Mini Hi-Fi System

SERVICE MANUAL

MODEL: CM4321 (CM4321, CMS4320F)

CAUTION

BEFORE SERVICING THE UNIT, READ THE “SAFETY PRECAUTIONS” IN THIS MANUAL.

P/NO : AFN75914233

OCTOBER, 2012

SERVICE MANUAL

MODEL: CM4321 (CM4321, CMS4320F)

LG

CONTENTS

SECTION 1

SUMMARY

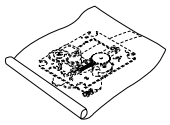
CONTENTS

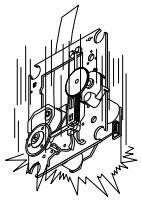
SERVICING PRECAUTIONS

NOTES REGARDING HANDLING OF THE PICK-UP

1. Notes for transport and storage

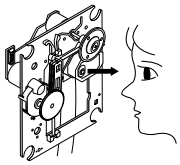
1) The pick-up should always be left in its conductive bag until immediately prior to use.
2) The pick-up should never be subjected to external pressure or impact.

Storage in conductive bag 

 Drop impact

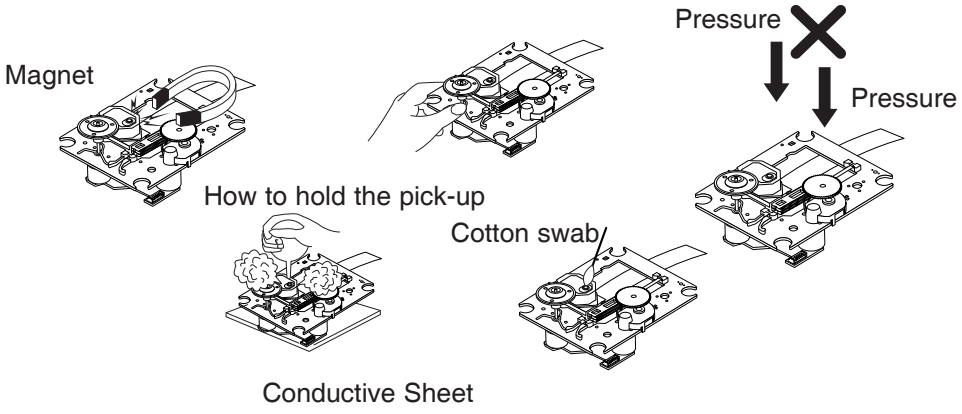
2. Repair notes

1) The pick-up incorporates a strong magnet, and so should never be brought close to magnetic materials.
2) The pick-up should always be handled correctly and carefully, taking care to avoid external pressure and impact. If it is subjected to strong pressure or impact, the result may be an operational malfunction and/or damage to the printed-circuit board.
3) Each and every pick-up is already individually adjusted to a high degree of precision, and for that reason the adjustment point and installation screws should absolutely never be touched.
4) Laser beams may damage the eyes!
   Absolutely never permit laser beams to enter the eyes!
   Also NEVER switch ON the power to the laser output part (lens, etc.) of the pick-up if it is damaged.



NEVER look directly at the laser beam, and don't allow contact with fingers or other exposed skin.

5) Cleaning the lens surface
   If there is dust on the lens surface, the dust should be cleaned away by using an air bush (such as used for camera lens). The lens is held by a delicate spring. When cleaning the lens surface, therefore, a cotton swab should be used, taking care not to distort lens.



6) Never attempt to disassemble the pick-up.
   Spring has excess pressure. If the lens is extremely dirty, apply isopropyl alcohol to the cotton swab. (Do not use any other liquid cleaners, because they will damage the lens.) Take care not to use too much of this alcohol on the swab, and do not allow the alcohol to get inside the pick-up.

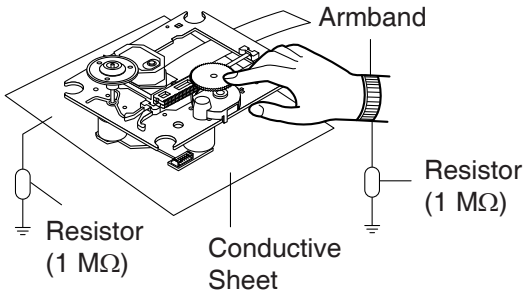
NOTES REGARDING COMPACT DISC PLAYER REPAIRS

1. Preparations

1) Compact disc players incorporate a great many ICs as well as the pick-up (laser diode). These components are sensitive to, and easily affected by, static electricity. If such static electricity is high voltage, components can be damaged, and for that reason components should be handled with care.
2) The pick-up is composed of many optical components and other high-precision components. Care must be taken, therefore, to avoid repair or storage where the temperature or humidity is high, where strong magnetism is present, or where there is excessive dust.

2. Notes for repair

1) Before replacing a component part, first disconnect the power supply lead wire from the unit
2) All equipment, measuring instruments and tools must be grounded.
3) The workbench should be covered with a conductive sheet and grounded.
   When removing the laser pick-up from its conductive bag, do not place the pick-up on the bag. (This is because there is the possibility of damage by static electricity.)
4) To prevent AC leakage, the metal part of the soldering iron should be grounded.
5) Workers should be grounded by an armband (1 MΩ)
6) Care should be taken not to permit the laser pick-up to come in contact with clothing, in order to prevent static electricity changes in the clothing to escape from the armband.
7) The laser beam from the pick-up should NEVER be directly facing the eyes or bare skin.



ESD PRECAUTIONS

Electrostatically Sensitive Devices (ESD)

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ESD devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ESD devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ESD devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ESD devices.
6. Do not remove a replacement ESD device from its protective package until immediately before you are ready to install it. (Most replacement ESD devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive materials).
7. Immediately before removing the protective material from the leads of a replacement ESD device, touch the protective material to the chassis or circuit assembly into which the device will by installed.

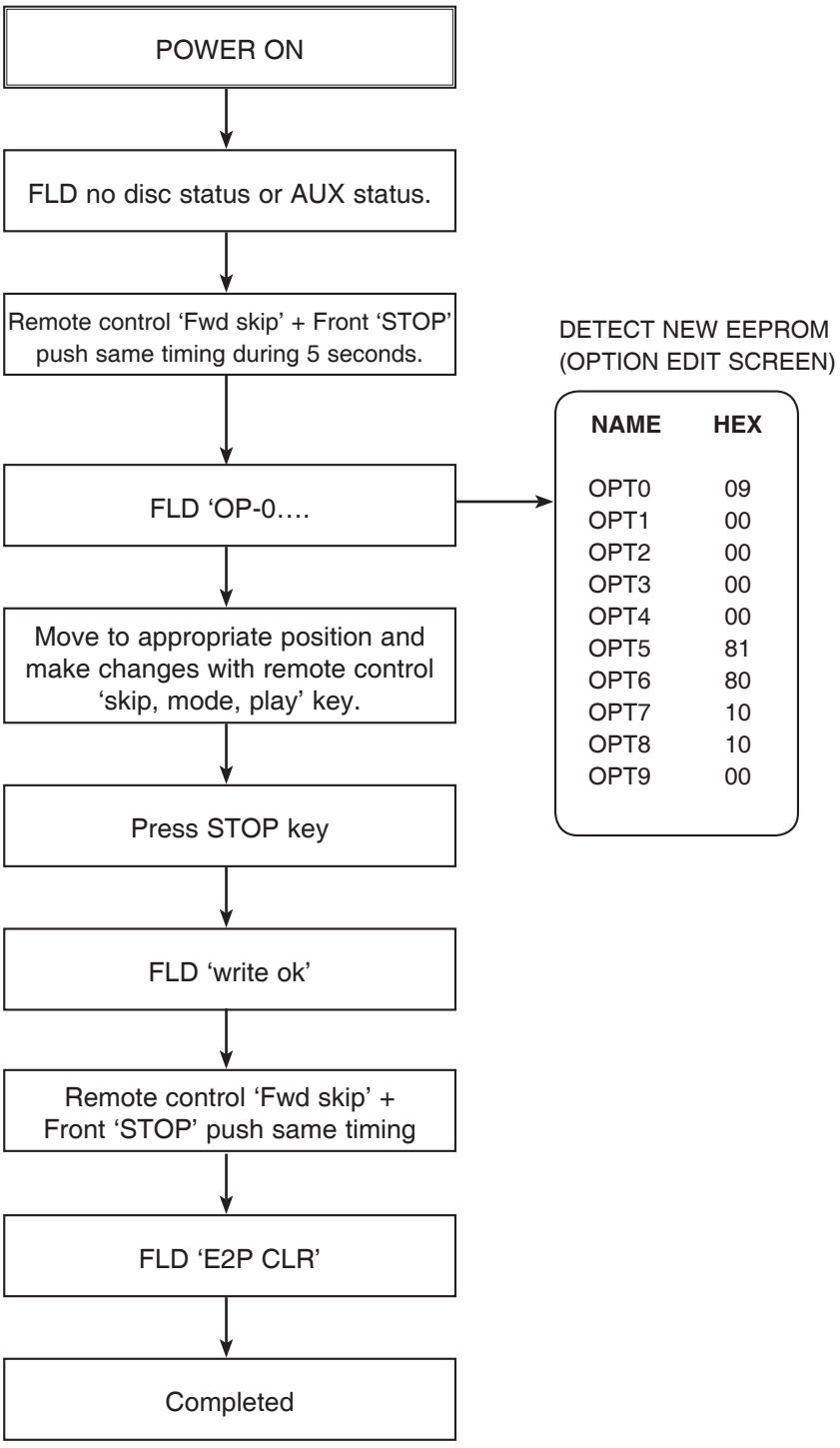
CAUTION : BE SURE NO POWER IS APPLIED TO THE CHASSIS OR CIRCUIT, AND OBSERVE ALL OTHER SAFETY PRECAUTIONS.

8. Minimize bodily motions when handing unpackaged replacement ESD devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ESD device).

CAUTION. GRAPHIC SYMBOLS

	THE LIGHTNING FLASH WITH APROWHEAD SYMBOL. WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF UNINSULATED “DANGEROUS VOLTAGE” THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.
	THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

SERVICE INFORMATION FOR EEPROM



PROGRAM DOWNLOAD GUIDE

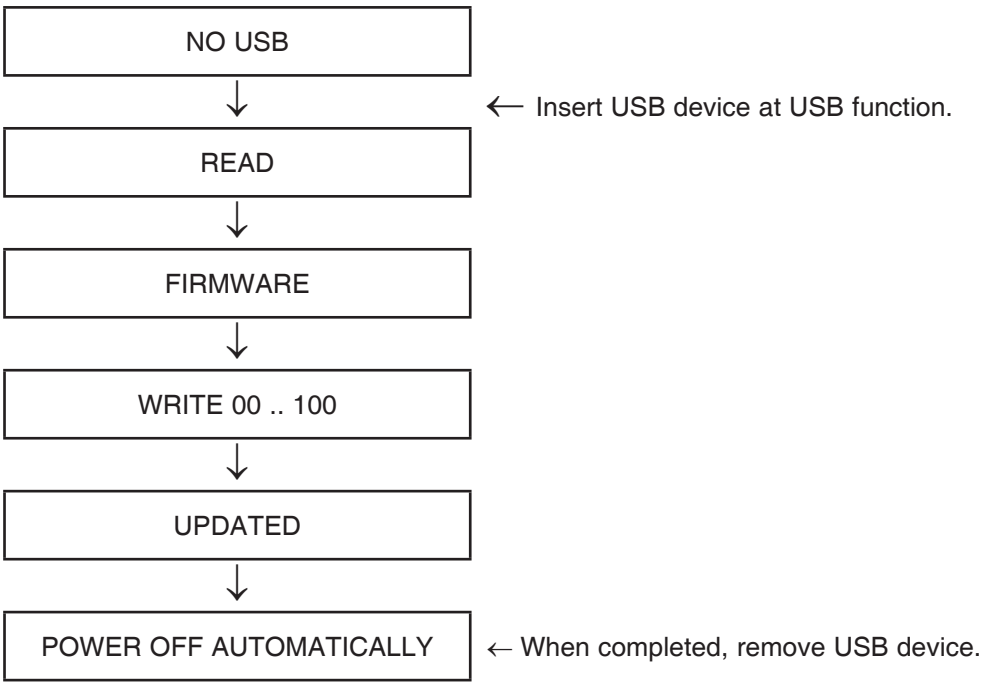
1. AUDIO PROGRAM

Download program file name must be CM4320_*.HEX**

If security program (Water Wall) is activated on your PC, you must save the file to the USB storage device and disable the security software, then download the file to your set.

Caution: When downloading the file, you should neither unplug the USB device, change to the other function, nor power off the device. USB device must be unplugged when the downloading process is completed.

ON VFD DISPLAY SCREEN



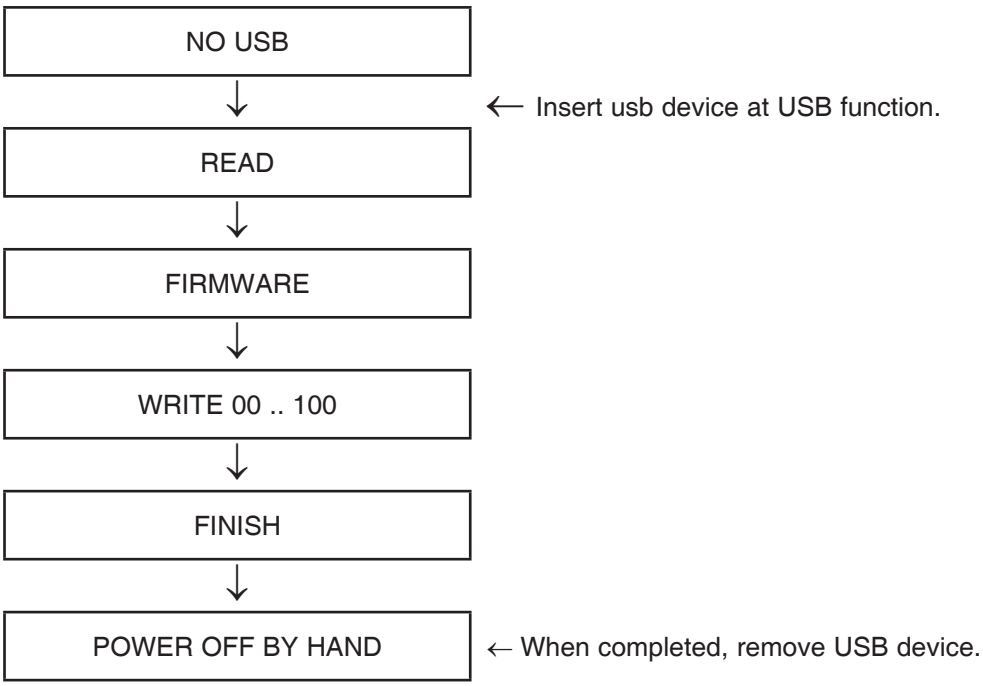
2. CD PROGRAM

Download program file name must be HE001_DATE_00.BIN

If security program (Water Wall) is activated on your PC, you must save the file to the USB storage device and disable the security software, then download the file to your set.

Caution: When downloading the file, you should neither unplug the usb device, change to the other function, nor power off the device. USB device must be unplugged when the downloading process is completed.

ON VFD DISPLAY SCREEN



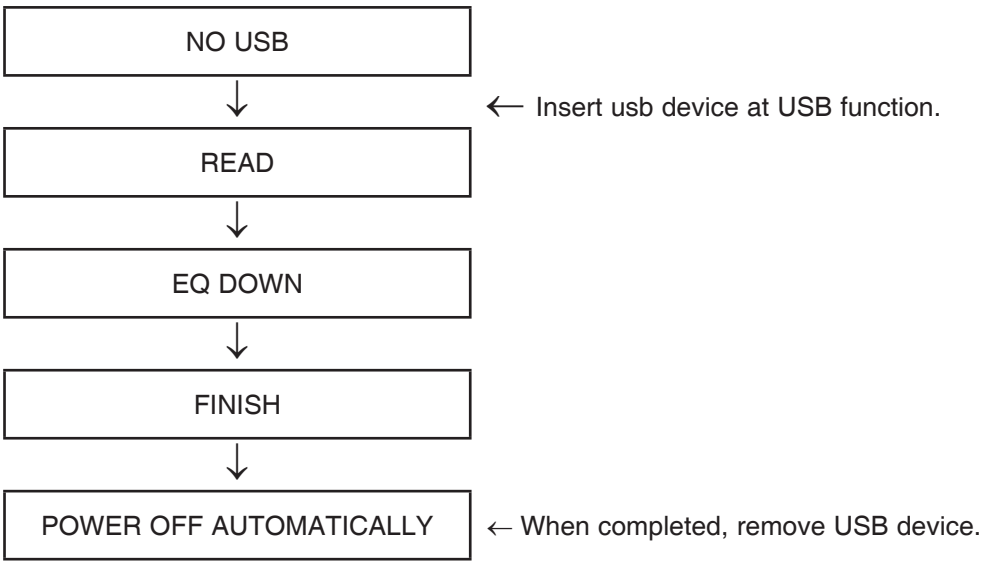
3. EQ PROGRAM

Download program file name must be EQ_PRG_CM4320_*.BIN**

If security program (Water Wall) is activated on your PC, you must save the file to the USB storage device and disable the security software, then download the file to your set.

Caution: When downloading the file, you should neither unplug the usb device, change to the other function, nor power off the device. USB device must be unplugged when the downloading process is completed.

ON VFD DISPLAY SCREEN



SPECIFICATIONS

• GENERAL

Power requirements	Refer to main label
Power consumption	Refer to main label
Dimensions (W x H x D)	202 X 300 X 297 mm
Net Weight (Approx.)	2,85 kg
Operating temperature	5 °C to 35 °C (41 °F to 95 °F)
Operating humidity	5 % to 90 %
Bus Power Supply (USB)	USB DC 5 V ⎓ 500 mA

• INPUTS

AUX IN	2,0 Vrms (1 kHz, 0 dB), 75 Ω, RCA jack (L, R) x 1

• TUNER

FM Tuning Range	87,5 to 108,0 MHz or 87,50 to 108,00 MHz
AM Tuning Range	522 to 1 620 kHz, 520 to 1 710 kHz or 522 to 1 710 kHz

• AMPLIFIER

Stereo mode	80 W + 80 W (4 Ω at 1 KHz, THD 10 %)
Surround mode	80 W + 80 W (4 Ω at 1 KHz, THD 10 %)

• CD

Frequency Response	100 to 20 000 Hz
Signal-to-noise ratio	75 dB
Dynamic range	80 dB

• FRONT SPEAKER

Model	CMS4320F
Type	2 Way 2 Speaker
Impedance	4 Ω
Rated Input Power	80 W
Max. Input power	160 W
Net Dimensions (W x H x D)	215 X237 X304 mm
Net Weight	2,47 Kg

