LG

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SERVICE MANUAL

MODEL: CM9530 (CM9530, NS9530F/W)

LG

LG

Internal Use Only

Website http://biz.lgservice.com

Mini Hi-Fi System

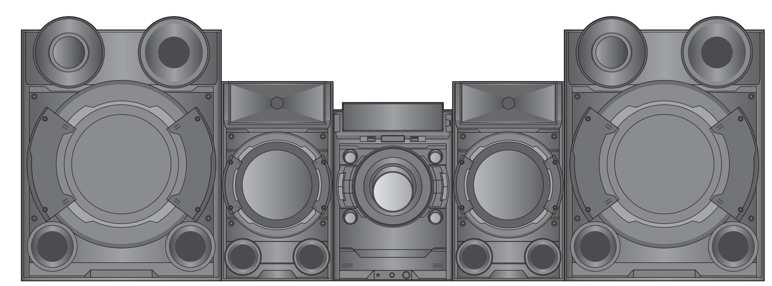
SERVICE MANUAL

MODEL: CM9530

(CM9530, NS9530F/W)

CAUTION

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



CONTENTS

SECTION 1
SUMMARY

CONTENTS

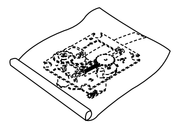
SERVICING PRECAUTIONS

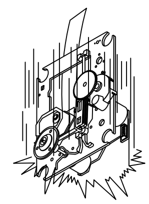
NOTES REGARDING HANDLING OF THE PICK-UP

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

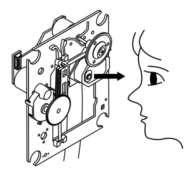




Drop impact

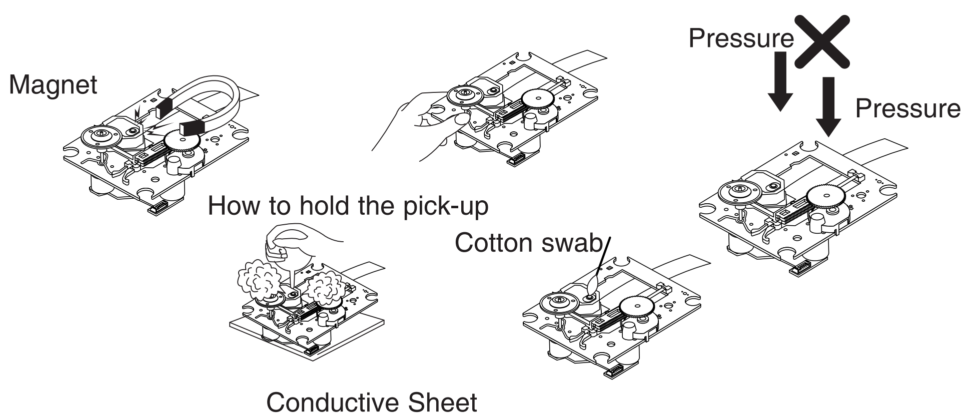
2. Repair notes

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.

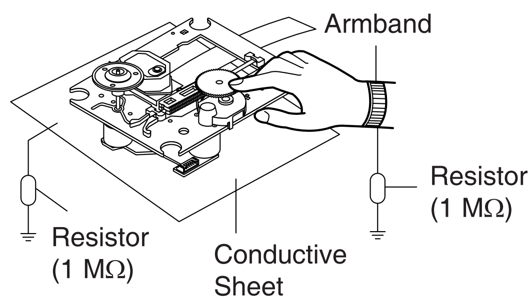
NOTES REGARDING COMPACT DISC PLAYER REPAIRS

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)

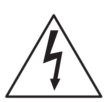
Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive Devices (ESD). Examples of typical ESD devices are integrated circuits and some field-effect transistors and semiconductor chip components. The following 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.

HIDDEN KEY MODE

Push both Front key and RCU key to activate it for 5 seconds.

1. Disc Lock On/Off (CD Function Only Active)
- Front Key : STOP
- RCU Key : STOP

2. Check Version and Option code
- Front Key : STOP
- RCU Key : PLAY/PAUSE
- You can change [Audio MCU Version <-> CD Controller Version <-> EEPROM Option] by SKIP+/-.

3. Clear EEPROM
- Front Key : STOP
- RCU Key : SKIP-

4. Edit EEPROM
- Front Key : STOP
- RCU Key : SKIP+
- You can change the digit of option by SKIP+/-.
- You can edit 0~f by REPEAT or PLAY/PAUSE key.

5. Bluetooth DUT
- Front Key : STOP
- RCU Key : PROGRAM
- Bluetooth model only

6. Power Disc Lock On/Off (CD Function Only Active)
- Front Key : STOP
- RCU Key : EQ

7. Amp Clip On/Off
- Front Key : STOP
- RCU Key : Mute

Amp Clip Mode Change (Amp Clip On --> Amp Clip Off --> Level Down display)

8. Demo ALL Key Lock (CM9520/CM8520 Only)
- Front Key : STOP
- RCU Key : 9

Demo All Key Lock Change (All Key Lock On --> All Key Lock Off)
- Working on Demo Operation only
- When All Key Lock, Volume Key work only
- After All Key Lock Off, it can unlock Demo Mode

SERVICE INFORMATION FOR EEPROM

1. POWER ON
2. FLD no disc status
3. Remote control '⏭' + Front 'STOP' push same timing during 5 seconds.
4. FLD 'OP-0….
5. Move to appropriate position and make changes with remote control. (⏮ , ⏭ , ▶/■ , REPEAT)
6. Press STOP key
7. FLD 'write ok'
8. Remote control '⏭' + Front 'STOP' push same timing.
9. FLD 'E2P CLR'
10. Completed

DETECT NEW EEPROM
(OPTION EDIT SCREEN)

NAME	HEX
OP0	05
OP1	00
OP2	00
OP3	00
OP4	00
OP5	69
OP6	80
OP7	45
OP8	00
OP9	01

PROGRAM UPGRADE GUIDE

1. Check the download file name.

	MICOM	Mpeg (DSP)	EQ	DEMO
File Name	CM9530_"version". HEX	HE006_"version". BIN	EQ_PRG_"version". BIN	DEMO_DAT_"version". BIN

* There is the Update File only in the USB storage.

2. Copy the download file to the USB storage.

3. Insert the USB storage on USB1 or USB2 Function.

4. VFD Display
   1) MICOM : "WRITE XX"
   2) Mpeg(DSP) : "FIRMWARE"
   3) EQ : "EQ DOWN"
   4) DEMO : "FIRMWARE"

5. Complete Update
   1) When the Set is turned off automatically after display "UPDATED", remove the USB storage.
   2) Unplugged the power cord after display "FINISHED", then remove the USB storage.

Upgrade required time

♦ Upgrade required time is determined depending on the Writing time considering the Download stability.

	MICOM	Mpeg (DSP)	EQ	DEMO
Upgrade time	about 60 seconds	about 60 seconds	about 5 seconds	about 45 seconds

SPECIFICATIONS

• GENERAL

Power requirements	Refer to the main label.
Power consumption	Refer to the main label.
Dimensions (W x H x D)	285 x 398 x 357mm
Net Weight (Approx.)	8.2 kg
Operating temperature	5 °C to 35 °C (41 °F to 95 °F)
Operating humidity	5 % to 90 %
Bus Power Supply	USB DC 5 V ⎓ 500 mA

• INPUTS

Auxiliary Input	2.0 Vrms (1 kHz, 0 dB), 600 Ω, RCA jack (L, R) x 1
Microphone Input	6.3 mm jack
Portable Input	1.2 Vrms (3.5 mm stereo jack)

• 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 1 720 kHz or 522 to 1 710 kHz

• CD

Frequency Response	40 to 20 000 Hz
Signal-to-noise ratio	75 dB
Dynamic range	80 dB

• AMPLIFIER

Stereo mode		420 W x 2 (THD 20 %)
Surround mode	Front	420 W x 2 (THD 20 %)
	Surround	210 W x 2 (THD 20 %)
	Subwoofer	420 W x 2 (THD 20 %)

• FRONT SPEAKER

Type	2 Way 2 speaker
Impedance	6 Ω
Rated Input Power	420 W
Max. Input power	840 W
Net Dimensions (W x H x D)	263 x 445 x 357 mm
Net Weight	8.6 kg

• SURROUND SPEAKER : BUILT IN SUBWOOFER

Type	2 Way 2 speaker
Impedance	12 Ω
Rated Input Power	210 W
Max. Input power	420 W

• SUBWOOFER

Type	1 way 1 speaker
Impedance	6 Ω
Rated Input Power	420 W
Max. Input power	840 W
Net Dimensions (W x H x D)	456 x 602 x 453 mm
Net Weight	20.8 kg

◆ Design and specifications are subject to change without notice.

MEMO

SECTION 2

CABINET & MAIN CHASSIS

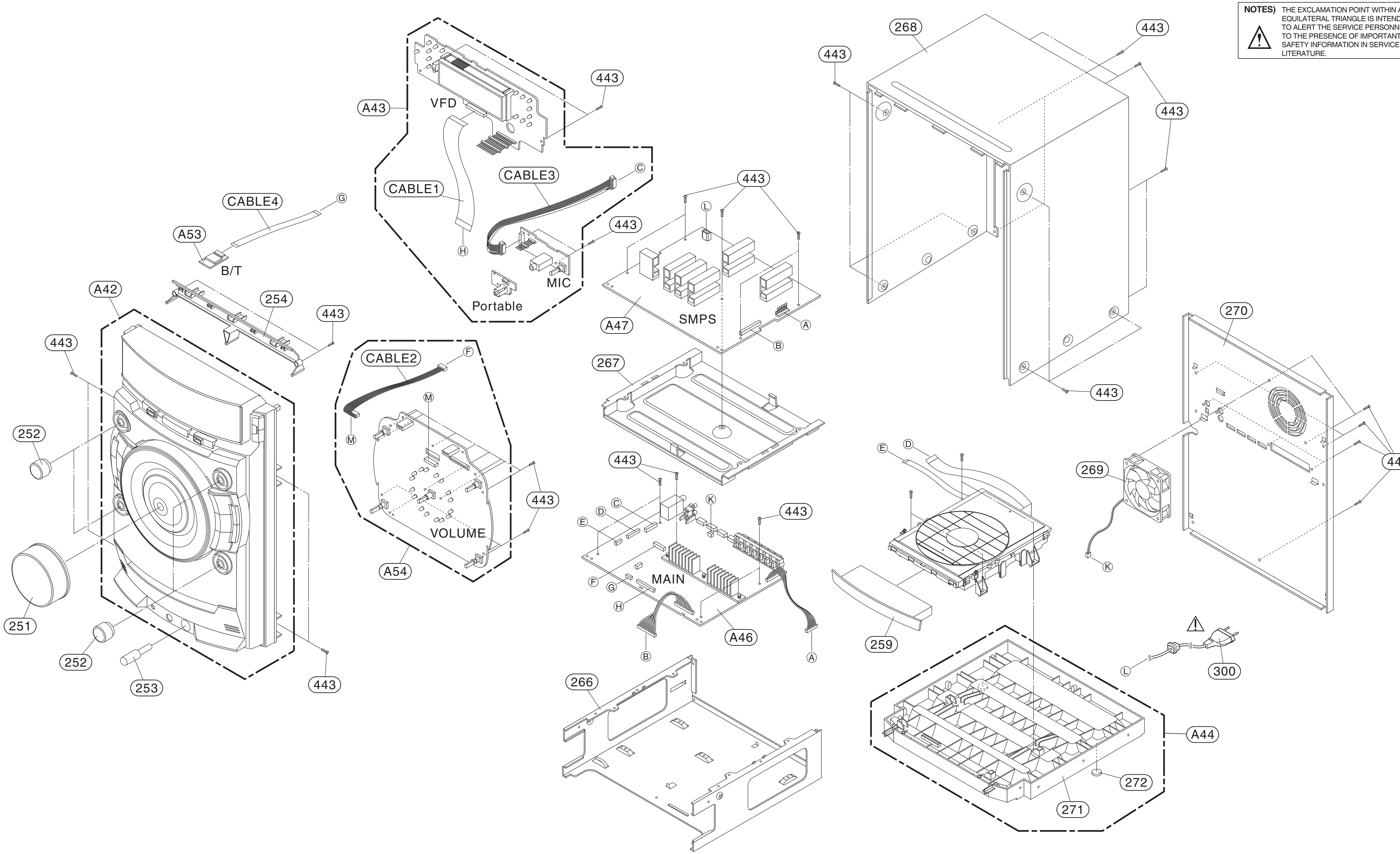
CONTENTS

MEMO

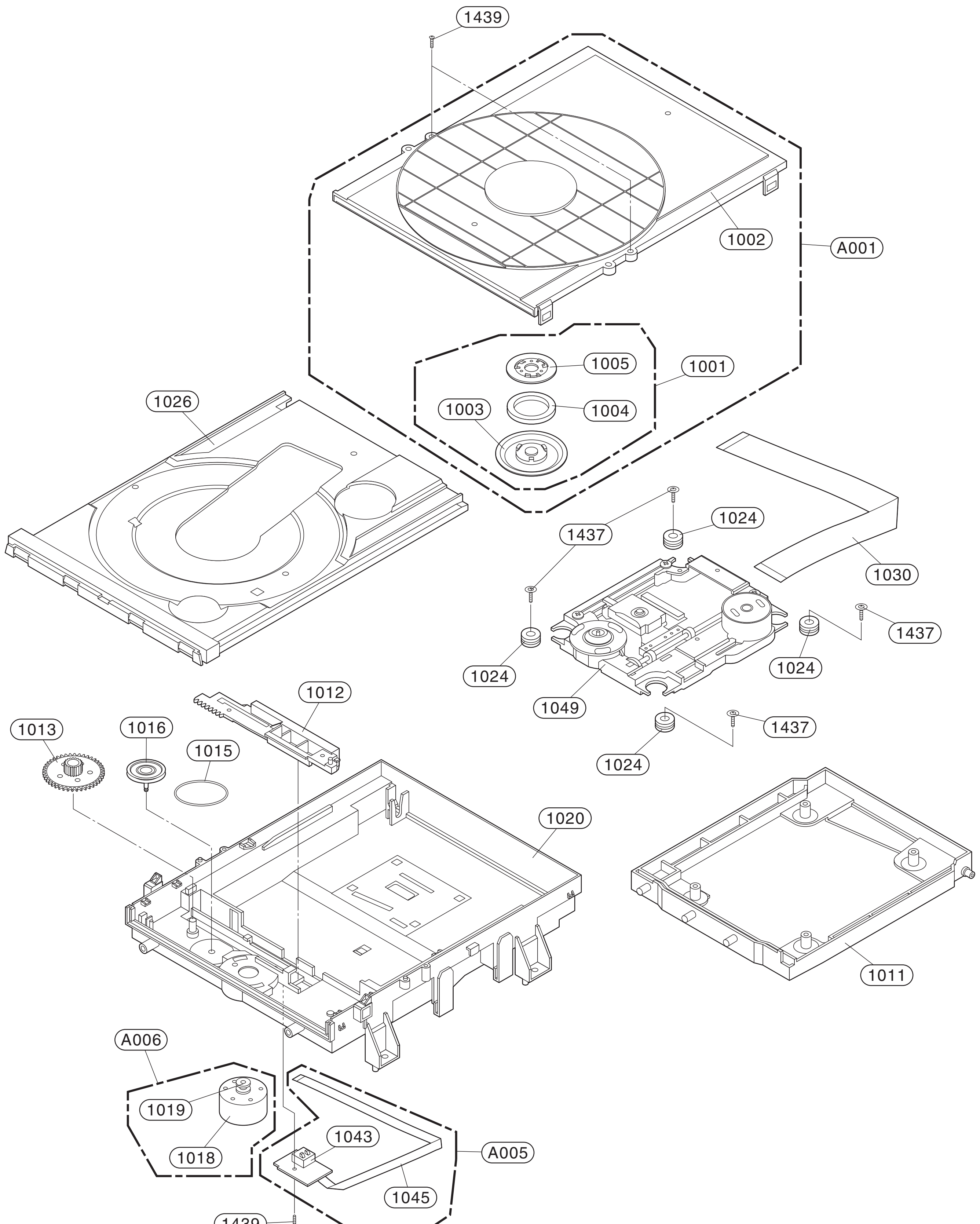
EXPLODED VIEWS

1. CABINET AND MAIN FRAME SECTION (CM9530)

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.

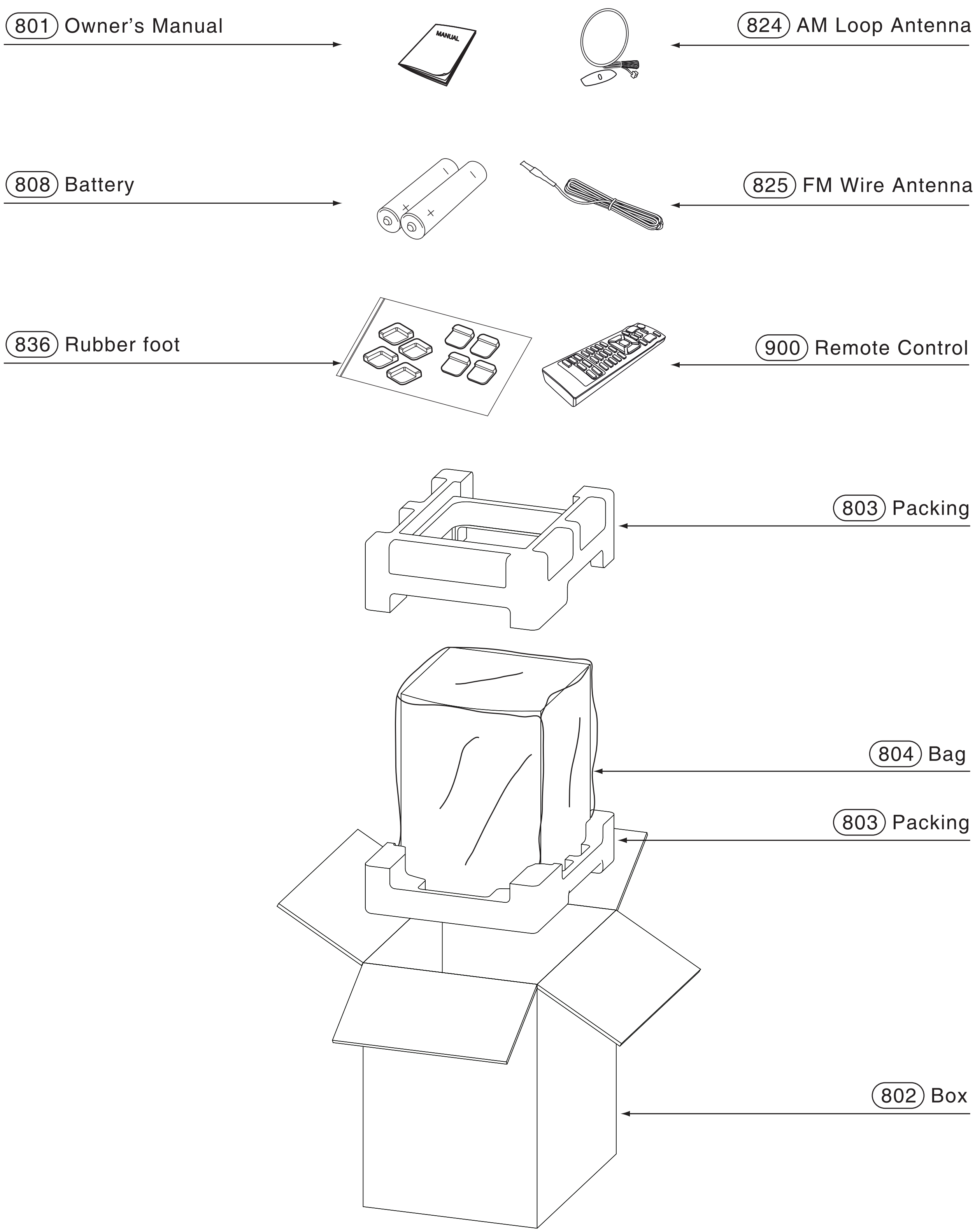


2. MECHANISM DECK SECTION (DP17TM)

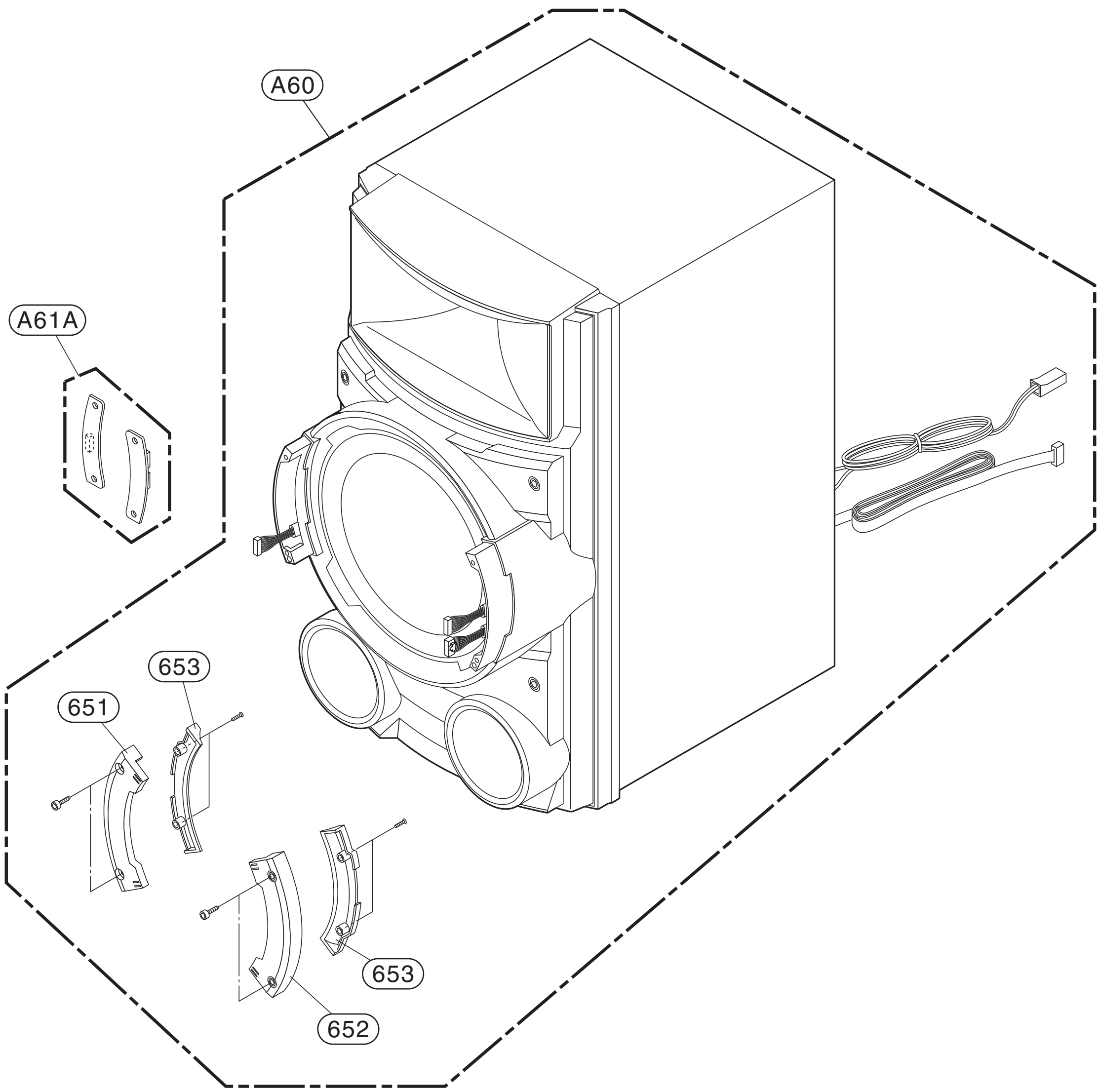


MEMO

3. PACKING ACCESSORY SECTION

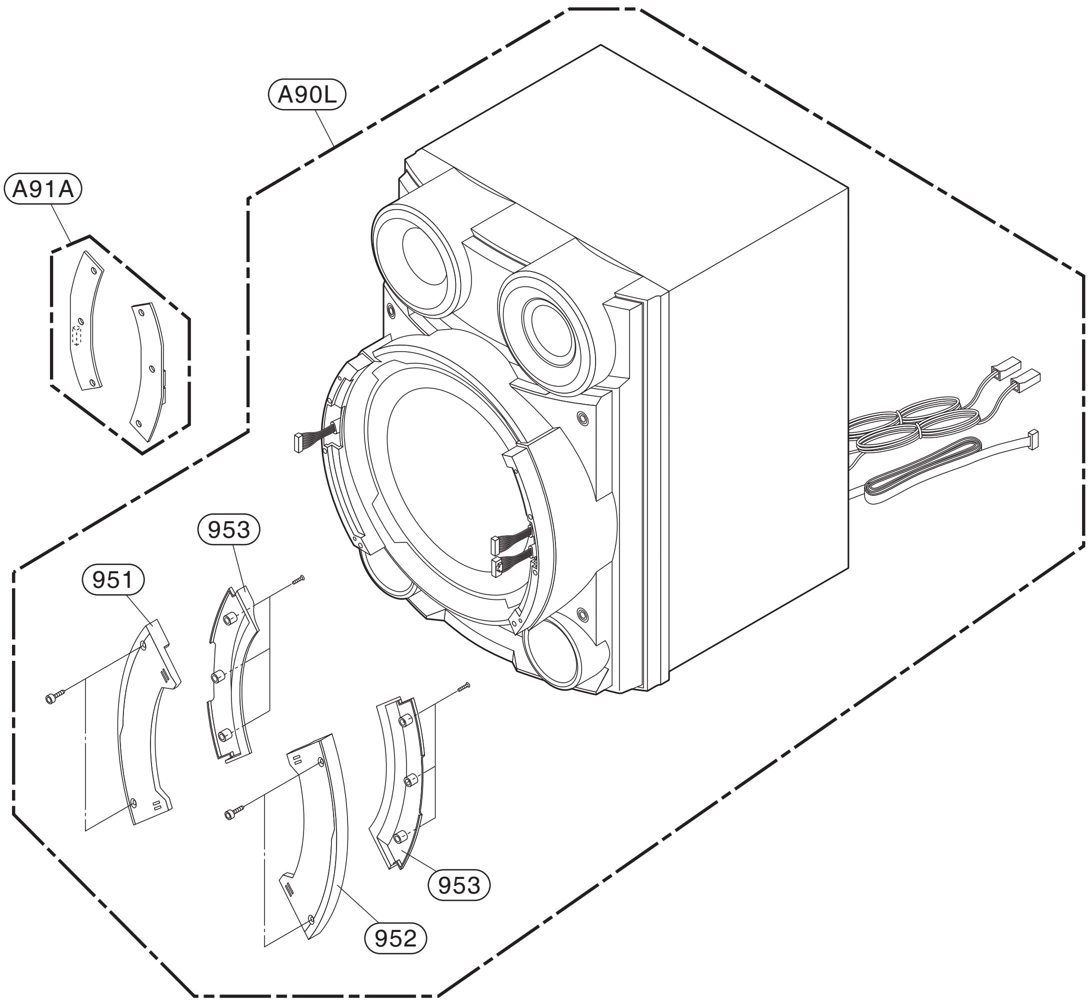


4. SPEAKER SECTION
4-1. FRONT SPEAKER (NS9530F)



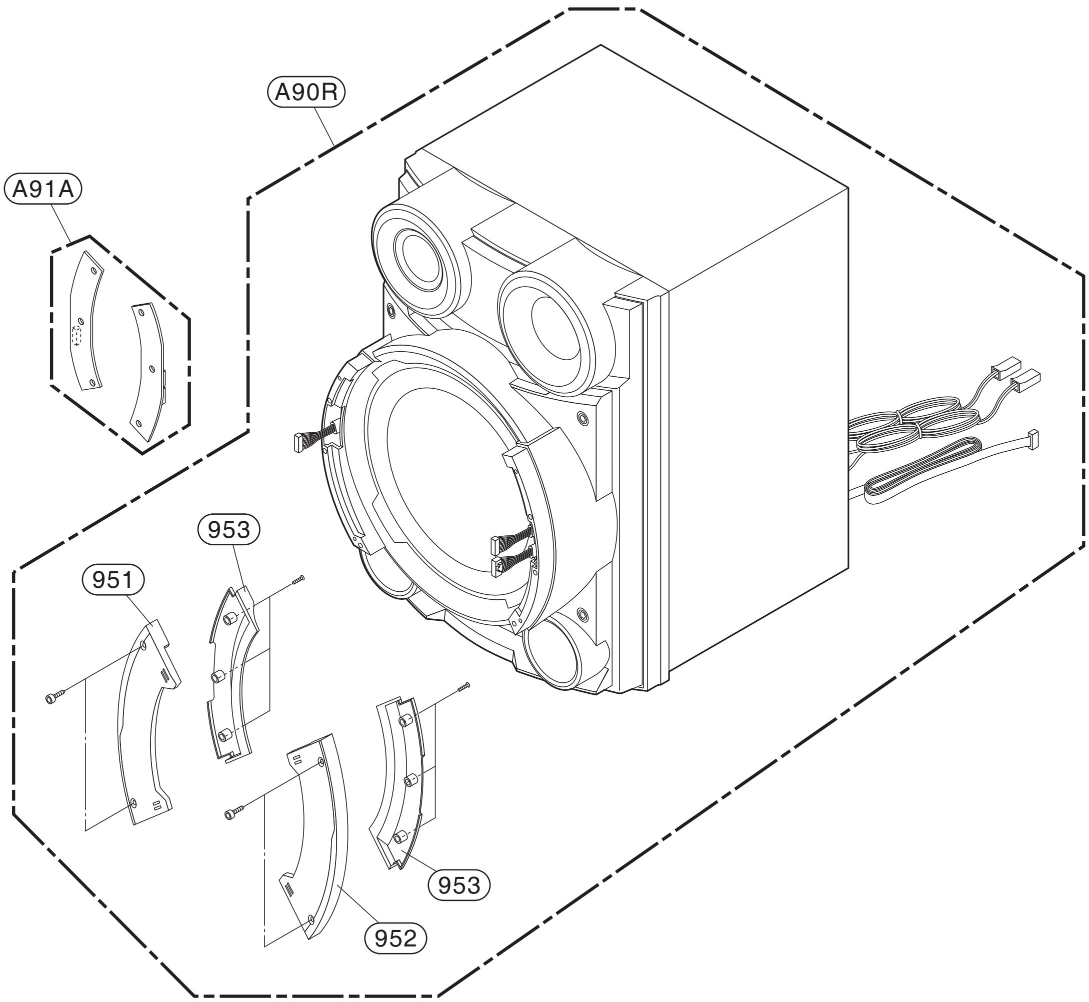
4-2. SUBWOOFER SPEAKER (NS9530W)

• LEFT SUBWOOFER



SUBWOOFER SPEAKER (NS9530W)

• RIGHT SUBWOOFER



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.

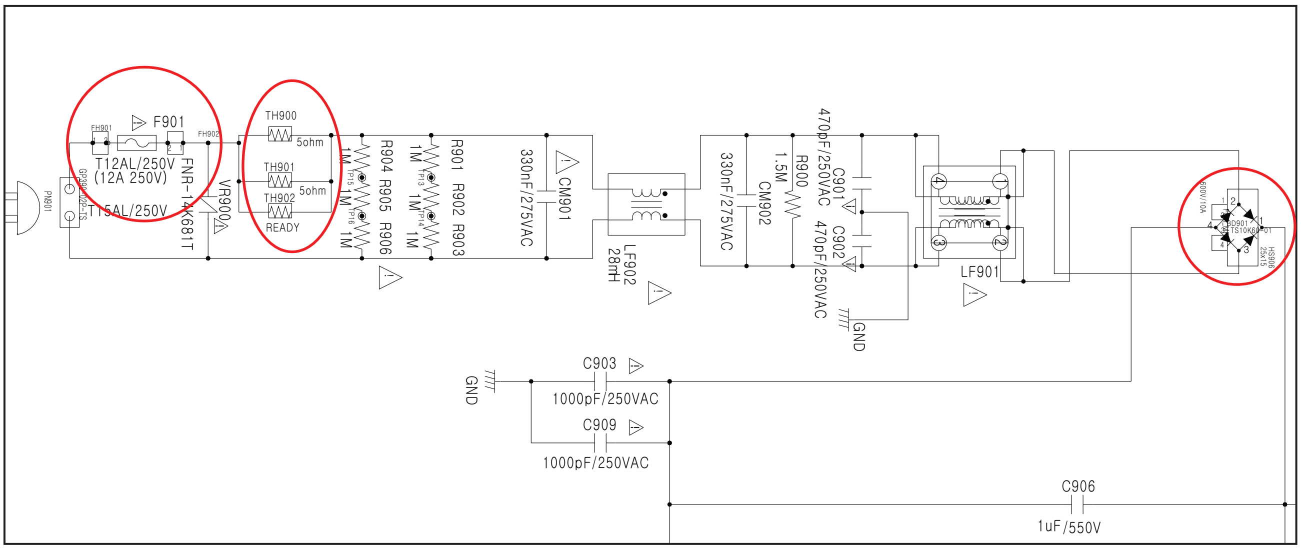
1-1. FUSE / BRIDGE DIODE / THERMISTOR

1-1-1. Solution

Please check and replace F901, BD901, TH900 ~ TH902 on SMPS board.

