MP3 Mini Hi-Fi System

FWM997X/78

FWM997/55

Service
Service
Service

Service Manual

COMPACT
dISC
DIGITAL AUDIO

COMPACT
dISC
DIGITAL AUDIO
Recordable

COMPACT
dISC
DIGITAL AUDIO
ReWritable

CONTENTS

**CLASS 1
LASER PRODUCT**

Version 1.0

PHILIPS

TECHNICAL SPECIFICATION

AMPLIFIER

RMS output power
  Total output power .... 800 W RMS
Signal-to-noise ratio .... 67 dB A (IEC)
Frequency response .... 60 – 16000 Hz
Input sensitivity
  AUX 1500mV/2000mV
Output
  Speakers .... 3 Ω
(1) (3 Ω, 1 kHz, 10% THD)

CD/MP3-CD PLAYER

Number of programmable tracks 40
Frequency response .... 60 – 16000 Hz -3dB
Signal-to-noise ratio .... 75 dB A
Channel separation .... 50 dB (1 kHz)
Total harmonic distortion .... < 1.5%
MPEG 1 Layer 3 (MP3-CD) .... MPEG AUDIO
MP3-CD bit rate .... 32-256 kbps
                                                  (128 kbps advised)
Sampling frequencies .... 32, 44.1, 48 kHz

TUNER

FM wave range .... 87.5 – 108 MHz
AM wave range (9 kHz) .... 531 – 1602 kHz
AM wave range (10 kHz) .... 530 – 1700 kHz
Tuning grid .... 9/10 kHz
Number of presets 40
Antenna
  FM .... 75 Ω wire
  AM .... Loop antenna

USB PLAYER

USB 12Mb/s, V1.1
.... support MP3 and WMA files
Number of albums/folders .... maximum 99
Number of tracks/titles .... maximum 999

FRONT SPEAKERS

System 4-way; double port bass reflex
Impedance .... 2 × 6 Ω
Woofer .... 2 × 5.25''
Tweeter .... 2 × 1.75''
Output power .... 2 × (100 W+ 100 W)
Dimensions (w × h × d) . 225 × 430 × 275 (mm)
Weight .... 4.928 kg each

REAR SPEAKERS

System full range satellite
Impedance .... 3 Ω
Speaker driver .... 4'' + 4'' (fake)
Frequency response 150Hz-16KHz
Output power .... 2 × 100 W
Dimensions (w × h × d) .... 142.5 × 345 × 171.3
Weight .... 2.1 kg each

SUBWOOFER

AC Power .... 110 – 127 / 220 – 240 V;
  .... 50/60 Hz, Switchable
Power Consumption
  Active .... 100 W
Impedance .... 6 Ω
Subwoofer driver .... 8''
Output power .... 200 W
Dimensions (w × h × d)..... 274 × 430 × 342.3 (mm)
Weight .... 11.2 kg

GENERAL

Material/finish .... Polystyrene/Metal
AC Power (for the main unit) ....
  ....110 – 127 / 220 – 240 V;
  .... 50/60 Hz, Switchable
Power Consumption
  Active .... 90 W
  Standby .... ≤ 20 W
Dimensions (w × h × d) .. 265 × 345 × 382 (mm)
Weight (without speakers) .... 8.671 kg

Specifications and external appearance are
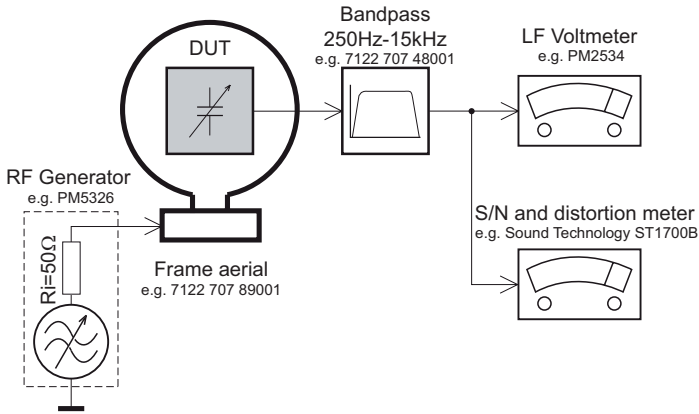*subject to change without notice.*

MEASUREMENT SETUP

Tuner FM
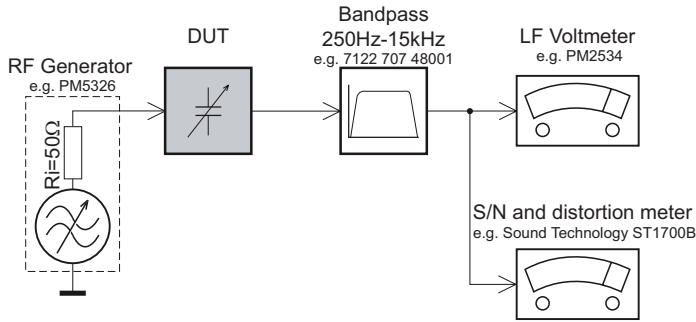
Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).
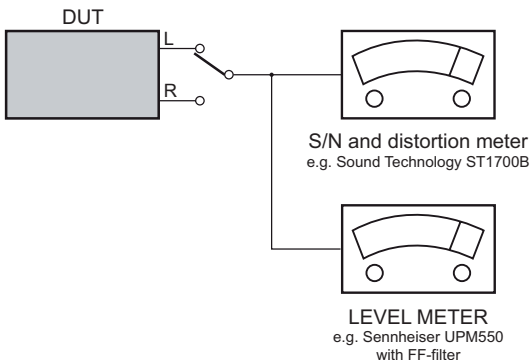
Tuner AM (MW,LW)

To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
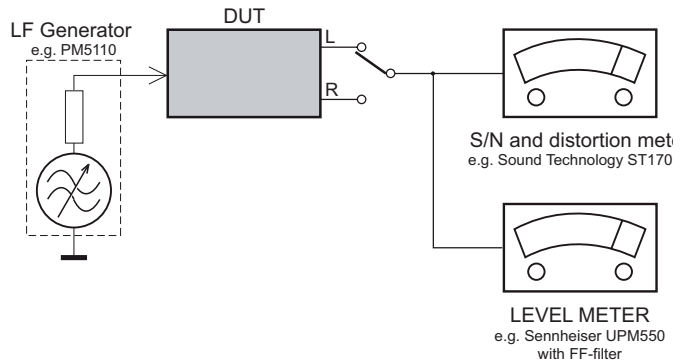Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

CD

Use Audio Signal Disc   SBC429   4822 397 30184
(replaces test disc 3)

Recorder

Use Universal Test Cassette **CrO2**   SBC419 4822 397 30069
  or Universal Test Cassette **Fe**   SBC420 4822 397 30071

SERVICE AIDS

GB WARNING

ESD

All ICs and many other semi-conductors are
susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life
drastically.
When repairing, make sure that you are
connected with the same potential as the mass
of the set via a wrist wrap with resistance.
Keep components and tools also at this
potential.

GB

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

Safety components are marked by the symbol $\triangle$.

**CLASS 1
LASER PRODUCT**

INFORMATION ABOUT LEAD-FREE SOLDERING

Philips CE is producing lead-free sets from 1.1.2005 onwards.
IDENTIFICATION:

Regardless of special logo (not always indicated) one must treat all sets from 1 Jan 2005 onwards, according next rules:

- On our website **www.atyourservice.ce.Philips.com** you find more information to:

  * BGA-de-/soldering (+ baking instructions)
  * Heating-profiles of BGAs and other ICs used in Philips-sets
  * Lead free

  You will find this and more technical information within the "magazine", chapter "workshop news".

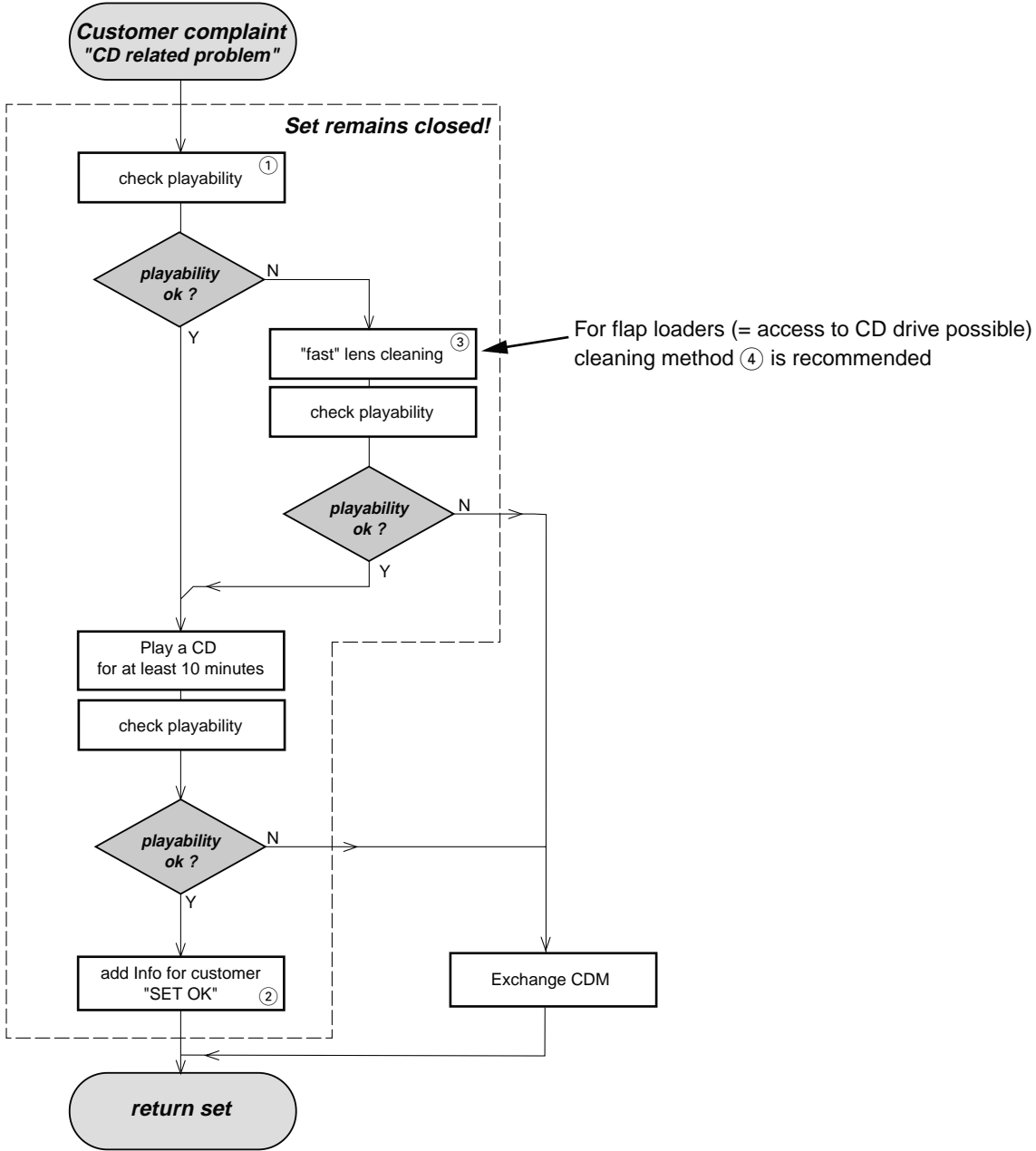For additional questions please contact your local repair-helpdesk.

SERVICE INSTRUCTION

Safety regulations require that after a repair, the set must be returned in its original condition. Pay in particular attention to
the following points:

- Route the wire trees correctly and fix them with the
  mounted cable clamps.
- Check the insulation of the AC Power lead for external
  damage.
- Check the strain relief of the AC Power cord for proper
  function.
- Check the electrical DC resistance between the AC Power
  Plug and the secondary side (only for sets which have a AC
  Power isolated power supply):

1. Unplug the AC Power cord and connect a wire
   between the two pins of the AC Power plug.
2. Set the AC Power switch to the "on" position (keep the
   AC Power cord unplugged!).
3. Measure the resistance value between the pins of the
   AC Power plug and the metal shielding of the tuner or
   the aerial connection on the set. The reading should be
   larger than 4.5 Mohm (For U.S. it should be between
   4.2 Mohm and 12 Mohm).
4. Switch "off" the set, and remove the wire between the
   two pins of the AC Power plug.

- Check the cabinet for defects, to avoid touching of any
  inner parts by the customer.

INSTRUCTIONS ON CD PLAYABILITY

```
        ┌─────────────────────┐
        │  Customer complaint │
        │  "CD related problem"│
        └─────────────────────┘
                 │
    ┌ ─ ─ ─ ─ ─ ─│─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
    │            │        Set remains closed!
    │   ┌──────────────────────┐
    │   │ check playability  ①│
    │   └──────────────────────┘
    │            │
    │        ◇ playability ◇ ──N──┐
    │        ◇   ok ?     ◇       │
    │            │ Y             ▼
    │                    ┌──────────────────────┐        For flap loaders (= access to CD drive possible)
    │            │       │ "fast" lens cleaning ③│◄──    cleaning method ④ is recommended
    │                    └──────────────────────┘
    │            │       ┌──────────────────────┐
    │                    │   check playability  │
    │            │       └──────────────────────┘
    │                            │
    │            │           ◇ playability ◇ ──N──┐
    │                        ◇    ok ?    ◇       │
    │            │               │ Y             │
    │            │◄──────────────┘               │
    │   ┌──────────────────────┐                 │
    │   │   Play a CD          │                 │
    │   │ for at least 10 minutes│               │
    │   └──────────────────────┘                 │
    │   ┌──────────────────────┐                 │
    │   │   check playability  │                 │
    │   └──────────────────────┘                 │
    │            │                               │
    │        ◇ playability ◇ ──N──┐              │
    │        ◇   ok ?     ◇       │              │
    │            │ Y             │              │
    │   ┌──────────────────────┐ ▼              ▼
    │   │ add Info for customer│ ┌──────────────────────┐
    │   │   "SET OK"      ②   │ │    Exchange CDM      │
    │   └──────────────────────┘ └──────────────────────┘
    └ ─ ─ ─ ─ ─ ─│─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
                 │◄──────────────────────────────┘
        ┌─────────────────────┐
        │     return set      │
        └─────────────────────┘
```

① - ④ For description - see following pages

INSTRUCTIONS ON CD PLAYABILITY

①

PLAYABILITY CHECK

For sets which are compatible with **CD-RW** discs
use CD-RW Printed Audio Disc 7104 099 96611
    TR 3 (Fingerprint)
    TR 8 (600µ Black dot) **maximum at 01:00**

• playback of these two tracks without audible disturbance
  playing time for: Fingerprint ≥10seconds
                      Black dot from 00:50 to 01:10
• jump forward/backward (search) within a reasonable time

For all other sets
use CD-DA SBC 444A.................................4822 397 30245
    TR 14 (600µ Black dot) **maximum at 01:15**
    TR 19 (Fingerprint)
    TR 10 (1000µ wedge)

• playback of all these tracks without audible disturbance
  playing time for: 1000µ wedge ≥10seconds
                      Fingerprint ≥10seconds
                      Black dot from 01:05 to 01:25
• jump forward/backward (search) within a reasonable time

②

CUSTOMER INFORMATION

It is proposed to add an addendum sheet to the set which
informs the customer that the set has been checked
carefully - but no fault was found.
The problem was obviously caused by a scratched, dirty or
copy-protected CD. In case problems remain, the customer
is requested to contact the workshop directly.
The lens cleaning (method ③) should be mentioned in the
addendum sheet.

