

Service  
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# Service Manual

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Published by Xu & Kelly wk 1428 Subject to modification

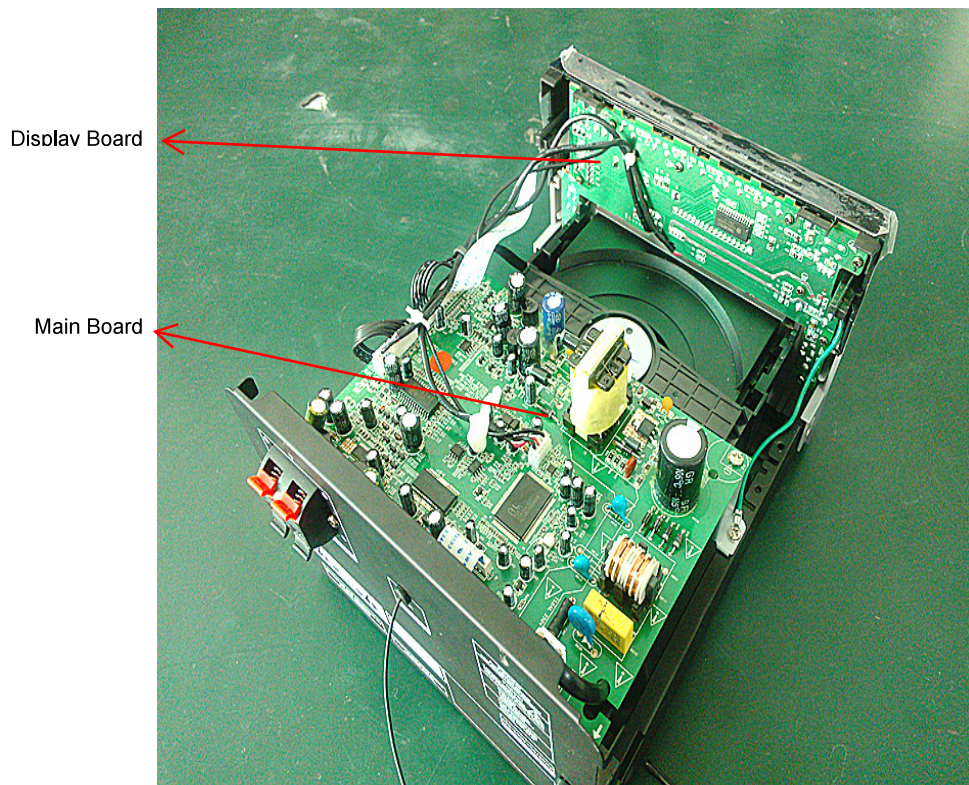
3140 038 61310

Version 3.0

# PHILIPS

# 1.Location of PC Boards & Versions Variation

## Location of PC Boards



## Versions Variation

| Type/Version<br>Service Policy |  | MCM2300     |                |     |     |     |     |
|--------------------------------|--|-------------|----------------|-----|-----|-----|-----|
|                                |  | /12<br>(EU) | /12<br>(APMEA) | /55 | /96 | /77 | /79 |
| Board in used                  |  |             |                |     |     |     |     |
| Main board                     |  | M           | M+C            | M+C | M+C | M+C | M+C |
| Display board                  |  | M           | M+C            | M+C | M+C | M+C | M+C |
|                                |  |             |                |     |     |     |     |
|                                |  |             |                |     |     |     |     |

Tips: C--Component Level Repair  
M--Module Level Rpair

## 2. Technical Specification

module: MCM2300

### TEST CONDITIONS:

- 1.POWER SUPPLY: AC.Accordiiing to Ver
- 2.REF OUTPUT: 4  $\Omega$  1W , Sound effect off
- 3.FM MONO: 22.5KHz Dev,1KHz MODULATION ,75 $\Omega$  IMPEDANCE ,60dBu
- 4.FM STEREO : MAIN+SUB = 50KHz, PILOT : 10KHz,COMPOSITE: 40.0KHz

### FM SECTION:

| NO | TEST ITEMS                     |        | UNIT | NOM. | LIMIT       | TEST DATA |         |
|----|--------------------------------|--------|------|------|-------------|-----------|---------|
|    |                                |        |      |      |             | 42#       | 2#      |
| 1  | Fvequency Range                |        | MHz  | 87.5 | 87.5        | 87.5      | 87.5    |
|    |                                |        |      | 108  | 108         | 108       | 108     |
| 2  | 26dB QUENTING SENSITIVITY      | 90.1   | dBf  | 16   | 22          | 14        | 13      |
|    |                                | 98.1   |      | 16   | 22          | 13        | 13      |
|    |                                | 106.1  |      | 16   | 22          | 13        | 13      |
| 3  | -3dB LIMITING POINT            |        | dBf  | 20   | 26          | 10        | 10      |
| 4  | FM IF REJECTION 98MHZ S/N=26dB |        | dB   | 65   | 60          | 113       | 113     |
| 5  | IMAGE REJECT 98MHZ S/N=26dB    |        | dB   | 40   | 25          | 113       | 113     |
| 6  | S/N                            | MONO   |      | 65   | 60          | 68        | 68      |
|    |                                | ST     |      | 55   | 50          | 64        | 65      |
| 7  | OVERALL DISTERTION             |        | %    | 1    | 2           | 0.2       | 0.2     |
| 8  | MODULATION HUM                 |        | dB   | 45   | 40          | 58        | 58      |
| 9  | TUNING SENS                    | 90MHz  | dBf  | —    | 19-35       | 18        | 18      |
|    |                                | 98MHz  | dBf  | —    | 19-35       | 18        | 18      |
|    |                                | 106MHz | dBf  | —    | 19-35       | 18        | 18      |
| 10 | STEREO CHANNEL SEPARATION      | 1KHz   | dB   | 25   | 18          | 39        | 39      |
| 11 | THD 10% POWER                  | 1KHz   | W    | —    | 5 $\pm$ 1dB | 5.7/5.7   | 5.7/5.8 |

### CD SECTION:

| NO | TEST ITEMS                            |     |       | UNIT | NOM.  | LIMIT | TEST DATA |           |
|----|---------------------------------------|-----|-------|------|-------|-------|-----------|-----------|
|    |                                       |     |       |      |       |       | 42#       | 2#        |
| 1  | TOTAL HARMONIC DISTORTION             |     | 1KHz  | %    | ≤0. 8 | ≤1    | 0. 1/0. 1 | 0.1/0.1   |
| 2  | S/N (1KHz,A-weightde)                 |     |       | dBA  | 82    | 77    | 86        | 87        |
| 3  | FREQUENCY RESPONSE AT LOUDSPEAKER OUT | L/R | 30Hz  | dB   | —     | ±3    | /         | /         |
|    |                                       |     | 20KHz | dB   | —     | ±3    | /         | /         |
| 4  | CHANNEL DIFFERENCE (1KHz)             |     |       | dB   | ±3    | —     | 0. 1/0. 1 | 0. 1/0. 1 |
| 5  | CHANNEL SEPARATION                    | 1K  | L     | dB   | 40    | —     | 68        | 67        |
|    |                                       |     | R     | dB   | 40    | —     | 68        | 67        |
|    |                                       | 10K | L     | dB   | 35    | —     | 64        | 61        |
|    |                                       |     | R     | dB   | 35    | —     | 64        | 61        |
| 6  | Residual noise (Vol min)              |     |       | nW   | —     | ≤40   | 1         | 1         |
| 7  | HUM                                   |     |       | nW   | —     | ≤150  | 15        | 15        |
| 8  | 10% THE POWER                         |     |       | W    | —     | 5±1dB | 5. 7/5. 7 | 5.7/5.7   |

## Technical Specification

### AUX SECTION:

| NO | TEST ITEMS                                           |                           |       | UNIT | NOM. | LIMIT | TEST DATA |         |         |
|----|------------------------------------------------------|---------------------------|-------|------|------|-------|-----------|---------|---------|
|    |                                                      |                           |       |      |      |       | 42#       | 2#      |         |
| 1  | THD 30% POWER                                        |                           |       | 1KHz | W    | —     | 75±1dB    |         |         |
| 2  | L/R OUTPUT POWER (10% THD, 8Ω,1KHz)                  |                           |       |      | W    | —     | 5±1dB     | 5.6/5.6 | 5.5/5.5 |
| 3  | FREQUENCY RESPONSE AT LOUDSPEAKER OUT                | L/R                       | 40Hz  | dB   | —    | ±3    | /         | /       |         |
|    |                                                      |                           | 20KHz | dB   | —    | ±3    | /         | /       |         |
| 4  | AMPLIFIER DISTORTION                                 |                           |       |      | %    | ≤0.8  | ≤1        | 0.1/0.1 | 0.1/0.1 |
| 5  | CHANNEL SEPARATION                                   |                           | 1K    | L    | dB   | 40    | —         | 47      | 47      |
|    |                                                      |                           |       | R    | dB   | 40    | —         | 47      | 47      |
|    |                                                      |                           | 10K   | L    | dB   | 35    | —         | 55      | 56      |
|    |                                                      |                           |       | R    | dB   | 35    | —         | 55      | 56      |
| 6  | CHANNEL DIFFERENCE (1KHz)                            |                           |       |      | dB   | ±3    | —         | 0.1/0.1 | 0.1/0.1 |
| 7  | LEVEL DIFFERENCE (RATED OUTPUT)                      | FM 1KHz 67.5KHz DEV,68dBf |       |      | dB   | -     | ±5        | -0.8    | -0.9    |
|    |                                                      | CD disc1-6dB track35      |       |      | dB   | -     | ±3        | 1       | 0.9     |
| 8  | INPUT SENSITIVITY(RATED OUTPUT POWER AT 1KHz,10%THD) |                           |       |      | mV   | 800   | ±200      | 700     | 700     |
| 9  | S/N RATIO (1KHz,A-WEIGHTED)                          |                           |       |      | dBA  | 82    | 77        | 85      | 85      |
| 10 | HUM (VOL.MIN-MAX-20dB,without signal)                |                           |       |      | nW   | -     | ≤150      | 10      | 10      |
| 11 | RESIDUAL NOISE (VOL.MIN.with signal ) A-WEIGHTED     |                           |       |      | nW   | -     | ≤40       | 1       | 1       |

### USB SECTION:

| NO | TEST ITEMS                            |     |       | UNIT | NOM. | LIMIT | TEST DATA |          |
|----|---------------------------------------|-----|-------|------|------|-------|-----------|----------|
|    |                                       |     |       |      |      |       | 42#       | 2#       |
| 1  | TOTAL HARMONIC DISTORTION             |     | 1KHz  | %    | ≤1   | ≤2    | 0..1/0.1  | 0..1/0.1 |
| 2  | S/N (1KHz,A-weightde)                 |     |       | dBA  | 67   | 65    | 86        | 85       |
| 3  | FREQUENCY RESPONSE AT LOUDSPEAKER OUT | L/R | 125Hz | dB   | —    | ±3    | /         | /        |
|    |                                       |     | 20KHz | dB   | —    | ±3    | /         | /        |
| 4  | CHANNEL DIFFERENCE (1KHz)             |     |       | dB   | 0    | ≤2    | 0..1/0.1  | 0..1/0.1 |
| 5  | CHANNEL SEPARATION                    | 1K  | L     | dB   | 45   | —     | 69        | 68       |
|    |                                       |     | R     | dB   | 45   | —     | 69        | 68       |
|    |                                       | 10K | L     | dB   | 30   | —     | 59        | 59       |
|    |                                       |     | R     | dB   | 30   | —     | 59        | 59       |
| 6  | Residual noise (Vol min)              |     |       | nW   | —    | ≤40   | 1         | 1        |
| 7  | HUM                                   |     |       | nW   | —    | ≤150  | 1         | 1        |
| 8  | 10% THE POWER                         |     |       | W    | —    | 5±1dB | 5. 6/5. 6 | 5.6/5.6  |

### 3.Safety instruction

---

#### 1. General safety

Safety regulations require that during a repair:

- . Connect the unit to the mains via an isolation transformer.
- . Replace safety components indicated by the symbol , only by components identical to the original ones. Any other component substitution (other than original type) may increase risk of fire or electrical shock hazard.

