

Service
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Service Manual



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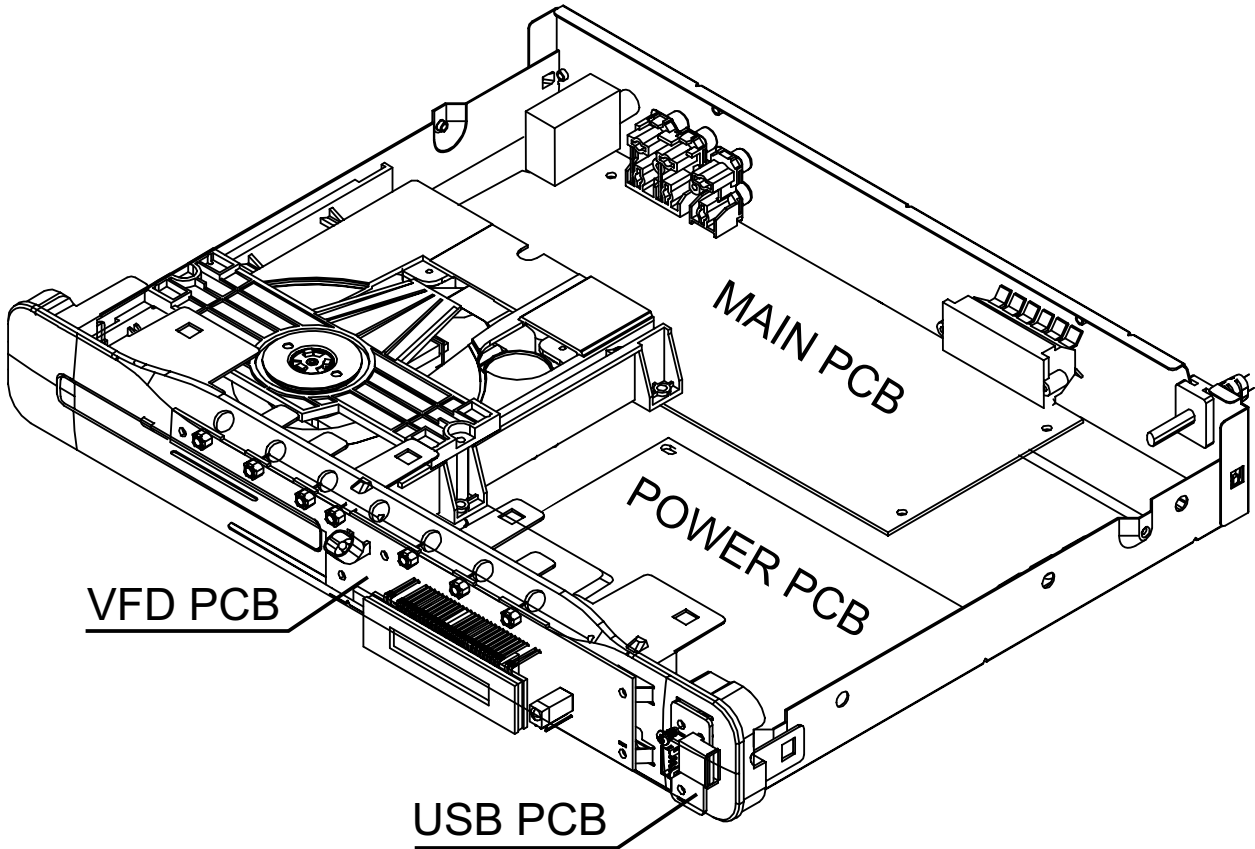
GB 3139 785 35700

Version 1.0



PHILIPS

LOCATION OF PCB BOARDS



VERSION VARIATION:

Type/Versions	HTS2201
Features	/93
Output Power - 150W	X
Output Power - 120W	X
Voltage (110-240V)	X
AUX	X

REPAIR SCENARIO MATRIX:

Type/Versions	HTS2201
Board in used	/93
Main Board	C
Power Board	C
VFD+USB Board	C

*C = Component Level Repair

SPECIFICATIONS

Playback media

DVD-Video, DVD+R/+RW, DVD-R/-RW, CD-R/CD-RW, Audio CD, Video CD/SVCD, Picture CD, MP3-CD, WMA-CD, DivX-CD, USB storage device

File Format

Audiomp3, .wma
Videodivx, .divx ultra, .mpeg, .mpg
Picturejpeg, .jpg

Amplifier

Total output power.....
..... 150 W RMS (30% THD), 120W RMS(10% THD)
Frequency response..... 20 Hz-20 kHz /±3dB
Signal-to-noise ratio..... > 65 dB (CCIR) /(A-weighted)
Input sensitivity.....
AUX 800 mV

Video

Signal system PAL / NTSC

Audio

Sampling frequency.....
MP3 32 kHz, 44.1 kHz, 48 kHz
WMA..... 44.1 kHz, 48 kHz
Constant bit rate
MP3 112 kbps - 320 kbps
WMA..... 48 kbps - 192 kbps

Radio

Tuning range FM 87.5-108 MHz (50 kHz)
Signal-to-noise ratio..... FM 50 dB
Frequency response..... FM 180 Hz-10 kHz/ ±6dB

USB

Compatibility USB
Class support..... UMS (USB Mass Storage Class)
File system FAT16, FAT32
Maximum memory support..... < 160GB

Main Unit

Power supply 110-240V, ~50-60 Hz;
Power consumption..... 50 W
Standby power consumption ≤ 0.9 W
Dimensions (WxHxD) 360 x 58 x 303(mm)
Weight 2.3 kg

Speakers

System..... full range satellite
Speaker impedance..... 3 ohm
Speaker drivers 76 mm (3") full range
Frequency response..... 150 Hz-20 kHz
Dimensions (WxHxD) 254 x 1001 x 254(mm)
Weight 3.38 kg/each
Cable length 4 m

Subwoofer

Impedance..... 12 ohm
Speaker drivers 165 mm (6.5") woofer
Frequency response..... 20 Hz-150 kHz
Dimensions (WxHxD) 123 x 309 x 369 (mm)
Weight 3.81 kg
Cable length 4 m

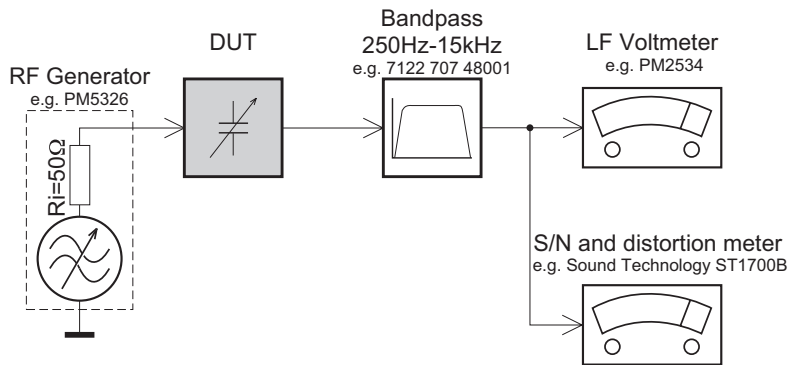
Laser specification

Type..... Semiconductor laser GaAlAs (CD)
Wave length..... 645 - 665 nm (DVD), 770 - 800 nm (CD)
Output power 6 mW (DVD), 7 mW (VCD/CD)
Beam divergence..... 60 degrees.

Specifications subject to change without prior notice.

MEASUREMENT SETUP

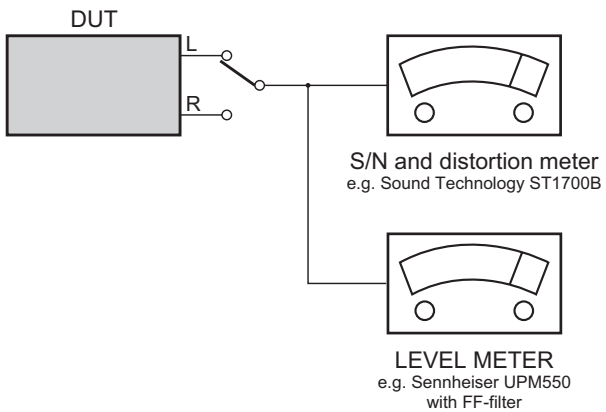
Tuner FM



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

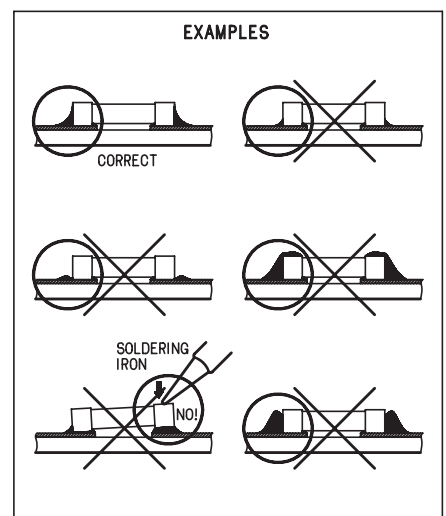
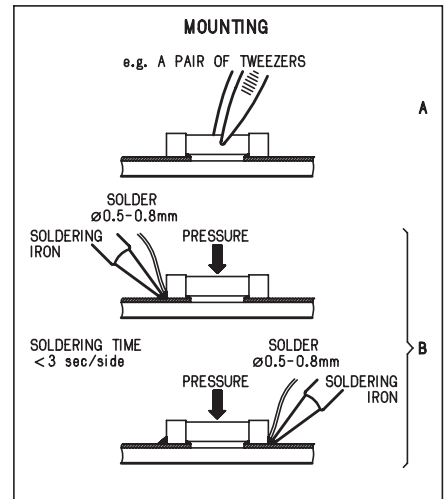
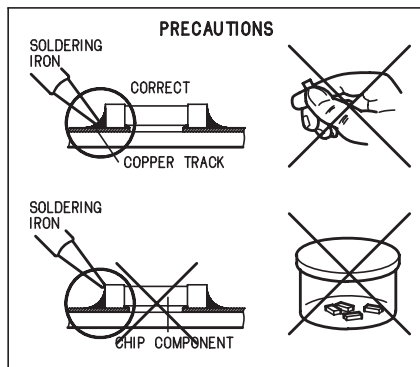
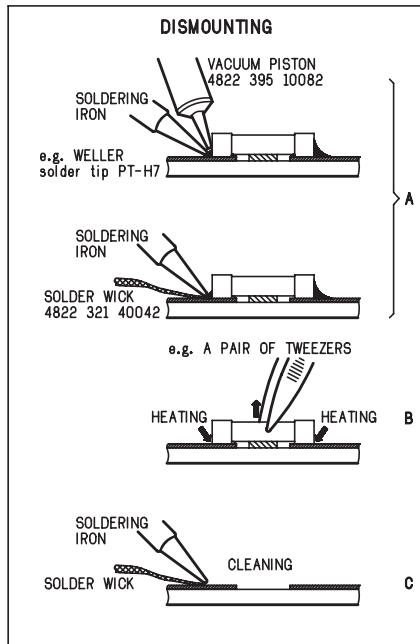
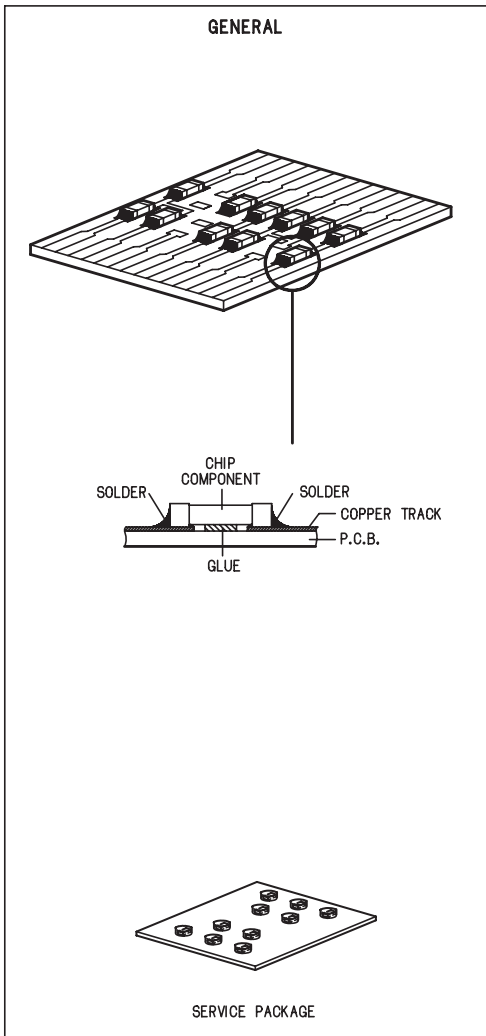
Service Tools:

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



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 enfiler 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).

Unsorgfältige 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 hetzelfde potentiaal.

(I) AVVERTIMENTO

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

La loro longevità potrebbe essere fortemente ridatta 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 Δ .

(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 Δ .

(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 Δ .

(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 Δ 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 Δ .

(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 spärren är urkopplad. Betrakta ej strålen.

(SF) Varoitus !

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

(DK) Advarsel !

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

(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 de-soldering 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 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 Prochure

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:	2201-93
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: 07.00	BootLoader: Er

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) Trade model

- Press <Open/Close>button on R/C.
- Press "2" "5" "9" on R/C,VFD will display "TRA ON " or "TRA OFF".

5) 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:	2201-93
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: 07.00	BootLoader: Er

OK

Press SETUP to exit menu

6) Upgrading new software

- Check for the latest software version on www.philips.com/support.
Search for your model and click on 'software&drivers'.
- Copy the latest upgrading software onto USB storage device.
- 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:

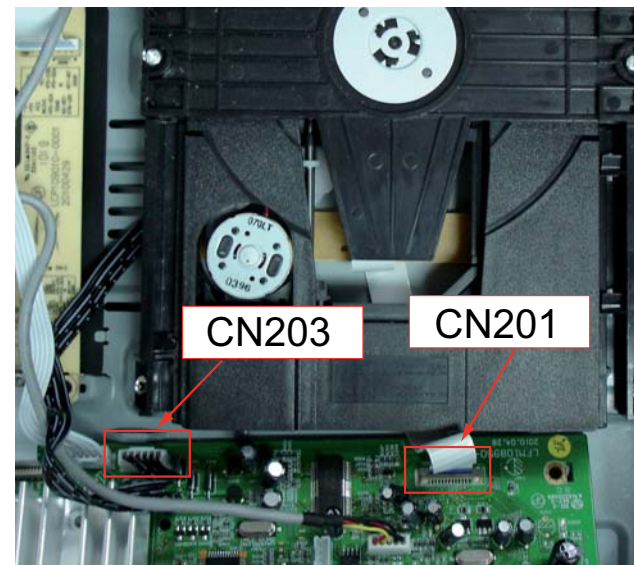
Upgrade file detected
Upgrade?
Press PLAY to start
Upgrading

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

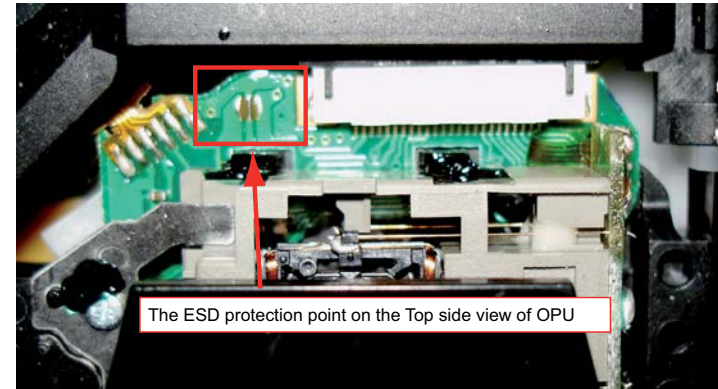
Note: when upgrade in progress, please do not unplug or switch off the device.

7) 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 board as shown below:



- 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

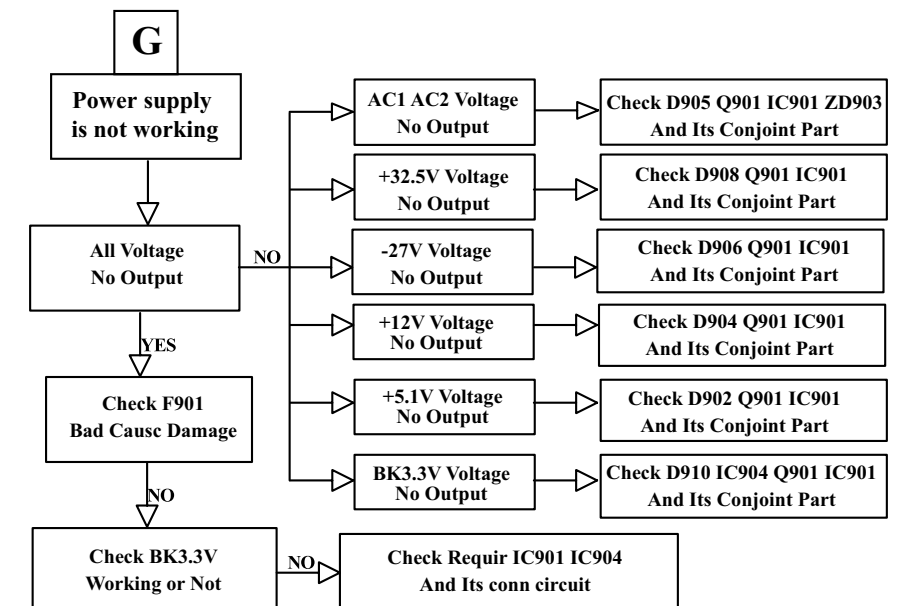
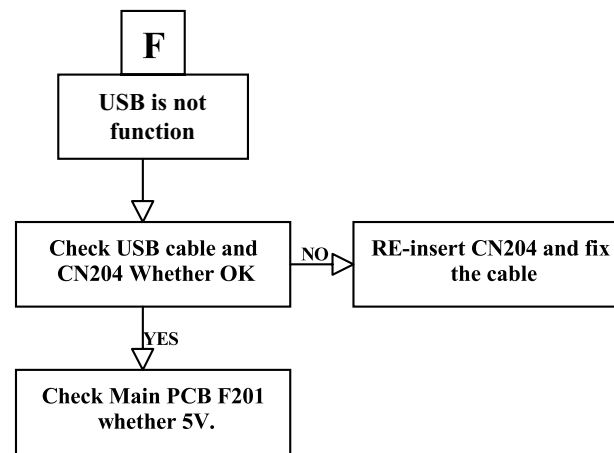
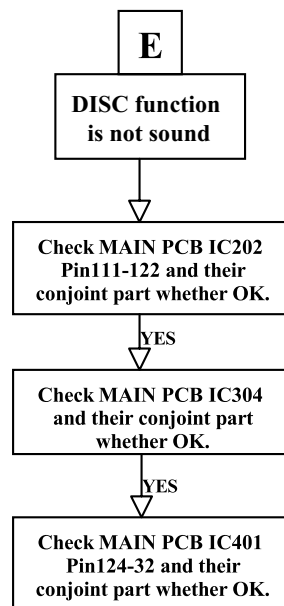
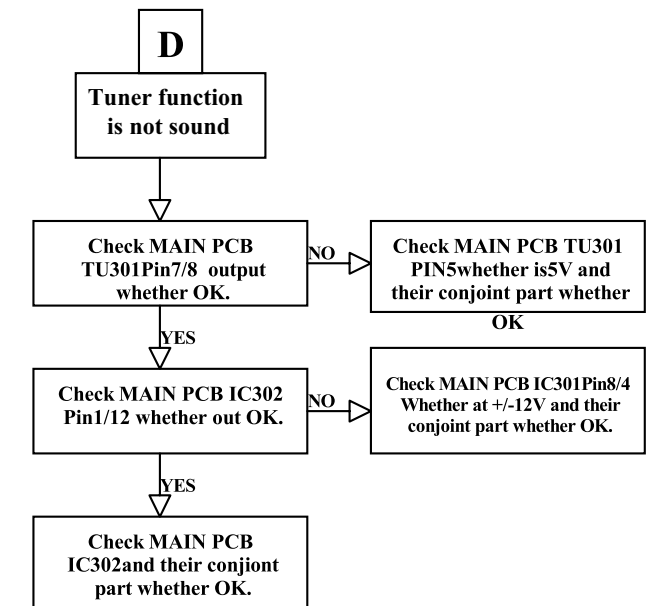
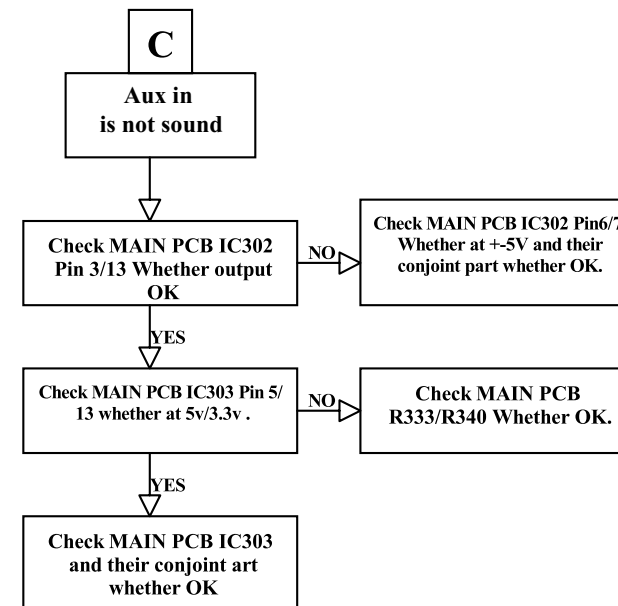
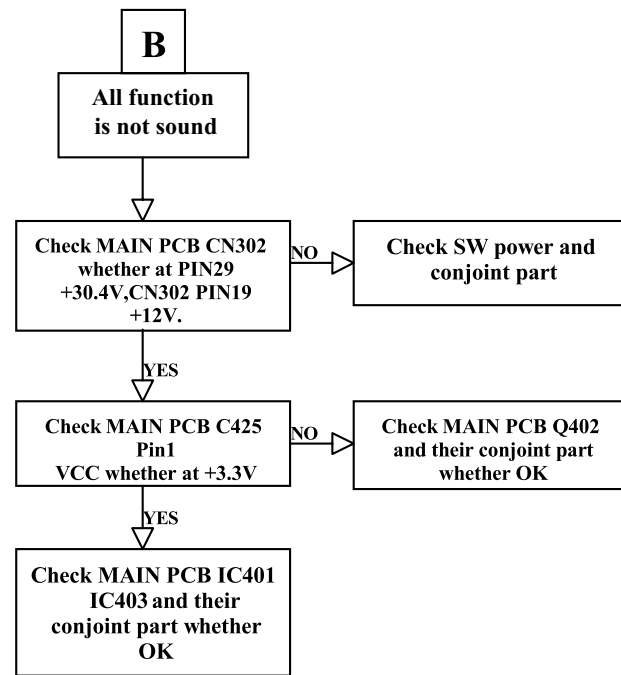
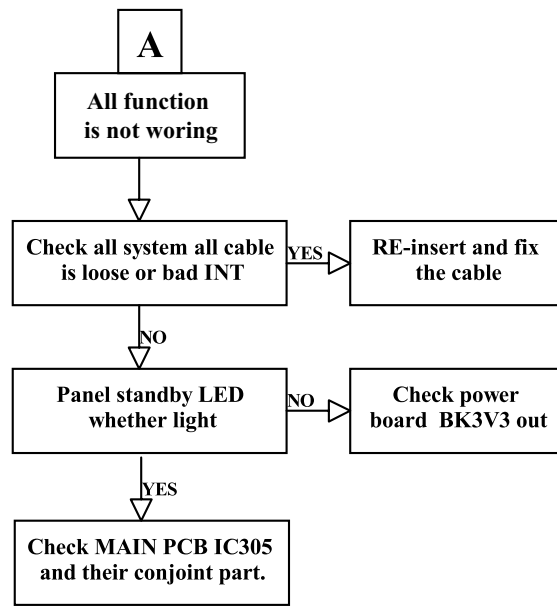
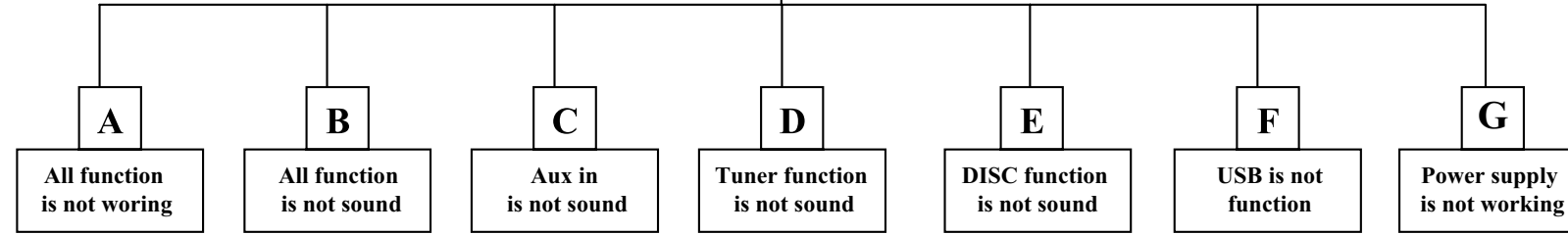
- the DVD Loader is OK and needs to be disconnected from connector "CN201" and "CN203" of the main board.
- the defective DVD Loader is needed to be send back to supplier for failure analysis and to support back charging evidence.

