

Service
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Service Manual

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**CLASS 1
LASER PRODUCT**

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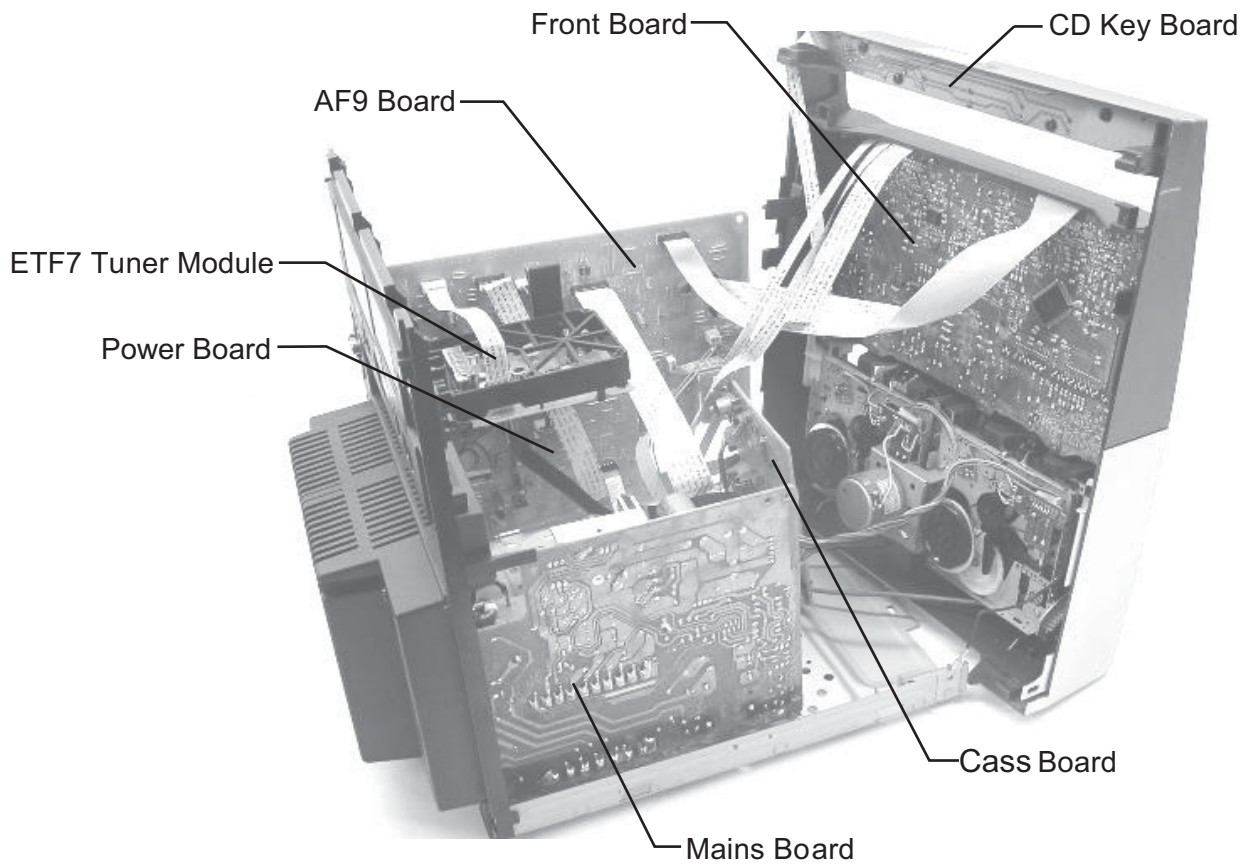
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Version 1.1



PHILIPS

LOCATION OF PCBS

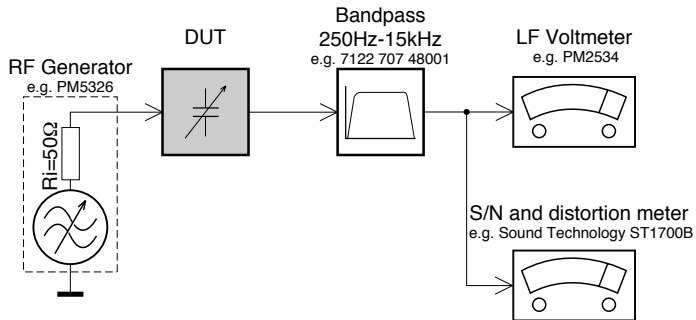


VERSION VARIATIONS:

Type /Versions:	FWM372/FWM572							
	/05	/12	/55					
Features & Board in used:								
Karaoke								
News	x	x						
RDS	x	x						
Rotary Encoder (volume control)	x	x	x					
Jog Shuttle								
Voltage Selector			x					
Aux Input	x	x	x					
Digital Output								
Headphone Socket	x	x	x					
Line Output	x	x	x					
Matrix Surround Loudspeakers								
Standby - FTD Clock Display	x	x	x					
ECO Standby - Dark	x	x						
ECO6 Tuner board - System Non-Cenelec			x					
ECO6 Tuner board - System Cenelec	x	x						
ETF7 Tape Module: Non-Autoreverse Ferro	x	x	x					
USB Direct	x	x	x					

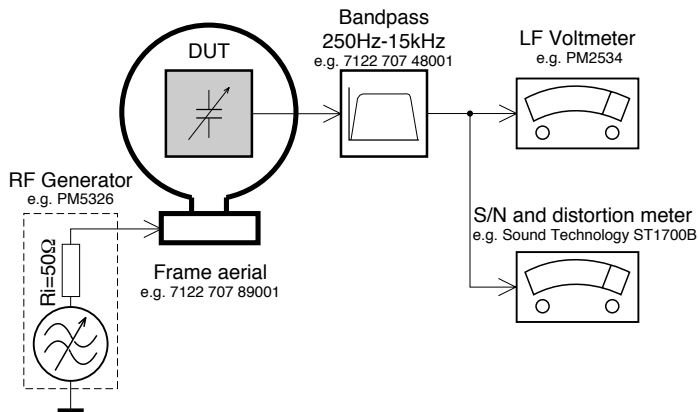
MEASUREMENT SETUP

Tuner FM



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

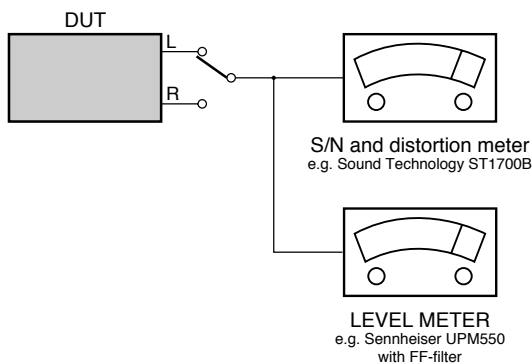
Tuner AM (MW,LW)



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).

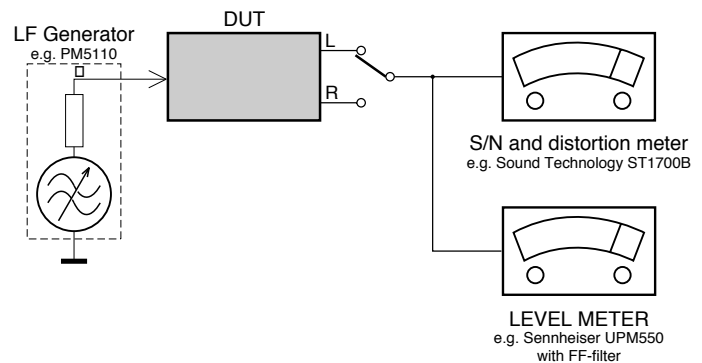
CD

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

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

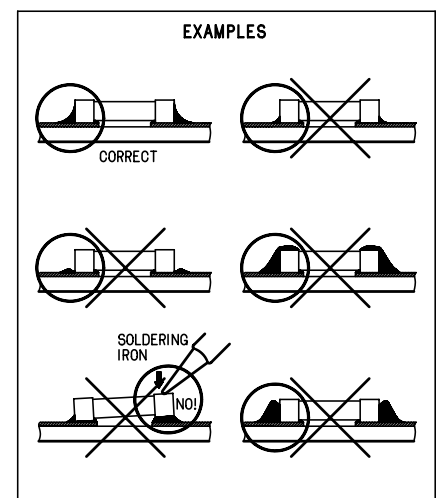
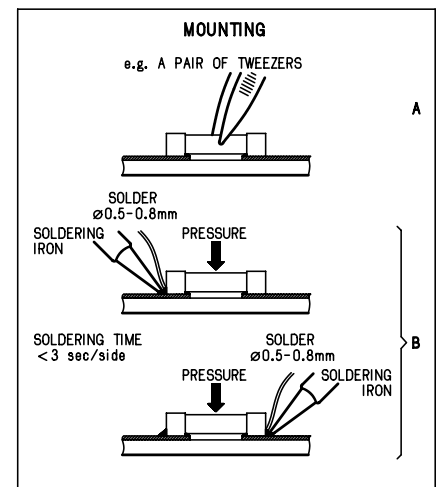
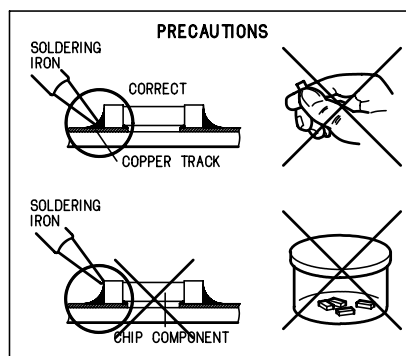
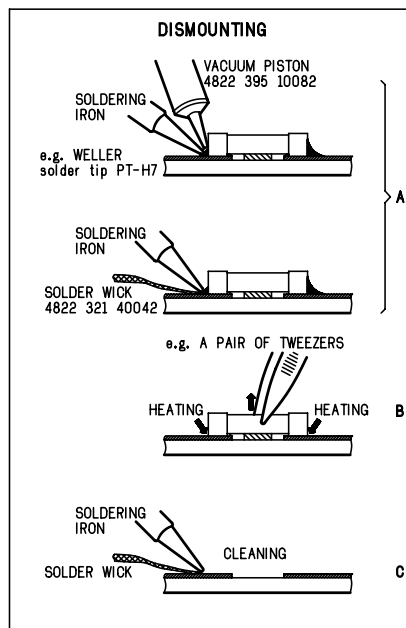
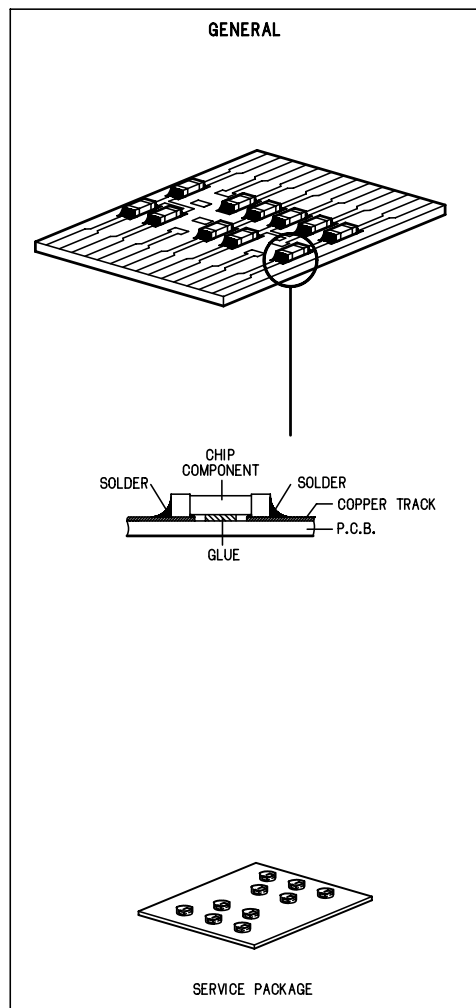
Compact Disc:

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

ESD Equipment:

Anti-static table mat - large 1200x650x1.25mm ...	4822 466 10953
anti-static table mat - small 600x650x1.25mm	4822 466 10958
Anti-static wristband	4822 395 10223
Connectorbox (1M Ω)	4822 395 11307
Extension cable (to connect wristband to conn.box)	4822 320 11305
Connecting cable (to connect table mat to conn.box)	4822 320 11306
Earth cable (to Connect product to mat or box) --	4822 320 11308
Complete kit ESD3 (combining all above products)	4822 320 10671
Wristband tester	4822 344 13999

HANDLING CHIP COMPONENTS



**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.

ESD**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.