Safety regulations require that after a repair, you must return the unit in its original condition. Pay, in particular, attention to the following points:

- . Route the wires/cables correctly, and fix them with the mounted cable clamps.
- . Check the insulation of the mains lead for external damage.
- . Check the electrical DC resistance between the mains plug and the secondary side:
  - 1) Unplug the mains cord, and connect a wire between the two pins of the mains plug.
  - 2) Set the mains switch the "on" position (keep the mains cord unplug).
  - 3) Measure the resistance value between the mains plug and the front panel, controls, and chassis bottom.
  - 4) Repair or correct unit when the resistance measurement is less than 1M $\Omega$ .
  - 5) Verify this, before you return the unit to the customer/user (ref. UL-standard no. 1492).
  - 6) Switch the unit "off", and remove the wire between the two pins of the mains plug.

#### 2.Laser safety

This unit employs a laser. Only qualified service personnel may remove the cover, or attempt to service this device (due to possible eye injury).

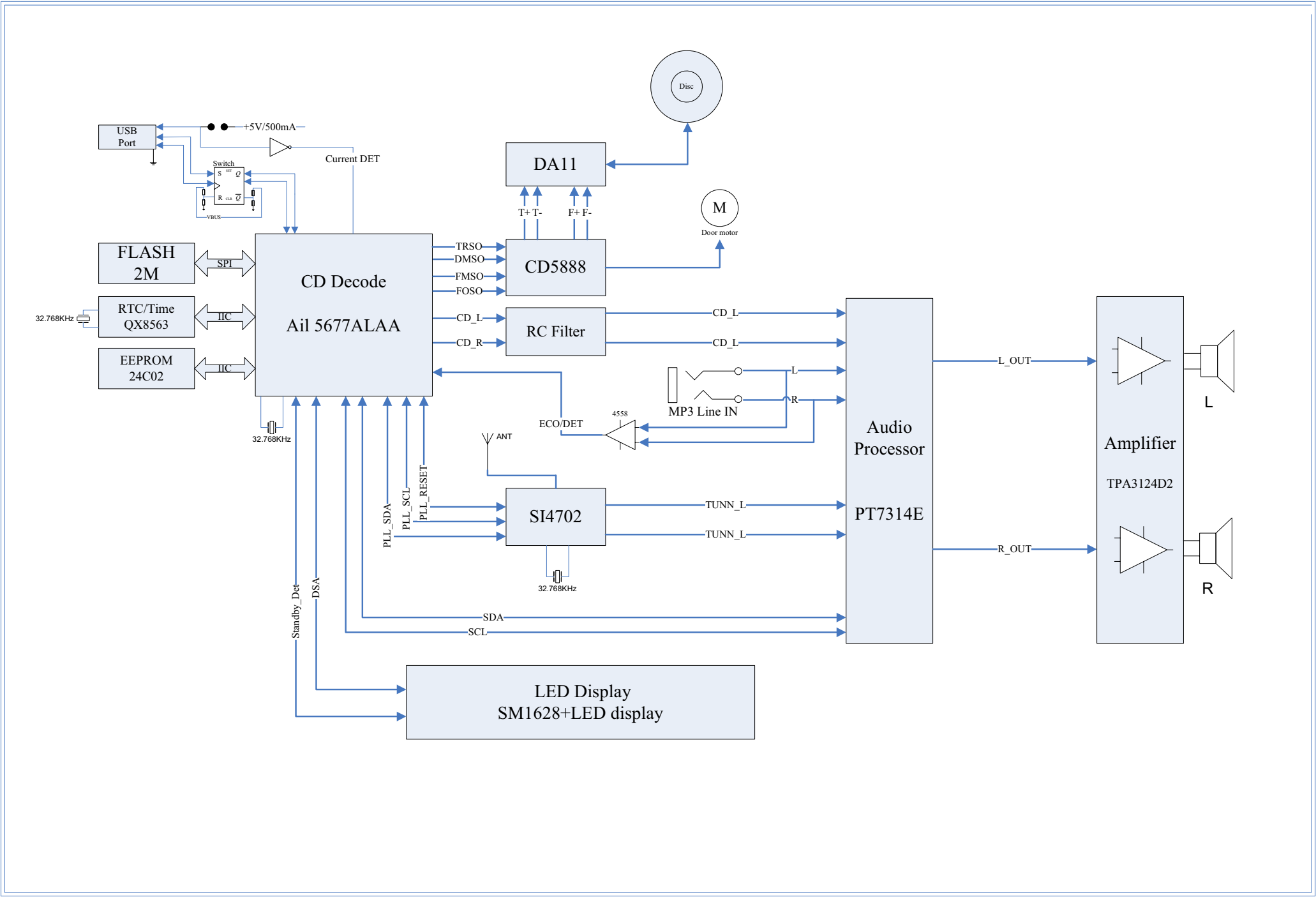
Laser device unit

|              |                              |
|--------------|------------------------------|
| Type         | : Semiconductor laser GaAlAs |
| Wavelength   | : 650nm (DVD)                |
|              | : 780nm (VCD/CD)             |
| Output power | : 7mW (DVD)                  |
|              | : 10mW (DVD /CD)             |

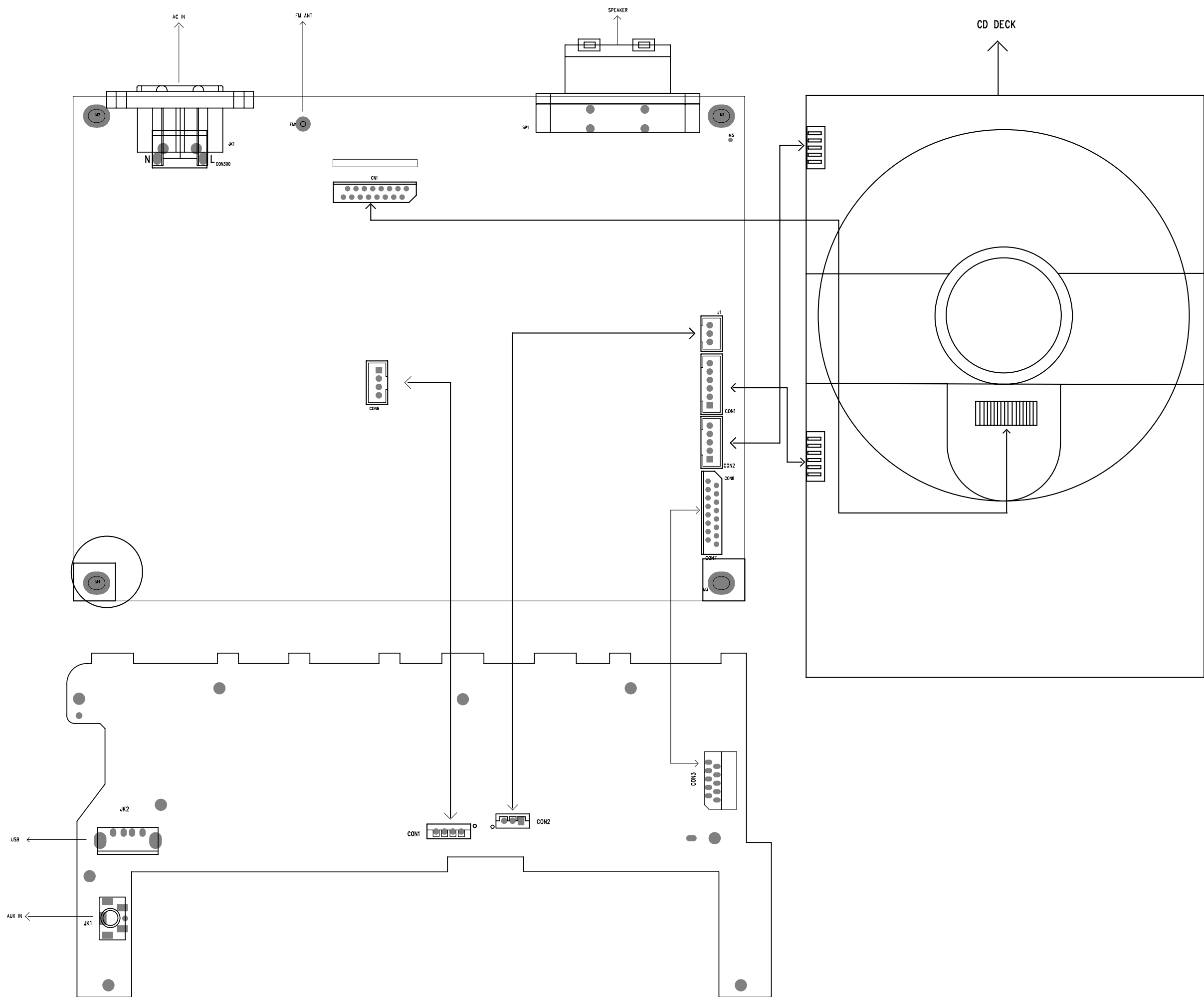
Beam divergence: 60 degree

Note: Use of controls or adjustments or performance of procedure other than those specified herein, may result in hazardous radiation exposure. Avoid direct exposure to beam.

4.Set Block Diagram



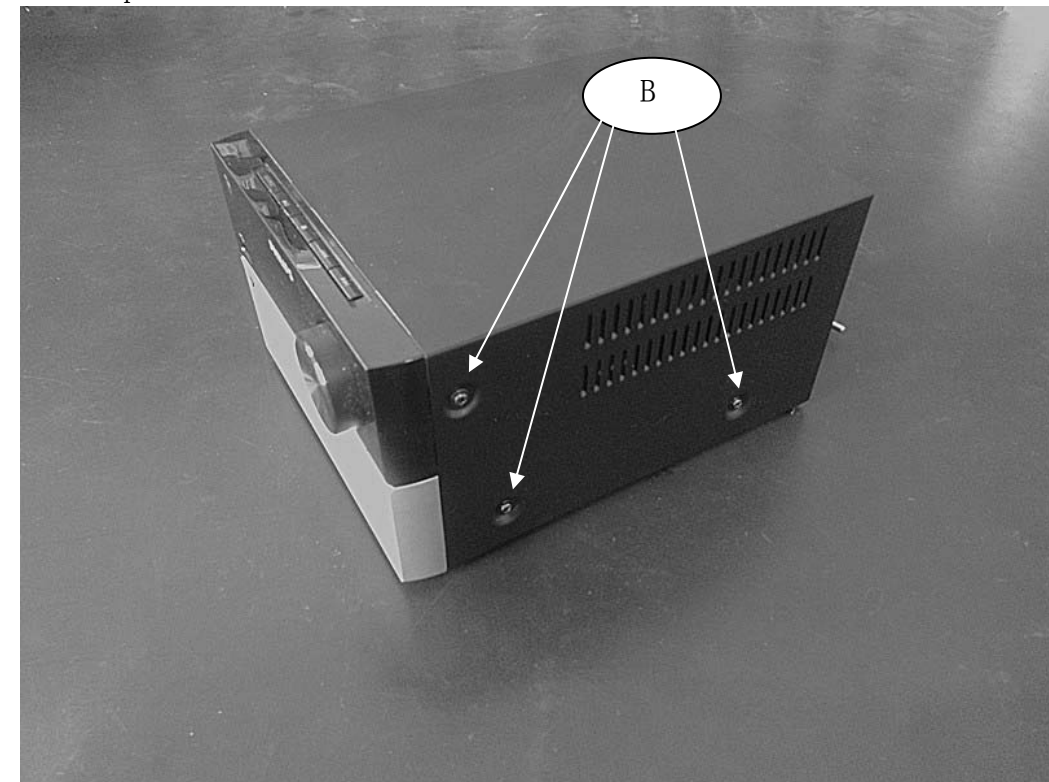
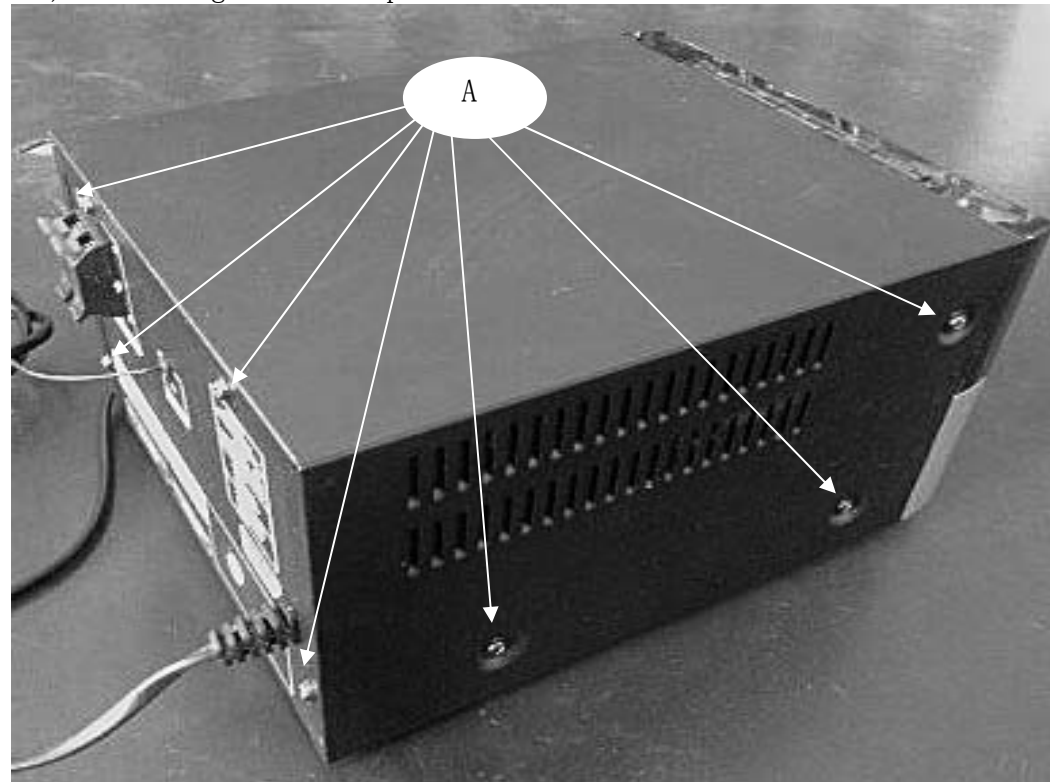
5.Set Wiring Diagram