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

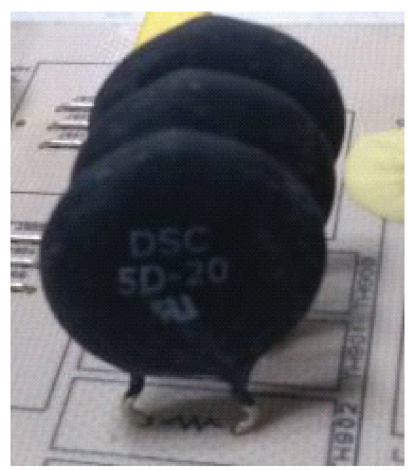
1) Check if the fuse F901 is open or short-circuit.
2) Check if the bridge diode BD901 is short-circuit by over current with a digital multi meter.
3) Check if the NTC thermistor TH900 ~ TH902 is normal or open.



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.



< TH900 ~ TH902 >
If TH900 ~ TH902 is open, replace it with a new one.

ONE POINT REPAIR GUIDE

NO POWER

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

1-2. NO AMP POWER

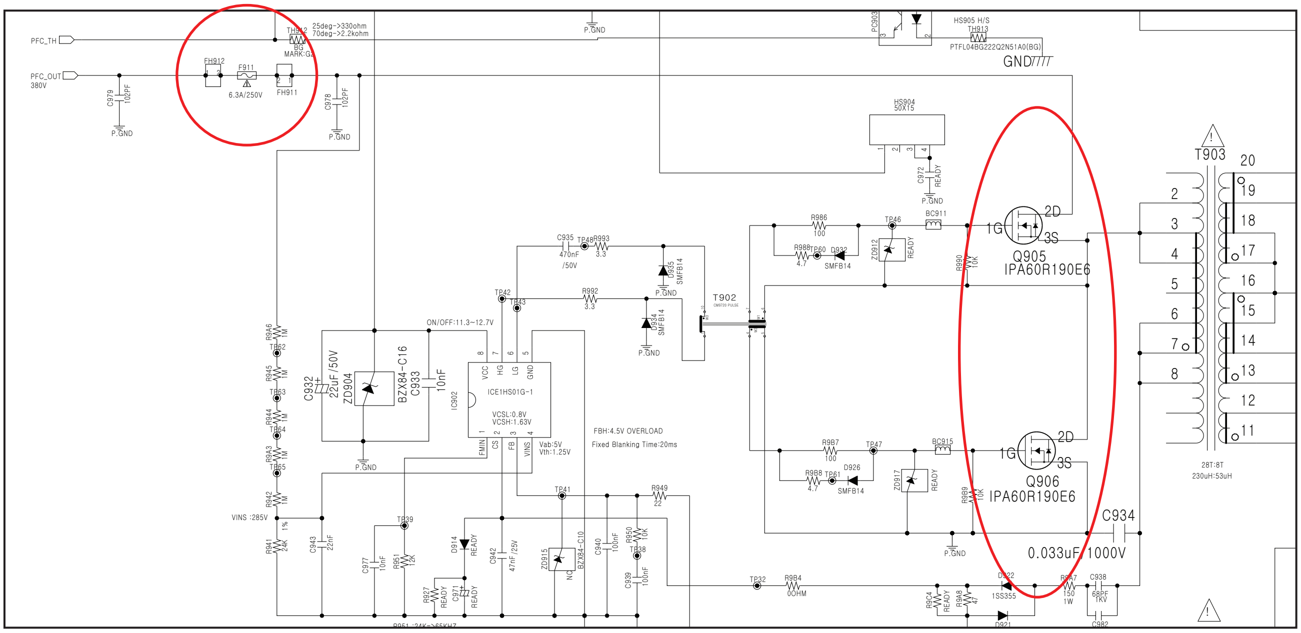
1-2-1. Solution

Please check and replace F911, Q905, Q906 on SMPS board.

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

1) Check if the fuse F901 is open or short-circuit.
2) Check the Drain-Source or Drain-Gate, Gate-Source Resistance of Q905, Q906 with a digital multi-meter.
   ⇨ If it is short condition, it's destroyed. Replace it with a new one.
   (Please replace 2 FET at the same time although several FET is OK)

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



< F911 >
If F911 is not short-circuit,
replace it with a same specifications one.

< Q905, Q906 >
If Q905, Q906 is short-circuit,
replace it with a new one.

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. MICOM (IC101)

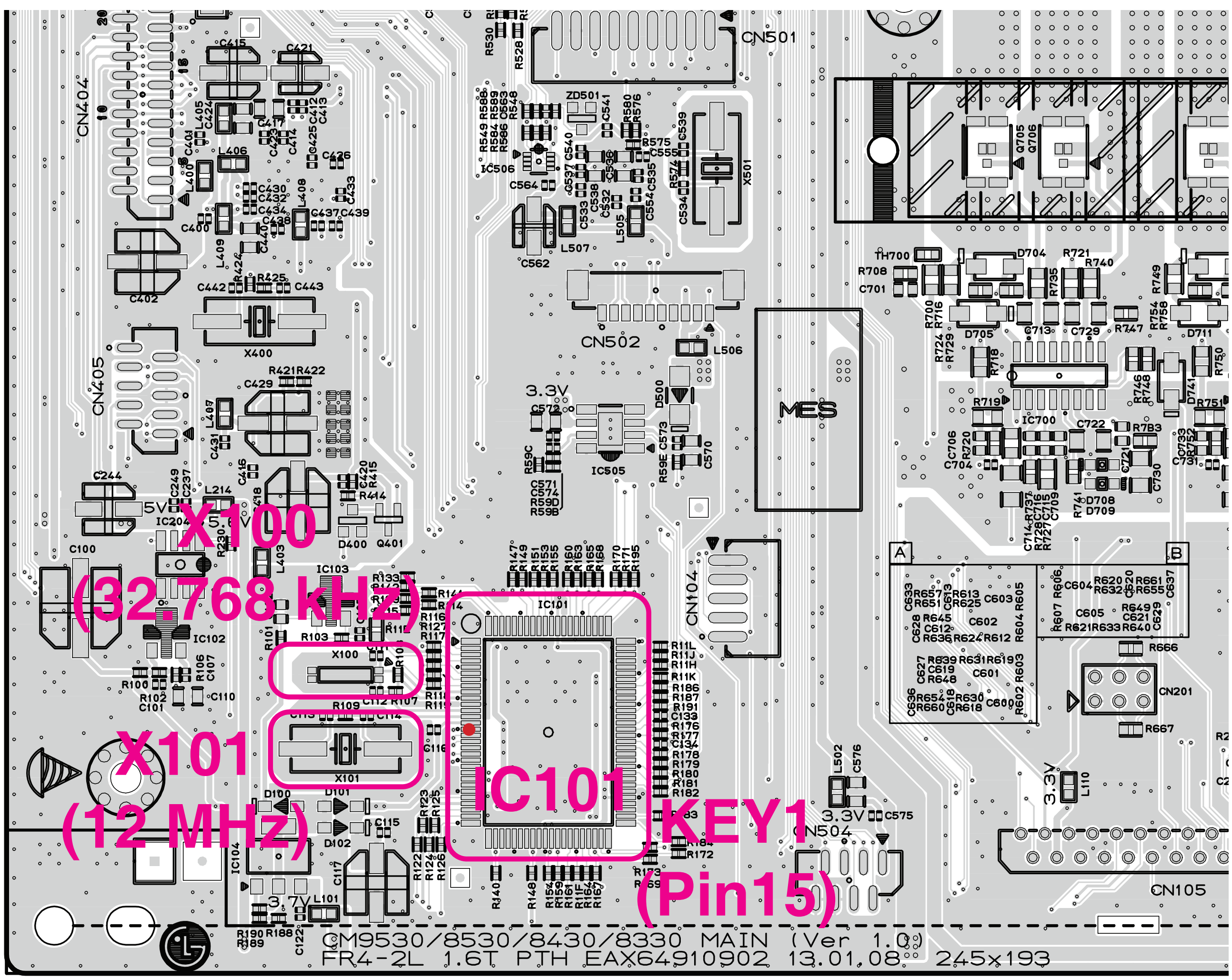
2-1-1. Solution

Please check and replace IC101 on MAIN board.

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

1) Check the 5.6 VA (CN106) and 3.7 VA (IC104) in standby mode.
   ⇨ If there is no 5.6 VA, check the SMPS and if doesn’t appear 3.7 VA, check IC104.
2) Check 5.6 VA, 12 V, FL+, FL-, an VKK (39 V) 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 the IC101 with a new one on the MAIN board.

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



< MAIN board top view >

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 (DIG301)

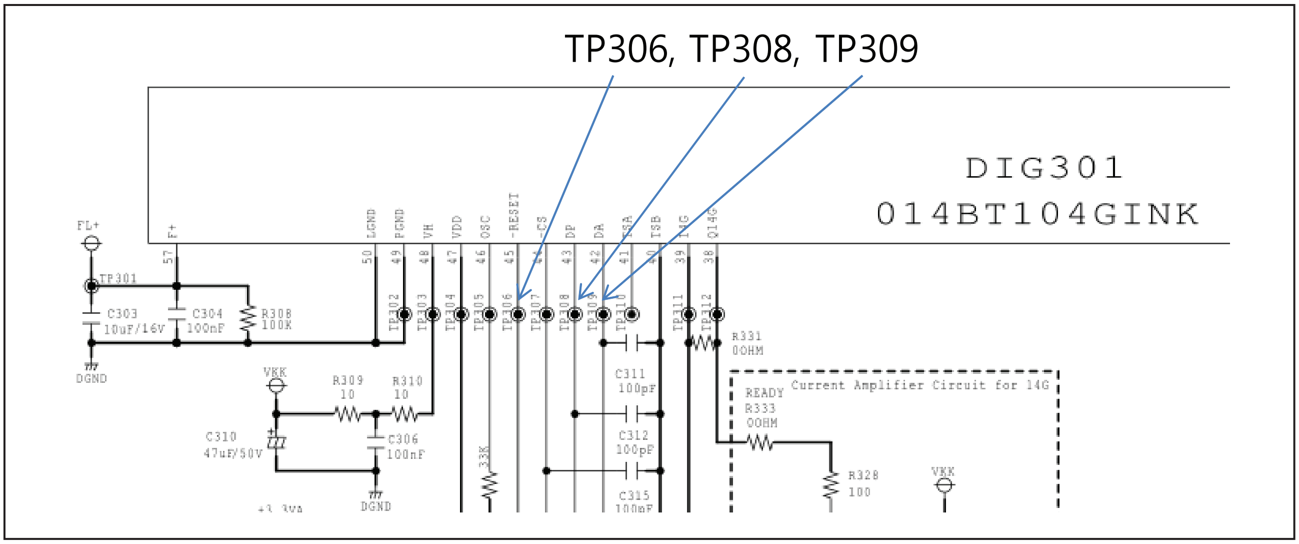
3-1-1. Solution

Please check and replace DIG301 on FRONT board.

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

1) Check connection first.(VFD to Volume Board to Board Connector, VFD to Main FFC cable)
2) Check if 4.6~4.9 V, FL+ and FL- are output from SMPS to VFD via the MAIN board.
3) Check if the IC101 outputs VFD_RST, VFD_CLK, VFD_STB and VFD_STB to the FRONT board.
   ⇨ If the there are control signals from VFD (TP306, TP308, TP309), replace VFD with a new one.

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



ONE POINT REPAIR GUIDE

4. NO BOOTING IN CD/USB FUNCTION

After you turn on power key and displayed message in the following order (HELLO --> VOL XX --> CD or USB) on VFD,
it will not display other message on VFD, and it will not boot-up normally.

4-1. NO VCC33, VCC12

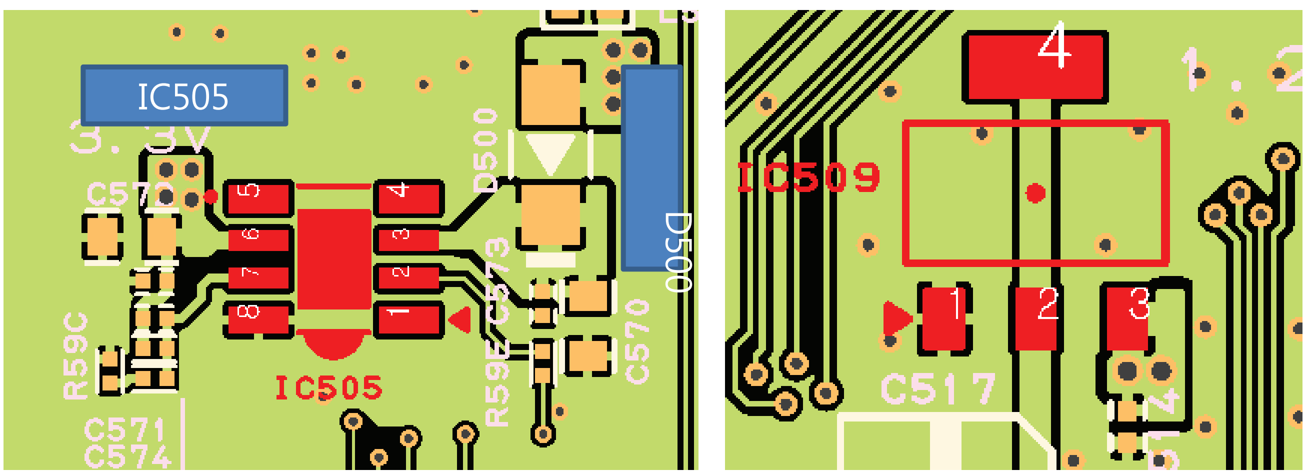
4-1-1. Solution

Please check and replace IC505, IC509 on MAIN board.

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

1) Check Voltage of IC505 pin2 on MAIN board.
   ⇨ If IC505 pin3 (about 4.9 V) & D500 Input 5.6 VA doesn't come out, check 5.6 VA from SMPS board.
2) If IC505 pin3 (about 4.9 V) is normal, check the PWR_CTRL (IC505 pin12) is high (about 3.3 V).
   ⇨ If PWR_CTRL isn't high, check pin63 of IC101 & R179, R59E.
3) If PWR_CTRL is high, check R59D, R59B, R59C and if there's no defective component then replace IC505.
4) If 3.3 V (VCC33) is normal, check output (pin2, 4) voltage of IC509.
   ⇨ If 1.2 V of IC509 pin2, 4 doesn't come out, then replace IC509.

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



< MAIN board top view >

ONE POINT REPAIR GUIDE

NO BOOTING IN CD/USB FUNCTION

After you turn on power key and displayed message in the following order (HELLO --> VOL XX --> CD or USB) on VFD,
it will not display other message on VFD, and it will not boot-up normally.

4-2. CRYSTAL (X500)

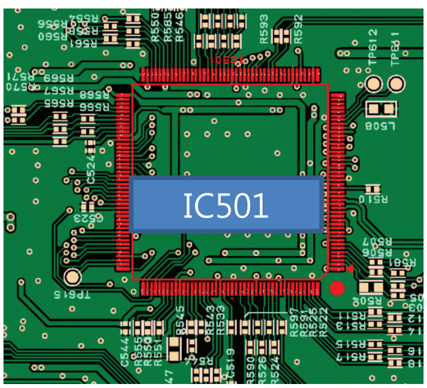
4-2-1. Solution

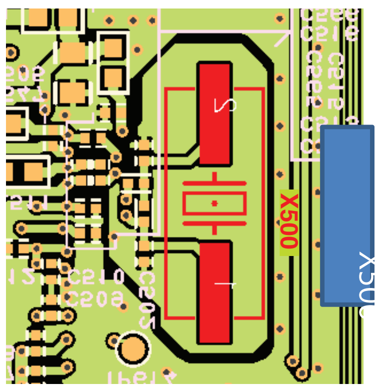
Please check and replace X500 on MAIN board.

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

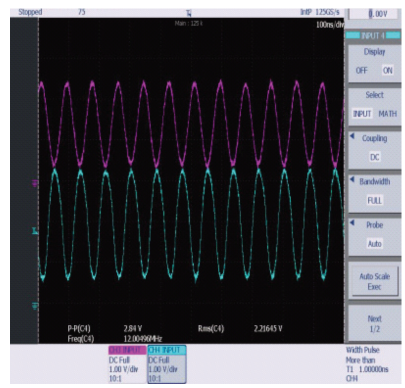
1) If 3.3 V & 1.2 V is normal, check Reset 'High' of IC501 pin153 on MAIN board.
   ⇨ If MAIN_RESET isn't high, check MICOM (IC101) pin59.
2) If MAIN_RESET is high, check the soldering status of 12 MHz crystal (X500).
3) If the crystal (X500) doesn't oscillate, check R508, R509, C502, C503 around crystal (X500).
   ⇨ If there's no defective component, then replace X500.

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





< Signal check point >



< Signal waveform >

ONE POINT REPAIR GUIDE

NO BOOTING IN CD/USB FUNCTION

After you turn on power key and displayed message in the following order (HELLO --> VOL XX --> CD or USB) on VFD, it will not display other message on VFD, and it will not boot-up normally.

4-3. SERIAL FLASH (IC503)

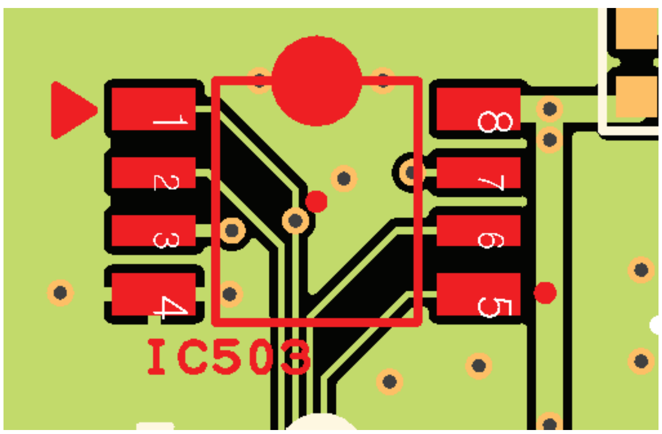
4-3-1. Solution

Please check and replace IC503 on MAIN board.

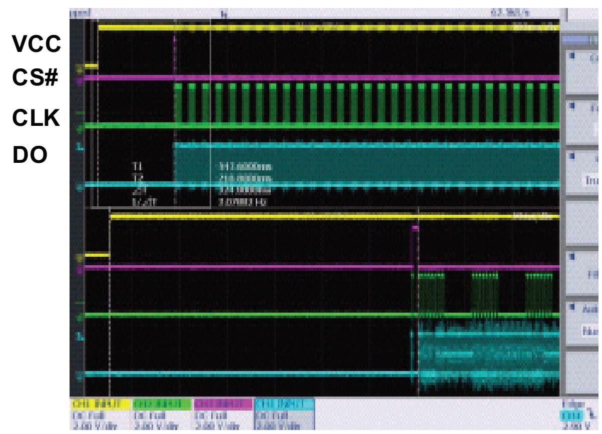
4-3-2. How to troubleshoot (Countermeasure)

1) If the crystal (X501) does oscillate, check serial flash (IC503) on MAIN board.
   ⇨ Check pin8(VCC), pin6(CLK), pin1(CS#), pin2(DO), pin5(DI) of below waveform.
2) If pin1, 2, 5, 6, 8 doesn't come out, check damping resistor (R511, R513, R514, R515) of IC503.
   ⇨ If damping resistor of IC503 is OK, then replace IC503. (it need to download program)
3) After change IC503, if It is still not below waveform, check IC501(DSP IC).

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



< Signal check point >



< Signal waveform >

ONE POINT REPAIR GUIDE

NO BOOTING IN CD/USB FUNCTION

After you turn on power key and displayed message in the following order (HELLO --> VOL XX --> CD or USB) on VFD,
it will not display other message on VFD, and it will not boot-up normally.

4-4. SDRAM (IC502)

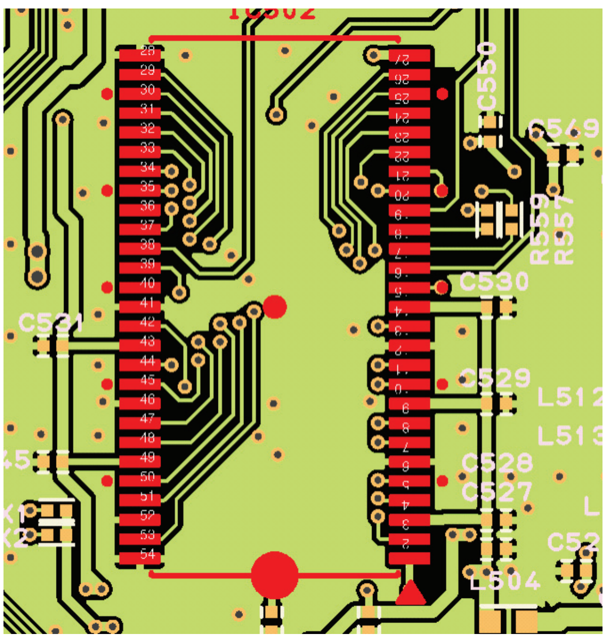
4-4-1. Solution

Please check and replace IC502 on MAIN board.

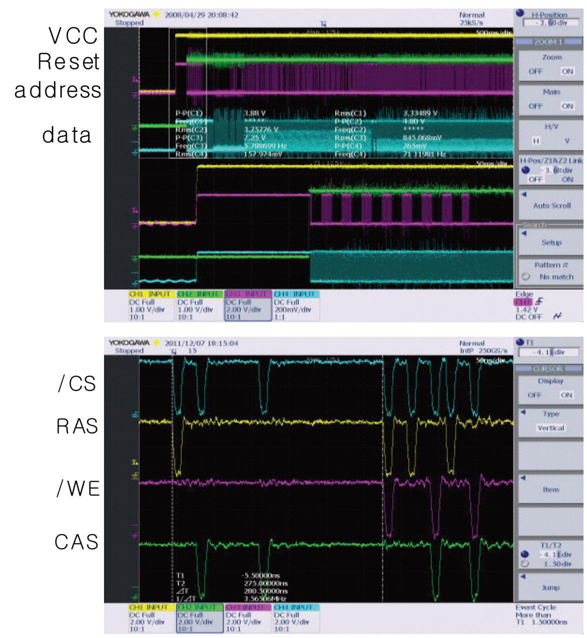
4-4-2. How to troubleshoot (Countermeasure)

1) Check below waveform & soldering status of SDRAM (IC502) on MAIN board.
   ⇨ If pin17(#CAS), pin18(#RAS), pin19($CS), pin38(CLK), pin29(address), pin2(DQ) doesn't come out, check damping resistor (R508, R506, R504, R507).
2) If resistor is OK, then replace IC502 (SDRAM).
3) After change IC502, if It is still not below waveform, check IC501 (DSP IC).

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



< Signal check point >



< Signal waveform >

ONE POINT REPAIR GUIDE

5. 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.

5-1. SPINDLE MOTOR

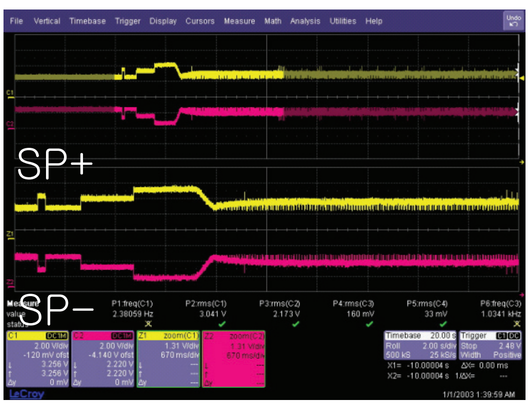
5-1-1. Solution

Please check and replace IC407, IC408 on MAIN board.

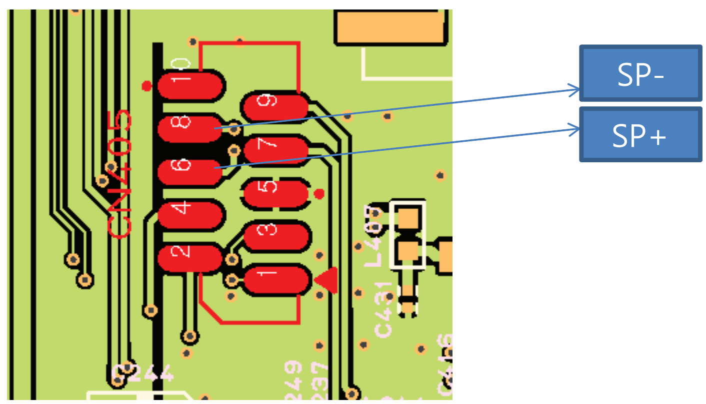
5-1-2. How to troubleshoot (Countermeasure)

1) Check the SPDO signal from Pin16 of IC407.
   ⇨ If no signal, check 3.3 V(RF) and X402.
2) Check the SP- & SP+ from IC408 to CN405 for driving SPINDLE motor. It is about 3.6 Vp-p.
   ⇨ If no signal, check +1.8 V and +5 V for IC408.
3) Check if the FFC cable is solidly connected between CN405 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.

5-1-3. 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.

5-2. SLED MOTOR

5-2-1. Solution

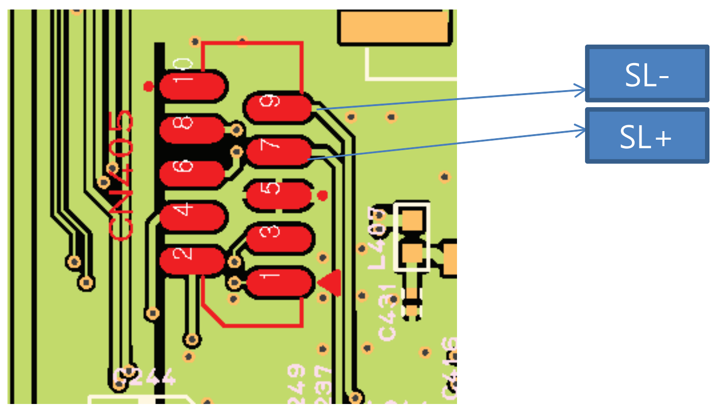
Please check and replace IC407, IC408 on MAIN board.

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

1) Check the SLDO signal from Pin15 of IC407.
   ⇨ If no signal, check 3.3 V(RF) and X402.
2) Check the SLED+ & SLED- from IC408 to CN405 for driving SPINDLE motor. It is about 2.9 Vp-p.
   ⇨ If no signal, check +1.8 V and +5 V for IC408.
3) Check if the FFC cable is solidly connected between CN405 and MD.
4) Check the MD.
   ⇨ If the sled motor is sort-circuit or has any trouble, it can not move the pick-up module.
   Please check the function after changing another MD.

5-2-3. 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.

5-3. TRAY OPEN / CLOSE MOTOR

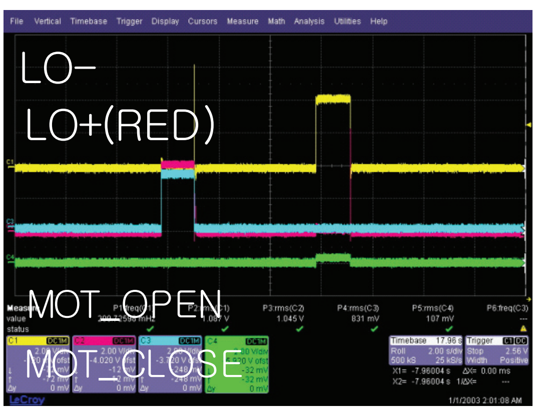
5-3-1. Solution

Please check and replace IC407, IC408 on MAIN board.

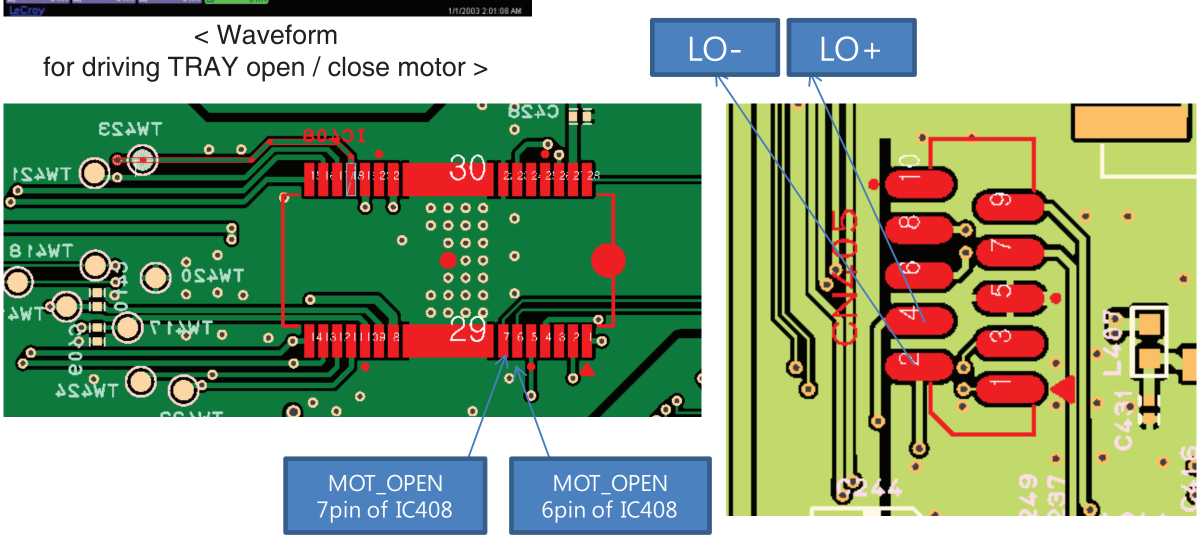
5-3-2. How to troubleshoot (Countermeasure)

1) Check MOT_OPEN & MOT_CLOSE signals from Pin62 & 63 of IC501 to IC408.
   ⇨ If no signal, check +1.8 V & + 5 V to IC408.
2) Check LOAD± from IC408 to CN405 for driving the tray open / close motor. It is about 3.85 Vp-p.
   ⇨ If no signal, check +5 V to IC408. If it has any trouble, replace it with a new one.
3) Check if the FFC cable is solidly connected between CN405 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.

5-3-3. 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.

5-4. LASER TRACKING ACTUATOR

5-5-1. Solution

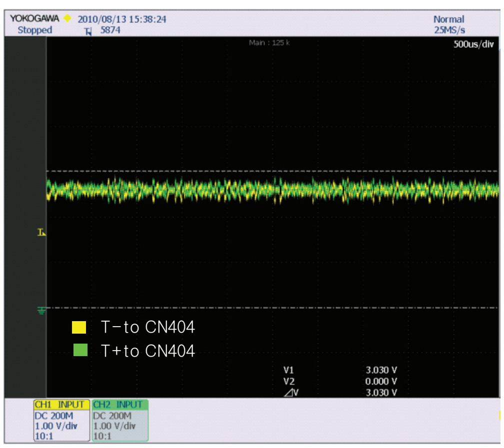
Please check and replace IC407, IC408 on MAIN board.

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

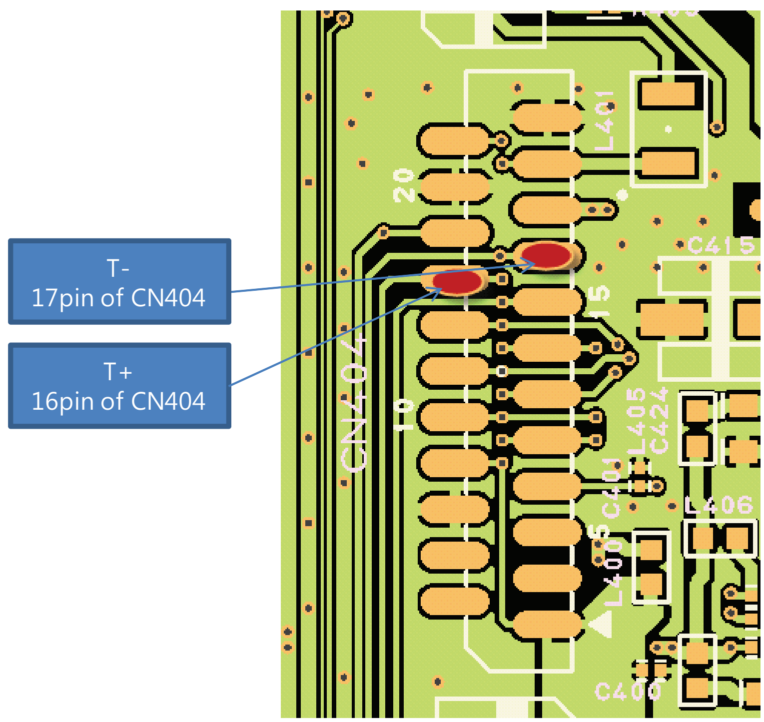
The tracking actuator makes the laser beam be positioned in the center of a track on CD disc.

