

CD Player

CD6006



- For purposes of improvement, specifications and design are subject to change without notice.
- Please use this service manual with referring to the operating instructions without fail.
- Some illustrations using in this service manual are slightly different from the actual set.

[Click here!](#)

On-line service parts list

We are getting ready.

On-line owner's manual

<http://manuals.marantz.com/CD6006/NA/EN/index.php>

<http://manuals.marantz.com/CD6006/EU/EN/index.php>

<http://manuals.marantz.com/CD6006/JP/JA/index.php>

CAUTION IN SERVICING

ELECTRICAL

MECHANICAL

REPAIR INFORMATION

UPDATING

Please refer to the MODIFICATION NOTICE.

CAUTION IN SERVICING

SAFETY PRECAUTIONS

NOTE FOR SCHEMATIC DIAGRAM

NOTE FOR PARTS LIST

INSTRUCTIONS FOR HANDLING SEMICONDUCTORS AND OPTICAL UNIT

WARNING AND LASER SAFETY INSTRUCTIONS

CAUTION IN SERVICING.

Initializing This Unit
JIG FOR SERVICING

SAFETY PRECAUTIONS

The following items should be checked for continued protection of the customer and the service technician.

Leakage current check

Before returning the set to the customer, be sure to carry out either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 460 kohms, the set is defective.

Be sure to test for leakage current with the AC plug in both polarities, in addition, when the set's power is in each state (on, off and standby mode), if applicable.

Ⓢ Make a safety check after servicing!

Check that all screws, parts and wires removed or disconnected when servicing have been put back in their original positions, check that no serviced parts have deteriorate the area around. Then make an insulation check on the external metal connectors and between the blades of the power plug, and otherwise check that safety is ensured.

(Insulation check procedure)

Unplug the power cord from the power outlet, disconnect the antenna, plugs, etc., and on the power. Using a 500V insulation resistance tester, check that the insulation resistance value between the inplug and the externally exposed metal parts (antenna terminal, headphones terminal, input terminal, etc.) is 1M Ω or greater. If it is less, the set must be inspected and repaired.

CAUTION

Please heed the following cautions and instructions during servicing and inspection.

Ⓢ Heed the cautions!

Cautions which are delicate in particular for servicing are labeled on the cabinets, the parts and the chassis, etc. Be sure to heed these cautions and the cautions described in the handling instructions.

Ⓢ Cautions concerning electric shock!

- (1) An AC voltage is impressed on this set, so if you touch internal metal parts when the set is energized, you may get an electric shock. Avoid getting an electric shock, by using an isolating transformer and wearing gloves when servicing while the set is energized, or by unplugging the power cord when replacing parts, for example.
- (2) There are high voltage parts inside. Handle with extra care when the set is energized.

Ⓢ Caution concerning disassembly and assembly!

Through great care is taken when parts were manufactured from sheet metal, there may be burrs on the edges of parts. The burrs could cause injury if fingers are moved across them in some rare cases. Wear gloves to protect your hands.

Ⓢ Use only designated parts!

The set's parts have specific safety properties (fire resistance, voltage resistance, etc.). Be sure to use parts which have the same properties for replacement. The burrs have the same properties. In particular, for the important safety parts that are indicated by the $\triangle$ mark on schematic diagrams and parts lists, be sure to use the designated parts.

Ⓢ Be sure to mount parts and arrange the wires as they were originally placed!

For safety reasons, some parts use tapes, tubes or other insulating materials, and some parts are mounted away from the surface of printed circuit boards. Care is also taken with the positions of the wires by arranging them and using clamps to keep them away from heating and high voltage parts, so be sure to set everything back as it was originally placed.

CAUTION

Concerning important safety parts

Many of the electric and the structural parts used in the set have special safety properties. In most cases these properties are difficult to distinguish by sight, and the use of replacement parts with higher ratings (rated power and withstand voltage) does not necessarily guarantee that safety performance will be preserved. Parts with safety properties are indicated as shown below on the wiring diagrams and the parts list in this service manual. Be sure to replace them with the parts which have the designated part number.

- | | |
|------------------------|------------------------------------|
| (1) Schematic diagrams | Indicated by the $\triangle$ mark. |
| (2) Parts lists | Indicated by the $\triangle$ mark. |

The use of parts other than the designated parts could cause electric shocks, fires or other dangerous situations.

NOTE FOR SCHEMATIC DIAGRAM

WARNING:

Parts indicated by the $\triangle$ mark have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.

CAUTION:

Before returning the set to the customer, be sure to carry out either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 460 kohms, the set is defective.

WARNING:

DO NOT return the set to the customer unless the problem is identified and remedied.

NOTICE:

ALL RESISTANCE VALUES IN OHM. k=1,000 OHM / M=1,000,000 OHM

ALL CAPACITANCE VALUES ARE EXPRESSED IN MICRO FARAD, UNLESS OTHERWISE INDICATED. P INDICATES MICRO-MICRO FARAD. N INDICATES NANO FARAD. EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION. CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

NOTE FOR PARTS LIST

1. Parts indicated by "nsp" on this table cannot be supplied.
2. When ordering a part, make a clear distinction between "1" and "I" (i) to avoid mis-supplying.
3. A part ordered without specifying its part number can not be supplied.
4. Part indicated by "@" mark is not illustrated in the exploded view.

WARNING: Parts indicated by the $\triangle$ mark have critical characteristics. Use ONLY replacement parts recommended by the manufacturer.

INSTRUCTIONS FOR HANDLING SEMICONDUCTORS AND OPTICAL UNIT

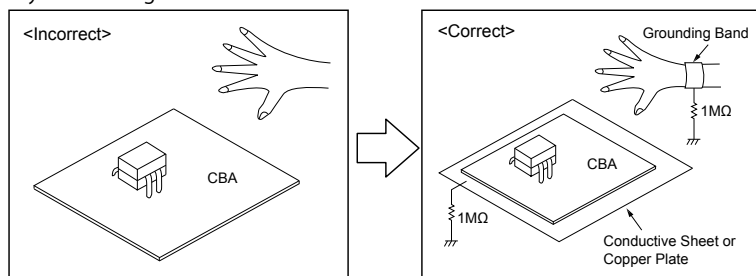
Electrostatic breakdown of the semi-conductors or optical pickup may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

1. Ground for Human Body

Be sure to wear a grounding band (1 M Ω) that is properly grounded to remove any static electricity that may be charged on the body.

2. Ground for Workbench

Be sure to place a conductive sheet or copper plate with proper grounding (1 M Ω) on the workbench or other surface, where the semi-conductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semi-conductors with your clothing



WARNING AND LASER SAFETY INSTRUCTIONS

(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.

(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 muni d'une résistance de sécurité. Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

(GB)

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

(NL)

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

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

(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.

ESD



(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 apparaat. Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(I) AVVERTIMENTO

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

(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.

(I)

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

LASER SAFETY

This unit employs a laser. Only a qualified service person should remove the cover or attempt to service this device, due to possible eye injury.



USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURE OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

AVOID DIRECT EXPOSURE TO BEAM

WARNING

The use of optical instruments with this product will increase eye hazard. Repair handling should take place as much as possible with a disc loaded inside the player

WARNING LOCATION: INSIDE ON LASER COVERSHELD

CAUTION VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING VED ÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
ADVARSEL SYNLIG OG USYNLIG LASERSTRÅLING NÅR DEKSEL Å PNES UNNGÅ EKSPONERING FOR STRÅLEN
VARNING SYNLIG OCH USYNLIG LASERSTRÅLING NÅR DENNA DEL ÅR ÖPPNAD BETRÄKTA EJ STRÅLEN
VARO! AVATT AESSA OLET ALTTIINA NÄKYVÄLLE JA NÄKYMÄTTÖMÄLLE LASER SÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN
VORSICHT SICHTBARE UND UNSICHTBARE LASERSTRALUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETSEN
DANGER VISIBLE AND INVISIBLE LASER RADIATION WHEN OPEN AVOID DIRECT EXPOSURE TO BEAM
ATTENTION RAYONNEMENT LASER VISIBLE ET INVISIBLE EN CAS D'OUVERTURE EXPOSITION DANGEREUSE AU FAISCEAU

CAUTION IN SERVICING.

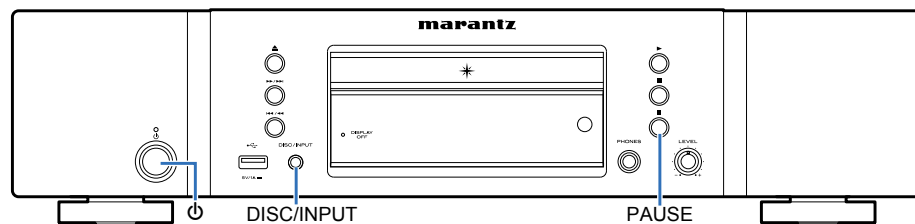
Initializing This Unit

Make sure to initialize this unit after replacing the microcomputer or any peripheral equipment, or the CD PCB.

1. Press the power button to turn off the power.
2. While holding down buttons "**PAUSE**" and "**DISC/INPUT**" simultaneously, press the power button to turn on the power.
3. "**INITIALIZING**" is displayed.

NOTE :

- If the unit fails to enter the service mode in step 3, repeat the procedure from step 1.
- Initializing the device restores the customized settings to the factory settings. Write down your settings in advance and reconfigure the settings after initialization.



JIG FOR SERVICING

The jig (RS-232C > product internal connector conversion board + 7P Cable Kit) used for firmware updates is as shown below.

Order with your dealer for the jigs your dealer if necessary.

8U-210100S : WRITING KIT : 1 Set

606050028012P : 7P FFC (straight) : 1Set

(See [FIRMWARE UPDATE PROCEDURE](#))

SCHEMATIC DIAGRAMS

SCH01 MAIN CD DSP USB

SCH02 MAIN CPU

SCH03 AUDIO OUTPUT POWER

SCH04 FRONT PHONE

PRINTED CIRCUIT BOARDS

MAIN, MAIN TRANS, HP, FRONT

POWER, AUDIO, STBY LED, FLASHER

BLOCK DIAGRAM

POWER DIAGRAM

WIRING DIAGRAM

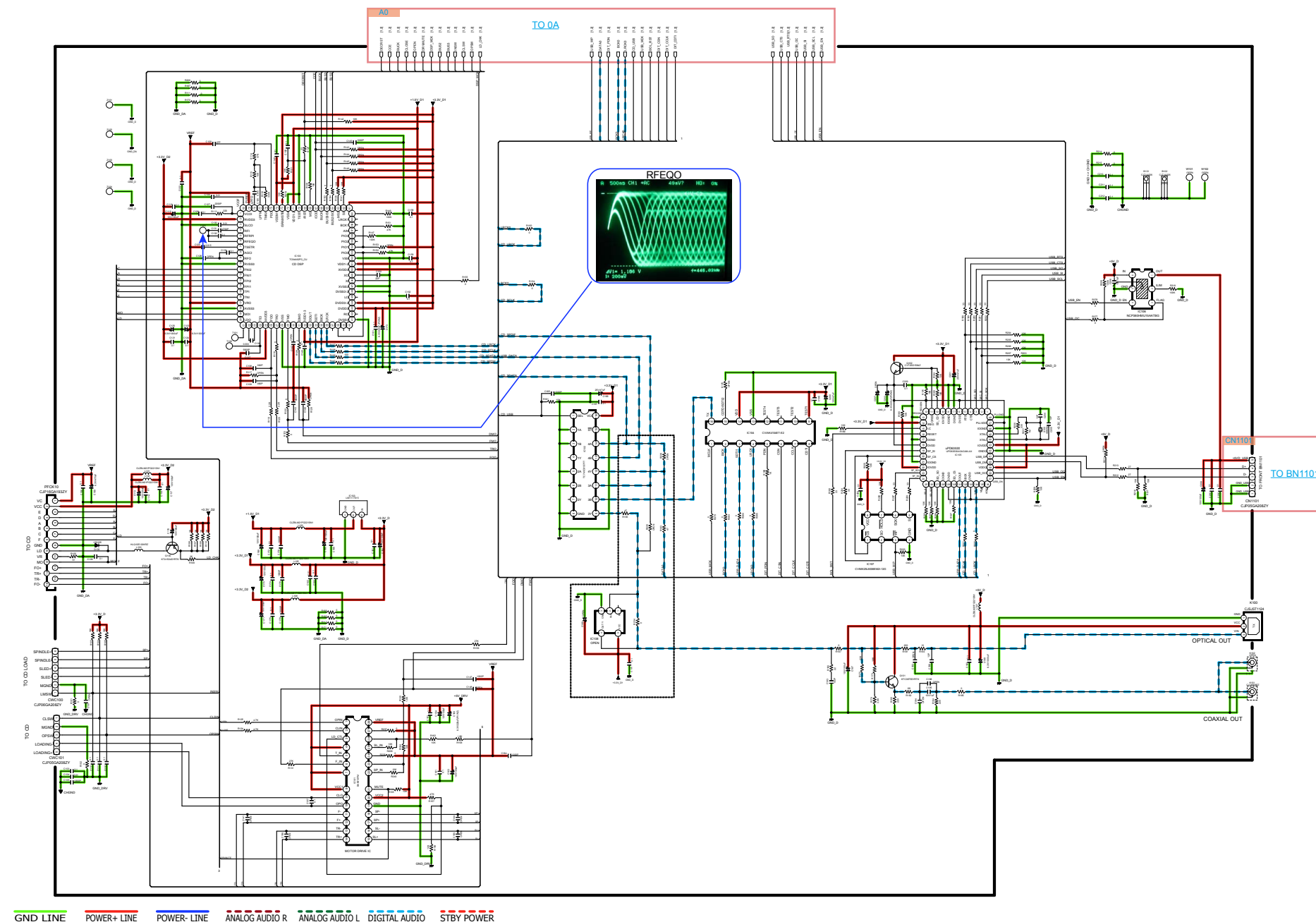
SEMICONDUCTORS

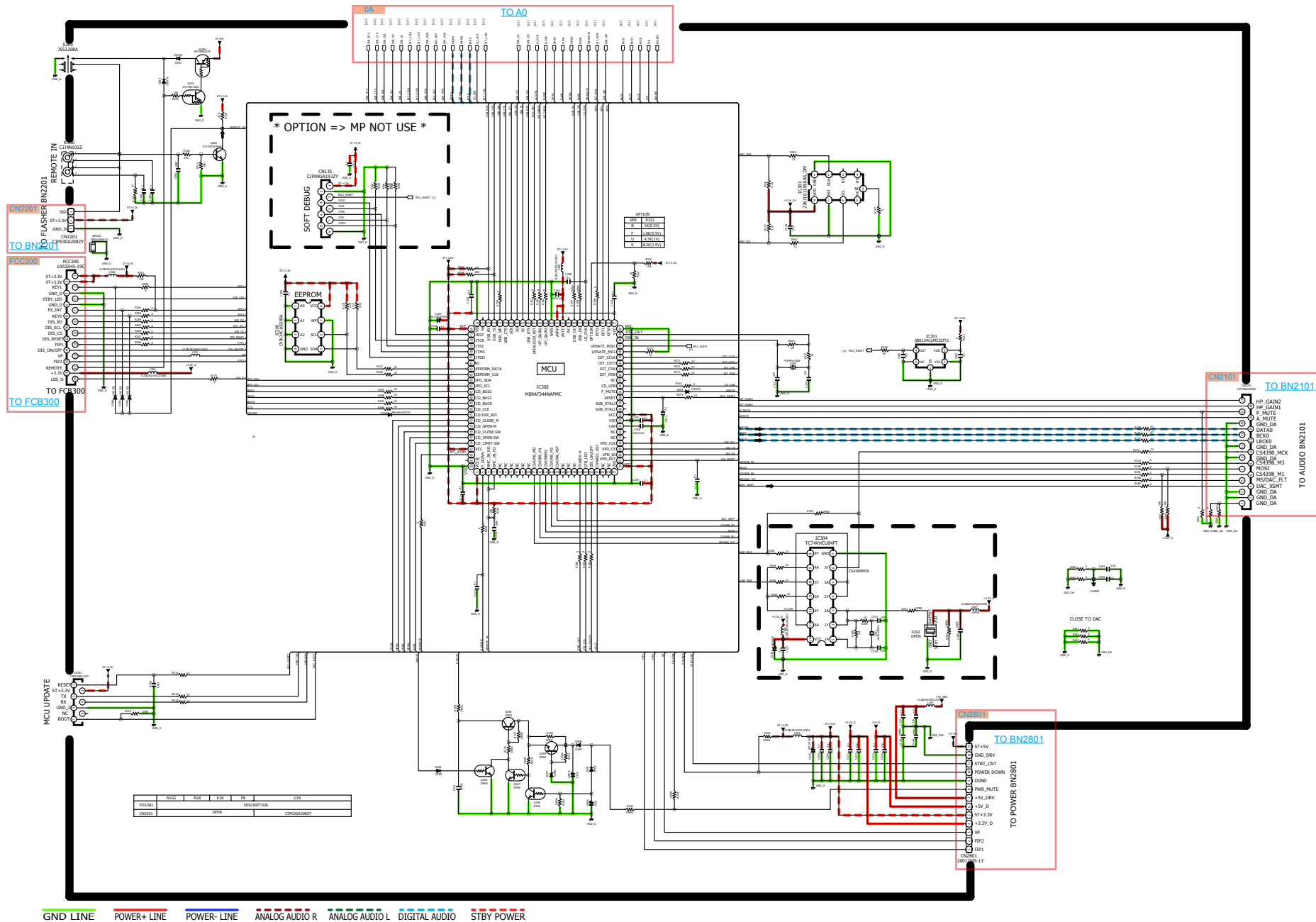
1. IC's

2. FL DISPLAY

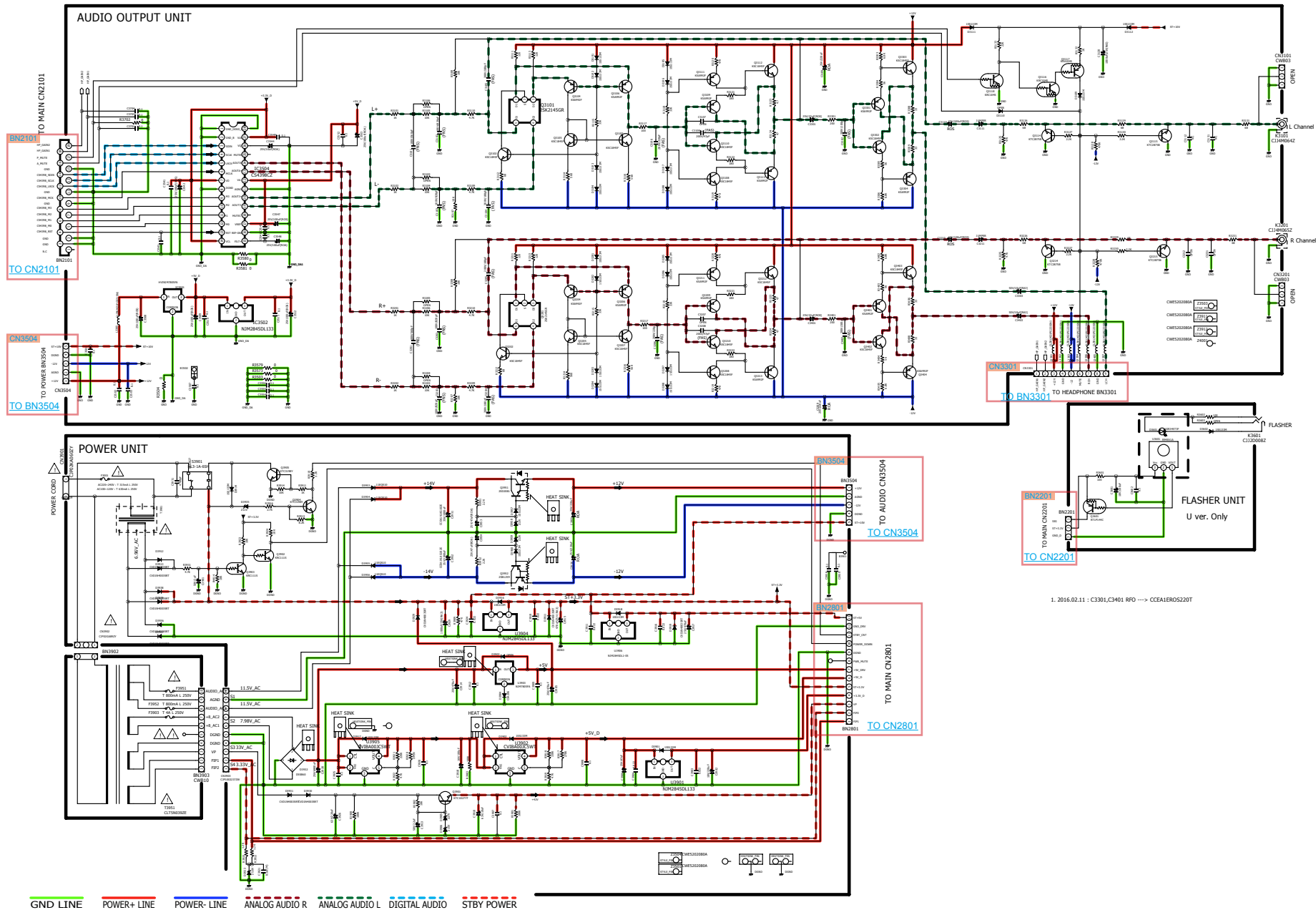
SCHEMATIC DIAGRAMS

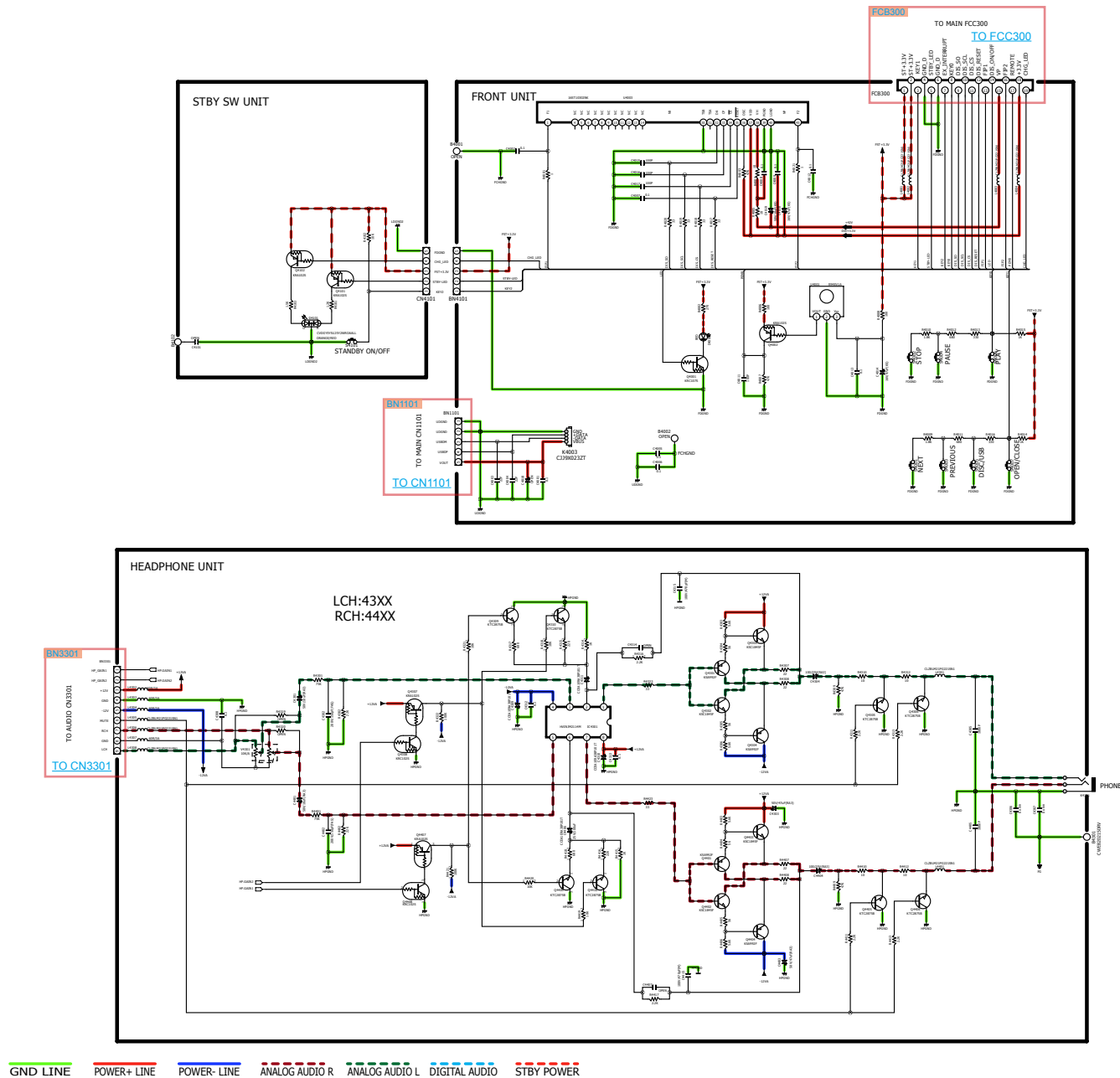
SCH01_MAIN_CD_DSP_USB





SCH03_AUDIO OUTPUT_POWER





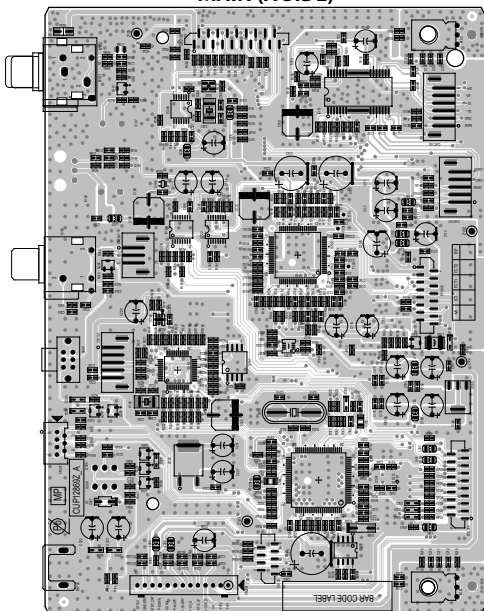
PRINTED CIRCUIT BOARDS

MAIN, MAIN TRANS, HP, FRONT

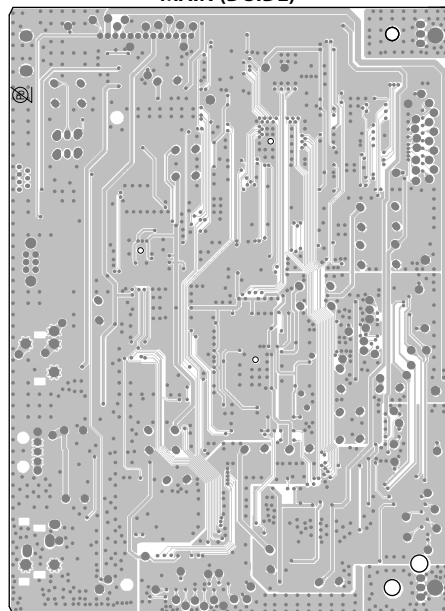
Lead-free Solder

When soldering, use the Lead-free Solder (Sn-Ag-Cu).

