

Service  
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# Service Manual



## TABLE OF CONTENTS

	Chapter
Location Of PCB Boards .....	1-2
Versions Variation .....	1-2
Specifications .....	1-3
Measurement Setup .....	1-5
BG LE .....	1-6
ESD & Safety Instruction .....	1-7
Lead-free Soldering Information .....	1-8
Setting Procedure & Repair Instructions .....	2
Disassembly Instructions & Service Positions .....	3
Block & Wiring Diagram .....	4
Diagram Quick Start Guide .....	5
Main Board .....	6
Power Board .....	7
VFD+KEY+USB+MP3 Board .....	8
Mechanical Exploded View .....	9
Revision List .....	10

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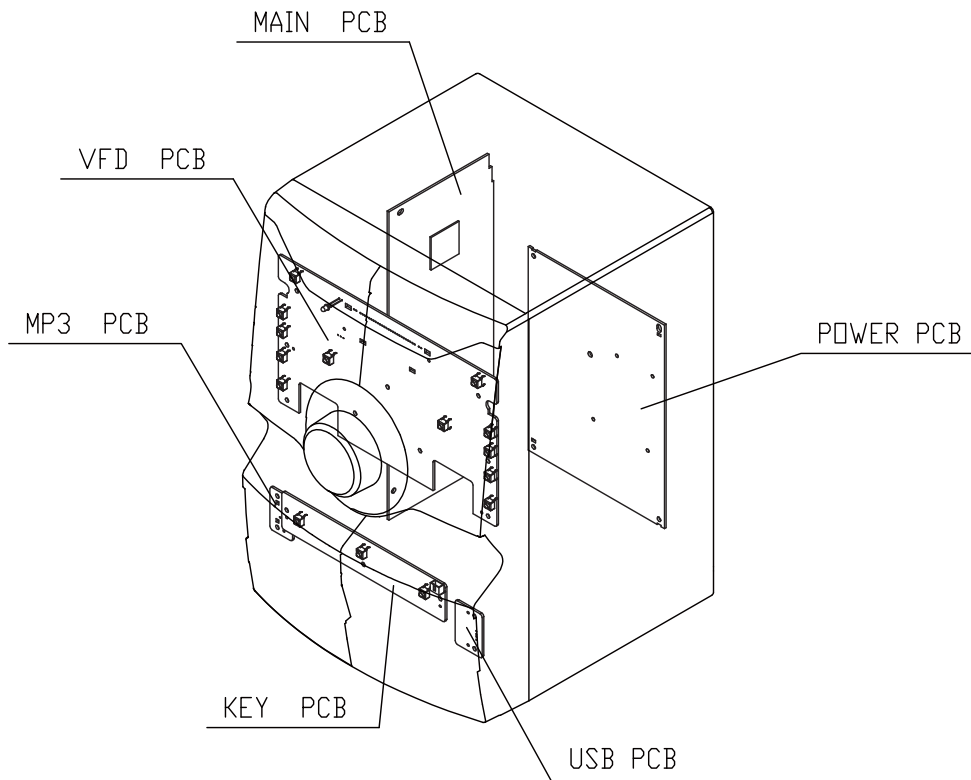
GB 314 1785 37130

Version 1.0



# PHILIPS

## LOCATION OF PCB BOARDS



## VERSION VARIATION:

Type/Versions	FWD410		
	/77	/98	/51
Features			
Output Power - (4*40W)	X	X	X
Voltage (220-240V)	X	X	X
MP3	X	X	X

## SERVICE SCENARIO MATRIX:

Type/Versions	FWD410		
	/77	/98	/51
Board in used			
Main Board	C/M	C/M	C/M
Power Board	C/M	C/M	C/M
VFD Board	C/M	C/M	C/M

\*M= Module Level Replacement

\*C = Component Level Repair

## SPECIFICATIONS

### Amplifier

Rated Output Power	4x40w +1/-0.5dB RMS
Frequency Response	45 Hz - 16000 Hz, ±3 dB
Signal to Noise Ratio	>/= 65 dBA
Aux Input	900mV RMS 22k ohm

### Disc

Laser Type	Semiconductor
Disc Diameter	12 cm/8 cm
Video Decoding	MPEG-1 / MPEG-2 / DivX
Video DAC	12 Bits
Signal System	PAL / NTSC
Video Format	4:3 / 16:9
Video Luminance S/N	> 55 dB
Audio DAC	24 Bits / 96 kHz
Total Harmonic	</= 1% (1 kHz)

### Tuner (FM)

Tuning Range	87.5 - 108MHz
Tuning grid	100 KHz
Sensitivity - Mono, 26dB S/N Ratio	<22 dBf
Total Harmonic Distortion	<3%
Signal to Noise Ratio	>50dB

### Speakers

Speaker	4 ohm
Impedance	
Speaker Driver	13cm woofer + 2.5cm Dome tweeter
Sensitivity	> 86 dB/m/W±4dB/m/W

### General information

AC power	220-240V ~, 50/60 Hz
Operation Power Consumption	45 W

Standby Power Consumption	< 0.5 W
Composite Video Output	1.0Vp-p, 75 ohm
Component Video Output	
USB Direct	Version 2.0
Dimensions	223X 258 X
- Main Unit (W x H x D)	310 mm
- Speaker (W x H x D)	210 X 242 X 310 mm
Weight	16.5 kg
- With Packing	4.8 kg
- Main Unit	2 x 4.6 kg
- Speaker Box	

## Supported disc formats

- Digital Video Discs (DVDs)
- Video CDs (VCDs)
- SuperVideo CDs (SVCDs)
- Digital Video Discs + Rewritable (DVD+RW)
- Compact Discs (CDs)
- Picture (Kodak, JPEG) files on CDR(W)
- DivX(R) disc on CD-R(W):
- DivX 3.11, 4.x and 5.x

### Supported MP3-CD formats:

- ISO 9660
- Max. title/album name: 12 characters
- Max. title number plus album: 255.
- Max. nested directory: 8 levels.
- Max. album number: 32.
- Max. MP3 track number: 999.
- Supported sampling frequencies for MP3 disc: 32 kHz, 44.1 kHz, 48 kHz.
- Supported Bit-rates of MP3 disc are: 32, 64, 96, 128, 192, 256 (kbps).
- The following formats are not supported:
  - Files like \*.VMA, \*.AAC, \*.DLF, \*.M3U,
  - \*.PLS, \*.WAV
  - Non-English Album/Title name
  - Discs recorded in Joliet format
  - MP3 Pro and MP3 with ID3 tag

---

# USB playability information

## Compatible USB devices:

- USB flash memory (USB 2.0 or USB1.1)
- USB flash players (USB 2.0 or USB1.1)
- memory cards (requires an additional card reader to work with this apparatus)

## Supported formats:

- USB or memory file format FAT12, FAT16, FAT32 (sector size: 512 bytes)
- MP3 bit rate (data rate): 32-320 Kbps and variable bit rate
- Directory nesting up to a maximum of 8 levels
- Number of albums/ folders: maximum 99
- Number of tracks/titles: maximum 999
- ID3 tag v2.0 or later
- File name in Unicode UTF8 (maximum length: 128 bytes)

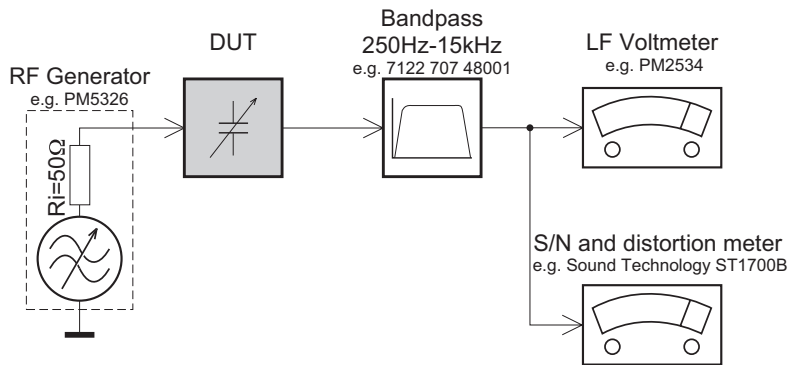
## Unsupported formats:

- Empty albums: an empty album is an album that does not contain MP3/ WMA files, and is not be shown in the display.
- Unsupported file formats are skipped. For example, Word documents (.doc) or MP3 files with extension .dlf are ignored and not played.
- AAC, WAV, PCM audio files
- DRM protected WMA files (.wav, .m4a, .m4p, .mp4, .aac)
- WMA files in Lossless format

**Specifications subject to change without prior notice.**

# MEASUREMENT SETUP

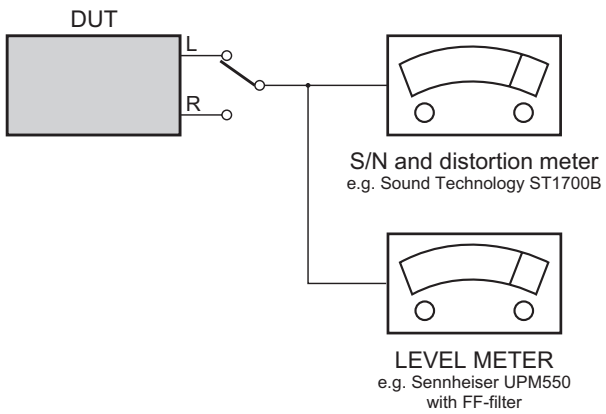
## Tuner FM



Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilotone (19kHz, 38kHz).

## CD

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



# SERVICE AIDS

## Service Tools:

- Universal Torx driver holder .....4822 395 91019
- Torx bit T10 150mm .....4822 395 50456
- Torx driver set T6-T20 .....4822 395 50145
- Torx driver T10 extended .....4822 395 50423

## Compact Disc:

- SBC426/426A Test disc 5 + 5A .....4822 397 30096
- SBC442 Audio Burn-in test disc 1kHz .....4822 397 30155
- SBC429 Audio Signals disc .....4822 397 30184
- Dolby Pro-logic Test Disc .....4822 395 10216

## HANDLING CHIP COMPONENTS

**GENERAL**

SOLDER    CHIP COMPONENT    SOLDER  
COPPER TRACK    P.C.B.  
GLUE

SERVICE PACKAGE

**DISMOUNTING**

VACUUM PISTON  
4822 395 10082

SOLDERING IRON  
e.g. WELLER solder tip PT-H7

SOLDERING IRON  
SOLDER WICK  
4822 321 40042

e.g. A PAIR OF TWEEZERS

HEATING    HEATING

SOLDERING IRON  
SOLDER WICK    CLEANING

**MOUNTING**

e.g. A PAIR OF TWEEZERS

SOLDER  
ø0.5-0.8mm    PRESSURE

SOLDERING IRON

SOLDERING TIME  
< 3 sec/side

SOLDER ø0.5-0.8mm    PRESSURE    SOLDERING IRON

**PRECAUTIONS**

SOLDERING IRON    CORRECT    COPPER TRACK

SOLDERING IRON    CHIP COMPONENT

**EXAMPLES**

CORRECT

SOLDERING IRON    NO!

**ESD****GB WARNING**

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.

**F ATTENTION**

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).

Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.

Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfilez le bracelet serti d'une résistance de sécurité.

Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

**D WARNUNG**

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).

Unvorsichtige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren. Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes. Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

**NL WAARSCHUWING**

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).

Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.

Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

**I AVVERTIMENTO**

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).

La loro longevità potrebbe essere fortemente ridotta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.

Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

**GB ESD PROTECTION EQUIPMENT**

Complete Kit ESD3 (small tablemat, wristband, connection box, estention cable and earth cable ..... 4822 310 10671  
Wristband tester ..... 4822 344 13999

**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  $\Delta$ .

**NL**

Veiligheidsbepalingen vereisen, dat het apparaat bij reparatie in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.

De Veiligheidsonderdelen zijn aangeduid met het symbol  $\Delta$ .

**F**

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisés les pièces de rechange identiques à celles spécifiées.

Less composants de sécurité sont marqués  $\Delta$ .

**D**

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Geräts darf nicht verändert werden; für Reparaturen sind Original-Ersatzteile zu verwenden.

Sicherheitsbauteile sind durch das Symbol  $\Delta$  markiert.

**I**

Le norme di sicurezza esigono che l'apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambio identici a quelli specificati.

Componenti di sicurezza sono marcati con  $\Delta$ .

**GB**

After servicing and before returning set to customer perform a leakage current measurement test from all exposed metal parts to earth ground to assure no shock hazard exist, The leakage current must not exceed 0.5mA.

**GB Warning !**

Invisible laser radiation when open.  
Avoid direct exposure to beam.

**S Varning !**

Osynlig laserstrålning när apparaten är öppnad och spårren är urkopplad. Betrakta ej strålen.

**SF Varoitus !**

Avatussa laitteessa ja suojaelukituksen ohitettaessa olet alltiina näkymättömälle laserisäteilylle. Älä katso säteeseen!

**DK Advarse !**

Usynlig laserstrålning ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for strålning.

**F**

"Pour votre sécurité, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

## Pb(Lead) Free Solder

When soldering, be sure to use the pb free solder.

### IDENTIFICATION:

Regardless of special logo (not always indicated)



one must treat all sets from **1 Jan 2005** onwards, according next rules:

**Important note:** In fact also products of year 2004 must be treated in this way as long as you avoid mixing solder-alloys (leaded/ lead-free). So best to always use SAC305 and the higher temperatures belong to this.

Due to lead-free technology some rules have to be respected by the workshop during a repair:

- Use only lead-free solder alloy Philips SAC305 with order code 0622 149 00106. If lead-free solder-paste is required, please contact the manufacturer of your solder-equipment. In general use of solder-paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free solder alloy. The solder tool must be able
  - To reach at least a solder-temperature of 400°C,
  - To stabilize the adjusted temperature at the solder-tip
  - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature around 360°C – 380°C is reached and stabilized at the solder joint. Heating-time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips switch off unused equipment, or reduce heat.
- Mix of lead-free solder alloy / parts with leaded solder alloy / parts is possible but PHILIPS recommends strongly to avoid mixed solder alloy types (leaded and lead-free).  
If one cannot avoid or does not know whether product is lead-free, clean carefully the solder-joint from old solder alloy and re-solder with new solder alloy (SAC305).
- Use only original spare-parts listed in the Service-Manuals. Not listed standard-material (commodities) has to be purchased at external companies.
- Special information for BGA-ICs:
  - Always use the 12nc-recognizable soldering temperature profile of the specific BGA (for desoldering always use the lead-free temperature profile, in case of doubt)
  - Lead free BGA-ICs will be delivered in so-called 'dry-packaging' (sealed pack including a silica gel pack) to protect the IC against moisture. After opening,

dependent of MSL-level seen on indicator-label in the bag, the BGA-IC possibly still has to be baked dry. (MSL=Moisture Sensitivity Level). This will be communicated via AYS-website.

Do not re-use BGAs at all.

- For sets produced before 1.1.2005 (except products of 2004), containing leaded solder-alloy and components, all needed spare-parts will be available till the end of the service-period. For repair of such sets nothing changes.
- On our website [www.atyourservice.ce.Philips.com](http://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

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

For additional questions please contact your local repair-helpdesk.



## System , Region Code , etc. Setting Produre

### 1) Restore factory setting

- Press <SETUP> button on R/C.
- Select <preference setup> ,then press < OK > .
- Select <default>,then press <OK> to confirm.

### 2) Version control change

- Open the Door,then,press "1" "5" "9" on RC.
- Press <OK> button on RC.
- TV will show message as follow:

Current model:	FWD410/77/98
Version:00.07.02_0	Release:2010.06.10
Region:0	Servo:62.10.00.07
8032: 0F.01.00.09	Risc:01.00.00.04
MCU(41): 13.00	CH

if current model doesnot match your set,  
use down arrow key on the remote to change

OK

- If current model doesnot match your set, use down arrow key on the remote to change.

### 3) Password change

- Press <SETUP> button on R/C.
- Select <preference setup> ,then press <OK>.
- Select <password> <change>,then press <OK> to confirm  
"0000" is default password supplied.

### 4) Check on software version

- Press <SETUP> button on R/C.
- Select <preference setup> ,then press < OK>.
- Select <version info>,then press <OK>.
- TV will show message as follow:

Current model:	FWD410/77/98
Version:00.07.02_0	Release:2010.06.10
Region:0	Servo:62.10.00.07
8032: 0F.01.00.09	Risc:01.00.00.04
MCU(41): 13.00	CH

OK

Press SETUP to exit menu

### 5) Upgrading new software

- Check for the latest software version on [www.philips.com/support](http://www.philips.com/support).  
Search for your model and click on 'software&drivers'
- Copy the latest upgrading software onto a CD-R or USB storage device.
- Insert the CD-R program disc or connect the USB storage device to the home theater.
- Press <USB> button on R/C.
- TV will show message as follow:

Upgrade file detected  
Upgrade?  
Press PLAY to start

- Press <PLAY> "▶||" button on R/C.
- TV will show message as follow:

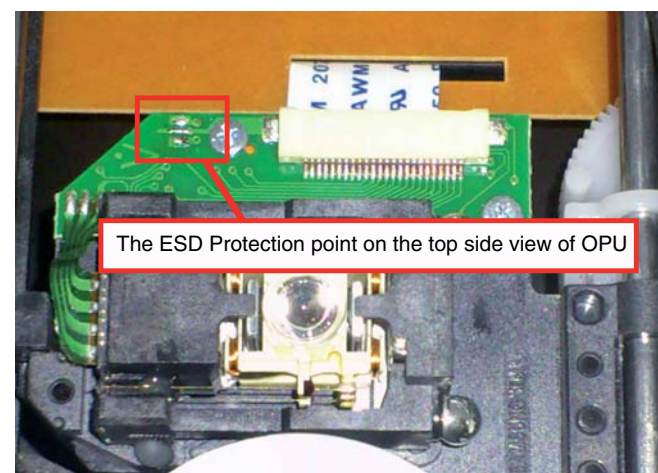
Upgrade file detected  
Upgrade?  
Press PLAY to start  
Upgrading

- When the updated is complete ,the home theater automatically switch to standby.

Note: when upgrade in progress, please do not unplug or switch off the device.