1) Check the TRD signal from Pin14 of IC407.
   ⇨ If no signal, check 3.3 V(RF) and X402.
2) Check T- & T+ from IC408 to CN404 for driving the tracking actuator.
   ⇨ If no signal, check +1.8 V and +5 V for IC408.
3) Check if the FFC cable is solidly connected between CN404 and MD.
4) Check the MD.
   ⇨ If the pick-up 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.

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



< Waveform of T±
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.

5-5. LASER FOCUSING ACTUATOR

5-5-1. Solution

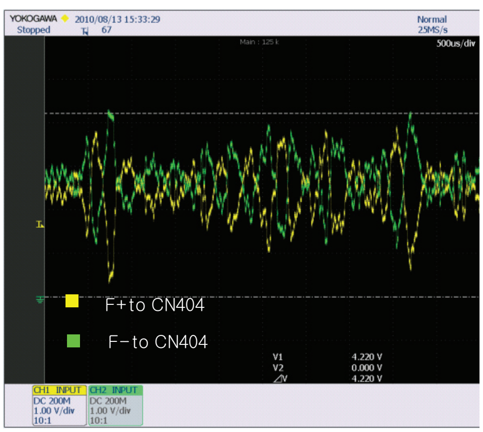
Please check and replace IC407, IC408 on MAIN board.

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

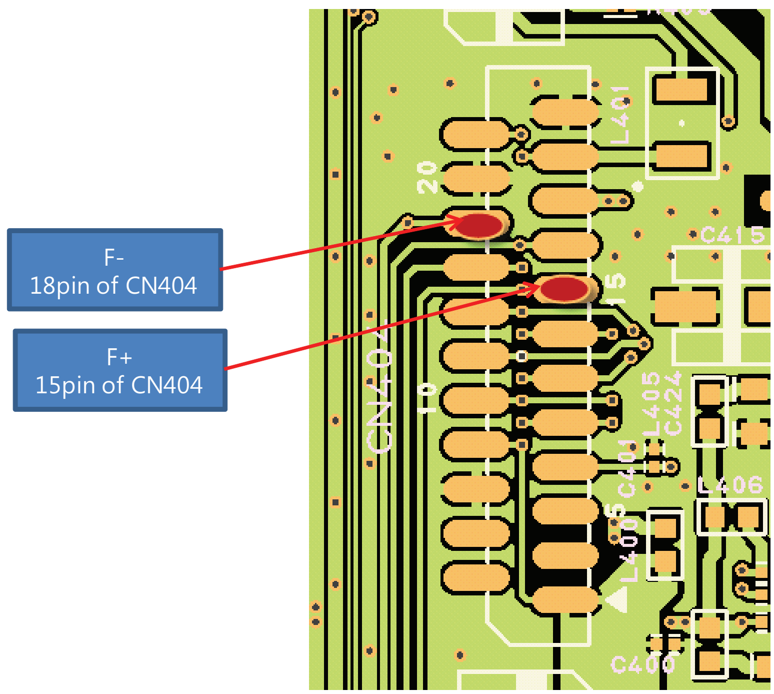
The focusing actuator makes the laser beam keep a regular interval with the surface of a CD disc.

1) Check the FOD signal from Pin13 of IC407.
   ⇨ If no signal, check 3.3 V(RF) and X402.
2) Check F- & F+ from IC408 to CN404 for driving the focusing actuator.
   ⇨ If no signal, check +1.8 V and +5 V for IC408.
3) Check if the FFC cable is solidly connected between CN404 and MD.
4) Check the MD.
   ⇨ If the pick-up 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.

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



< Waveform of TR±
for driving FOCUSING actuator >



< Signal check point >

ONE POINT REPAIR GUIDE

6. NO SOUND

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

6-1. IN THE CD FUNCTION

6-1-1. Solution

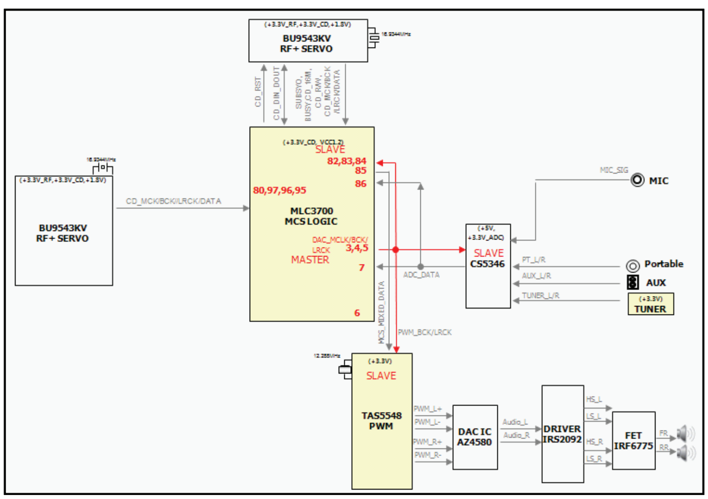
Please check and replace IC501, IC600 on MAIN board.

6-1-2. How to troubleshoot (Countermeasure)

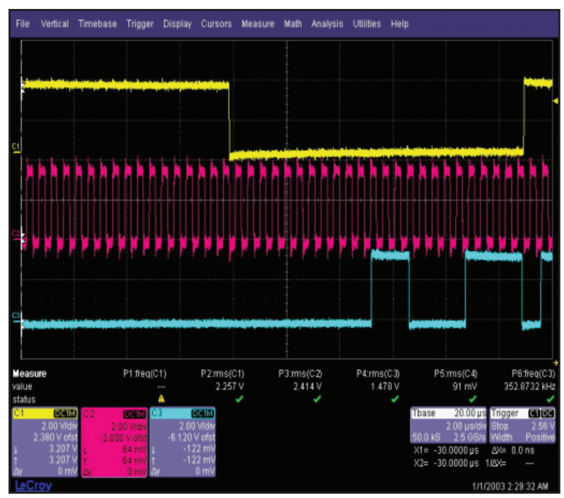
1) Check CD_BCK, CD_LRCK, & CD_DATA signals from IC407 to IC501.
   ⇨ If no signal, check if the RF & servo signals from MD is entered to IC407.
   Refer to the “No operation of MD” guide.
2) Check the following I2S signal flow. **< I2S audio signal Interface >**
   - MCS_BCK : IC501_pin4 --> IC600_pin23
   - MCS_LRCK : IC501_pin5 --> IC600_pin22 (44.1 kHz)
   - MCS_DATA_OUT : IC501_pin85 --> IC600_pin24
   - MCS_MCLK : IC501_pin3 --> IC501_pin82

   ⇨ 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”.

6-1-3. Service hint (Any picture / Remark)



< I2S Signal Flow >



< Waveform of I2S audio interface signals >
LRCK / BCK / DATA(IC501 Pin83, 84, 85)

ONE POINT REPAIR GUIDE

NO SOUND

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

6-2. IN THE USB FUNCTION

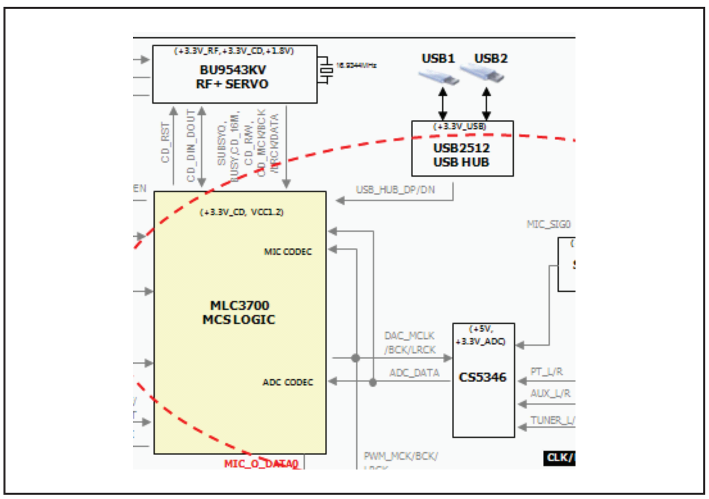
6-2-1. Solution

Please check and replace IC501, IC504 on MAIN board & IC3U01 on USB board.

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

1) Check +5VU to USB board.
   ⇨ If +5.6 VA to pin2 of IC352(LDO) doesn't come out, check pin2, 3 of CN351.
   ⇨ If +5.6 VA is normal & +5VU of IC352 pin3 doesn't come out, then replace IC352.
2) Check USB D± from main board to USB board.
   a. Check USB_HUB_DN/DP signals to IC501(pin16, 18)
   b. Check USB1/2_DN/DP signals from IC501 to CN502 (pin5, 6, 8 & 9)
   ⇨ 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".

6-2-3. Service hint (Any picture / Remark)



< USB function signal flow >

< Waveform of USB D± signal >
USB D+ / D- (CN502 Pin5, 6 & 8, 9)

ONE POINT REPAIR GUIDE

NO SOUND

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

6-3. IN THE AUX FUNCTION

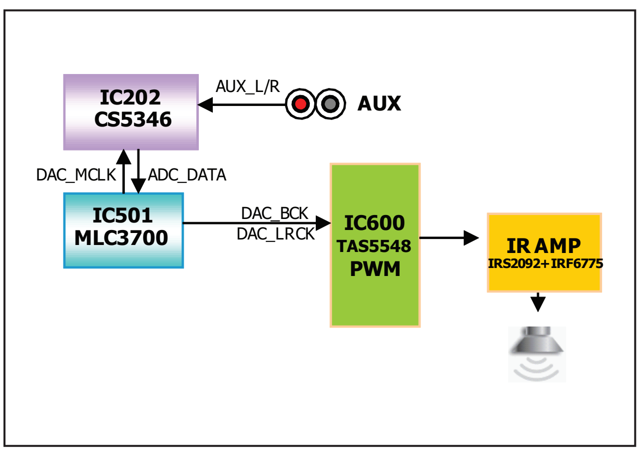
6-3-1. Solution

Please check and replace IC202 on MAIN board.

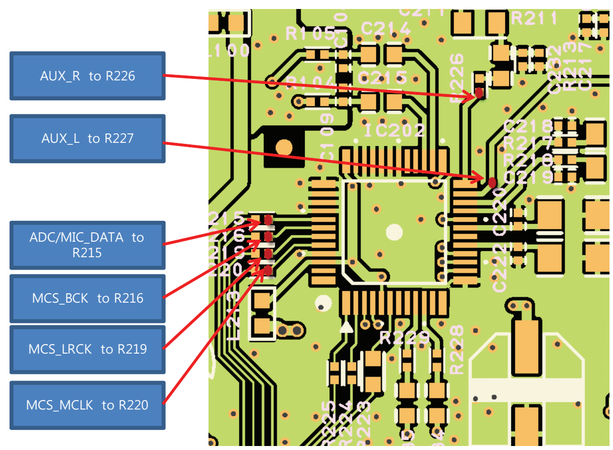
6-3-2. How to troubleshoot (Countermeasure)

1) Check AUX_L/R signals to IC202 (Pin23, 24).
2) Check if MCS_BCLK, MCS_LRCLK, & MCS_MCLK are entered from IC501 to IC202.
3) Check if ADC/MIC_DATA is entered from IC202 to IC501.
   ⇨ If no signal, check +5 V & +3.3 V(ADC) for IC202. If is NG, replace it a new one.
4) Check the following I2S signal flow from IC501 to IC600. (Refer to Item 6-1.)
   ⇨ 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.
   ⇨ If AMP is damaged, replace it with a new one.

6-3-3. 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 PORT. IN FUNCTION, repair the set according to the following guide.

6-4. IN THE PORT. IN FUNCTION

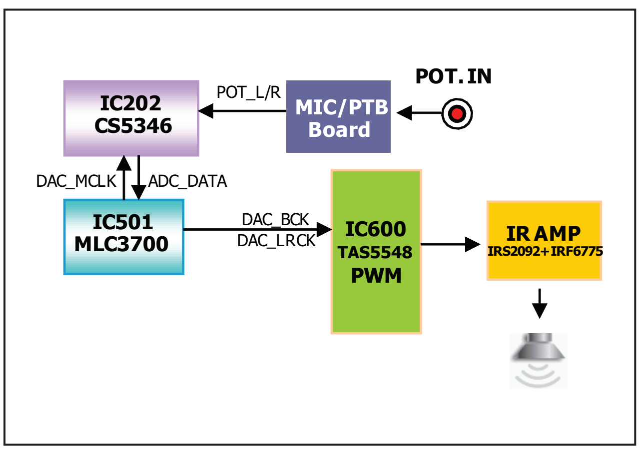
6-4-1. Solution

Please check and replace IC202 on MAIN board.

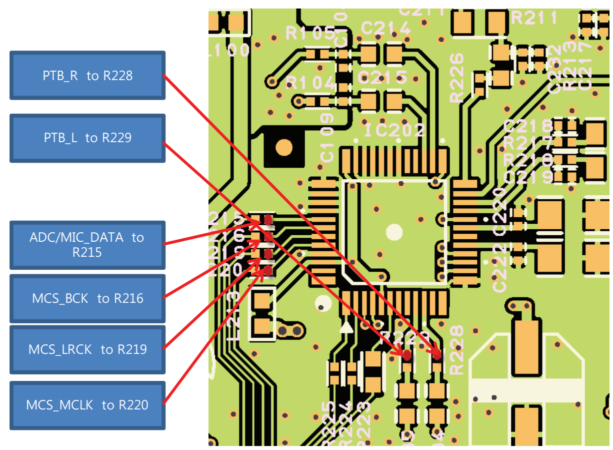
6-4-2. How to troubleshoot (Countermeasure)

1) Check PT_L/R signal from MIC/PTB board to MAIN board.
2) Check POT_L/R signals to IC202(Pin9, 10).
3) Check if ADC_BCK, ADC_LRCK, & DAC_MCLK are entered from IC501 to IC202.
4) Check if ADC_DATA is entered from IC202 to IC501.
   ⇨ If no signal, check +5 V & +3.3 V(ADC) for IC202. If is NG, replace it a new one.
5) Check the following I2S signal flow from IC501 to IC600. (Refer to Item 6-1.)
   ⇨ 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.
6) Check if the digital audio AMP block is okay. Refer to “Digital Audio AMP” guide.
   ⇨ If AMP is damaged, replace it with a new one.

6-4-3. Service hint (Any picture / Remark)



< PORT. IN 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.

6-5. IN THE TUNER FUNCTION

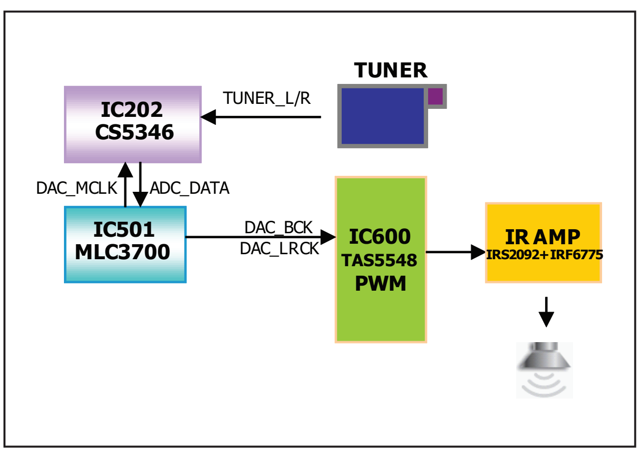
6-5-1. Solution

Please check and replace IC202, TU101 on MAIN board.

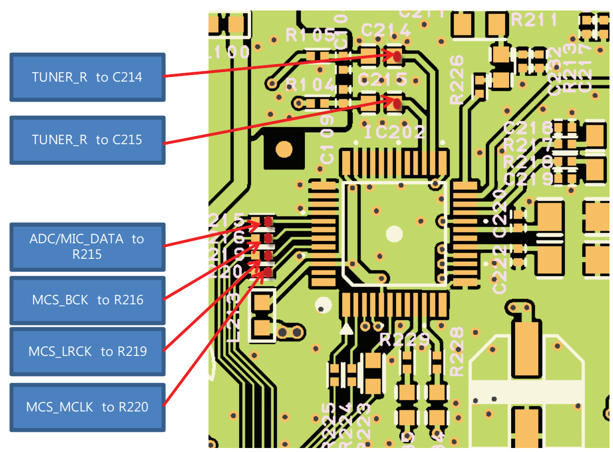
6-5-2. How to troubleshoot (Countermeasure)

1) Check if TUNER_LR is entered from Pin1 & 3 of TU101 to IC202(Pin23, 24).
   ⇨ If no signals, Check +3.3 V for Tuner power.
   ⇨ Check if the Tuner control signals (CLK, DAT, CE, RST, GPO2) are entered from IC101 to TU101. If it doesn't work, replace TUNER with a new one.
2) Check if MCS_BCK, MCS_LRCK, & MCS_MCLK are entered from IC501 to IC202.
3) Check if ADC/MIC_DATA is entered from IC202 to IC501.
   ⇨ If no signal, check +5 V & +3.3 V(ADC) for IC202. If is NG, replace it a new one.
4) Check the following I2S audio signal flow from IC501 to IC600. (Refer to Item 6-1.)
   ⇨ 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.
   ⇨ If AMP is damaged, replace it with a new one.

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



< TUNER function signal flow >



< Signal check point >

ONE POINT REPAIR GUIDE

NO SOUND

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

6-6. IN THE MIC IN FUNCTION

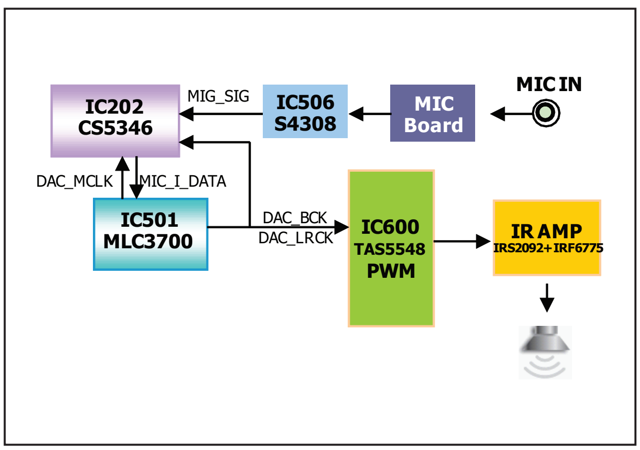
6-6-1. Solution

Please check and replace IC202 on Main Board or ICM101 on MIC board.

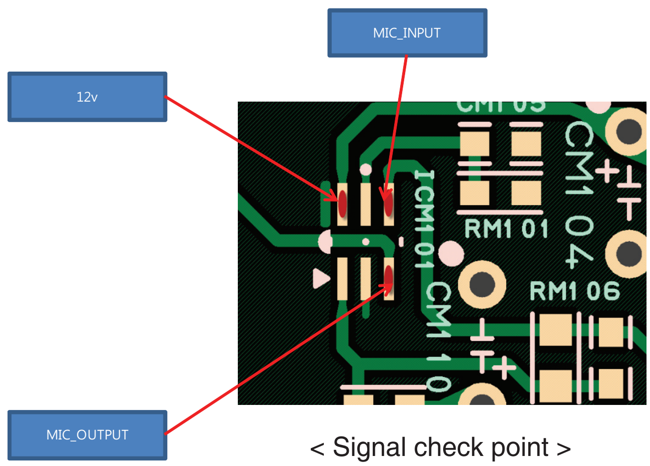
6-6-2. How to troubleshoot (Countermeasure)

1) Check MIC_SIG signal to Pin10 of CN200.
   ⇨ If no signal, Check the signal to Pin1 of CNM101 on the MIC board.
2) Check if MIC_SIG is entered from Pin1 of CNM101 to Pin3 of IC506 (MIC AMP).
3) Check if the amplified signal is entered from Pin4 of IC506.
   ⇨ If no signal output, check +12 V for IC506, replace IC506 with a new one if it has a problem.
4) Check if MCS_BCK, MCS_MLCK & MCS_LRCK is entered from IC501 to IC202.
   ⇨ If no signal, check +5 V & +3.3 V for IC508. If it is abnormal, change replace it a new one.
5) Check if the digital audio AMP block is okay. Refer to “Digital Audio AMP” guide.
   ⇨ If AMP is damaged, replace it with a new one.

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



< MIC IN function signal flow >



< Signal check point >

ONE POINT REPAIR GUIDE

NO SOUND

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

6-7. IN THE BLUETOOTH FUNCTION

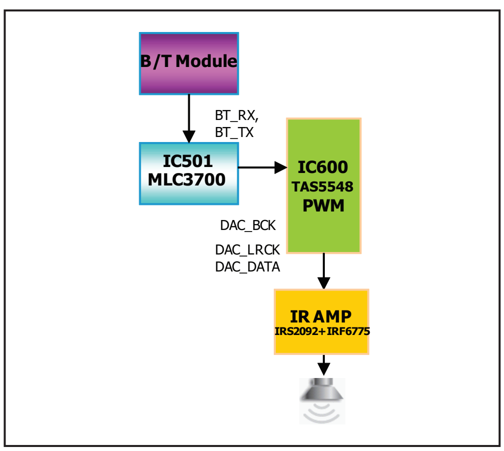
6-7-1. Solution

Please check and replace IC501 on MAIN board and Bluetooth module on front panel.

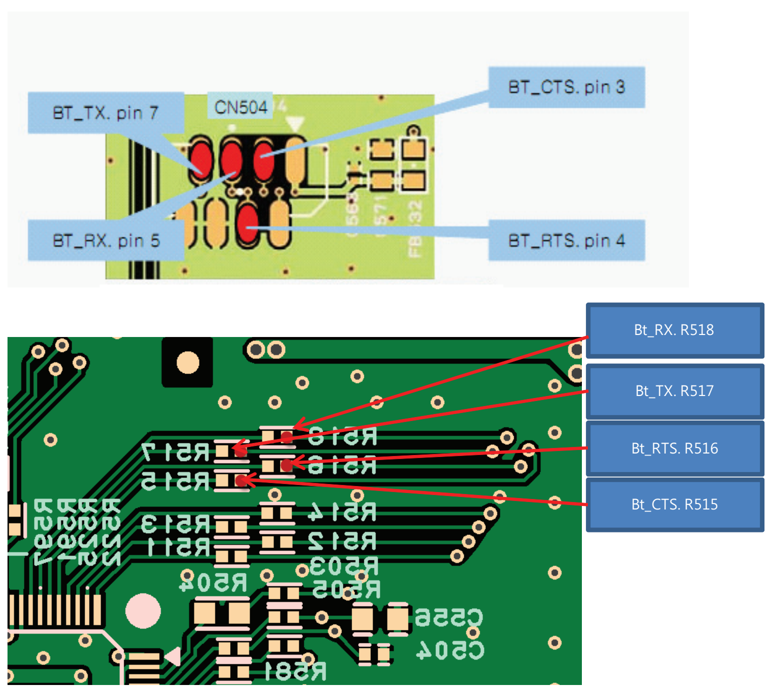
6-7-2. How to troubleshoot (Countermeasure)

1) Check BT_RX, BT_TX signal to Pin5, 7 of CN504.
   ⇨ If no signal, check the signal to Pin5, 7 and Pin1(+3.3 V) of on the Bluetooth module and cable connection state.
   ⇨ If there are no signal out from module, replace new module.
2) Check if BT_RX/TX is entered from Pin5, 7 of CN504 to Pin169, 170 to IC501 (DSP).
3) Check if MIC_BCK, MIC_MLCK & MIC_O_DATA is entered from IC501 to IC600.
   ⇨ If no signal, check VCC12(+1.2 V) for IC501. If it is abnormal, change replace it a new one.
4) Check the following I2S signal flow from IC501 to IC600.
   ⇨ If there is any trouble, check the power for each IC. If the signals are abnormal, replace it a new one.
5) Check if the digital audio AMP block is okay. Refer to "Digital Audio AMP" guide.
   ⇨ If AMP is damaged, replace it with a new one.

6-7-3. Service hint (Any picture / Remark)



< BLUETOOTH function signal flow >



< Signal check point >

ONE POINT REPAIR GUIDE

7. AUDIO OUTPUT IS SMALL OR NO AUDIO OUTPUT

Audio signal output is small or not. when you power on the Middle Power Mini System.

7-1. IC700 ~ IC705

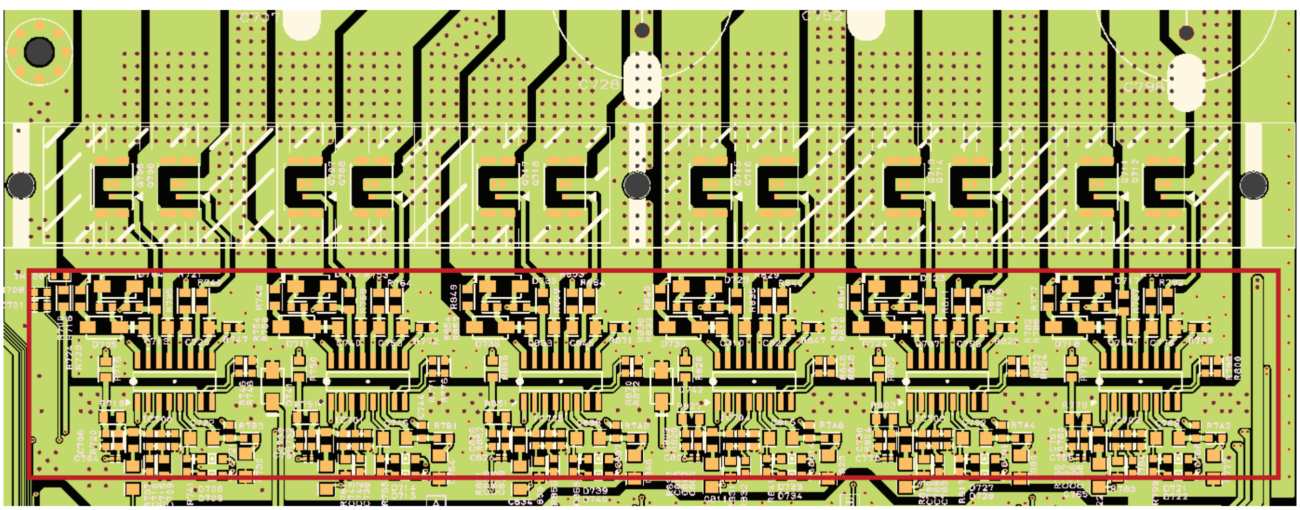
7-1-1. Solution

Please check and replace IC700 ~ IC705 on MAIN board.

7-1-2. How to troubleshoot (Countermeasure)

1) Please check if this system is on bass blast mode.
   ⇨ C, RL and RR make sound only on bass blast mode.
2) Check the IC700 ~ IC705 on your eyes.
3) Check the audio signal output check (Pin13 of IC700 ~ IC705).
   First, check the Audio Data input (Pin3 pin of IC700 ~ IC705).
4) If the audio signal output has no output, try to change IC which has no output.
5) Lastly, check Speaker Terminal (TM700).

7-1-3. Service hint (Any picture / Remark)



< MAIN board top view >

ONE POINT REPAIR GUIDE

8. NO POWER ON (STANDBY LED IS BLINKING)

It doesn't turn on, and blinks standby LED(Red).

8-1. AMP FETs

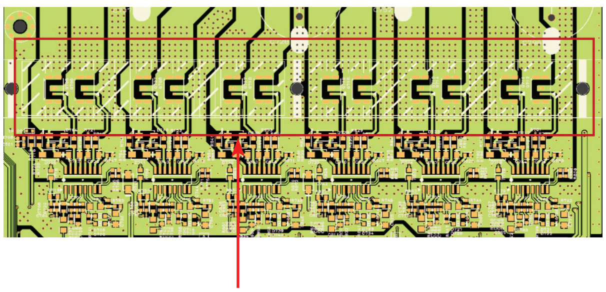
8-1-1. Solution

Please check and replace Q705 ~ Q708, Q711 ~ Q718 on MAIN board.

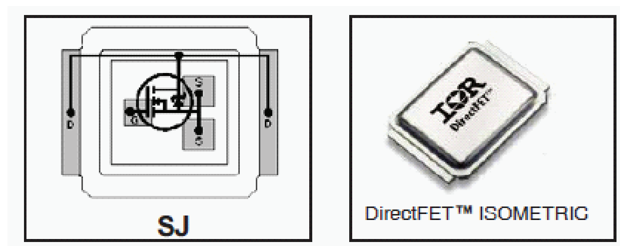
8-1-2. How to troubleshoot (Countermeasure)

1) This symptom occurs, when DC protection is detected. Main reasons are like below.
   - When Some of AMP FETs dead.

8-1-3. Service hint (Any picture / Remark)



AMP FET : IRF6775



Notice for FET service

- In case of RF6775, Metal case, FET Drain, has electric potential. So be careful when you deal with it.

*** You can see FET after removing heatsink.**

*** Notice for Service**

Before repair Main Assy, you need to discharge SMPS.
After then, open the connector.
You should try to change both of +/- FET and Driver IC as a pair.

ONE POINT REPAIR GUIDE

9. SPEAKER NO AUDIO

Speaker No Audio

9-1. AMP IC

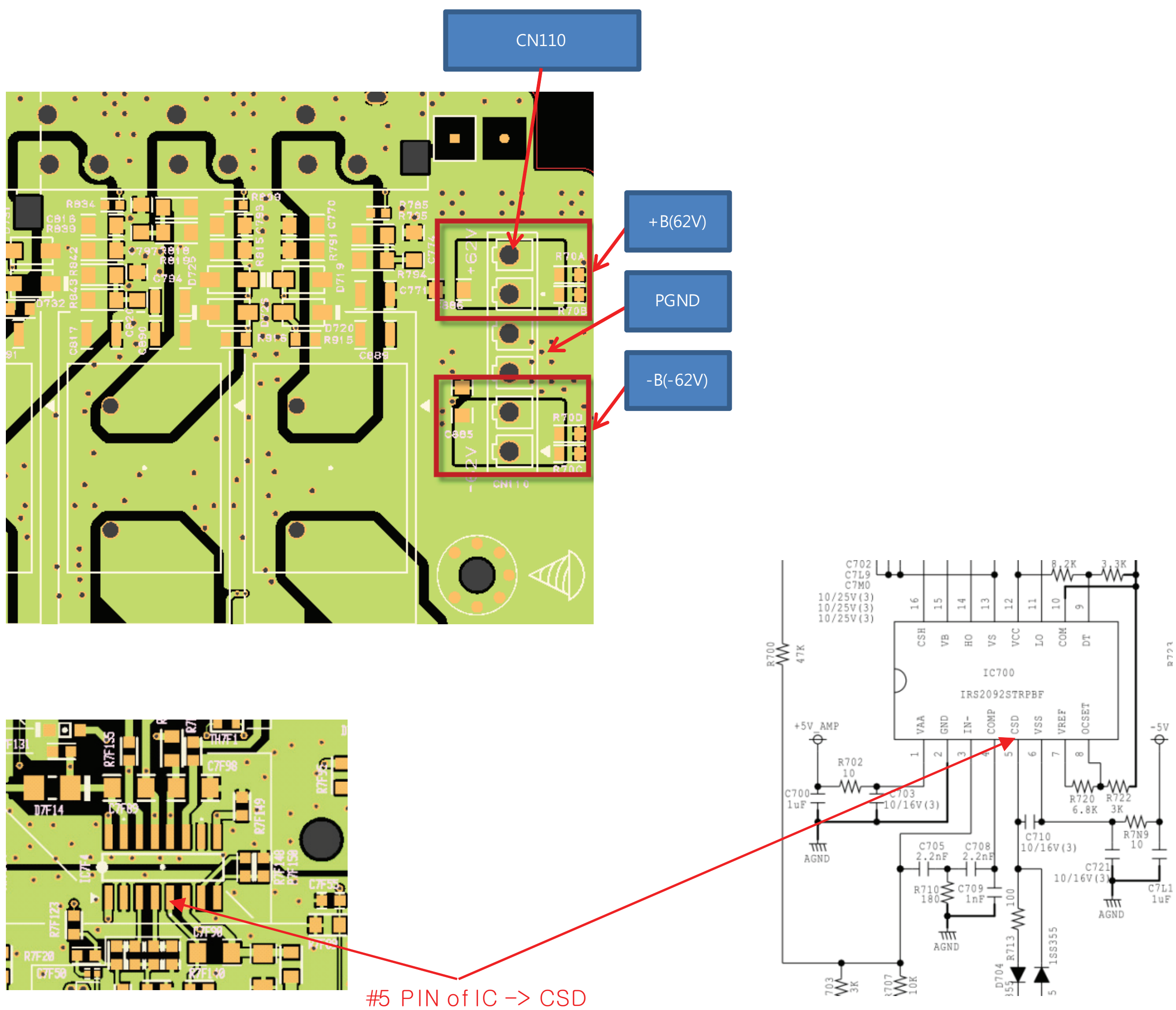
9-1-1. Solution

Please check and replace the component on MAIN board.