The final wording in national language as well as the printing
is under responsibility of the Regional Service Organizations.

④

LIQUID LENS CLEANING

**Before touching the lens it is advised to clean the
surface of the lens by blowing clean air over it.
This to avoid that little particles make scratches on
the lens.**

Because the material of the lens is synthetic and coated
with a special anti-reflectivity layer, cleaning must be done
with a non-aggressive cleaning fluid. It is advised to use
"Cleaning Solvent

The actuator is a very precise mechanical component and
may not be damaged in order to guarantee its full function.
Clean the lens gently (don't press too hard) with a soft and
clean cotton bud moistened with the special lens cleaner.

The direction of cleaning must be in the way as indicated in
the picture below.
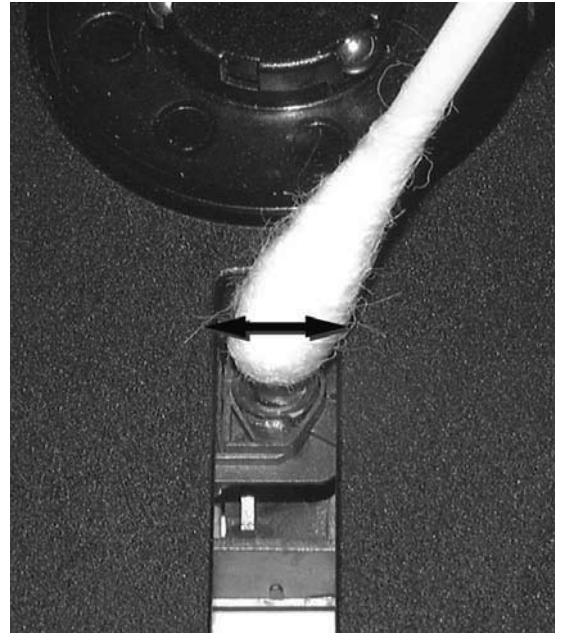
DISASSEMBLY DIAGRAM VIEW
PART 1

Dismantling of the CDC Module and Front Panel

1) Loosen 17 screws to remove the Cover Top of the set.

2) Slide out the CDC Tray as shown in the diagram below with the help of a flat head screw driver.

USE A FLAT HEAD SCREW DRIVER TO GIVE A PUSH IN THE DIRECTION AS SHOWN TO UNLOCK THE CDC TRAY BEFORE SLIDING IT OUT.
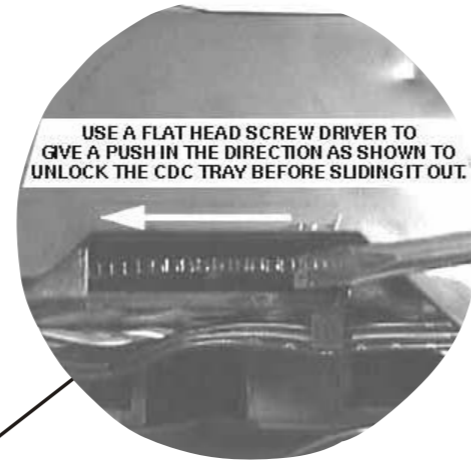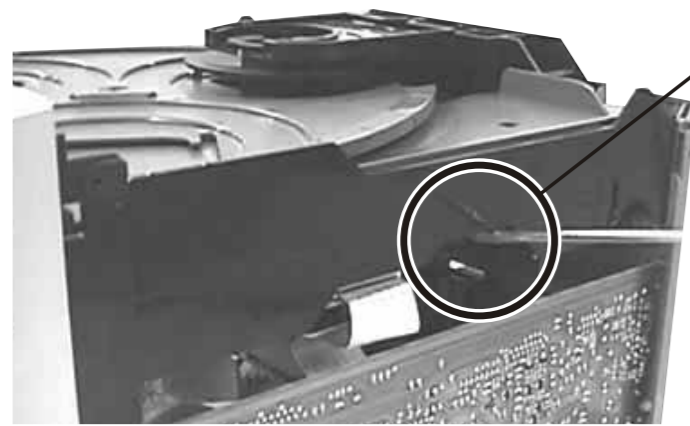
Sliding Out The CDC Tray

3) Remove the Cover Tray CDC as indicated.
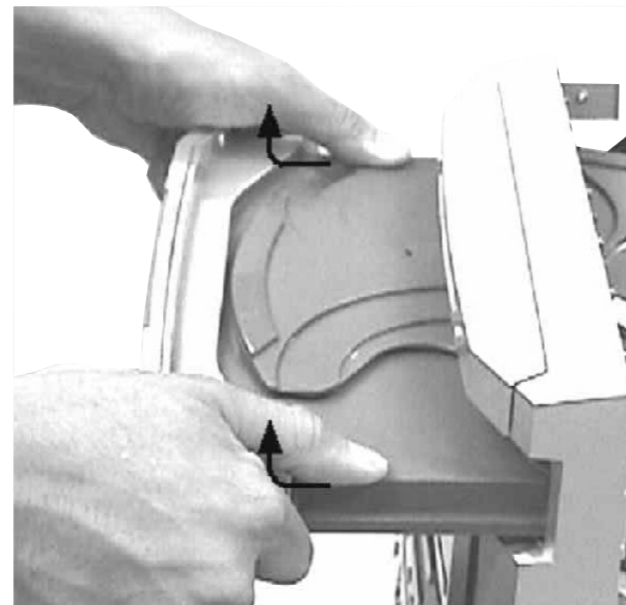
Remove Cover Tray CDC

4) Loosen 2 screws A and 2 screws B to remove the CDC Module as indicated.
5) Remove 2 screws at the bottom to separate the Front Panel Assembly from the Plate Bottom.

Front View CDC
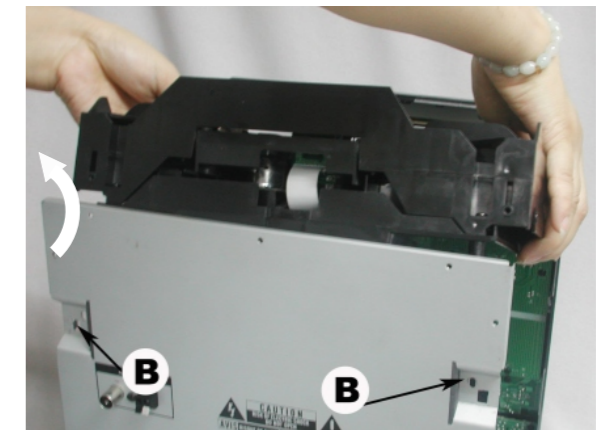
Remove CDC Module

DISASSEMBLY DIAGRAM VIEW
PART 2

Dismantling of Rear Portion

1)Remove 1 screw C as indicated to loosen the Tuner Module

2)Remove 9 screws D&G as indicated to loosen the Main Board.

3)Remove 8 screws E&H as indicated to loosen the AMP Board.

4)Remove 3 screws F as indicated to loosen the Bottom Cabinet.
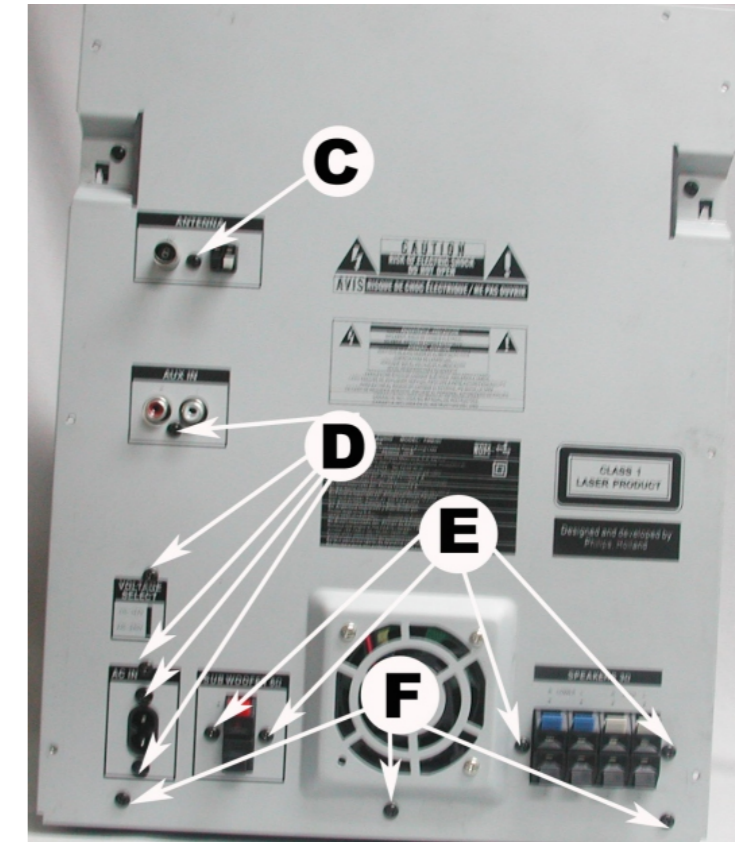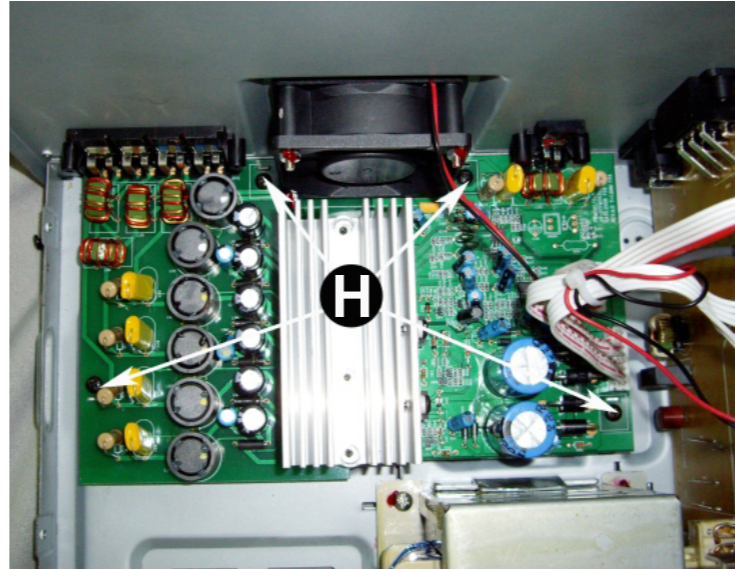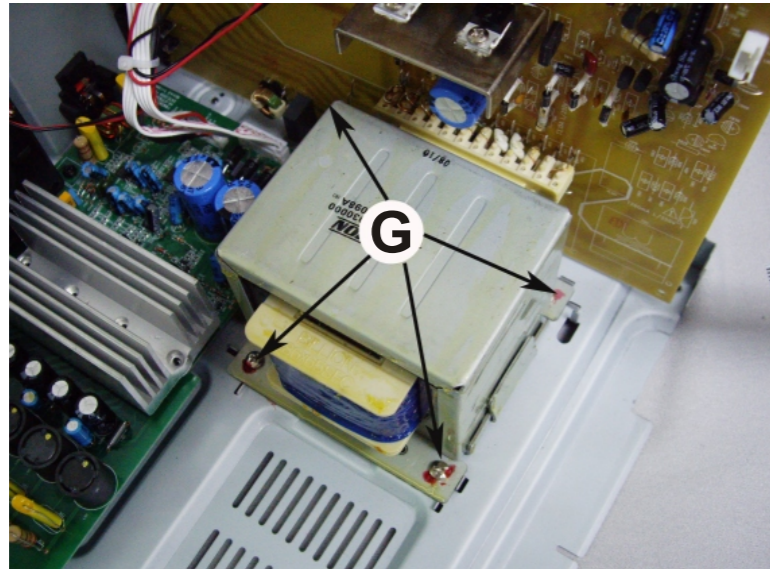
Dismantling of the PCB Board

1) Remove 11 screws I as indicated to loosen the KEY1 Board.

2) Remove 11 screws J as indicated to loosen the KEY2 Board.

