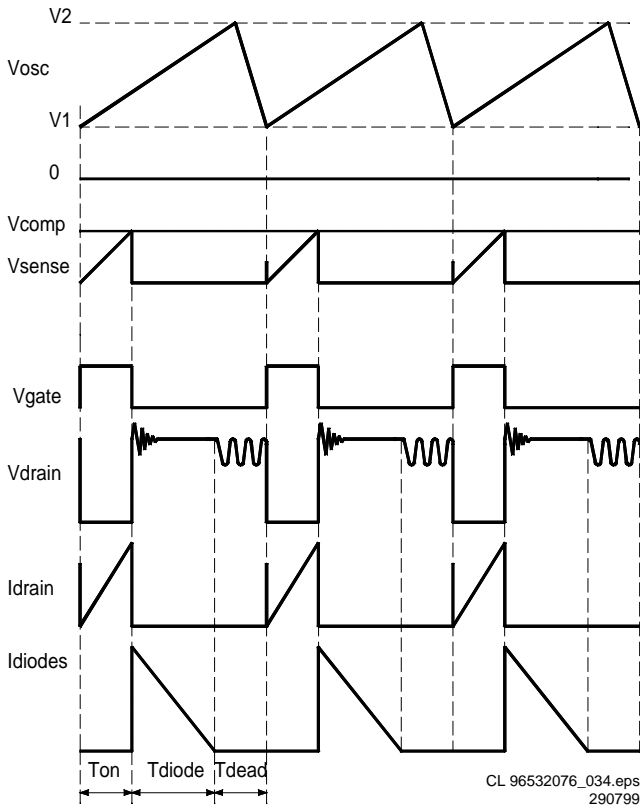
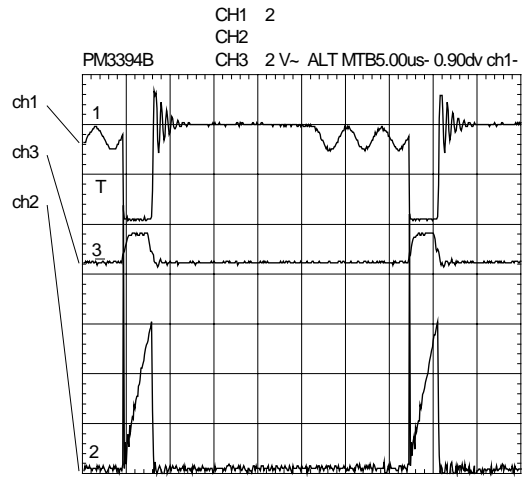
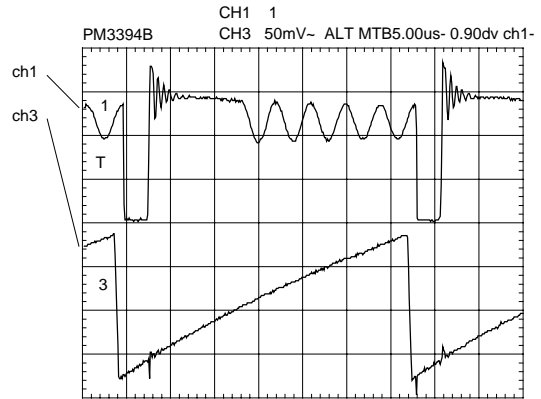


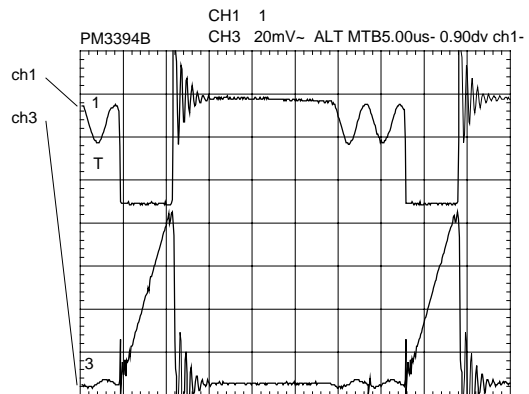
Figure 7-15 'Regulation'



ch1 : Drain voltage
ch2 : Drain current
ch3 : Gate voltage



ch1 : Drain voltage
ch2 : Oscillator voltage



ch1 : Drain voltage
ch3 : Sense voltage

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Figure 7-16 'Oscillograms'

Circuit description of PSU 20PS317

Input circuit

The input circuit consists of a lightning protection circuit and an EMI filter.

The lightning protection comprises R3120, gasarrester 1125 and R3124. The EMI filter is formed by C2120, L5120, C2125 and C2126. It prevents inflow of noise into the mains.

Primary rectifier/smoothing

The AC input is rectified by rectifier bridge 6102 and smoothed into C2121. The voltage over C2121 is approximately 300V. It can vary from 100V to 390V.

Start up circuit and Vcc supply

This circuit is formed by R3123, R3134, C2129, D6129, R3129, R3111, C2133 and C2111.

When the power plug is connected to the mains voltage, the stabilised voltage over D6129 (24V) will charge C2133 via R3129. When the voltage reaches 14.5V across C2111, the control circuit of IC7110 is turned on and the regulation starts. During regulation, Vcc of IC7110 will be supplied by the rectified voltage from winding 7-9 via L5132, D6132 and C2133.

Control circuit

The control circuit exists of IC7110, C2102, C2104, C2107, C2109, C2110, R3102, R3103, R3104, R3107, R3108, R3109 and R3110. C2102 and R3110 define the frequency of the oscillator.

Power switch circuit

This circuit comprises MOSFET 7125, Rsense 3126, 3127 and 3128, R3125, C2127, L5125, R3112 and R3113. R3125 is a pull-down resistor to remove static charges from the gate of the MOSFET.

Regulation circuit

The regulation circuit comprises opto-coupler 7200 which isolates the error signal from the control IC on the primary side and a reference component 7201. The TL431(7201) can be represented by two components:

a very stable and accurate reference diode

a high gain amplifier

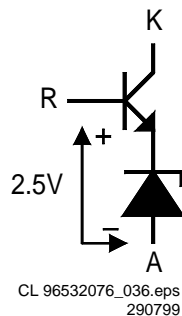


Figure 7-17 'TL 431'

TL431 will conduct from cathode to anode when the reference is higher than the internal reference voltage of about 2.5V. If the reference voltage is lower, the cathode current is almost zero. The cathode current flows through the LED of the opto-coupler. The collector current of the opto-coupler flows through R3106, producing an error voltage, connected to voltage feedback pin 14 of IC7110.

Demagnetisation

The auxiliary winding (7-9) voltage is used to detect magnetic saturation of the transformer core and connected via R3101 to pin 8 of IC7110. During the demagnetisation phase, the output will be disabled.

Overvoltage protection circuit

This circuit consist of D6114, C2114, R3115 and R3116. When the regulation circuit is interrupted due to an error in the control loop, the regulated output voltage will increase (overvoltage). This overvoltage is sensed at the auxiliary winding 7-9.

When an overvoltage longer than 2.0 (s is detected, the output is disabled until VCC is removed and then re-applied. The power supply will come in a hiccup mode as long as the error in the control loop is present.

Secondary rectifier/smoothing circuit

There are 5 rectifier/smoothing circuits on the secondary side. Each voltage depends on the number of windings of the transformer.

The -8V supply is regulated by voltage regulator 7249.

On/off circuit

In off mode pin 1 and pin 2 of connector 0206 are connected. The high voltage (-8V, +12V) over opto coupler 7200 forces this one to conduct. IC7110 is switched off and thus the output supply voltages.

7.2.2 Troubleshooting PSU 20PS317

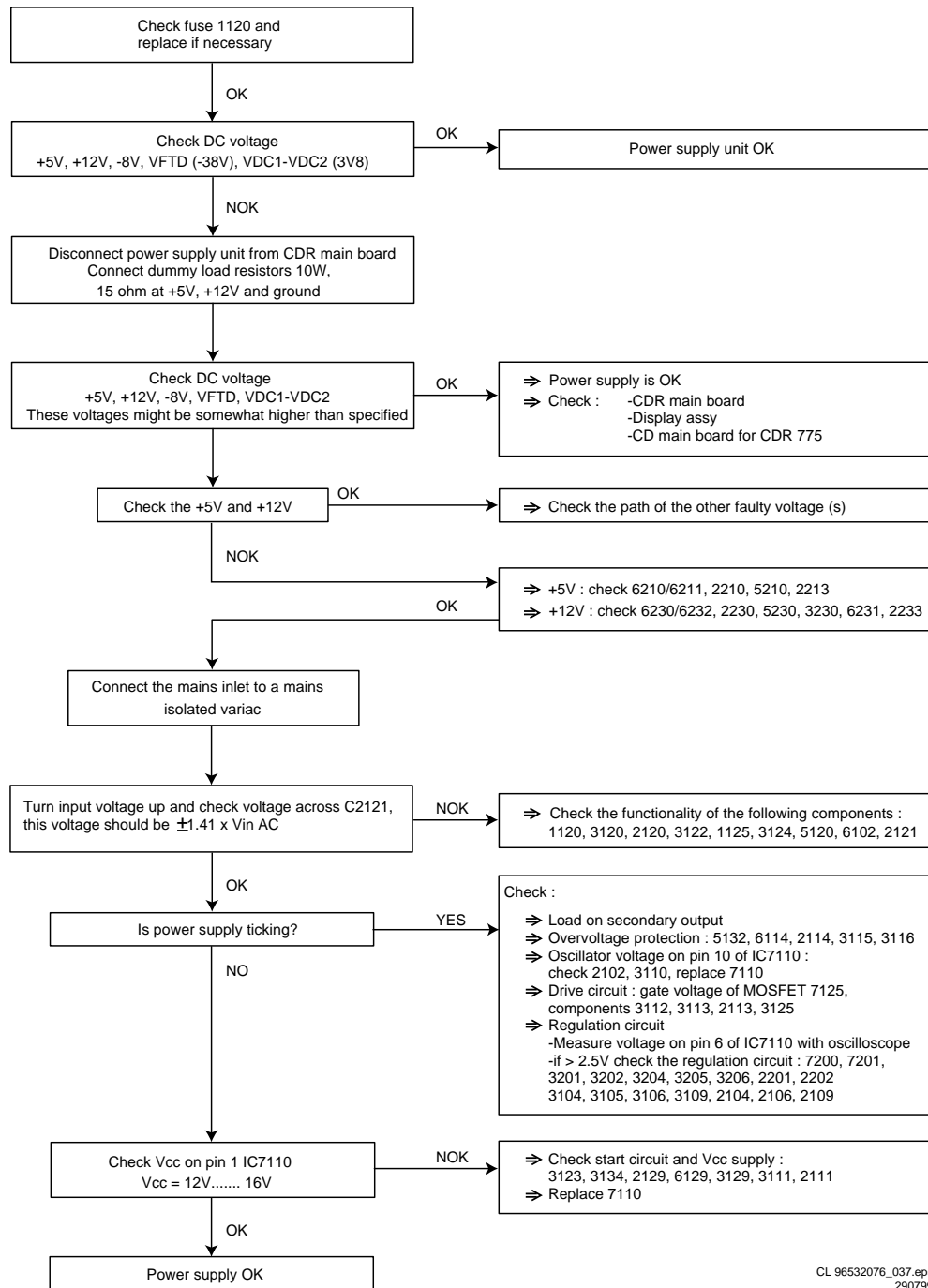
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Figure 7-18

7.3 CD Main Board

The CD main board is built around the compact disc mechanism VAM1250 and a loader 1250. The CDM delivers diode signals and an unequalised high frequency signal. These signals are necessary inputs for the decoder CD10. Based on these signals the decoder will control the disc. The decoder is able to control the sledge, focus motor, radial motor and turn table. When everything is "locked", the decoder delivers a digital output according to IEC958 standard, subcode to the microprocessor and I2S for reproducing analog audio signals by means of a D/A converter.

The microprocessor controls the CD10 and is slave of the master processor on the CDR main board in the CDR775. Both processors communicate via a DSA connection (data, strobe and acknowledge).

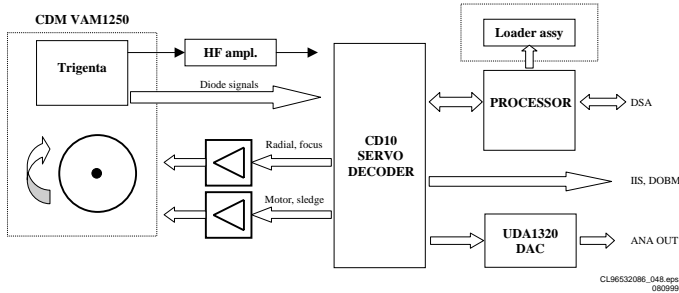


Figure 7-19

7.3.1 Supply Voltages

Description

The CD main board receives +5V and +12V from the CDR main board via respectively pin 16 and pin 15 of connector 1208. The +5V is split up into +5VHF and +5V. The +5VHF is used mainly for the diode currents and the HF-amplifier. The +5V is used for the digital part of the board. On the board a +3V3 is made from the +5V for the decoder CD10 and an A3V3 for the DAC UDA1320. The +12V is split up into A12V for the audio output stage and +12V for the power drivers of the CDM.