### 6) How to replace the defective DVD Loader

- Remove the defective DVD Loader (see chapter 3).
- Accordingly connect DVD Loader and "CN201", "CN203" on the top of main b
- Remove solder joint on the ESD protection point.



The Top side view of OPU

Note: The ESD protection point on the Top side view of OPU must be soldered if

- the DVD Loader is OK and needs to be disconnected from connector "CN201" and "CN203" of the main board.
- the defective DVD Loader is needed to be send back to supplier for failure analysis and to support back charging evidence.

### 7) Produce to change Tuner grid (only for /98 version)

In some countries, you can switch the FM tuning grid between 50 kHz and 100 kHz. Changing the tuning grid erases all preset radio stations.

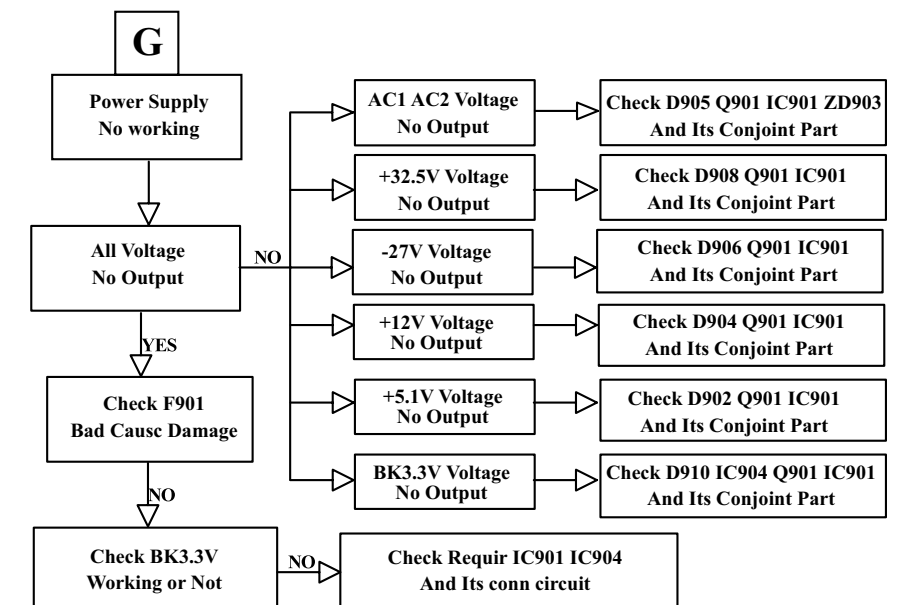
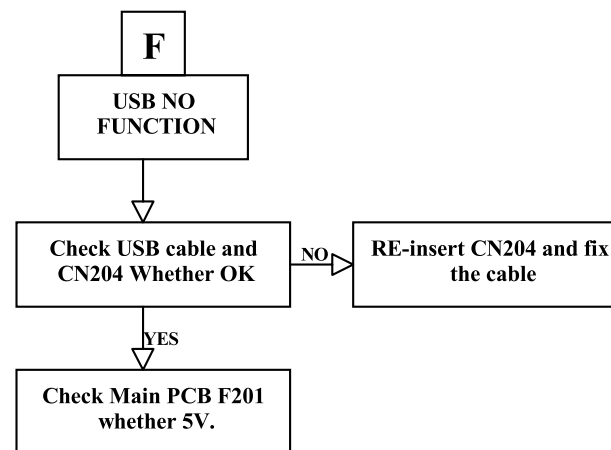
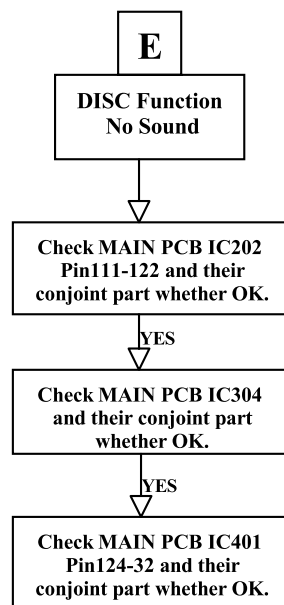
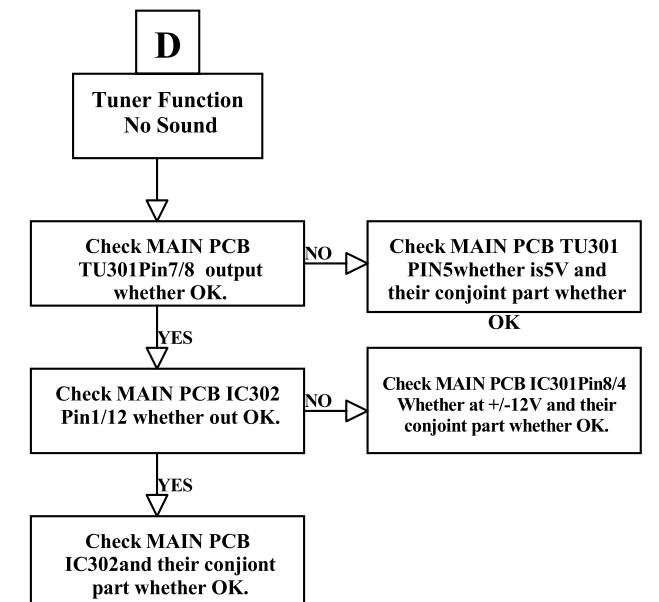
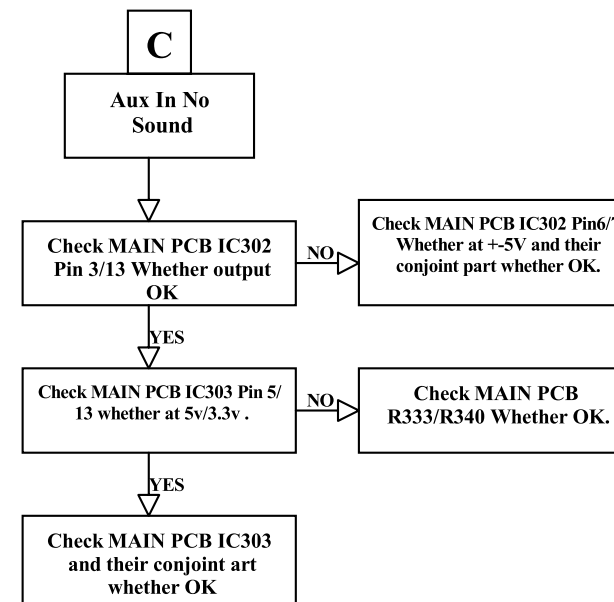
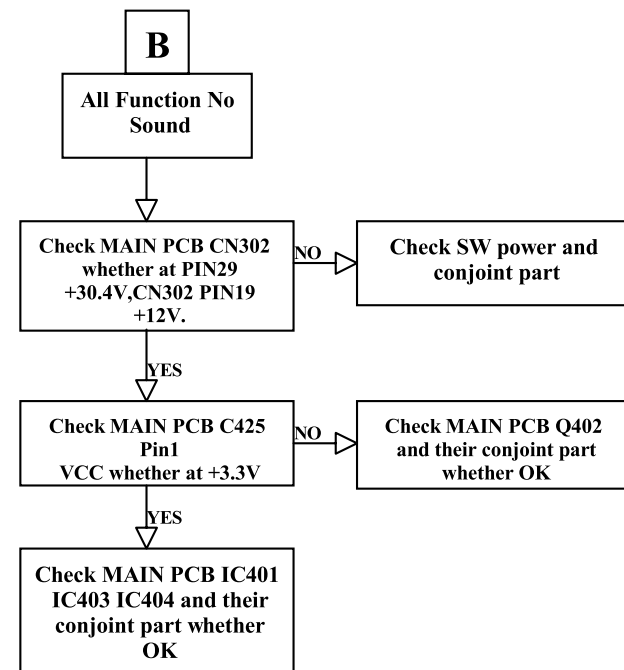
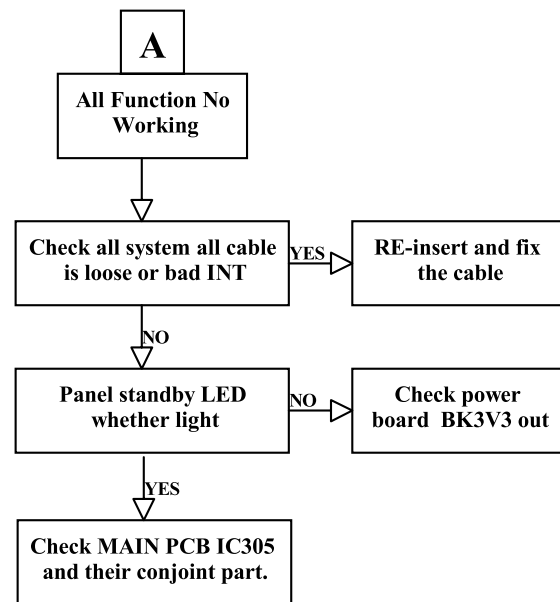
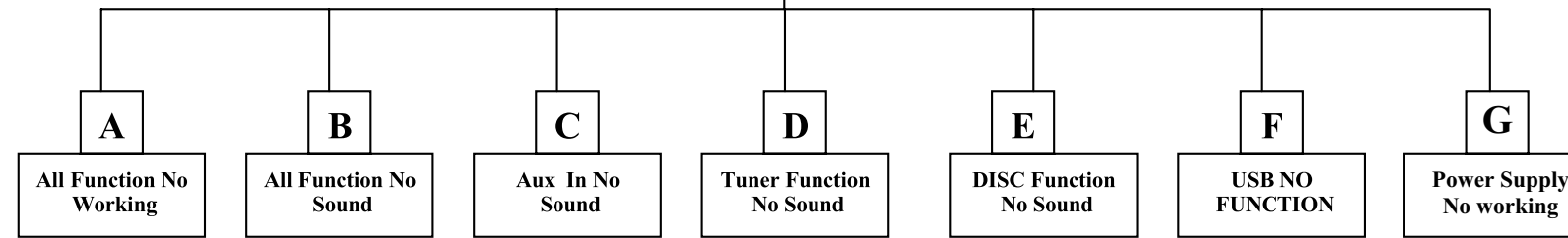
- Press<radio> button on R/C
- Press <Stop> button on R/C.
- Press and hold <Play/Pause> until Grid 9(50 kHz) or Grid (100 kHz) is displayed.

Note: repeating the same action will toggle back to it previous tuning grid setting.

### CAUTION!

This information is confidential and may not be distributed.Only a qualified service person should reprogram the Region Code.

# MAIN UNIT REPAIR CHART



# DISASSEMBLY INSTRUCTIONS

Note: In some service positions the components or copper patterns of one board may risk touching its neighbouring pc boards or metallic parts. To prevent such short-circuit use a piece of hard paper or other insulating material between them.

## Dismantling of the Top & Front Panel Assemble

- 1) Loosen 14 screws and remove the Top Cover by lifting the rear portion upwards before sliding it out towards the rear.
  - 6 screws "A" at the back panel as shown in figure 1.
  - 4 screw "B" each on the left & right side as shown in figure 2.

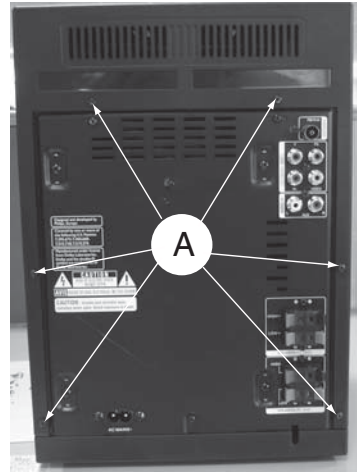


Figure 1

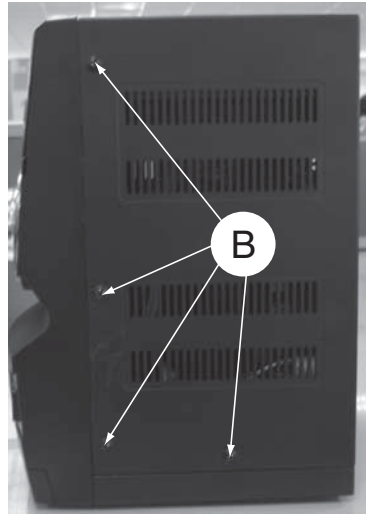


Figure 2

- 2) Open the BD Tray by using the Open/Close Button while the Set is ON and disconnect the mains supply after removing the DVD Door.
- 3) Return the set to its upright position and remove the Tray Cover as shown in Figure 3 and close the tray manually by pushing it back in.
- 4) Loosen 4 screws remove the front panel.
  - 1 screw "C" each on the left & right side as shown in figure 4.
  - 2 screws "D" at the bottom of the set as shown in figure 5.



Figure 3

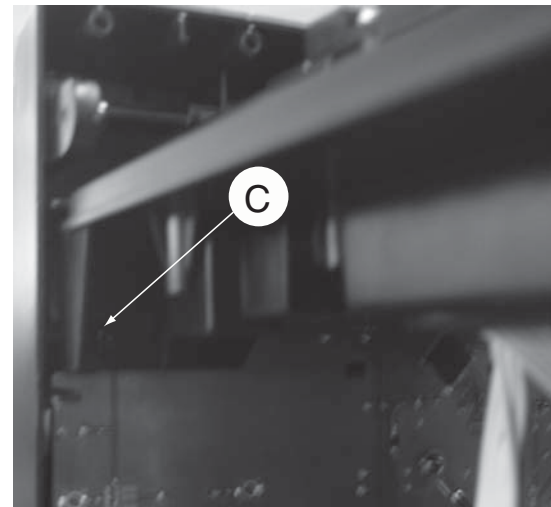


Figure 4

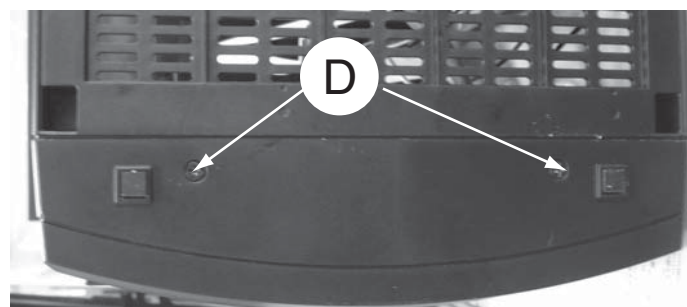


Figure 5

## Dismantling of the DVD LOADER & LOader brakcet

- 1) Loosen 4 screws "E" on the top of DVD Loader as shown in figure 6.
- 2) Loosen 2 screws "F" at the back panel as shown in figure 7.

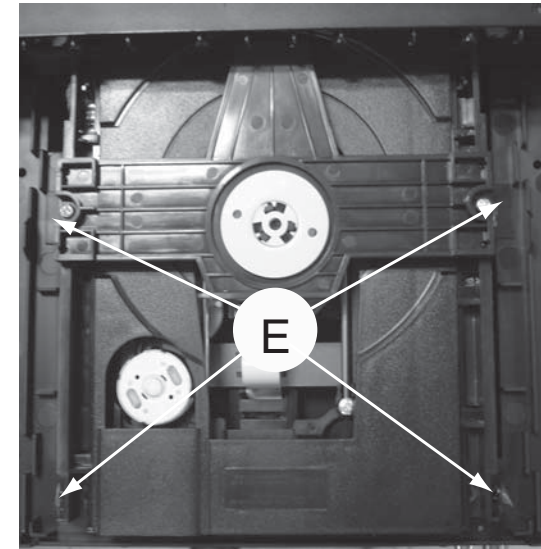


Figure 6

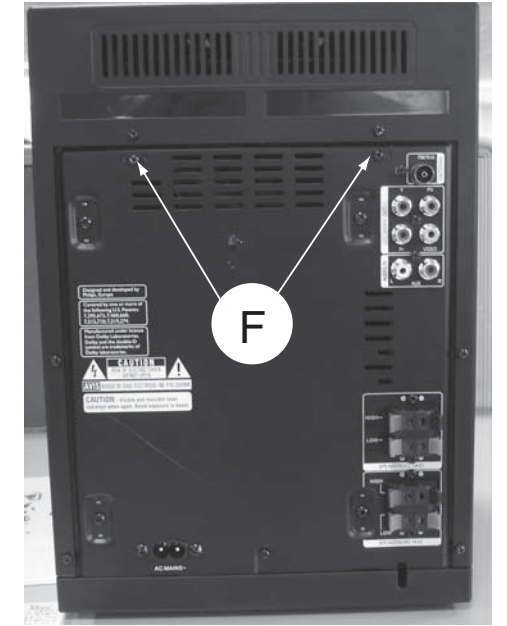


Figure 7

## Dismantling of the MAIN Board

- 1) Loosen 2 screws "G" on the top of Main board as shown in figure 8.
- 2) Loosen 7 screws "H" at the back panel as shown in figure 9.

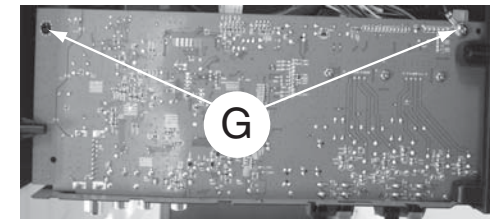


Figure 8

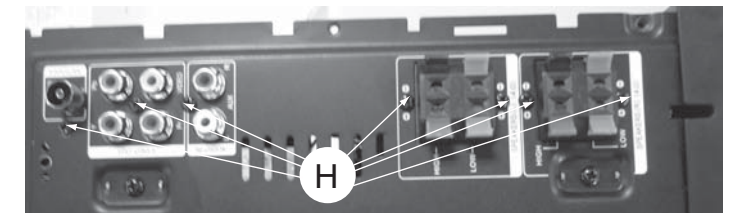


Figure 9

## Dismantling of the POWER Board

- 1) Loosen 4 screws "I" on the top of Power board as shown in figure 10.