CAUTION!

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

REPAIR INSTRUCTION

MAIN UNIT REPAIR CHART



DISASSEMBLY INSTRUCTIONS

Dismantling of the Top & Front Panel Assemble

- 1) Open the DVD Tray by using the Open/Close Button while the Set is ON and disconnect the mains supply after removing the Tray Cover.
Note: If this is not possible, the DVD Tray has to be open manually.
Take a mini screw driver about 2mm diameter and make a marking 24mm from the tip as shown in figure 2 . Place the set on its side, insert the mini screw driver till the marking and slide it towards the left as shown in figure 1 until the Tray moves out of the Front Panel.
- 2) 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.

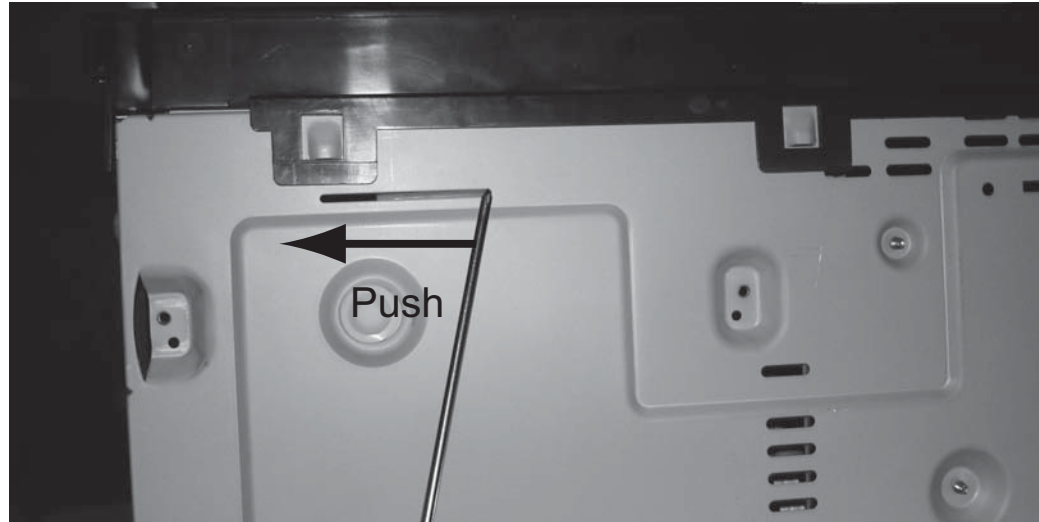


Figure 1

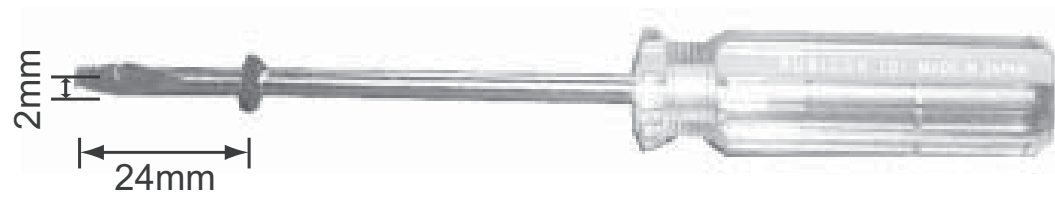


Figure 2

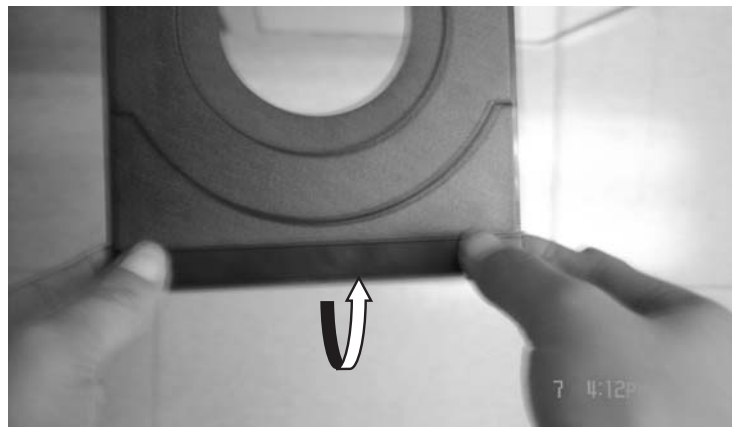


Figure 3

- 3) Loosen 6 screws and remove the Top Cover by lifting the rear portion upwards before sliding it out towards the rear.
 - 4 screws "A" at the back panel as shown in figure 4.
 - 1 screw "B" each on the left & right side as shown in figure 5.

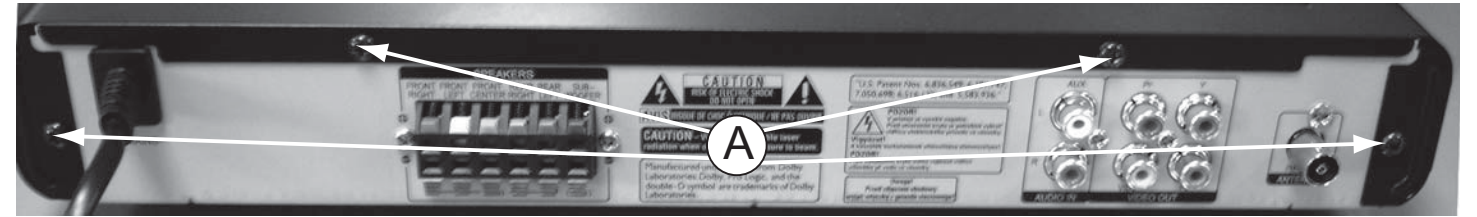


Figure 4

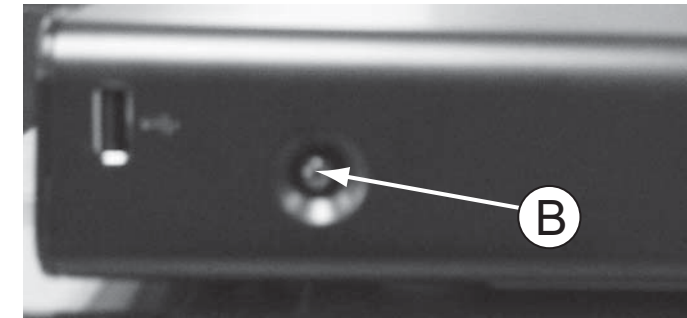


Figure 5

Dismantling of the DVD Loader Module

- 1) Loosen 4 screws "C" at the DVD Loader Module as shown in figure 6.

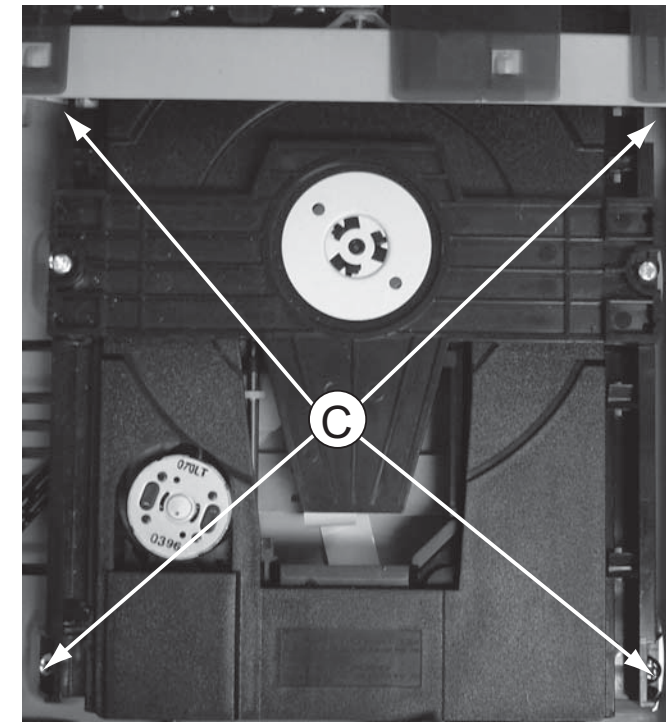


Figure 6

Dismantling of the VFD+USB Board

1) Loosen 7 screws "D" on the top of VFD+USB Board as shown in figure 7.

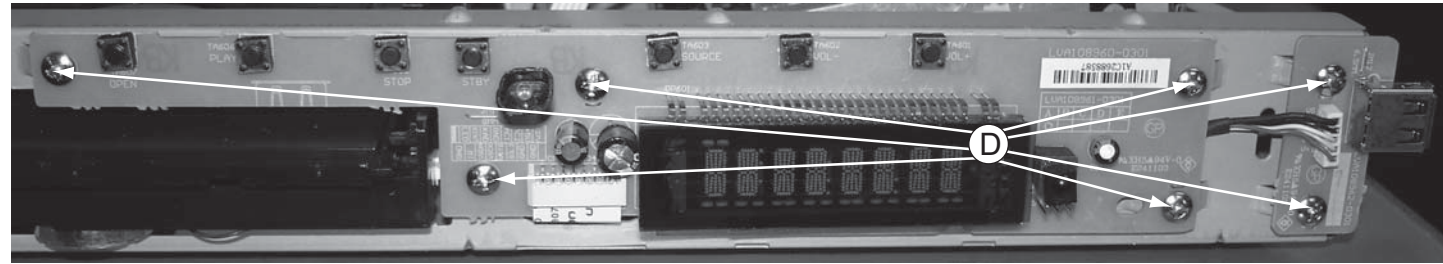


Figure 7

Dismantling of the MAIN Board

- 1) Loosen 4 screws "E" on the top of MAIN Board as shown in figure 8.
- 2) Loosen 5 screws "F" at the back panel as shown in figure 9.

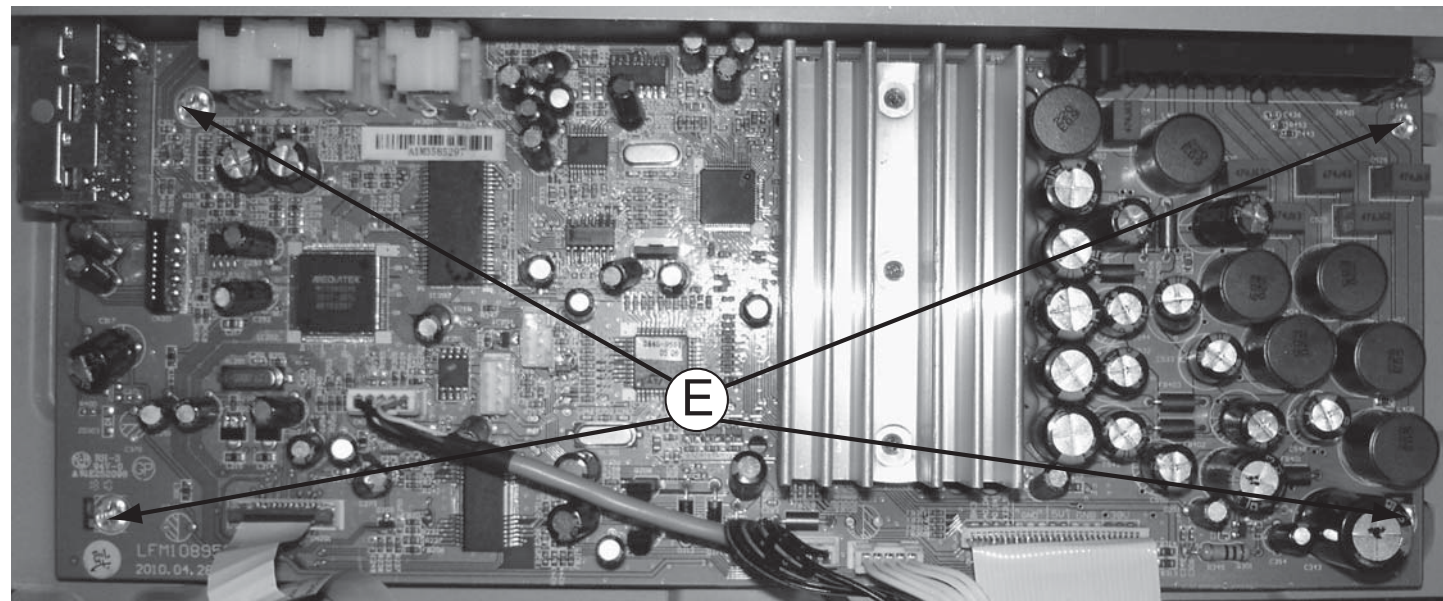


Figure 8

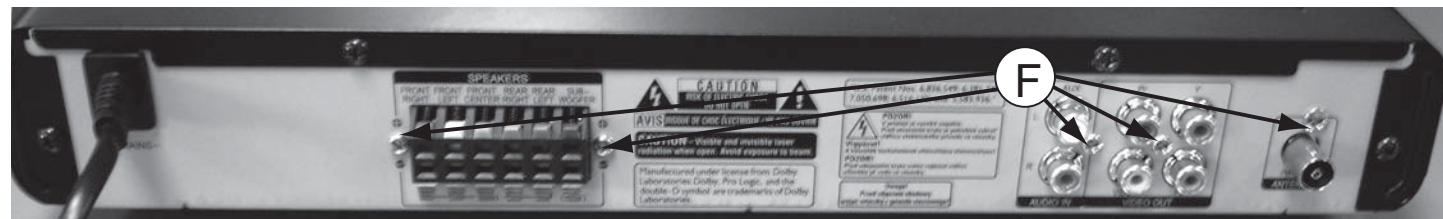


Figure 9

Dismantling of the POWER Board

1) Loosen 5 screws "G" on the top of Power Board as shown in figure 10.

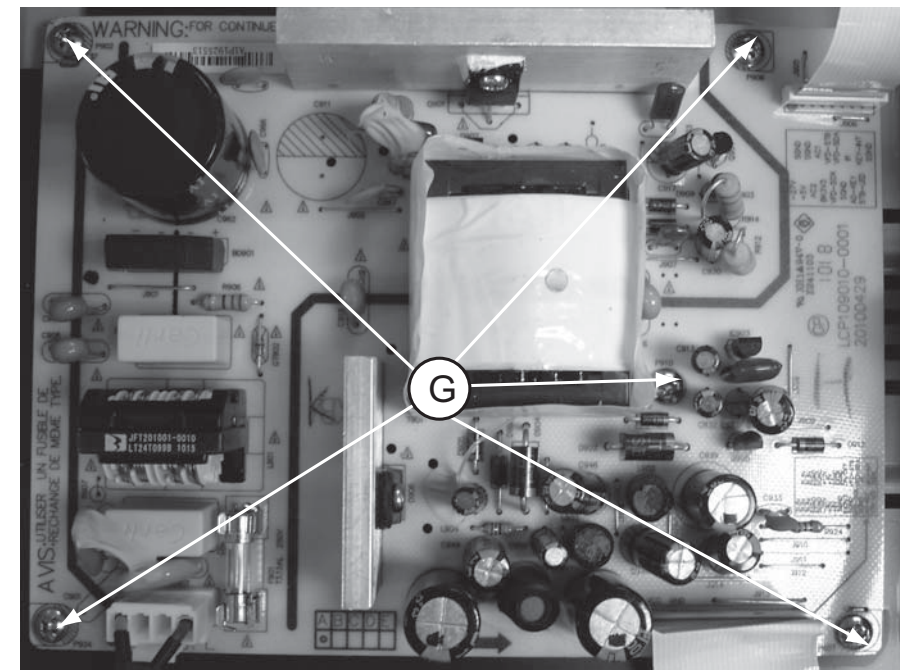
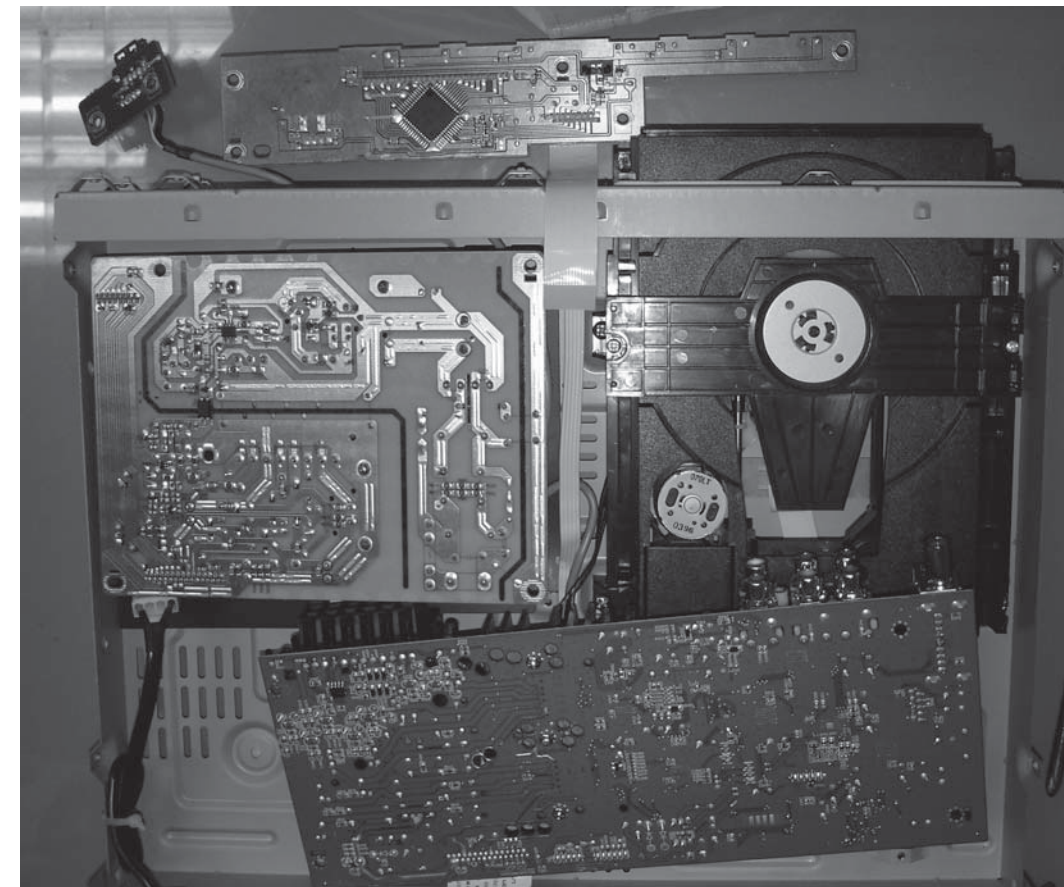