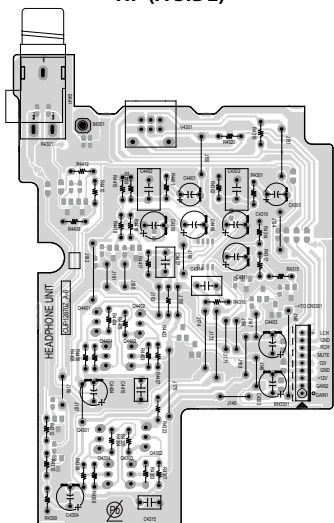
MAIN (A SIDE)



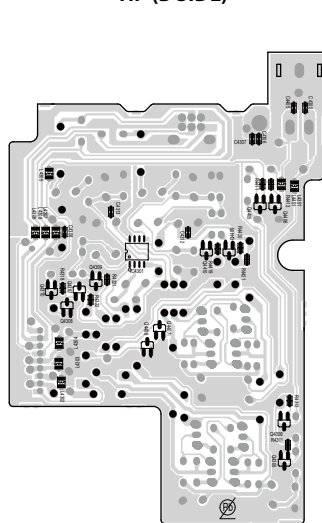
MAIN (B SIDE)



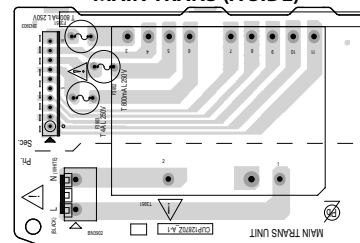
HP (A SIDE)



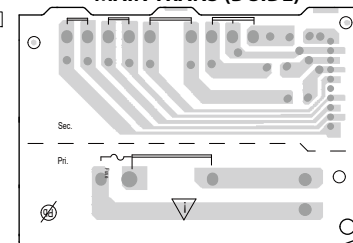
HP (B SIDE)



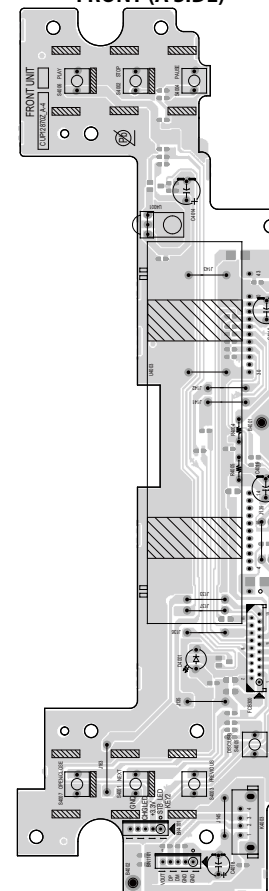
MAIN TRANS (A SIDE)



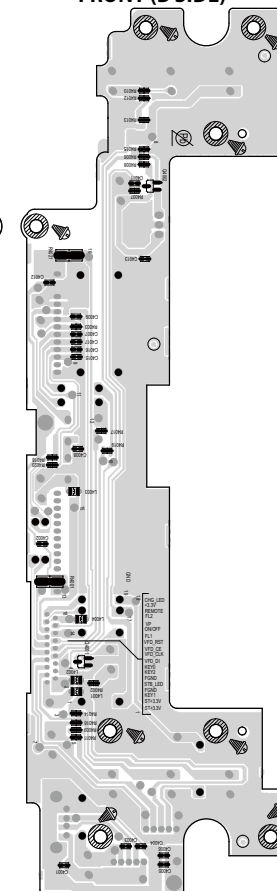
MAIN TRANS (B SIDE)



FRONT (A SIDE)



FRONT (B SIDE)



Caution in
servicing

Electrical

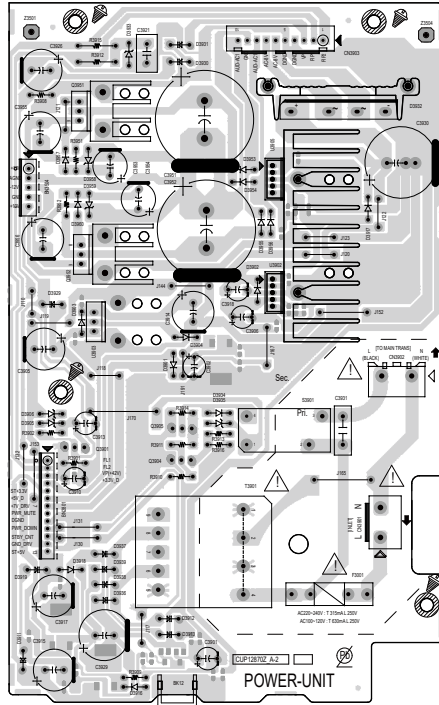
Mechanical

Repair Information

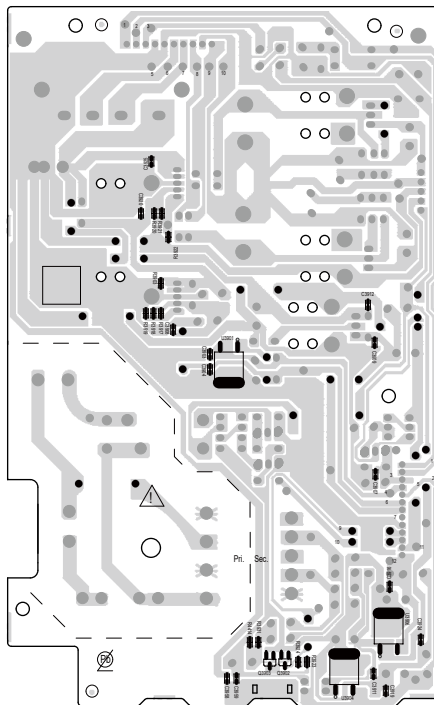
Updating

POWER, AUDIO, STBY LED, FLASHER

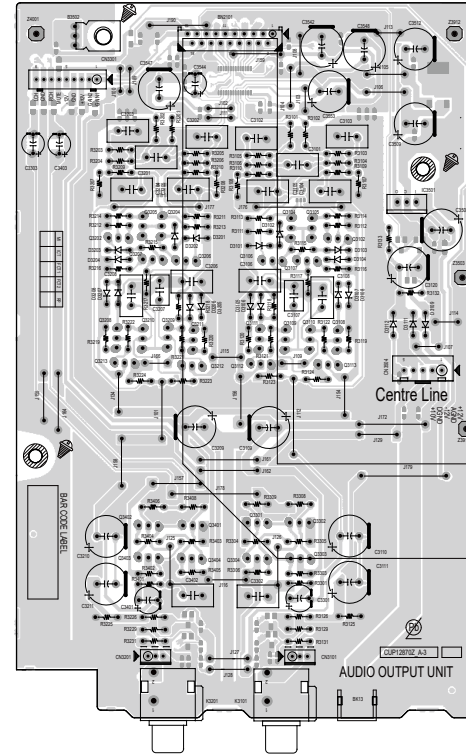
POWER (A SIDE)



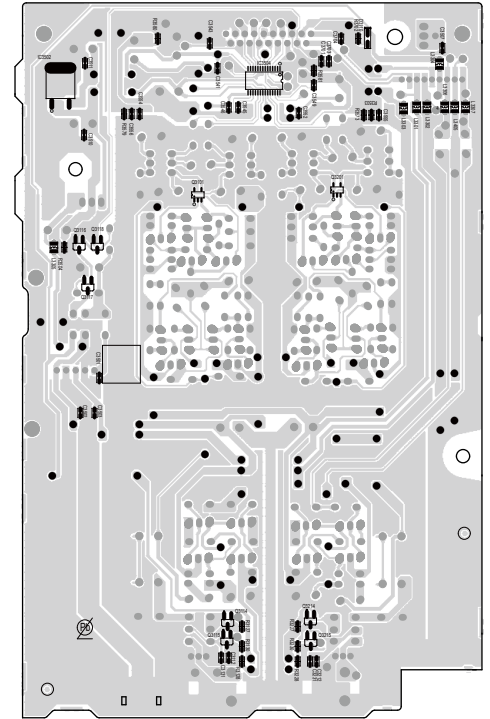
POWER (B SIDE)



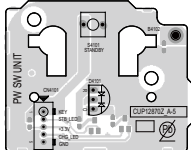
AUDIO (A SIDE)



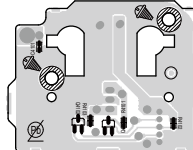
AUDIO (B SIDE)



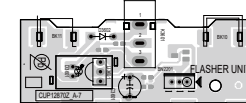
STBY LED (A SIDE)



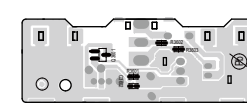
STBY LED (B SIDE)



FLASHER (B SIDE)



FLASHER (B SIDE)



Caution in
servicing

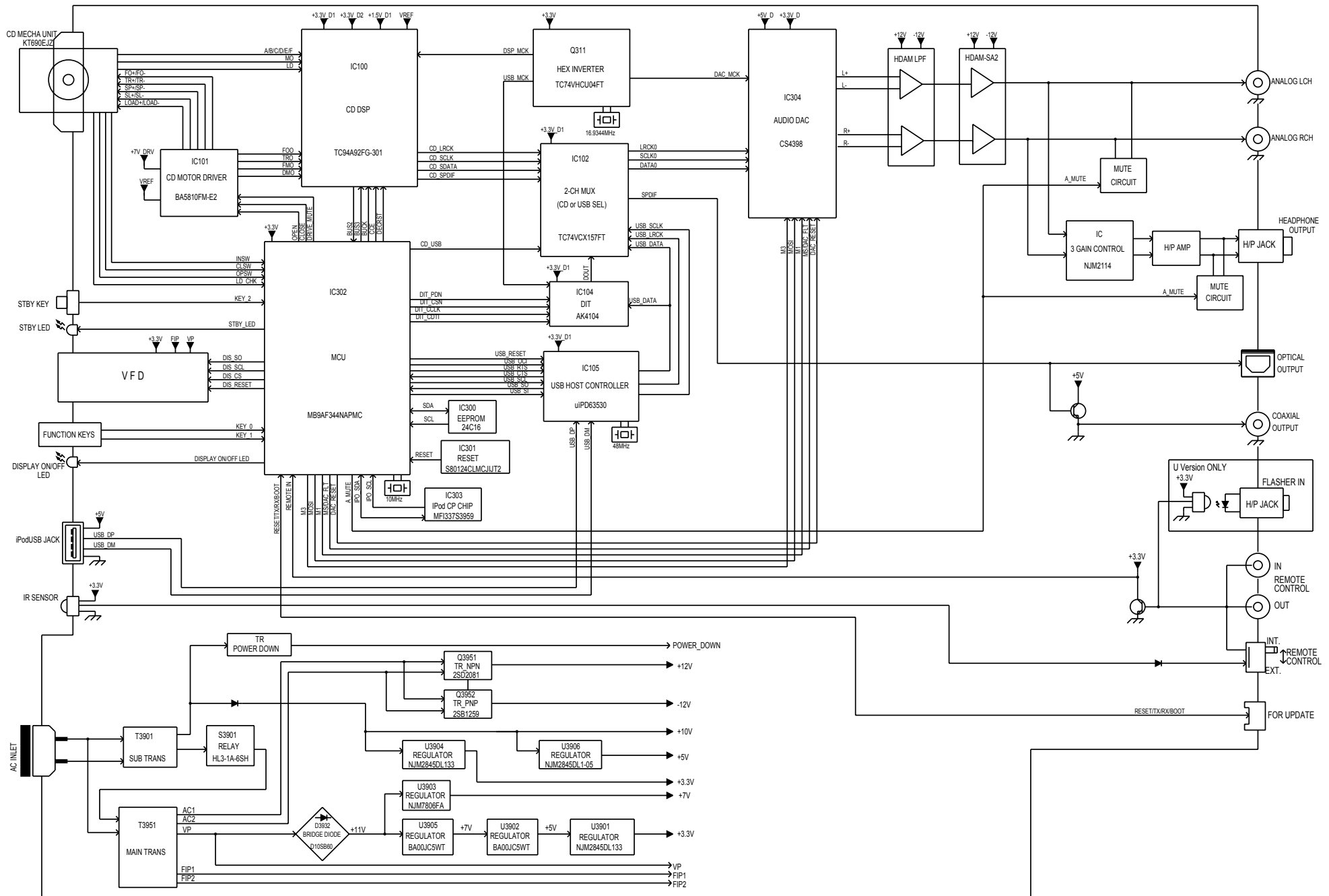
Electrical

Mechanical

Repair Information

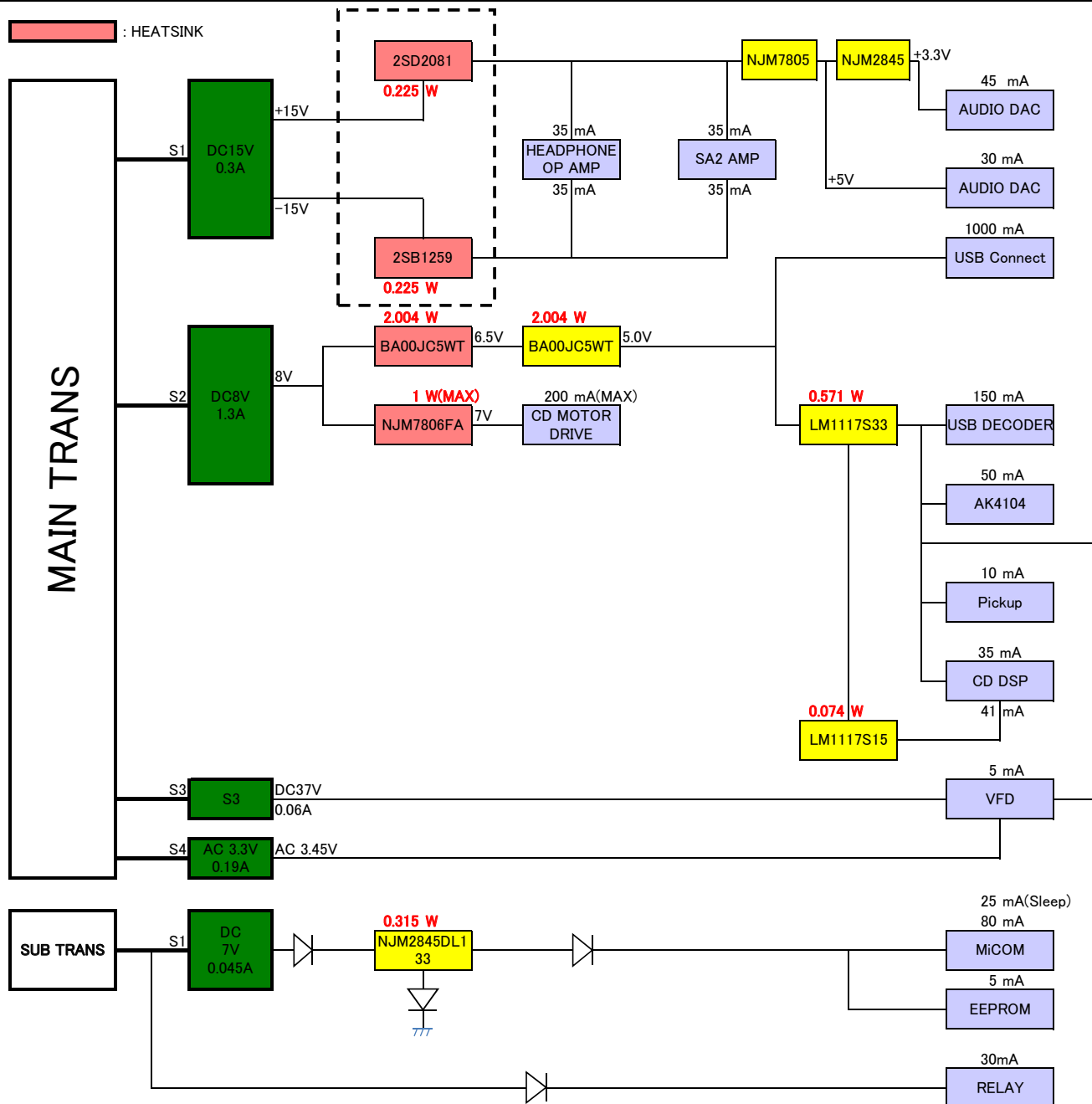
Updating

CD6006 BLOCK DIAGRAM

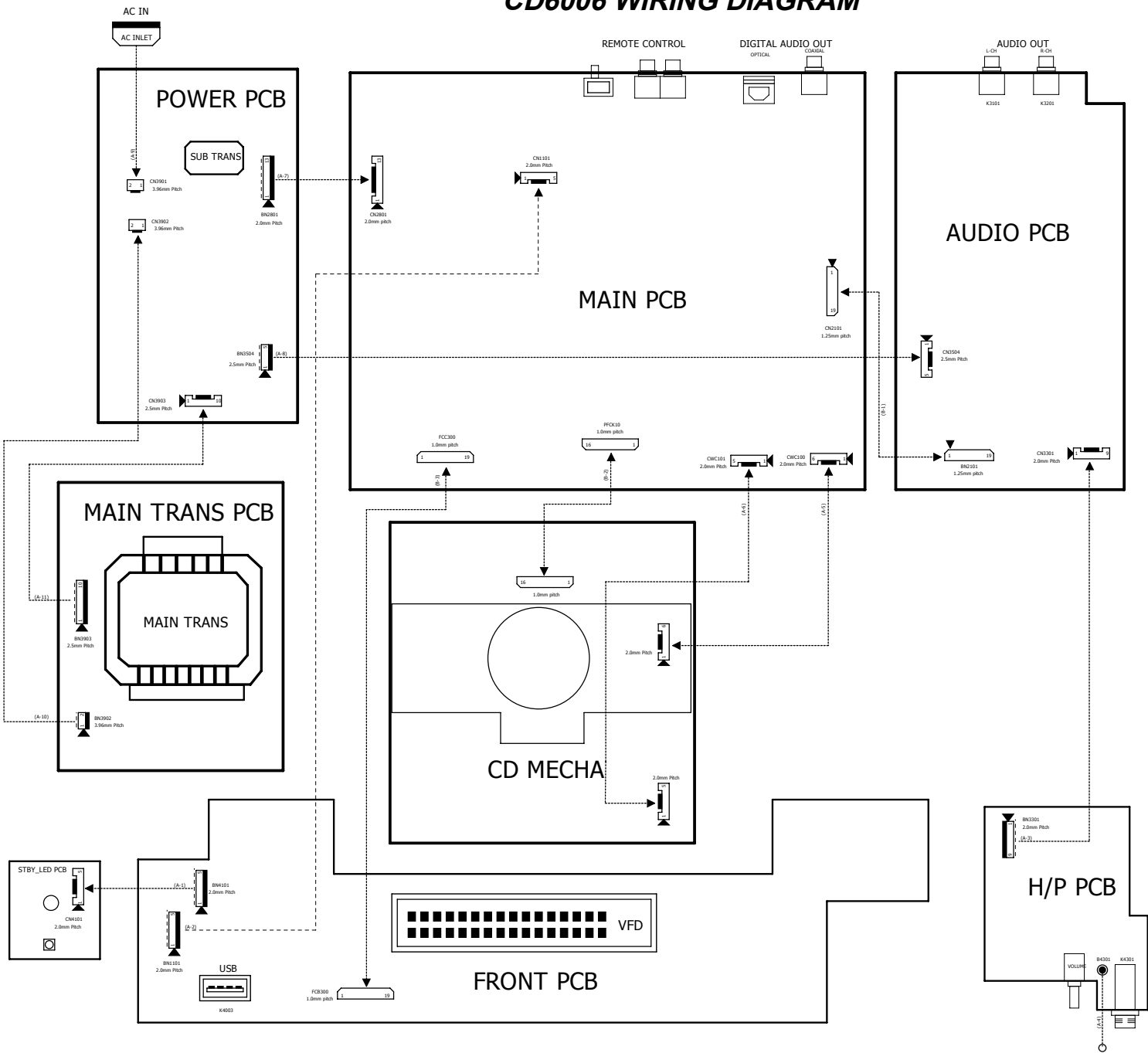


POWER DIAGRAM

CD6006 CURRENT BLOCK DIAGRAM



CD6006 WIRING DIAGRAM



*(A) WIRE ASSY

NO	PCB	REF.	PART NUMBER	COMMENT
1	FRONT	BN4101	CWZCD6004B4101	2.0mm , 5P
2	FRONT	BN1101	CWZCD6004B1101	2.0mm , 5P
3	H/P	BN3301	CWB1C0091207E001	2.0mm , 9P
4	H/P	B4301	CWE8202150RV	1P
5	MAIN~CD	CWC100	CWB5A906220GG	2.0mm , 6P
6	MAIN~CD	CWC101	CWB2B005250GG	2.0mm , 5P
7	POWER	BN2801	CWZCD6004B2801	2.0mm , 13P
8	POWER	BN3504	CWZCD6004B3504	2.5mm , 5P
9	POWER	CN3901	CJP02KA060ZY	3.96mm , 2P
10	MAIN TRANS	BN3902	CWB4D932200UZ	3.96mm , 2P
11	MAIN TRANS	BN3903	CWZCD6004B3903	2.5mm , 10P
12				

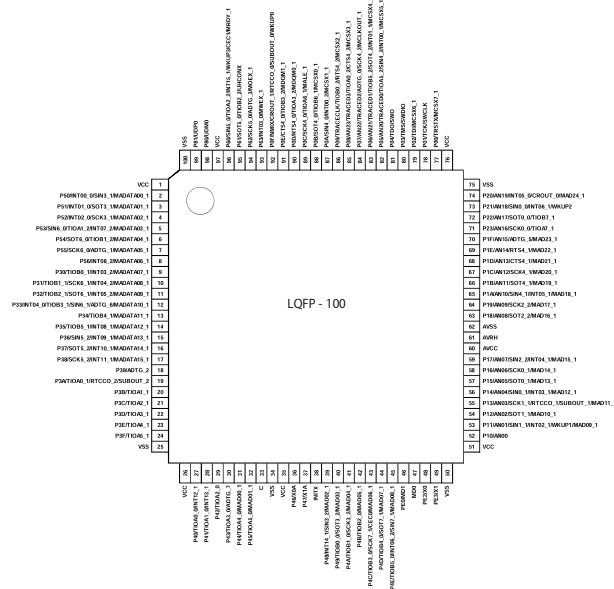
*(B) CARD CABLE

NO	PCB	REF.	PART NUMBER	COMMENT
1	MAIN~AUDIO	BN2101	CWC4CA19B250B08001	1.25mm , 19P
2	MAIN~CD	PFCK10	CWC4F1A16A140A10	1.0mm , 16P
3	MAIN~FRONT	FCC300	CWC4F4A19A250B08	1.0mm , 19P

Only major semiconductors are shown, general semiconductors etc. are omitted to list.
The semiconductor which described a detailed drawing in a schematic diagram are omitted to list.