## 6. DISMANTING DIAGRAM

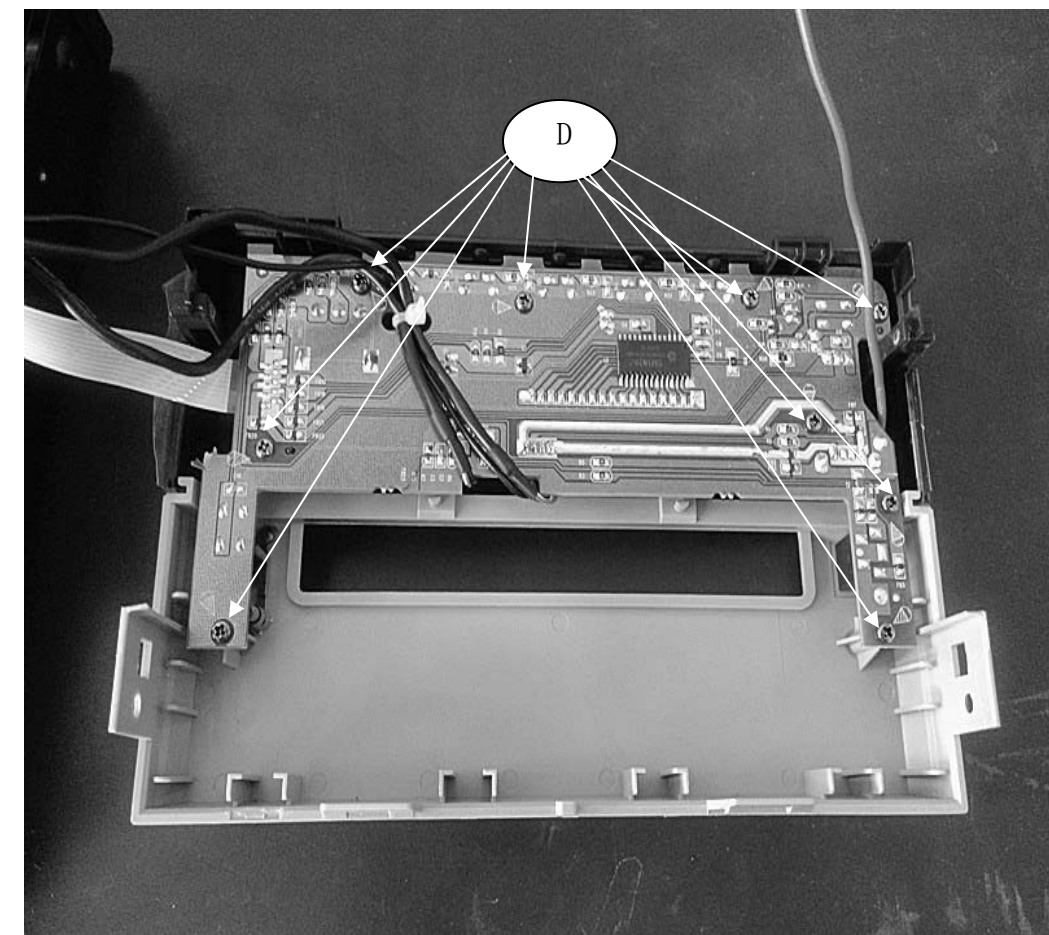
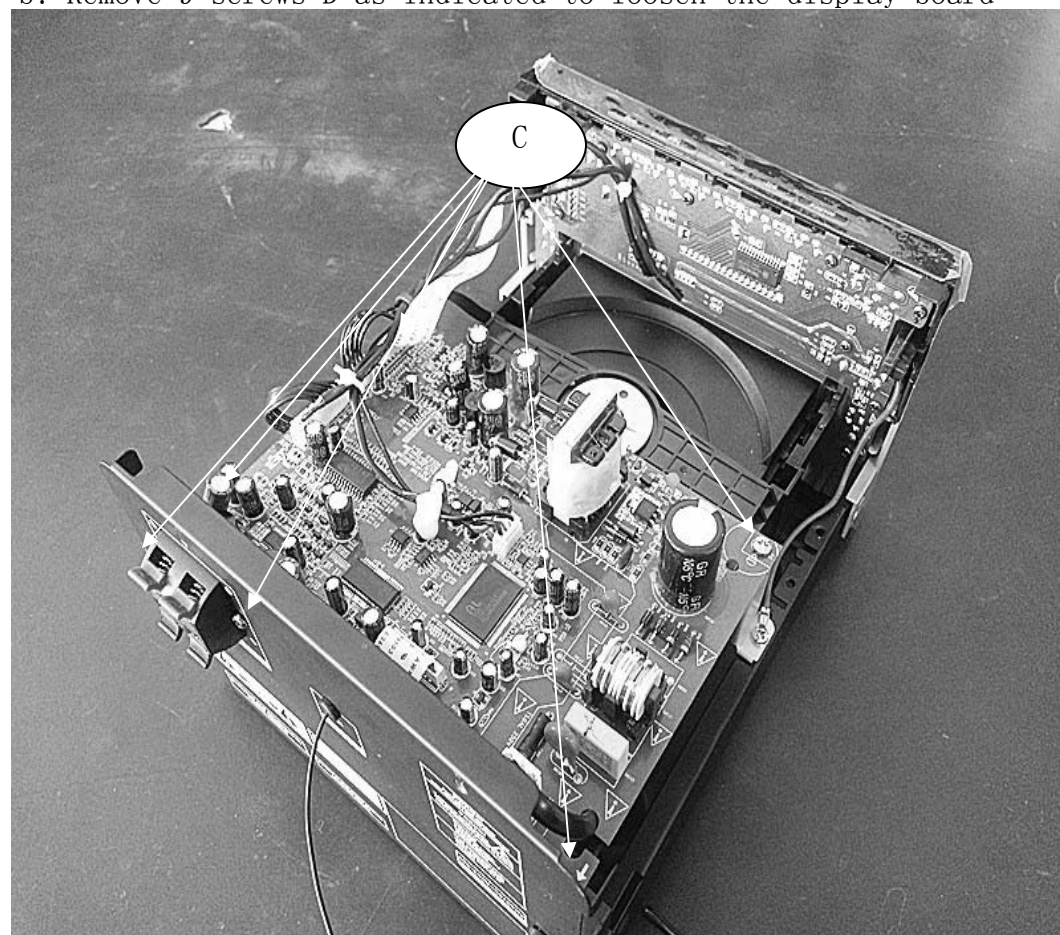
1) Dismantling of the top cabinet: Remove 10 screws A&B as indicated to loosen the top cabinet



2) Dismantling of the PCB board:

a: Remove 6 screws C as indicated to loosen the main board

b: Remove 9 screws D as indicated to loosen the display board

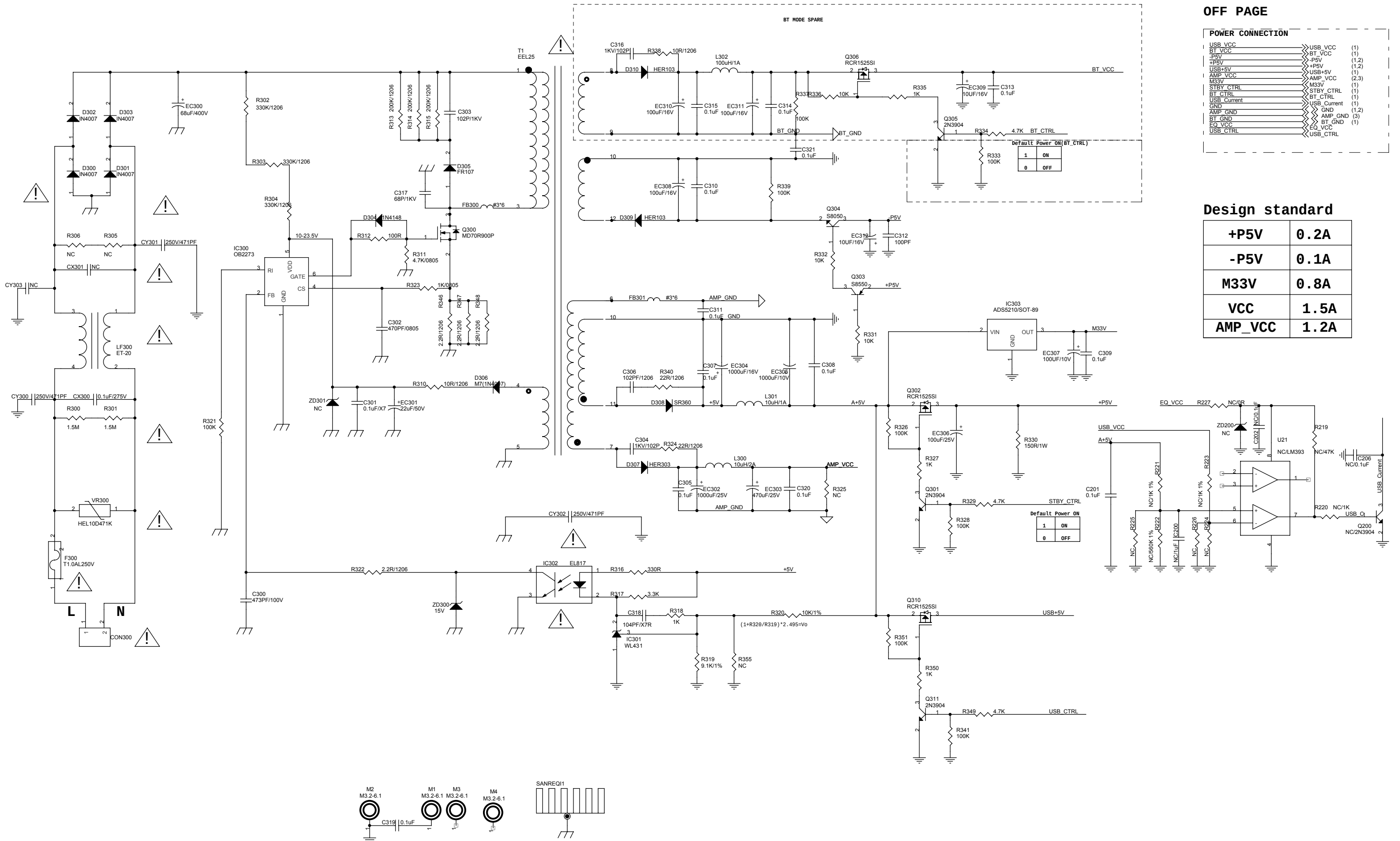




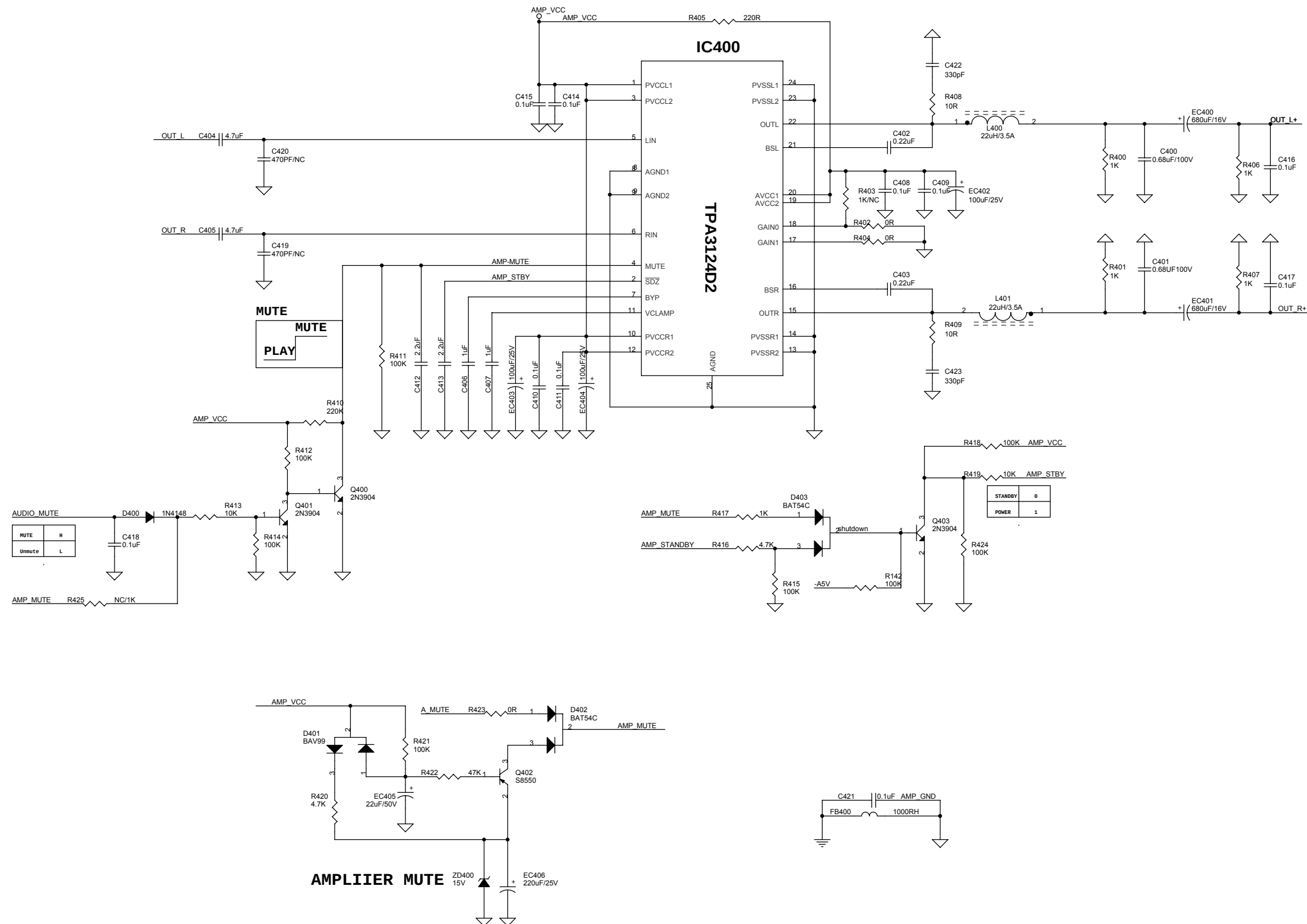
**\* CAUTION :**

THE PARTS MARKED WITH  ARE IMPORTANT PARTS ON THE SAFETY.

PLEASE USE THE PARTS HAVING THE DESIGNATED PARTS NUMBER WITHOUT FAIL.

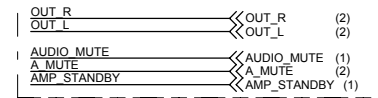


### Main Board Circuit Diagram

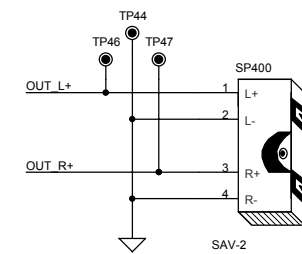
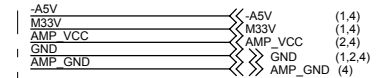