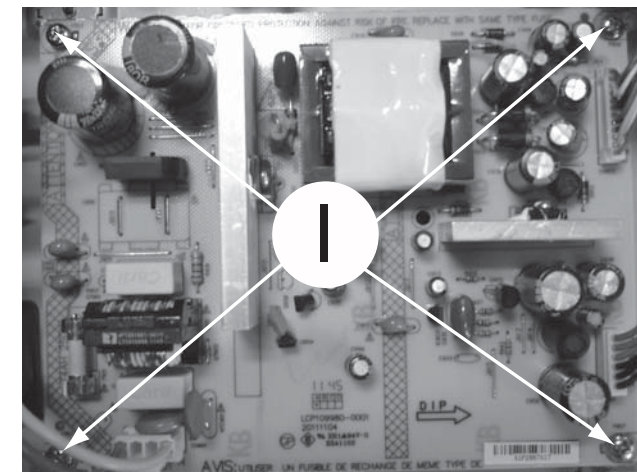


Figure 10

1) Loosen 15 screws "J" on the top of Main Board as shown in figure 11.

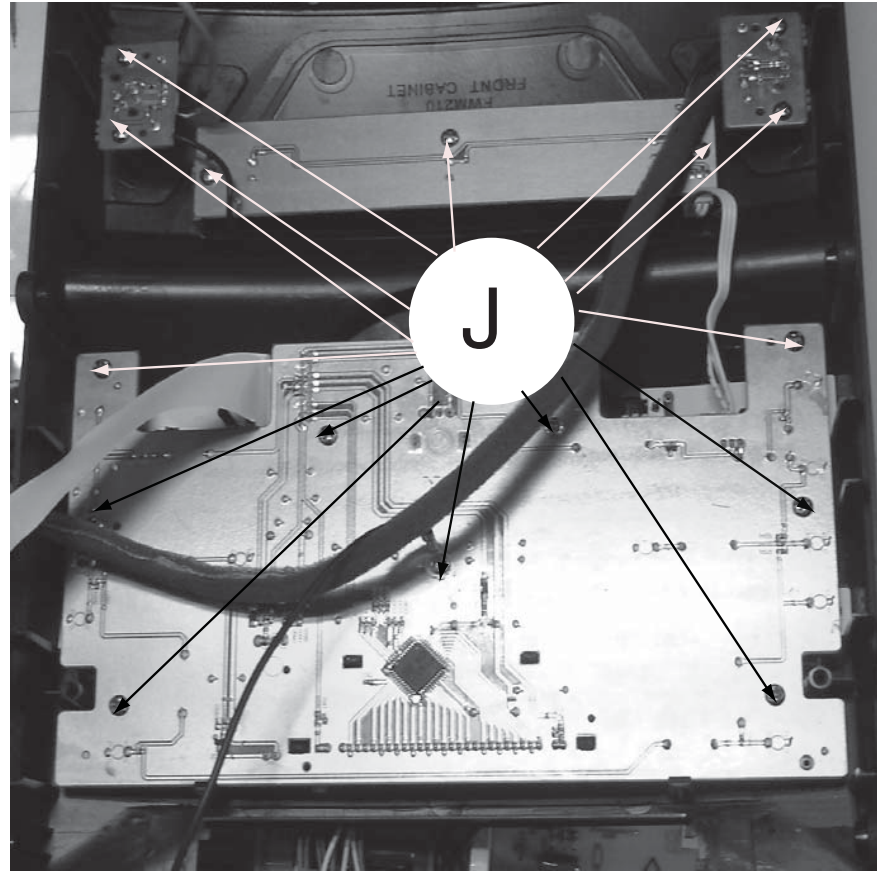


Figure 11

## SERVICE POSITIONS

### Service Position A - Main Board

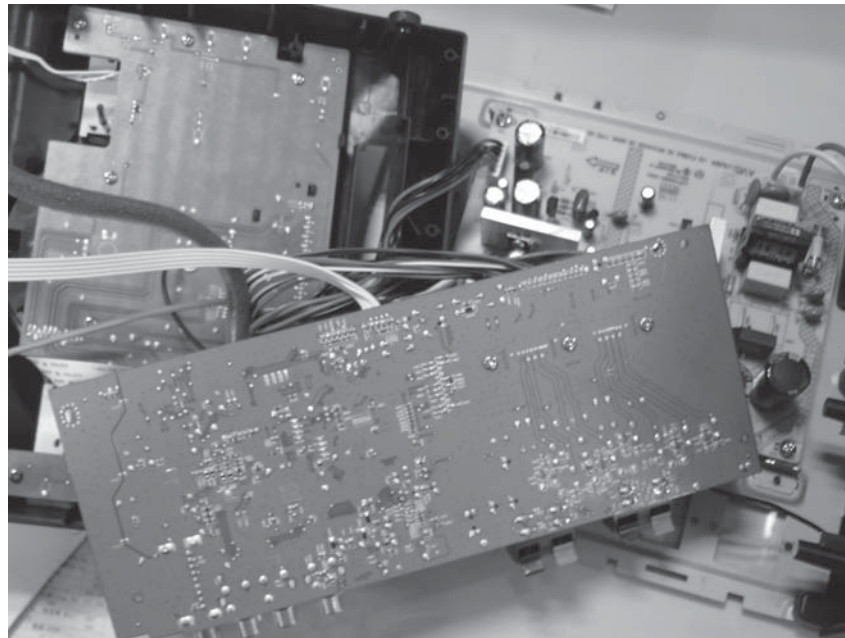
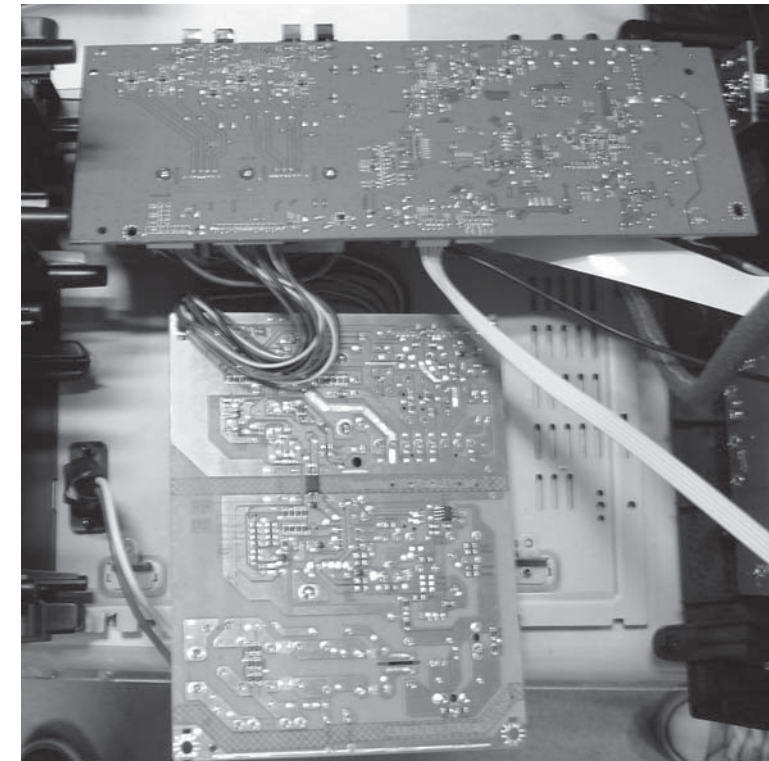
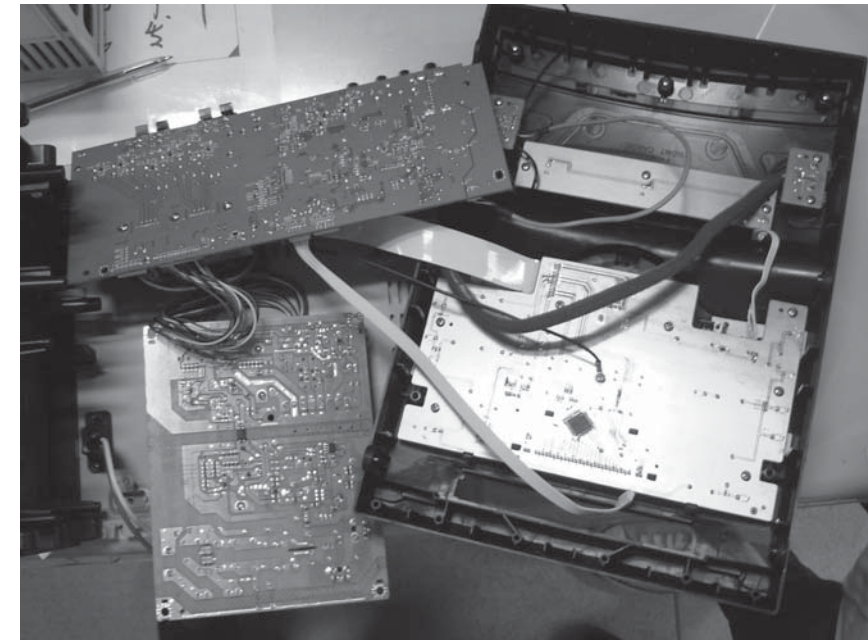


Figure 17

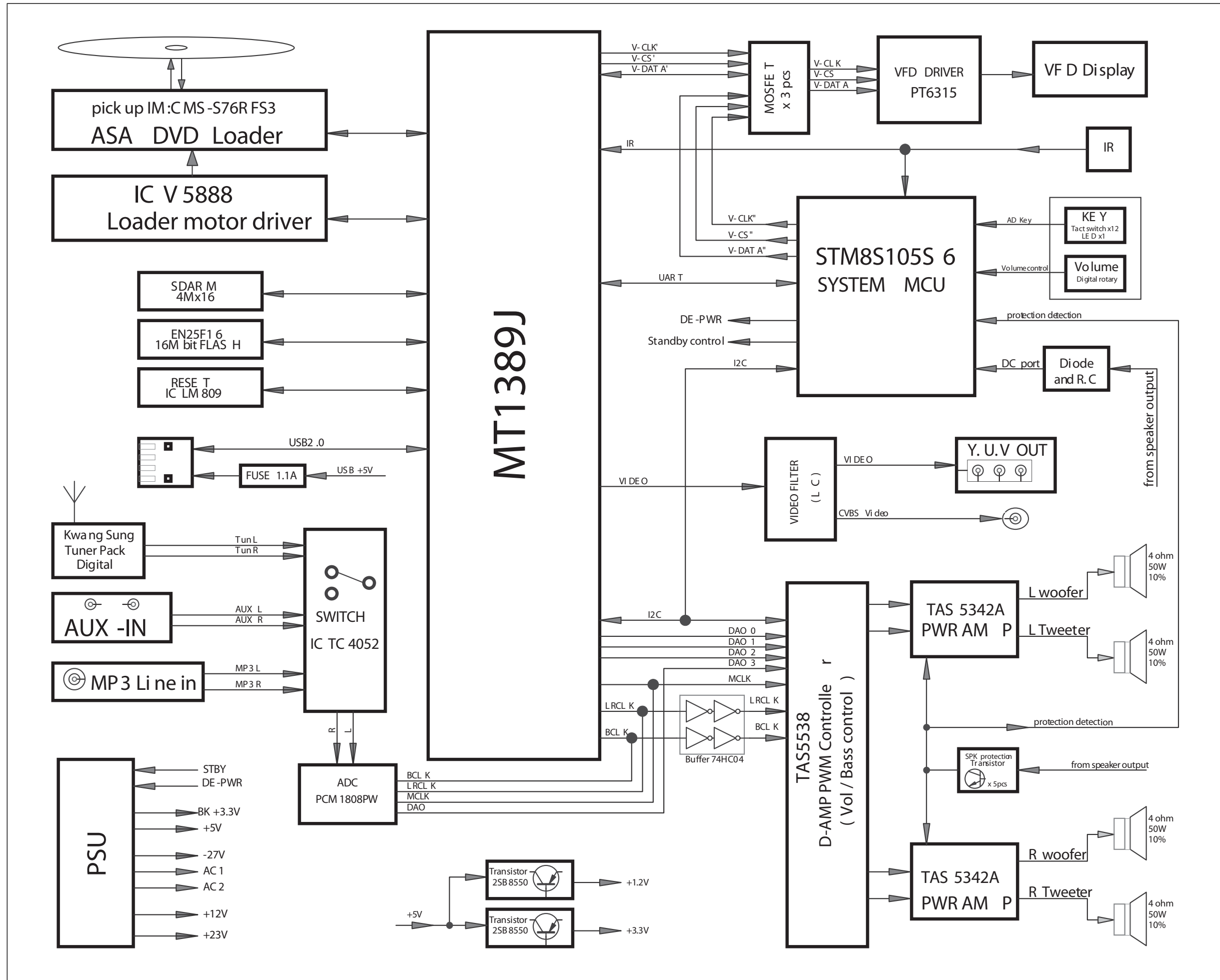
### Service Position B - Main & Power Board

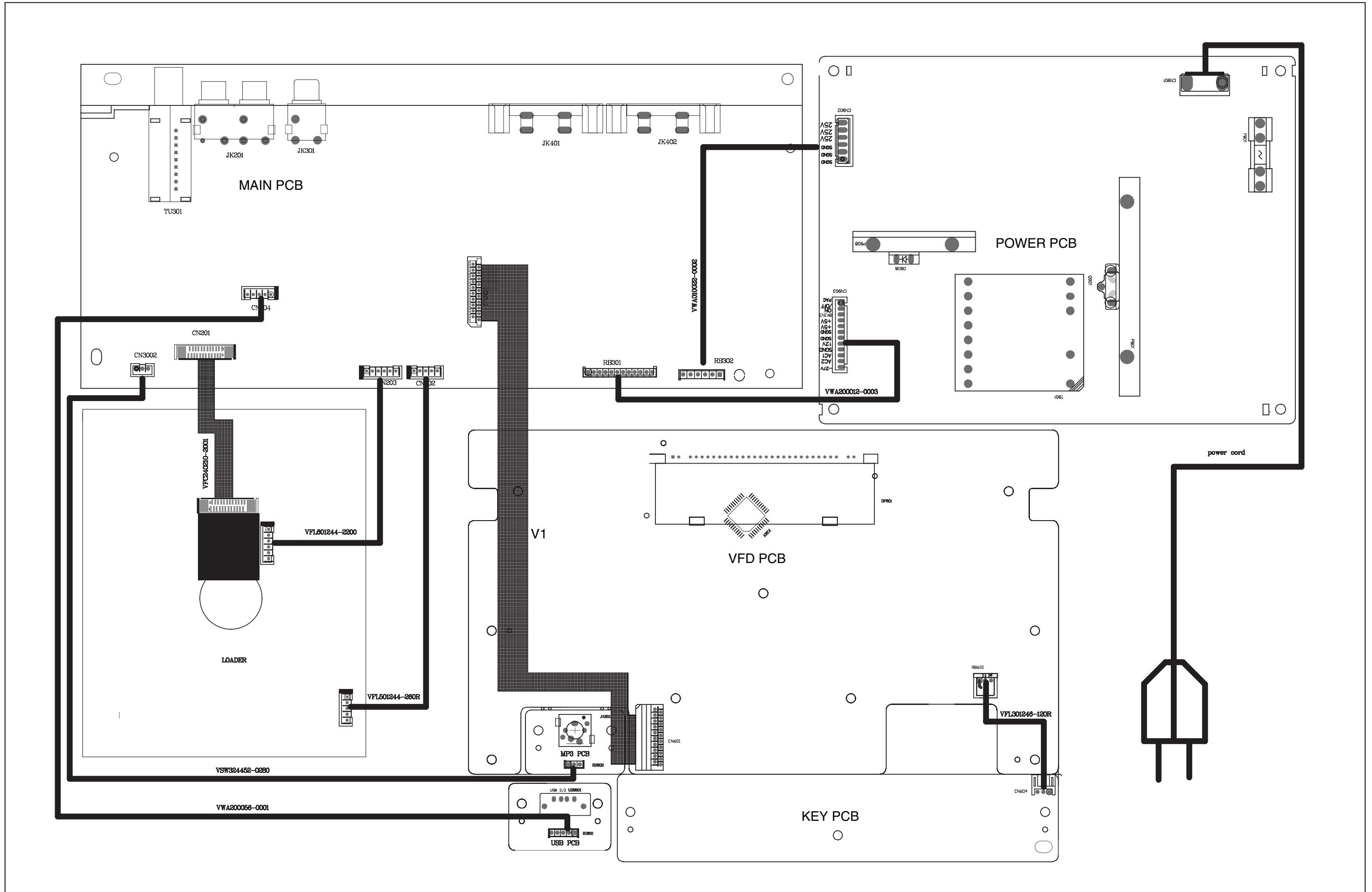


### Service Position C - All Board



Note: In some service positions the components or copper patterns of one board may risk touching its neighbouring pc boards or metallic parts. To prevent such short-circuit use a piece of hard paper or other insulating material between them.