1. IC's

MB9AF344NAPMC (IC302)



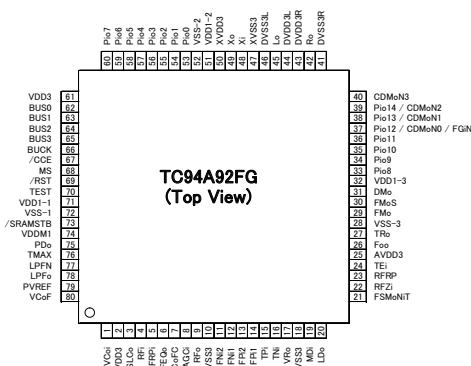
MAIN MCU PORT MAP

Pin	Symbol	Pin Name	I/O	Pu/Pd	STBY	Description
1	VCC	VCC				VCC
2	P50/INT00_0/SIN3_1	POWER_DOWN	I	Pu	L	Ac Cord Disconnect Check Pin (Active : Low)
3	P51/INT01_0/SOT3_1	RC5_IN_Rising	I	Pu	L/H	Remote Rising Detect
4	P52/INT02_0/SCK3_1	RC5_IN_Falling	I	Pu	L/H	Remote Falling Detect
5	P53/INT07_2/SIN6_0/TIOA1_2/MADA-TA03_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
6	P54/SOT6_0/TIOB1_2/MADATA04_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
7	P55/SCK6_0/ADTG_1/MADATA05_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
8	P56/INT08_2/MADATA06_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
9	P30/INT03_2/TIOB0_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
10	P31/INT04_2/TIOB1_1/SCK6_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
11	P32/INT05_2/TIOB2_1/SOT6_1	DAC_I2C(M0)	O	Pd	L	CS4398 AD0
12	P33/INT04_0/TIOB3_1/SIN6_1/ADTG_6	DAC_I2C(M1)	I/O	Pu	L	CS4398 SDA
13	P34/TIOB4_1/MADATA11_1	DAC_I2C(M2)	O	Pu	L	CS4398 SCL
14	P35/INT08_1/TIOB5_1/MADATA12_1	DAC_I2C(M3)	O		L	CS4398 AD1
15	P36/INT09_1/SIN5_2/MADATA13_1	DAC_I2C(RST)	O	Pd	L	CS4398 Reset
16	P37/INT10_1/SOT5_2/MADATA14_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
17	P38/INT11_1/SCK5_2/MADATA15_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
18	P39/ADTG_2	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
19	P3A/TIOA0_1/RTCCO_2/SUBOUT_2	POWER_ON	O		L	TURN POWER ON ,OUTPUT LOW LEVEL
20	P3B/TIOA1_1	ST_LED	O		L	Standby LED (Active : Low)
21	P3C/TIOA2_1	DISPLAY_LED	O		L	Display Off LED (Active : High)
22	P3D/TIOA3_1	CHARGE_LED	O		L	Charge LED (Active : HIGH)

Pin	Symbol	Pin Name	I/O	Pu/Pd	STBY	Description
23	P3E/TIOA4_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
24	P3F/TIOA5_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
25	VSS	VSS				VSS
26	VCC	VCC				VCC
27	P40/INT12_1/TIOA0_0	VFD_RST	O		L	VFD Reset
28	P41/INT13_1/TIOA1_0	VFD_DI	O		L	VFD Data In
29	P42/TIOA2_0	VFD_CS	O		L	VFD CS
30	P43/TIOA3_0/ADTG_7	VFD_CLK	O		L	VFD Clock
31	P44/TIOA4_0/MAD00_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
32	P45/TIOA5_0/MAD01_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
33	CAP	CAP				CAP
34	VSS	VSS				VSS
35	VCC	VCC				VSS
36	P46/X0A	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
37	P47/X1A	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
38	INITX	RESET				MCU RESET
39	P48/INT14_1/SIN3_2/MAD02_1	F_MUTE	O		L	Function Mute (Active : Low)
40	P49/TIOB0_0/SOT3_2/MAD03_1	CD_USB_SP-DIF_Control	O		L	CD USB Dac Select Pin (USB : High / CD : Low)
41	P4A/TIOB1_0	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
42	P4B/TIOB2_0	DIT_PDN	O		L	AK4104 Power (Active : High)
43	P4C/TIOB3_0/SCK7_1/CECO	DIT_CSN	O		L	AK4104 CS
44	P4D/TIOB4_0/SOT7_1	DIT_CDTI	O		L	AK4104 Data in
45	P4E/TIOB5_0/INT06_2/SIN7_1	DIT_CLK	O		L	AK4104 Clock
46	PE0/MD1	UPDATE_MD1	I		L	MCU update mode1 change(LowFixed)
47	MD0	UPDATE_MD0	I		L	MCU update mode0 change(Low:Normal,High:Update)
48	X0	XTAL1				X-tal(4MHZ)
49	X1	XTAL2				X-tal(4MHZ)
50	VSS	VSS				VSS
51	VCC	VCC				VCC
52	P10/AN00	KEY0	I	Pu	-	KEY 0 (ADC Input)
53	P11/AN01/SIN1_1/IN02_1/WKUP1	KEY1	I	Pu	-	KEY 1 (ADC Input)
54	P12/AN02/SOT1_1	KEY2	I	Pu	-	KEY 2 (ADC Input)
55	P13/AN03/SCK1_1/RTCCO_1/SUBOUT_1	Version Option	I	Pu	-	Version Option (ADC Input)
56	P14/AN04/INT03_1	LD_CHK	I	Pu	-	Laser Check (ADC Input)
57	P15/AN05	USB_EN	O		L	USB 5V
58	P16/AN06/SCK0_1/MAD14_1	USB_OC	I		L	USB Over Current Detect
59	P17/AN07/SIN2_2/INT04_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
60	AVCC	AVCC				AVCC
61	AVRH	AVRH				AVRH
62	AVSS	AVSS				AVSS
63	P18/AN08/SOT2_2	HP_GAIN1	O		L	Headphone Gain Switch 1
64	P19/AN09/SCK2_2	HP_GAIN2	O		L	Headphone Gain Switch 2
65	P1A/AN10/SIN4_1/INT05_1/MAD18_1	USB_Reset	O		L	uPD63530 Reset
66	P1B/AN11/SOT4_1/MAD19_1	USB_RTS	O	Pd	L	uPD63530 RTS
67	P1C/AN12/SCK4_1/MAD20_1	USB_SI	O	Pd	L	uPD63530 SI
68	P1D/AN13/CTS4_1/MAD21_1	USB_SO	I	Pd	L	uPD63530 SO
69	P1E/AN14/RTS4_1/MAD22_1	USB_CLK	O	Pd	L	uPD63530 CLOCK
70	P1F/AN15/ADTG_5/MAD23_1	USB_CTS	I	Pd	L	uPD63530 CTS
71	P23/AN16/SCK0_0/TIOA7_1	USB_WP	O	Pd	L	uPD63530 Flash Write protect Pin (Enable : High / Disable : Low)
72	P22/AN17/SOT0_0/TIOB7_1	UPDATE_TX	O		L	MCU uart update tx

Pin	Symbol	Pin Name	I/O	Pu/Pd	STBY	Description
73	P21/AN18/SINO_0/INT06_1/WKUP2	UPDATE_RX	I		L	MCU uart update rx
74	P20/AN19/INT05_0/CROUT_0/MAD24_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
75	VSS	VSS				VSS
76	VCC	VCC				VCC
77	P00/TRSTX	JTRST	I		-	J-Link emulator
78	P01/TCK/SWCLK	JTCK	I		-	J-Link emulator
79	P02/TDI	JTDI	I		-	J-Link emulator
80	P03/TMS/SWDIO	JTMS	O		-	J-Link emulator
81	P04/TDO/SWO	TDO	O		-	J-Link emulator
82	P05/INT00_1/AN20/TRACED0/TIOA5_2/SIN4_2/MCS5_1	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
83	P06/INT01_1/AN21/TRACED1/TIOB5_2/SOT4_2/MCSX4_1	EEPROM_SDA	I/O		L/H	EEPROM Data
84	P07/AN22/ADTG_0/MCLKOUT_1/TRACED2/SCK4_2	EEPROM_SCL	O		L/H	EEPROM Clock
85	P08/AN23/TRACED3/TIOA0_2/CTS4_2/MCSX3_1	IPOD_SDA	I/O	Pu	L	Apple Chip SDA
86	P09/TRACECLK/TIOB0_2/RTS4_2/MCSX2_1	IPOD_SCL	O	Pu	L	Apple Chip SCL
87	P0A/SIN4_0/INT00_2	CD_UBS2	I	Pu	L	CD Data Out (receive data from CD DSP)
88	P0B/SOT4_0/TIOB6_1	CD_UBS3	O	Pu	L	CD Data In (send command to CD DSP)
89	P0C/SCK4_0/TIOA6_1	CD_BUCK	O	Pu	L	CD Clock
90	P0D/RTS4_0/TIOA3_2/MDQM0_1	CD_CCE	O	Pu	L	CD Chip Select
91	P0E/CTS4_0/TIOB3_2/MDQM1_1	CD_DSP_RST	O	Pu	L	CD RESET
92	P0F/NMIX/CROUT_1/RTCCO_0/SUBOUT_0/WKUP0	CD_CLOSE_M	O		L	CD Close Motor
93	P63/INT03_0/MWEX_1	CD_OPEN_M	O		L	CD Open Motor
94	P62/SCK5_0/ADTG_3	CD_CLOSE_SW	I	Pu	L	CD Close Switch
95	P61/SOT5_0/TIOB2_2/UHCONX	CD_OPEN_SW	I	Pu	L	CD Open Switch
96	P60/SIN5_0/TIOA2_2/INT15_1/WKUP3/CEC1	CD_LIMIT_SW	I	Pu	L	CD Inner Switch
97	VCC	VCC				VCC
98	P80/UDM0	MT_STBY	O	Pu	L	CD Motor Standby
99	P81/UDP0	N.C	O		L	Case of OPEN : "I/O"="O", Output LOW
100	VSS	VSS				VSS

TC94A92FG (IC100)



Terminal Function

Pin No.	Symbol	I/O	Description	Default	Remarks
1	VCoI	O 3A/I/F	DSP VCO - EFM and PLCK Phase difference signal output pin. (DSP VCO control voltage input pin.)	O	3 state output
2	RVDD3	-	CD-DSP-Power supply for 3.3V RF amplifier core and PLL circuit	-	
3	SLCo	O 3A/I/F	EFM slice level output pin	O	Connect capacitor according with se nvo frequency band.
4	RFI	I 3A/I/F	RF signal input pin	I	Selectable Zin 20/10 kΩ
5	RFRPI	I 3A/I/F	RF ripple signal input pin	I	
6	RFEQo	O 3A/I/F	RF equalizer circuit output pin.	O	Connect to RFRPI by 0.1uF, to RFI by 4700pF.
7	DCoFC	O 3A/I/F	RFEQo offset compensation LPF output	O	Connect to Vro by more than 0.015uF
8	AGCI	I 3A/I/F	RF signal AGC amplifier input pin	I	
9	RFo	O 3A/I/F	RF signal generation amplifier output pin	O	
10	RVSS3	-	Grounding pin for 3.3 RF amplifier core and PLL circuit	-	
11	FNI2	I 3A/I/F	Main beam signal input pin. To be connected to PIN diode C.	I	
12	FNI1	I 3A/I/F	Main beam signal input pin. To be connected to PIN diode A.	I	
13	FPI2	I 3A/I/F	Main beam signal input pin. To be connected to PIN diode D.	I	
14	FPI1	I 3A/I/F	Main beam signal input pin. To be connected to PIN diode B.	I	
15	TPI	I 3A/I/F	Sub beam signal input pin. To be connected to PIN diode F.	I	
16	TNI	I 3A/I/F	Sub beam signal input pin. To be connected to PIN diode E.	I	
17	VRo	O 3A/I/F	1.65 V reference voltage output pin.	O	Connected to PVREF, And connect to GNG by 0.1uF+100uF.
18	AVSS3	-	Grounding pin for 3.3V CD analog circuits.	-	
19	MDI	I 3A/I/F	Monitor photodiode amplifier input pin.	I	Reference Voltage=178mVtyp.
20	LDo	O 3A/I/F	Laser diode amplifier output pin	O	

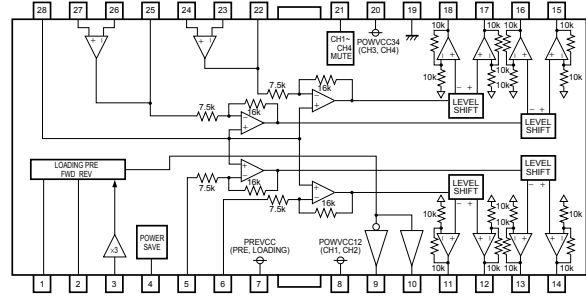
Pin No.	Symbol	I/O	Description	Default	Remarks
21	FSMoNIT	O 3A/I/F	Focus Error signal / Sub beam add signal output pin(monitor pin/GND)	O	
22	RFZI	I 3A/I/F	RF ripple zero-cross signal Input pin	I	
23	RFRP	O 3A/I/F	RF ripple signal output pin.	O	
24	TEI	O 3A/I/F	Tracking error signal output pin.	O	Built-in series R=500Ω. Connect to VRo by capacitor.
25	AVDD3	-	Power supply pin for 3.3 V CD analog circuits.	-	
26	FOo	O 3A/I/F	Focus servo equalizer output pin.	O	Built-in series R=3.3 kΩ
27	TRo	O 3A/I/F	Tracking servo equalizer output pin.	O	Built-in output R=3.3 kΩ
28	VSS-3	-	Grounding pin for 1.5V Decoder-DSP CD circuit	-	
29	FMo	O 3A/I/F	Feed servo equalizer output pin.	O	Built-in output R=3.3 kΩ
30	FMoS	O 3A/I/F	Feed servo equalizer output pin. (Stepper motor application)	O	Built-in output R=3.3 kΩ
31	DMo	O 3A/I/F	Disc servo equalizer output pin	O	Built-in output R=3.3 kΩ
32	VDD1-3	I/O 3I/F	Power supply pin for 1.5V Decoder-DSP /CD circuit	-	
33	Pio8	I/O 3I/F	Port 8 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
34	Pio9	I/O 3I/F	Port 9 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
35	Pio10	I/O 3I/F	Port 10 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
36	Pio11	I/O 3I/F	Port 11 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
37	Pio12/ CDMoN0/ FGIN	I/O 3I/F	Port 12 (General Input/Output Port) / CD Monitor 0 / FG signal input	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
38	Pio13/ CDMoN1	I/O 3I/F	Port 13 (General Input/Output Port) / CD Monitor1	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
39	Pio14/ CDMoN2	I/O 3I/F	Port 14 (General Input/Output Port) / CD Monitor 2	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
40	CDMoN3	O 3I/F	CD Monitor3 (Default output : SBSY)	O	CMOS Port Refer to [1.2 Pin Assinment Table]

Pin No.	Symbol	I/O	Description	Default	Remarks
41	DVSS3R	-	Grounding pin for 3.3V Multi-Bit DAC circuit	-	
42	Ro	O 3A/I/F	R channel audio output pin of Audio DAC.	O	
43	DVDD3R	-	Power supply pin for 3.3V Audio DAC circuit.	-	
44	DVDD3L	-	Power supply pin for 3.3V Audio DAC circuit.	-	
45	Lo	O 3A/I/F	L channel audio output pin of Audio DAC	O	
46	DVSS3L	-	Grounding pin for 3.3V Multi-Bit DAC Circuit	-	
47	XVSS3	-	Grounding pin for 3.3V clock oscillator circuit	-	
48	Xi	I 3A/I/F	System clock Input pin	I	Xtal oscillation circuit. Connect feedback resistor 1 MΩ between Xo and Xi
49	Xo	O 3A/I/F	System clock Output pin	O	
50	XVDD3	-	Power Supply pin for 3.3V clock oscillator circuit	-	
51	VDD1-2	-	Power Supply pin for 1.5V Digital circuit	-	
52	VSS-2	-	Grounding pin for 1.5V digital circuit	-	
53	Pio0	I/O 3I/F	Port 0 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
54	Pio1	I/O 3I/F	Port 1 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
55	Pio2	I/O 3I/F	Port 2 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
56	Pio3	I/O 3I/F	Port 3 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
57	Pio4	I/O 3I/F	Port 4 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
58	Pio5	I/O 3I/F	Port 5 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
59	Pio6	I/O 3I/F	Port 6 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
60	Pio7	I/O 3I/F	Port 7 (General Input/Output Port)	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]

Pin No.	Symbol	I/O	Description	Default	Remarks
61	VDD3	-	Power Supply pin for 3.3V Digital circuit	-	
62	BUS0	I/O 3I/F	Microprocessor I/F data input/output pin 0	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
63	BUS1	I/O 3I/F	Microprocessor I/F data input/output pin 1	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
64	BUS2	I/O 3I/F	Microprocessor I/F data input/output pin 2	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
65	BUS3	I/O 3I/F	Microprocessor I/F data input/output pin 3	I	CMOS Port Schmitt input Refer to [1.2 Pin Assinment Table]
66	BUCK	I 3I/F	Microprocessor I/F BUS clock Input pin	I	Schmitt input Refer to [1.2 Pin Assinment Table]
67	/CCE	I 3I/F	Microprocessor I/F chip enable input pin	I	Schmitt input Refer to [1.2 Pin Assinment Table]
68	MS	I 3I/F	Microprocessor I/F mode selection pin. "H": Parallel I/F, "L": Serial I/F	I	Refer to [1.2 Pin Assinment Table]
69	/RST	I 3I/F	Reset Input pin	I	Schmitt input
70	Test	I 3I/F	Test pin ("L" fixed)	I	Connect to GND for normal operation
71	VDD1-1	-	Power Supply pin for 1.5V Digital circuit	-	
72	VSS-1	-	Grounding pin for 1.5V Digital circuit	-	
73	/SRAMSTB	I 3I/F	1Mbit SRAM stand by pin(/SRAMSTB="L")	I	
74	VDDM1	-	Power Supply for 1.5V 1Mbit SRAM circuit	-	
75	PDo	O 3AI/F	EFM and PLCK Phase difference signal output pin.	O	4-state output (RVDD3, RVSS3,PVREF, Hiz)
76	TMAX	O 3AI/F	TMAX detection result output pin	O	3-state output (RVDD3, RVSS3, Hiz)
77	LPFN	I 3AI/F	PLL circuit LPF amplifier inversion input pin	I	
78	LPFo	O 3AI/F	PLL circuit LPF amplifier Output pin	O	
79	PVREF	-	PLL circuit 1.65 V reference voltage pin.	-	Connected to VRO. Connect to GND by 0.1uF and 100uF.
80	VCoF	O 3AI/F	VCO filter pin	O	Connect to GND by 0.01uF

3AI/F : 3 V analog circuit input/output pin.
1.5 I/F : 1.5Vdigital input/output pin.
3 I/F : 3 V digital input/output pin.

BA5810 (IC101)

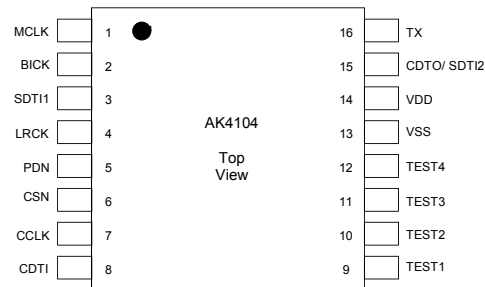


■各端子説明

Pin No.	端子名	機 能	Pin No.	端子名	機 能
1	FWD	ローディングドライバFWD入力端子	15	VO4 (+)	ドライバCH4正出力
2	REV	ローディングドライバREV入力端子	16	VO4 (-)	ドライバCH4負出力
3	LDCONT	ローディングドライバ出力電圧制御端子	17	VO3 (+)	ドライバCH3正出力
4	PS	パワーセーブコントロール端子	18	VO3 (-)	ドライバCH3負出力
5	IN1	ドライバCH1入力端子	19	GND	グランド端子
6	IN2	ドライバCH2入力端子	20	POWVCC34	CH3,CH4パワー段電源端子
7	PREVCC	プリ段、ローディングパワー段電源端子	21	MUTE	ミュートコントロール端子
8	POWVCC12	CH1,CH2パワー段電源端子	22	OPOUT3	CH3前段アンプ出力端子
9	VOL (-)	ローディングドライバ負出力	23	OPIN3 (-)	CH3前段アンプ反転入力端子
10	VOL (+)	ローディングドライバ正出力	24	OPIN3 (+)	CH3前段アンプ非反転入力端子
11	VO2 (-)	ドライバCH2負出力	25	OPOUT4	CH4前段アンプ出力端子
12	VO2 (+)	ドライバCH2正出力	26	OPIN4 (-)	CH4前段アンプ反転入力端子
13	VO1 (-)	ドライバCH1負出力	27	OPIN4 (+)	CH4前段アンプ非反転入力端子
14	VO1 (+)	ドライバCH1正出力	28	BIAS	バイアス入力端子

注：ドライバの正出力、負出力は入力に対する順性
(例えば5pin端子電圧がHIGHのとき、14pinがHIGHになります。)

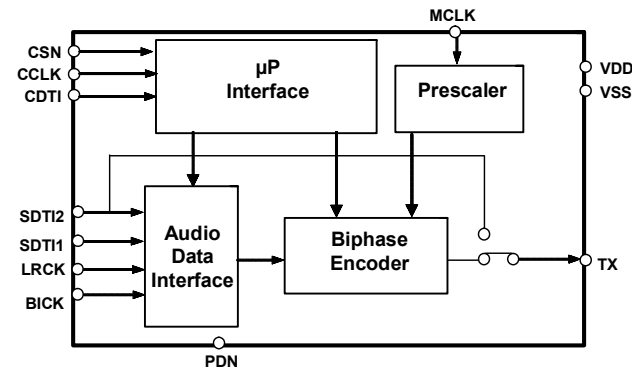
AK4104 (IC104)



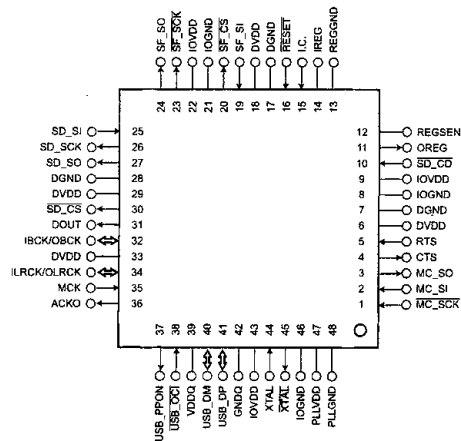
Terminal Function

No.	Pin Name	I/O	Function
1	MCLK	I	Master Clock Input Pin
2	BICK	I	Audio Serial Data Clock Pin
3	SDTI1	I	Audio Serial Data Input 1 Pin
4	LRCK	I	Input Channel Clock Pin
5	PDN	I	Power Down and Reset Pin "L": Power down and Reset, "H": Power up
6	CSN	I	Chip Select Pin
7	CCLK	I	Control Data Clock Pin
8	CDTI	I	Control Data Input Pin
9	TEST1	I	TEST Pin This pin should be connected to VDD.
10	TEST2	O	TEST Pin This pin should be OPEN.
11	TEST3	O	TEST Pin This pin should be OPEN.
12	TEST4	O	TEST Pin This pin should be OPEN.
13	VSS	-	Ground Pin
14	VDD	-	Power Supply Pin, 2.7 ~ 3.6V
15	CDT0	O	Control Data Output Pin, The output is "Hi-Z" when PDN pin = "L".
15	SDTI2	I	Audio Serial Data Input 2 Pin
16	TX	O	Transmit Channel Output Pin, The output is "L" when PDN pin = "L" or RSTN bit = "0" or PW bit = "0" or MCLK stops.

