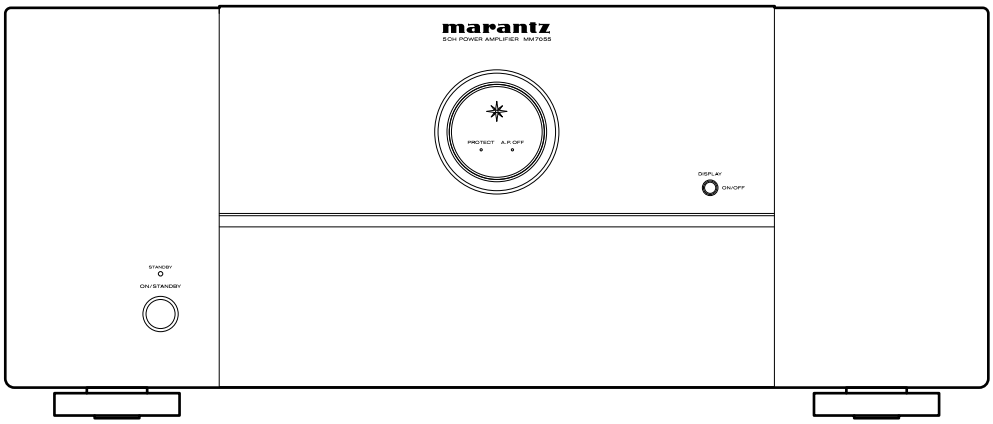
Service Manual

MM7055 /N1B/U1B

5 Channel Power Amplifier



MM7055

- 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.

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MM7055

Ver. 2

Please refer to the MODIFICATION NOTICE.

S0168-1V01DM/DG1010

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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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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。

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. 60065.

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

091105DM/DG

SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Before returning the unit to the customer, make sure you make 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 unit is defective.
Be sure to test for leakage current with the AC plug in both polarities, in addition, in each power ON, OFF and STANDBY mode, if applicable.

CAUTION Please heed the points listed below during servicing and inspection.

◎ Heed the cautions!

Spots requiring particular attention when servicing, such as the cabinet, parts, chassis,etc., have cautions indicated on labels. be sure to heed these causions and the cautions indicated in the handling instructions.

◎ Caution concerning electric shock!

(1) An AC voltage is impressed on this set, so touching internal metal parts when the set is energized could cause electric shock. Take care to avoid electric shock, by for example using an isolating transformer and gloves when servicing while the set is energized, unplugging the power cord when replacing parts, etc.

(2) Tere 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 manufacturing parts from sheet metal, there may in some rare cases be burrs on the edges of parts which could cause injury if fingers are moved across them. Use gloves to protect your hands.

◎ Only use designated parts!

The set's parts have specific safety properties (fire resistance, voltage resistance, etc.). For replacement parts, be sure to use parts which have the same poroperties. In particular, for the important safety parts that are marked ⚠ on wiring diagrams and parts lists, be sure to use the designated parts.

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

For safety seasons, some parts use tape, 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 wores omsode amd clamps are used to keep wires away from heating and high voltage parts, so be sure to set everything back as it was originally.

◎ Inspect for safety after servicing!

Check that all screws, parts and wires removed or disconnected for servicing have been put back in their original positions, inspect that no parts around the area that has been serviced have been negatively affected, conduct an inslation 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 turn the power switch on. Using a 500V insulation resistance tester, check that the inplug and the externally exposed metal parts (antenna terminal, headphones terminal, input terminal, etc.) is 1MΩ or greater. If it is less, the set must be inspected and repaired.

CAUTION Concerning important safety parts

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

(1) Schematic diagrams .....Indicated by the ⚠ mark.
(2) Parts lists .....Indicated by the ⚠ mark.
Using parts other than the designated parts could result in electric shock, fires or other dangerous situations.

NOTE FOR SCHEMATIC DIAGRAM

WARNING:

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

CAUTION:

Before returning the unit to the customer, make sure you make 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 unit is defective.

WARNING:

DO NOT return the unit to the customer until the problem is located and corrected.

NOTICE:

ALL RESISTANCE VALUES IN OHM. k=1,000 OHM / M=1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO 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

PARTS INFORMATION

RESISTORS

1) 00MGD05 × × × 140, Carbon film fixed resistor, ±5% 1/4W
2) 00MGD05 × × × 160, Carbon film fixed resistor, ±5% 1/6W
① ——— Resistance value

Examples ;

① Resistance value

0.1Ω.....001	10Ω.....100	1kΩ.....102	100kΩ.....104
0.5Ω.....005	18Ω.....180	2.7kΩ.....272	680kΩ.....684
1Ω.....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

CERAMIC CAP.
3) 00MDD1 × × × × 370, Ceramic capacitor
② ③ Disc type
Temp.coeff.P350 ～ N1000, 50V
③ ——— Capacity value
② ——— Tolerance

Examples ;

② Tolerance (Capacity deviation)
±0.25pF..... 0
±0.5pF..... 1
±5%..... 5

＊Tolerance of COMMON PARTS handled here are as follows :
0.5pF ～ 5pF.....±0.25pF
6pF ～ 10pF.....±0.5pF
12pF ～ 560pF.....±5%

③ Capacity value

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

CERAMIC CAP.
4) 00MDK16 × × × 300, High dielectric constant ceramic capacitor
④ Disc type
Temp.chara. 2B4, 50V
④ ——— Capacity value

Examples ;

④ Capacity value

100pF.....101	1000pF..... 102	10000pF.....103
470pF.....471	2200pF..... 222	

ELECTROLY CAP. (⧧)
5) 00MEA × × × × × × 10, Electrolytic capacitor
⑤ ⑥ One-way lead type, Tolerance ±20%
⑥ ——— Working voltage
⑤ ——— Capacity value

Examples ;

⑤ Capacity value

0.1μF.....104	4.7μF.....475	100μF ... 107
0.33μF.....334	10μF.....106	330μF ... 337
1μF.....105	22μF.....226	1100μF ... 118
		2200μF ... 228

⑥ Working voltage

6.3V.....006	25V.....025
10V.....010	35V.....035
16V.....016	50V.....050

FILM CAP. (⧦)
6) 00MDF15 × × × 350 → Plastic film capacitor
00MDF15 × × × 310 One-way type, Mylar ±5% 50V
00MDF16 × × × 310 → Plastic film capacitor
⑦ One-way type, Mylar ±10% 50V
⑦ ——— Capacity value

Examples ;

⑦ Capacity value

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

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
00MNH05 × × × 140	→ RF25S × × × × ΩJ	(±5% 1/4W)
00MNH05 × × × 120	→ RF50S × × × × ΩJ	(±5% 1/2W)
00MNH85 × × × 110	→ RF73B2A × × × × ΩJ	(±5% 1/10W)
00MNH95 × × × 140	→ RF73B2E × × × × ΩJ	(±5% 1/4W)

＊Resistance value — Resistance value (0.1 – 10kΩ)

2. Matsushita Electronic Components Co., Ltd

Part No. (MJI)	Type No. (MEC)	Description
00MNF05 × × × 140	→ ERD-2FCJ × × ×	(±5% 1/4W)
00MRF05 × × × 140		
00MNF02 × × × 140	→ ERD-2FCG × × ×	(±2% 1/4W)
00MRF02 × × × 140		

＊Resistance value — ＊Resistance value

Examples ;

＊Resistance value

0.1Ω.....001	10Ω.....100	1kΩ.....102	100kΩ.....104
0.5Ω.....005	18Ω.....180	2.7kΩ.....272	680kΩ.....684
1Ω.....010	100Ω.....101	10kΩ.....103	1MΩ.....105
6.8Ω.....068	390Ω.....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.	: TRAMSISTOR
VAR.	: VARIABLE	X'TAL	: CRYSTAL

NOTE ON FUSE :

Regarding to all parts of parts code **00MFS20xxx2xx,** replace only with Wickmann-Werke GmbH, Type 372 non glass type fuse.

NOTE ON SAFETY :

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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。

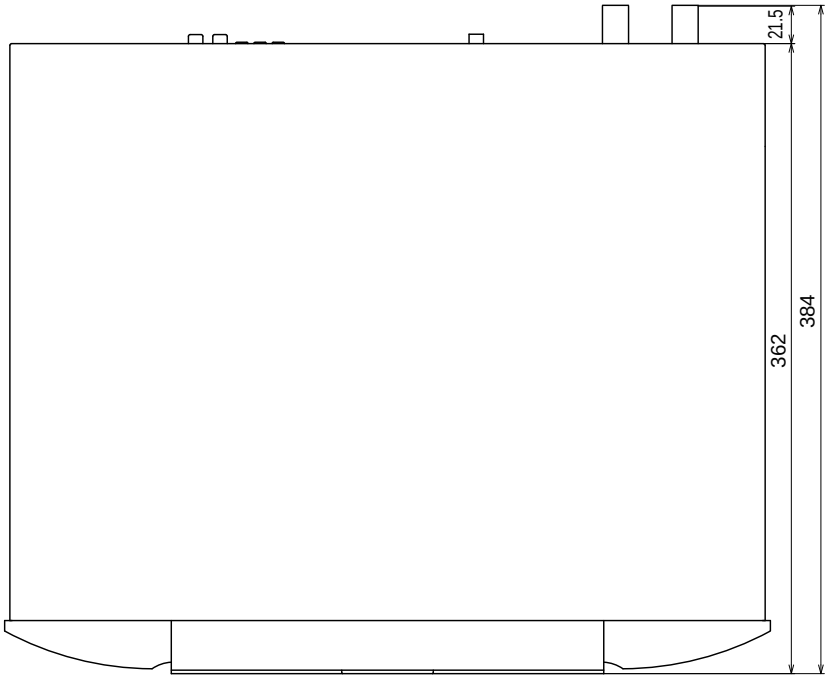
060522 MZ

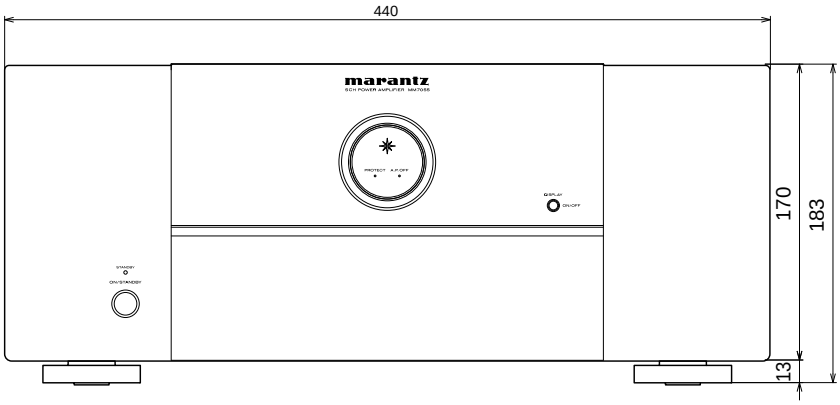
TECHNICAL SPECIFICATIONS

❑ MM7055

Rated power output (from 20 Hz to 20 kHz/THD = 0.08 %, two channels driven)**:**	140 W/ch, 8 Ω 170 W/ch, 6 Ω
Maximum effective output power (from 1 kHz, two channels driven)**:**	210 W/ch, 6 Ω
Output bandwidth (8 Ω load, 0.09 %)**:**	5 Hz – 40 kHz
Frequency response (1 W, 8 Ω)**:**	8 Hz – 100 kHz (±3 dB)
Damping factor:	100
Input sensitivity/impedance:	1.2 V / 22 kΩ (UNBALANCED) 2.4 V / 30 kΩ (BALANCED)
Signal-to-noise ratio (IHF-A)**:**	105 dB
Voltage amplifi cation level:	29 dB
Supply voltage (for U1B):	AC 120 V, 60 Hz
Supply voltage (for N1B):	AC 230 V, 50 Hz
Power consumption:	660 W
Standby power:	0.2 W
Maximum external dimensions:	440 (W) x 183 (H) x 384 (D) mm
Weight:	15.7 kg

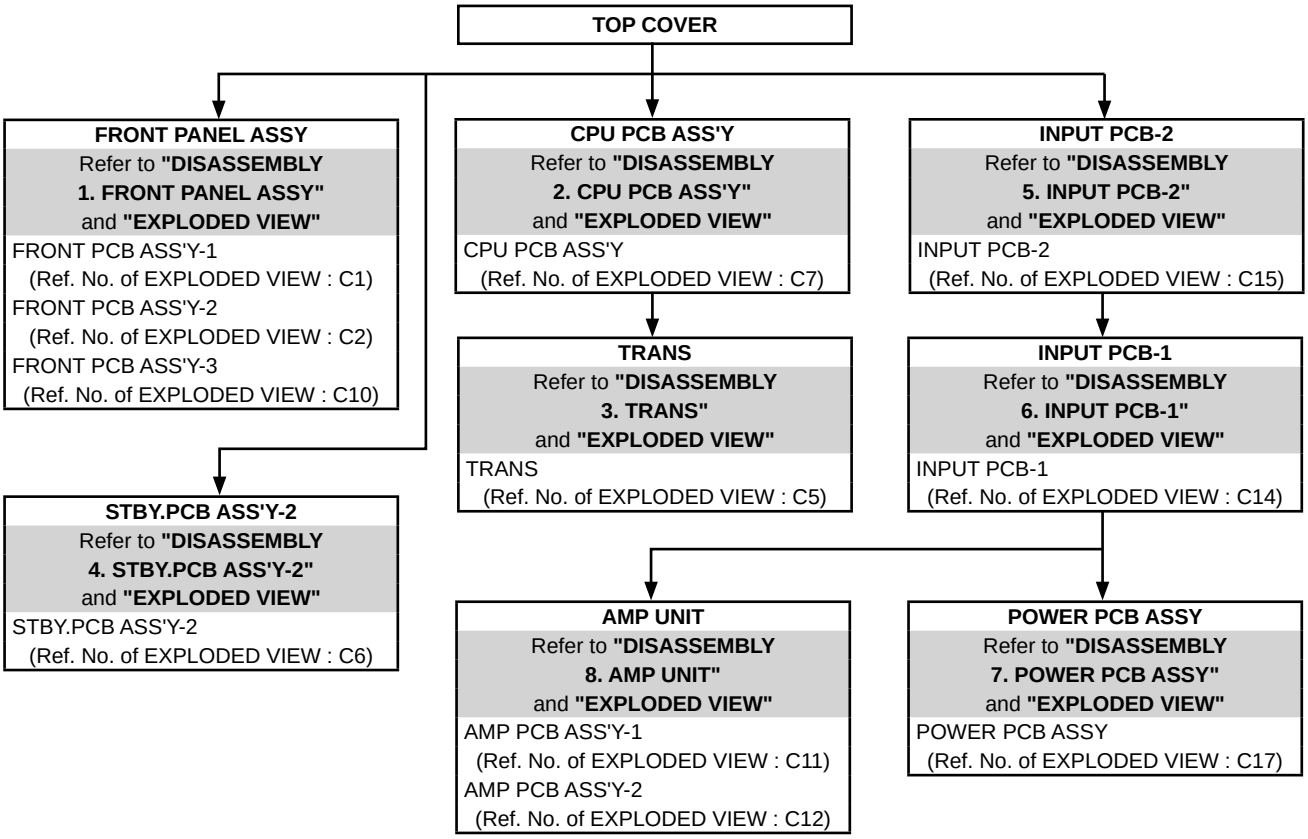
DIMENSION





DISASSEMBLY

- Disassemble in order of the arrow of the figure of following flow.
- In the case of the re-assembling, assemble it in order of the reverse of the following flow.
- In the case of the re-assembling, observe "attention of assembling" it.
- If wire bundles are untied or moved to perform adjustment or parts replacement etc., be sure to rearrange them neatly as they were originally bundled or placed afterward.
  Otherwise, incorrect arrangement can be a cause of noise generation.

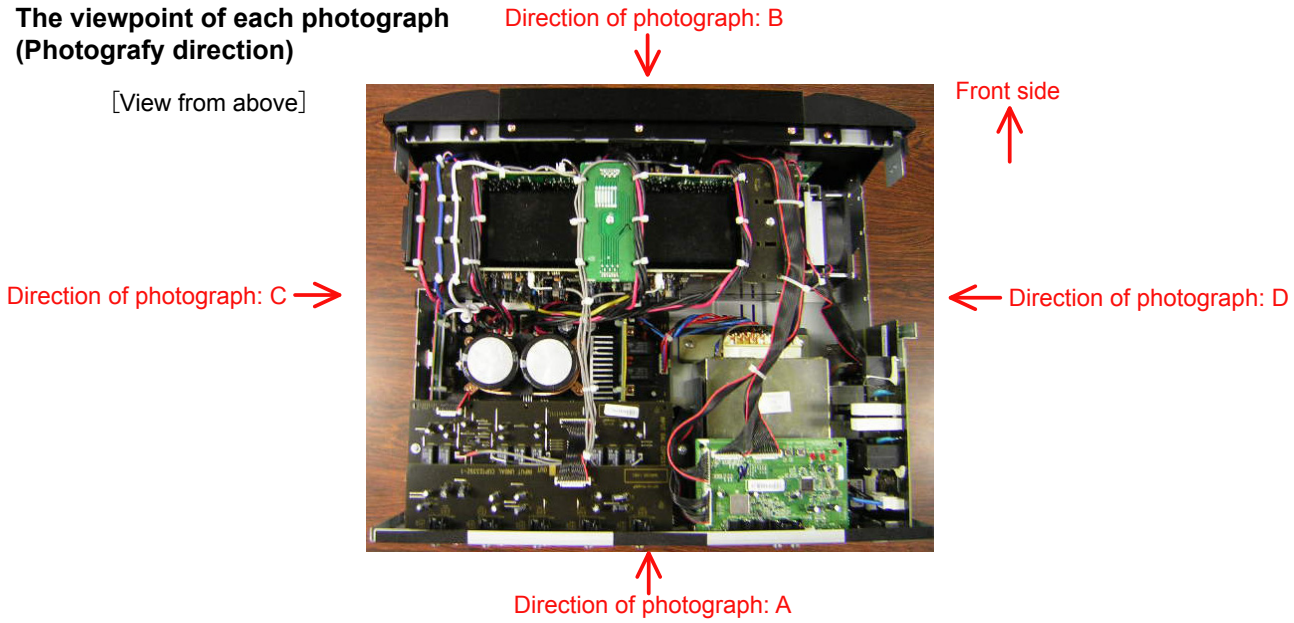


About the photos used for descriptions in the DISASSEMBLY" section.

- The direction from which the photographs used herein were photographed is indicated at "Direction of photograph: ***" at the left of the respective photographs.
- Refer to the table below for a description of the direction in which the photos were taken.
- Photographs for which no direction is indicated were taken from above the product.

The viewpoint of each photograph (Photografy direction)

[View from above]



1. FRONT PANEL ASSY

Proceeding : TOP COVER → FRONT PANEL ASSY

Please refer to "EXPLODED VIEW" for the disassembly method of each PCB included in FRONT PANEL ASSY and FRONT PANEL ASSY.

2. CPU PCB ASS'Y

Proceeding : TOP COVER → CPU PCB ASS'Y

Please refer to "EXPLODED VIEW" for the disassembly method of CPU PCB ASS'Y.

3. TRANS

Proceeding : TOP COVER → CPU PCB ASS'Y → TRANS

Please refer to "EXPLODED VIEW" for the disassembly method of TRANS.

4. STBY.PCB ASS'Y-2

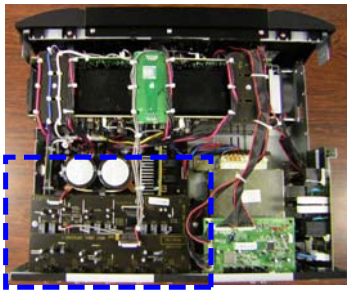
Proceeding : TOP COVER → STBY.PCB ASS'Y-2

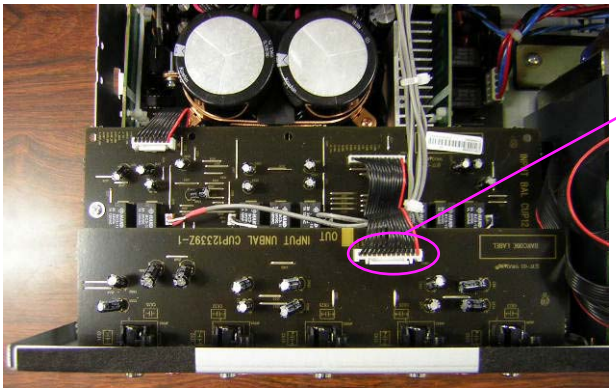
Please refer to "EXPLODED VIEW" for the disassembly method of STBY.PCB ASS'Y-2.

5. INPUT PCB-2

Proceeding : TOP COVER → INPUT PCB-2

(1) Disconnect the connector wire.





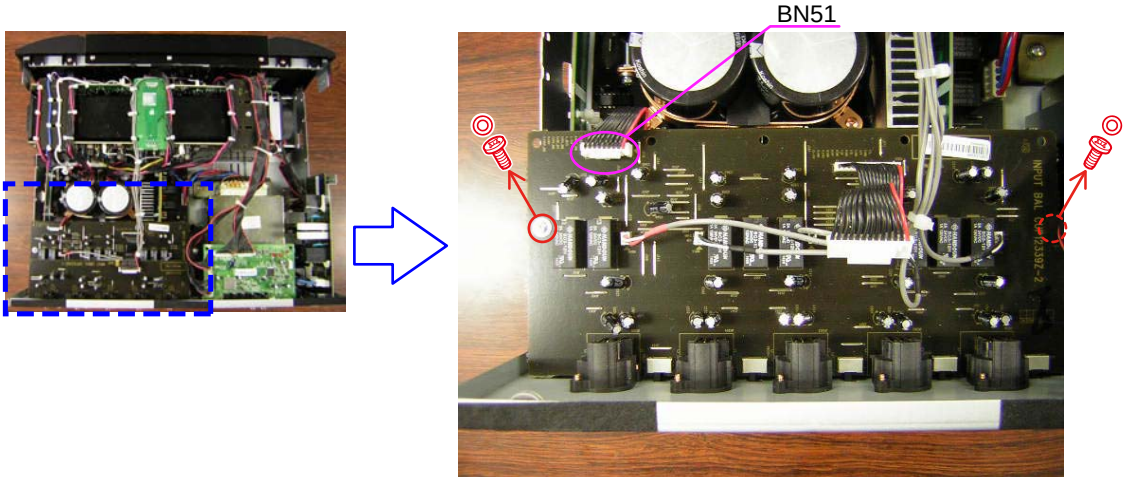
(2) Remove the screws.

Direction of photograph: A

6. INPUT PCB-1

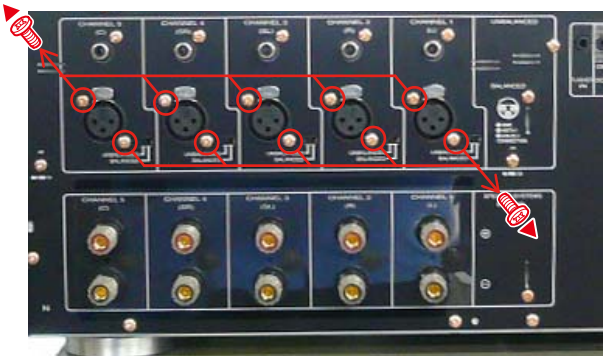
Proceeding : TOP COVER → INPUT PCB-2 → INPUT PCB-1

(1) Disconnect the connector wire.



(2) Remove the screws.

Direction of photograph: A



7. POWER PCB ASSY

Proceeding : TOP COVER → INPUT PCB-2 → INPUT PCB-1 → POWER PCB ASS'Y

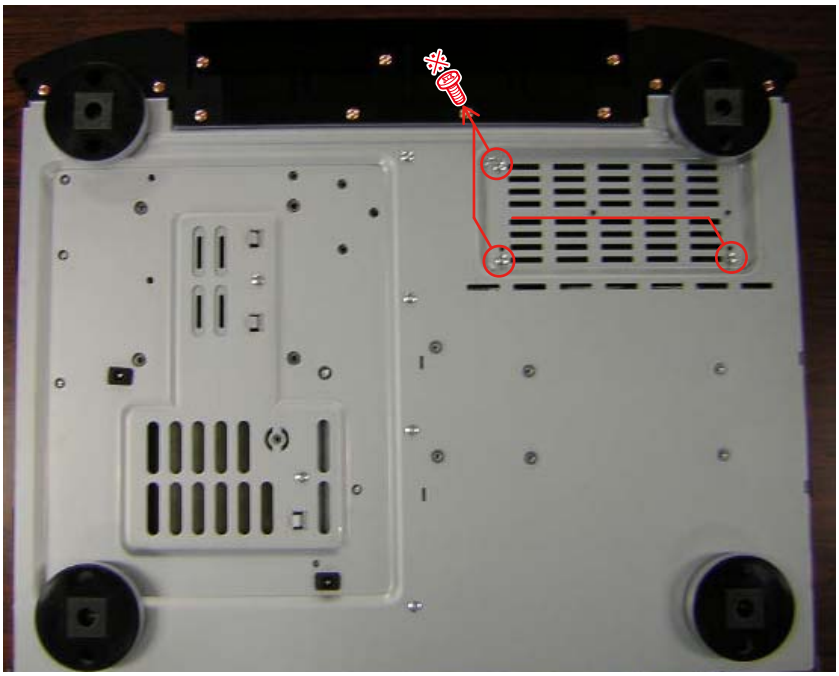
Please refer to "EXPLODED VIEW" for the disassembly method of POWER PCB ASS'Y.

8. AMP UNIT

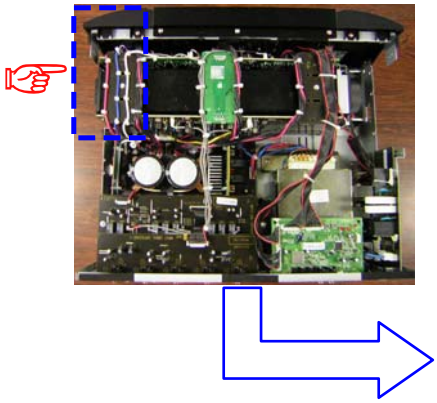
Proceeding : TOP COVER → INPUT PCB-2 → INPUT PCB-1 → AMP UNIT

(1) Remove the screws.

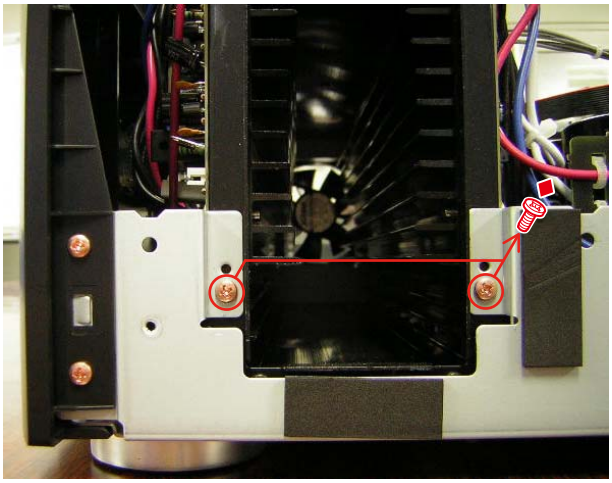
View from bottom



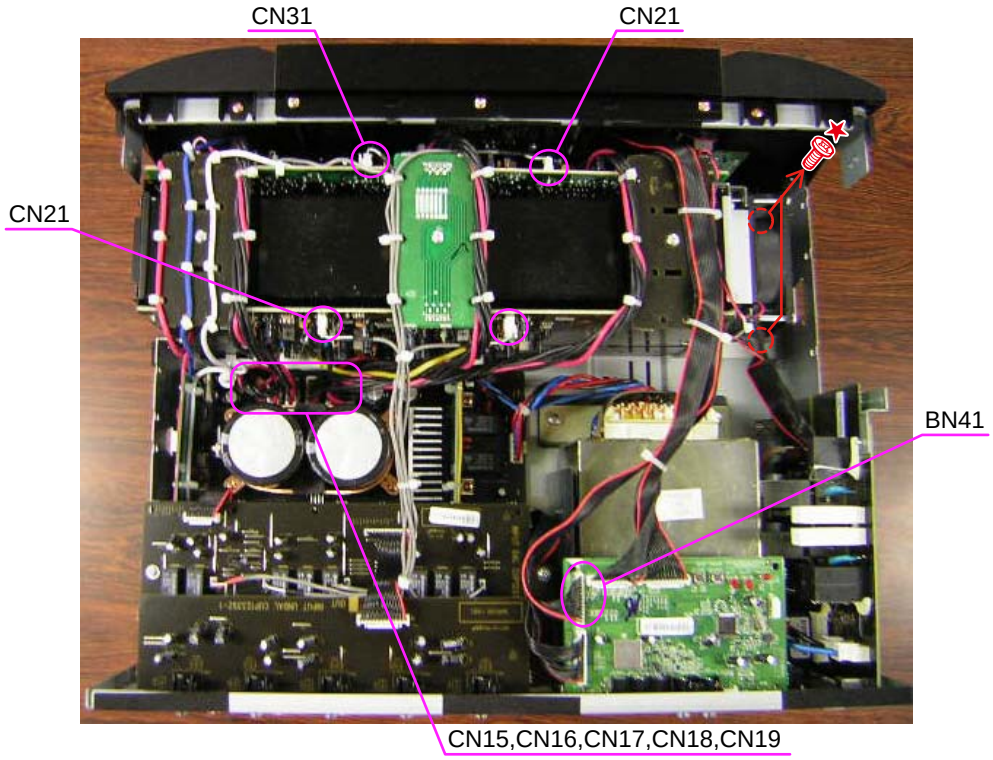
(2) Remove the screws.



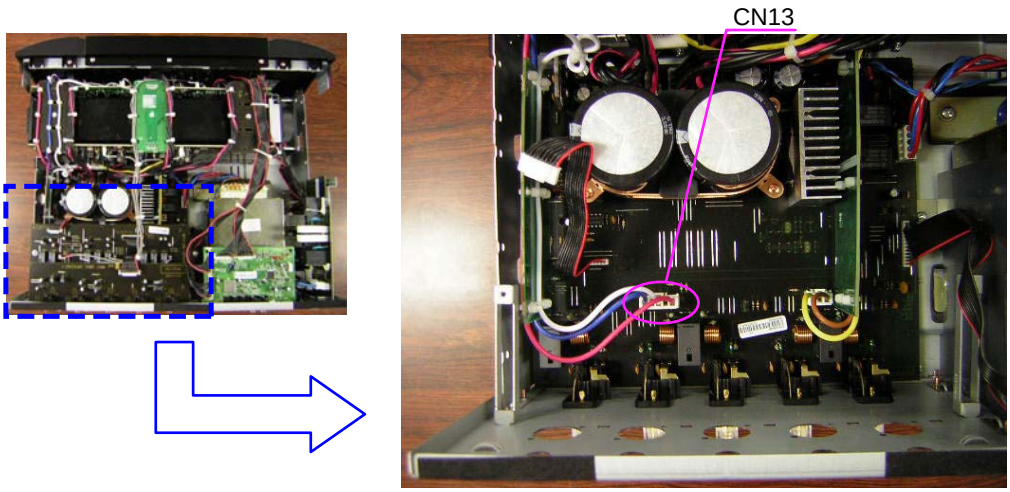
Direction of photograph: C



(3) Disconnect the connector wires, then remove the screws.