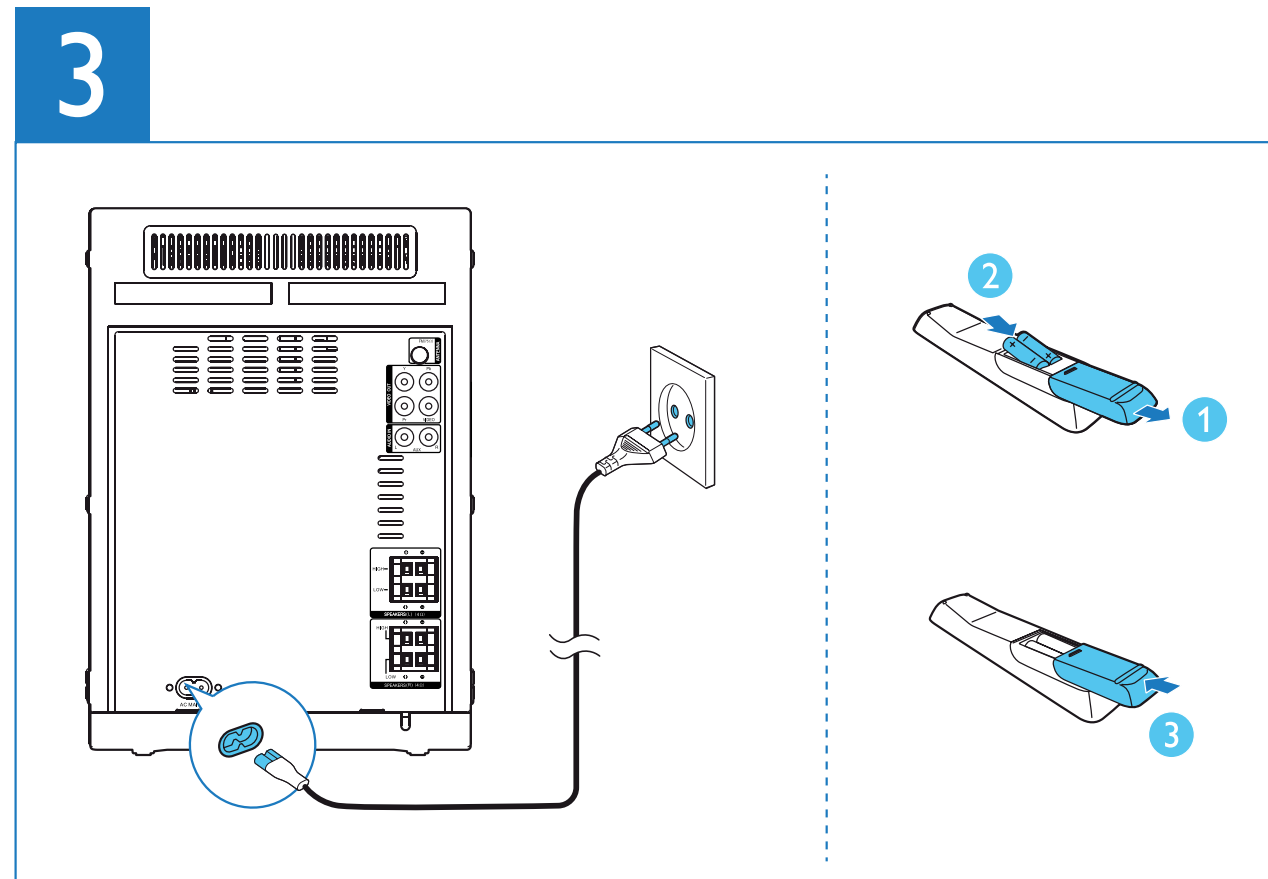
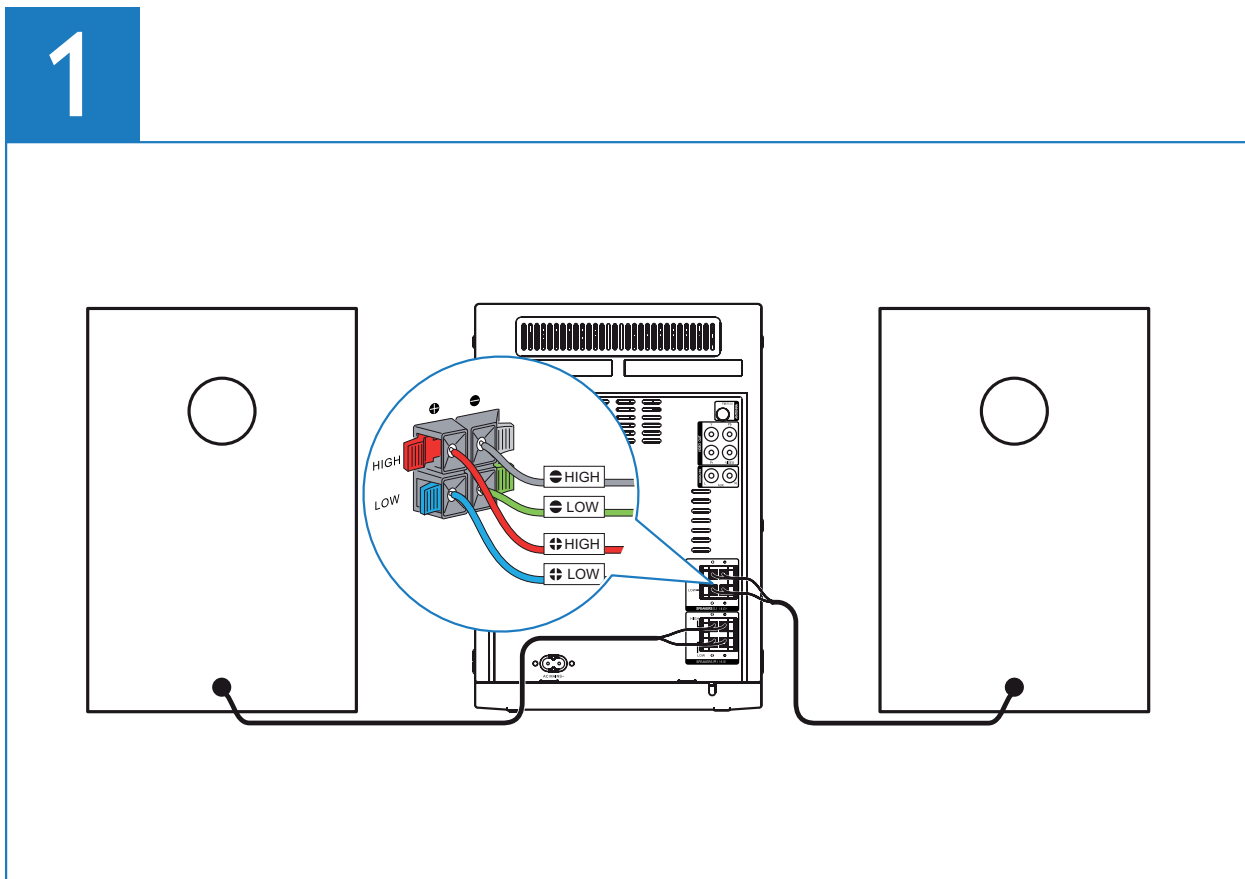
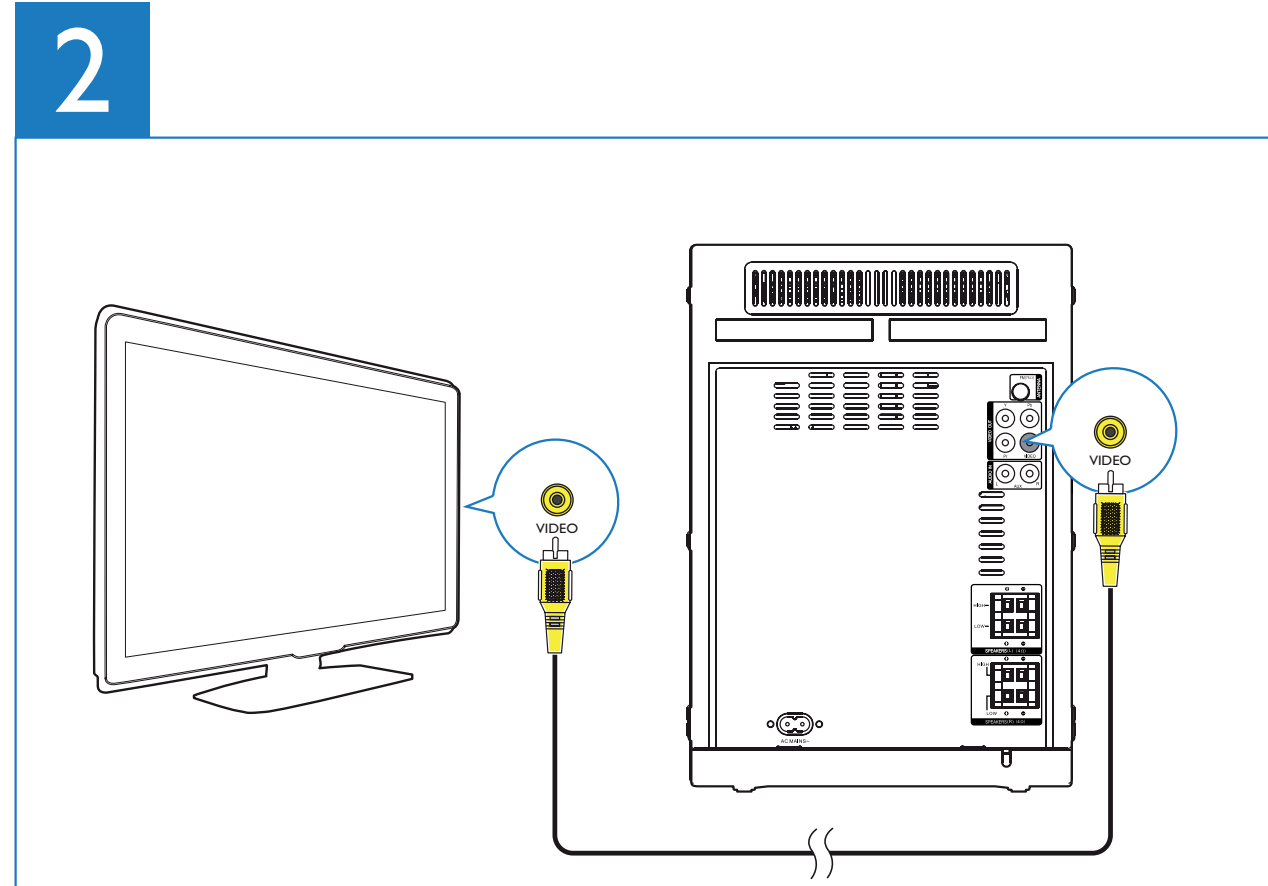
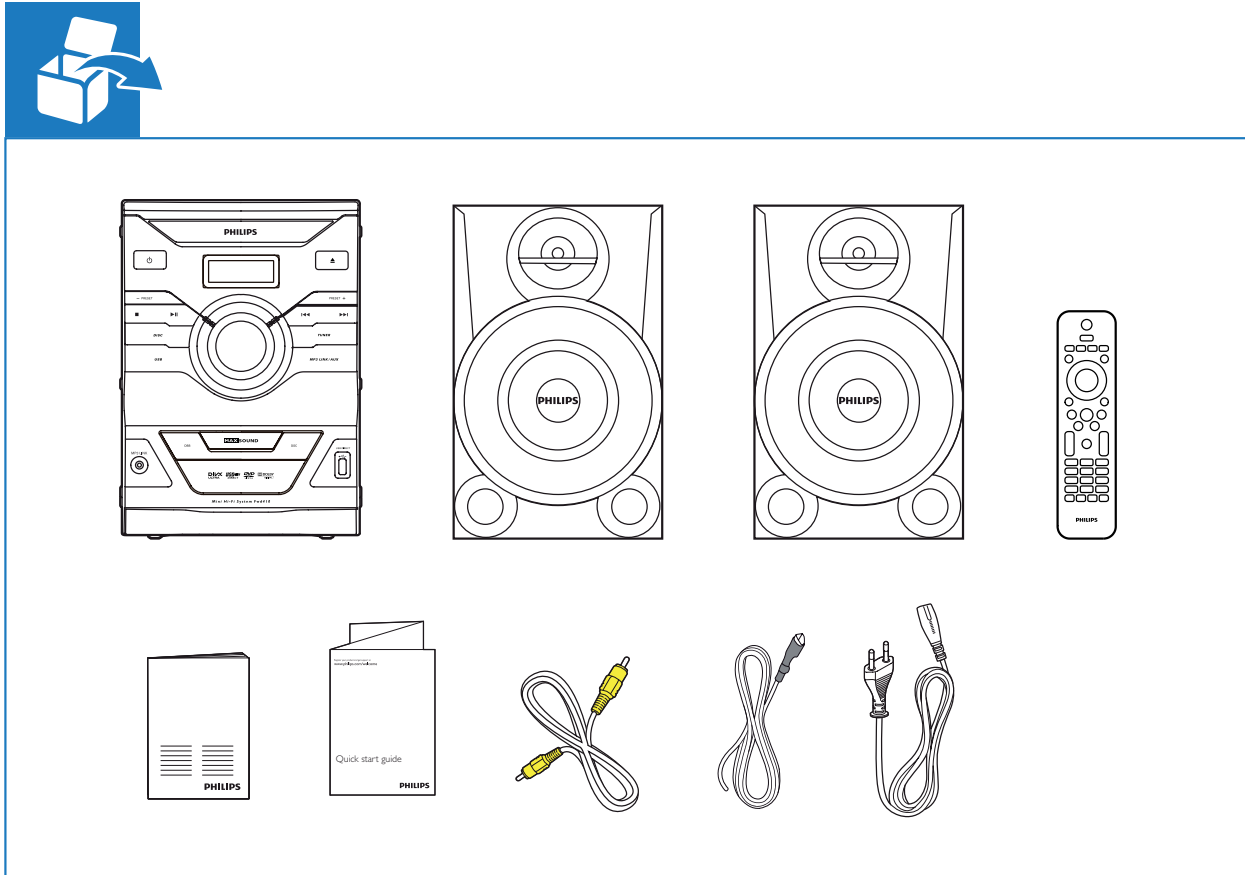


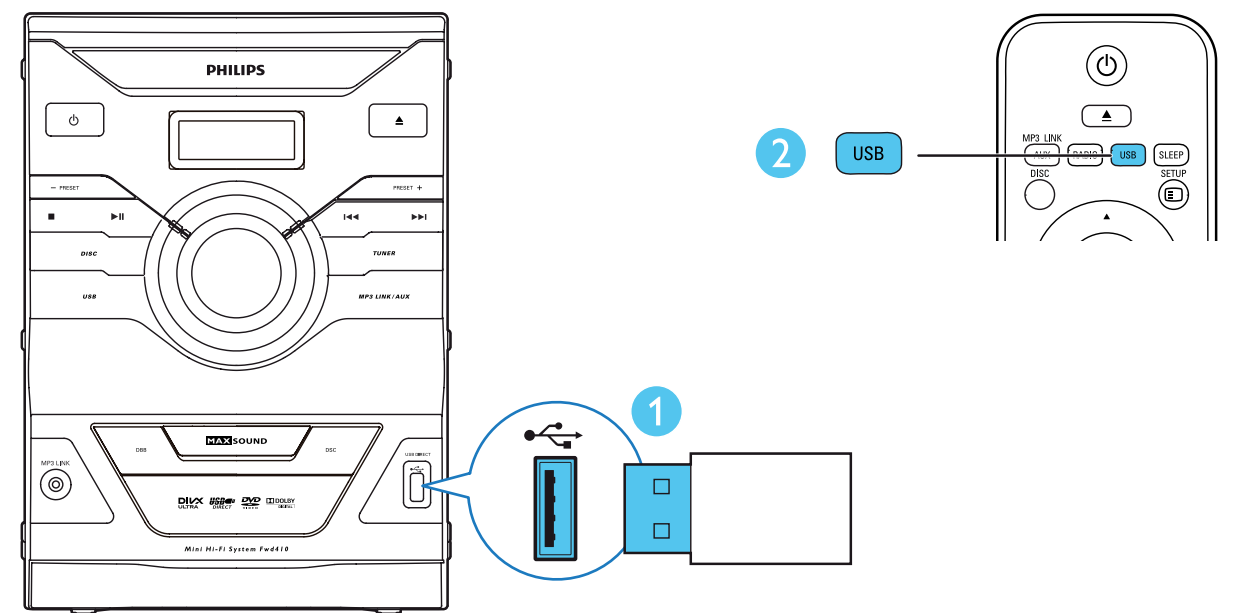
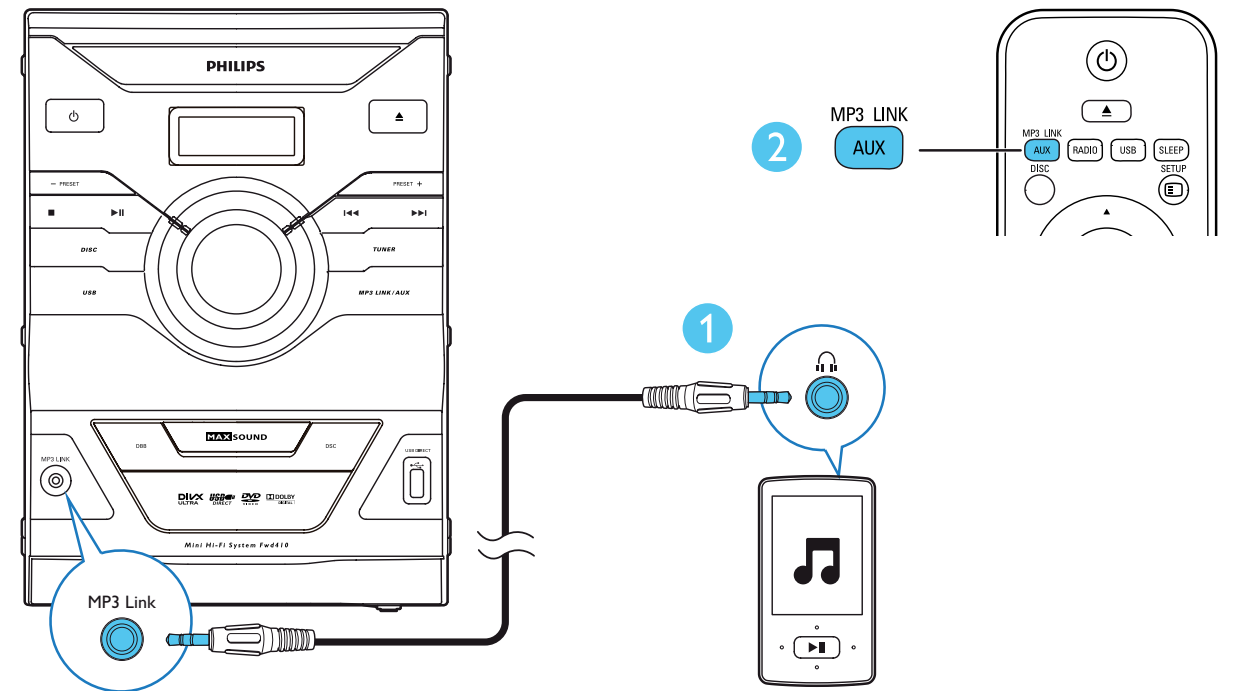
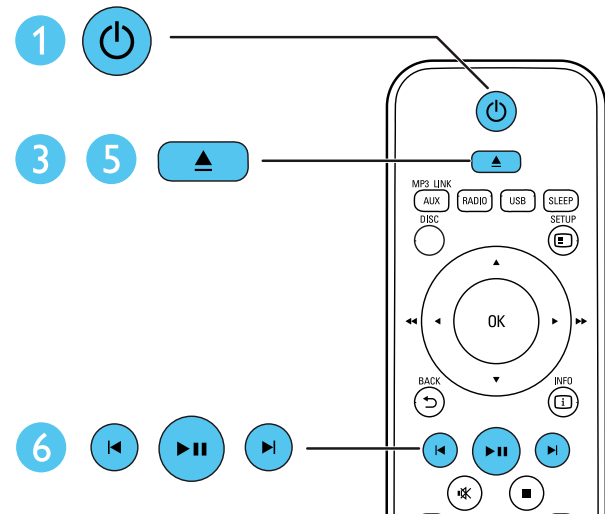
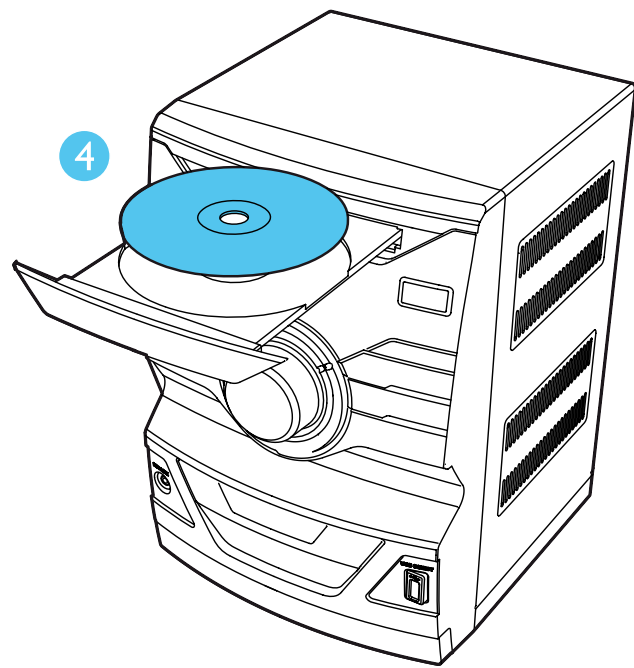
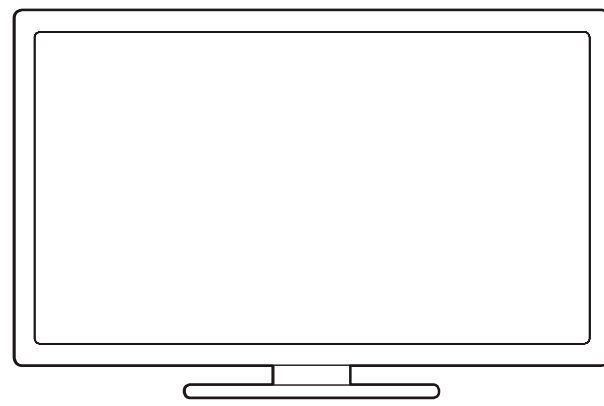