SECTION 2

CABINET & MAIN CHASSIS

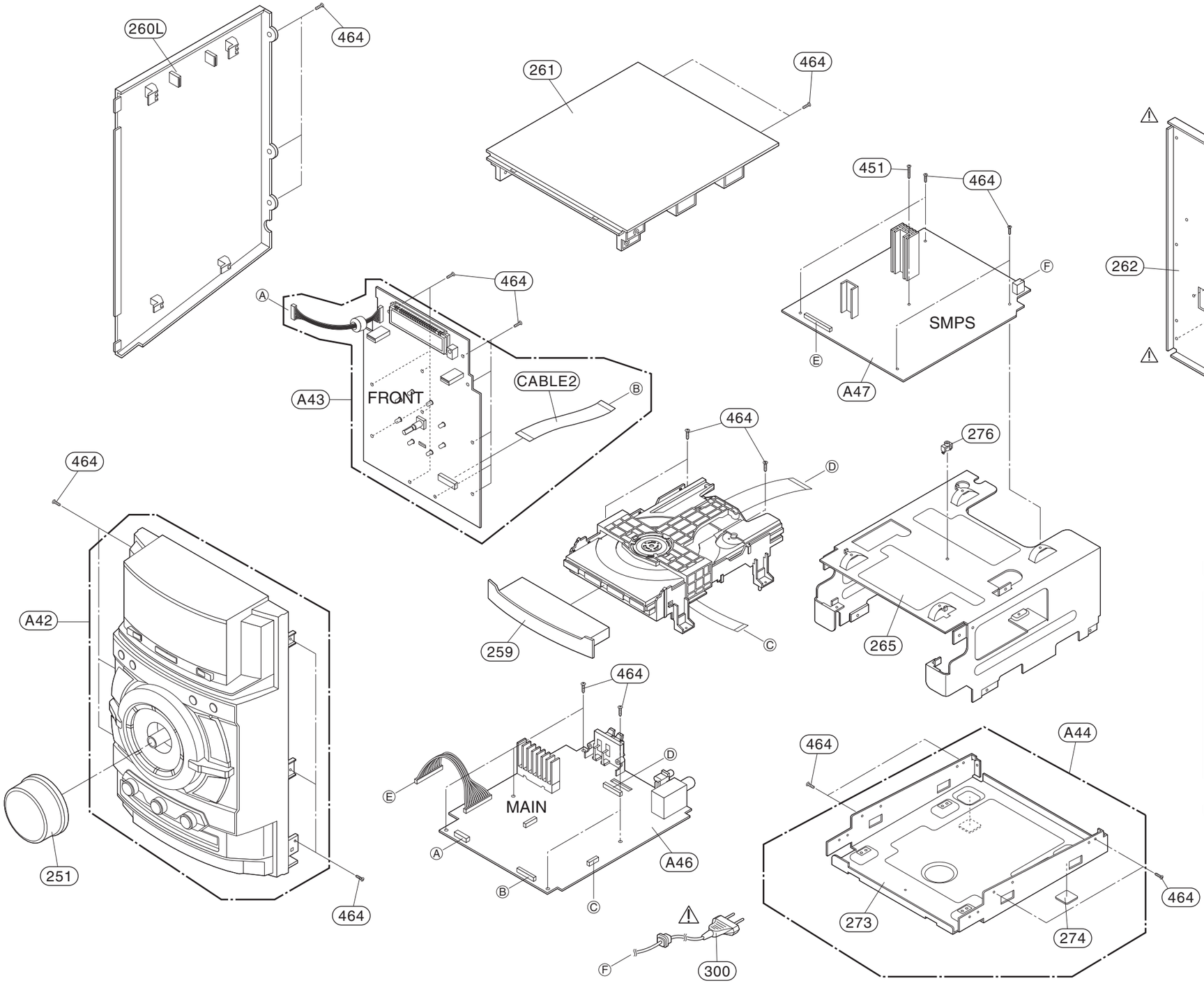
CONTENTS

MEMO

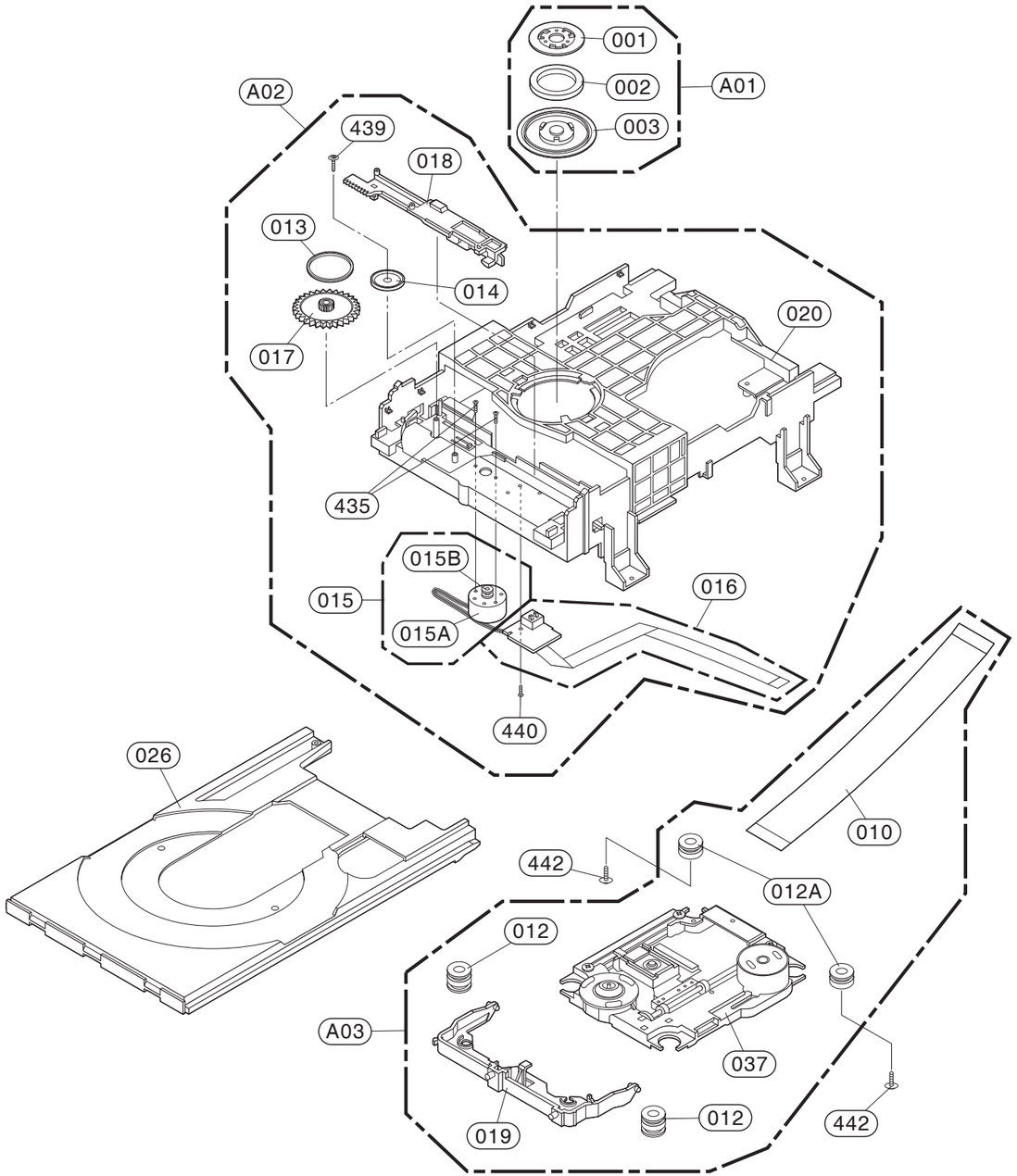
EXPLODED VIEWS

1. CABINET AND MAIN FRAME SECTION (CM4321)

NOTES) THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

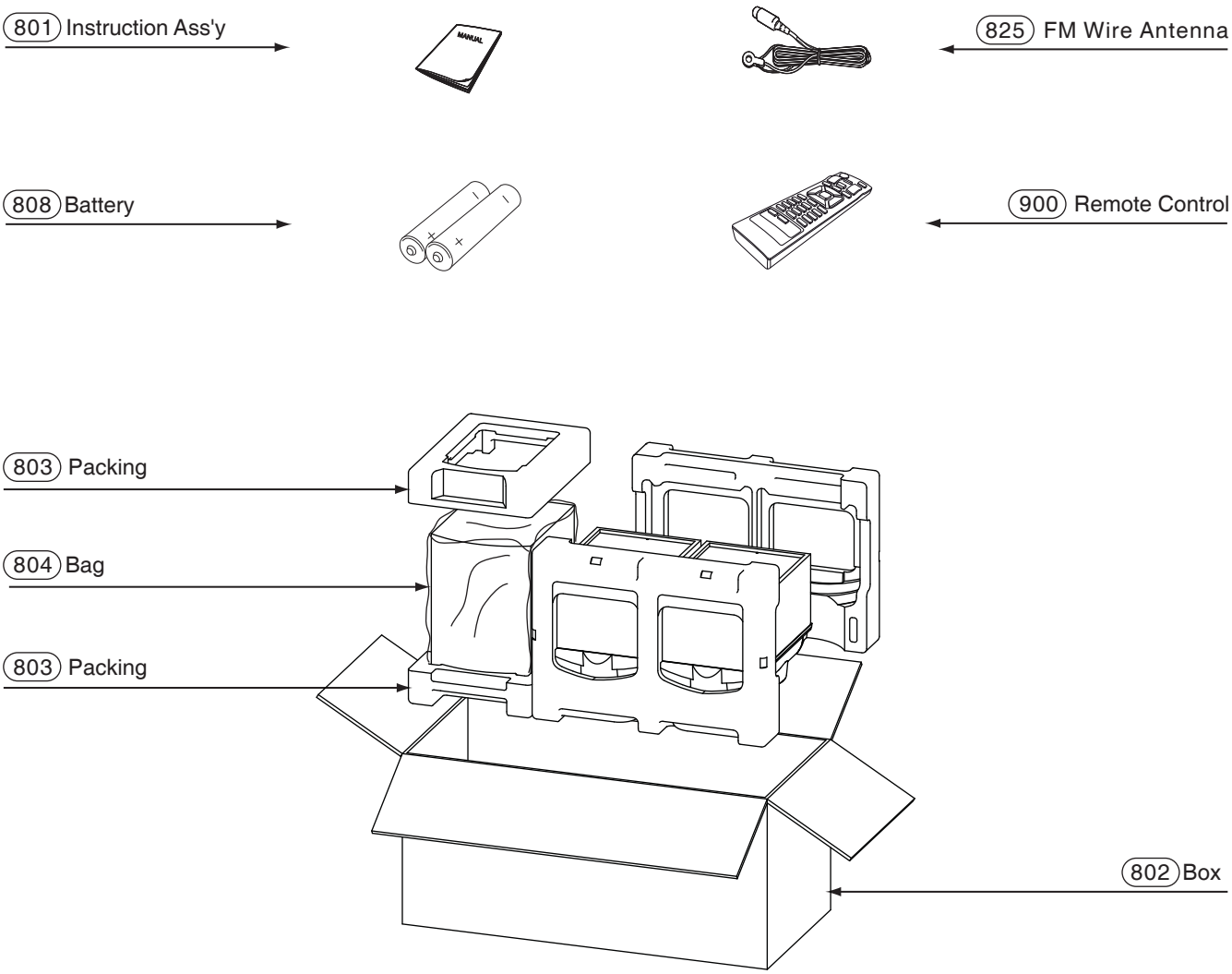


2. MECHANISM DECK SECTION (DP-12AM)

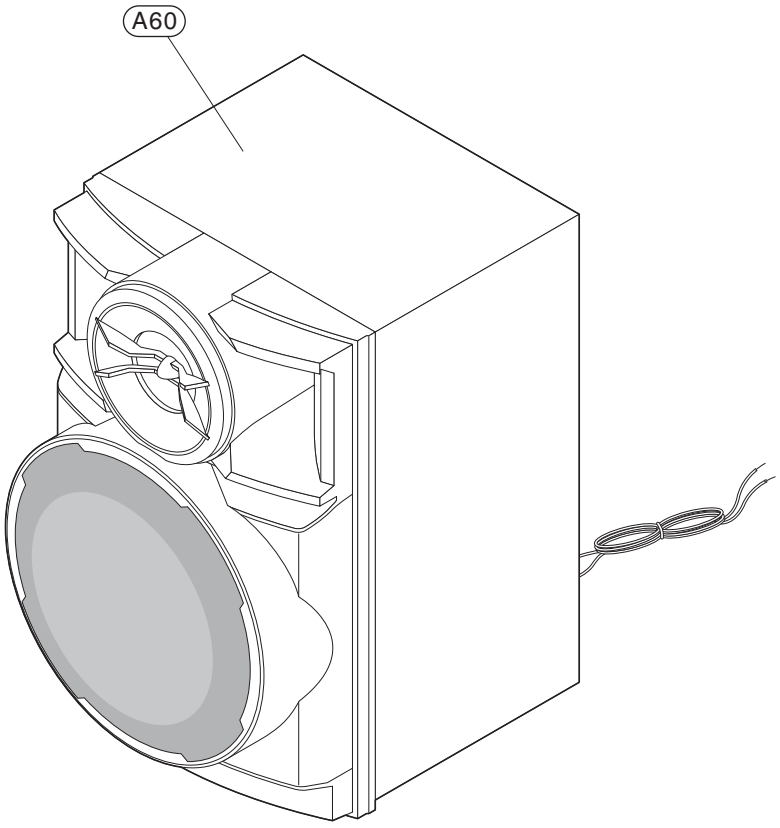


MEMO

3. PACKING ACCESSORY SECTION



4. SPEAKER SECTION (CMS4320F)



SECTION 3

ELECTRICAL

CONTENTS

ONE POINT REPAIR GUIDE

1. NO POWER

If the unit doesn't work by no power problem, repair the set according to the following guide.

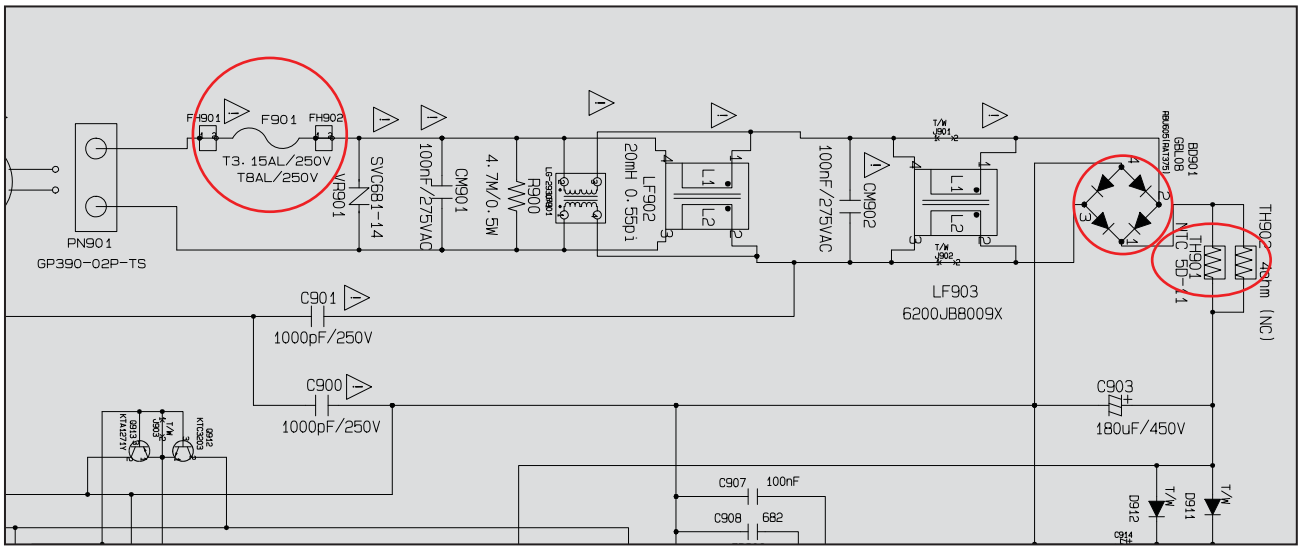
1-1. FUSE & BRIDGE DIODE

1-1-1. Solution

Please check and replace F901, BD901, TH901 on SMPS board.

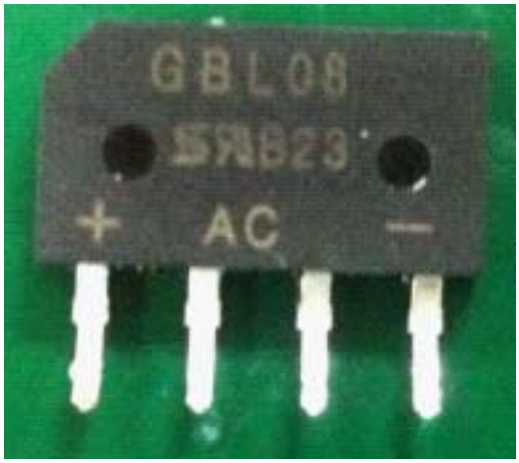
1-1-2. How to troubleshoot (Countermeasure)

1) Check if the fuse F901 is open or short-circuit.
2) Check if the bridge diode DB901 is short-circuit by over current with a digital multi meter.
3) Check if the NTC thermistor TH901 is normal or open.



1-1-3. Service hint (Any picture / Remark)

< F901 >
If F901 is not short-circuit, replace it with a same specifications one.



< BD901 >
If BD901 is short-circuit, replace it with a new one.

< TH901 >
If TH901 is open, replace it with a new one.

ONE POINT REPAIR GUIDE

NO POWER

If the unit doesn't work by no power problem, repair the set according to the following guide.

1-2. D929

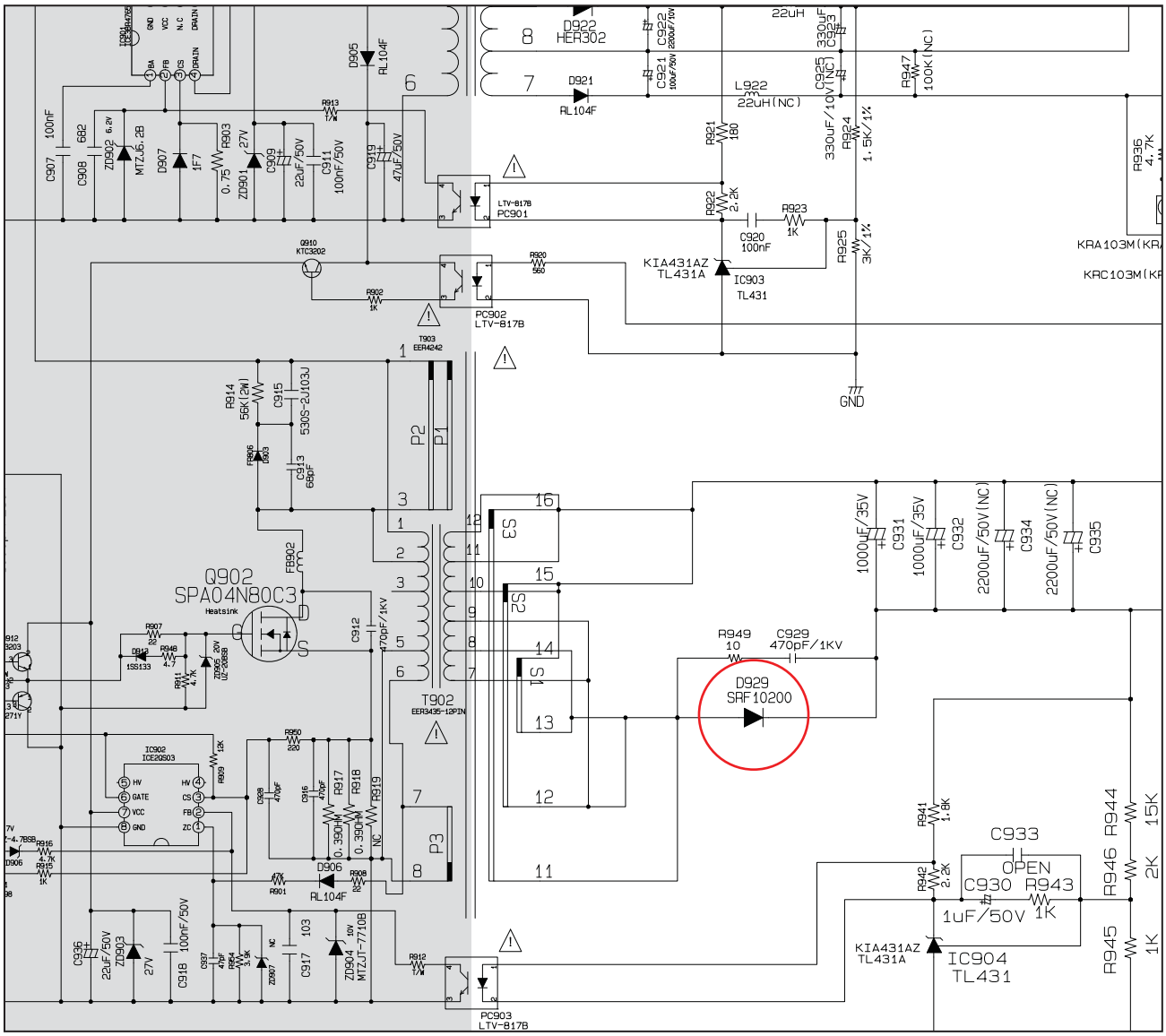
1-2-1. Solution

Please check and replace D929 on SMPS board.

1-2-2. How to troubleshoot (Countermeasure)

1) Check the Anode-Cathod Voltage of D929 with a digital multi-meter, it is normally 0.2 ~ 0.3 V.
   ⇨ If it doesn't have any voltage, it's destroyed. Replace it with a new one.

1-2-3. Service hint (Any picture / Remark)



< SMPS schematic diagram >

ONE POINT REPAIR GUIDE

2. NO BOOTING WHEN POWER ON THE SET

The set doesn't work when press the power button on the front board or the remote control.

2-1. FLASH MEMORY

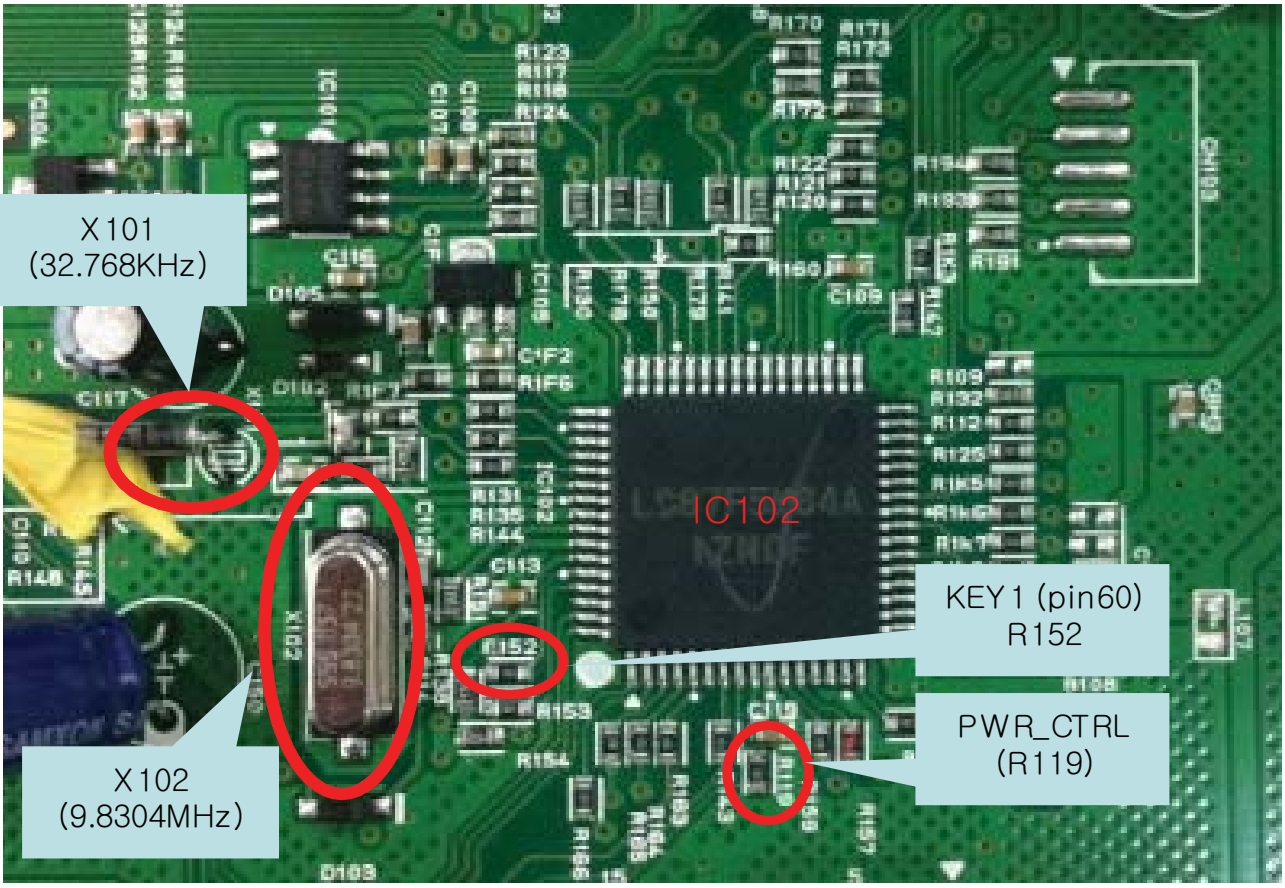
2-1-1. Solution

Please check and replace IC102 on MAIN board.

2-1-2. How to troubleshoot (Countermeasure)

1) Check 3.7 V to CN101 and CN105 in standby mode.
   ⇨ If there is no 3.7 V, check the SMPS.
2) Check 5.6 V, 12 V, F+, F- and PVDD when power on the set.
   - If the set doesn't work regardless of what the KEY1 changes high to low while pressing the power button. X100 and X101 work normally but, if you can not power on the set, replace IC101 with a new one on the MAIN board.

2-1-3. Service hint (Any picture / Remark)



< Signal check point >

ONE POINT REPAIR GUIDE

3. VFD IS NOT DISPLAYED WHEN POWER ON THE SET

When power on the set, any icons or characters on VFD are not displayed.

3-1. VFD

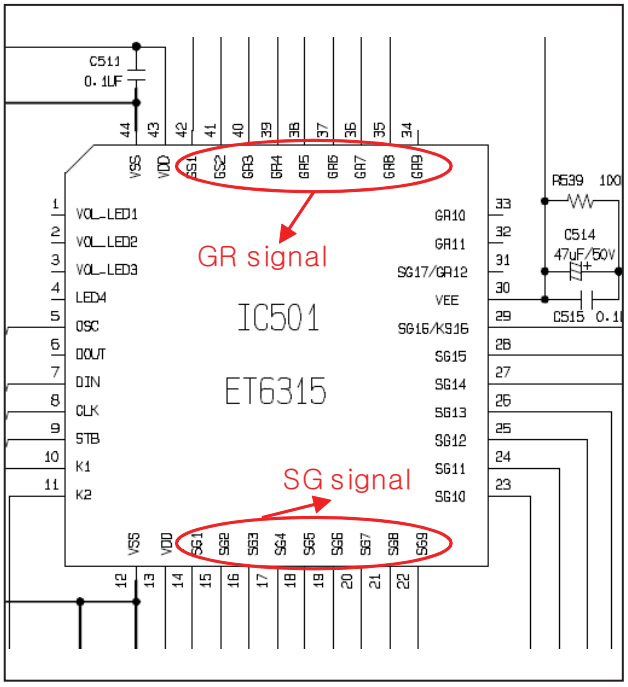
3-1-1. Solution

Please check and replace DIG502 on FRONT board.

3-1-2. How to troubleshoot (Countermeasure)

1) Check if VKK, FL+ and FL- are output from SMPS to VFD via the MAIN board.
2) Check if IC102 outputs VFD_D0, VFD_CLK and VFD_STB to the FRONT board.
3) Check the GR signal(pulse signal) of IC501 on the FRONT board.
   Check the SG signal(pulse signal) of IC501 on the FRONT board.
   ⇨ If the GR and SG signal isn't output, replace IC501 with a new one.
   ⇨ If the GR and SG signal is output, replace DIG502 with a new one.

3-1-3. Service hint (Any picture / Remark)



Click the picture, and then drag to enlarge it.
check the waveform on details.

< Waveform of GR and SG signal >

ONE POINT REPAIR GUIDE

4. NO OPERATION OF MD

When no sound output in the CD function, you can not listen to music reading data from a CD disc if the servo motors in MD don't work. This step is for checking the SPINDLE MOTOR among them.

4-1. SPINDLE MOTOR

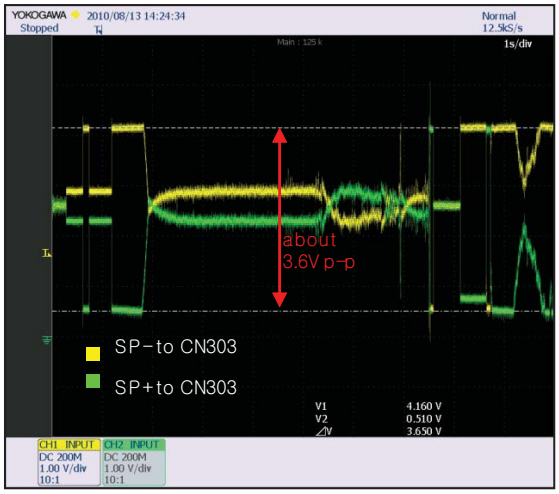
4-1-1. Solution

Please check and replace IC301, IC302 on MAIN board.

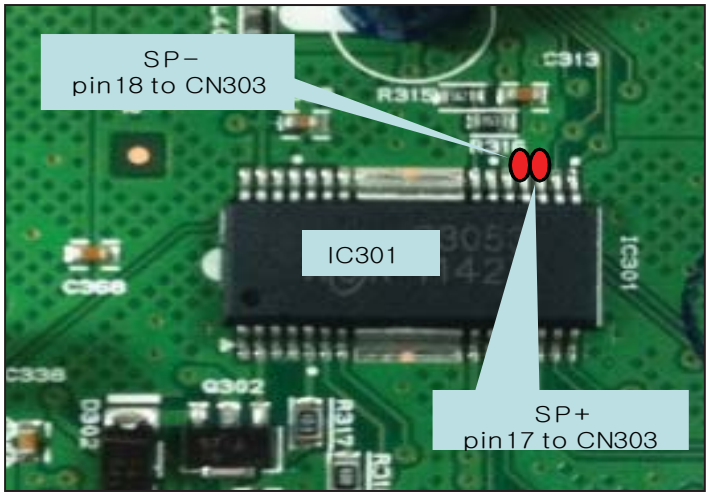
4-1-2. How to troubleshoot (Countermeasure)

1) Check the SPDO signal from pin16 of IC302.
   ⇨ If no signal, check 3.3 V(RF) and X301.
2) Check the SPIN- & SPIN+ from IC301 to CN303 for driving SPINDLE motor. It is about 3.6 Vp-p.
   ⇨ If no signal, check +1.8 V and +5 V for IC301.
3) Check if the FFC cable is solidly connected between CN303 and MD.
4) Check the MD.
   ⇨ If the spindle motor is sort-circuit or has any trouble, it can not rotate CD discs.
   Please check the function after changing another MD.

4-1-3. Service hint (Any picture / Remark)



< Waveform of SP- & SP+
for driving SPINDLE motor >



< Signal check point >

ONE POINT REPAIR GUIDE

NO OPERATION OF MD

When no sound output in the CD function, you can not listen to music reading data from a CD disc if the servo motors in MD don't work. This step is for checking the SLED MOTOR among them.

4-2. SLED MOTOR

4-2-1. Solution

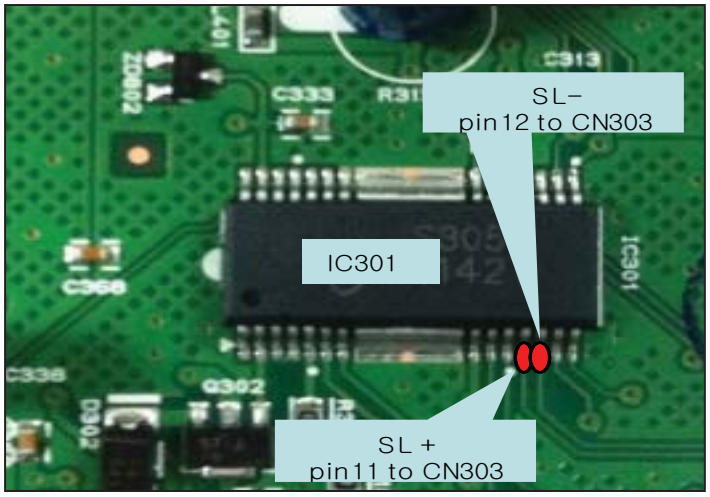
Please check and replace IC301, IC302 on MAIN board.