9-1-2. How to troubleshoot (Countermeasure)

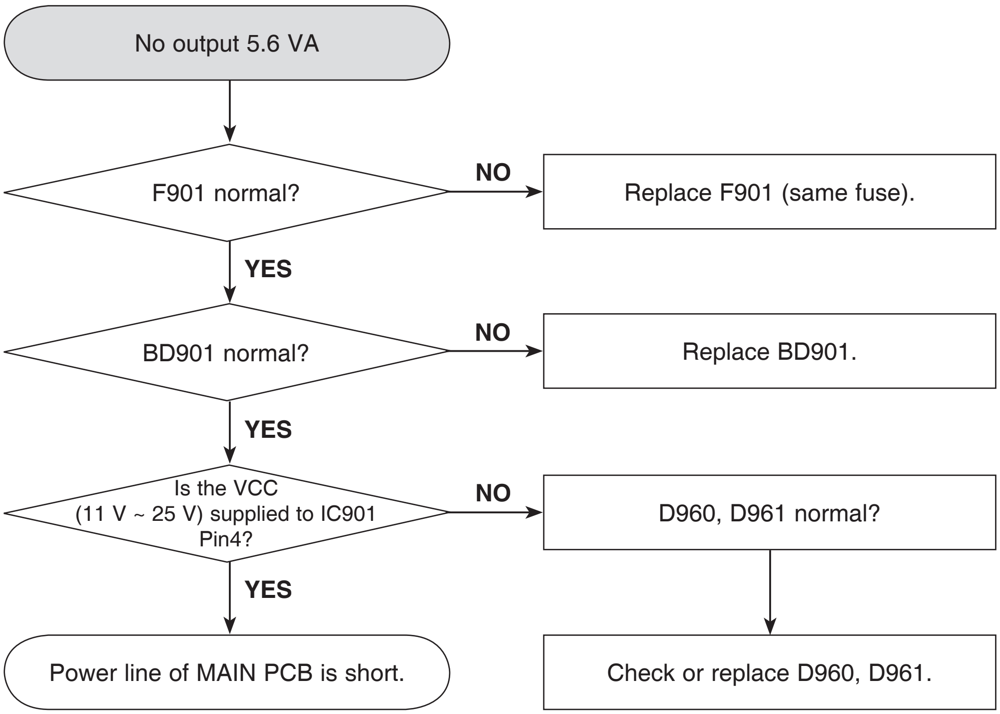
1) Check supply voltage of AMP(CN101) & PWM signal
   Normal Supply voltage and signal ⇨ Check AMP IC.
   Poor supply voltage ⇨ Check SMPS Assy.
   Poor signal ⇨ Check PWM IC.
2) Check CSD of FET driver IC (IRS2092 : EAN60778301).
   CSD has about 5 V on normal state.
   When AMP has problem, CSD is LOW state or keep change LOW to HIGH.

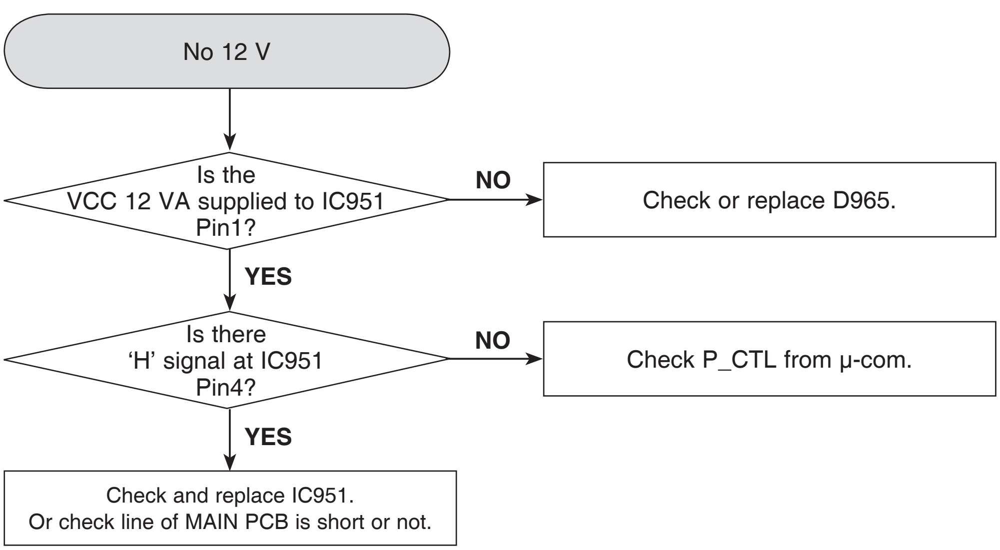
9-1-3. Service hint (Any picture / Remark)