3) Remove 4 screws K as indicated to loosen the USB&LINE IN Board.
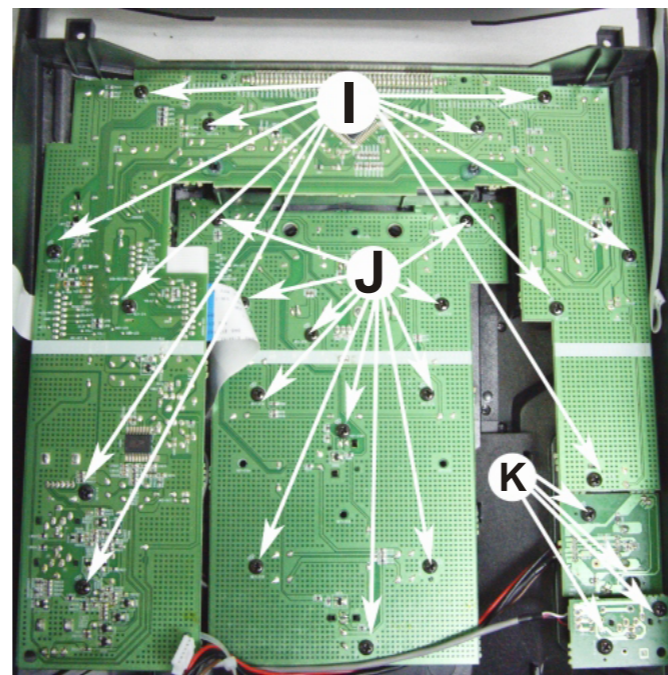
SET BLOCK DIAGRAM
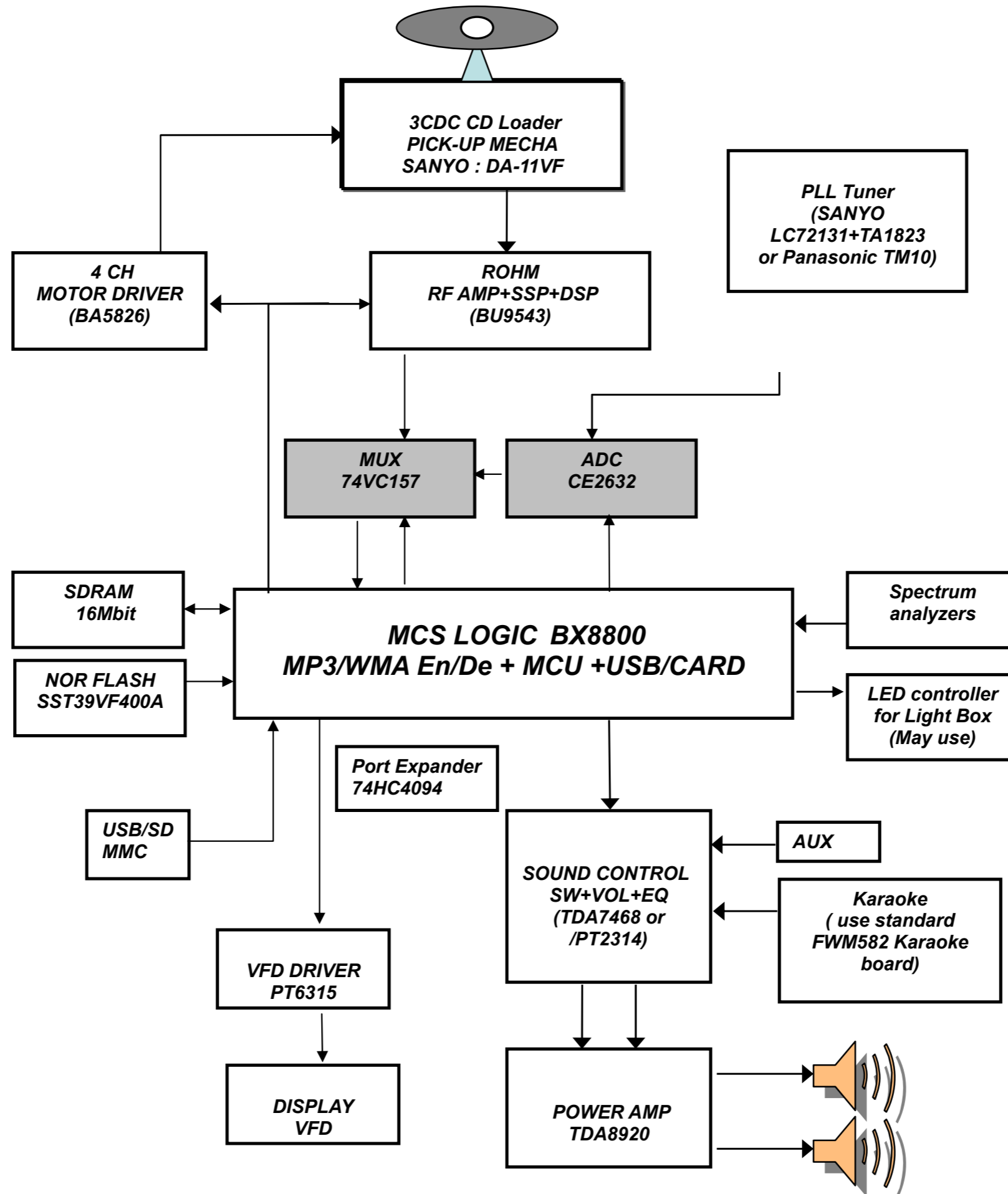
SET WIRING DIAGRAM
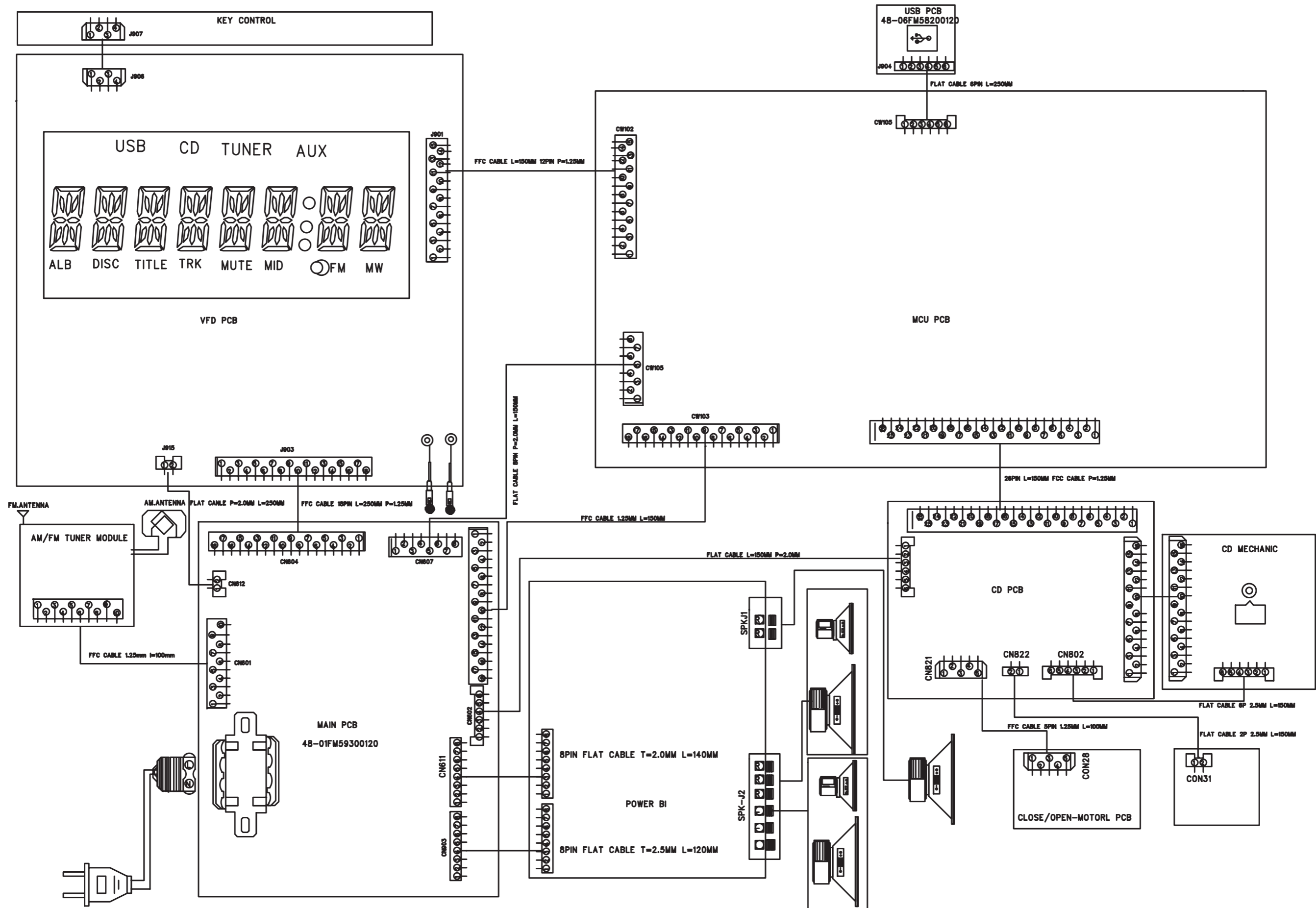
CIRCUIT DIAGRAM - MAIN BOARD
PART 1