# QUICK START GUIDE

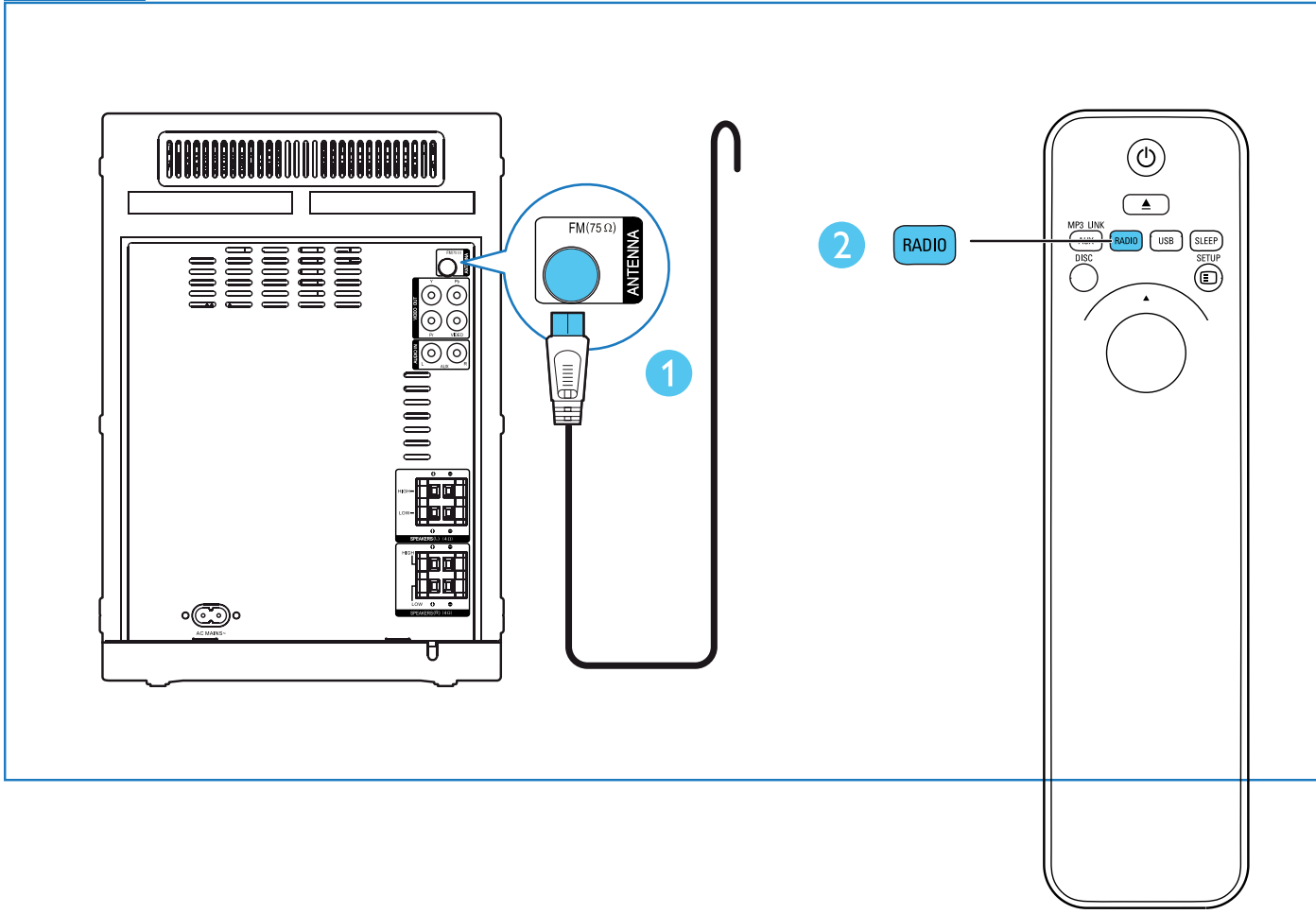
The following excerpt of the QSG/DFU serves as an introduction to the set.

The complete Direction for Use can be download in the different languages from the internet site of Philips Consumer Care Center: [www.support.philips.com](http://www.support.philips.com).







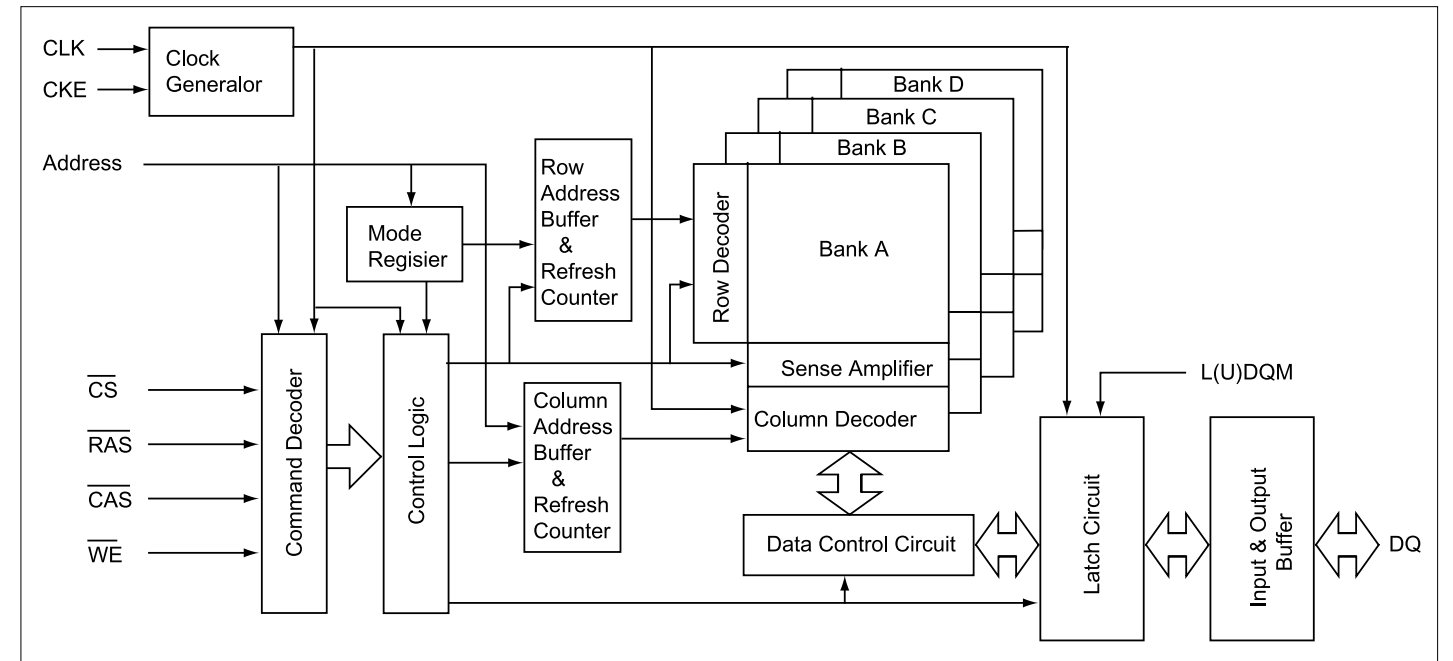


# MAIN BOARD

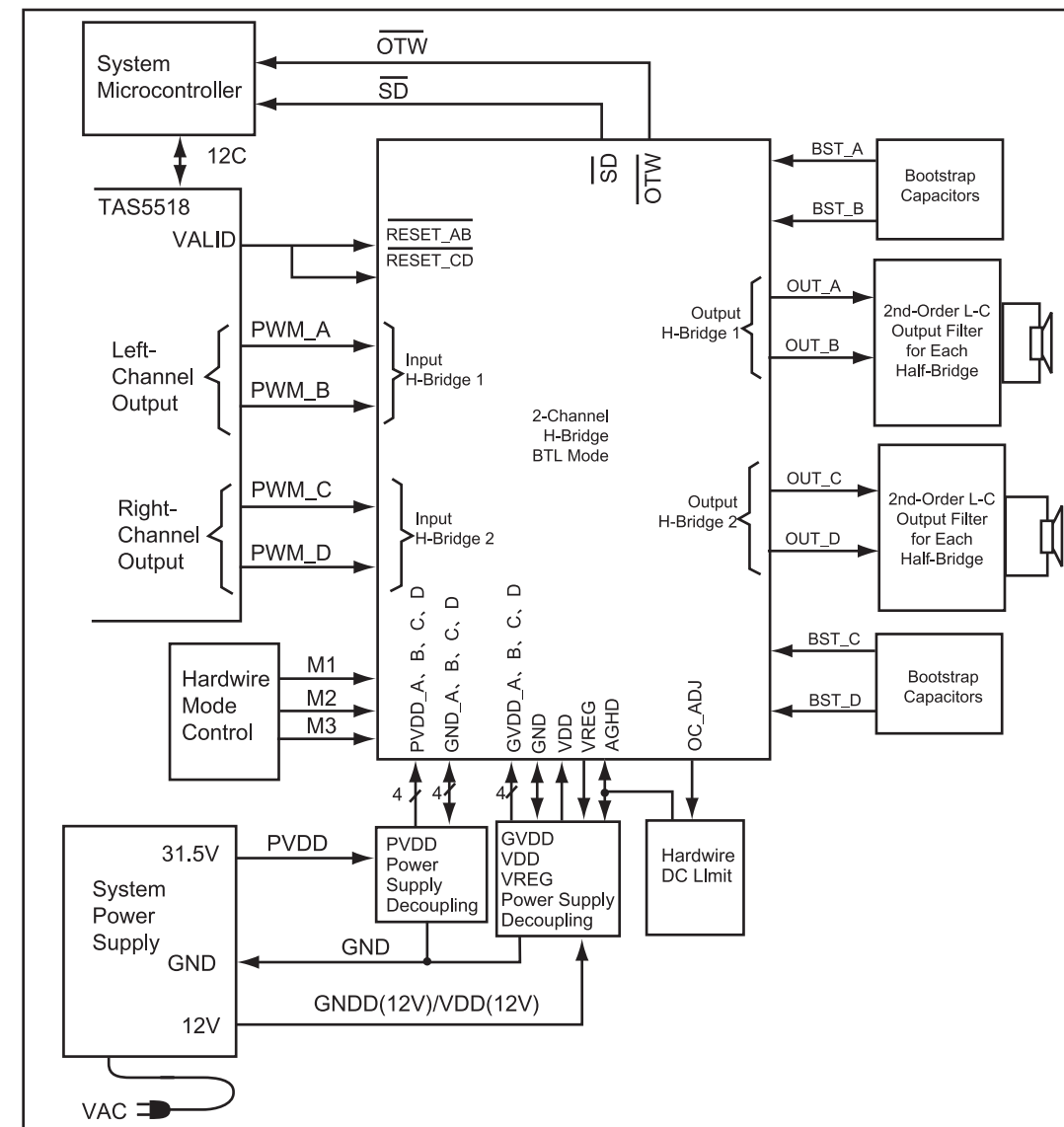
TABLE OF CONTENTS

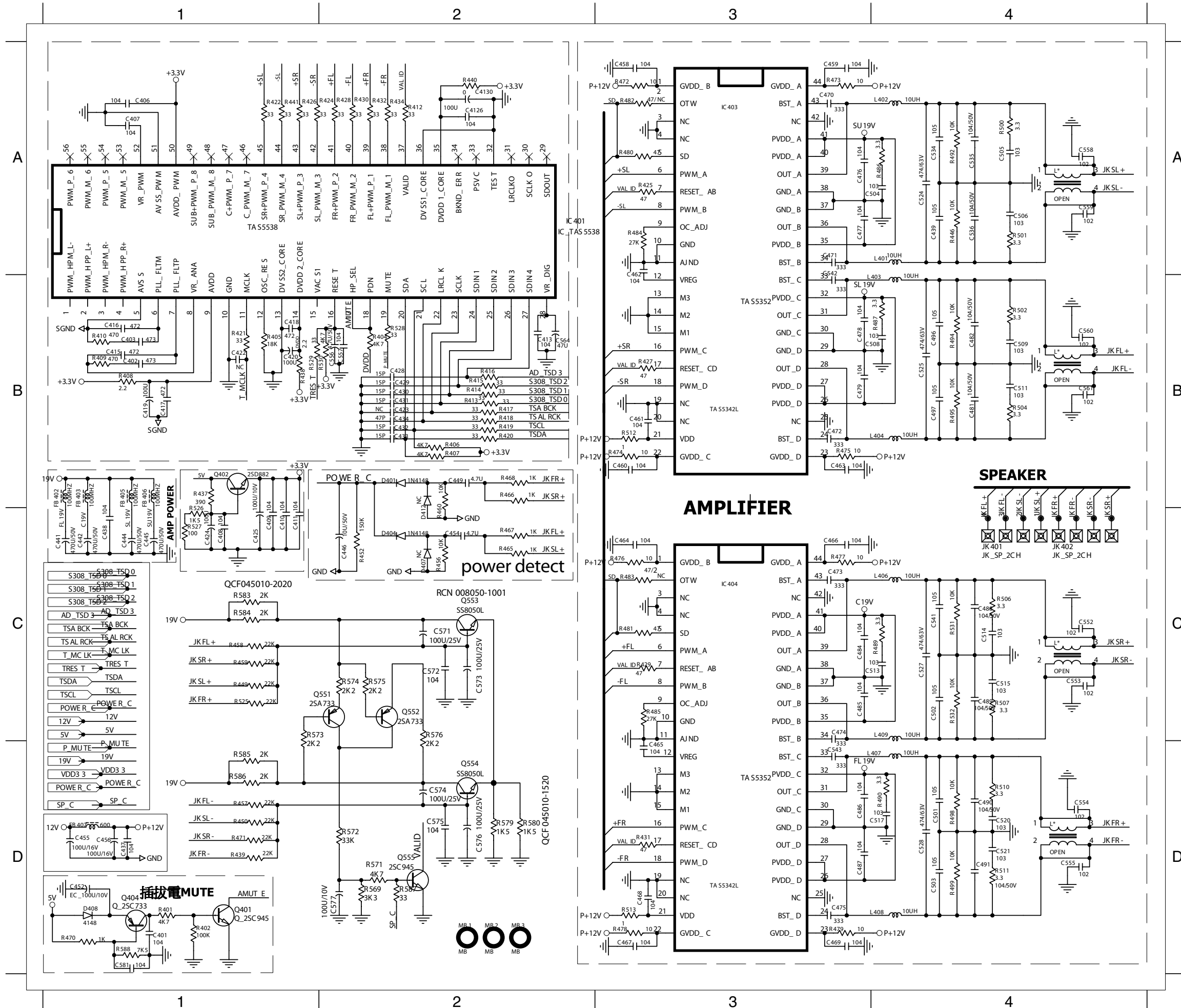
- Internal IC Diagram ..... 6-1
- Circuit Diagram( AMP ) ..... 6-2
- Circuit Diagram( SERVO ) ..... 6-3
- Circuit Diagram( MCU ) ..... 6-4
- PCB Layout Top View ..... 6-5
- PCB Layout Bottom View ..... 6-6