(4) Disconnect the connector wire.



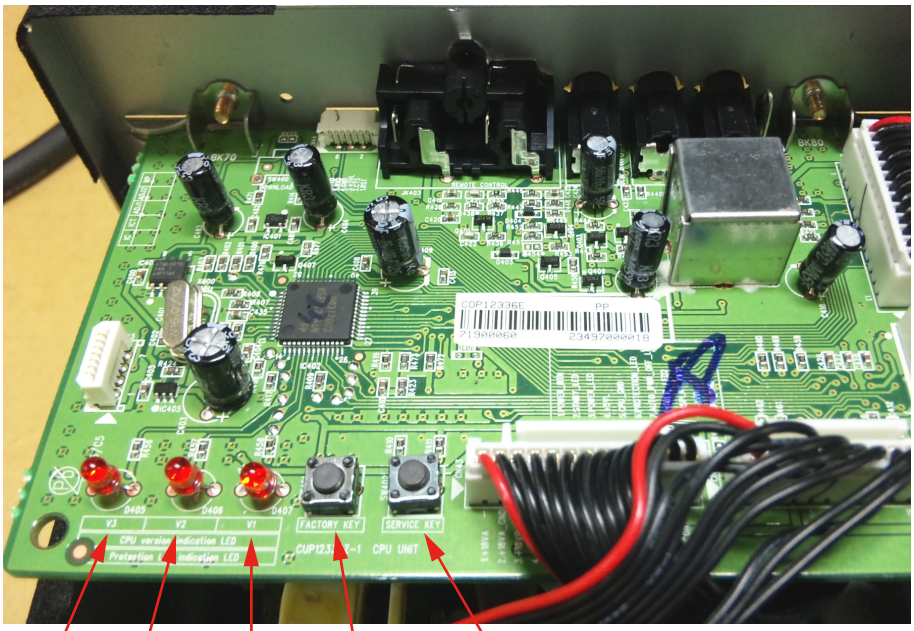
Please refer to "EXPLODED VIEW" for the disassembly method of each PCB included in AMP UNIT.

SPECIAL MODE

Special mode setting button ⚠2

※ Enters the special mode when A button is pressed in normal power state.

No.	Mode	Button A	Contents
1	Service mode	Service	CPU version displayed. and Furthermore,this unit in a condition of the following by pushing the Button A.
1-1	Protection Log display	Service	Displayed protection history.
1-2	Exit from protection state	Service (Hold button more than 5 seconds.)	Displayed protection history and move to normal mode.
2	Factory mode	Factory	Cooling FAN actived . and Furthermore,this unit in a condition of the following by pushing the Button A.
2-1	AVSS output checking mode	Factory	AVSS, H/L check mode
2-2	Destination Switching checking mode	Display	Display and changing destination.
2-3	Auto standby confirm mode.	Display + ON/STANDBY	Go to standby mode condition with after 15 seconds. • no signal • no operation • no command (RC)
2-4	Initialize mode	ON/STANDBY	Initialize



1. CPU Version check

The firmware version is displayed on LEDs as follows.

V1(D407)	V2(D406)	V3(D405)	Version
ON	OFF	OFF	Ver1
OFF	**ON**	OFF	Ver2
ON	**ON**	OFF	Ver3
OFF	OFF	**ON**	Ver4
ON	OFF	**ON**	Ver5
OFF	**ON**	**ON**	Ver6
ON	**ON**	**ON**	Ver7

1.1. Protection Log display

The last time protection log is displayed on LEDs as follows if the Service button is pushed(>5sec) in the Service mode. For detail and coping process, please refer to **"SYSTEM ERROR"**.

V1(D407)	V2(D406)	V3(D405)	Cause of protect
OFF	OFF	OFF	No protection log
OFF	OFF	**ON**	Detection of over current over 200msec on Power AMP
OFF	**ON**	OFF	Detection of DC on Power Amp output
OFF	**ON**	**ON**	-
ON	OFF	OFF	Detection of over current below 200msec on Power Amp
ON	OFF	**ON**	Detection of abnormality on +/-38V, +/-15V supply or power amp supply
ON	**ON**	OFF	Detection of abnormal heat of Power Amp
ON	**ON**	**ON**	-

2. Cooling FAN active

The fan rotates according to the condition of the temperature sensor(IC406,407,408) as follows.

T :IC406,407 and 408 temperature	Fan rotate
T < 0°C	STOP
0°C ≦ T < 10°C	Rotate Low speed
10°C ≦ T	Rotate High speed

2.1. AVSS H/L Switching

The AVSS relay High/Low switching cyclic if the Factory button is pushed in the factory mode.
If not changing, there is an error in the AVSS relay circuit (RY14,15 on Power pcb).
This is effective only in factory mode.

2.2. Destination Switching

The destination changes cyclic if the DISPLAY button is pushed for five seconds in the factory mode.
For confirmation, The Auto Standby LED lights as follows.
The difference by destination is only a Auto Standby function.

Destination	Auto standby function	Auto standby LED (factory mode only)
N (Europe)	Enable	Lights
Others (NA/Japan)	Disable	Blinking **500msec** interval

2.3. Auto Standby Function confirm mode

When press DISPLAY button(first) + ON/STANDBY button(second) together, enters Auto Standby Function confirm mode.
From this state, if there is no audio input/operation/command for 15 seconds, changes in the state of the standby.
If not changing, there is an error in the auto standby detect circuit (IC510,511,512 on Bal input pcb).

2.4. Initialize

Initializes following setting if the ON/STANDBY button is pushed in the factory mode.

Contents	After initialized
Auto Standby Mode	Not change
Illumination LED On/Off	On
Protection log	No protection log

3. SYSTEM ERROR

The reason for the error can be presumed from Standby LED display when the error occurs and protection log display.
Refer to [1-1.] for the method of confirming protection log.
If the AC power supply is turned off, the state of all protection can be released.

Error Detection	Protection log display			Reason	Check Point	
	V1 D407	V2 D406	V3 D405			
Standby LED Blinking 125msec interval (Fast Blinking)	**ON**	OFF	**ON**	Detection of abnormality on +/-38V, +/-15V supply or power amp supply (_P LINE FAIL) CPU (IC402) 45pin _P LINE FAIL : 0V : Fail 5V : Normality There is a possibility that ± 38 V supply or P-AMP power supply is broken.	Connection	POWER PWB : BN12- 4pin CPU PWB : CN41 - 4pin
					Power Amp Supply Power	POWER PWB : IC13,IC14,D109,RY14,RY15 ,F101,F102,D110-D113
	OFF	OFF	**ON**	Detection of over current over 200msec on Power AMP (_P CUR FAIL) CPU (IC402) 38pin _P CUR FAIL : 0V : Fail 5V : Normality There is a possibility that Power AMP is broken.	Connection	AMP PWB : CN95 - 4pin, CN94-8pin CPU PWB :BN41 - 8pin.
					Power Amp	Check Power AMP circuit (AMP PWB)
Standby LED Blinking 500msec interval (Slow Blinking)	**ON**	OFF	OFF	Detection of over current below 200msec on Power Amp (_P CUR FAIL) CPU (IC402) 38pin _P CUR FAIL : 0V : Fail 5V : Normality	Connection	AMP PWB : CN95 - 4pin, CN94-8pin CPU PWB :BN41 - 8pin.
					Power Amp	Check Power AMP circuit (AMP PWB)
	OFF	**ON**	OFF	Detection of DC on Power Amp output (_P AMP FAIL) Main-CPU (IC402) 41pin _P AMP FAIL : 0V : Fail 5V : Normality	Connection	AMP PWB :CN95 - 5pin, CN94-9pin CPU PWB : BN41 - 9pin
					Power Amp	Check Power AMP circuit (AMP PWB)
	ON	**ON**	OFF	Detection of abnormal heat of Power Amp (_HEAT DET P) Main-CPU (IC402) 24pin 0V : Fail 5V : Normality	Connection	AMP PWB : CN94 - 10pin CPU PWB : BN41 - 10pin
					Posistor	TH91,TH92
	OFF	OFF	OFF	No protection log		

VERSION UPGRADE PROCEDURE OF FIRMWARE

ABOUT REPLACE THE MICROPROCESSOR WITH A NEW ONE

When replaced of the U-PRO (Microprocessor), confirm contents of the following.

PWB Name	Ref. No.	Description	After replaced	Remark
12336Z-A	IC402	R5F21246SNFP	**C**	

After replaced

A : Mask ROM (With software). No need write-in of software to the microprocessor.

B : Flash ROM (With software). Usually, no need write-in of software. But, when the software was updated, you should be write-in of the new software to the microprocessor or flash ROM. Please check the software version.

C : Empty Flash ROM (Without software). You should be write-in of the software to the microprocessor. Refer to “Update procedure” or “writing procedure”, when you should be write-in the software.

[A]Update CPU's software to internal Flash-ROM.

- This mode is to update the software for microprocessor.
- The target devise is internal flash ROM of microprocessor (IC402) on CPU PWB (12336Z-A).
- The updating of software takes about 20 seconds.
- The software is common by MM7055 and MM7025.

Necessary Equipment

The following items are required for updating.

- Windows PC (OS: Windows2000 or WindowsXP) with Serial port.
- RS-232C Dsub-9 pin cable (female to female/straight type)
- Update software to CPU. (FlashSta.exe, MM7055_7025_yymmddvv.mot and MM7055_7025_yymmddvv.id in CPU (MM7055_7025) folder)
- DATA UPDATE KIT (part no. 90M-SR4500JIG)
  Use DATA UPDATE KIT to connect PC and CN44 (FFC connector) in rear panel of the unit, when updating CPU

Update CPU’s software to internal Flash-ROM

(1) Disconnect the mains cord from the unit

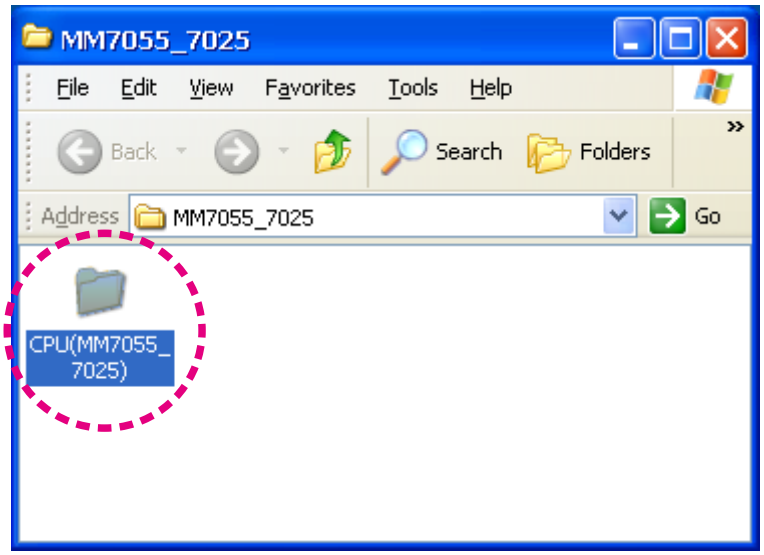
(2) Connect PC and the DATA UPDATE KIT with the RS-232C cable. And connect FFC (upside contact) to the connector (CN44) into the rear panel of the unit from the DATA UPDATE KIT.

(3) Connect the mains cord into the unit.

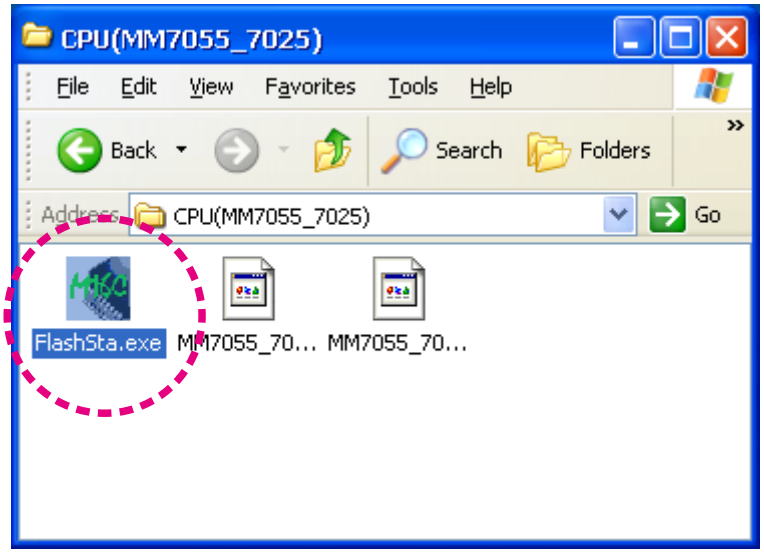
(4) Press the POWER ON/OFF button for turn on the unit. Then the STANDBY LED do not turn on a light.

(5) Put the CPU (MM7055_7025) folder into anywhere on your PC’s hard disc.

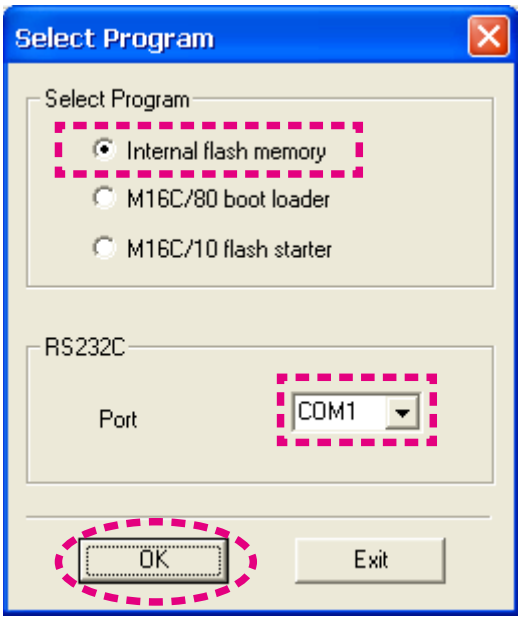
(6) Double click the CPU (MM7055_7025) folder.



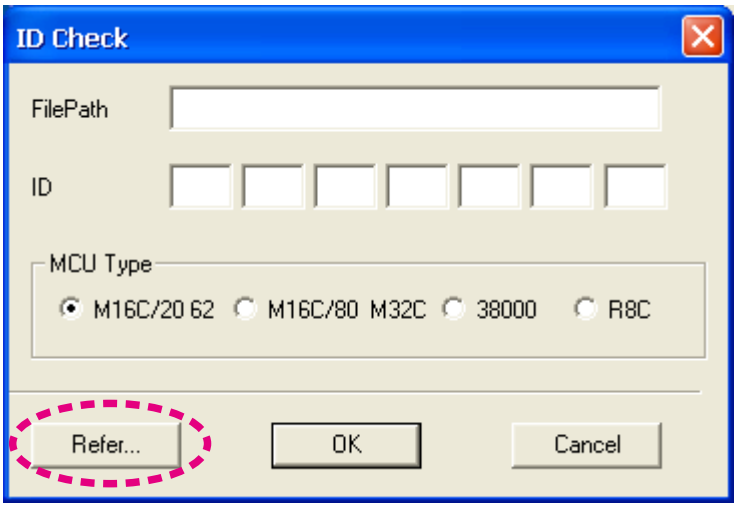
(7) Double click the FlashSta.exe. And launch the M16C Flash Start.



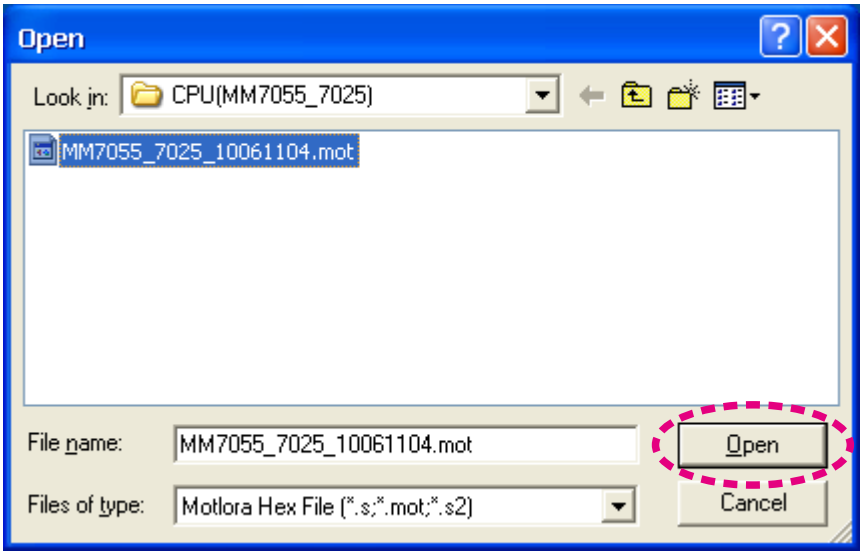
(8) Check the internal flash memory in the Select Program.
Choose the COM Port number. And the click OK.



(9) Click the Refer....

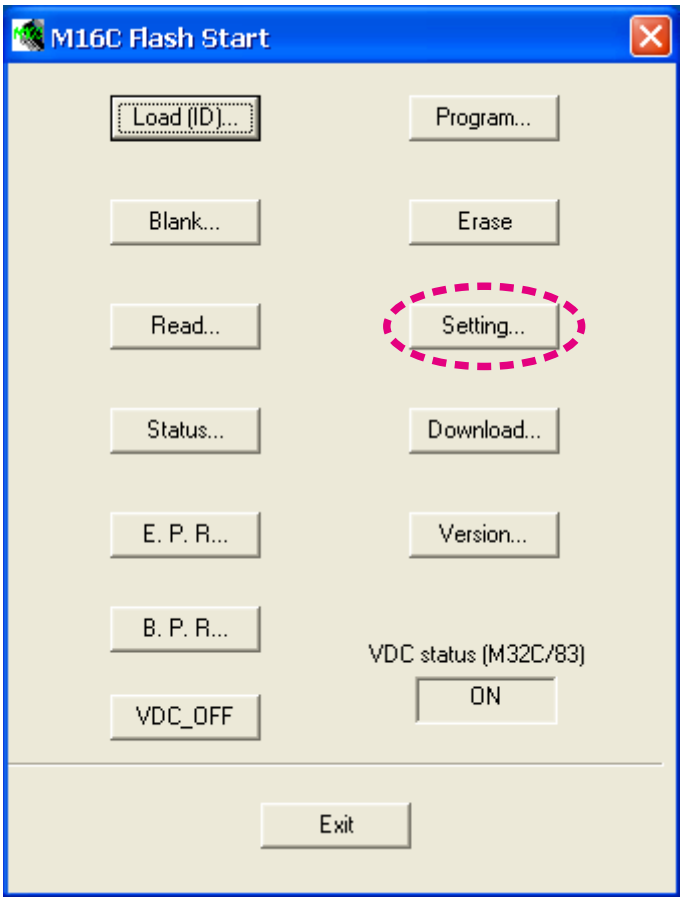


(10) Choose the MM7055_7025_yymmddvv.mot. And click Open.
NOTE : The yy is two digit of year. The mm is month. The dd is date. The vv is version.

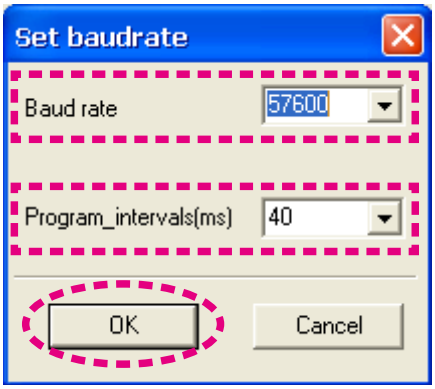


(11) The FilePath and ID are inputted automatically, and the MCU Type is selected to R8C automatically.
Click the OK.

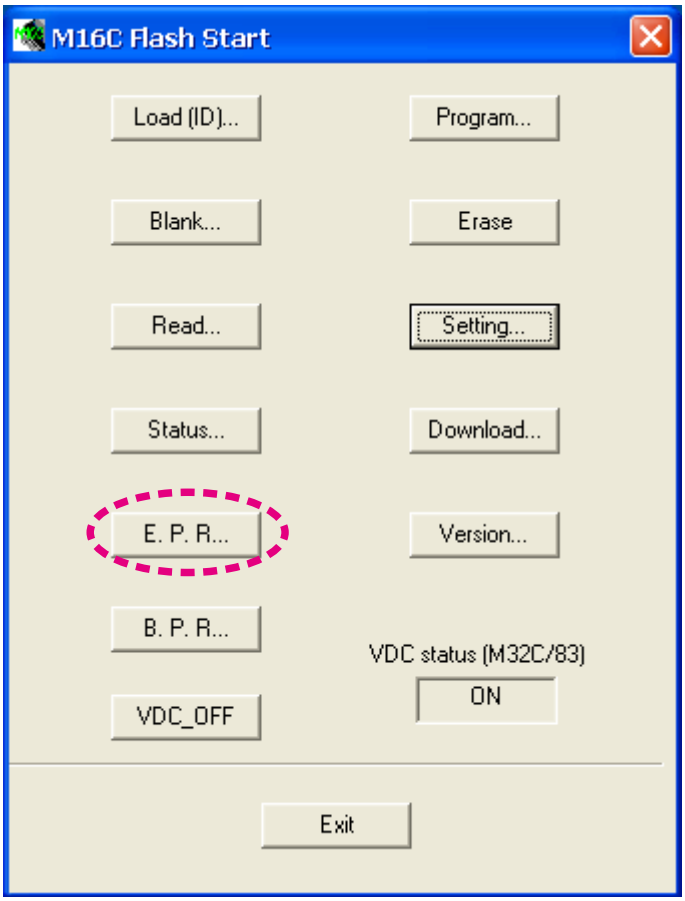
(12) Click the Setting....



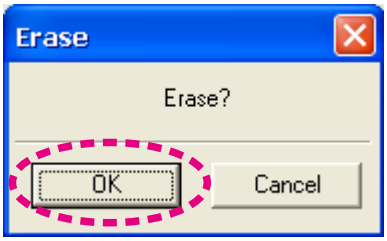
(13) Choose the 57600 in the Baud rate. (DO NOT choose the other one.)
Choose the 40 in Program_intervals(ms). Click the OK.



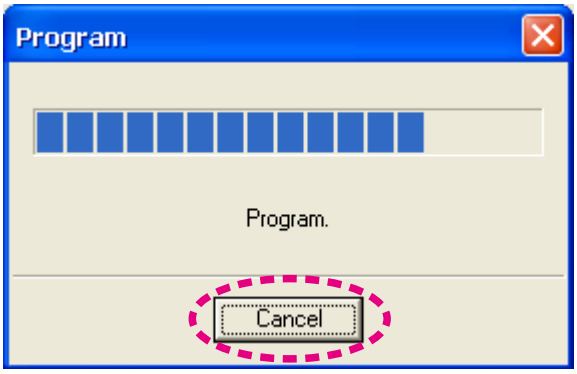
(14) Click the E.P.R....



(15) Click the OK.

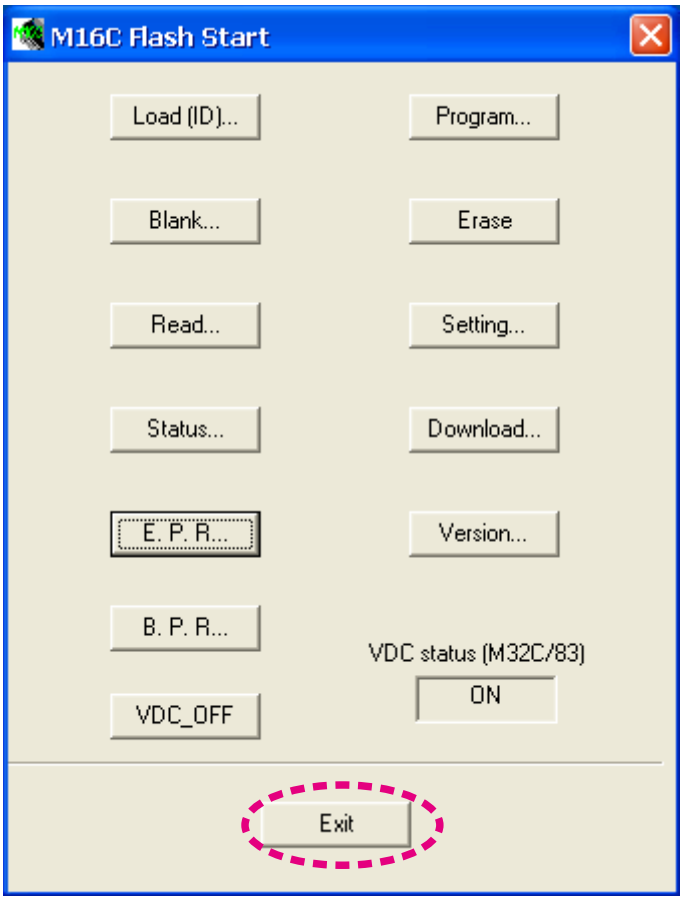


(16) Software is written into the internal Flash-ROM of CPU.
The updating of software takes about 20 seconds.



(17) Click the OK.

(18) Click the Exit.



(19) Disconnect the mains cord from the unit.

(20) Disconnect the RS-232C cable from the unit.

ADJUSTMENT

Idling Current Alignment

(1) Each of the measurement points are provided with the two test points. Set a digital Voltage meter to DC voltage input, connect the meter to the test points at both contact points.

(2) After the setup above, turn on the main switch.

(3) Adjust variable resistors (VR11 - VR31) according to the digital voltmeter readings. The target setting value is the following table for each channel.