Block Diagram



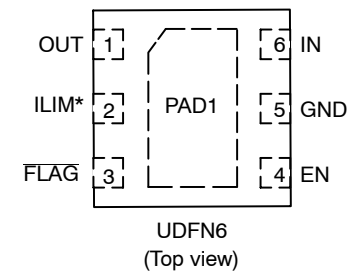
UPD63530 (IC105)



Terminal Function

Pin No.	Pin Name	I/O	RESET Status	Handling of Unused Pins	Description
1	MC_SCK	I	Hi-Z	--	3-wire serial interface pin (command communication clock) (Host interface)
2	MC_SI	I	Hi-Z	--	3-wire serial interface pin (command communication data input) (Host interface)
3	MC_SO	O	Hi-Z	--	3-wire serial interface pin (command communication data output) (Host interface)
4	CTS	O	Hi-Z	--	Output for command communication CTS control (Host interface)
5	RTS	I	Hi-Z	--	Input for command communication RTS control (Host interface)
6	DVDD	--	--	--	Power supply for internal digital circuits (1.0 V)
7	DGND	--	--	--	GND for internal digital circuits
8	IOGND	--	--	--	GND for digital I/O buffers
9	IOVDD	--	--	--	Power supply for digital I/O buffers (3.3 V)
10	SD_CD	I	Hi-Z	Pull down	Input for SD card detection (SD card interface)
11	OREG	O	O	--	Driver pin for external regulator transistor (1.0 V: Reference output)
12	REGSEN	--	--	--	Sensing input for 1.0 V internal regulator (1.0 V)
13	REGGND	--	--	--	GND for internal regulator
14	IREG	--	--	--	Power supply for OREG generator (3.3 V)
15	I.C.	--	--	GND	--
16	RESET	I	I	--	Device reset pin
17	DGND	--	--	--	GND for internal digital circuits
18	DVDD	--	--	--	Power supply for internal digital circuits (1.0 V)
19	SF_SI	I	Hi-Z	--	3-wire serial interface pin (serial data input for SD card) (Serial flash interface)
20	SF_CS	O	Hi-Z	--	3-wire serial interface pin (chip select input for serial flash) (Serial flash interface)
21	IOGND	--	--	--	GND for digital I/O buffers

NCP380 (IC106)



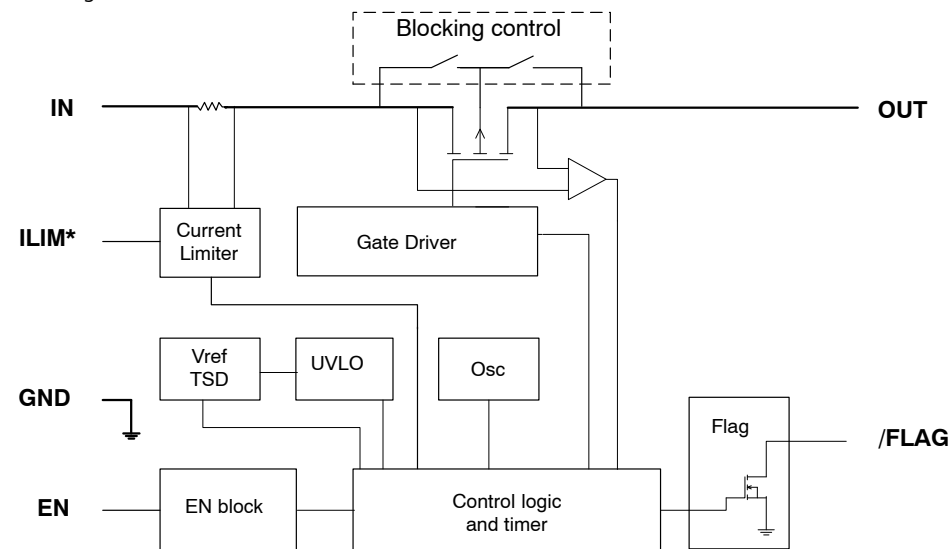
Terminal Function

Pin Name	Type	Description
EN	INPUT	Enable input, logic low/high (i.e. EN or EN) turns on power switch
GND	POWER	Ground connection;
IN	POWER	Power-switch input voltage; connect a 1 μ F or greater ceramic capacitor from IN to GND as close as possible to the IC.
FLAG	OUTPUT	Active-low open-drain output, asserted during overcurrent, overtemperature or reverse-voltage conditions. Connect a 10 k Ω or greater resistor pull-up, otherwise leave unconnected.
OUT	OUTPUT	Power-switch output; connect a 1 μ F ceramic capacitor from OUT to GND as close as possible to the IC is recommended. A 1 μ F or greater ceramic capacitor from OUT to GND must be connected if the USB requirement (i.e. 120 μ F capacitor minimum) is not met.
ILIM*	INPUT	External resistor used to set current-limit threshold; recommended 5 k Ω < R _{ILIM} < 250 k Ω .
PAD1**	THERMAL	Exposed Thermal Pad: Must be soldered to PCB Ground plane

*(For adjustable version only, otherwise not connected).

**For DFN version only.

Block Diagram



Pin No.	Pin Name	I/O	RESET Status	Handling of Unused Pins	Description
22	IOVDD	-	-	-	Power supply for digital I/O buffers (3.3 V)
23	SF_SCK	O	Hi-Z	-	3-wire serial interface pin (serial clock for serial flash) (Serial flash interface)
24	SF_SO	O	Hi-Z	-	3-wire serial interface pin (serial data output for serial flash) (Serial flash interface)
25	SD_SI	I	Hi-Z	Pull down	3-wire serial interface pin (serial data input for SD card) (SD card interface)
26	SD_SCK	O	Hi-Z	Pull down	3-wire serial interface pin (serial clock for SD card) (SD card interface)
27	SD_SO	O	Hi-Z	Pull down	3-wire serial interface pin (serial data output for SD card) (SD card interface)
28	DGND	-	-	-	GND for internal digital circuits
29	DVDD	-	-	-	Power supply for internal digital circuits (1.0 V)
30	SD_CS	O	Hi-Z	Pull down	Chip select input for SD card (SD card interface)
31	DOUT	O	Hi-Z	Pull down	Output pin for 3-wire audio interface (IIS) (External audio DAC interface)
32	ISCK/OSCK	I/O	Hi-Z	Pull down	Bit clock pin for 3-wire audio interface (IIS) (External audio DAC interface)
33	DVDD	-	-	-	Power supply for internal digital circuits (1.0 V)
34	ILRCK/OLRCK	I/O	Hi-Z	Pull down	Audio LR clock for 3-wire audio interface (IIS) (External audio DAC interface)
35	MCK	I	Hi-Z	Pull down	Clock input for 3-wire audio interface (IIS) (External audio DAC interface)
36	ACKO	O	Hi-Z	Pull down	Output pin for 3-wire audio interface (IIS) (External Audio DAC interface)
37	USB_PON	O	Hi-Z	Pull down	Output pin for power supply (USB interface)
38	USB_OC	I	Hi-Z	Pull up	Input pin for overcurrent on USB-VBUS (USB interface)

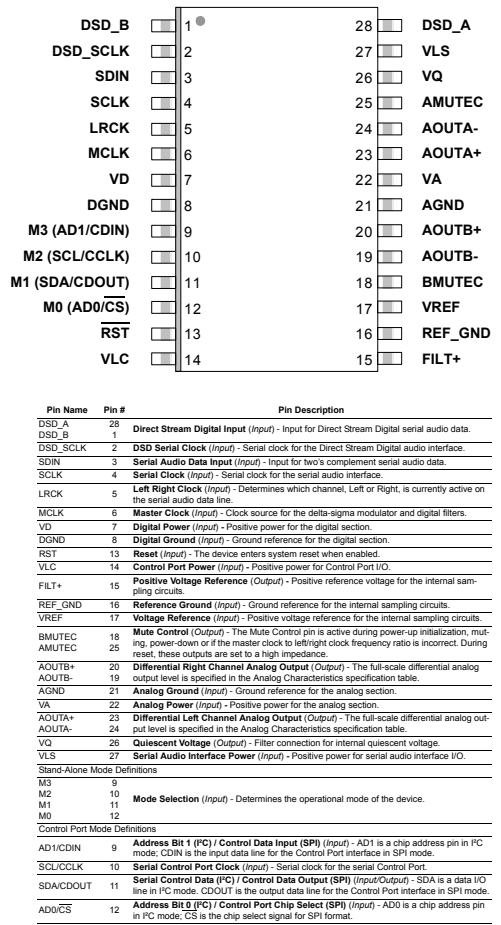
Note: This pin must be pulled up.

Pin No.	Pin Name	I/O	RESET Status	Handling of Unused Pins	Description
39	VDDQ	-	-	-	Power supply for USB (3.3 V)
40	USB_DM	I/O	L	Leave open	USB data - (minus) (USB interface)
41	USB_DP	I/O	L	Leave open	USB data + (plus) (USB interface)
42	GNDD	-	-	-	Analog GND for USB
43	IOVDD	-	-	-	Power supply for digital I/O buffers (3.3 V)
44	XTAL	I	-	-	Oscillator clock (48 MHz)
45	XTAC	O	-	-	Oscillator clock (48 MHz)
46	IOGND	-	-	-	GND for digital I/O buffers
47	PLLVDD	-	-	-	Power supply for PLL (1.0 V)
48	PLLGND	-	-	-	GND for PLL

CS4398 (IC3504)

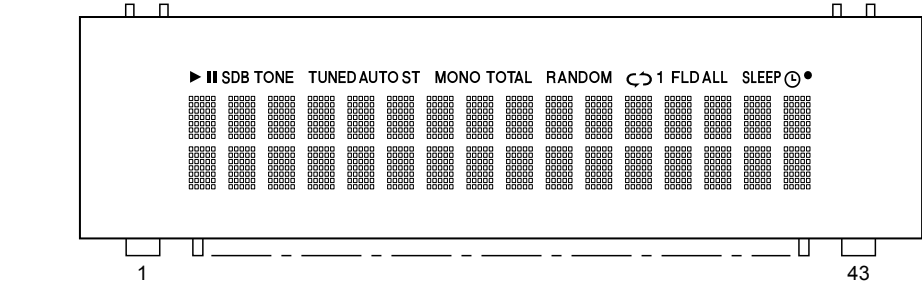
Terminal Function

Block Diagram



2. FL DISPLAY

V.F.D (FUTABA, 16ST103GINK) (U4003)



PIN CONNECTION

CONNECTION	PIN NO.
F1	1
NP	2
NP	3
NC	4
NC	5
NC	6
NC	7
NC	8
NC	9
NC	10
NC	11
NC	12
NC	13
NC	14
NX	15
NX	16
NX	17
NX	18
NX	19
NX	20
NX	21
NX	22
NX	23
NX	24
NX	25
NX	26
NX	27
NX	28
NX	29
NX	30
TSA	31
DA	32
CP	33
CS	34
RESET	35
OSC	36
VDD	37
VH	38
PGND	39
LGND	40
NP	41
NP	42
F2	43

NOTE

- 1) F1, F2 ----Filament
- 2) NP -----No pin
- 3) NC -----No connection
(NC pin should be electrically open on the PC board)
- 4) NX -----No extend pin
- 5) DL -----Datum Line
- 6) LGND ----Logic GND pin
- 7) PGND ----Power GND pin
- 8) VH -----High Voltage Supply pin
- 9) VDD -----Logic Voltage Supply pin
- 10) CP ----Shift Register Clock
- 11) DA ----Serial Data Input
- 12) TSA, B --Test pin
- 13) CS -----Chip Select Input pin
- 14) RESET --Reset Input
- 15) OSC ----Pin for self-oscillation
- 16) Solder composition is Sn-3Ag-0.5Cu.

DISASSEMBLY

Flowchart

1. TRAY PANEL

2. FRONT PANEL ASSY

3. MECHA ASSY

4. MAIN PCB

5. POWER PCB

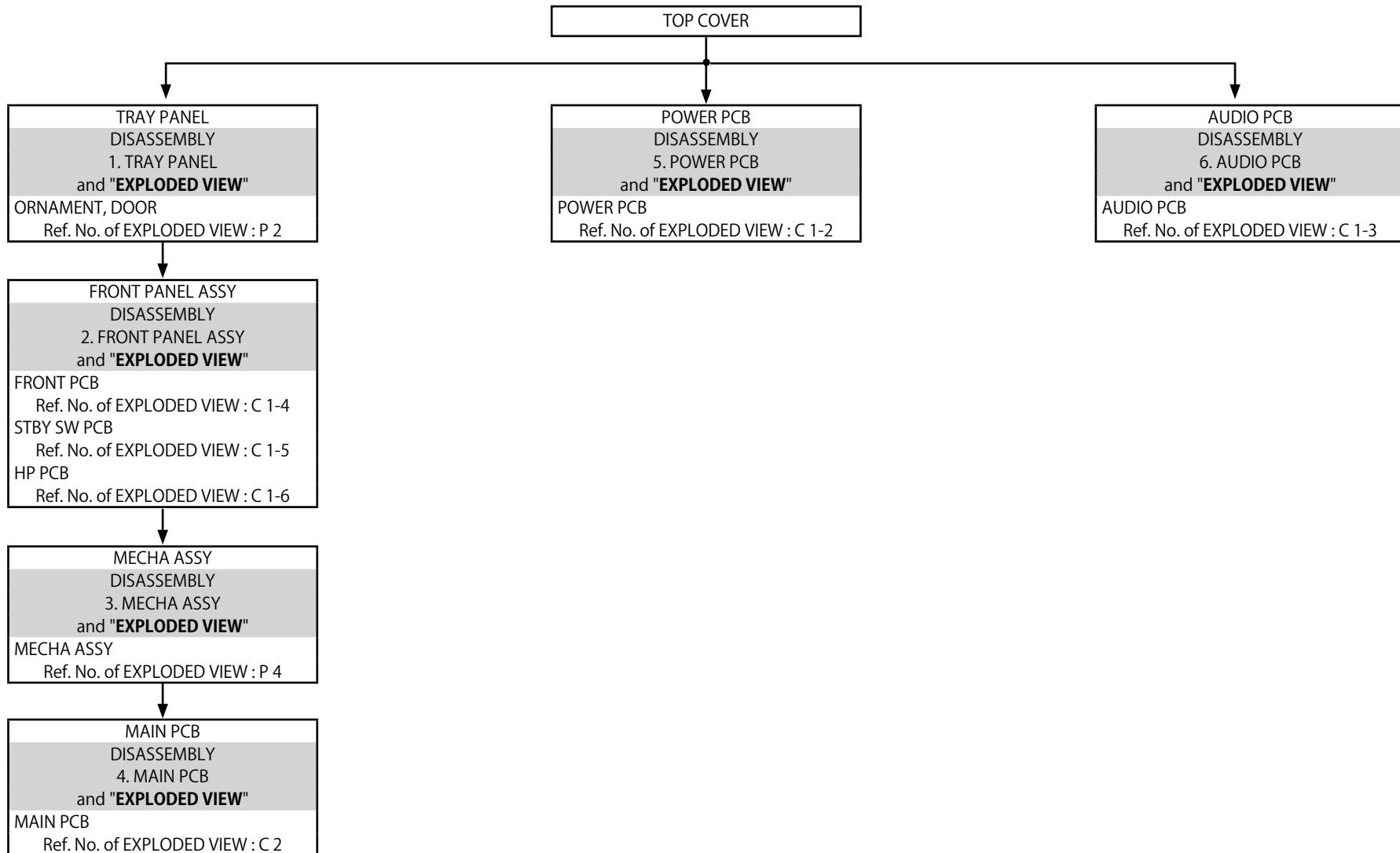
6. AUDIO PCB

EXPLODED VIEW

PACKING VIEW

Flowchart

- Remove each part following the flow below.
- Reassemble the removed parts in the reverse order.
- Read "[SAFETY PRECAUTIONS](#)" before reassembling the removed parts.
- If wire bundles are removed or moved during adjustment or part replacement, reshape the wires after completing the work. Failure to shape the wires correctly may cause problems such as noise.
- See "[EXPLODED VIEW](#)"

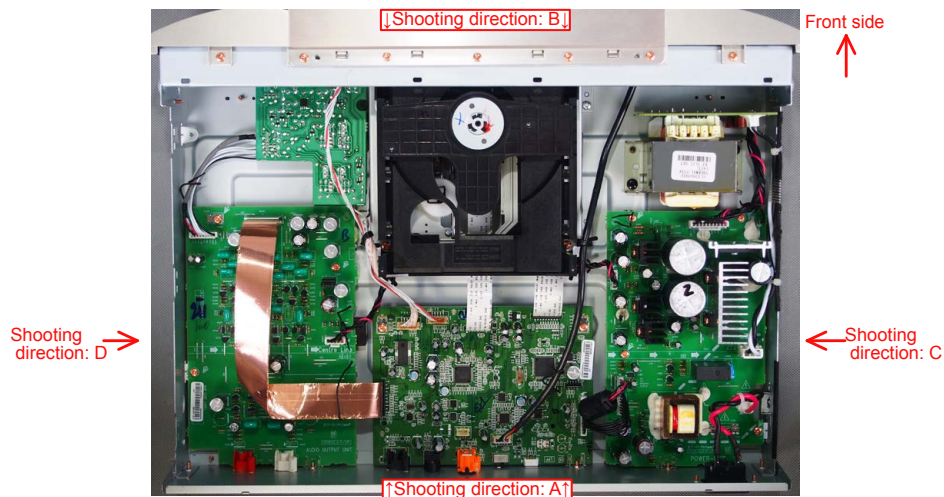


Explanatory Photos for DISASSEMBLY

- For the shooting direction of each photos used in this manual, see the photo below.
- **A, B, C and D** in the photo below indicate the shooting directions of photos.
- The photographs with no shooting direction indicated were taken from the top of the unit.
- Photos of CD6006 N1SG are used in this manual.

The viewpoint of each photograph

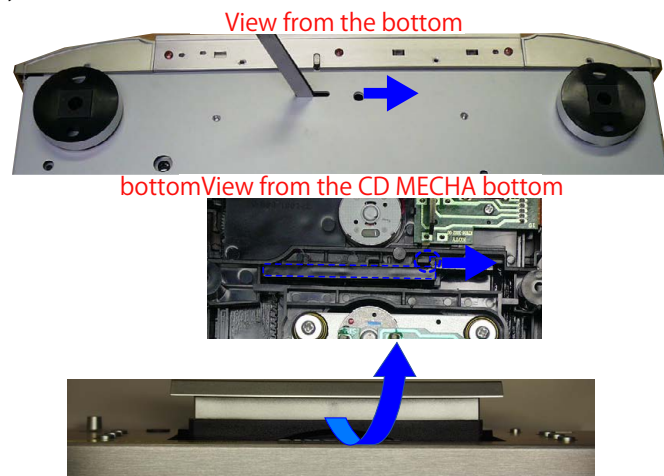
(Shooting direction : X) [View from the top]



1. TRAY PANEL

Proceeding : TOP COVER → TRAY PANEL

- (1) Open the tray and remove the TRAY PANEL.



NOTE: Please remove slowly so as not to damage the hook of Tray and LOADER PANEL.

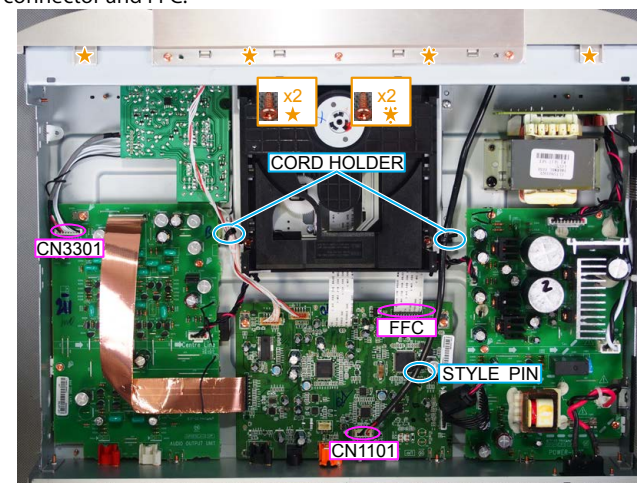
2. FRONT PANEL ASSY

Proceeding : TOP COVER → TRAY PANEL → FRONT PANEL ASSY

- (1) Remove the screws.



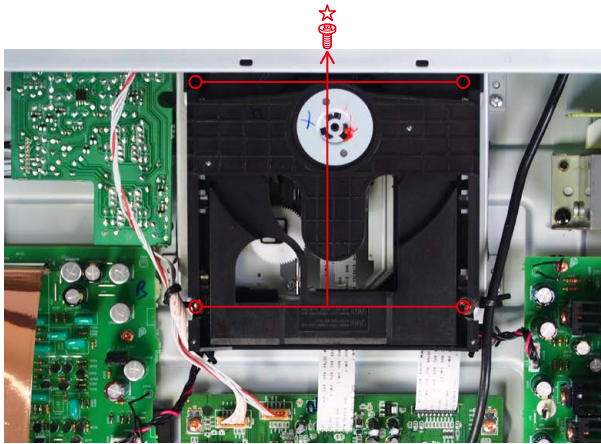
- (2) Remove the screws. Remove the STYLE PIN and CORD HOLDER. Remove the connector and FFC.



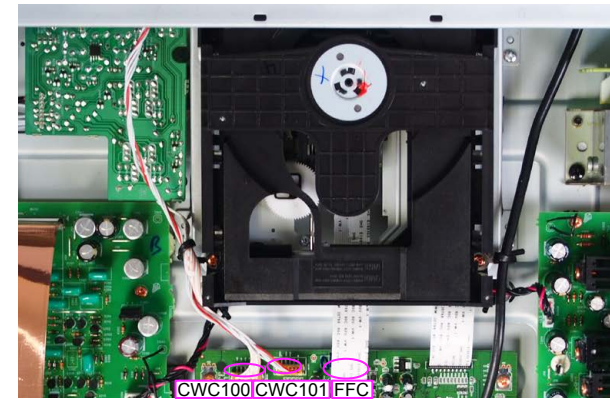
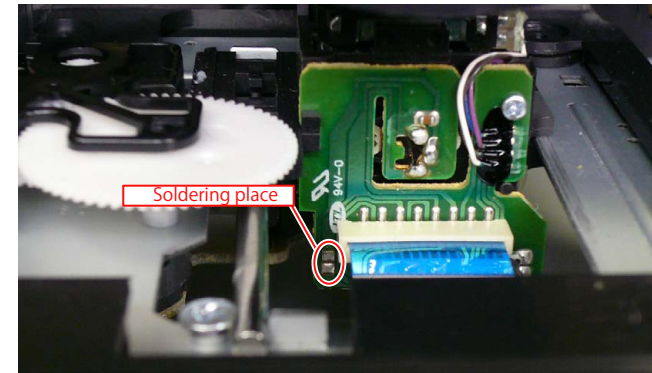
3. MECHA ASSY

Proceeding : TOP COVER → TRAY PANEL → FRONT PANEL ASSY → MECHA ASSY

(1) Remove the screws.