Measurements

Connect following supplies to next pins :

- +5V + 5% to pin 16 of connector 1208.
- +12V + 5% to pin 15 of connector 1208.
- Ground reference to pin 17 of connector 1208.

Keep microprocessor 7202 in reset by forcing pin 7 of connector 1208 to +5V. Check the following voltages :

Point	Voltage
Position 1000 pins 1,3	+5V ±5%
Position 7000 pins 5,17,21,57	+3.3V ±5%
Position 7005 pin 14	+5V ±5%
Position 7020 pins 25	+5V ±5%
Position 7020 pins 26,27,28	+10 ±10%
Position 7021 pin 5	+12V ±10
Position 7022 pin 5	+12V ±10
Position 7025 pin 16	+5V ±5%
Position 7202 pin 38	+5V ±5% (other appl. 3V3 possible)
Position 7309 pins 4,13	+3V3 ±5%
Position 7120 pin 8	+12V ±10

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Figure 7-20

8.3.2 Clock Signals

Description

The microprocessor has its own Xtal or resonator of 12MHz. The CD10 needs a clock of 8.4672MHz + 100ppm. This speed also relates to the disc speed. To avoid locking problems between the two drives in the CDR775, both drives run on the same clock. Therefore the CD main board gets the clock for the decoder from the CDR main board via pin 2 of connector 1208. The DAC needs a system clock to drive its internal digital filters and to clock the I2S signals from the decoder. In our case this is 11.2896MHz (CL11) generated by the CD10.

Measurements

- Connect the power supply as described above in "1.1.1. Supply Voltages".

- Connect on pin 2 of position 1208 a clock signal of 8.4672 MHz (100ppm minimum rise time of 50ns and at TTL level (0V and +5V).
- Keep microprocessor 7202 in reset by forcing pin 7 at position 1208 to +5V.
- Release the reset. Now, the processor will reset the CD10 for at least 75µs.
- The output clock CL11 should be available now at pin 42 of the CD10.

Check the following frequencies :

Point	Frequency
Position 7000 pin 16	8.4672 MHz ±100ppm
Position 7202 pins 14,15	12MHz ±5%
Position 7309 pin 6	11.2896 MHz ± 100ppm
Position 7309 pin 1	2.1168 MHz ± 100ppm
Position 7309 pin2	44.1kHz ± 100ppm

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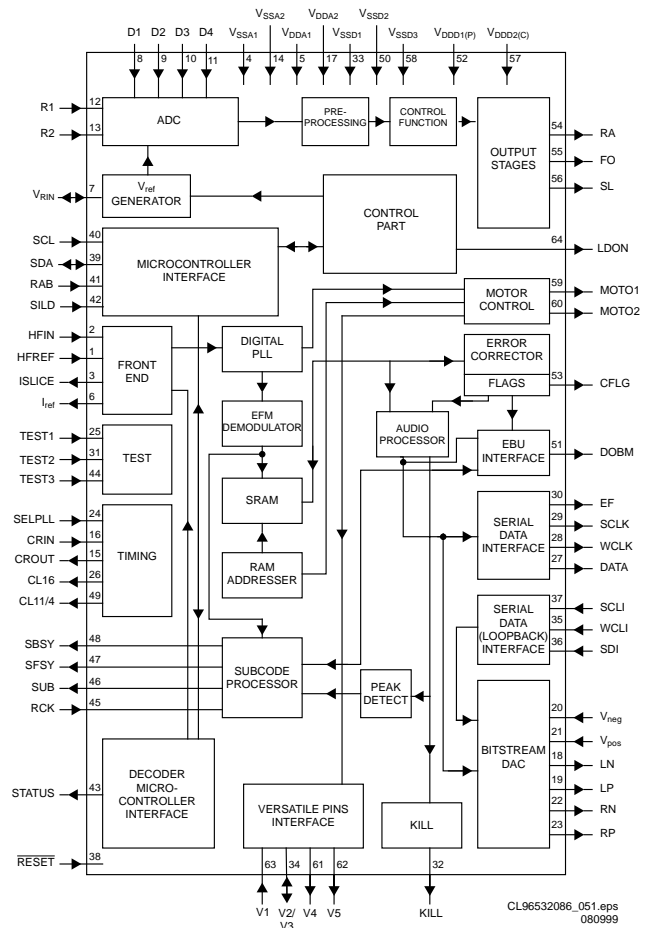
Figure 7-21

7.3.3 CD10 Decoder/Servo SAA7324 (7000)

Description

The CD10 is a single chip combining the functions of a CD decoder, digital servo and bitstream DAC. The decoder/servo part is based on the CD7. The decoding part supports a full audio specification and can operate at single speed (n=1) and double speed (n=2).

Block Diagram



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Figure 7-22

Pin Configuration

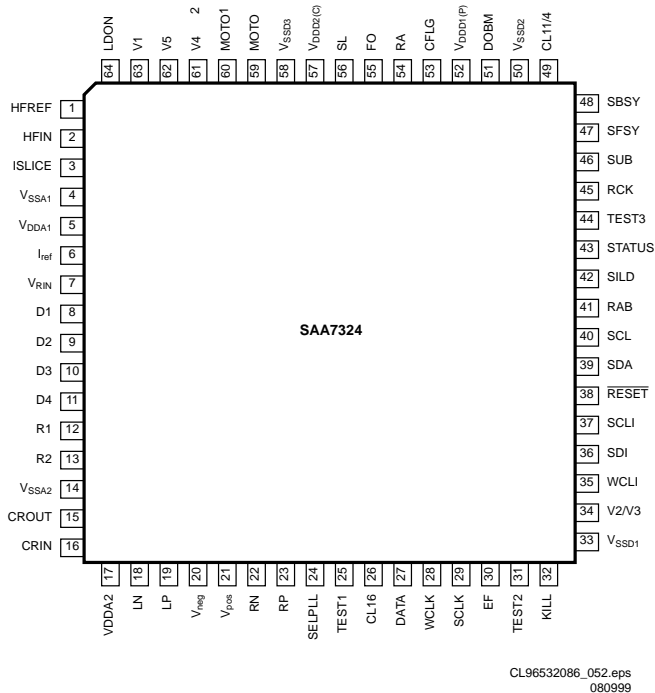


Figure 7-23

7.3.4 TDA7073A Power Drivers (7021, 7022)

Description

The TDA7073A is a dual power driver circuit for servo systems with a single supply. In this configuration it is used to drive the sledge, tray, focus and radial.

Measurements

Keep microprocessor 7202 in reset by forcing pin 7 of connector 1208 to +5V. Connect the power supply as described above in "1.1.1. Supply Voltages". Check the following voltages :

Pin	Location	Value
5	7021	12V ±10%
5	7022	12V ±10%
1	7022	1.65V ±10%
2	7022	1.65V ±10%
6	7022	1.65V ±10%
7	7022	1.65V ±10%
1	7021	5.0 ±10%
2	7021	5.0 ±10%
6	7021	1.65V ±10%
7	7021	1.65V ±10%

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Figure 8-24

Pin	Location		Value DC
9	7022	FOC	5.8V ±10%
12	7022	FOC	5.8V
13	7022	RAD	5.8V
16	7022	RAD	5.8V
9	7021	SLE	5.8V
12	7021	SLE	5.8V
13	7021	TRAY-	5.8V
16	7021	TRAY+	5.8V

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Figure 7-25

7.3.5 BA6856FP Turn Table Motor Driver (7020)

Description

This component is a 3 phase, full wave pseudo linear driving system with inbuilt Hall Bias circuit and 3 phase parallel output.

Measurements

Keep processor 7202 in reset by forcing pin 7 of connector 1208 to +5V. The outputs 9, 10, 11 of connector 1006 are 0V. Pin 21 of the motor driver 7020 is 2.5V (10%). Pin 22 of the motor driver 7020 is 2.5V (10%). Pin 23 of the motor driver 7020 is 0V. Pin 19 of the motor driver 7020 is 5V (10%). Put the processor out of reset to continue the measurement. Check MOT1 at pin 59 of CD10. The duty cycle of the output should be 50%. Check wave form at pin 11 of 7005-D : amplitude 5V + 5% duty cycle 50%.

The motor driver 7020 can be measured dynamically by connecting a hall motor to the application panel. Apply a pulse of 1V 10Hz and 15% duty cycle to pin 22 (Ec) as input value with reference to pin 21 (Ecr=2.5V). Measure the output signals on the driver. This will give as response a square wave on pin 17 and pin 18. When a positive voltage is applied, the square wave on pin 17 will go ahead of the square wave on pin 18. All signals will have a value as shown in the truth table. Check the following output signals :

Motor controller truth table

Input conditions conn 1006 pin						Outputs conn 1006			Test points on driver		
6	8	4	7	3	2	9	10	11	18	17	16
U+	U-	V+	V-	W+	W-	UCOIL	VCOIL	WCOIL	HALL_U	HALL_V	HALL_W
L	M	H	M	M	M	6V	0V	0V	0V	5V	
H	M	L	M	M	M	0V	6V	6V	5V	0V	
M	M	L	M	H	M	0V	6V	0V		0V	5V
M	M	H	M	L	M	6V	0V	6V		5V	0V
H	M	M	M	L	M	0V	0V	6V	5V		0V
L	M	M	M	H	M	6V	6V	0V	0V		5V

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Figure 7-26

Hall-elements input signal voltage levels

Input voltage	Level	Tolerance	Unit
H	2.8	0.1	V
M	2.5	0.1	V
L	2.2	0.1	V

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Figure 7-27

7.3.6 Tray Control

Description

The tray control consists of a TDA7073A power driver (7021) controlled by the processor 7202 via pin 19 TRAYIN and pin 20 TRAYOUT. If pin 20 is low and pin 19 high, the TRAY+ signal at pin 16 of 7021 is forced to +8V and the TRAY- signal at pin 13 of 7021 to GND : the tray will open. If pin 20 is high and pin 19 low, TRAY+ becomes GND and TRAY- becomes +8V : the tray will close. If pin 19 and 20 of the processor have the same value, TRAY+ and TRAY- will have the same value as well : the tray stops moving.

Measurements

Keep processor 7202 in reset by forcing pin 7 of connector 1208 to +5V. Connect a load of 15Ω, 7W between pin 3 and 4 of connector 1002. Check the voltage over the load with TRAY+ (pin 3) as positive reference. Check also the levels of pins 19 and 20 of the processor.

U TRAY+,TRAY- = <100mV

Pin 20 = +5V

Pin 19 = +5V

Force pin 20 of the processor to ground, and check the voltages.

U TRAY+,TRAY- = -6.5V(10%)

Pin 20 = +0V

Pin 19 = +5V

Force pin 19 of the processor to ground as well and check the levels again.

U TRAY+,TRAY- = <100mV

Pin 20 = +0V

Pin 19 = +0V

Release pin 20 of the processor and check the levels.

U TRAY+,TRAY- = 6.5V(10%)

Pin 20 = +5V

Pin 19 = +0V

Release pin 19 of the processor and check the levels again:

U TRAY+,TRAY- = <100mV

Pin 20 = +5V

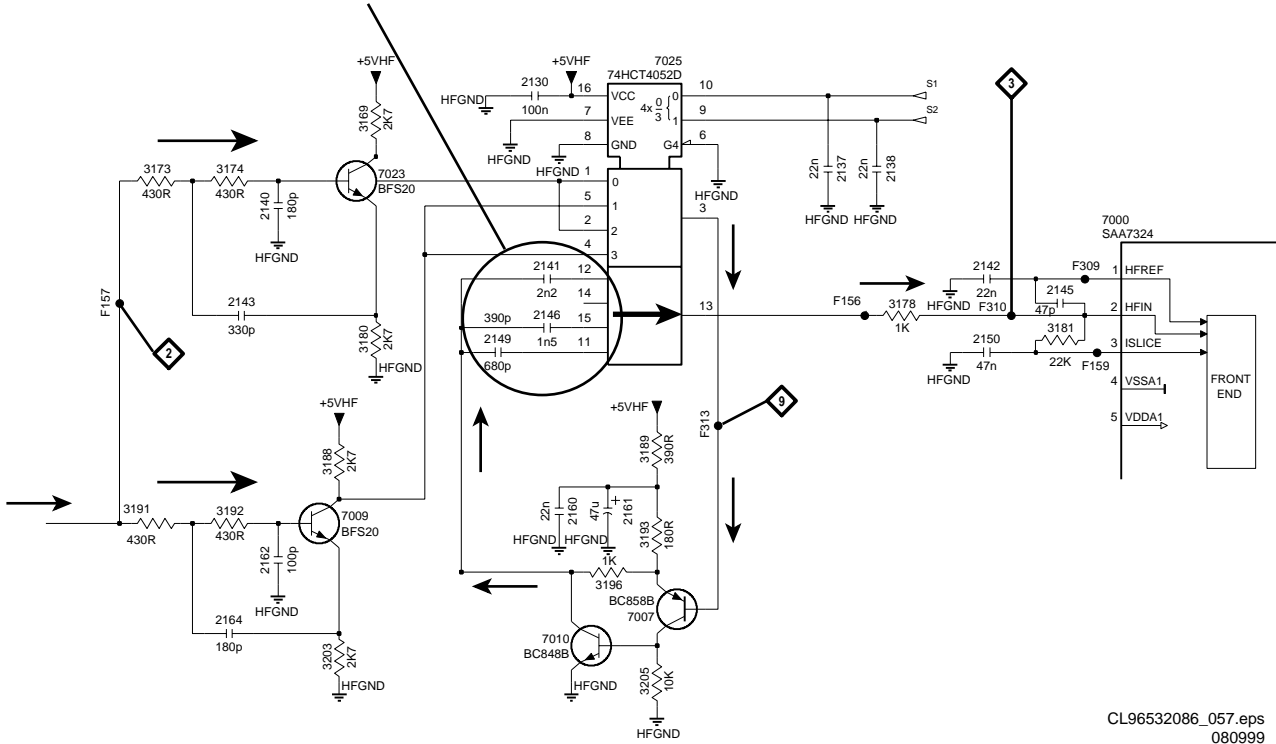
Pin 19 = +5V

7.3.7 HF Path

Description

The pre-amplified HF-signal is presented to both n=1 and n=2 amplifier circuits. The mux/demux switches via software and micro processor controlled S1 and S2 lines between either one of the amplified n=1 or n=2 signals. The signal will then follow

another amplification and filtering circuit. The filtering again is controlled by the S1 and S2 lines, dependant on whether the disc starts up (speed n=1, S1 and S2 Low), disc plays at speed n=1 (S1 Low, S2 High) or disc plays at speed n=2 (S1 and S2 High).