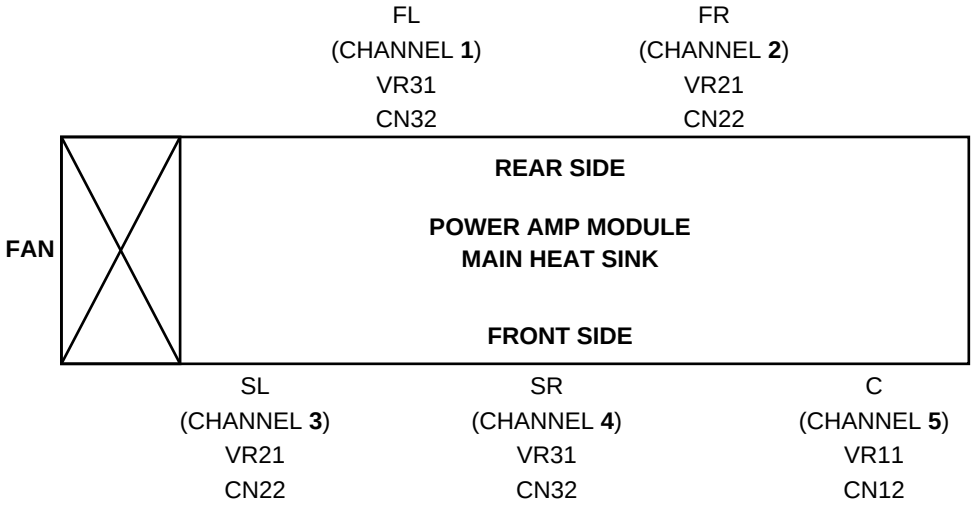
Settings : No-signal of input
Speaker out — No Load
Top lid — OPEN

Measurement Point

AMP PWB	Channel	Adjustment VR	Measurement Point
Front side AMP PWB	SL (CHANNEL **3**)	VR21	CN22
	SR (CHANNEL **4**)	VR31	CN32
	C (CHANNEL **5**)	VR11	CN12
Rear side AMP PWB	FL (CHANNEL **1**)	VR31	CN32
	FR (CHANNEL **2**)	VR21	CN22

Time Table of Idling Current Rise

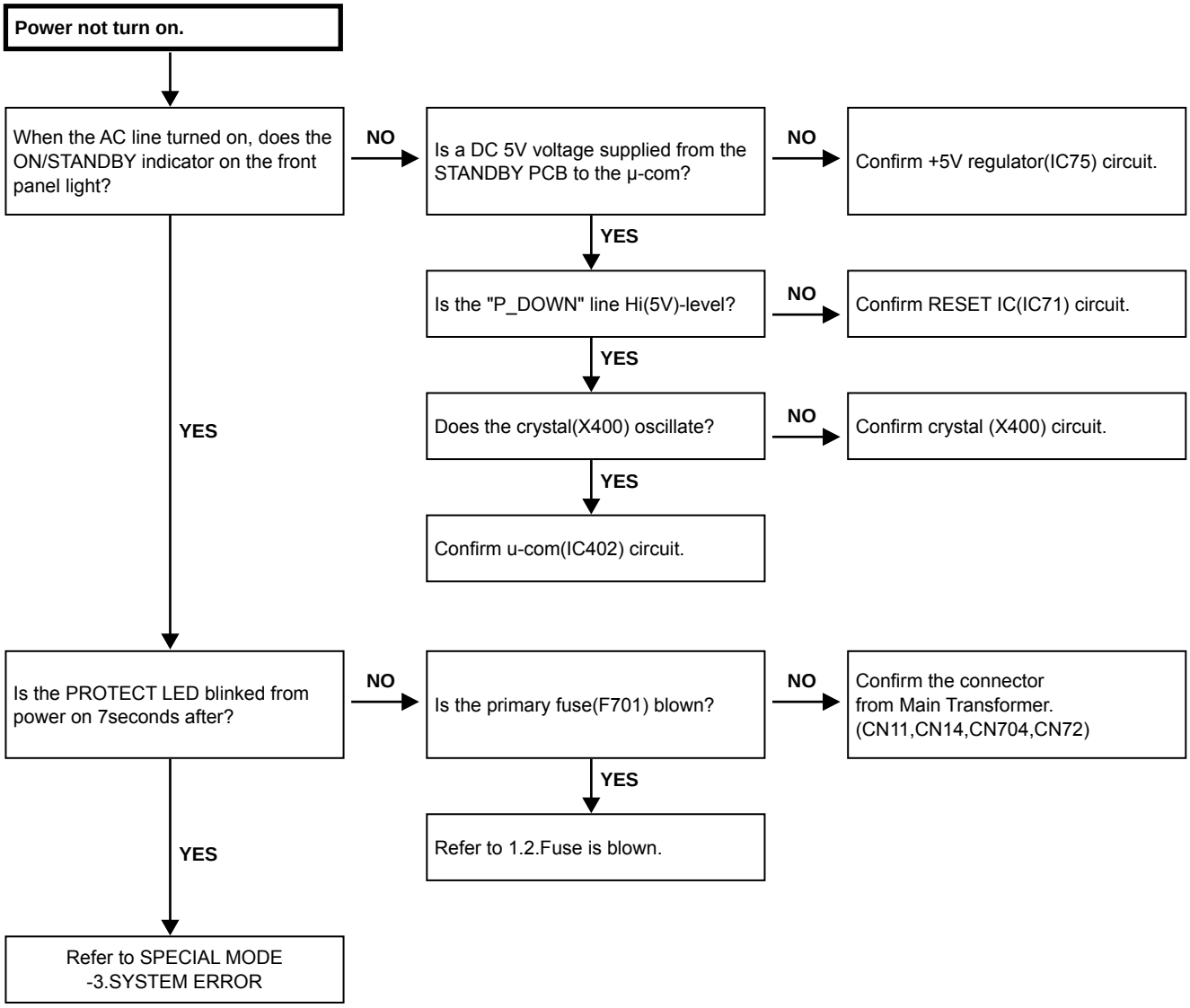
After Turning ON	Ambient temperature 20 to 30 degrees centigrade
	Measurement Voltage
10 min.	1.5 mV ± 0.2 mV
20 min.	1.5 mV ± 0.2 mV
30 min.	1.5 mV ± 0.2 mV



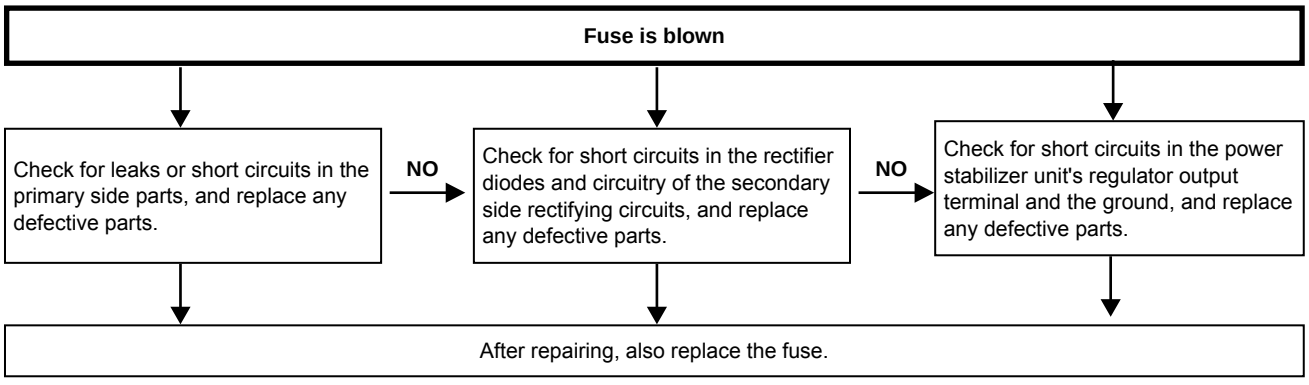
TROUBLE SHOOTING

1. POWER

1.1. Power not turn on

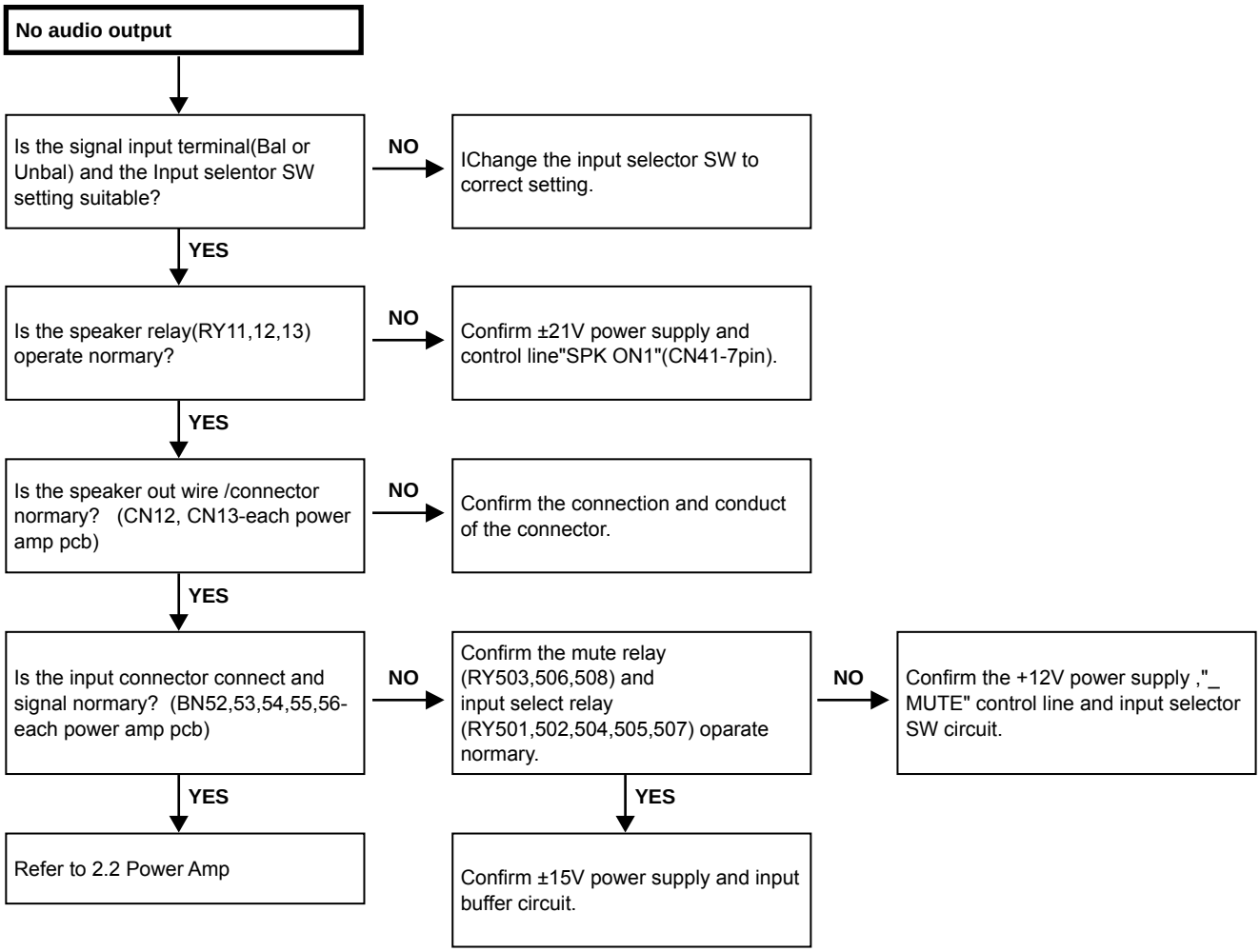


1.2. Fuse is blown

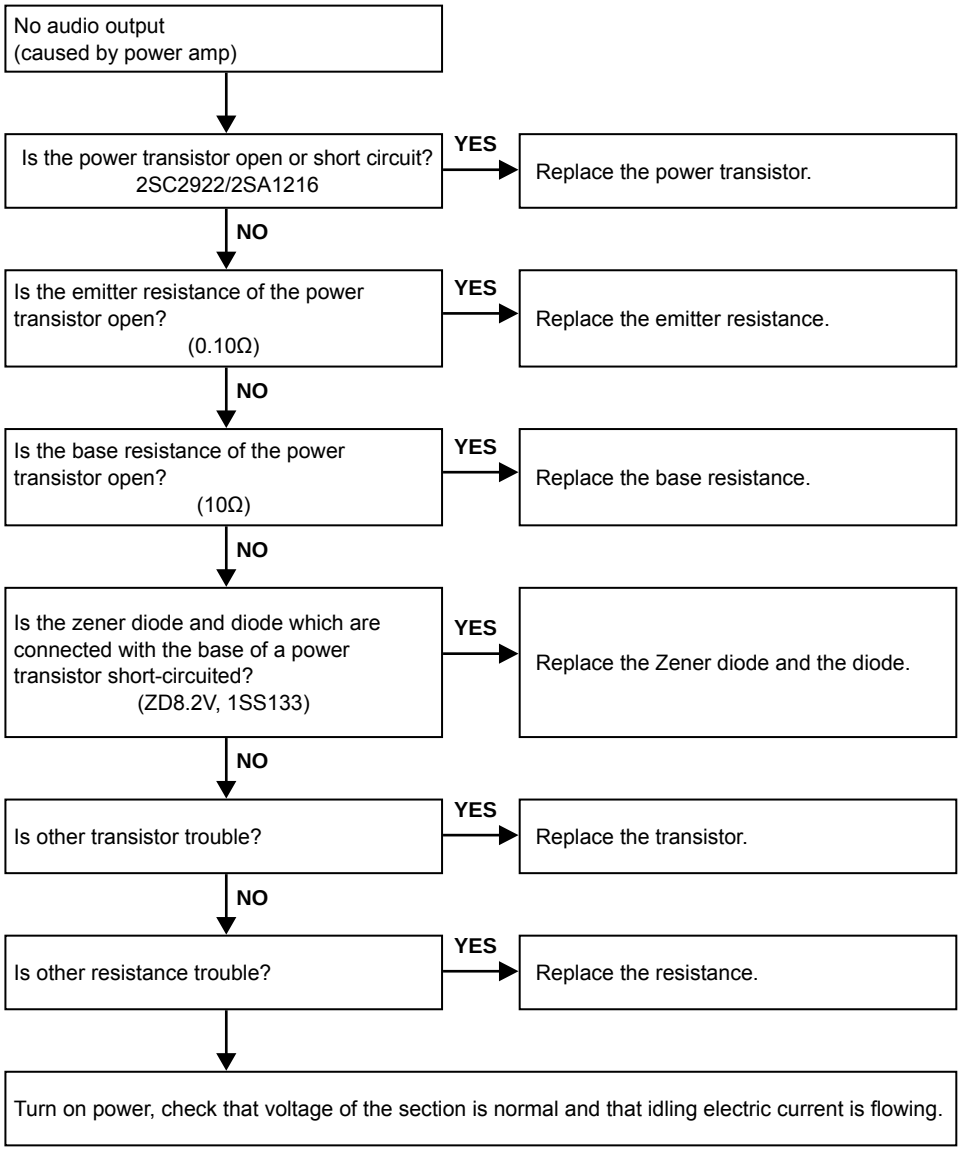


2. AUDIO

2.1. No audio output



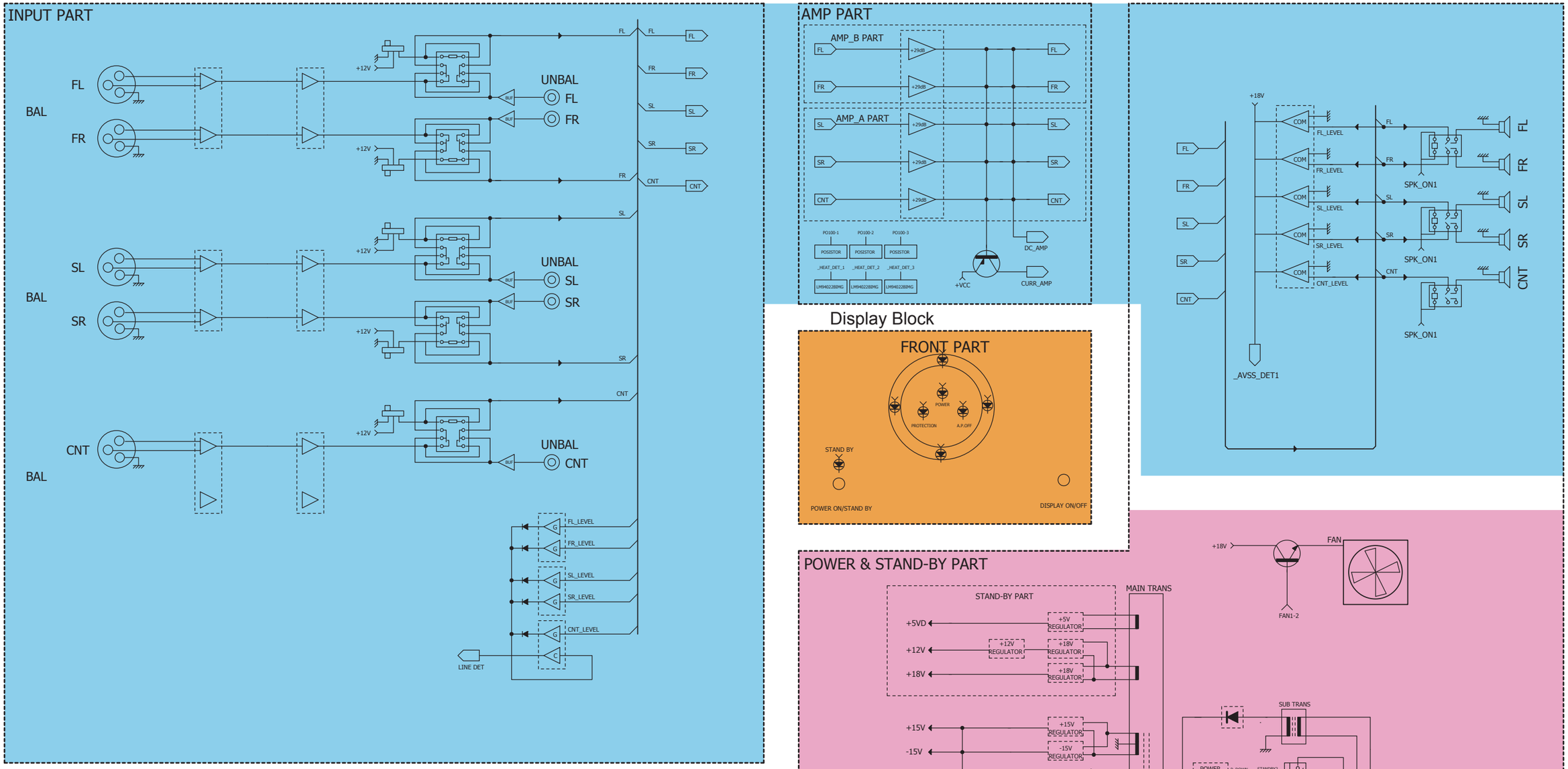
2.2. Power Amp (AMP PCB)



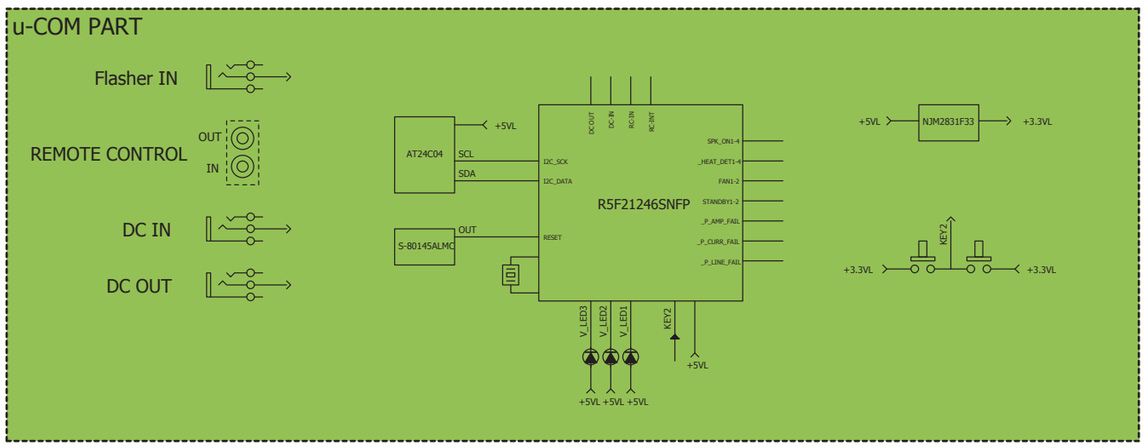
Personal notes:

BLOCK DIAGRAM

Audio Block



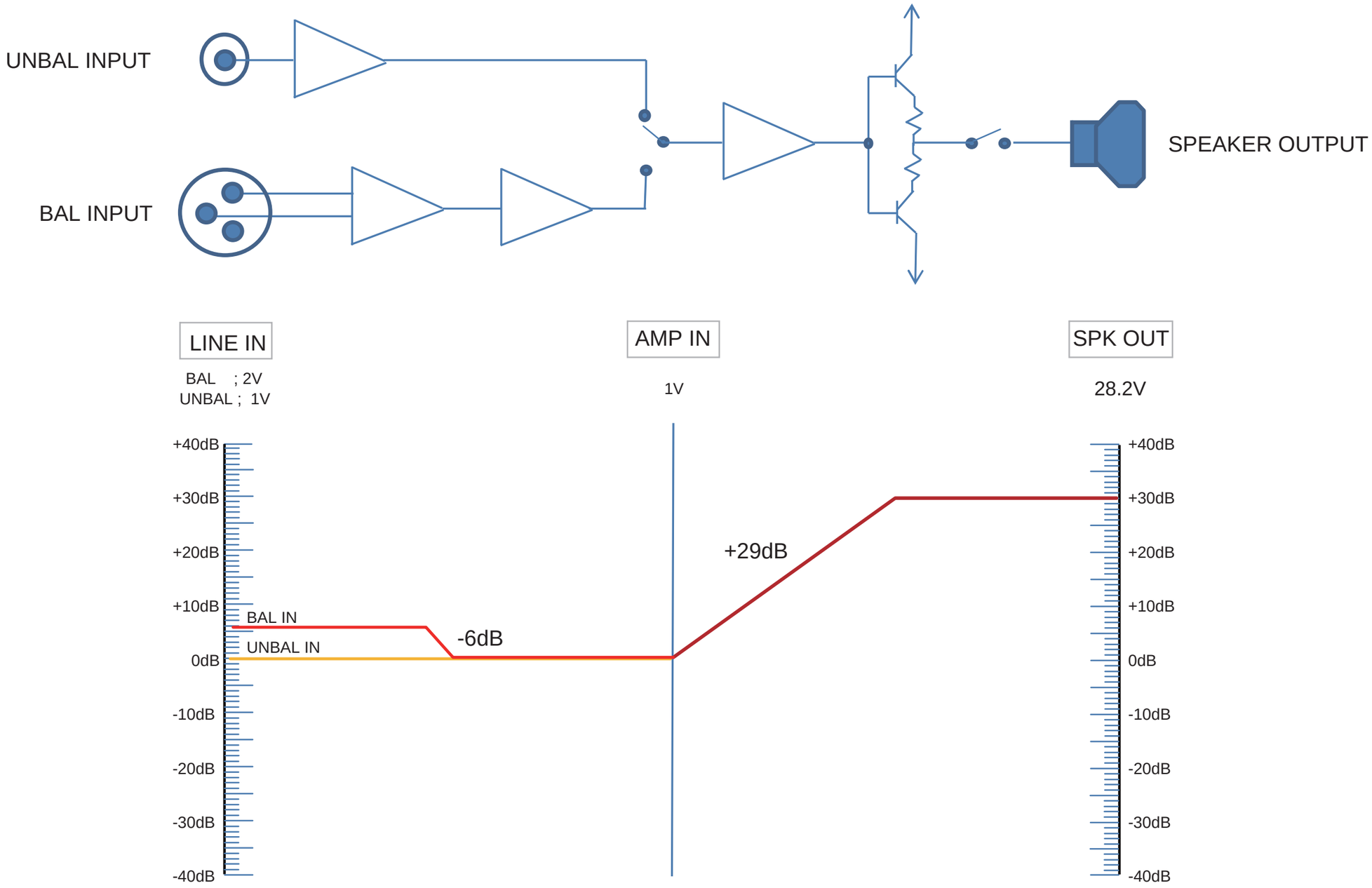
Digital Block



Display Block

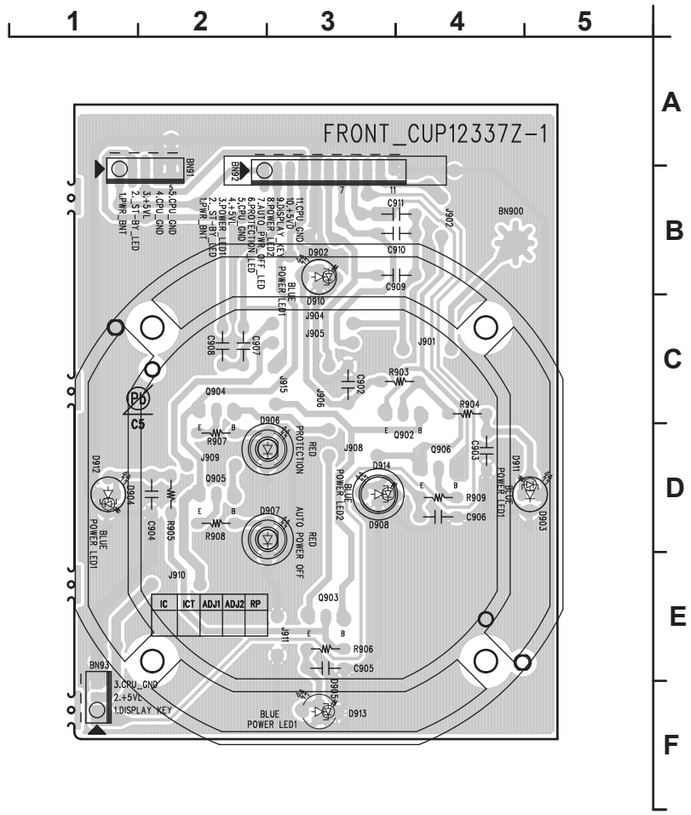
POWER Block

LEVEL DIAGRAM

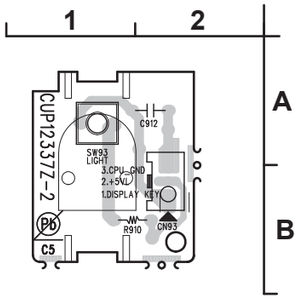


PRINTED WIRING BOARDS

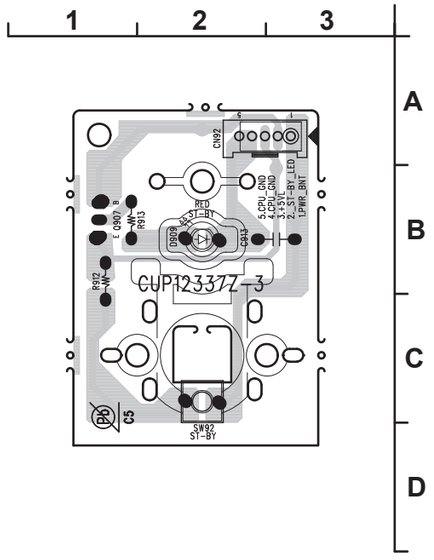
FRONT-1 (COMPONENT SIDE)



FRONT-2 (COMPONENT SIDE)



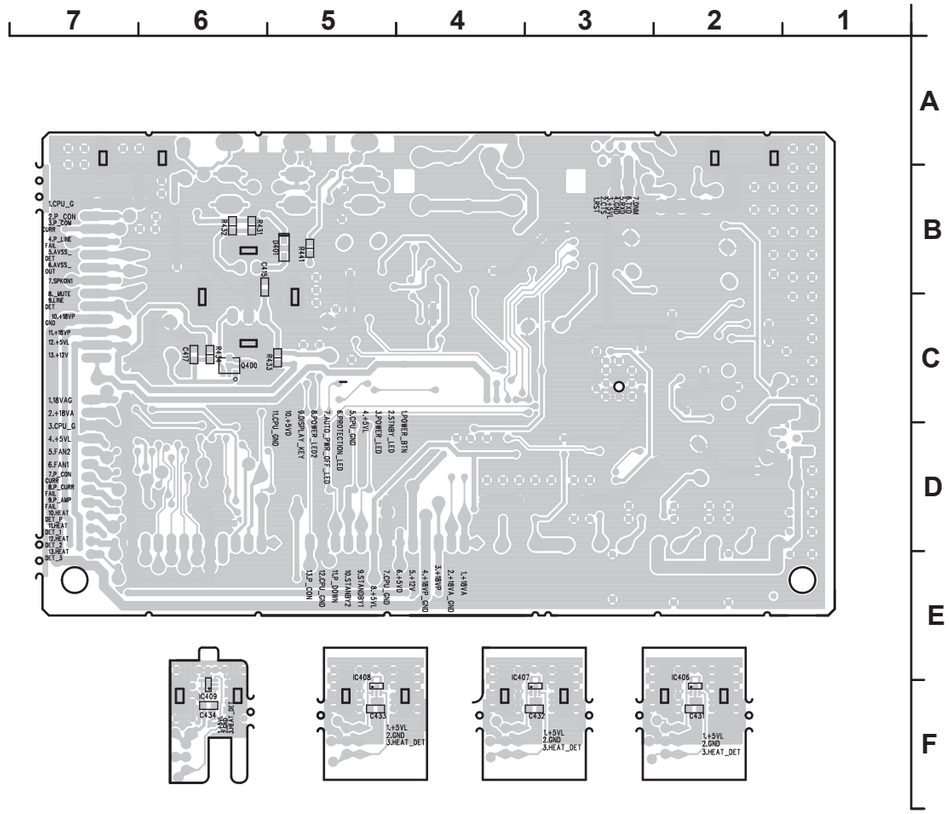
FRONT-3 (COMPONENT SIDE)



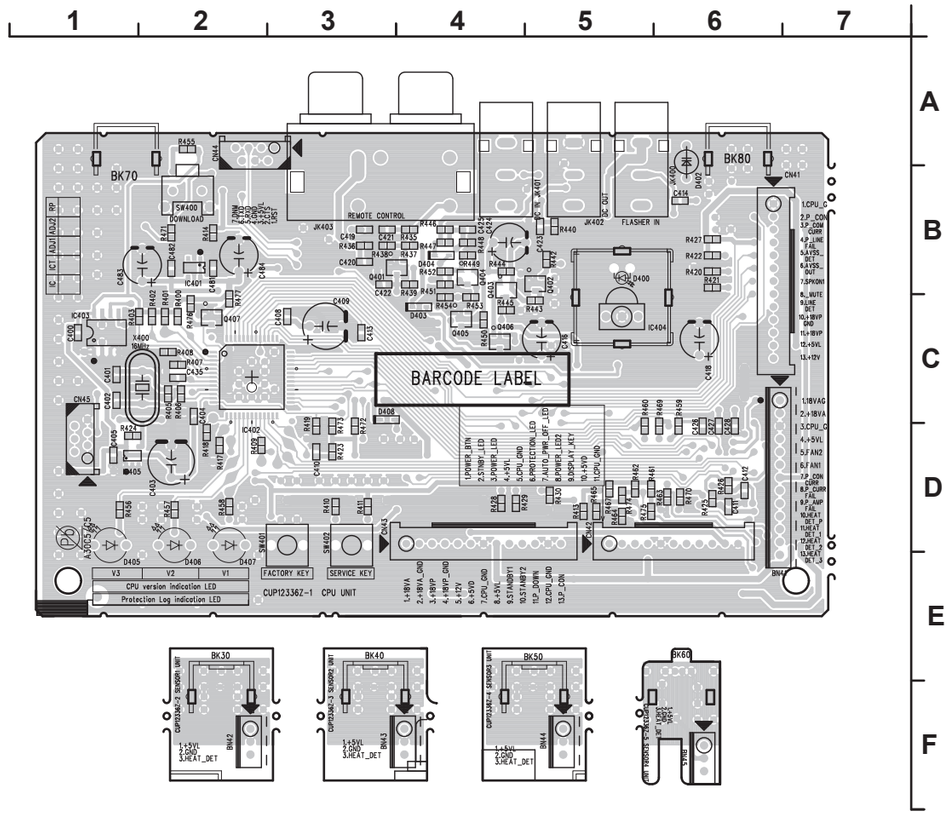
鉛フリー半田
半田付けには、鉛フリー半田 (Sn-Ag-Cu) を使用してください。

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

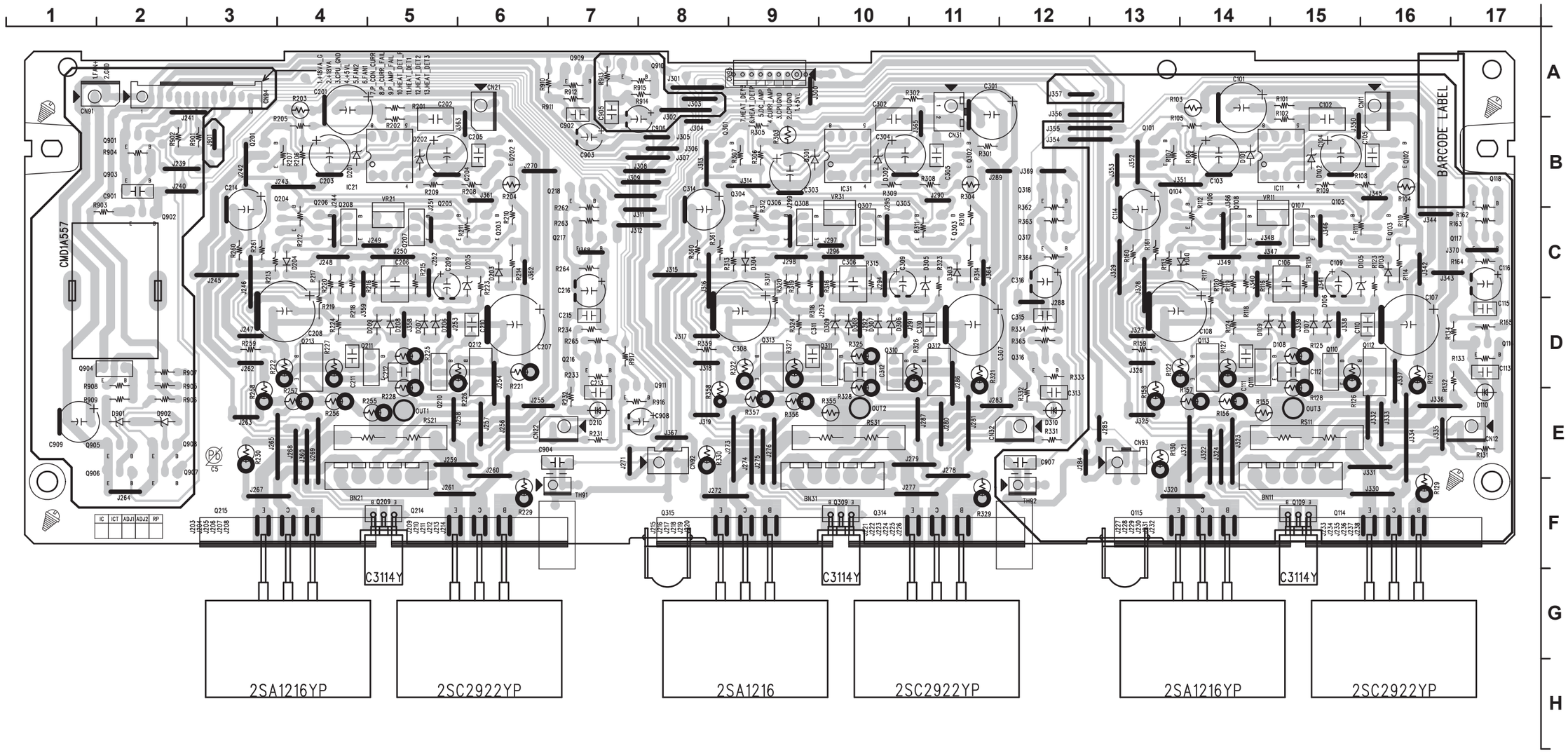
CPU (FOIL SIDE)