**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.

**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.

**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.



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

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



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



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



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



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.

"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."

**Warning !**

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

**Varning !**

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

**Varoitus !**

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

**Advarse !**

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

INFORMATION ABOUT LEAD-FREE SOLDERING

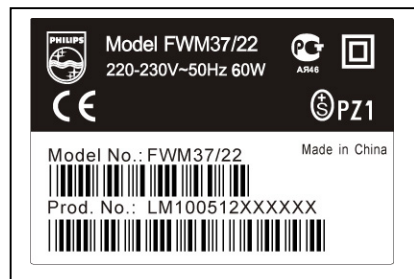
Philips CE is producing lead-free sets from 1.1.2005 onwards.

IDENTIFICATION:

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



Example S/N:



Bottom line of typeplate gives a 14-digit S/N. Digit 5&6 is the year, digit 7&8 is the week number, so in this case 2005 wk12

So from **0501** onwards = from 1 Jan 2005 onwards

Important note: In fact also products of year 2004 must be treated in this way as long as you avoid mixing solder-alloys (lead/ 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 un-used 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 "drypackaging" (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*if*, chapter *iworkshop news*!

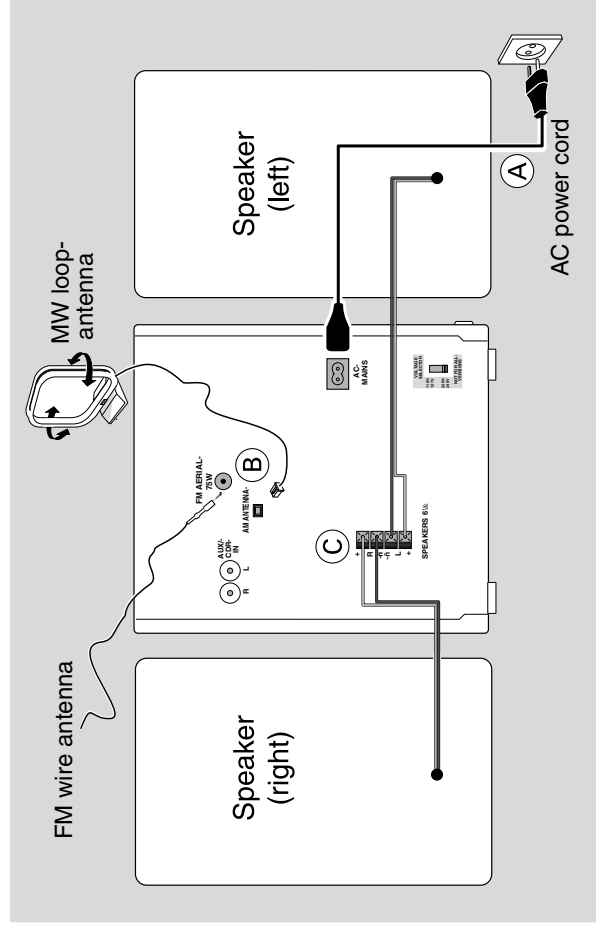
For additional questions please contact your local repair-helpdesk.

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.

Preparations



Preparations

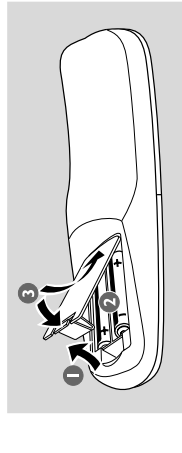
- OR
- for the devices with USB cables:**
- 1 Insert one plug of the USB cable (not supplied) to the socket on the set.
 - 2 Insert the other plug of the USB cable to the USB output terminal of the USB device.
- OR
- for the memory card:**
- 1 Insert the memory card into a card reader (not supplied).
 - 2 Use a USB cable (not supplied) to connect the card reader into the socket on the set.
- Connecting a non-USB device**
- Use a cinch cable to connect **AUX** to the analogue audio out terminals of an external equipment (TV,VCR, Laser Disc player, DVD player or CD Recorder).

Note:

- If you are connecting equipment with a mono output (a single audio out terminal), connect it to the **AUX** left terminal. Alternatively, you can use a "single to double" cinch cable (the output sound still remain mono).

Inserting batteries into the remote control

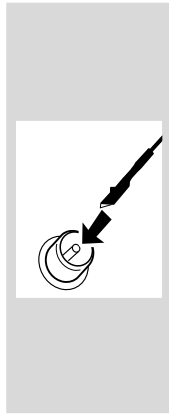
Insert two batteries (Type R06 or AA) into the remote control with the correct polarity as indicated by the "+" and "-" symbols inside the battery compartment.



CAUTION!

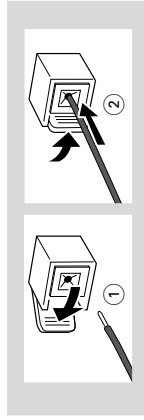
- Remove batteries if they are exhausted or will not be used for a long time.
- Do not use old and new or different types of batteries in combination.
- Batteries contain chemical substances, so they should be disposed of properly.

FM Antenna



For better FM stereo reception, connect an outdoor FM antenna to the **FM ANTENNA** terminal.

- © **Speakers Connection**
- Front Speakers**
- Connect the speaker wires to the **SPEAKERS** terminals; right speaker to "**R**" and left speaker to "**L**", coloured (marked) wire to "+" and black (unmarked) wire to "-".



Fully insert the stripped portion of the speaker wire into the terminal as shown.

Notes:

- For optimal sound performance, use the supplied speakers.
- Do not connect more than one speaker to any one pair of +/- speaker terminals.
- Do not connect speakers with an impedance lower than the speakers supplied. Please refer to the **SPECIFICATIONS** section of this manual.

Optional connection

The optional equipment and connecting cords are not supplied. Refer to the operating instructions of the connected equipment for details.

Connecting a USB device or memory card

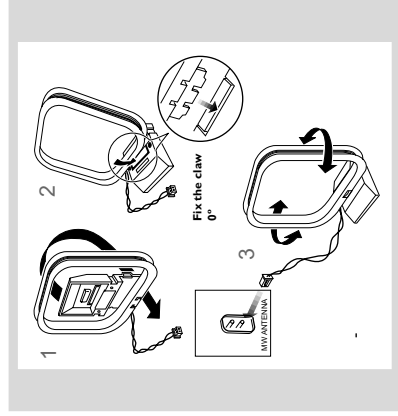
By connecting a USB mass storage device (including USB flash memory, USB flash players or memory cards) to the Hi-Fi system, you can enjoy the device's stored music through the powerful speakers of Hi-Fi system.

Insert the USB device's USB plug into the socket on the set.

© **Antennas Connection**

Connect the supplied MW loop antenna and FM antenna to the respective terminals. Adjust the position of the antenna for optimal reception.

MW Antenna



Position the antenna as far as possible from a TV, VCR or other radiation source.

Rear connections

The type plate is located at the rear of the system.

© **Power**

- Before connecting the AC power cord to the wall outlet, ensure that all other connections have been made.
- If your system is equipped with a Voltage Selector; set the **VOLTAGE SELECTOR** to the local power line voltage.

Warning!

- For optimal performance, use only the original power cable.
- Never make or change any connections with the power switched on.

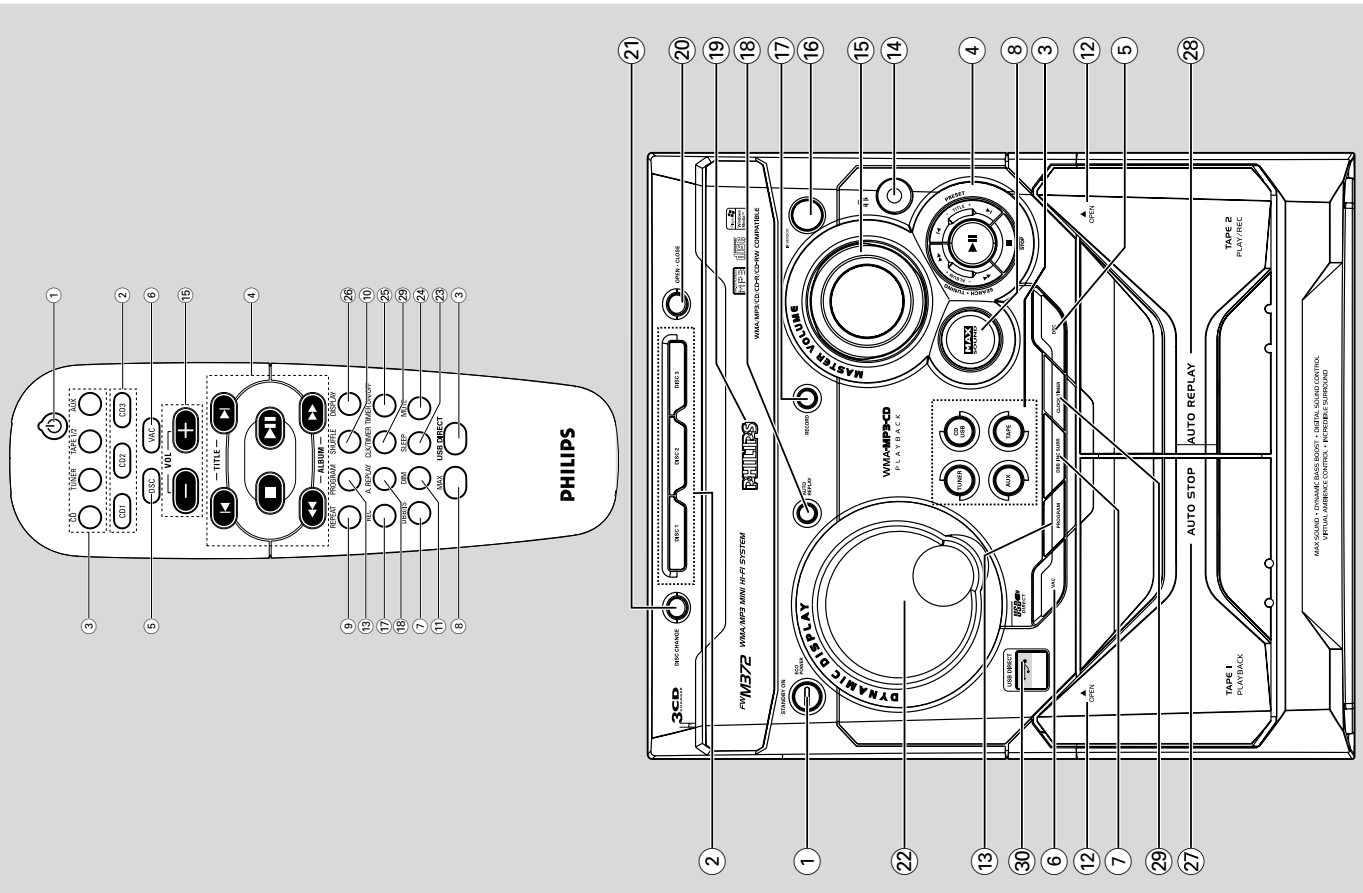
To avoid overheating of the system, a safety circuit has been built in. Therefore, your system may switch to Standby mode automatically under extreme conditions. If this happens, let the system cool down before reusing it (not available for all versions).