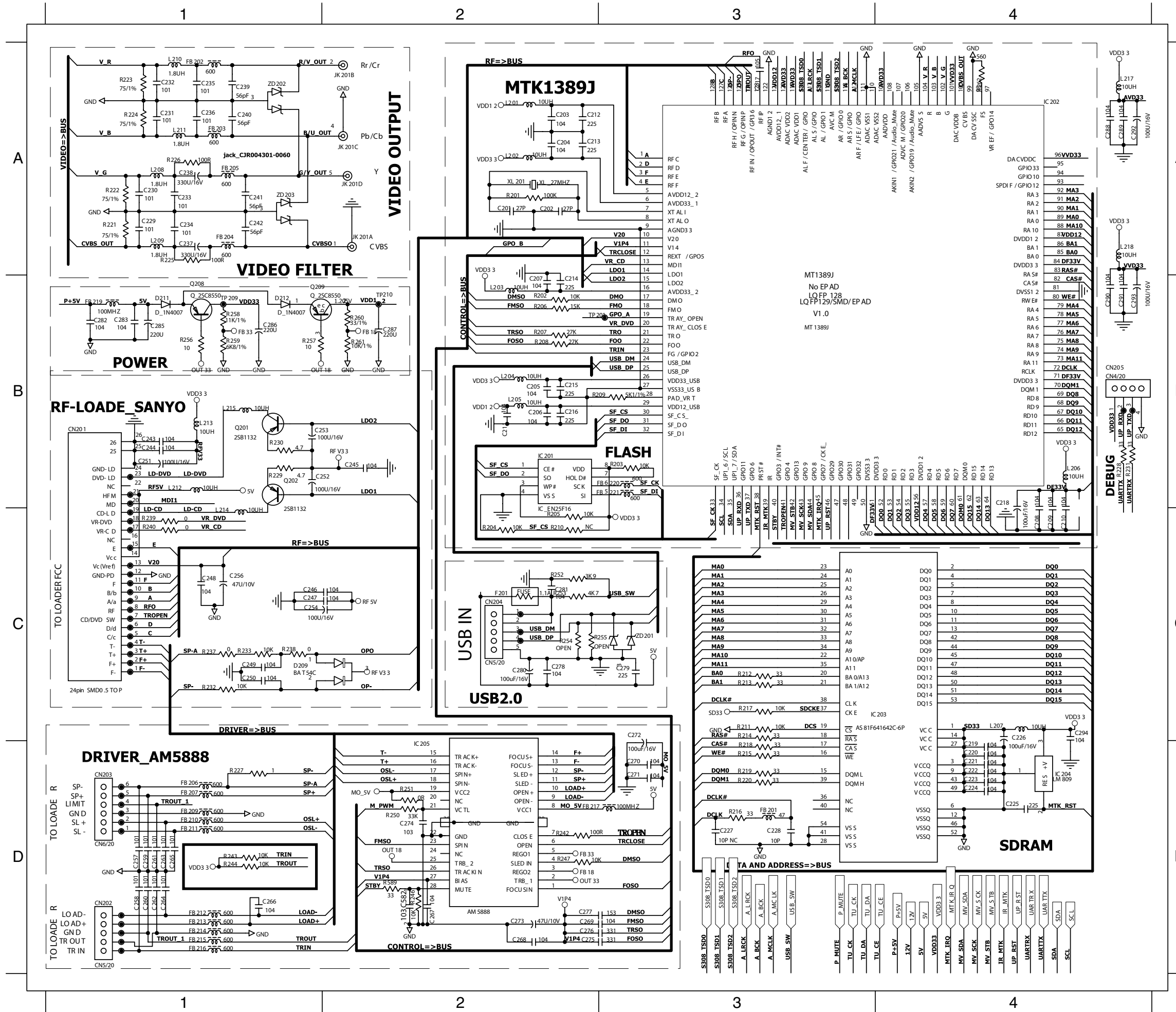
## INTERNAL IC DIAGRAM - A641604L

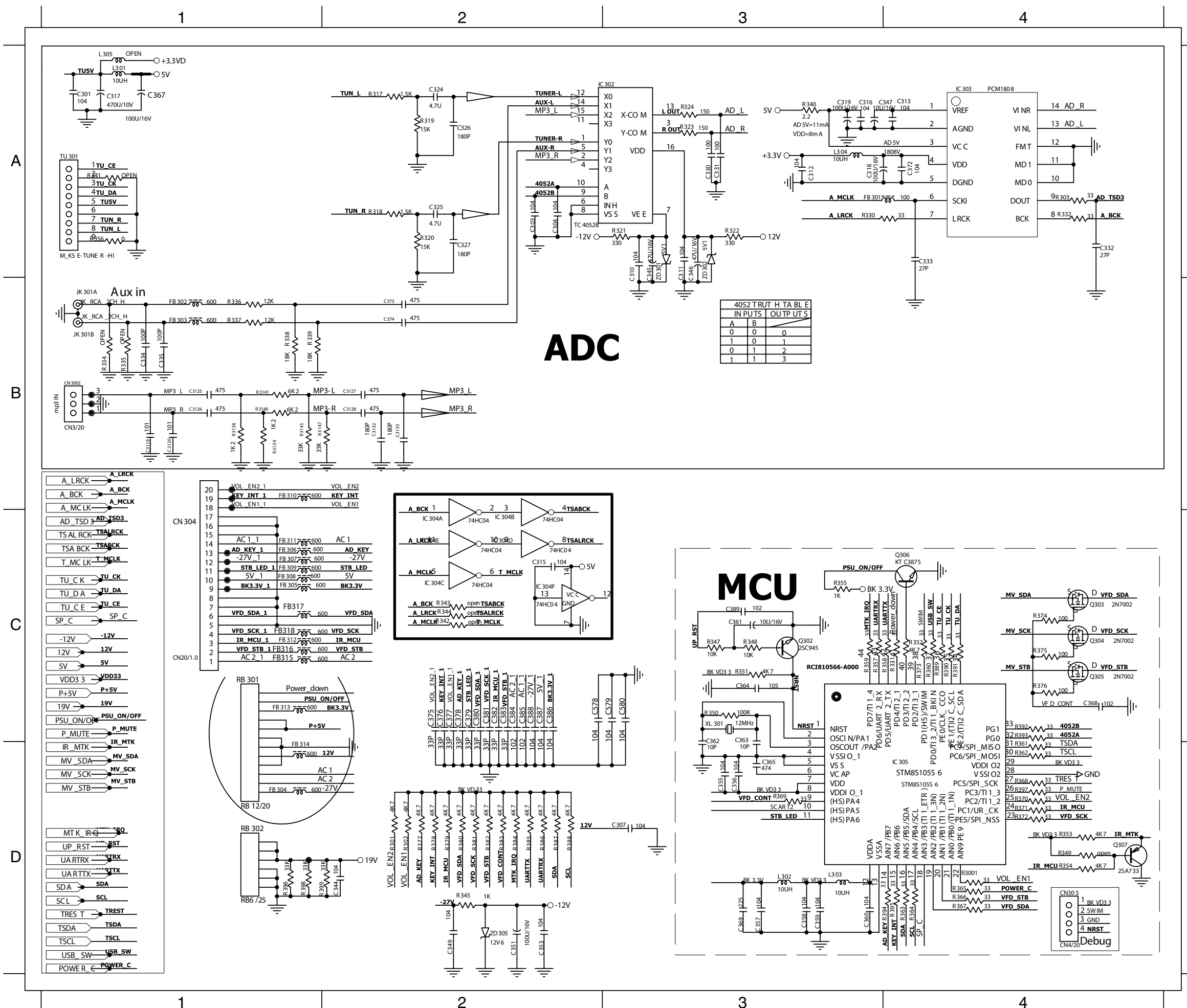


## INTERNAL IC DIAGRAM - TAS5342ADDV

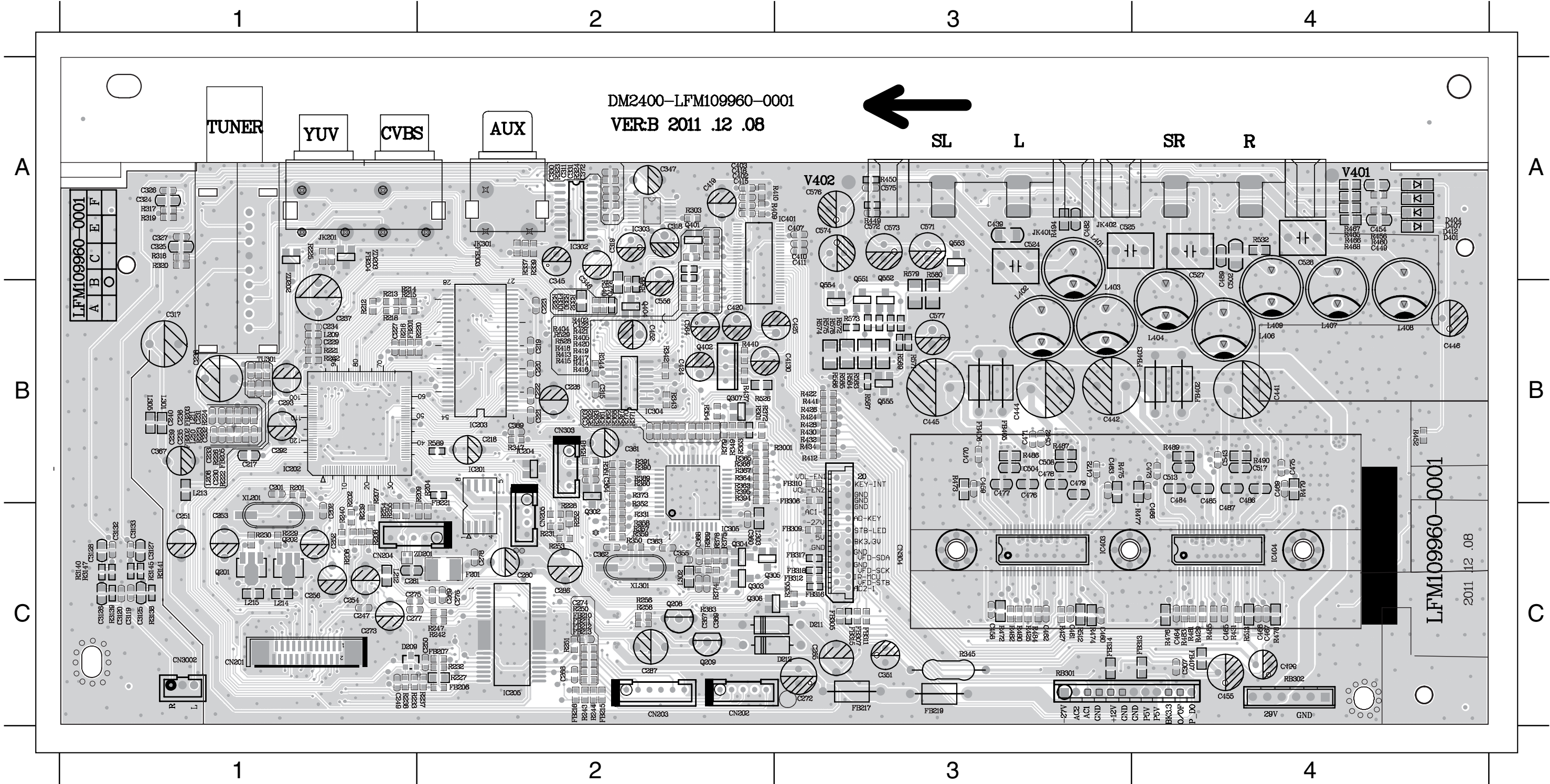








DM2400-LFM109960-0001  
VER:B 2011.12.08



LFM109960-0001  
A B C E F  
A B C E F

LFM109960-0001  
2011.12.08

TUNER

YUV

CVBS

AUX

SL

L

SR

R

V402

V401

A

A

B

B

C

C

1

2

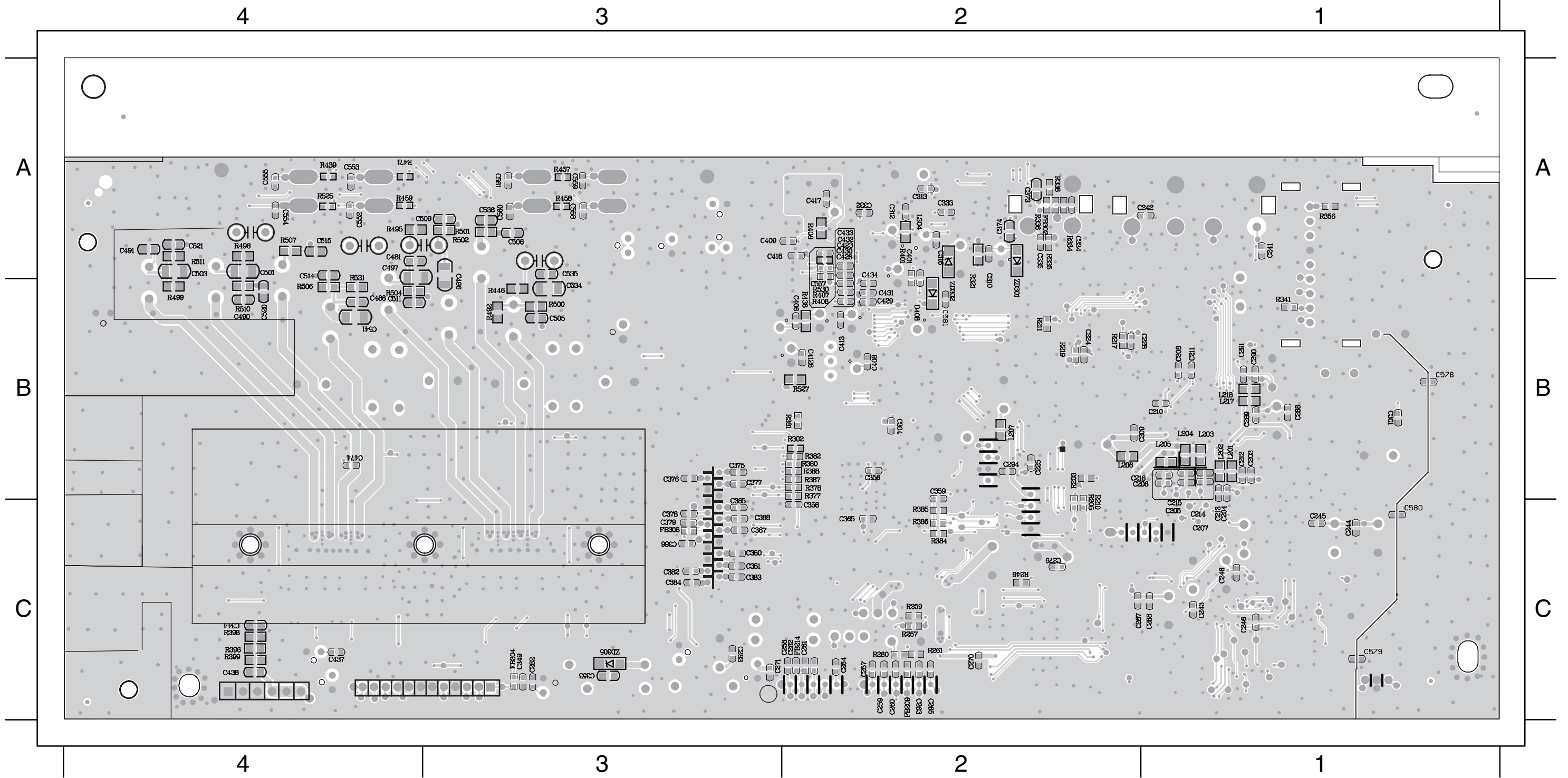
3

4

PCB LAYOUT - BOTTOM VIEW

6 - 6

6 - 6

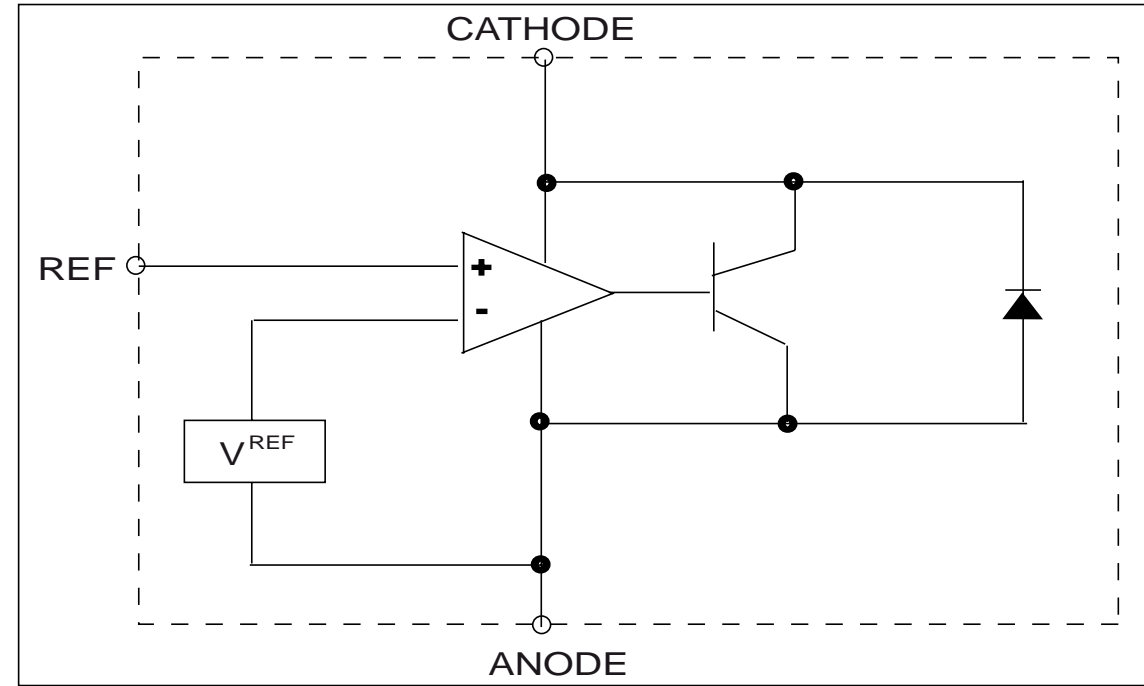


# POWER BOARD

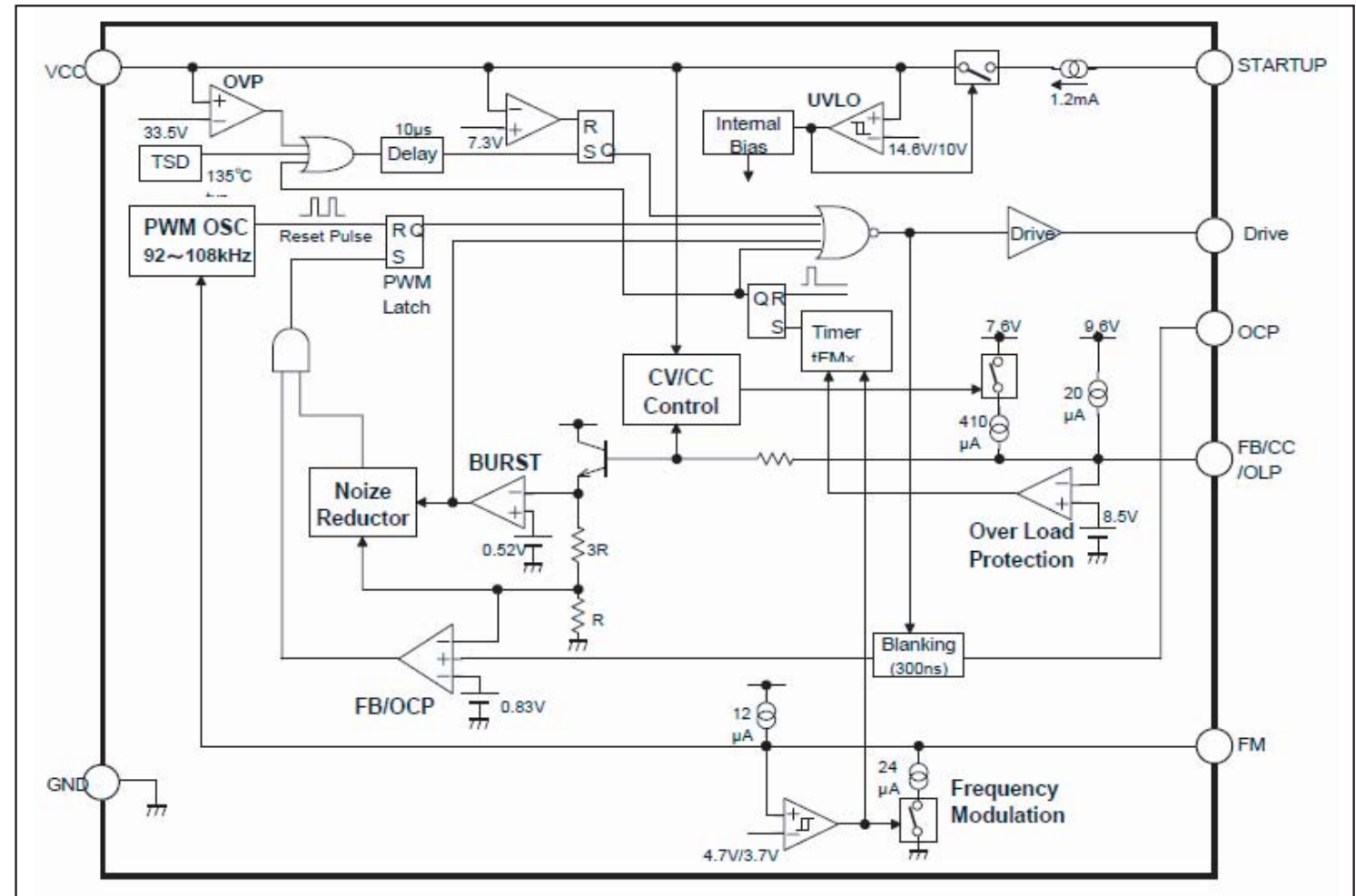
TABLE OF CONTENTS