4-2-2. How to troubleshoot (Countermeasure)

1) Check the SLDO signal from Pin15 of IC302.
   ⇨ If no signal, check 3.3 V(RF) and X301.
2) Check the SLED+ & SLED- from IC301 to CN303 for driving SPINDLE motor. It is about 2.9 Vp-p.
   ⇨ If no signal, check +1.8 V and +5 V for IC301.
3) Check if the FFC cable is solidly connected between CN303 and MD.
4) Check the MD.
   ⇨ If the sled motor is sort-circuit or has any trouble, it can not move the pickup module.
   Please check the function after changing another MD.

4-2-3. Service hint (Any picture / Remark)

< Waveform of SLED- & SLED+ for driving SLED motor >



< Signal check point >

ONE POINT REPAIR GUIDE

NO OPERATION OF MD

When no sound output in the CD function, you can not listen to music reading data from a CD disc if the servo motors in MD don't work. This step is for checking the TRAY OPEN / CLOSE MOTOR among them.

4-3. TRAY OPEN / CLOSE MOTOR

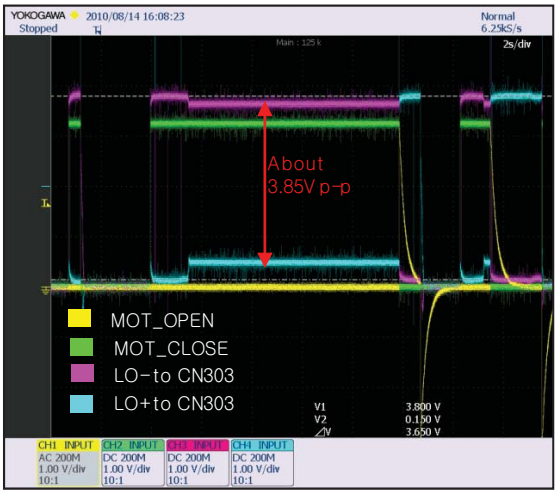
4-3-1. Solution

Please check and replace IC301, IC302 on MAIN board.

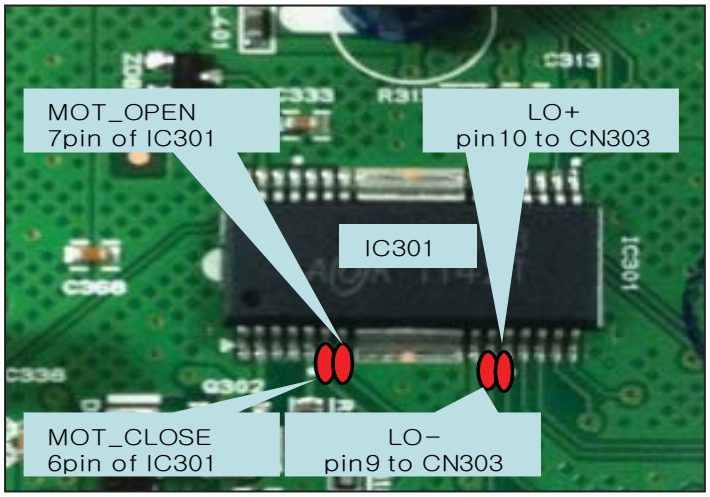
4-3-2. How to troubleshoot (Countermeasure)

1) Check MOT_OPEN & MOT_CLOSE signals from Pin104, 105 of IC801 to IC301.
   ⇨ If no signal, check +1.8 V & + 5 V to IC301.
2) Check LOAD± from IC301 to CN303 for driving the tray open / close motor. It is about 3.85 Vp-p.
   ⇨ If no signal, check +5 V to IC301. If it has any trouble, replace it with a new one.
3) Check if the FFC cable is solidly connected between CN303 and MD.
4) Check the MD.
   ⇨ If the tray motor is sort-circuit or has any trouble, it can not open or close the tray.
   Please check the function after changing another MD.

4-3-3. Service hint (Any picture / Remark)



< Waveform
for driving TRAY open / close motor >



< Signal check point >

ONE POINT REPAIR GUIDE

NO OPERATION OF MD

When no sound output in the CD function, you can not listen to music reading data from a CD disc if the pickup module in MD doesn't work. This step is for checking the LASER TRACKING ACTUATOR.

4-4. LASER TRACKING ACTUATOR

4-4-1. Solution

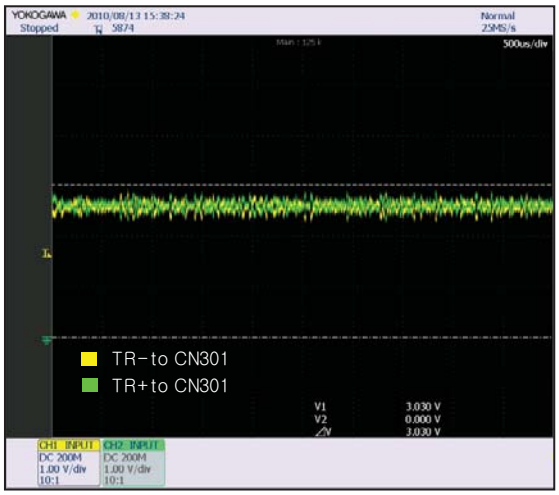
Please check and replace IC301, IC302 on MAIN board.

4-4-2. How to troubleshoot (Countermeasure)

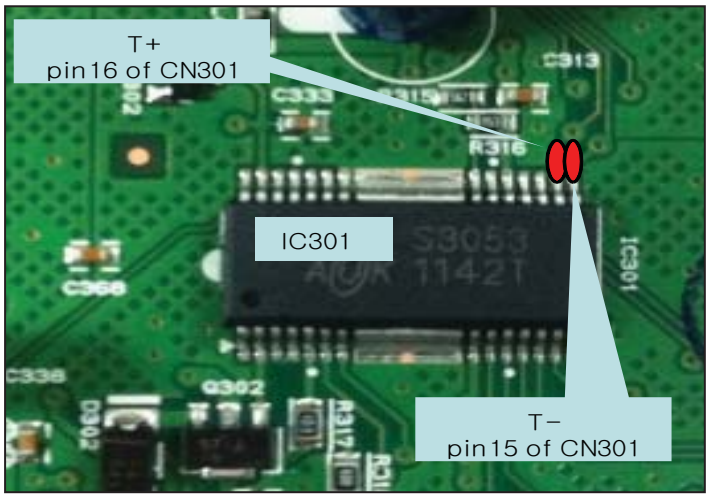
The tracking actuator makes the laser beam be positioned in the center of a track on CD disc.

1) Check the TRD signal from Pin14 of IC302.
   ⇨ If no signal, check 3.3 V(RF) and X301.
2) Check TR- & TR+ from IC301 to CN301 for driving the tracking actuator.
   ⇨ If no signal, check +1.8 V and +5 V for IC301.
3) Check if the FFC cable is solidly connected between CN301 and MD.
4) Check the MD.
   ⇨ If the pickup module has any trouble, it can not move the laser beam on the left or right side.
   Please check the function after changing another MD.

4-4-3. Service hint (Any picture / Remark)



< Waveform of TR±
for driving TRACKING actuator >



< Signal check point >

ONE POINT REPAIR GUIDE

NO OPERATION OF MD

When no sound output in the CD function, you can not listen to music reading data from a CD disc if the pickup module in MD doesn't work. This step is for checking the LASER FOCUSING ACTUATOR.

4-5. LASER FOCUSING ACTUATOR

4-5-1. Solution

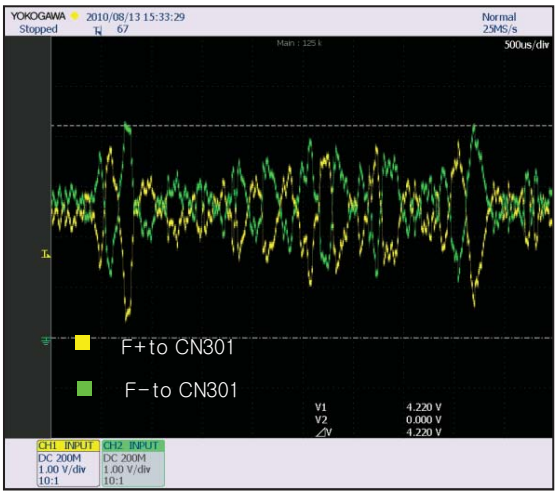
Please check and replace IC301, IC302 on MAIN board.

4-5-2. How to troubleshoot (Countermeasure)

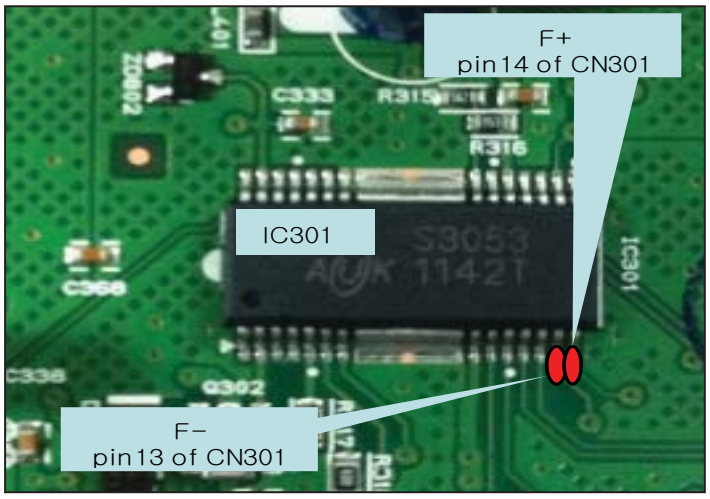
The focusing actuator makes the laser beam keep a regular interval with the surface of a CD disc.

1) Check the FOD signal from Pin13 of IC302.
   ⇨ If no signal, check 3.3 V(RF) and X301.
2) Check F- & F+ from IC301 to CN301 for driving the focusing actuator.
   ⇨ If no signal, check +1.8 V and +5 V for IC301.
3) Check if the FFC cable is solidly connected between CN301 and MD.
4) Check the MD.
   ⇨ If the pickup module has any trouble, it can not move the laser beam on the top or bottom side.
   Please check the function after changing another MD.

4-5-3. Service hint (Any picture / Remark)



< Waveform of TR±
for driving FOCUSING actuator >



< Signal check point >

ONE POINT REPAIR GUIDE

5. NO SOUND

There is no sound output in the CD FUNCTION, repair the set according to the following guide.

5-1. IN THE CD FUNCTION

5-1-1. Solution

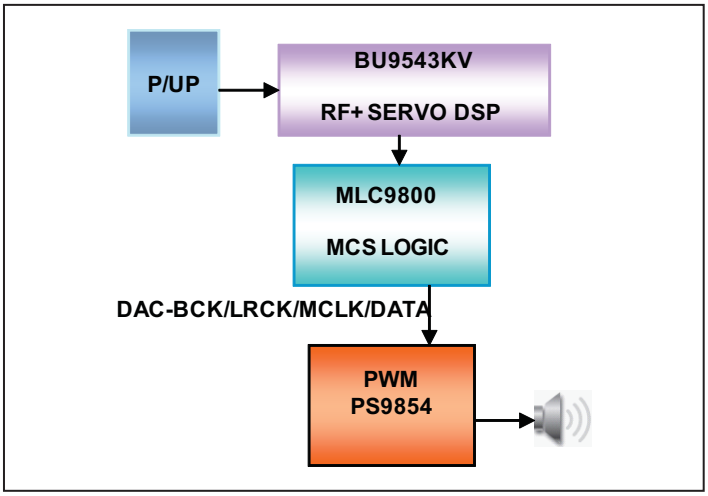
Please check and replace IC601, IC801 on MAIN board.

5-1-2. How to troubleshoot (Countermeasure)

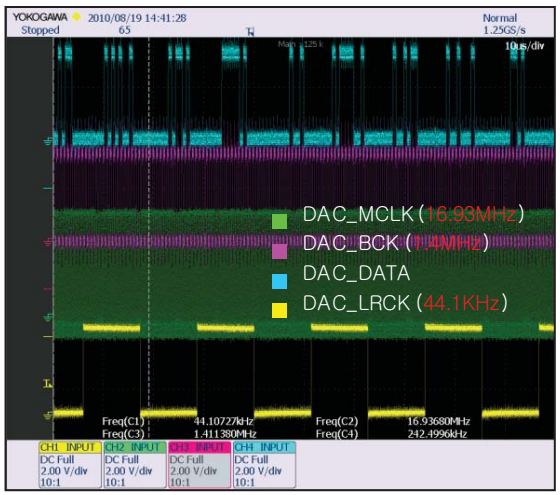
1) Check CD_BCLK, CD_LRCK, & CD_DOUTA signals from IC302 to IC801.
   ⇨ If no signal, check if the RF & servo signals from MD is entered to IC302.
   Refer to the “No operation of MD” guide on Item 4.
2) Check the following I2S signal flow. < I2S audio signal Interface >
   - DAC_BCK: IC801_Pin87 --> IC601_Pin4
   - DAC_LRCK : IC801_Pin88 --> IC601_Pin5 (44.1 kHz)
   - DAC_DATA : IC801_Pin83 --> IC601_Pin6, 9
   - DAC_MCLK : IC801_Pin86 --> IC401_Pin44

   ⇨ If there is any trouble, check the power for each IC. The power is normal but, if the signal waveform to the IC is distorted or no signal, replace it with a new one.
3) Check if “Digital audio AMP block” on Item 5-2 is normal.

5-1-3. Service hint (Any picture / Remark)



< I2S Signal Flow >



< Waveform of I2S audio interface signals >

ONE POINT REPAIR GUIDE

NO SOUND

There is no sound output by DIGITAL AUDIO AMP DAMAGE, repair the set according to the following guide.

5-2. BY DIGITAL AUDIO AMP DAMAGE (IN ALL FUNCTIONS)

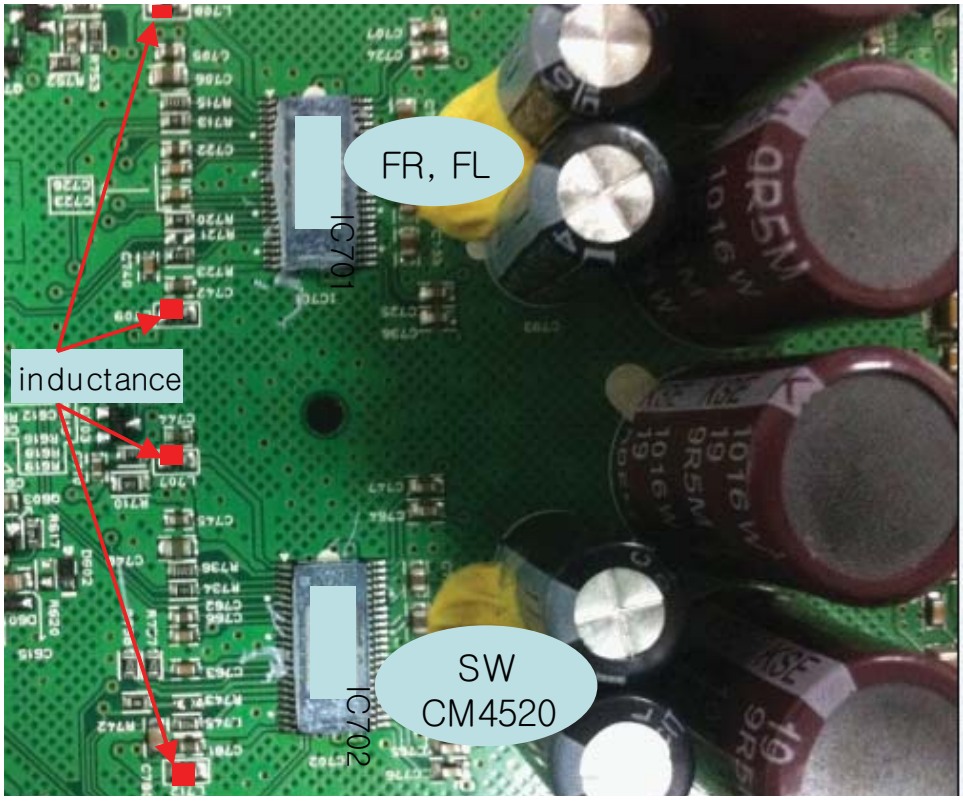
5-2-1. Solution

Please check and replace IC701, IC702(CM4520) on MAIN board.

5-2-2. How to troubleshoot (Countermeasure)

1) Check FL±, FR± & SW± signals from IC601 to IC701 & 702 each input function.
   ⇨ If no signal, check if I2S audio signals are entered to IC601.
   Refer to “I2S audio signal interface” on Item 5-1.
2) Check PVDD.
   ⇨ If PVDD is abnormal, check the SMPS.
3) Check +12 V for driving the gate of AMP IC.
   a. All the powers are normal, but if +12 V is low, there is possible for AMP IC to be damaged.
   b. Remove L707, L708, L709 and L712 one by one.
   When removed a inductance, if +12 V is recovered, the IC connected to it was damaged.
   c. Replace the IC with a new one.
4) Check the impedance between IC701/IC702_OUT-A/OUT-B & GND.
   a. If the impedance is 0 Ω, the IC must be damaged.
   b. After removing the heat sink, replace it with a new one.

5-2-3. Service hint (Any picture / Remark)



< Signal check point >

ONE POINT REPAIR GUIDE

NO SOUND

There is no sound output in the USB FUNCTION, repair the set according to the following guide.

5-3. IN THE USB FUNCTION

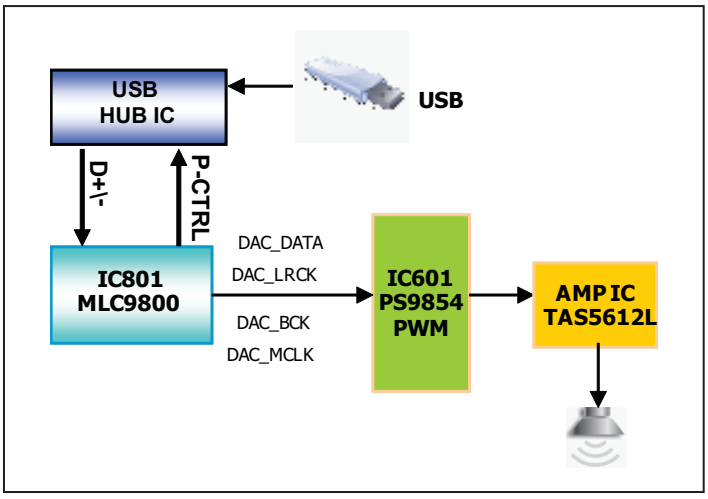
5-3-1. Solution

Please check and replace IC801 on MAIN board & IC502 on USB board.

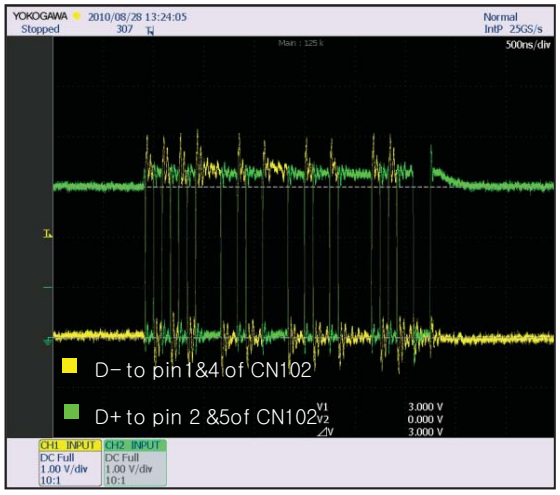
5-3-2. How to troubleshoot (Countermeasure)

1) Check +5VU to USB board.
   ⇨ If the USB LED are turned on, the voltage is okay, if so not, check +5.6 V to pin6 of CN502.
2) Check USB D± from MAIN board to USB board.
   a. Check USB_DN/DP signals to IC801(pin116, 117).
   b. Check USB± signals to CN502 (pin1, 2, 4, 5).
   ⇨ If there is any trouble, check the power for each IC. The power is normal but , if the signal waveform to the IC is distorted or no signal, replace it with a new one.
3) Check if “Digital audio AMP block” on item 5-2 is normal.

5-3-3. Service hint (Any picture / Remark)



< USB function signal flow >



< Waveform of USB D± signal >

ONE POINT REPAIR GUIDE

NO SOUND

There is no sound output in the AUX FUNCTION, repair the set according to the following guide.

5-4. IN THE AUX FUNCTION

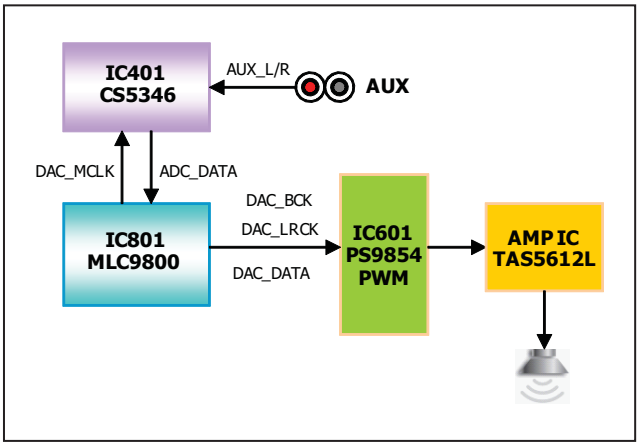
5-4-1. Solution

Please check and replace IC401 on MAIN board.

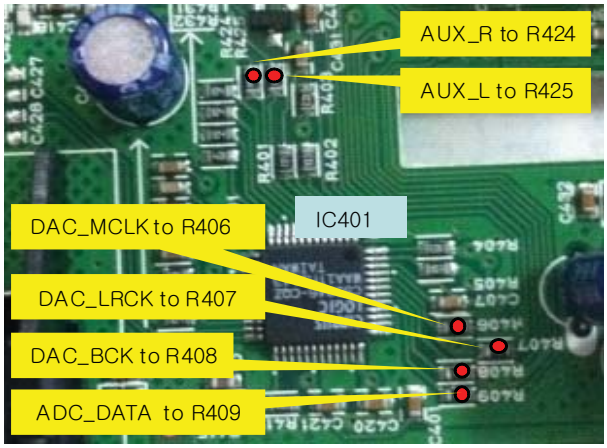
5-4-2. How to troubleshoot (Countermeasure)

1) Check AUX_L/R signals to IC401 (Pin7, 8).
2) Check if DAC_BCK, DAC_LRCK, & DAC_MCLK are entered from IC801 to IC401.
3) Check if ADC_DATA is entered from IC401 to IC801.
   ⇨ If no signal, check +5 V & +3.3 V(ADC) for IC401. If is NG, replace it a new one.
4) Check the following I2S signal flow from IC801 to IC602. (Refer to Item 5-1.)
   ⇨ If there is any trouble, check the power for each IC. The power is normal but, if the signal waveform to the IC is distorted or no signal, replace it with a new one.
5) Check if the digital audio AMP block is okay. Refer to “Digital Audio AMP” guide on Item 5-2.
   ⇨ If AMP is damaged, replace it with a new one.

5-4-3. Service hint (Any picture / Remark)



< AUX function signal flow >



< Signal check point >

ONE POINT REPAIR GUIDE

NO SOUND

There is no sound output in the TUNER FUNCTION, repair the set according to the following guide.

5-5. IN THE TUNER FUNCTION

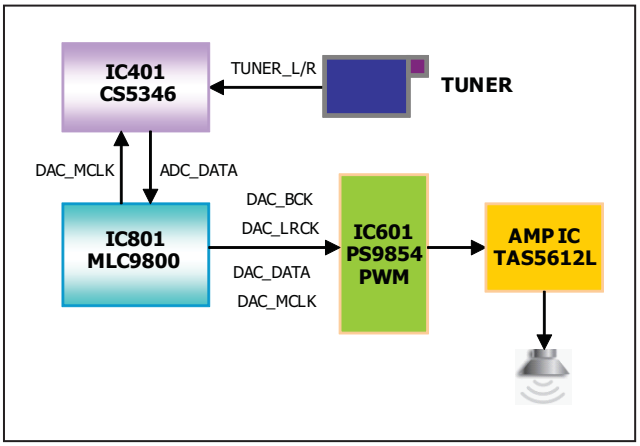
5-5-1. Solution

Please check and replace IC401, TU100 on MAIN board.

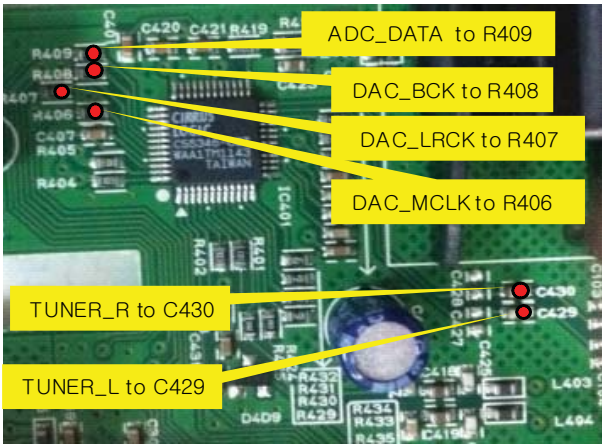
5-5-2. How to troubleshoot (Countermeasure)

1) Check if TUNER_LR is entered from Pin1,3 of TU100 to IC401(Pin23, 24).
   ⇨ If no signals, Check +3.3 V for Tuner power.
   ⇨ Check if the Tuner control signals (CLK, DAT, CE, RST, SLT) are entered from IC102 to TU100. If it doesn't work, replace TUNER with a new one.
2) Check if DAC_BCK, DAC_LRCK, & DAC_MCLK are entered from IC501 to IC401.
3) Check if ADC_DATA is entered from IC401 to IC801.
   ⇨ If no signal, check +5 V & +3.3 V(ADC) for IC401. If is NG, replace it with a new one.
4) Check the following I2S audio signal flow from IC801 to IC601. (Refer to Item 5-1.)
   ⇨ If there is any trouble, check the power for each IC. The power is normal but, if the signal waveform to the IC is distorted or no signal, replace it with a new one.
5) Check if the digital audio AMP block is okay. Refer to "Digital Audio AMP" guide on Item 5-2.
   ⇨ If AMP is damaged, replace it with a new one.

5-5-3. Service hint (Any picture / Remark)



< TUNER IN function signal flow >



< Signal check point >

ONE POINT REPAIR GUIDE

NO SOUND

If set can't read IPOD in the USB function, repair the set according to the following guide.