Figure 10

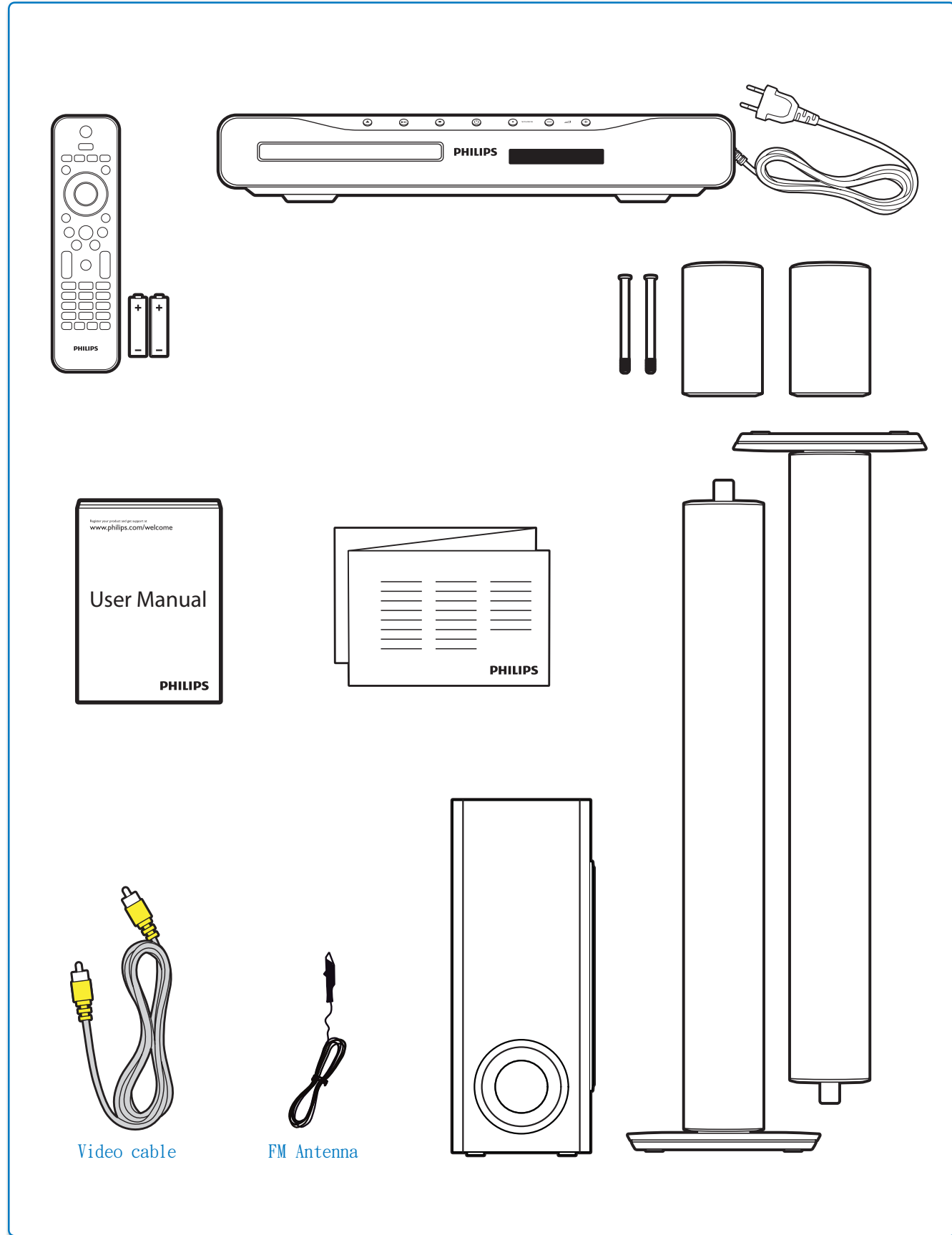
SERVICE POSITIONS



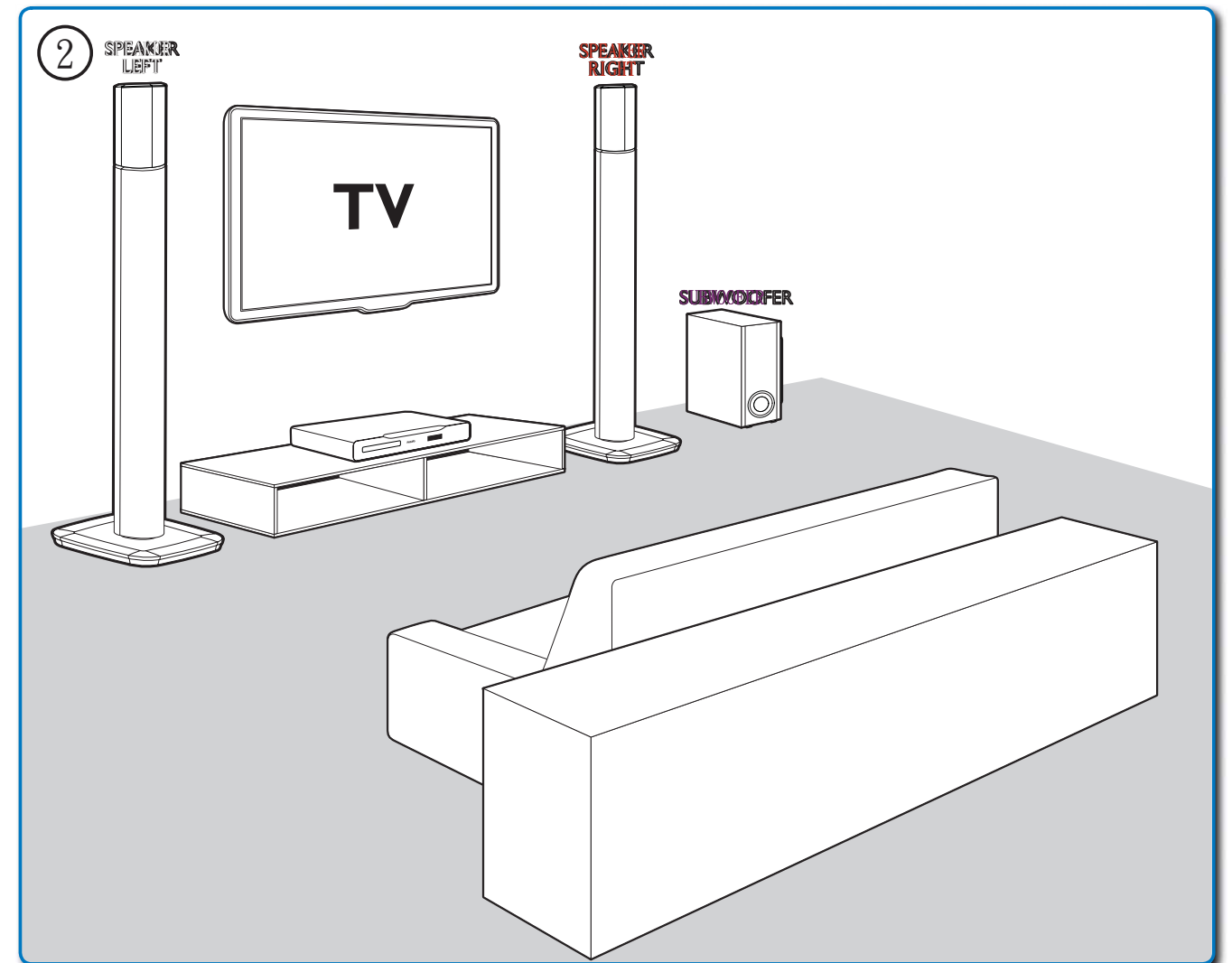
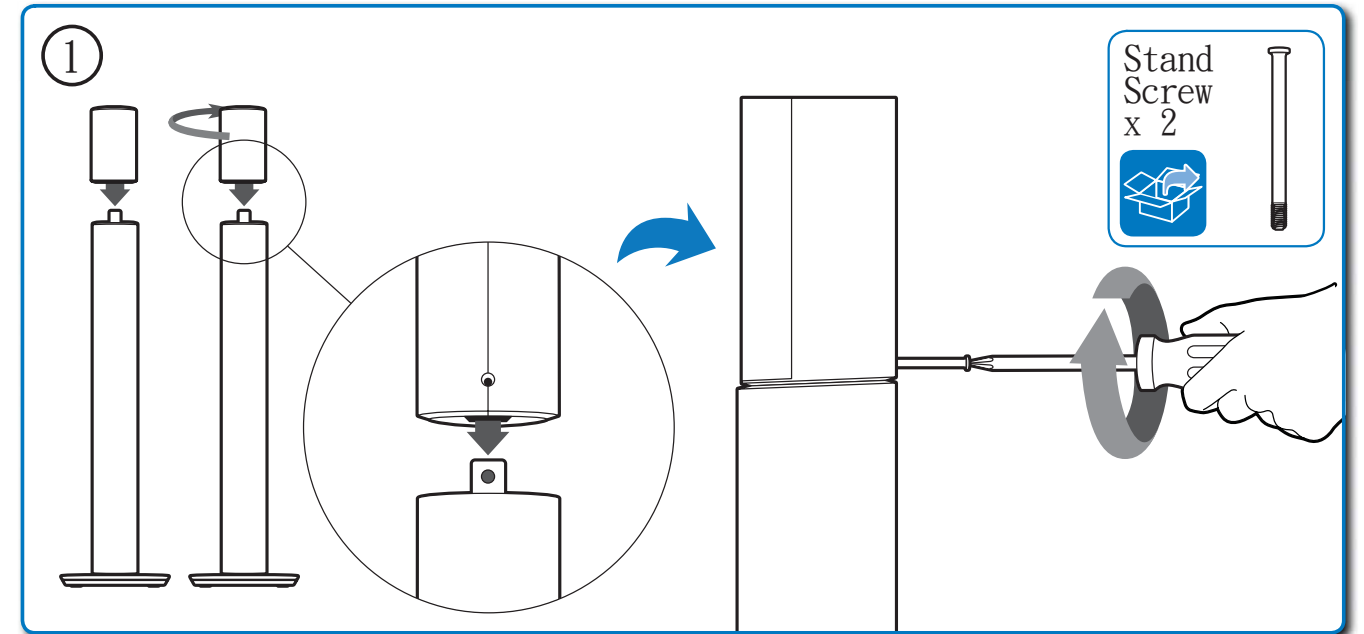
Note: In some service positions the components or copper patterns of one board may risk touching its neighbouring pc boards or metallic parts. To prevent such short-circuit use a piece of hard paper or other insulating material between them.

CIRCUIT DIAGRAM

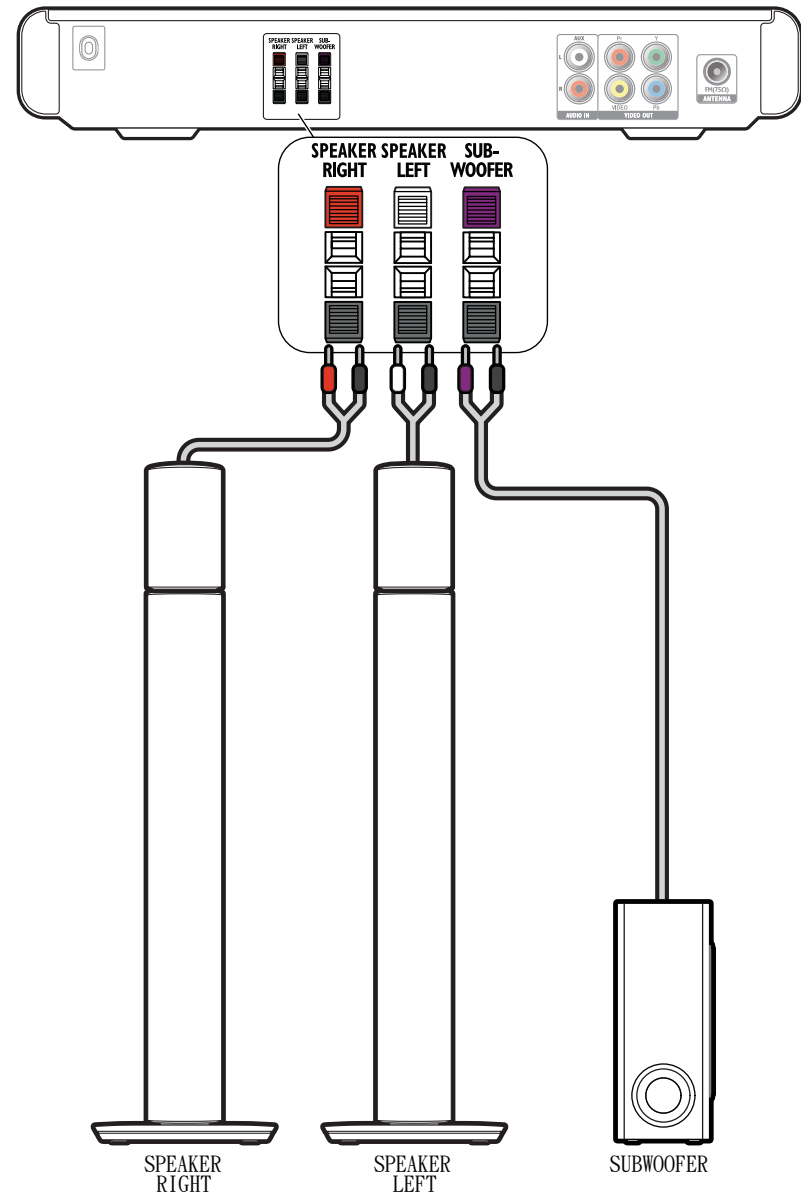
The following excerpt of the QSG/DFU serves as an introduction to the set.
The complete Direction for Use can be download in the different languages from the internet site of Philips Consumer care Center: www.support.philips.com