Internal IC Diagram ..... 7-1  
 Circuit Diagram ..... 7-2  
 PCB Layout Top View ..... 7-3  
 PCB Layout Bottom View ..... 7-4

## INTERNAL IC DIAGRAM - AZ431AZ-A



## INTERNAL IC DIAGRAM - SSC620S

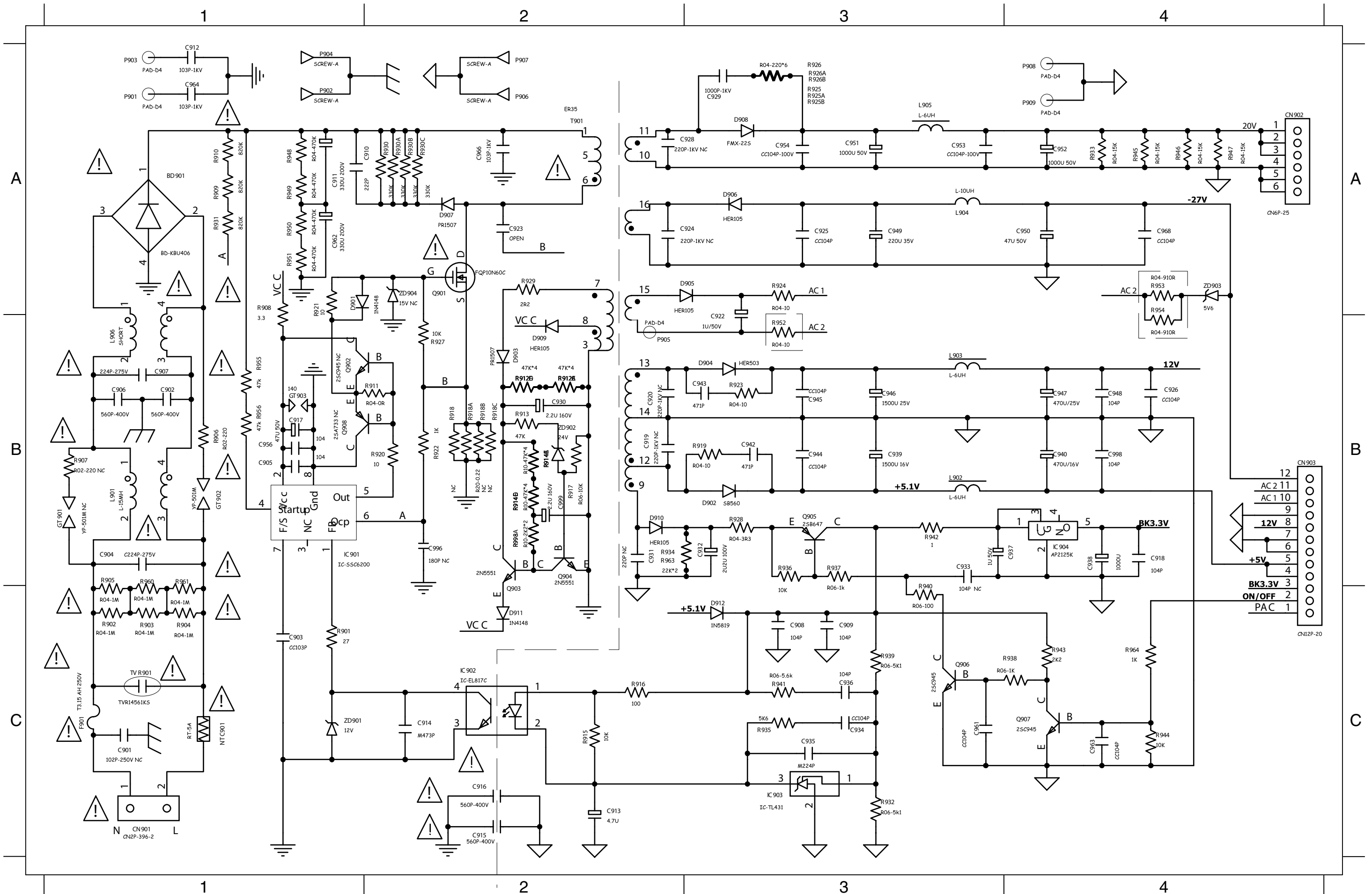


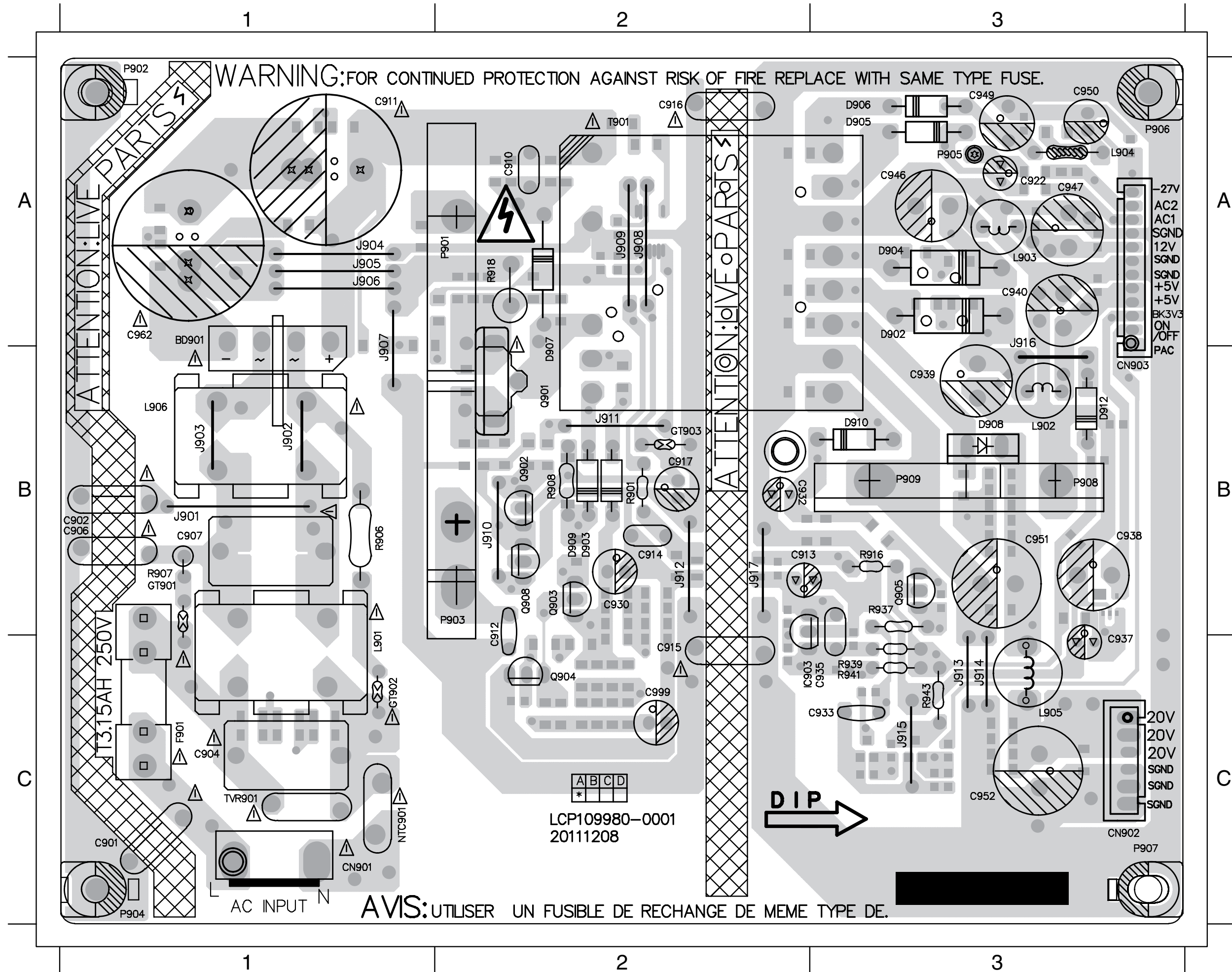


# CIRCUIT DIAGRAM

7 - 2

7 - 2

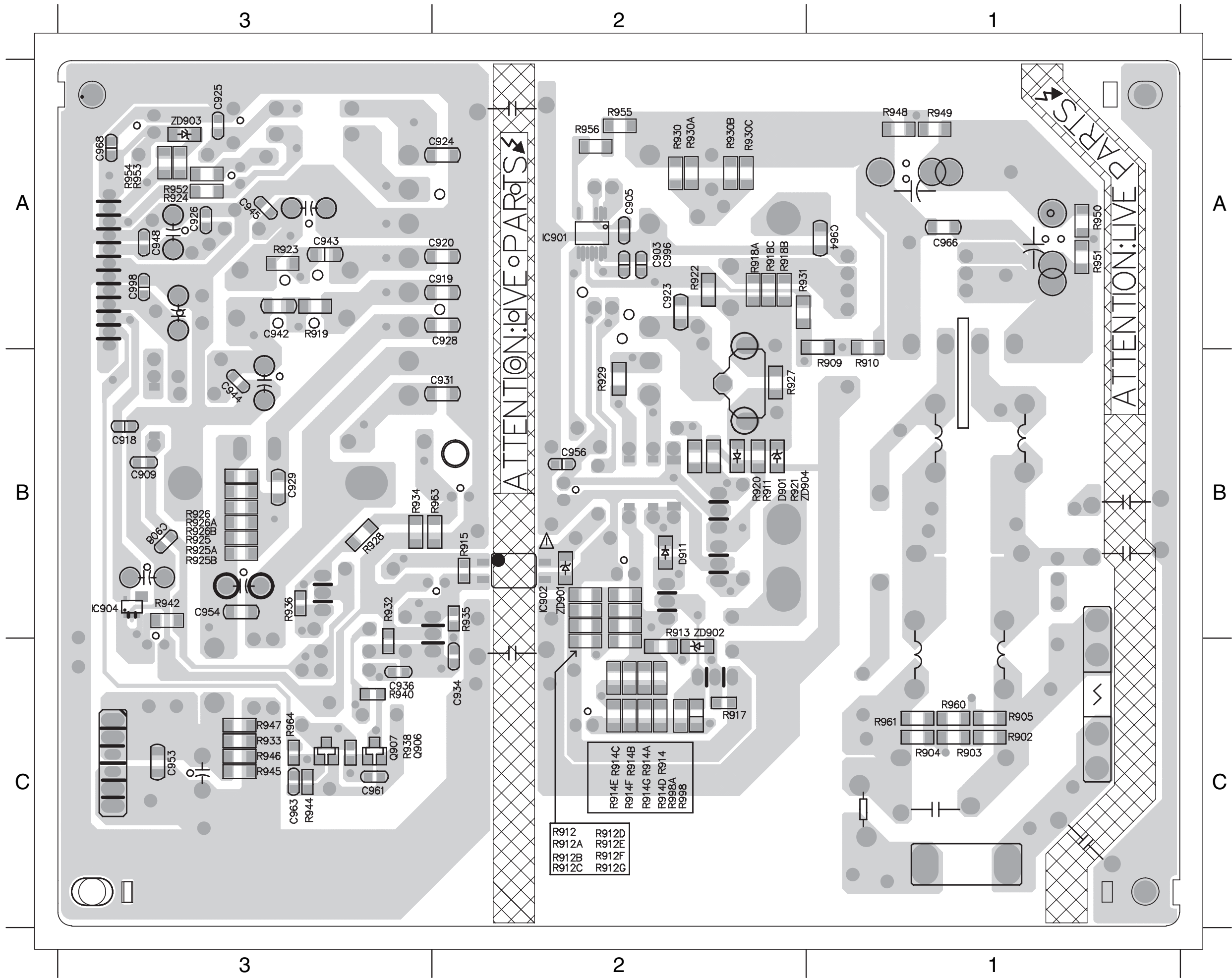




PCB LAYOUT - BOTTOM VIEW

7-4

7-4

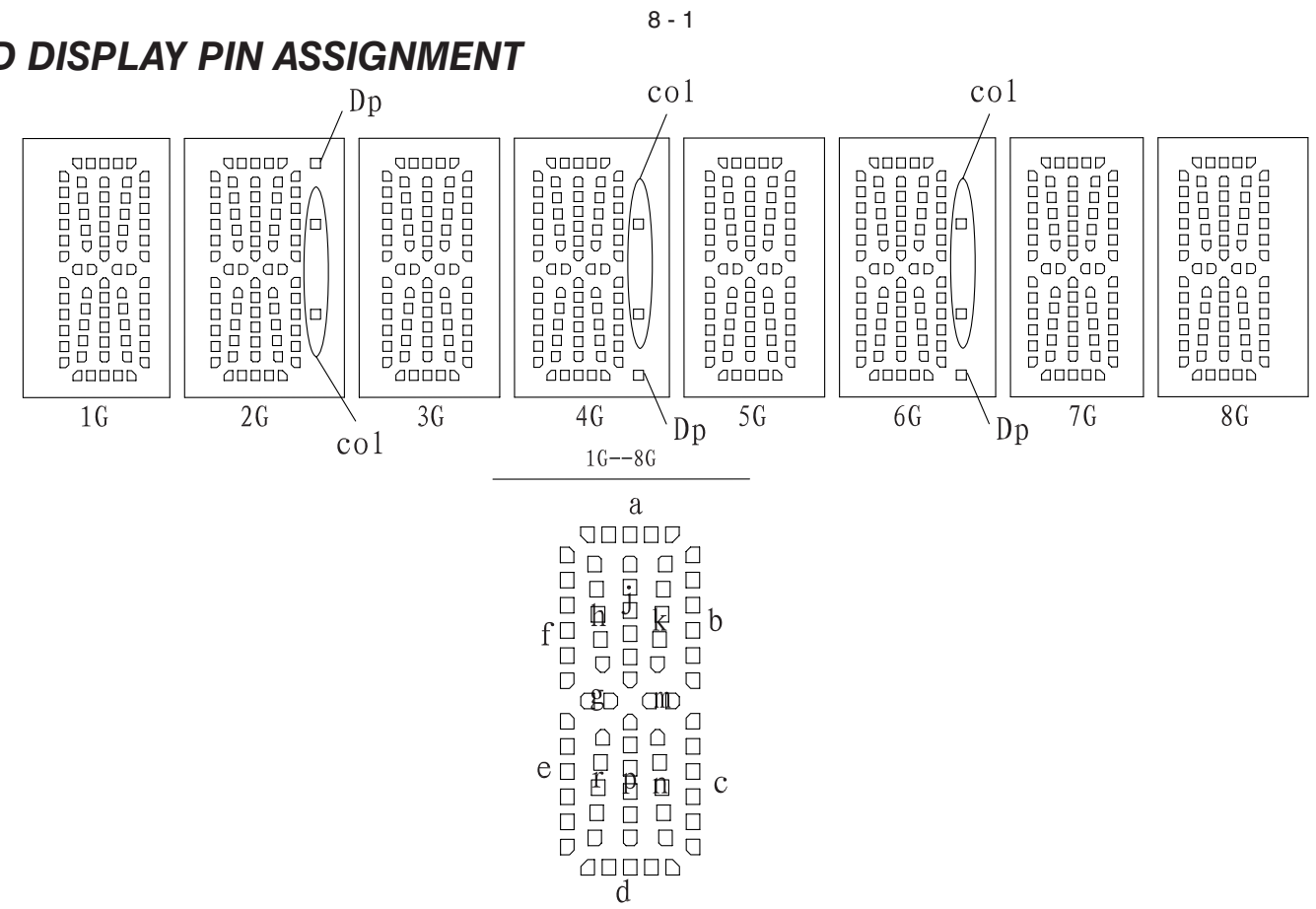


# VFD+KEY+USB+MP3 BOARD

TABLE OF CONTENTS

FTD Display Pin Assignment.....8-1  
 Circuit Diagram .....8-2  
 PCB Layout Top View .....8-3  
 PCB Layout Bottom View.....8-4