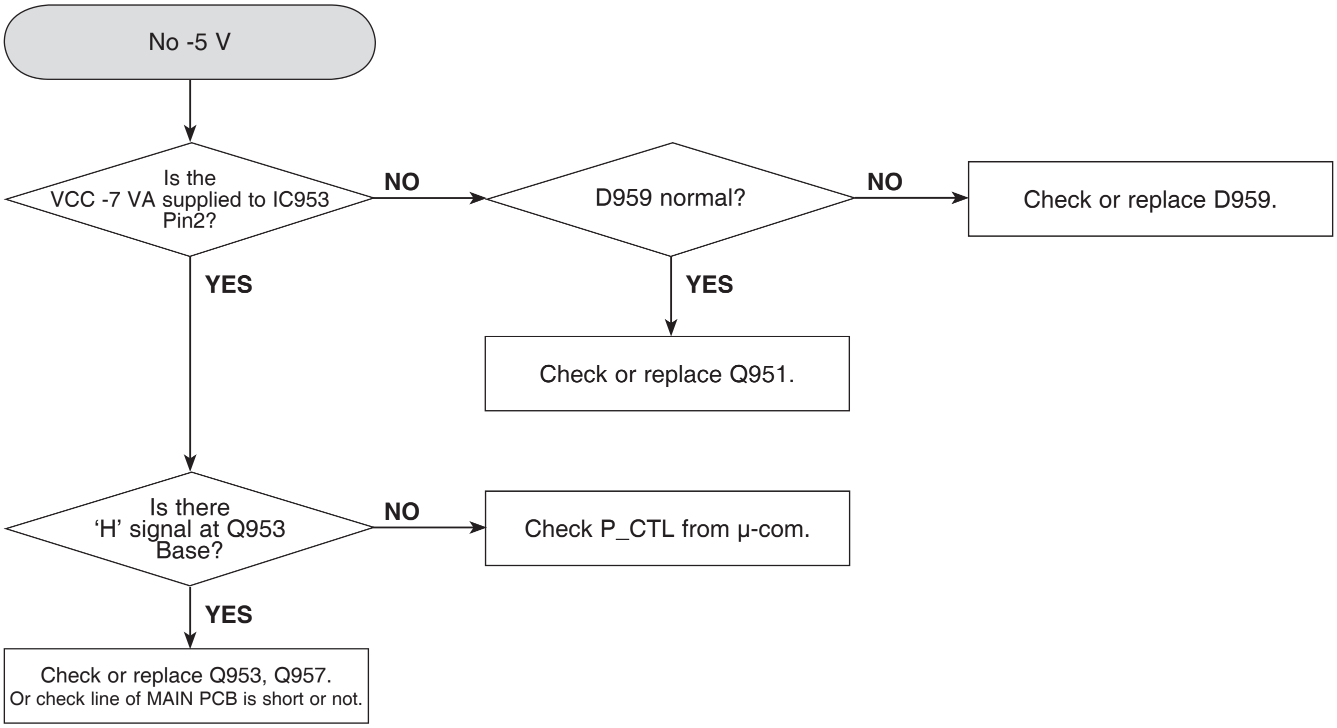
ELECTRICAL TROUBLESHOOTING GUIDE

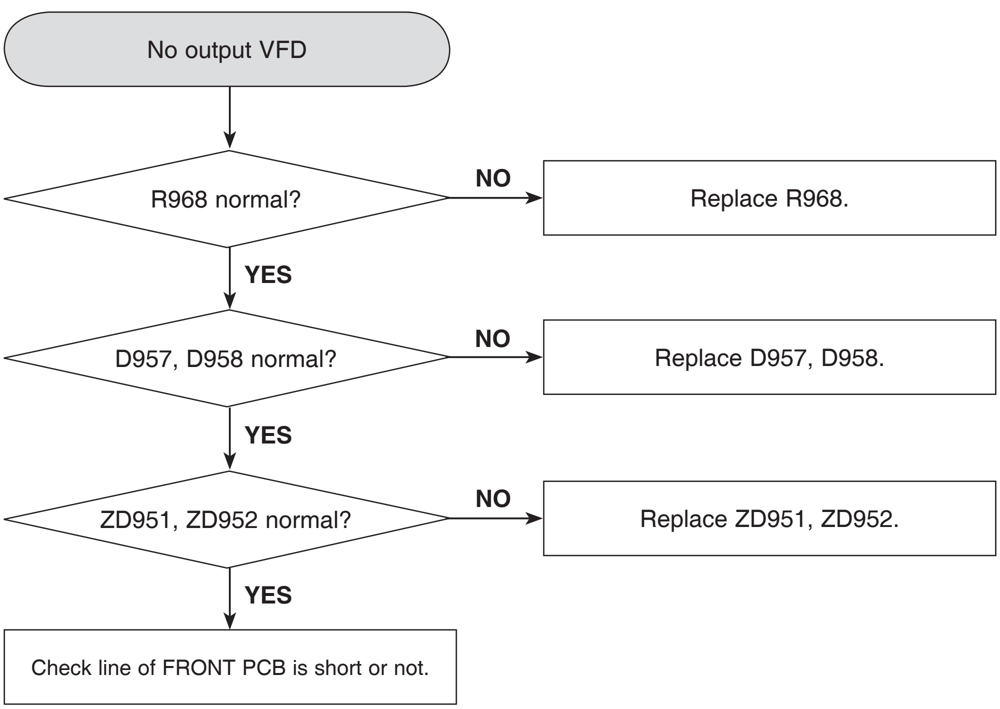
1. POWER SUPPLY ON SMPS BOARD



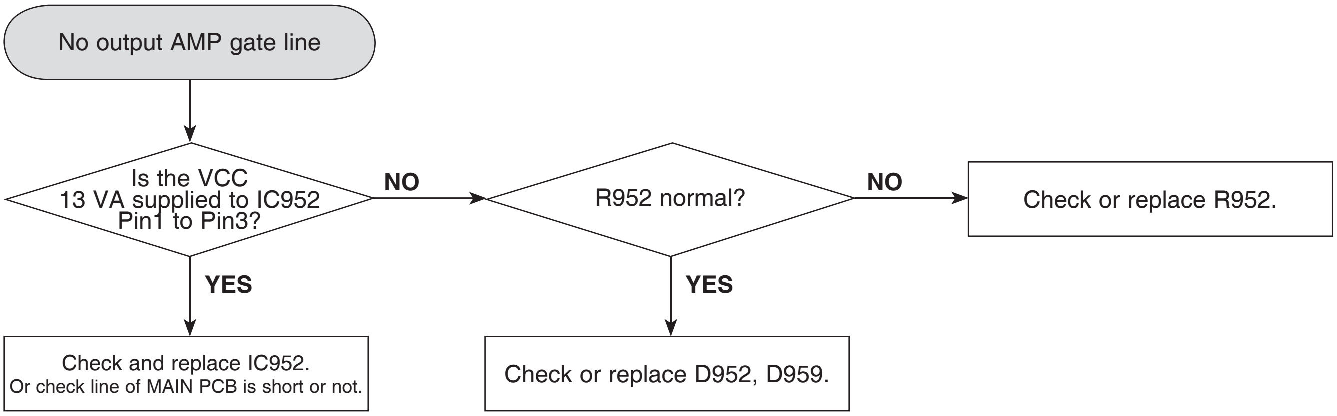


ELECTRICAL TROUBLESHOOTING GUIDE

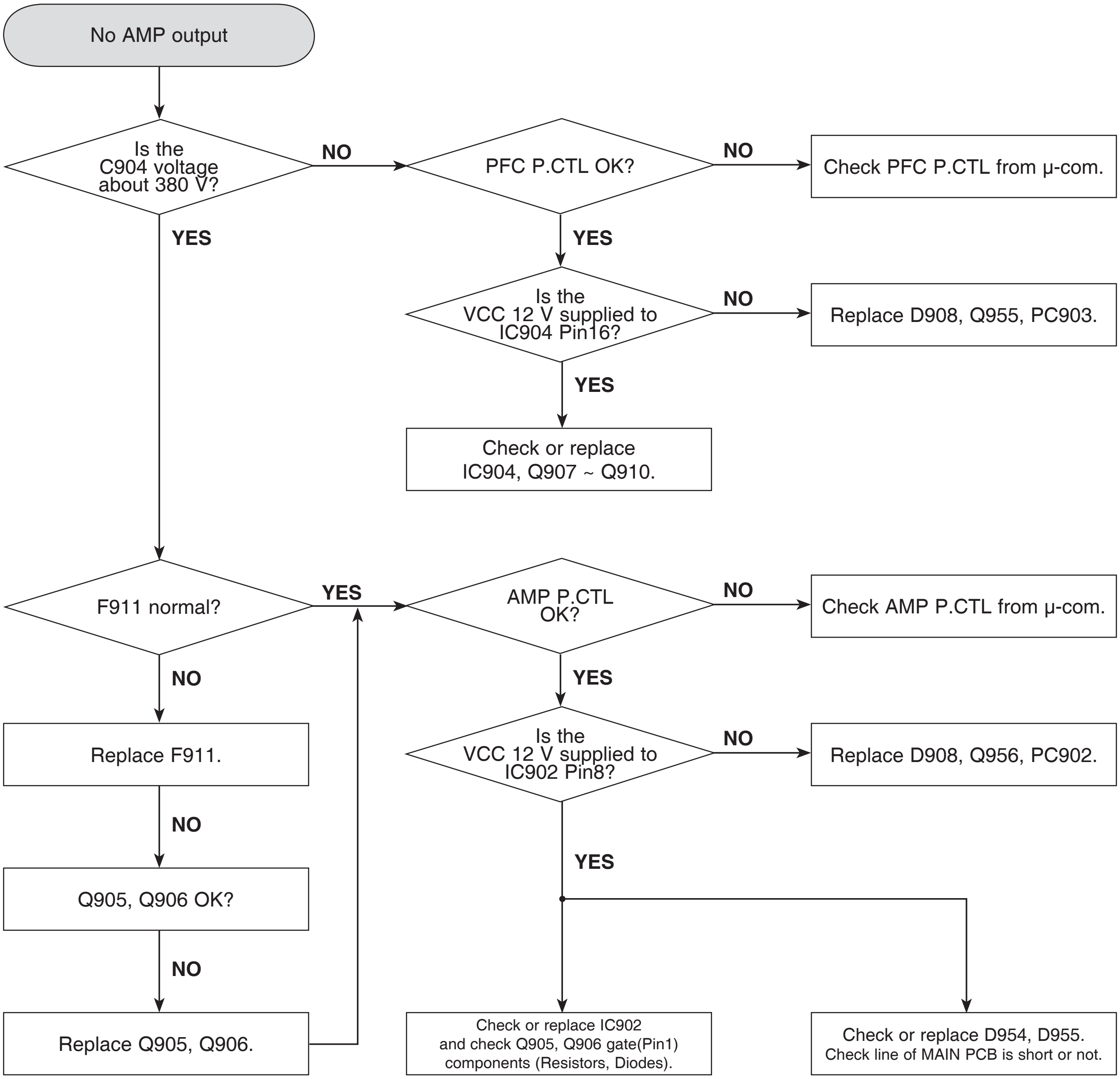




ELECTRICAL TROUBLESHOOTING GUIDE

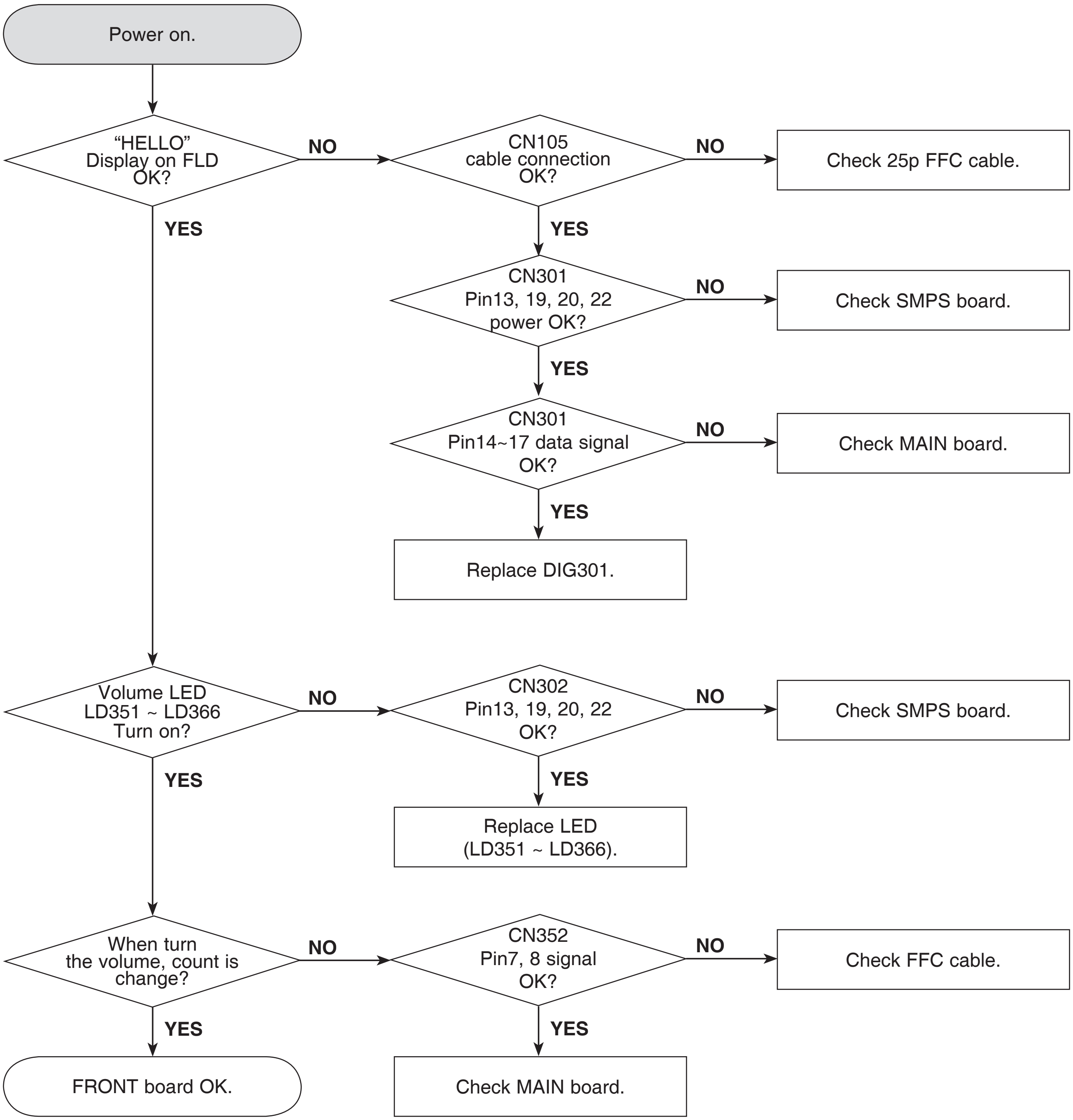


ELECTRICAL TROUBLESHOOTING GUIDE



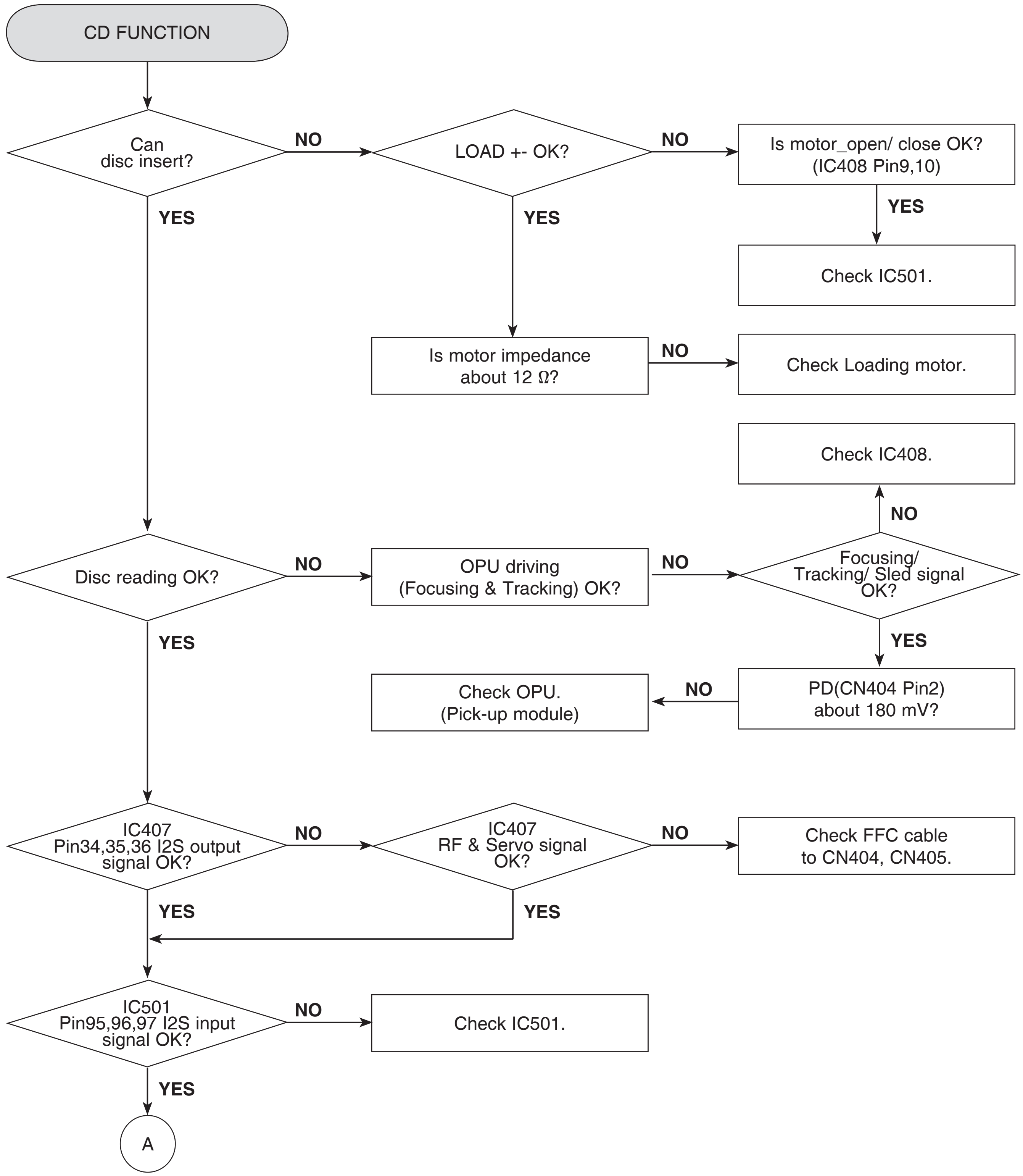
ELECTRICAL TROUBLESHOOTING GUIDE

2. SYSTEM PART

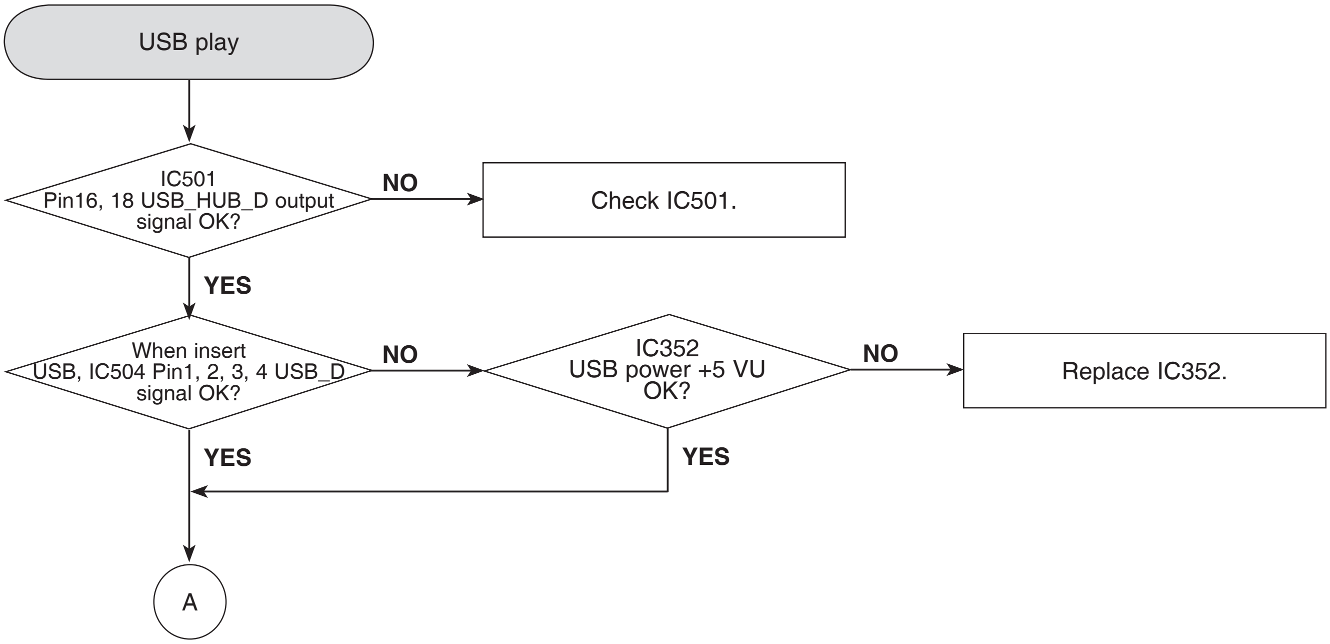


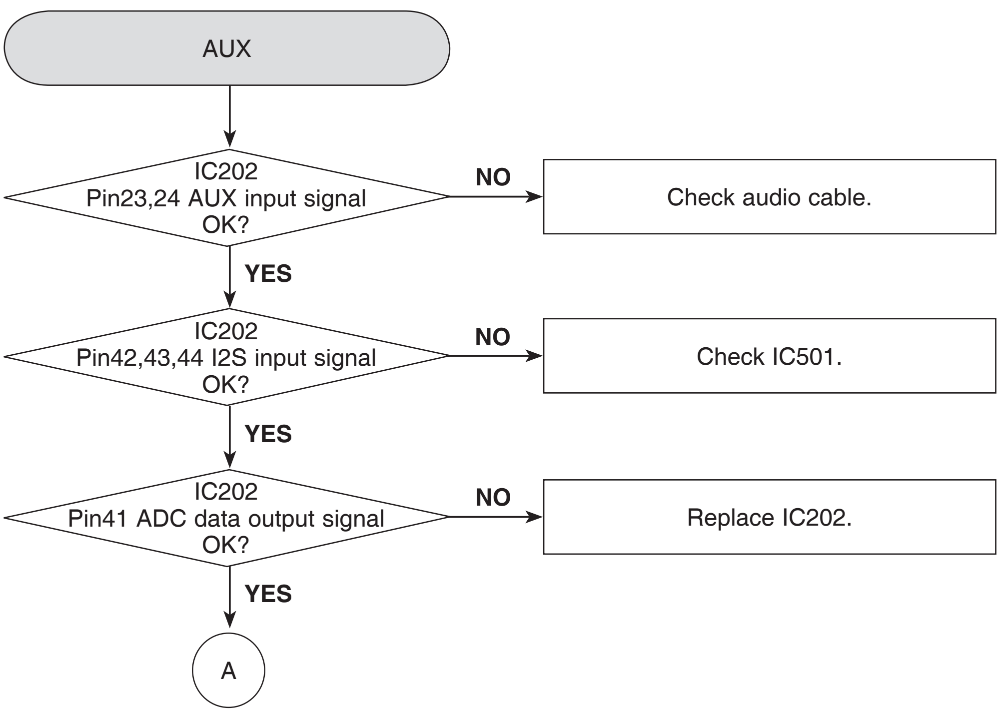
ELECTRICAL TROUBLESHOOTING GUIDE

3. NO AUDIO PART

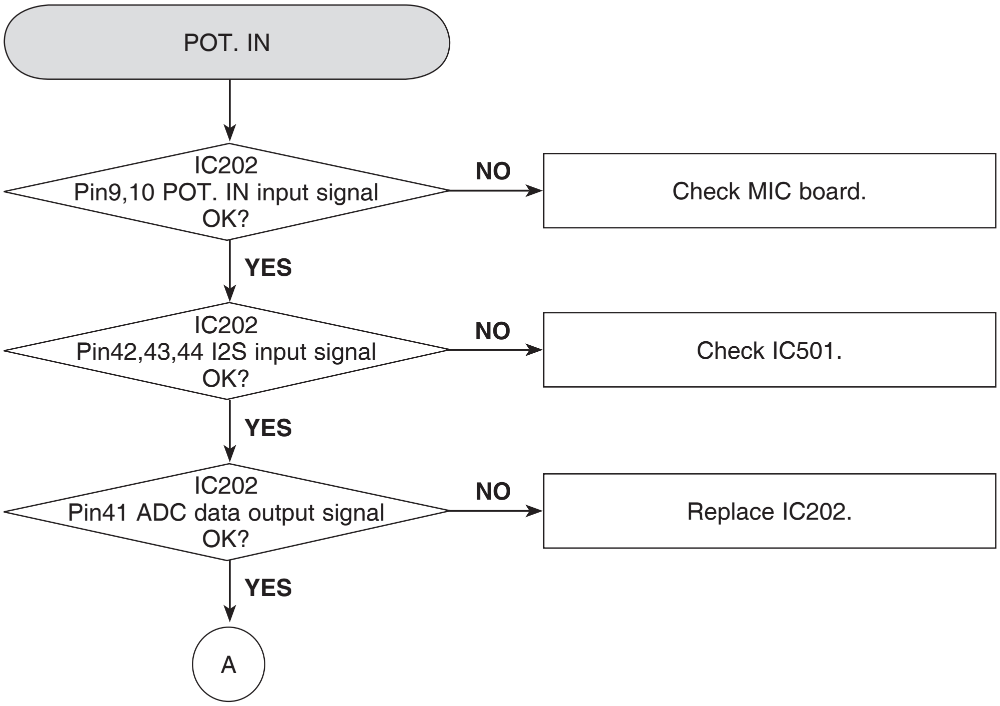


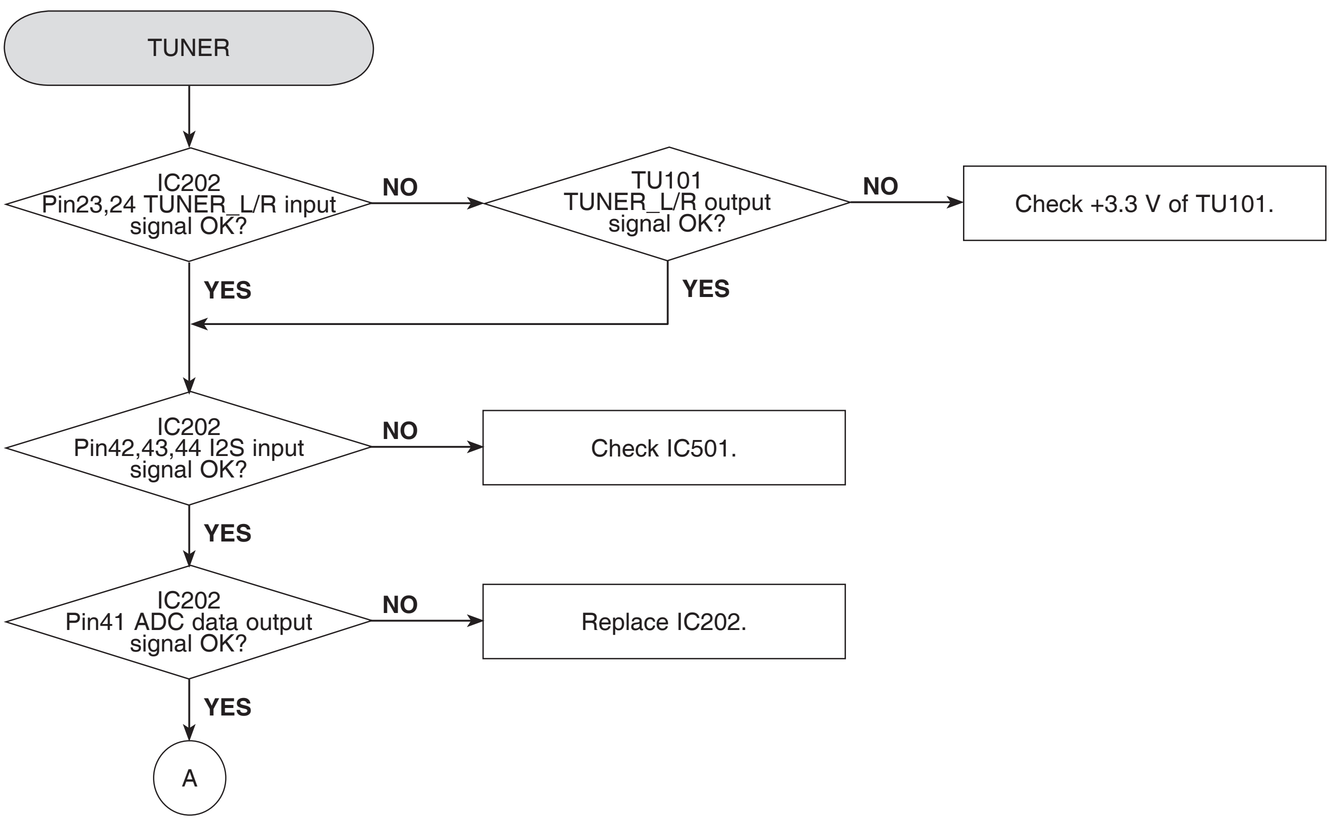
ELECTRICAL TROUBLESHOOTING GUIDE



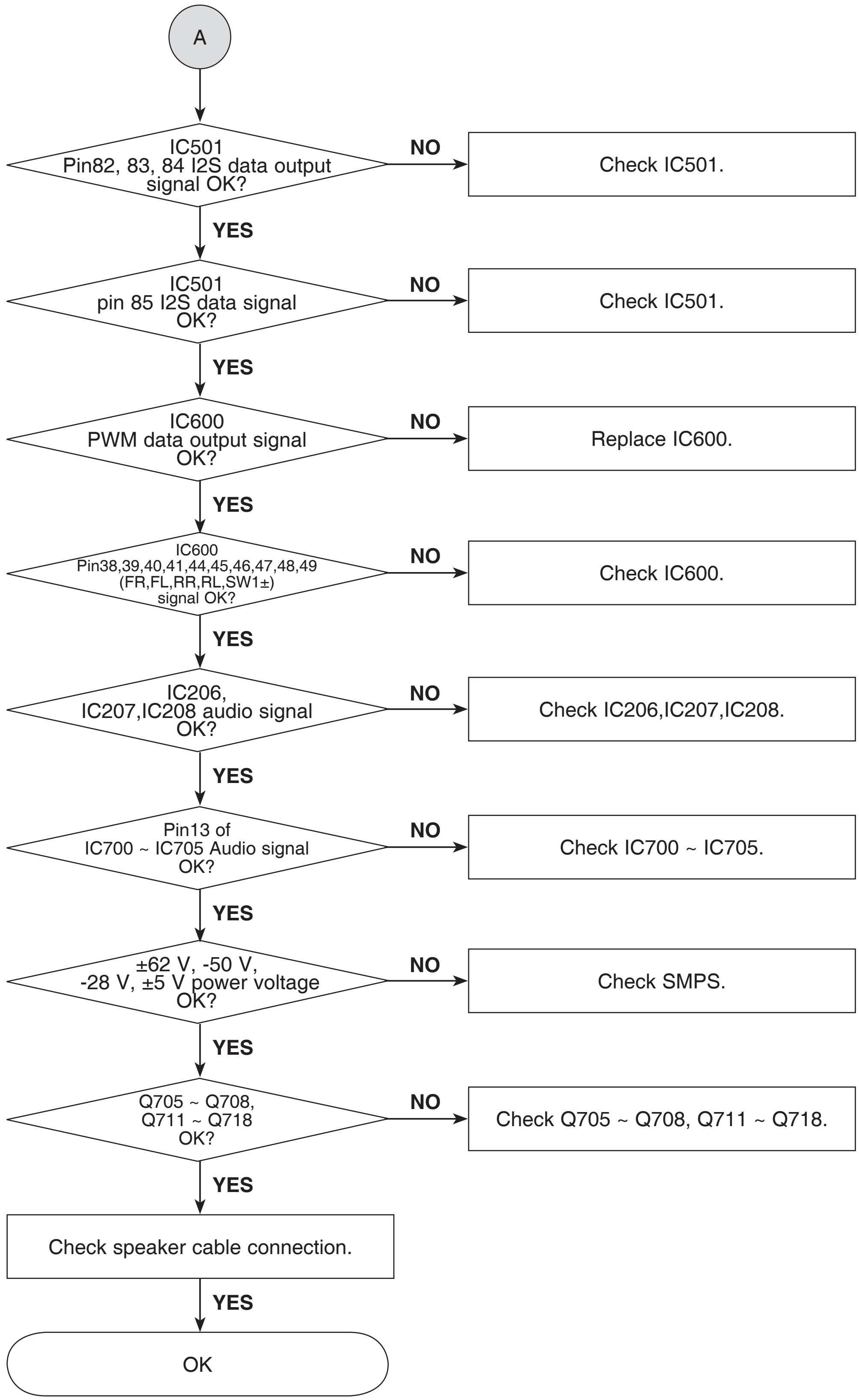


ELECTRICAL TROUBLESHOOTING GUIDE



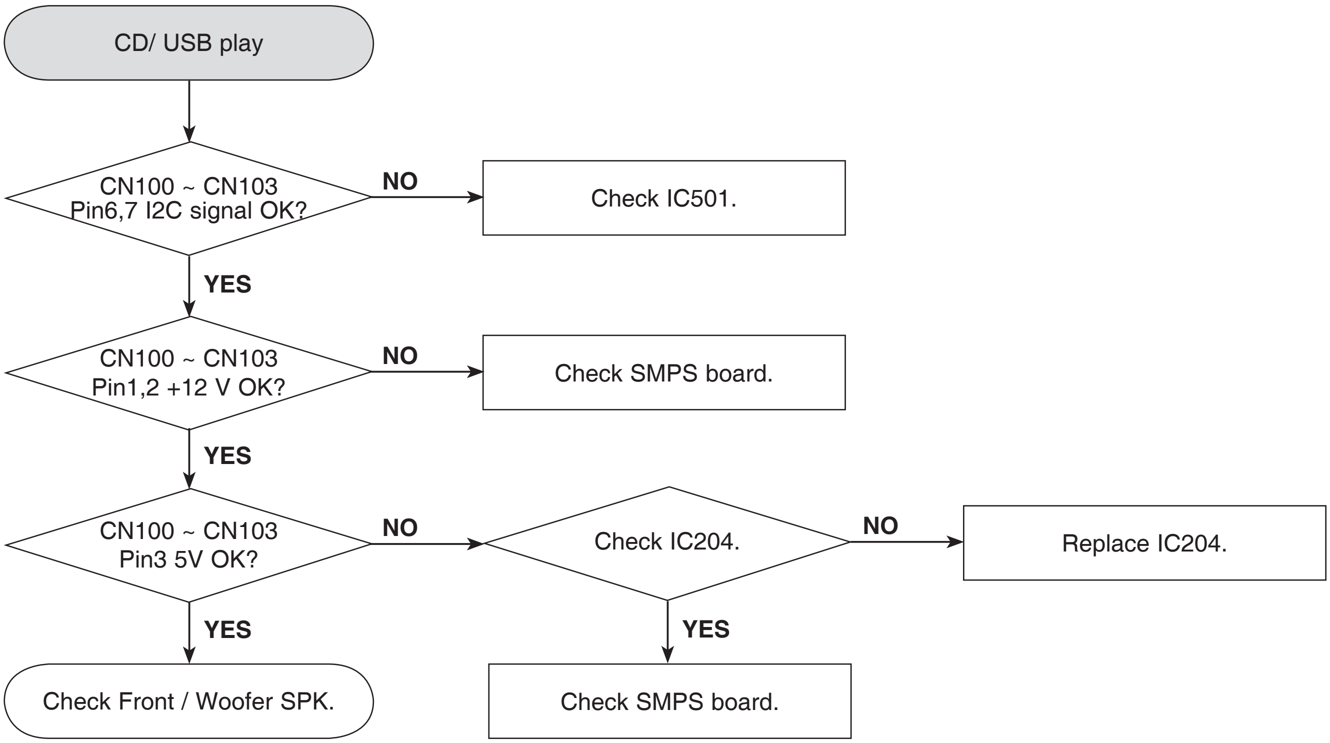


ELECTRICAL TROUBLESHOOTING GUIDE



ELECTRICAL TROUBLESHOOTING GUIDE

4. NO LIGHTING (FRONT/ WOOFER SPEAKER)



WAVEFORMS OF MAJOR CHECK POINT

1. WAVEFORM OF SERVO

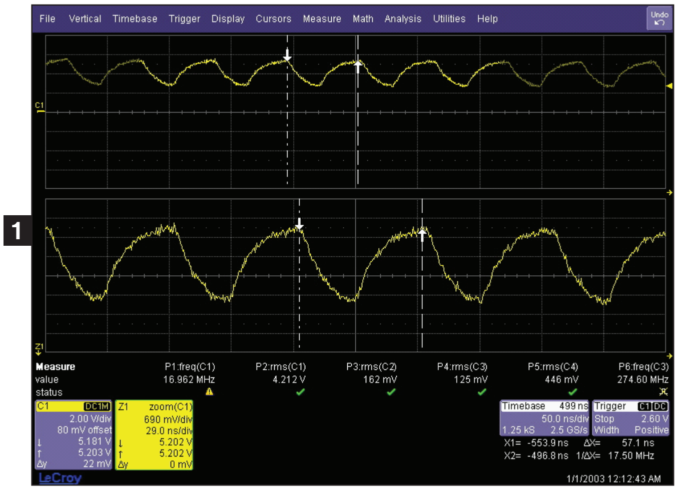


Figure 1-1. CD-16M
(IC407 Pin31)

Figure 1-2. SERVO-FE, TE, FOD, RF
(IC407 Pin61, 62, 63 / IC408 Pin1)

2. WAVEFORM OF MOTOR DRIVE

Figure 2-1. SP- & SP+ for driving SPINDLE motor (IC408 Pin17, 18)

Figure 2-2. SL- & SL+ for driving SPINDLE motor (IC408 Pin11, 12)

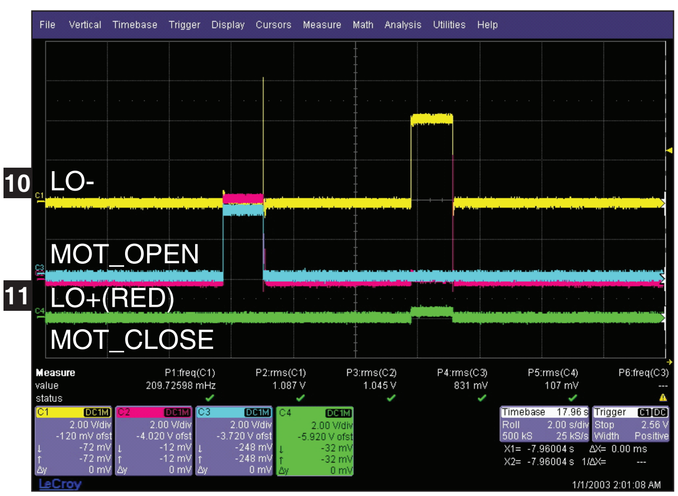


Figure 2-3. LO- & LO+ for driving Tray motor (IC408 Pin9, 10)

3. WAVEFORM OF AUDIO SIGNAL

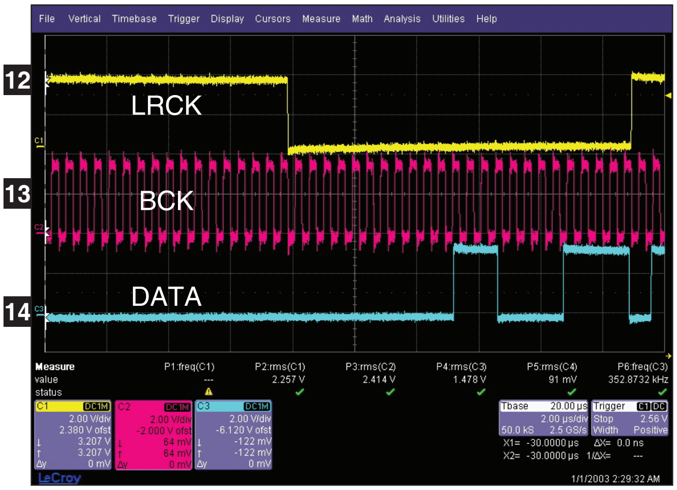


Figure 3-1. (IC501 Pin83, 84, 85)

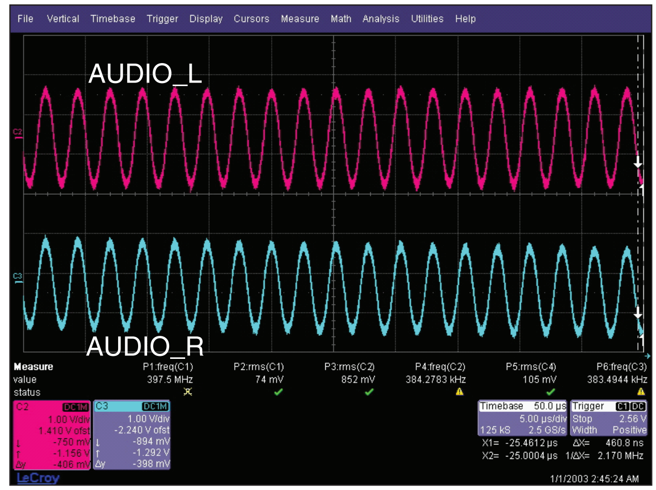


Figure 3-2. AUDIO_L/R

4. WAVEFORM OF ADC

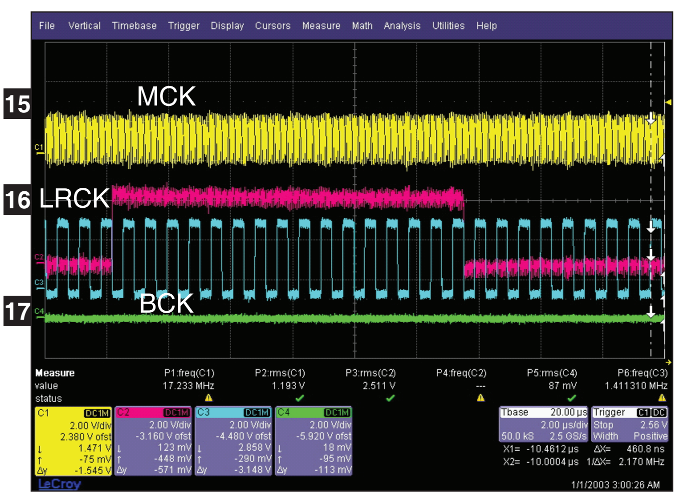


Figure 4. ADC I2S
(IC202 Pin42, 43, 44)

5. WAVEFORM OF USB

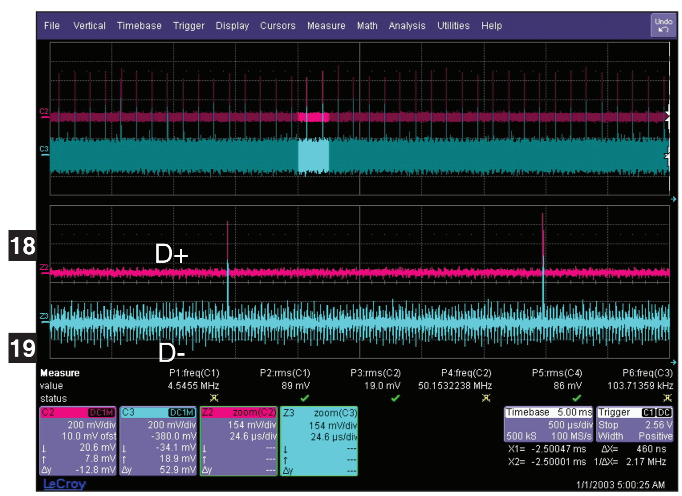


Figure 5. USB D+/D-
(CN502 Pin1, 2 & Pin9, 10)

6. WAVEFORM OF CRYSTAL

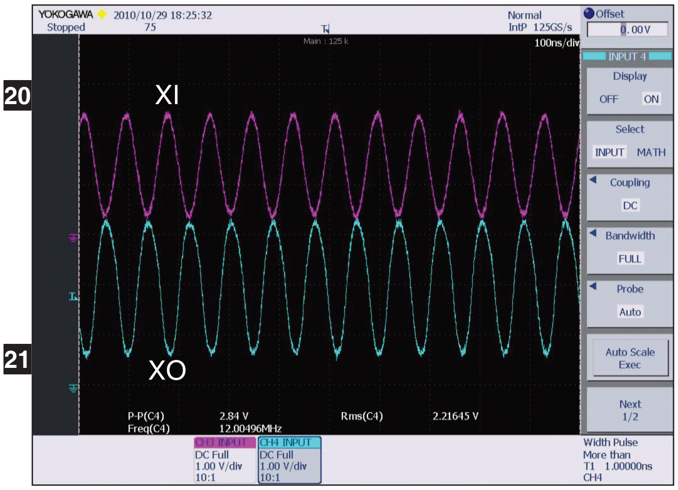


Figure 6. 12 MHz Crystal
(IC501 Pin27, 28)

7. WAVEFORM OF VFD GRID CURRENT DRIVER

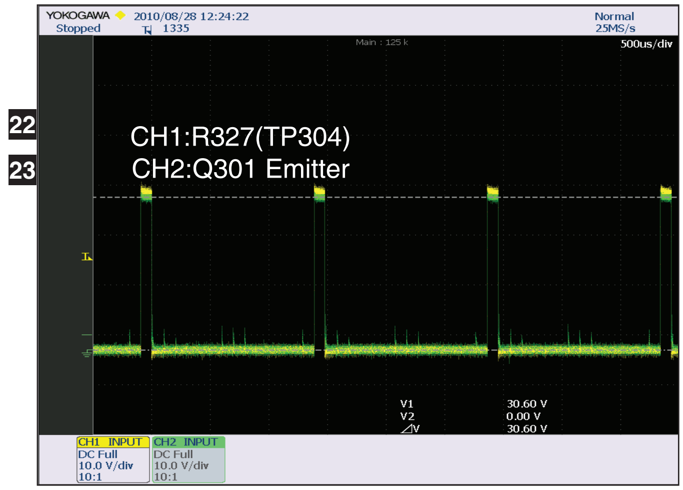
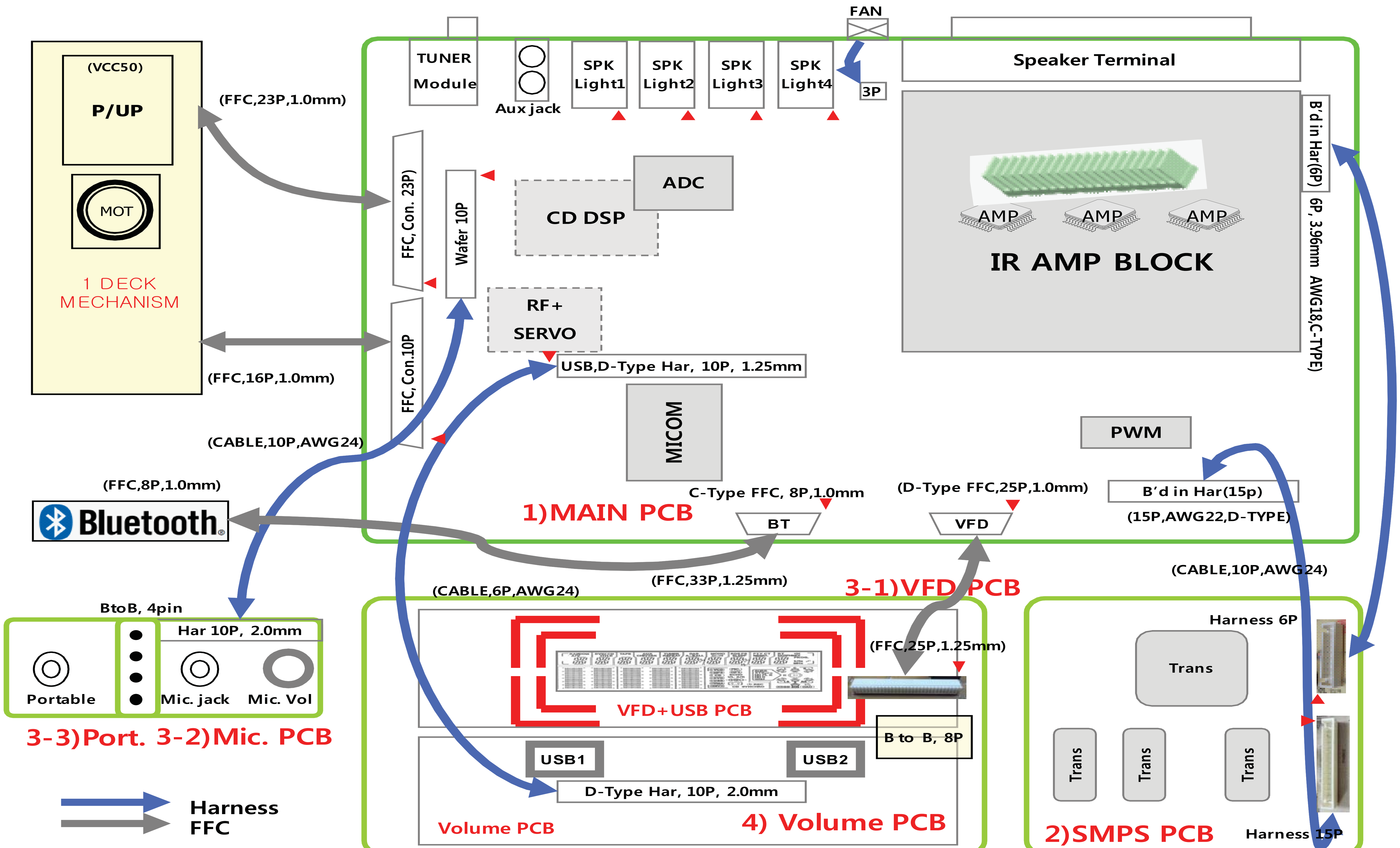


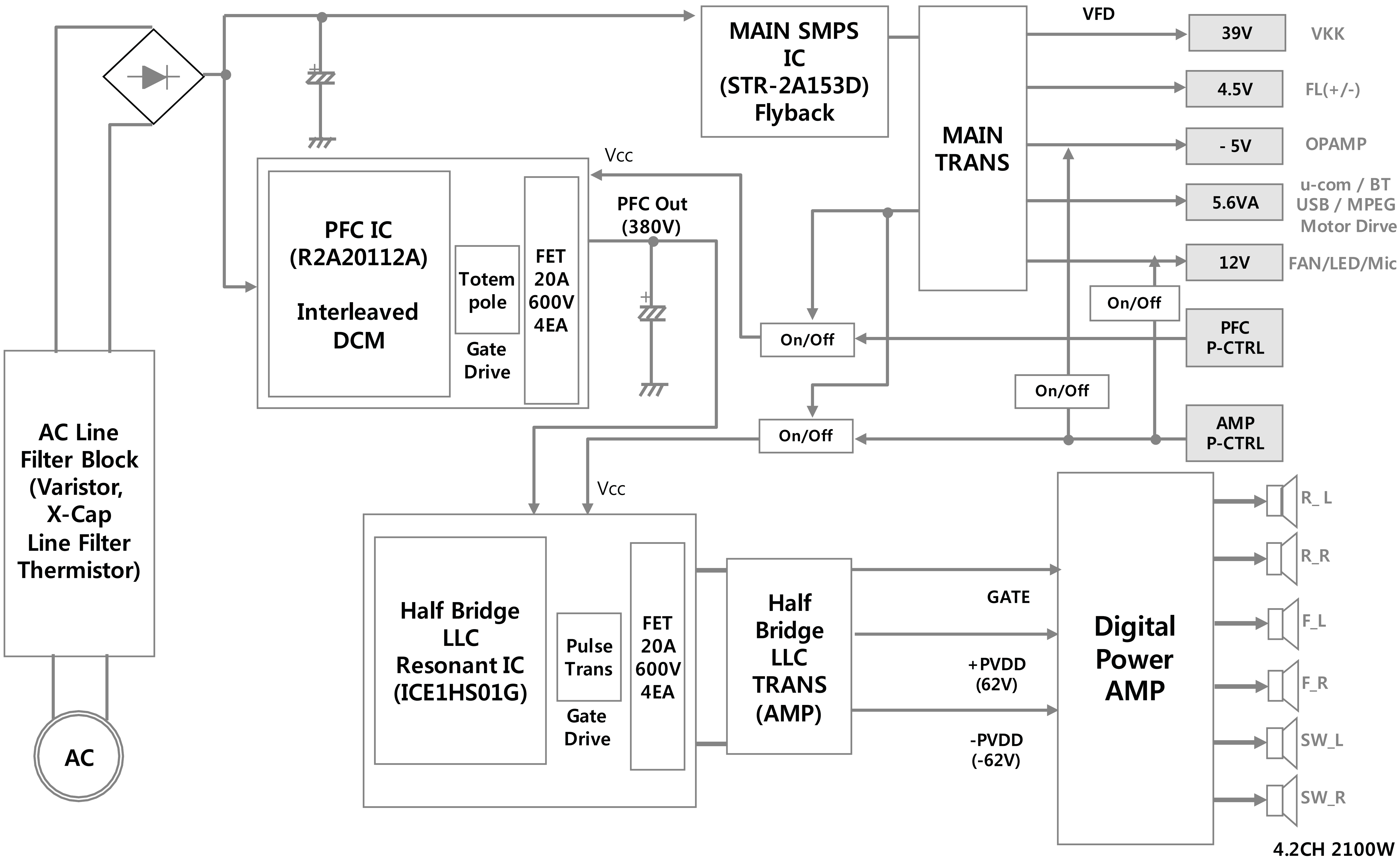
Figure 7.

WIRING DIAGRAM

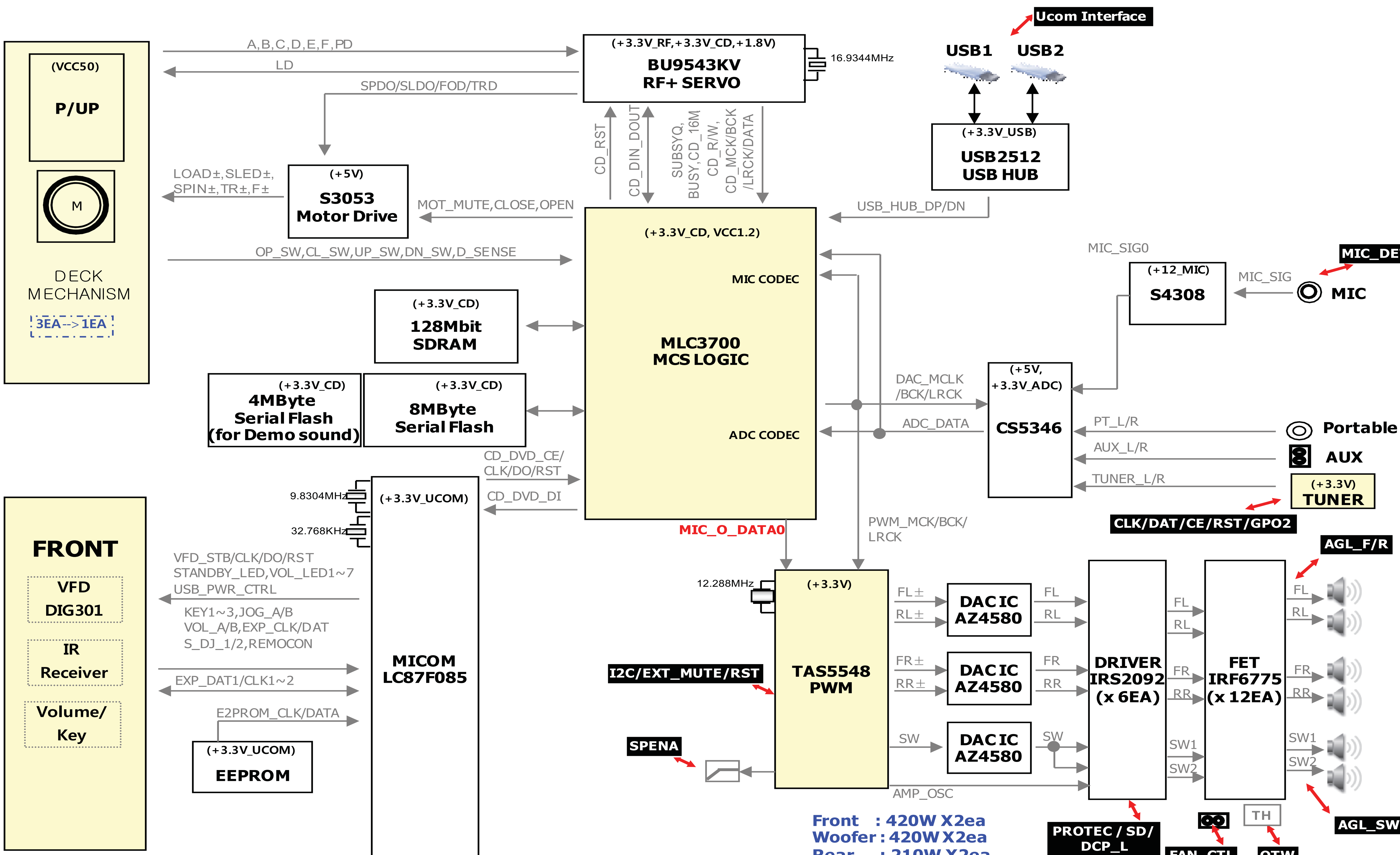


BLOCK DIAGRAMS

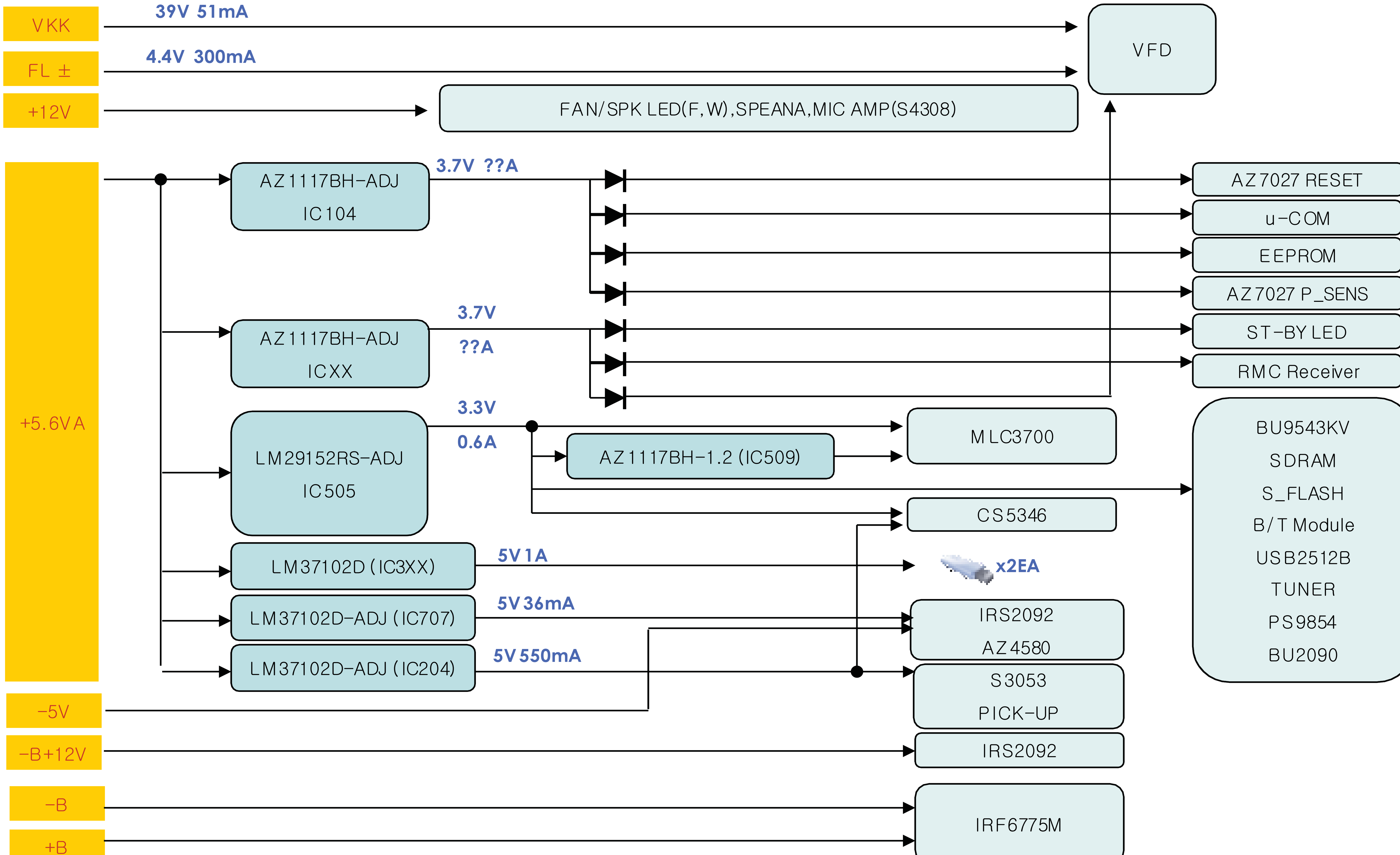
1. SMPS BLOCK DIAGRAM



2. MAIN SYSTEM BLOCK DIAGRAM



3. MAIN POWER BLOCK DIAGRAM

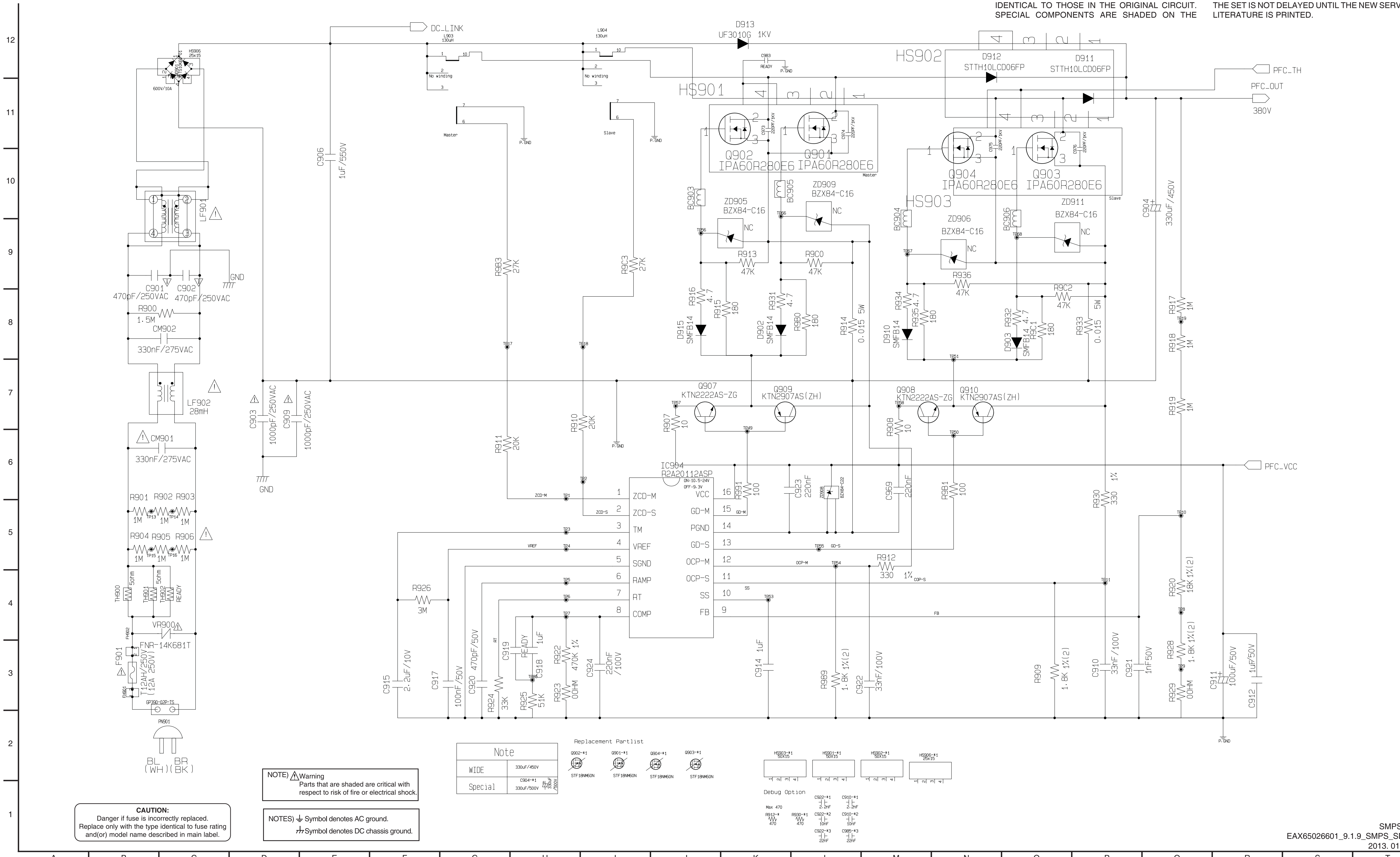


CIRCUIT DIAGRAMS

1. SMPS - POWER #1 CIRCUIT DIAGRAM

IMPORTANT SAFETY

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.