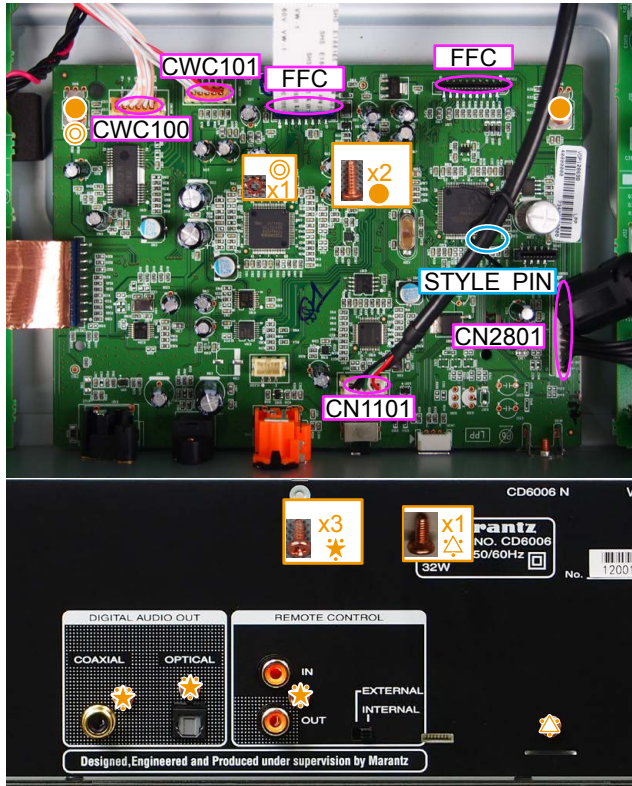
(2) Short the pickup protective solder for the CD mechanism. Then remove the connector and FFC. Be sure to wear an earth band. Remove the connector.



4. MAIN PCB

Proceeding : **TOP COVER** → **TRAY PANEL** → **FRONT PANEL ASSY** → **MECHA ASSY**
→ **MAIN PCB**

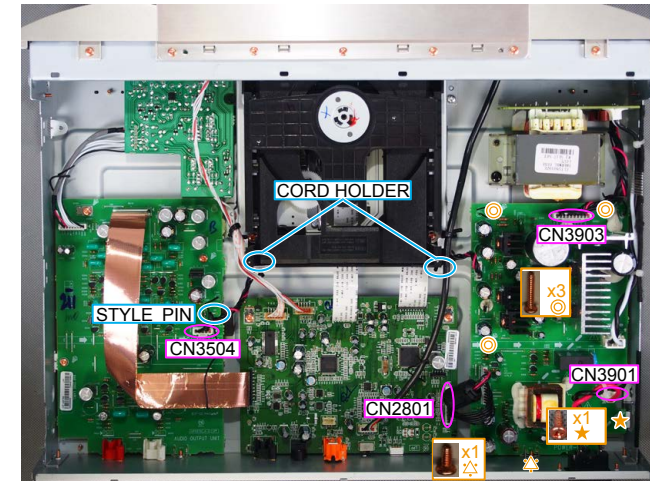
- (1) Remove the screws. Remove the STYLE PIN and connectors.
Short the pickup protective solder for the CD mechanism. Then remove the FFC.
Be sure to wear an earth band.



5. POWER PCB

Proceeding : **TOP COVER** → **POWER PCB**

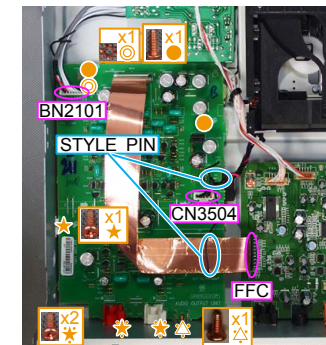
- (1) Remove the screws. Remove the STYLE PIN and CORD HOLDER. Remove the connector.

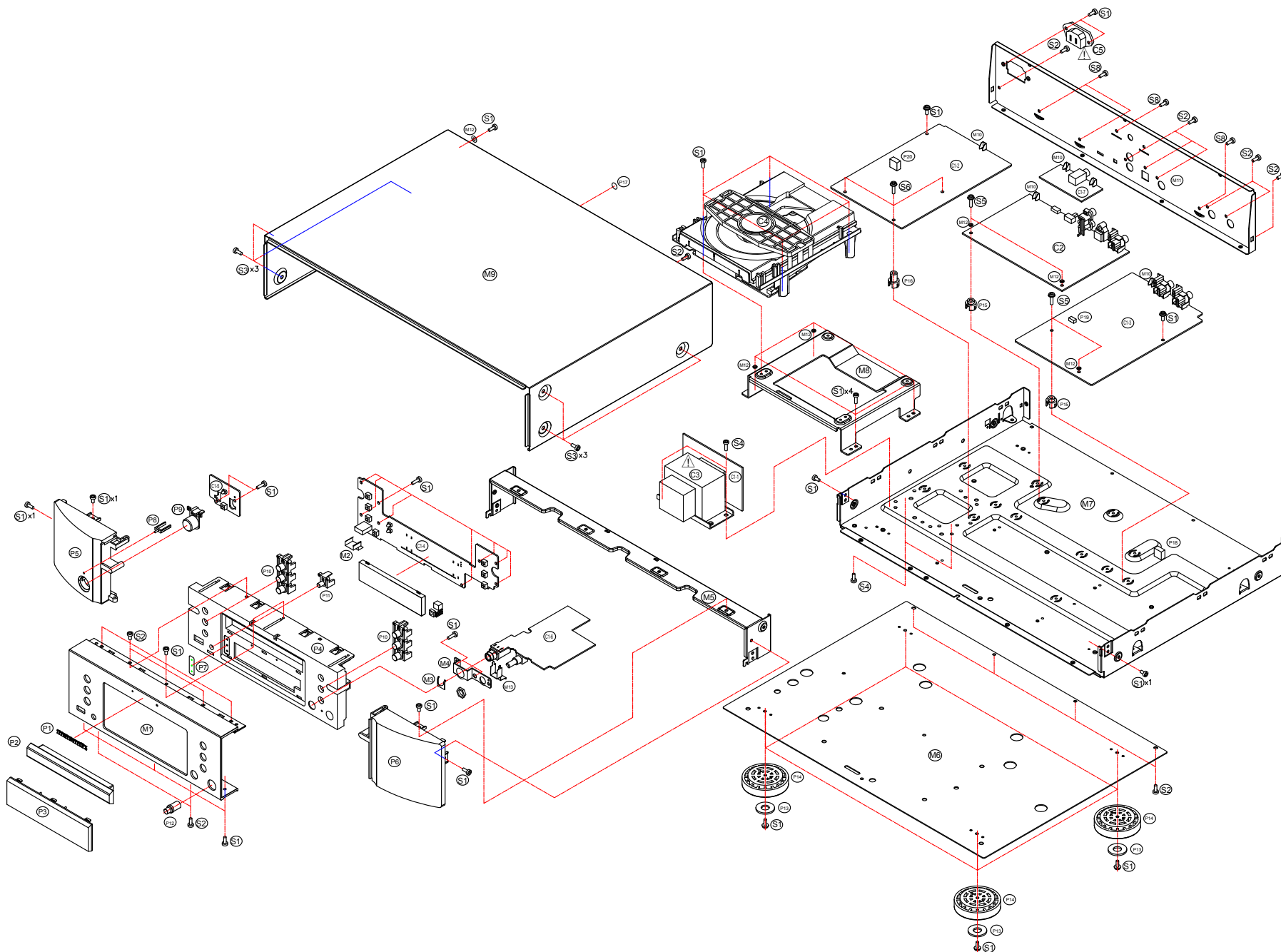


6. AUDIO PCB

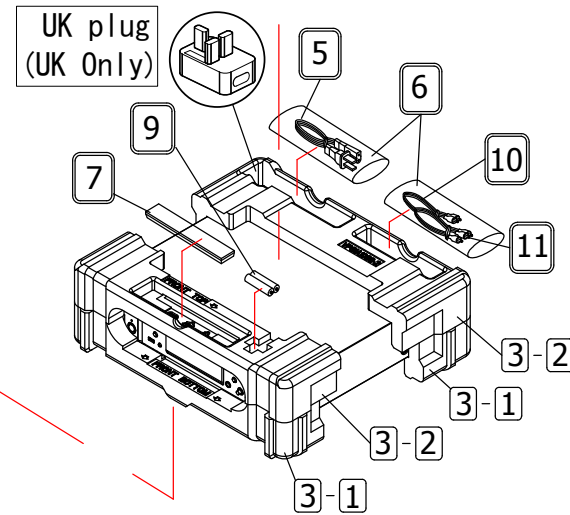
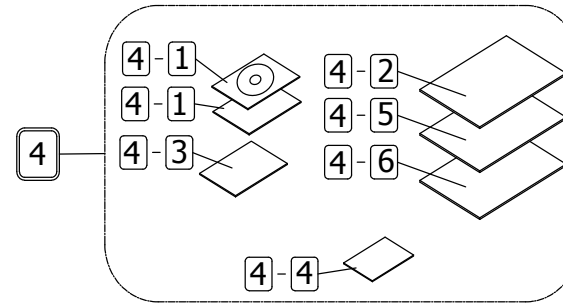
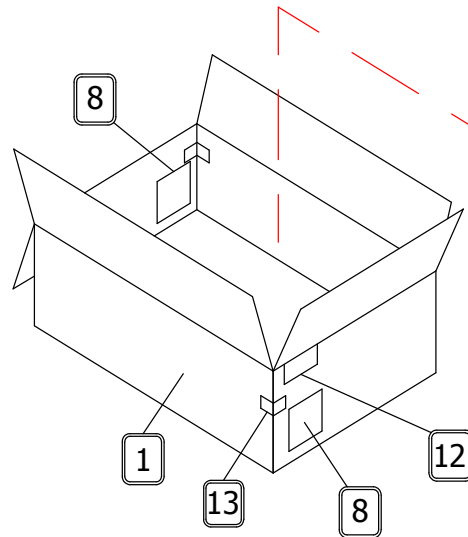
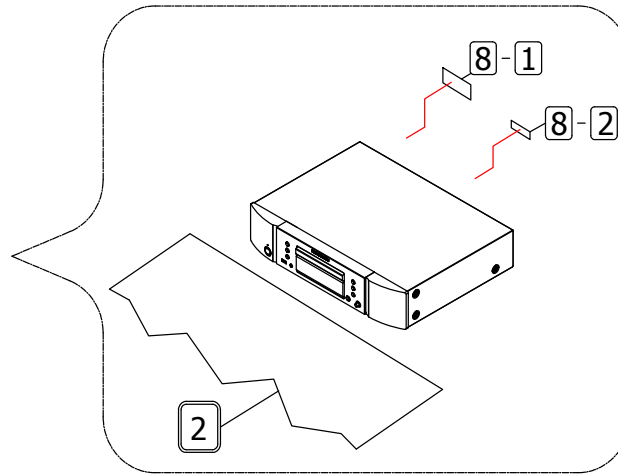
Proceeding : **TOP COVER** → **AUDIO PCB**

- (1) Remove the screws. Remove the STYLE PIN. Remove the connector and FFC.





WARNING:
Parts marked with this symbol  have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.



TROUBLE SHOOTING

- 1. POWER
- 2. FLD
- 3. No audio output.

MEASURING METHOD AND WAVEFORMS

NOTES ON HANDLING AND REPLACEMENT OF THE LASER PICK-UP

- 1. Protection of the LD
- 2. Precautions when handling the laser CD mechanism
- 3. Cautions on assembling and adjustment
- 4. Notes on Handling the Laser Pick-Up

SPECIAL MODE

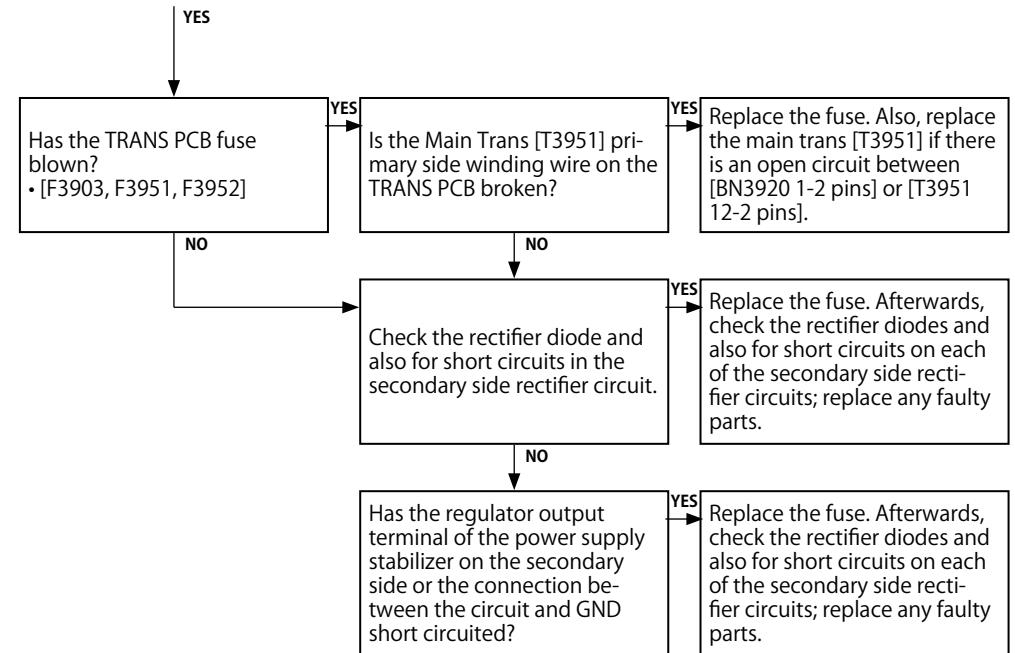
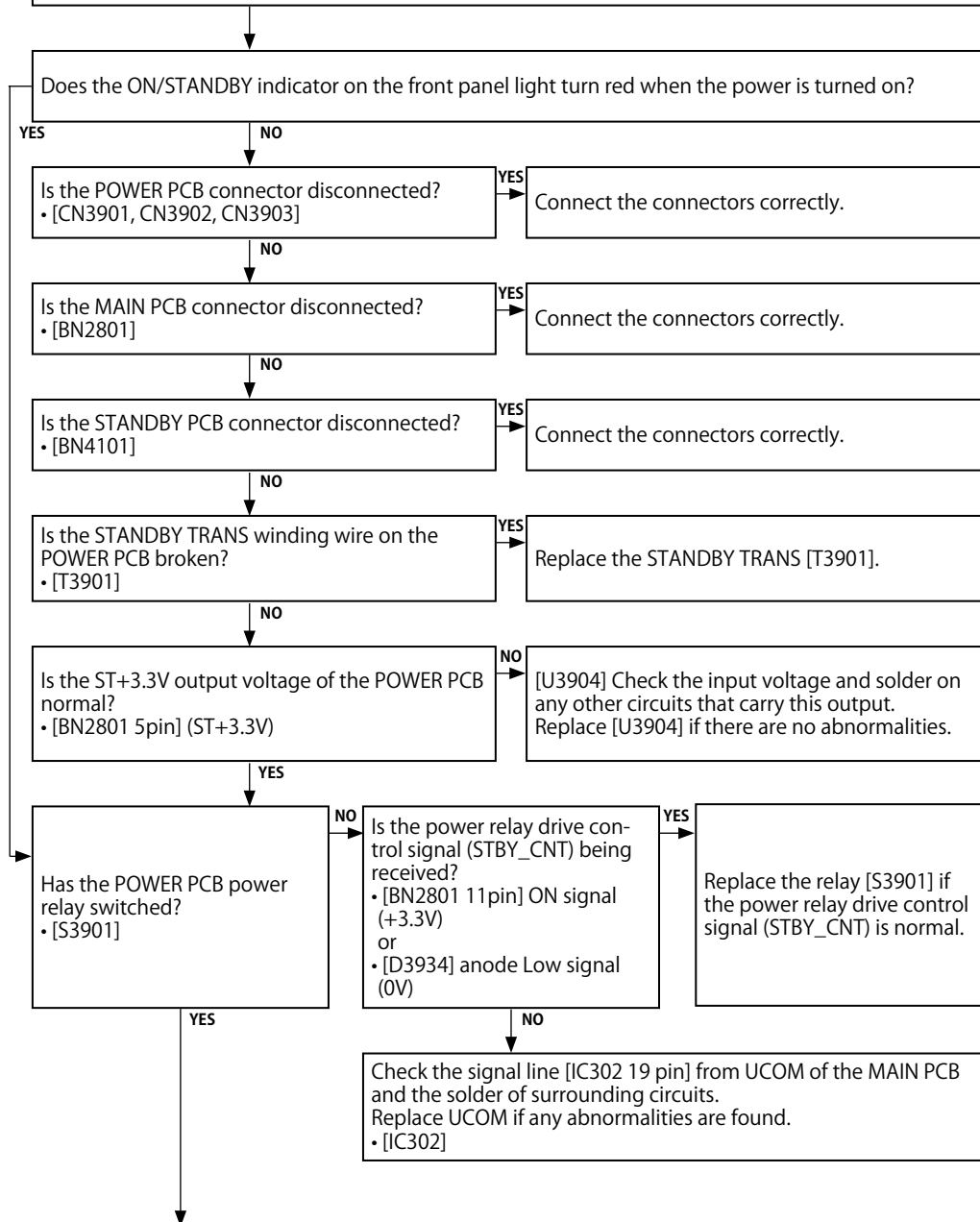
Special mode setting button

- 1. Version Display Mode
- 2. Display check mode
- 3. Initialization (cold start)
- 4. CD test mode
- 5. CD Heat run mode
- 6. Accumulated laser on time display mode
- 7. Timer check mode