CPU (COMPONENT SIDE)



AMP (COMPONENT SIDE)



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Lead-free Solder
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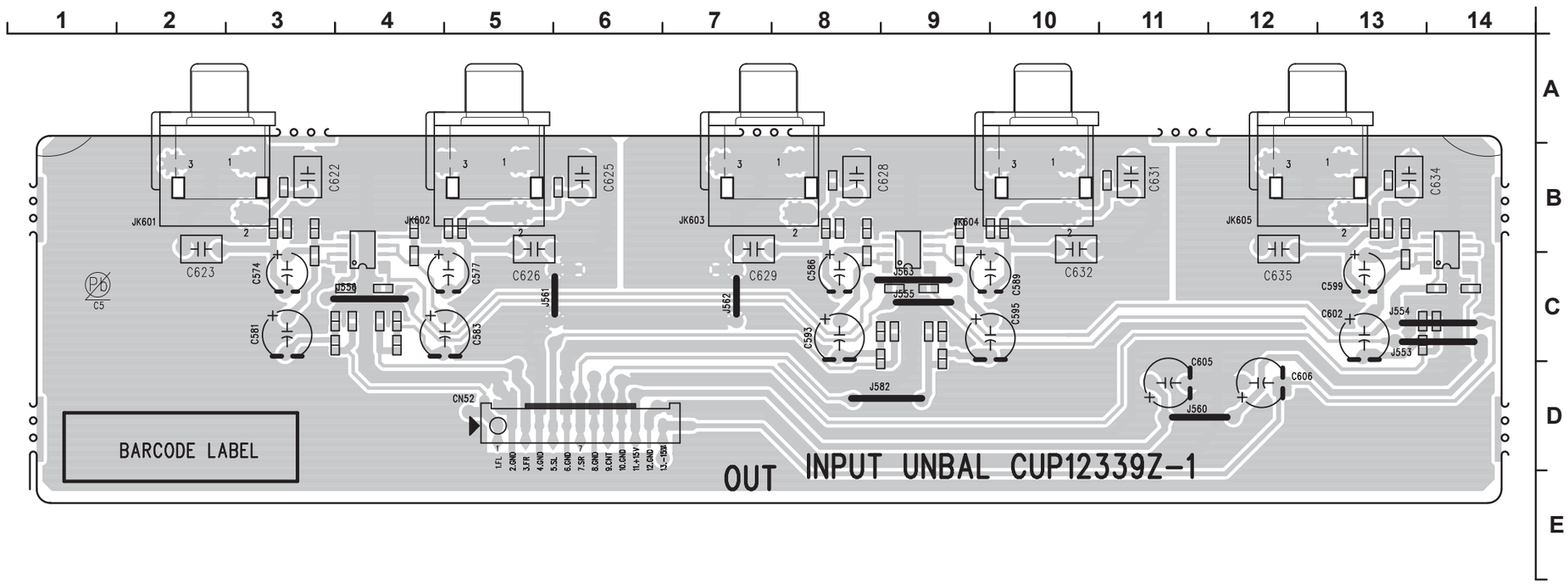
INPUT-1 (COMPONENT SIDE)



鉛フリー半田
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Lead-free Solder
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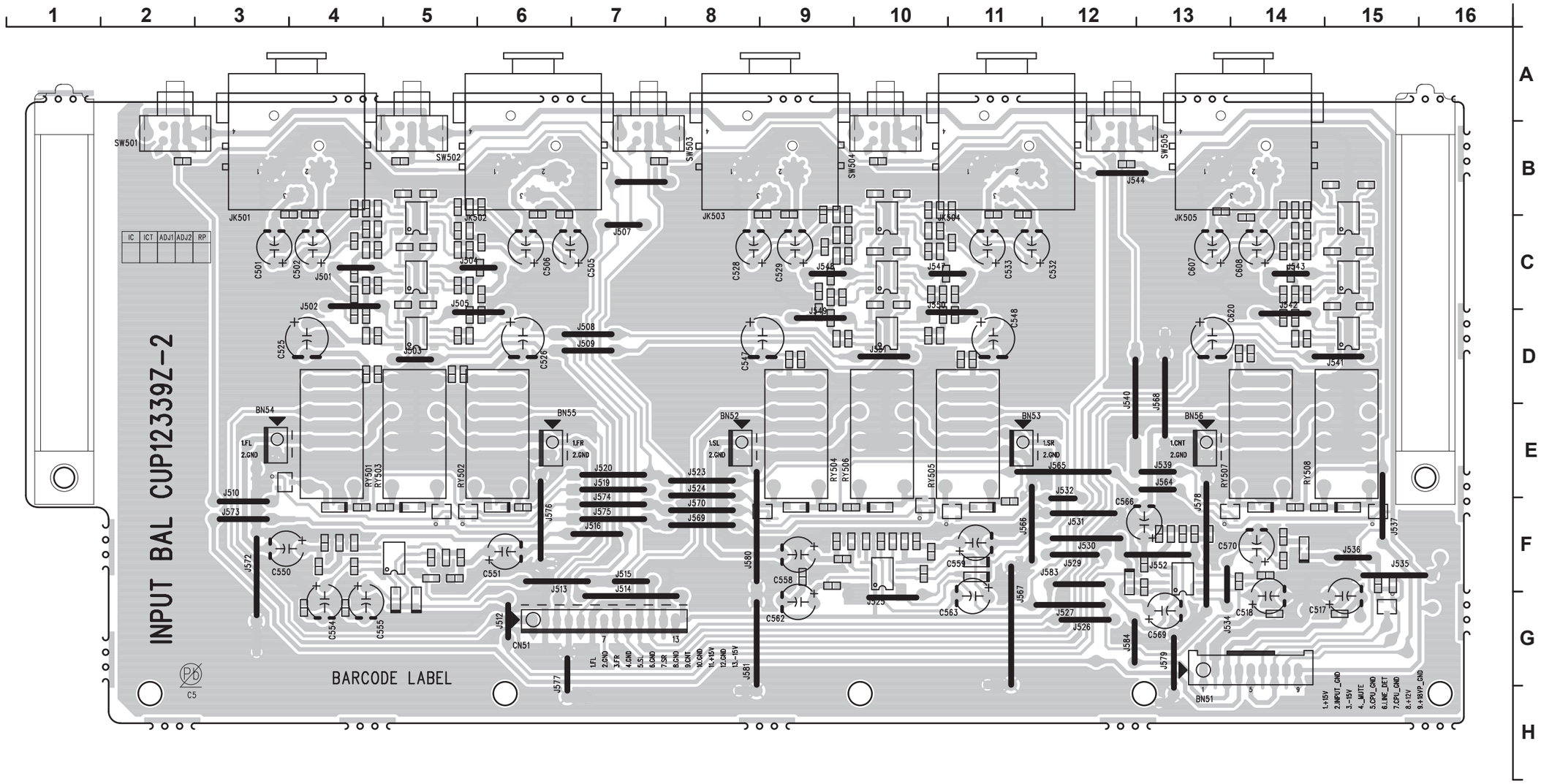
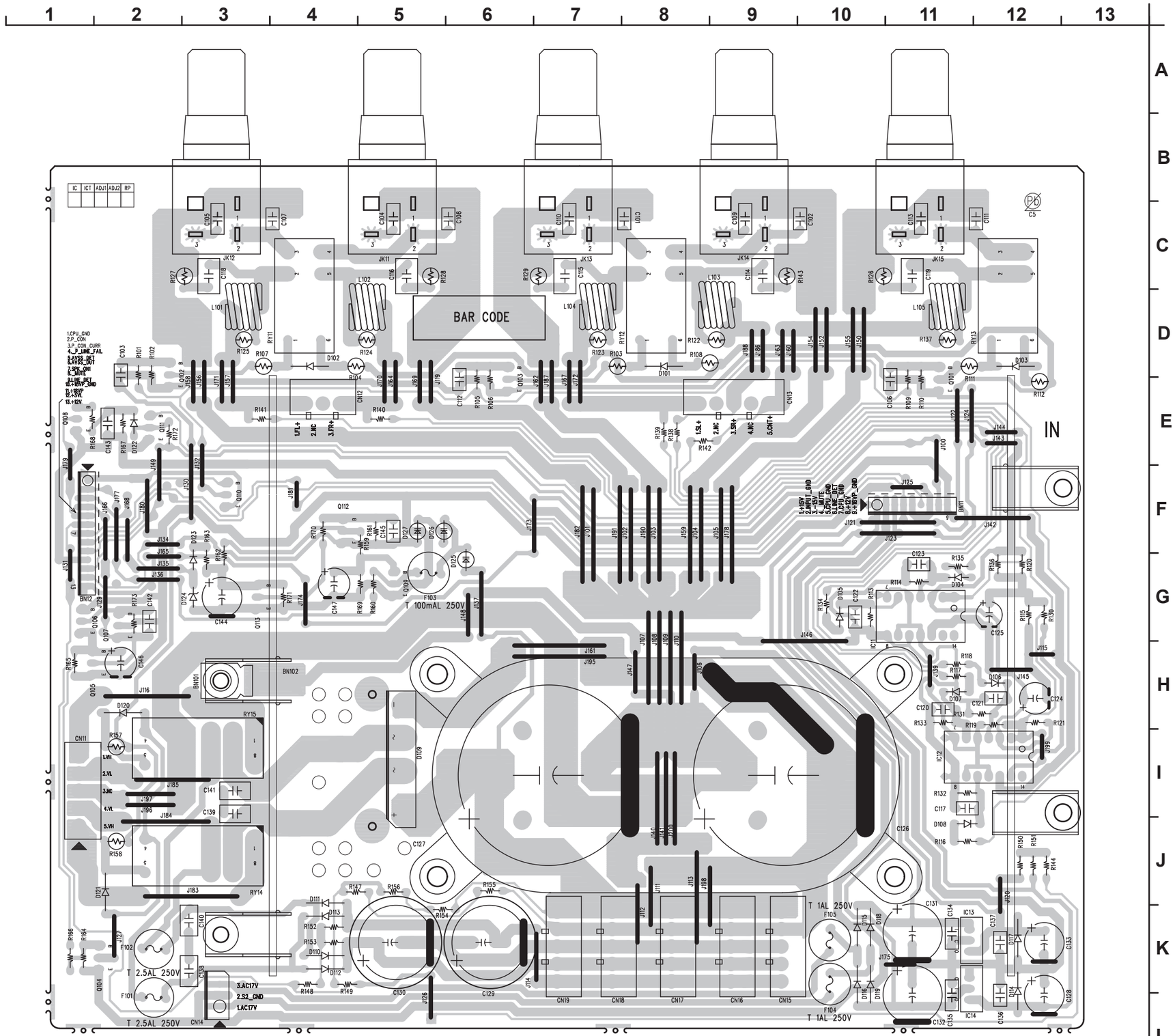
INPUT-2 (COMPONENT SIDE)



鉛フリー半田
半田付けには、鉛フリー半田 (Sn-Ag-Cu) を使用してください。

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

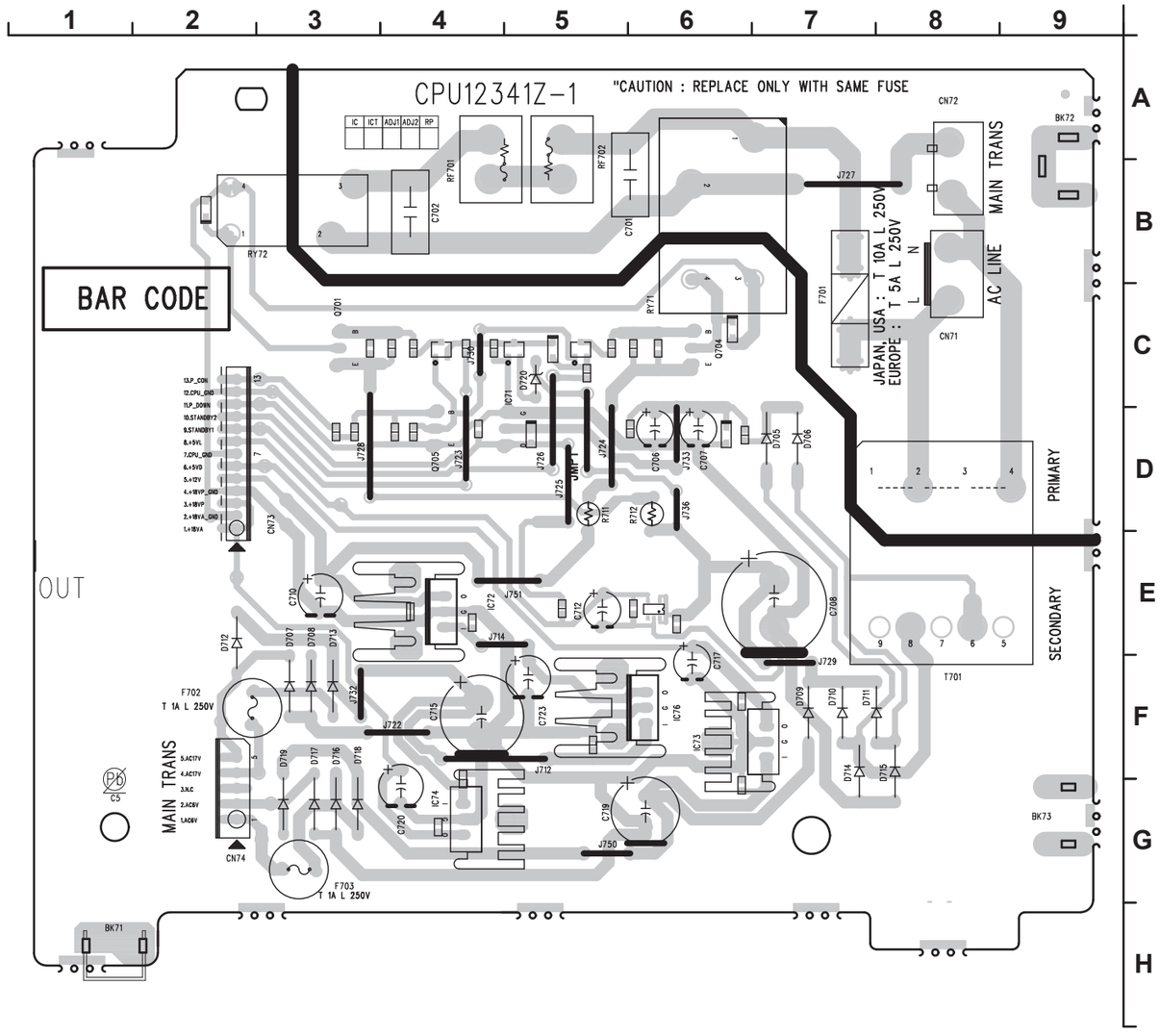
POWER (COMPONENT SIDE)



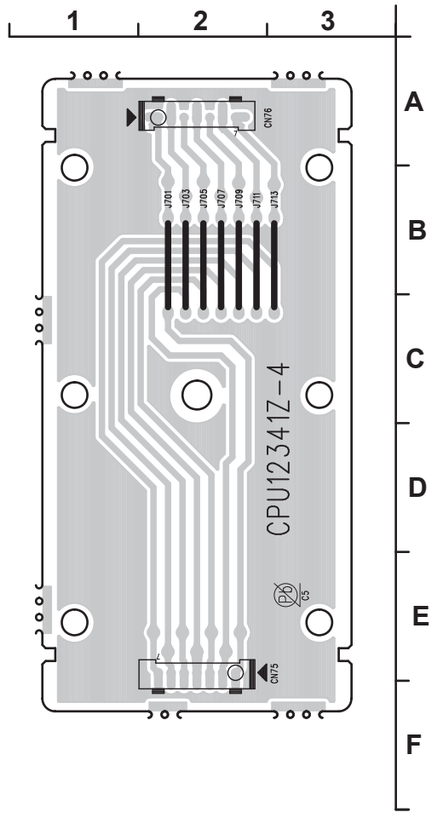
鉛フリー半田
半田付けには、鉛フリー半田 (Sn-Ag-Cu) を使用してください。

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

STANDBY-2 (COMPONENT SIDE)



STANDBY-1 (COMPONENT SIDE)



鉛フリー半田
半田付けには、鉛フリー半田 (Sn-Ag-Cu) を使用してください。

Lead-free Solder
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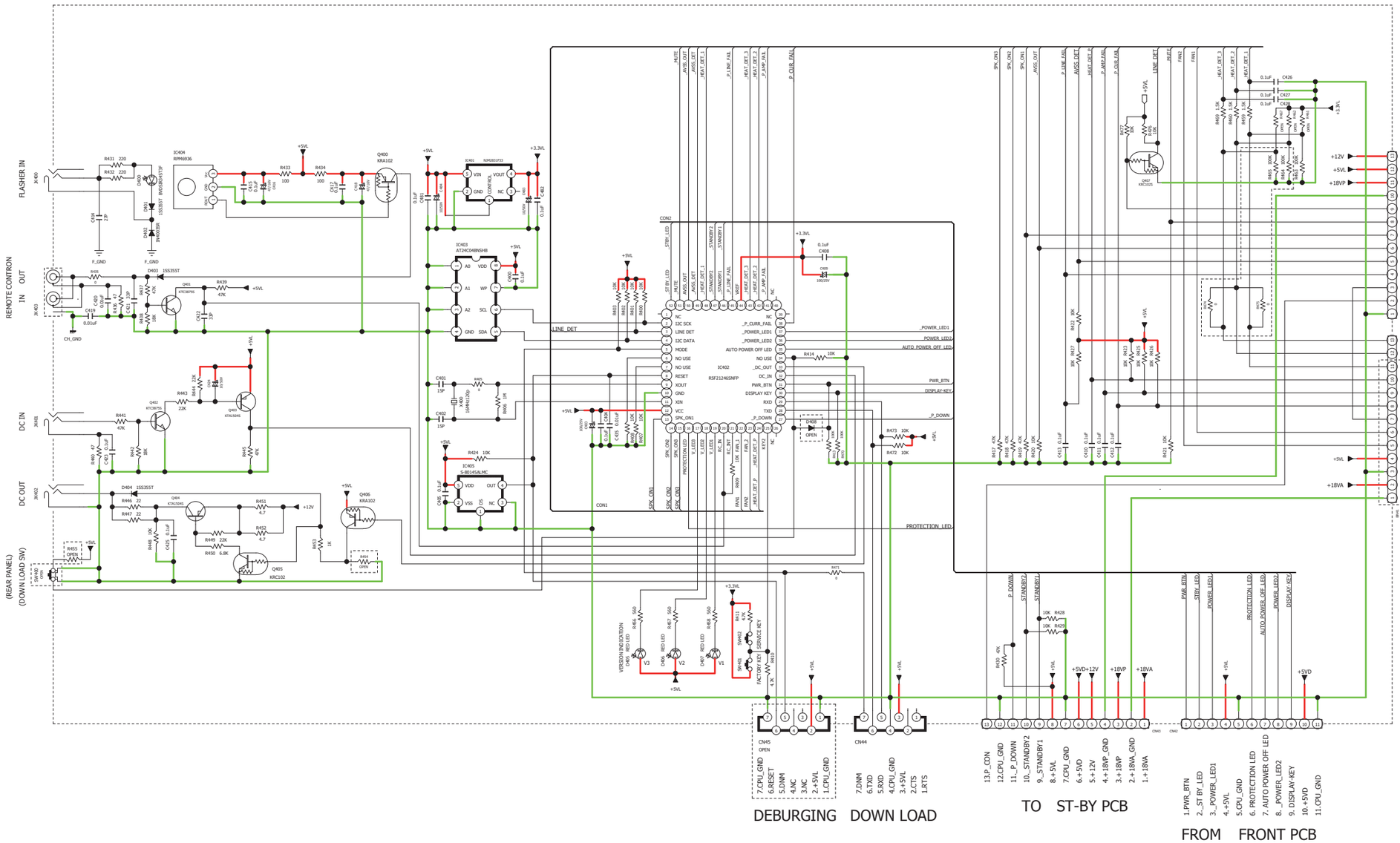
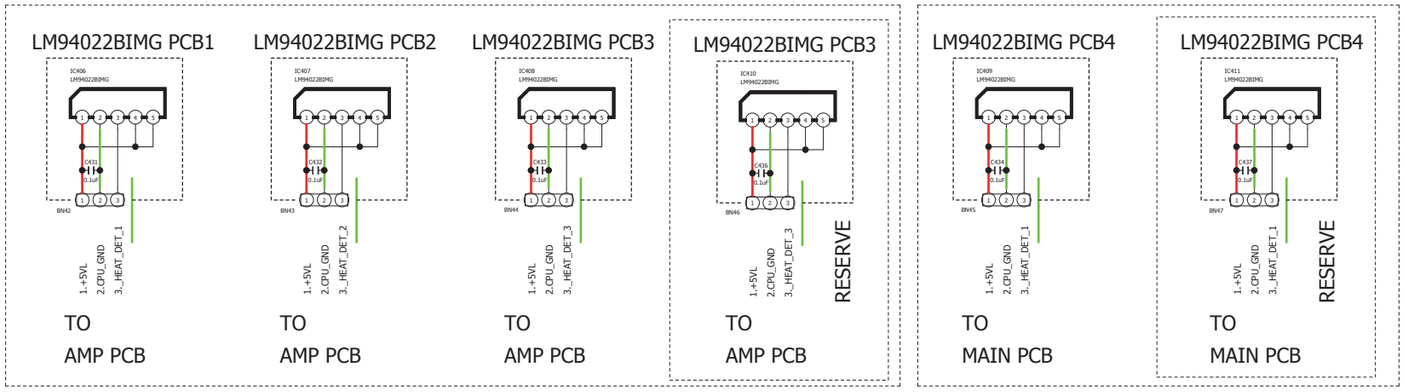
CPU PART



	MM7025	MM7055
R465	OPEN	100K
R464	OPEN	100K
R474	JUMPER	OPEN
R475	JUMPER	OPEN

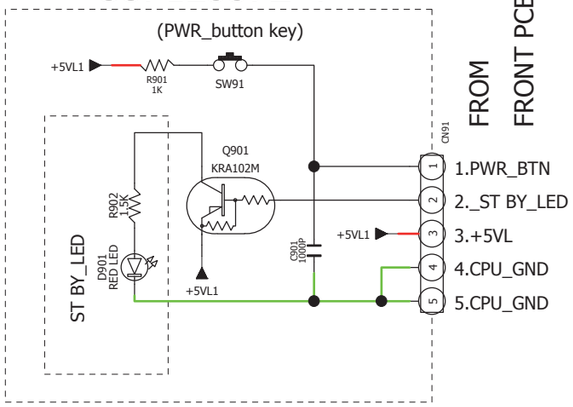
	BN41
MM7025	11P
MM7055	13P



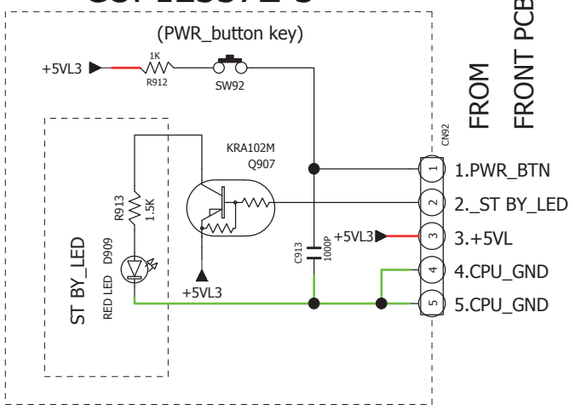
GND POWER + POWER -

SCHEMATIC DIAGRAMS (1/7)

MM7025
ST-BY LED PCB
CUP12337Z-4



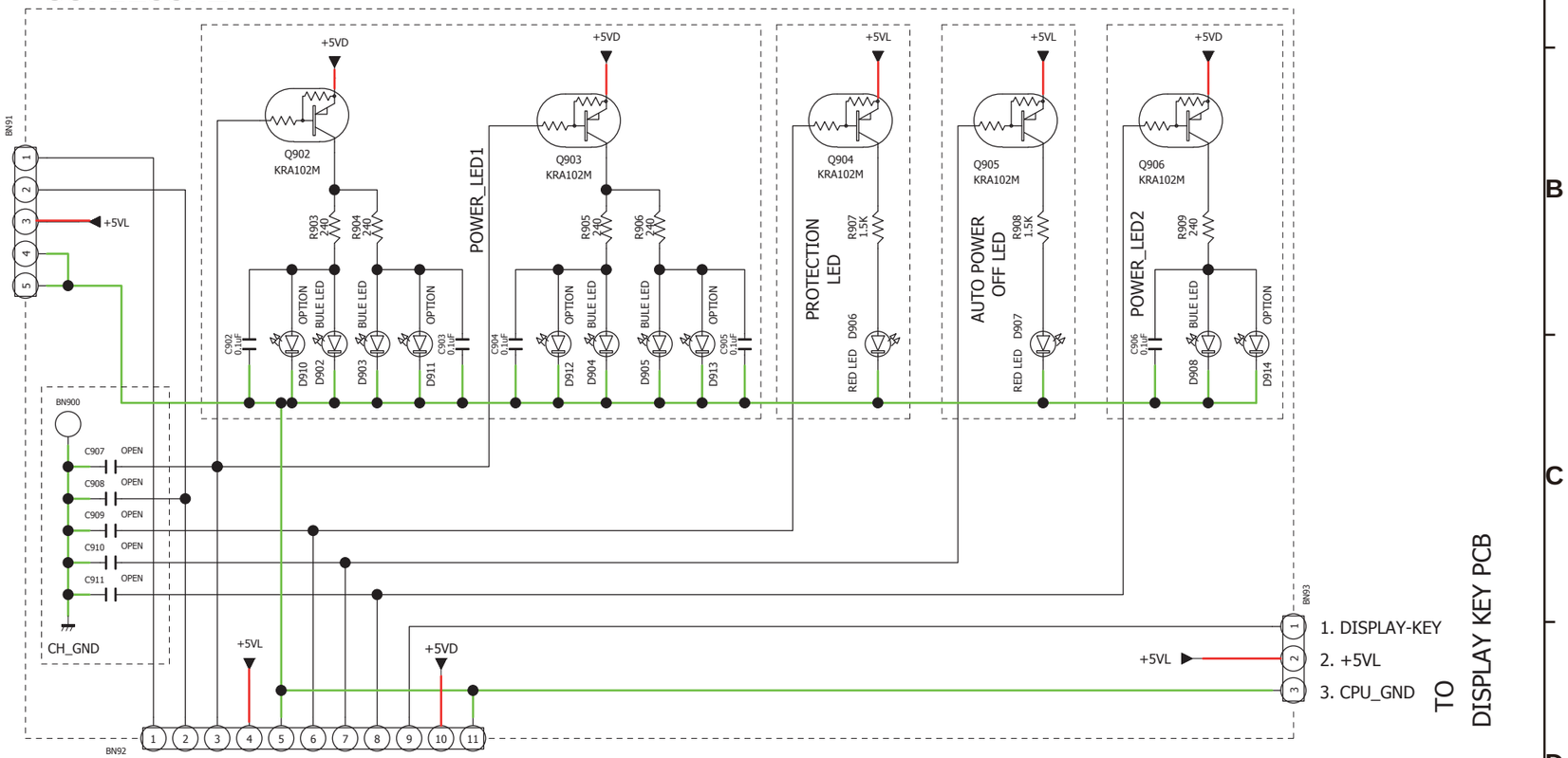
MM7055
ST-BY LED PCB
CUP12337Z-3



TO
ST-BY LED PCB

BN91
1.PWR_BTN
2._ST BY_LED
3.+5VL
4.CPU_GND
5.CPU_GND

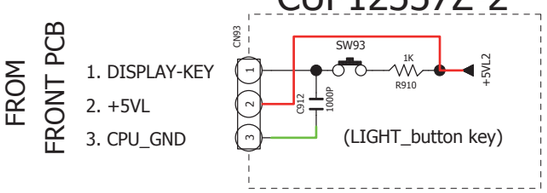
FRONT PCB
CUP12337Z-1



1.PWR_BTN
2._ST BY_LED
3._POWER_LED1
4.+5VL
5.CPU_GND
6.PROTECTION LED
7.AUTO POWER OFF LED
8._POWER_LED2
9.DISPLAY-KEY
10.+5VD
11. CPU_GND