CIRCUIT DIAGARM - MAIN BOARD
PART 2
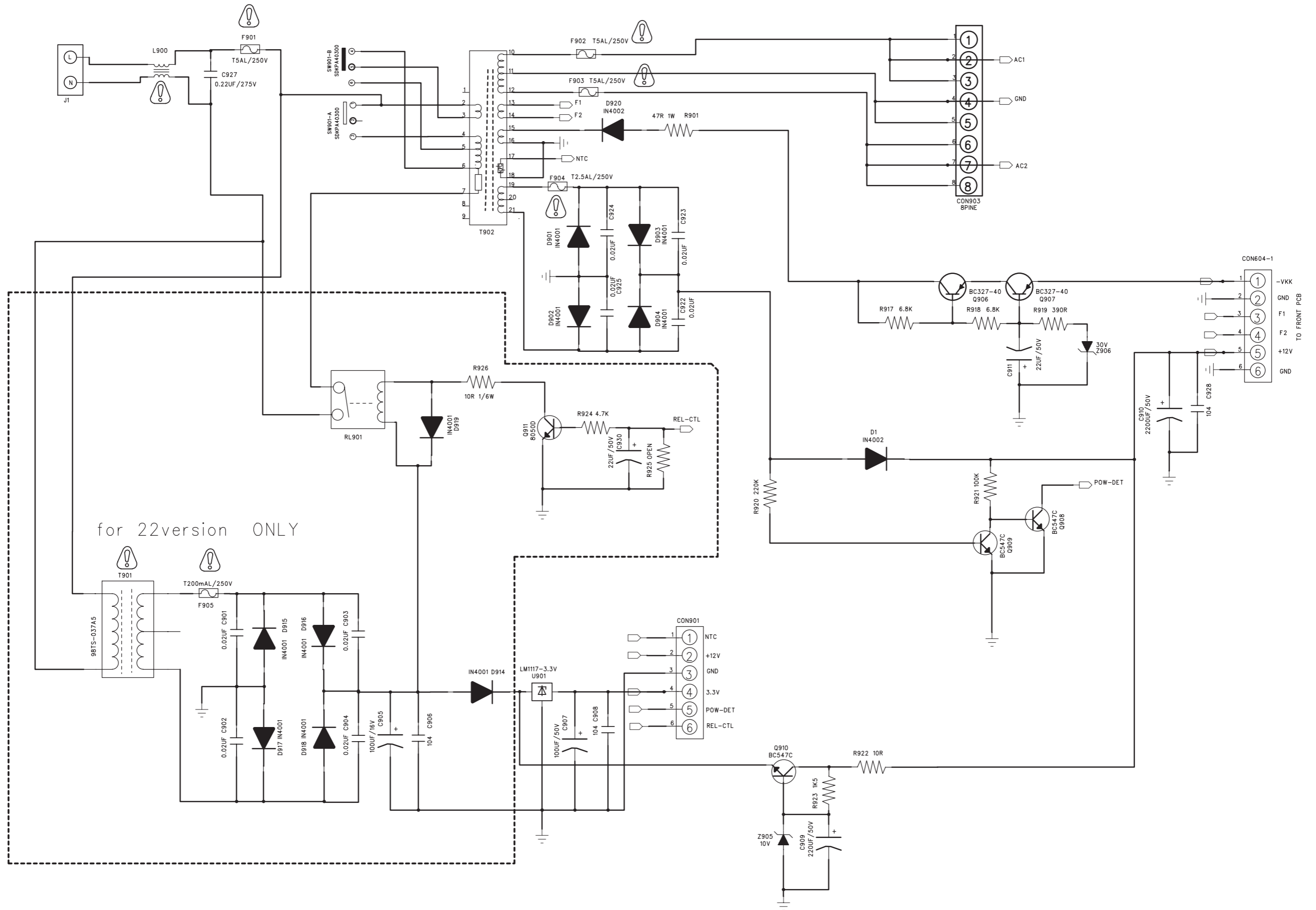
LAYOUT DIAGARM - MAIN BOARD
COMPONENT SIDE VIEW
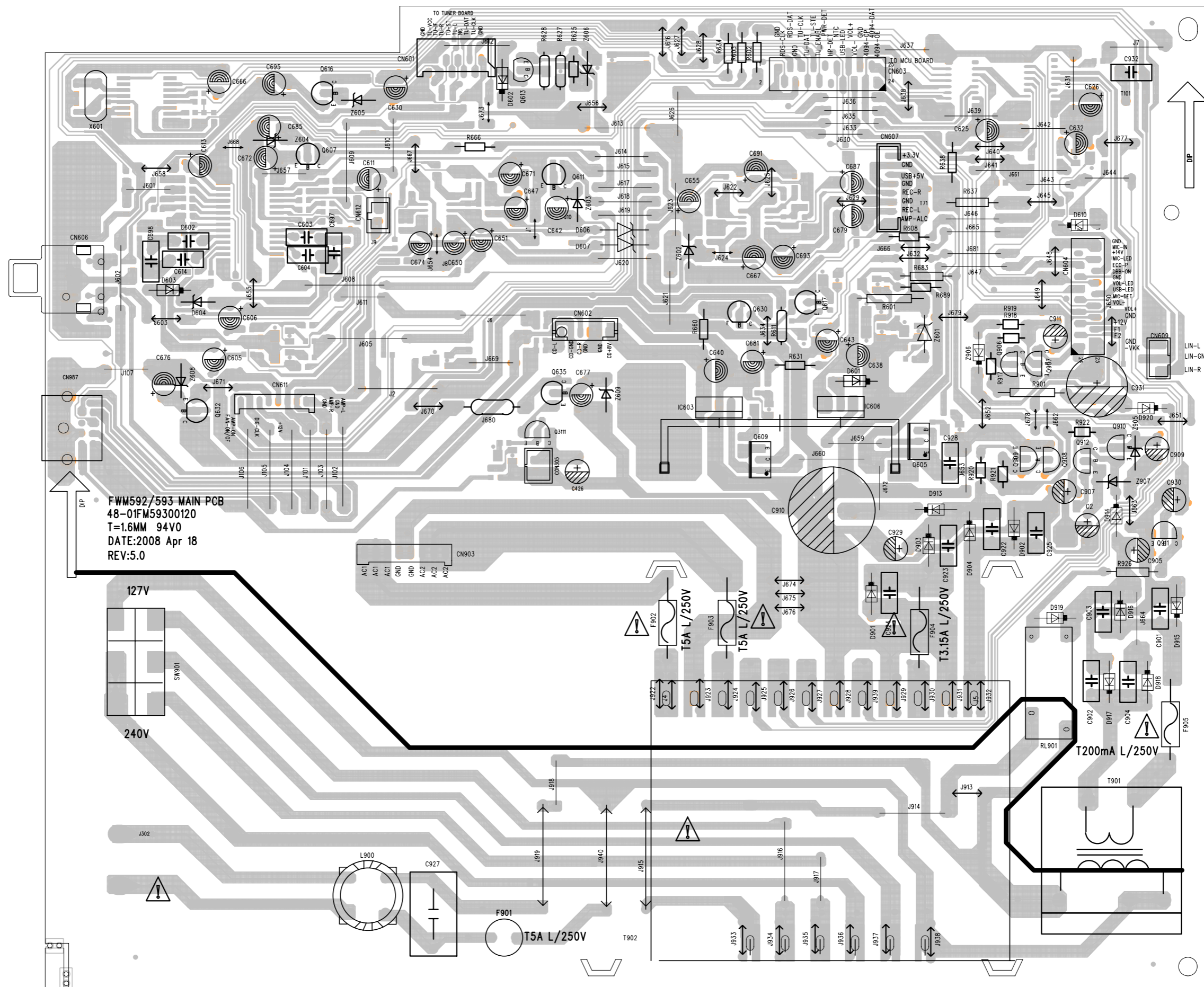
FWM592/593 MAIN PCB
48-01FM59300120
T=1.6MM 94V0
DATE:2008 Apr 18
REV:5.0
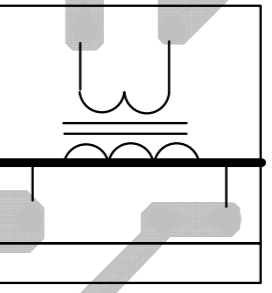
LAYOUT DIAGARM - MAIN BOARD
COPPER SIDE VIEW
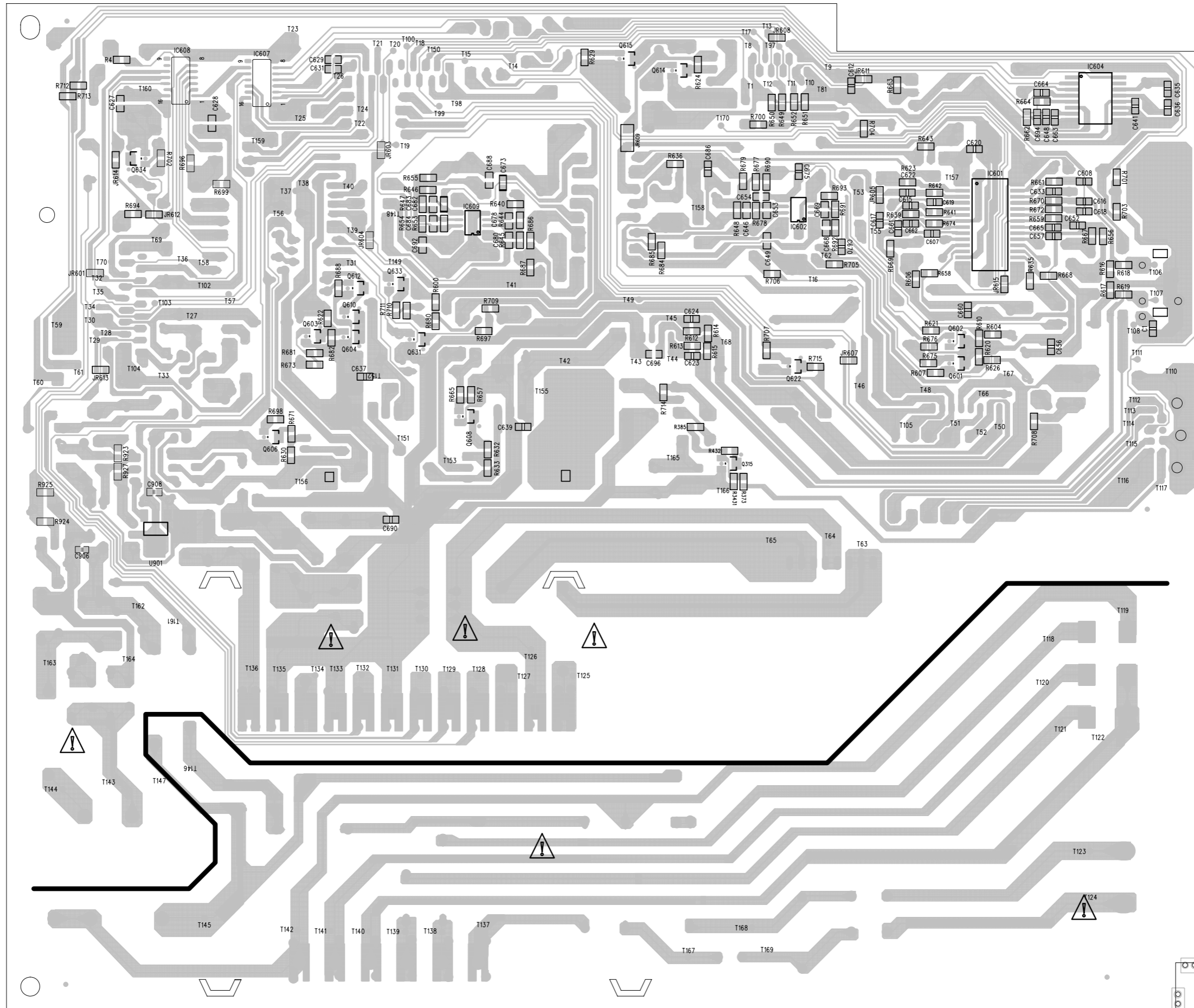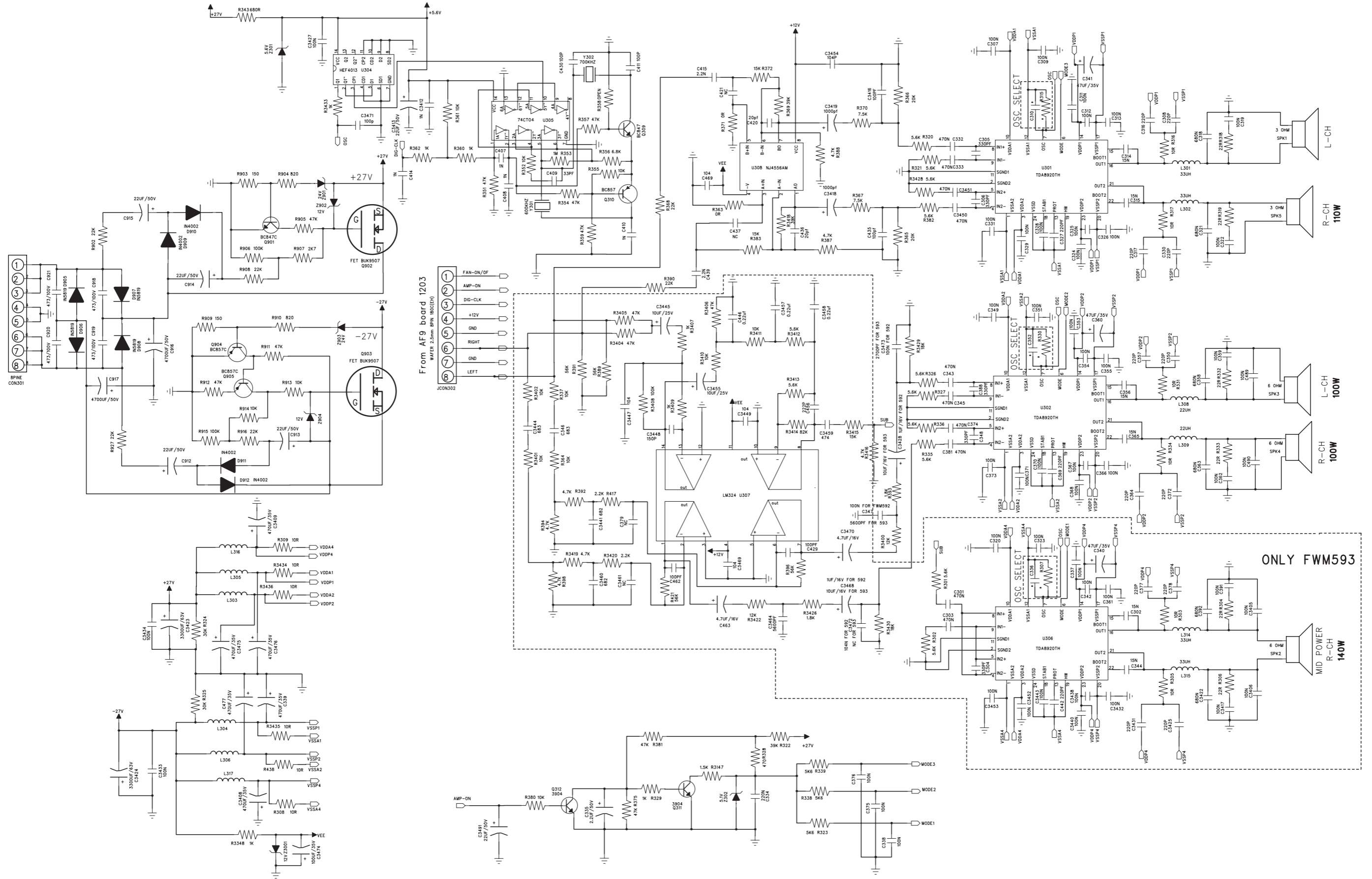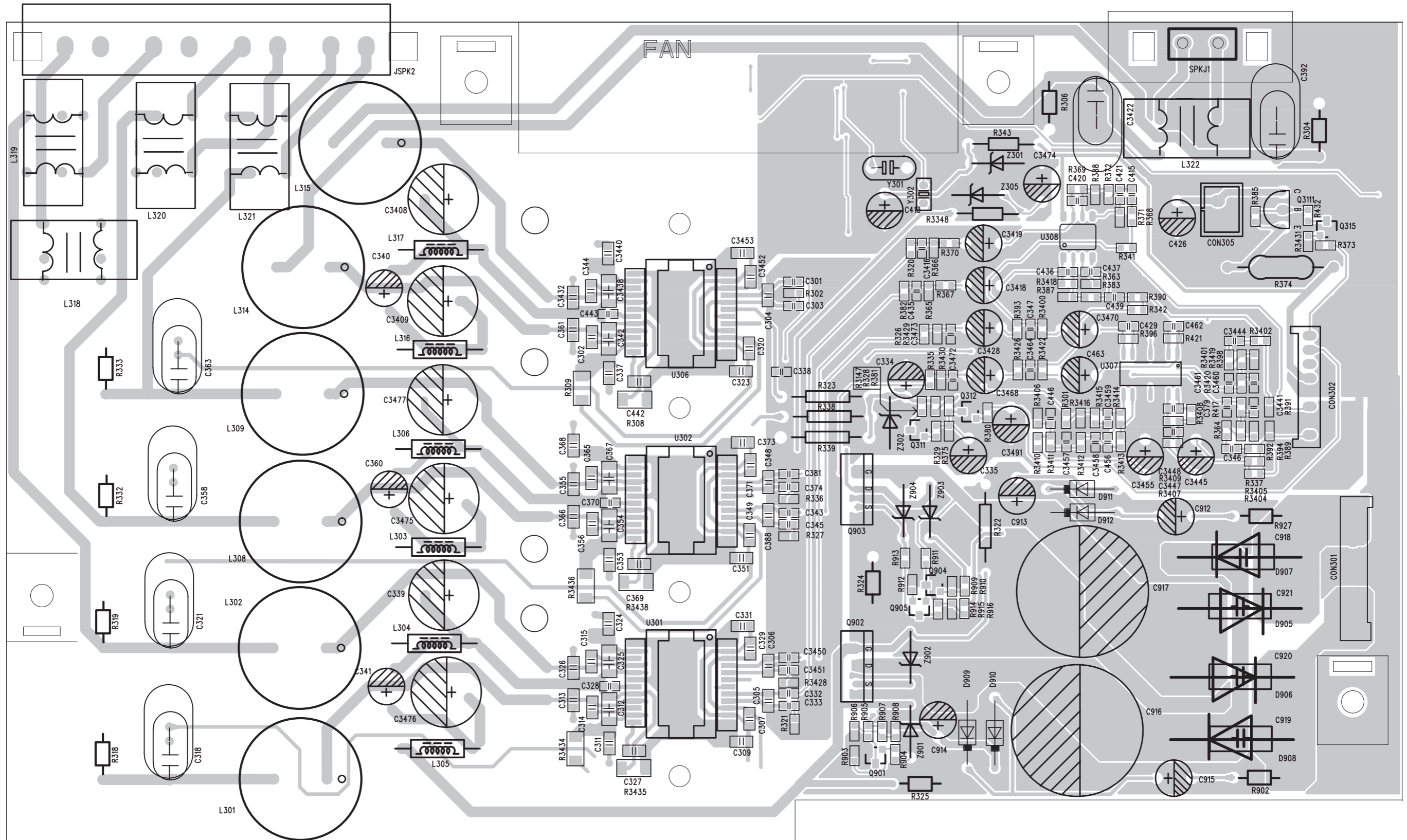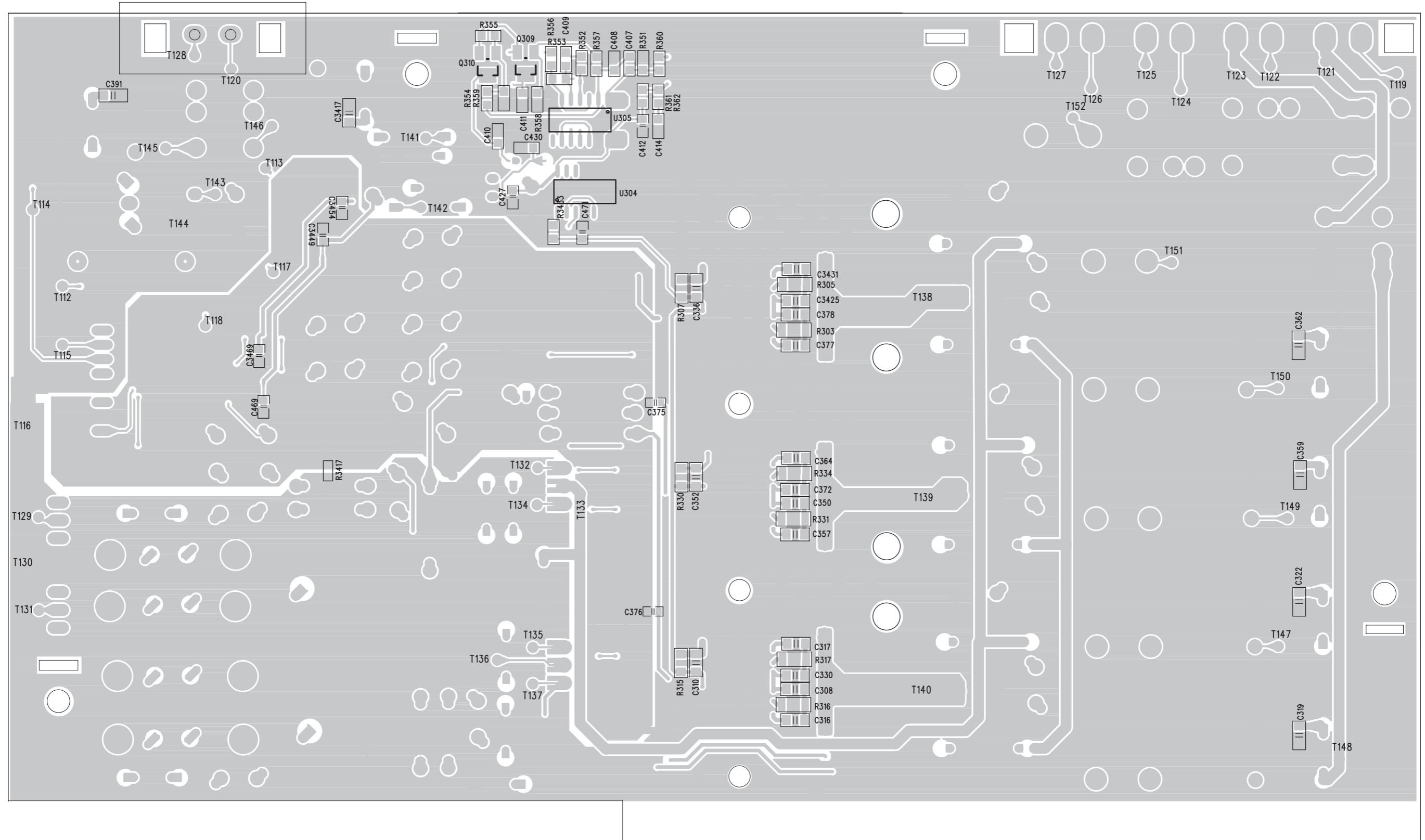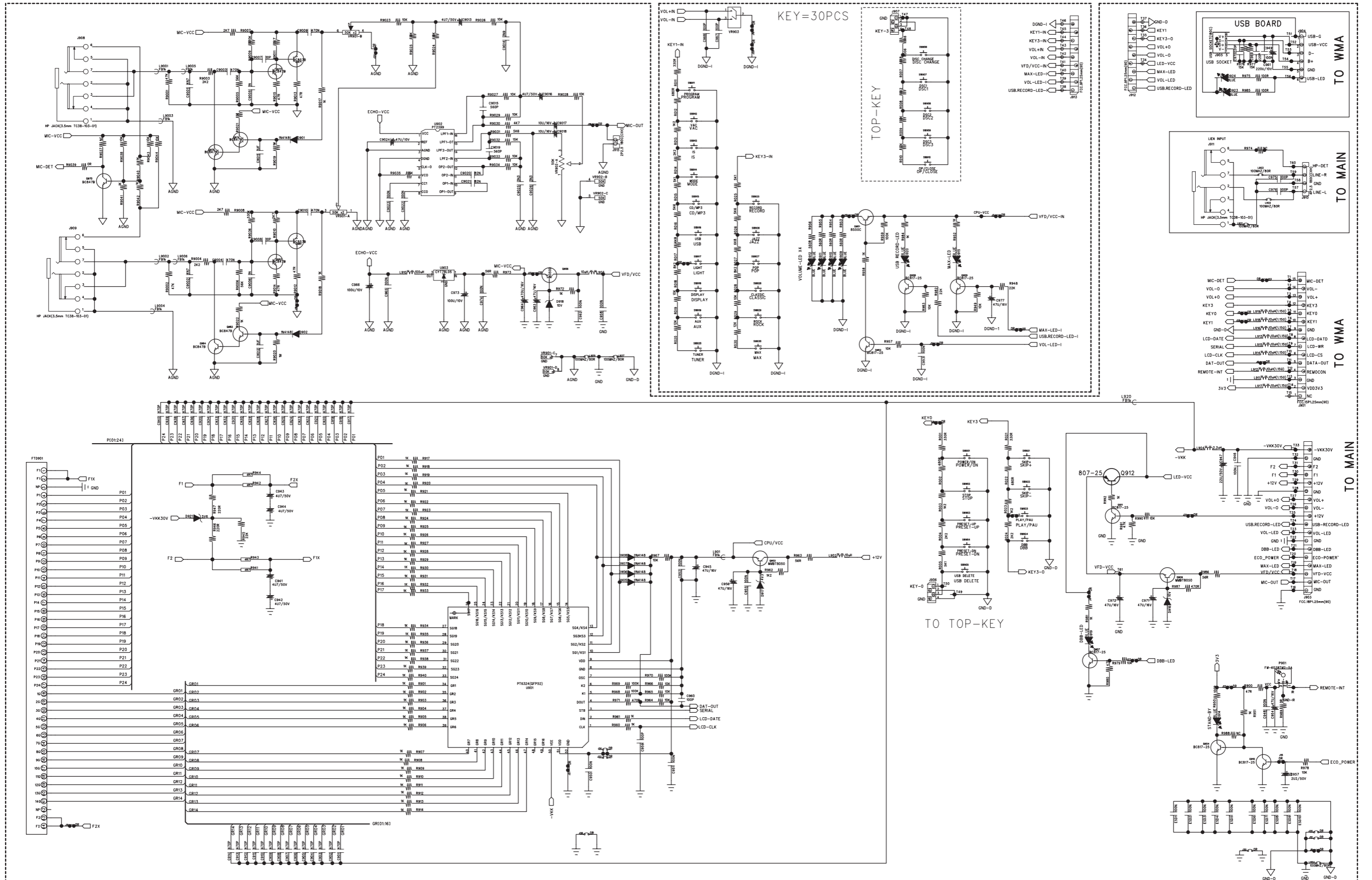
CIRCUIT DIAGRAM - AMP BOARD