TROUBLE SHOOTING

1. POWER

1.1. The unit does not power on



Caution in
servicing

Electrical

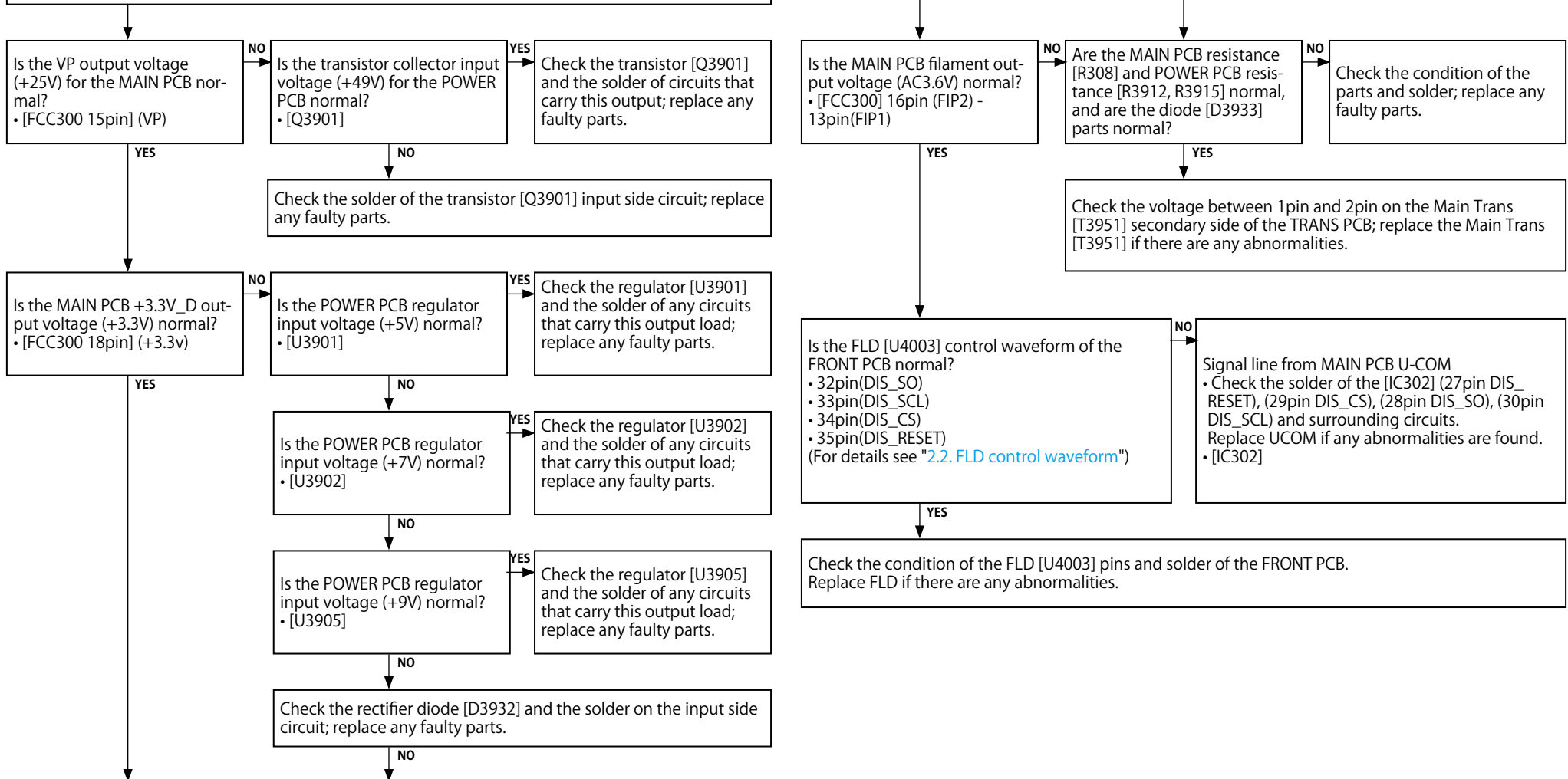
Mechanical

Repair Information

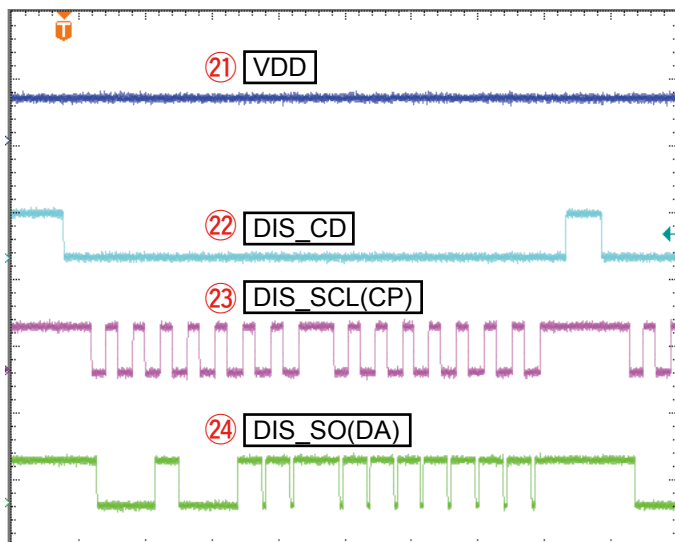
Updating

2. FLD

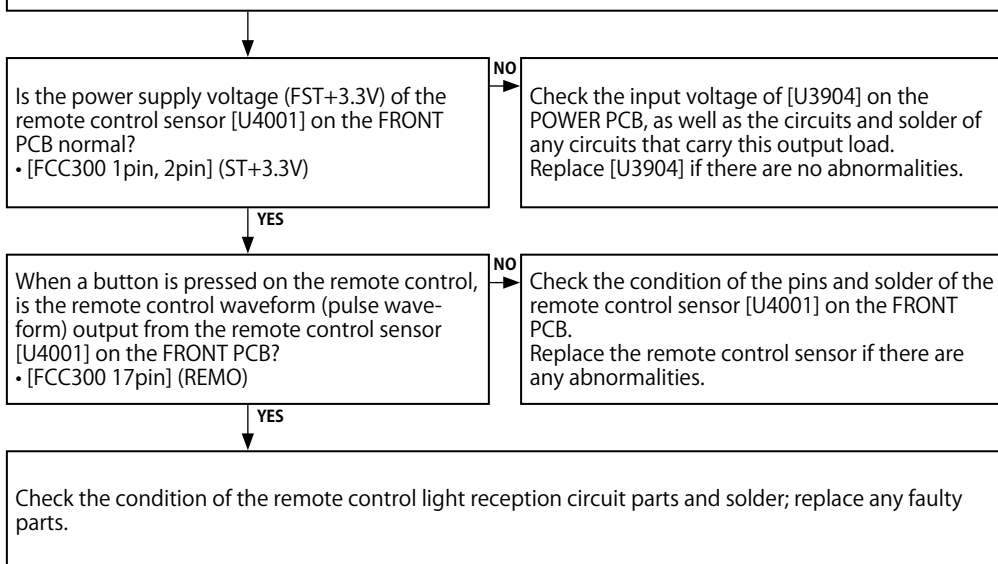
2.1. FLD is not lit



2.2. FLD control waveform

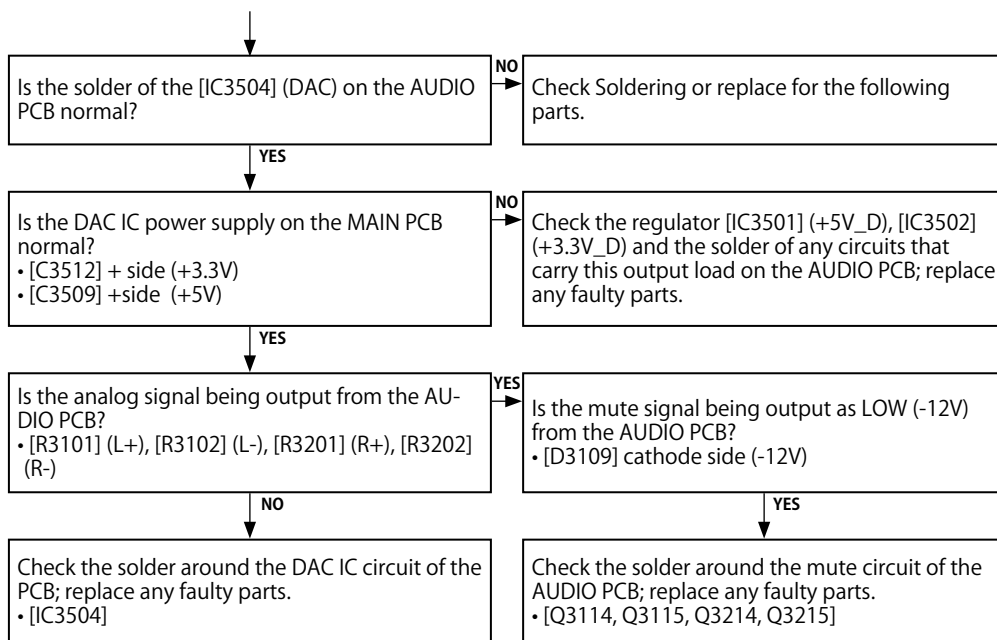
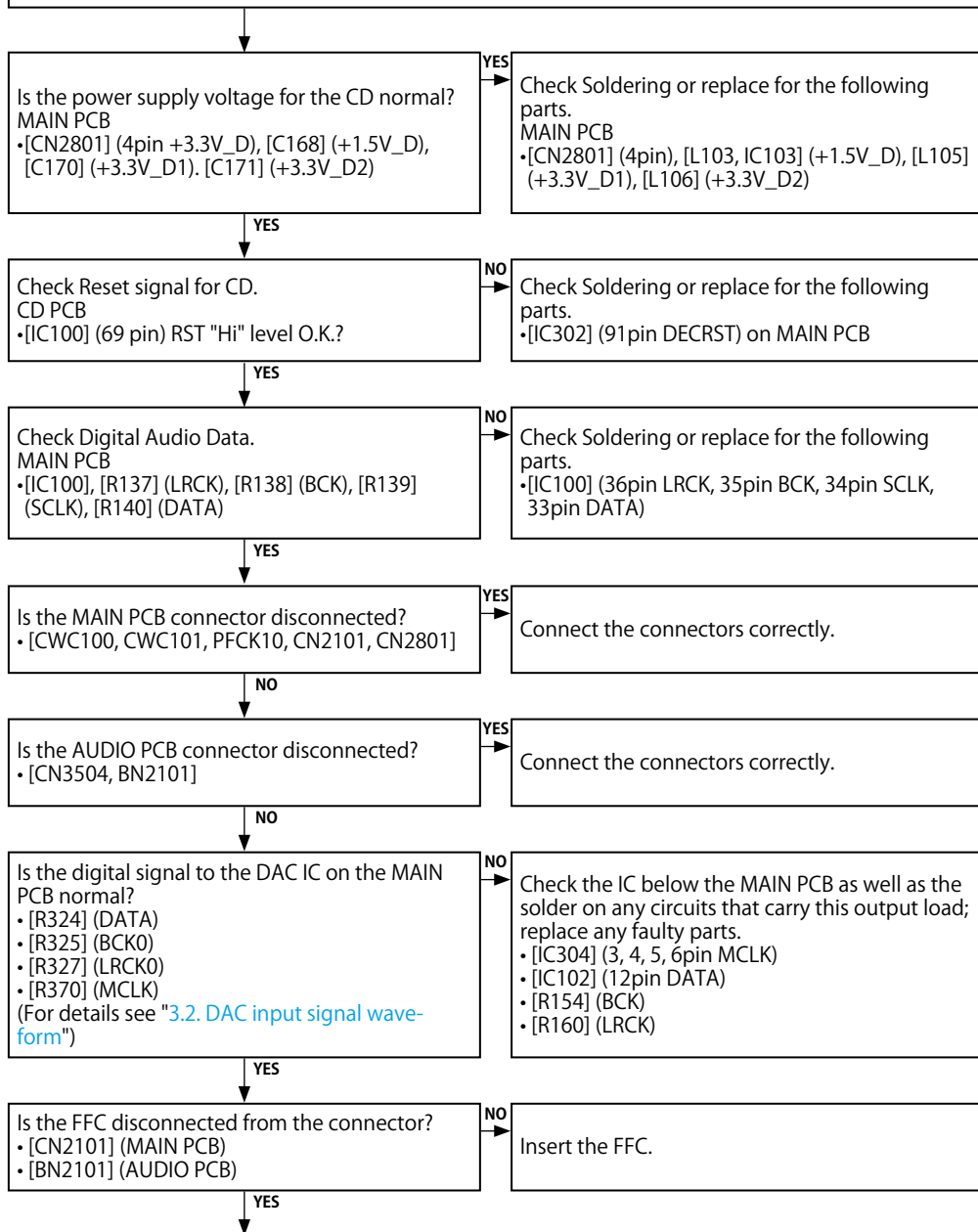


2.3. Remote control signals are not being received.

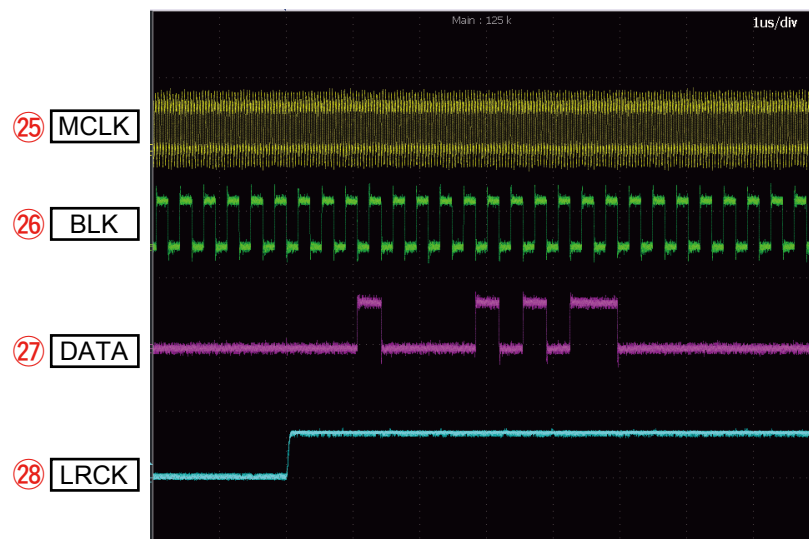


3. No audio output.

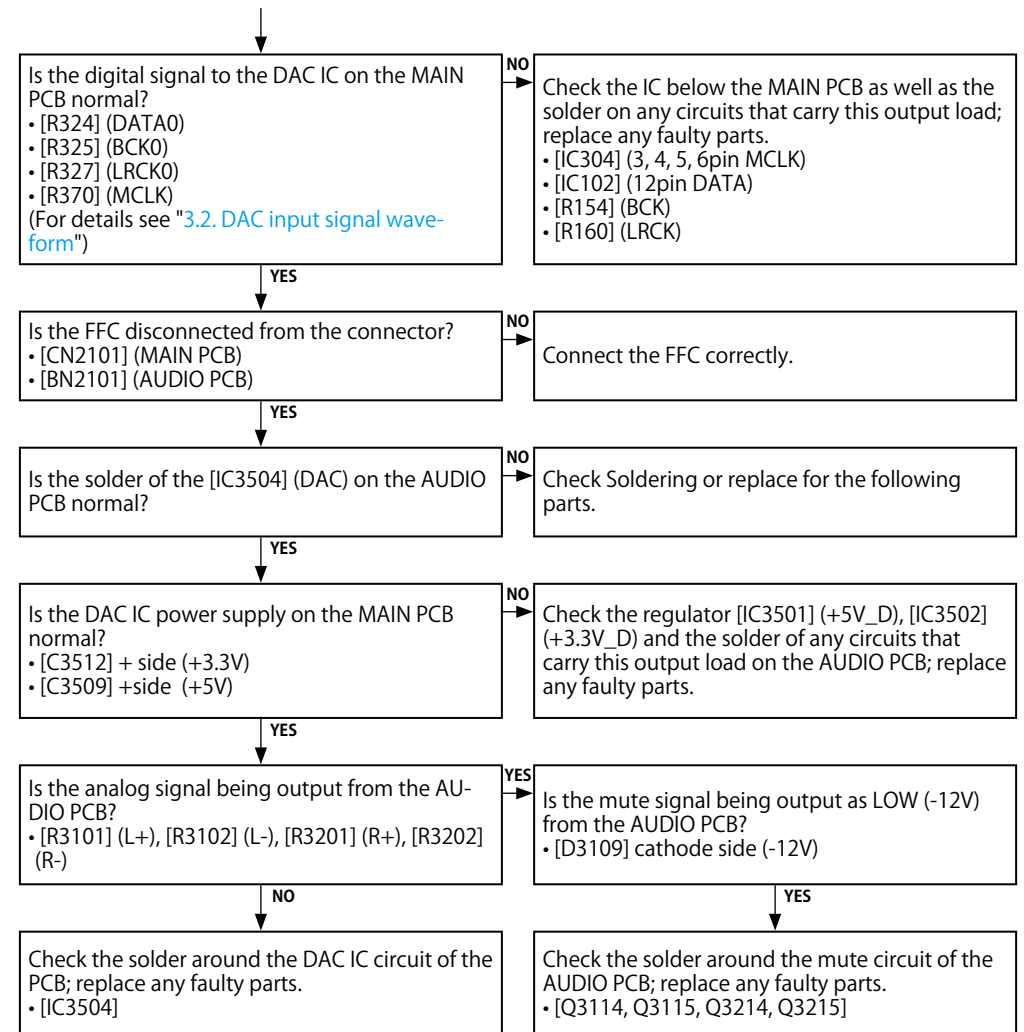
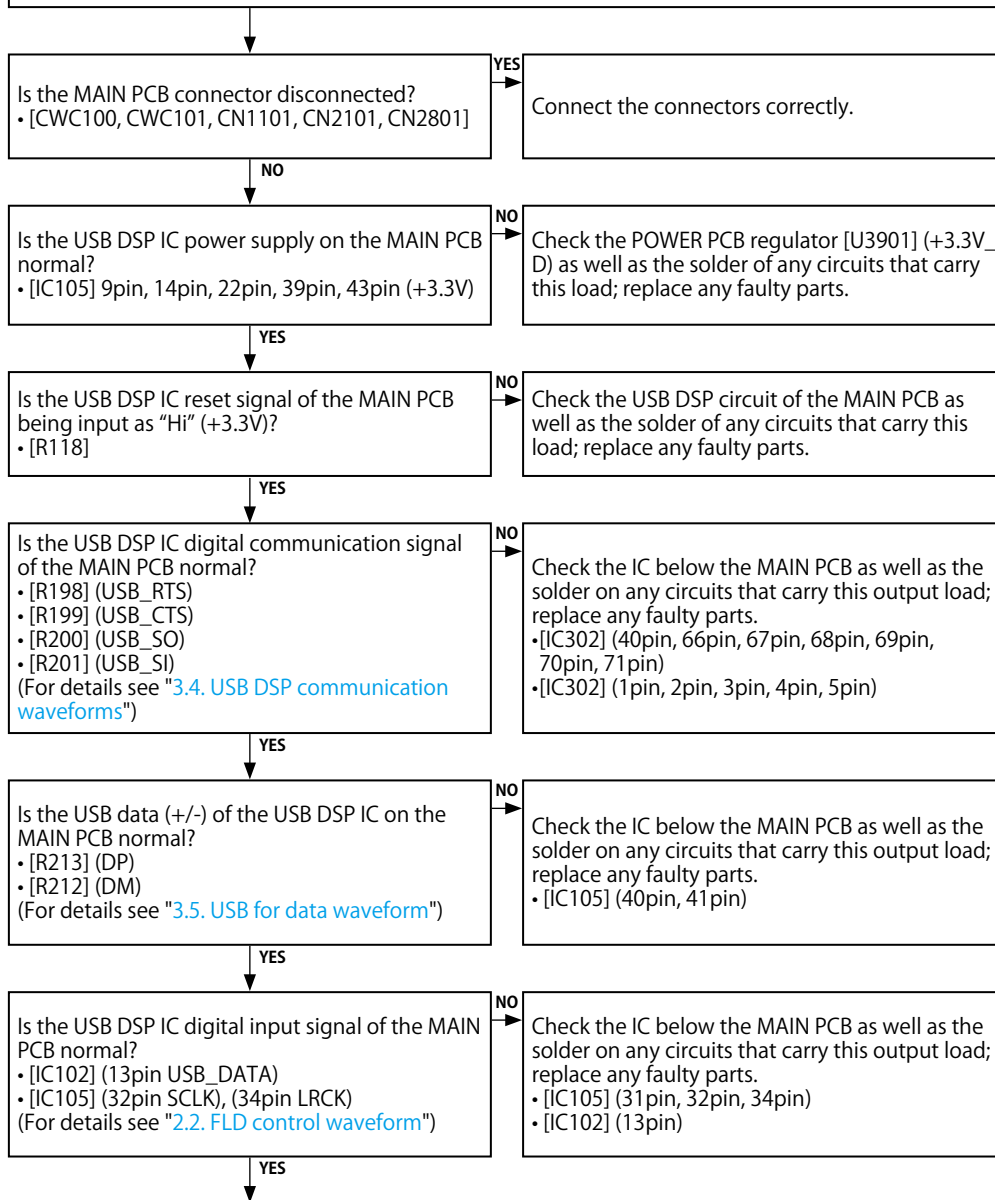
3.1. No sound is output when a CD is played back.



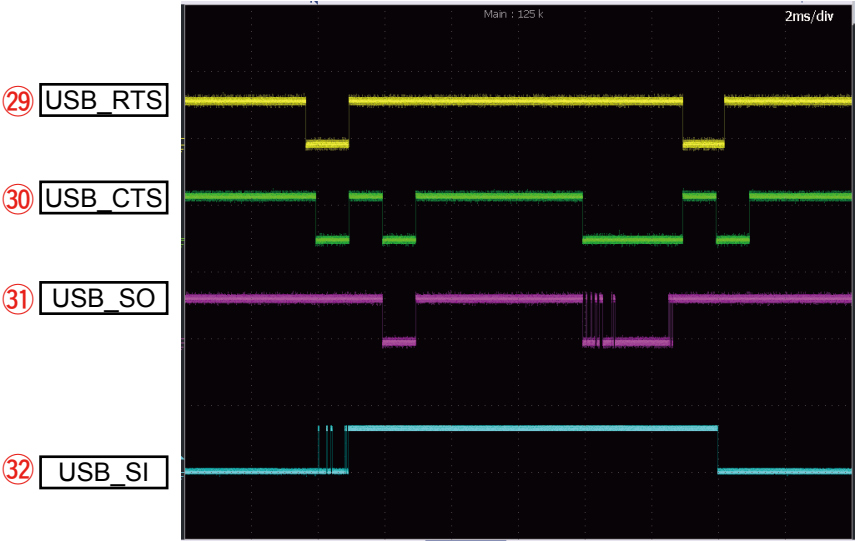
3.2. DAC input signal waveform



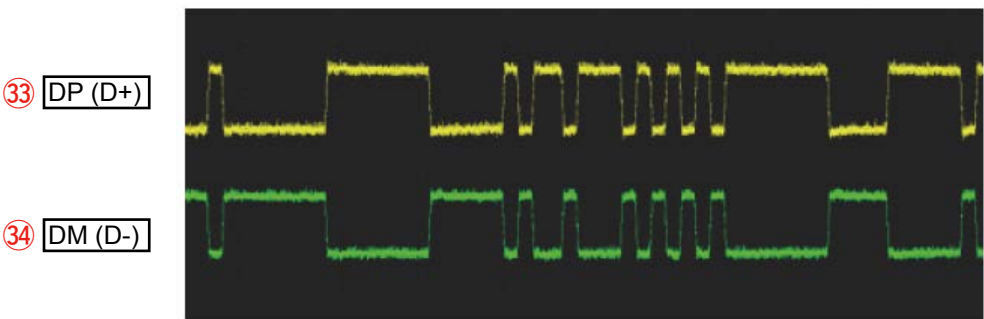
3.1. No sound is output when a USB, iPod is played back.



3.4. USB DSP communication waveforms



3.5. USB for data waveform



MEASURING METHOD AND WAVEFORMS

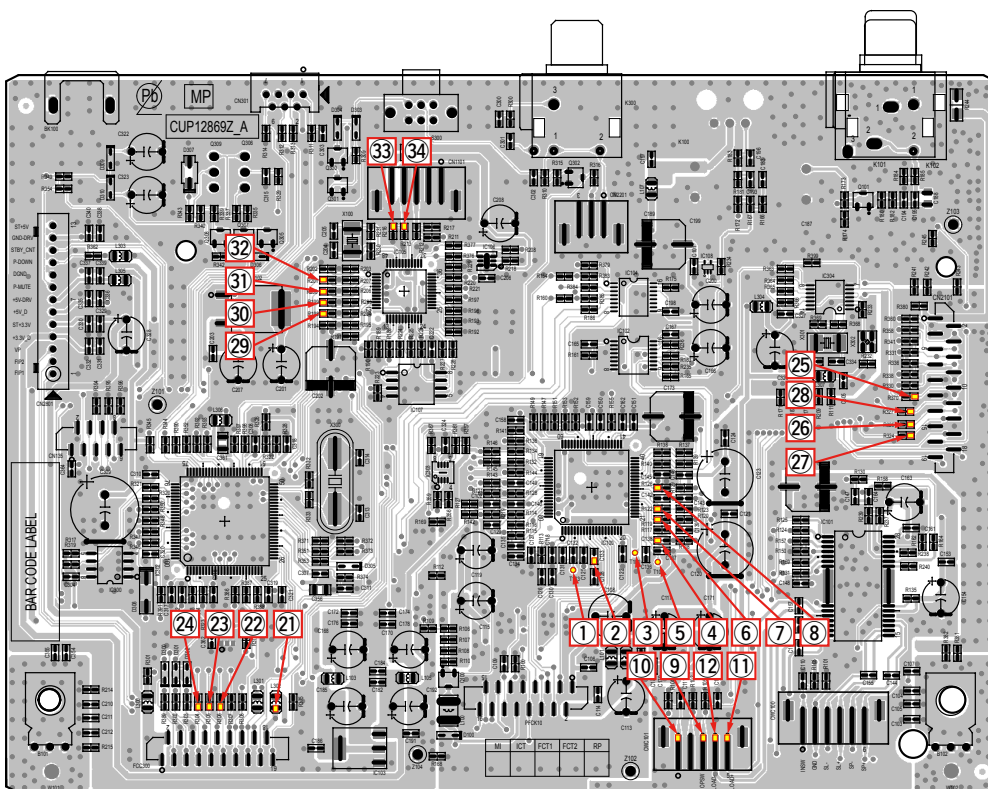
Measuring Disc : 4822 397 30184

TCD-784

(It is recommended to use extension wires between the probe and test points.)

MAIN PCB : test point

①	RFEQO	⑪	LOAD+	⑳	VDD	㉓	USB SO
②	RFO	⑫	LOAD-	㉑	DIS CD	㉔	USB SI
③	FSMONIT			㉒	DIS SCL(CP)	㉕	DP
④	FOO			㉓	DIS SO(DA)	㉖	NP
⑤	TEI			㉔	MCLK		
⑥	TRO			㉕	BLK		
⑦	FMO			㉖	DATA		
⑧	DMO			㉗	LRCK		
⑨	OP SW			㉘	USB RTS		
⑩	CL SW			㉙	USB CTS		



Caution in
servicing

Electrical

Mechanical

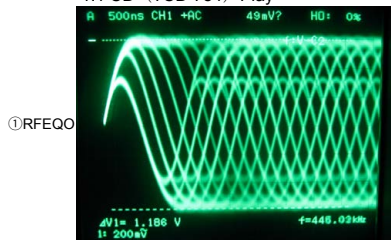
Repair Information

Updating

WAVEFORMS

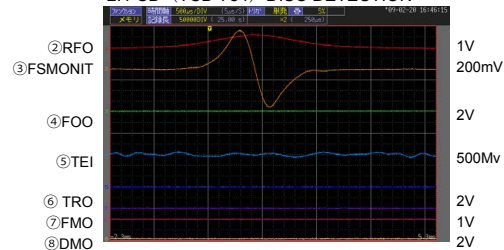
1. DISC PLAY RF WAVEFORM (EYE-PATTERN)

1.1 CD (TCD-784) Play



2. DISC DETECTION

2.1 CD (TCD-784) DISC DETECTION



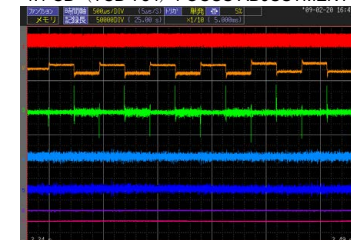
3. TOC READ

3.1 CD (TCD-784) TOC READ

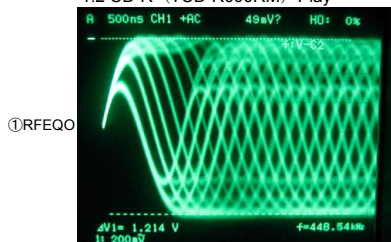


4. FOCUS ADJUSTMENT

4.1 CD (TCD-784) FOCUS ADJUSTMENT



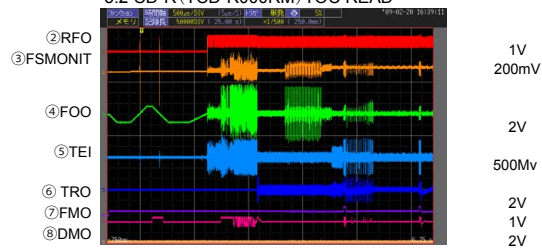
1.2 CD-R (TCD-R000RM) Play



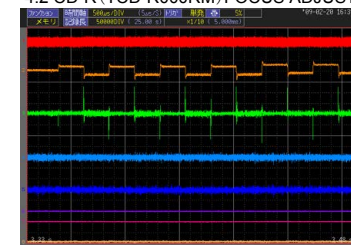
2.2 CD-R (TCD-R000RM) DISC DETECT



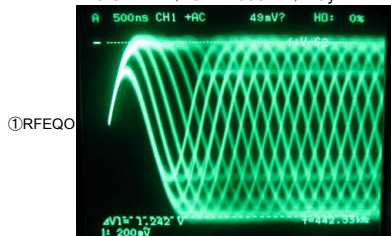
3.2 CD-R (TCD-R000RM) TOC READ



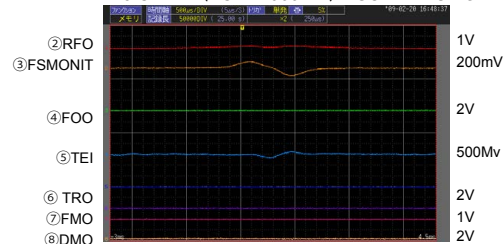
4.2 CD-R (TCD-R000RM) FOCUS ADJUSTMENT



1.3 CD-RW (TCD-W000RM) Play



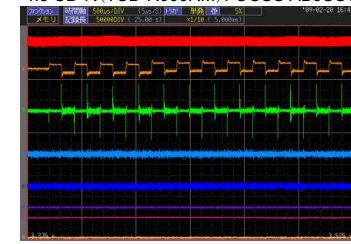
2.3 CD-RW (TCD-W000RM) DISC DETECTION



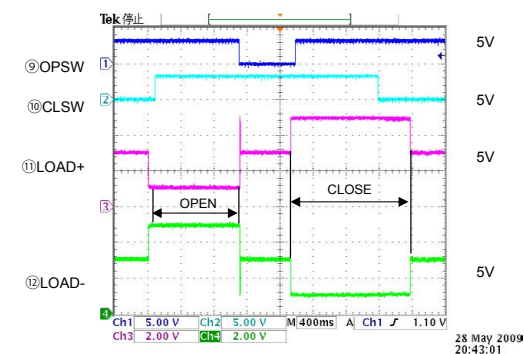
3.3 CD-RW (TCD-W000RM) TOC READ



4.3 CD-R (TCD-R000RM) FOCUS ADJUSTMENT



5. LOADER OPEN-CLOSE



NOTES ON HANDLING AND REPLACEMENT OF THE LASER PICK-UP

1. Protection of the LD

Solder a part of the LD circuit to short-circuit. After connecting the circuit, remove the soldering form. Precautions when handling the laser CD mechanism

2. Precautions when handling the laser CD mechanism

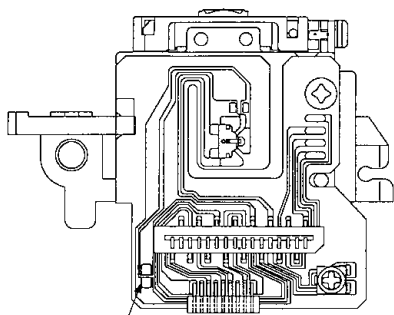
- Be careful not to expose the laser pick-up to dust.
- Do not leave the laser pick-up bare. Be sure to cover it.
- If dust adheres on the laser pick-up lens, blow it off with a blower brush.
- Do not apply shock to the laser pick-up.
- Do not watch the light of the laser pick-up.