PREPARATIONS AND CONTROLS

Controls

Controls on the system and remote control

- ① **STANDBY-ON/ ECO POWER (⏻)**
 - switches the system on or to Eco Power standby/normal standby with clock display.
- ② **DISC 1/2/3 (CD 1/2/3)**
 - to select a disc tray for playback.
- ③ **Source selection** – to select the following :
 - CD/USB** (on the system only)
 - to switch between disc or USB source.
 - CD** (on the remote only)
 - to select disc source.
 - press repeatedly to select a disc tray for playback.
- TUNER**
 - to select waveband : FM or AM.
- TAPE (TAPE 1/2)**
 - to select tape deck 1 or 2.
- AUX**
 - to select the input for an additional appliance : AUX.
- USB DIRECT** (on the remote only)
 - to select USB source directly.
- ④ **Mode Selection**
 - ALBUM – / + ◀ ▶**
 - for MP3-CD/USB .. to select previous/next album.
 - for CD to search backward/forward.
 - for Tuner to tune to a lower or higher radio frequency.
 - for Tape to rewind or fast forward.
 - for Clock (on the system only) to set the hour.
- STOP ■**
 - for CD/ MP3-CD/USB to stop playback or to clear a programme.
 - for Tuner (on the system only) to stop programming.
 - for Tape to stop playback or recording.
 - for Demo (on the system only) to activate/deactivate the demonstration.
- for Clock (on the system only) to exit clock setting.
- for Plug & Play (on the system only) to exit plug & play mode.
- ▶ **II**
 - for CD/ MP3-CD/USB to start or interrupt playback.
 - for Tape to start playback.
 - for Plug & Play (on the system only) to initiate and start plug & play mode.
- TITLE – / + ◀ ▶ PRESET**
 - for MP3-CD/USB .. to select previous/next title.
 - for CD to skip to the beginning of the current, previous, or next track.
 - for Tuner to select a preset radio station.
 - for Clock (on the system only) to set the minute.
- ⑤ **DSC**
 - selects different type of preset sound equaliser settings. (OPTIMAL, JAZZ, ROCK or TECHNO)
- ⑥ **VAC**
 - selects different type of ambience-based equaliser settings. (HALL, CONCERT or CINEMA)
- ⑦ **DBB/INC. SURR (DBB/IS)**
 - to select the desired bass boost level. (DBB 1, DBB 2, DBB 3 or DBB OFF)
 - to activate or deactivate the surround sound effect.
- ⑧ **MAX SOUND (MAX)**
 - to activate or deactivate the optimal mix of various sound features.
- ⑨ **REPEAT**
 - to playback track(s)/disc(s)/programme repeatedly.
- ⑩ **SHUFFLE**
 - Turns on/off the random play mode.



PREPARATIONS AND CONTROLS

Controls

- 11

DIM

–

to select different brightness for the display screen : DIM 1, DIM 2, DIM 3 or DIM OFF.

12

OPEN 

–

to open the tape deck door.

13

PROGRAM

–

for CD/ MP3-CD/USB to programme disc tracks.
– for Tuner to programme preset radio stations.
– for Clock to select 12- or 24-hour clock mode.

14



–

to connect headphones.

15

MASTER VOLUME (VOL -/+)

–

to increase or decrease the volume.

16

IR SENSOR

–

sensor for the infrared remote control.

17

RECORD (REC)

–

to start recording on tape deck 1 or 2.

18

AUTO REPLAY (A. REPLAY)

–

to select continuous playback in either AUTO REPLAY or ONCE MODE only.

19

Disc tray

20

OPEN•CLOSE

–

to open or close the disc tray.

21

DISC CHANGE

–

to change disc(s).

22

Display screen

–

to view the current status of the system.

23

SLEEP

–

to activate/deactivate or set the sleep timer:

≤

MUTE

–

mutes or restores the volume.

∞

TIMER ON/OFF

–

activates/deactivates the timer function.
- 26

DISPLAY

–

to display the album and title name for MP3 disc.

≥

Tape deck 1

28

Tape deck 2

29

CLOCK•TIMER (CLK/TIMER)

–

to view the clock.


30

USB DIRECT 

–

jack for the external USB mass storage device.
- Notes for remote control:

– First, select the source you wish to control by pressing one of the source select keys on the remote control (CD or TUNER, for example).

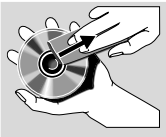
– Then select the desired function (, , , , for example).

MAINTENANCE AND TROUBLESHOOTING

Maintenance

Cleaning the Cabinet

Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasives.



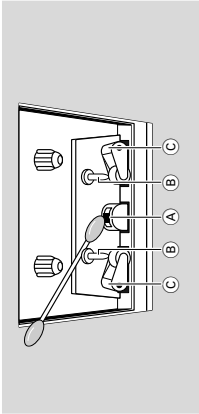
Cleaning Discs

When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the centre out. Do not wipe in circular motion.

Do not use solvents such as benzene, thinner, commercially available cleaners, or antistatic spray intended for analogue records.

Cleaning the disc lens

After prolonged use, dirt or dust may accumulate at the disc lens. To ensure good playback quality, clean the disc lens with Philips CD Lens Cleaner or any commercially available cleaner. Follow the instructions supplied with cleaner.



Demagnetising the heads

Use a demagnetising tape available at your dealer.

Radio reception is poor.

Recording or playback cannot be made.

The tape deck door cannot open.

The system does not react when buttons are pressed.

Sound cannot be heard or is of poor quality.

The left and right sound outputs are reversed.

The remote control does not function properly.

The time is not working.

Not all lighted buttons are showing light. The Clock/Timer setting is erased.

The system displays features automatically and buttons start flashing.

Cleaning the Heads and the Tape Paths

To ensure good recording and playback quality, clean the heads (A), the capstan(s) (B), and pressure roller(s) (C) after every 50 hours of tape operation.

Use a cotton swab slightly moistened with cleaning fluid or alcohol.

You also can clean the heads by playing a cleaning tape once.

Troubleshooting

WARNING

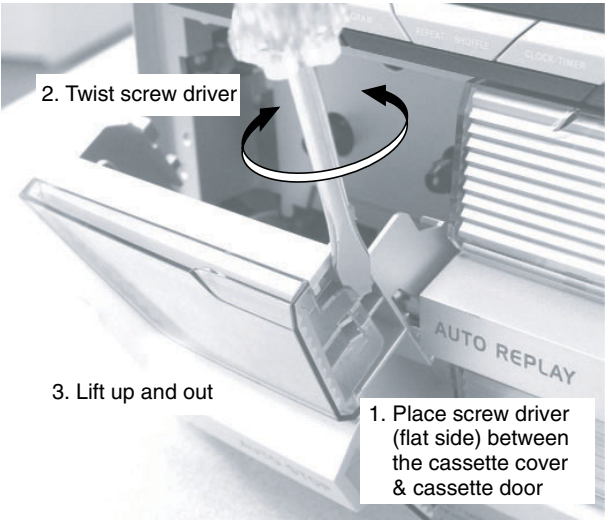
Under no circumstances should you try to repair the system yourself, as this will invalidate the warranty. Do not open the system as there is a risk of electric shock.

If a fault occurs, first check the points listed below before taking the system for repair. If you are unable to remedy a problem by following these hints, consult your dealer or Philips for help.

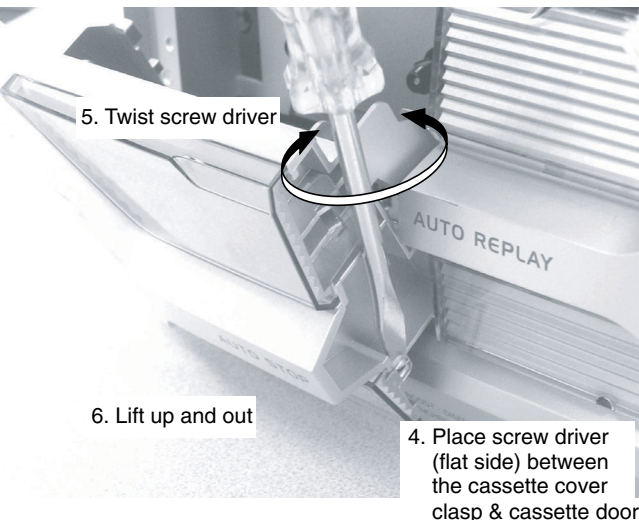
Problem	Solution
"NO DISC" is displayed.	Insert a disc. Check if the disc is inserted upside down. Wait until the moisture condensation at the lens has cleared. Replace or clean the disc, see "Maintenance". Use a finalized CD-RW or a correct MP3-CD format disc. Use a finalised CD-RW or CD-R.
"DISC NOT FINALIZED" is displayed.	Check if the number of folders exceeds 99 or the number of titles exceeds 999.
Some files on the USB device are not displayed.	Remove the USB mass storage device or select another source..
"DEVICE NOT SUPPORTED" scrolls on the display.	