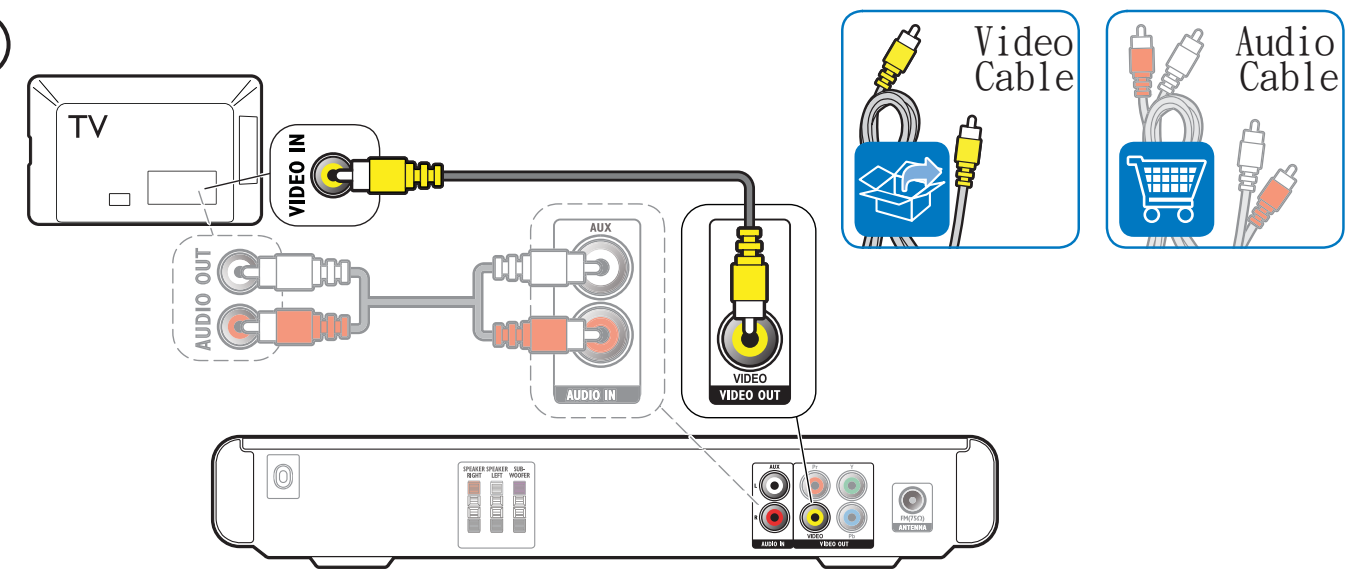
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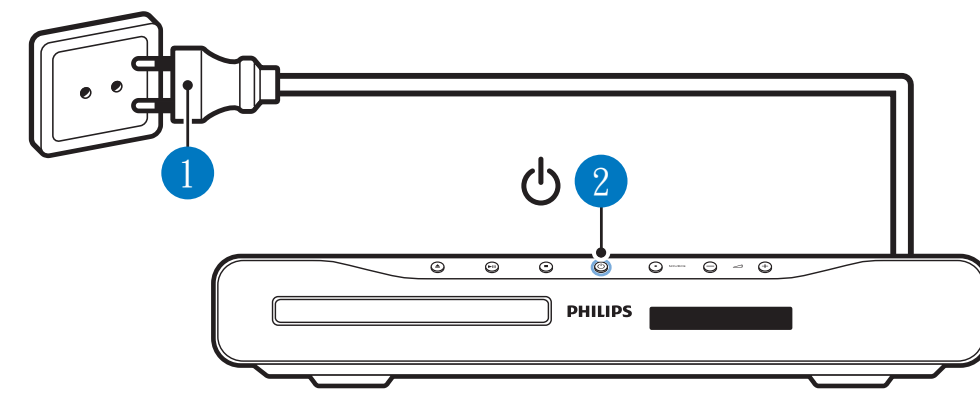
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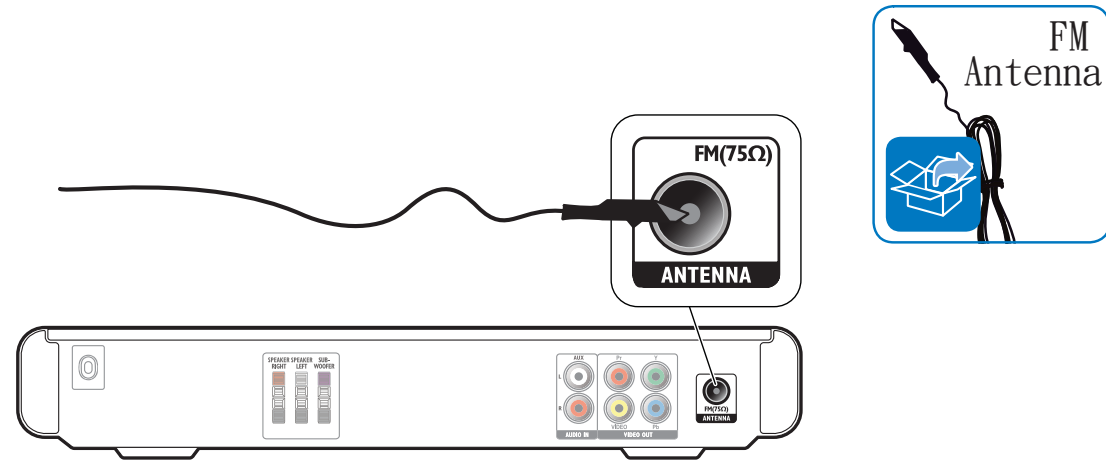
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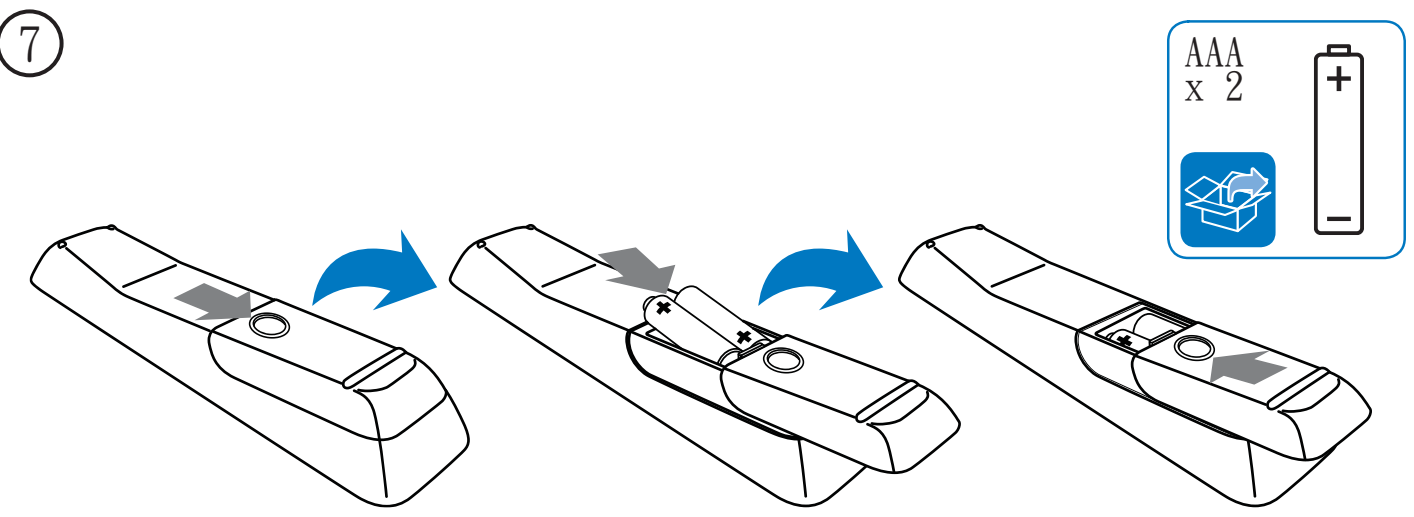
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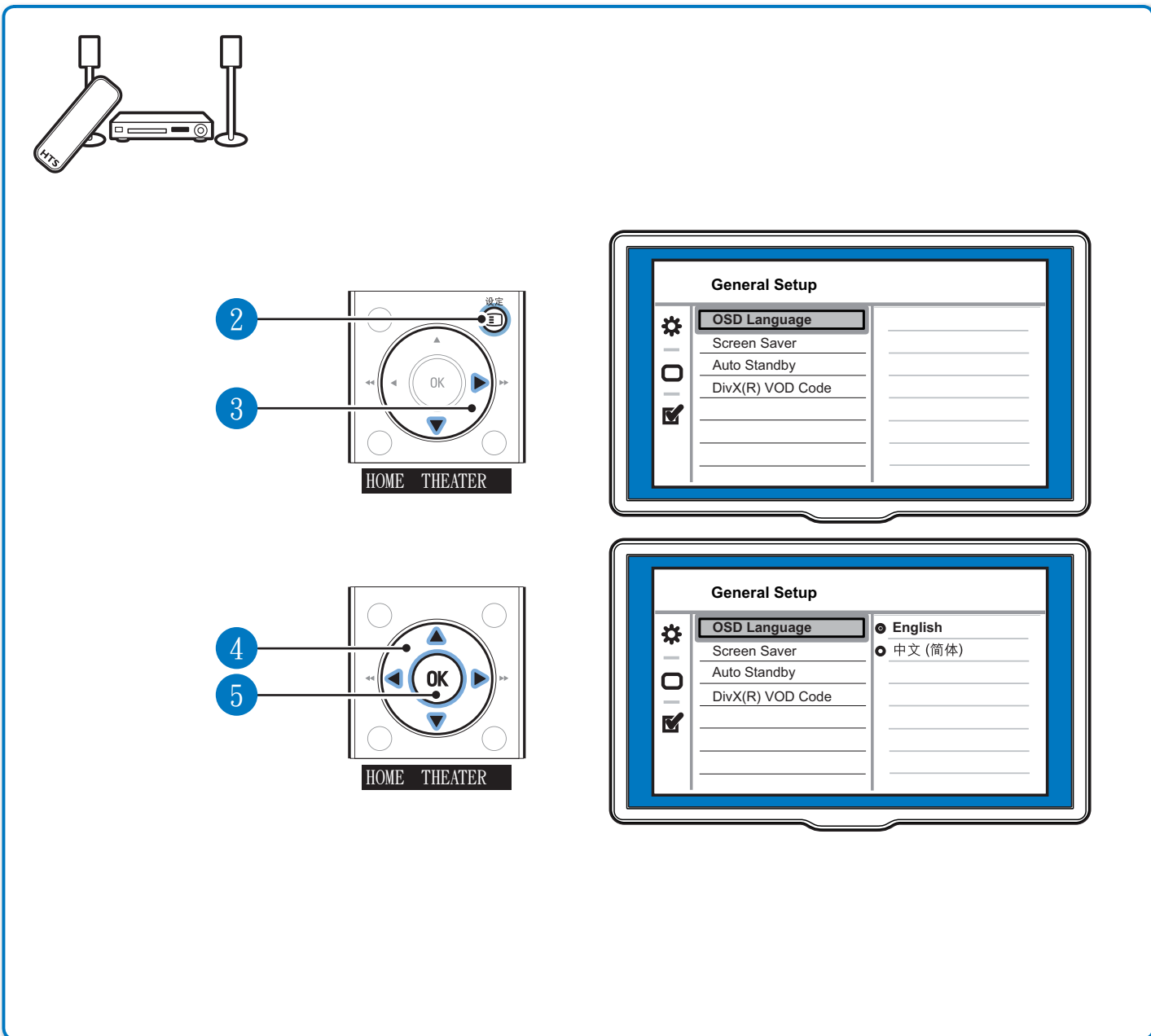
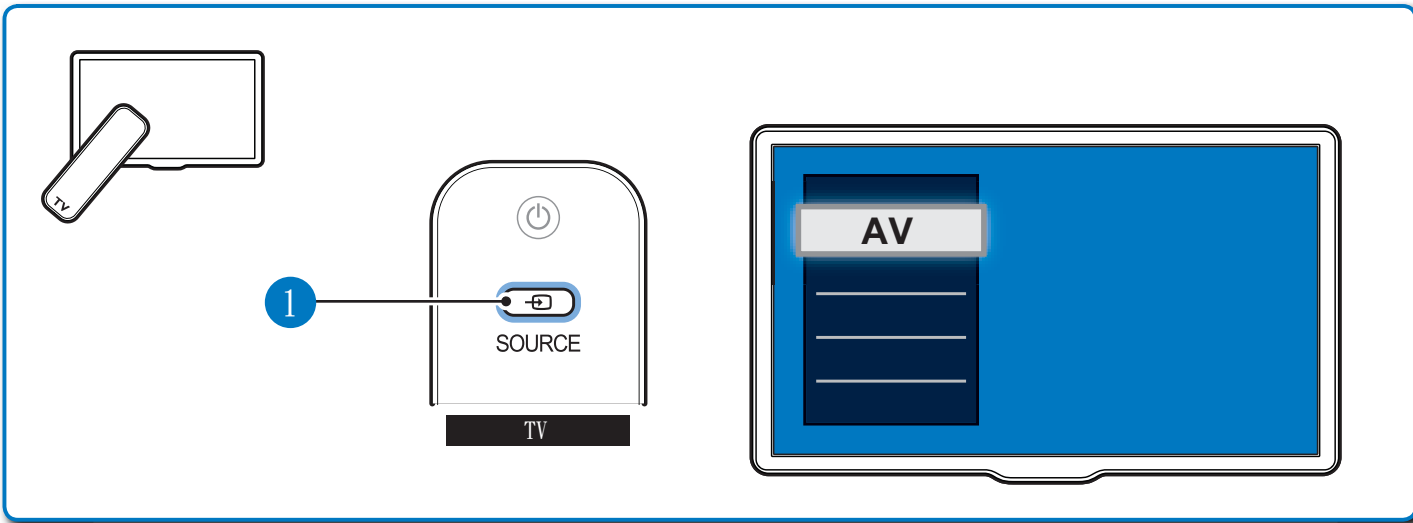
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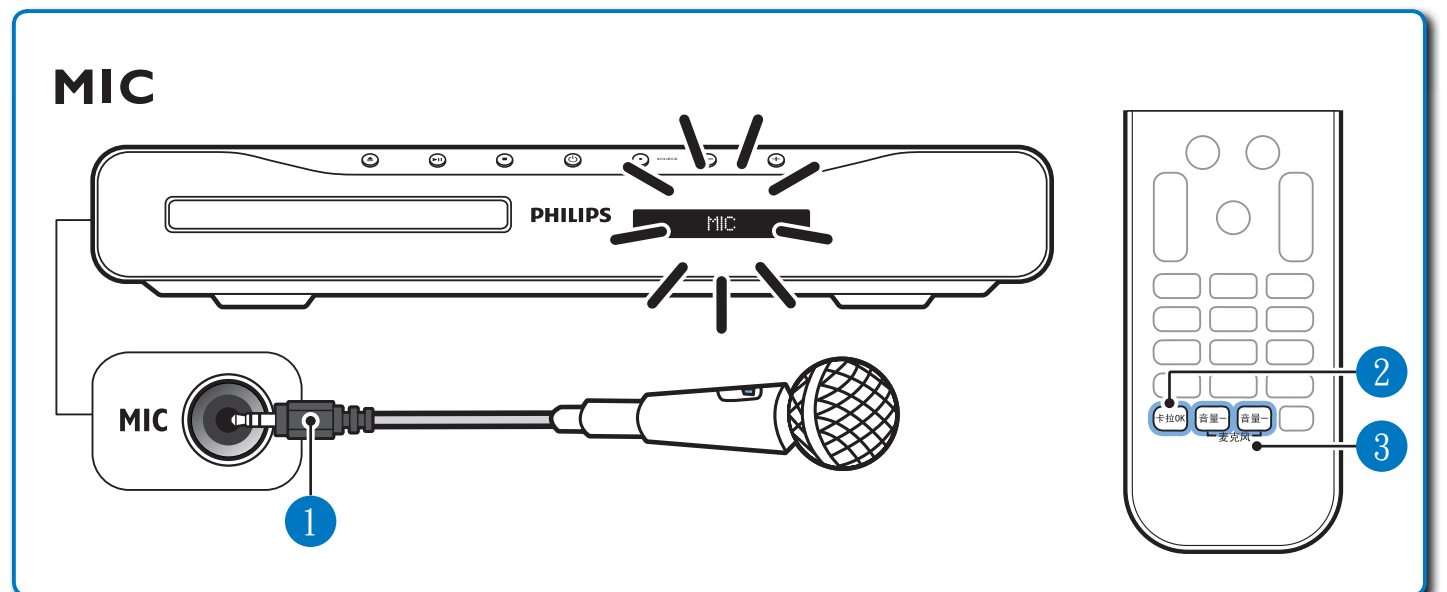
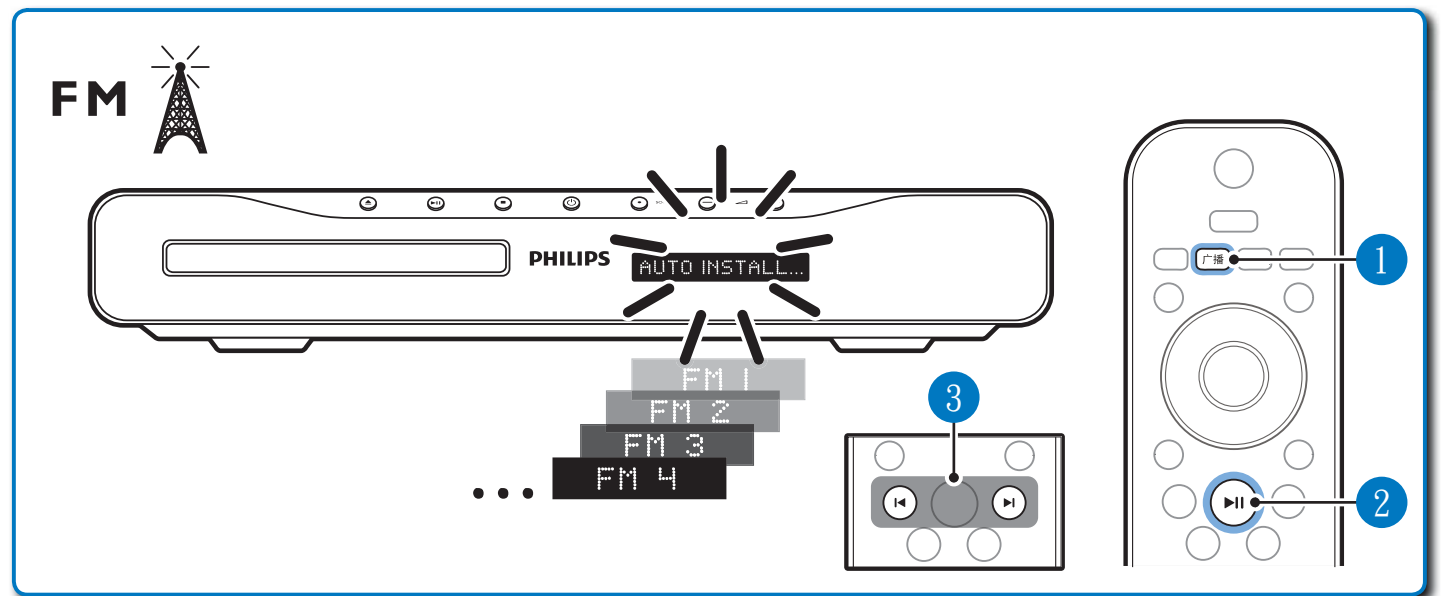
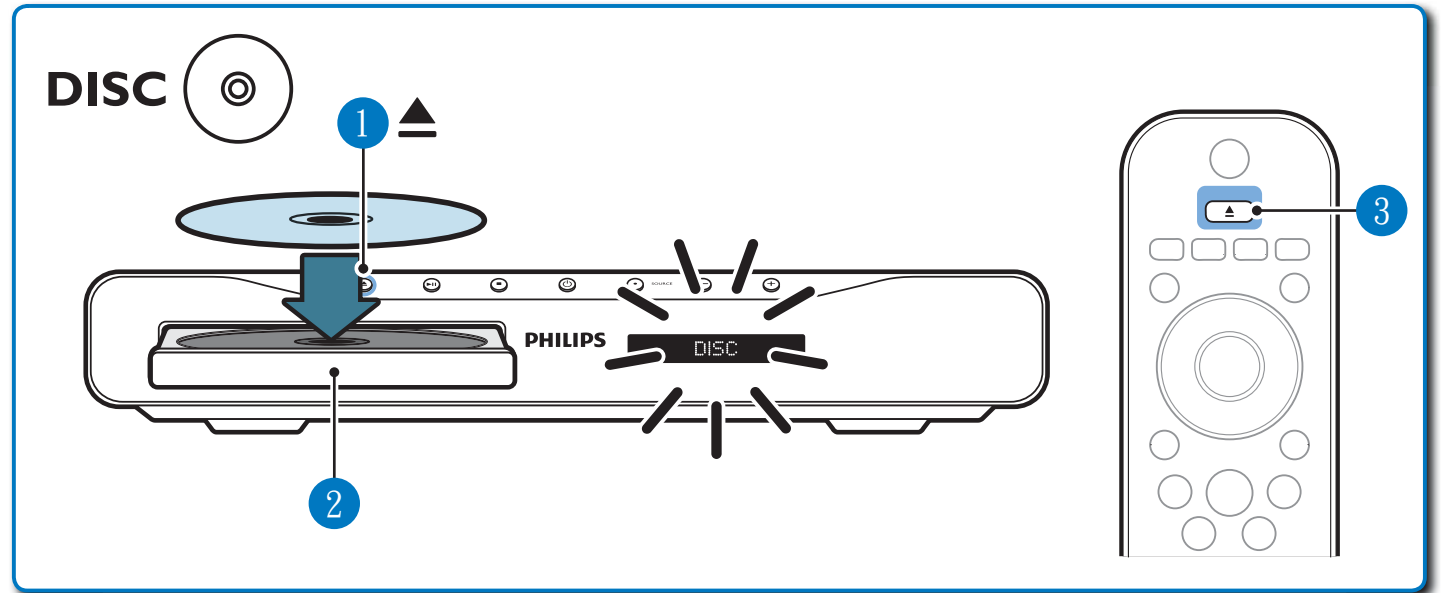
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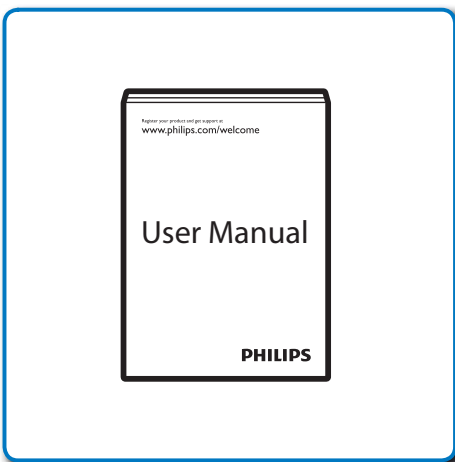
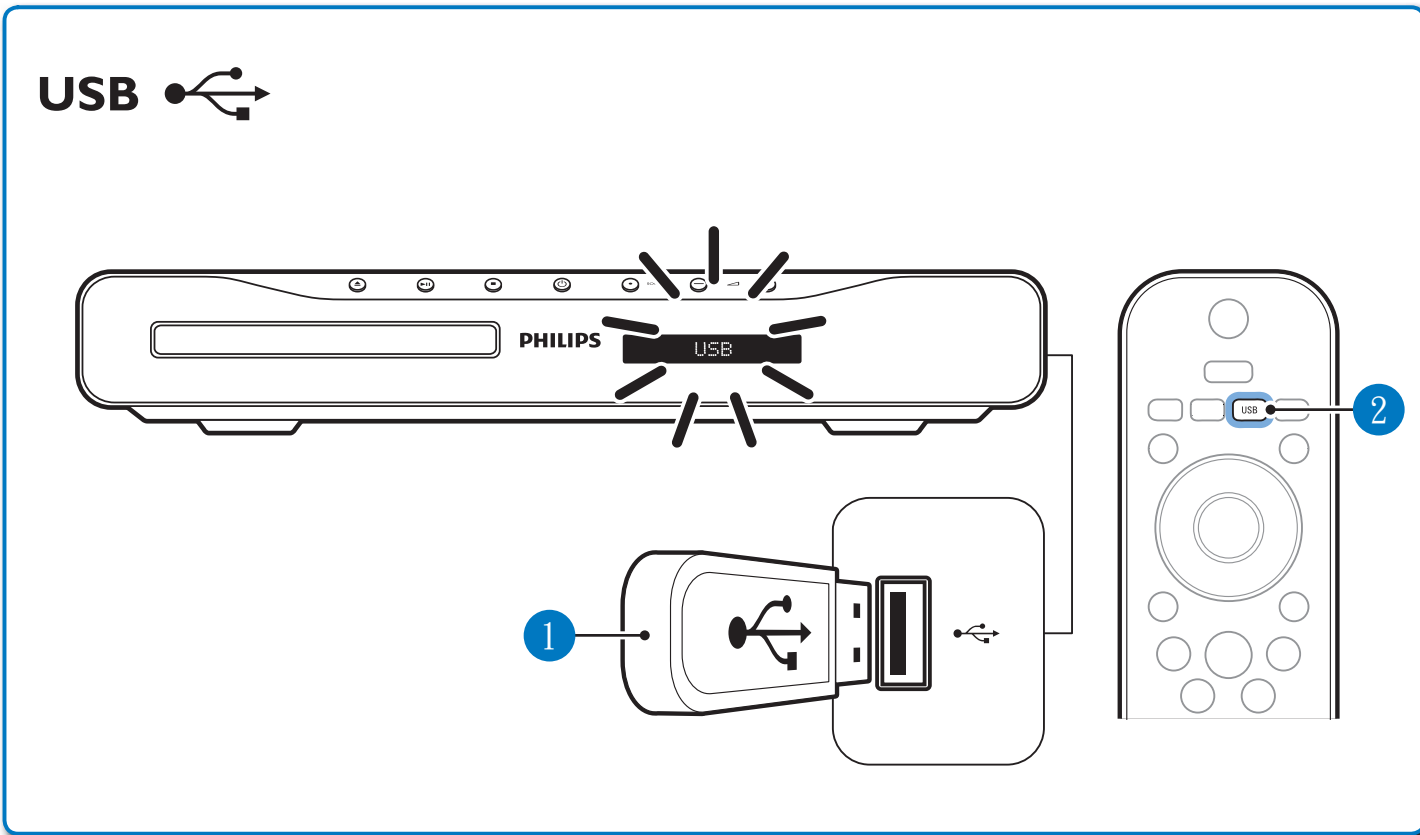


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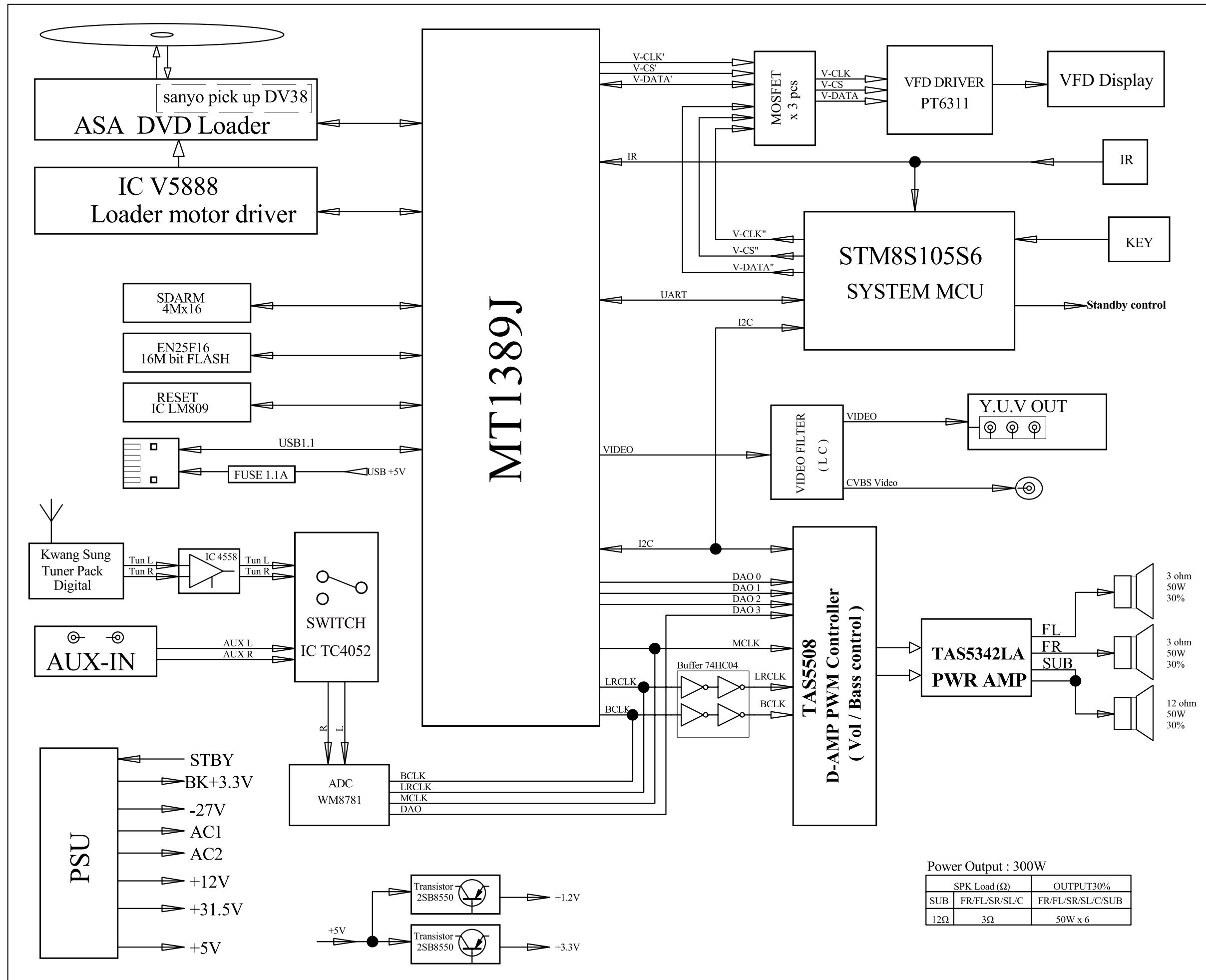