3. Cautions on assembling and adjustment

- Be sure that the bench, jig, head of soldering iron (with ceramic) and measuring instruments are well grounded.
- Workers who handle the laser pick-up must be grounded.
- The finished mechanism (prior to anchoring in the set) should be protected against static electricity and dust. The mechanism must be stored where abnormal external force is not applied.
- When carrying the finished mechanism, hold it by the chassis body.
- Do not use or store the mechanism where corrosive gas such as H₂S, SO₂, NO₂ and Cl₂ or toxic gas may be generated, or where substances especially organosilicon, cyanide, formalin and phenolic materials exist. In particular, make sure that these substances which generate toxic gas do not exist in the set. This may cause the motor not rotating.

4. Notes on Handling the Laser Pick-Up

- Measure the ①RFEQO waveform of the MAIN PCB ASSY and check the amplitude level.
(See [MEASURING METHOD AND WAVEFORMS](#))
- If the amplitude level of the measured RFEQO waveform is between 0.4 and 1.1Vp-p, the pickup laser is OK.



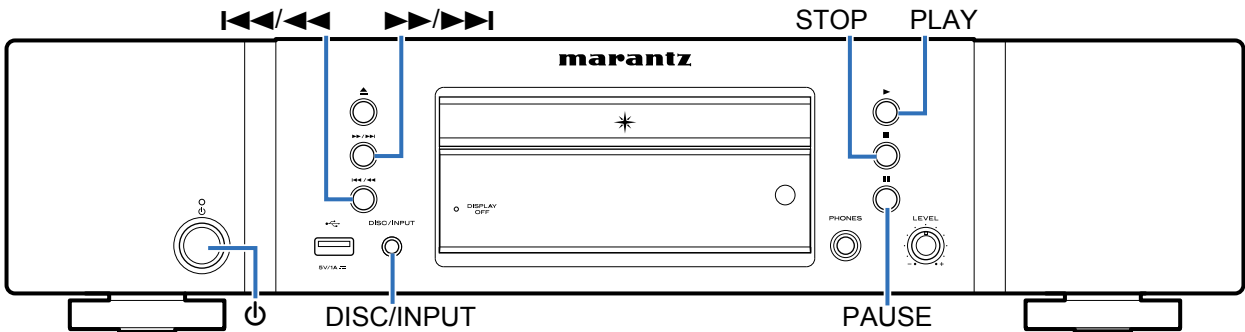
Protective soldering place for laser diode.

SPECIAL MODE

Special mode setting button

※ No. 1 - 7 : While holding down buttons "A" and "B" simultaneously, insert the AC plug into the wall outlet to turn on the power.

No.	Mode	Button A	Button B	Descriptions
1	Version Display Mode	DISC/INPUT	PLAY	The firmware version is shown on the display. Errors that have occurred are displayed. (See 1. Version Display Mode)
2	FLD check mode	DISC/INPUT	STOP	All segments on the FL display flash in a 2 second cycle. (See 2. Display check mode)
3	Initialization (cold start)	DISC/INPUT	PAUSE	Initialize the CD player. (See 3. Initialization (cold start))
4	CD test mode	⏮/⏪	PLAY	Initializing CD Player. (See 4. CD test mode)
5	CD heat Run mode	⏮/⏪	STOP	Test of CD mech. (See 5. CD Heat run mode)
6	Accumulated laser on time display mode	⏮/⏪	PAUSE	Indicates the accumulated laser on time. If the CD mechanism has been replaced, reset the laser ON accumulated time using this mode. (See 6. Accumulated laser on time display mode)
7	Timer check mode	⏭/⏩	PLAY	Not for service.



1. Version Display Mode

1.1. Actions

Version information is displayed when the device is started in this mode.

1.2. Starting up

While holding down buttons the "DISC/INPUT" and "▶" buttons simultaneously, insert the AC plug to turn the power on.

Then press the "◀◀/▶▶" or "▶▶/▶▶" button to display the information in section "1.3." on the display.

1.3. Display Order

Version of System μ -com $\rightarrow$ Version of USB μ -com $\rightarrow$ Serial number

Turn the power back on to cancel this mode.

Main μ -com :



"_Ver_#####v**"

#####:Main μ -com version Display

**:region

USB μ -com :



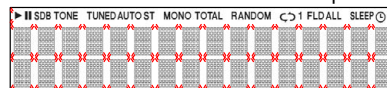
"####_##_##_##_"

#:USB μ -com version Display

2. Display check mode

While holding down buttons the "DISC/INPUT" and "■" buttons simultaneously, insert the AC plug to turn the power on.

This mode is cancelled when the power is turned off.



All segments on the FL display flash in a 2 second cycle (1 second on, 1 second off).

3. Initialization (cold start)

While holding down buttons the "DISC/INPUT" and "■" buttons simultaneously, insert the AC plug to turn the power on.

Returns to normal operation after "INITIALIZING" is displayed.



Initialized settings

DIMMER :	100%
DISC/USB :	Disc
H/P AMP GAIN :	LOW
Digital Out :	On
Timer Play :	Off
Playback Media :	Disc
Resume Play :	On
Quick Replay :	10 seconds
Auto Standby :	On (N), Off (F, U, K)
iPod Mode :	From iPod

* "Laser on time" is not deleted.

* "Initial value of laser current" is not deleted.

4. CD test mode

While holding down buttons the "◀◀/▶▶" and "▶" buttons simultaneously, insert the AC plug to turn the power on.

This mode is cancelled when the power is turned off.



* : flashes

CD test mode

No.	Mode	Button / Operation
1	Disc mounting	▲
2	Servo check	-
	LD ON	▶
	FOCUS ON	▶
	CLV ON	▶
	TRACKING ON	▶
	READ SUB CODE	▶
	BER display	▶
3	Pickup movement	◀◀/▶▶ or ▶▶/▶▶ (The pickup keeps moving while the button is pressed.)
4	STOP Servo	■
5	All servo on	■+▲
6	Display adjustment values	■ (Press after all servos are turned on.)
	FOCUS BALANCE	▶▶/▶▶
	FOCUS GAIN	▶▶/▶▶
	TRACKING BALANCE	▶▶/▶▶
	TRACKING GAIN	▶▶/▶▶
	FOCUS OFFSET	▶▶/▶▶
	TRACKING OFFSET	▶▶/▶▶
7	RFRP	▶▶/▶▶
	Displaying the laser current	■ (Press and hold for more than 1 second)

4.1. Disc loading mode

- Press the "▲" button to open the tray.
- Place the disc in the tray and press the "▲" button again to close the tray and start disc chucking.
- Return the slide to the default setting position (10mm from inner circumference) and stop it in this position.
- Remains in CD test mode.

4.2. Servo check

- Press "▶" button. Execute the following steps.

(1) LD ON(while servo is stopped)



(2) FOCUS ON (disc rotating, tracking off)

If there is no disc, the unit retries the operation and then stops.



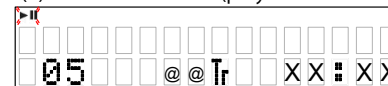
(3) CLV ON



(4) TRACKING ON



(5) READ SUB CODE (playback sound output)



* : flashes

* @@ : T.No

* XX:XX : Elapsed time

* BER: If button "▶" is pressed while SUB CODE is displayed, BER (Block Error Rate) is displayed for 2 seconds.



4.3. Pickup movement

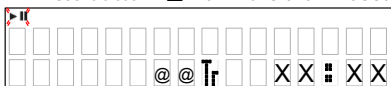
- If button "◀◀/▶▶" or "▶▶/▶▶" is pressed in the stopped state, the pickup moves in the REV (inner circumference) or FWD (outer circumference) direction.
- You can also stop the pickup by pressing the "◀◀/▶▶" button. After the inner switch is set to on, the pickup stops.
- Release the button to stop the pickup.

4.4. STOP Servo

- Press the "■" button to stop the playback operation and servo.
- After stopping, the auto adjustment values will be read.

4.5. All servo on

- If button "■" or "▲" is pressed, automatic adjustment is performed, after which the mode switches to playback operation. (Playback sound is output)
- Press button "■" first.
- Press button "■" for more than 1 second to measure the laser current.



* : flashes

4.6. Adjustment value display

- Press button "■" after turning all servos on in order to display the adjustment value.
- When "▶▶/▶▶" button is pressed, the adjustment values are displayed in the following order.

(1) FOCUS BALANCE



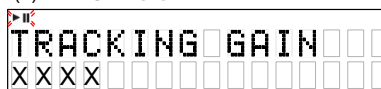
(2) FOCUS GAIN



(3) TRACKING BALANCE



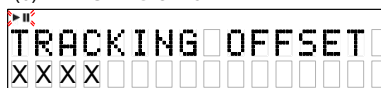
(4) TRACKING GAIN



(5) FOCUS OFFSET



(6) TRACKING OFFSET



(7) RFRP



* XXXX : adjustment values

4.7. Displaying the laser current

- Press and hold the "■" button for at least 1 second while stopped to turn the laser ON and measure and display the laser current.
- The initial current value is measured after the laser has been on for 3 seconds.
- The current value is updated every 3 seconds.
- "■" button to return to CD TEST MODE.
- Saved data is not deleted when the set is initialized (cold start).



* XX : Stored data (EEPROM)

* YY : Current value

How to overwrite saved data

- Press and hold button "▶" for more than 5 seconds while the laser current is being displayed to save the current value to EEPROM (overwrites the saved data).
- When writing is complete, "4.7. Displaying the laser current" is displayed again.
- Rewriting is performed upon shipment from the factory and when the mechanism is replaced.



5. CD Heat run mode

- Insert a disc and press the "◀◀/▶▶" and "■" buttons together while inserting the AC plug and turning on the power.
- If an error occurs, an error display appears and the operation stops immediately.
The number of operations is saved at this time.
See "1.1. Actions" for details on the error.
- Pressing the "■" button clears the heat run count.
Press button "▲" to cancel this mode and open the tray.

Details on CD heat run mode

No.	Mode	Button / Operation
1	Normal heat run mode	▶
2	Chucking	■
3	Error display	◀◀/▶▶ or ▶▶/▶▶ (While button is pressed)

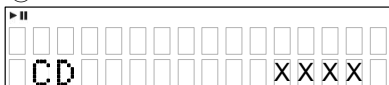
5.1. Normal heat run mode

- Press the "▶" button after the CD heat run mode starts and TOC reading is completed.
The heat run repetition count is 0 at this time.
- ① Play the disc from the first track to the last track.
- ② All tracks are played if the disc being used contains 20 tracks or less. If the disc contains 21 or more tracks, the unit plays track 1 and then skips to the last track.
- ③ When playback of the disc is finished, move the pickup to the inner circumference and open the tray.
- ④ When the loader OPEN status is detected, close the tray again and start playing the disc from the first track after TOC has been loaded.
- ⑤ An increment is added to the heat run count when the tray is opened.
- ⑥ Repeat steps ① ~ ⑤.

Displaying playback ①, ②



③



- * XXXX: heat run repetition count
The display is the same as the normal playback display, except that "▶" is lit.

5.2. Chucking mode

Press the "■" button while stopped after CD heat run mode has started and TOC reading has been completed.

The stages below are repeated.

TOC reading

Search the first track on the disc

Tray Close

- 1 is added to the heat run count after the tray is opened.

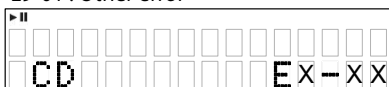


* XXXX: heat run repetition count

The display is the same as the normal playback display, except that "▶" is lit.

5.3. Error display

E1-00 : Disc cannot be detected.
 E1-01 : Tracking offset adjustment not possible.
 E1-02 : Focus offset adjustment not possible.
 E2-00 : The focus servo was disabled during playback.
 E2-01 : The focus servo was disabled during searching.
 E2-03 : The focus servo was disabled during TOC reading.
 E2-06 : The focus servo was disabled during manual search.
 E2-10 : Subcode became unreadable during playback.
 E2-11 : Subcode became unreadable during searching.
 E2-12 : Subcode became unreadable during TOC reading.
 E2-14 : Subcode cannot be read while pausing.
 E2-15 : Subcode cannot be read during manual search.
 E3-00 : TOC could not be read within the specified time.
 E3-01 : PVD/SVD analysis was not completed within the specified time.
 E4-04 : Search time out
 E4-05 : Error in communications with CD decoder
 E5-00 : Inner switch is not on.
 E6-00 : Inner switch is not off.
 E9-00 : CD u-com error
 E9-01 : Other error



* X-XX : Error cord

Heat run count at the time the error occurred

- Press the "▶▶/▶▶" button while the error is displayed.
- The heat run count is displayed for 5 seconds before returning to the error code display.



* XXXX: heat run repetition count

The track number and elapsed playback time where the error occurred is displayed.

- Press the "◀◀/◀◀" button while the error code is displayed.
- The track number and elapsed time of the track at the time the error occurred are displayed for 5 seconds before returning to the error code display.



* " _ C D _ _ _ x x Tr _ _ m : s s "
 * xx : Track Number of error occurred.
 * mm:ss: elapsed time of track at the time the error occurred

6. Accumulated laser on time display mode

While holding down buttons the "◀◀/◀◀" and "▶▶" buttons simultaneously, insert the AC plug to turn the power on.

- One count corresponds to 10 minutes. (Values under 10 minutes are discarded)
- The retained data is not updated after 10922 hours. (The display will continue to read 10922.)



Resetting the count value

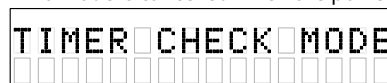
- With the accumulated laser-on time displayed, press and hold the "▶" button for over 5 second to reset the count value (overwrite the stored data).
- The display returns to the display in 6. ("00000 hour" at top) after initialization is completed.
- The Count value is reset upon shipment from the factory and when the mechanism is replaced.



7. Timer check mode

Not for service.

This mode is cancelled when the power is turned off.



UPDATING

PROCEDURE AFTER REPLACING THE U-COM, ETC.

FIRMWARE UPDATE PROCEDURE

1. Items necessary for update
2. Updating via System u-com (IC302)
3. Updating via USB-A (IC107)

PROCEDURE AFTER REPLACING THE U-COM, ETC.

The procedure after replacing the u-COM (microprocessor), flash ROM, etc. is as follows.

PCB Name	Ref. No.	Description	Procedure after Re- placement	Remark
MAIN	IC302	MB9AF344NAPMC	C	SOFTWARE : System
MAIN	IC107	I.C , SERIAL FLASH(8M)	B	SOFTWARE : USB-A

Procedure after Replacement

A : The software has been written. The software is not written at the time of replacement.

B : The software has been written. The software may need to be rewritten by version updates. Check the version.

See "[FIRMWARE UPDATE PROCEDURE](#)" for information on writing the software.

C : The software has not been written. The software needs to be written after replacement.

See "[FIRMWARE UPDATE PROCEDURE](#)" for information on writing the software.

D : The software has been written. Be sure to rewrite with the latest software for your service region.

See "[FIRMWARE UPDATE PROCEDURE](#)" for information on writing the software.

FIRMWARE UPDATE PROCEDURE

1. Items necessary for update

Items necessary for update are as follows.

Update Type	Needed Part for Update	Requirement	Offered / not Offered		
			Standard Service Equipment Not offered by D&M	Purchase from D&M Article code	Download from SDI
System u-com Update	RS-232C cable	9P (Male), Straight	X	-	-
	8U-210100S WRITING KIT	OLD JIG : SPK-581 WRITING KIT	-	8U- 210100S	-
	7P FFC	Straight	-	606050028012P	-
	FLASH MCU Programmer	-	-	-	pcwfm3-v01107.zip
Via USB	USB Stick (USB 2.0 : Min 1GB)	Formatting FAT 32	X	-	USB_CD6006_XXXX.zip

Caution in
servicing

Electrical

Mechanical

Repair Information

Updating

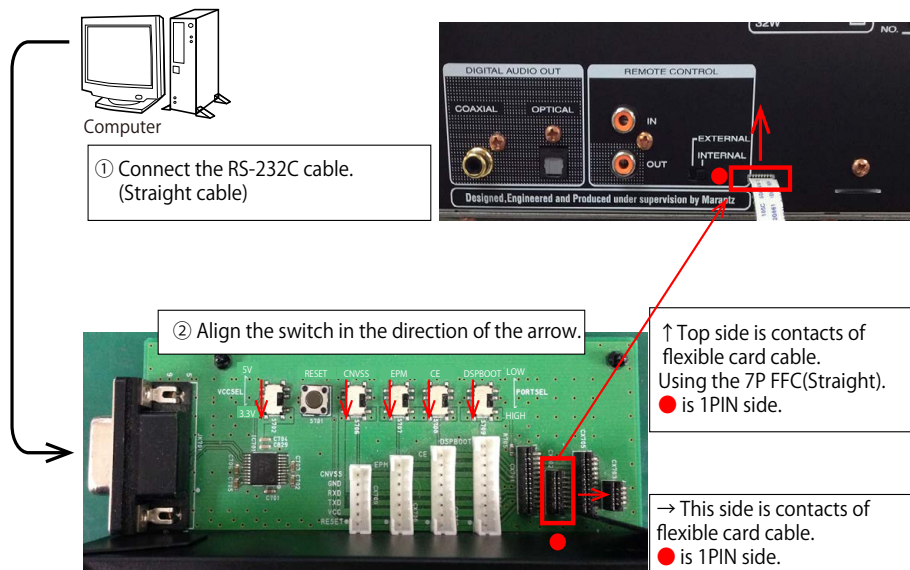
2. Updating via System u-com (IC302)

1. Items to Be Prepared

- (1) Obtain "pcwfm3-v01107.zip" from SDI.
- (2) Personal Computer (Be installed "FUJITSU FLASH MCU Programmer for FM3/FM4").
- (3) RS-232C cable (9P (Male), Straight).
- (4) 8U-210100S : WRITING KIT (OLD JIG : SPK-581 WRITING KIT)
606050028012P : 7P FFC (Straight)

2. Connecting the WRITING KIT to This Unit

- (1) Check that the power of this unit is off.
- (2) Connect the RS-232C cable to the computer and WRITING KIT.
- (3) Connect the update terminal of this unit to the WRITING KIT.



3. Installing the Software

Install the writing software "FUJITSU FLASH MCU Programmer for FM3/FM4" on your computer.

- (1) Download "pcwfm3-v01107.zip" from SDI.
- (2) Double-click "Setup.exe".



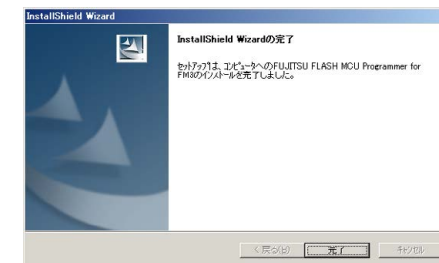
- (3) Click "Next >".



- (4) Click "Next >".



- (5) Click "Finish".

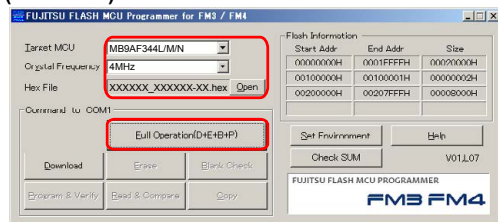


4. Run the FLASH MCU Programmer

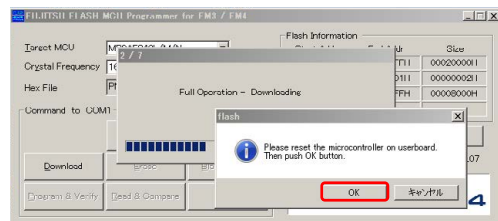
- (1) Press the power button to turn on the power.
- (2) Execute **"FUJITSU FLASH MCU Programmer for FM3/FM4"** after installing it on your computer.
Double-click **FLASH MCU Programmer** to launch **FLASH MCU Programmer Start**.



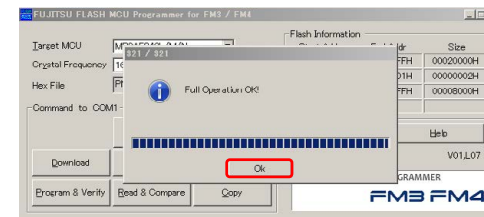
- (3) Target MCU : Select **"MB9AF344L/M/N"**
Crystal Frequency : Select **"4MHz"**
Hex File : Select the file to be **"Update"** (CD6006_XXXXXX-XX.hex)
Click **"Full Operation(D+E+B+P)"**



- (4) Click **"OK"**.



- (5) The following display appears when the firmware update is complete.
Click **"OK"**.



- (6) Initialize this unit.
Remove the AC plug.
While holding down buttons the **"DISC/INPUT"** and **"II"** buttons simultaneously, insert the AC plug to turn the power on.
- (7) After updating the firmware, check the version.
See ["1. Version Display Mode"](#)

3. Updating via USB-A (IC107)

The latest firmware can be downloaded to a USB memory for updates.

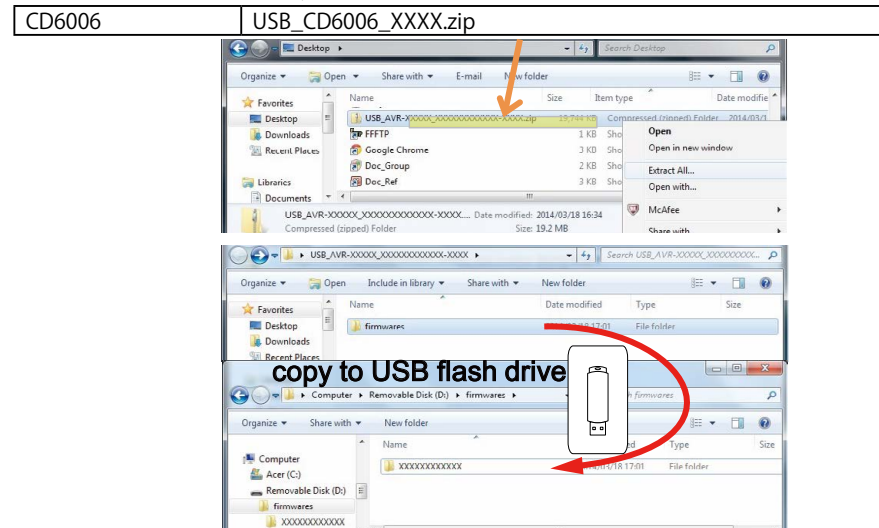
3.1. Connecting to the USB Memory

(1) Preparation

- Use a memory that supports USB2.0.
- USB format : Prepare a USB memory formatted in FAT16 or FAT32.
- Do not run the USB memory through a hub.
- Do not connect a computer to the USB port of this unit using a USB cable.
- Do not use an extension cable when connecting the USB unit.
- If a USB memory device cannot be updated, replace it with a different USB memory device and perform the update again.

3.2. Unzipping the Downloaded File

Unzip the downloaded file on your computer.