DISMANTLING INSTRUCTIONS

Dismantling of the Cassette Cover



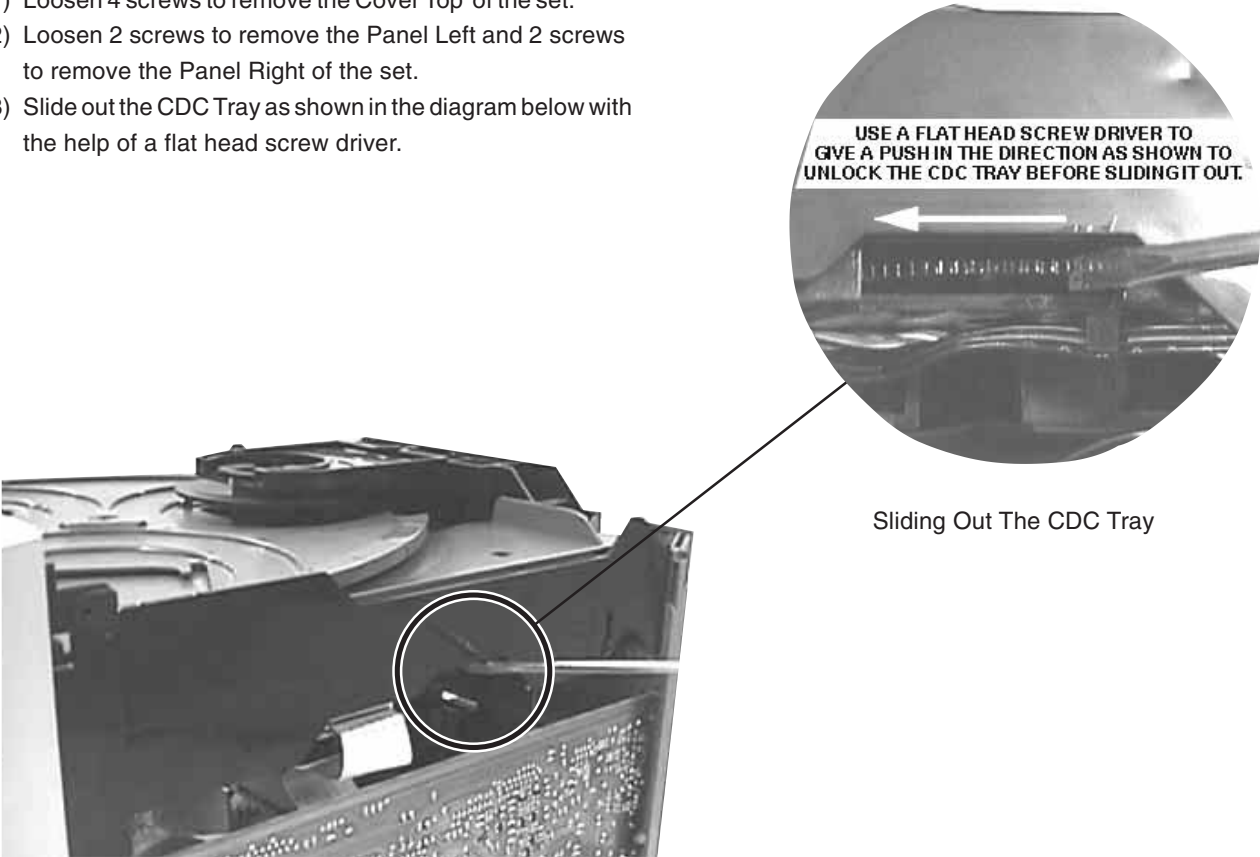
Remove Cassette Upper Cover



Remove Cassette Nether Cover

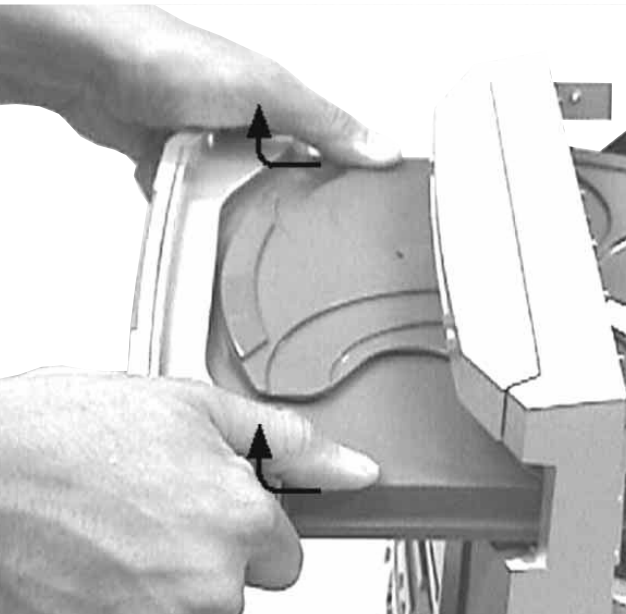
Dismantling of the CDC Module and Front Panel

- 1) Loosen 4 screws to remove the Cover Top of the set.
- 2) Loosen 2 screws to remove the Panel Left and 2 screws to remove the Panel Right of the set.
- 3) Slide out the CDC Tray as shown in the diagram below with the help of a flat head screw driver.



Dismantling of the CDC Module and Front Panel

- 4) Remove the Cover Tray CDC as indicated.

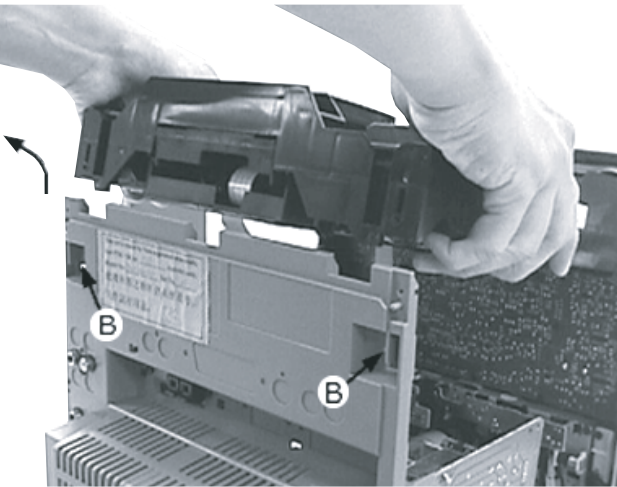


Remove Cover Tray CDC

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



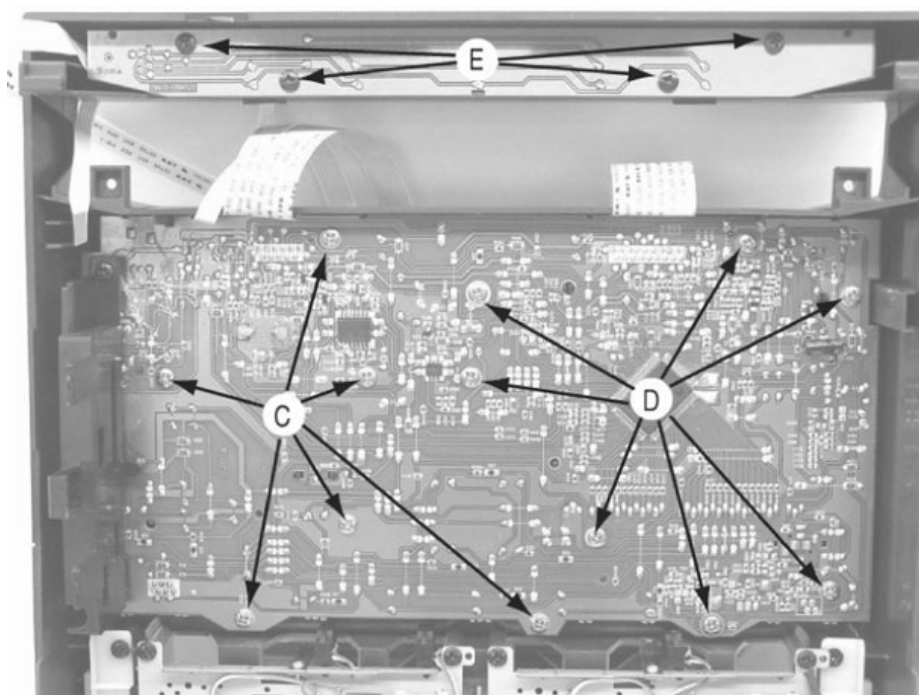
Front View CDC



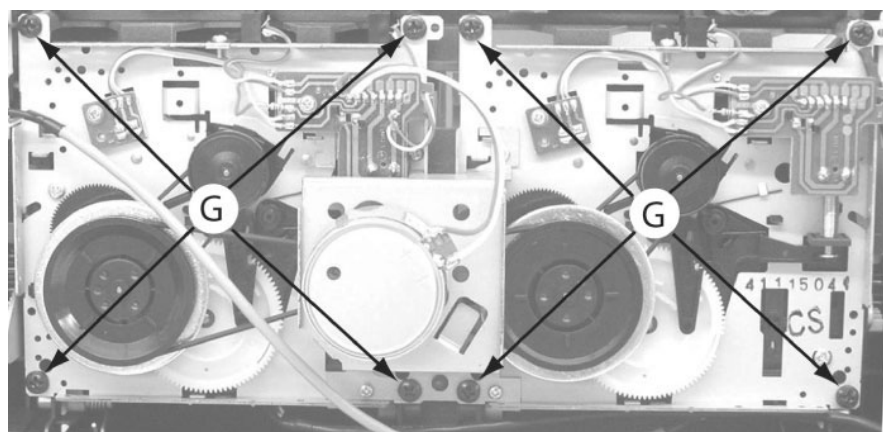
Remove CDC Module

Dismantling of the Front Board

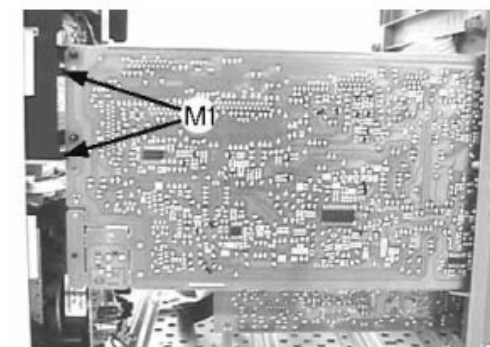
- 1) Remove 6 screws C and 7 screws D as indicated to loosen the Front Board.
- 2) Remove 4 screws E as indicated to loosen the Front Board.

**Dismantling of the ETF Tape Module**

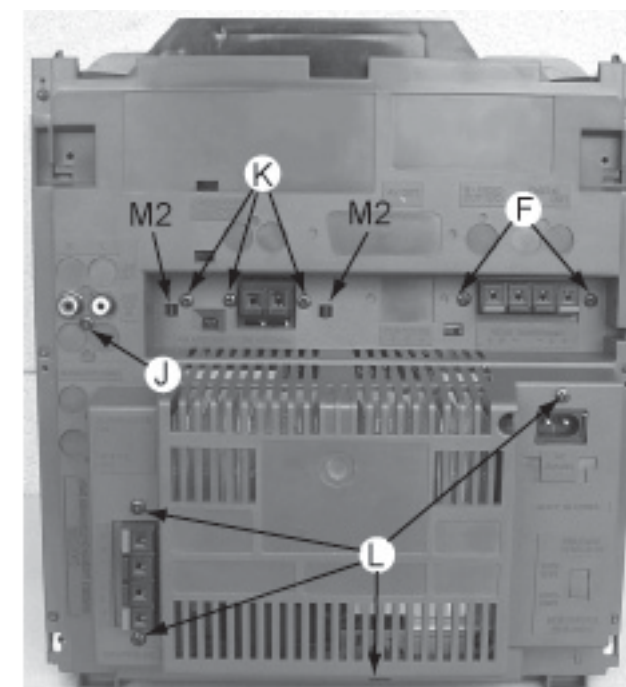
- 1) Remove 8 screws G as indicated to loosen the ETF Tape Module.