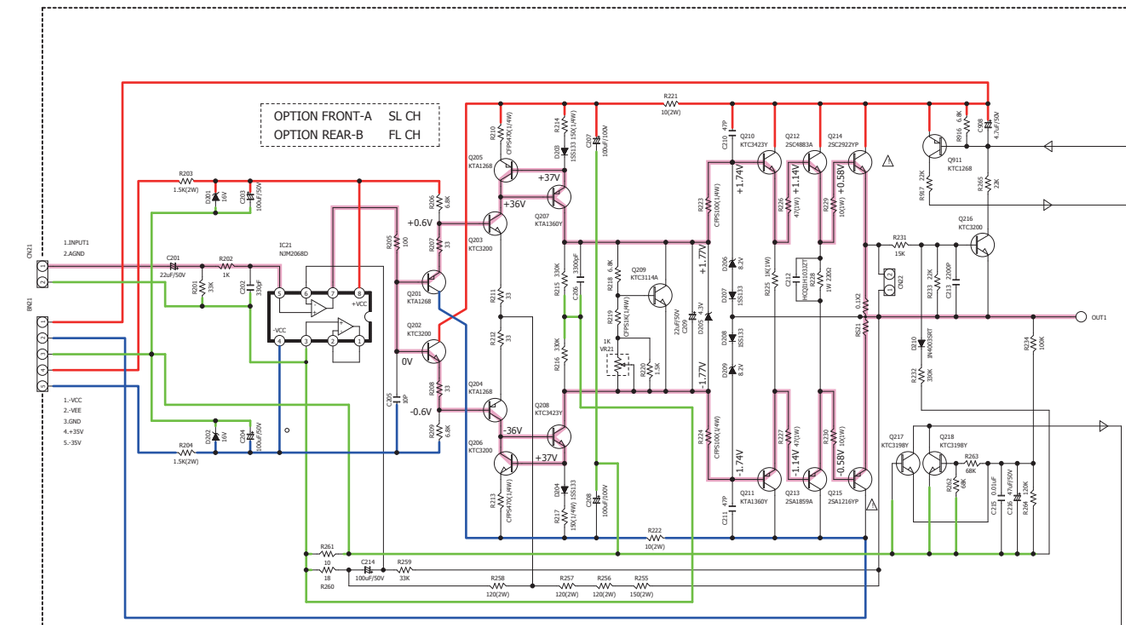
TO
CPU PCB

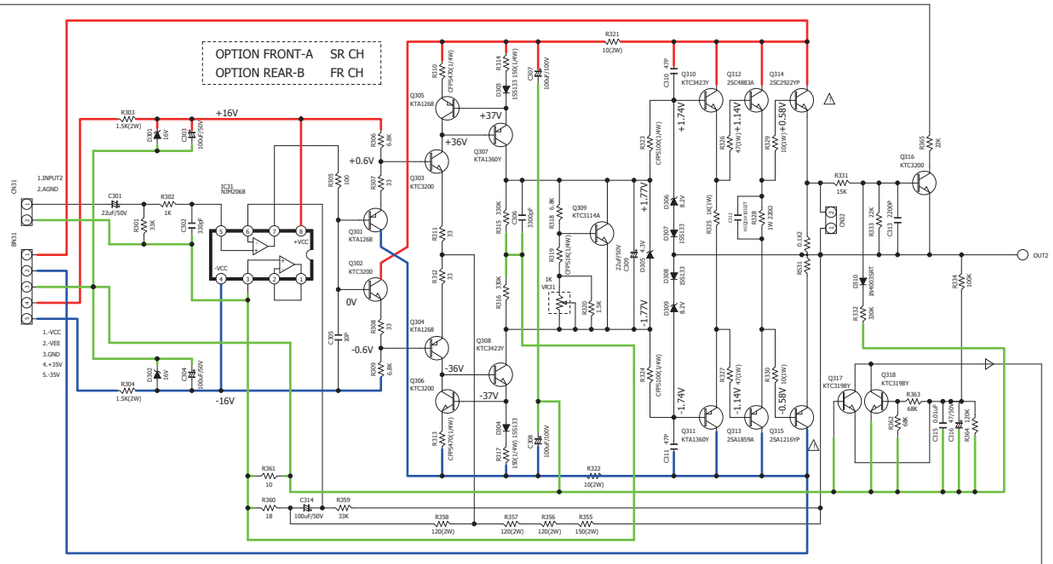
DISPLAY KEY PCB
CUP12337Z-2

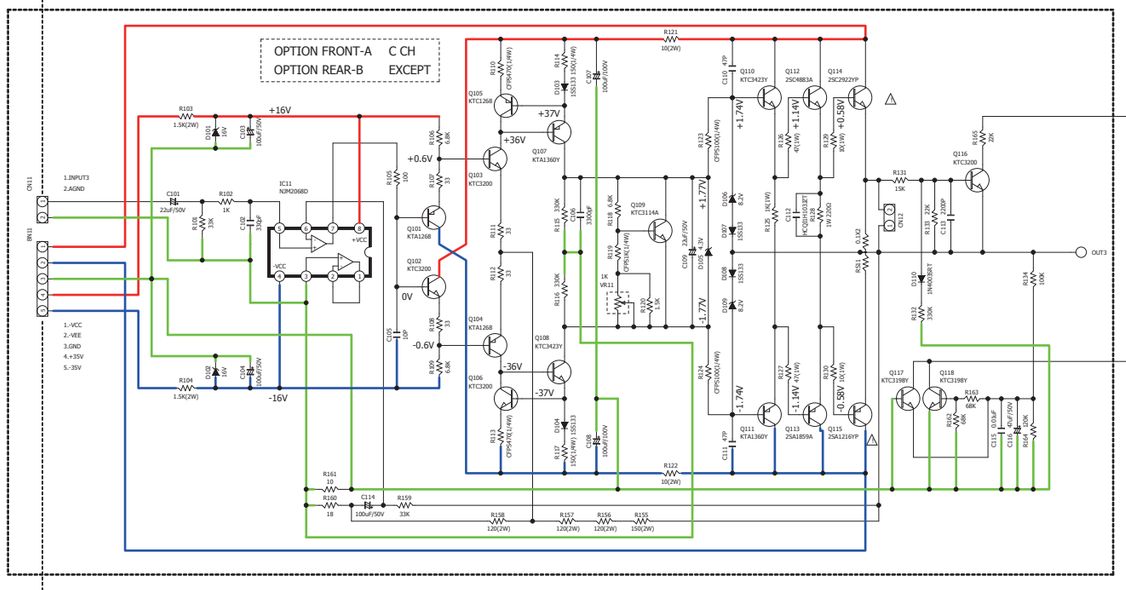


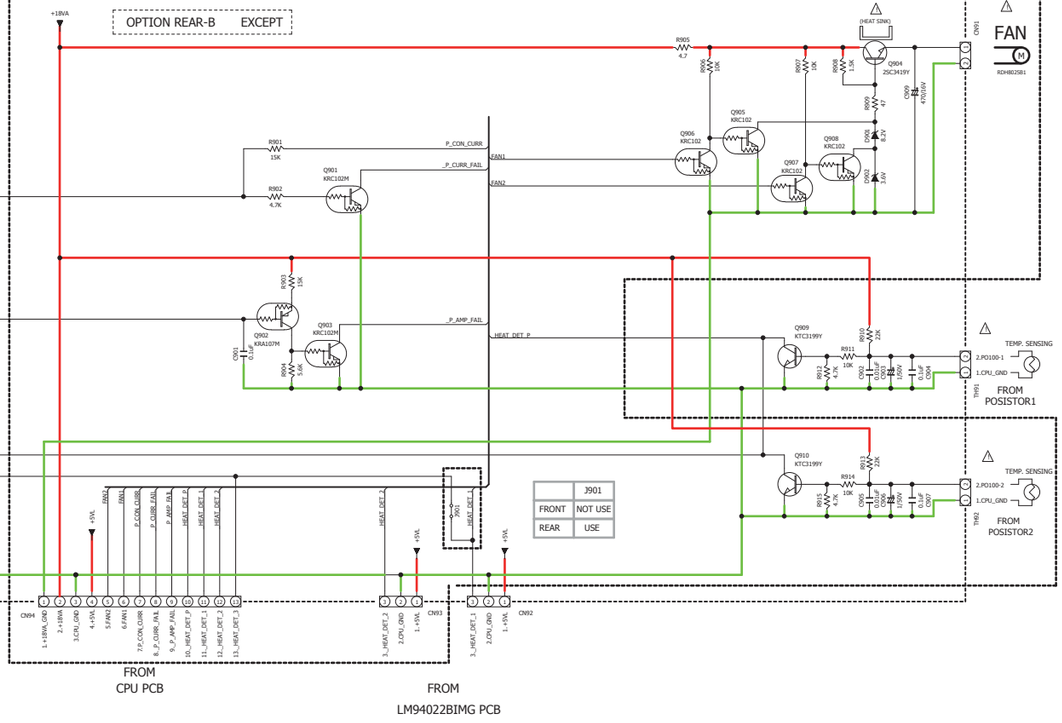
GND POWER + POWER -

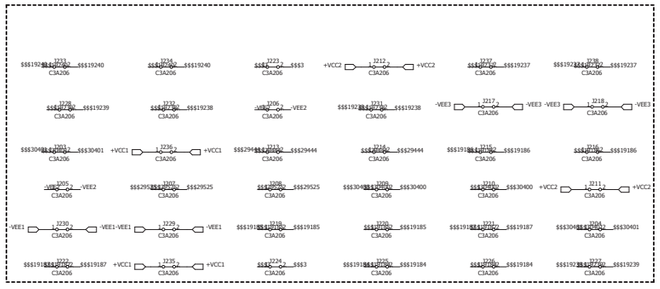
SCHEMATIC DIAGRAMS (2/7)

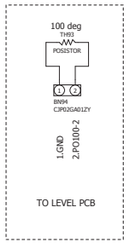


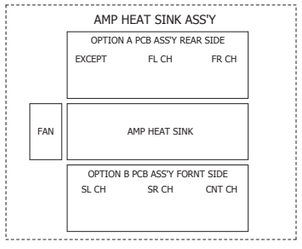










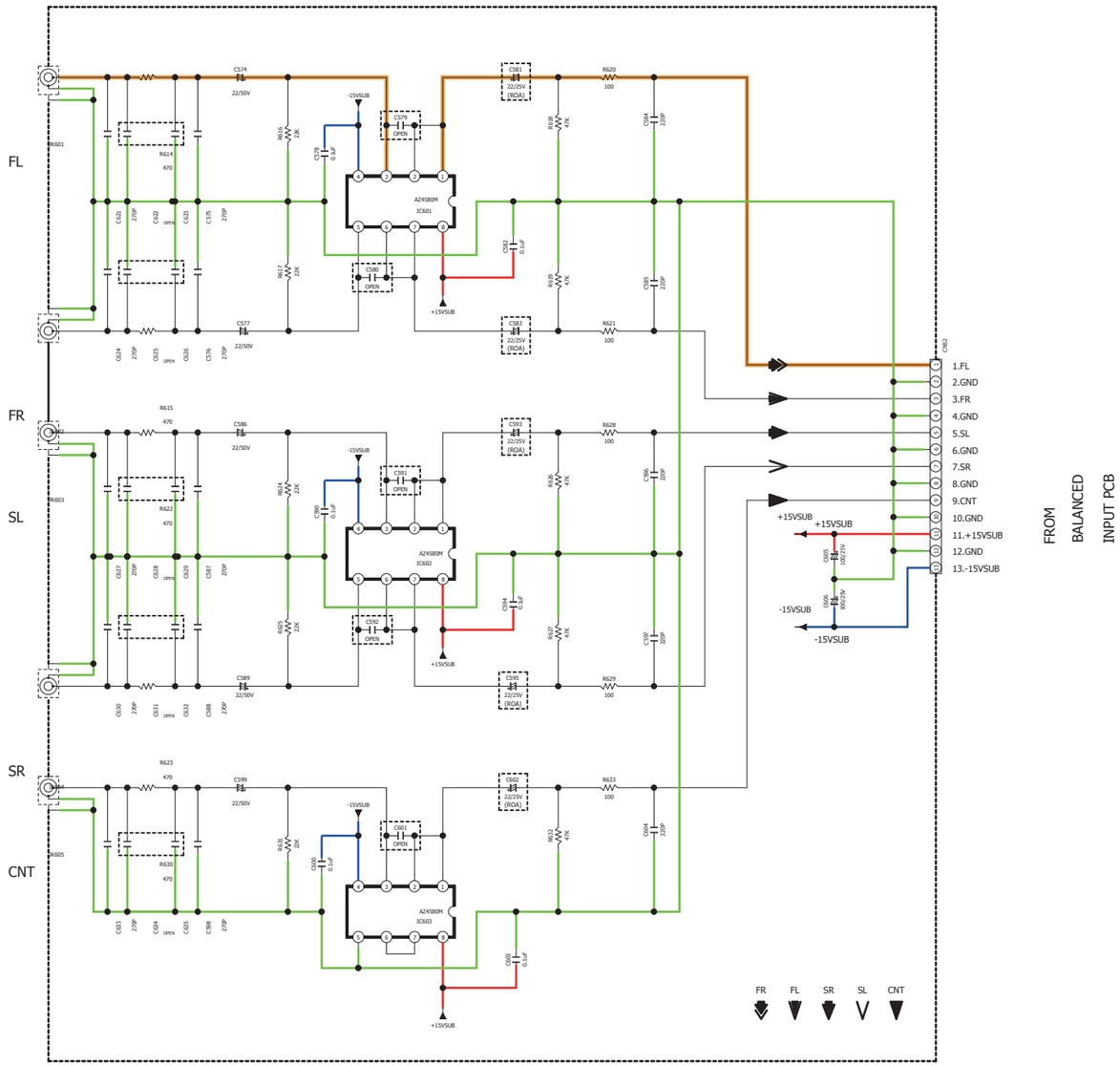


SIGNAL LINE

GND POWER + POWER -

SCHEMATIC DIAGRAMS (3/7)

UNBALANCED INPUT PCB

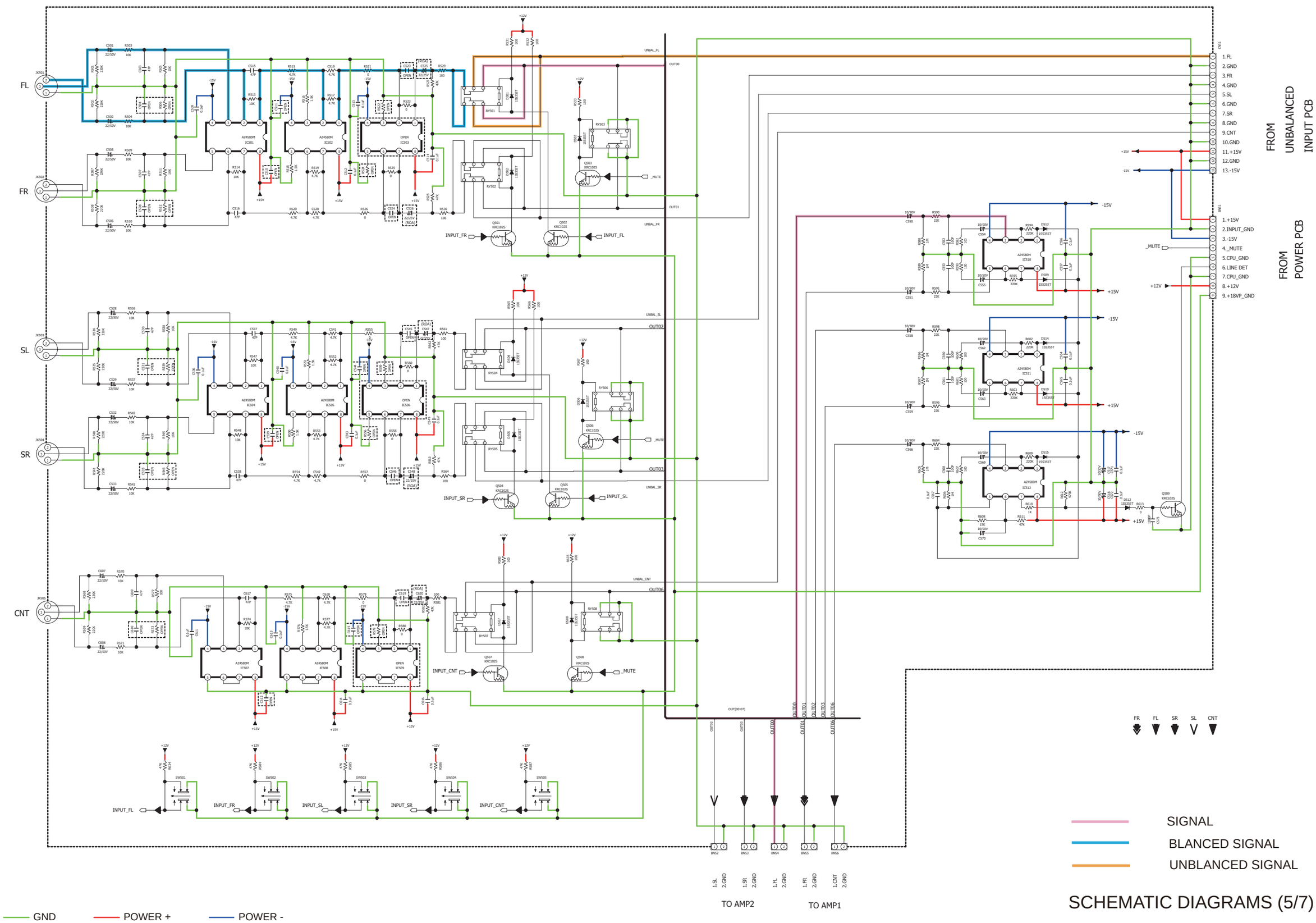


UNBLANCED SIGNAL

GND POWER + POWER -

SCHEMATIC DIAGRAMS (4/7)

BALANCED INPUT PCB



SCHEMATIC DIAGRAMS (5/7)

POWER PCB

FROM AMP PCB ASS'Y

TO CPU PCB

TO INPUT PCB

MAIN TRANS

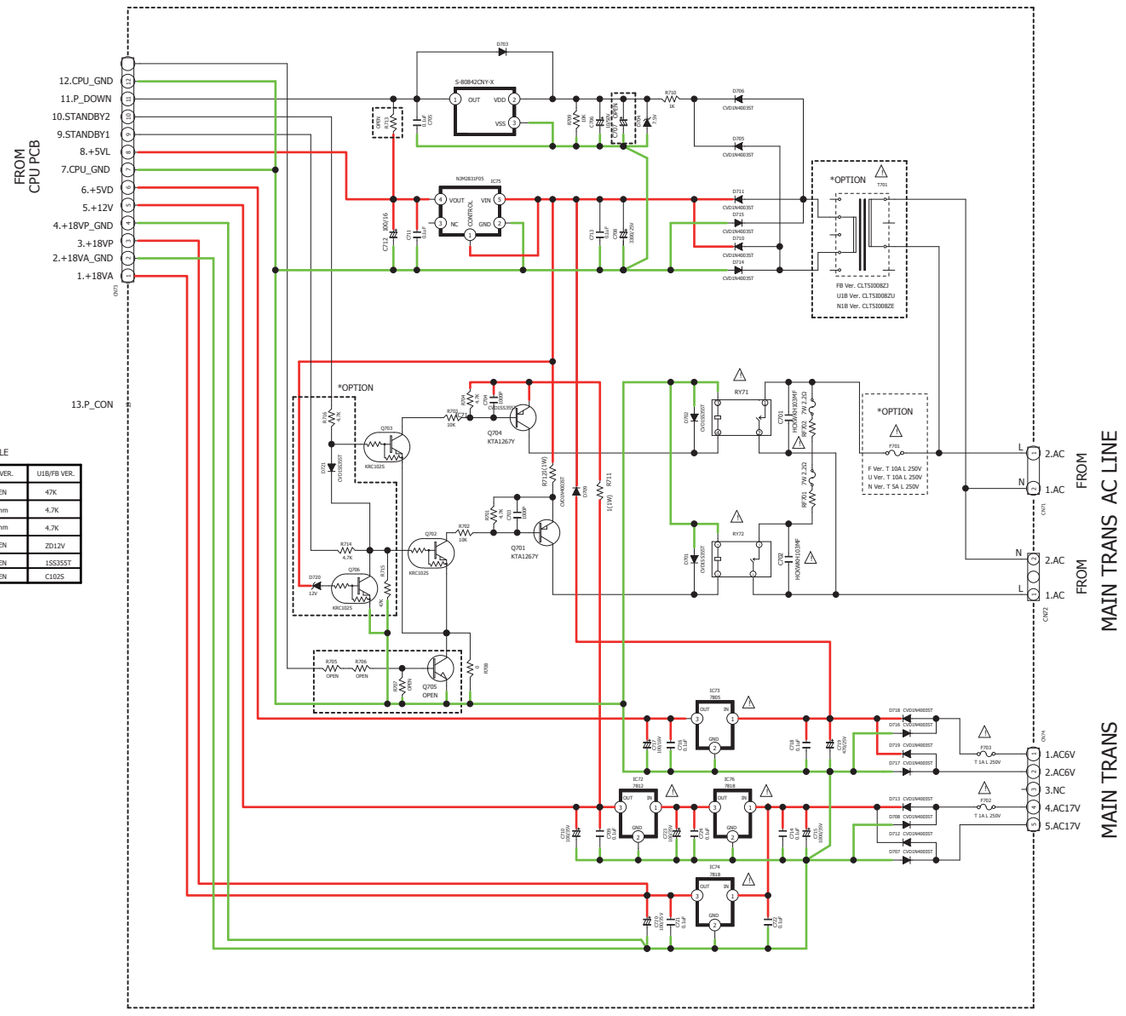
TO AMP5 TO AMP4 TO AMP3 TO AMP2 TO AMP1

SIGNAL

GND POWER + POWER -

SCHEMATIC DIAGRAMS (6/7)

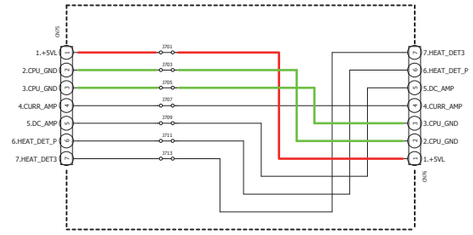
ST-BY PCB



*OPTION TABLE

REF.NO.	N1B VER.	U1B/FB VER.
R715	OPEN	47K
R714	0 ohm	4.7K
R716	0 ohm	4.7K
D720	OPEN	ZD12V
D721	OPEN	1SS355T
Q706	OPEN	C1025

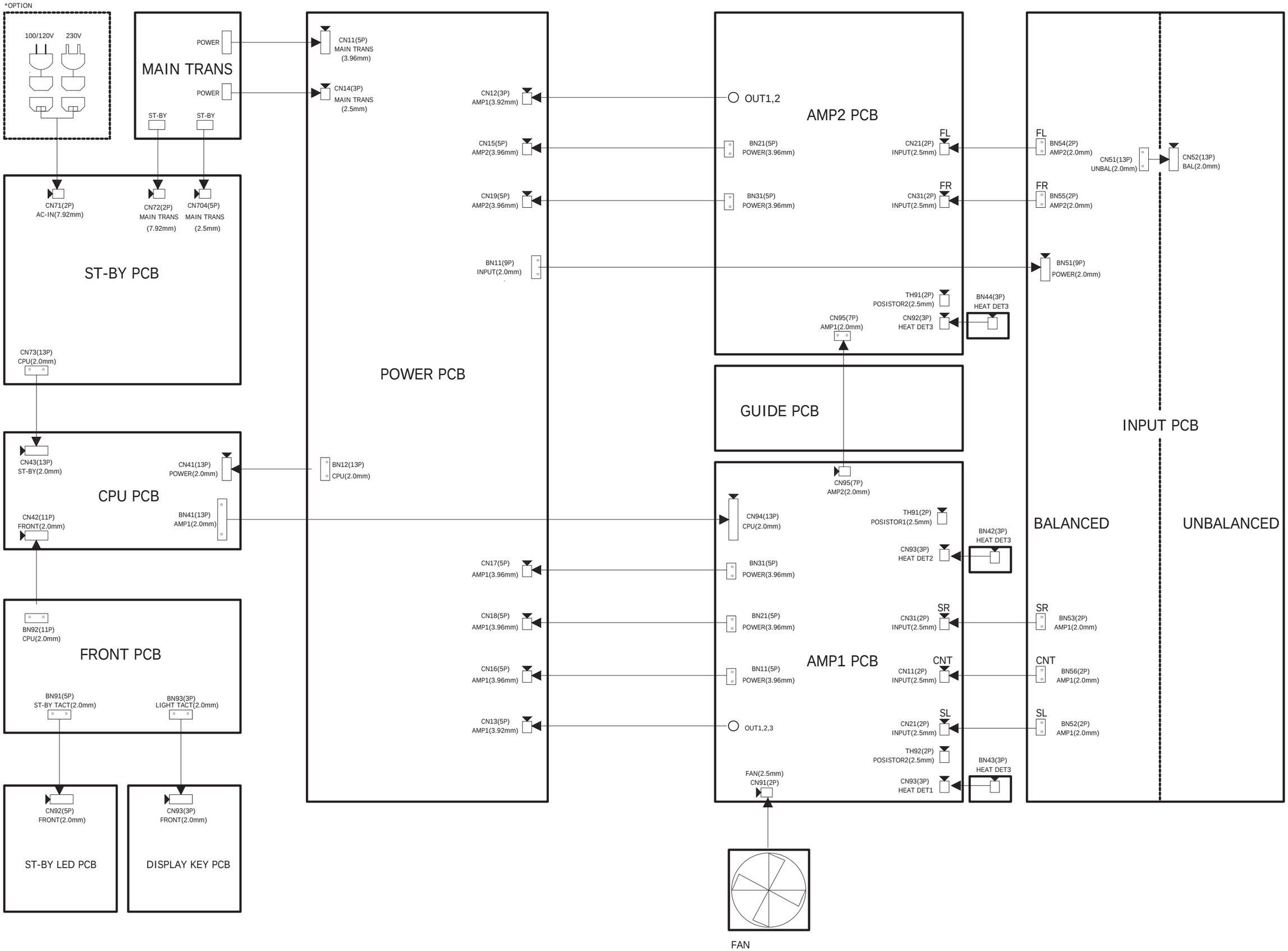
2CH - 3CH AMP CONNECTION PCB



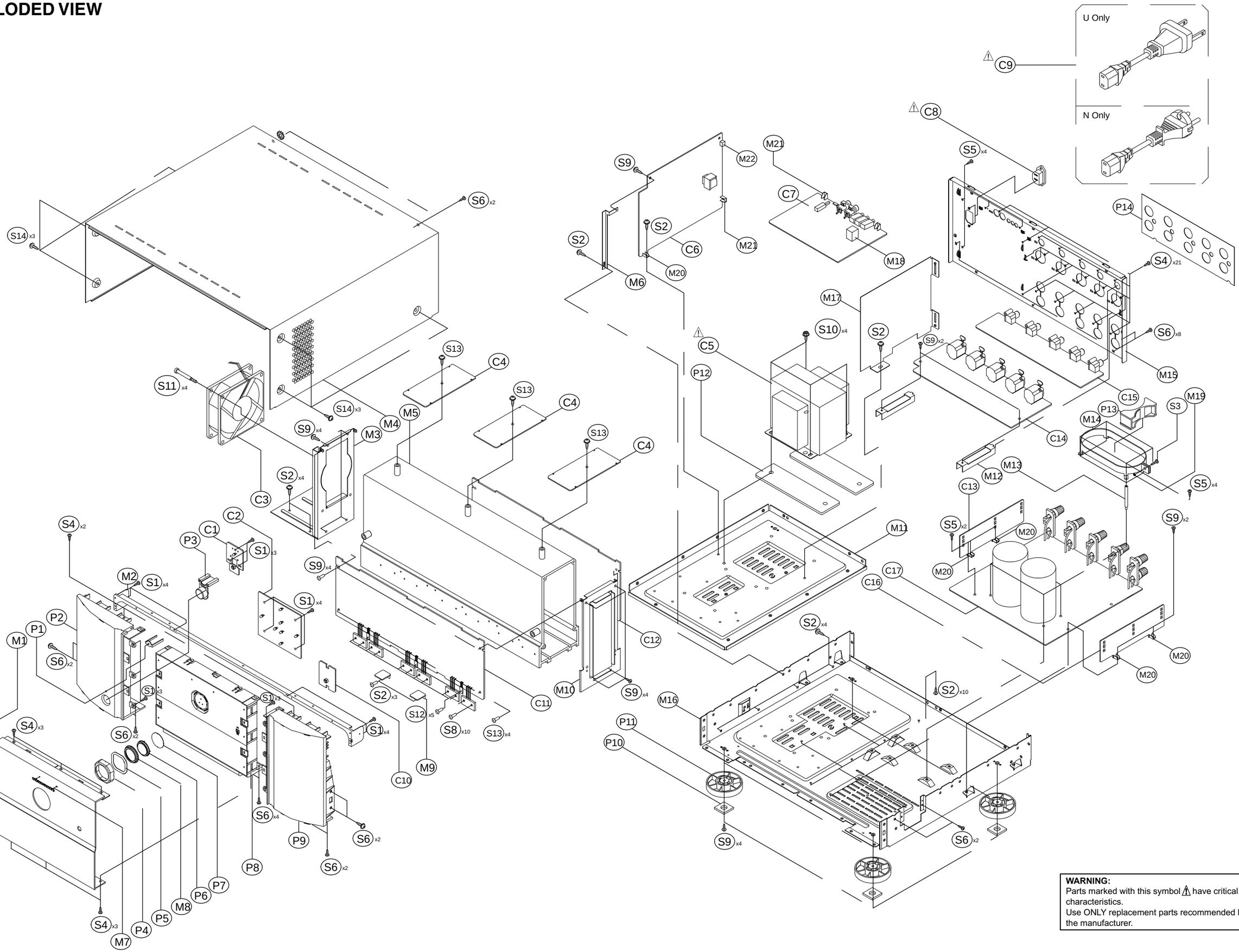
GND POWER + POWER -

SCHEMATIC DIAGRAMS (7/7)

WIRING DIAGRAM



EXPLODED VIEW



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

PARTS LIST OF EXPLODED VIEW

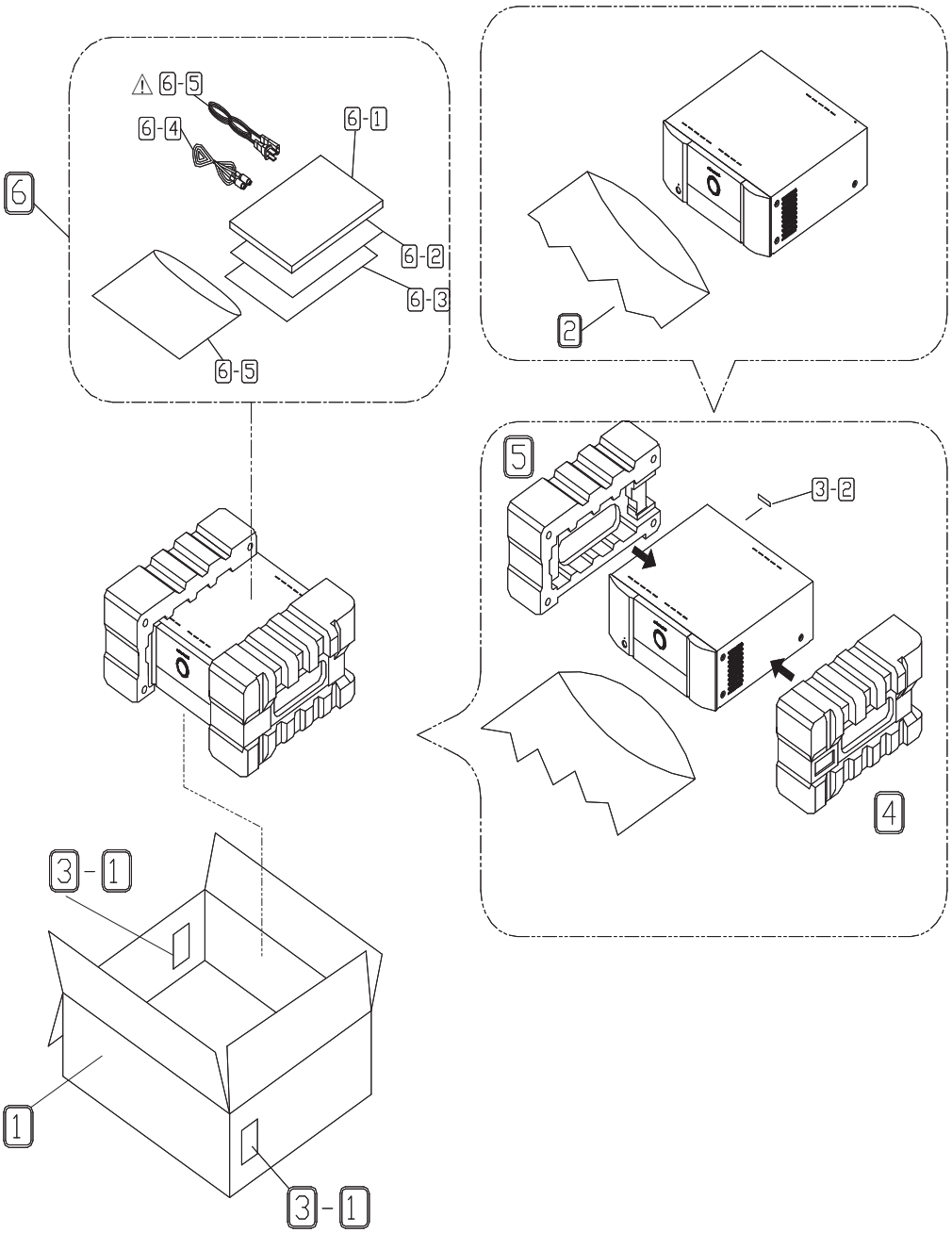
∗Parts for which "nsp" is indicated on this table cannot be supplied.
∗P.W.B. ASS'Y for which "nsp" is indicated on this table cannot be supplied. When repairing the P.W.B. ASS'Y, check the board parts table and order replacement parts.
∗Part indicated with the mark " ★ " is not illustrated in the exploded view.
∗The parts listed below are for maintenance only, might differ from the parts used in the unit in appearances or dimensions.