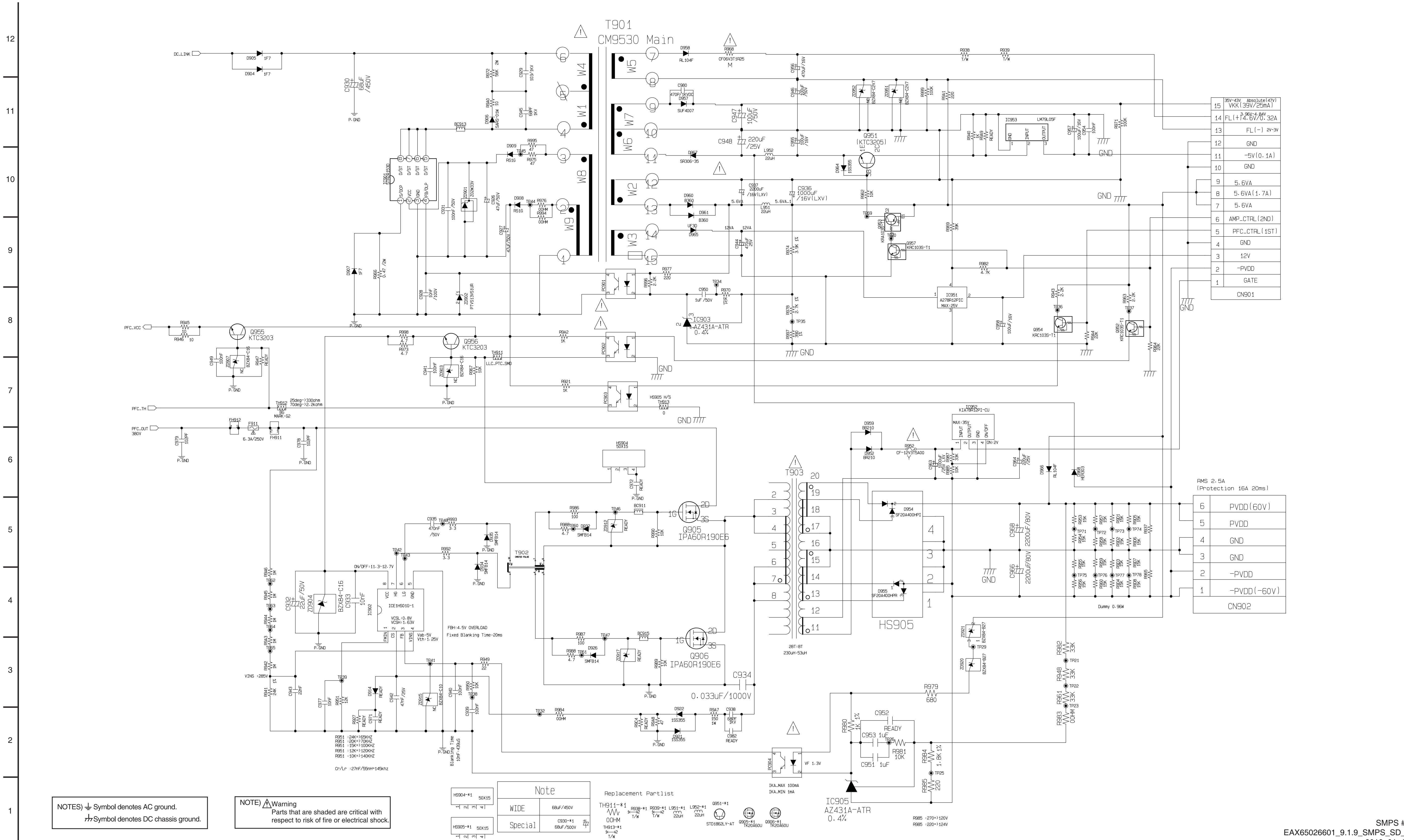
NOTE) Warning
Parts that are shaded are critical with respect to risk of fire or electrical shock.

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

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

SMPS #1
EAX65026601_9.1.9_SMPS_SD_1
2013. 01. 17

2. SMPS - POWER #2 CIRCUIT DIAGRAM

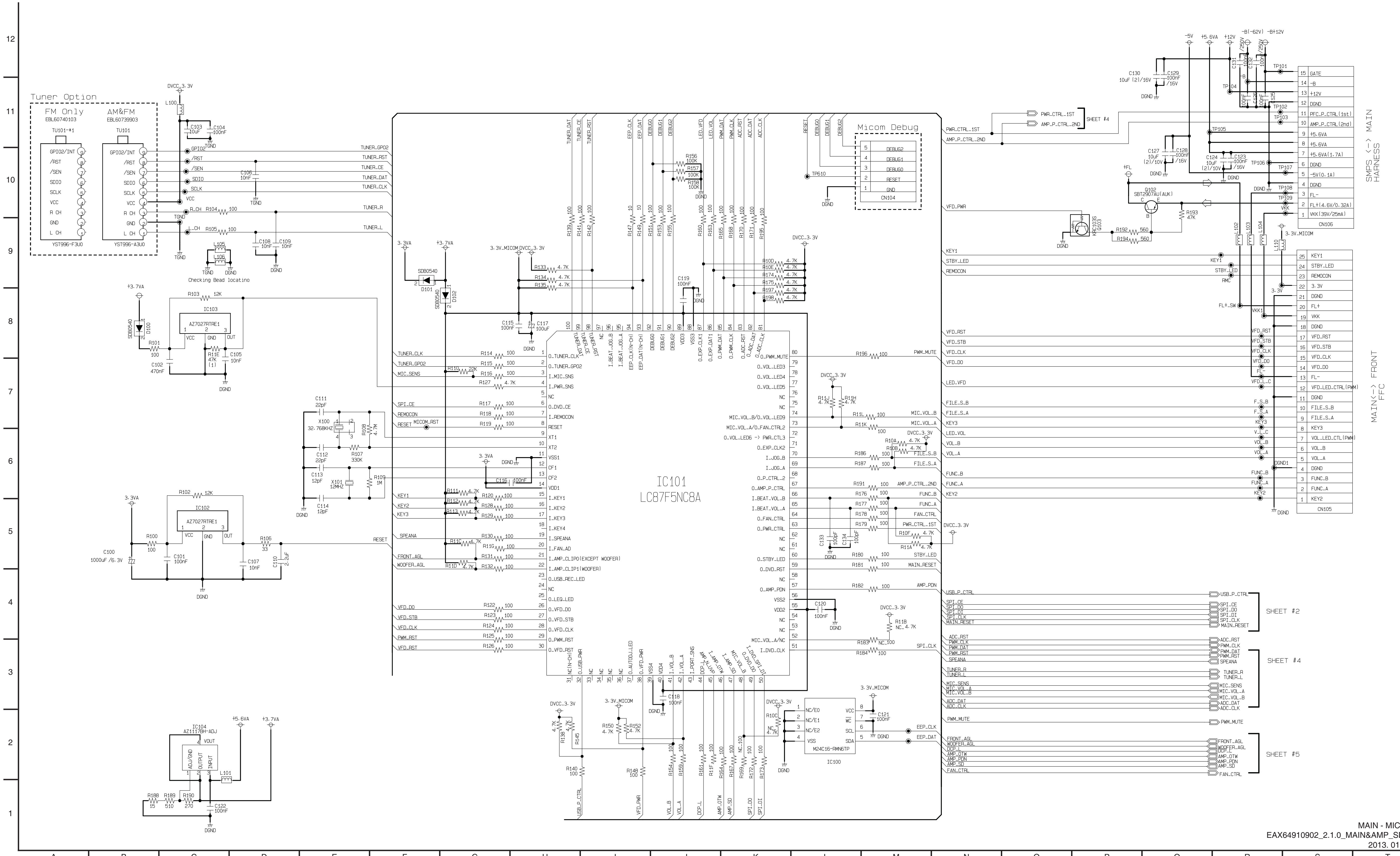


NOTES) Symbol denotes AC ground.
Symbol denotes DC chassis ground.

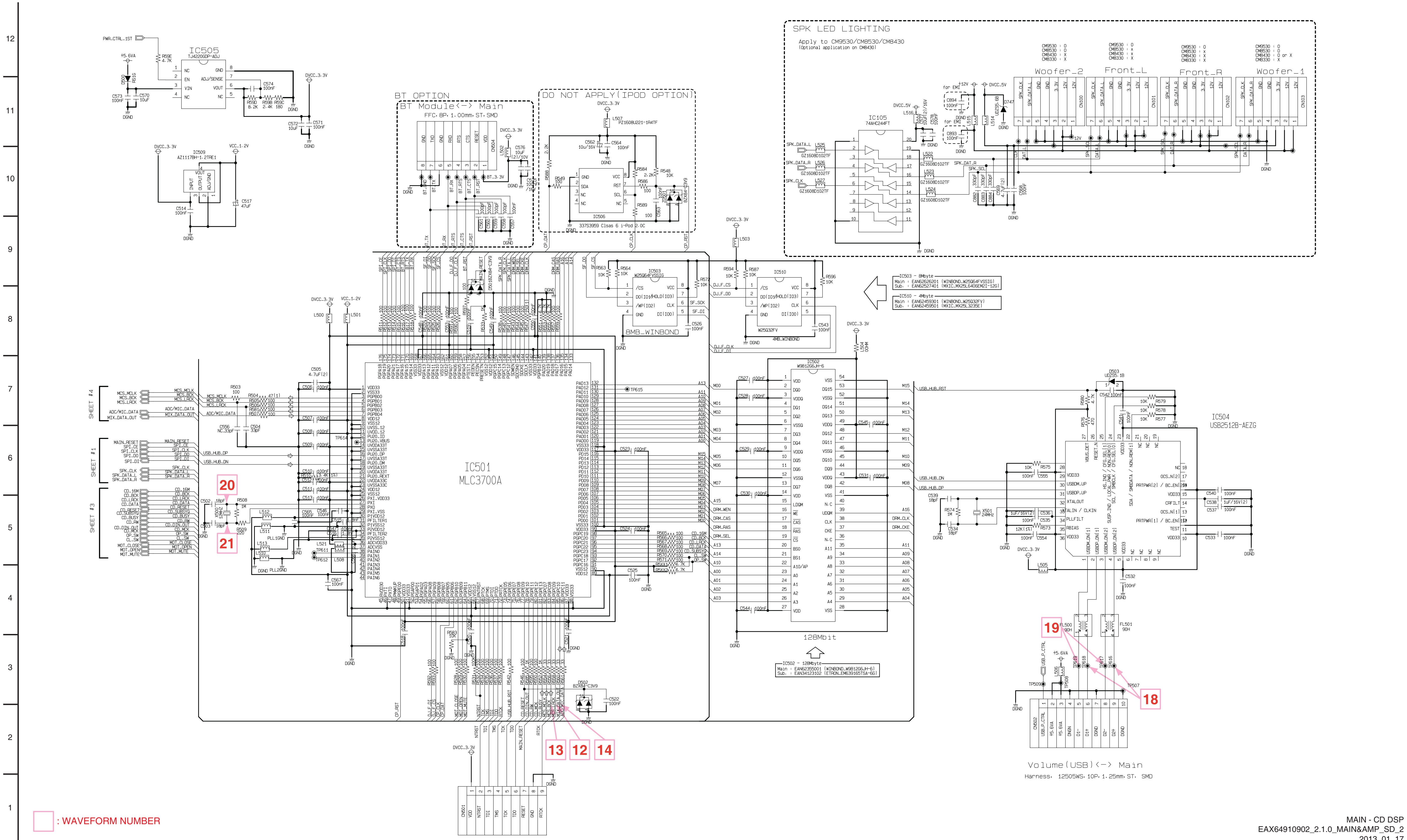
NOTE) Warning
Parts that are shaded are critical with respect to risk of fire or electrical shock.

SMPS #2
EAX65026601_9.1.9_SMPS_SD_2
2013. 01. 17

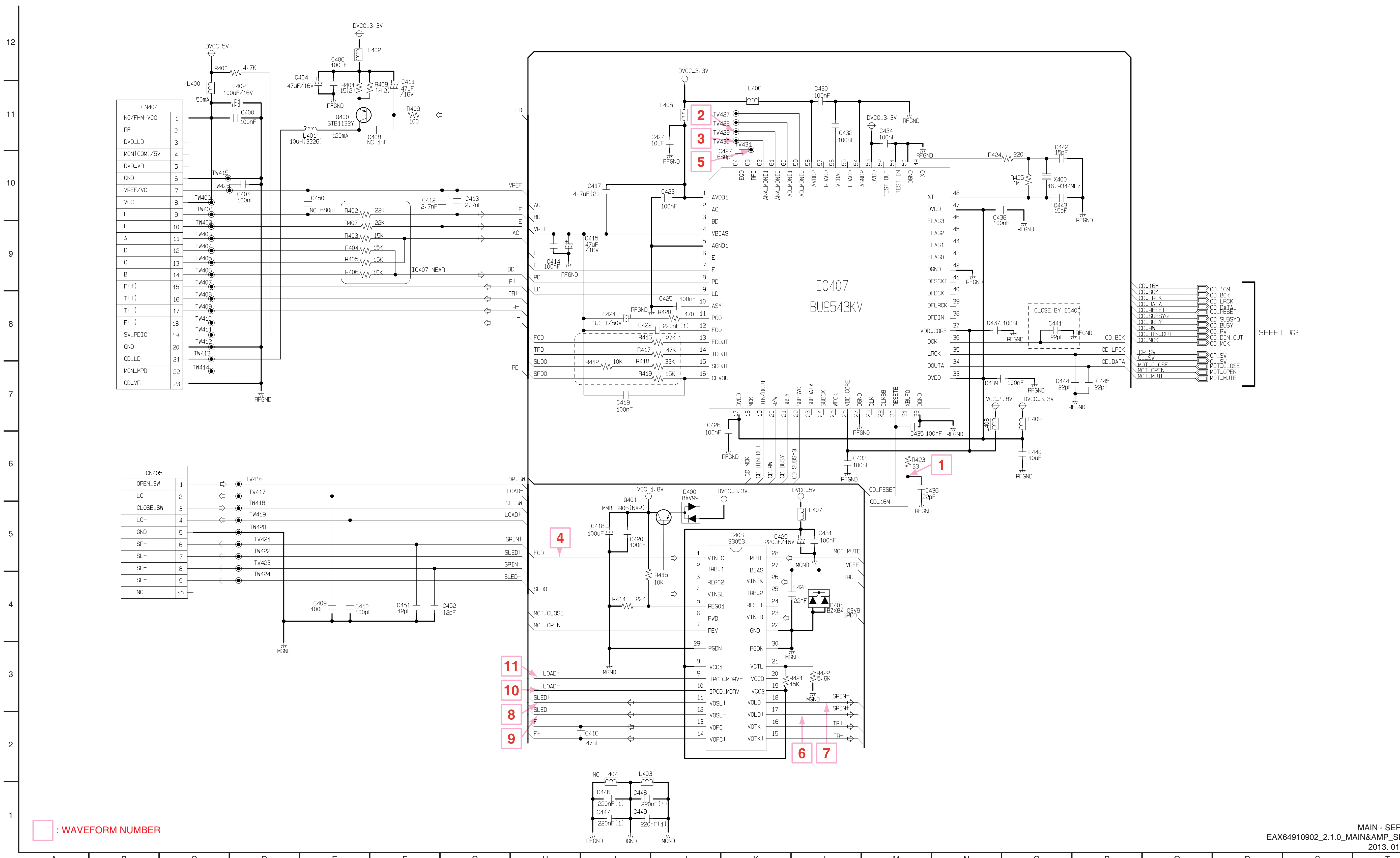
3. MAIN - MICOM CIRCUIT DIAGRAM



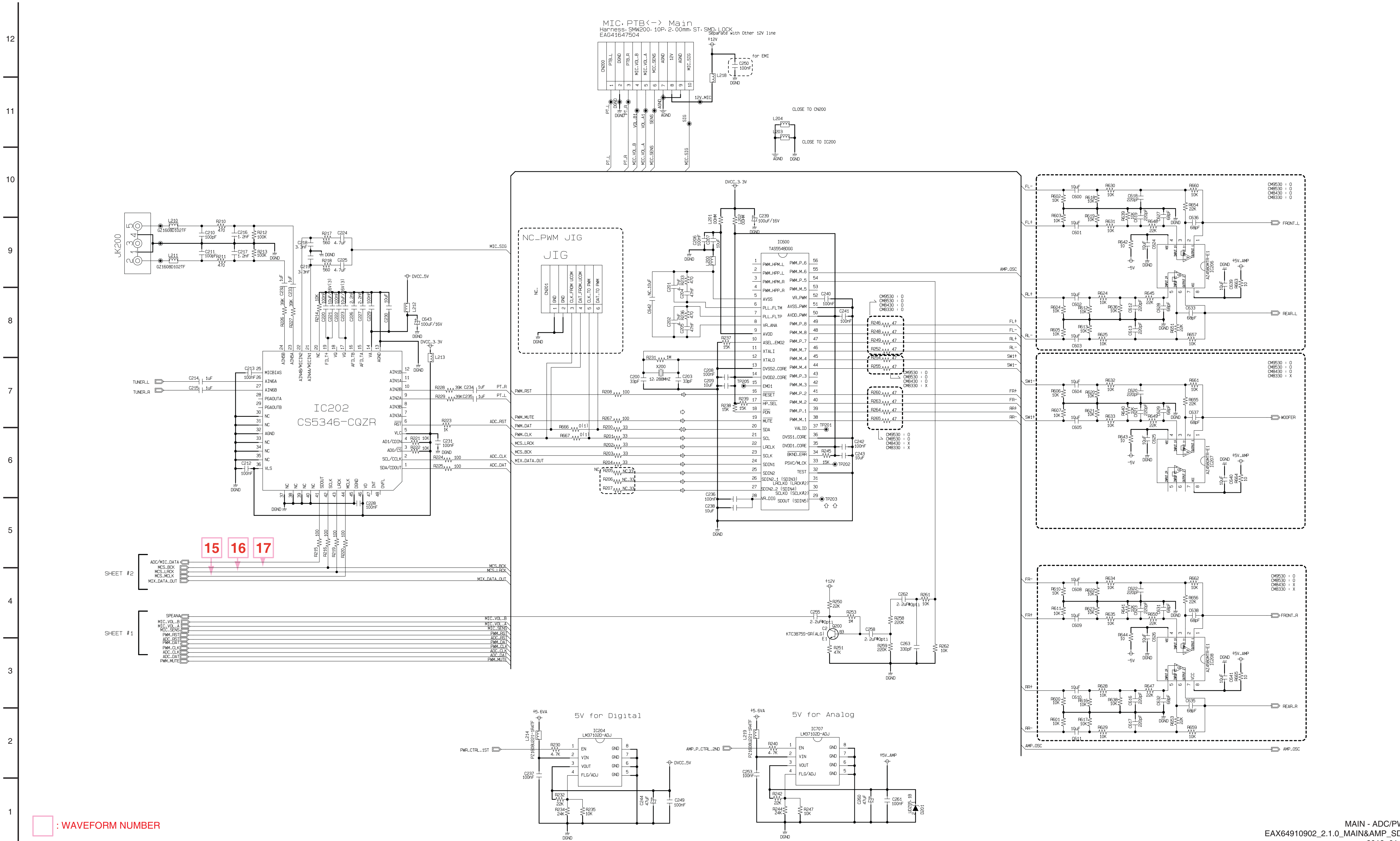
4. MAIN - CD DSP CIRCUIT DIAGRAM



5. MAIN - SERVO CIRCUIT DIAGRAM

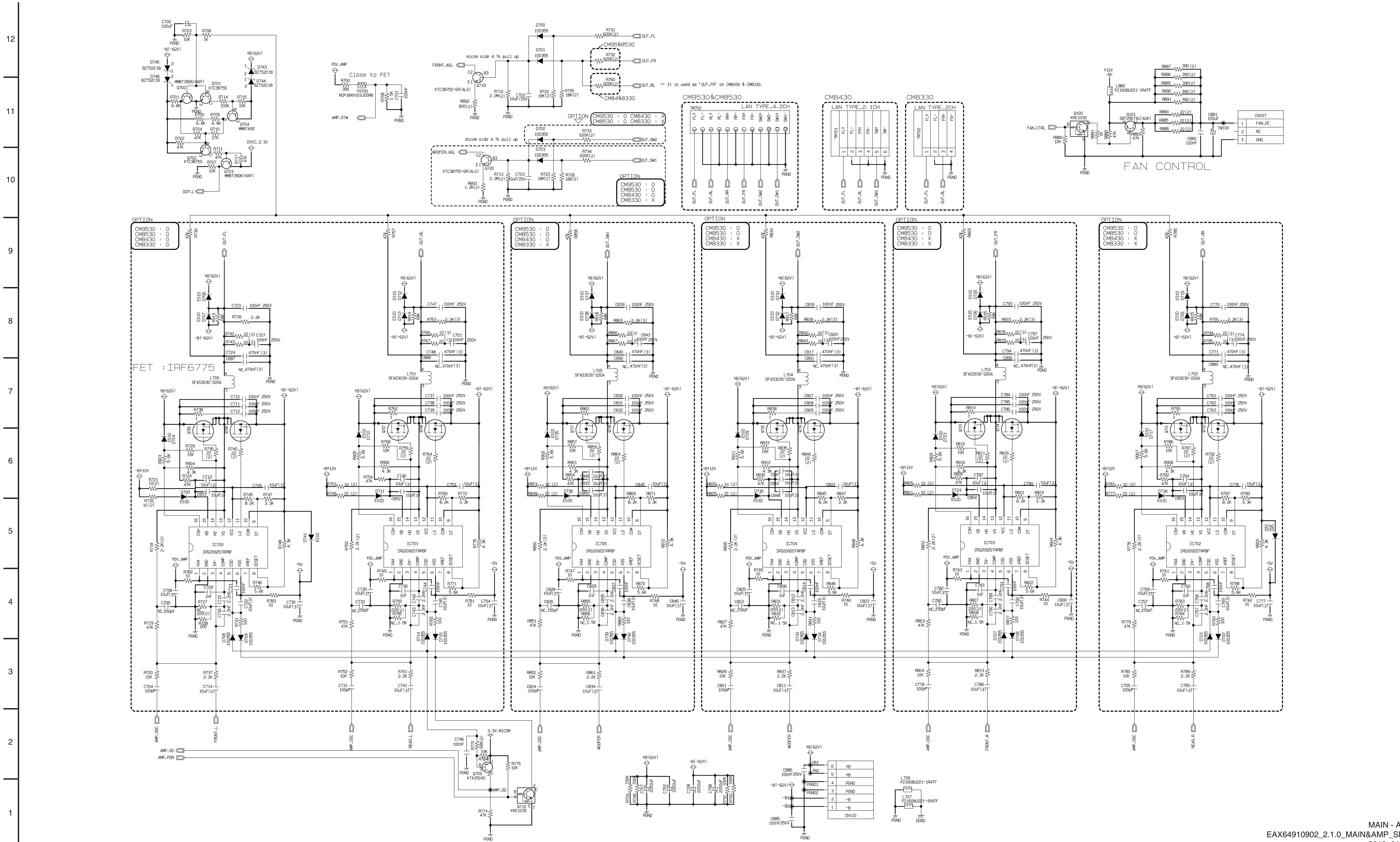


6. MAIN - ADC/ PWM CIRCUIT DIAGRAM



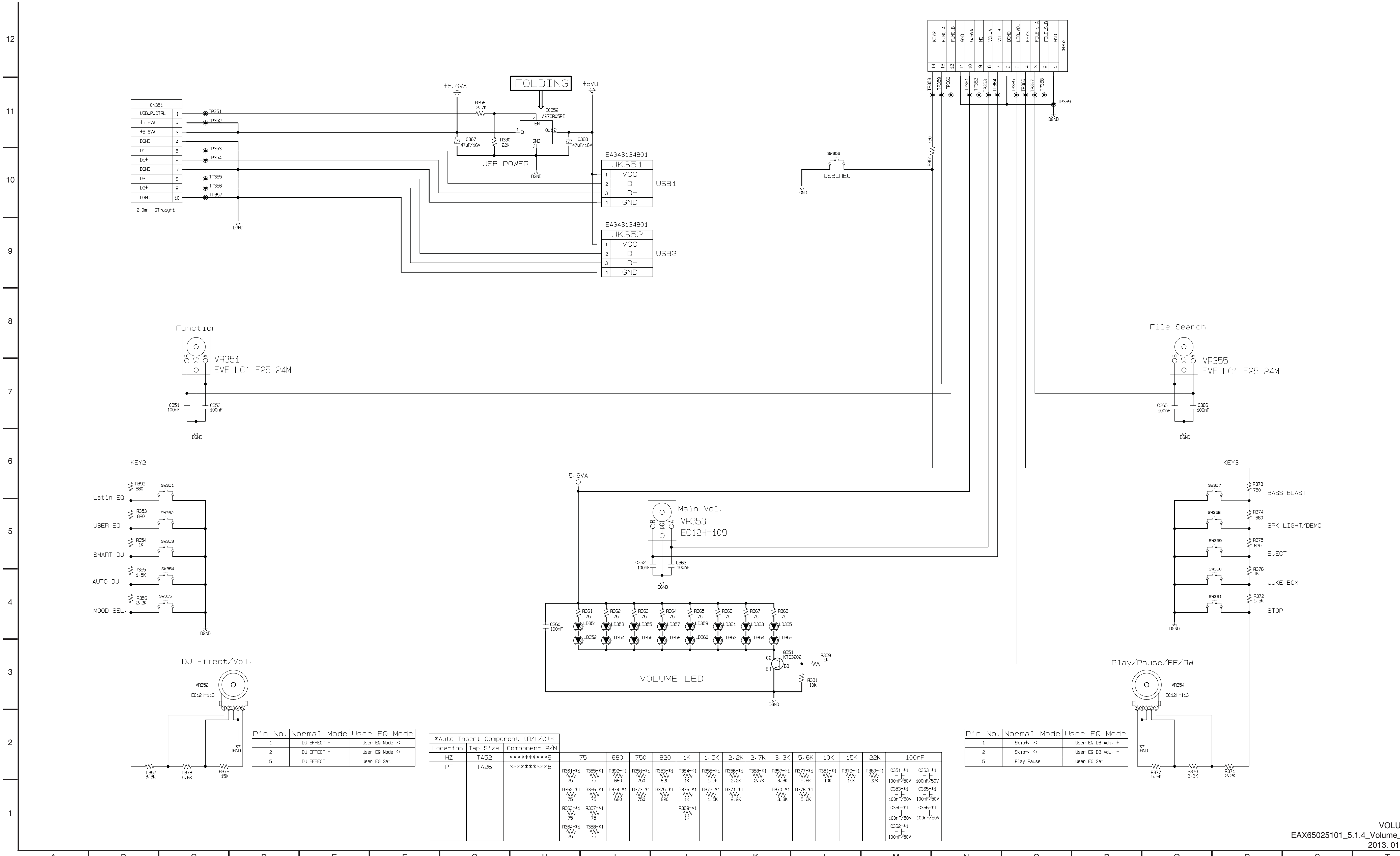
MAIN - ADC/PWM
EAX64910902_2.1.0_MAIN&AMP_SD_4
2013. 01. 17

7. MAIN - AMP CIRCUIT DIAGRAM



MAIN - AMP
EAX64910902_2.1.0_MAIN&AMP_SD_5
2013. 01. 17

8. VOLUME CIRCUIT DIAGRAM



Pin No.	Normal Mode	User EQ Mode
1	DJ EFFECT +	User EQ Mode >>
2	DJ EFFECT -	User EQ Mode <<
5	DJ EFFECT	User EQ Set