**Dismantling of Rear Portion**

- 1) Remove 2 screws F as indicated to loosen the Speaker Board.
- 2) Remove 1 screws J and uncatch M1 as indicated to loosen the AF Board.
- 3) Remove 3 screws K and uncatch M2 as indicated to loosen the Tuner Board.
- 4) Remove 4 screws L as indicated to loosen the Panel Rear .



Remove Main Board

**Repair Hints**

- 1) The Knob Volume can be remove pull it out in the direction as indicated. See picture 1.

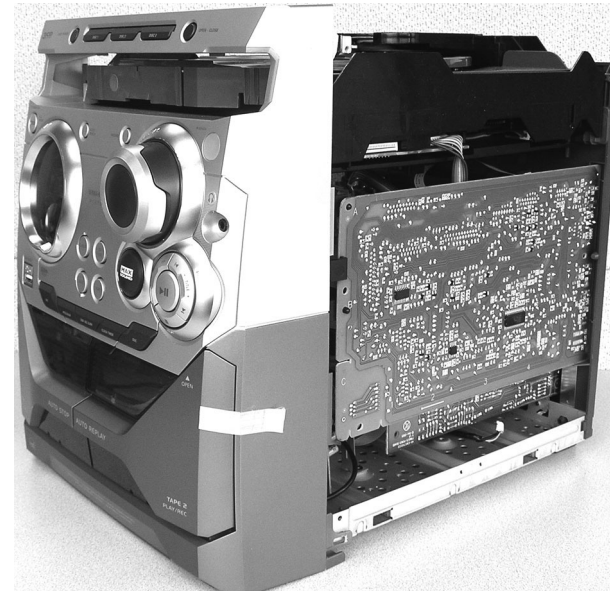


Repair Hints

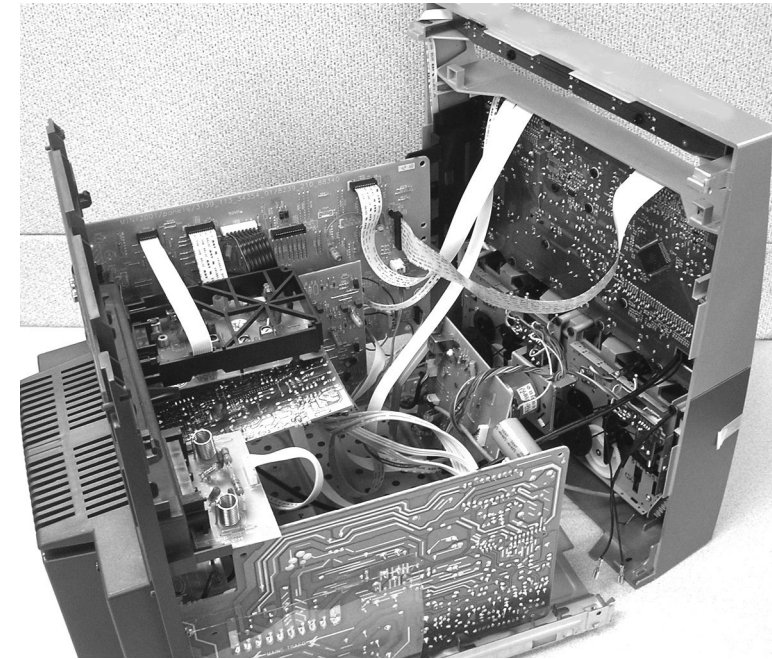
- 3) During repair it is possible to disconnect the Tape board and CDC Module completely unless the fault is suspected to be in that area. This will not affect the performance of the rest of the set.

Note: The flex cables are very fragile, care should be taken not to damage them during repair. After repair, be very sure that the flex cables are inserted properly into the flex sockets before encasing, otherwise faults may occur.