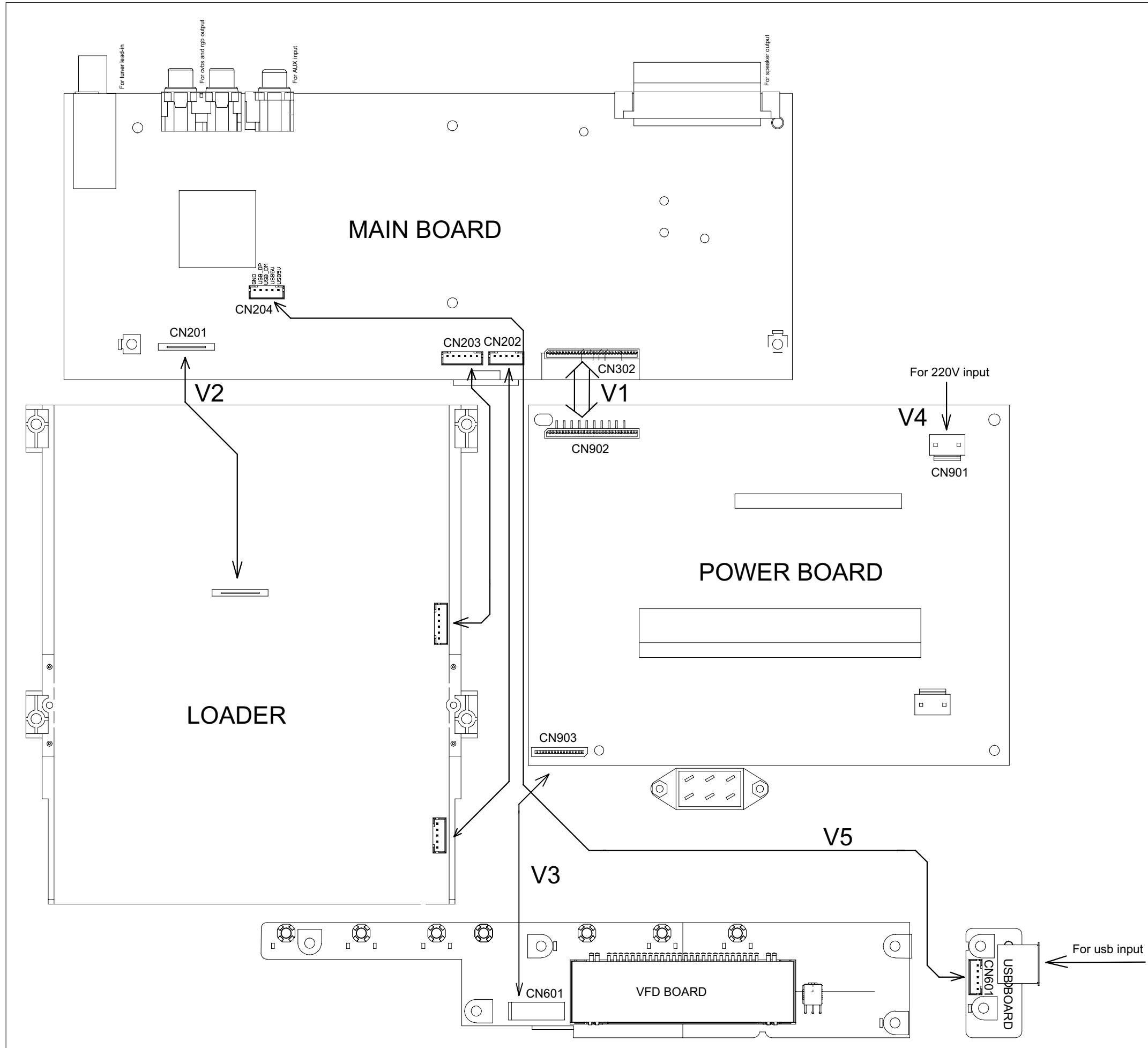


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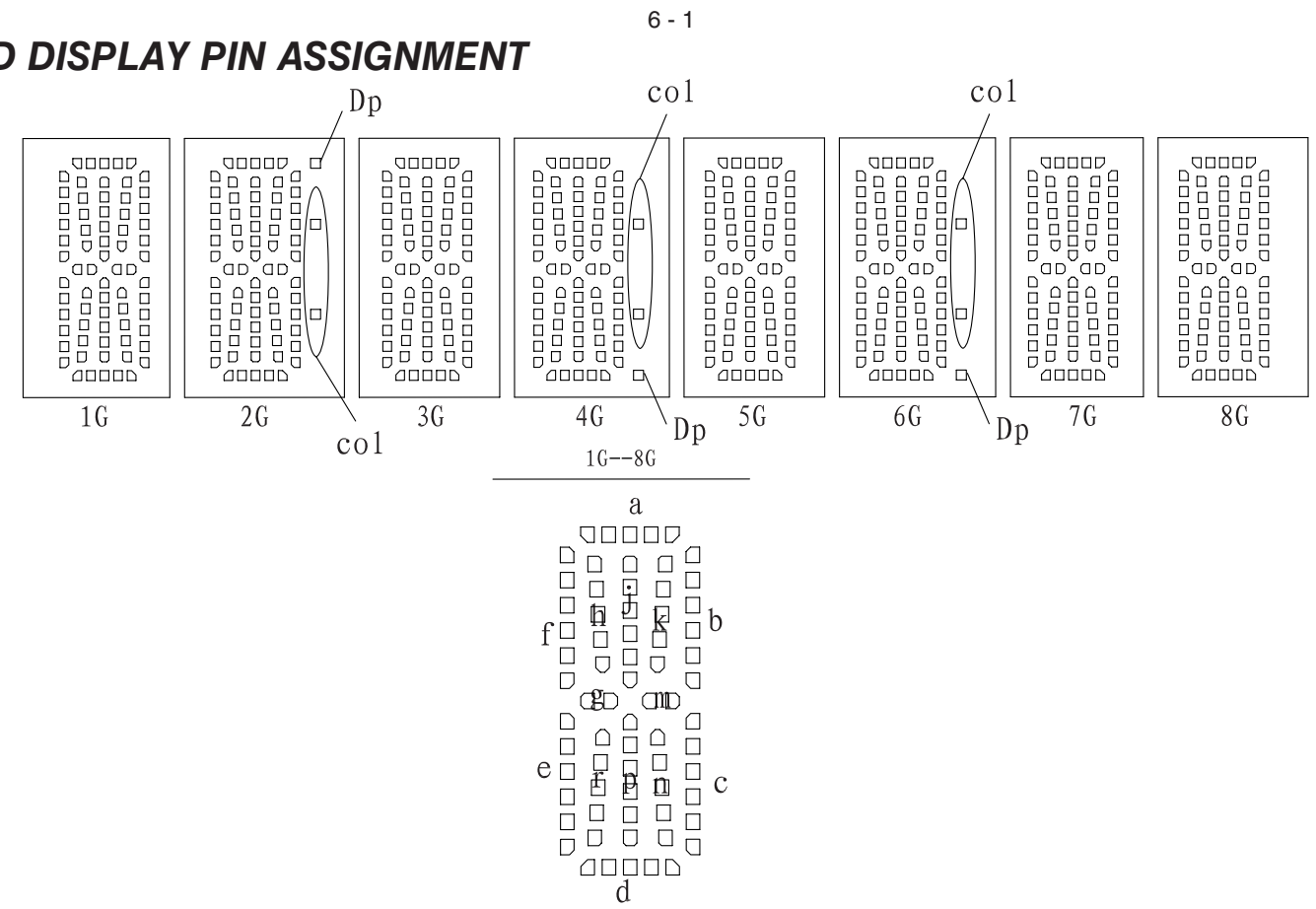
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FTD DISPLAY PIN ASSIGNMENT



VFD+USB BOARD

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	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	/	/

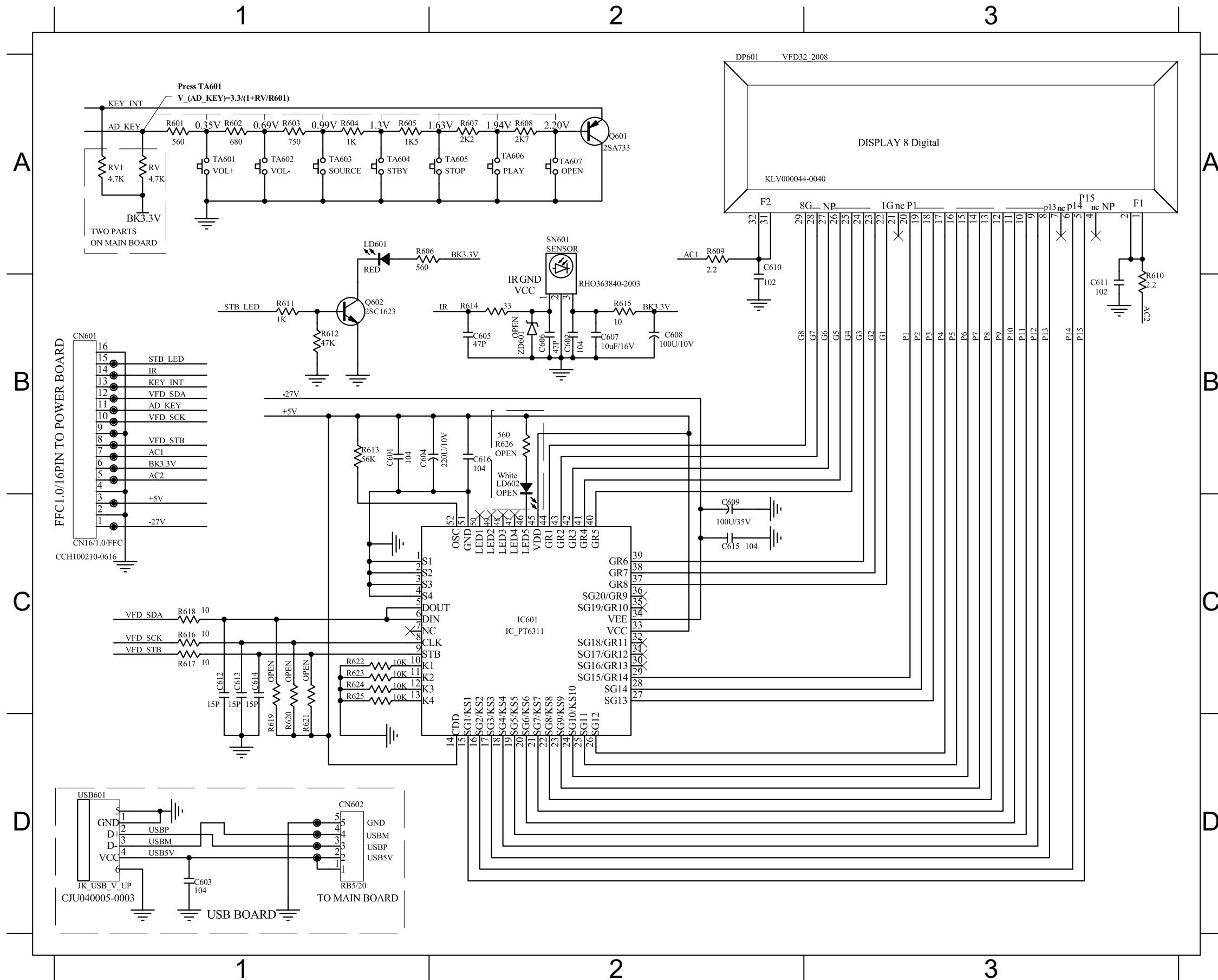
PIN CONNECTION

(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)

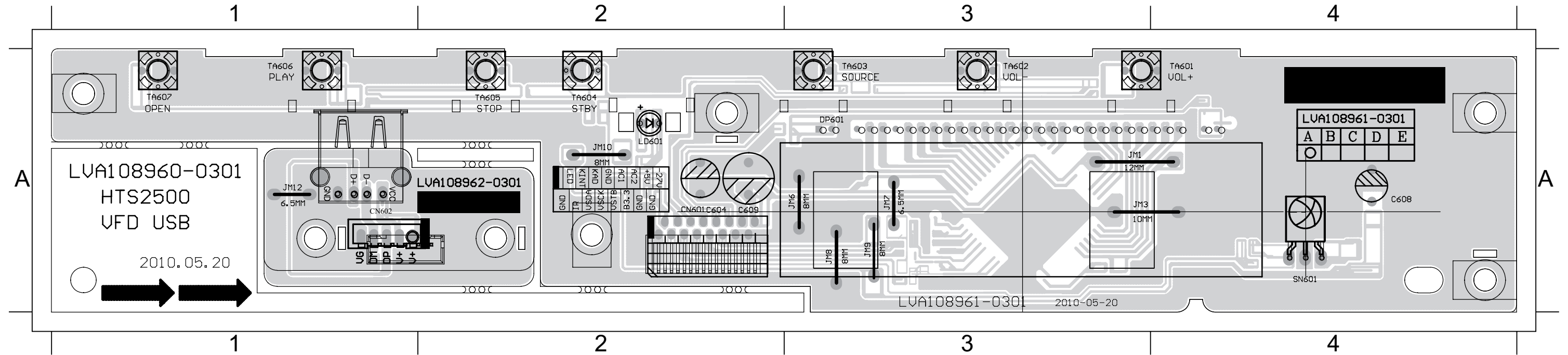
CIRCUIT DIAGRAM

C601 B1 C604 B1 C607 B2 C610 A2 C613 C1 C616 B2 DP601 A2 Q601 A2 R602 A1 R605 A1 R608 A2 R611 B1 R614 B2 R617 C1 R620 D1 R623 C1 SN601 A2 TA603 A1 TA606 A2
 C602 B2 C605 B2 C608 B2 C611 B3 C614 C1 CN601 B1 IC601 C2 Q602 B1 R603 A1 R606 A1 R609 A2 R612 B1 R615 B2 R618 C1 R621 D1 R624 C1 TA601 A1 TA604 A1 TA607 A2
 C603 D1 C606 B2 C609 C2 C612 C1 C615 C2 CN602 D1 LD601 A1 R601 A1 R604 A1 R607 A2 R610 B3 R613 B1 R616 C1 R619 D1 R622 C1 R625 C1 TA602 A1 TA605 A2 USB601 D1



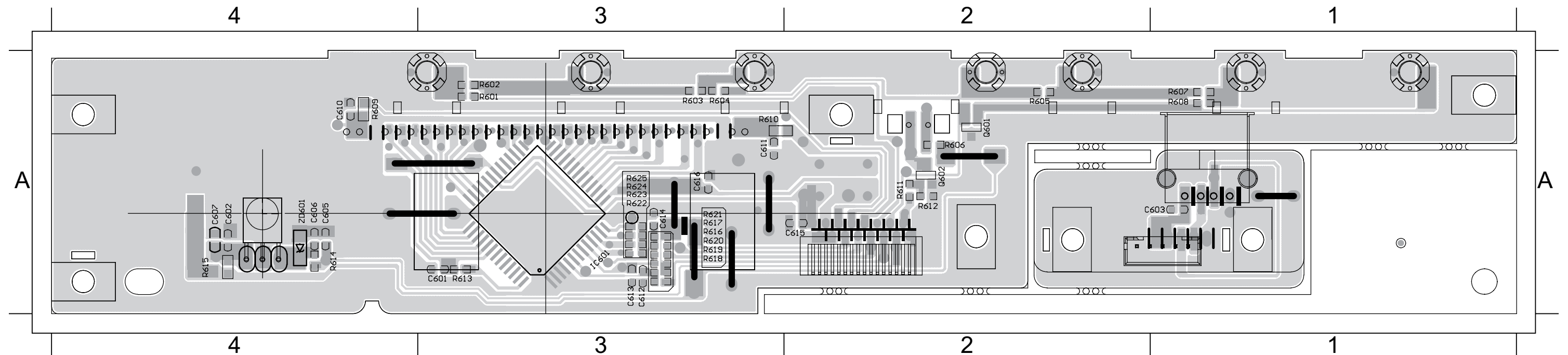
PCB LAYOUT - TOP VIEW

C604 A2 C609 A2 CN602 A1 JM1 A3 JM12 A2 JM6 A3 JM8 A3 LD601 A2 TA601 A4 TA603 A3 TA605 A2 TA607 A1
 C608 A4 CN601 A2 DP601 A3 JM10 A2 JM3 A3 JM7 A3 JM9 A3 SN601 A4 TA602 A3 TA604 A2 TA606 A1 USB601 A1



PCB LAYOUT - BOTTOM VIEW

C601 A3 C603 A1 C606 A4 C610 A4 C612 A3 C614 A3 C616 A3 Q601 A2 R601 A3 R603 A3 R605 A2 R607 A1 R609 A4 R611 A2 R613 A3 R615 A4 R617 A3 R619 A3 R621 A3 R623 A3 R625 A3
 C602 A4 C605 A4 C607 A4 C611 A3 C613 A3 C615 A2 IC601 A3 Q602 A2 R602 A3 R604 A3 R606 A2 R608 A1 R610 A3 R612 A2 R614 A4 R616 A3 R618 A3 R620 A3 R622 A3 R624 A3

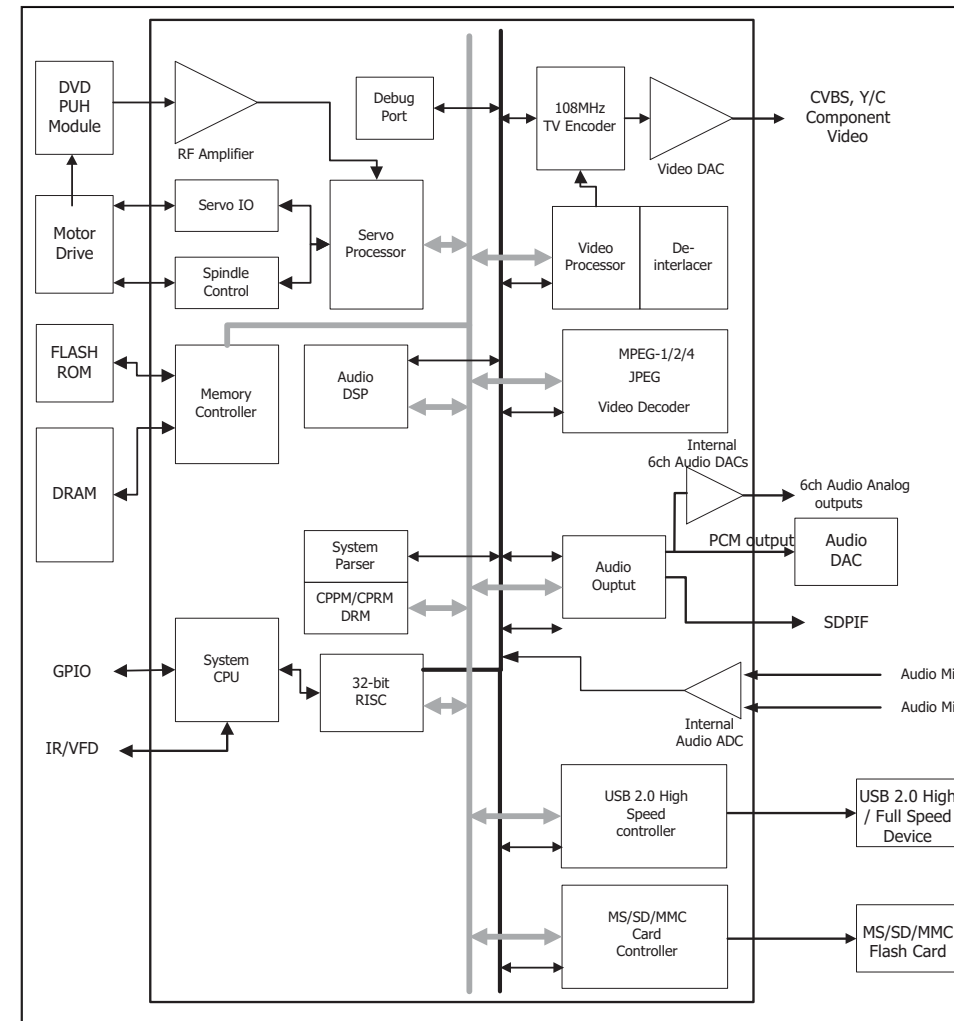


MAIN BOARD

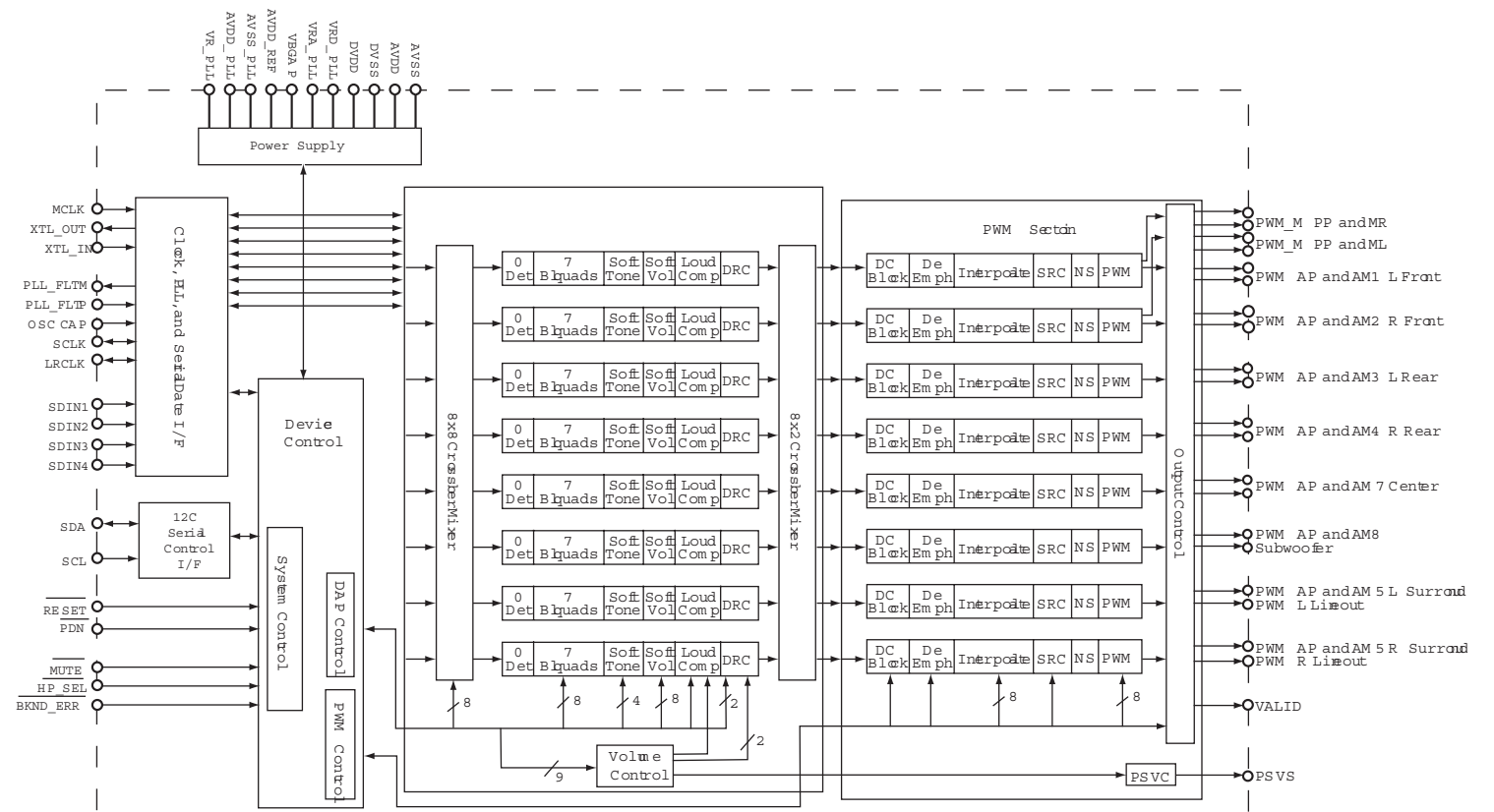
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INTERNAL IC DIAGRAM - MT1389DXE/J