Note: The symbols in the column "Remarks" indicate the following destinations.
U1B : North America model N1B : Europe model

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New	
	C1A	nsp	FRONT PCB ASS'Y		COP12337B	1		
	C1	-	FRONT PCB ASS'Y-1		-			
	C2	-	FRONT PCB ASS'Y -2		-			
	C10	-	FRONT PCB ASS'Y-3		-			
	C11	nsp	AMP PCB ASS'Y-1		COP12338B-1	1		
	C12	nsp	AMP PCB ASS'Y-2		COP12338C-1	1		
	C17	nsp	POWER PCB ASS'Y		COP12340B-1	1		
	C4A	nsp	STBY.PCB ASS'Y		COP12341B	1		
	C4	-	STANDBY PCB-1		-			
	C6	-	STBY.PCB ASS'Y-2		-			
	C13	-	STBY.PCB ASS'Y-3		-			
	C16	-	STBY. PCB ASS'Y-4		-			
	C7	nsp	CPU PCB ASS'Y		COP12336B-1	1		
	C14A	nsp	INPUT PCB ASS'Y		COP12339B	1		
	C14	-	INPUT PCB -1		-			
	C15	-	INPUT PCB-2		-			
	C3	943685011470S	FAN		CFNRDH8025B1	1	*	
⚠	C5	943101010760M	MAIN TRANS	U1B	CLT5W041ZU	1	*	2
⚠	C5	943101010750M	MAIN TRANS	N1B	CLT5W041ZE	1	*	2
⚠	C8	00MYJ04002640	RECEPTACLE		CJJ8A006ZW	1		
⚠	C9	90M-ZC000310R	CORD, POWER	U1B	CJA2A070Z	1		
⚠	C9	90M-ZC000320R	CORD, POWER	N1B	CJA2B054Z	1		
	M1	943402010730M	FRONT PANEL(AL)		CKM1A234ZC23	1	*	2
	M2	nsp	BODY BRACKET		CMD1A668	1		
	M3	nsp	H/S BRACKET		CMD1A666	1		
	M4	943403011580S	TOP CABINET		CKC3A170K117	1	*	
	M5	nsp	MAIN HEAT SINK		CMY1A363	1	*	
	M6	nsp	PCB BRACKET(DMP)		CMD1A669	1		
	M7	421410006004M	BADGE		CGB1A206	1		
	M8	424410019009M	RING		CGK1A163C23	1		
	M9	nsp	PCB BRACKET		CMD1A629	2		
	M10	nsp	FAN BRACKET		CMD1A667Z	1		
	M11	nsp	TRANS BRACKET		CMD2A671	1		
	M12	nsp	MULTI.BRACKET		CMD1A665	2		
	M13	nsp	RETAINER SHAFT		CDF1A024	4		
	M14	nsp	CONDENSER BRACKET		CMD1A663	1		
	M15	nsp	REAR PANEL	U1B	CKF1A438Y	1		
	M15	nsp	REAR PANEL	N1B	CKF1A438Z	1		
	M16	nsp	BOTTOM CHASSIS		CUA2A285	1		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	M17	nsp	SHIELD PLATE		CMC1A410	1	
	M18	nsp	SHIELD BRACKET		CMD1A775	1	
	M19	nsp	NUT		CNE1A012	1	
	M20	nsp	PCB BRACKET		CMD1A387	5	
	M21	nsp	PCB BRACKET		CMD1A188	1	
	M22	nsp	PCB BRACKET		CMD1A569	3	
	P1	943423011600S	POWER INDICATOR		CGL1A231	1	
	P2	943404011570S	LEFT SIDE PANEL		CGW1A450RNXB37	1	*
	P3	411510015017M	POWER KNOB(TACT)		CBT1A1072	1	
	P4	nsp	LENS		CGL1A290	1	
	P5	nsp	SHEET		CGX1A455Z	1	
	P6	416510046009M	WINDOW		CGU1A455	1	
	P7	943423011610S	FILTER		CGX1A449Z	1	*
	P8	943443011590S	SUB PANEL(MOLD)		CGW1A503	1	*
	P9	422510011039M	RIGHT SIDE PANEL		CGW1A451RNB37	1	
	P10	00M32CW107010	RUBBER		CHG1A360	4	
	P11	00M243W057210	FOOT		CKL2A042H46	4	
	P12	nsp	MAINTRANS CUSHION		CHG1A486	2	*
	P13	nsp	SPACER SUPPORT		CMH1A286	1	
	P14	nsp	PROTECT SHEET		CGX1A452Z	1	
	★1	nsp	CUSHION , SIDE MM8003		CHG1A427	2	
	★2	nsp	RUBBER		CHG1A113	4	
	★3	nsp	CUSHION , SUPPORT		CHG1A305	5	
	★4	nsp	2P WIRE ASS'Y(100MM)		CWZPM5003TW91	1	
	★5	nsp	CLAMPER		CHR301	74	
	★6	nsp	WASHER , FIBRE(0.5)		CNW4A028	4	
	★7	nsp	TAPE , HEMELON		CHS1A032	-	
	★8	nsp	SHEET, COVER		CHS1A154	-	
SCREWS							
	S1	nsp	SCREW		CTB3+10JR	21	
	S2	nsp	SCREW		CTB3+6JR	23	
	S3	nsp	SCREW,SPECIAL		CHD6A012JR	1	
	S4	nsp	SCREW		CTB3+10JFB	29	
	S5	nsp	SCREW		CTB3+6FFB	10	
	S6	nsp	SCREW		CTB3+8JFB	25	
	S7	nsp	SCREW		CTW3+8JFZR	6	
	S8	nsp	SCREW ,TR		CHD5A012JR	10	
	S9	nsp	SCREW		CTW3+8JR	20	
	S10	nsp	SCREW ,TRANS		CHD1A068R	4	
	S11	nsp	SCREW ,SPECIAL		CHD1A036R	4	
	S12	nsp	SCREW ,TR		CHD1A012JR	5	
	S13	nsp	SCREW		CTB3+6FFC	7	
	S14	nsp	SCREW		CTW3+8JFZR	6	

PACKING VIEW



PARTS LIST OF PACKING & ACCESSORIES

* Parts for which "nsp" is indicated on this table cannot be supplied.
* Part indicated with the mark " ★ " is not illustrated in the exploded view.
* The parts listed below are for maintenance only, might differ from the parts used in the unit in appearances or dimensions.

Note: The symbols in the column "Remarks" indicate the following destinations.
U1B : North America model N1B : Europe model

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	1	943531011620S	BOX, OUT CARTON		CPG1A861V	1	*
	2	nsp	BAG,POLY SET		CPP1A081Z	1	
	3	nsp	CONTROL, LABEL		CQB1A993Z	1	
	4	533610007014M	PAD , SNOW L		CPS1A813	1	
	5	533610008024M	PAD , SNOW R		CPS1A814	1	
	6	-	MANUAL, INSTRUCTION□ASS'Y		-	-	

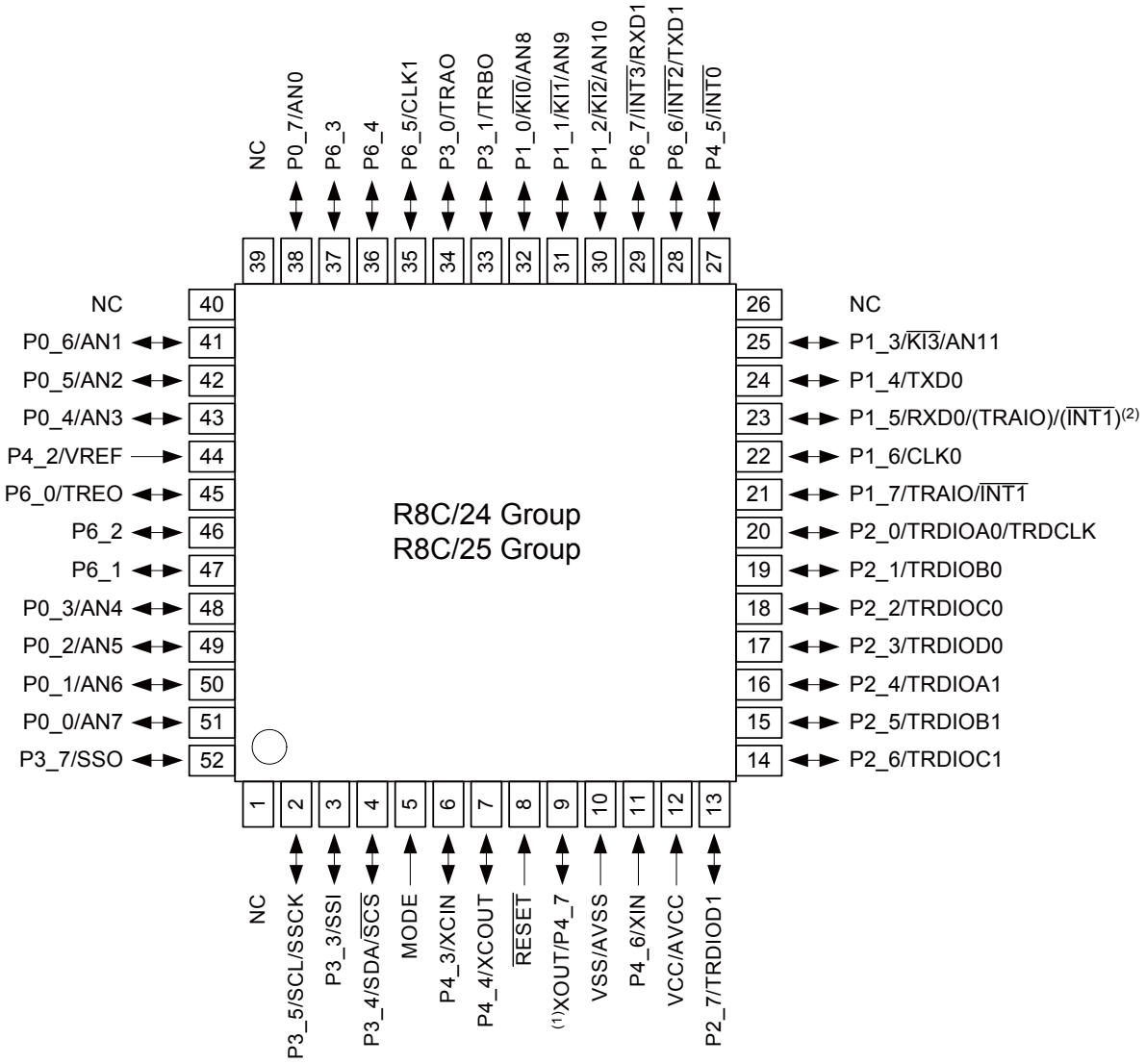
	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	6-1	541110586001M	MANUAL, INSTRUCTION	U1B	CQX1A1564Z	1	
	6-1	541110585008M	MANUAL, INSTRUCTION	N1B	CQX1A1563Z	1	
	6-2	nsp	CARD , WARRANTY	U1B	CQE1A131W	1	
	6-3	nsp	WARRANTY CANADA	U1B	CQE1A132V	1	
	6-4	943613000560S	CORD , ORANGE PIN(1.2MM)		CJS4M034Z	1	
⚠	6-5	90M-ZC000310R	CORD , POWER(PLUG+SOCKET)UL	U1B	CJA2A070Z	1	
⚠	6-5	90M-ZC000320R	CORD , POWER(DETACHABLE/EUR)	N1B	CJA2B054Z	1	
	6-6	nsp	BAG , POLY(ENGLISH/FRANCH)		CPB1061W	1	
	★7	nsp	LOCKER		CRE1A037	10	
	★8	nsp	LABEL , BAR CODE(SET)		CQB1A978	1	
	★9	nsp	LABEL , BAR CODE(MANUAL)		CQB1A971	1	

SEMICONDUCTORS

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

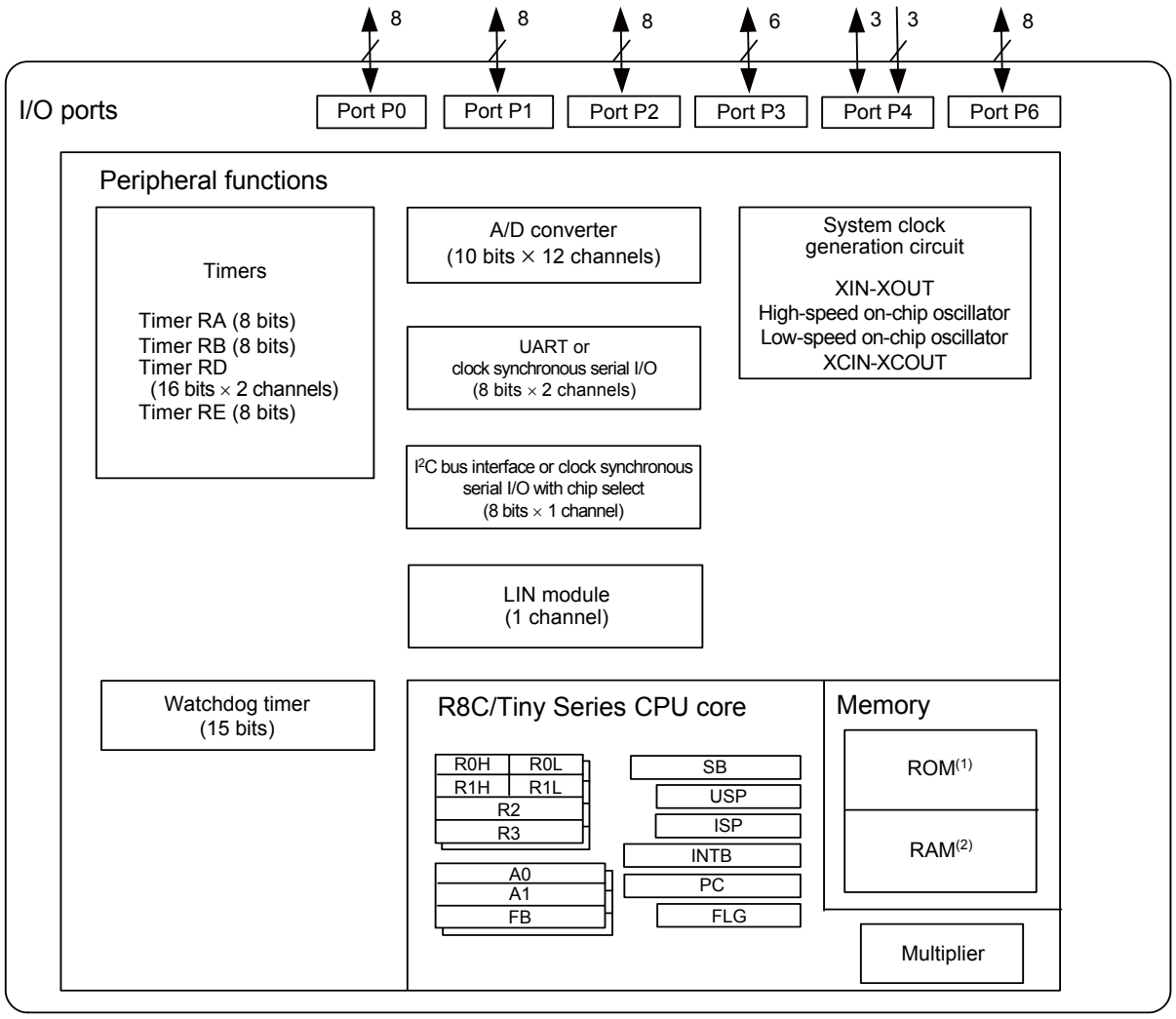
R5F21246SNFP (IC402)



Package: PLQP0052JA-A(52P6A-A)
0.65 mm pin pitch, 10 mm square body

NOTES:
1. P4_7 is an input-only port.
2. Can be assigned to the pin in parentheses by a program.
   NC: Non-Connection

R5F21246SNFP Block Diagram



NOTES:
1. ROM size varies with MCU type.
2. RAM size varies with MCU type.

R5F21246SNFP Terminal Function

Pin No.	Port Spec	Port Setting	I/O setting	STBY MODE	Act.	Init	Port Name	Ext. R	Description
1	NC	NC	-	X	X	X	X	OPEN	NC
2	P35/SCL/SSCK	SSCK	S_OUT	H	-	H	I2C CLK	10kPU	I2C CLK for Serial EEPROM
3	P33/SSI	P33	IN	H	H	L	LINE DET	10kPU	Audio Signal Detection for Auto Standby Function (No Signal=L/signal detect=H)
4	P34/SDA/SCS	SCS	I/O	H	-	H	I2C DATA	10kPU	I2C DATA for Serial EEPROM
5	MODE	MODE	IN	H	L	H	MODE	10kPU	For CPU writing
6	P43/XCIN	P43	-	-	-	L	-	10kPD	NO USE
7	P44/XCOUT	P44	-	-	-	L	-	10kPD	NO USE
8	RESET	RESET	IN	H	L	H	_RESET	10kPU	RESET PORT(Low Active)
9	XOUT/P47	XOUT	X_OUT	X	X	X	XOUT	1MΩ	16MHz X'tal
10	VSS/AVSS	VSS/ AVSS	-	L	L	L	GND	-	GND
11	P46/XIN	XIN	X_IN	X	X	X	XIN	1MΩ	16MHz X'tal
12	VCC/AVCC	VCC/ AVCC	-	H	H	H	VCC	-	+5V
13	P27/YRDIOD1	P27	OUT	L	H	L	SPK_ON1	47kPD	SPK1 OUT ON/OFF Control

Pin No.	Port Spec	Port Setting	I/O setting	STBY MODE	Act.	Init	Port Name	Ext. R	Description
14	P26/TRDIOC1	P26	OUT	L	H	L	SPK_ON2	47kPD	NO USE
15	P25/TRDIOB1	P25	OUT	L	H	L	SPK_ON3	47kPD	NO USE
16	P24/TRDIOA1	P24	OUT	H	L	H	Protection LED	DTrPU	Protection LED ON/OFF LED ON:L/ OFF:H
17	P23/TRDIOD0	P23	OUT	H	L	H	V_LED3	-	Version display LED bit3(MSB) LED ON:L/ OFF:H
18	P22/TRDIOC0	P22	OUT	H	L	H	V_LED2	-	Version display LED bit2 LED ON:L/ OFF:H
19	P21/TRDIOB0	P21	OUT	H	L	H	V_LED1	-	Version display LED bit1(LSB) LED ON:L/ OFF:H
20	P20/TRDIOA0	P20	IN	H	-	H	RC_IN	47kPU	RC5 INPUT
21	P17/TRAIO/ INT1	INT1	T_IN	H	L	H	RC_INT	47kPU	RC5 INPUT
22	P16/CLK0	P16	OUT	L	H	L	FAN_1	DTr PD	FAN Control 1 H:ON / L:OFF
23	P15/RXD0	P15	OUT	L	H	L	FAN_2	DTr PD	FAN Control 2 H:fast / L:slow
24	P14/TXD0	P14	IN	H	L	H	_HEAT_DET_P	10kPU	Power AMP Heat detection for posistor
25	P13/KI3/AN11	AN11	AD	L	H	L	KEY2	4.7kPD	Factory_Key / Service Key
26	NC	NC						OPEN	NC
27	P45/INT0	INT0	INT	H	L	H	_P_DOWN	47kPU	Power Down Detection
28	P66/INT2/ TXD1	TXD1	SO	H	-	H	TXD	10kPU	UART for RS232C
29	P67/INT3/ RXD1	RXD1	SI	H	-	H	RXD	10kPU	UART for RS232C
30	P12/KI2/AN10	P12	IN	L	H	L	DISPLAY KEY	100kPD	Display Key input
31	P11/KI1/AN9	KI1	KEY INT/AD	L	H	L	PWR_BTN	100kPD	On/Standby key input
32	P10/KI0/AN8	KI0	INT	L	H	L	DC_IN	47kPD	DC Trigger Detect H→L:Stand-by L→H:Power On
33	P31/TRBO	P31	OUT	H	L	H	_DC_OUT	DTrPU	DC Trigger OUT Set Stand-by→H Set Power ON→L
34	P30/TRAO	P30	IN	L	-	L	-	10kPD	NO USE
35	P65/CLK1	P65	OUT	H	L	H	_Auto Power OFF LED	DTrPU	Auto Power OFF LED Control LED ON:L/ OFF:H
36	P64	P64	OUT	H	L	H	_POWER_LED2	DTrPU	Power LED2(Star mark LED) LED ON:L/ OFF:H
37	P63	P63	OUT	H	L	H	_POWER_LED1	DTrPU	Power LED1(Ring illumination LED) LED ON:L/ OFF:H
38	P07/AN0	P07	IN	H	L	H	_P_CUR_FAIL	10kUP	Power Amp Current Fail Detect L:fail detect
39	NC	NC	-	X	X	X	X	OPEN	NC
40	NC	NC	-	X	X	X	X	OPEN	NC
41	P06/AN1	P06	IN	H	L	H	_P_AMP_FAIL	10kUP	Power Amp DC Fail Detect L:fail detect
42	P05/AN2	AN2	AD	Sensor Voltage	L	H	_HEAT_DET_2	100kPD	Power AMP Heat detection 2 (NS LM94022)
43	P04/AN3	AN3	AD	Sensor Voltage	L	H	_HEAT_DET_3	100kPD	Power AMP Heat detection 3 (NS LM94022)
44	P42/VREF	VREF	IN	H	-	H	VREF	-	+3.3V
45	P60/TREO	P60	IN	H	L	H	__P_LINE_FAIL	10kPU	Emergency Protection(Power Voltage Ditection) L:fail detect

Pin No.	Port Spec	Port Setting	I/O setting	STBY MODE	Act.	Init	Port Name	Ext. R	Description
46	P62	P62	OUT	L	H	L	_STANDBY1	10kPD	Standby Control 1
47	P61	P61	OUT	L	H	L	_STANDBY2	10kPD	Standby Control 2
48	P03/AN4	AN4	AD	Sensor Voltage	L	H	_HEAT_DET_1	100kPD	"Power AMP Heat detection 1 (NS LM94022)"
49	P02/AN5	P02	IN	H	L	H	_AVSS_DET	10kPU	Power AMP AVSS Level detection
50	P01/AN6	P01	OUT	L	H	L	AVSS_OUT	10kPD	"Power Supply H/L switch H:High voltage/L:low voltage"
51	P00/AN7	P00	OUT	L	L	L	_MUTE	10kPD	ALL Channel Signal MUTE
52	P37/SSO	P37	OUT	L	L	H	_STBY_LED	DTrPU	"Standby LED On LED ON:L/ OFF:H"

Features

- **Low-voltage and Standard-voltage Operation**
  - **1.8 (V_{CC} = 1.8V to 5.5V)**
- **Internally Organized 512 x 8 (4K), or 1024 x 8 (8K)**
- **Two-wire Serial Interface**
- **Schmitt Trigger, Filtered Inputs for Noise Suppression**
- **Bidirectional Data Transfer Protocol**
- **1 MHz (5V), 400 kHz (1.8V, 2.5V, 2.7V) Compatibility**
- **Write Protect Pin for Hardware Data Protection**
- **16-byte Page (4K, 8K) Write Modes**
- **Partial Page Writes Allowed**
- **Self-timed Write Cycle (5 ms max)**
- **High-reliability**
  - **Endurance: 1 Million Write Cycles**
  - **Data Retention: 100 Years**
- **8-lead PDIP, 8-lead JEDEC SOIC, 8-lead Ultra-Thin Mini-MAP (MLP 2x3), 5-lead SOT23, 8-lead TSSOP and 8-ball dBGA2 Packages**
- **Lead-free/Halogen-free**
- **Die Sales: Wafer Form, Tape and Reel and Bumped Wafers**

Description

The AT24C04B/08B provides 4096/8192 bits of serial electrically erasable and programmable read-only memory (EEPROM) organized as 512/1024 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low-power and low-voltage operation are essential. The AT24C04B/08B is available in space-saving 8-lead PDIP, 8-lead JEDEC SOIC, 8-lead Ultra-Thin Mini-MAP (MLP 2x3), 5-lead SOT23, 8-lead TSSOP, and 8-ball dBGA2 packages and is accessed via a Two-wire serial interface. In addition, the AT24C04B/08B is available in 1.8V (1.8V to 5.5V) version.

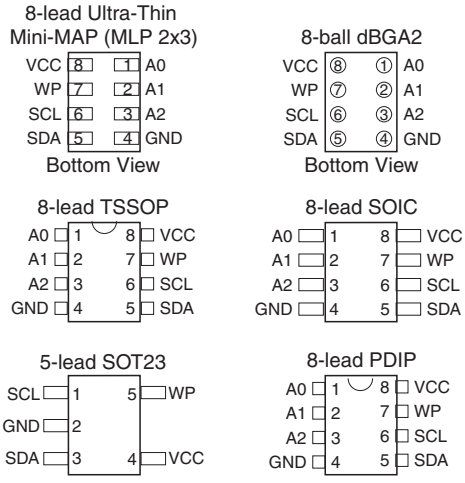
Table 0-1. Pin Configuration

Pin Name	Function
A0 - A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect
GND	Ground
VCC	Power Supply

Note: For use of 5-lead SOT23

4K: The software A2 and A1 bits in the device address word must be set to zero to properly communicate.

8K: The software A2 bit in the device address word must be set to zero to properly communicate.



Two-wire Serial EEPROM

4K (512 x 8)

8K (1024 x 8)

AT24C04B
AT24C08B

Preliminary

5226B–SEEPR–8/07

National Semiconductor

December 6, 2007

LM94022/LM94022Q
1.5V, SC70, Multi-Gain Analog Temperature Sensor with Class-AB Output

General Description

The LM94022 is a precision analog output CMOS integrated-circuit temperature sensor that operates at a supply voltage as low as 1.5 Volts. A class-AB output structure gives the LM94022 strong output source and sink current capability for driving heavy loads. For example, it is well suited to source the input of a sample-and-hold analog-to-digital converter with its transient load requirements. While operating over the wide temperature range of −50°C to +150°C, the LM94022 delivers an output voltage that is inversely porportional to measured temperature. The LM94022's low supply current makes it ideal for battery-powered systems as well as general temperature sensing applications.

Two logic inputs, Gain Select 1 (GS1) and Gain Select 0 (GS0), select the gain of the temperature-to-voltage output transfer function. Four slopes are selectable: −5.5 mV/°C, −8.2 mV/°C, −10.9 mV/°C, and −13.6 mV/°C. In the lowest gain configuration (GS1 and GS0 both tied low), the LM94022 can operate with a 1.5V supply while measuring temperature over the full −50°C to +150°C operating range. Tying both inputs high causes the transfer function to have the largest gain of −13.6 mV/°C for maximum temperature sensitivity. The gain-select inputs can be tied directly to V_{DD} or Ground without any pull-up or pull-down resistors, reducing component count and board area. These inputs can also be driven by logic signals allowing the system to optimize the gain during operation or system diagnostics.