Service pos A

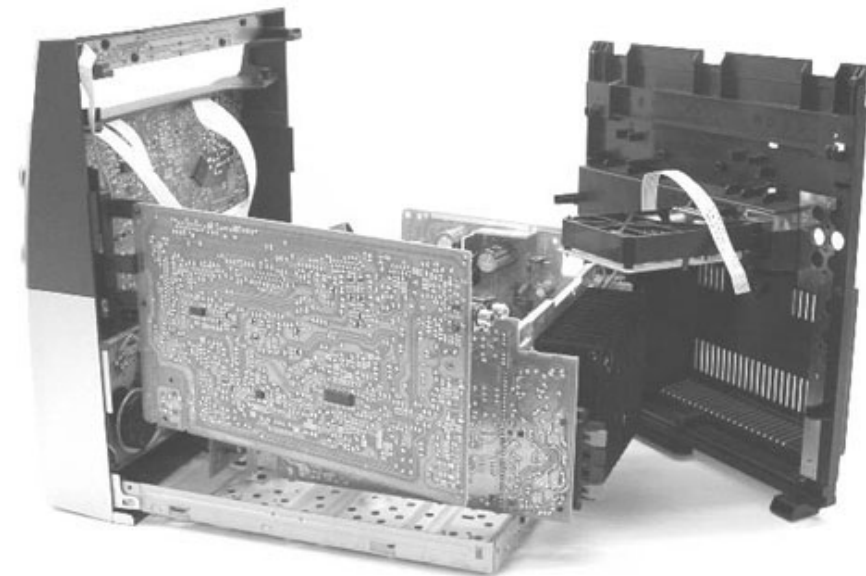


Service pos C

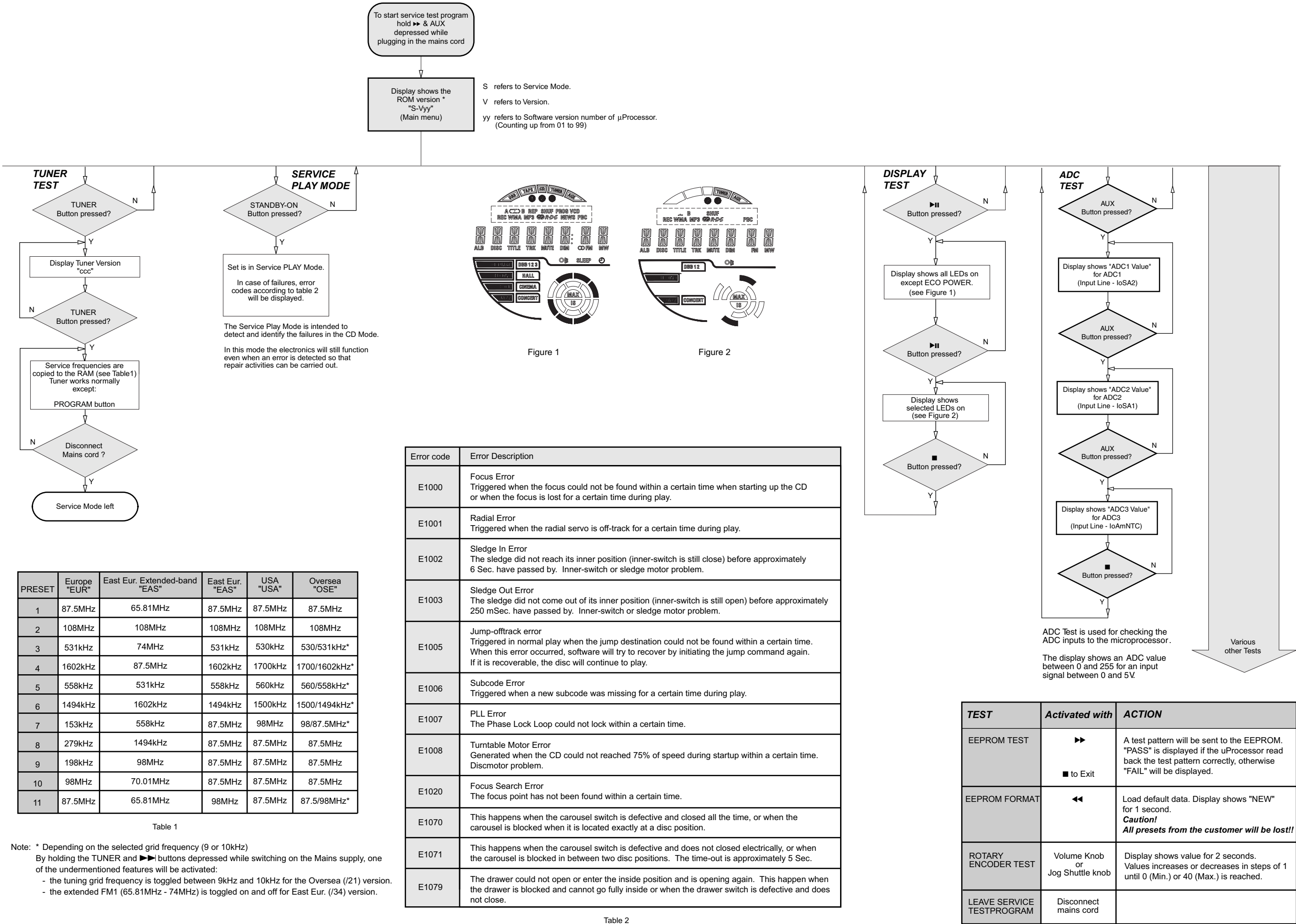


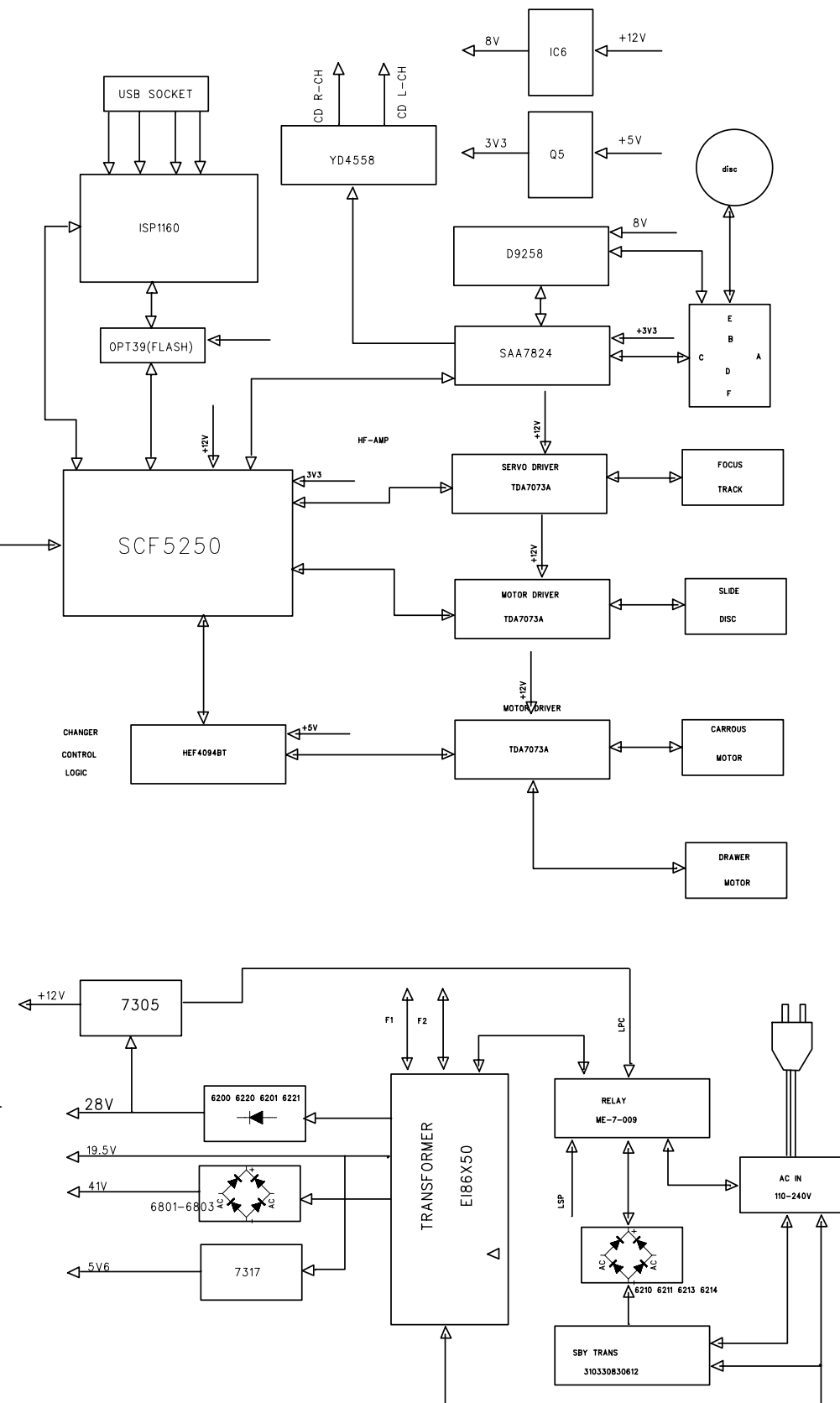
Service pos D

Service pos B

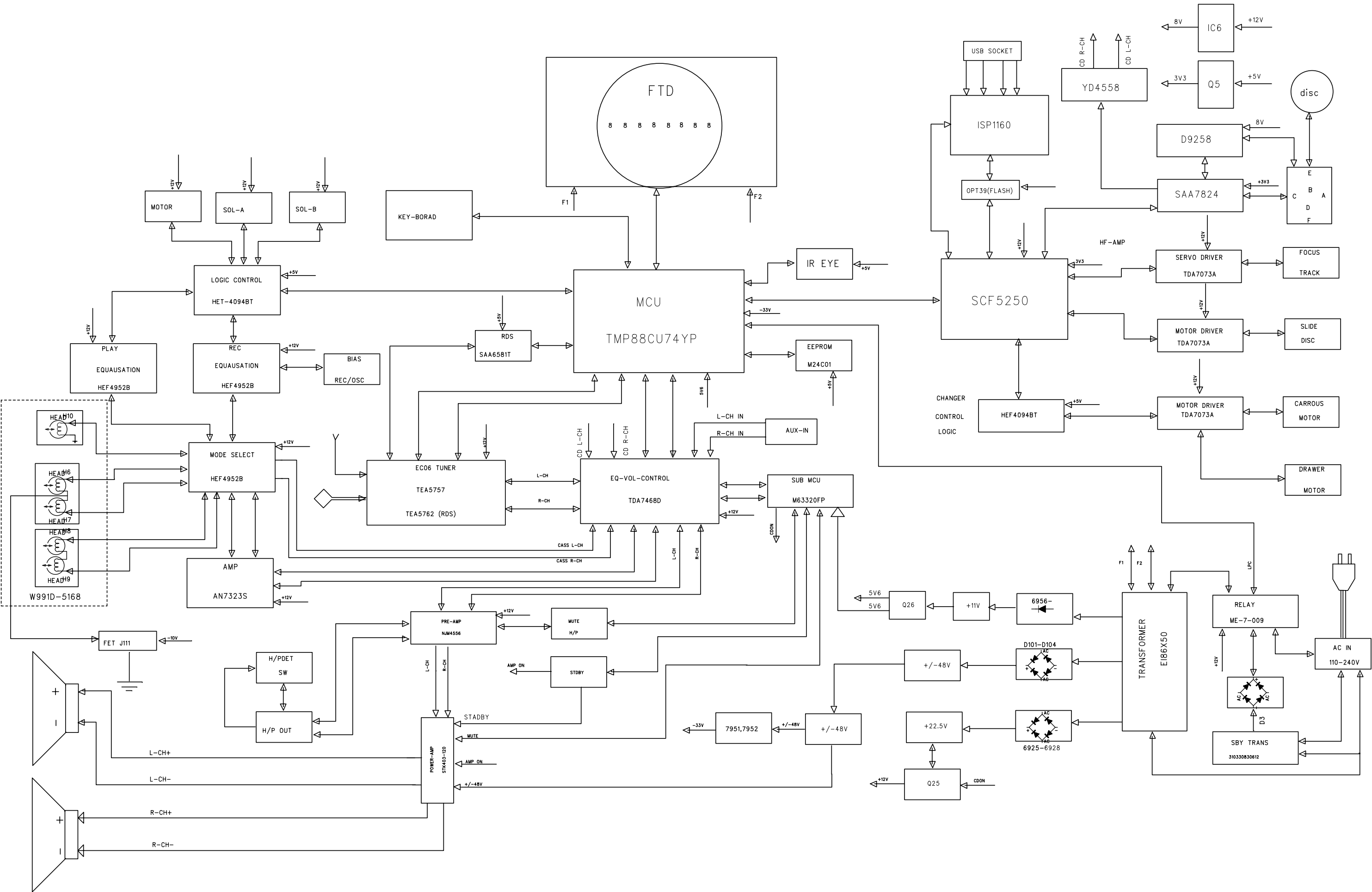


SERVICE TEST PROGRAM

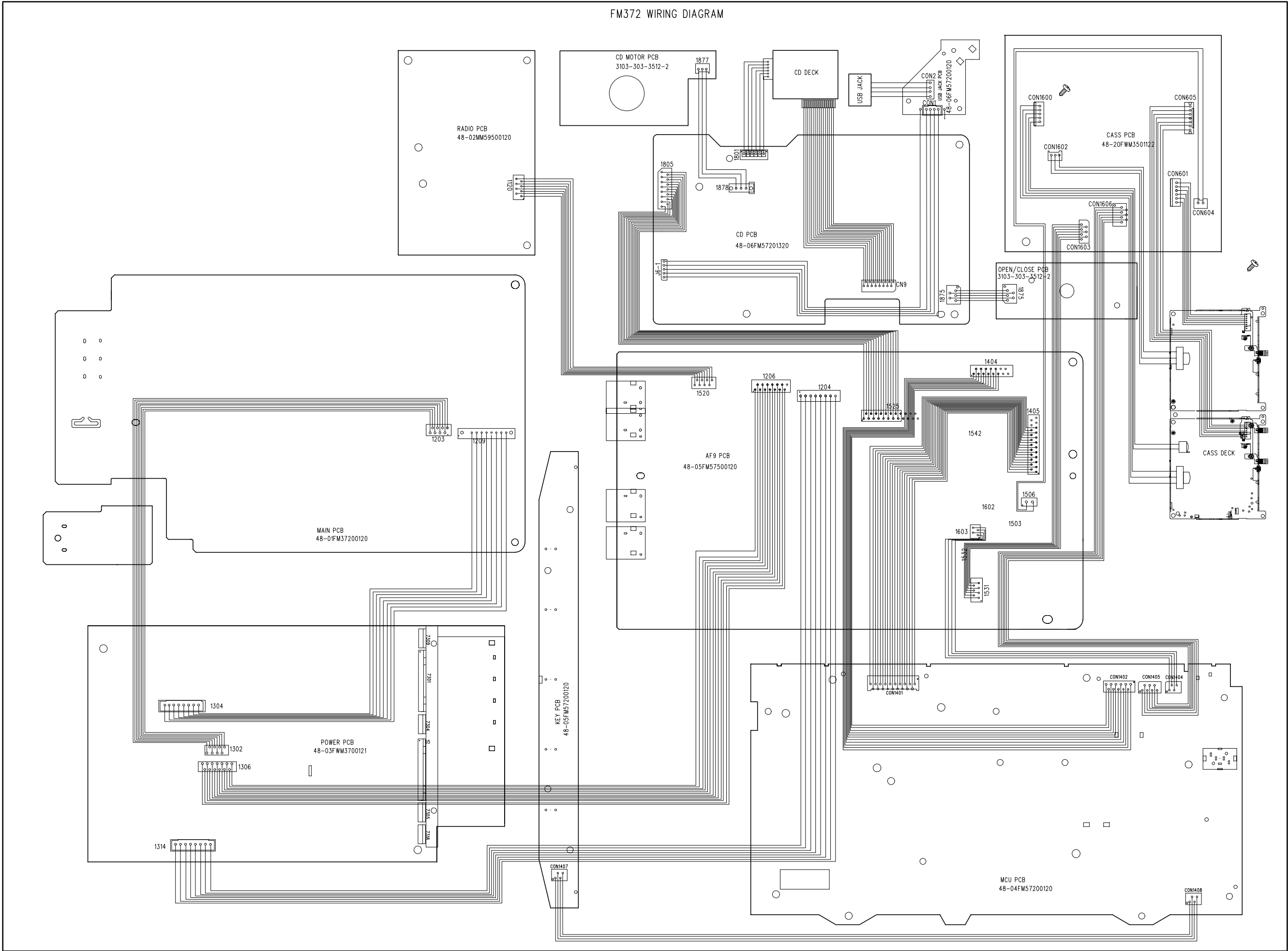




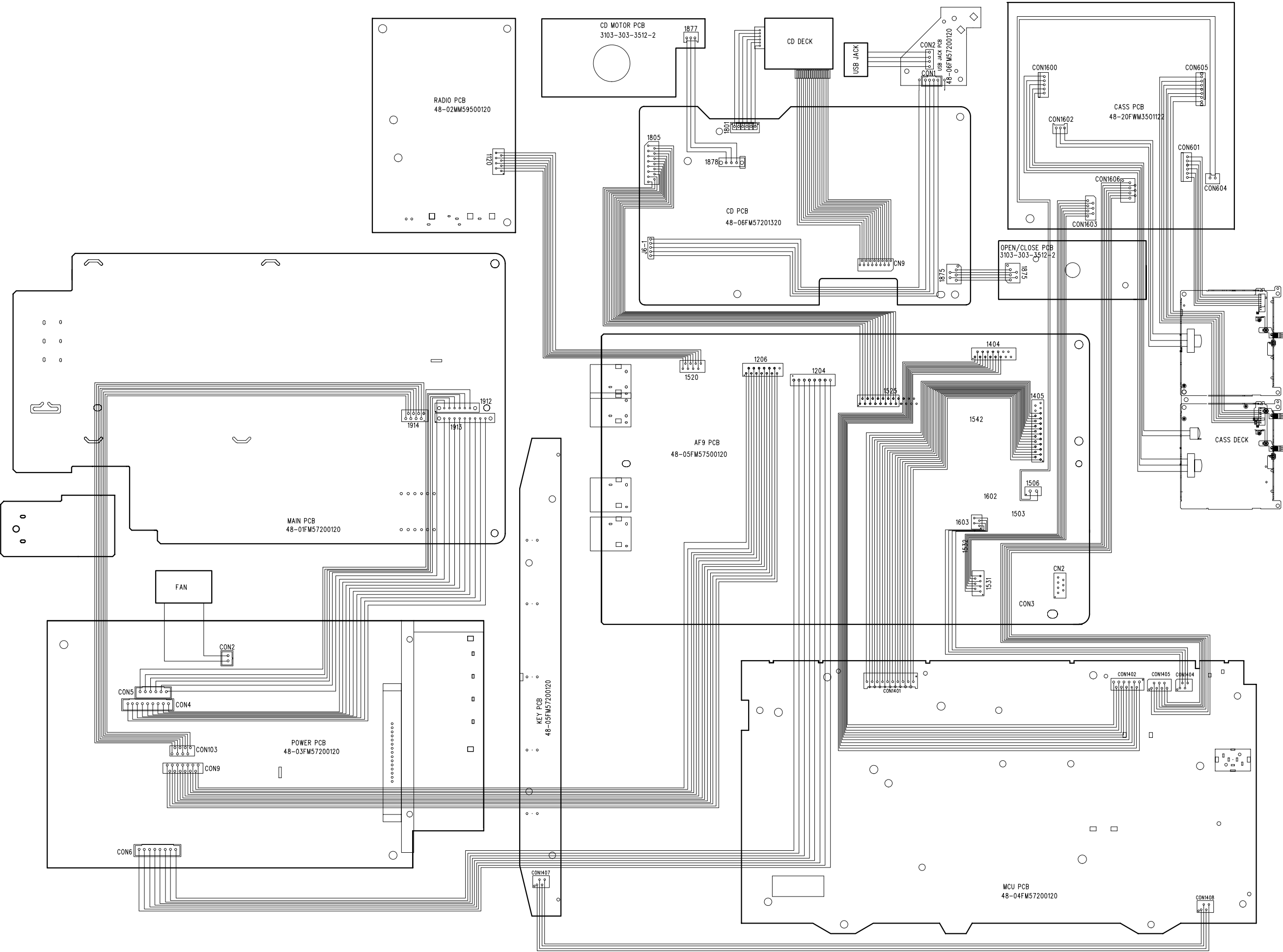
SET BLOCK DIAGRAM - FWM572



SET WIRING DIAGRAM - FWM372



SET WIRING DIAGRAM - FWM572



FTD DISPLAY PIN CONNECTION

FRONT & KEY & USB BOARD

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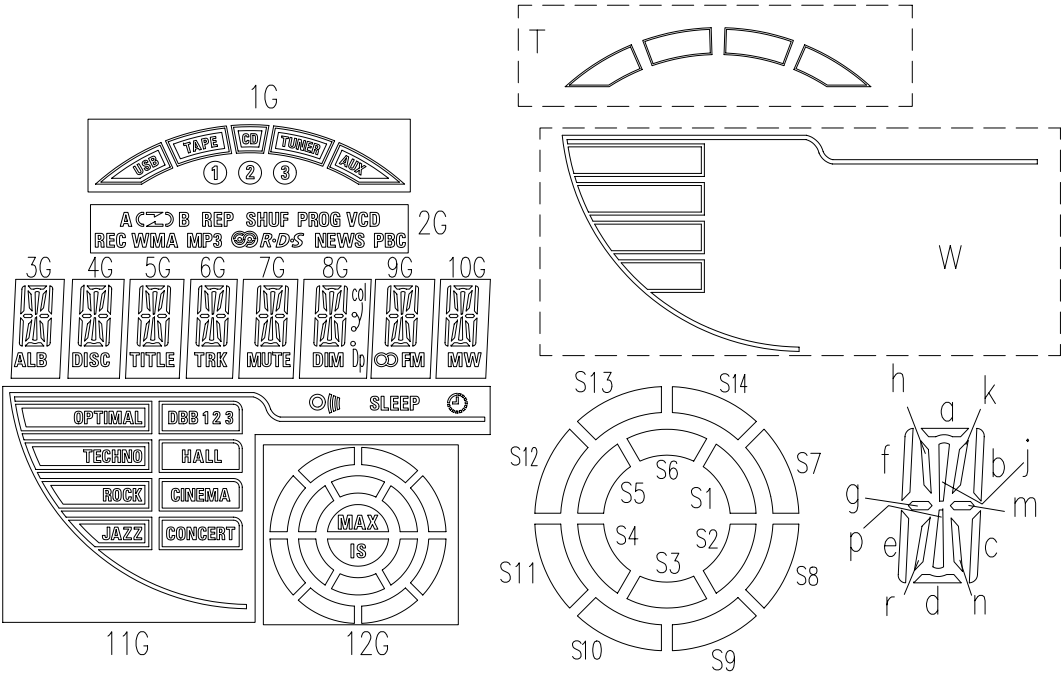
Front PCB - Layout Top View6-2

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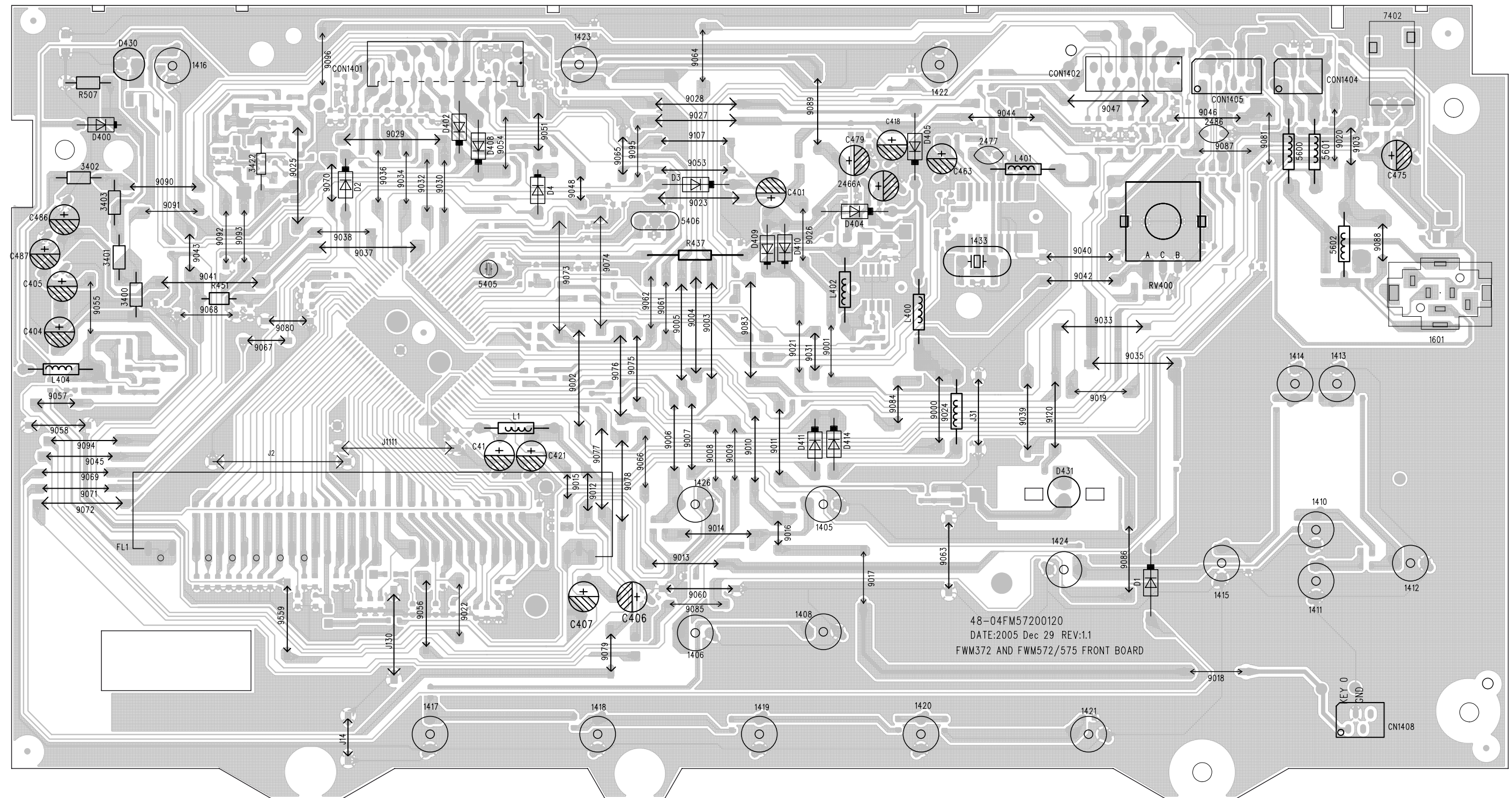