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Figure 7-28

DC Settings

Set the power and reset connections as described above in "1.1.1. Supply Voltages". Check the following voltages :

Force	Pin	Location	Measure
	Emitter	7006	2.4 ±10%
S1 and S2 "HIGH"	Collector	7010	1.9 ±10%
S1 and S2 "LOW"	Collector	7010	1.9 ±10%
S1 and S2 "HIGH"	13	7025	1.6 ±10%
S1 and S2 "LOW"	13	7025	1.6 ±10%
S1 and S2 "HIGH"	3	7025	3.2 ±10%
S1 and S2 "LOW"	3	7025	3.2 ±10%

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Figure 7-29

Transfer Characteristics

Set the power and reset connections as described above in "1.1.1. Supply Voltages". Connect a function generator via a serial resistor of 1k5 to pin 4 of connector 1000. Use the

function generator as a sine wave generator with output level of 1Vt. Check this AC value with an AC mV-meter connected to the input (pin 2) of the CD10 (7000) :

Frequencies	S1 and S2 "low"		S1 and S2 "high"	
	Input V _{AC}	Pin 2 at 7000	Input V _{AC}	Pin 2 at 7000
300 Hz	200mV	< 100mV ±20%	200mV	< 100mV ±20%
10 kHz	200mV	295mV ±20%	200mV	330mV ±20%
100 kHz	200mV	310 mV ±20%	200mV	330 mV ±20%
300 kHz	200mV	385 mV ±20%	200mV	335 mV ±20%
800 kHz	200mV	655 mV ±20%	200mV	485 mV ±20%
1.5 MHz	200mV	1.1V ±20%	200mV	760 mV ±20%
3MHz	200mV	1.1V ±20%	200mV	1.1V ±20%

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Figure 7-30

HFDET Setting

Set the power and reset connections as described above in "1.1.1. Supply Voltages". Connect a function generator via a serial resistor of 1k5 to pin 4 of connector 1000. Use the

function generator as a sine wave generator with output level of 500 kHz, 1Vt. Check this AC value with an AC mV-meter :

Location	Voltage DC		Voltage AC
	No HF	HF	
F190	4.8V ±20%	4.8V ±20%	175mV ±20%
F192	< 100mV	1.1V ±20%	-
F206	4.9V ±20%	150mV ±20%	-

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Figure 7-31

8.3.8 Audio Part - DAC

Description

The DAC used, is the UDA1320 bit stream, continuous calibration. I2S signals from various formats can be entered at pins 1,2 and 3. If these signals are in phase with the delivered system clock at pin 6, the DAC will reproduce analog output signals at pins 14 and 16. 0dB level is 0.85Vrms. These analog signals are at 1.65Vdc level.

The DAC has features which can be checked on the input pins. Mute will switch off the analog signals. De-emphasis is not used, since this is done in the decoder. Attenuation of -12dB is not used because this is also done in the decoder.

I2S

I2S is a kind of digital audio format, consisting out of 3 lines : CLOCK, WORDSELECT and DATA.

WORD-SELECT

Word select (WS) indicates whether the data-sample is from the left or the right audio-channel. It has the same frequency as the sample rate of the digital audio signal. This can be 32, 44.1 or 48kHz. Normal polarity is low for a left sample and high for a right sample. So within the low state of the WS-line the data bits for the left channel are transferred, and within the high state the data bits of the right channel are transferred.

CLOCK

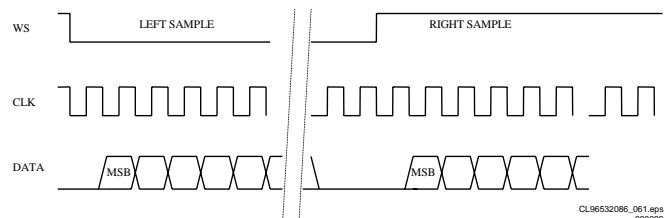
The CLOCK signal (CLK) indicates when DataTips must be set, and when DataTips must be read. The frequency depends on the speed of the I2S-bus, but is always a factor of the frequency of the WS-signal. It can be 48x, 64x, 96, 128x... .In our case it is 48x the sample rate frequency = 2.1168MHz. The

signal is in phase with the WS-signal. Transition of the WS always happens on a falling edge of the CLK.

DATA

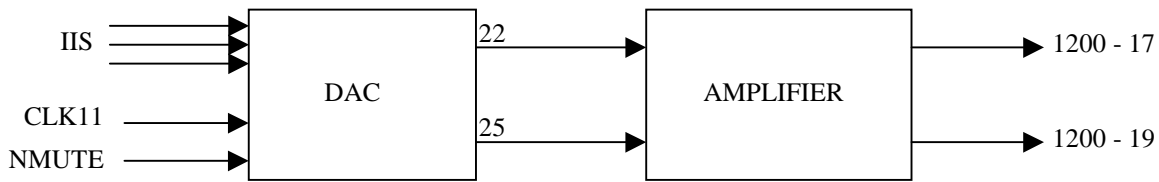
DATA contains all data-bits. Data bits are set by the transmitting device, and read by the receiving device. The position of the DATA-bits within the WS-signal is very important. There are several formats for this. In our case we always use Philips I2S format, no Japanese or Sony format. The number of data-bits per channel depends on the used devices.

Timing of the I2S-bus, in case of Philips I2S is shown in the next figure :



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Figure 7-32

Measurements

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Figure 7-33

Keep processor 7202 in reset by forcing pin 7 of connector 1208 to +5V. This puts the processor outputs in tristate. Check the reset at pin 4 of processor 7202 to make sure that the processor is in reset.

Now, force port 0-4 pin 33 at 7202 to 0V to set the decoder outputs (SCLK, WCLK, DATA, and CL11).

Check the MUTE pin 11 at 7309 : this pin should be low.

Connect via an I2S generator I2S-signals to the DAC :

Pin 1 at 7309: SLCK.

Pin 2 at 7309: WCLK.

Pin 3 at 7309: DATA.

Connect also the SYSCLK pin 6 at position 7309 to a clock signal of 11.2896 MHz (100ppm).

Generate an I2S signal equivalent with a sine wave of 1kHz at 0dB for both left and right channels.

Check if 0.8 VRMS at pins 14 and 16 at location 7209 with a DC of 1.65VDC.

Check if 1.7 VRMS (2 dB at connector pins 1 and 3 at location 1209.

Force MUTE Pin 11 at 7309 high.

Measure again at pins 1 and 3 at location 1209 : both signals should be at -90 dB.

8. List of Abbreviations

SIGNAL NAME	SIGNAL FLOW	FUNCTION AND DESCRIPTION
+12V	main supply voltage from PSU	+12V supply voltage from PSU
+12VA	supply voltage	+12V supply voltage for Audio part
+5V	main supply voltage from PSU	+5V supply voltage from PSU
+5VA	supply voltage	+5V supply voltage for Audio part
+9SRVPWR	IC7558 -> IC7240	PoWeR supply for SeRVo driver IC
12VPWR	supply voltage	+12V supply voltage for servo part
-8V	main supply voltage from PSU	-8V supply voltage from PSU
-8VA	supply voltage	-8V supply voltage for Audio part
A(1:20)	IC7701 -> R3818,R3819, R3820, R3821, R3897 -> IC7703	Address lines 1 to 20 between DASP and flash ROM
A(10:20)	IC7701 -> R3819, R3820, R3821 -> IC7702	Address lines 10 to 20 between DASP and DRAM
A1	IC7010 -> IC7270	amplitude of the "land" reflection relative to the average EFM, voltage output, OPC input
A1LF, A2LF	CONN1000 -> IC7010	satellite photo diodes A1, A2 current output
A2	IC7010 -> IC7270	amplitude of the "pit" reflection relative to the average EFM, voltage output, OPC input
A-8V	supply voltage	-8V supply voltage for servo part
AEGER		Analog Error signal GEnerator for Recordable
AINTON	IC7008 -> IC7010	Alpha INTegrator ON (to AEGER)
ALE	IC7270 -> R3213 -> IC7209, IC7300IC7270 -> R3230	Address Latch Enable; external address latch strobe line, freeze address when low
ALPHA0	IC7270 -> IC7010	analog voltage mode output from OPC D/A converter
ALS	IC7008 -> IC7010	Alpha Loop Switch (to AEGER)
ASTROBE	IC7008 -> IC7010	Alpha STROBE (to AEGER)
ATIP		Absolute Time In Pre-groove (sync signal)
ATIPSYNC	IC7300 -> IC7270	ATIP SYNC signal
ATT	IC7270 -> R3717, R3722IC7270 -> IC7701	ATTenuation request from MACE2 to audio DAC, active low; means that the output can be attenuated in case of search activities
B1LF, B2LF	CONN1000 -> IC7010	satellite photo diodes B1, B2 current output
BCLK	IC7701 -> R3898A -> IC7300	I2S1 BitCLock from DASP to CDR60 (playback and record)
BE_RESET	IC7701 -> R3261 -> IC7270IC7701 -> R3716	Basic Engine RESET, active high
BIASC	IC7008 -> R3056	BIAS Current switch CDRW output
BKPT	CONN1819, R3907 -> IC7701	JTAG mode select / debug mode BreakPoint
C1LF, .. , C4LF	CONN1000 -> IC7010	Central photo diodes C1, C2, C3, C4 current output
CAGAIN	R3016,R3115 -> IC7010	set-point laser power on disc, current input
CAHF	CONN1000 -> C2374	Central Aperture (central photo diodes) High Frequency current output (C1+C2+C3+C4)
CALF	IC7010 -> IC7270	Central Aperture (central photo diodes) Low-pass Filtered signal (DC coupled EFM signal), voltage output, OPC input
CAS0	IC7701 -> IC7702	Column Address Strobe DRAM for upper byte
CAS1	IC7701 -> IC7702	Column Address Strobe DRAM for lower byte
CDR	IC7008 -> IC7355	CDR strategy detected output (active high)
CDR60CFLG	IC7300 -> R3382B -> CONN1812	serial output of error corrector status information of the CDR60-decoder, to be measured at test connector
CDR60CL1	IC7300 -> R3382C -> CONN1812	output of CLock signal for testing system clock of IC CDR60 at test connector
CDR60CS	IC7270 -> R3235B -> R3702, IC7300	CDR60 Chip Select, active high
CDR60INT	IC7300 -> IC7270	CDR60 INTerrupt line, active low
CDR60LWRT	IC7300 -> R3048	CDR60 Laser WRITe control output