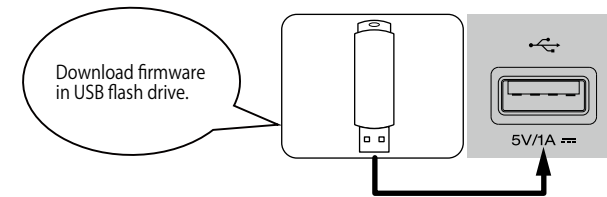


The "**DCD1650U.BIN**" file is created upon unzipping the file.

Copy that file to USB flash drive.

The "**DCD1650U.BIN**" file must be in the root directly of the USB flash drive (memory).

3.3. Insert the USB memory into the USB port.



3.4. Start the update.

While holding down buttons the "▶▶/▶▶!" and "■" buttons simultaneously, insert the AC plug to turn the power on.

3.5. Display during USB update



(1) Indication during the version up



x : Retry count, YYY : Progress rate (0-100%)

(2) Completion display



(5) Remove the AC plug after the update is completed.

Remove the USB memory device.

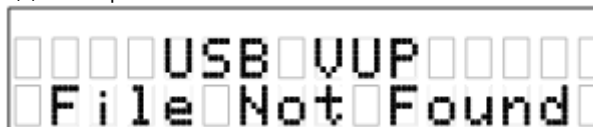
It takes about 10 seconds to complete the writing procedure.

(6) After updating the firmware, check the version.

See "1. Version Display Mode"

3.6. Error display

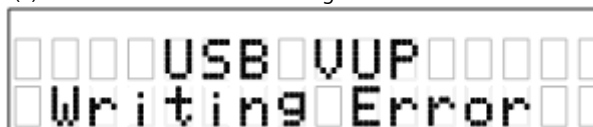
(1) If the update file name is incorrect



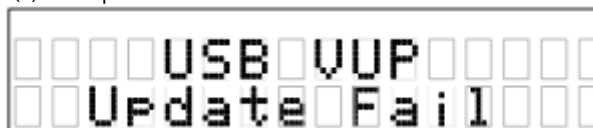
(2) If the update file configuration is incorrect



(3) If an error occurs when writing to the flash ROM



(4) USB Update fails



---Cautions on Firmware Update---

- Never remove the USB memory before the update is finished.
- Do not turn off the power until updating is completed.
- It takes around 10 seconds to complete the update.

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FR,PW,AD								
	REF No.	Part No.	Part Name	Remarks		Q'ty	New	Ver
	B4301	nsp	WIRE ASS'Y		CWE8202150RV	1		
	BK10	nsp	BRACKET , PCB	U	CMD1A569-V1	1		
	BK11	nsp	BRACKET , PCB	U	CMD1A569-V1	1		
	BK12	nsp	BRACKET , PCB		CMD1A569-V1	1		
	BK13	nsp	BRACKET , PCB		CMD1A569-V1	1		
	BK41	nsp	EARTH PLATE (HP)		VMC1A491	1	*	
	BN1101	nsp	USB WIRE ASS'Y (5PIN,350MM,61205032500AS)		CWZCD6004B1101	1		
	BN2101	nsp	WAFER, FFC(19P-1.25mm, STRAIGHT)		CJP19GA115ZY	1		
	BN2201	nsp	WIRE ASS'Y (3PIN,140MM,61205032800AS)	U	CWZCD6004B2201	1		
	BN2801	nsp	WIRE ASS'Y (13PIN,80MM,61205032400AS)		CWZCD6004B2801	1		
	BN3301	nsp	WIRE ASS'Y(9P, SHIELD, 120mm, 2.0mm)		CWB1C0091207E001	1	*	
	BN3504	nsp	WIRE ASS'Y (5PIN,300MM,61205032600AS)		CWZCD6004B3504	1		
	BN3902	nsp	WIRE ASS'Y(2P, 220mm,3.96mm)		CWB4D932200UZ	1	*	
	BN3903	nsp	WIRE ASS'Y (10PIN,120MM,61205032300AS)		CWZCD6004B3903	1		
	BN4101	nsp	WIRE ASS'Y (5PIN,40MM,61205032700AS)		CWZCD6004B4101	1		
	CN3301	nsp	WAFER, STRAIGHT, 9PIN		CJP09GA19ZY	1		
	CN3504	nsp	LOCKING TYPE , STRAIGHT WAFER , 2.5MM		CJP05GI237ZW	1		
	CN3901	nsp	WAFER, 2P, 3.96mm		CJP02KA060ZY	1		
	CN3902	nsp	WAFER, 2P, 7.92mm		CJP02GA89ZY	1		
	CN3903	nsp	LOCKING TYPE , STRAIGHT WAFER , 2.5MM 10PIN		CJP10GI237ZW	1		
	CN4101	nsp	WAFER , STRAIGHT		CJP05GA19ZY	1		
	F3001	nsp	HOLDER , FUSE		KJCFCS5	2		
!	F3001	90M-FS001370R	FUSE(218Series, 250V/630mA)	U, F	KBA2C0630TLEY	1		2
!	F3001	90M-FS001260R	FUSE(218Series, 250V/315mA)	N, K	KBA2C0315TLEY	1		
!	F3903	943652500330M	FUSE(372 Series/4A/TR5)		CBA2D4000A3EYT	1		
!	F3951	90M-FS001530R	FUSE(0.8A, 372 SERIES/TR5)		KBA2D0800A3EYT	1		
!	F3952	90M-FS001530R	FUSE(0.8A, 372 SERIES/TR5)		KBA2D0800A3EYT	1		
	FCB300	nsp	WAFER, FFC(19P-1mm, STRAIGHT)		CJP19GA117ZY	1		
	K3101	943643002370S	JACK , 1P BOARD (WHITE, GD PLATE)		CJJ4M064Z	1		
	K3201	943643002380S	JACK , 1P BOARD (RED, GD PLATE)		CJJ4M065Z	1		
	K3601	90M-YT004860R	JACK, STEREO (BLK MOLD)	U	CJJ2D008Z	1		
	K4003	943643100150S	JACK , USB STRAIGHT(BLACK)		CJJ9X006Z	1		
	K4301	943643102640M	JACK , PHONE(6.3mm,4PIN,Silver)		CJJ2E036Z	1		
	L3301	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L3302	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L3303	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L3304	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L3305	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L3306	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L3307	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L3405	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L4001	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L4002	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L4003	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L4004	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L4301	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L4302	nsp	FERRITE , CHIP BEAD(60ohm, 2012)		CLZ9R001Z	1		
	L4303	nsp	FERRITE , CHIP BEAD(60ohm, 2012)		CLZ9R001Z	1		
	L4304	nsp	FERRITE , CHIP BEAD(60ohm, 2012)		CLZ9R001Z	1		
	L4305	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L4306	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L4307	nsp	FERRITE , CHIP BEAD(60ohm, 2012)		CLZ9R001Z	1		
	L4308	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L4401	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
!	S3901	943682100540S	RELAY ,DC6V , 1C1P, 0.25W		CSL1E007ZE	1		
	S4001	00D9430004402	SW , TACT		CST1A012ZT	1		
	S4002	00D9430004402	SW , TACT		CST1A012ZT	1		
	S4003	00D9430004402	SW , TACT		CST1A012ZT	1		
	S4004	00D9430004402	SW , TACT		CST1A012ZT	1		
	S4005	00D9430004402	SW , TACT		CST1A012ZT	1		
	S4006	00D9430004402	SW , TACT		CST1A012ZT	1		
	S4007	00D9430004402	SW , TACT		CST1A012ZT	1		
	S4101	00D9430004402	SW , TACT		CST1A012ZT	1		
!	T3901	943101002880M	TRANS , SUB C515	U	CLT5I009ZU	1		
!	T3901	90M-TS003180R	TRANS , SUB CD6002/N	N, K	CLT5I009ZE	1		
!	T3901	90M-TS003170R	TRANS , SUB CD6002/F	F	CLT5I009ZJ	1		
	U3601	262010007707S	REMOTE SENSOR , R94EV1A	U	CRVR94EV1A	1		
	V4301	943129500940M	V092Q20FA103 (METAL)(00D2115646001)		CVV2U02A103Z	1		
	Z3501	nsp	WIRE ASS'Y(1P, 80MM,BLK,#22)		CWE5202080A	1		
	Z3503	nsp	WIRE ASS'Y(1P, 80MM,BLK,#22)		CWE5202080A	1		
	Z3504	nsp	WIRE ASS'Y(1P, 80MM,BLK,#22)		CWE5202080A	1		
	Z3911	nsp	WIRE ASS'Y(1P, 80MM,BLK,#22)		CWE5202080A	1		
	Z4001	nsp	WIRE ASS'Y(1P, 80MM,BLK,#22)		CWE5202080A	1		
	@	nsp	FL SUPPORT		CHG1A584	2		
	@	nsp	SHIELD , CASE FLASHER	U	CMC1A441	1		

	REF No.	Part No.	Part Name	Remarks		Q'ty	New	Ver
	C304	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C306	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C307	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C308	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C309	00MOA107025Z1	CAP , ELECT (ELNA/R0S, 25V/100UF)		HCEA1ER101T	1		
	C310	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C311	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C312	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C313	nsp	CAP, CHIP(1608, 50V/27pF)		CCUS1H270JA	1		
	C314	nsp	CAP, CHIP(1608, 50V/27pF)		CCUS1H270JA	1		
	C316	nsp	CAP, CHIP(1608, 50V/100pF)		CCUS1H101JA	1		
	C317	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C318	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C319	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C320	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C321	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C324	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C326	nsp	CAP, ELECT(25V/47uF)		CCEA1EH470T	1		
	C327	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C328	nsp	CAP, ELECT(10V/100uF)		CCEA1AH101T	1		
	C329	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C330	nsp	CAP, CHIP(1608, 50V/0.01uF)		CCUS1H103KC	1		
	C331	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C332	nsp	CAP, CHIP(1608, 50V/0.01uF)		CCUS1H103KC	1		
	C333	nsp	CAP, CHIP(1608, 50V/15pF)		CCUS1H150JA	1		
	C334	nsp	CAP, CHIP(1608, 50V/15pF)		CCUS1H150JA	1		
	C335	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C336	nsp	CAP, CHIP(1608, 50V/0.01uF)		CCUS1H103KC	1		
	C337	nsp	CAP, CHIP(1608, 50V/0.01uF)		CCUS1H103KC	1		
	C339	nsp	CAP, CHIP(1608, 50V/0.01uF)		CCUS1H103KC	1		
	C354	nsp	CAP, CHIP(1608, 50V/0.01uF)		CCUS1H103KC	1		
	C355	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C356	nsp	CAP, CHIP(2012, 10V/22uF, X5R) SAMSUNG		CCUC1A226KCS	1		
	C361	nsp	CAP, CHIP(2012, 10V/22uF, X5R) SAMSUNG		CCUC1A226KCS	1		
	C362	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
	C364	nsp	CAP, CHIP(1608, 50V/0.1uF)		CCUS1H104KC	1		
OTHER PARTS GROUP								
	B101	nsp	PLATE , EARTH(TRONIC ELECTRONICS)		CJT1A026	1		
	B102	nsp	PLATE , EARTH(TRONIC ELECTRONICS)		CJT1A026	1		
	BK100	nsp	BRACKET , PCB		CMD1A569-V1	1		
	CN1101	nsp	WAFER , SMD (2MM PITCH)		CJP05GA208ZY	1		
	CN135	nsp	WAFER, FFC, SMD(09-1mm, STRAIGHT)		CJP09GA193ZY	1		
	CN2101	nsp	WAFER, FFC, SMD(19P-1.25mm, STRAIGHT)		CJP19GA299ZN	1		
	CN2201	nsp	WAFER , SMD (2MM PITCH)-3P		CJP03GA208ZY	1		
	CN2801	nsp	WAFER, STRAIGHT, 13PIN		CJP13GA19ZY	1		
	CN301	nsp	WAFER, FFC(7P-1mm, ANGLE)		CJP07GB113ZY	1		
	CWC100	nsp	WAFER , SMD (2MM PITCH)		CJP06GA208ZY	1		
	CWC101	nsp	WAFER , SMD (2MM PITCH)		CJP05GA208ZY	1		
	FCC300	nsp	WAFER, FFC, SMD(19P-1mm, STRAIGHT)		CJP19GA193ZY	1		
	K100	943623100030D	MODULE , OPTICAL(TX 16MHz)		CJSJST1124	1		
	K101	943643102590M	JACK, 1P(BK),SEPA-GND,GOLD		CJJ4M085Z	1		
	K300	943643102610M	JACK RCA, 2P(O/O), VERTICAL, SILVER		CJJ4N102Z	1		
	L100	90M-LU000220R	INDUCTOR CHIP 10UH (3225 PKG)		HLQ10E100KRZ	1		
	L101	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L102	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L103	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L105	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L106	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L107	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L300	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L301	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L302	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L303	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L304	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L305	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	L306	nsp	FERRITE CHIP BEAD(2012/220R)		CLZBLM21PG221SN1	1		
	PFCK10	nsp	WAFER, FFC, SMD(16P-1mm, STRAIGHT)		CJP16GA193ZY	1		
	S300	90M-SS000710R	SWITCH , SLIDE		KSS2B016Z	1		
	X100	943141101040M	X-TAL, SMD, 48MHz/FCX-03,8.6PF		COX48000I086SR	1		
	X300	943141101370S	X-TAL, HC-49/S SMD , 4.000MHz, 18PF		COX04000E180ST	1		
	X301	943141101030M	X-TAL, SMD, 16.9344MHz/FCX-03,10PF		COX16934I100SR	1		
	Z101	nsp	WIRE ASS'Y(1P, 80MM,BLK,#22)		CWE5202080A	1		

EXPLODED

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NOTE:The symbols in the column Remarks indicate the following destinations.
U : North America model N : Europe model K : China model F : Japan model
B : Black model SG : Silver Gold model

	REF No.	Part No.	Part Name	Remarks		Q'ty	New	Ver
PCB GROUP								
	C1-1	nsp	TRANS PCB		VOP12870B	1	*	
	C1-2	-	POWER PCB		-	1	*	
	C1-3	-	AUDIO OUTPUT PCB		-	1	*	
	C1-4	-	FRONT PCB		-	1	*	
	C1-5	-	STANDBY PCB		-	1	*	
	C1-6	-	HEADPHONE PCB		-	1	*	
	C1-7	-	FLASHER		-	1	*	
	C2	nsp	MAIN PCB		VOP12869B	1	*	
OTHER PARTS GROUP								
!	C3	943101102260M	TRANS , POWER CD6005	U	CLT5N039ZU	1		
!	C3	943101102261M	TRANS , POWER CD6005	N, K	CLT5N039ZE	1		
!	C3	943101102263M	TRANS , POWER CD6005	F	CLT5N039ZJ	1		
	C4	943302100130D	CJDKT690 CD MECHA ASSY DCD720		CJDKT690EJ	1		
	C4-1	900302100200S	CD MECHANISM (Traverse)		CJD5C6Z01Z	1		
	C4-2	30201005100AD	LM BELT	For LOADING MECHA	CDV1A011	1		
!	C5	00MYJ04002640	AC INNET ASS'Y		CJJ8A006ZW	1		
	P1	421410006004M	BADGE , MARANTZ		CGB1A206	1		
	P2	943415100410M	ORNAMENT, DOOR BLACK	BK	CGR1A552ZB37	1		
	P2	943415100400M	ORNAMENT, DOOR	SG	CGR1A552RMZD10	1		
	P3	943416101150M	WINDOW , FIP		CGU1A423A12Y	1		
	P4	nsp	PANEL , SUB CD5003/N1B	BK	CGW1A462B37	1		
	P4	nsp	PANEL , SUB	SG	CGW1A462RMD10	1		
	P5	943404100590M	PANEL , SIDE L	U, N, BK	CGW1A463RNVB37	1		
	P5	943404100870S	PANEL SIDE L(K)	K	CGW1A463RNVB37	1	*	
	P5	943404100600M	PANEL , SIDE L	N, F, SG	CGW1A463ROVD10	1		
	P6	943402007080M	PANEL , SIDE R CD5003/N1B	BK	CGW1A464RNB37	1		
	P6	943402007090M	PANEL , SIDE R CD5003/N1SG	SG	CGW1A464ROD10	1		
	P7	nsp	SHEET , LED		CGX1A411Z	1		
	P8	481510003006M	INDICATOR , POWER		CGL1A274	1		
	P9	411510015017M	KNOB , TACT POWER AV8003/U	BK	CBT1A1072	1		
	P9	411510021036M	KNOB , POWER	SG	CBT1A1072RMD10	1		
	P10	943411102840M	BUTTON , PLAY	BK	CBT1A1181	2		
	P10	943411102850M	BUTTON , PLAY	SG	CBT1A1181RMD10	2		
	P11	943411102860M	BUTTON , USB	BK	CBT1A1182	1		
	P11	943411102870M	BUTTON , USB	SG	CBT1A1182RMD10	1		
	P12	943412101430S	KNOB , ROTARY	BK	CBN1A304	1	*	
	P12	943412101440S	KNOB , ROTARY	SG	CBN1A304RMD10	1	*	
	P13	9434711100930S	CUSHION , FOOT		CHG1A663	4	*	
	P14	943407100640S	FOOT		CKL1A235H46	4		
	P15	nsp	HOLDER , PCB		CHE170	4		
	P16	nsp	HOLDER , PCB		CHE2A030	3		
	P17	nsp	SHEET , SCREW		CGX1A439	1		
	P18	nsp	CUSHION, EVA		VHG1A660	1	*	
	P19	nsp	CUSHION , PCB		VHG1A657	1	*	
	P20	nsp	CUSHION , EVA		CHG1A104	1		
	@1	nsp	WASHER		VNW2A028	1	*	
	@2	nsp	CLAMPER , WIRE		CHE36-3	4		
	@3	nsp	TAPE , HEMELON		VHS1A032	2		
	@4	nsp	TAPE , FILAMENT		C4FE187	0.06		
	M1	943402106110S	PANEL , AL FRONT (BK)	BK	CKM2A203KC23	1	*	
	M1	943402106120S	PANEL , AL FRONT (SG)	SG	CKM2A203KC62	1	*	
	M2	nsp	PLATE , EARTH USB		CMC1A370	1		
	M4	nsp	BRACKET SA7003 33AK		CMD1A757	1		
	M5	nsp	FRAME , FRONT		CUF2A004	1		
	M6	nsp	BOTTOM PALTE		CUA3A298	1	*	
	M7	nsp	CHASSIS BOTTOM		CUA7A289	1	*	
	M8	nsp	SUPPORT , MECHA		CMD2A842	1		
	M9	401310003002M	CABINET , TOP CD5003/N1B	BK	VKC2A187K117	1		
	M9	401310003033M	CABINET , TOP CD5003/N1SG	SG	VKC2A187D11	1		
	M10_BK10-13,BK100	nsp	BRACKET , PCB		CMD1A569-V1	5		
	M11	nsp	REAR , PANEL	U	VKF5A390Z	1	*	
	M11	nsp	REAR , PANEL	N	VKF6A390Y	1	*	
	M11	nsp	REAR , PANEL	K	VKF6A390Z	1	*	
	M11	nsp	REAR , PANEL	F	VKF6A390X	1	*	
	M12	nsp	WASHER , GROUND		CNW1A035	1		
	M12	nsp	WASHER , GROUND		CNW1A035	5		
	M13_BK41	nsp	EARTH PLATE (HP)		VMC1A491		*	
	@	943606007140M	CABLE , CARD (19P,1.0MM,250MM,B,8MM)		CWC4F4A19A250B08	1		
	@	943606502280M	CABLE , CARD CD Mecha (16P, 1mm, 140mm, A TYPE)		CWC4F1A16A140A10	1		
	@	943606502950S	CABLE CARD (19P 1.250MM SHIELD 250MM B 8MM)		CWC4C4A19B250B08001	1	*	
	@	90M-FC500030R	FERRITE , RING		CLZ9W003Z	1		
	@	90M-FC500130R	FERRITE , CORE		CLZ9Z071Z	1		
	@	nsp	WIRE ASS'Y (5P, 250MM, MECHA)		CWB2B005250GG	1		
	@	nsp	WIRE ASS'Y (6P, 220MM, MECHA)		CWB5A906220GG	1		
SCREW GROUP								
	S1	nsp	SCREW		CTB3+8JFB	36		
	S2	nsp	SCREW , DOT		CTBD3+8JFB	29		
	S3	nsp	SCREW (JAPAN)		CTW3+8JFB-V1	6		
	S4	nsp	SCREW		CTB4+6FFZR	4		
	S5	nsp	SCREW		CTB3+12JFB	4		
	S6	nsp	SCREW		CTB3+18JFB	3		
	S7	nsp	SCREW , ROUND		CTBR3+6JR	6		
	S8	nsp	SCREW , DOT		CTBD3+6FFB	3		

PACKING

※Parts indicated by "nsp"on this table cannot be supplied. Part indicated by "@" mark is not illustrated in the exploded view.
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	REF No.	Part No.	Part Name	Remarks		Q'ty	New	Ver
	1	943531105820S	BOX, OUT CARTON (N,U,K)	U, N, K	VPG1A994U	1	*	
	1	943531105990S	BOX OUT CARTON (FN)	F	VPG1A994O	1	*	
	2	nsp	POLY SHEET		VPB1A213	1		
	3-1	943533103410S	SNOW PAD BOTTOM		VPS1A1067	1	*	
	3-2	943533103420S	SNOW PAD TOP		VPS1A1066	1	*	
	4-1	35201047000AM	CD MANUAL ASS'Y	U	VFT1A184ZA	1	*	
	4-1	35201046900AM	CD MANUAL ASS'Y	N	VFT1A183ZA	1	*	
	4-1	35201047100AM	CD MANUAL ASS'Y	K	VFT1A185ZA	1	*	
	4-1	54111140200AM	MANUAL , INSTRUCTION	F	VQX1A1962Z	1	*	
	4-2	nsp	SHEET , SAFETY	U	VQE1A794Z	1	*	
	4-2	nsp	SAFETY INSTRUCTION	N	VQE1A799Y	1	*	
	4-2	nsp	SHEET , SAFETY	K	VQE1A741Y	1	*	
	4-2	nsp	SHEET,SAFTY	F	CQE1A578Z	1		
	4-3	54111140400AM	MANUAL , GETTING START	U	VQX1A1957Z	1	*	
	4-3	54111140500AM	MANUAL , GETTING START	N	VQX1A1955Z	1	*	
	4-3	54111140800AM	MANUAL , GETTING START	K	VQX1A1954Z	1	*	
	4-3	54111141000AM	MANUAL , GETTING START	F	VQX1A1956Z	1	*	
	4-4	nsp	CARD FOR CHINA INDENTIFICATION	K	VQE1A450Z	1		
	4-5	nsp	CARD , WARRANTY	U	VQE1A131V	1	*	
	4-6	nsp	WARRANTY , CANADA	U	VQE1A132U	1	*	
	4-7	nsp	CARD , USER (JAPAN)	F	VQE1A139Q	1		
!	5	90M-ZC000320R	CORD , POWER(DETACHABLE/EUR)	N	CJA2B054Z	1		
!	5	90M-ZC000310R	CORD , POWER(PLUG+SOCKET)UL	U	CJA2A070Z	1		
!	5	90M-ZC000650R	CORD , POWER	K	CJA2N075Z	1		
!	5	611050028007S	CORD , POWER JPN INLET TYPE (250V)	F	CJA2J115ZV	1		
	6	nsp	BAG , POLY		VPB1A008Z	2	*	
	7	30701022500AS	REMOCON TRANSMITER ASS'Y (PM6006&CD6006)		CARTPMCD6006	1	*	
	8	nsp	LABEL , CONTROL		VQB2A993Z	2	*	
	8-1	nsp	LABEL , BAR CODE(SET)		VQB1A978	1		
	8-2	nsp	LABEL , CONTROL		VQB2A993Z	2	*	
	9	nsp	BATTERY , AAA 2PCS IN PACK		CABR03PPB-GN	2		
	10	nsp	CORD, PIN (1P,ORANGE,700MM), TIE=WHITE		CJS4M009Y	1		
	11	943605101000D	CORD, PIN (RCA, 1000mm, R/W, TIE=WHITE)		CJS4N014Y	1		
	12	nsp	CARD , WARRANTY(JAPAN)	F	VQE1A123W	1	*	
	12	nsp	CARD , WARRANTY CHINA	K	VQE1A449W	1	*	
	13	544110091014M	LABEL , WHITE M1 SG	SG	VQB1A908Z	2	*	
	14	nsp	TAPE , OPP(50)		V4FC500CL	2.2		