## FTD DISPLAY PIN ASSIGNMENT

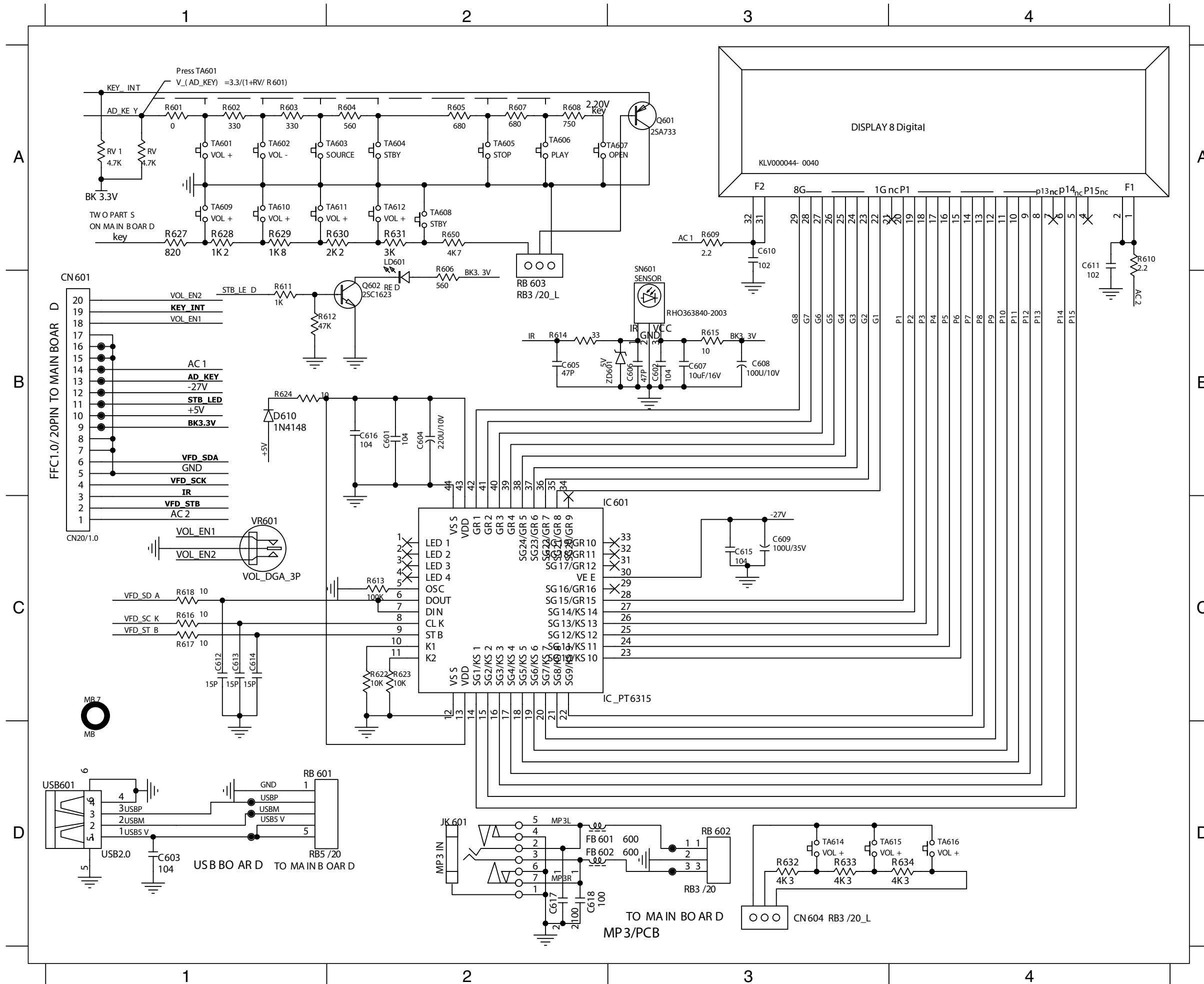


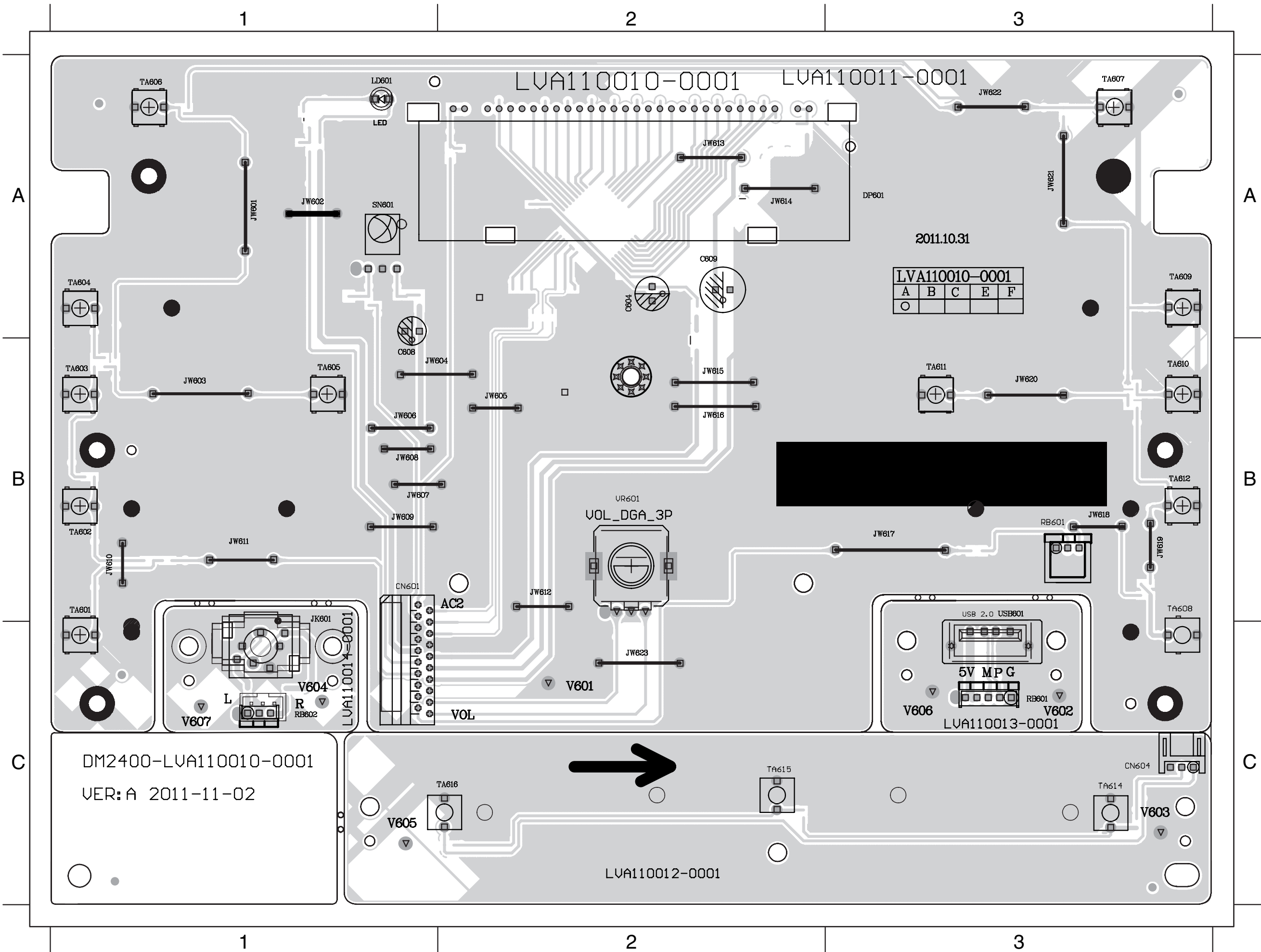
	1G	2G	3G	4G	5G	6G	7G	8G
P1	a	a	a	a	a	a	a	a
P2	j, p	j, p	j, p	j, p	j, p	j, p	j, p	j, p
P3	h	h	h	h	h	h	h	h
P4	k	k	k	k	k	k	k	k
P5	b	b	b	b	b	b	b	b
P6	f	f	f	f	f	f	f	f
P7	m	m	m	m	m	m	m	m
P8	g	g	g	g	g	g	g	g
P9	c	c	c	c	c	c	c	c
P10	e	e	e	e	e	e	e	e
P11	r	r	r	r	r	r	r	r
P12	n	n	n	n	n	n	n	n
P13	d	d	d	d	d	d	d	d
P14	/	col	/	col	/	col	/	/
P15	/	Dp	/	Dp	/	Dp	/	/

PIN CONNECTION

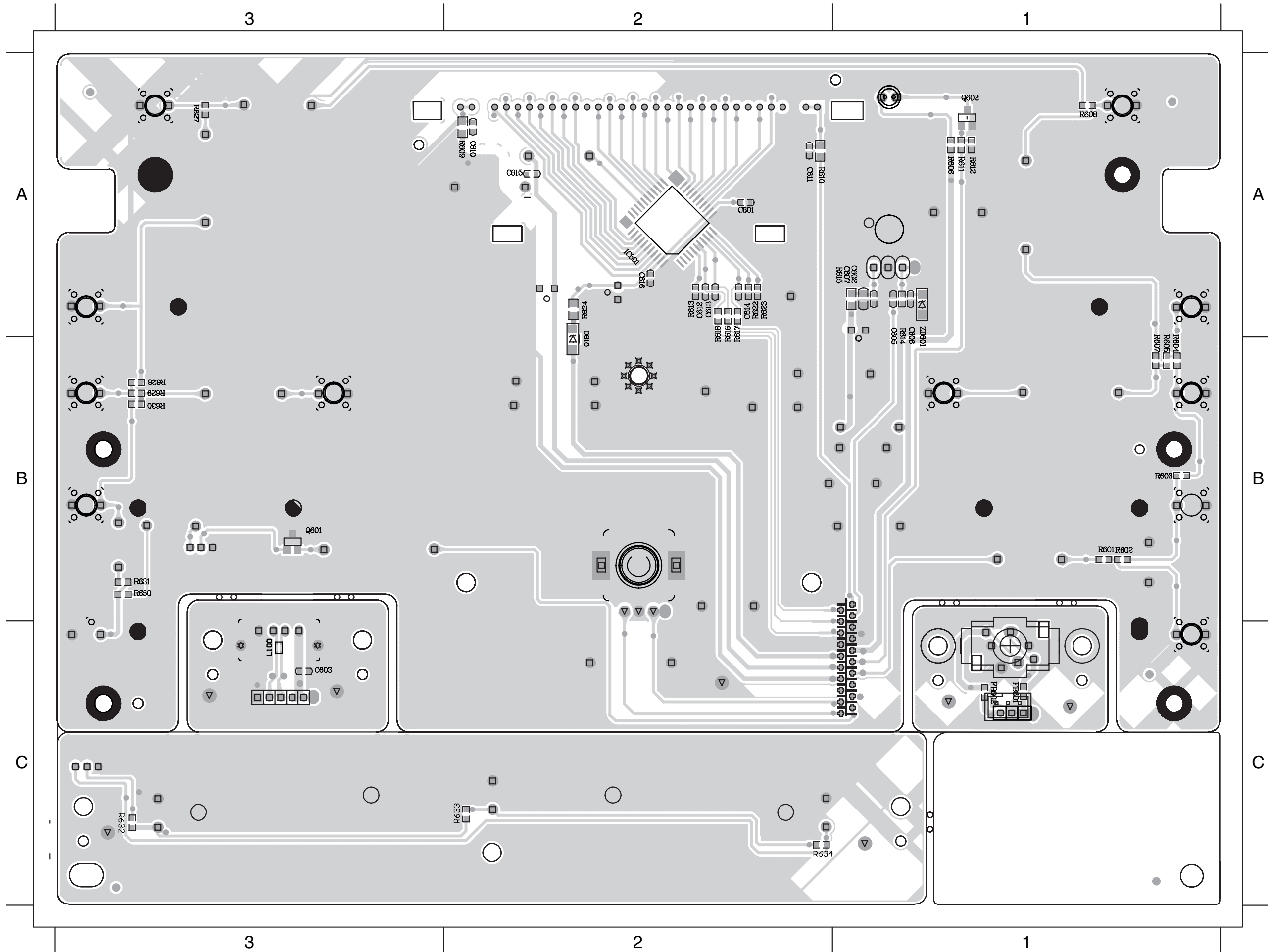
(Pin NO.)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
(Connection)	F1	F1	NP	NC	P15	P14	NC	P13	P12	P11	P10	P9	P8	P7	P6	P5
(Pin NO.)	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
(Connection)	P4	P3	P2	P1	NC	1G	2G	3G	4G	5G	6G	7G	8G	NP	F2	F2

(Notes) : Fn : (Filament Pin)      nG : (Grid Pin)  
 Pn : (Anode Pin)                      NP : (No Pin)  
 NC : (No connection Pin)





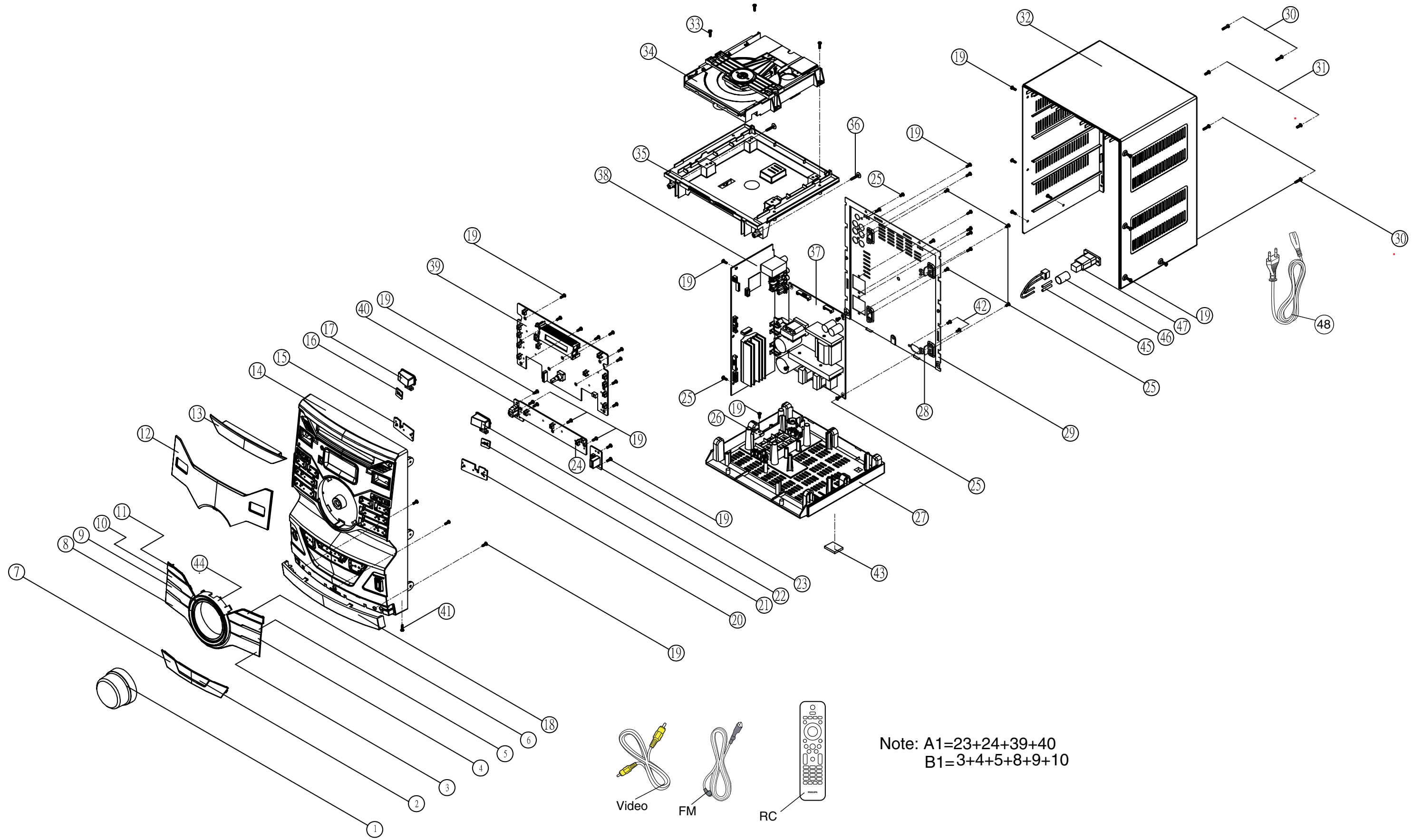
# PCB LAYOUT - BOTTOM VIEW



EXPLODED VIEW

9 - 1

9 - 1



Note: A1=23+24+39+40  
B1=3+4+5+8+9+10



# REVISION LIST

Version 1.0  
\*Initial release