CDR60MEAS1	IC7300 -> R3382A -> CONN1812	serial output of information about jitter, PLL frequency and asymmetry of bit recovery block in CDR60, to be measured at test connector
CDR60PLL	IC7270 -> R3305 -> IC7300	CDR60 clock multiplier enable, active high
CDRW	IC7355D -> IC7355CIC7355D -> CONN1000	inverted CDR-strategy-detected signal
CLK_OUT	IC7701 -> R3771 -> CONN1819	system CLoCK OUT
CLK_SYS	IC7701 -> R3727, R3731	oscillator output
COS-	CONN1220 -> IC7225B	Hall feedback signal from sledge motor
COS+	CONN1220 -> IC7225B	Hall feedback signal from sledge motor
CSFLASH	IC7701 -> IC7703	Chip Select for FLASH or boot device
CSRAM	IC7270 -> R3235A -> R3703, IC7802	Chip Select SRAM, active low
D(16:31)	IC7701 <-> R3822, R3823, R3824, R3825 <-> IC7703, IC7702	Databus bit 16 to 31 between DASP, flash ROM and DRAM
D3V3	supply voltage	+3,3V supply voltage for Digital part
D5V	supply voltage	+5V supply voltage for Digital part
D5VS	supply voltage	+5V supply voltage for Servo part
DALPHA	IC7010 -> R3037	ALPHA error signal for laser power control
DASP		Digital Audio Signal Processor
DATAI	IC7701 -> R3898C -> IC7300	I2S1 DATA In from DASP to CDR60 (recording)
DATAO	IC7300 -> R3314 -> IC7701	I2S1 DATA Out from CDR60 to DASP (playback)
DEEMP	IC7270 -> R3719, R3724IC7270 -> IC7701	DE-EMphasis control for audio DAC from MACE2, active high; means that de-emphasis is needed in digital filter
DELTAP	IC7016 -> R3126	DELTA Power current source drive signal from XDAC
DIG_OUT_C	IC7701 -> R3706 -> C2707, CONN1400	Common DIGital OUTput (consumer)
DISPLAY_INT	F934 -> R3812, IC7701	DISPLAY INTerrupt
DMON	IC7270 -> R3324	power save at stop, active low
DOBM_CD	CONN1708, C2731 -> R3757 -> R3903 -> IC7701	Digital Output (EBU output) from CD player in CDR775 to DASP
DOBM_CDR	IC7300 -> R3382D -> C2379, IC7701	Digital Output (EBU output) from CDR60 to DASP
DRAM_RW	IC7701 -> IC7702	Read/Write strobe for DRAM
DSA_ACK_CD	IC7701 <-> R3830 <-> R3831 <-> CONN1708IC7701 <-> R3830 <-> C2735	Data/Strobe/Acknowledge serial communication between DASP and CD-player in CDR775
DSA_ACK_CD R	IC7701 -> R3729 -> IC7270, CONN1830IC7701 -> R3729 -> R3769	Data/Strobe/Acknowledge serial communication between MACE2 and DASP for CDR; acknowledge input for MACE2 is strobe output for DASP
DSA_DATA_CD	IC7701 <-> R3828 <-> R3829 <-> CONN1708IC7701 <-> R3828 <-> C2733	Data/Strobe/Acknowledge serial communication between DASP and CD-player in CDR775
DSA_DATA_CD R	IC7270<->R3246 <-> R3813 <-> IC7701, CONN1830IC7270<->R3246 <-> R3767	Data/Strobe/Acknowledge serial communication between MACE2 and DASP for CDR
DSA_STR_CD	IC7701 <-> R3835 <-> R3832 <-> CONN1708IC7701 <-> R3835 <->C2734	Data/Strobe/Acknowledge serial communication between DASP and CD-player in CDR775
DSA_STR_CD R	IC7270 -> R3245 -> IC7701, CONN1830IC7270 -> R3245 -> R3768	Data/Strobe/Acknowledge serial communication between MACE2 and DASP for CDR (strobe output for MACE2 is acknowledge input for DASP)
DSCLK	CONN1819, R3908 -> IC7701	reset in / Debug Serial CLoCK in
DSI	CONN1819, R3909 -> IC7701	JTAG reset in / Debug Serial clock In
EFM		Eight to Fourteen Modulation = modulation method used for CD storage, also the actual raw CD signal as written or read on or from the CD disc
EFMCLK	IC7300 -> IC7008	EFM CLoCK output
EFMDATA	IC7300 -> IC7008	EFM DATA output
EFMTIM3		EFM TIMing generator
EPON	IC7008 -> R3010IC7008 -> C2010	Erase Power ON
EPONO	IC7008 -> R3107	Erase Power ON Open drain output
EPONRC	R3004 -> CONN1000	Erase Power ON (after RC circuit)

ERASEC	IC7008 -> R3087	ERASE Current switch CDRW output
ERON	IC7008 -> IC 7010	ERror ON (to AEGER)
EXT_DIG_IN1	CONN1400 -> IC7701	EXTERNAL DIGital Input 1
EXT_DIG_IN2	CONN1702, C2767, C2721 -> R3701 -> IC7701	EXTERNAL DIGital Input 2 (CDR950 only)
EXT_OPT_IN	CONN1400, C2722 -> R3708 -> IC7701	EXTERNAL OPTical Input
F_READY	IC7703 -> R3817 -> IC7701 CONN1701 -> IC7701	Flash READY detection, this line is forced low as long as the flash is busy with erase or program algorithm
F_RW	IC7701 -> IC7708B	Read/Write strobe for Flash ROM
FEN	IC7010 -> IC7270	Focus Error Normalized current output
FOC-	IC7240 -> CONN1000	FOCUS actuator drive signal negative connection
FOC+	IC7240 -> CONN1000	FOCUS actuator drive signal positive connection
FS30V	D6500 -> CONN1000	Forward Sense diode 30V power supply
FSA	CONN1000 -> T7119, T7120	Forward Sense photo diode current output
FSCLR	IC7008 -> IC7126	Forward Sense signals CLEAR switch
FSOF	IC7008 -> R3052	Forward Sense photo diode sampling OFF
FSON	IC7008 -> R3051	Forward Sense photo diode sampling ON
FSR	R3040 -> IC7270	Forward Sense signal while Reading for read control loop
FSRS	IC7008 -> IC7126D	Forward Sense photo diode Read Sampling
FSW	R3050 -> IC7270	Forward Sense signal while Writing for write control loop
FSWS	IC7008 -> IC7126C	Forward Sense photo diode Write Sampling
FWEN	IC7270 -> IC7208, R3806	Flash EPROM Write ENable
HALL_U, HALL_V, HALL_W	IC7330 -> IC7300, CONN1812	HALL feedback signals from turn table motor via hall motor driver
HFS0	IC7270 -> R3249 -> IC7360	select HF circuit
I2C		Inter IC
I2C_CLK	IC7701, R3711 -> R3715 -> C2709 -> F934IC7701, R3711 -> IC7801	I2C CLOCK line used for display slave processor and digital potmeter
I2C_DATA	IC7701, R3712 <-> R3713 <-> C2708, R3714 <-> F934IC7701, R3712 <-> IC7801	I2C DATA line used for display slave processor and digital potmeter
I2CL	R3248B -> IC7207, R3247C	I2C CLOCK line
I2CSCL	IC7207 -> IC7008IC7207 -> IC7010IC7207 -> R3248B	I2C Serial CLOCK line
I2CSDA	IC7207 <-> IC7008IC7207 <-> IC7010IC7207 <-> R3248A	I2C Serial DATA line
I2DA	R3248A <-> IC7270, R3247D	I2C DATA line
I2S_BCLK_AI	IC7701 -> R3814 -> IC7406	I2S4 Bit CLOCK for CODEC (ADC for CDR950) Analog Input (record from analog source)
I2S_BCLK_AO	IC7701 -> R3894A -> IC7406	I2S2 Bit CLOCK for CODEC (DAC for CDR950) Analog Output
I2S_BCLK_CD	CONN1708, C2739 -> R3834 -> IC7701	I2S3 Bit CLOCK from CD player (record n=2) (CDR775 only)
I2S_BCLK_MIC	CONN1708, C2739 -> R3834 -> IC7701	I2S3 Bit CLOCK from MICROPHONE (CDR950 only)
I2S_DATA_AI	IC7406 -> IC7701	I2S4 DATA from CODEC (ADC for CDR950) Analog Input (record from analog source)
I2S_DATA_AO	IC7701 -> R3894C -> IC7406	I2S2 DATA for CODEC (DAC for CDR950) Analog Output
I2S_DATA_CD	CONN1708, C2738 -> R3836 -> IC7701	I2S3 DATA from CD player (record n=2) (CDR775 only)
I2S_DATA_MIC	CONN1708, C2738 -> R3836 -> IC7701	I2S3 DATA from MICROPHONE (CDR950 only)
I2S_WS_AI	IC7701 -> R3743 -> IC7406	I2S4 Word CLOCK for CODEC (ADC for CDR950) Analog Input (record from analog source)
I2S_WS_AO	IC7701 -> R3894B -> IC7406	I2S2 Word CLOCK for CODEC (DAC for CDR950) Analog Output
I2S_WS_CD	CONN1708, C2740 -> R3833 -> IC7701	I2S3 Word CLOCK from CD player (record n=2) (CDR775 only)
I2S_WS_MIC	CONN1708, C2740 -> R3833 -> IC7701	I2S3 Word CLOCK from MICROPHONE (CDR950 only)
I2S1_MS	IC7270 -> R3910, IC7701	I2S1 Master-Slave interrupt from MACE2
IE	T7121 -> CONN1000	laser Erase drive current signal

INT_COPY_AN A	IC7701 -> R3721 -> IC7401IC7701 -> R3721 -> R3410	select INTernal COPY ANAlog (in case of copy protected disc or track on CD drive) (CDR775 only)
IR	T7135 -> CONN1000T7135 -> R3056T7135 -> IC7008	laser Read drive current signal
IW	T7122 -> CONN1000T7122 -> D6003	laser Write drive current signal
KEY_PRESSE D	IC7706B -> R3816 -> IC7701	KEY PRESSED interrupt
KILL	T7560, T7561, R3560 -> CONN1400, R3424, R3428	KILL signal from power supply part to audio outputs
KILL_OUT	IC7701 -> R3532	disables the KILL activity from the PSU; 1 = no kill,0 = kill active
L12V	supply voltage	+12V supply voltage for servo/Laser part
L3_CLK	IC7701 -> R3725 -> IC7406	L3 interface CLocK line / control CODEC (not for CDR950)
L3_DATA	IC7701 <-> R3728 <-> IC7406	L3 interface DATA line with CODEC (not for CDR950)
L3_MODE	IC7701 -> R3735 -> IC7406	L3 interface MODE line selects data or address transfer mode for CODEC (not for CDR950)
L5V	supply voltage	+5V supply voltage for servo/Laser part
L-5V	supply voltage	-5V supply voltage for servo/Laser part
LASCK	IC7270 <-> R3248D	ClocK line DAC LASer control
LASDACCK	R3248D <-> IC7016	ClocK line DAC LASer control
LASDACDI	R3248C <-> IC7016	Data line DAC LASer control
LASDACLD	R3212 <-> IC7016	LoaD line DAC LASer control
LASDD	IC7270 <-> R3248C	Data line DAC LASer control
LASLD	IC7270 <-> R3238 <-> R3212IC7270 <-> R3232	LoaD line DAC LASer control
LEFT	CONN1708, C2743 -> IC7401C, IC7407C	audio output LEFT channel from CD-player in CDR775
LLP	IC7270 -> IC7300	Laser Low Power (active high), switches the laser from write to read power whenever the device tends to go offtrack
LWRT	R3048 -> IC7008	Laser WRITe control input
MA(16:17)	IC7270 <-> IC7208	bank switch higher address lines
MA(8:15)	IC7270 <-> IC7802 <-> IC7208	address bus high byte
MACE2		Mini All Cd Engine (minus decoder + OPC + PCS + extra RAM)
MAD(0:7)	IC7270 <-> IC7209 <-> IC7802 <-> IC7208 <-> IC7300	bi-directional data bus / address bus low byte
MIRN	IC7010 -> IC7270	MIRror Normalized (disc reflection) current output
MOTO1	IC7300 -> IC7355A	turn table MOTOr control output
MRDN	IC7270 -> R3276 -> R3242A, IC7802, IC7300	Master ReaD, read strobe for external peripherals, active low
MUTE	IC7270 -> R3718, R3723IC7270 -> IC7701	MUTE control from MACE2 to DASP, active low
MWRN	IC7270 -> R3280 -> R3242B, IC7802, IC7300	Master WRite, write strobe for external peripherals, active low
NMUTE	IC7701 -> R3726, IC7406	MUTE output, low active
OFFTRACK	IC7270 -> IC7300	OFFTRACK detection flag
OPC		Optimum Power Calibration
P12VKILL	supply voltage	+12V supply voltage for KILL-circuit
PCS		Position Control Sledge
PCSCOS	IC7225B, C2229 -> IC7270, CONN1812	Position Control Sledge COS feedback signal
PCSSIN	IC7225A, C2227 -> IC7270, CONN1812	Position Control Sledge SIN feedback signal
PDAR		Photo Diode Amplifier Recordable
PERASE	R3036, R3031, R3030, R3029, R3028, R3027, R3020 -> IC7002C, R3043, T7113	laser Power switch for ERASE
POWER_UP	IC7270 -> R3243C,R3556, R3538	standby pin, high level activates essential powers necessary for full function; overrules HI_POWER setting
PPN	IC7010 -> IC7050C	Push-Pull signal, Normalized, balanced, voltage output