PCB Layout (CD Key & USB Jack Part)6-5

Electrical Parts List6-6

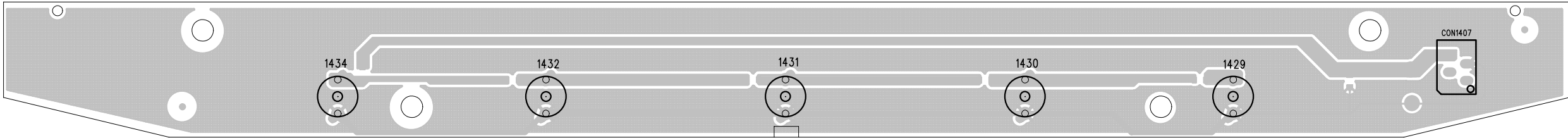


	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G
P1		PBC	a	a	a	a	a	a	a	a		S14
P2		NEWS	h	h	h	h	h	h	h	h		S13
P3		SHUF	j p	j p	j p	j p	j p	j p	j p	j p	1	S12
P4		PROG	k	k	k	k	k	k	k	k	3	S6
P5	T		b	b	b	b	b	b	b	b	2	S1
P6		VCD	f	f	f	f	f	f	f	f		S7
P7		MP3	m	m	m	m	m	m	m	m		S5
P8		REP	g	g	g	g	g	g	g	g		
P9		WMA	c	c	c	c	c	c	c	c		S2
P10		⌂	e	e	e	e	e	e	e	e	W	S4
P11		REC	r	r	r	r	r	r	r	r		S8
P12		A	n	n	n	n	n	n	n	n		
P13			d	d	d	d	d	d	d	d		S3
P14								col				S9
P15		B	ALB	DISC	TITLE	TRK	MUTE	DIM	FM	MW		S10
P16								Dp			SLEEP	S11