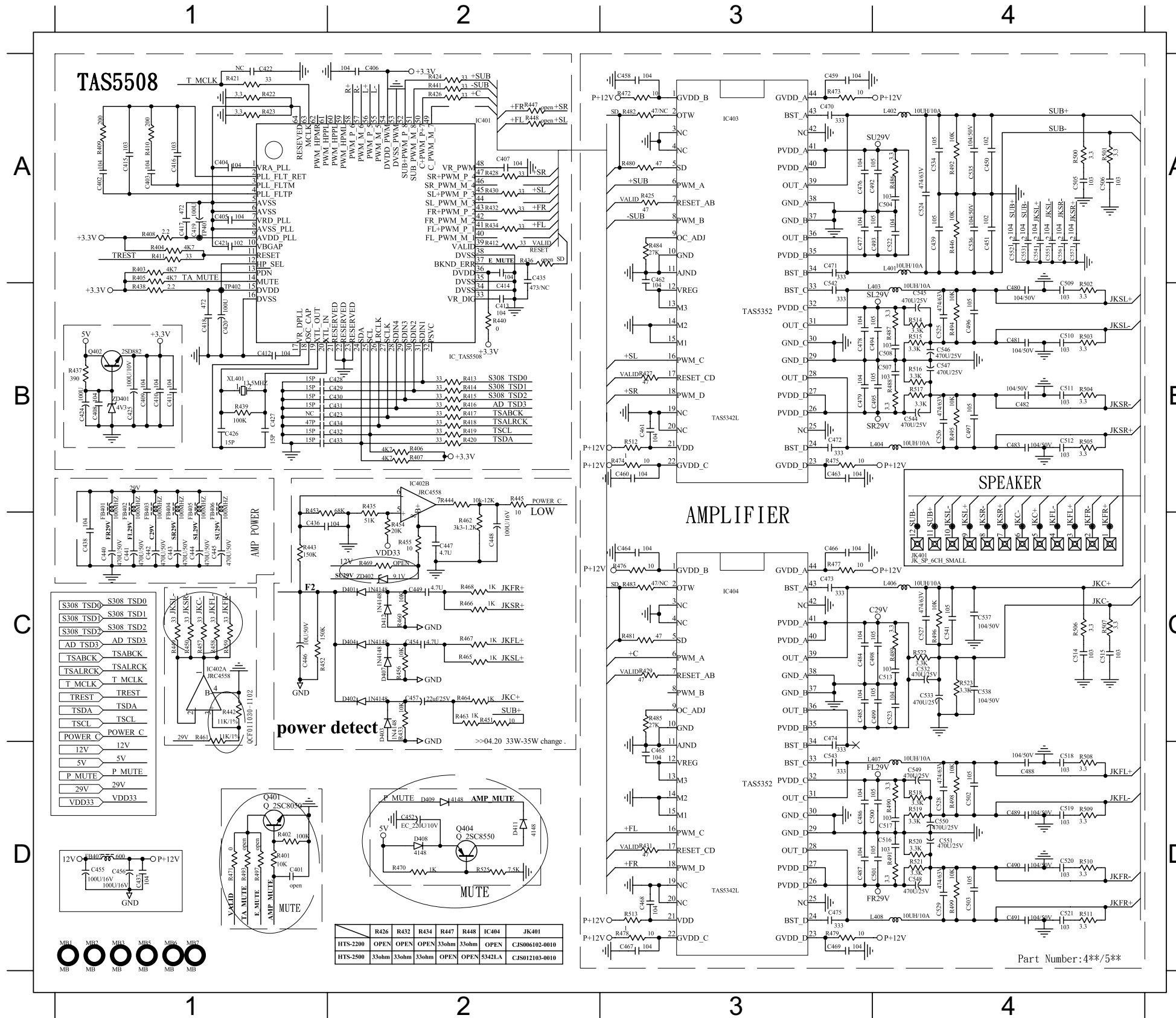


INTERNAL IC DIAGRAM - TAS5508BPAG



CIRCUIT DIAGRAM - part one

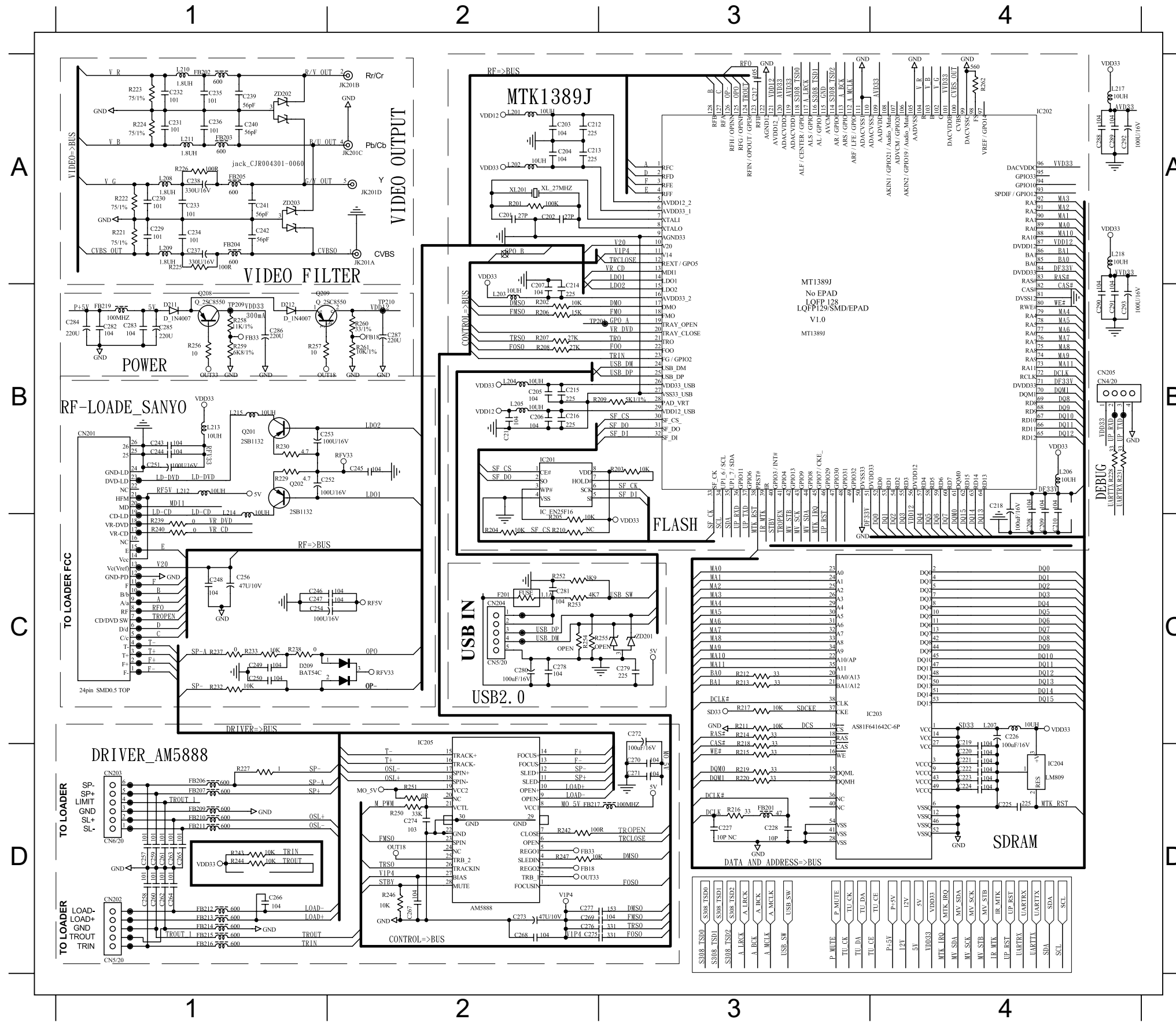
C401 D1 C412 B1 C425 B1 C437 D1 C451 A4 C463 B3 C483 B4 C508 B4 C536 A4 D401 C2 FB406 B1 Q402 B1 R410 A1 R421 A1 R438 B1 R449 C1 R460 C2 R472 A3 R495 B4 R517 B4
 C402 A1 C413 B2 C426 B2 C438 C1 C452 D2 C470 A3 C492 A3 C509 B4 C542 A3 D402 C2 FB407 D1 Q404 D2 R411 A1 R422 A1 R439 B1 R450 C1 R461 C1 R473 A3 R500 A4 R525 D2
 C403 A1 C414 B2 C427 B1 C439 A4 C454 C2 C471 A3 C493 A3 C510 B4 C544 B4 D403 C2 IC401 A2 R401 D1 R412 A2 R423 A1 R440 B2 R451 C2 R462 C2 R474 B3 R501 A4 XL401 B1
 C404 A1 C415 A1 C428 B2 C443 C1 C455 D1 C472 B3 C494 B3 C511 B4 C545 B4 D404 C2 IC402 B2 R402 D1 R413 B2 R424 A2 R441 A2 R452 C1 R463 C2 R475 B3 R502 B4 ZD401 B1
 C405 A1 C416 A1 C429 B2 C444 C1 C456 D1 C476 A3 C495 B3 C512 B4 C546 B4 D407 C2 IC403 A3 R403 A1 R414 B2 R425 A3 R442 C1 R453 B1 R464 C2 R480 A3 R503 B4 ZD402 C2
 C406 A2 C417 A1 C430 B2 C445 C1 C457 C2 C477 A3 C496 B4 C522 A4 C547 B4 D408 D2 JK401 C4 R404 A1 R415 B2 R427 B3 R443 C1 R454 C2 R465 C2 R484 A3 R504 B4
 C407 A2 C418 B1 C431 B2 C446 C1 C458 A3 C478 B3 C497 B4 C524 A4 C552 A4 D409 D2 L401 A4 R405 A1 R416 B2 R432 A2 R444 B2 R455 C2 R466 C2 R486 A4 R505 B4
 C408 B1 C419 A1 C432 B2 C447 C2 C459 A3 C479 B3 C504 A4 C525 B4 C554 A4 D411 D2 L402 A4 R406 B2 R417 B2 R433 C2 R445 B2 R456 C2 R467 C2 R487 B4 R512 B3
 C409 B1 C420 B1 C433 B2 C448 C2 C460 B3 C480 B4 C505 A4 C526 B4 C555 A4 D412 C2 L403 B4 R407 B2 R418 B2 R434 A2 R446 A4 R457 C1 R468 C2 R488 B4 R514 B4
 C410 B1 C421 A1 C434 B2 C449 C2 C461 B3 C481 B4 C506 A4 C534 A4 C556 A4 FB404 B1 L404 B4 R408 A1 R419 B2 R435 B2 R447 A2 R458 C1 R470 D2 R492 A4 R515 B4
 C411 B1 C424 B1 C436 C1 C450 A4 C462 A3 C482 B4 C507 B4 C535 A4 C557 A4 FB405 B1 Q401 D1 R409 A1 R420 B2 R437 B1 R448 A2 R459 C1 R471 D1 R494 B4 R516 B4



Part Number: 4**/5**

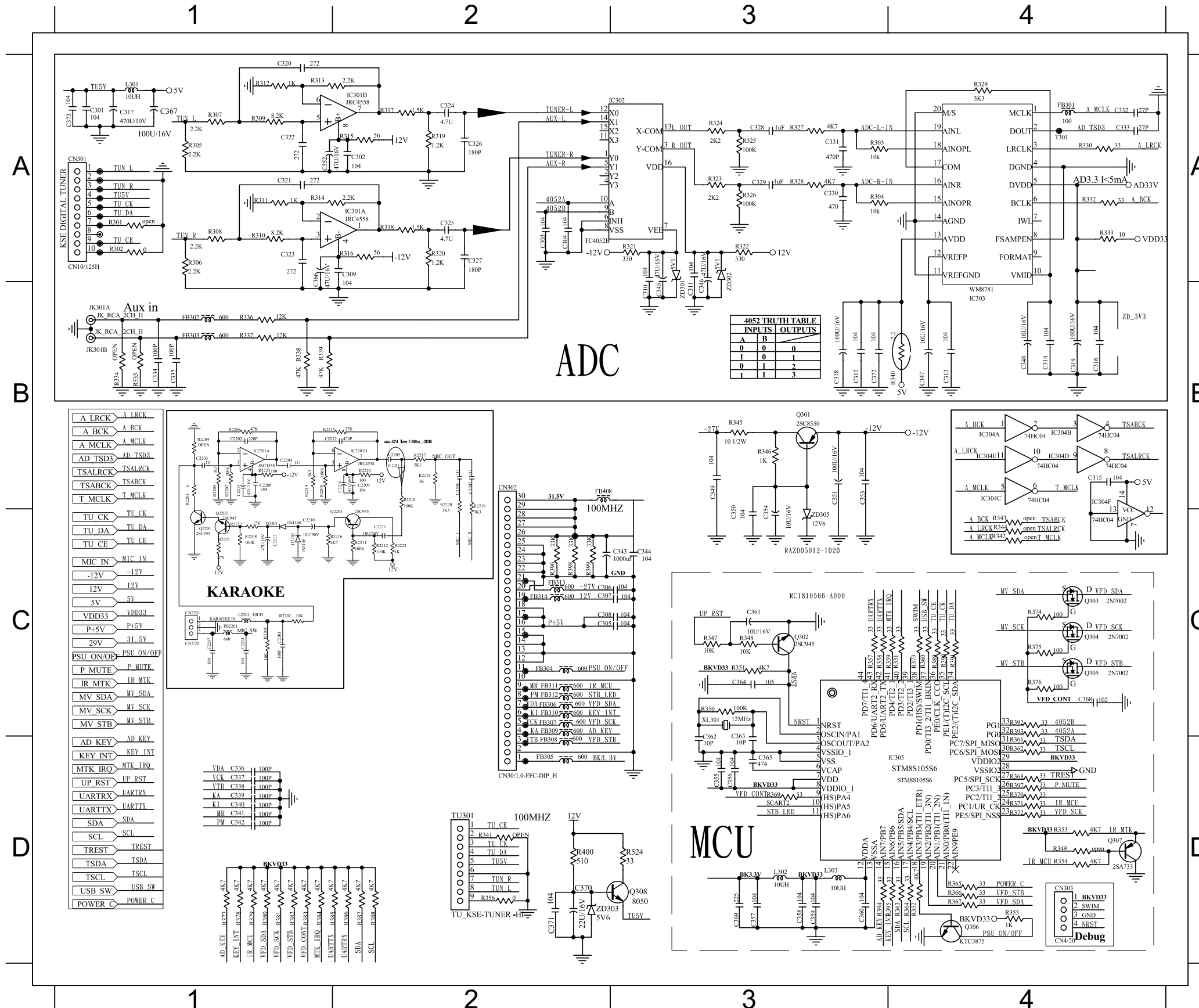
CIRCUIT DIAGRAM - part two

C201 A2 C209 D3 C217 A3 C225 D4 C234 A1 C242 A1 C250 C1 C259 D1 C267 D2 C275 D1 C283 B1 C291 B4 D211 B1 FB206D1 FB215D1 IC205 D2 L207 D3 L215 B1 R202 B2 R211 C3 R219 D3 R227 D1 R238 C1 R250 D2 R260 B2
 C202 A2 C210 D3 C218 B4 C226 D3 C235 A1 C243 B1 C251 B1 C260 D1 C268 D2 C276 D2 C284 B1 C292 A4 D212 B1 FB207D1 FB216D1 JK201A2 L208 A1 L217 A4 R203 B3 R212 C3 R220 D3 R228 B4 R239 C1 R251 D2 R261 B2
 C203 A2 C211 D4 C219 D4 C228 D3 C236 A1 C244 B1 C252 B1 C261 D1 C269 D2 C277 D2 C285 B1 C293 B4 F201 C2 FB209D1 FB217D2 L201 A2 L209 A1 L218 A4 R204 C2 R213 C3 R221 A1 R229 B1 R240 C1 R252 C2 R262 A4
 C204 A2 C212 A2 C220 D4 C229 A1 C237 A1 C245 B2 C253 B1 C262 D1 C270 D3 C278 C2 C286 B1 CN201B1 FB210D3 FB211D1 FB219B1 L202 A2 L210 A1 Q201 B1 R205 C2 R214 C3 R222 A1 R230 B1 R242 D2 R253 C2 XL201A2
 C205 B2 C213 A2 C221 D4 C230 A1 C238 A1 C246 C1 C254 C1 C263 D1 C271 D3 C279 C3 C287 B2 CN202D1 FB202A1 FB211D1 IC201 B2 L203 B2 L211 A1 Q202 B1 R206 B2 R215 D3 R223 A1 R231 B4 R243 D1 R256 B1 ZD201C3
 C206 B2 C214 A2 C222 D4 C231 A1 C239 A1 C247 C1 C256 C1 C264 D1 C272 C3 C280 C2 C288 A4 CN203D1 FB203A1 FB212D1 IC202 A4 L204 B2 L212 B1 Q208 B1 R207 B2 R216 D3 R224 A1 R232 C1 R244 D1 R257 B1 ZD202A1
 C207 B2 C215 B2 C223 D4 C232 A1 C240 A1 C248 C1 C257 D1 C265 D1 C273 D2 C281 C2 C289 A4 CN204C2 FB204A1 FB213D1 IC203 D3 L205 B2 L213 B1 Q209 B1 R208 B2 R217 C3 R225 A1 R233 C1 R246 D2 R258 B1 ZD203A1
 C208 D3 C216 B2 C224 D4 C233 A1 C241 A1 C249 C1 C258 D1 C266 D1 C274 D2 C282 B1 C290 B4 D209 C1 FB205A1 FB214D1 IC204 D4 L206 B4 L214 B1 R201 A2 R209 B3 R218 C3 R226 A1 R237 C1 R247 D2 R259 B1



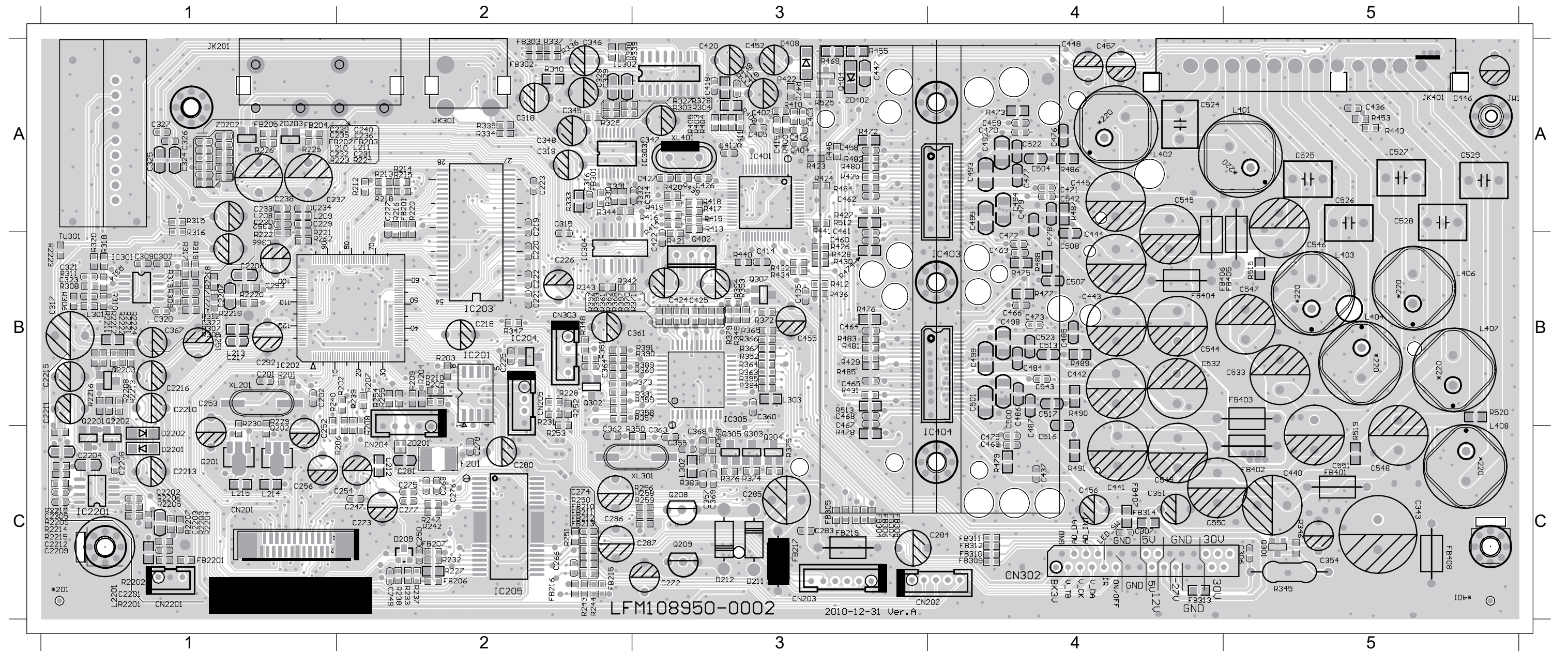
CIRCUIT DIAGRAM - part three

C2201C1 C2210C1 C302 A2 C311 B3 C320 A1 C329 A3 C338 D1 C347 B4 C357 D3 C366 A1 D2202C1 FB308D2 IC301 A2 L303 D3 Q306 D4 R2209B1 R2218B2 R304 A3 R313 A1 R322 A3 R331 C4 R346 B3 R356 D2 R365 D4 R374 C4 R386 D2 R395 D3
 C2202B1 C2211C2 C303 A2 C312 B3 C321 A1 C330 A3 C339 D1 C348 B4 C358 D3 C367 A1 FB2201C1 FB309C2 IC302 A3 Q2201C1 Q307 D4 R2210B2 R2219B2 R305 A1 R314 A1 R323 A3 R332 A4 R347 C3 R357 C3 R366 D4 R375 C4 R387 D2 R396 C2
 C2203B1 C2212B1 C304 A2 C313 B4 C322 A1 C331 A3 C340 D1 C350 B3 C359 D3 C368 C4 FB301A4 FB310C2 IC303 B4 Q2202C1 R2201C1 R2211C2 R2220B2 R306 A1 R315 A2 R324 A3 R333 A4 R348 C3 R358 C3 R367 D4 R376 C4 R388 D2 R397 D4
 C2204B1 C2213C1 C305 C2 C314 B4 C323 A1 C332 A4 C341 D1 C351 B3 C360 D3 C369 D3 FB302B1 FB311C2 IC304 B4 Q2203C1 R2202C1 R2212C2 R2221C1 R307 A1 R316 A2 R325 A3 R336 B1 R350 C3 R359 C3 R368 D4 R377 D1 R389 C4 R398 C2
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 C2206B2 C2215B1 C307 C2 C316 B4 C325 A2 C334 B1 C343 C3 C353 B3 C362 C3 C373 A1 FB304C2 FB313C2 JK301B1 Q302 C3 R2205B1 R2214B1 R2223B1 R309 A1 R318 A2 R327 A3 R338 B1 R352 D4 R361 D4 R370 D4 R379 D1 R391 C4 XL301C3
 C2207B2 C2216B2 C308 C2 C317 A1 C326 A2 C335 B1 C344 C3 C354 B3 C363 C3 CN2201C1 FB305D2 FB314C2 L2201C1 Q303 C4 R2206B1 R2215B1 R2224B2 R310 A1 R319 A2 R328 A3 R339 B1 R353 D4 R362 D4 R371 D4 R383 D1 R392 C4 ZD301B3
 C2208B1 C2217C1 C309 A2 C318 B3 C327 A2 C336 D1 C345 B3 C355 D3 C364 C3 CN302B2 FB306C2 FB408B2 L301 A1 Q304 C4 R2207B1 R2216C2 R302 A1 R311 A1 R320 A2 R329 A4 R340 B4 R354 D4 R363 D4 R372 D4 R384 D1 R393 C4 ZD302B3
 C2209B2 C301 A1 C310 B3 C319 B4 C328 A3 C337 D1 C346 B3 C356 D3 C365 D3 D2201C1 FB307C2 IC2201B1 L302 D3 Q305 C4 R2208C1 R2217B2 R303 A3 R312 A1 R321 A3 R330 A4 R345 B3 R355 D4 R364 D4 R373 C4 R385 D1 R394 D3 ZD305C3