**OFF PAGE**

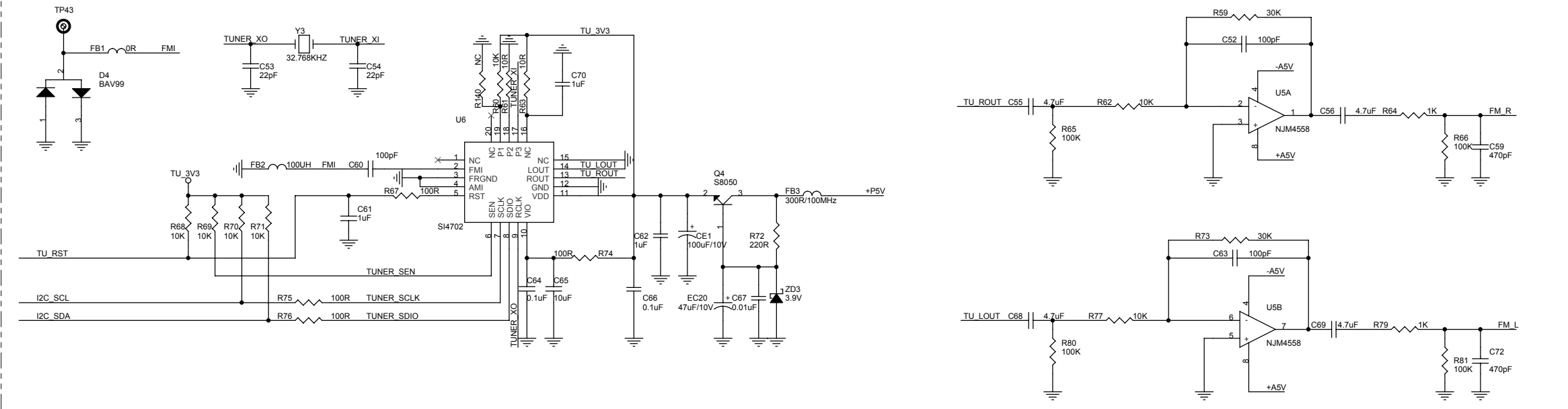
## DATA CONNECTION



## POWER CONNECTION



**TUNER Audio OP**



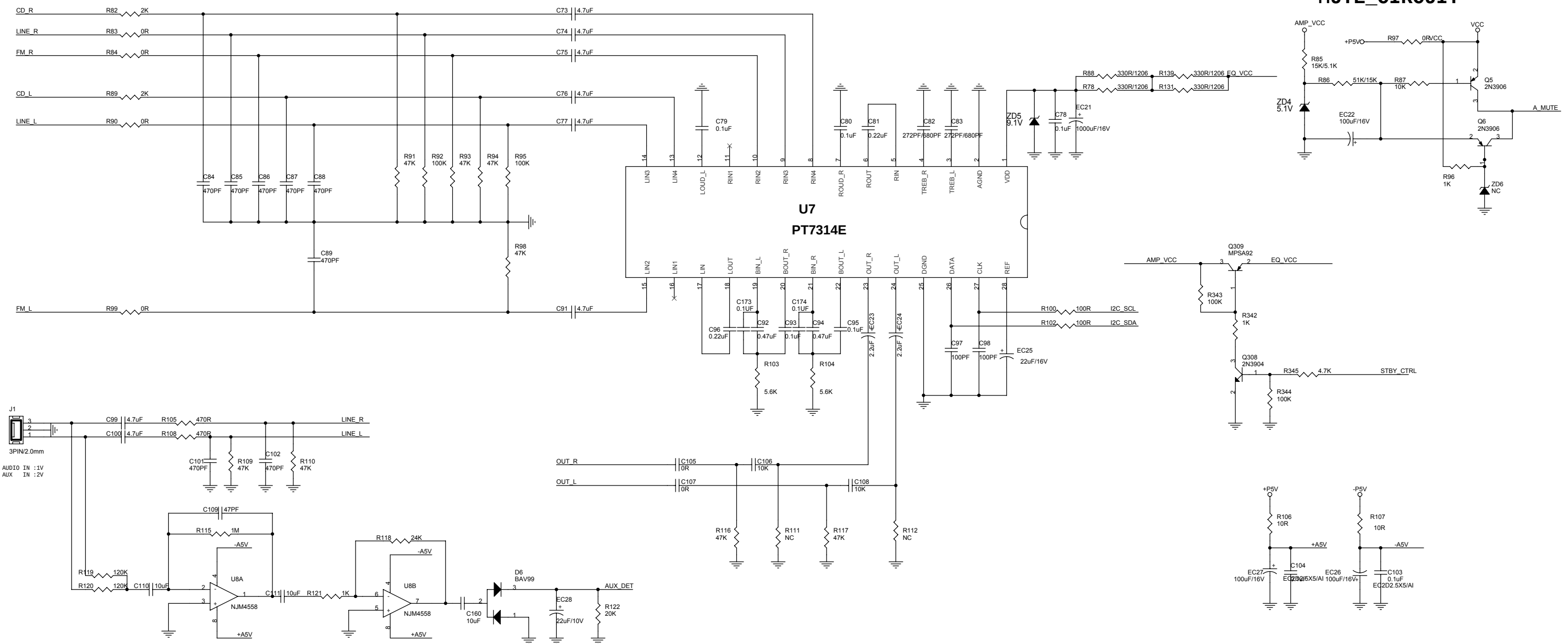
## DATA CONNECTION

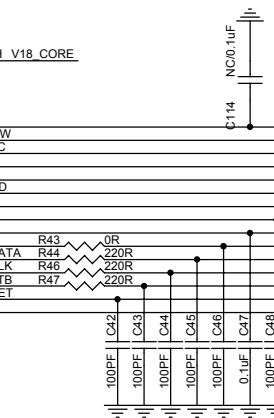
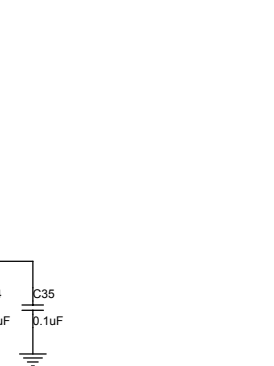
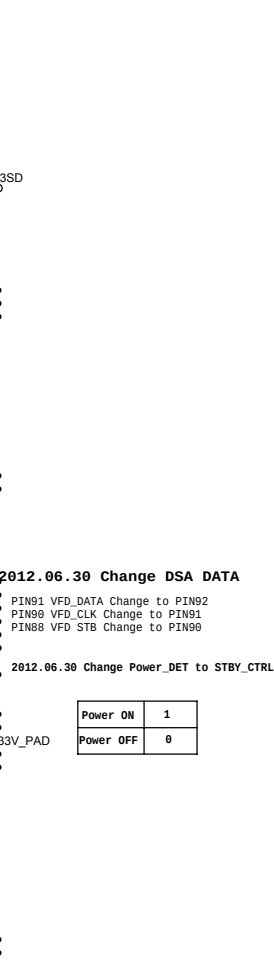
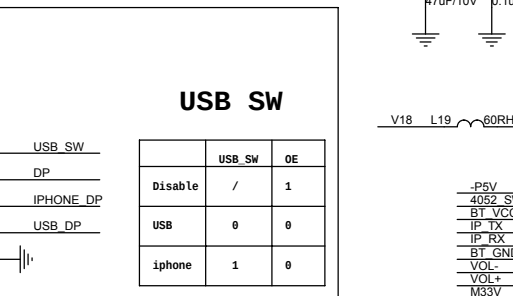
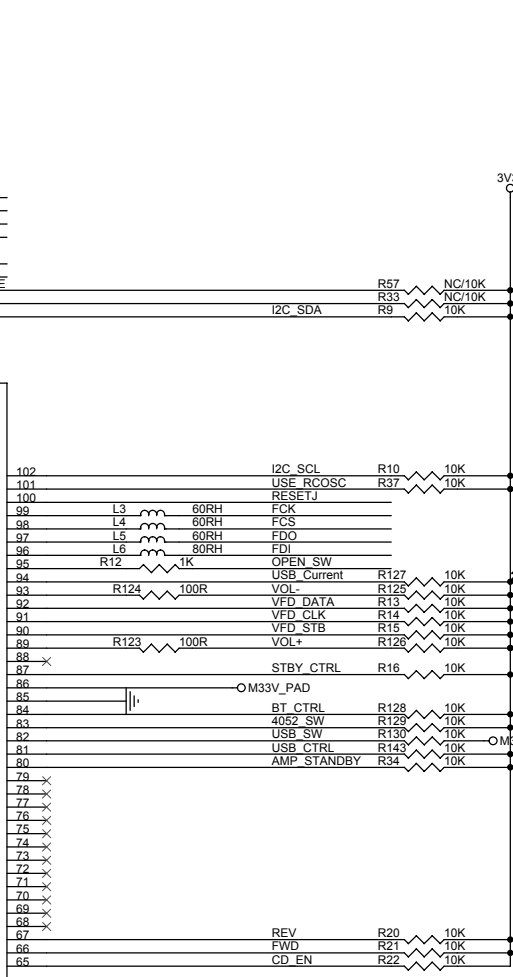
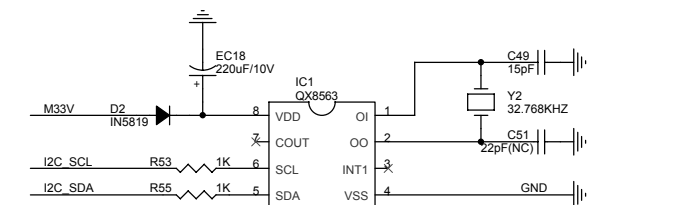
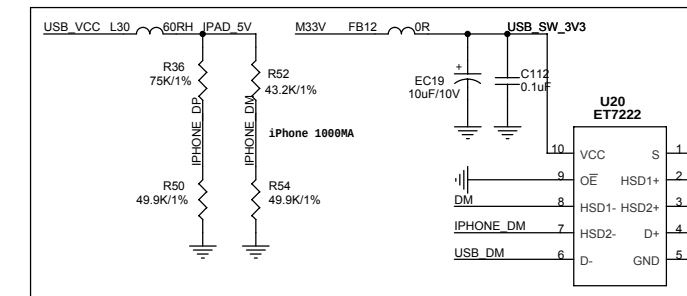
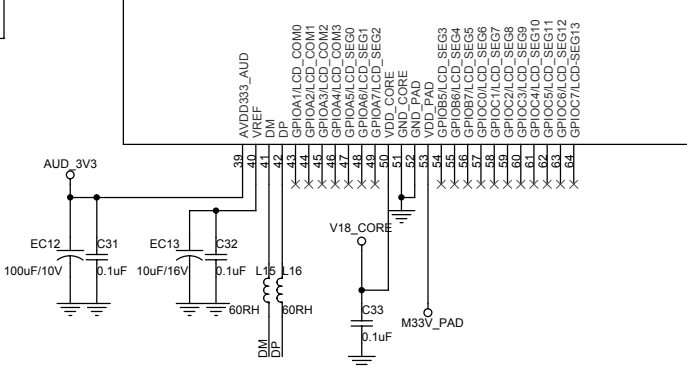
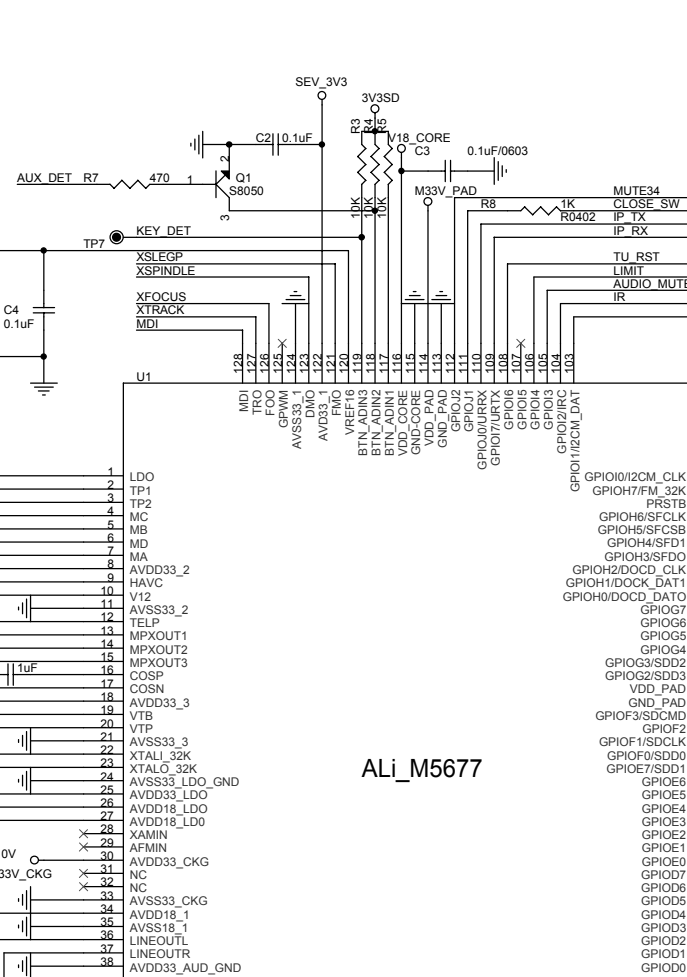
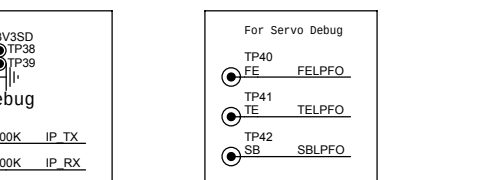
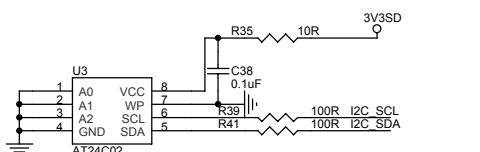
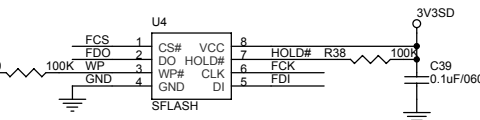
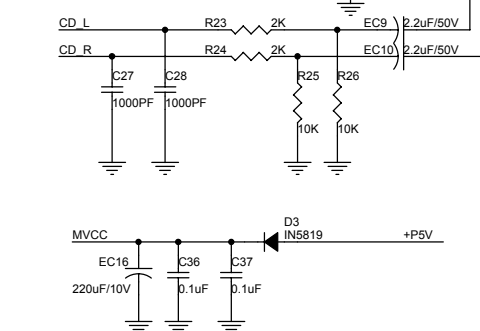
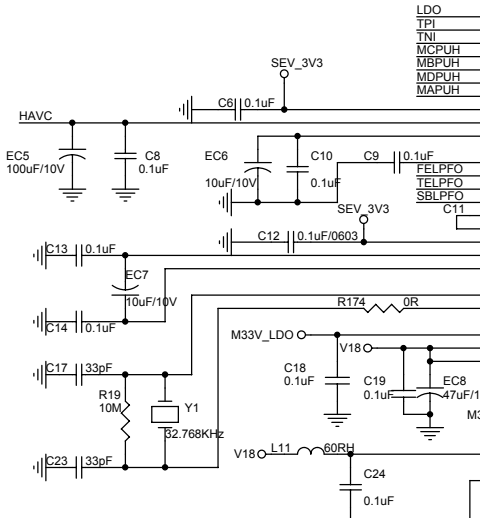
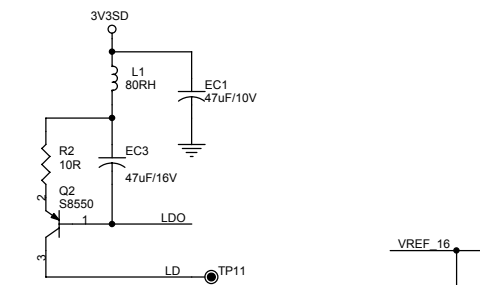
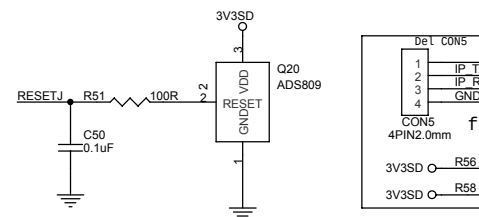
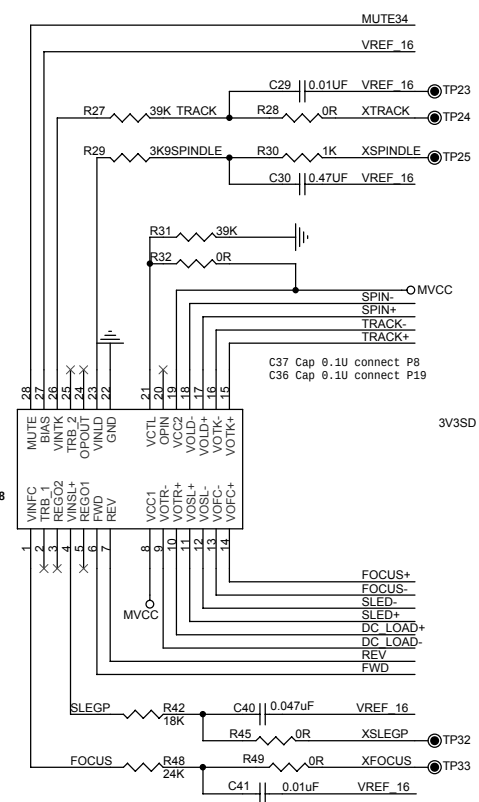
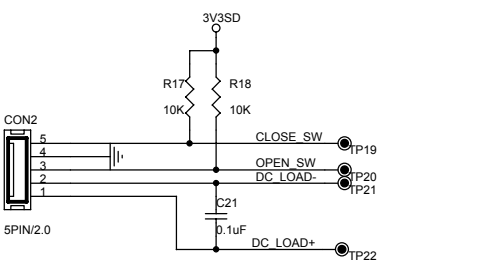
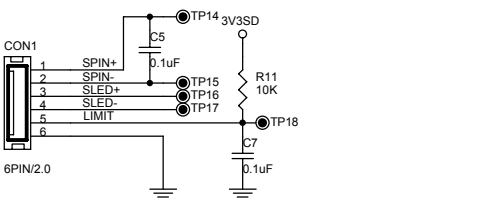
## AUDIO CONNECTION

CTRL CONNECTION

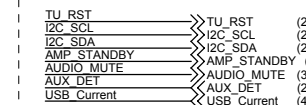
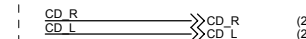
## POWER CONNECTION