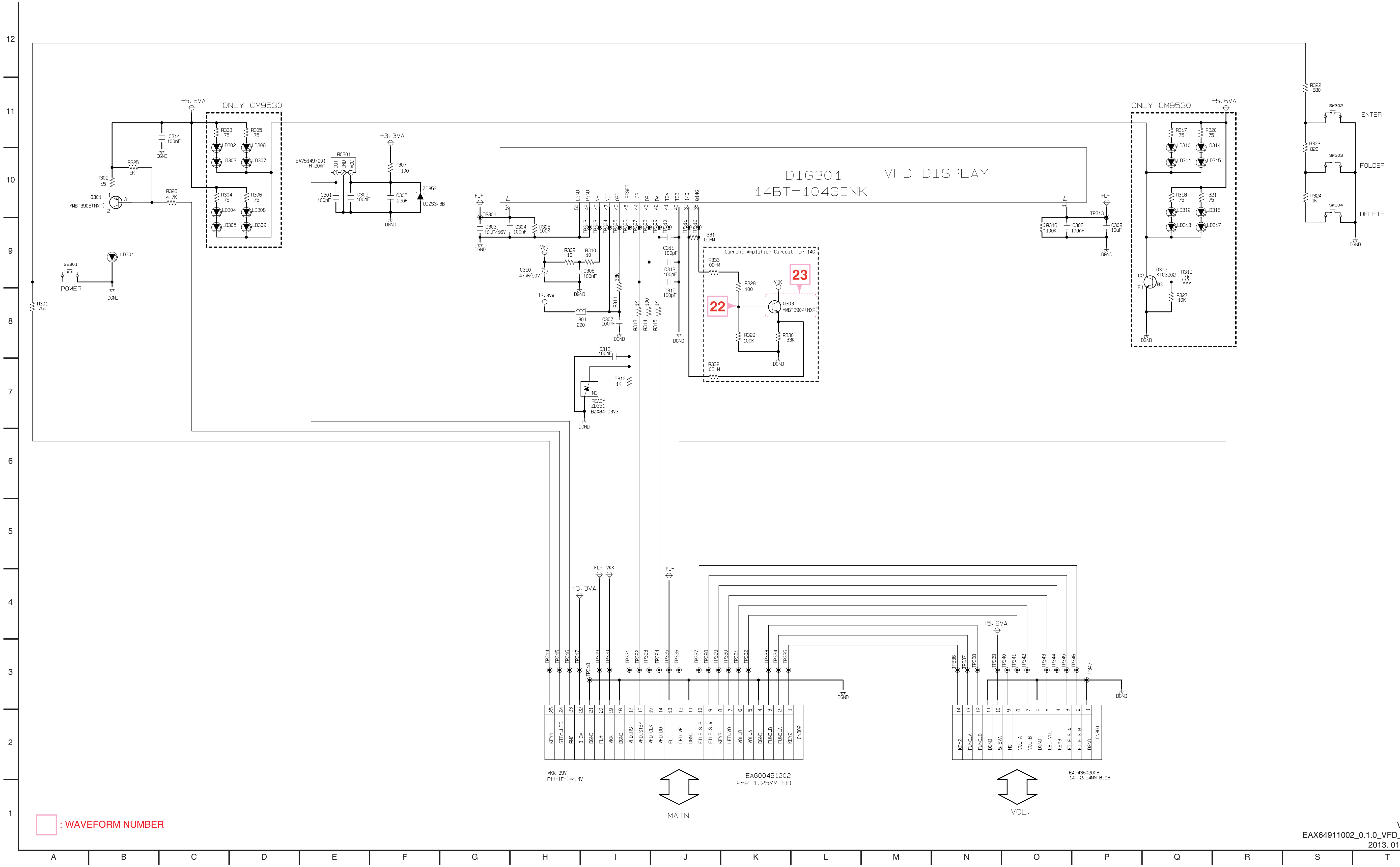
Auto Insert Component (R/L/C)

Location	Tap Size	Component P/N	75	680	750	820	1K	1.5K	2.2K	2.7K	3.3K	5.6K	10K	15K	22K	100nF
HZ	TA52	**********9														
PT	TA26	**********8	R361-*1 75, R365-*1 75, R362-*1 75, R366-*1 75, R363-*1 75, R367-*1 75, R364-*1 75, R368-*1 75	R392-*1 680, R374-*1 680	R351-*1 750, R373-*1 750	R353-*1 820, R375-*1 820	R354-*1 1K, R376-*1 1K, R369-*1 1K	R355-*1 1.5K, R372-*1 1.5K	R356-*1 2.2K, R371-*1 2.2K	R358-*1 2.7K	R357-*1 3.3K, R370-*1 3.3K	R377-*1 5.6K, R378-*1 5.6K	R381-*1 10K	R379-*1 15K	R380-*1 22K	C351-*1 100nF/50V, C363-*1 100nF/50V, C353-*1 100nF/50V, C365-*1 100nF/50V, C360-*1 100nF/50V, C366-*1 100nF/50V, C362-*1 100nF/50V

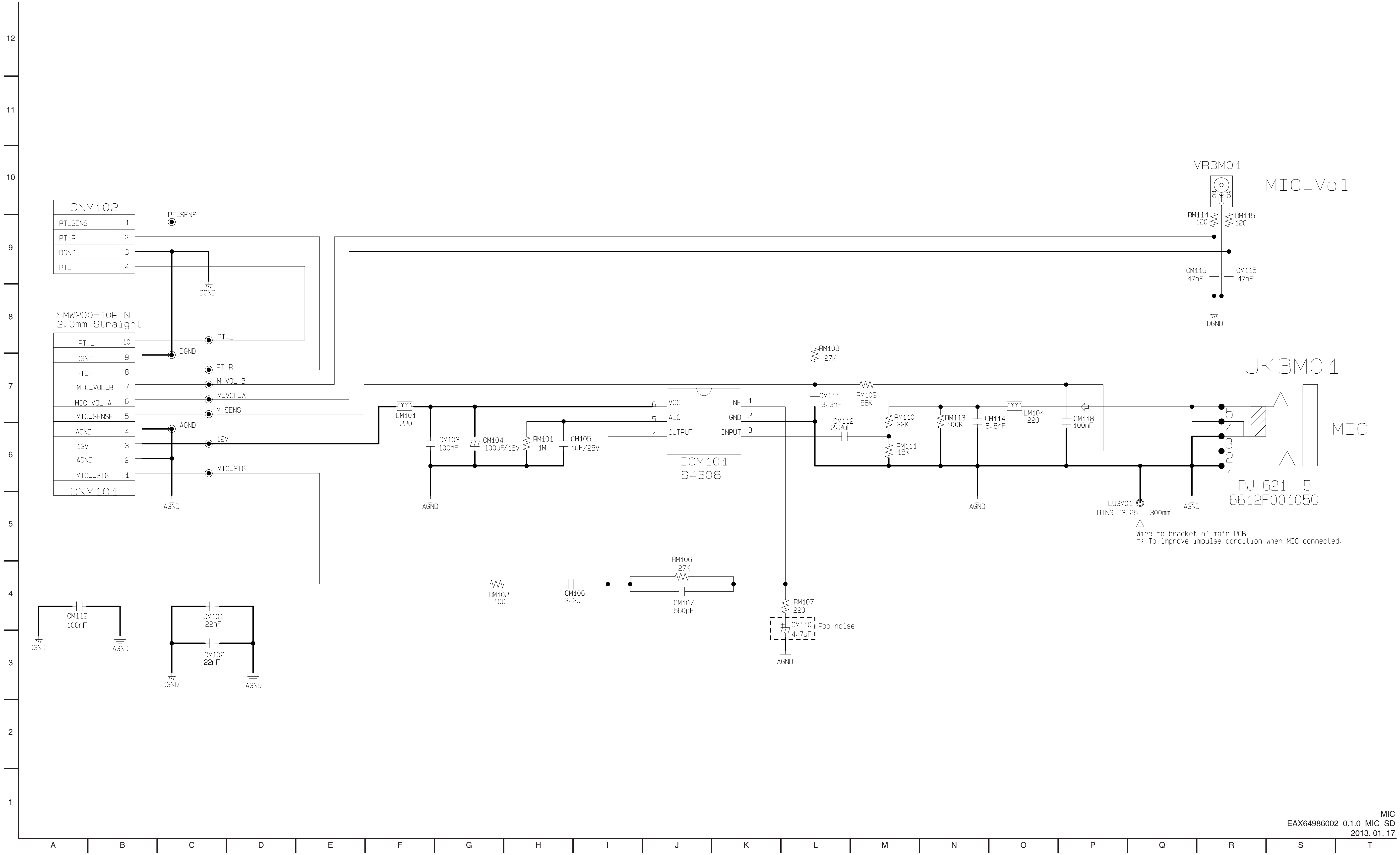
Pin No.	Normal Mode	User EQ Mode
1	Skip+, >>	User EQ DB Adj. +
2	Skip-, <<	User EQ DB AdJ. -
5	Play Pause	User EQ Set

VOLUME
EAX65025101_5.1.4_Volume_SD
2013. 01. 17

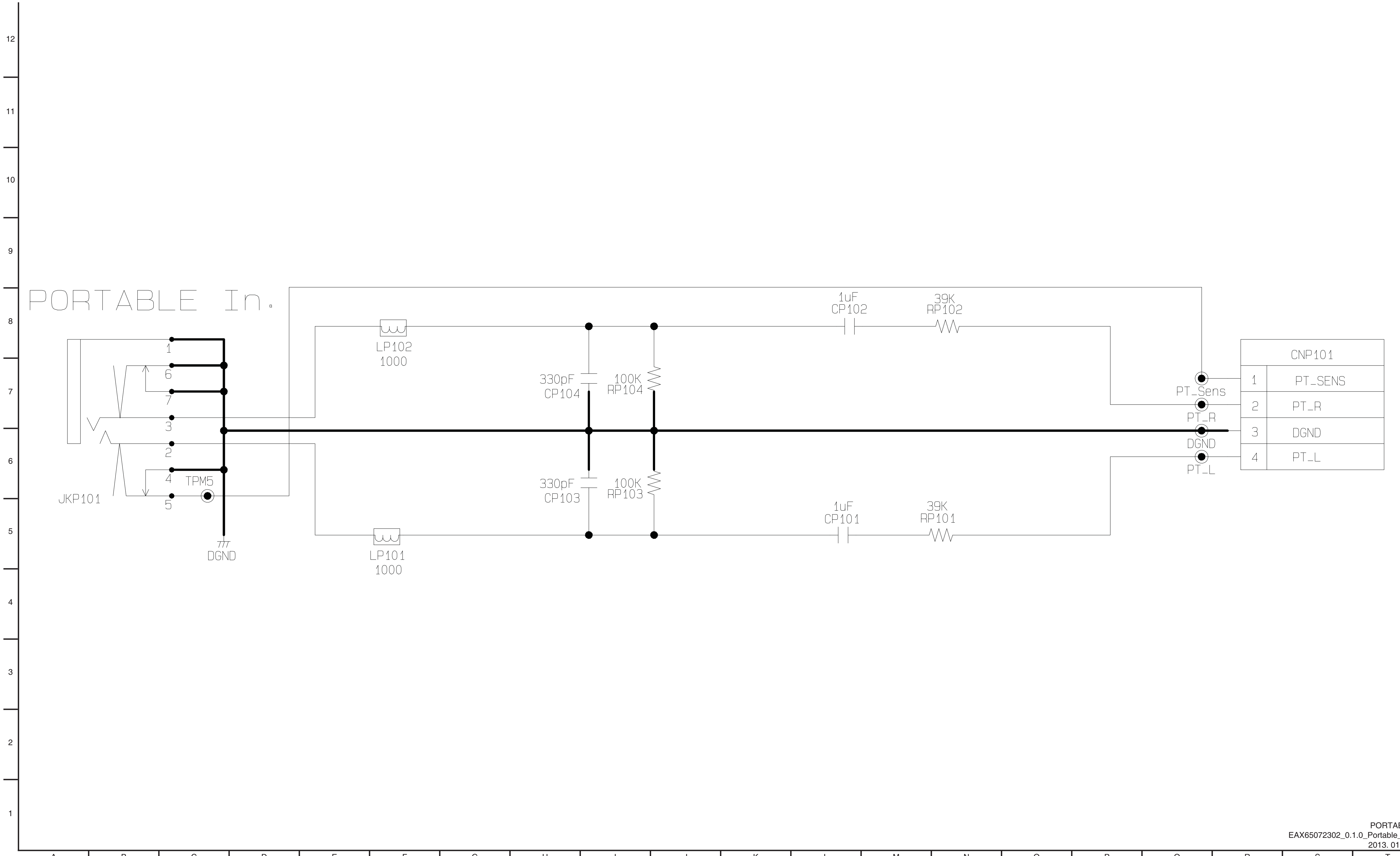
9. VFD CIRCUIT DIAGRAM



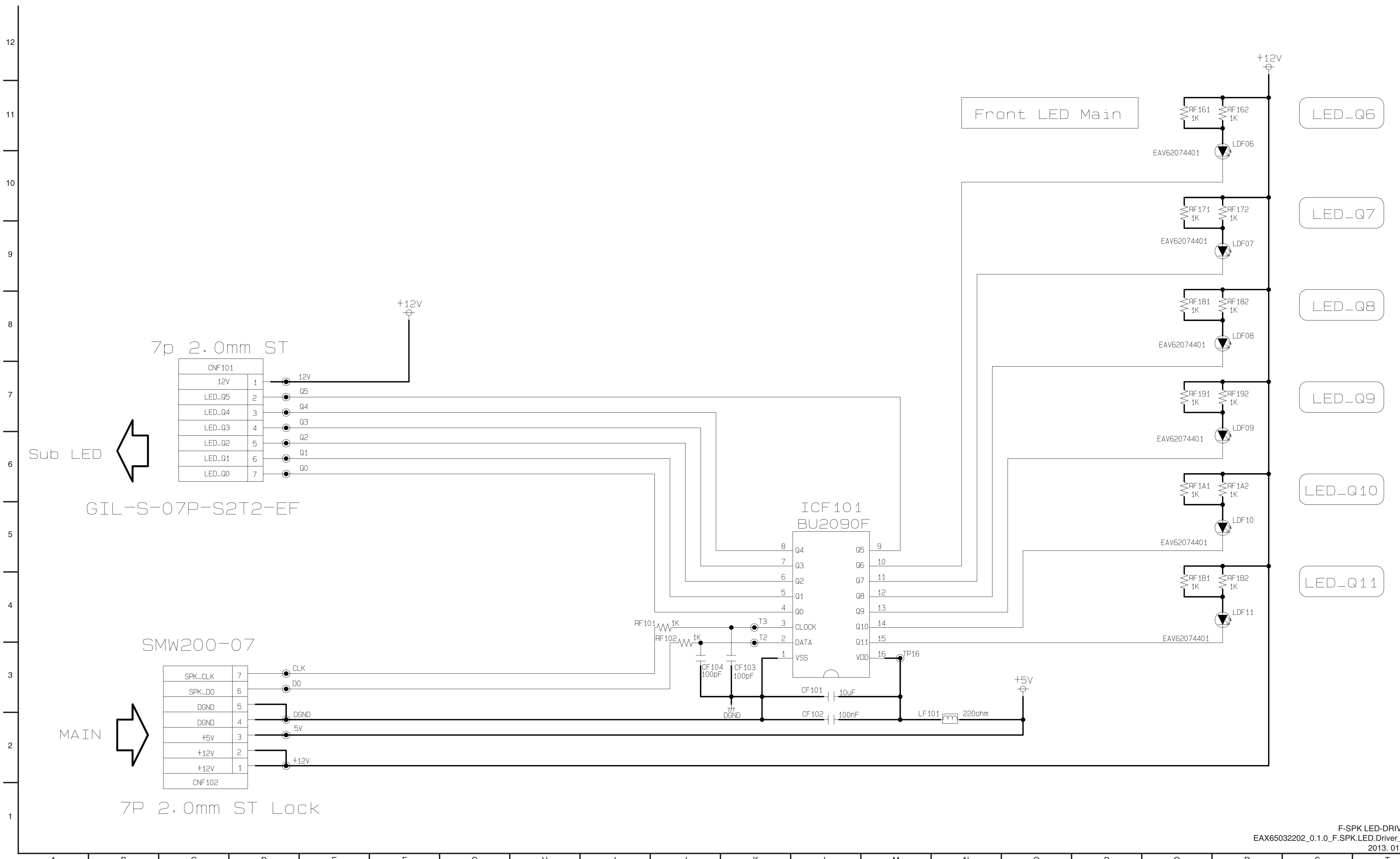
10. MIC CIRCUIT DIAGRAM



11. PORTABLE CIRCUIT DIAGRAM

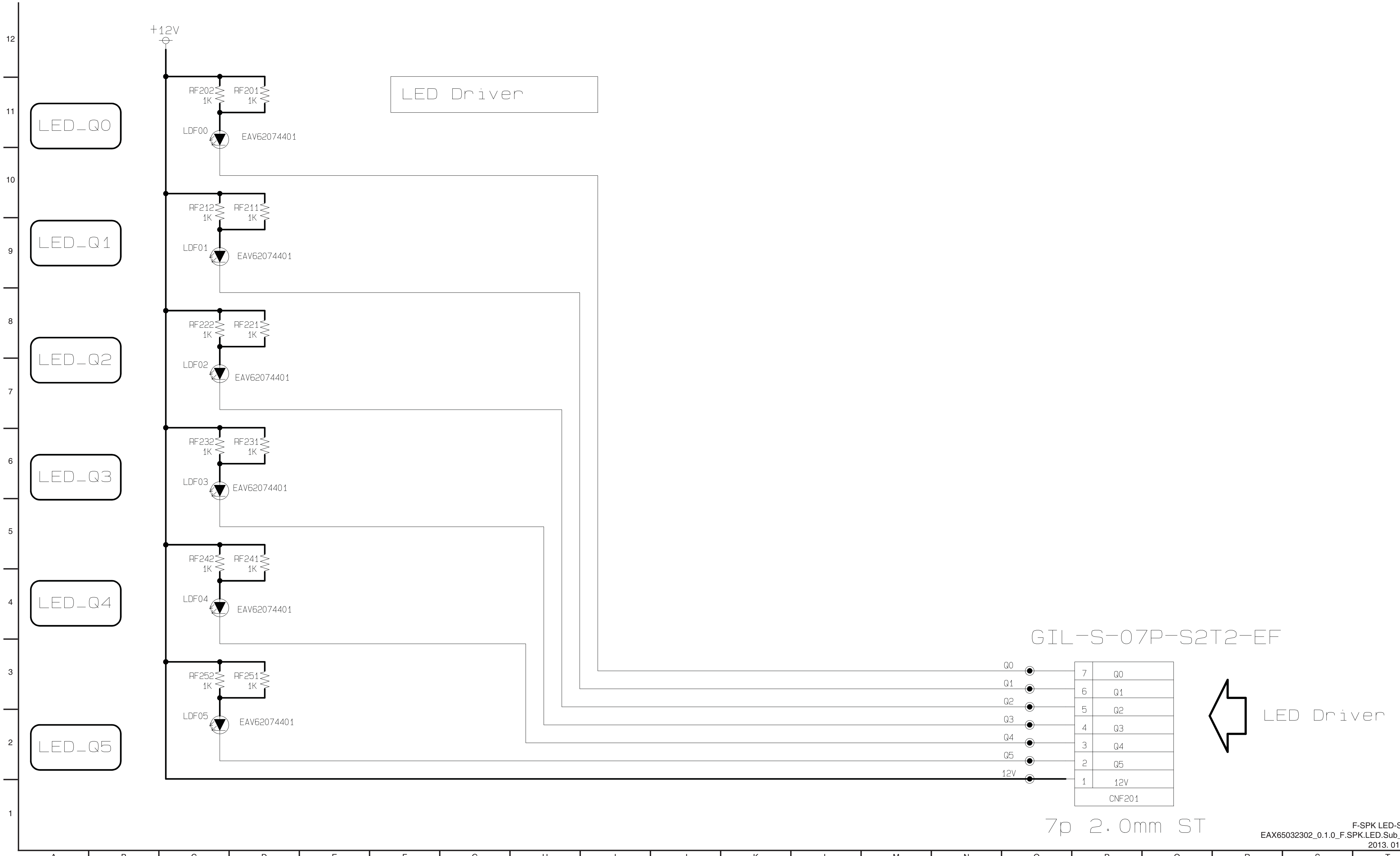


12. FRONT SPEAKER LED - DRIVER CIRCUIT DIAGRAM

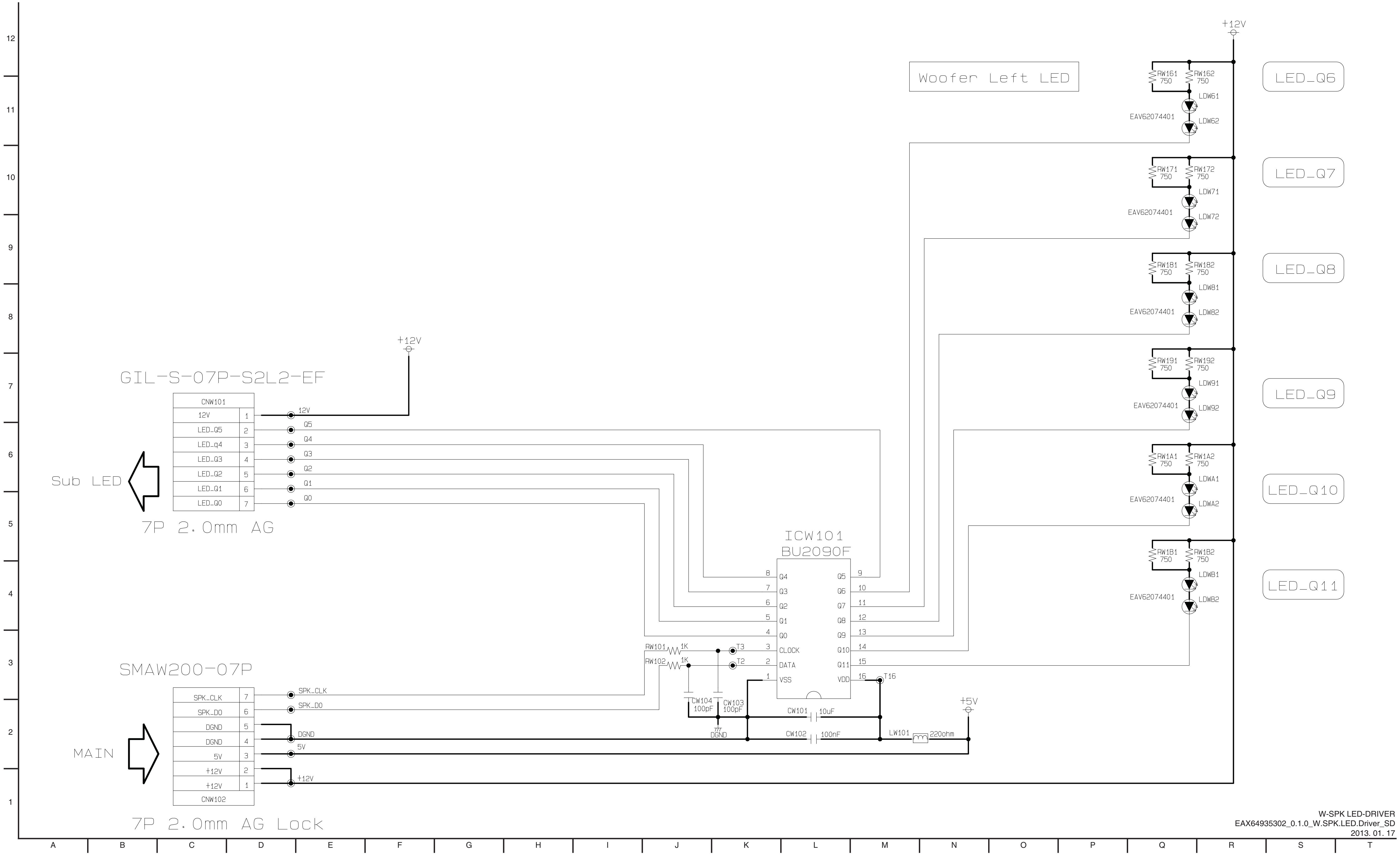


F-SPK LED-DRIVER
EAX65032202_0.1.0_F.SPK.LED.Driver_SD
2013. 01. 17

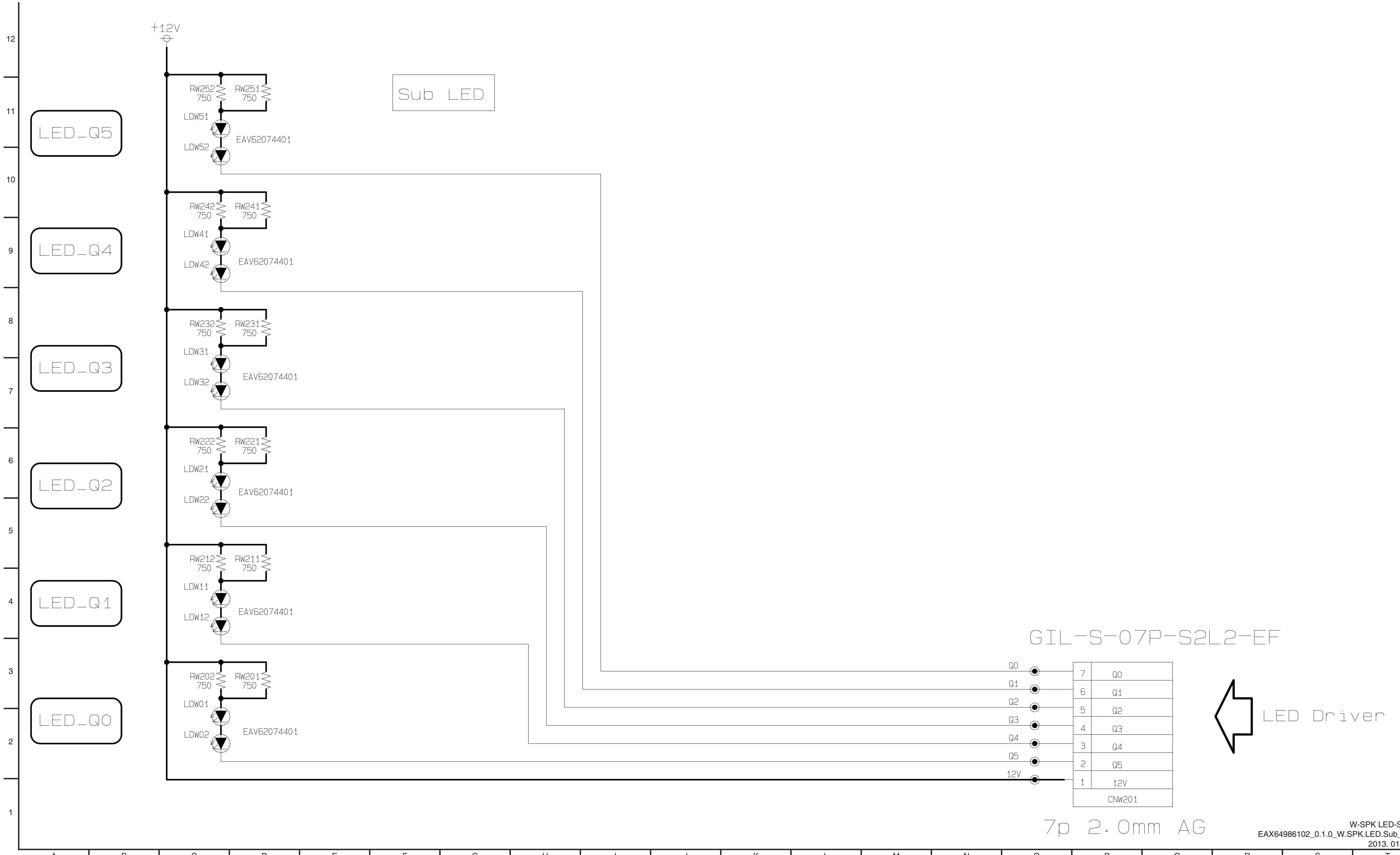
13. FRONT SPEAKER LED - SUB CIRCUIT DIAGRAM



14. WOOFER SPEAKER LED - DRIVER CIRCUIT DIAGRAM



15. WOOFER SPEAKER LED - SUB CIRCUIT DIAGRAM



CIRCUIT VOLTAGE CHART

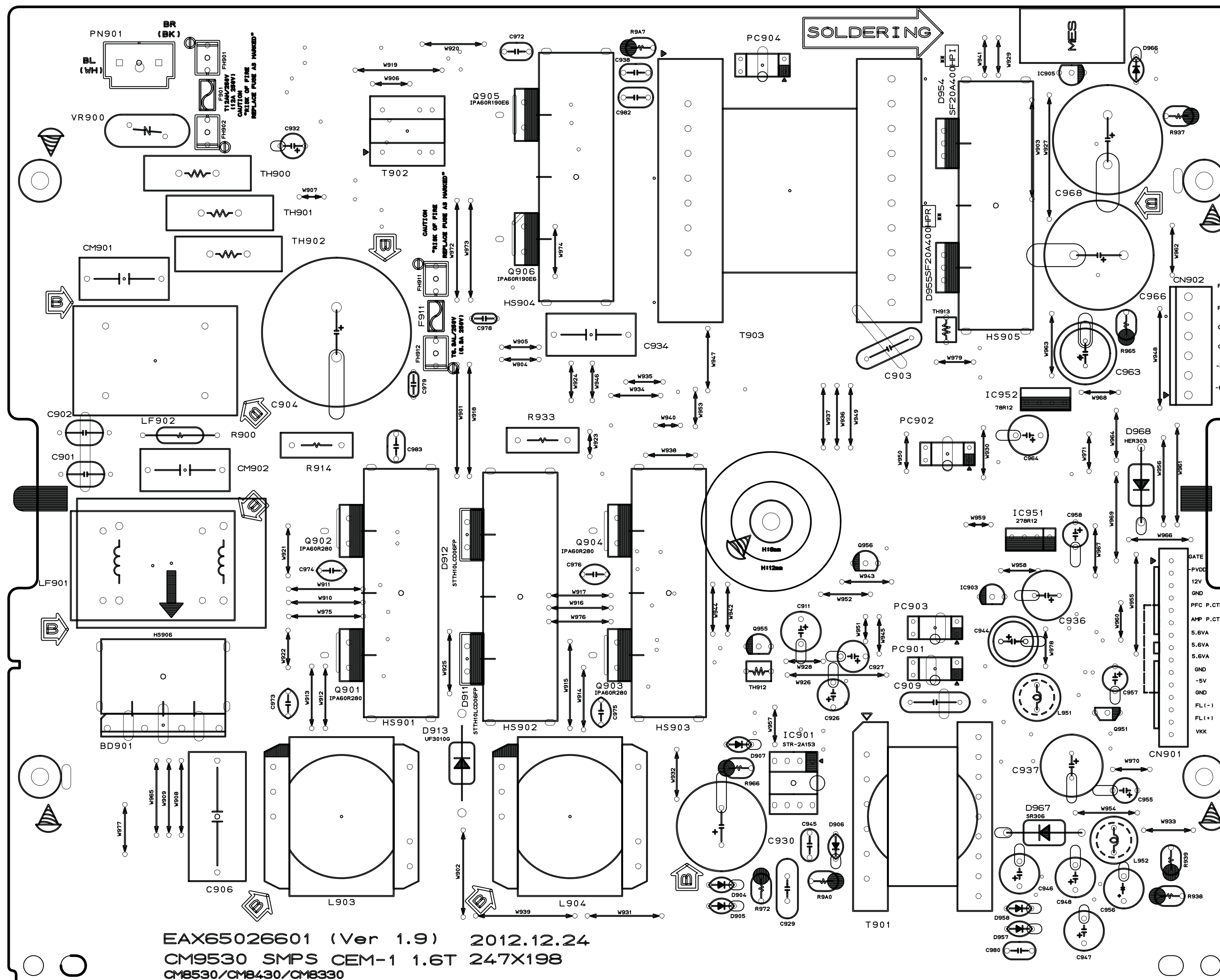
Location No.	Value Capacitor (uF)	Voltage_Spec.	100V-10%	240V/50Hz+10%
			Measured voltage	Measured voltage
SMPS Board				
C904	330uF	450V	380V	380V
C911	100uF	50V	12.5V	12.8V
C930	68uF	450V	138V	336V
C932	22uF	50V	14V	14.5V
C936	1000uF	16V	5.65V	5.68V
C947	100uF	50V	31.2V	31.5V
C956	470uF	16V	5.1V	5.08V
C957	100uF	16V	-5V	-5V
C958	100uF	16V	12V	12V
C964	220uF	25V	11.99V	11.98V
C966	2200uF	80V	62V	62V
C968	2200uF	80V	62V	62V