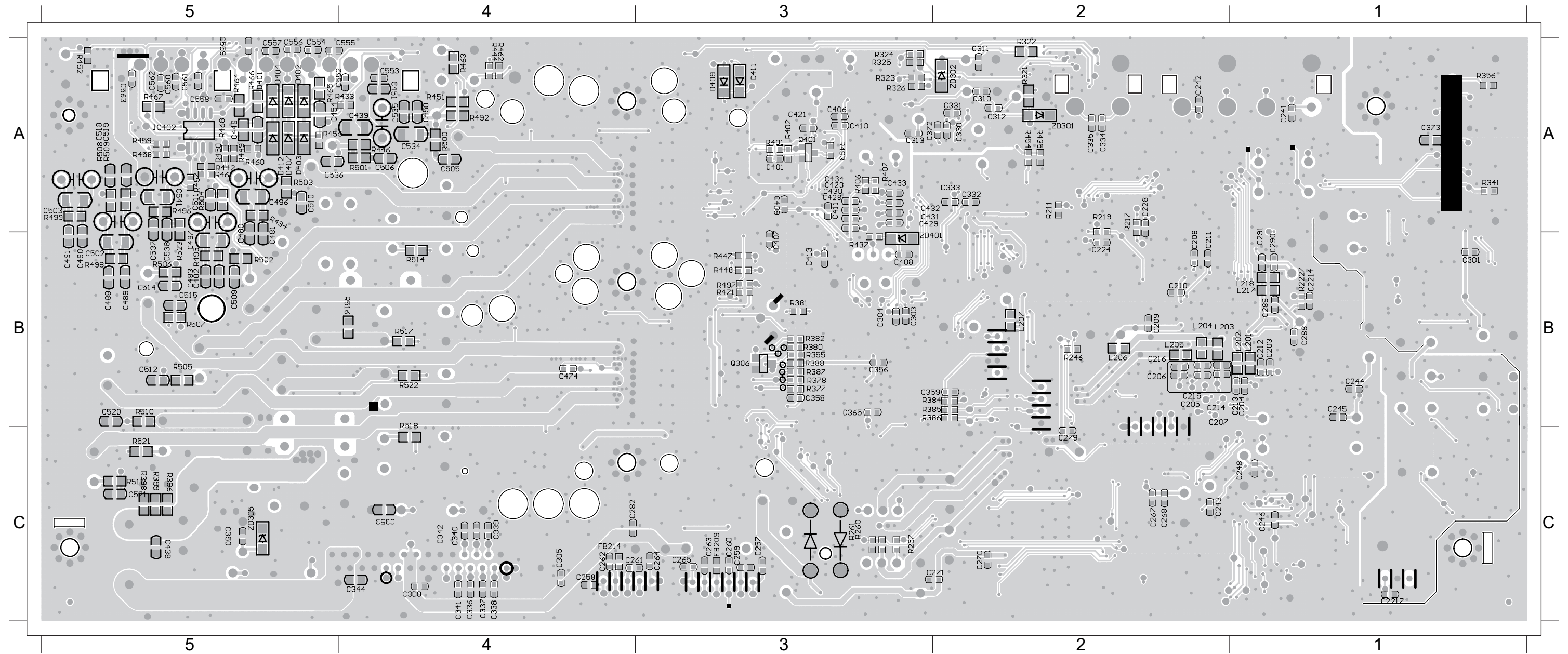
PCB LAYOUT - TOP VIEW

C201	B1 C2213	C1 C247	C2 C283	C3 C323	B1 C361	B3 C420	A3 C460	B3 C524	A4 D408	A3 FB302	A2 IC202	B1 L212	C2 Q301	C5 R214	A2 R2215	C1 R231	B2 R303	A3 R328	A3 R354	B3 R375	C3 R412	B3 R440	B3 TU301	B1	
C202	B1 C2215	B1 C249	C2 C284	C4 C324	A1 C362	C2 C424	B3 C461	A3 C525	A5 F201	C2 FB303	A2 IC203	B2 L213	B1 Q302	B2 R215	A2 R2216	B1 R232	C2 R304	A3 R329	A2 R357	B3 R376	C3 R413	A3 R441	A3 XL201	B1	
C217	B1 C2216	B1 C250	C2 C285	C3 C325	A1 C363	C3 C425	B3 C462	A3 C526	A5 FB201	A2 FB304	C3 IC204	B2 L214	C1 Q303	C3 R216	A2 R2217	B1 R233	C2 R305	B1 R330	A2 R358	B3 R379	B3 R414	A3 R443	A5 XL301	C3	
C218	B2 C222	B2 C251	B1 C286	C2 C286	C2 C326	A1 C364	B2 C426	A3 C463	B4 C542	A4 FB202	A1 FB305	C3 IC205	C2 L215	C1 Q304	C3 R218	A2 R2218	B1 R237	C2 R306	B1 R331	B3 R359	B3 R383	C3 R415	A3 R445	A5 XL401	A3
C219	A2 C223	A2 C252	B1 C287	C3 C327	A1 C366	B1 C427	A3 C470	A4 C544	B4 FB203	A2 FB306	C3 IC2201	C1 L2201	C5 Q305	C3 R220	A2 R2219	B1 R238	C2 R307	A1 R332	A3 R360	B3 R389	B3 R416	A3 R453	A5 ZD201	C2	
C220	B2 C225	B2 C253	B1 C292	B1 C328	A2 C367	C1 C436	A5 C471	A4 C545	A4 FB204	A1 FB307	C3 IC301	B1 L301	C1 Q307	B3 R2201	C4 R222	A1 R239	B2 R308	B1 R333	A2 R361	B2 R390	B3 R417	A3 R455	A3 ZD202	A1	
C2201	C2 C226	B2 C254	C1 C293	B1 C329	A2 C368	C3 C437	C4 C472	B4 C546	B5 FB205	A1 FB308	C3 IC302	A3 L302	C3 Q402	B3 R2202	C1 R2220	B1 R240	B1 R309	A1 R336	A2 R362	B2 R391	B3 R418	A3 R470	A3 ZD203	A1	
C2202	C1 C229	A1 C256	C1 C302	A1 C343	C5 C369	C3 C443	B4 C476	A4 C547	B5 FB206	C2 FB309	C4 IC303	A2 L303	B3 Q404	A3 R2203	C1 R2221	B1 R242	C2 R310	B1 R337	A2 R363	B3 R392	B2 R419	A3 R472	A3 ZD305	C5	
C2203	C1 C230	A1 C266	C2 C306	C5 C345	A2 C402	A3 C444	B4 C477	A4 CN201	C1 FB207	C2 FB310	C4 IC304	B2 L401	A5 R201	B1 R2205	C1 R2222	B1 R243	C2 R311	B1 R338	A2 R364	B3 R393	B2 R420	A3 R473	A4 ZD402	A3	
C2204	C1 C231	A2 C269	C2 C309	B1 C346	A2 C403	A3 C445	A4 C478	A4 CN202	C3 FB210	C2 FB311	C4 IC305	B3 L402	A4 R202	B2 R2206	C1 R2223	B1 R244	C2 R312	A1 R339	A3 R365	B3 R394	B3 R421	B3 R474	B3		
C2205	C1 C232	A1 C272	C3 C314	A3 C347	A3 C404	A3 C446	A5 C479	A4 CN203	C3 FB211	C2 FB312	C4 IC401	A3 L403	B5 R203	B2 R2207	C1 R2224	B1 R247	C2 R313	A1 R340	A2 R366	B3 R395	B3 R422	A3 R475	B4		
C2206	B1 C233	A1 C273	C2 C315	A2 C348	A2 C405	A3 C447	A3 C492	A4 CN204	C2 FB212	C2 FB313	C5 IC403	A4 L404	B5 R204	B2 R2208	B1 R223	A1 R250	C2 R314	B1 R345	C5 R367	B3 R397	B2 R423	A3 R480	A3		
C2207	B1 C234	A1 C274	C2 C316	A2 C351	C5 C412	A3 C448	A4 C493	A4 CN2201	C1 FB213	C2 FB314	C4 JK201	A1 Q201	C1 R205	B2 R2209	C1 R224	A2 R251	C2 R315	A1 R346	C5 R368	B2 R403	A3 R424	A3 R484	A3		
C2208	C1 C235	A1 C275	C2 C317	B1 C352	B1 C414	B3 C452	A3 C494	A4 CN302	C4 FB215	C2 FB404	B4 JK301	A2 Q202	B1 R206	C2 R221	A1 R225	A1 R252	B2 R316	A1 R347	B2 R369	C3 R404	A3 R425	A3 R486	A4		
C2209	C1 C236	A2 C276	C2 C318	A2 C353	C5 C415	A3 C455	B3 C495	B4 D209	C2 FB216	C2 FB405	B5 JK401	A5 Q208	C3 R207	B2 R2210	C1 R226	A1 R253	C2 R317	A1 R348	B2 R370	B2 R405	A3 R427	A3 R487	A4		
C221	B2 C237	A1 C277	C2 C319	A2 C354	C5 C416	A3 C456	C4 C504	A4 D211	C3 FB217	C3 FB406	B4 L208	A1 Q209	C3 R208	B2 R2211	B1 R227	C2 R256	C3 R318	B1 R350	C3 R371	B3 R408	A3 R432	B3 R488	B4		
C2210	B1 C238	A1 C278	C2 C320	B1 C355	C3 C417	A3 C457	A4 C507	B4 D212	C3 FB219	C3 FB407	C4 L209	A1 Q2201	B1 R209	B2 R2212	B1 R228	B2 R258	C3 R319	A1 R351	B2 R372	B3 R409	A3 R434	B3 R512	A3		
C2211	B1 C239	A1 C280	C2 C321	B1 C357	C3 C418	A3 C458	A3 C508	A4 D2201	C1 FB2201	C1 FB408	C5 L210	A1 Q2202	B1 R212	A2 R2213	B1 R229	B1 R259	C3 R320	B1 R352	B3 R373	B3 R410	A3 R438	A3 R515	B5		
C2212	C1 C240	A2 C281	C2 C322	A1 C360	B3 C419	A3 C459	A4 C522	A4 D2202	C1 FB301	A2 IC201	B2 L211	A2 Q2203	B1 R213	A2 R2214	C1 R230	B1 R262	B1 R327	A3 R353	B3 R374	C3 R411	A3 R439	A3 R525	A3		



PCB LAYOUT - BOTTOM VIEW

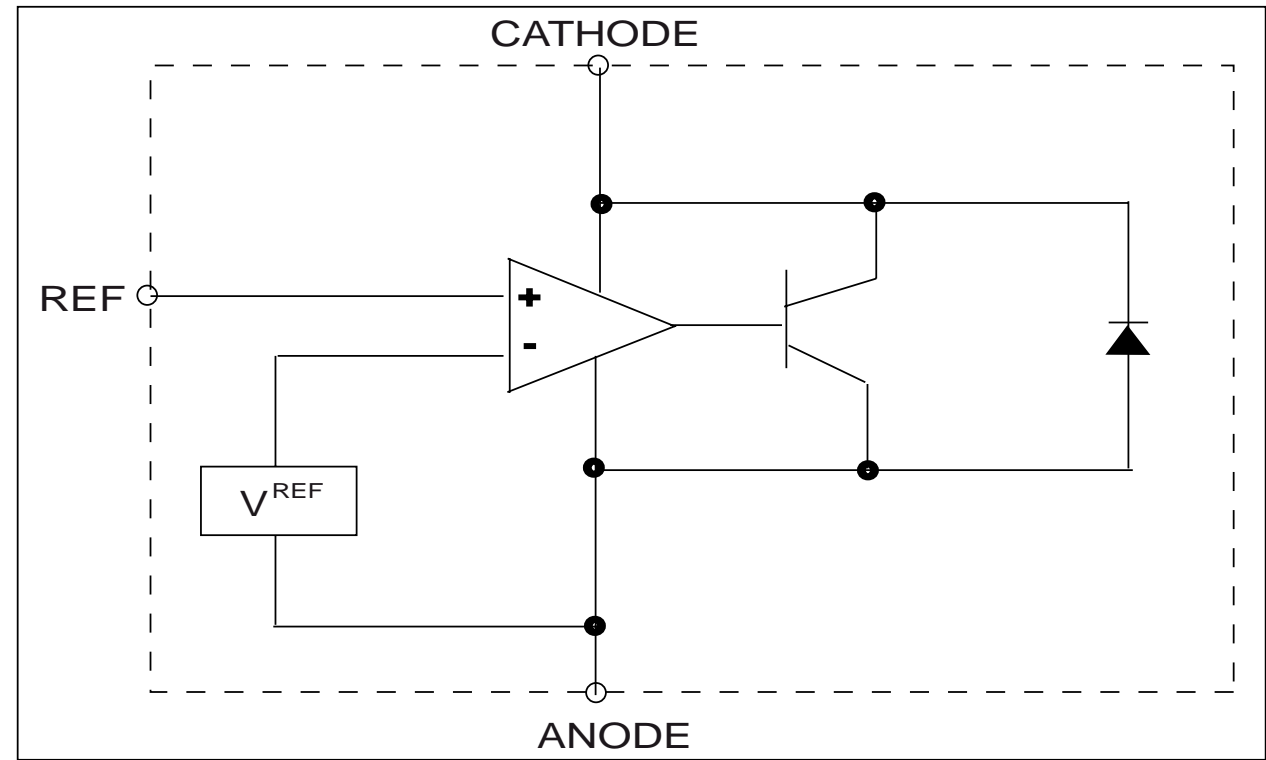
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 C207 B2 C216 B2 C245 B1 C263 C3 C288 B1 C308 C4 C334 A2 C344 C4 C406 A3 C429 A3 C450 A4 C505 A4 C552 A4 D404 A5 L202 B1 Q401 A3 R302 B1 R377 B3 R399 C5 R444 A4 R456 A5 R465 A5 R501 A4 ZD302A2
 C208 B2 C2214B1 C246 C1 C264 C3 C289 B1 C310 A2 C335 A2 C350 C5 C407 B3 C430 A3 C451 A4 C506 A4 C553 A4 D407 A5 L203 B1 R211 A2 R321 A2 R378 B3 R401 A3 R446 A4 R457 A5 R466 A5 R502 B5 ZD401B3
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 C211 B2 C228 A2 C258 C4 C268 C2 C301 B1 C313 A3 C338 C4 C359 B3 C410 A3 C433 A3 C481 A5 C511 A5 C556 A5 D412 A5 L206 B2 R2227B1 R324 A3 R386 B3 R407 A3 R449 A5 R460 A5 R471 B3 R505 B5



POWER BOARD

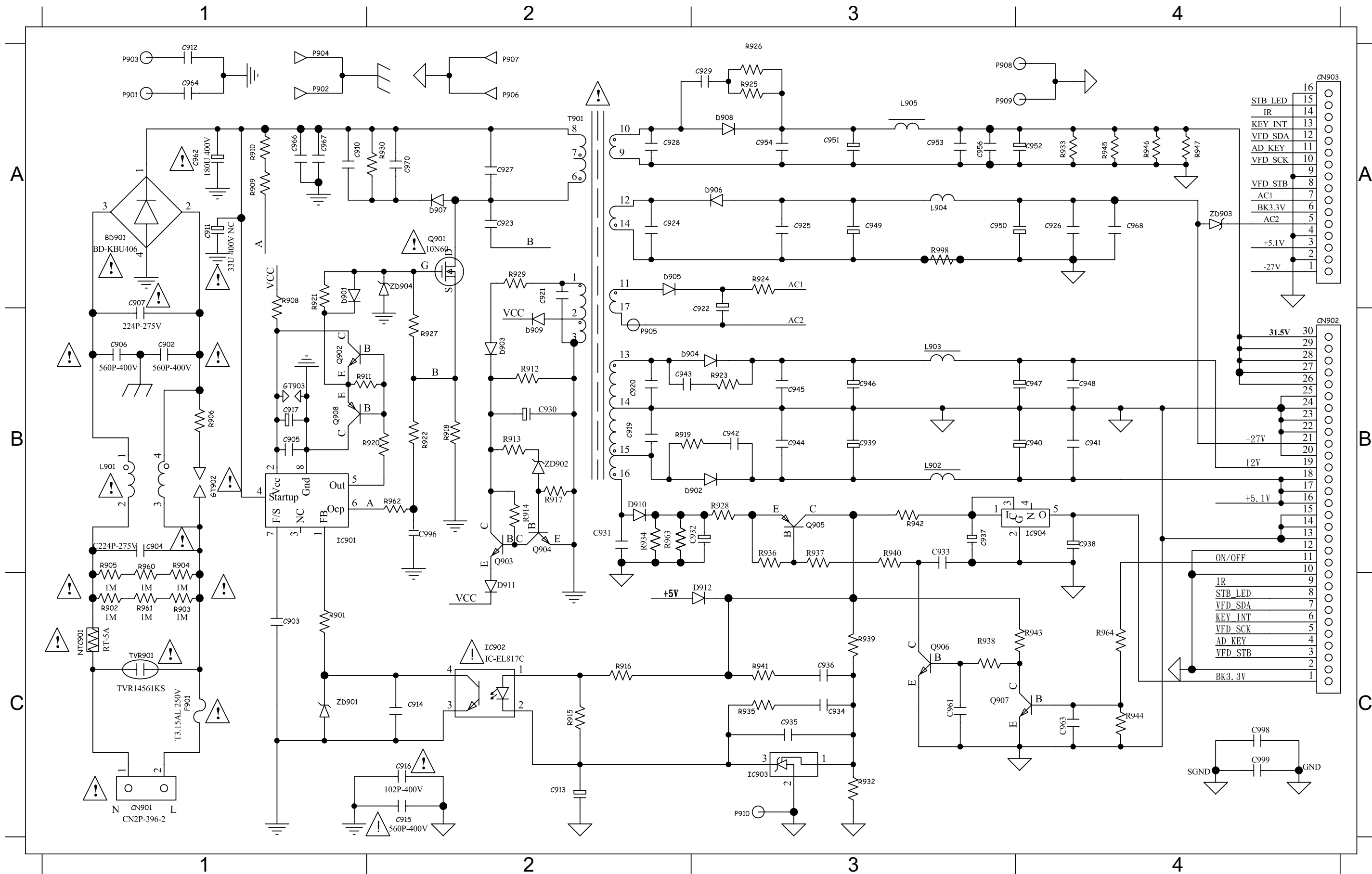
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CIRCUIT DIAGRAM

BD901 A1 C907 A1 C916 C2 C930 B2 C938 B4 C944 A3 C950 A3 C961 C3 C968 A4 D903 B2 D909 B2 IC901 B1 L902 A3 Q903 B2 R902 C1 R911 B1 R917 B2 R923 A3 R929 A2 R936 A3 R942 A3 R960 B1 T901 A2 ZD904 A2
 C902 B1 C910 A1 C917 B1 C932 A3 C939 A3 C945 A3 C951 A3 C962 A1 CN901 C1 D904 A3 D910 B2 IC902 C2 L903 A3 Q904 B2 R903 C1 R912 B2 R918 B2 R924 A3 R930 A2 R937 A3 R943 C4 R961 C1
 C903 C1 C912 A1 C922 A3 C933 A3 C940 B4 C946 A3 C952 A4 C963 C4 CN902 B4 D905 A2 D911 C2 IC903 C3 L904 A3 Q905 A3 R904 B1 R913 B2 R919 B2 R925 A3 R932 C3 R938 C3 R944 C4 R962 B2 ZD901 C1
 C904 B1 C913 C2 C925 A3 C934 C3 C941 B4 C947 B4 C953 A3 C964 A1 CN903 A4 D906 A3 D912 C3 IC904 C3 L905 A3 Q906 C3 R905 B1 R914 B2 R920 B2 R926 A3 R933 A4 R939 C3 R945 A4 R963 B2 ZD901 C1
 C905 B1 C914 C2 C926 A4 C935 C3 C942 A3 C948 B4 C954 A3 C966 A1 D901 A1 D907 A2 F901 C1 IC905 B4 NTC901 C1 Q907 C3 R906 B1 R915 C2 R921 A1 R927 B2 R934 B2 R940 A3 R946 A4 R964 C4 ZD902 B2
 C906 B1 C915 C2 C929 A3 C936 C3 C943 B2 C949 A3 C956 A3 C967 A1 D902 A3 D908 A3 GT902 B1 L901 B1 Q901 A2 R901 C1 R908 A1 R916 C2 R922 B2 R928 A3 R935 C3 R941 C3 R947 A4 T901 A2 ZD903 A4