LAYOUT DIAGARM - AMP BOARD
COMPONENT SIDE VIEW

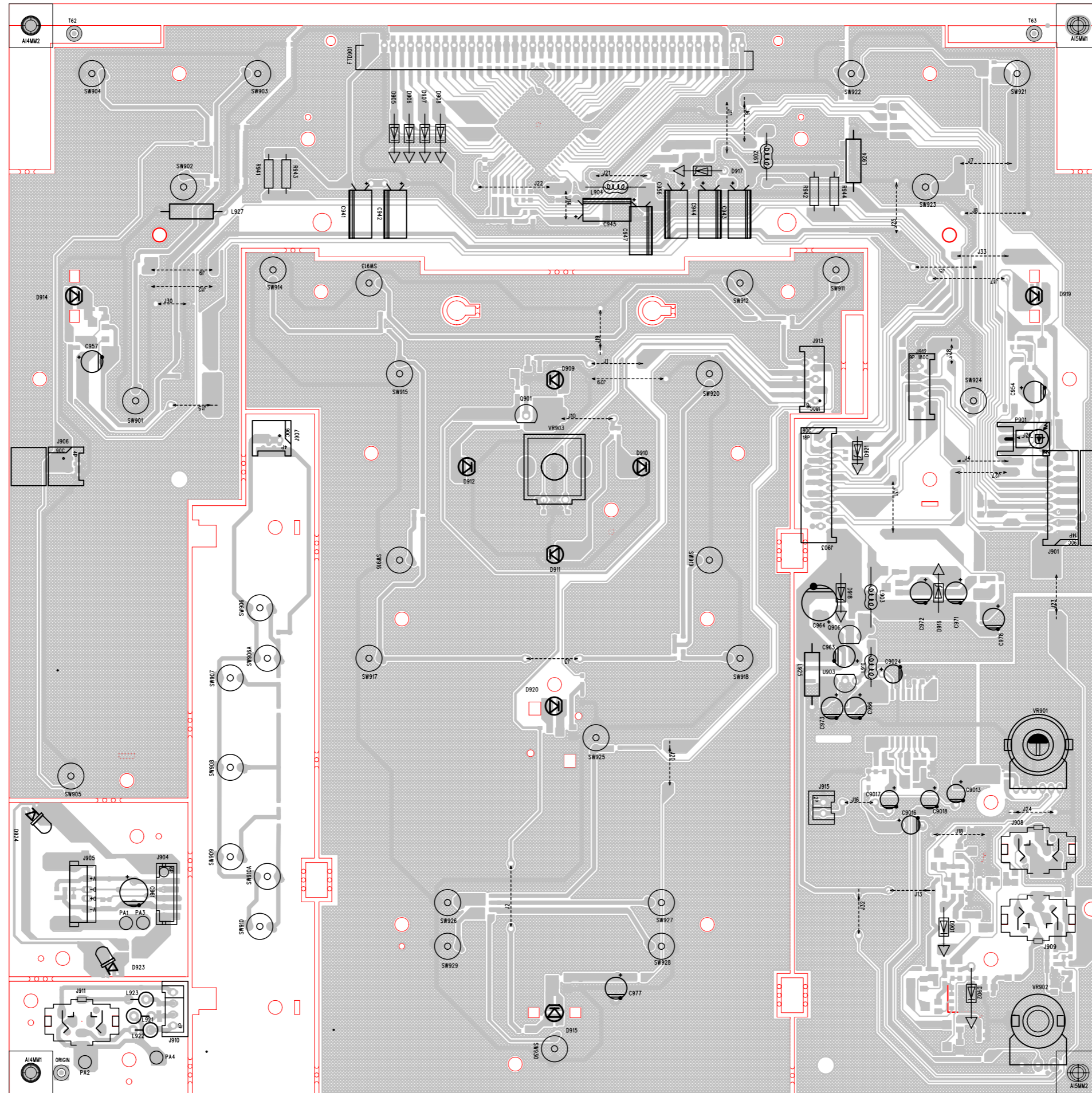**LAYOUT DIAGARM - AMP BOARD**
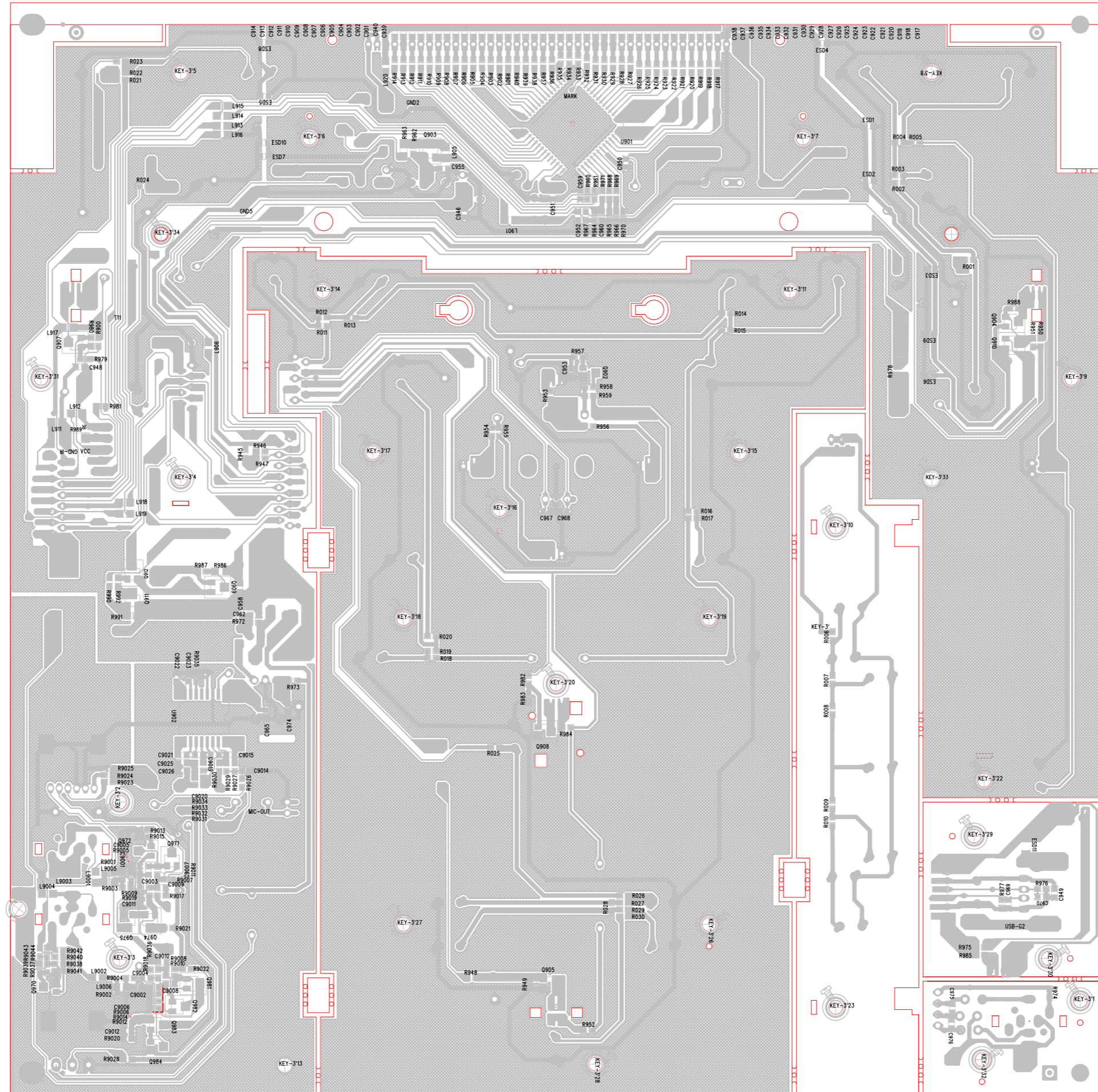**COPPER SIDE VIEW**

CIRCUIT DIAGRAM - FRONT BOARD

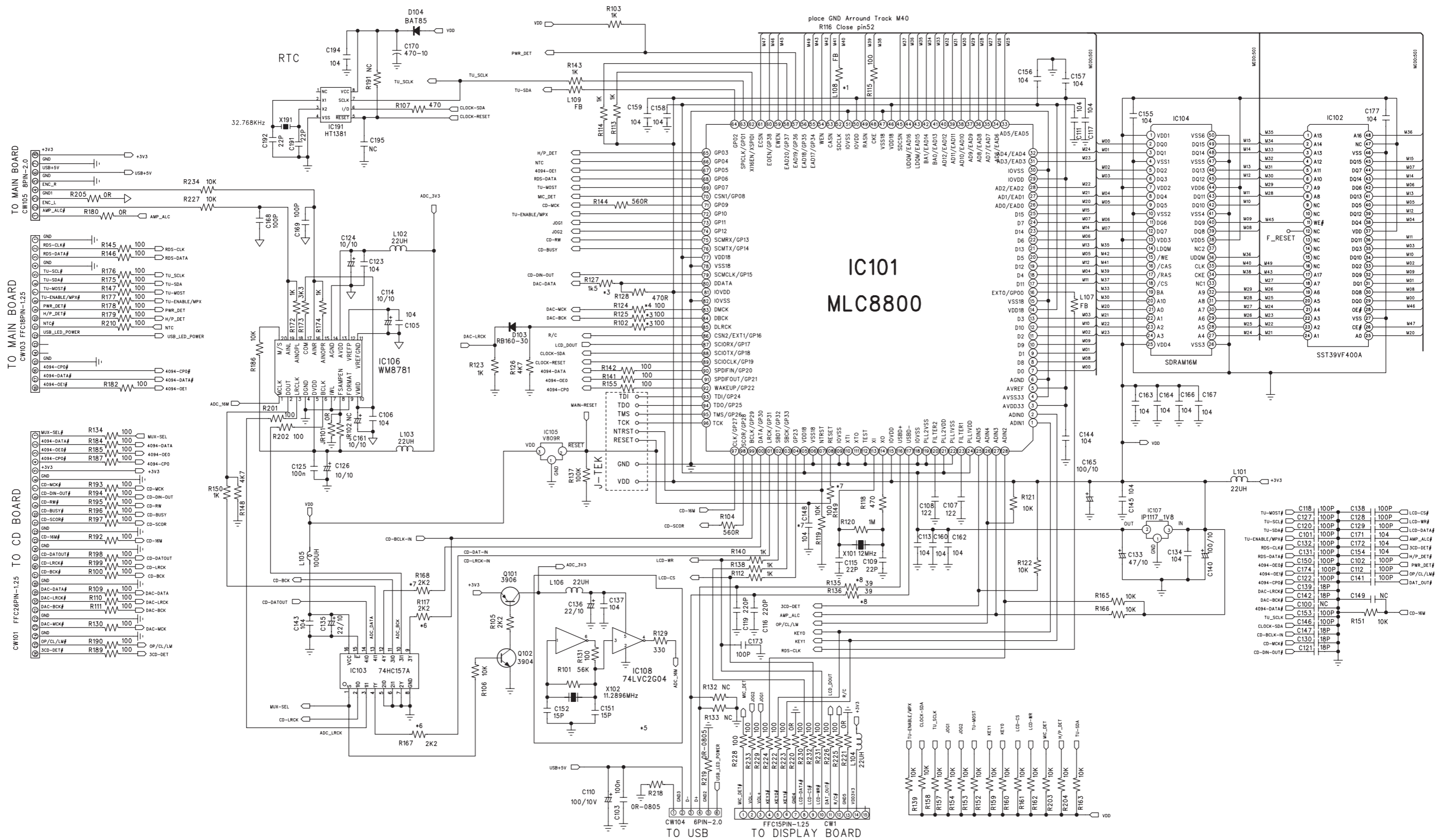**LAYOUT DIAGARM - FRONT BOARD**
COMPONENT SIDE VIEW