## MUTE\_CIRCUIT

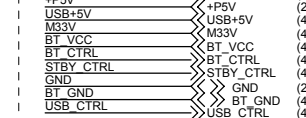




## Audio Connection



|   |         |         |     |
|---|---------|---------|-----|
| 1 | USB_VCC | USB_VCC | (4) |
| 1 | -P5V    | -P5V    | (2) |
| 1 | +P5V    | +P5V    | (2) |



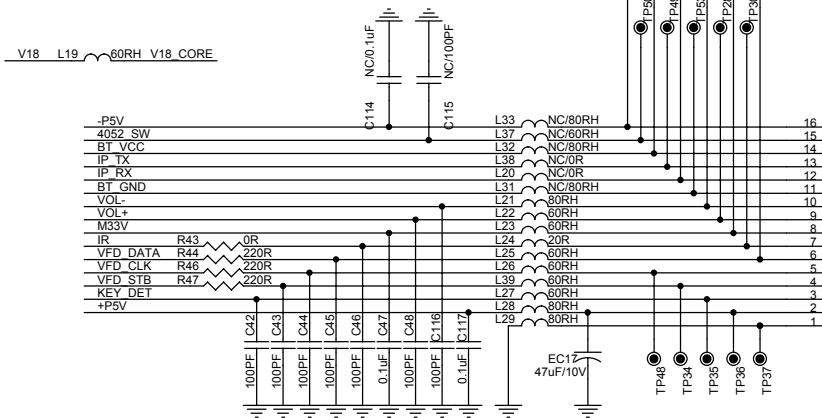
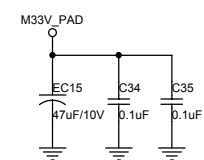
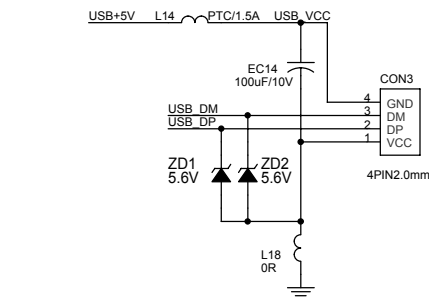
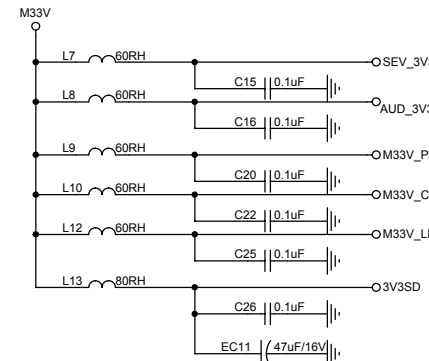
2012.06.30 Change DSA DATA

PIN91 VFD\_DATA Change to PIN92

PIN90 VFD\_CLK Change to PIN91  
PIN88 VFD\_STB Change to PIN90

2012.06.30 Change Power\_DET to STBY\_CTRL

|           |   |
|-----------|---|
| Power ON  | 1 |
| Power OFF | 0 |



h Board Layout Diagram

AC IN

VR300

F300

T1.0AL 250V

CX300

LF300

CX301

D301

D300

D302

D303

EC300

R311

R312

D304

R346

R347

R348

R323

EC301

C300

IC300

R321

R322

C301

C302

Q300

R302

C303

R303

R313

R315

R314

D305

FB300

Q301

C317

D306

R310

ZD301

CY302

IC301

R316

R320

R319

R318

R317

R316

R315

R314

R313

R312

R311

R310

R309

R308

R307

R306

R305

R304

R303

R302

R301

R300

R299

R298

R297

R296

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R294

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R271

R270

R269

R268

R267

R266

R265

R264

R263

R262

R261

R260

R259

R258

R257

R256

R255

R254

R253

R252

R251

R250

R249

R248

R247

R246

R245

R244

R243

R242

R241

R240

R239

R238

R237

R236

R235

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R233

R232

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R220

R219

R218

R217

R216

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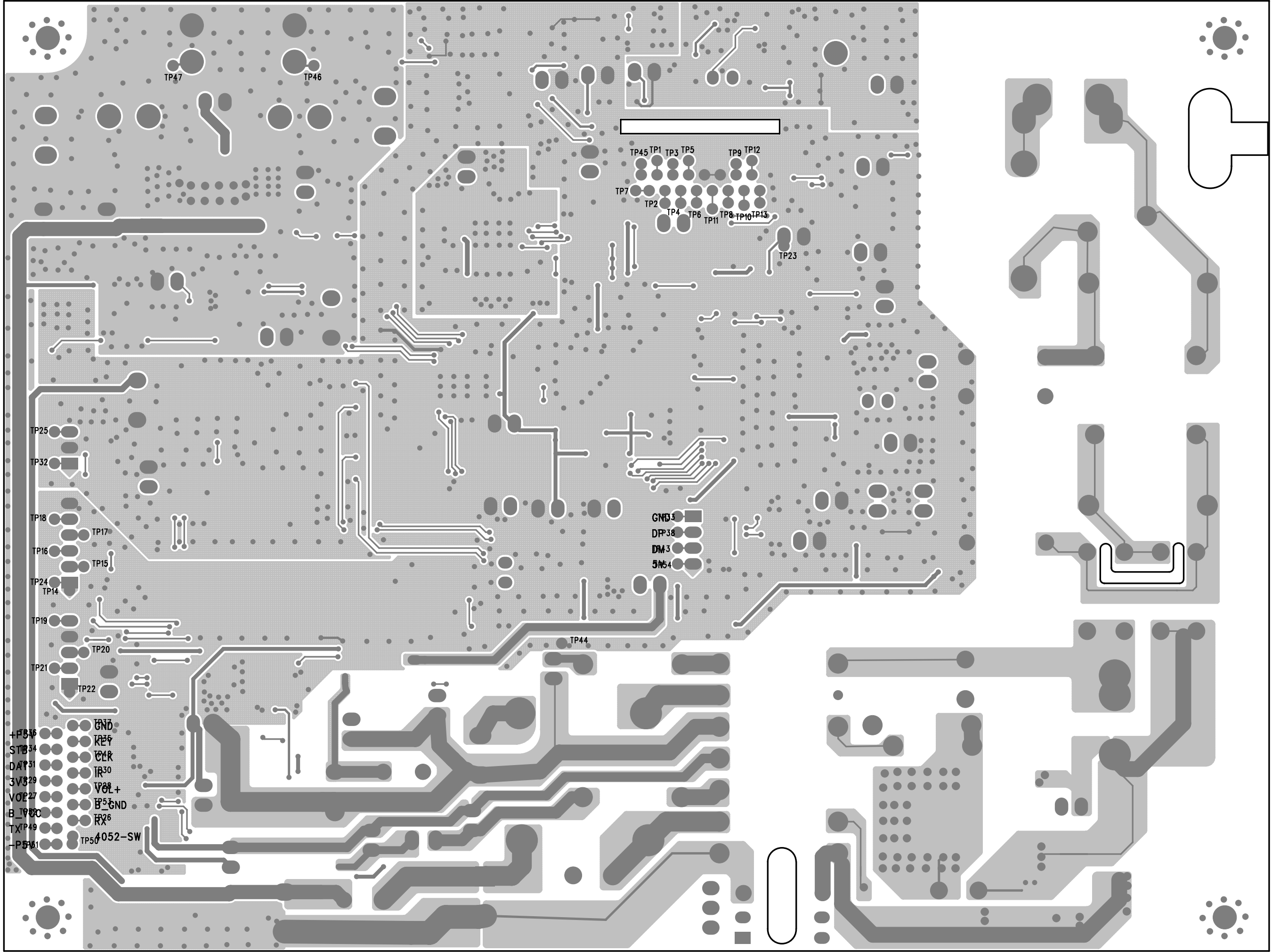
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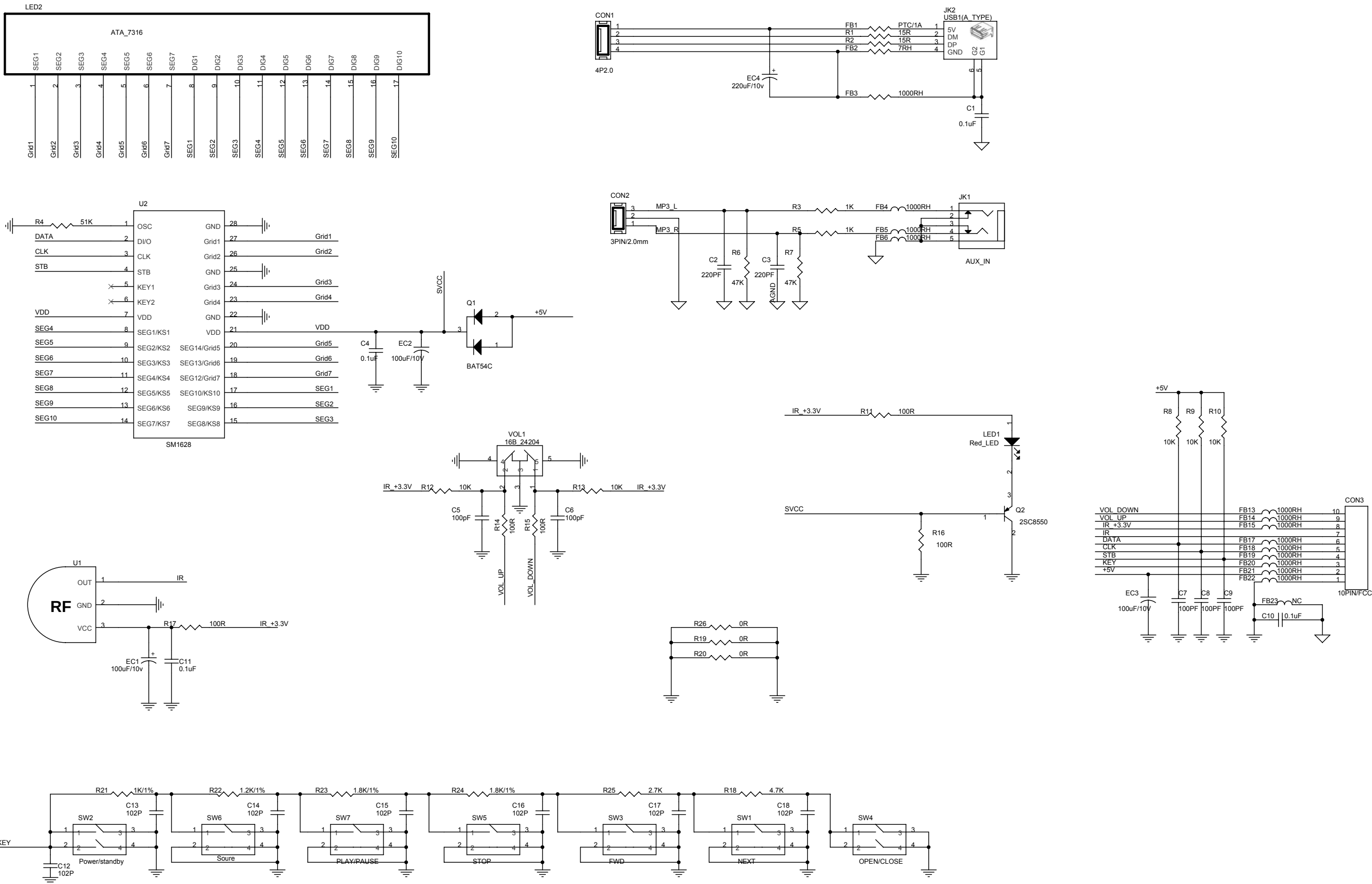
C9