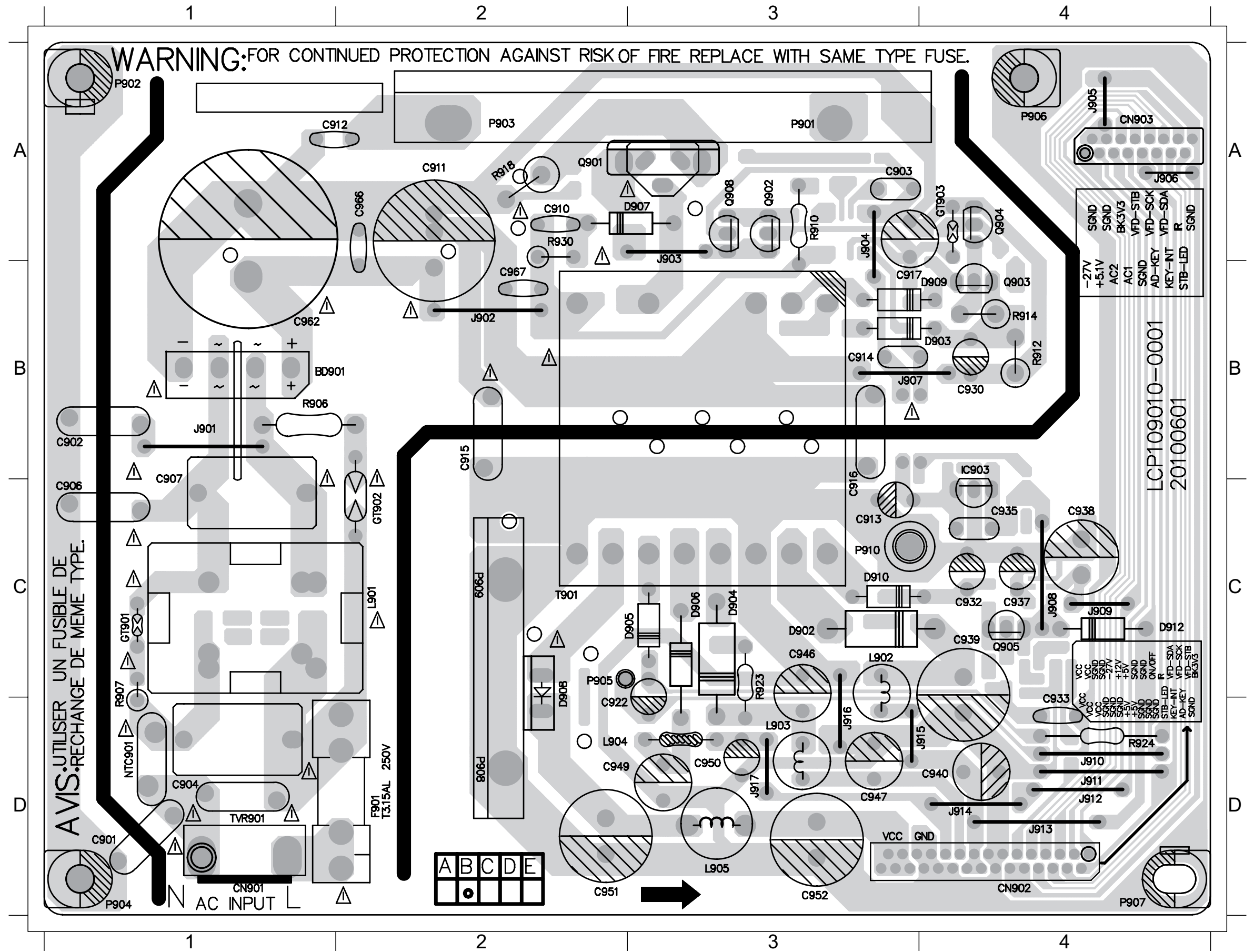


STB LED	16
IR	15
KEY INT	14
VFD_SDA	13
VFD_SCK	12
AD KEY	11
VFD STB	10
AC1	9
BK3.3V	8
AC2	7
+5.1V	6
-27V	5
	4
	3
	2
	1

31.5V	30
	29
	28
	27
	26
	25
	24
	23
	22
-27V	21
12V	20
	19
	18
+5.1V	17
	16
	15
	14
	13
	12
ON/OFF	11
IR	10
STB LED	9
VFD_SDA	8
VFD_SCK	7
KEY INT	6
VFD STB	5
AD KEY	4
BK3.3V	3
	2
	1

PCB LAYOUT - TOP VIEW

BD901	B1	C910	A2	C917	B3	C938	C4	C950	D3	CN901	D1	D905	C3	D912	C4	J902	B2	J908	C4	J915	D3	L904	D2	Q905	C4	R924	D4
C902	B1	C912	A1	C922	D2	C939	C4	C951	D2	CN902	D4	D906	C3	F901	D2	J903	A3	J909	C4	J916	D3	L905	D3	R906	B1	R930	A2
C903	A3	C913	C3	C930	B4	C940	D4	C952	D3	CN903	A4	D907	A3	GT902	C2	J904	A3	J910	D4	J917	D3	NTC901	D1	R912	B4	T901	C2
C904	D1	C914	B3	C932	C4	C946	C3	C962	B1	D902	C3	D908	D2	IC903	B4	J905	A4	J912	D4	L901	C2	Q901	A2	R914	B4	T901	C2
C906	C1	C915	B2	C933	D4	C947	D3	C966	A2	D903	B4	D909	B4	IC903	B4	J906	A4	J913	D4	L902	C3	Q903	B4	R918	A2	TVR901	D1
C907	B1	C916	B3	C935	C4	C949	D2	C967	B2	D904	C3	D910	C3	J901	B1	J907	B3	J914	D4	L903	D3	Q904	A4	R923	C3		

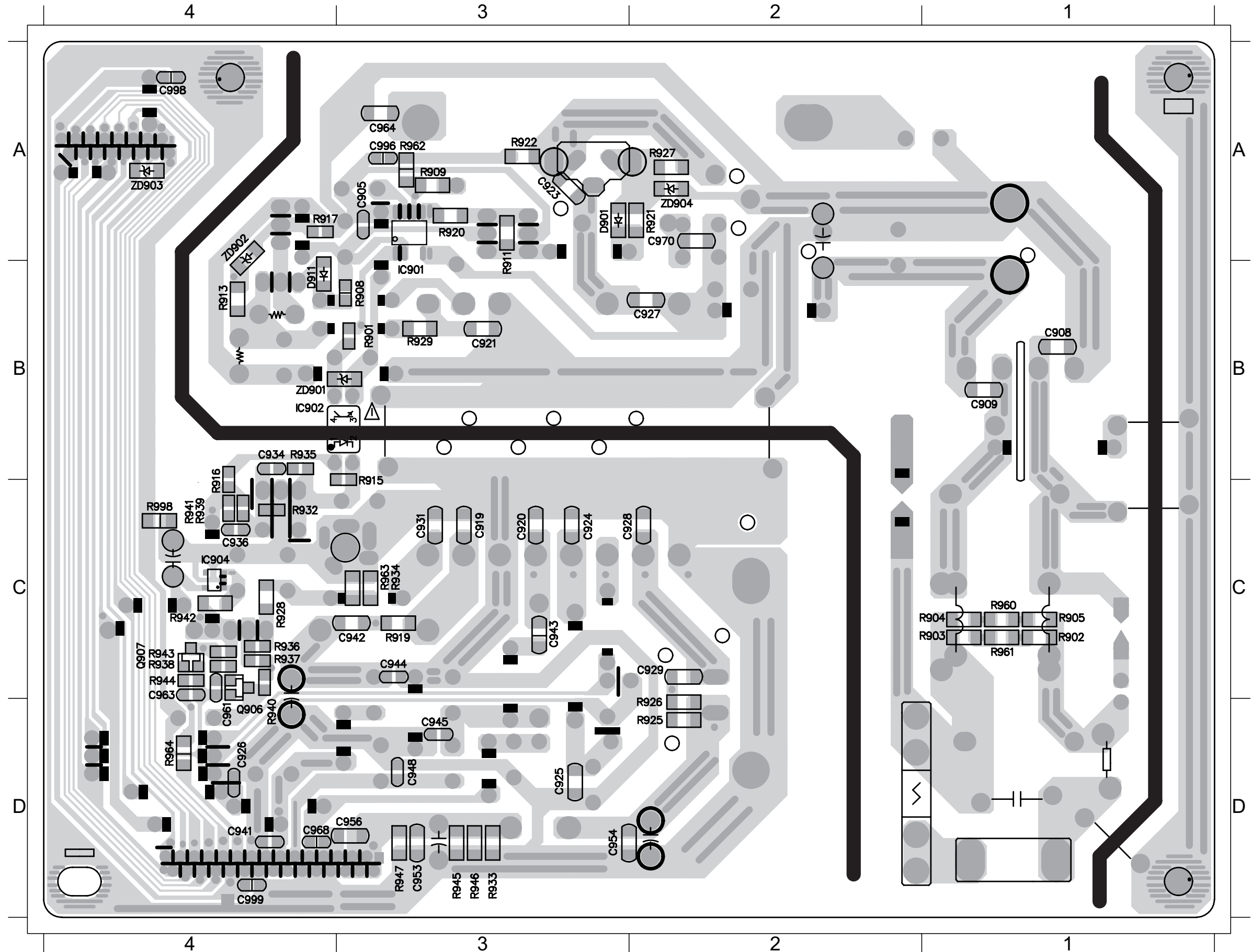


PCB LAYOUT - BOTTOM VIEW

8 - 4

8 - 4

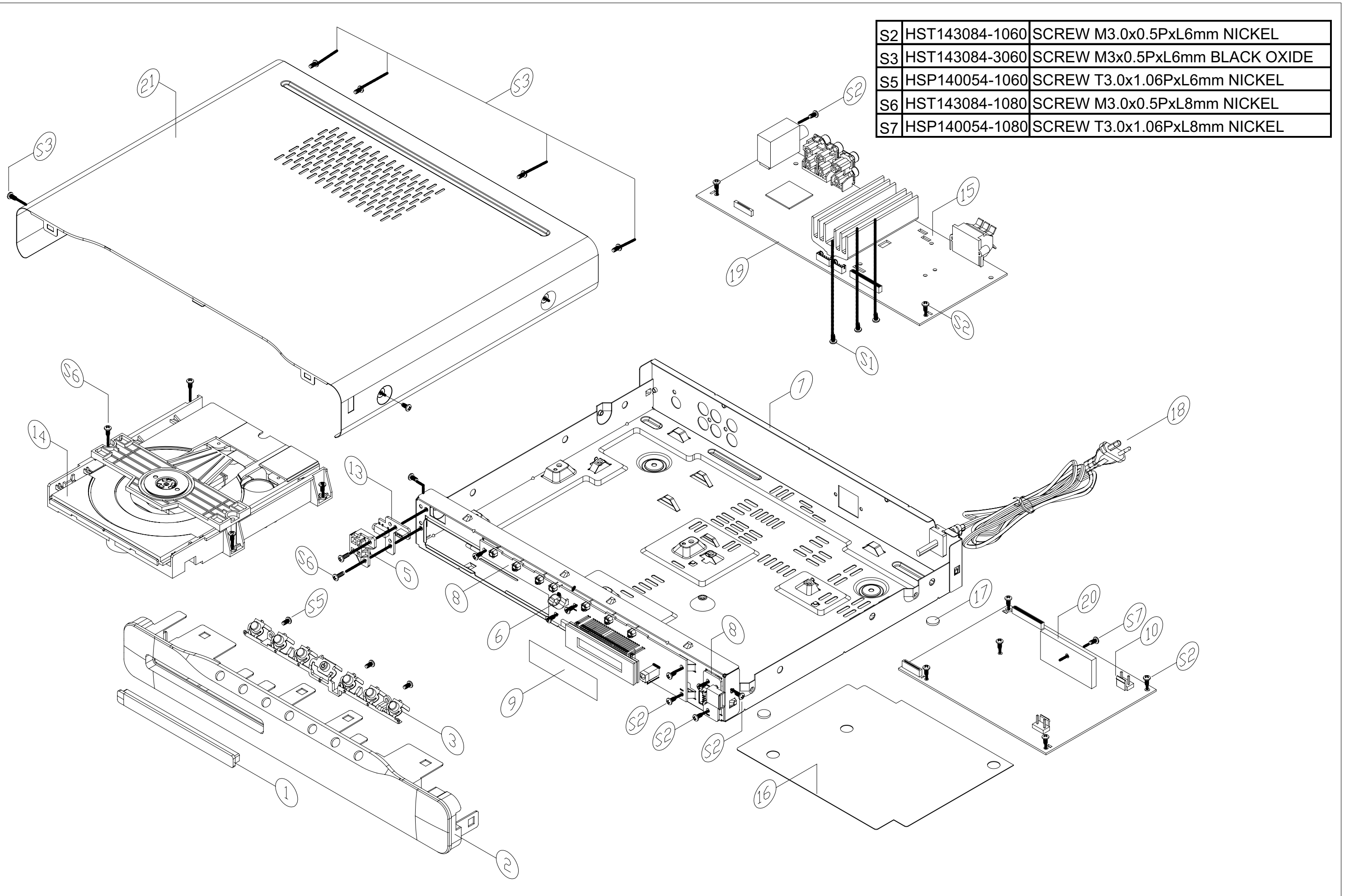
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C925	D3	C941	D4	C948	D3	C963	C4	IC901	B3	R901	B3	R908	B3	R917	A4	R925	D2	R932	C4	R937	C4	R942	C4	R947	D3	R964	D4	ZD904	A2
C926	D4	C942	C3	C953	D3	C964	A3	IC902	B4	R902	C1	R911	B3	R919	C3	R926	D2	R933	D3	R938	C4	R943	C4	R960	C1	ZD901	B4		
C929	C2	C943	C3	C954	D3	C968	D4	IC904	C4	R903	C1	R913	B4	R920	A3	R927	A2	R934	C3	R939	C4	R944	C4	R961	C1	ZD901	B4		
C934	B4	C944	C3	C956	D3	D901	A3	Q906	D4	R904	C1	R915	C3	R921	A2	R928	C4	R935	B4	R940	D4	R945	D3	R962	A3	ZD902	A4		



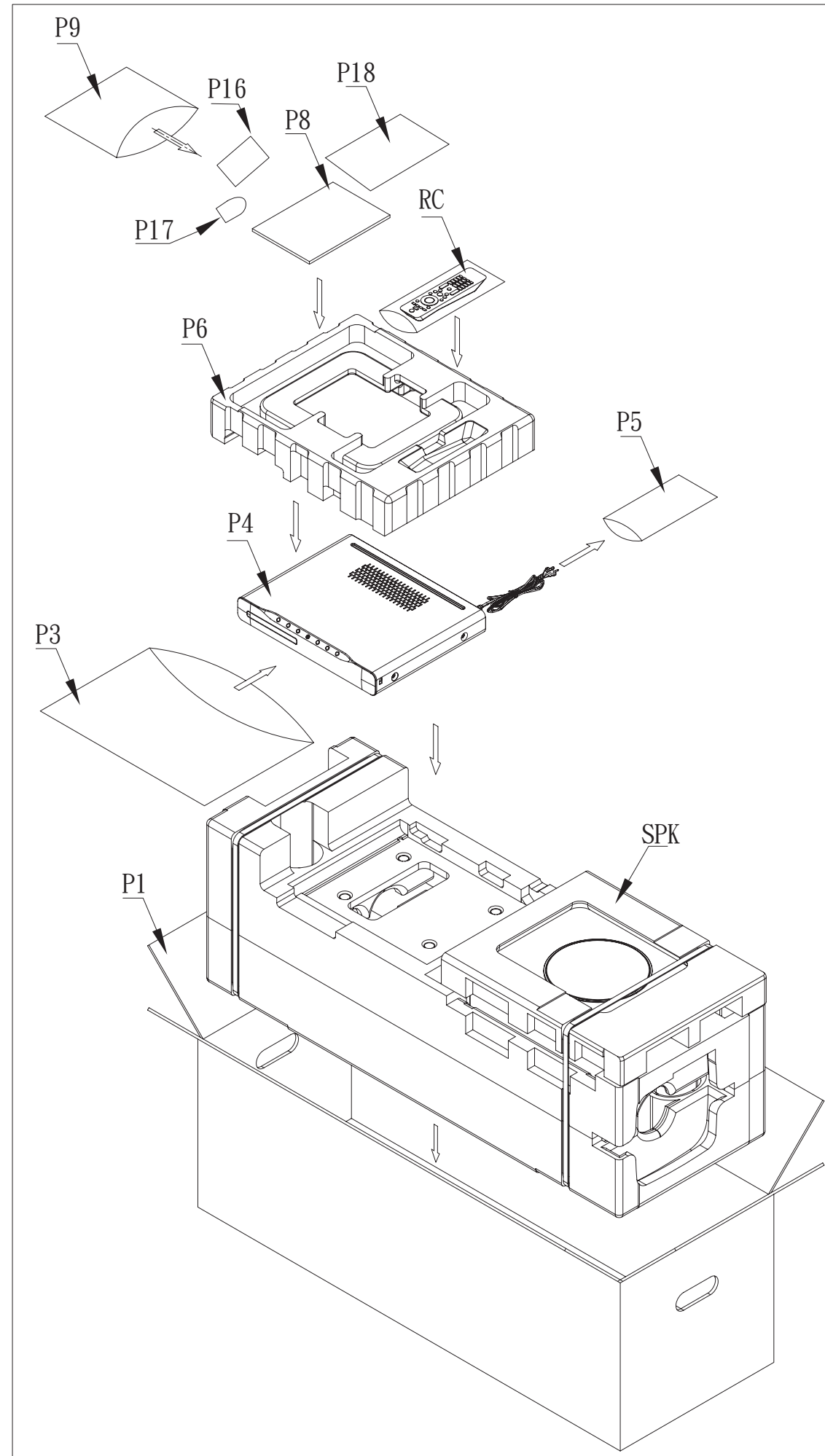
Mechanical Exploded View

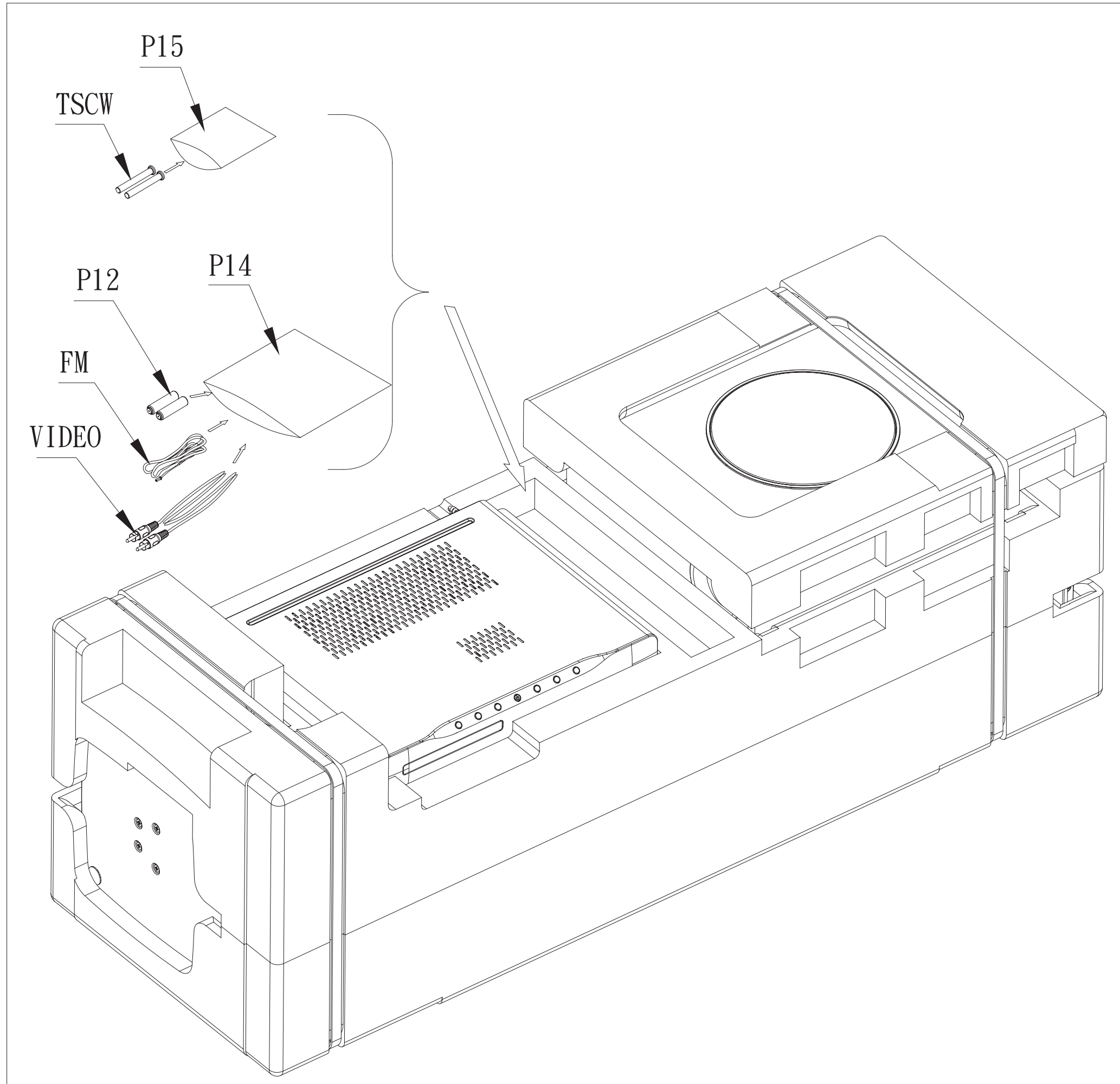
9 - 1

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S2	HST143084-1060	SCREW M3.0x0.5PxL6mm NICKEL
S3	HST143084-3060	SCREW M3x0.5PxL6mm BLACK OXIDE
S5	HSP140054-1060	SCREW T3.0x1.06PxL6mm NICKEL
S6	HST143084-1080	SCREW M3.0x0.5PxL8mm NICKEL
S7	HSP140054-1080	SCREW T3.0x1.06PxL8mm NICKEL





REVISION LIST

Version 1.0

*Initial release