LAYOUT DIAGARM - FRONT BOARD
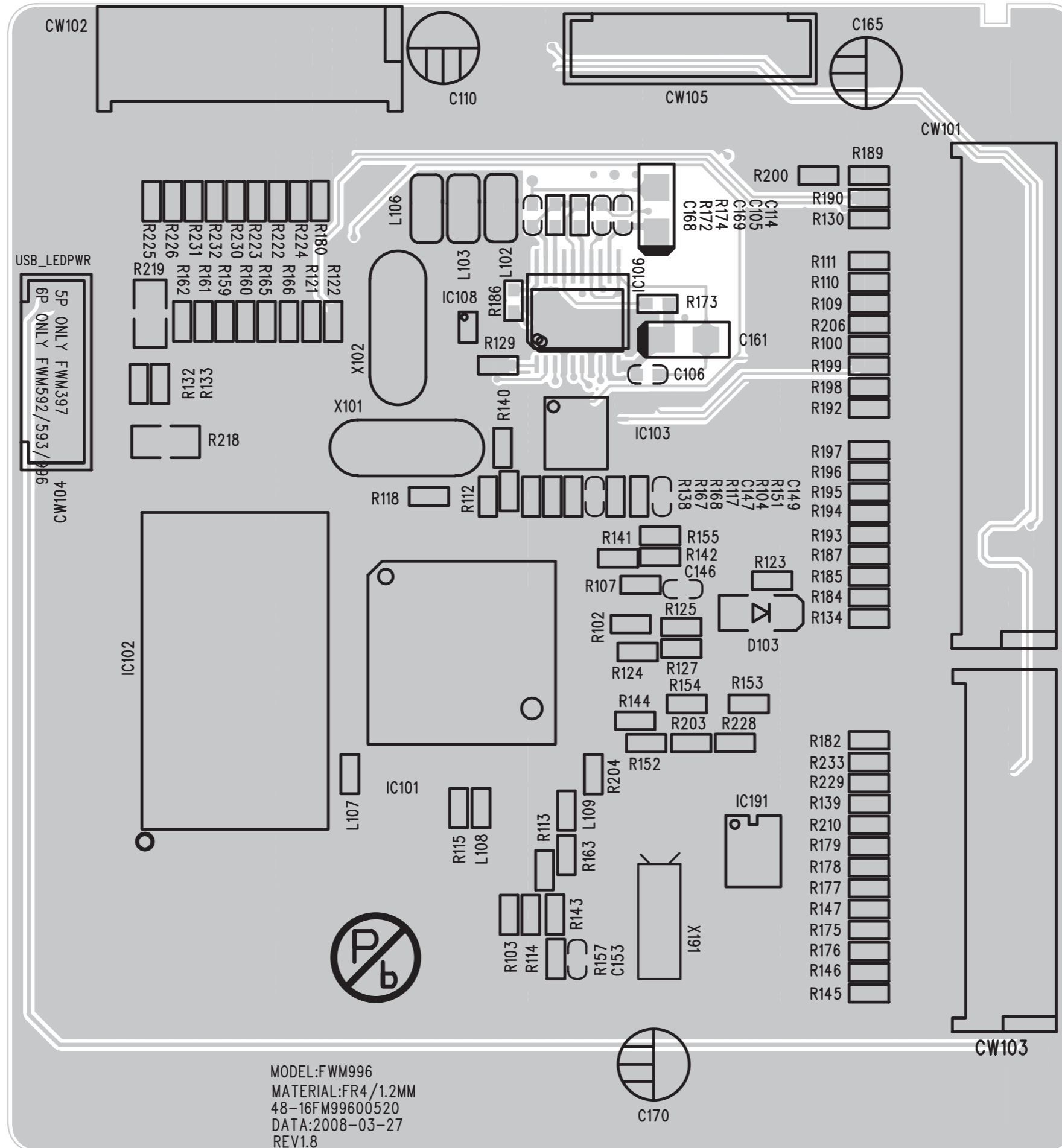**COPPER SIDE VIEW**