5-6. IPOD IN THE USB FUNCTION

5-6-1. Solution

Please check and replace IC801, IC806 on MAIN board and IC502 on USB board.

5-6-2. How to troubleshoot (Countermeasure)

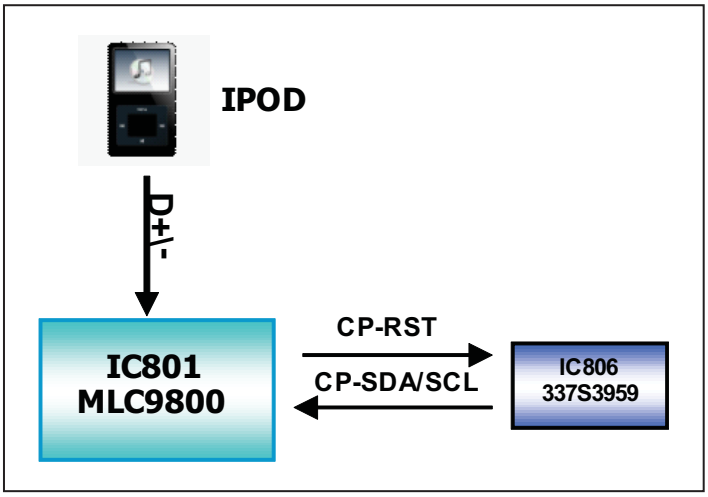
If Set display "NO USB"

1) Check +5VU to USB board.
   ⇨ Check pin 4 of JK502, if voltage NG, check +5.6 V to pin6 of CN502.
2) Check USB D± from main board to USB board.
   Check USB_DN/DP signals to IC801(pin116, 117)
   ⇨ If you can't found any trouble on VCC and USB D+/D- line, replace IC801.

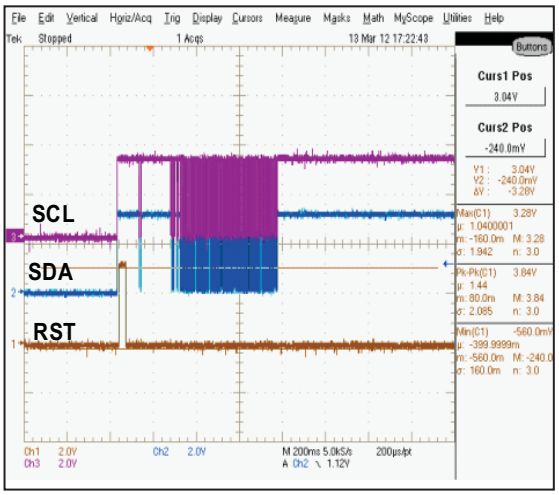
If Set display "Search"continue

1) Check IC806 pin8(VCC), if NG, check IC106 PIN3;
2) Check IC806 pin7(RST), it will become high level after IPOD insert.
3) Check IC806 pin2, 3(SDS, SCL), If haven't signal, first check PCB line, if no problem, replace IC806.
4) If you change IC806, set always NG, replace IC801.

5-6-3. Service hint (Any picture / Remark)



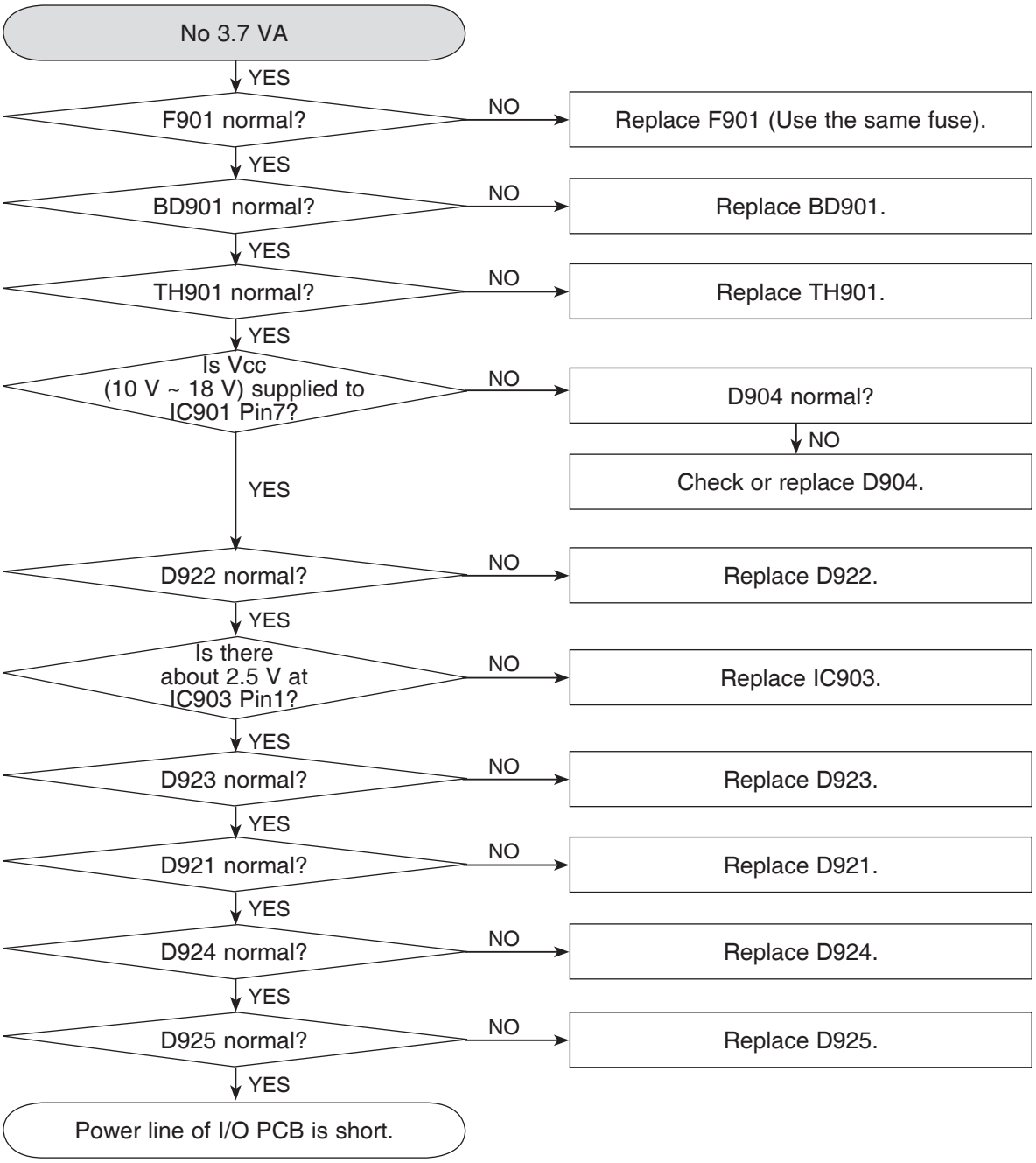
< IPOD function signal flow >



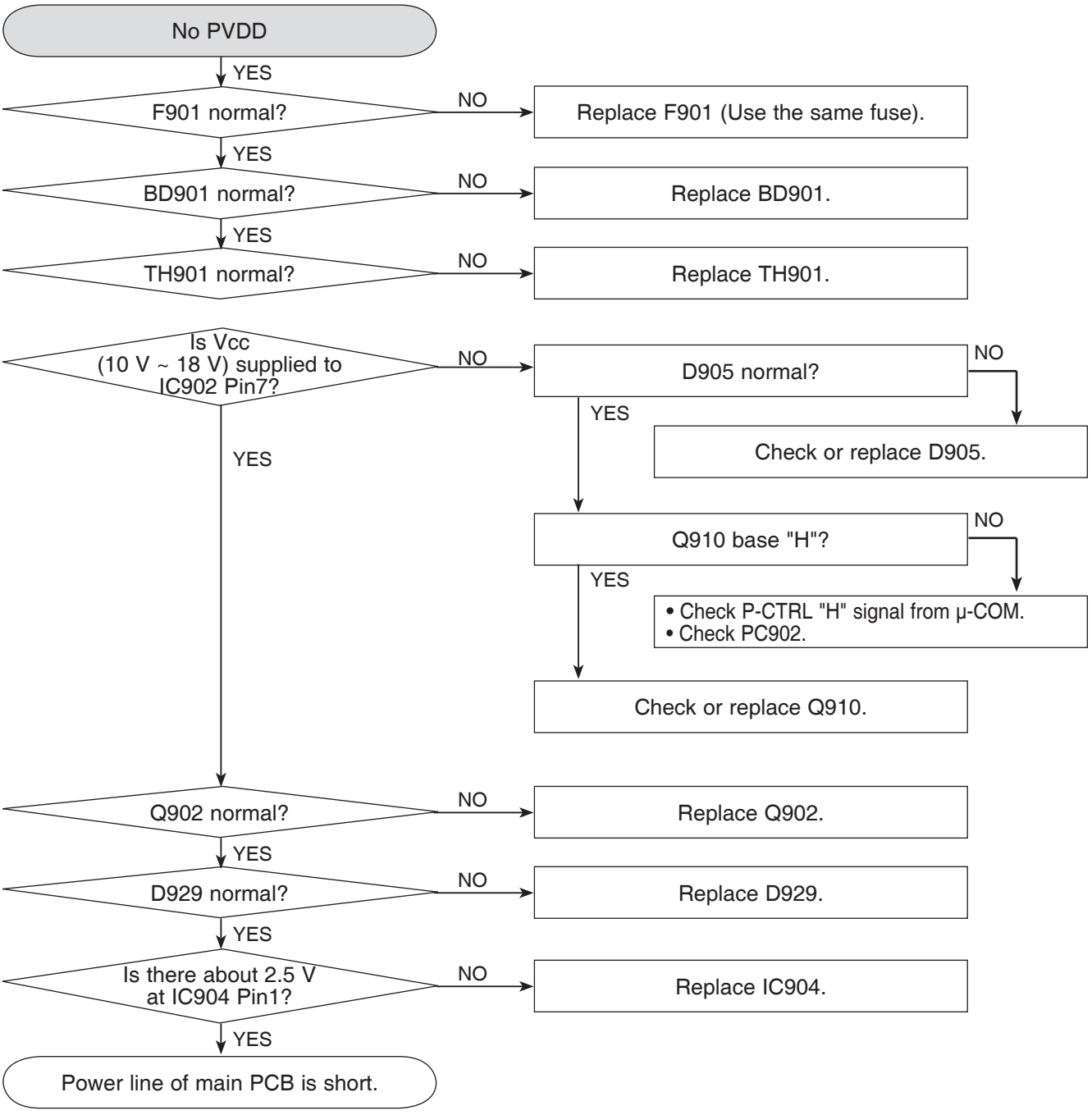
< Waveform of IPOD CHIP IC(IC806) signal >

AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE

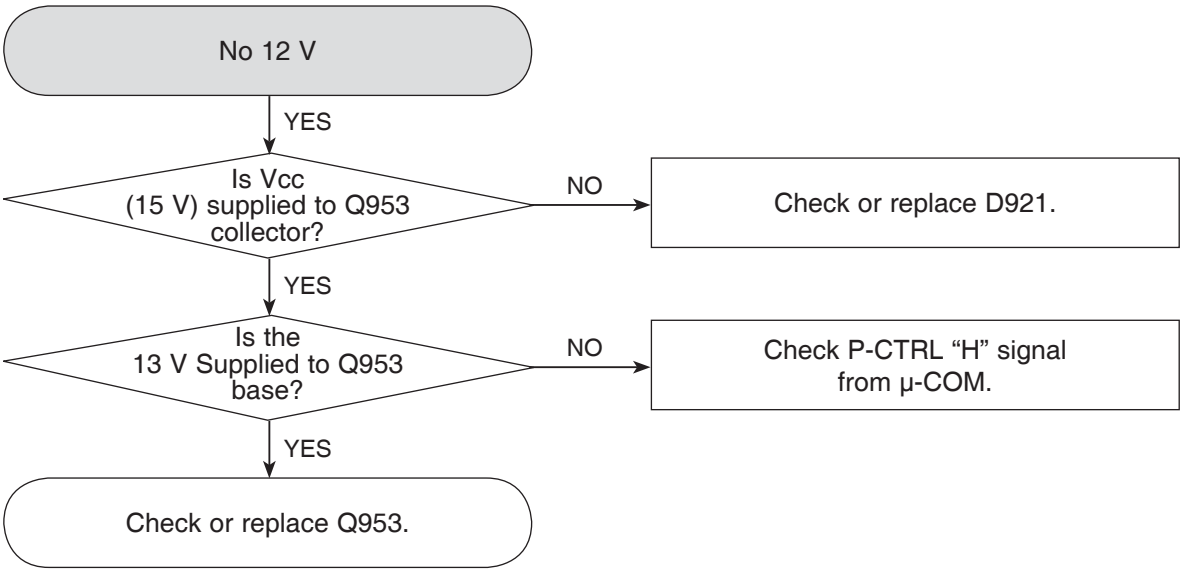
1. POWER (SMPS)