Main Board Layout Diagram

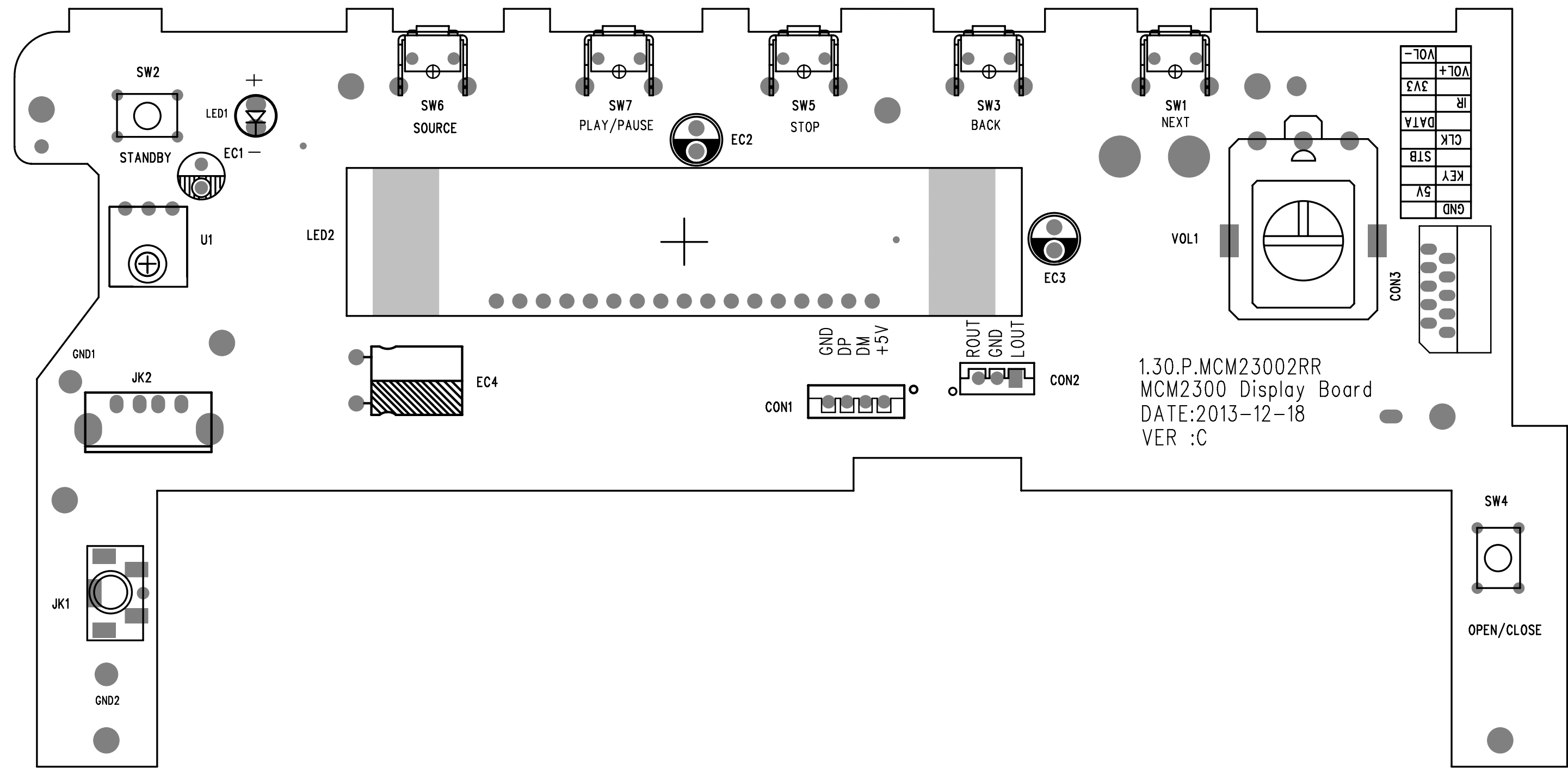




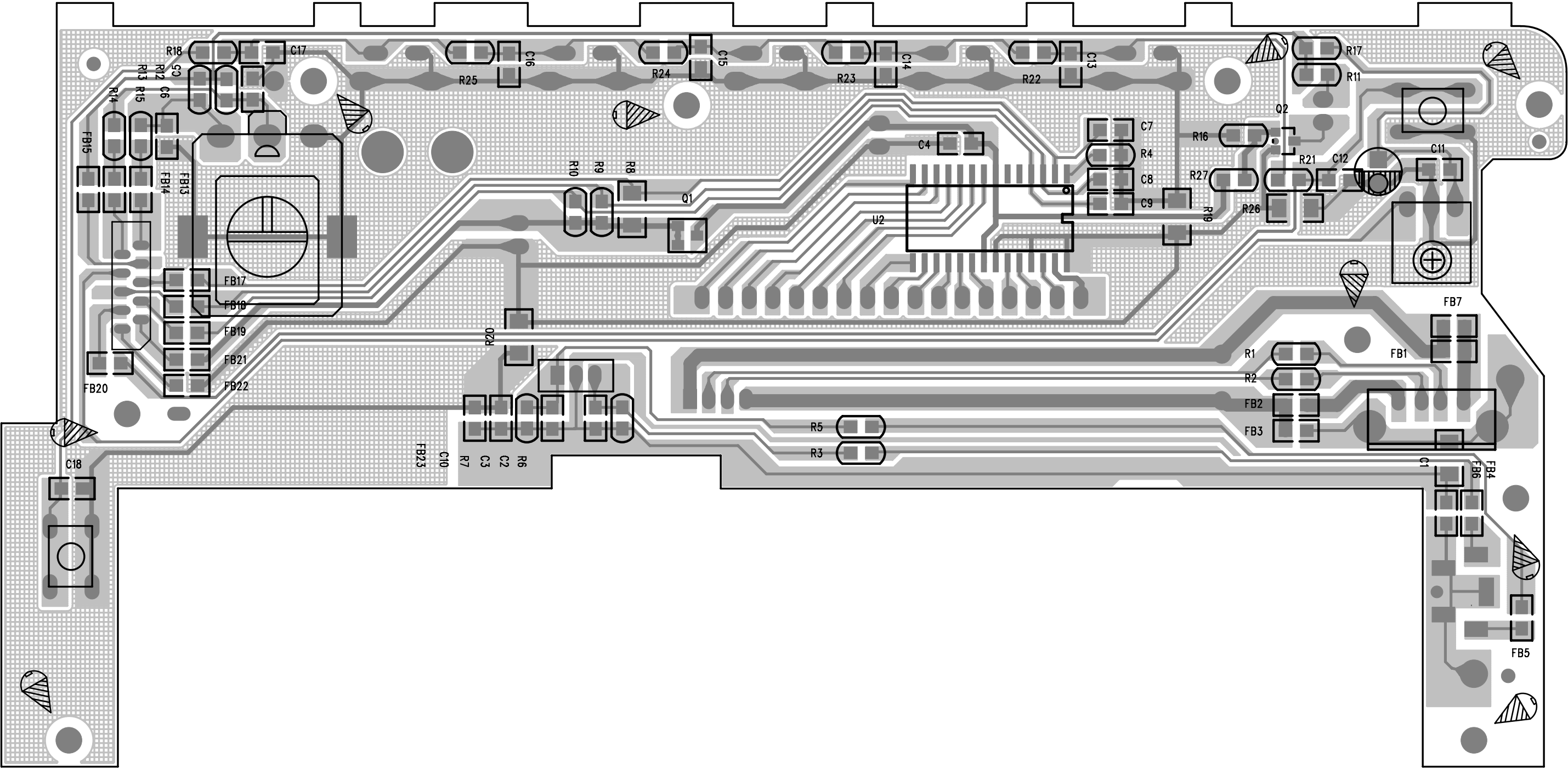
8-1.Display Board Circuit Dirgram



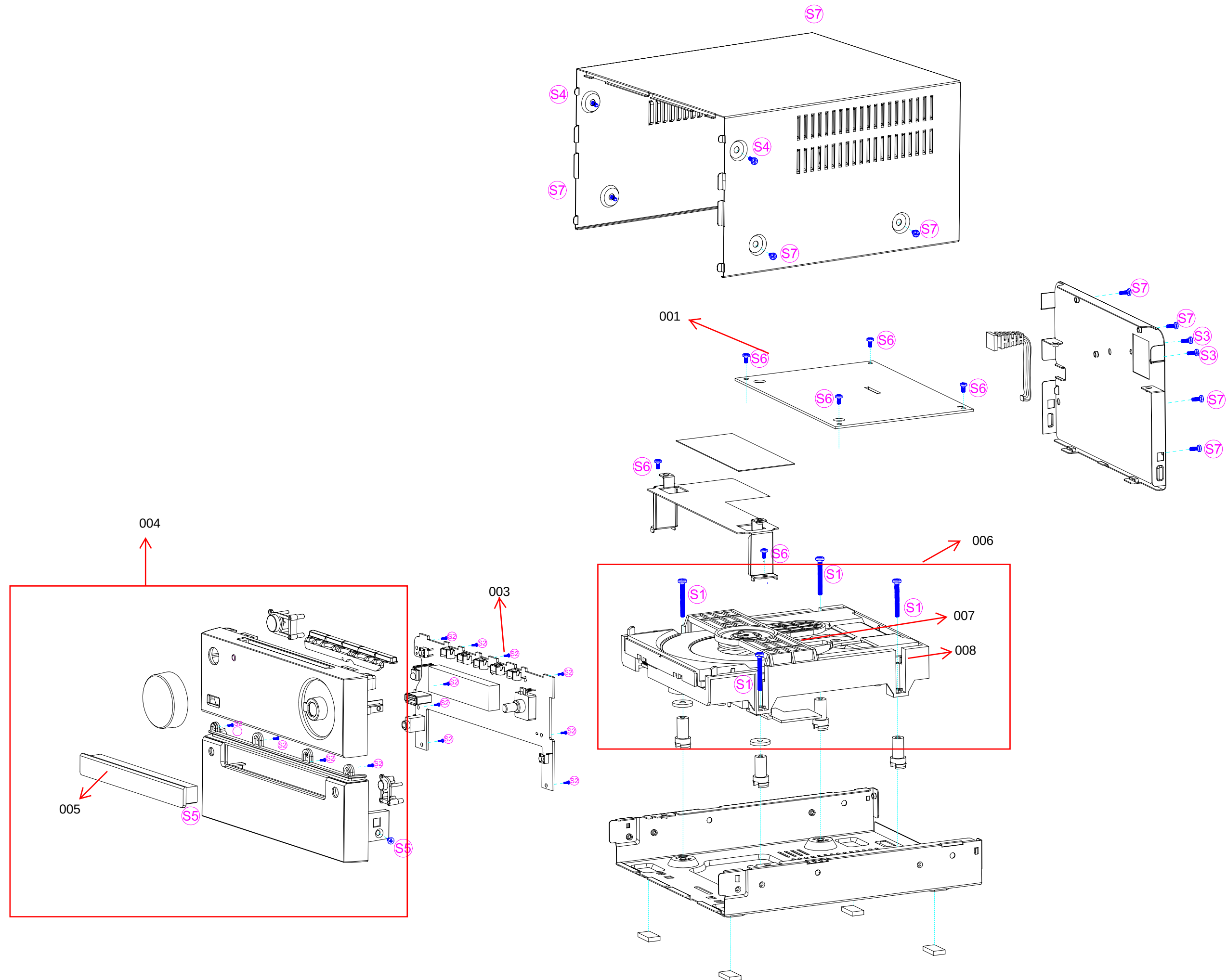
8-2 Display Board layout Diagram



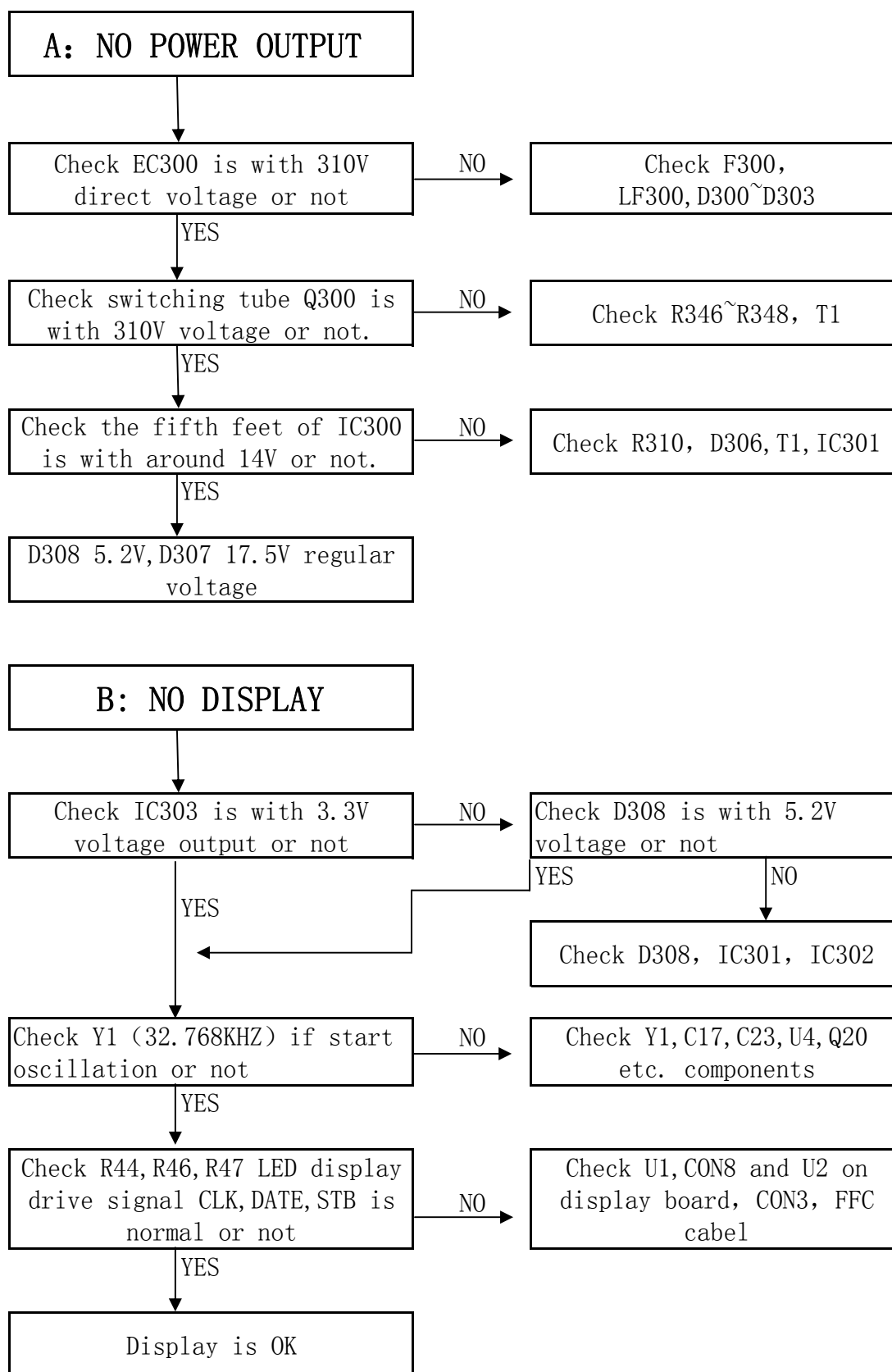
Display Board layout Diagram



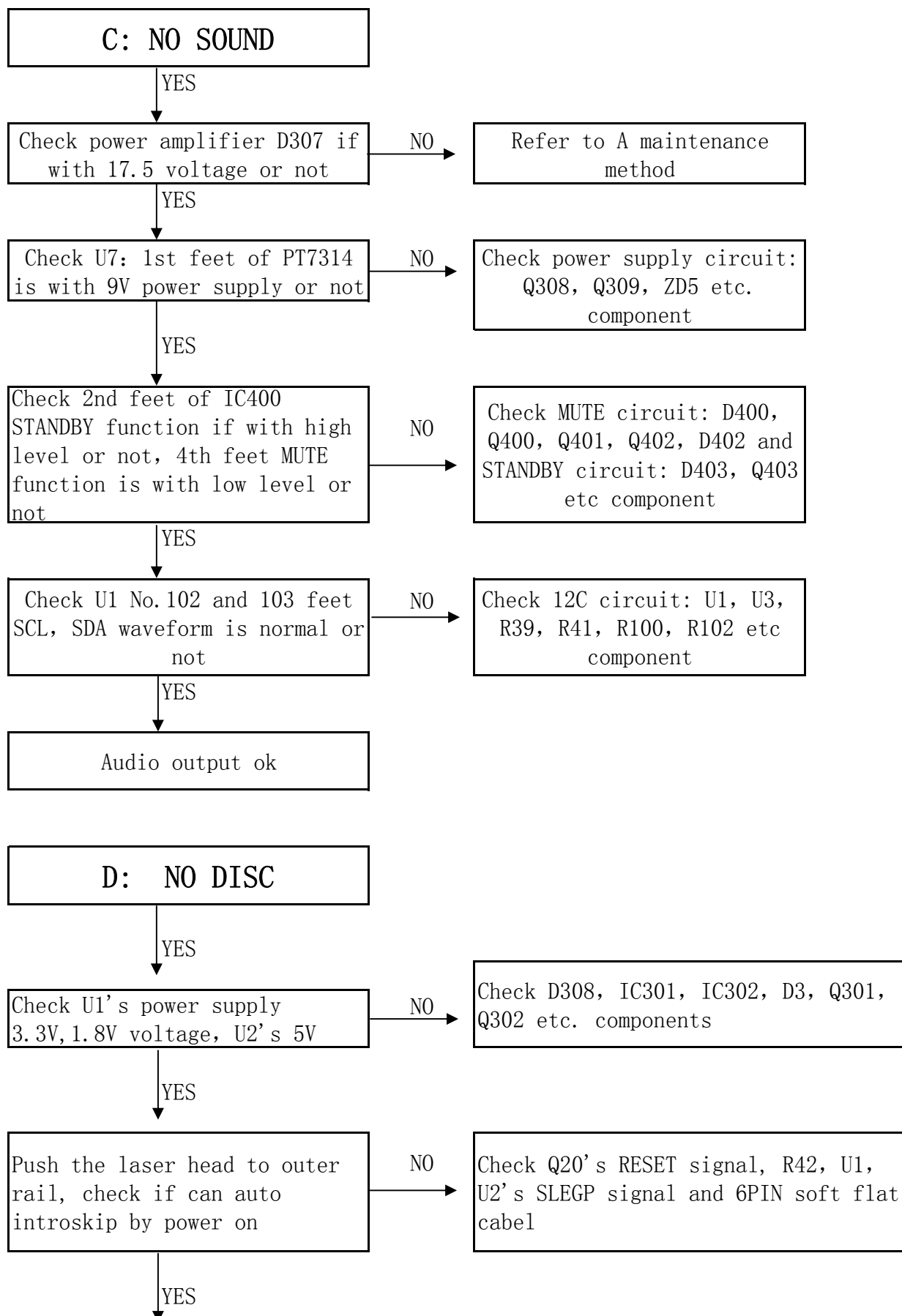
### 9.Mechanical Exploded View



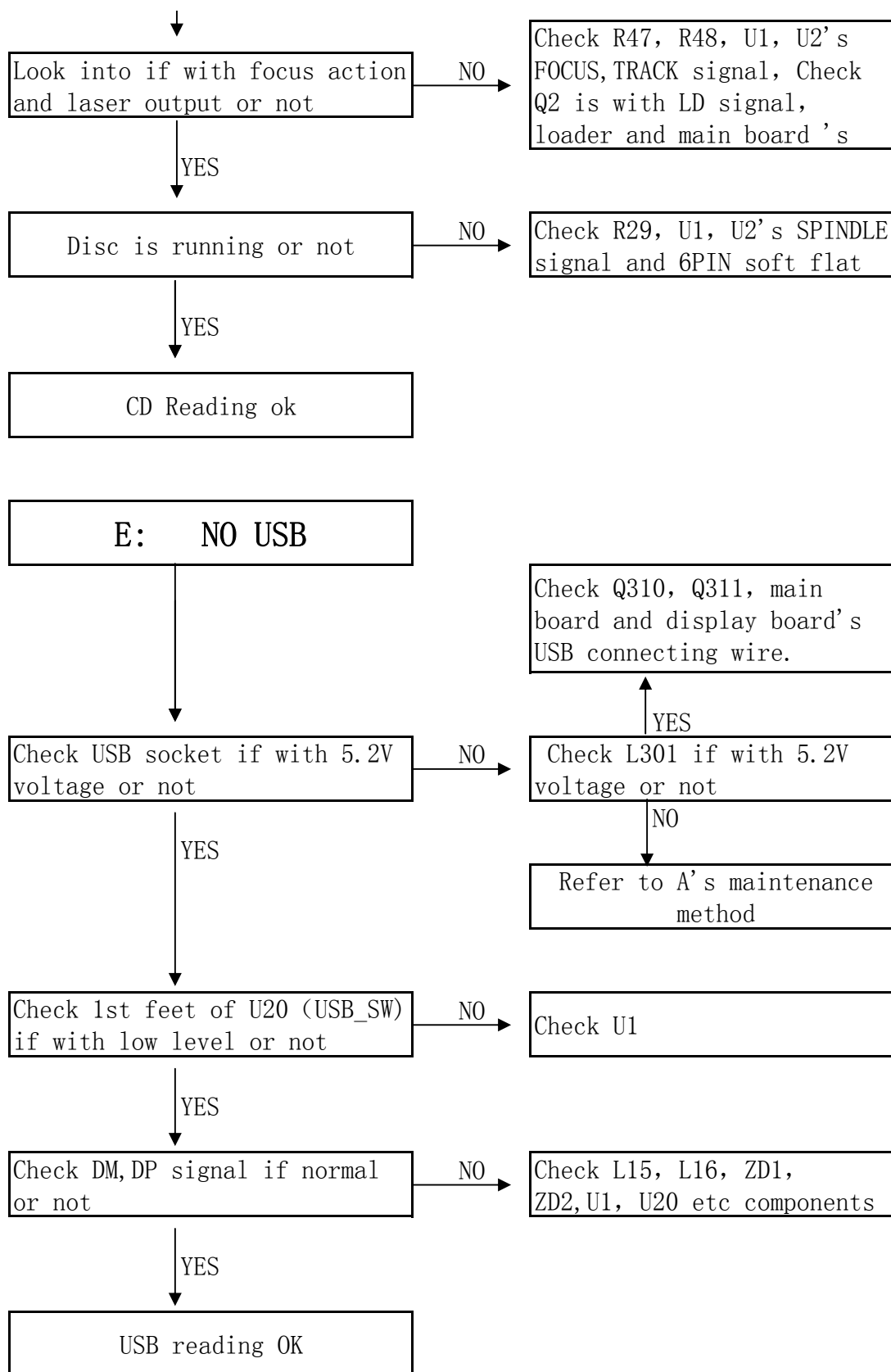
## 10. TROUBLE SHOOTING



## TROUBLE SHOOTING



## TROUBLE SHOOTING





## 11. Software upgrade & procedure to restore product setting

### 1. Reset to defaults:

Plug in, long press “Stop” button quickly, it will display the software version. Then short press the “Stop” button, it will display “Reset”, and access “STANDBY” in a while. When it displays “--”, it has been reset to defaults.

### 2. Check the software version:

Plug in, long press the “STOP” button quickly, it will display the software version.

### 3. Software-upgrade method:

Copy the updated software (boot.ali and nemo.bin) into USB, insert it into the CD MINI, you will hear “Do” sound for two times, which means it starts to upgrade. About 40 seconds later, you will keep hearing “Do” sound which means the upgrade is done. At this time you can unplug the power and remove the USB. Noted: Should not blackout during the upgrade, otherwise the machine will crash (it can not start up and the display shows nothing.). After the crash, the only solution is to remove the FLASH IC (U4, EN25F20), rewrite the software on programmer or directly replace a new FLASH with effective program.

## 12 REVITION LIST

|      |            |                      |
|------|------------|----------------------|
| V1.0 | 2013.12.27 | initial release      |
| V2.0 | 2014.01.13 | add trouble shooting |
| V3.0 | 2014.07.12 | add /77 /79 version  |