CIRCUIT DIAGRAM - MCU BOARD

LAYOUT DIAGARM - MCU BOARD
COMPONENT SIDE VIEW

CW102

C110

CW105

C165

CW101

R189

R200

R190

R130

R225 R226 R231 R232 R230 R223 R222 R224 R180 R121 R122

USB_LEDPWR

R219

R162 R161 R159 R160 R165 R166 R121

L106

L103 L102

C114 C105 C169 R172 R174 R173 C168

R111
R110
R109
R206
R100
R199
R198
R192

5P ONLY FWM397
6P ONLY FWM592/593/996

IC108 R186

R129

IC106

C161

C106

X102

R132 R133

R140

IC103

CW104

X101

R218

R197
R196
R195
R194
R193
R187
R185
R184
R134

R118 R112

C149 R151 R104 C147 R117 R168 R167 R138

R141 R155
R142
R107 C146

R123

R102 R125

D103

IC102

R124 R127

R144 R154 R203 R228 R153

R152

R182
R233
R229
R139
R210
R179
R178
R177
R147
R175
R176
R146
R145

IC101

L107

R204

IC191

R115 R113 L109
L108 R163

X191

R103 R143
R114 R157 C153

CW103

MODEL:FWM996
MATERIAL:FR4/1.2MM
48-16FM99600520
DATA:2008-03-27
REV1.8

C170

LAYOUT DIAGARM - MCU BOARD
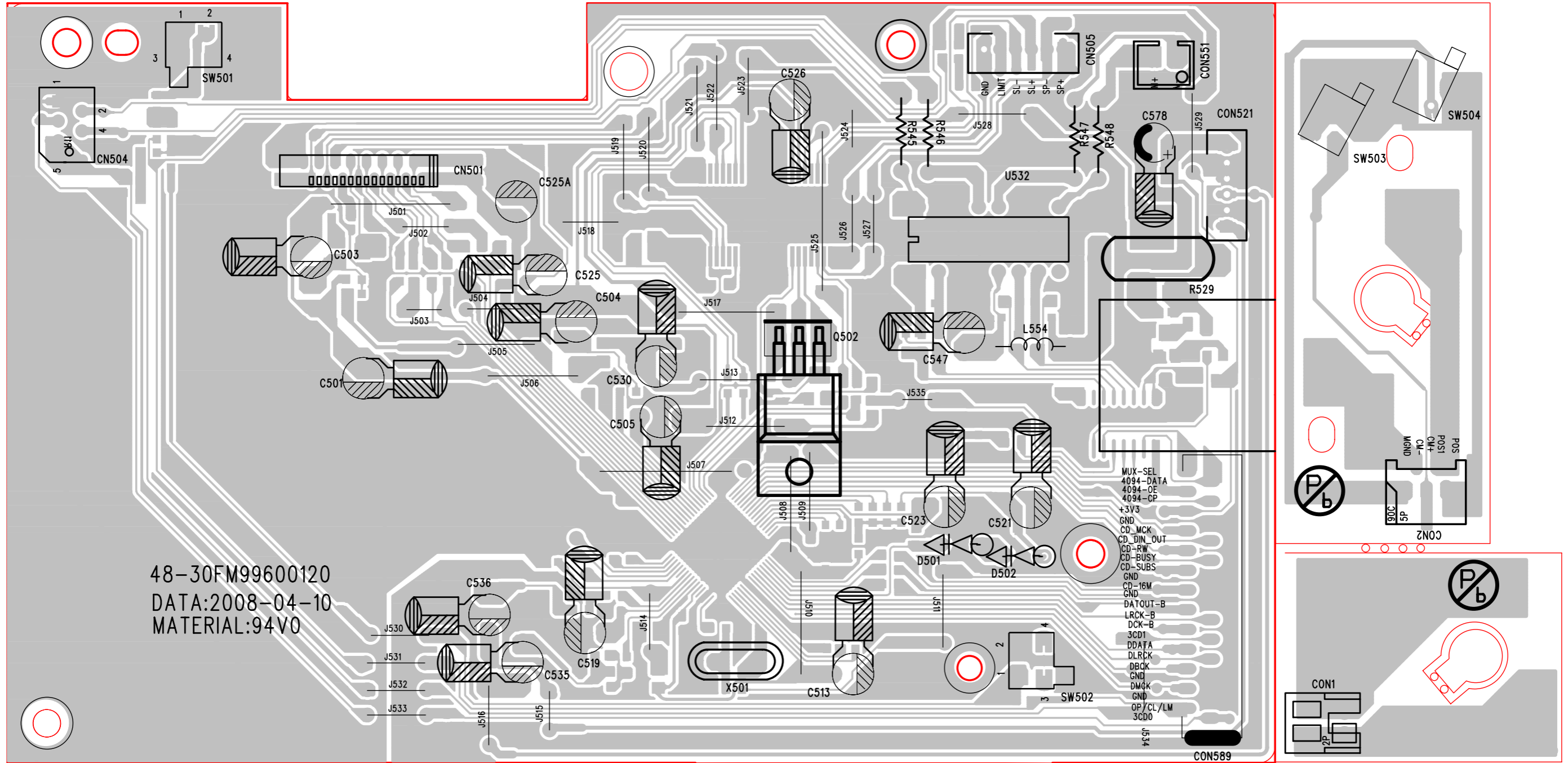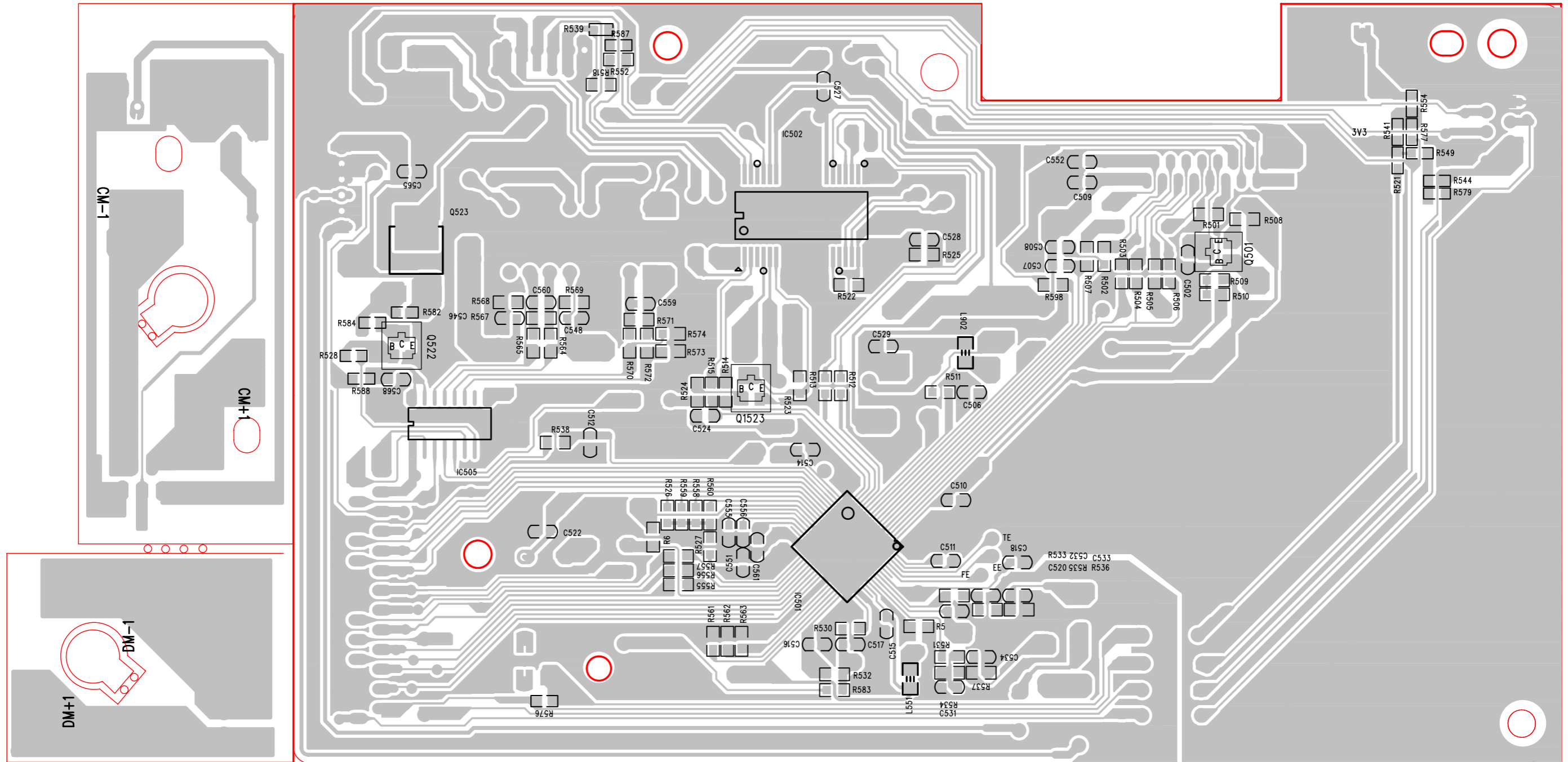**COPPER SIDE VIEW**
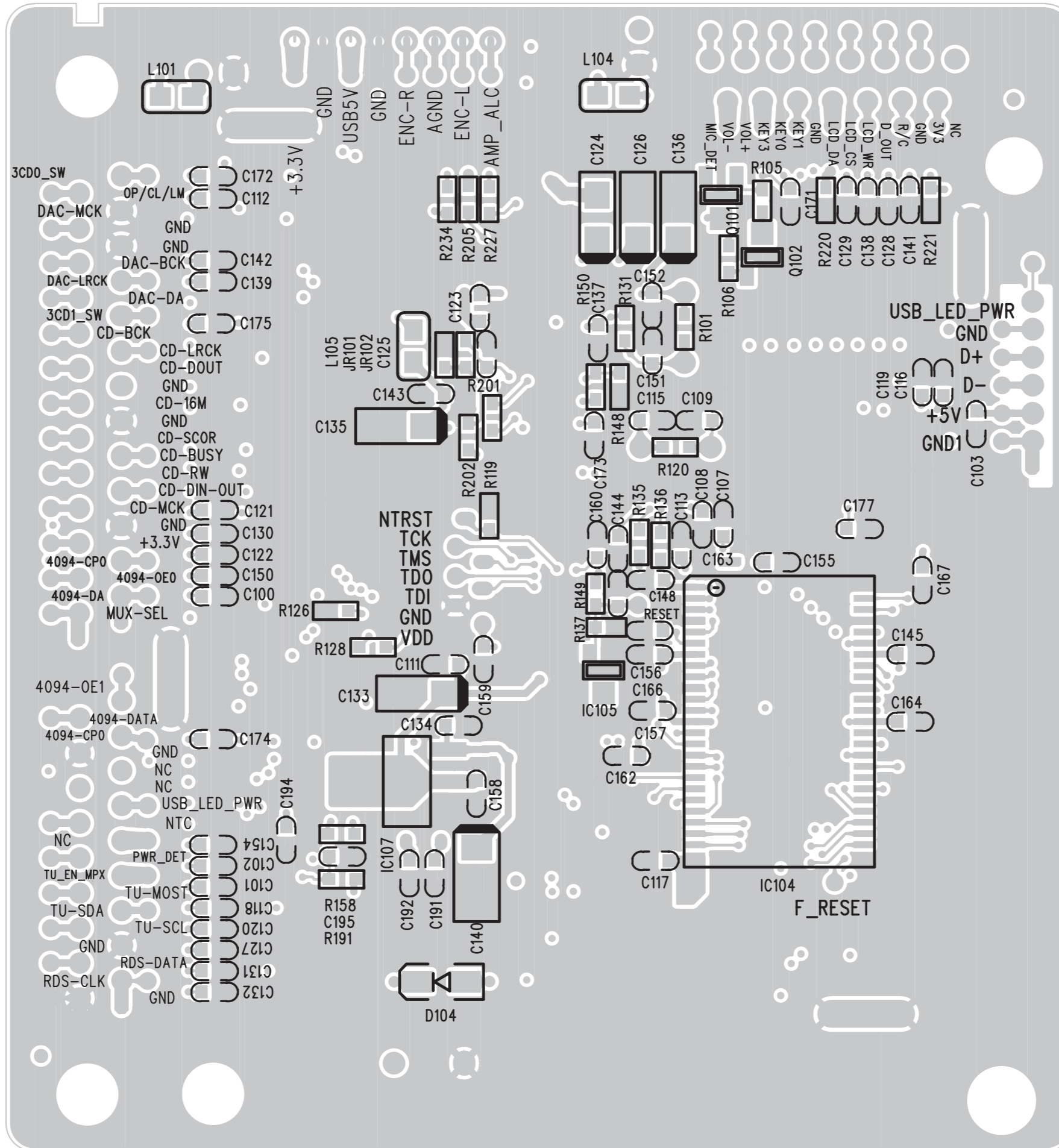
CIRCUIT DIAGRAM - CD BOARD
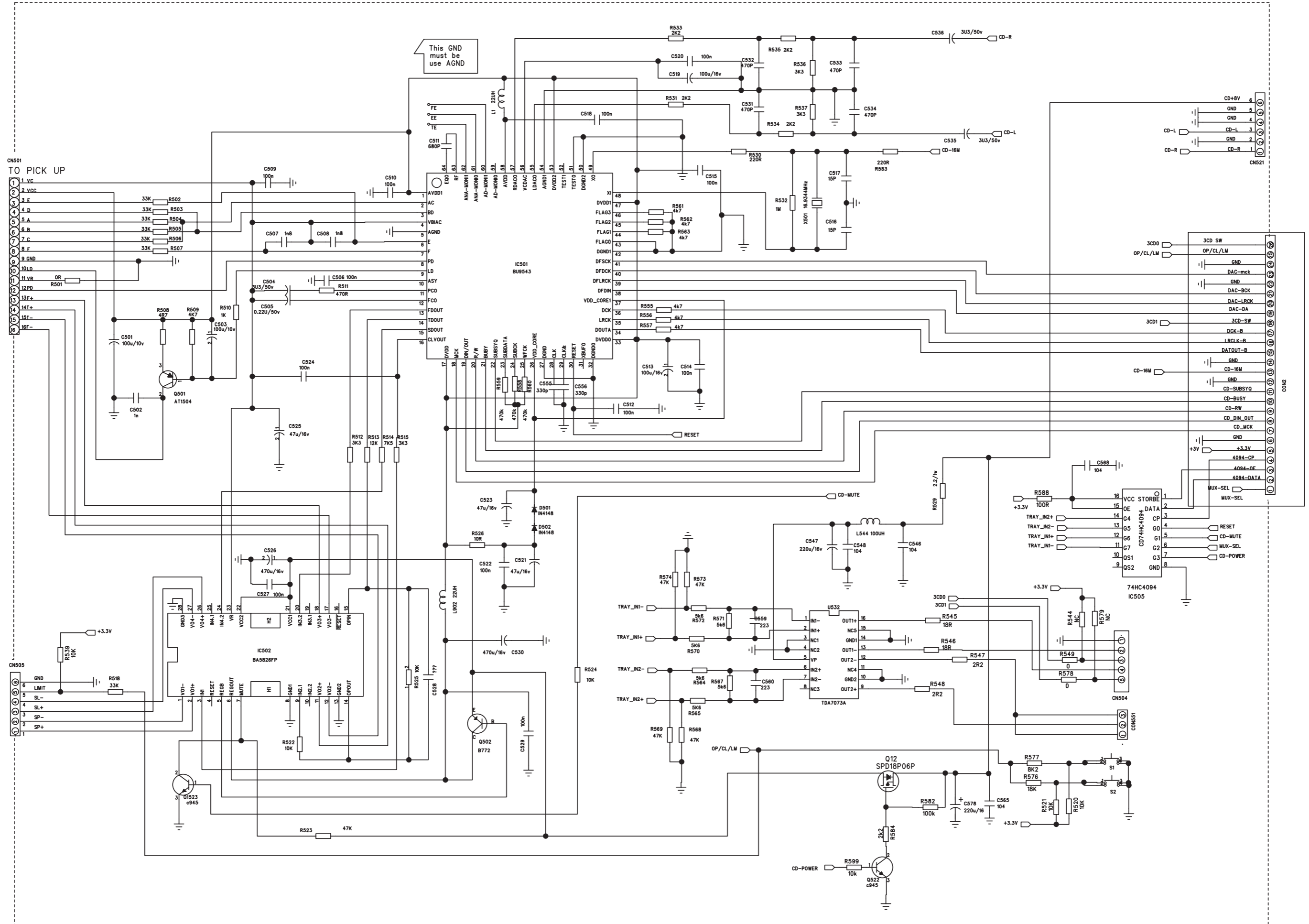
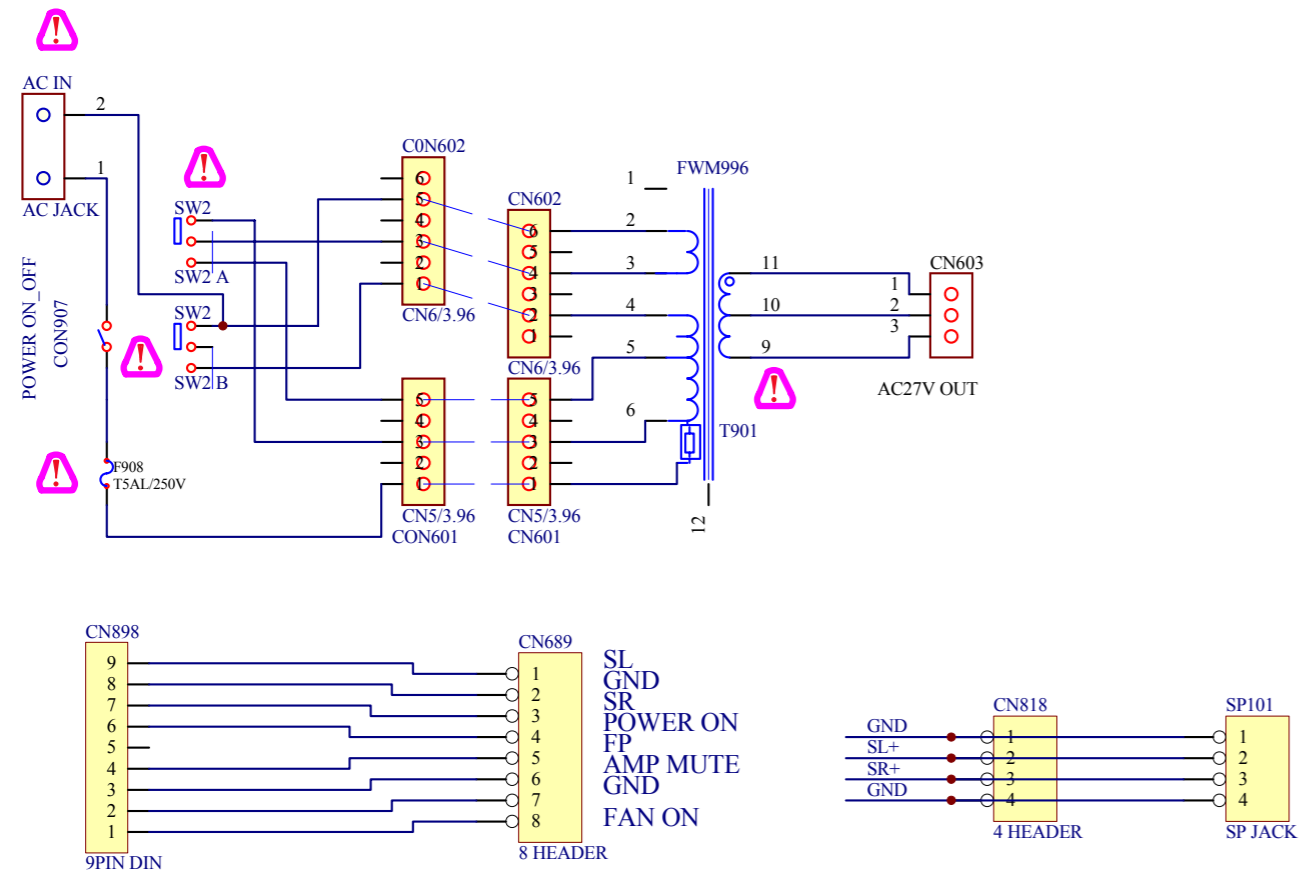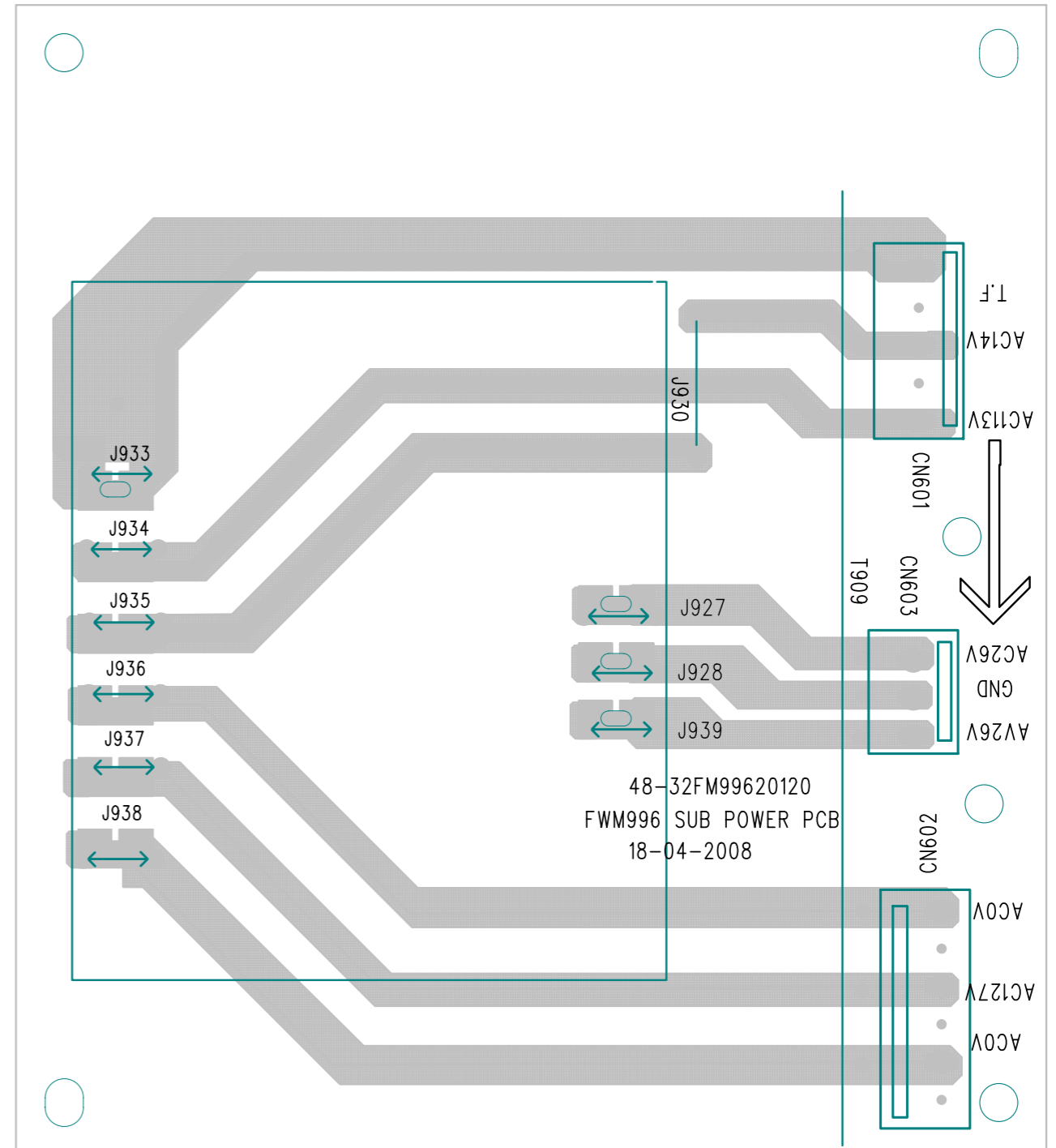**LAYOUT DIAGRAM - CD BOARD**
COMPONENT SIDE VIEW

LAYOUT DIAGRAM - CD BOARD
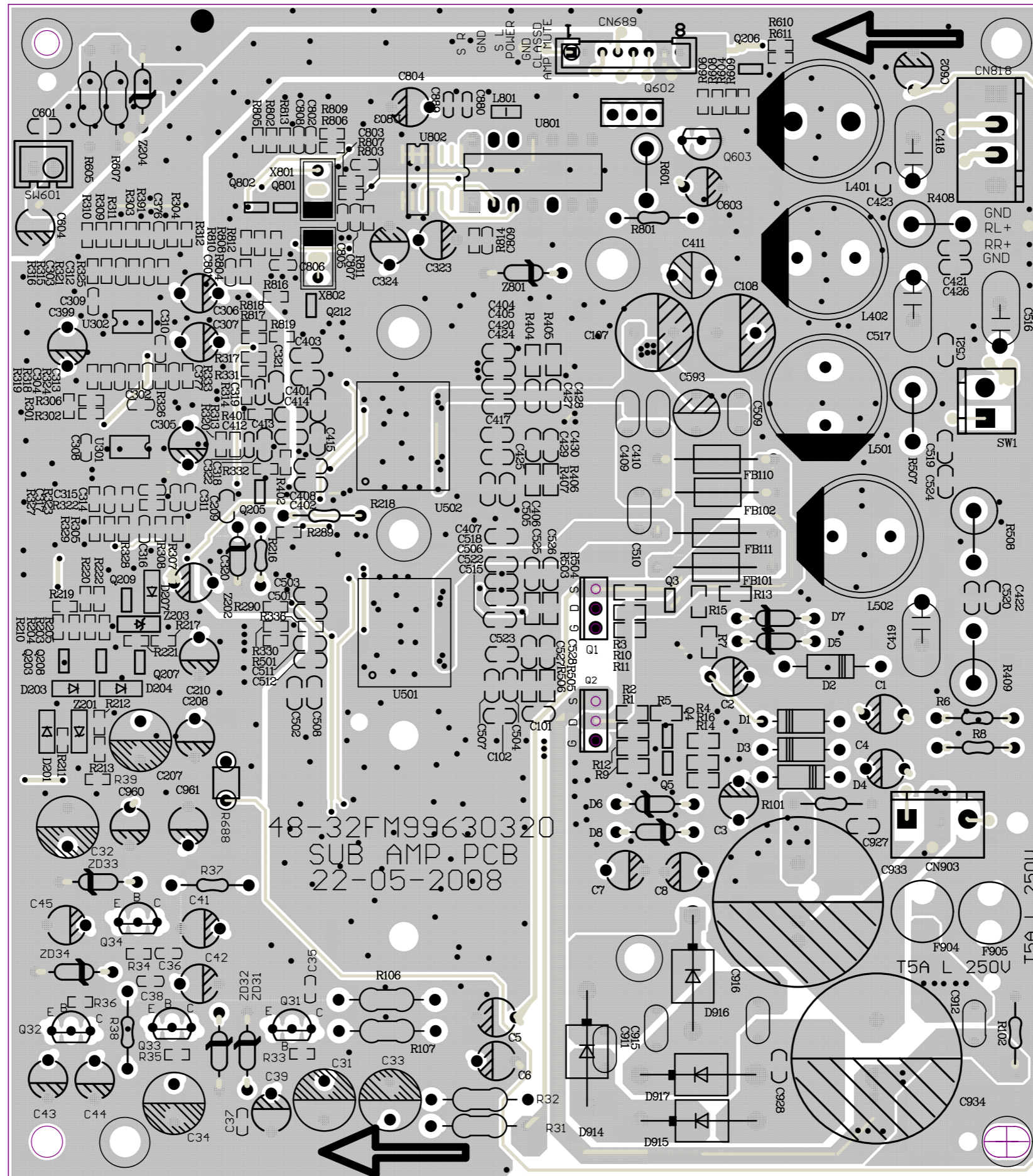**COPPER SIDE VIEW**