PRCOARSE	IC7016 -> R3057	drive signal from Power Read COARSE DAC for read current source
PRFINE	IC7016 -> R3058	drive signal from Power Read FINE DAC for read current source
PROF_EBU	IC7701 -> CONN1820	PROFessional digital output (CDR950 only)
PSEn	IC7270 -> R3260 -> IC7208IC7270 -> R3231	Program Store ENable; external ROM output enable line, active low
PW	R3081 -> IC7008	Write Power signal to OPC input of MACE2
PWB	IC7001C -> IC7016	drive signal to XDAC<->s for write and erase current sources and VCAGAIN
PWD	IC7016 -> IC7002BIC7016 -> IC7002C	drive signal from XDAC for write and erase current sources
PWMAX	IC7016 -> R3073	PW MAXimum signal from DAC used for determining set point for laser power during writing
PWMIN	IC7016 -> R3072	PW MINimum signal from DAC used for determining set point for laser power during writing
PWRITE	R3035, R3026, R3025, R3024, R3023, R3022, R3021 -> IC7002B, R3044, T7124	laser Power switch for WRITE
RAD-	IC7240 -> CONN1000	Radial actuator drive signal negative connection
RAD+	IC7240 -> CONN1000	Radial actuator drive signal positive connection
RAS0	IC7701 -> IC7702	Row Address Strobe DRAM
RCK	IC7300 -> R3319 -> IC7701	EIAJ subcode clock from CDR60 to DASP (CD text interface)
RDGAIN1	IC7008 -> R3054	forward sense ReaD GAIN switch 1
RDGAIN2	IC7008 -> C2027	forward sense ReaD GAIN switch 2
RDGAIN3	IC7008 -> C2060	forward sense ReaD GAIN switch 3
RE	IC7010 -> IC7215A	Radial Error signal for fast track counting, voltage output
RECORDING	IC7008 -> IC7010IC7008 -> CONN1000IC7008 -> IC7355C	RECORDING output (active high)
REN	IC7010 -> IC7270	Radial Error Normalized current output
RIGHT	CONN1708, C2742 -> IC7401A, IC7407A	audio output RIGHT channel from CD-player in CDR775
RXD_TOOL	CONN1818 -> IC7701	Receive of UART for test TOOL
S1V65	Referenve Voltage	1.65V delivered by IC7215B for Servo part
S2V9	Reference Voltage	2.9V delivered by IC7010 for Servo part
SEL_HP_OUT	IC7701 -> R3720 -> IC7407	SElect HeadPhone OUTput in DJ-mode (for CDR775 only)
SFSY	IC7701 -> R3756 -> IC7300	EIAJ subcode synchronisation from DASP to CDR60 (CD text interface)
SIN-	CONN1220 -> IC7225A	Hall feedback signal from sledge motor
SIN+	CONN1220 -> IC7225A	Hall feedback signal from sledge motor
SL-	IC7240 -> R3265 -> CONN1220	SLedge motor drive signal negative connection
SL+	IC7240 -> CONN1220	SLedge motor drive signal positive connection
SRSTN	IC7270 -> R3243B, IC7300	Slave ReSeT out (CDR60 reset), active low
STANDBY	IC7270 -> R3807 -> R3887 -> IC7701	STANDBY pin, high level activates essential powers necessary for full function; overrules HI_POWER setting
SUB	IC7701 -> R3710 -> IC7300	EIAJ subcode data from DASP to CDR60 (CD text interface)
SYS_CLK_11W	IC7701 -> R3732 -> IC7406	11.2896 MHz SYStem CLock for AD/DA datapath
SYS_CLK_16W	IC7701 -> R3894D-> IC7706A	16.9344 MHz SYStem CLock for producing SYS_CLK_BE
SYS_CLK_8W	IC7706A -> R3815 -> CONN1708	SYStem CLock CD player (8.4672 MHz) (CDR775 only)
SYS_CLK_BE	IC7706A -> R3826 -> IC7270	SYStem CLock Basic Engine (8.4672 MHz)
SYS_RESET	IC7701 -> R3758 -> CONNF934IC7701 -> R3770 -> T7707 -> CONN1708	SYStem RESET to display assy (and CD player for CDR775)
TCK	CONN1819 -> R3906, IC7701	JTAG ClOCK signal
TDSO	IC7701 -> CONN1819	JTAG Serial Data Out / debug data out
TERMB	IC7270 -> CONN1818	UART connection with MACE
TLN	IC7010 -> IC7270	Track Loss Normalized current output
TR-	IC7240 -> CONN1200	TRay motor drive signal negative connection
TR+	IC7240 -> CONN1200	TRay motor drive signal positive connection

TRACE99_RXD	CONN1818 -> R3838, IC7701	TRACE99 test tool receive data
TRACE99_TXD	IC7701 -> CONN1818	TRACE99 test tool transmit data
TRAYIN	IC7270 -> IC7240	move TRAY IN line, active low
TRAYOUT	IC7270 -> IC7240	move TRAY OUT line, active low

TRAYSW	CONN1200 -> R3747CONN1200 -> R3748	TRAY SWitch signal from loader assy
TRAYSWF	R3748, C2214 -> IC7270	Filtered TRAY SWitch signal, low is completely out or in
TXD_TOOL	IC7701 -> CONN1818	Transmit of UART for test TOOL
U+, U-, V+, V-, W+, W-	CONN1330 -> IC7330	hall feedback signals from turn table motor to hall motor driver
UCOIL, VCOIL, WCOIL	IC7330 -> CONN1330	drive signals for turn table motor
VCAGAIN	IC7016 -> IC7005A	set-point laser power on disc, voltage output
VDC1	CONN1500 -> CONNF934	supply voltage for display assy
VDC2	CONN1500 -> CONNF934	supply voltage for display assy
VFO	IC7270 -> R3295 -> R3244	FOcus actuator drive output
VFTD	CONN1500 -> CONNF934	Voltage Fluorescent Tube Display (display assy)
VRA	IC7270 -> R3297 -> R3254	RAdial actuator drive output
VSL	IC7270 -> R3299 -> IC7240	SLedge actuator drive output
WCLK	IC7701 -> R3898B -> IC7300	I2S1 WordCLOCK from DASP to CDR60 (playback and record)
WOBBLE	IC7050C -> IC7300	analog WOBBLE signal of pre-groove detected by PPN-signal
WPON	IC7008 -> R3009IC7008 -> C2009	Write Power ON
WPONO	IC7008 -> R3106	Write Power ON Open drain output
WPONRC	R3003 -> CONN1000	Write Power ON (after RC circuit)
XDAC		multiplying DAC

9. ELECTRICAL PARTS LIST

ASSIGNMENT OF COMMON PARTS CODES.

RESISTORS

R*** : 1) GD05 x x x 140, Carbon film fixed resistor, ±5% 1/4W
 R*** : 2) GD05 x x x 160, Carbon film fixed resistor, ±5% 1/6W
 → ① Resistance value

Examples

① Resistance value
 0.1Ω 001 10 Ω 100 1kΩ 102 100kΩ 104
 0.5Ω 005 18 Ω 180 2.7kΩ 272 680kΩ 684
 1 Ω 010 100Ω 101 10kΩ 103 1MΩ 105
 6.8Ω 068 390Ω 391 22kΩ 223 4.7MΩ 475

Note : Please distinguish 1/4W from 1/6W by the shape of parts used actually.

CAPACITORS

C*** : CERAMIC CAP.

3) DD1 x x x x 370, Ceramic capacitor
 Disc type
 Temp.coeff. P350~N1000, 50V
 → ③ Capacity value
 → ② Tolerance

Examples

② Tolerance (Capacity deviation)
 ±0.25 pF 0
 ±0.5 pF 1
 ±5 % 5
 Tolerance of COMMON PARTS handled here are as follows :
 0.5 pF - 5 pF ± 0.25 pF
 6 pF - 10 pF ± 0.5 pF
 12 pF - 560 pF ... ± 5 %

③ Capacity value
 0.5 pF 005 3 pF 030 100 pF 101
 1 pF 010 10 pF 100 220 pF 221
 1.5 pF 015 47 pF 470 560 pF 561

C*** : CERAMIC CAP.

4) DK16 x x x x 300, High dielectric constant ceramic capacitor
 Disc type
 Temp.chara. 2B4, 50V
 → ④ Capacity value

Examples

④ Capacity value
 100 pF 101 1000 pF 102 10000 pF 103
 470 pF 471 2200 pF 222

C*** : 5) ELECTROLY CAP. (), 6) FILM CAP ()

5) EA x x x x x x 10, Electrolytic capacitor
 One-way lead type, Tolerance ±20%
 → ⑥ Working voltage
 → ⑤ Capacity value

Examples

⑤ Capacity value
 0.1 μF 104 4.7 μF 475 100 μF 107
 0.33 μF 334 10 μF 106 330 μF 337
 1 μF 105 22 μF 226 1100 μF 118
 2200 μF 228
 ⑥ Working voltage
 6.3 V 006 25 V 025
 10 V 010 35 V 035
 16 V 016 50 V 050

6) DF15 x x x 350 → Plastic film capacitor
 DF15 x x x 310 → One-way type, Mylar ±5% 50V
 DF16 x x x 310 → Plastic film capacitor
 One-way type, Mylar ±10% 50V
 → ⑦ Capacity value

Examples

⑦ Capacity value
 0.001 μF (1000 pF) 102 0.1 μF 104
 0.0018 μF 182 0.56 μF 564
 0.01 μF 103 1 μF 105
 0.015 μF 153

NOTE 1) The above CODES(R***, R***, C***, C*** and C***) are omitted on the schematic diagram in some case.
 2) On the occasion, be confirmed the common parts on the parts list.
 3) Refer to "Common Parts List" for the other common parts(RI05, DD4, DK4).

NOTE ON SAFETY FOR FUSIBLE RESISTOR :

The suppliers and their type numbers of fusible resistors are as follows :

1. KOA Corporation

Part No.(MJI)	Type No.(KOA)	Description
NH05 x x x 140	RF25S x x x x Ω	J ±5% (1/4W)
NH05 x x x 120	RF50S x x x x Ω	J ±5% (1/2W)
NH85 x x x 110	RF73B2A x x x x Ω	J ±5% (1/10W)
NH95 x x x 140	RF73B2E x x x x Ω	J ±5% (1/4W)

* Resistance value Resistance value(0.1Ω - 10kΩ)

2. Matsushita Electronic Components Co., Ltd

Part No.(MJI)	Type No.(MEC)	Description
NF05 x x x 140	ERD-2FCJ x x x	(±5% 1/4W)
RF05 x x x 140		
NF02 x x x 140	ERD-2FCG x x x	(±2% 1/4W)
RF02 x x x 140		



Examples

* Resistance value
 0.1 Ω 001 10 Ω 100 1kΩ 102 100kΩ 104
 0.5Ω 005 18 Ω 180 2.7kΩ 272 680kΩ 684
 1 Ω 010 100 Ω 101 10kΩ 103 1MΩ 105
 6.8 Ω 068 390 Ω 391 22kΩ 223 4.7MΩ 475


ABBREVIATION AND MARKS

ANT. : ANTENNA	BATT. : BATTERY
CAP. : CAPACITOR	CER. : CERAMIC
CONN. : CONNECTING	DIG. : DIGITAL
HP : HEADPHONE	MIC. : MICROPHONE
μ-PRO : MICROPROCESSOR	REC. : RECORDING
RES. : RESISTOR	SPK : SPEAKER
SW : SWITCH	TRANSF. : TRANSFORMER
TRIM. : TRIMMING	TRS. : TRANSISTOR
VAR. : VARIABLE	X' TAL : CRYSTAL

NOTE ON SAFETY:

Symbol  Fire or electrical shock hazard. Only original parts should be used to replaced any part marked with symbol  Any other component substitution (other than original type), may increase risk of fire or electrical shock hazard.