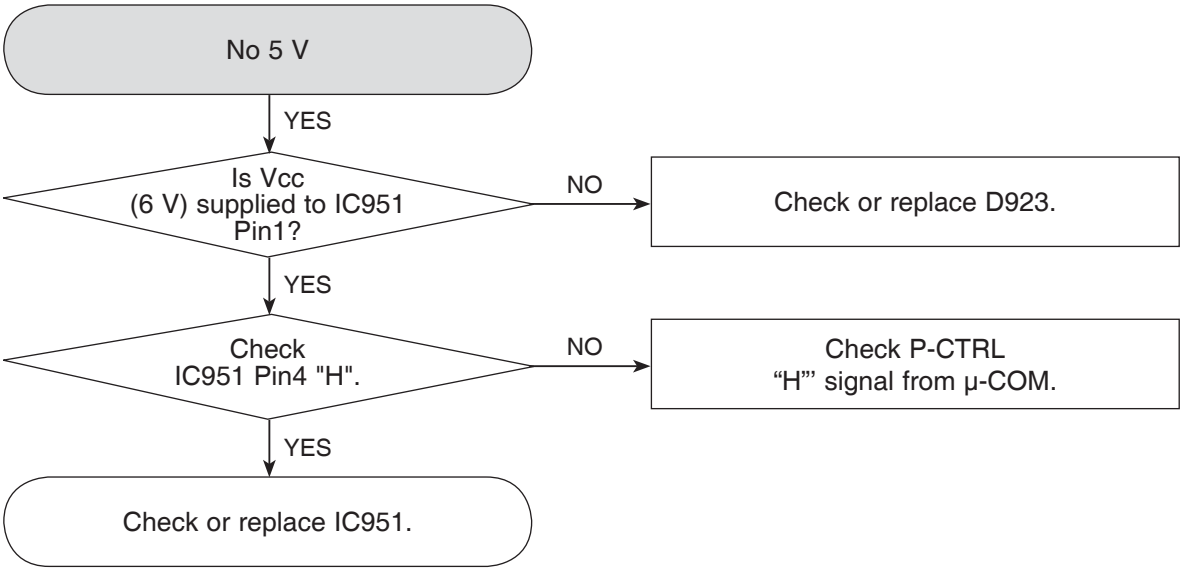


AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE

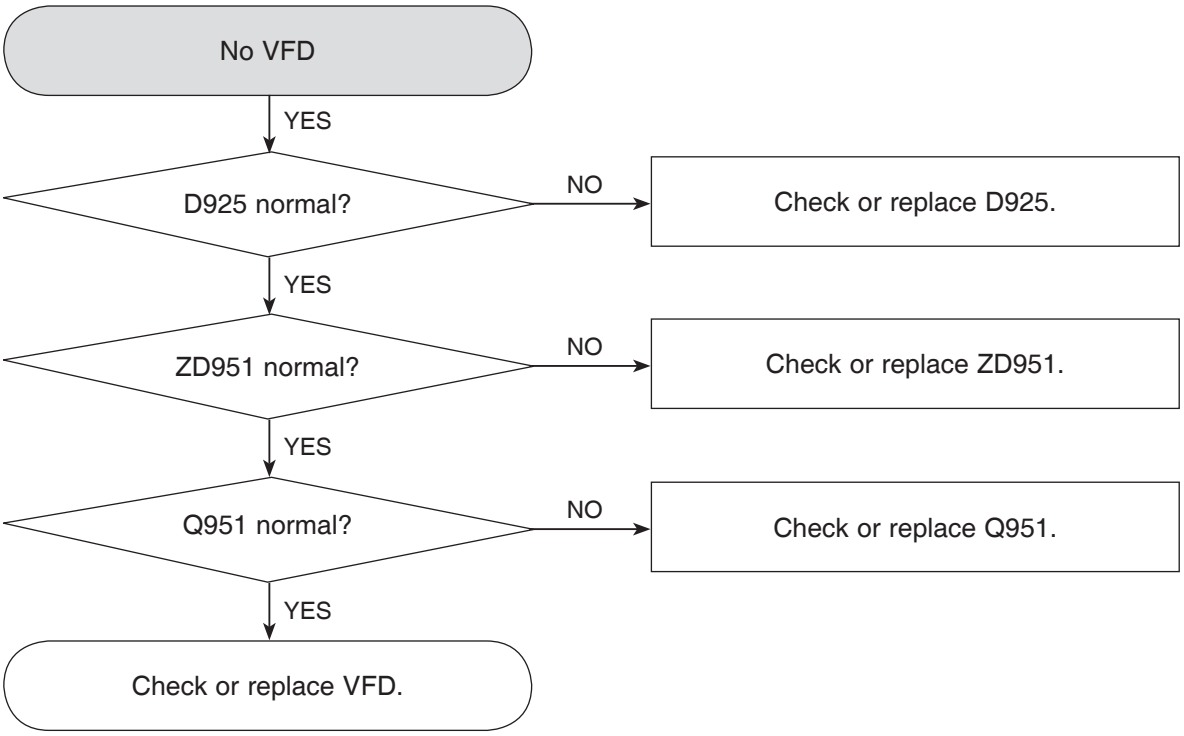


AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE



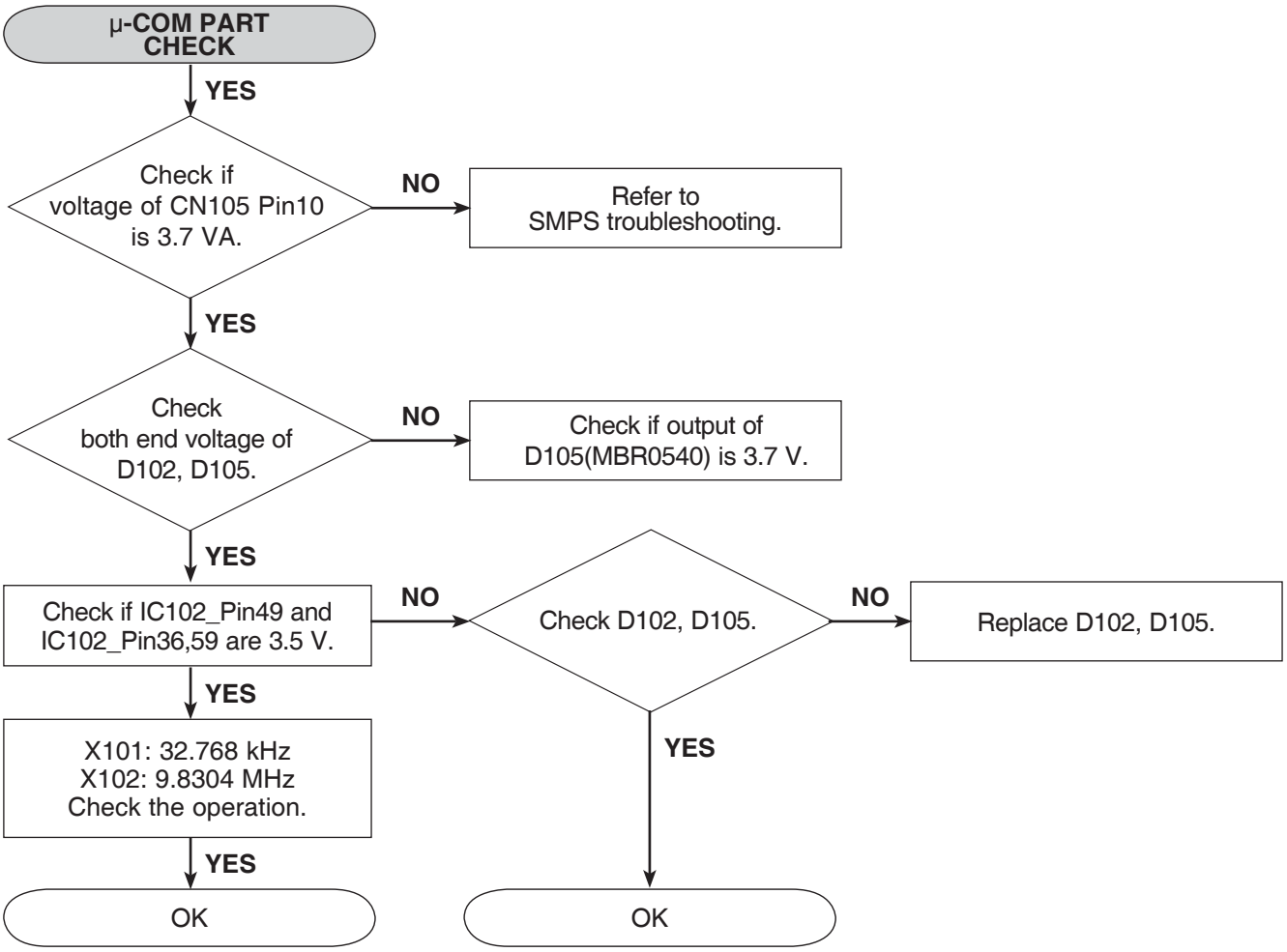


AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE

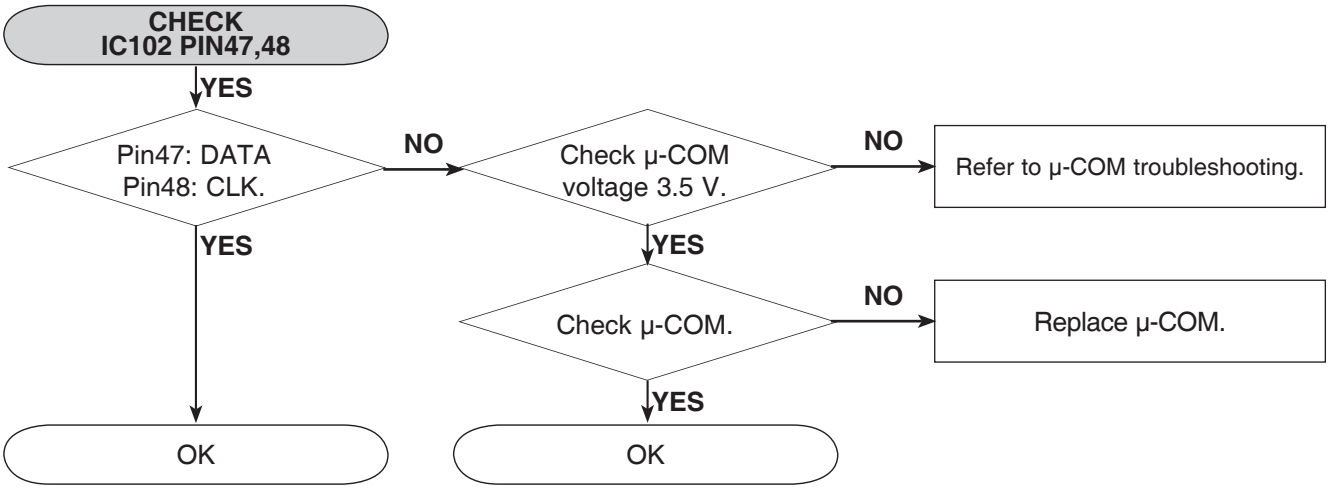


AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE

2. µ-COM PART CHECK

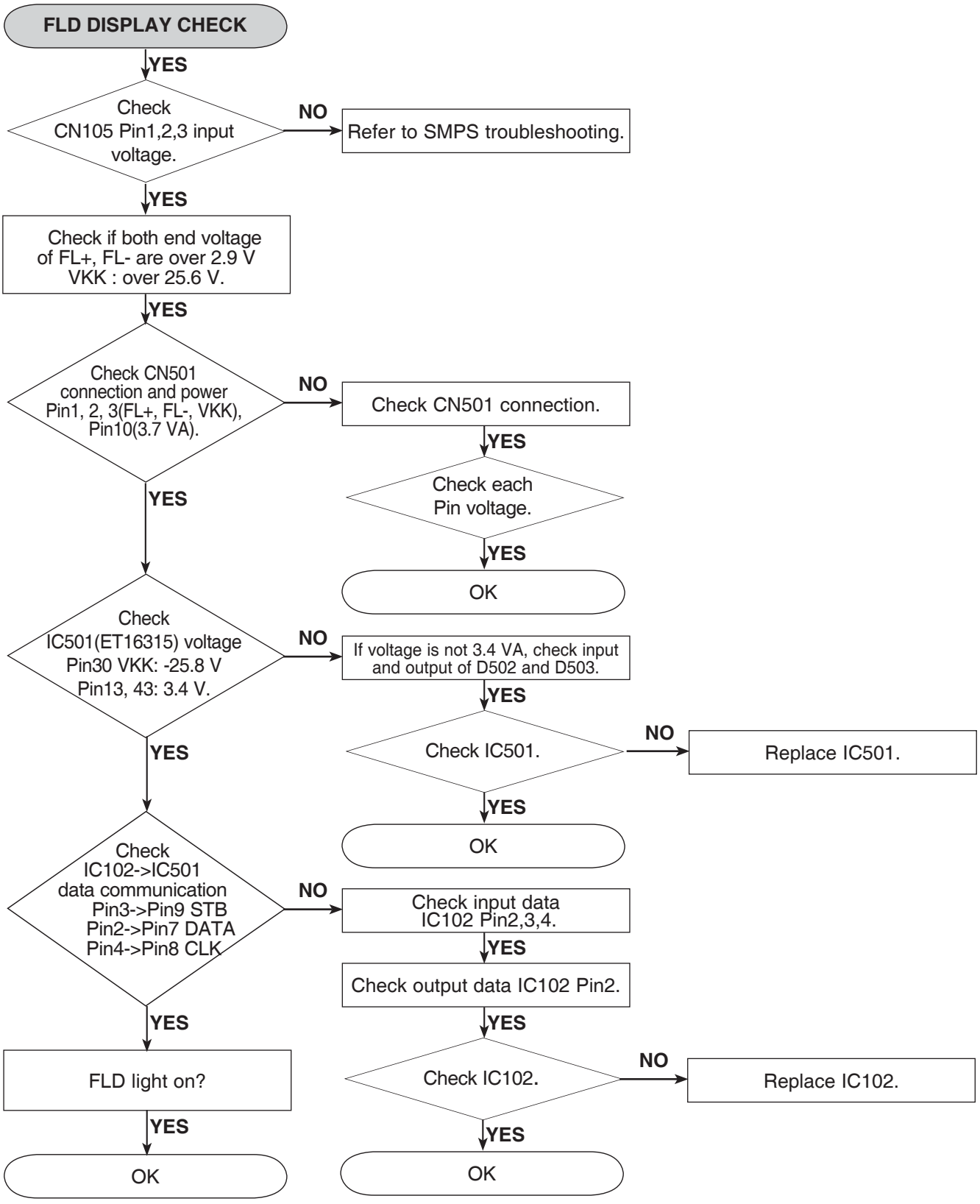


3. IC101(M24C16) CHECK



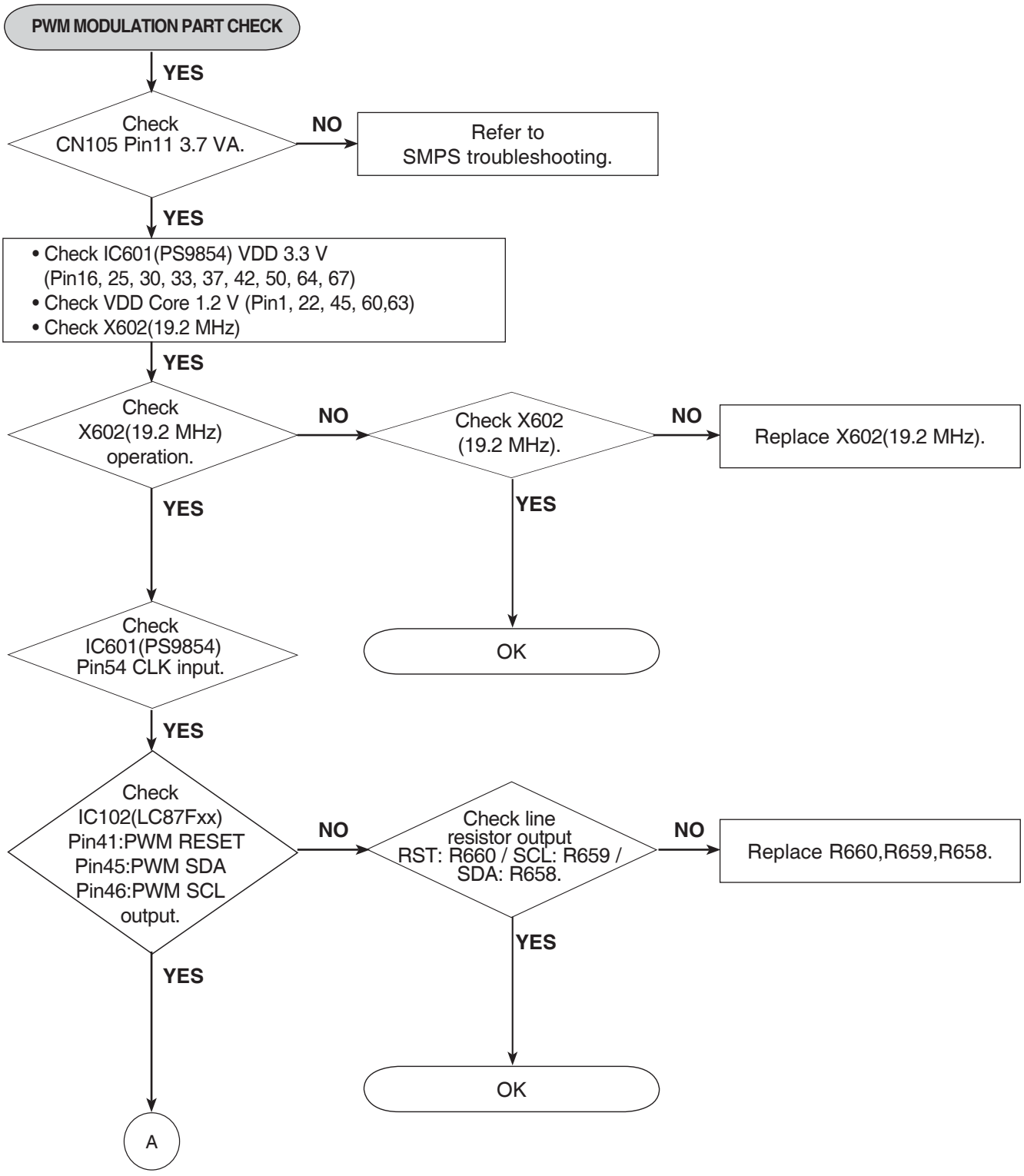
AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE

4. FLD DISPLAY CHECK

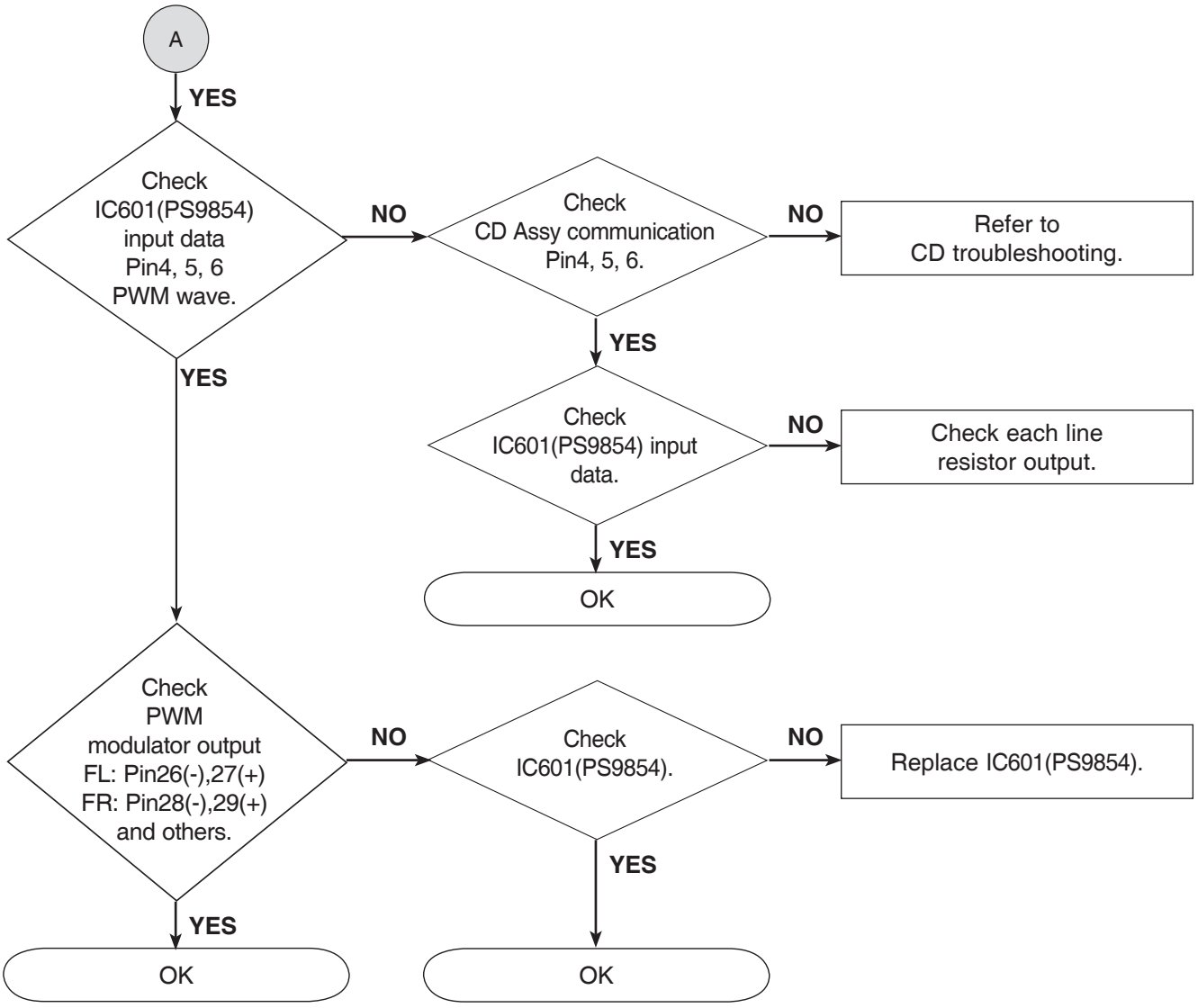


AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE

5. PWM MODULATION CHECK

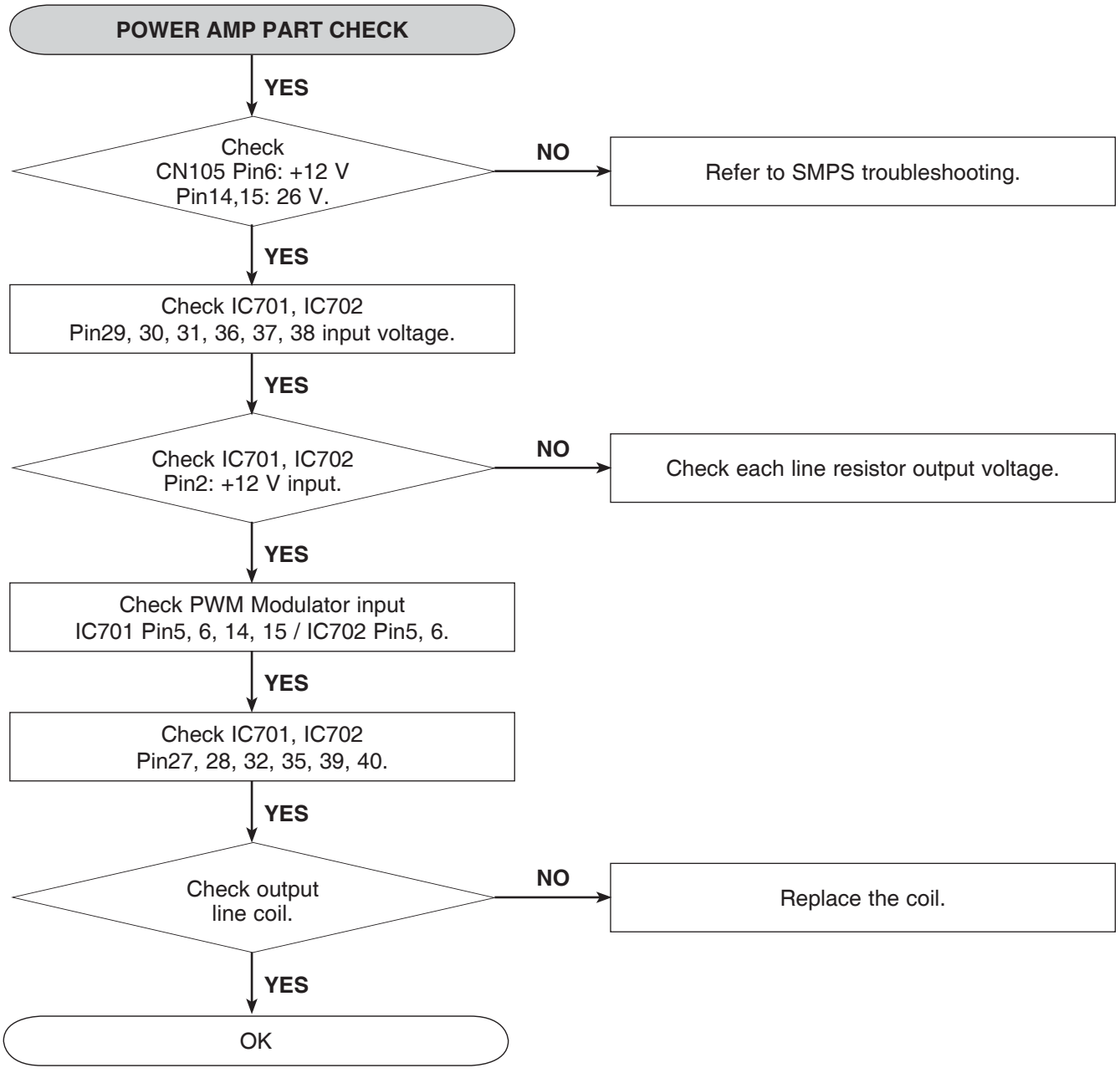


AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE



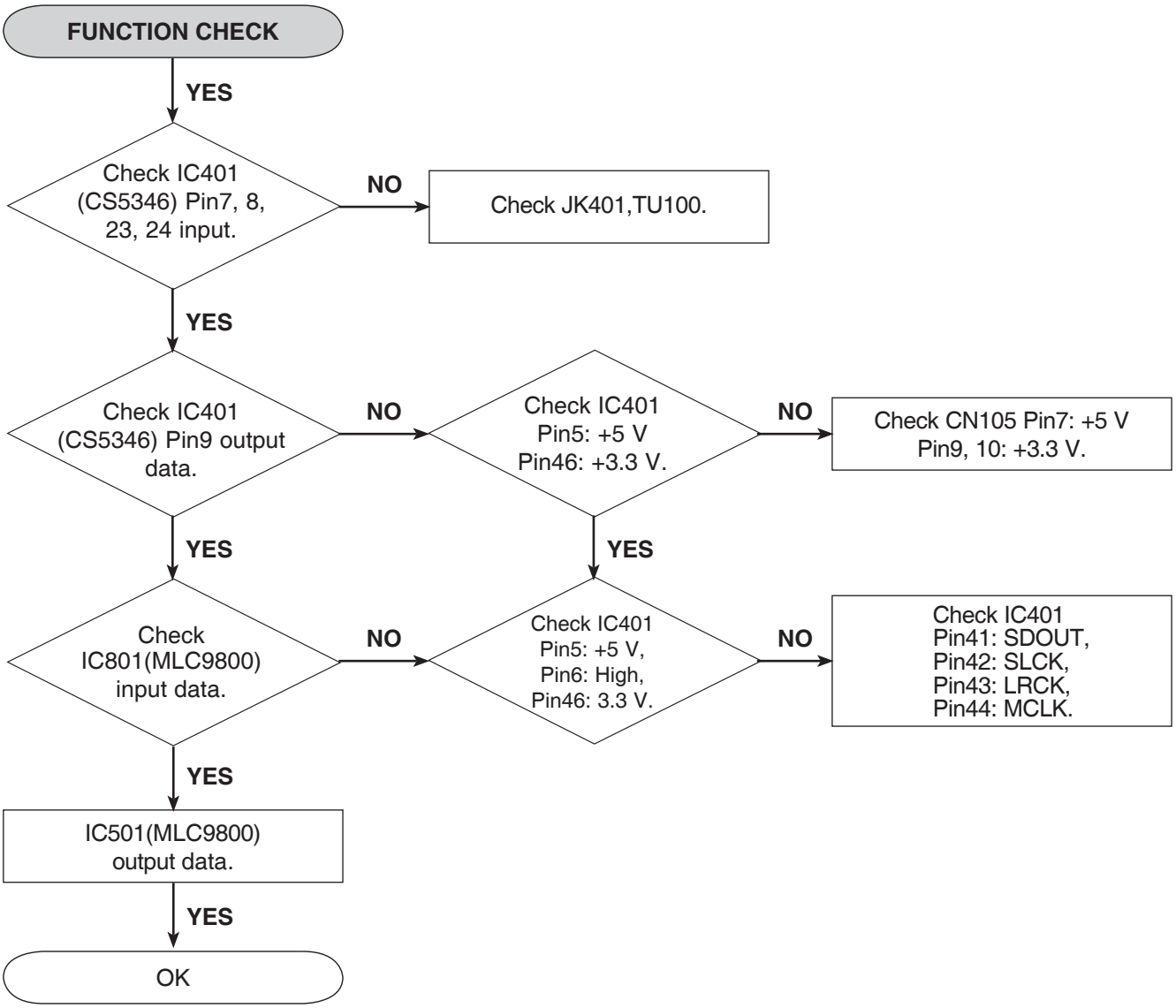
AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE

6. POWER AMP PART CHECK



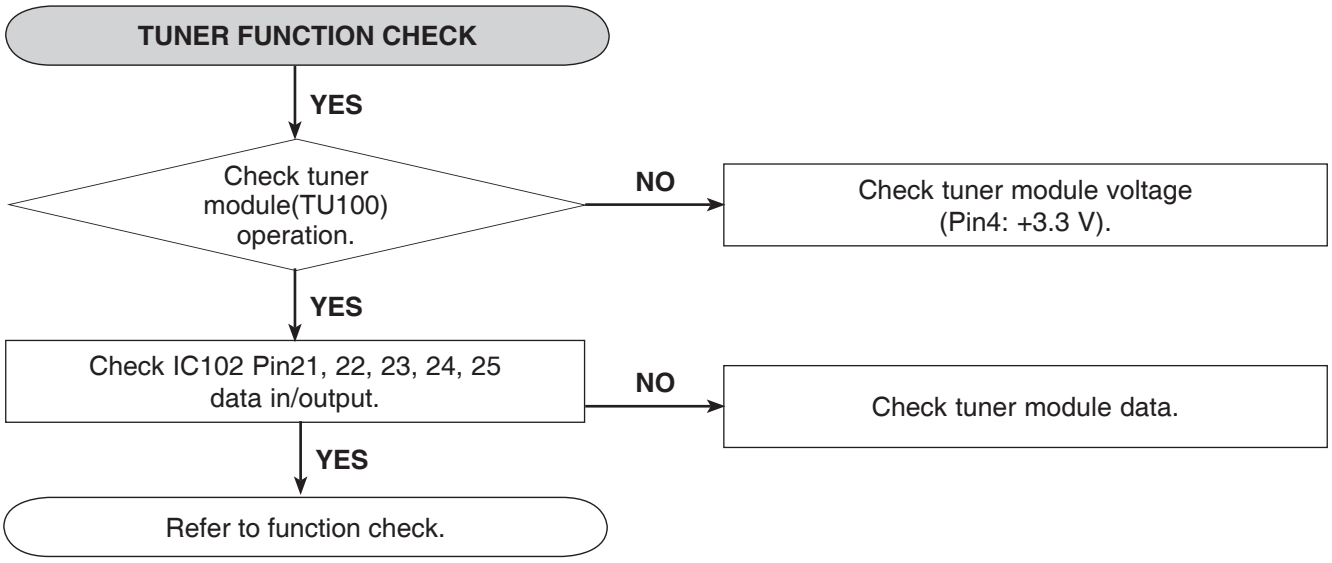
AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE

7. TUNER / AUX FUNCTION CHECK

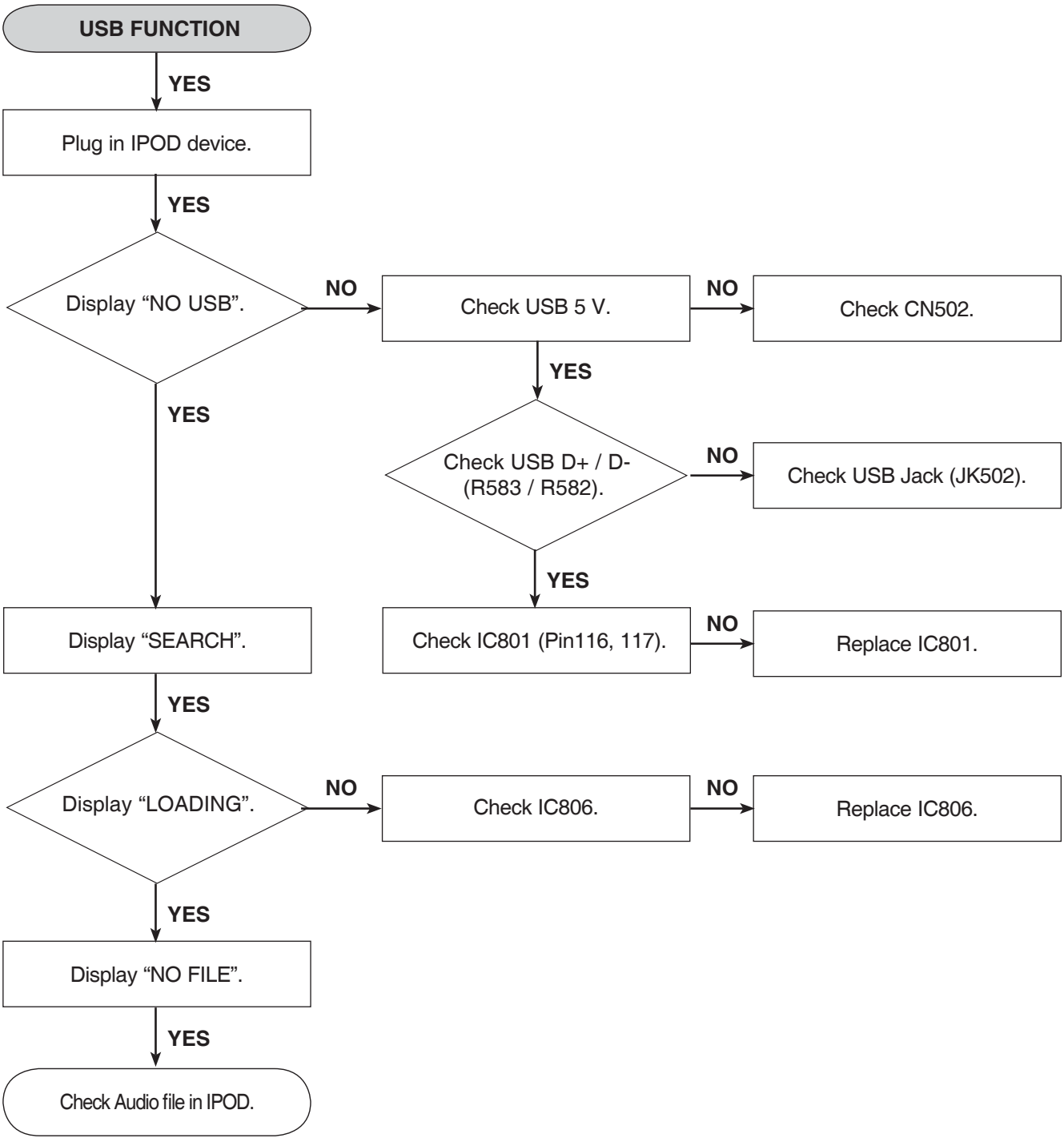


AUDIO ELECTRICAL TROUBLESHOOTIHG GUIDE

8. TUNER FUNCTION CHECK

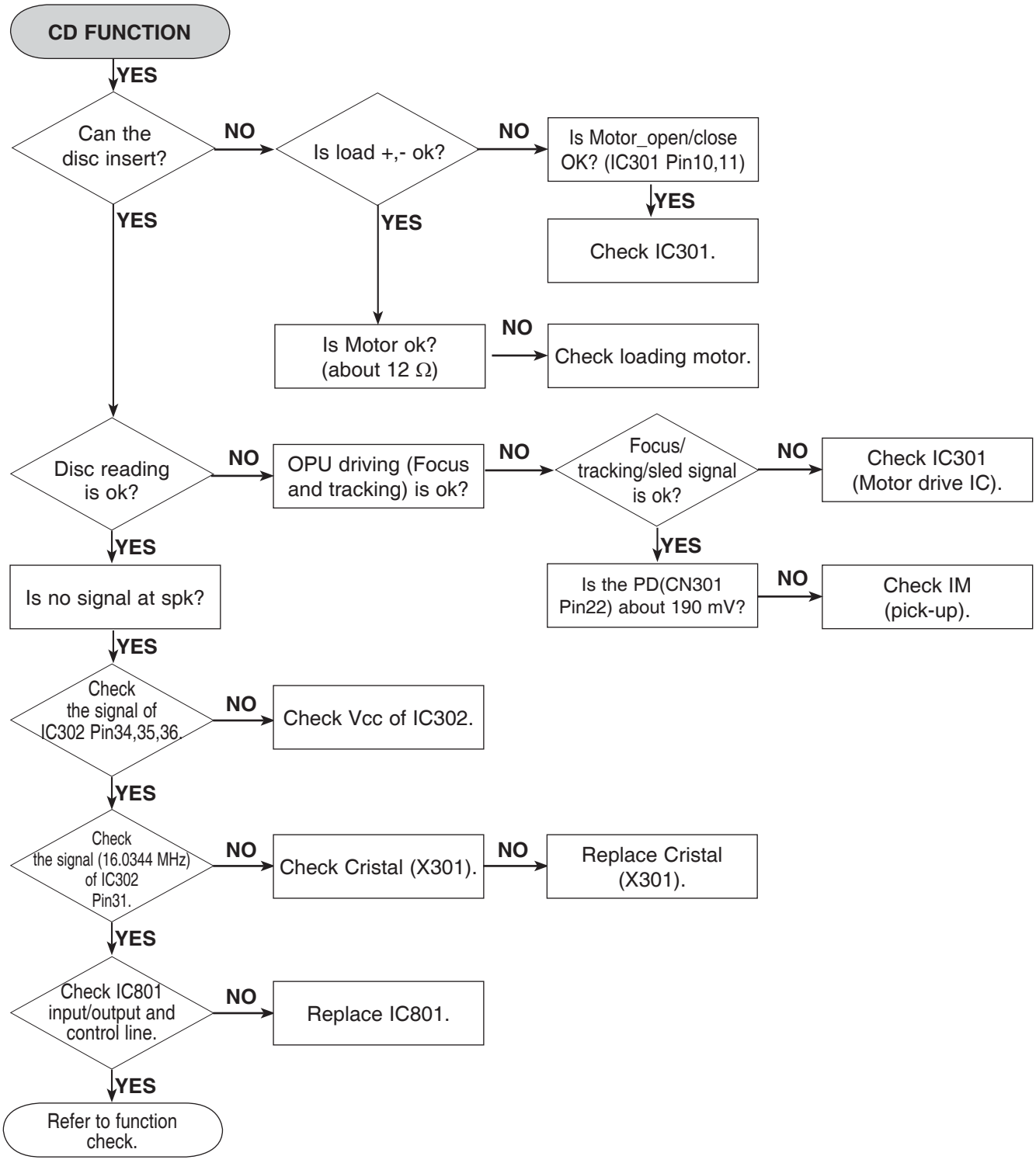


9. IPOD FUNCTION CHECK



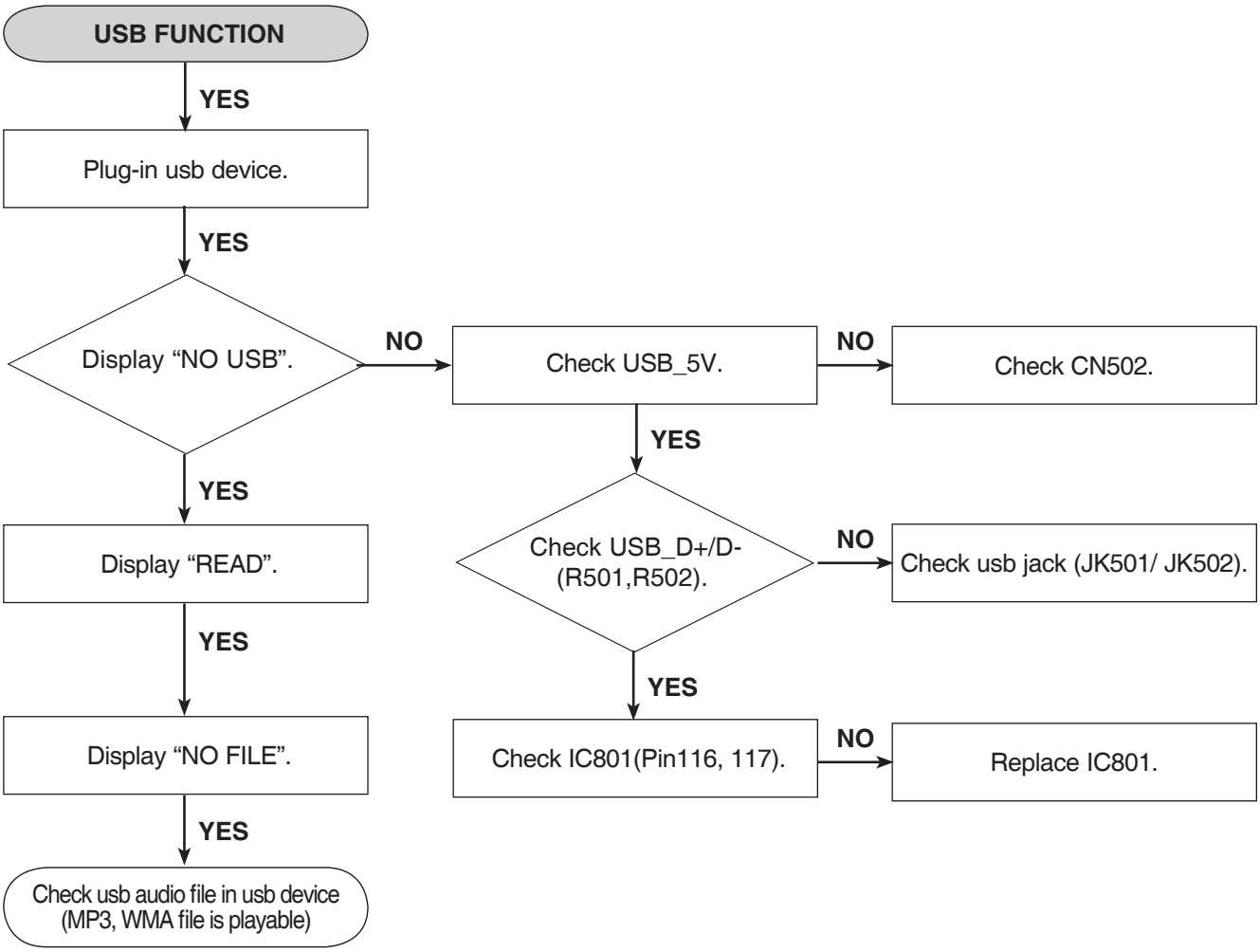
CDP ELECTRICAL TROUBLESHOOTIHG GUIDE

1. CD FUNCTION



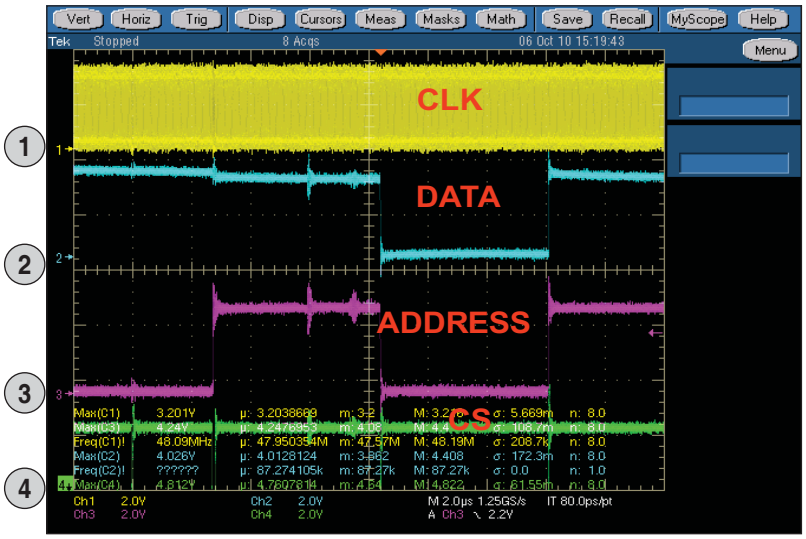
CDP ELECTRICAL TROUBLESHOOTIHG GUIDE

2. DOUBLE USB FUNCTION



WAVEFORMS

1. SDRAM



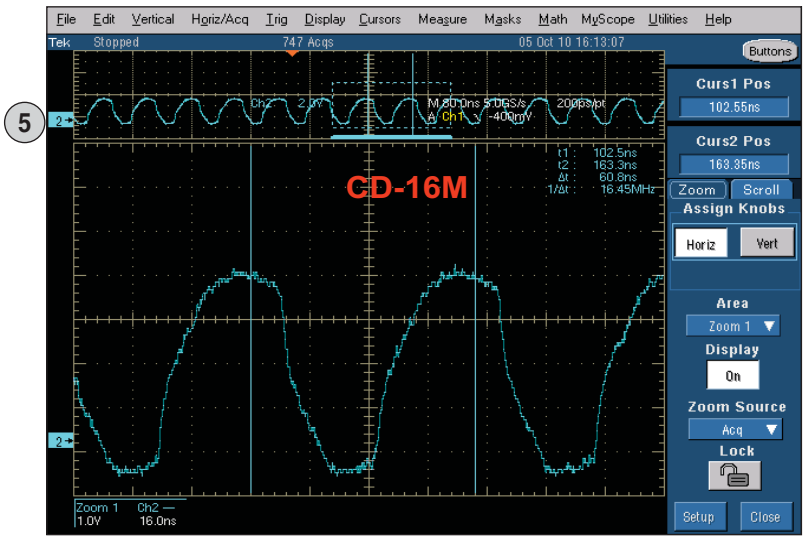
IC802 Pin38

IC802 Pin53

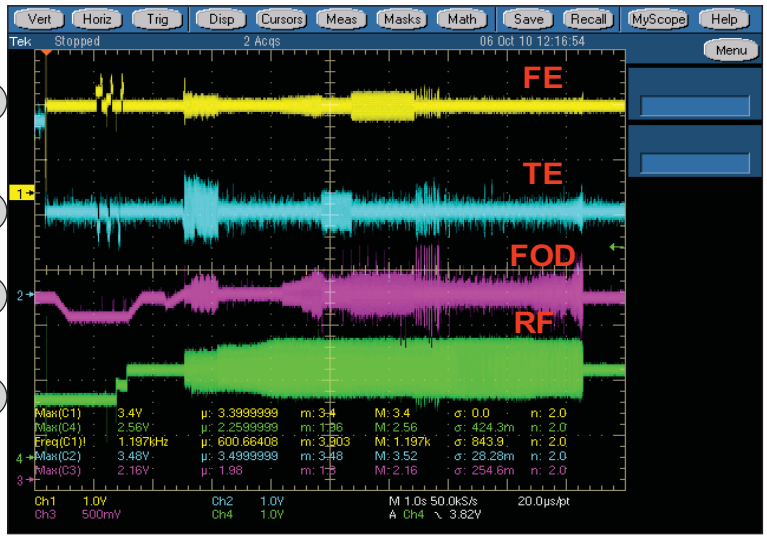
IC802 Pin35

IC803 Pin1

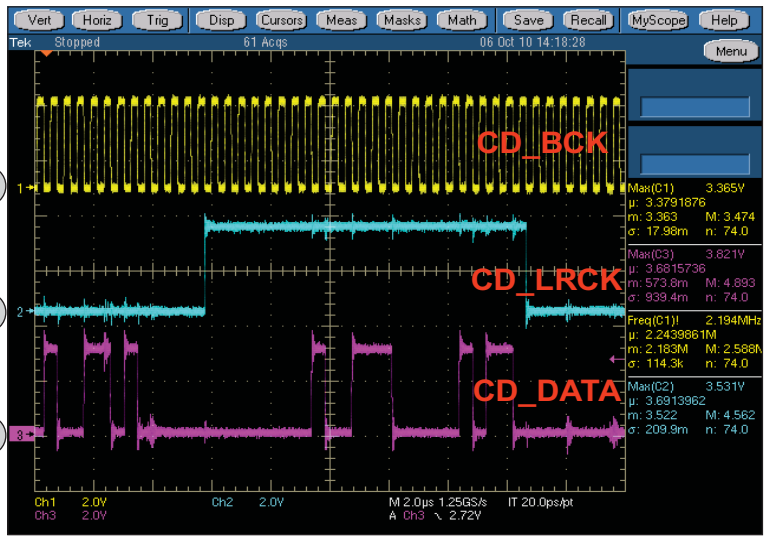
2. SERVO

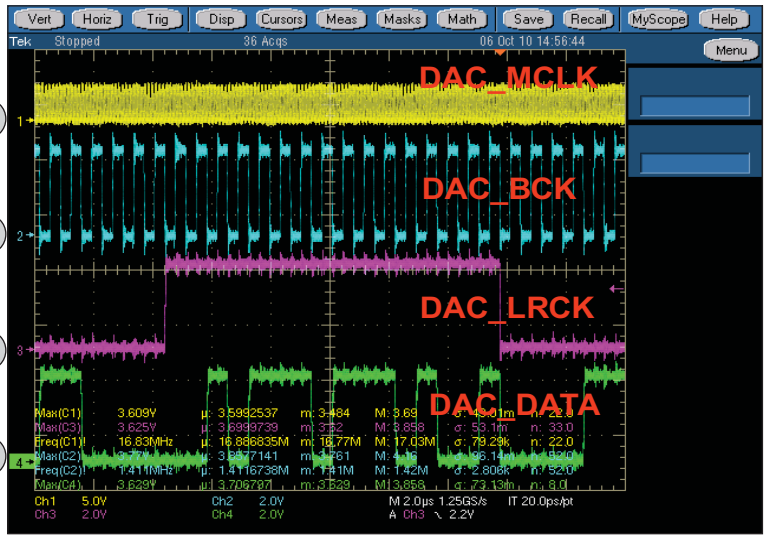


IC801 Pin63



3. AUDIO PATH





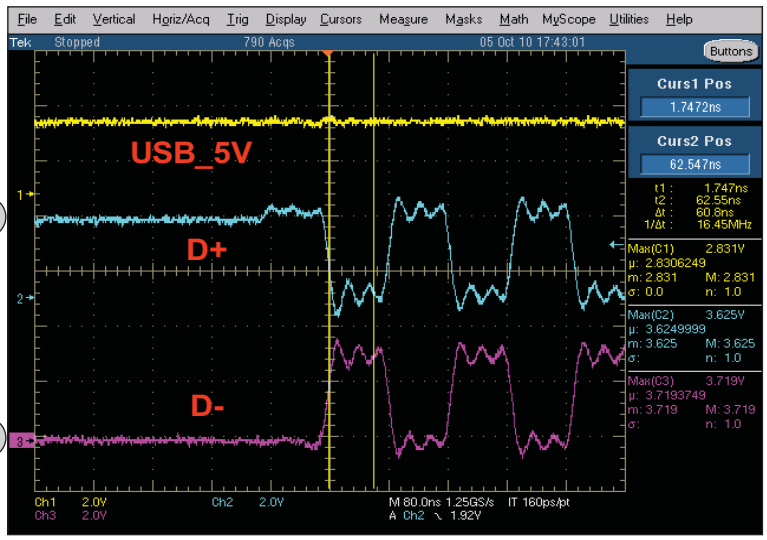
IC801 Pin86

IC801 Pin87

IC801 Pin88

IC801 Pin83

4. USB

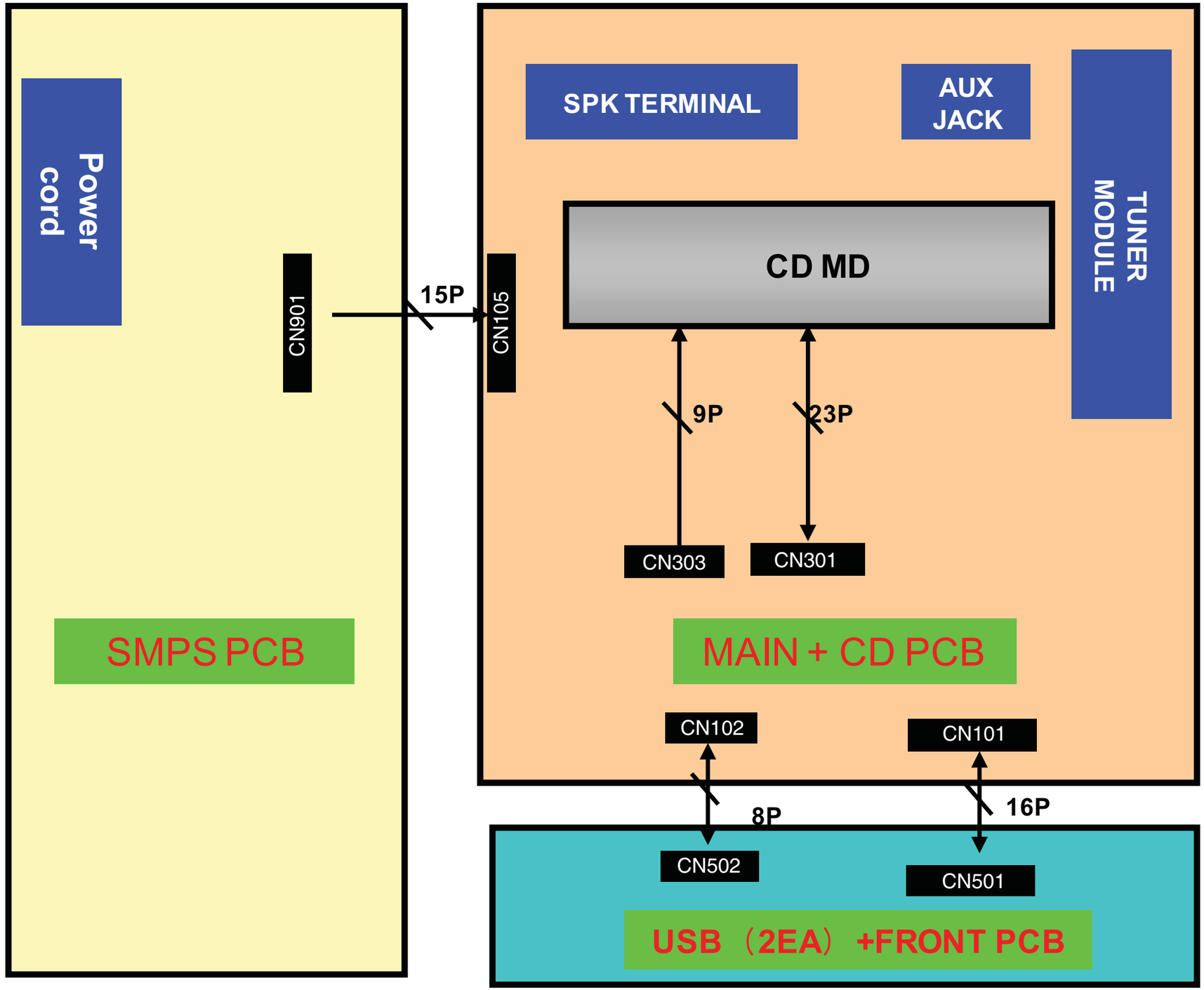


IC801 Pin116

IC801 Pin117

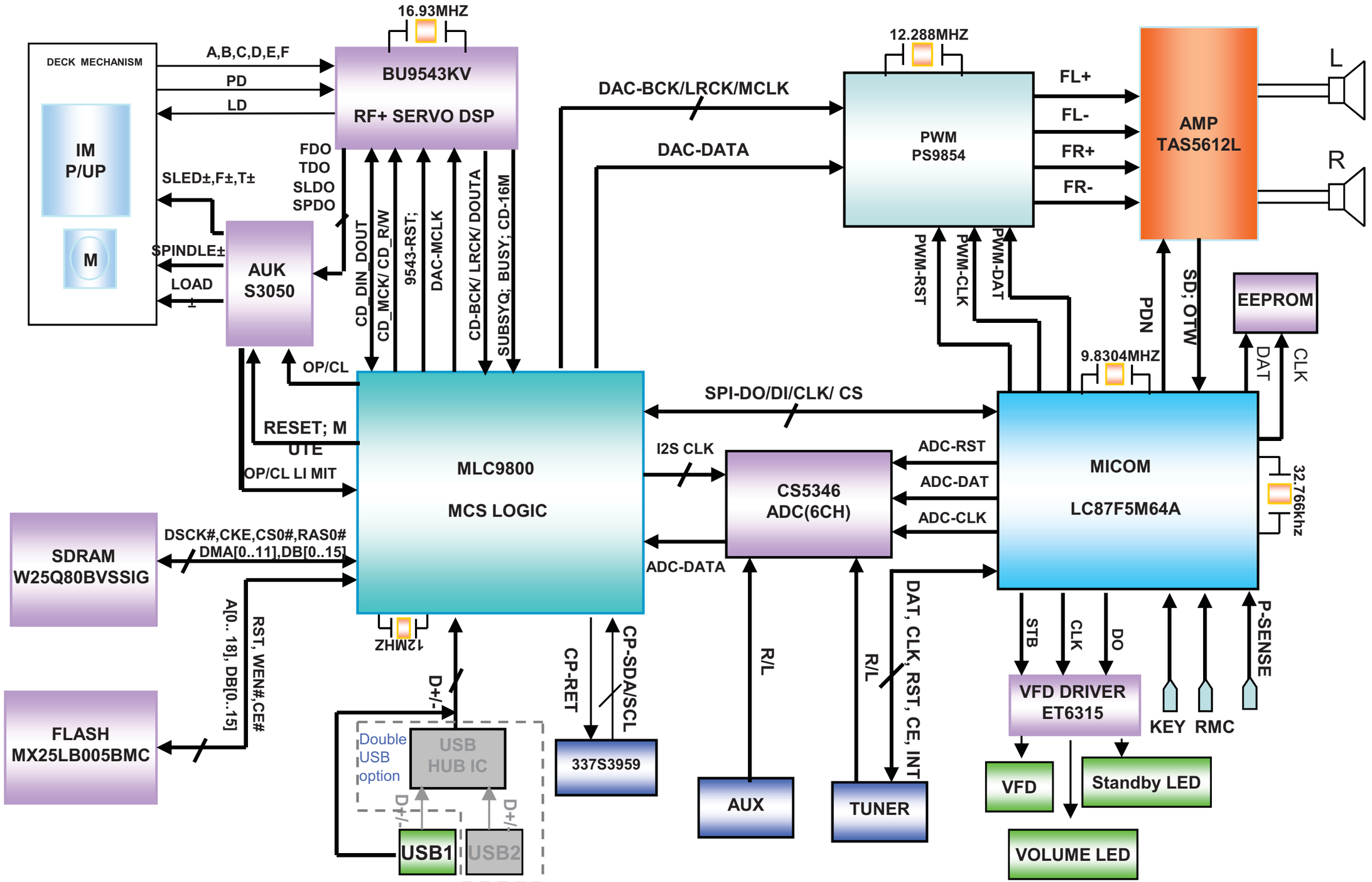
MEMO

WIRING DIAGRAM

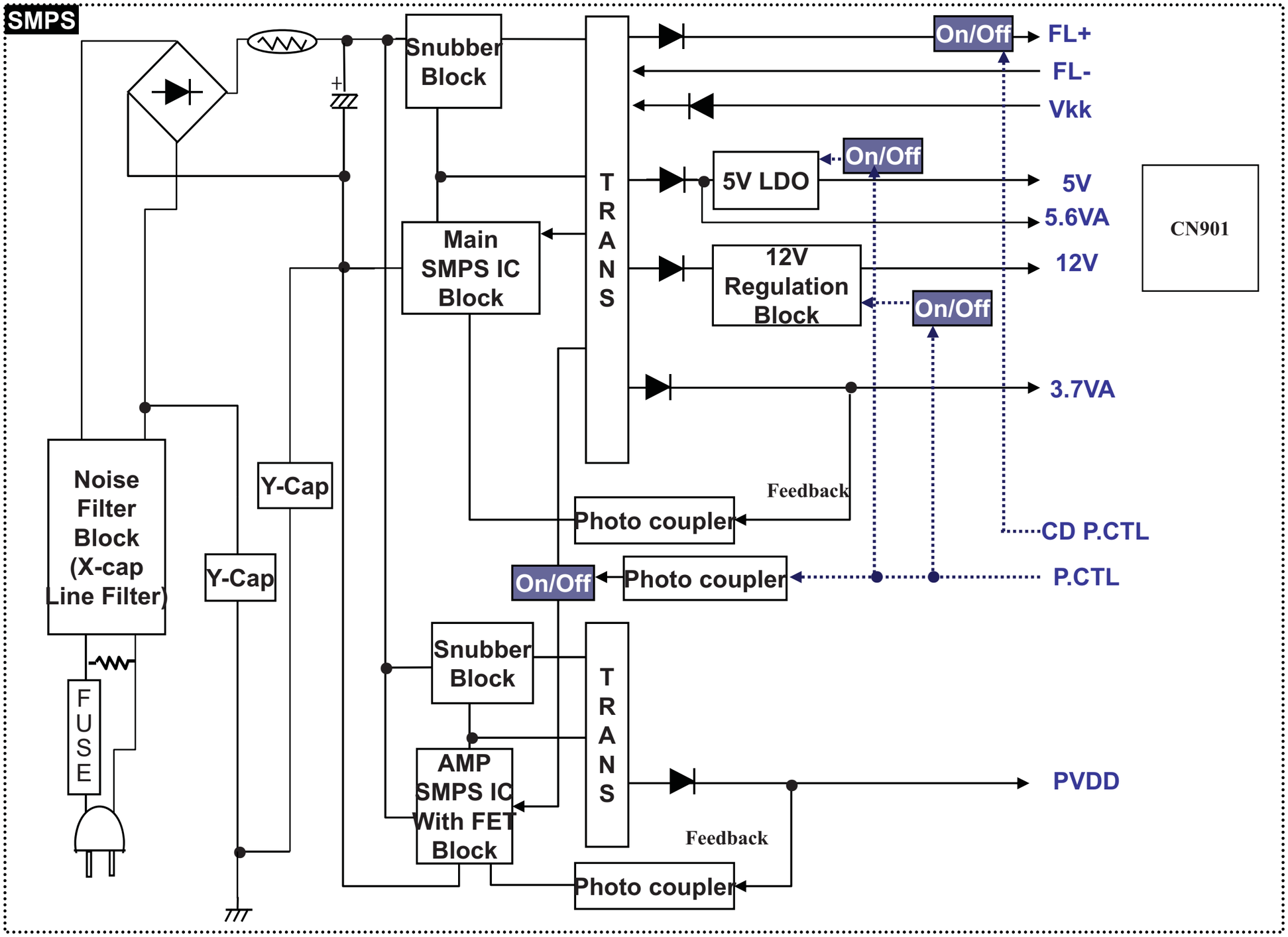


BLOCK DIAGRAMS

1. OVERALL BLOCK DIAGRAM



2. SMPS BLOCK DIAGRAM



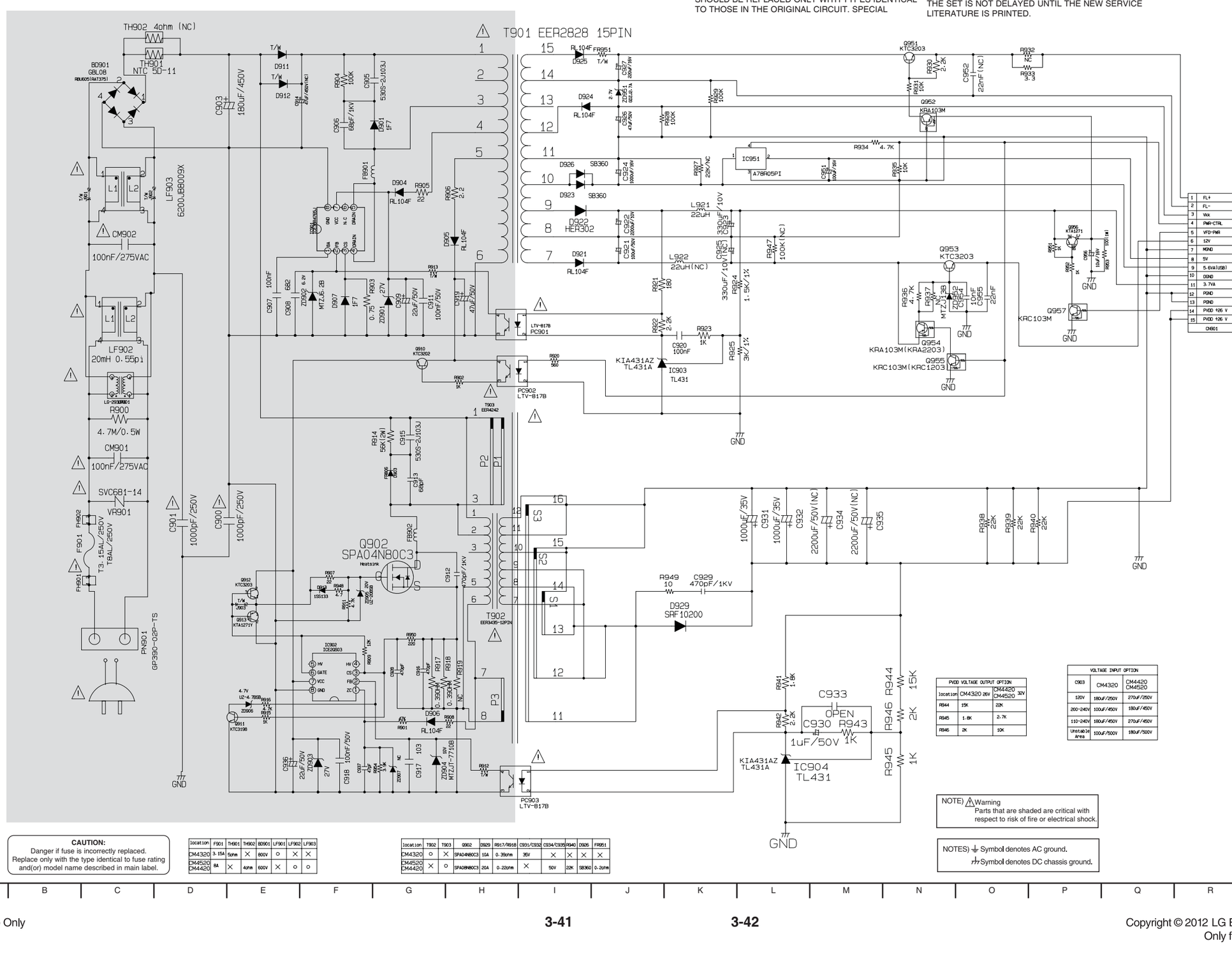
CIRCUIT DIAGRAMS

1. SMPS CIRCUIT DIAGRAM

IMPORTANT SAFETY NOTICE

WHEN SERVICING THIS CHASSIS, UNDER NO CIRCUMSTANCES SHOULD THE ORIGINAL DESIGN BE MODIFIED OR ALTERED WITHOUT PERMISSION FROM THE LG CORPORATION. ALL COMPONENTS SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL CIRCUIT. SPECIAL COMPONENTS ARE SHADED ON THE SCHEMATIC FOR EASY IDENTIFICATION.
THIS CIRCUIT DIAGRAM MAY OCCASIONALLY DIFFER FROM THE ACTUAL CIRCUIT USED. THIS WAY, IMPLEMENTATION OF THE LATEST SAFETY AND PERFORMANCE IMPROVEMENT CHANGES INTO THE SET IS NOT DELAYED UNTIL THE NEW SERVICE LITERATURE IS PRINTED.