CIRCUIT DIAGRAM - SUB POWER BOARD
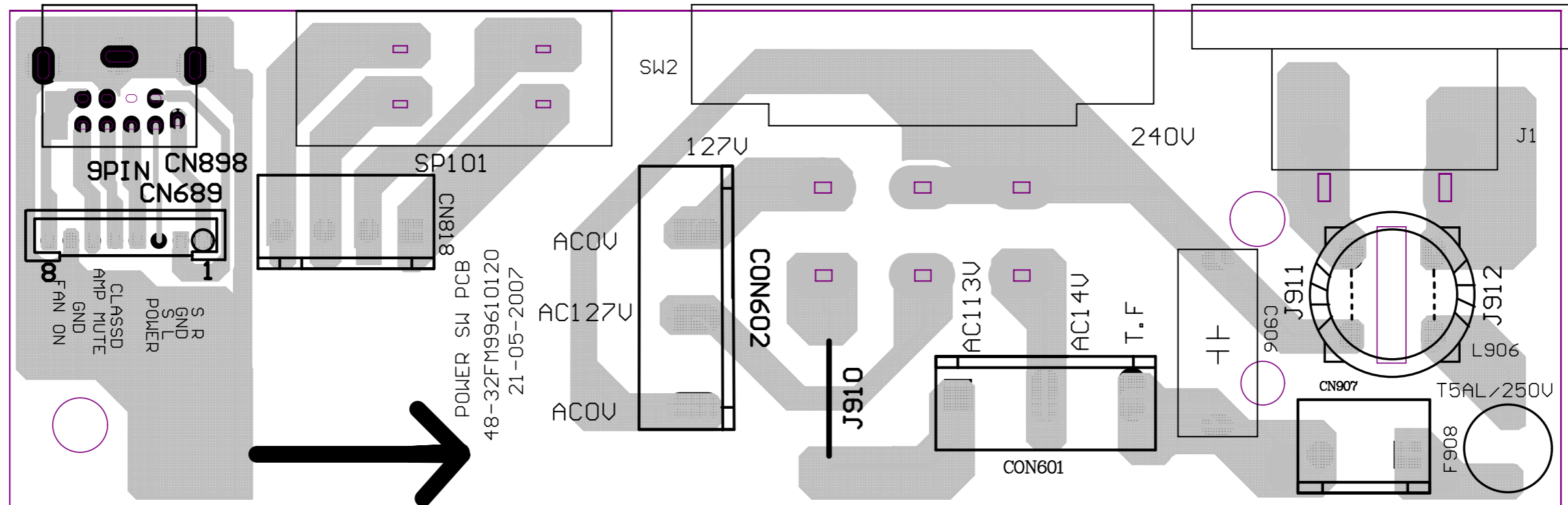**(in subwoofer box)**

LAYOUT DIAGRAM - SUB POWER BOARD

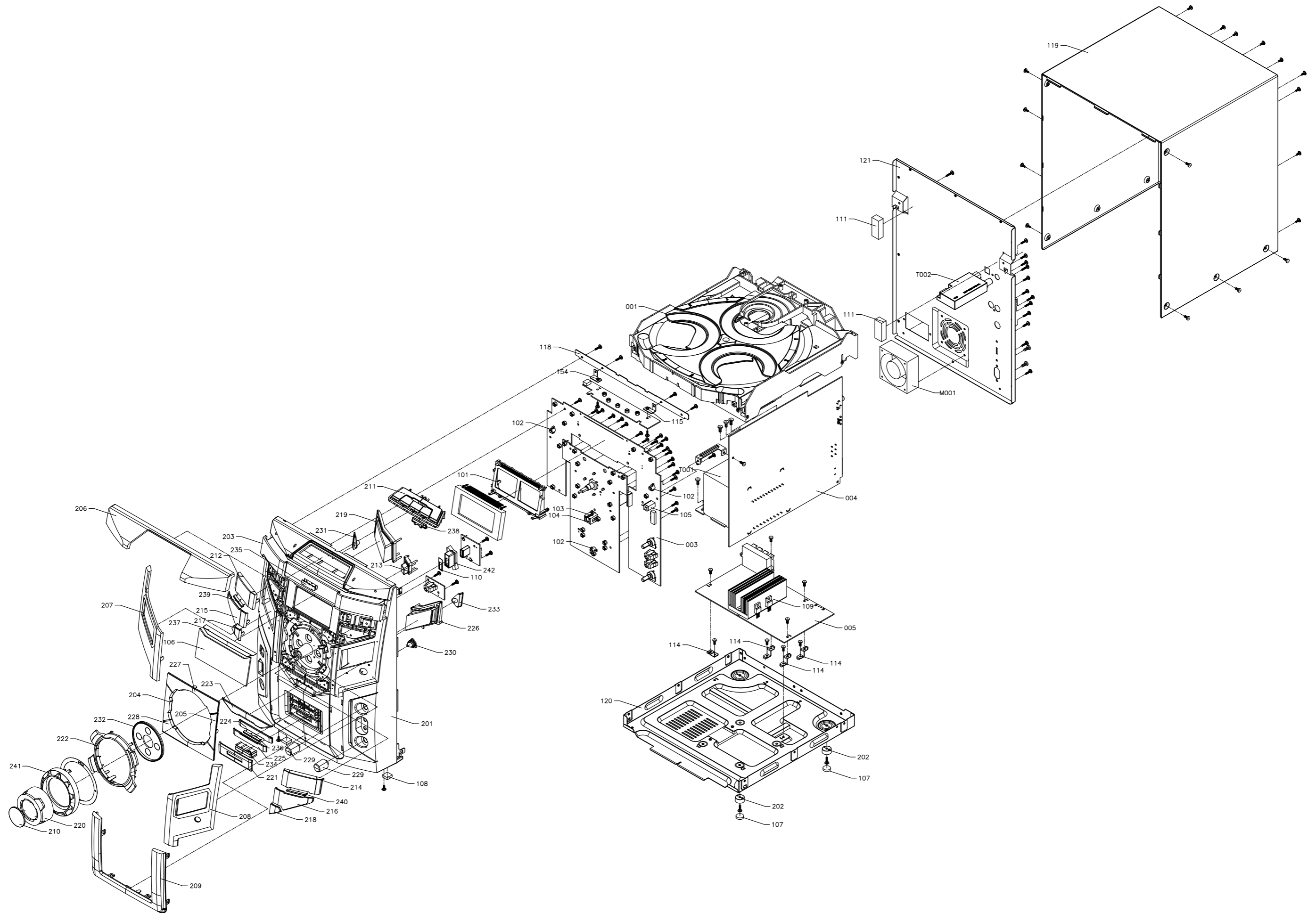**LAYOUT DIAGRAM - SUB AMP BOARD**
(in subwoofer box)

LAYOUT DIAGRAM - SUB SW BOARD
(in subwoofer box)

EXPLODED VIEW DIAGRAM

MECHANICAL PARTSLIST

110	996510014336	SPRING-GUIDING
111	996510014337	SPRING-DISC
201	996510020795	FRONT CABINET
202	996510016105	FOOT HOLDER
203	996510017810	3CDC DOOR
204	996510017811	LEFT PANEL AROUND VOL
205	996510017812	RIGHT PANEL AROUND VOL
206	996510016109	TOP COVER
207	996510016110	LEFT COVER
208	996510016111	RIGHT COVER
209	996510016112	BOTTOM COVER
210	996510016113	VOL KNOB COVER
211	996510017813	TOP CD BUTTON
212	996510016115	ALBUM BUTTON
213	996510015507	USB DELETE BUTTON
214	996510016116	TITLE BUTTON
215	996510016117	STOP BUTTON
216	996510016118	PLAY BUTTON
217	996510016119	MODE BUTTON
218	996510016120	PROGRAM BUTTON
219	996510016121	POWER BUTTON
220	996510016122	VOL KNOB
221	996510020799	MAX SOUND BUTTON
222	996510016124	CLUSTER BUTTON
223	996510017815	USB REC BUTTON
224	996510020794	JAZZ BUTTON
225	996510020793	TECHNO BUTTON
226	996510016128	DDB BUTTON
227	996510017818	IS-VAC BUTTON
228	996510017819	LIGHT-DISPLAY BUTTON
229	996510015510	MIC KNOB
230	996510016131	IR LENS
231	996510016132	POWER LIGHT GUIDE
232	996510016133	VOL LIGHT GUIDE
233	996510016134	DBB LIGHT GUIDE
234	996510017820	MAX BUTTON LIGHT GUIDE
235	996510000439	PHILIPS LOGO
236	996510017821	MIDDLE STRAP SOUND BUTTON
237	996510020797	DISPLAY TOP BAR
238	996510020803	MIDDLE STRAP TOP BUTTON
239	996510016139	MIDDLE STRAP L
240	996510016140	MIDDLE STRAP R
241	996510017988	VOL RING
242	996510017989	USB RING

Note: **Only these parts mentioned in the list are normal service parts.**

ACCESSORIES

J003	⚠	994000001478	AC PLUG ADAPTOR
J010		996510016101	AM LOOP ANTENNA
J011		996510009429	FM ANT (GREY) 1.5M CE/75
J012		996510002103	CONN. CORD 3.5 ST/PLUGx2 500mm
J012		996510020804	9P MINI DIN CABLE L=1.5M BLK
J110	⚠	996500037714	AC CORD SET VDE/BRAZIL APP 1.8
RC		996510020798	REMOTE CONTROL
SP1		996510024541	SPEAKER BOX (2 L + 2 R)
SP2		996510024536	SUBWOOFER BOX

Note: **Only these parts mentioned in the list are
normal service parts.**

ELECTRICAL PARTSLIST

MAIN BOARD ASSEMBLY

C927	994000001225	SAFETY CAP 275V 0.22UF -20%
CN606	994000001221	V/RCA JACK 2P
F902	⚠ 996510002426	CERAMIC FUSE 3.9x10.5mmW
F904	⚠ 994000000586	GLASS FUSE W/LEAD 3.15A/250V
IC601	996510005250	IC TDA7468D
IC603	996510018852	IC UTC7808
IC606	996510018962	IC UTC7805
IC607	994000001247	IC HEF4094BT
IC609	994000001201	IC NJM4556AM
J001	996510014304	AC SOCKET UL APP
R901	994000004472	RESISTORS FUSIBLE 47R 1W +-1%
SW901	994000001323	SWITCH
U901	996510016090	IC AP1117E33L-13

AMP BOARD ASSEMBLY

J013	996500039522	4P FFC CABLE 1.25mm L=270mm
J014	996510016102	9P FFC.1.25mm L=80mm
J015	994000002431	FFC CABLE 10P L=120MM
J016	996510016103	14P FFC.1.25mm L=180mm
J017	996510015486	18P FFC.1.25mm L=150mm
J018	996500040407	18P FFC 1.25mm L=130mm
T001	⚠ 996510016098	TRANSFORMER EI68xS65 127/240V
U301	996510003980	IC TDA8920(SOT566-3) 2X100W
U304	996500042457	IC HEF4013BT
U305	996500042456	IC 74HCT04D SOP14
U308	994000001201	IC NJM4556AM

CD BOARD ASSEMBLY

0082	994000003669	CD MECHANISM (SANYO) DA11VF
8001	994000004487	16P FFC 1MM L=170MM
8002	996510001327	23P FFC 1.25mm L80mm
8003	994000004457	5P FFC L=200MM(AA)
IC501	996510009311	IC BU9543KV (SMD)
IC502	996510009310	IC BA5826FP
IC505	994000001247	IC HEF4094BT
J005	996510015477	26P FFC.1.25mm L=80mm
SW501	994000004552	DETECT SWITCH
X501	994000004551	CRYSTAL 16.9344MHZ +-20PPM

ELECTRICAL PARTSLIST

FRONT BOARD ASSEMBLY

D914	994000001234	LED LAMP 3MM (RED)
D920	996510017986	LED LAMP 2x5x7mm
FTD901	996510016092	VFD DISPLAY
J905	996510000344	USB SOCKET
J908	994000001244	V/PHONE JACK 3.5MM
P901	994000000325	OPTIC SENSER (OPTO..)
SW901	994000001243	TACT SWITCH
U901	996510016091	IC PT6324
U902	996510020796	IC CD3699GO
U903	996510003984	IC CYT78L05 (TO-92)
VR901	996510006586	ROTARY VOLUME F-122KGP B50K L
VR902	996510003986	ROTARY VOLUME
VR903	994000001241	ROTARY ENCODER

MCU BOARD ASSEMBLY

0082	994000003669	CD MECHANISM (SANYO) DA11VF
0102	996510014310	MAGNET 27x16x4mm 546g
IC101	996510015478	IC BX8800
IC102	996510009337	IC SST39VF800A-70 8M 3.3V TSOP
IC103	996510001318	IC 74LVC157APW
IC104	996510003990	IC SDRAM M12L16161A-7T
IC105	996510003993	IC V809R
IC106	996510015480	IC WM8782SEDS
IC107	996510009335	IC LM1117S-1.8V SOT-223
IC108	996510015479	IC 74LVC2G04GW
IC191	996510015481	IC HT1381
J005	996510015477	26P FFC.1.25mm L=80mm
X101	996510008326	CRYSTAL 12 MHzHC-49/US H=3.5mm
X102	996510015482	CRYSTAL 11.2896MHz
X191	994000004615	CRYSTAL 32.768KHZ 12.5PF

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normal service parts.