Applications

- Cell phones
- Wireless Transceivers
- Battery Management
- Automotive
- Disk Drives
- Games
- Appliances

Features

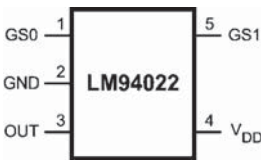
- LM94022Q is AEC-Q100 Grade 0 qualified and is manufactured on an Automotive Grade Flow.
- Low 1.5V operation
- Push-pull output with 50µA source current capability
- Four selectable gains
- Very accurate over wide temperature range of −50°C to +150°C
- Low quiescent current
- Output is short-circuit protected
- Extremely small SC70 package
- Footprint compatible with the industry-standard LM20 temperature sensor

Key Specifications

■ Supply Voltage		1.5V to 5.5V
■ Supply Current		5.4 µA (typ)
■ Output Drive		±50 µA
■ Temperature Accuracy	20°C to 40°C	±1.5°C
	-50°C to 70°C	±1.8°C
	-50°C to 90°C	±2.1°C
	-50°C to 150°C	±2.7°C
■ Operating Temperature		−50°C to 150°C

Connection Diagram

SC70-5



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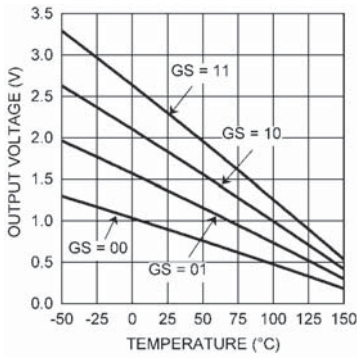
Top View
See NS Package Number MAA05A

Typical Transfer Characteristic

Output Voltage vs Temperature



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2SC2922 Y (Q114,Q214,Q314)

LAPT 2SC2922

Silicon NPN Epitaxial Planar Transistor (Complement to type 2SA1216)

Application : Audio and General Purpose

Absolute maximum ratings (Ta=25°C)

Symbol	2SC2922	Unit
V_{CBO}	180	V
V_{CEO}	180	V
V_{EBO}	5	V
I_C	17	A
I_B	5	A
P_C	200(Tc=25°C)	W
Tj	150	°C
Tstg	–55 to +150	°C

Electrical Characteristics (Ta=25°C)

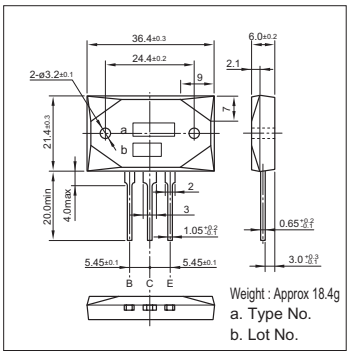
Symbol	Conditions	2SC2922	Unit
I_{CBO}	V_{CB}=180V	100max	μA
I_{EBO}	V_{EB}=5V	100max	μA
$V_{(BR)CEO}$	I_C=25mA	180min	V
h_{FE}	V_{CE}=4V, I_C=8V	30min*	
$V_{CE(sat)}$	I_C=8A, I_B=0.8A	2.0max	V
f_T	V_{CE}=12V, I_E=–2A	50typ	MHz
C_{OB}	V_{CB}=10V, f=1MHz	250typ	pF

*h_{FE} Rank O(30 to 60), Y(50 to 100), P(70 to 140), G(90 to 180)

Typical Switching Characteristics (Common Emitter)

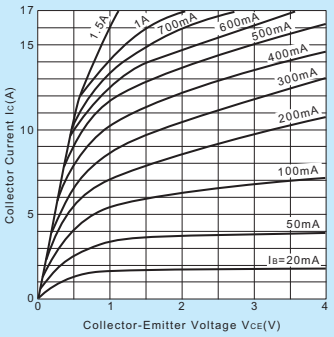
V_{CC} (V)	R_L (Ω)	I_C (A)	V_{B2} (V)	I_{B1} (A)	I_{B2} (A)	ton (μs)	tstg (μs)	tf (μs)
40	4	10	–5	1	–1	0.2typ	1.3typ	0.45typ

External Dimensions MT-200

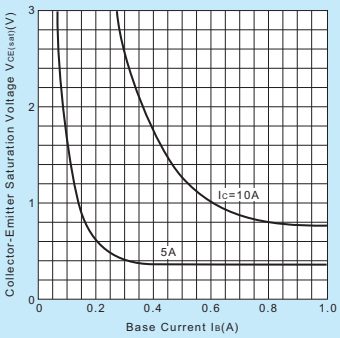


Weight : Approx 18.4g
a. Type No.
b. Lot No.

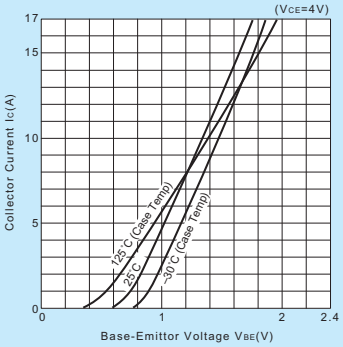
I_C–V_{CE} Characteristics (Typical)



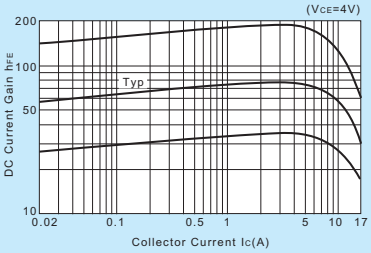
V_{CE}(sat)–I_B Characteristics (Typical)



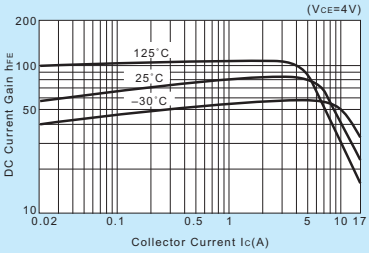
I_C–V_{BE} Temperature Characteristics (Typical)



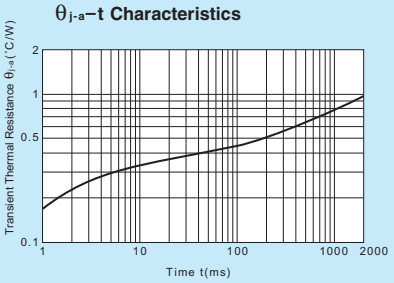
h_{FE}–I_C Characteristics (Typical)



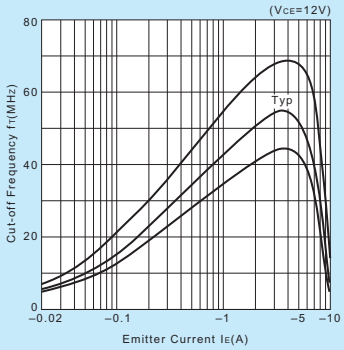
h_{FE}–I_C Temperature Characteristics (Typical)



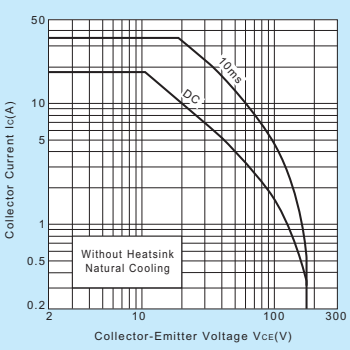
$\theta_{j\text{-}a}$–t Characteristics



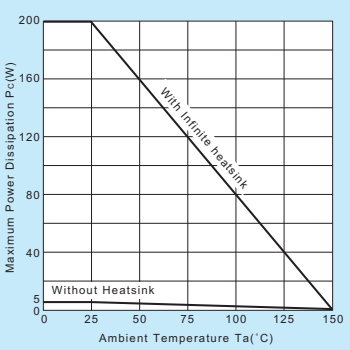
f_T–I_E Characteristics (Typical)



Safe Operating Area (Single Pulse)



P_C–Ta Derating



2SA1216 Y (Q115,Q215,Q315)

LAPT 2SA1216

Silicon PNP Epitaxial Planar Transistor (Complement to type 2SC2922)

Application : Audio and General Purpose

Absolute maximum ratings (Ta=25°C)

Symbol	2SA1216	Unit
V_{CBO}	–180	V
V_{CEO}	–180	V
V_{EBO}	–5	V
I_C	–17	A
I_B	–5	A
P_C	200(Tc=25°C)	W
Tj	150	°C
Tstg	–55 to +150	°C

Electrical Characteristics (Ta=25°C)

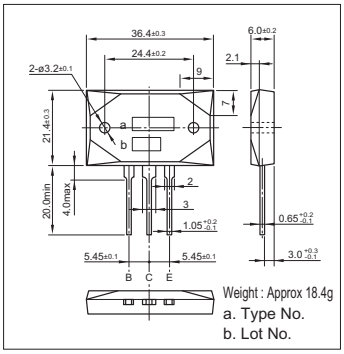
Symbol	Conditions	2SA1216	Unit
V_{CBO}	V_{CB}=–180V	–100max	μA
I_{EBO}	V_{EB}=–5V	–100max	μA
$V_{(BR)CEO}$	I_C=–25mA	–180min	V
h_{FE}	V_{CE}=–4V, I_C=–8A	30min*	
$V_{CE(sat)}$	I_C=–8A, I_B=–0.8A	–2.0max	V
f_T	V_{CE}=–12V, I_E=2A	40typ	MHz
C_{OB}	V_{CB}=–10V, f=1MHz	500typ	pF

*h_{FE} Rank O(30 to 60), Y(50 to 100), P(70 to 140), G(90 to 180)

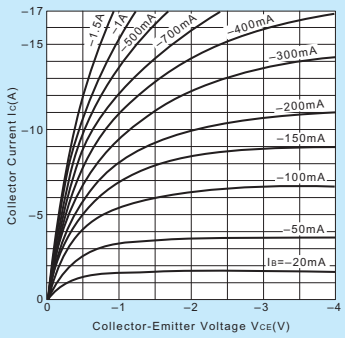
Typical Switching Characteristics (Common Emitter)

V_{CC} (V)	R_L (Ω)	I_C (A)	V_{B2} (V)	I_{B1} (A)	I_{B2} (A)	ton (μs)	tstg (μs)	tf (μs)
–40	4	–10	5	–1	1	0.3typ	0.7typ	0.2typ

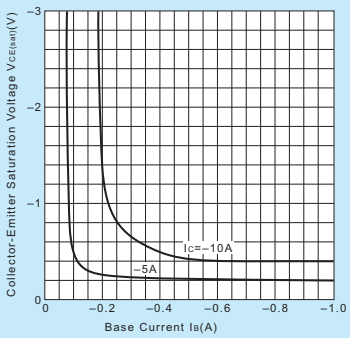
External Dimensions MT-200



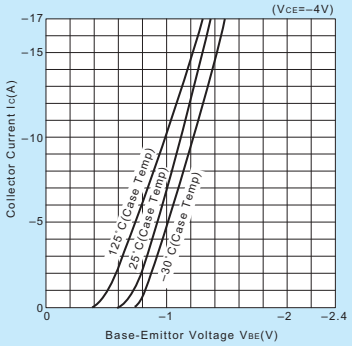
I_C–V_{CE} Characteristics (Typical)



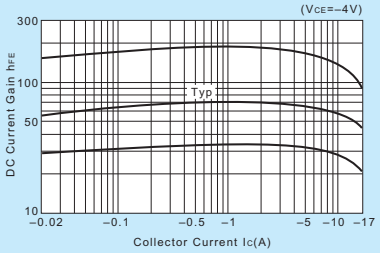
V_{CE}(sat)–I_B Characteristics (Typical)



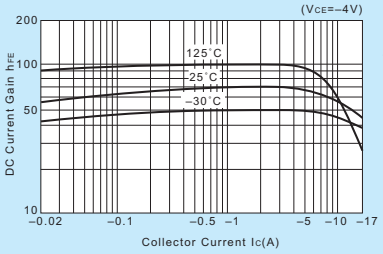
I_C–V_{BE} Temperature Characteristics (Typical)



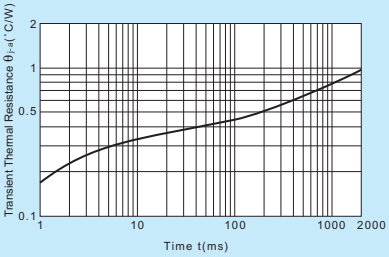
h_{FE}–I_C Characteristics (Typical)



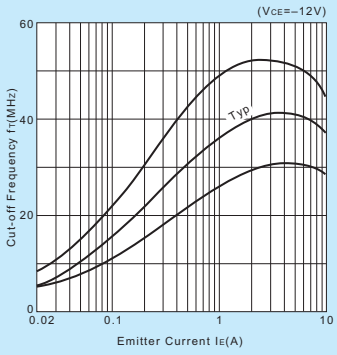
h_{FE}–I_C Temperature Characteristics (Typical)



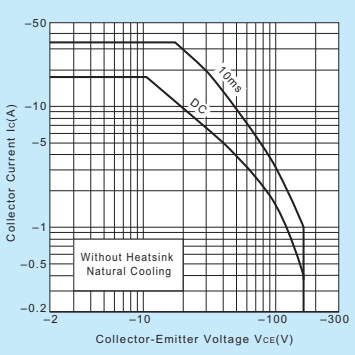
$\theta_{j\text{-}a}$–t Characteristics



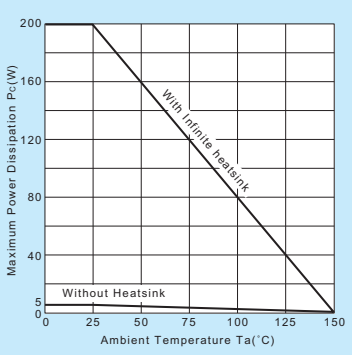
f_T–I_E Characteristics (Typical)



Safe Operating Area (Single Pulse)



Pc–Ta Derating



PARTS LIST OF P.C.B. UNIT

* Parts for which "nsp" is indicated on this table cannot be supplied.
* The parts listed below are for maintenance only, might differ from the parts used in the unit in appearances or dimensions.

Note: The symbols in the column "Remarks" indicate the following destinations.
U1B : North America model N1B : Europe model

CPU PCB ASS'Y

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
SEMICONDUCTORS GROUP							
	IC401	00D2631242905	IC NJM2831F33		CVINJM2831F33		
	IC402	943243001000M	IC U-COM R5F21246SNFP		CVIR5F21246SNFP		
	IC403	943236000650S	IC AT24C04BN-SH-B		CVIAT24C04BNSHB		
	IC404	90M-HW100690R	PHOTO UNIT RPM674CBR-S		CRVRPM6936		
	IC405	00MHC10099540	IC S-80145ALMC		HVIS-80145ALMC		
	IC406-408	943235000640S	IC LM94022BIMG		CRTLM94022BIMG		
	Q400	90M-HX600010R	CHIP TRS. KRA102S		HVTKRA102S		
	Q401,402	90M-HX800100R	CHIP TRS. KTC3875S Y RTK		HVTKTC3875SYRTK		
	Q403,404	90M-HX600020R	CHIP TRS. KTA1504S Y RTK		HVTKTA1504SYRTK		
	Q405	90M-HX800010R	CHIP TRS. KRC102S		HVTKRC102S		
	Q406	90M-HX600010R	CHIP TRS. KRA102S		HVTKRA102S		
	Q407	90M-HX800010R	CHIP TRS. KRC102S		HVTKRC102S		
	D400	90M-HI200020R	L.E.D. SIR-34ST3F		BVDSIR34ST3F		
	D401	00MHZ21303210	DIODE 1SS355		CVD1SS355T		
	D402	90M-HD201750R	DIODE 1N4003		CVD1N4003SRT		
	D403,404	00MHZ21303210	DIODE 1SS355		CVD1SS355T		
	D405-407	90M-HI101040R	L.E.D. SLR342VCTB7T089		HVD342VCTB7T089		
CAPACITORS GROUP							
	C400	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C401,402	nsp	CER. CAP. 15PF 50V JA		CCUS1H150JA		
	C403	00MOA10702520	ELECT CAP. 100UF 25V		CCEA1EH101T		
	C404,405	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C408	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C409	00MOA10702520	ELECT CAP. 100UF 25V		CCEA1EH101T		
	C410-413	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C414	nsp	CER. CAP. 27PF 50V JA		CCUS1H270JA		
	C415	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C416	00MOA47601640	ELECT CAP. 47UF 16V		CCEA1CH470T		
	C417	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C418	00MOA47601640	ELECT CAP. 47UF 16V		CCEA1CH470T		
	C419,420	nsp	CER. CAP. 0.01UF 50V KC		CCUS1H103KC		
	C421,422	nsp	CER. CAP. 33PF 50V JA		CCUS1H330JA		
	C423	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C424	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		
	C425-428	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C431-433	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C435	nsp	CER. CAP. 0.01UF 50V KC		CCUS1H103KC		
	C481,482	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C483,484	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		

NOTE :
When update Firmware, please confirm a last version in SDI.
Use the service board after updating it.

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
OTHERS PARTS GROUP							
	BK30	nsp	BRACKET BRACKET PWB		CMD1A629		
	BK40	nsp	BRACKET BRACKET PWB		CMD1A629		
	BK50	nsp	BRACKET BRACKET PWB		CMD1A629		
	BK70	nsp	BRACKET BRACKET FOR PWB		CMD1A569		
	BK80	nsp	BRACKET BRACKET FOR PWB		CMD1A569		
	BK90	nsp	BRACKET, SHIELD		CMD1A775		
	BN41	nsp	WIRE ASSY(13P, 350MM, 2.0MM)		CWB1B01335047		
	BN42-44	nsp	WIRE ASSY(3P, 80MM, 2.0MM,TWIST)		CWB1B00308047		
	CN41	nsp	CONN. STRAIGHT WAFER 2MM		CJP13GI236ZW		
	CN42	nsp	CONN. STRAIGHT WAFER 2mm		CJP11GI236ZW		
	CN43	nsp	CONN. STRAIGHT WAFER 2MM		CJP13GI236ZW		
	CN44	nsp	WAFER , CARD CABLE		CJP07GB113ZY		
	CN45	nsp	WAFER		CJP07GA117ZY		
	JK400-402	90M-YT004860R	TERMINAL 3.5MM JACK STEREO PJ-308-02		CJJ2D008Z		
	JK403	943646000850S	TERMINAL CINCH 2P JACK (OR/OR)		CJJ4N076Y		
	SW401,402	90M-SP001210R	SKHV10910G TACT SKHV10910G		CST1A012ZT		
	X400	90M-JX001370R	CRYSTAL 16.000MHZ		COX16000E120TF		

FRONT PCB ASS'Y

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
SEMICONDUCTORS GROUP							
	Q902-907	00MBA10001000	TRS KRA102M		HVTKRA102MT		
	D902-905	90M-HI101190R	LED SLI-325URT31W TP		CVD52CSBBCEAB2		
	D906,907	263710016400S	LED BLUE LED TOL-52CSBBCEAB2		CVDSLI325URT31WT055		
	D908	90M-HI101190R	LED SLI-325URT31W TP		CVD52CSBBCEAB2		
	D909	263710016400S	LED BLUE LED TOL-52CSBBCEAB2		CVDSLI325URT31WT055		
CAPACITORS GROUP							
	C902-906	nsp	CER. CAP. 0.1UF 50V Z CERAMIC		CCBS1H104ZFT		
	C912,913	nsp	CER. CAP. 1000PF 50V B CERAMIC		CCBS1H102KBT		
OTHERS PARTS GROUP							
	BN91	nsp	WIRE ASSY(5P, 150MM, 2.0MM)		CWB1B00515047		
	BN92	nsp	WIRE ASSY(11P, 350MM, 2.0MM)		CWB1B01135047		
	BN93	nsp	WIRE ASS'Y (3PIN, 2mm, 100mm, TWIST)		CWB1B00310047		
	CN92	nsp	CONN. STRAIGHT WAFER , 2mm		CJP05GI236ZW		
	CN93	nsp	CONN. STRAIGHT WAFER , 2MM		CJP03GI236ZW		
	SW92,93	90M-SP001210R	SW SKHV10910G TACT		CST1A012ZT		

AMP PCB ASS'Y-1

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
SEMICONDUCTORS GROUP							
	IC11	00MHC10053090	IC NJM2068DD		HVINJM2068DD		
	IC21	00MHC10053090	IC NJM2068DD		HVINJM2068DD		
	IC31	00MHC10053090	IC NJM2068DD		HVINJM2068DD		
	Q101	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q102,103	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q104,105	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q106	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q107	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q108	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q109	90M-HT800120R	TRS. KTC3114A		HVTKTC3114A		
	Q110	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q111	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q112	90M-HT300940R	TRS. 2SC4883A		HVT2SC4883A		
	Q113	90M-HT100690R	TRS. 2SA1859A		HVT2SA1859A		
	Q114	00MHT329222B0	TRS. 2SC2922 Y P FORMING		CVT2SC2922YP		
	Q115	00MHT112162B0	TRS. 2SA1216 Y P FORMING		CVT2SA1216YP		
	Q116	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q117,118	90M-HT800050R	TRS. KTC3198Y		HVTKTC3198YT		
	Q201	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q202,203	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q204,205	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q206	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q207	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q208	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q209	90M-HT800120R	TRS. KTC3114A		HVTKTC3114A		
	Q210	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q211	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q212	90M-HT300940R	TRS. 2SC4883A		HVT2SC4883A		
	Q213	90M-HT100690R	TRS. 2SA1859A		HVT2SA1859A		
	Q214	00MHT329222B0	TRS. 2SC2922 Y P FORMING		CVT2SC2922YP		
	Q215	00MHT112162B0	TRS. 2SA1216 Y P FORMING		CVT2SA1216YP		
	Q216	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q217,218	90M-HT800050R	TRS. KTC3198Y		HVTKTC3198YT		
	Q301	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q302,303	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q304,305	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q306	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q307	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q308	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q309	90M-HT800120R	TRS. KTC3114A		HVTKTC3114A		
	Q310	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q311	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q312	90M-HT300940R	TRS. 2SC4883A		HVT2SC4883A		
	Q313	90M-HT100690R	TRS. 2SA1859A		HVT2SA1859A		
	Q314	00MHT329222B0	TRS. 2SC2922 Y P FORMING		CVT2SC2922YP		
	Q315	00MHT112162B0	TRS. 2SA1216 Y P FORMING		CVT2SA1216YP		
	Q316	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q317,318	90M-HT800050R	TRS. KTC3198Y		HVTKTC3198YT		
	Q901	00MBA20001000	TRS. KRC102M		HVTKRC102MT		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	Q902	90M-BA001450R	TRS. KRA107M		HVTKRA107MT		
	Q903	00MBA20001000	TRS. KRC102M		HVTKRC102MT		
	Q904	00MHT334191Y0	TRS. 2SC3419Y		HVT2SC3419Y		
	Q905-908	00MBA20001000	TRS. KRC102M		HVTKRC102MT		
	Q909,910	00MHT30001000	TRS. KTC3199Y		HVTKTC3199YT		
	Q911	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	D101,102	9432020009405	ZENER DIODE ZJ16B 1/2W		CVDZJ16BT		
	D103,104	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D105	9432020009505	ZENER DIODE ZJ4.3B 1/2W		CVDZJ4.3BT		
	D106	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D107,108	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D109	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D110	90M-HD201750R	DIODE 1N4003		CVD1N4003SRT		
	D201,202	9432020009405	ZENER DIODE ZJ16B 1/2W		CVDZJ16BT		
	D203,204	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D205	9432020009505	ZENER DIODE ZJ4.3B 1/2W		CVDZJ4.3BT		
	D206	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D207,208	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D209	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D210	90M-HD201750R	DIODE 1N4003		CVD1N4003SRT		
	D301,302	9432020009405	ZENER DIODE ZJ16B 1/2W		CVDZJ16BT		
	D303,304	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D305	9432020009505	ZENER DIODE ZJ4.3B 1/2W		CVDZJ4.3BT		
	D306	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D307,308	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D309	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D310	90M-HD201750R	DIODE 1N4003		CVD1N4003SRT		
	D901	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D902	90M-HD302380R	ZENER DIODE ZJ3.6B 1/2W		CVDZJ3.6BT		
RESISTORS GROUP							
	R103,104	nsp	RES. 1.5K OHM 2W METAL OXIDE FILM		CRG2SANJ152RT		
	R110	9431240116505	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R113	9431240116505	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R119	nsp	RES. 1K 1/4W 5% FLAME RETARDANT		CRG14SANCJ102T		
	R121,122	nsp	RES. 10 OHM 2W METAL OXIDE FILM		CRG2SANJ100RT		
	R123,124	9431240116405	RES. 100 OHM 1/4W FLAME RETARDANT		CRG14SANCJ101T		*
	R125	9431240116705	RES. METAL OXIDE FILM(1W 1K OHM)		CRG1SANJ102RT		*
	R126,127	00D9430129905	RES. 47 OHM 1W J METAL OXIDE FILM		KRG1SANJ470RT		
	R128	9431240116805	RES. 220 OHM 1W J METAL OXIDE FILM		CRG1SANJ221RT		*
	R129,130	9431240116605	RES. 10 OHM 1W J METAL OXIDE FILM		CRG1SANJ100RT		*
	R155	nsp	RES. 150 OHM 2W METAL OXIDE FILM		CRG2SANJ151RT		
	R156-158	nsp	RES. 120 OHM 2W METAL OXIDE FILM		CRG2SANJ121RT		
	R203,204	nsp	RES. 1.5K OHM 2W METAL OXIDE FILM		CRG2SANJ152RT		
	R210	9431240116505	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R213	9431240116505	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R219	nsp	RES. 1K 1/4W 5% FLAME RETARDANT		CRG14SANCJ102T		
	R221,222	nsp	RES. 10 OHM 2W METAL OXIDE FILM		CRG2SANJ100RT		
	R223,224	9431240116405	RES. 100 OHM 1/4W FLAME RETARDANT		CRG14SANCJ101T		*
	R225	9431240116705	RES. METAL OXIDE FILM(1W 1K OHM)		CRG1SANJ102RT		*

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	R226,227	00D9430129905	RES. 47 OHM 1W J METAL OXIDE FILM		KRG1SANJ470RT		
	R228	943124011680S	RES. 220 OHM 1W J METAL OXIDE FILM		CRG1SANJ221RT		*
	R229,230	943124011660S	RES. 10 OHM 1W J METAL OXIDE FILM		CRG1SANJ100RT		*
	R255	nsp	RES. 150 OHM 2W METAL OXIDE FILM		CRG2SANJ151RT		
	R256-258	nsp	RES. 120 OHM 2W METAL OXIDE FILM		CRG2SANJ121RT		
	R303,304	nsp	RES. 1.5K OHM 2W METAL OXIDE FILM		CRG2SANJ152RT		
	R310	943124011650S	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R313	943124011650S	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R319	nsp	RES. 1K 1/4W 5% FLAME RETARDANT		CRG14SANCJ102T		
	R321,322	nsp	RES. 10 OHM 2W METAL OXIDE FILM		CRG2SANJ100RT		
	R323,324	943124011640S	RES. 100 OHM 1/4W FLAME RETARDANT		CRG14SANCJ101T		*
	R325	943124011670S	RES. METAL OXIDE FILM(1W 1K OHM)		CRG1SANJ102RT		*
	R326,327	00D9430129905	RES. 47 OHM 1W J METAL OXIDE FILM		KRG1SANJ470RT		
	R328	943124011680S	RES. 220 OHM 1W J METAL OXIDE FILM		CRG1SANJ221RT		*
	R329,330	943124011660S	RES. 10 OHM 1W J METAL OXIDE FILM		CRG1SANJ100RT		*
	R355	nsp	RES. 150 OHM 2W METAL OXIDE FILM		CRG2SANJ151RT		
	R356-358	nsp	RES. 120 OHM 2W METAL OXIDE FILM		CRG2SANJ121RT		
	RS11	943129000820S	RES. 0.1 OHM 5W CEMENT		CRF5EKR10X2		
	RS21	943129000820S	RES. 0.1 OHM 5W CEMENT		CRF5EKR10X2		
	RS31	943129000820S	RES. 0.1 OHM 5W CEMENT		CRF5EKR10X2		
	VR11	943161000920S	TRIM. RES. EVMEGGA00B13		CVN3RE102B02		
	VR21	943161000920S	TRIM. RES. EVMEGGA00B13		CVN3RE102B02		
	VR31	943161000920S	TRIM. RES. EVMEGGA00B13		CVN3RE102B02		
CAPACITORS GROUP							
	C101	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C102	nsp	CER. CAP. 330PF 50V KB		CCKT1H331KB		
	C103,104	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C105	nsp	CER. CAP. 10PF 50V DC		CCCT1H100DC		
	C106	nsp	FILM CAP. 3300PF 100V J MYLAR		HCQI1H332JZT		
	C107,108	00MOA10710020	ELECT CAP. 100UF 100V		CCEA2AH101E		
	C109	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C110,111	nsp	CER. CAP. 47PF/500VDC		CCCT2H470JT		
	C112	nsp	FILM CAP. 0.01UF 100V J MYLAR		HCQI1H103JZT		
	C113	nsp	CER. CAP. 2200PF 50V KB		CCKT1H222KB		
	C114	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C115	nsp	CER. CAP. 0.01UF 50V Z		CCFT1H103ZF		
	C116	00MOA47605020	ELECT CAP. 47UF 50V		CCEA1HH470T		
	C201	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C202	nsp	CER. CAP. 330PF 50V KB		CCKT1H331KB		
	C203,204	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C205	nsp	CER. CAP. 10PF 50V DC		CCCT1H100DC		
	C206	nsp	FILM CAP. 3300PF 100V J MYLAR		HCQI1H332JZT		
	C207,208	00MOA10710020	ELECT CAP. 100UF 100V		CCEA2AH101E		
	C209	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C210,211	nsp	CER. CAP. 47PF/500VDC		CCCT2H470JT		
	C212	nsp	FILM CAP. 0.01UF 100V J MYLAR		HCQI1H103JZT		
	C213	nsp	CER. CAP. 2200PF 50V KB		CCKT1H222KB		
	C214	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C215	nsp	CER. CAP. 0.01UF 50V Z		CCFT1H103ZF		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	C216	00MOA47605020	ELECT CAP. 47UF 50V		CCEA1HH470T		
	C301	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C302	nsp	CER. CAP. 330PF 50V KB		CCKT1H331KB		
	C303,304	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C305	nsp	CER. CAP. 10PF 50V DC		CCCT1H100DC		
	C306	nsp	FILM CAP. 3300PF 100V J MYLAR		HCQI1H332JZT		
	C307,308	00MOA10710020	ELECT CAP. 100UF 100V		CCEA2AH101E		
	C309	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C310,311	nsp	CER. CAP. 47PF/500VDC		CCCT2H470JT		
	C312	nsp	FILM CAP. 0.01UF 100V J MYLAR		HCQI1H103JZT		
	C313	nsp	CER. CAP. 2200PF 50V KB		CCKT1H222KB		
	C314	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C315	nsp	CER. CAP. 0.01UF 50V Z		CCFT1H103ZF		
	C316	00MOA47605020	ELECT CAP. 47UF 50V		CCEA1HH470T		
	C901	nsp	CER. CAP. 0.1UF 50V ZF		CCFT1H104ZF		
	C902	nsp	CER. CAP. 0.01UF 50V Z		CCFT1H103ZF		
	C903	00MOA10505020	ELECT CAP. 1UF 50V		CCEA1HH1R0T		
	C904	nsp	CER. CAP. 0.1UF 50V ZF		CCFT1H104ZF		
	C905	nsp	CER. CAP. 0.01UF 50V Z		CCFT1H103ZF		
	C906	00MOA10505020	ELECT CAP. 1UF 50V		CCEA1HH1R0T		
	C907	nsp	CER. CAP. 0.1UF 50V ZF		CCFT1H104ZF		
	C908	00MOA47505020	ELECT CAP. 4.7UF 50V		CCEA1HH4R7T		
	C909	00MOA47701620	ELECT CAP. 470UF 16V ZF		CCEA1CH471T		
OTHERS PARTS GROUP							
	BN11	nsp	WIRE ASSY(5P, 150MM, 3.96MM)		CWB3F005350UZ		
	BN13	nsp	WIRE ASSY(5P, 800M 3.96MM)		CWBMM7055BN13		
	BN21	nsp	WIRE ASSY(5P, 450MM, 3.96MM)		CWB3F005450UZ		
	BN31	nsp	WIRE ASSY(5P, 400MM, 3.96MM)		CWB3F005400UZ		
	CN11,12	nsp	CONN. STRAIGHT WAFER 2PIN		CJP02GA01ZY		
	CN21,22	nsp	CONN. STRAIGHT WAFER 2PIN		CJP02GA01ZY		
	CN31	nsp	CONN. STRAIGHT WAFER 2.5MM		CJP02GI237ZW		
	CN32	nsp	CONN. STRAIGHT WAFER 2PIN		CJP02GA01ZY		
	CN91	nsp	CONN. STRAIGHT WAFER 2PIN		CJP02GA01ZY		
	CN92,93	nsp	CONN. STRAIGHT WAFER 2MM		CJP03GI236ZW		
	CN94	nsp	CONN. STRAIGHT WAFER 2MM		CJP13GI236ZW		
	CN95	nsp	HOUSING		CJP07GB99ZY		
	TH91,92	943252011420S	POSISTOR ASS'Y, (SENSING 100, 50mm)		CRTDHTS100050W		*
		nsp	BRAKET , I.C		CMD1A557		
		nsp	SCREW		CTB3+6JR		