NOTE :
1. Shaded( ) parts are critical for safety. Replace only with specified part number.
2. Voltages are DC-measured with a digital voltmeter during Play mode.



location	F901	TH901	TH902	BD901	LF901	LF902	LF903
CM4320	3.15A	5ohm	X	800V	O	X	X
CM4520 CM4420	8A	X	4ohm	600V	X	O	O

location	T902	T903	Q902	D929	R917/R918	C931/C932	C934/C935	R940	R938	D926	FR951
CM4320	O	X	SPA04N80C3	10A	0.39ohm	35V	X	X	X	X	X
CM4520 CM4420	X	O	SPA08N80C3	20A	0.22ohm	X	50V	22K	5B360	0.2ohm	

P-VDD VOLTAGE OUTPUT OPTION			
location	CM4320 26V	CM4420 CM4520	32V
R944	15K	22K	
R945	1.8K	2.7K	
R946	2K	10K	

VOLTAGE INPUT OPTION		
C903	CM4320	CM4420 CM4520
120V	180uF/250V	270uF/250V
200~240V	100uF/450V	180uF/450V
110~240V	180uF/450V	270uF/450V
Unstable Area	100uF/500V	180uF/500V

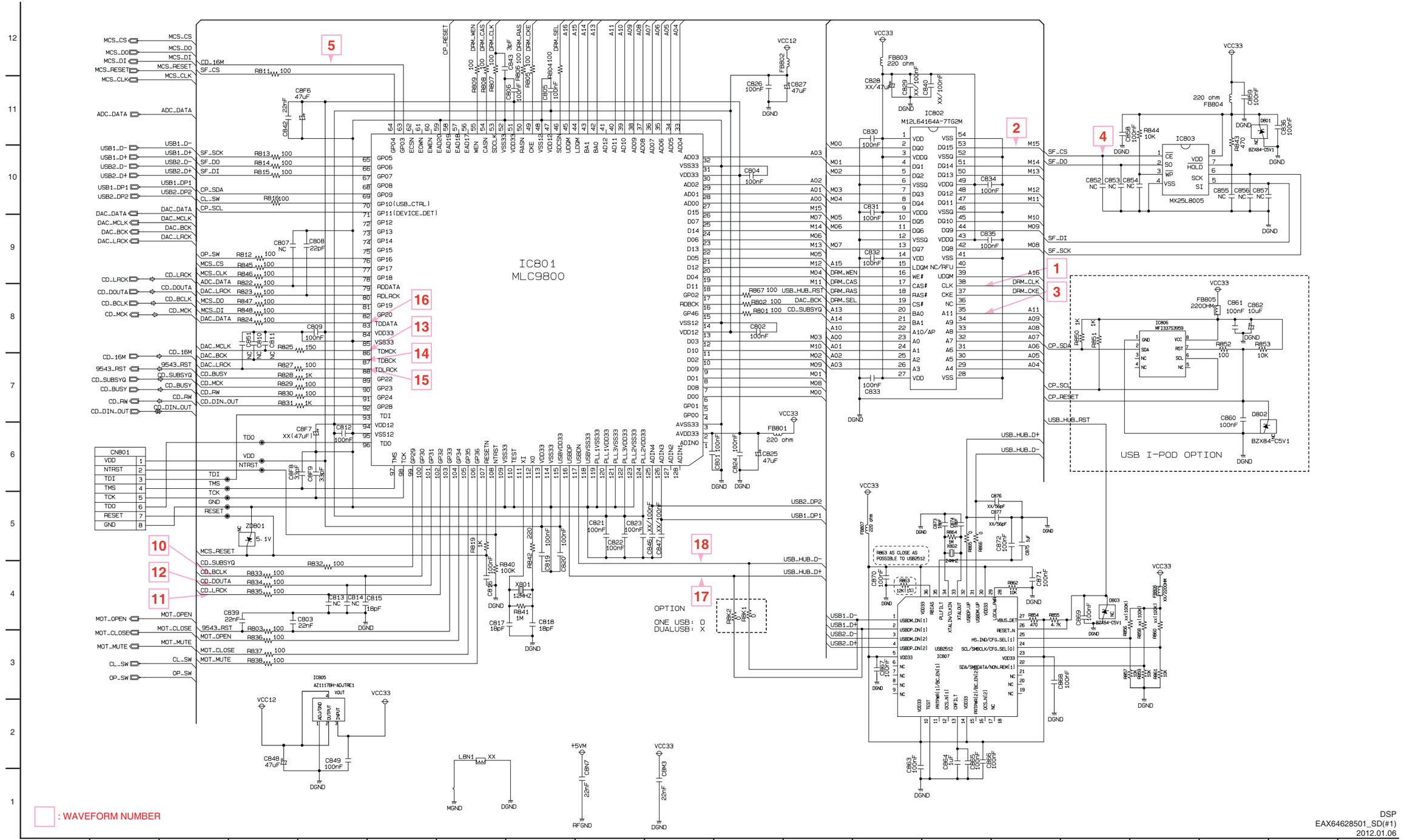
NOTE) ⚠ Warning
Parts that are shaded are critical with respect to risk of fire or electrical shock.

NOTES) ⏚ Symbol denotes AC ground.
⏚ Symbol denotes DC chassis ground.

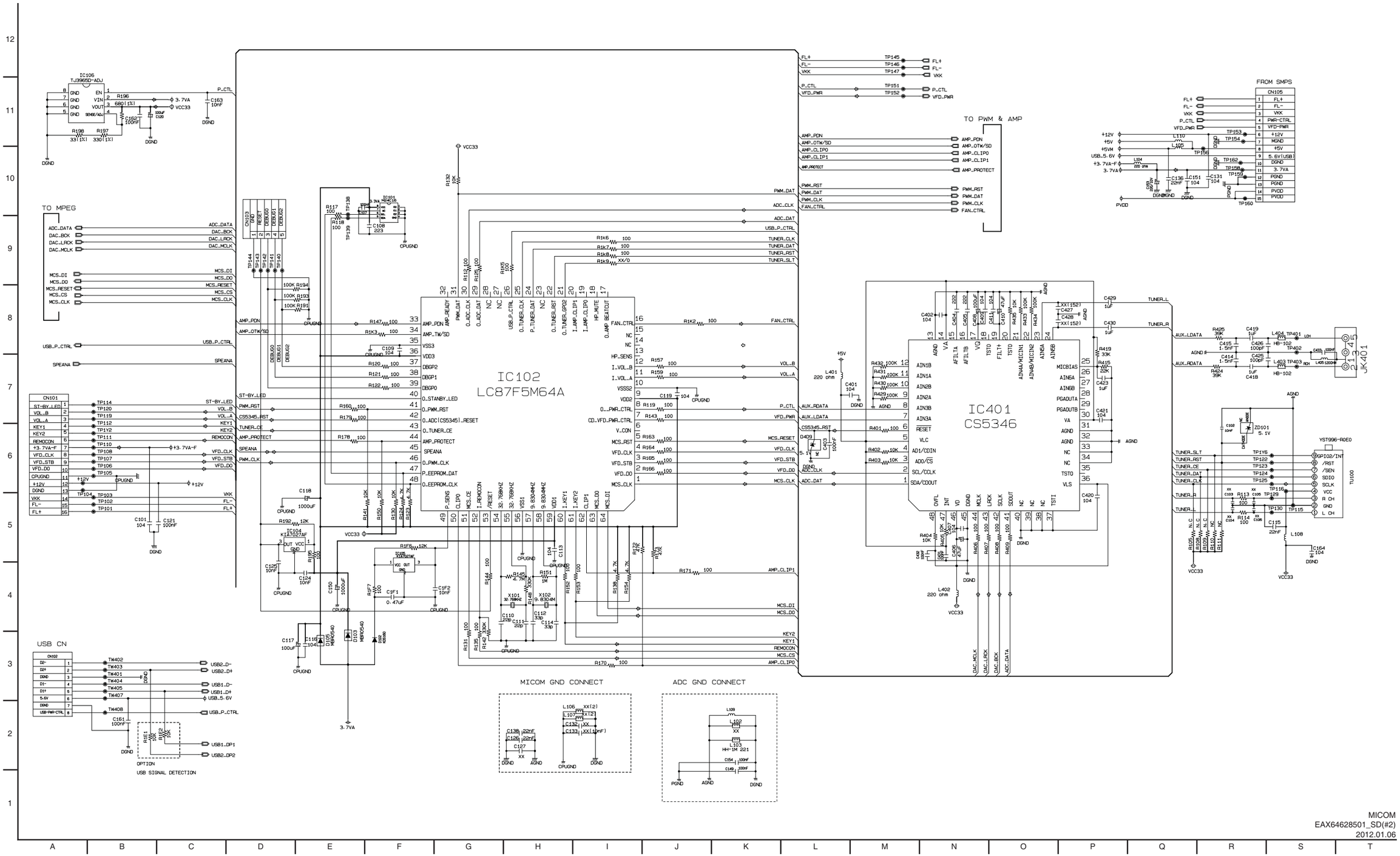
CAUTION:
Danger if fuse is incorrectly replaced.
Replace only with the type identical to fuse rating and(or) model name described in main label.

SMPS
EAX64544601_SD
2012.01.06

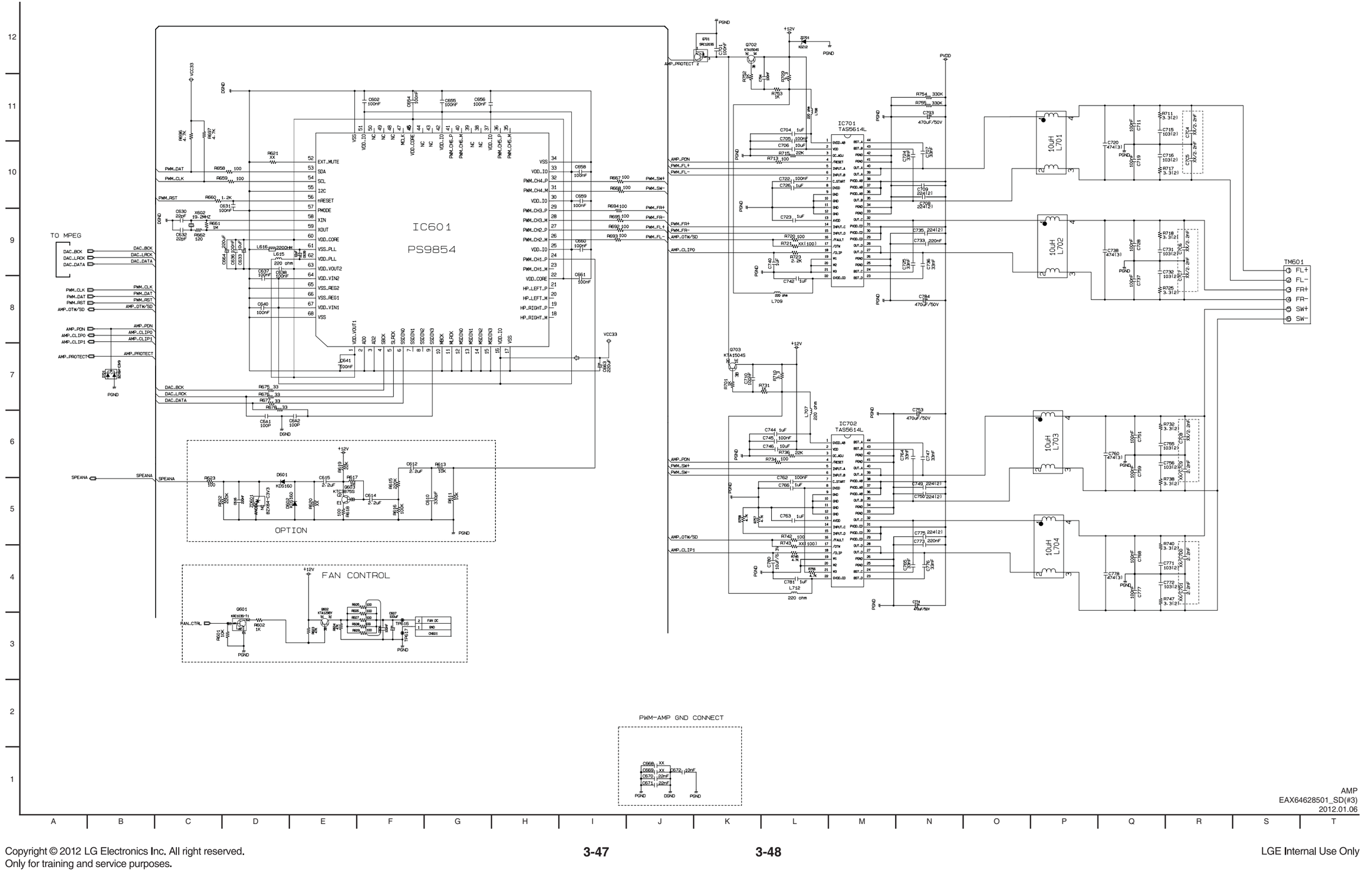
2. MAIN - DSP CIRCUIT DIAGRAM



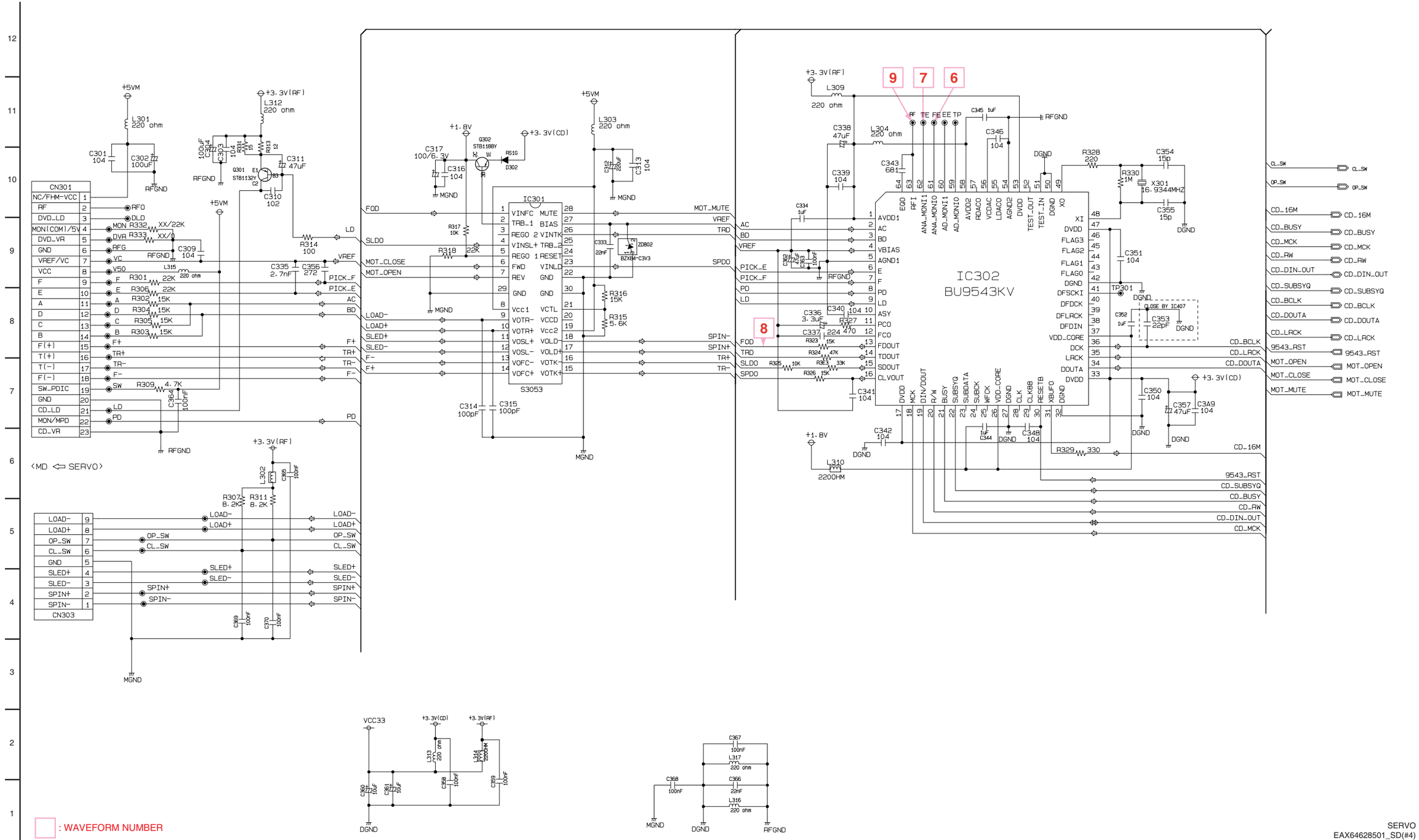
3. MAIN - MICOM CIRCUIT DIAGRAM



4. MAIN - AMP CIRCUIT DIAGRAM

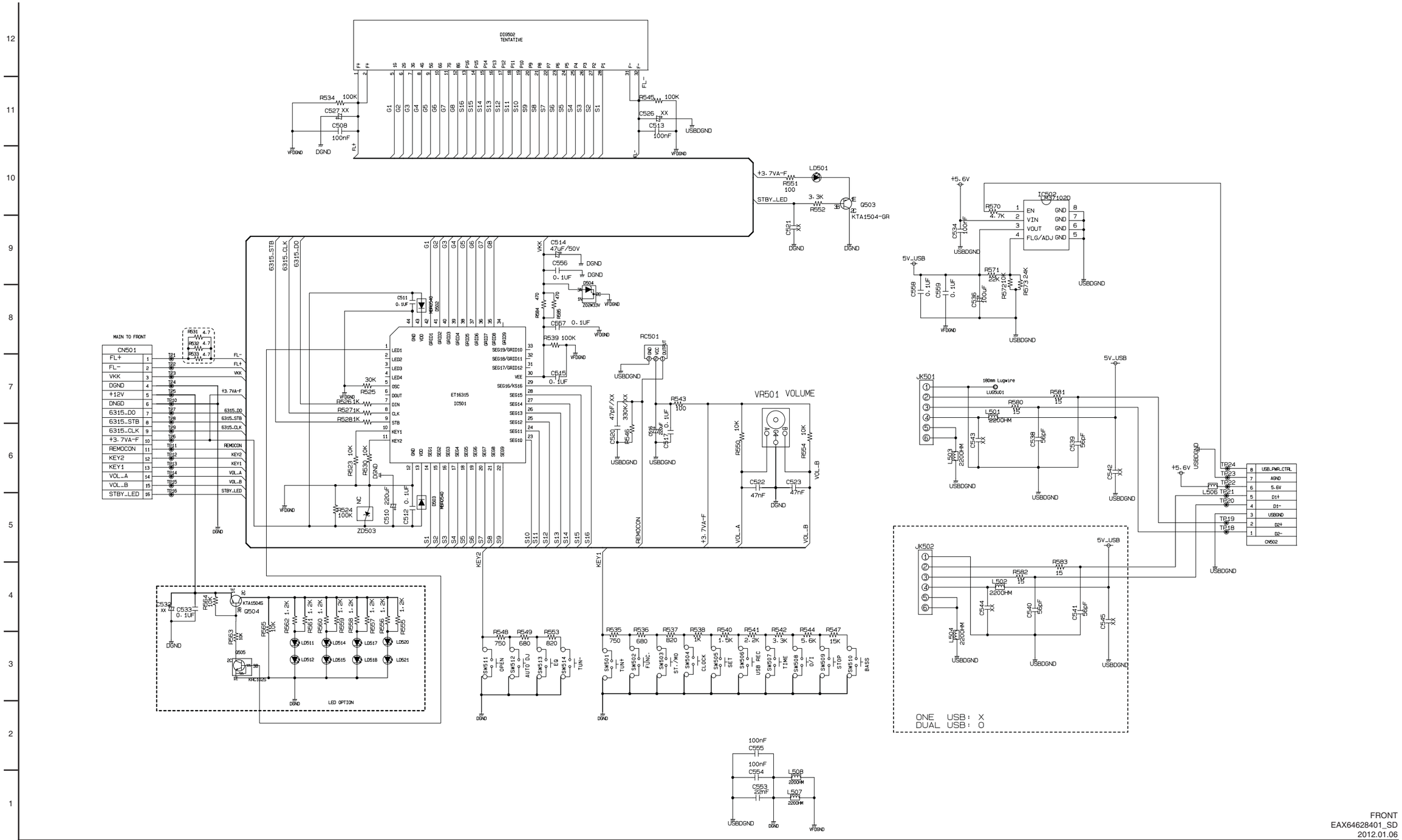


5. MAIN - SERVO CIRCUIT DIAGRAM



SERVO
EAX64628501_SD(#4)
2012.01.06

6. FRONT CIRCUIT DIAGRAM



FRONT
EAX64628401_SD
2012.01.06

CIRCUIT VOLTAGE CHART

1. IC

Location Pin No.	Specification	EE Mode (V)	Margin	Playback Mode (V)	Margin
IC101 EEPROM(M24C16)					
8(VCC)	1.8~5.5	3.4	2.1	3.4	2.1
IC102 MICOM (LC87F5M64A)					
9(VDD2)	2.8~5.5	3.4	0.6	3.4	0.6
36(VDD3)	2.8~5.5	3.4	0.6	3.4	0.6
59(VDD1)	2.8~5.5	3.4	0.6	3.4	0.6
IC301 MOTOR IC					
8(VCC1)	4.3~13.2	4.95	0.65	4.93	0.63
19(VCC2)	4.3~Vcc1	4.95	0.65	4.93	0.63
IC302 SERVER (BU9543KV)					
1(AVDD1)	2.7~3.6	3.24	0.36	3.24	0.36
17(DVDD)	2.7~3.6	3.24	0.36	3.24	0.36
33(DVDD)	2.7~3.6	3.24	0.36	3.24	0.36
26(VDD_CORE)	1.35~1.65	1.56	0.09	1.56	0.09
37(VDD_CORE)	1.35~1.65	1.56	0.09	1.56	0.09
47(DVDD)	2.7~3.6	3.24	0.36	3.24	0.36
53(DVDD2)	2.7~3.6	3.24	0.36	3.24	0.36
58(AVDD2)	2.7~3.6	3.24	0.36	3.24	0.36
IC401 ADC(CS5346)					
5(VLC)	3.13~5.25	4.94	0.31	4.94	0.31
14(VA)	4.75~5.25	4.94	0.31	4.94	0.31
30(VA)	4.75~5.25	4.94	0.31	4.94	0.31
36(VLS)	3.13~5.25	3.24	2.01	3.24	2.01
46(VD)	3.13~3.47	3.24	0.23	3.24	0.23
IC501 VFD (ET6315)					
13(VDD)	4.5~5.5	3.5	-	3.48	-1.02
43(VDD)	4.5~5.5	3.5	-	3.48	-1.02
30(VEE)	VDD-35	-25.8	9.2	-25.5	9.5
IC601 PWM (PS9854)					
16(VDD_IO)	2.97~3.63	3.23	0.4	3.23	0.4
22(VDD_CORE)	1.08~1.32	1.24	0.08	1.24	0.08
25(VDD_IO)	2.97~3.63	3.22	0.41	3.22	0.41
30(VDD_IO)	2.97~3.63	3.22	0.41	3.22	0.41
33(VDD_IO)	2.97~3.63	3.22	0.41	3.22	0.41
375(VDD_IO)	2.97~3.63	3.24	0.39	3.24	0.39
42(VDD_IO)	2.97~3.63	3.24	0.39	3.24	0.39
45(VDD_CORE)	1.08~1.32	1.24	0.08	1.24	0.08
50(VDD_IO)	2.97~3.63	3.22	0.41	3.22	0.41
60(VDD_CORE)	1.08~1.32	1.24	0.08	1.24	0.08
62(VDDA)	1.08~1.32	1.24	0.08	1.24	0.08
64(VDD_VIN2)	2.20~3.30	3.22	0.08	3.22	0.08
67(VDD_VIN1)	2.20~3.30	3.22	0.08	3.22	0.08
IC701 AMP(TAS5614L)					
1(GVDD_AB)	10.8~13.2	11.6	1.6	11.6	1.06
2(VDD)	10.8~13.2	11.7	1.5	11.7	1.07
22(GVDD_CD)	10.8~13.2	11.7	1.03	11.7	1.06
29(PVDD_CD)	18~38	25.8	12.1	25.8	12.1
30(PVDD_CD)	18~38	25.8	12.1	25.8	12.1
31(PVDD_CD)	18~38	25.8	12.1	25.8	12.1
36(PVDD_AB)	18~38	25.8	12.1	25.8	12.1
37(PVDD_AB)	18~38	25.8	12.1	25.8	12.1
38(PVDD_AB)	18~38	25.8	12.1	25.8	12.1
IC801 (MLC9800)					
2 (AVDD33)	2.97~3.63	3.2	0.43	3.2	0.43
13 (VDD12)	1.08~1.32	1.2	0.12	1.1	0.22
30 (IOVDD33)	2.97~3.63	3.2	0.43	3.2	0.43
47 (VDD12)	1.08~1.32	1.2	0.12	1.1	0.22
51 (IOVDD33)	2.97~3.63	3.2	0.43	3.2	0.43
84 (IOVDD33)	2.97~3.63	3.2	0.43	3.2	0.43
94 (VDD12)	1.08~1.32	1.2	0.12	1.2	0.12
113 (IOVDD33)	2.97~3.63	3.2	0.43	3.2	0.43
115(USBVDD33)	2.97~3.63	3.2	0.43	3.2	0.43
120 (PLL1VDD12)	1.08~1.32	1.2	0.12	1.2	0.12
122(PLL3VDD12)	1.08~1.32	1.2	0.12	1.2	0.12
124(PLL2VDD12)	1.08~1.32	1.2	0.12	1.2	0.12
IC802 SDRAM					
1(VDD)	3.0~3.6	3.2	0.4	3.26	0.34
3(VDDQ)	3.0~3.6	3.2	0.4	3.26	0.34
9(VDDQ)	3.0~3.6	3.2	0.4	3.26	0.34
14(VDD)	3.0~3.6	3.2	0.4	3.26	0.34
27(VDD)	3.0~3.6	3.2	0.4	3.26	0.34
43(VDDQ)	3.0~3.6	3.2	0.4	3.26	0.34
49(VDDQ)	3.0~3.6	3.2	0.4	3.26	0.34
IC803 Flash					
8(VDD)	2.7~3.6	3.2	0.4	3.2	0.4