安全上の注意 :

 がついている部品は、安全上重要な部品です。必ず指定されている部品番号の部品を使用して下さい。

POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)
			I/O CIRCUIT BOARD						
			MISCELLANEOUS						
1000		2422 025 16289	CON PRINTED 14P	QU02516289	1114		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
1001		4822 267 31448	CON ELECT OTHERS	QP26731448	1115		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
1002		4822 265 11151	CON ELECT OTHERS	QP26511151	1116		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
			YKC21-3699		1117		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
5001		4822 157 70601	COIL 100μH (920927085A)	QP15770601	1118		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
5002		4822 157 71206	COIL BLM21A601SPT	QP15771206	1120		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
6000		4822 218 11487	CON GP1F32R	QP21811487	1125		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
					1126		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
					1127		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
					1128		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114
					1130		4822 276 13441	SWITCH, PUSH BUTTON	QP27613441
					1131		4822 276 13441	SWITCH, PUSH BUTTON	QP27613441
2016		4822 126 14585	CER. 100nF 10% 50V	QP12614585	1301		4822 276 14007	SWI PUSH 2P 0.1A 12V	QP27614007
2017		5322 122 32654	CER. 22nF 63V	QQ12232654	1401		4822 267 31453	CON CABLE/WIRE	QP26731453
2019		4822 124 40248	ELECT 10μF 20% 63V	QP12440248	1500		4822 267 31729	CON ELECT OTHERS	QP26731729
2020		5322 122 32654	CER. 22nF 63V	QQ12232654	1501		4822 265 11406	CON BM CINCH V 2P F	QP26511406
2021		4822 126 12105	CER. 33nF 50V	QP12612105				WHRD B	
2022		4822 126 12105	CER. 33nF 50V	QP12612105	1502		4822 265 30987	BMT 7SR>CBL0,3-1,25	QP26530987
2023		5322 122 32654	CER. 22nF 63V	QQ12232654	5100		4822 157 71206	COIL BLM21A601SPT	QP15771206
2024		5322 122 32654	CER. 22nF 63V	QQ12232654	5500		4822 157 70601	COIL 100μH (920927085A)	QP15770601
2025		5322 122 33538	CER. 150pF 2% 63V	QQ12233538					
2026		5322 122 32531	CER. 100pF 5% 50V	QQ12232531					
2027		5322 122 32531	CER. 100pF 5% 50V	QQ12232531					
2028		5322 122 32659	CER. 33pF 5% 50V	QQ12232659	2100		4822 126 14585	CER. 100nF 10% 50V	QP12614585
2029		5322 122 32659	CER. 33pF 5% 50V	QQ12232659	2101		4822 126 13838	CER. 100nF 50V	QP12613838
2030		5322 122 32659	CER. 33pF 5% 50V	QQ12232659	2102		5322 122 32654	CER. 22nF 63V	QQ12232654
					2104		5322 122 32658	CER. 22pF 5% 50V	QQ12232658
					2106		5322 122 32658	CER. 22pF 5% 50V	QQ12232658
2018		4822 117 11139	1k5 1% 0.1W	QP11711139	2111		4822 126 14585	CER. 100nF 10% 50V	QP12614585
3020		4822 117 12521	68R 1% 0.1W	QP11712521	2400		5322 122 31647	CER. 1nF 10% 63V	QQ12231647
3021		4822 051 20332	3k30 5% 0.1W	QP05120332	2401		5322 122 31647	CER. 1nF 10% 63V	QQ12231647
3024		4822 051 20332	3k30 5% 0.1W	QP05120332	2500		4822 124 11947	ELECT 10μF 20% 16V	QP12411947
3026		4822 051 20332	3k30 5% 0.1W	QP05120332	2501		4822 126 12105	CER. 33nF 50V	QP12612105
3027		4822 051 20332	3k30 5% 0.1W	QP05120332	2502		4822 126 12105	CER. 33nF 50V	QP12612105
3028		4822 117 11152	4R7 5%	QP11711152	2503		4822 122 33575	CER. 220pF 5% 63V	QP12233575
3029		4822 117 11927	75R 1% 0.1W	QP11711927	2504		4822 122 33575	CER. 220pF 5% 63V	QP12233575
3032		4822 117 11373	100R 1% RC12H 0805	QP11711373					
3033		4822 117 11373	100R 1% RC12H 0805	QP11711373					
3034		4822 117 11449	2k2 5% 0.1W 0805	QP11711449	3100		4822 051 20472	4k70 5% 0.1W	QP05120472
3035		4822 117 11449	2k2 5% 0.1W 0805	QP11711449	3101		4822 051 20472	4k70 5% 0.1W	QP05120472
3036		4822 117 11373	100R 1% RC12H 0805	QP11711373	3102		4822 051 20472	4k70 5% 0.1W	QP05120472
3037		4822 117 11373	100R 1% RC12H 0805	QP11711373	3103		4822 051 20472	4k70 5% 0.1W	QP05120472
3038		4822 117 11449	2k2 5% 0.1W 0805	QP11711449	3104		4822 051 20472	4k70 5% 0.1W	QP05120472
3039		4822 117 11449	2k2 5% 0.1W 0805	QP11711449	3105		4822 051 20472	4k70 5% 0.1W	QP05120472
					3106		4822 117 11149	82k 1% 0.1W	QP11711149
					3107		4822 051 20472	4k70 5% 0.1W	QP05120472
7005		5322 209 11517	IC PC74HCU04T	QQ20911517	3108		4822 117 11373	100R 1% RC12H 0805	QP11711373
7006		4822 130 42615	TRS. BC817-40	QP13042615	3109		4822 117 11503	220R 1% 0.1W	QP11711503
7007		4822 130 42615	TRS. BC817-40	QP13042615	3111		4822 117 11373	100R 1% RC12H 0805	QP11711373
7008		4822 130 42615	TRS. BC817-40	QP13042615	3112		4822 051 20393	39k00 5% 0.1W	QP05120393
7009		4822 130 42615	TRS. BC817-40	QP13042615	3113		4822 117 10833	10k 1% 0.1W	QP11710833
					3114		4822 117 10833	10k 1% 0.1W	QP11710833
					3115		4822 051 20561	560R00 5% 0.1W	QP05120561
					3116		4822 051 20561	560R00 5% 0.1W	QP05120561
0003		4822 256 10506	FTD HOLDER	QP25610506	3122		4822 117 11149	82k 1% 0.1W	QP11711149
1050		2422 129 16314	ROT.ENCODER + SWITCH	QU12916314	3124		4822 117 11149	82k 1% 0.1W	QP11711149
1101		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	3125		4822 051 20332	3k30 5% 0.1W	QP05120332
1102		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	3500		4822 117 12521	68R 1% 0.1W	QP11712521
1103		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	3501		4822 117 11448	180R 1% 0.1W	QP11711448
1104		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	3502		4822 117 11449	2k2 5% 0.1W 0805	QP11711449
1105		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	3503		4822 117 11448	180R 1% 0.1W	QP11711448
1106		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	3504		4822 117 11449	2k2 5% 0.1W 0805	QP11711449
1107		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114					
1108		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	4001		4822 051 10008	0R00 5% 0.25W	QP05110008
1109		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	4002		4822 051 10008	0R00 5% 0.25W	QP05110008
1110		2422 540 98423	RES CER 8MHz CSTS*MG03	QU54098423	4003		4822 051 10008	0R00 5% 0.25W	QP05110008
1111		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	4004		4822 051 10008	0R00 5% 0.25W	QP05110008
1112		4822 276 13114	SWITCH, PUSH BUTTON	QP27613114	4005		4822 051 10008	0R00 5% 0.25W	QP05110008
1113		2722 171 07174	VFD 15-BT-60GNK 106*40 (FTB0)B		4006		4822 051 10008	0R00 5% 0.25W	QP05110008
					4007		4822 051 10008	0R00 5% 0.25W	QP05110008

POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)
4010		4822 051 10008	0R00 5% 0.25W	QP05110008				CAPACITORS	
4011		4822 051 10008	0R00 5% 0.25W	QP05110008	2100		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4012		4822 051 10008	0R00 5% 0.25W	QP05110008	2102		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4013		4822 051 10008	0R00 5% 0.25W	QP05110008	2103		5322 122 31647	CER. 1nF 10% 63V	QQ12231647
4015		4822 051 10008	0R00 5% 0.25W	QP05110008	2104		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4016		4822 051 10008	0R00 5% 0.25W	QP05110008	2105		4822 124 81286	ELECT 47µF 20% 16V	QP12481286
4017		4822 051 10008	0R00 5% 0.25W	QP05110008	2106		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4019		4822 051 10008	0R00 5% 0.25W	QP05110008	2107		4822 124 81286	ELECT 47µF 20% 16V	QP12481286
4020		4822 051 10008	0R00 5% 0.25W	QP05110008	2109		5322 122 32654	CER. 22nF 63V	QQ12232654
4033		4822 051 10008	0R00 5% 0.25W	QP05110008	2110		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4034		4822 051 10008	0R00 5% 0.25W	QP05110008	2111		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4039		4822 051 10008	0R00 5% 0.25W	QP05110008	2112		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4040		4822 051 10008	0R00 5% 0.25W	QP05110008	2113		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4041		4822 051 10008	0R00 5% 0.25W	QP05110008	2114		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4042		4822 051 10008	0R00 5% 0.25W	QP05110008	2115		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4044		4822 051 10008	0R00 5% 0.25W	QP05110008	2116		4822 124 41796	ELECT 22µF 20% 16V	QP12441796
4045		4822 051 10008	0R00 5% 0.25W	QP05110008	2117		4822 126 13561	CER. 220nF 10% 16V	QP12613561
4046		4822 051 10008	0R00 5% 0.25W	QP05110008	2118		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4052		4822 051 10008	0R00 5% 0.25W	QP05110008	2119		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4054		4822 051 10008	0R00 5% 0.25W	QP05110008	2120		4822 124 41796	ELECT 22µF 20% 16V	QP12441796
4061		4822 051 10008	0R00 5% 0.25W	QP05110008	2121		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4062		4822 051 10008	0R00 5% 0.25W	QP05110008	2122		4822 126 12104	CER. 12nF 5% 50V	QP12612104
4066		4822 051 10008	0R00 5% 0.25W	QP05110008	2123		5322 122 31863	CER. 330pF 63V	QQ12231863
4068		4822 051 10008	0R00 5% 0.25W	QP05110008	2124		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4069		4822 051 10008	0R00 5% 0.25W	QP05110008	2125		4822 124 81286	ELECT 47µF 20% 16V	QP12481286
4075		4822 051 10008	0R00 5% 0.25W	QP05110008	2126		5322 122 34098	CER. 10nF 10% 63V	QQ12234098
4077		4822 051 10008	0R00 5% 0.25W	QP05110008	2127		5322 122 31863	CER. 330pF 63V	QQ12231863
4080		4822 051 10008	0R00 5% 0.25W	QP05110008	2128		4822 124 80483	ELECT 47µF 20% 6.3V	QP12480483
4082		4822 051 10008	0R00 5% 0.25W	QP05110008	2130		4822 126 14305	CER. 100nF 10% 16V	QP12614305
4083		4822 051 10008	0R00 5% 0.25W	QP05110008	2131		4822 126 14585	CER. 100nF 10% 50V	QP12614585
4084		4822 051 10008	0R00 5% 0.25W	QP05110008	2132		4822 124 80483	ELECT 47µF 20% 6.3V	QP12480483
4085		4822 051 10008	0R00 5% 0.25W	QP05110008	2133		4822 126 13482	CER. 470nF +80-20% 16V	QP12613482
4087		4822 051 10008	0R00 5% 0.25W	QP05110008	2134		4822 126 14305	CER. 100nF 10% 16V	QP12614305
4089		4822 051 10008	0R00 5% 0.25W	QP05110008	2135		4822 124 41796	ELECT 22µF 20% 16V	QP12441796
4090		4822 051 10008	0R00 5% 0.25W	QP05110008	2137		4822 126 14494	CER. 22nF 10% 25V	QP12614494
4091		4822 051 10008	0R00 5% 0.25W	QP05110008	2138		4822 126 14494	CER. 22nF 10% 25V	QP12614494
4092		4822 051 10008	0R00 5% 0.25W	QP05110008	2139		4822 126 14305	CER. 100nF 10% 16V	QP12614305
4095		4822 051 10008	0R00 5% 0.25W	QP05110008	2140		4822 126 14508	CER. 180pF 5% 50V	QP12614508
					2141		4822 126 14238	CER. 2n2 50V	QP12614238
					2142		5322 122 32654	CER. 22nF 63V	QQ12232654
6100		9340 548 47115	DIODE PDZ3.3B		2143		4822 126 14241	CER. 330pF 50V	QP12614241
6200		4822 212 30842	REMOTE RECEIVER TSOP1736SB1	QP21230842	2145		4822 126 13692	CER. 47pF 1% 63V	QP12613692
6300		4822 130 82978	LED LTL-16KPE-P	QP13082978	2146		4822 126 14247	CER. 1n5 50V	QP12614247
7100		5322 130 60159	TRS. BC846B	QQ13060159	2147		4822 126 13482	CER. 470nF +80-20% 16V	QP12613482
7104		3104 123 94761	IC ROM TMP87CH74	QW12394761	2148		4822 124 22726	ELECT 4.7µF 35V	QP12422726
7203		5322 130 60159	TRS. BC846B	QQ13060159	2149		3198 016 36810	CER. 680pF 25V	QG01636810
7204		5322 130 60159	TRS. BC846B	QQ13060159	2150		4822 126 12105	CER. 33nF 50V	QP12612105
7500		5322 130 60159	TRS. BC846B	QQ13060159	2151		5322 124 11919	TANTAL 47µF 20% 6.3V	QQ12411919
7501		5322 130 60159	TRS. BC846B	QQ13060159	2152		4822 126 14305	CER. 100nF 10% 16V	QP12614305
			SEMICONDUCTORS		2153		4822 122 33777	CER. 47pF 5% 63V	QP12233777
			CD MAIN CIRCUIT BOARD		2154		4822 124 81286	ELECT 47µF 20% 16V	QP12481286
			MISCELLANEOUS		2155		4822 126 14585	CER. 100nF 10% 50V	QP12614585
1000		2422 025 11704	CON BM H 16P F 1.00 FFC 0.3 R	QU02511704	2156		5322 124 11919	TANTAL 47µF 20% 6.3V	QQ12411919
1004		2422 543 00896	RES XTL SM 8M4672 30P CX-5F R	QU54300896	2157		4822 126 14305	CER. 100nF 10% 16V	QP12614305
1006		4822 267 51454	CONN. 11P FEMALE	QP26751454	2158		4822 122 33777	CER. 47pF 5% 63V	QP12233777
1205		5322 242 73686	FILTER CER. CST12.00MTW-TF01	QQ24273686	2159		3198 017 34730	CER. 47nF 16V	QG01734730
1206		4822 252 51173	FUSE 19398E1(1.000A)	QP25251173	2160		4822 126 14494	CER. 22nF 10% 25V	QP12614494
1207		4822 252 51173	FUSE 19398E1(1.000A)	QP25251173	2161		5322 124 11919	TANTAL 47µF 20% 6.3V	QQ12411919
1208		4822 267 60409	CON 22P FEMALE	QP26760409	2162		4822 122 31765	CER. 100pF 2% 63V	QP12231765
1209		4822 265 30987	BMT 7SR>CBL0 3-1 25	QP26530987	2163		4822 126 14549	CER. 33nF 16V	QP12614549
1210		2422 025 11704	CON BM H 16P F 1.00 FFC 0.3 R	QU02511704	2164		4822 126 14508	CER. 180pF 5% 50V	QP12614508
					2165		4822 122 33777	CER. 47pF 5% 63V	QP12233777
					2166		3198 017 34730	CER. 47nF 16V	QG01734730
					2167		4822 126 14585	CER. 100nF 10% 50V	QP12614585
					2168		4822 126 13883	CER. 220pF 5% 50V	QP12613883
					2169		5322 126 10794	CER. 220pF 5% 63V	QQ12610794
					2170		5322 126 10794	CER. 220pF 5% 63V	QQ12610794
					2171		5322 126 10794	CER. 220pF 5% 63V	QQ12610794

POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)
2172		5322 126 10794	CER. 220pF 5% 63V	QQ12610794	3130		4822 117 10833	10k 1% 0.1W	QP11710833
2173		5322 126 10794	CER. 220pF 5% 63V	QQ12610794	3131		4822 117 11151	1R 5%	QP11711151
2174		4822 126 14494	CER. 22nF 10% 25V	QP12614494	3132		4822 051 20223	22k00 5% 0.1W	QP05120223
2175		4822 124 81286	ELECT 47μF 20% 16V	QP12481286	3134		4822 051 20108	1R00 5% 0.1W	QP05120108
2176		4822 122 33777	CER. 47pF 5% NP0 63V	QP12233777	3135		4822 051 20108	1R00 5% 0.1W	QP05120108
2178		4822 126 14585	CER. 100nF 10% 50V	QP12614585	3136		4822 051 20122	1k20 5% 0.1W	QP05120122
2180		4822 124 41796	ELECT 22μF 20% 16V	QP12441796	3137		4822 117 11504	270R 1% 0.1W	QP11711504
2181		4822 124 41796	ELECT 22μF 20% 16V	QP12441796	3138		4822 117 11504	270R 1% 0.1W	QP11711504
2184		4822 126 14225	CER. 56pF 5% 50V	QP12614225	3139		4822 117 10833	10k 1% 0.1W	QP11710833
2185		4822 126 14225	CER. 56pF 5% 50V	QP12614225	3142		4822 117 11504	270R 1% 0.1W	QP11711504
2186		4822 124 81286	ELECT 47μF 20% 16V	QP12481286	3143		4822 117 10834	47k 1% 0.1W	QP11710834
2187		4822 126 14585	CER. 100nF 10% 50V	QP12614585	3144		4822 117 10834	47k 1% 0.1W	QP11710834
2188		4822 126 14305	CER. 100nF 10% 16V	QP12614305	3145		4822 117 11504	270R 1% 0.1W	QP11711504
2189		4822 126 14585	CER. 100nF 10% 50V	QP12614585	3146		4822 117 10837	100k 1% 0.1W	QP11710837
2191		4822 124 81286	ELECT 47μF 20% 16V	QP12481286	3149		4822 051 10102	1k00 2% 0.25W	QP05110102
2197		4822 124 81286	ELECT 47μF 20% 16V	QP12481286	3150		4822 117 11383	12k 1% 0.1W	QP11711383
2199		4822 126 13692	CER. 47pF 1% 63V	QP12613692	3151		4822 117 11383	12k 1% 0.1W	QP11711383
2200		4822 126 14249	CER. 560pF 10% 50V	QP12614249	3153		4822 051 30101	100R00 5% 0.062W	QP05130101
2201		4822 126 14247	CER. 1n5 50V	QP12614247	3154		4822 117 11151	1R 5%	QP11711151
2202		5322 122 32658	CER. 22pF 5% 50V	QQ12232658	3156		4822 117 11383	12k 1% 0.1W	QP11711383
2203		4822 124 22726	ELECT 4.7μF 35V	QP12422726	3157		4822 117 11383	12k 1% 0.1W	QP11711383
2204		4822 126 14585	CER. 100nF 10% 50V	QP12614585	3158		4822 051 20122	1k20 5% 0.1W	QP05120122
2208		4822 124 81286	ELECT 47μF 20% 16V	QP12481286	3160		4822 117 10833	10k 1% 0.1W	QP11710833
2211		4822 126 13692	CER. 47pF 1% 63V	QP12613692	3161		4822 117 11748	2R2 5% 1206 FUSE	QP11711748
2214		5322 122 32658	CER. 22pF 5% 50V	QQ12232658	3162		4822 117 11748	2R2 5% 1206 FUSE	QP11711748
2216		4822 126 14305	CER. 100nF 10% 16V	QP12614305	3164		4822 051 20479	47R00 5% 0.1W	QP05120479
2217		4822 122 33777	CER. 47pF 5% 63V	QP12233777	3168		4822 117 11373	100R 1% RC12H 0805	QP11711373
2220		4822 126 14585	CER. 100nF 10% 50V	QP12614585	3169		4822 051 30272	2k70 5% 0.062W	QP05130272
					3171		4822 051 30103	10k00 5% 0.062W	QP05130103
2230		5322 126 10223	CER. 4.7nF 10% 63V	QQ12610223	3172		4822 117 11373	100R 1% RC12H 0805	QP11711373
2232		4822 126 14305	CER. 100nF 10% 16V	QP12614305	3173		4822 117 11452	430R 1% 0.1W	QP11711452
2233		5322 122 31865	CER. 1n5 63V	QQ12231865	3174		4822 117 11452	430R 1% 0.1W	QP11711452
2234		4822 124 12362	ELECT 47μF 20% 4V	QP12412362	3176		4822 117 11373	100R 1% RC12H 0805	QP11711373
2235		4822 124 12362	ELECT 47μF 20% 4V	QP12412362	3177		4822 117 11151	1R 5%	QP11711151
2252		5322 122 31647	CER. 1nF 10% 63V	QQ12231647	3178		4822 051 30102	1k00 5% 0.062W	QP05130102
2280		4822 126 14585	CER. 100nF 10% 50V	QP12614585	3179		4822 051 30102	1k00 5% 0.062W	QP05130102
2285		5322 122 31865	CER. 1n5 63V	QQ12231865	3180		4822 051 30272	2k70 5% 0.062W	QP05130272
2286		5322 122 31865	CER. 1n5 63V	QQ12231865	3181		4822 051 20223	22k00 5% 0.1W	QP05120223
2300		4822 126 14305	CER. 100nF 10% 16V	QP12614305	3182		4822 051 30391	390R00 5% 0.062W	QP05130391
2301		4822 124 81286	ELECT 47μF 20% 16V	QP12481286	3183		4822 051 30103	10k00 5% 0.062W	QP05130103
2302		4822 124 11947	ELECT 10μF 20% 16V	QP12411947	3184		4822 117 11748	2R2 5% 1206 FUSE	QP11711748
2303		4822 126 14305	CER. 100nF 10% 16V	QP12614305	3185		4822 051 30472	4k70 5% 0.062W	QP05130472
2304		4822 124 40196	ELECT 220μF 20% 16V	QP12440196	3186		4822 051 30472	4k70 5% 0.062W	QP05130472
2306		2222 780 15656	CER. 330nF 16V	QL78015656	3187		4822 051 30391	390R00 5% 0.062W	QP05130391
2307		4822 124 40207	ELECT 100μF 20% 25V	QP12440207	3188		4822 051 30272	2k70 5% 0.062W	QP05130272
2320		4822 122 33777	CER. 47pF 5% 63V	QP12233777	3189		4822 051 30391	390R00 5% 0.062W	QP05130391
2321		4822 122 33777	CER. 47pF 5% 63V	QP12233777	3190		4822 117 11456	30k 1% 0.1W	QP11711456
2322		4822 122 33777	CER. 47pF 5% 63V	QP12233777	3191		4822 117 11452	430R 1% 0.1W	QP11711452
2325		4822 126 14305	CER. 100nF 10% 16V	QP12614305	3192		4822 117 11452	430R 1% 0.1W	QP11711452
2326		4822 126 14305	CER. 100nF 10% 16V	QP12614305	3193		4822 051 30181	180R00 5% 0.062W	QP05130181
2327		4822 126 14305	CER. 100nF 10% 16V	QP12614305	3196		4822 051 30102	1k00 5% 0.062W	QP05130102
					3197		4822 117 10833	10k 1% 0.1W	QP11710833
					3198		4822 051 30479	47R00 5% 0.062W	QP05130479
3342		4822 117 10833	10k 1% 0.1W	QP11710833	3199		4822 051 30152	1k50 5% 0.062W	QP05130152
3350		4822 051 10102	1k00 2% 0.25W	QP05110102	3200		4822 117 10833	10k 1% 0.1W	QP11710833
3353		4822 117 11373	100R 1% RC12H 0805	QP11711373					
3354		4822 117 11373	100R 1% RC12H 0805	QP11711373	3201		4822 117 11817	1k2 1% 1/16W	QP11711817
3355		4822 117 11373	100R 1% RC12H 0805	QP11711373	3202		4822 051 30223	22k00 5% 0.062W	QP05130223
3356		4822 117 11373	100R 1% RC12H 0805	QP11711373	3203		4822 051 30272	2k70 5% 0.062W	QP05130272
3361		4822 117 11373	100R 1% RC12H 0805	QP11711373	3205		4822 051 30103	10k00 5% 0.062W	QP05130103
3100		4822 051 20223	22k00 5% 0.1W	QP05120223	3208		4822 117 13608	47R 5% 0.0016W 0603	QP11713608
3101		4822 051 20223	22k00 5% 0.1W	QP05120223	3212		4822 051 30105	1M00 5% 0.062W	QP05130105
3102		4822 051 20479	47R00 5% 0.1W	QP05120479	3215		4822 117 11748	2R2 5% 1206 FUSE	QP11711748
3103		4822 117 10834	47k 1% 0.1W	QP11710834	3216		4822 117 11748	2R2 5% 1206 FUSE	QP11711748
3113		4822 051 10102	1k00 2% 0.25W	QP05110102	3217		4822 117 10833	10k 1% 0.1W	QP11710833
3114		4822 051 20822	8k20 5% 0.1W	QP05120822	3218		4822 051 10102	1k00 2% 0.25W	QP05110102
3115		4822 051 20472	4k70 5% 0.1W	QP05120472	3219		4822 117 13573	NETW 4 X 47R 5% MNR14	QP11713573
3116		4822 117 10834	47k 1% 0.1W	QP11710834	3220		4822 051 30103	10k00 5% 0.062W	QP05130103
3117		4822 051 20479	47R00 5% 0.1W	QP05120479	3225		4822 117 11748	2R2 5% 1206 FUSE	QP11711748

POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)
3226		4822 117 10833	10k 1% 0.1W	QP11710833
3229		4822 117 11748	2R2 5% 1206 FUSE	QP11711748
3233		4822 117 10354	22k 1% 0.1W	QP11710354
3241		4822 117 10354	22k 1% 0.1W	QP11710354
3242		4822 117 10833	10k 1% 0.1W	QP11710833
3243		4822 117 10834	47k 1% 0.1W	QP11710834
3245		4822 117 10834	47k 1% 0.1W	QP11710834
3248		4822 117 10354	22k 1% 0.1W	QP11710354
3254		4822 117 10354	22k 1% 0.1W	QP11710354
3256		4822 117 10833	10k 1% 0.1W	QP11710833
3258		4822 117 10834	47k 1% 0.1W	QP11710834
3260		4822 117 10834	47k 1% 0.1W	QP11710834
3263		4822 117 11748	2R2 5% 1206 FUSE	QP11711748
3265		4822 117 10837	100k 1% 0.1W	QP11710837
3266		4822 051 10102	1k00 2% 0.25W	QP05110102
3267		4822 051 30102	1k00 5% 0.062W	QP05130102
3268		4822 117 10837	100k 1% 0.1W	QP11710837
3269		4822 117 11373	100R 1% RC12H 0805	QP11711373
3270		4822 117 10833	10k 1% 0.1W	QP11710833
3271		4822 117 11373	100R 1% RC12H 0805	QP11711373
3273		4822 117 11373	100R 1% RC12H 0805	QP11711373
3274		4822 117 11373	100R 1% RC12H 0805	QP11711373
3275		4822 117 11373	100R 1% RC12H 0805	QP11711373
3276		4822 117 11373	100R 1% RC12H 0805	QP11711373
3277		4822 117 11373	100R 1% RC12H 0805	QP11711373
3279		4822 117 11151	1R 5%	QP11711151
3280		4822 117 10833	10k 1% 0.1W	QP11710833
3282		4822 051 30103	10k00 5% 0.062W	QP05130103
3283		4822 117 10833	10k 1% 0.1W	QP11710833
3285		4822 051 30472	4k70 5% 0.062W	QP05130472
3286		4822 051 30154	150k00 5% 0.062W	QP05130154
3287		4822 117 12925	47k 1% 0.063W 0603	QP11712925
3300		4822 051 30103	10k00 5% 0.062W	QP05130103
3302		4822 051 30103	10k00 5% 0.062W	QP05130103
3303		4822 051 30103	10k00 5% 0.062W	QP05130103
3304		4822 051 30103	10k00 5% 0.062W	QP05130103
3305		4822 051 30103	10k00 5% 0.062W	QP05130103
3306		4822 051 30103	10k00 5% 0.062W	QP05130103
3307		4822 051 30103	10k00 5% 0.062W	QP05130103
3308		4822 117 11748	2R2 5% 1206 FUSE	QP11711748
3310		4822 051 10102	1k00 2% 0.25W	QP05110102
3312		4822 051 10102	1k00 2% 0.25W	QP05110102
3313		4822 117 10833	10k 1% 0.1W	QP11710833
3314		4822 117 10833	10k 1% 0.1W	QP11710833
3318		4822 117 11373	100R 1% RC12H 0805	QP11711373
3319		4822 117 11373	100R 1% RC12H 0805	QP11711373
3320		4822 117 11373	100R 1% RC12H 0805	QP11711373
3328		4822 051 20105	1M00 5% 0.1W	QP05120105
3331		4822 117 11373	100R 1% RC12H 0805	QP11711373
3333		4822 051 30101	100R00 5% 0.062W	QP05130101
3335		4822 051 30103	10k00 5% 0.062W	QP05130103
3337		4822 051 30103	10k00 5% 0.062W	QP05130103
3339		4822 051 30103	10k00 5% 0.062W	QP05130103
SEMICONDUCTORS				
6000		4822 130 11382	DIODE BYG50D	QP13011382
6001		4822 130 11382	DIODE BYG50D	QP13011382
6002		4822 130 11382	DIODE BYG50D	QP13011382
6003		4822 130 83757	DIODE BAS216	QP13083757
7000		9352 641 80557	IC MICROPROCESSOR SAA7324H/M2B	QB64180557
7005		9337 143 50653	IC 74HCT08	
7006		5322 130 42718	TRS. BFS20	QQ13042718
7007		4822 130 60373	TRS. BC856B	QP13060373
7008		5322 130 42718	TRS. BFS20	QQ13042718
7009		5322 130 42718	TRS. BFS20	QQ13042718
7010		5322 130 60159	TRS. BC846B	QQ13060159
7011		5322 130 42718	TRS. BFS20	QQ13042718

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7019		4822 130 60373	TRS. BC856B	QP13060373
7020		4822 209 16877	IC BA6856FP	QP20916877
7021		4822 209 32852	IC TDA7073A/N2	QP20932852
7022		4822 209 32852	IC TDA7073A/N2	QP20932852
7023		5322 130 42718	TRS. BFS20	QQ13042718
7025		9337 153 10118	IC SM 74HCT4052D (PHSE) R	
7120		4822 209 30095	IC LM833D	QP20930095
7130		5322 130 60159	TRS. BC846B	QQ13060159
7131		4822 130 60373	TRS. BC856B	QP13060373
7132		5322 130 60159	TRS. BC846B	QQ13060159
7203		5322 130 60159	TRS. BC846B	QQ13060159
7204		4822 209 17398	IC LD1117DT33	QP20917398
7301		5322 130 60159	TRS. BC846B	QQ13060159
7309		4822 209 17237	IC UDA1320ATS	QP20917237
7310		5322 130 60159	TRS. BC846B	QQ13060159
POWER SUPPLY UNIT CIRCUIT BOARD MISCELLANEOUS				
5121		4822 157 53348	COIL FILTER CHOKE ASSY CU15D3	QP15753348
5125		4822 157 11411	BEAD FERRITE 100MHZ	QP15711411
5130		4822 157 51312	COIL 68μH	QP15751312
!5131		3128 138 38950	SM TRANSFORMER -CT283D3	
5210		4822 157 11722	COIL 6.8μH 20% 7.7X9.5	QP15711722
5220		4822 157 51462	COIL 10μH 10% 4X9.8MM LAL04T100K	QP15751462
5225		4822 157 53139	COIL 4.7μH	QP15753139
5226		4822 157 53139	COIL 4.7μH	QP15753139
5230		4822 157 50963	COIL 2.2μH	QP15750963
5240		4822 157 51462	COIL 10μH 10% 4X9.8MM LAL04T100K	QP15751462
5250		4822 157 51462	COIL 10μH 10% 4X9.8MM LAL04T100K	QP15751462
5255		4822 157 51195	COIL 1μH 20% 4X9.8MM AXIAL	QP15751195
0025		4822 492 63524	SPRING FIX. TRANSISTOR	QP49263524
0060		4822 492 63524	SPRING FIX. TRANSISTOR	QP49263524
▲ 0101	/F, /N	4822 265 31015	CON ELECT OTHERS	QP26531015
▲ 0101	/U	4822 265 31016	CON ELECT OTHERS	QP26531016
▲ 1120		4822 070 32002	FUSE 218002.(2A)	QP07032002
1121		4822 265 11253	FUSE HOLDER 2P	QP26511253
CAPACITORS				
2102		2238 861 15182	CER. 1n8 50V	223886115182
2104		5322 122 31647	CER. 1nF 10% 63V	QQ12231647
2106		5322 126 10223	CER. 4.7nF 10% 63V	QQ12610223
2109		5322 122 31863	CER. 330pF 63V	QQ12231863
2111	/F, /N	4822 126 14585	CER. 100nF 10% 50V	QP12614585
2111	/U	4822 126 14585	CER. 100nF 10% 50V	QP12614585
▲ 2120		4822 121 10697	FILM 220nF 20% 275V	QP12110697
2121		2020 024 90676	ELECT 100μF 400V	QV02490676
2127		4822 122 50116	CER. 470pF 10% 1KV	QP12250116
2128		4822 121 70141	FILM 33nF 5% 400V	QP12170141
2129		4822 124 40769	ELECT 4.7μF 20% 100V	QP12440769
▲ 2131		4822 126 14497	CER. 2.2nF 20% 250V	QP12614497
2133		4822 124 42084	ELECT 100μF 20% 35V	QP12442084
2134		4822 124 42084	ELECT 100μF 20% 35V	QP12442084
2141		4822 124 22652	ELECT 2.2μF 20% 50V	QP12422652
2142	/F, /N	4822 126 14585	CER. 100nF 10% 50V	QP12614585
2150	/F, /N	4822 126 14585	CER. 100nF 10% 50V	QP12614585
2161	/F, /N	4822 126 14585	CER. 100nF 10% 50V	QP12614585
2201	/F, /N	4822 126 14585	CER. 100nF 10% 50V	QP12614585
2202		5322 122 32654	CER. 22nF 63V	QQ12232654
2210		2020 012 93728	ELECT 2200μF 10V	QV01293728
2220		4822 124 40849	ELECT 330μF 20% 16V	QP12440849
2221		4822 126 13751	CER. 47nF 10% 63V	QP12613751
2222		4822 124 42234	ELECT 100μF 20% 6.3V	QP12442234
2230		4822 124 81144	ELECT 1000μF 16V	QP12481144

POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)	POS. NO	VERS. COLOR	PART NO. (PCS)	DESCRIPTION	PART NO. (MJI)
2234		4822 124 81151	ELECT 22 μ F 50V	QP12481151	6210		4822 130 83865	DIODE SB360	QP13083865
2240		4822 124 40196	ELECT 220 μ F 20% 16V	QP12440196	6220		4822 130 42488	DIODE BYD33D	QP13042488
2242		4822 124 41584	ELECT 100 μ F 20% 10V	QP12441584	6230		4822 130 11584	DIODE BYW98-200-C1	QP13011584
2250		4822 124 40255	ELECT 100 μ F 20% 63V	QP12440255	6240		4822 130 42488	DIODE BYD33D	QP13042488
2252		4822 124 40248	ELECT 10 μ F 20% 63V	QP12440248	6250		4822 130 42606	DIODE BYD33J	QP13042606
2260		4822 122 33177	CER. 10nF 20% 50V	QP12233177					
			RESISTORS						
3102		4822 117 10354	22k 1% 0.1W	QP11710354	7110		9322 145 88682	IC UC3842A	QA14588682
3103		4822 051 20339	33R00 5% 0.1W	QP05120339	7125		4822 130 11417	TRS. STP3NB60FP	QP13011417
3104		4822 116 83933	15k 1% 0.1W	QP11683933	▲ 7131		4822 130 91451	OPTO/PHOTO CQY80NG	QP13091451
3105		4822 116 83933	15k 1% 0.1W	QP11683933	7141		4822 130 60373	TRS. BC856B	QP13060373
3106		4822 051 10102	1k00 2% 0.25W	QP05110102	7150		5322 130 60159	TRS. BC846B	QQ13060159
3109		4822 051 10102	1k00 2% 0.25W	QP05110102	7201		4822 209 81397	IC TL431CLPST	QP20981397
3110		4822 050 21003	10k00 1% 0.6W	QP05021003	7249		4822 209 82112	IC MC7908CT	QP20982112
3111		4822 116 52199	68E 5% 0.5W	QP11652199	7251		4822 130 41344	TRS. BC337-40	QP13041344
3112		4822 053 11229	22R00 5% 2W	QP05311229	7252		4822 130 60373	TRS. BC856B	QP13060373
3113		4822 117 11504	270R 1% 0.1W	QP11711504	7253		4822 130 41246	TRS. BC327-25	QP13041246
▲ 3117		4822 053 21684	680k00 5% 0.5W	QP05321684	7254		5322 130 60159	TRS. BC846B	QQ13060159
3119		2322 595 90023	VDR DC 1MA/423V S MAX 800V B	QH59590023	7260		8222 675 06290	IC VOLT.REG.BA12T	
3122		2322 329 90248	2R7 WW 3W AC03 S PM5 B	QH32990248					
3123		4822 050 21803	18k00 1% 0.6W	QP05021803					
3124		4822 117 12181	470R 20% 0.5W	QP11712181					
3125		4822 117 10833	10k 1% 0.1W	QP11710833					
3126		4822 116 80176	1E 5% 0.5W	QP11680176					
3127		4822 116 80676	1R5 5% 0.5W	QP11680676					
3128		4822 116 80676	1R5 5% 0.5W	QP11680676					
3129		4822 117 10833	10k 1% 0.1W	QP11710833					
3134		4822 050 21803	18k00 1% 0.6W	QP05021803					
3141		4822 117 10833	10k 1% 0.1W	QP11710833					
3142		4822 051 20109	10R00 5% 0.1W	QP05120109					
3150		4822 117 11139	1k5 1% 0.1W	QP11711139					
3151		4822 117 11148	56k 1% 0.1W	QP11711148					
3201		4822 116 52176	10E 5% 0.5W	QP11652176					
3202		4822 050 13302	3k30 1% 0.4W	QP05013302					
3203		4822 116 52175	100E 5% 0.5W	QP11652175					
3204		4822 117 10833	10k 1% 0.1W	QP11710833					
3205		4822 117 11503	220R 1% 0.1W	QP11711503					
3206		4822 051 20332	3k30 5% 0.1W	QP05120332					
3207		4822 051 10102	1k00 2% 0.25W	QP05110102					
3208		4822 116 83883	470R 5% 0.5W	QP11683883					
3221		4822 051 20122	1k20 5% 0.1W	QP05120122					
3222		4822 051 20122	1k20 5% 0.1W	QP05120122					
3223		4822 117 11596	390R 1% 0.1W	QP11711596					
3224		4822 116 52199	68E 5% 0.5W	QP11652199					
3225		4822 116 52199	68E 5% 0.5W	QP11652199					
3229		4822 117 13085	5k6 1% 0.1W RC12H	QP11713085					
3230		4822 050 21002	1k00 1% 0.6W	QP05021002					
3232		4822 117 11383	12k 1% 0.1W	QP11711383					
3233		4822 051 20471	470R00 5% 0.1W	QP05120471					
3234		4822 051 20332	3k30 5% 0.1W	QP05120332					
3235		4822 116 52269	3k3 5% 0.5W	QP11652269					
			SEMICONDUCTORS						
6100		4822 130 34281	DIODE BZX79-B15	QP13034281					
6101		4822 130 34281	DIODE BZX79-B15	QP13034281					
6102		4822 130 83707	DIODE SINB80	QP13083707					
6106		4822 130 31603	DIODE 1N4006	QP13031603					
6107		4822 130 31603	DIODE 1N4006	QP13031603					
6129		5322 130 80122	DIODE BZX84-C24	QQ13080122					
6130		4822 130 83649	DIODE 1SS355	QP13083649					
6132		4822 130 42488	DIODE BYD33D	QP13042488					
6133		4822 130 83649	DIODE 1SS355	QP13083649					
6141		4822 130 11152	DIODE UDZ18B	QP13011152					
6150		4822 130 11148	DIODE UDZ4.7B	QP13011148					
6201		9322 107 43685	DIODE UDZ22B	QA10743685					
6202		9322 102 64685	DIODE REG SM UDZ2.7B (RHMO) R	QA10264685					