MEMO

PRINTED CIRCUIT BOARD DIAGRAMS

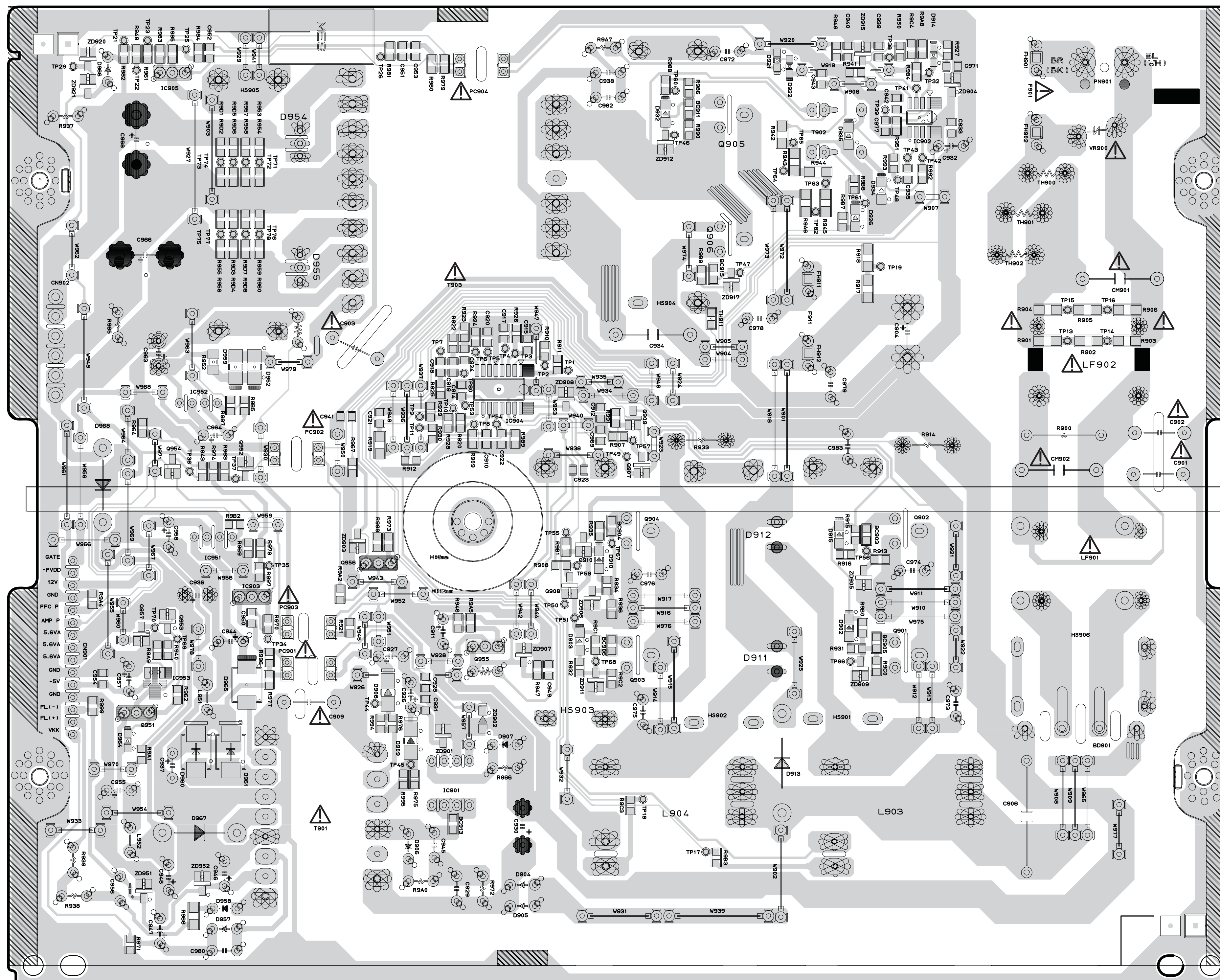
1. SMPS P.C.BOARD

(TOP VIEW)

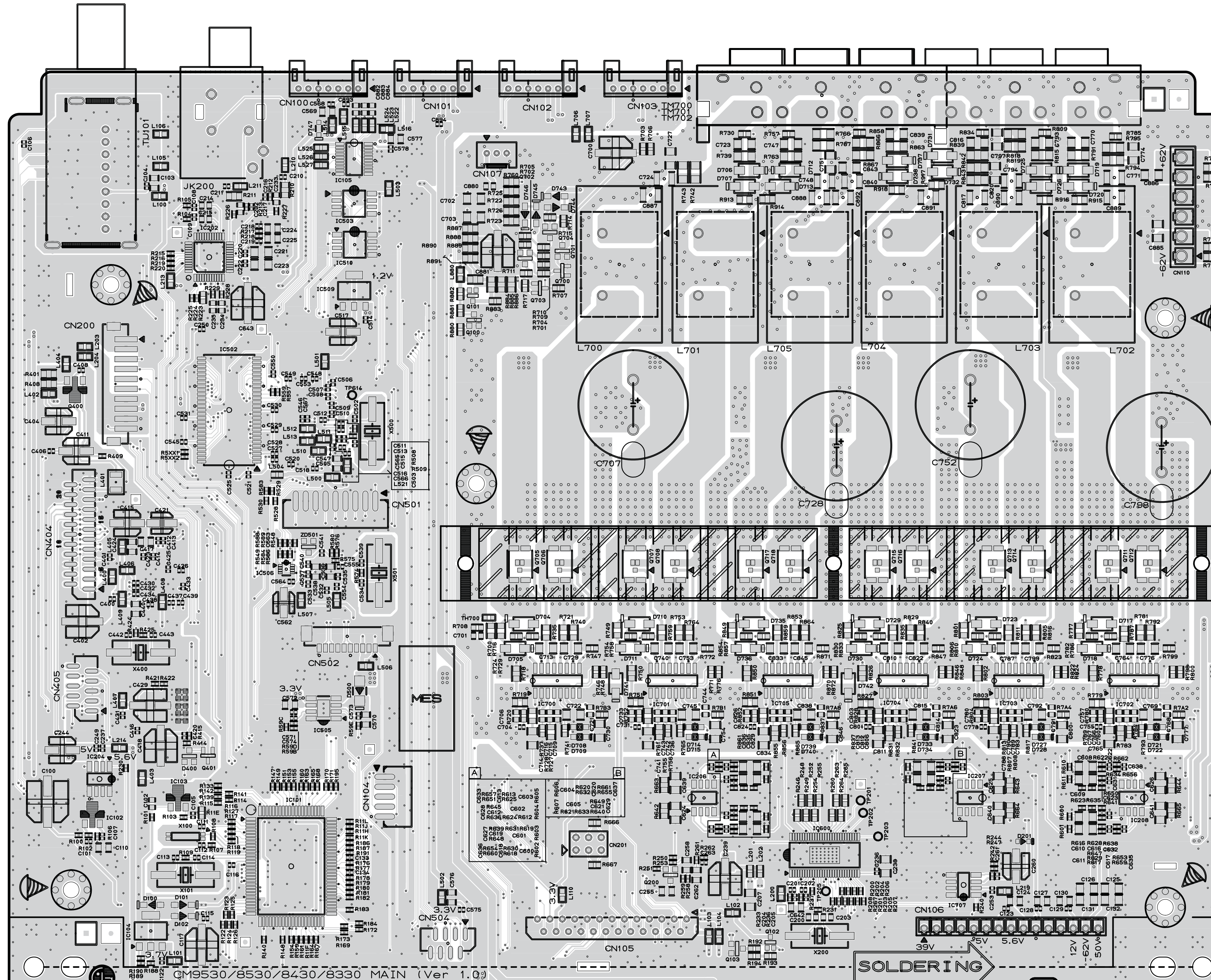


SMPS P.C.BOARD
(BOTTOM VIEW)

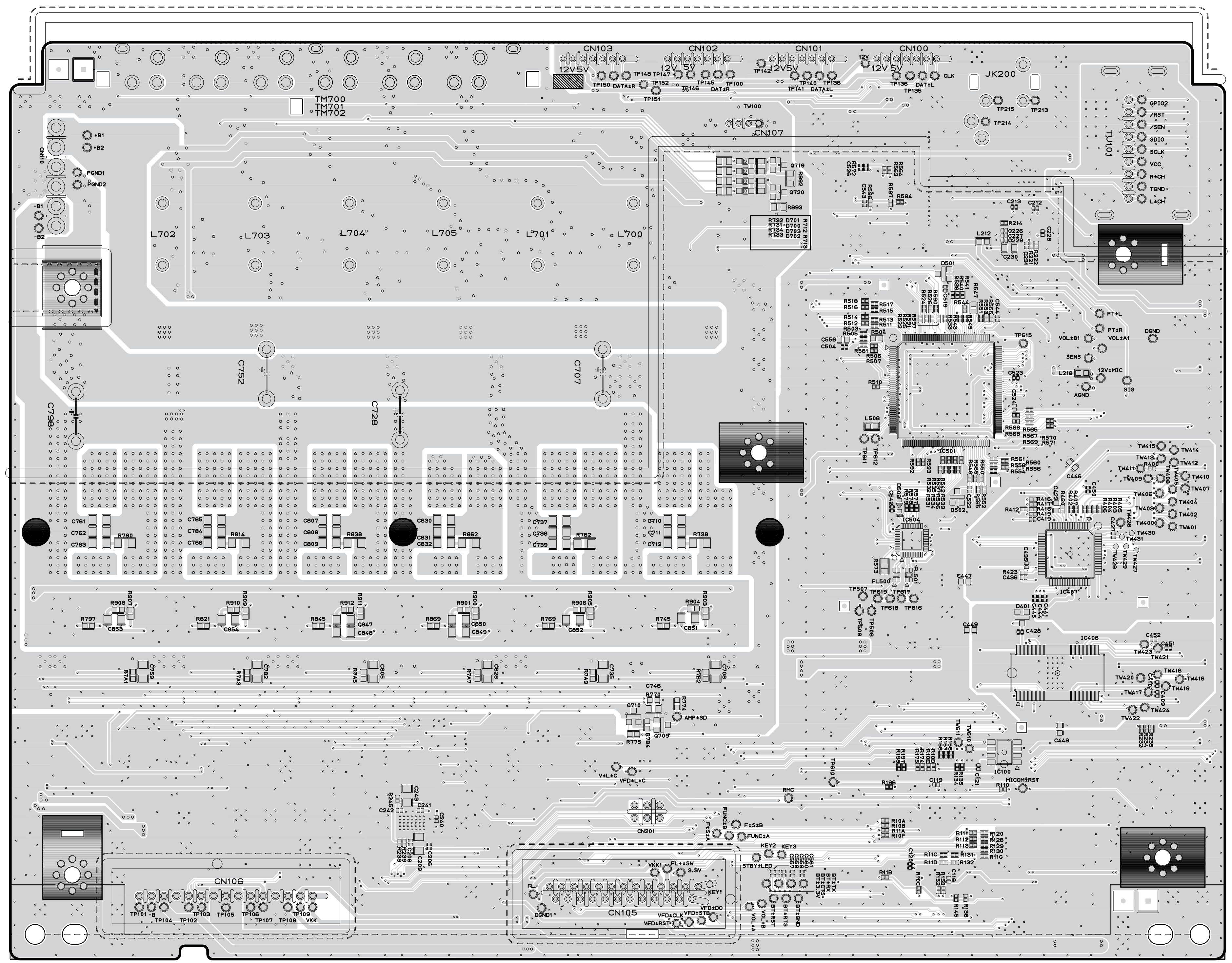
NOTE) Warning
⚠ Parts that are critical with respect to risk of fire or electrical shock.



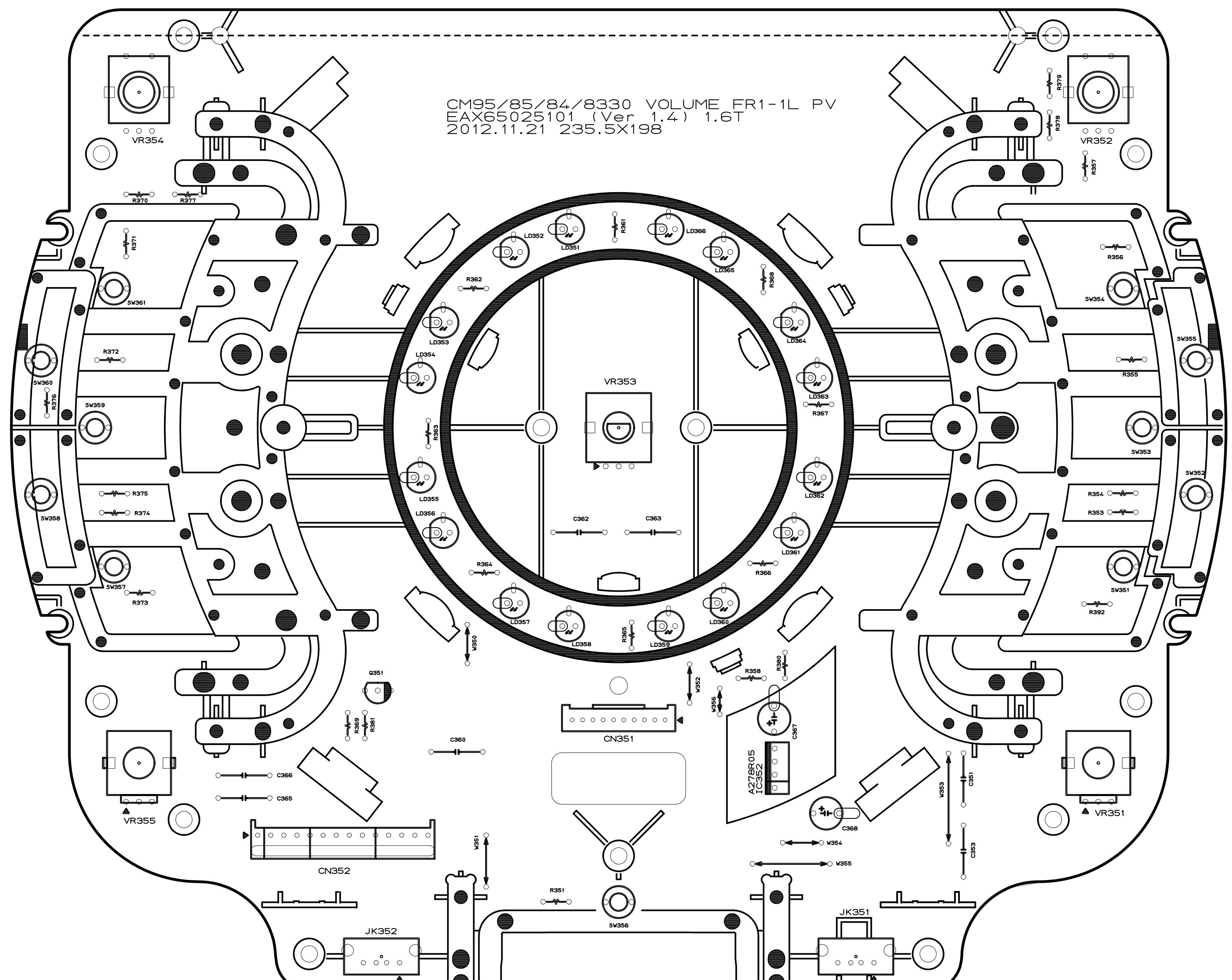
2. MAIN P.C.BOARD
(TOP VIEW)



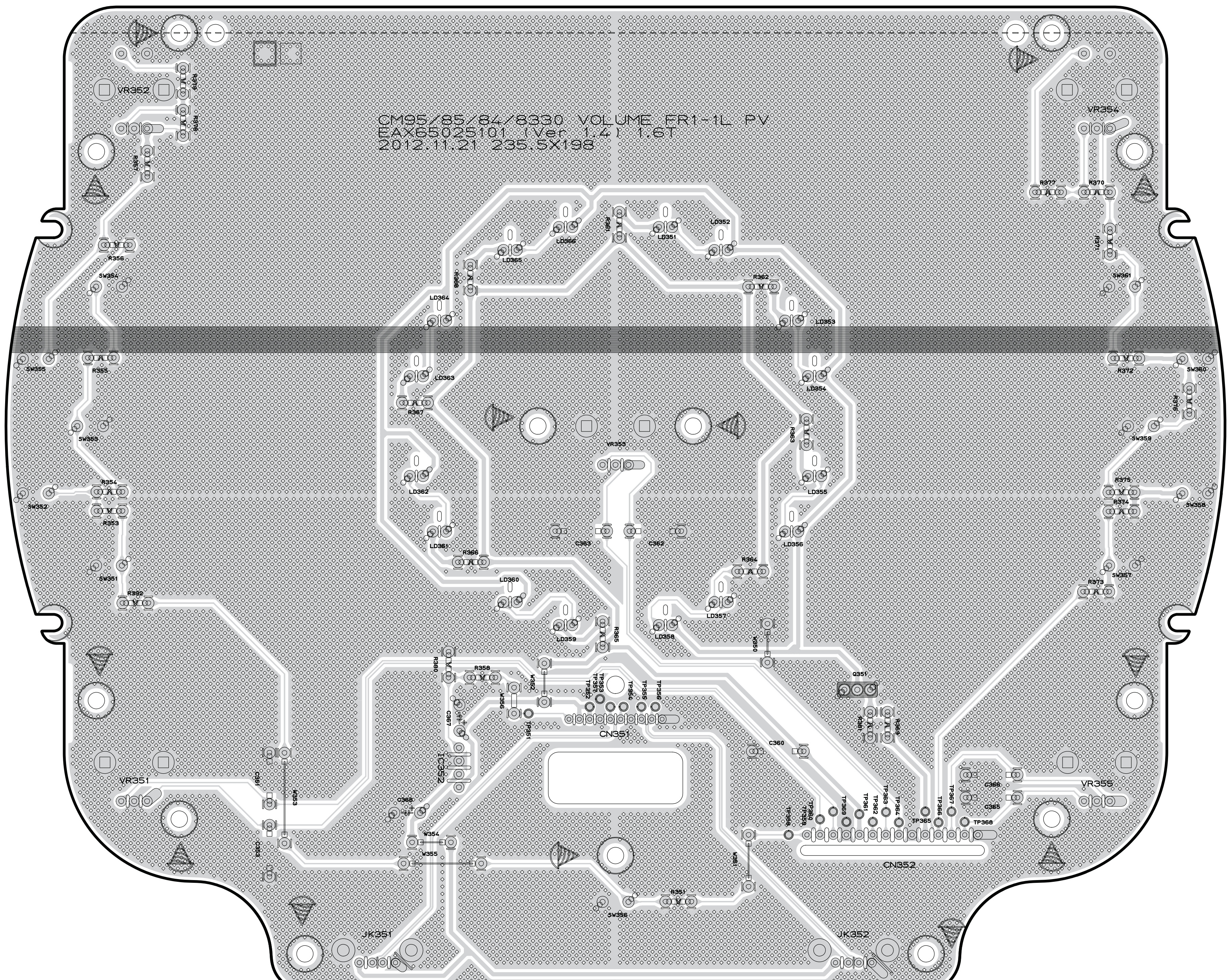
MAIN P.C.BOARD
(BOTTOM VIEW)



3. VOLUME P.C.BOARD
(TOP VIEW)

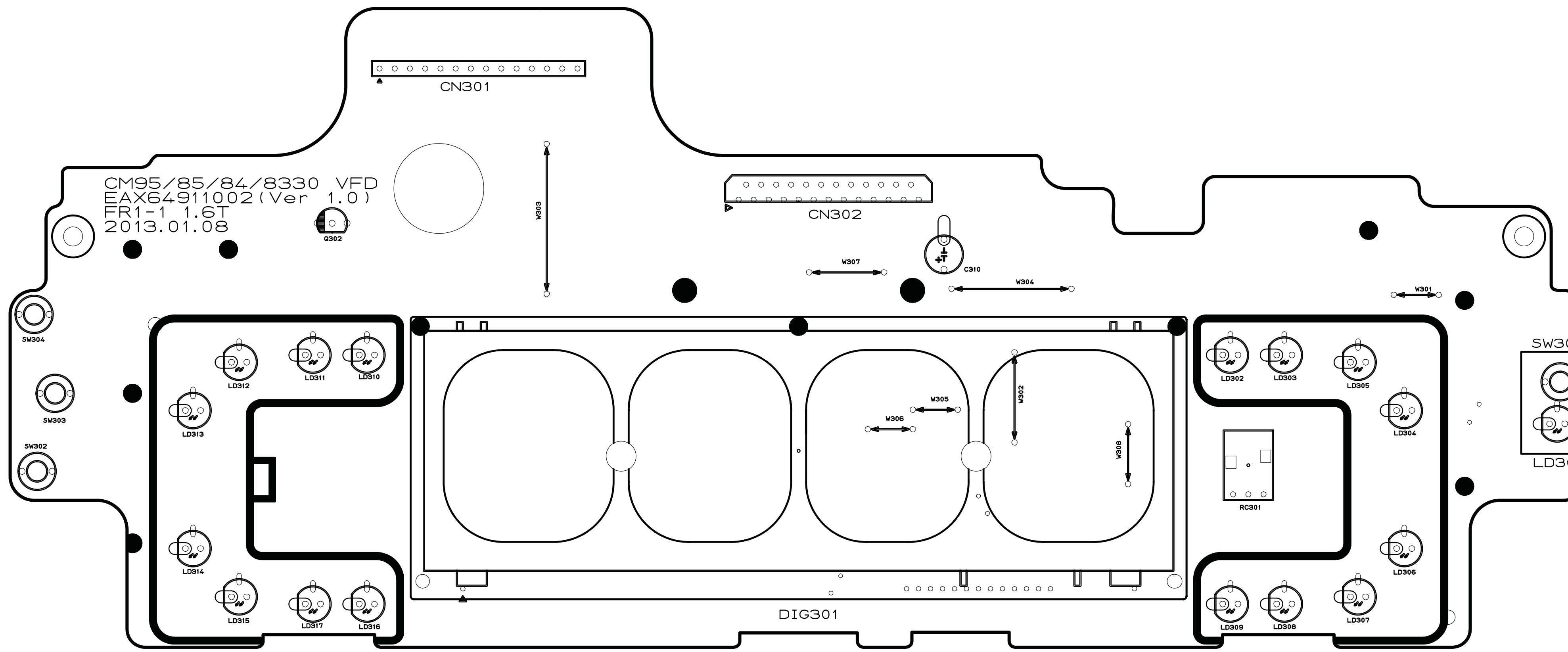


VOLUME P.C.BOARD
(BOTTOM VIEW)

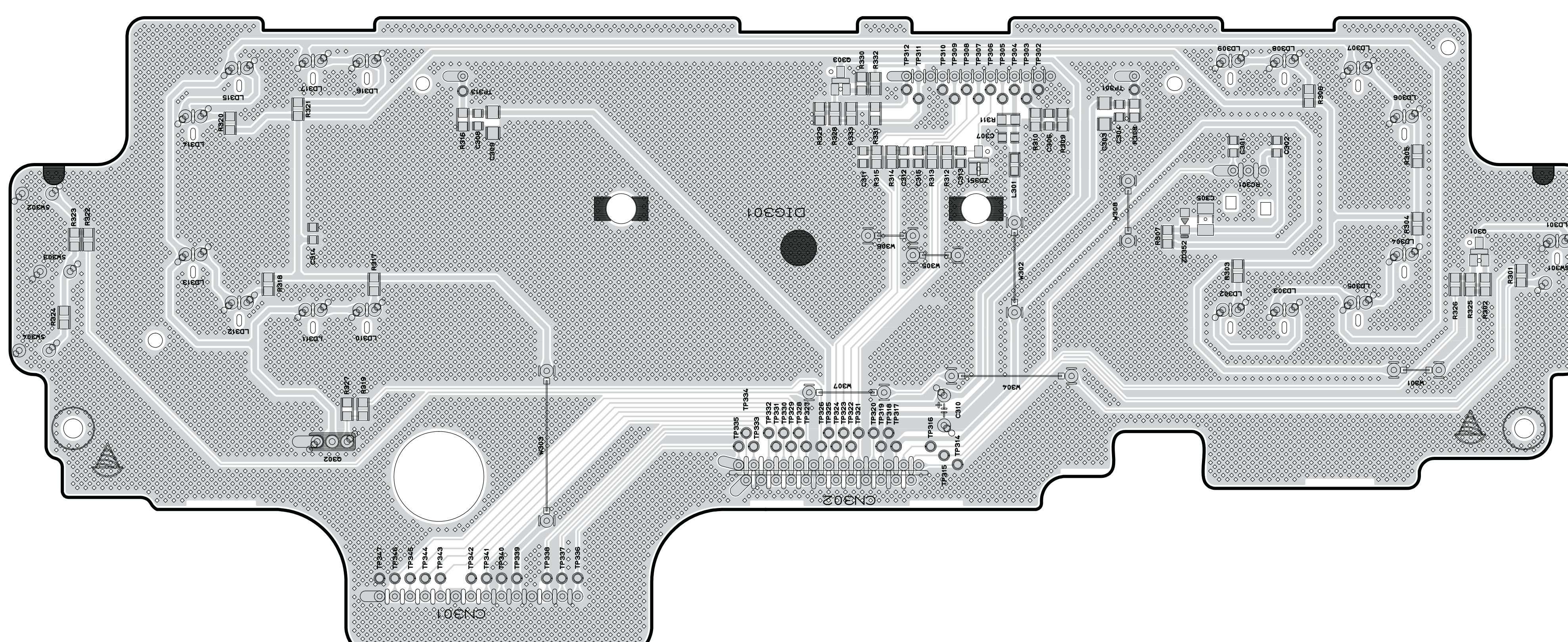


4. VFD P.C.BOARD

(TOP VIEW)

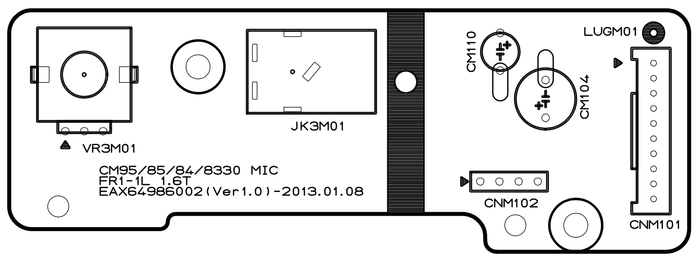


(BOTTOM VIEW)

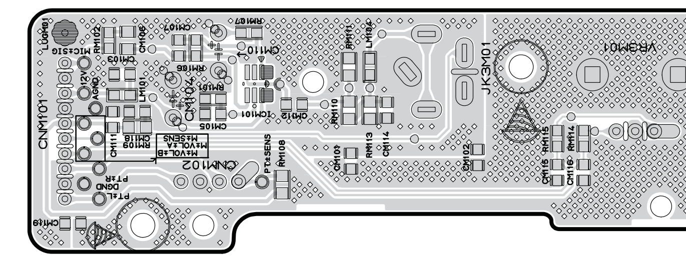


5. MIC P.C.BOARD

(TOP VIEW)

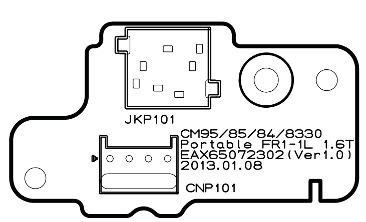


(BOTTOM VIEW)

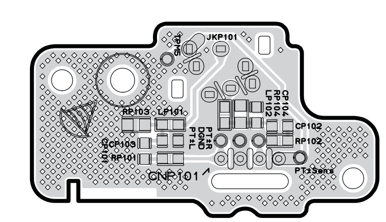


6. PORTABLE P.C.BOARD

(TOP VIEW)

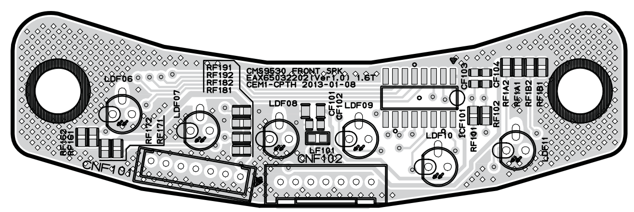


(BOTTOM VIEW)

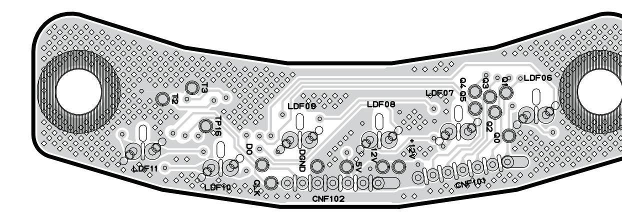


7. FRONT SPEAKER LED - DRIVER P.C.BOARD

(TOP VIEW)

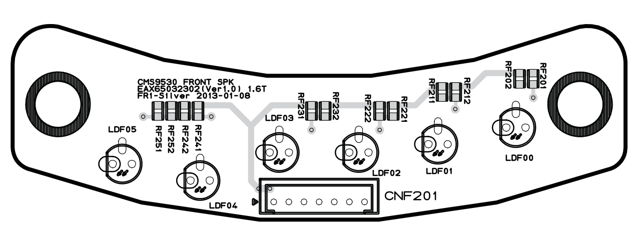


(BOTTOM VIEW)

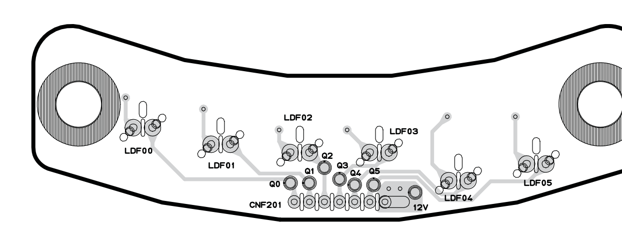


8. FRONT SPEAKER LED - SUB P.C.BOARD

(TOP VIEW)

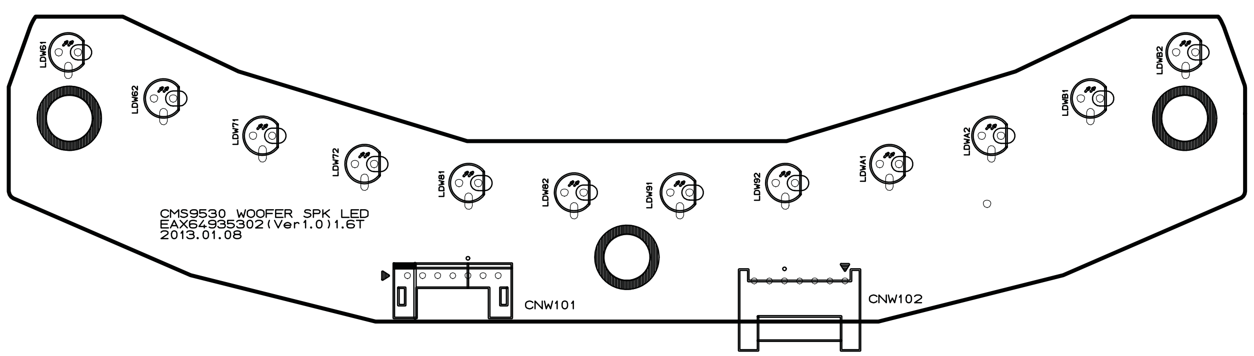


(BOTTOM VIEW)

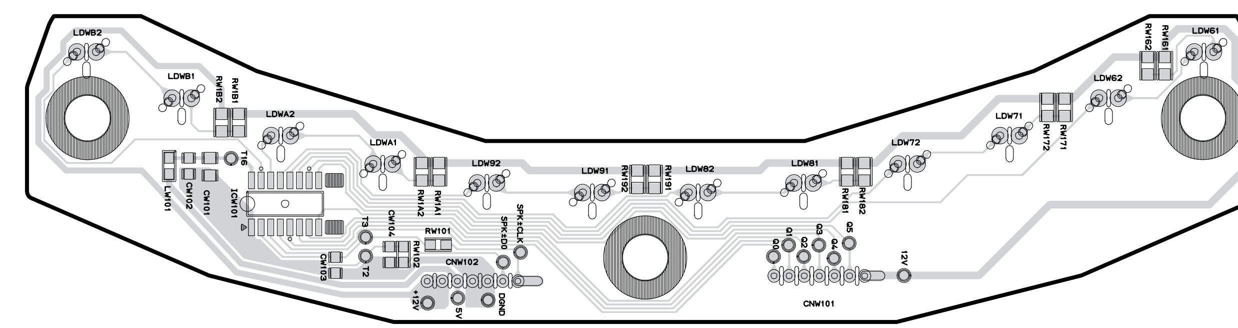


9. WOOFER SPEAKER LED - DRIVER P.C.BOARD

(TOP VIEW)

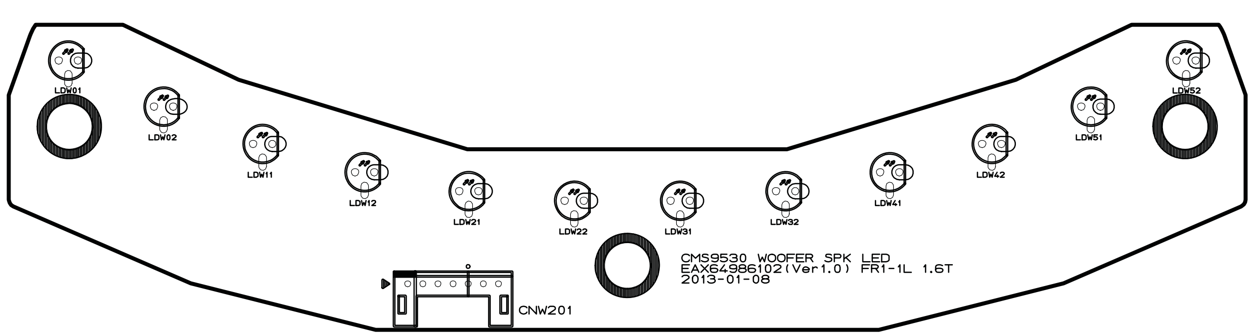


(BOTTOM VIEW)



10. WOOFER SPEAKER LED - SUB P.C.BOARD

(TOP VIEW)



(BOTTOM VIEW)