AMP PCB ASS'Y-2

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
SEMICONDUCTORS GROUP							
	IC21	00MHC10053090	IC NJM2068DD		HVINJM2068DD		
	IC31	00MHC10053090	IC NJM2068DD		HVINJM2068DD		
	Q201	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q202,203	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q204,205	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q206	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q207	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q208	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q209	90M-HT800120R	TRS. KTC3114A		HVTKTC3114A		
	Q210	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q211	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q212	90M-HT300940R	TRS. 2SC4883A		HVT2SC4883A		
	Q213	90M-HT100690R	TRS. 2SA1859A		HVT2SA1859A		
	Q214	00MHT329222B0	TRS. 2SC2922 Y P FORMING		CVT2SC2922YP		
	Q215	00MHT112162B0	TRS. 2SA1216 Y P FORMING		CVT2SA1216YP		
	Q216	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q217,218	90M-HT800050R	TRS. KTC3198Y		HVTKTC3198YT		
	Q301	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q302,303	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q304,305	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	Q306	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q307	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q308	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q309	90M-HT800120R	TRS. KTC3114A		HVTKTC3114A		
	Q310	90M-HT300820R	TRS. KTC3423Y		HVTKTC3423Y		
	Q311	90M-HT100540R	TRS. KTA1360Y		HVTKTA1360Y		
	Q312	90M-HT300940R	TRS. 2SC4883A		HVT2SC4883A		
	Q313	90M-HT100690R	TRS. 2SA1859A		HVT2SA1859A		
	Q314	00MHT329222B0	TRS. 2SC2922 Y P FORMING		CVT2SC2922YP		
	Q315	00MHT112162B0	TRS. 2SA1216 Y P FORMING		CVT2SA1216YP		
	Q316	00MHT800931A0	TRS. KTC3200GR-AT/P		HVTKTC3200GRT		
	Q317,318	90M-HT800050R	TRS. KTC3198Y		HVTKTC3198YT		
	Q909	00MHT30001000	TRS. KTC3199Y		HVTKTC3199YT		
	Q911	00MHT600121A0	TRS. KTA1268GR		HVTKTA1268GRT		
	D201,202	943202000940S	ZENER DIODE ZJ16B 1/2W		CVDZJ16BT		
	D203,204	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D205	943202000950S	ZENER DIODE ZJ4.3B 1/2W		CVDZJ4.3BT		
	D206	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D207,208	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D209	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D210	90M-HD201750R	DIODE 1N4003		CVD1N4003SRT		
	D301,302	943202000940S	ZENER DIODE ZJ16B 1/2W		CVDZJ16BT		
	D303,304	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D305	943202000950S	ZENER DIODE ZJ4.3B 1/2W		CVDZJ4.3BT		
	D306	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D307,308	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D309	90M-HD302410R	ZENER DIODE ZJ8.2B 1/2W		CVDZJ8.2BT		
	D310	90M-HD201750R	DIODE 1N4003		CVD1N4003SRT		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
RESISTORS GROUP							
	R203,204	nsp	RES. 1.5K OHM 2W METAL OXIDE FILM		CRG2SANJ152RT		
	R210	9431240116505	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R213	9431240116505	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R219	nsp	RES. 1K 1/4W 5% FLAME RETARDANT		CRG14SANCJ102T		
	R221,222	nsp	RES. 10 OHM 2W METAL OXIDE FILM		CRG2SANJ100RT		
	R223,224	9431240116405	RES. 100 OHM 1/4W FLAME RETARDANT		CRG14SANCJ101T		*
	R225	9431240116705	RES. METAL OXIDE FILM(1W 1K OHM)		CRG1SANJ102RT		*
	R226,227	00D9430129905	RES. 47 OHM 1W J METAL OXIDE FILM		KRG1SANJ470RT		
	R228	9431240116805	RES. 220 OHM 1W J METAL OXIDE FILM		CRG1SANJ221RT		*
	R229,230	9431240116605	RES. 10 OHM 1W J METAL OXIDE FILM		CRG1SANJ100RT		*
	R255	nsp	RES. 150 OHM 2W METAL OXIDE FILM		CRG2SANJ151RT		
	R256-258	nsp	RES. 120 OHM 2W METAL OXIDE FILM		CRG2SANJ121RT		
	R303,304	nsp	RES. 1.5K OHM 2W METAL OXIDE FILM		CRG2SANJ152RT		
	R310	9431240116505	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R313	9431240116505	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		*
	R319	nsp	RES. 1K 1/4W 5% FLAME RETARDANT		CRG14SANCJ102T		
	R321,322	nsp	RES. 10 OHM 2W METAL OXIDE FILM		CRG2SANJ100RT		
	R323,324	9431240116405	RES. 100 OHM 1/4W FLAME RETARDANT		CRG14SANCJ101T		*
	R325	9431240116705	RES. METAL OXIDE FILM(1W 1K OHM)		CRG1SANJ102RT		*
	R326,327	00D9430129905	RES. 47 OHM 1W J METAL OXIDE FILM		KRG1SANJ470RT		
	R328	9431240116805	RES. 220 OHM 1W J METAL OXIDE FILM		CRG1SANJ221RT		*
	R329,330	9431240116605	RES. 10 OHM 1W J METAL OXIDE FILM		CRG1SANJ100RT		*
	R355	nsp	RES. 150 OHM 2W METAL OXIDE FILM		CRG2SANJ151RT		
	R356-358	nsp	RES. 120 OHM 2W METAL OXIDE FILM		CRG2SANJ121RT		
	RS21	9431290008205	RES. 0.1 OHM 5W CEMENT		CRF5EKR10X2		
	RS31	9431290008205	RES. 0.1 OHM 5W CEMENT		CRF5EKR10X2		
	VR21	9431610009205	TRIM. RES. EVMEGGA00B13		CVN3RE102B02		
	VR31	9431610009205	TRIM. RES. EVMEGGA00B13		CVN3RE102B02		
CAPACITORS GROUP							
	C201	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C202	nsp	CER. CAP. 330PF 50V KB		CCKT1H331KB		
	C203,204	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C205	nsp	CER. CAP. 10PF 50V DC		CCCT1H100DC		
	C206	nsp	FILM CAP. 3300PF 100V J MYLAR		HCQI1H332JZT		
	C207,208	00MOA10710020	ELECT CAP. 100UF 100V		CCEA2AH101E		
	C209	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C210,211	nsp	CER. CAP. 47PF/500VDC		CCCT2H470JT		
	C212	nsp	FILM CAP. 0.01UF 100V J MYLAR		HCQI1H103JZT		
	C213	nsp	CER. CAP. 2200PF 50V KB		CCKT1H222KB		
	C214	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C215	nsp	CER. CAP. 0.01UF 50V Z		CCFT1H103ZF		
	C216	00MOA47605020	ELECT CAP. 47UF 50V		CCEA1HH470T		
	C301	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C302	nsp	CER. CAP. 330PF 50V KB		CCKT1H331KB		
	C303,304	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C305	nsp	CER. CAP. 10PF 50V DC		CCCT1H100DC		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	C306	nsp	FILM CAP. 3300PF 100V J MYLAR		HCQI1H332JZT		
	C307,308	00MOA10710020	ELECT CAP. 100UF 100V		CCEA2AH101E		
	C309	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C310,311	nsp	CER. CAP. 47PF/500VDC		CCCT2H470JT		
	C312	nsp	FILM CAP. 0.01UF 100V J MYLAR		HCQI1H103JZT		
	C313	nsp	CER. CAP. 2200PF 50V KB		CCKT1H222KB		
	C314	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C315	nsp	CER. CAP. 0.01UF 50V Z		CCFT1H103ZF		
	C316	00MOA47605020	ELECT CAP. 47UF 50V		CCEA1HH470T		
	C902	nsp	CER. CAP. 0.01UF 50V Z		CCFT1H103ZF		
	C903	00MOA10505020	ELECT CAP. 1UF 50V		CCEA1HH1R0T		
	C904	nsp	CER. CAP. 0.1UF 50V ZF		CCFT1H104ZF		
	C908	00MOA47505020	ELECT CAP. 4.7UF 50V		CCEA1HH4R7T		
OTHERS PARTS GROUP							
	BN12	nsp	WIRE ASSY(3P, 0,250M 3.96MM)		CWBMM7055BN12		
	BN21	nsp	WIRE ASSY(5P, 100MM, 3.96MM)		CWB3F005100UZ		
	BN31	nsp	WIRE ASSY(5P, 150MM, 3.96MM)		CWB3F005150UZ		
	CN21,22	nsp	CONN. STRAIGHT WAFER 2PIN		CJP02GA01ZY		
	CN31	nsp	CONN. STRAIGHT WAFER 2.5MM		CJP02GI237ZW		
	CN32	nsp	CONN. STRAIGHT WAFER 2PIN		CJP02GA01ZY		
	CN92	nsp	CONN. STRAIGHT WAFER 2MM		CJP03GI236ZW		
	CN95	nsp	HOUSING		CJP07GB99ZY		
	TH91	943252011420S	POSISTOR ASS'Y, (SENSING 100, 50mm)		CRTDHTS100050W		*
		nsp	SCREW		CTB3+6FR		
		nsp	SCREW		CTB3+6JFZR		
		nsp	SCREW		CTB3+8JR		
		nsp	SCREW		CTW3+8JR		
		nsp	NUT , M3		CNE1A012		
		nsp	WASHER , GROUND		CNW1A035		
		nsp	WASHER		CNW1A051		

INPUT PCB ASS'Y

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
SEMICONDUCTORS GROUP							
	IC501-512	00D2631289900	IC AZ4580MTR-E1		CVIAZ4580MTR-E1		
	IC601-603	00D2631289900	IC AZ4580MTR-E1		CVIAZ4580MTR-E1		
	Q501-509	90M-HX800010R	CHIP TRS. KRC102S		HVTKRC102S		
	D501-510	00MHZ21303210	DIODE 1SS355		CVD1SS355T		
	D512-515	00MHZ21303210	DIODE 1SS355		CVD1SS355T		
CAPACITORS GROUP							
	C501,502	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C503	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C505,506	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C507	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C509-514	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C515,516	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C517,518	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		
	C523,524	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C525	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C525	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C526	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C526	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C528,529	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C530	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C532,533	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C534	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C536	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C537,538	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C539,540	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C543,544	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C545,546	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C547	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C547	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C548	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C548	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C549	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C550,551	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		
	C552,553	nsp	CER. CAP. 100PF 50V JA		CCUS1H101JA		
	C554,555	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		
	C556,557	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C558,559	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		
	C560,561	nsp	CER. CAP. 100PF 50V JA		CCUS1H101JA		
	C562,563	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		
	C564,565	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C566	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		
	C567	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C568	nsp	CER. CAP. 100PF 50V JA		CCUS1H101JA		
	C569,570	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		
	C571,572	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C573	nsp	CER. CAP. 1000PF 50V KC		CCUS1H102KC		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	C574	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C575,576	nsp	CER. CAP. 270PF 50V J		CCUS1H271JA		
	C577	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C578	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C581	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C581	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C582	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C583	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C583	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C584,585	nsp	CER. CAP. 220PF 50V JA		CCUS1H221JA		
	C586	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C587,588	nsp	CER. CAP. 270PF 50V J		CCUS1H271JA		
	C589	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C590	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C593	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C593	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C594	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C595	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C595	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C596,597	nsp	CER. CAP. 220PF 50V JA		CCUS1H221JA		
	C598	nsp	CAP , CHIP (1608, 50V/270pF) 270PF 50V J		CCUS1H271JA		
	C599	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C600	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C602	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C602	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C603	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C604	nsp	CER. CAP. 220PF 50V JA		CCUS1H221JA		
	C605,606	00MOA10702520	ELECT CAP. 100UF 25V		CCEA1EH101T		
	C607,608	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C609	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C611-616	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C617	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C619	nsp	CER. CAP. 47PF 50V JA		CCUS1H470JA		
	C620	00MOA22605020	ELECT CAP. 22UF 50V		CCEA1HH220T		
	C620	90M-OA000230R	ELECT CAP. 22UF 25V ROA-25V220MF3#-		HCEA1EROA220T		
	C621	nsp	CER. CAP. 270PF 50V J		CCUS1H271JA		
	C624	nsp	CER. CAP. 270PF 50V J		CCUS1H271JA		
	C627	nsp	CER. CAP. 270PF 50V J		CCUS1H271JA		
	C630	nsp	CER. CAP. 270PF 50V J		CCUS1H271JA		
	C633	nsp	CER. CAP. 270PF 50V J		CCUS1H271JA		
OTHERS PARTS GROUP							
	BN51	nsp	CONN. STRAIGHT WAFER 2MM		CJP09GI236ZW		
	BN52	nsp	WIRE ASSY(2P, 400MM, 2.5MM, 2MM)		CWB1B902400BN001		
	BN53	nsp	WIRE ASSY(2P, 350MM, 2.5MM, 2MM)		CWB1B90235057001		
	BN54	nsp	WIRE ASSY(2P, 250MM, 2.5MM, 2MM)		CWB1B90225057001		
	BN55	nsp	WIRE ASSY(2P, 250MM, 2.5MM, 2MM)		CWB1B902250BN001		
	BN56	nsp	WIRE ASSY(2P, 500MM, 2.5MM, 2MM)		CWB1B902500BN001		
	CN51	nsp	WIRE ASSY(13P, 100MM, 2.0MM)		CWB1B01310047		
	CN52	nsp	CONN. STRAIGHT WAFER 2MM		CJP13GI236ZW		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	JK501-505	00D2051254007	TERMINAL XLR IN JK-5033U*030		CJS6S005Z		
	JK601-605	943643002710S	TERMINAL CINCH 1P RCA-107B-04		CJJ4M046Z		
	RY501-508	943682000810S	RELAY , 12V 2C2P BC3-12H		CSL4A016ZU		
	SW501-505	90M-SS000710R	SWITCH , SLIDE		KSS2B016Z		

POWER PCB ASS'Y

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
SEMICONDUCTORS GROUP							
	IC11,12	943232000660S	IC NJM2901N		CVINJM2901N		
	IC13	00MHC3891509F	IC NJM7815FA		HVINJM7815FA		
	IC14	00MHC3991509F	IC NJM7915FA		HVINJM7915FA		
	Q101-103	00MHT600111B0	TRS. KTA1267Y		HVTKTA1267YT		
	Q104-106	00MHT30001000	TRS. KTC3199Y		HVTKTC3199YT		
	Q107	00MHT600111B0	TRS. KTA1267Y		HVTKTA1267YT		
	Q108	00MHT30001000	TRS. KTC3199Y		HVTKTC3199YT		
	Q110,111	00MBA20001000	TRS. KRC102M		HVTKRC102MT		
	D101-103	90M-HD201730R	DIODE 1N4003		CVD1N4003ST		
	D104-108	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
	D109	00MHE20030290	DIODE ! D30XBN20 SBD BRIDGE		CVDD30XBN20		
	D110-113	00MHD20055100	DIODE ! SHOTTKY 11EQS10 1A 100V		CVD11EQS10GT		
	D114-121	90M-HD201730R	DIODE 1N4003		CVD1N4003ST		
	D122	00MHD20015210	DIODE 1SS133T-77		CVD1SS133MT		
RESISTORS GROUP							
	R103	nsp	RES. 390 OHM 1W J METAL OXIDE FILM		KRG1SANJ391RT		
	R104	nsp	RES. 470 OHM 1W J METAL OXIDE FILM		KRG1SANJ471RT		
	R107	nsp	RES. 390 OHM 1W J METAL OXIDE FILM		KRG1SANJ391RT		
	R108	nsp	RES. 470 OHM 1W J METAL OXIDE FILM		KRG1SANJ471RT		
	R111	nsp	RES. 390 OHM 1W J METAL OXIDE FILM		KRG1SANJ391RT		
	R112	nsp	RES. 470 OHM 1W J METAL OXIDE FILM		KRG1SANJ471RT		
	R122-129	nsp	RES. 10 OHM 1W J METAL OXIDE FILM		KRG1SANJ100RT		
	R137	nsp	RES. 10 OHM 1W J METAL OXIDE FILM		KRG1SANJ100RT		
	R143	nsp	RES. 10 OHM 1W J METAL OXIDE FILM		KRG1SANJ100RT		
	R157,158	nsp	RES. 1 OHM 1W J METAL OXIDE FILM		CRG1SANJ1R0RT		
CAPACITORS GROUP							
	C101,102	nsp	CER. CAP. 100PF 50V KB		CCKT1H101KB		
	C103	nsp	CER. CAP. 1000PF 50V KB		CCKT1H102KB		
	C104,105	nsp	CER. CAP. 0.1UF 50V ZF		CCFT1H104ZF		
	C106	nsp	CER. CAP. 1000PF 50V KB		CCKT1H102KB		
	C107,108	nsp	CER. CAP. 100PF 50V KB		CCKT1H101KB		
	C109,110	nsp	CER. CAP. 0.1UF 50V ZF		CCFT1H104ZF		
	C111	nsp	CER. CAP. 100PF 50V KB		CCKT1H101KB		
	C112	nsp	CER. CAP. 1000PF 50V KB		CCKT1H102KB		
	C113	nsp	CER. CAP. 0.1UF 50V ZF		CCFT1H104ZF		
	C114-116	nsp	FILM CAP. 0.039UF 100V J MYLAR		HCQI1H393JZT		
	C117	nsp	CER. CAP. 100PF 50V KB		CCKT1H101KB		
	C118,119	nsp	FILM CAP. 0.039UF 100V J MYLAR		HCQI1H393JZT		
	C120-123	nsp	CER. CAP. 100PF 50V KB		CCKT1H101KB		
	C124	00MOA10702520	ELECT CAP. 100UF 25V		CCEA1EH101T		
	C125	00MOA10505020	ELECT CAP. 1UF 50V		CCEA1HH1R0T		
	C126,127	nsp	ELECT CAP. 33000UF 71V		CCET71VPKL5333RK		
	C128	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C129,130	nsp	ELECT CAP. 2200UF 63V		CCEA1JKR3222E		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	C131,132	00MOA10803520	ELECT CAP. 1000UF 35V		CCEA1VH102E		
	C133	00MOA10705020	ELECT CAP. 100UF 50V		CCEA1HH101T		
	C134,135	nsp	CER. CAP. 0.1UF 50V ZF		CCFT1H104ZF		
	C136,137	nsp	CER. CAP. 0.01UF 50V Z		CCFT1H103ZF		
	C138-141	90M-OF100490R	FILM CAP. 0.1UF 250V METALLIZED		KCME2E104JP04T		
	C142	nsp	CER. CAP. 1000PF 50V KB		CCKT1H102KB		
	C143	nsp	CER. CAP. 0.1UF 50V ZF		CCFT1H104ZF		
	C146	00MOA10702520	ELECT CAP. 100UF 25V		CCEA1EH101T		
OTHERS PARTS GROUP							
	BN11	nsp	WIRE ASSY(9P, 150MM, 2.0MM)		CWB1B00915047		
	BN12	nsp	WIRE ASSY(13P, 200MM, 2.0MM)		CWB1B01320047		
	CN11	nsp	CONN. STRAIGHT WAFER 3.96MM		CJP05GA148ZW		
	CN12	nsp	CONN. STRAIGHT WAFER		CJP03GA90ZY		
	CN13	nsp	CONN. STRAIGHT WAFER 5P		CJP05GA90ZY		
	CN14	nsp	CONN. STRAIGHT WAFER		CJP03GA01ZY		
	CN15-19	nsp	CONN. STRAIGHT WAFER 5P		CJP05GA90ZY		
⚠	F101,102	90M-FS001070R	FUSE ! AC250V T2.5AL		KBA2D2500TLET		
⚠	F104,105	90M-FS001520R	FUSE ! FUSE 1A 372 SERIES/TR5		KBA2D1000A3EYT		
	JK11-15	943646000860S	TERMINAL 2P SPEAKER(RED/BLACK)		CJJ5N013Z		
	L101-105	nsp	COIL 0.5UH K		CLEY0R5KAK		
	RY11-13	943682000800S	RELAY G5PA-28-MC DC24V		CSL3B014ZE		
	RY14,15	943682000790S	RELAY ! HL1-1CT-24H 24V 1C2P		CSL2B003ZU		
		nsp	HEAT SINK TR		CMY1A311		
		nsp	SCREW		CTB3+8JR		

STBY.PCB ASS'Y

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
SEMICONDUCTORS GROUP							
	IC71	90M-HC108410R	IC S-80842CNY-X		HVIS-80842CNY-X		
	IC72	00MHC3891209F	IC NJM7812FA		HVINJM7812FA		
	IC73	00MHC3890509F	IC NJM7805FA		HVINJM7805FA		
	IC74	00MHC3891809F	IC NJM7818FA		CVINJM7818FA		
	IC75	90M-HC900200R	IC NJM2831F05		CVINJM2831F05		
	IC76	00MHC3891809F	IC NJM7818FA		CVINJM7818FA		
	Q701	00MHT600111B0	TRS. KTA1267Y		HVTKTA1267YT		
	Q702,703	90M-HX800010R	CHIP TRS. KRC102S		HVTKRC102S		
	Q704	00MHT600111B0	TRS. KTA1267Y		HVTKTA1267YT		
	Q706	90M-HX800010R	CHIP TRS. KRC102S	U1B	HVTKRC102S		
	D701-703	00MHZ21303210	DIODE 1SS355		CVD1SS355T		
	D704	90M-HD302290R	ZENER DIODE 7.5V		HVDUDZS7.5BSR		
	D705-719	90M-HD201730R	DIODE 1N4003		CVD1N4003ST		
	D720	HVDMTZJ12BT	ZENER DIODE MTZJ12B 1/2W	U1B	HVDMTZJ12BT		
	D721	00MHZ21303210	DIODE 1SS355	U1B	CVD1SS355T		
RESISTORS GROUP							
	R175	nsp	RES. 1.5K OHM 2W METAL OXIDE FILM		CRG2SANJ152RT		
	R178	nsp	RES. 1.5K OHM 2W METAL OXIDE FILM		CRG2SANJ152RT		
	R187	nsp	RES. 120 OHM 2W METAL OXIDE FILM		CRG2SANJ121RT		
	R188	nsp	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		
	R194	nsp	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		
	R197	nsp	RES. 1K 1/4W 5% FLAME RETARDANT		CRG14SANCJ102T		
	R199,200	nsp	RES. 120 OHM 2W METAL OXIDE FILM		CRG2SANJ121RT		
	R201	nsp	RES. 150 OHM 2W METAL OXIDE FILM		CRG2SANJ151RT		
	R202	nsp	RES. 10 OHM 2W METAL OXIDE FILM		CRG2SANJ100RT		
	R203	nsp	RES. 100 OHM 1/4W FLAME RETARDANT		CRG14SANCJ101T		
	R204	nsp	RES. METAL OXIDE FILM(1W 1K OHM)		CRG1SANJ102RT		
	R205	nsp	RES. 47 OHM 1W J METAL OXIDE FILM		KRG1SANJ470RT		
	R206	nsp	RES. METAL OXIDE FILM(1W, 10)		CRG1SANJ100RT		
	R207	nsp	RES. 220 OHM 1W J METAL OXIDE FILM		CRG1SANJ221RT		
	R208	nsp	RES. 100 OHM 1/4W FLAME RETARDANT		CRG14SANCJ101T		
	R209	nsp	RES. 10 OHM 2W METAL OXIDE FILM		CRG2SANJ100RT		
	R210	nsp	RES. 47 OHM 1W J METAL OXIDE FILM		KRG1SANJ470RT		
	R211	nsp	RES. METAL OXIDE FILM(1W, 10)		CRG1SANJ100RT		
	R223	nsp	RES. 1.5K OHM 2W METAL OXIDE FILM		CRG2SANJ152RT		
	R226	nsp	RES. 1.5K OHM 2W METAL OXIDE FILM		CRG2SANJ152RT		
	R235	nsp	RES. 120 OHM 2W METAL OXIDE FILM		CRG2SANJ121RT		
	R236	nsp	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		
	R242	nsp	RES. 470 OHM 1/4W FLAME RETARDANT		CRG14SANCJ471T		
	R245	nsp	RES. 1K 1/4W 5% FLAME RETARDANT		CRG14SANCJ102T		
	R247,248	nsp	RES. 120 OHM 2W METAL OXIDE FILM		CRG2SANJ121RT		
	R249	nsp	RES. 150 OHM 2W METAL OXIDE FILM		CRG2SANJ151RT		
	R250	nsp	RES. 10 OHM 2W METAL OXIDE FILM		CRG2SANJ100RT		
	R251	nsp	RES. 100 OHM 1/4W FLAME RETARDANT		CRG14SANCJ101T		
	R252	nsp	RES. METAL OXIDE FILM(1W 1K OHM)		CRG1SANJ102RT		
	R253	nsp	RES. 47 OHM 1W J METAL OXIDE FILM		KRG1SANJ470RT		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
	R254	nsp	RES. 220 OHM 1W J METAL OXIDE FILM		CRG1SANJ221RT		
	R255	nsp	RES. METAL OXIDE FILM(1W, 10)		CRG1SANJ100RT		
	R256	nsp	RES. 10 OHM 2W METAL OXIDE FILM		CRG2SANJ100RT		
	R257	nsp	RES. 100 OHM 1/4W FLAME RETARDANT		CRG14SANCJ101T		
	R258	nsp	RES. 47 OHM 1W J METAL OXIDE FILM		KRG1SANJ470RT		
	R259	nsp	RES. METAL OXIDE FILM(1W, 10)		CRG1SANJ100RT		
	R271	nsp	RES. 1 OHM 1W J METAL OXIDE FILM		CRG1SANJ1R0RT		
	R313-316	nsp	RES. METAL OXIDE FILM(1W, 10)		CRG1SANJ100RT		
	R317	nsp	RES. 470 OHM 1W J METAL OXIDE FILM		KRG1SANJ471RT		
	R318	nsp	RES. 390 OHM 1W J METAL OXIDE FILM		KRG1SANJ391RT		
CAPACITORS GROUP							
	C701,702	90M-DK100810R	CER. CAP. ! DE1610-610F103M JP (KH TYPE)		HCKWKH103MF		
	C703,704	nsp	CER. CAP. 1000PF 50V KC		CCUS1H102KC		
	C705	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C706	00MOA10605020	ELECT CAP. 10UF 50V		CCEA1HH100T		
	C708	00MOA33802520	ELECT CAP. 3300UF 25V		CCEA1EH332E		
	C709	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C710	00MOA10703520	ELECT CAP. 100UF 35V		CCEA1VH101T		
	C711	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C712	00MOA10701620	ELECT CAP. 100UF 16V		CCEA1CH101T		
	C713,714	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C715	00MOA10803520	ELECT CAP. 1000UF 35V		CCEA1VH102E		
	C716	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C717	00MOA10701620	ELECT CAP. 100UF 16V		CCEA1CH101T		
	C718	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C719	00MOA47702520	ELECT CAP. 470UF 25V		CCEA1EH471E		
	C720	00MOA10703520	ELECT CAP. 100UF 35V		CCEA1VH101T		
	C721,722	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
	C723	00MOA10703520	ELECT CAP. 100UF 35V		CCEA1VH101T		
	C724	nsp	CER. CAP. 0.1UF 50V K		CCUS1H104KC		
OTHERS PARTS GROUP							
	BK71	nsp	BRACKET BRACKET PWB		CMD1A387		
	BK72	nsp	BRACKET BRACKET FOR PWB (A)		CMD1A188		
	BK73	nsp	BRACKET BRACKET FOR PWB		CMD1A569		
	BK74-77	nsp	BRACKET BRACKET PWB		CMD1A387		
	CN71	nsp	CONN. 2P 7.92MM(YUNHO)		CJP02KA060ZY		
	CN72	nsp	CONN. 2P WAFER	U1B	CJP02GA89ZY		
	CN72	nsp	CONN. 2P WAFER	N1B	CJP02GA89ZY		
	CN73	nsp	WIRE ASSY(13P, 300MM, 2.0MM)		CWB1B01330047		
	CN74	nsp	CONN. 5P WAFER YMW025-05R 00906-0014		CJP05GA01ZY		
	CN75,76	nsp	CONN. 7P PIN HEADER		CJP07GA98ZY		
	F701	nsp	CONN. HOLDER FUSE		KJCFC5S		
⚠	F702,703	90M-FS001520R	FUSE ! FUSE 1A 372 SERIES/TR5		KBA2D1000A3EYT		
⚠	RF701,702	943129000830S	RES. ! SQMT-7W-2.2RJ FUSE		CRQT7CJ2R2		

	Ref. No.	Part No.	Part Name	Remarks		Q'ty	New
⚠	RY71	943682000780S	RELAY ! G4W-1112P-US-TV812VDC		CSL1A017ZE		
⚠	RY72	943682004660S	RELAY ! RELAY G5PA-1 DC6V		CSL1E002ZE		
⚠	T701	943101011370S	TRANSFORMER , SUB EI 28*16	U1B	CLT5I008ZU		*
⚠	T701	00D9430193203	TRANSFORMER , SUB EI 28*16	N1B	CLT5I008ZE		
⚠		90M-FS001080R	FUSE ! 10A/250V	U1B	KBA2C1002TLEY		
⚠		90M-FS001090R	FUSE ! 5A/250V(EUR) T5AL	N1B	KBA2C5000TLEY		
		nsp	HOLDER , FUSE		KJCFC5S		
		nsp	HEAT SINK		CMY4A025		
		nsp	HEATSINK		CMY5A223		
		nsp	HEAT SINK		CMY4A025		
		nsp	SCREW		CTB3+8JR		