2. CAPACITORS

Location No.	Value (uF)		EEMode				Play back				Rec voltage			
		Spec	(+)	(-)	Gap	Margin	(+)	(-)	Gap	Margin	(+)	(-)	Gap	Margin
C118	1000uF	6.3V	3.5V	0V	3.5V	2.8V	3.44V	0V	3.44V	2.86V	3.39V	0V	3.39V	2.91V
C302	100uF	16V	0.22V	0V	0.22V	15.78V	3.31	0V	3.31	12.69V	3.26	0.03	3.23V	12.77V
C304	100uF	16V	0V	0V	0V	16V	1.65V	0V	1.65V	14.35V	1.64	0.03	1.61V	14.39V
C311	47uF	25V	0.22V	0.13V	0.09V	24.78V	3.17V	2.44V	0.73V	21.83V	3.1	2.37	0.73V	24.27V
C313	100nF	50V	0V	0V	0V	50V	4.97V	0V	4.97V	45.03V	4.92	0	4.92V	45.08V
C317	100uF	6.3V	0V	0V	0V	6.3V	1.57V	0V	1.57V	4.73V	1.57	0	1.57V	4.73V
C336	3.3uF	50V	0V	0V	0V	50V	1.65V	1.65V	0V	48.35V	1.65	1.64	0.01V	49.99V
C338	47uF	25V	0.22V	0V	0.22V	24.78V	3.31	0V	3.31	21.69V	3.25	0.03	3.22V	21.78V
C357	47uF	25V	0.22V	0V	0.22V	24.78V	3.31V	0V	3.31V	21.69V	3.25	0.03	3.22V	21.78V
C403	100nF	50V	0.22V	0V	0.22V	49.78V	3.32V	0V	3.32V	46.68V	3.26V	0V	3.26V	46.74V
C406	47uF	16V	0.22V	0V	0.22V	15.78V	3.31V	0V	3.31V	12.69V	3.26	0	3.26V	12.74V
C408	100uF	16V	0V	0V	0V	16V	2.49V	0V	2.49V	13.51V	0	0	0V	16V
C410	47uF	16V	0.24V	0V	0.24V	15.76V	4.97V	0V	4.97V	11.03V	3.65	0	3.65V	12.35V
C423	1uF	16V	0V	0V	0V	16V	4.02V	0V	4.02V	11.98V	1.41	0	1.41V	14.59V
C510	220uF	10V	3.5V	0V	3.5V	6.5V	3.5V	0V	3.5V	6.5V	3.4V	0V	3.4V	6.6V
C514	47uF	35V	0V	-25.9V	25.9V	9.1V	0V	-25V	25V	10V	0V	-24.2V	24.2V	10.8V
C516	100uF	16V	3.6V	0V	3.6V	12.4V	3.6V	0V	3.6V	12.4V	3.6V	0V	3.6V	12.4V
C536	100uF	16V	3.6V	0V	3.6V	12.4V	3.6V	0V	3.6V	12.4V	3.6V	0V	3.6V	12.4V
C6A1	100pF	50V	0.18V	0V	0.18V	49.82V	1.65V	0V	1.65V	48.35V	3.25	0	3.25V	46.75V
C825	47uF	25V	0.2V	0V	0.2V	24.8V	3.31V	0V	3.31V	21.69V	3.26	0	3.26V	21.74V
C827	47uF	25V	0V	0V	0V	25V	1.19V	0V	1.19V	23.81V	1.18V	0V	1.18V	23.82V
C848	47uF	25V	0V	0V	0V	25V	1.19V	0V	1.19V	23.81V	1.18V	0V	1.18V	23.82V
C849	100nF	50V	0.22V	0V	0.22V	49.78V	3.32V	0V	3.32V	46.68V	3.26V	0V	3.26V	46.74V
C8F6	47uF	25V	0V	0V	0V	25V	1.19V	0V	1.19V	23.81V	1.18V	0V	1.18V	23.82V

3. SMPS CAPACITORS

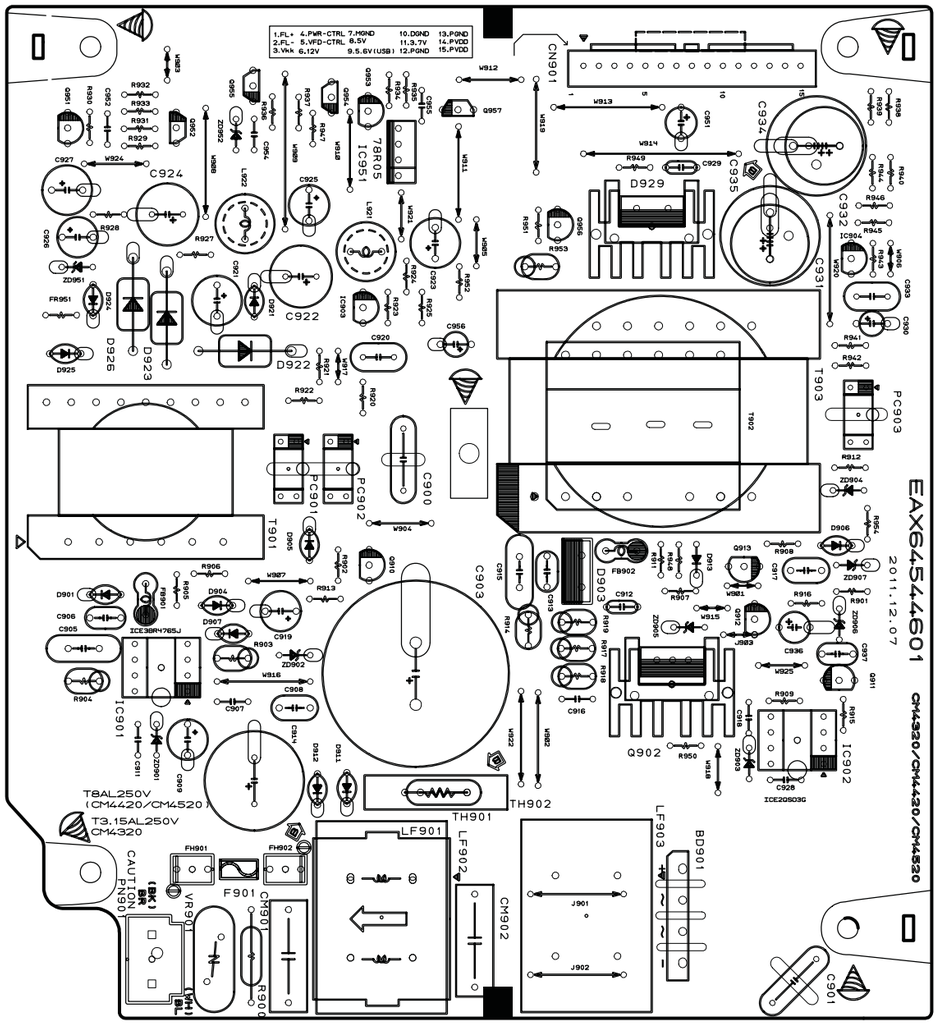
Location / Mode			P.OFF(STANBY)		P.ON (Unloaded)		CD_PLAY (USB insert)	
			Voltage (V)	Current (mA)	Voltage (V)	Current (mA)	Voltage (V)	Current (mA)
3.7VA	C923	330uF/16	3.70	40	3.70	200	3.70	220
5.0V(Main)	C951	100uF/16	0	0	5.0	40	5.0	200
F+	-	-	-24	0	-19	132	-19.0	136
F-	C952	-	-24	0	-23.5	130	-23.5	130
VKK	C926	47u/50	-26	10	-26.5	10	-26	10
12V	C921	100/50	0	0	12	100	12	115
PVDD	C932	1000/35	0	0	21.5	600	21.5	600

MEMO

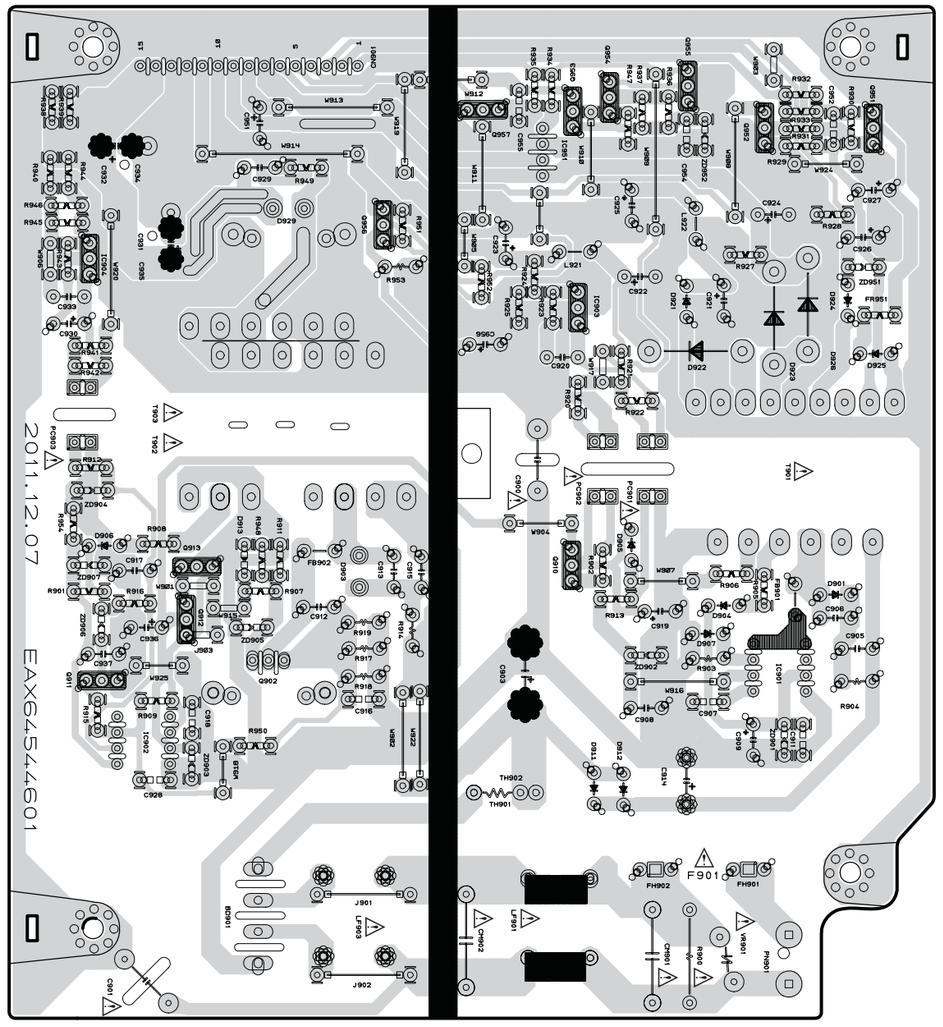
PRINTED CIRCUIT BOARD DIAGRAMS

1. SMPS P.C.BOARD

(TOP VIEW)



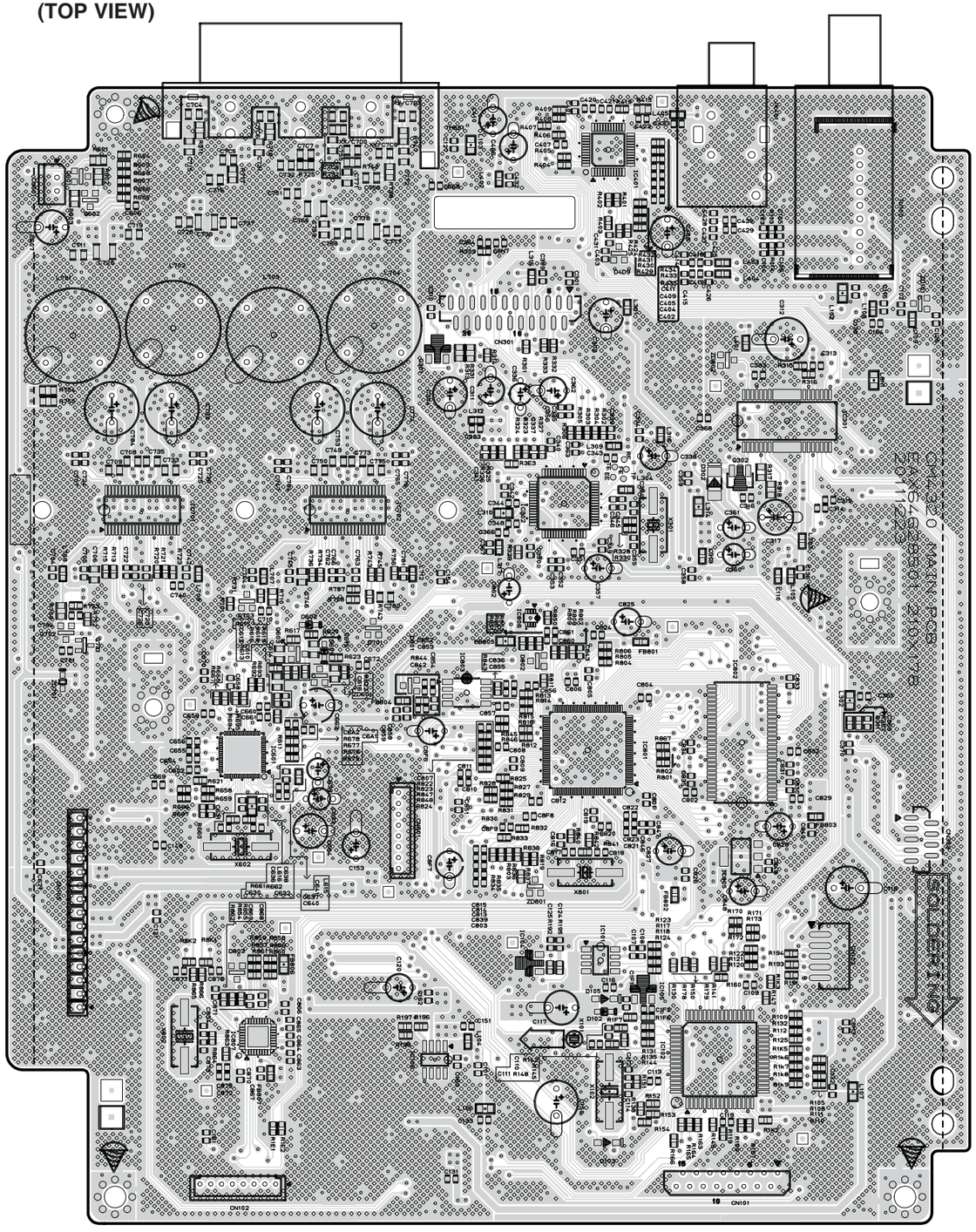
(BOTTOM VIEW)



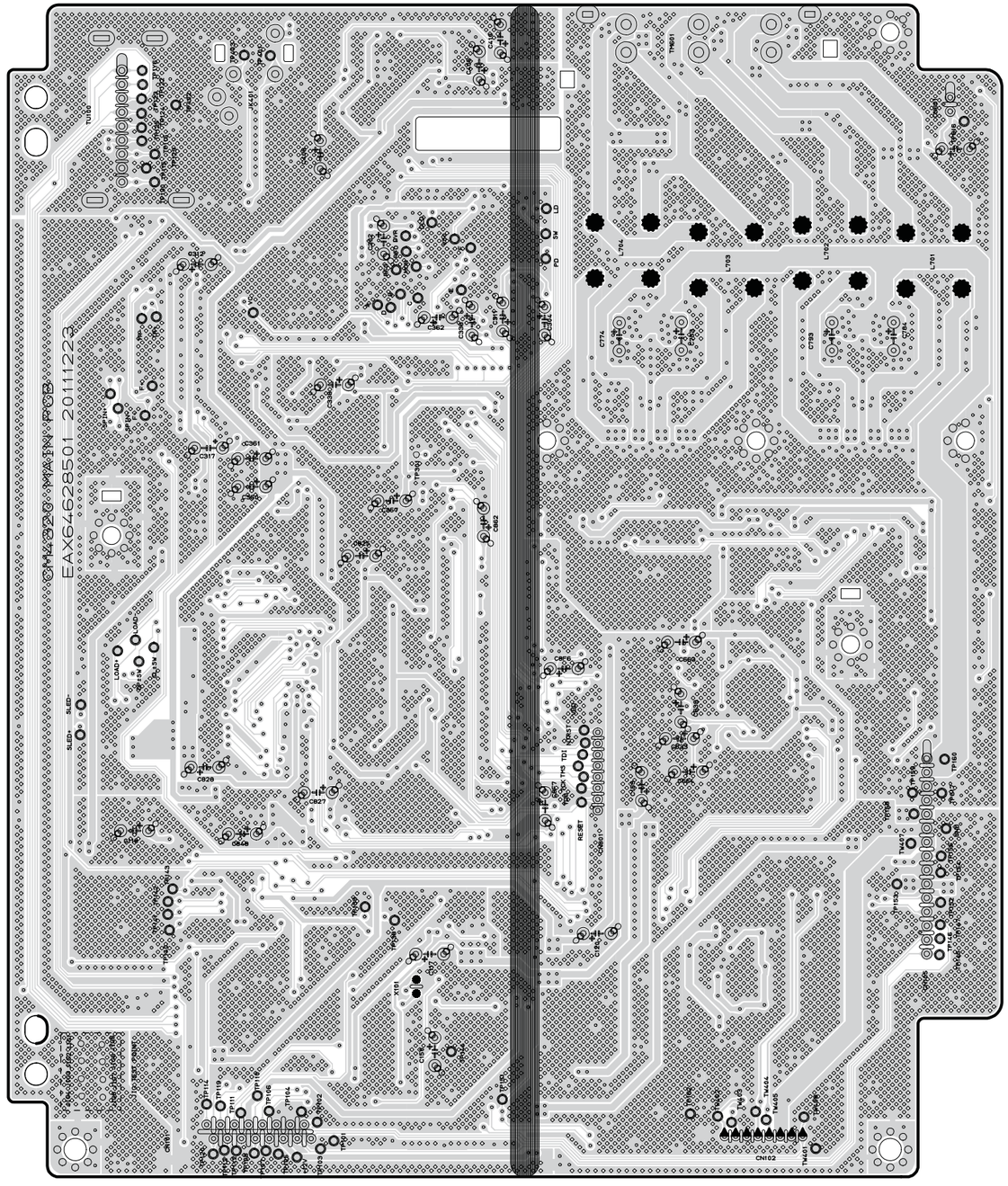
NOTE) Warning
⚠ Parts that are critical with respect to risk of fire or electrical shock.

2. MAIN P.C.BOARD

(TOP VIEW)

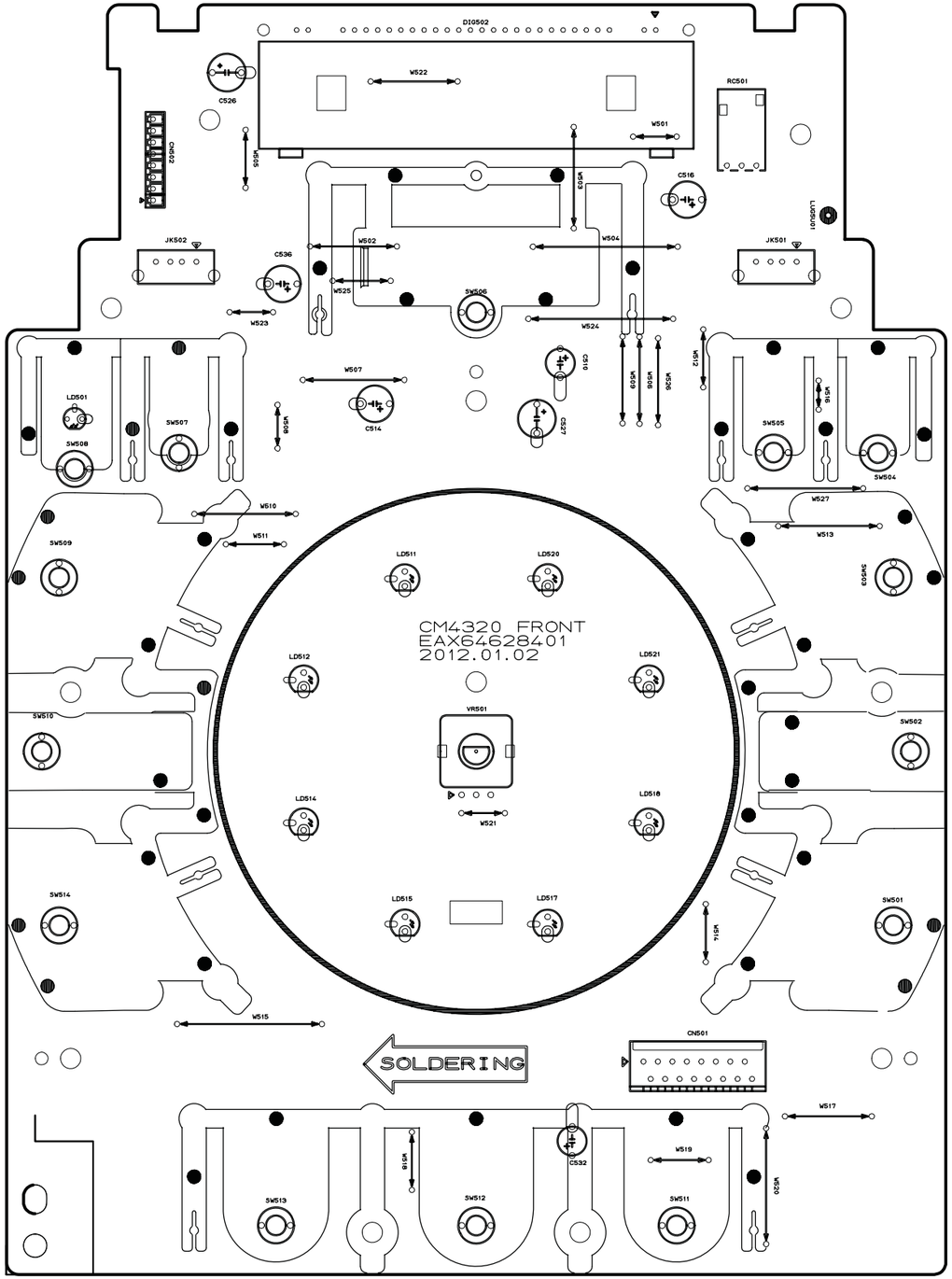


(BOTTOM VIEW)



3. FRONT P.C.BOARD

(TOP VIEW)



(BOTTOM VIEW)