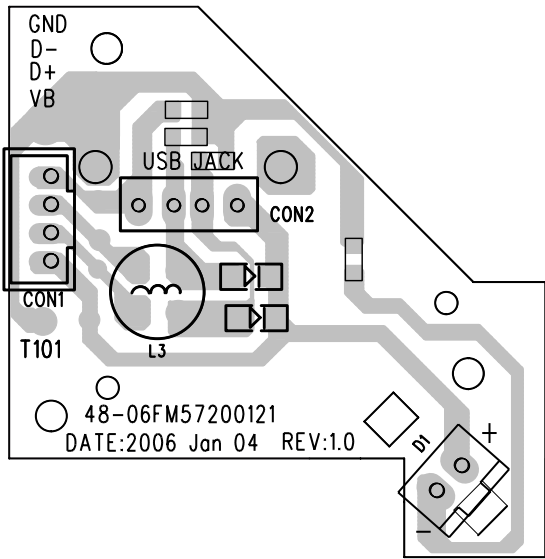
PCB LAYOUT - FRONT BOARD (TOP VIEW)



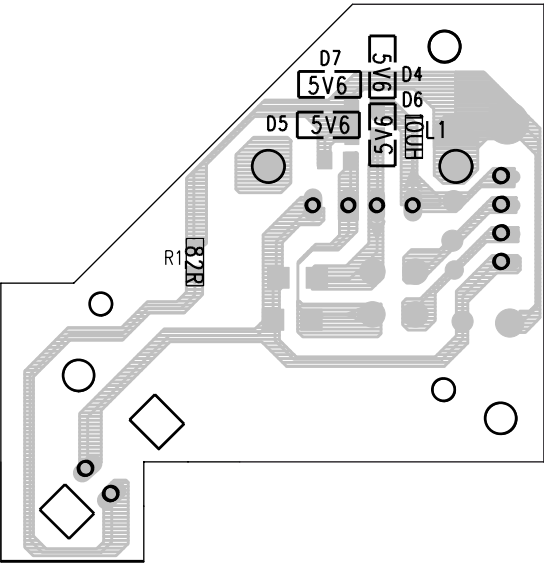
PCB LAYOUT - CDC KEY BOARD



PCB LAYOUT - USB JACK BOARD (TOP VIEW)



PCB LAYOUT - USB JACK BOARD (BOTTOM VIEW)



ELECTRICAL PARTS - FRONT BOARD

1405	9940 000 01243	TACT SWITCH
1406	9940 000 01243	TACT SWITCH
1408	9940 000 01243	TACT SWITCH
1410	9940 000 01243	TACT SWITCH
1411	9940 000 01243	TACT SWITCH
1412	9940 000 01243	TACT SWITCH
1413	9940 000 01243	TACT SWITCH
1414	9940 000 01243	TACT SWITCH
1415	9940 000 01243	TACT SWITCH
1416	9940 000 01243	TACT SWITCH
1417	9940 000 01243	TACT SWITCH
1418	9940 000 01243	TACT SWITCH
1419	9940 000 01243	TACT SWITCH
1420	9940 000 01243	TACT SWITCH
1421	9940 000 01243	TACT SWITCH
1422	9940 000 01243	TACT SWITCH
1423	9940 000 01243	TACT SWITCH
1424	9940 000 01243	TACT SWITCH
1426	9940 000 01243	TACT SWITCH
1433	9940 000 04449	CRYSTAL 4.332MHZ -20PPM /12/05
1601	9940 000 01244	PHONE JACK 3.5MM
5406	9940 000 04451	CRYSTAL 8MHZ -20PPM
7400	9940 000 04448	IC TMP88PU74YF (OTP)
7404	9322 131 04668	IC SM M24C01-WMN6
D430	9940 000 00265	LED LAMP (MICRO)
D431	9940 000 01234	LED LAMP 3MM (RED)
FL1	9940 000 04447	FTD DISPLAY
RV400	9940 000 01241	ROTARY ENCODER
U10	9352 686 05118	IC SM SAA6581T (PHSE) R
	9940 000 00325	OPTIC SENSER (OPTO..)

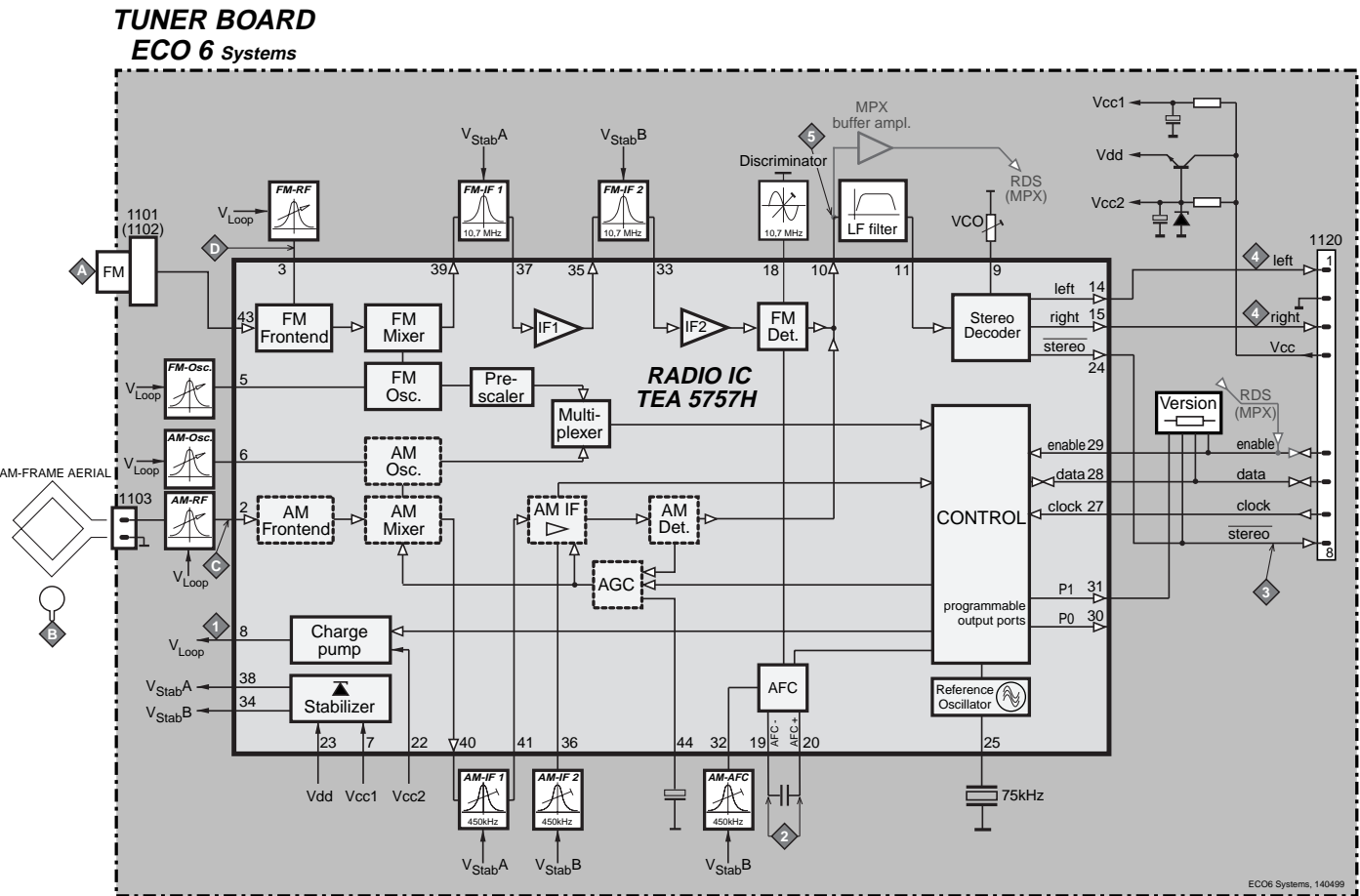
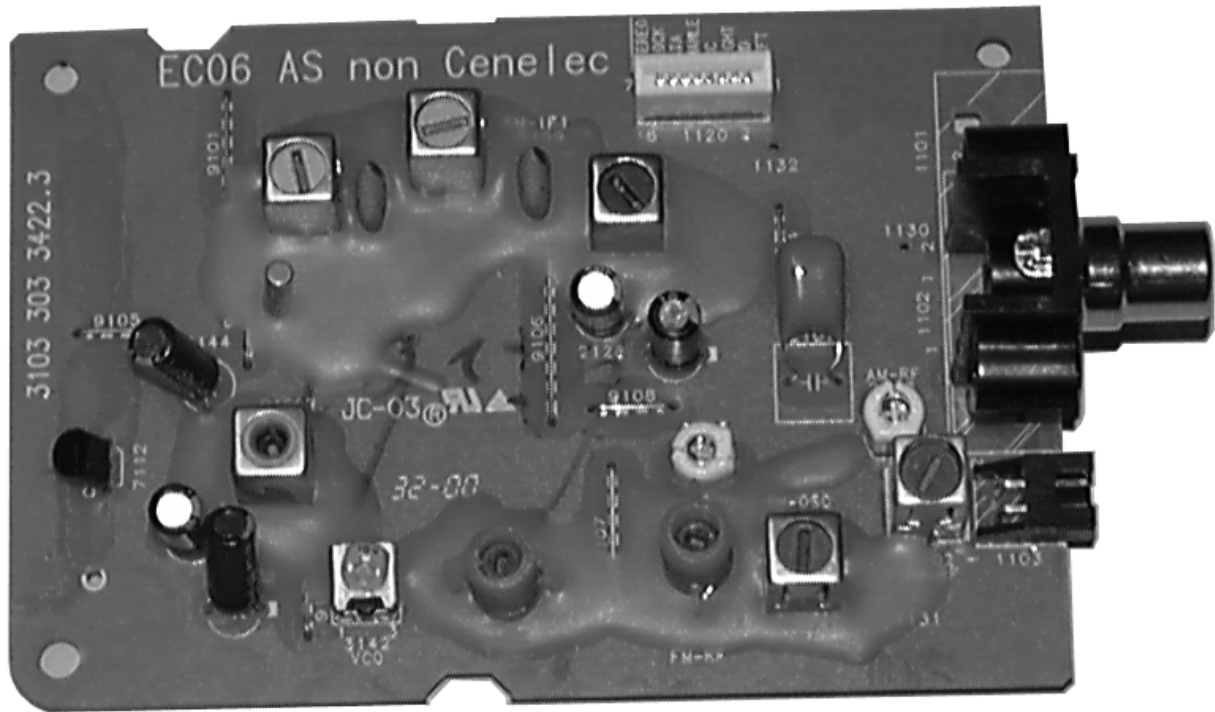
Note: Only these parts mentioned in the list are normal service parts.

ELECTRICAL PARTS - CD KEY BOARD

1429	9940 000 01243	TACT SWITCH
1430	9940 000 01243	TACT SWITCH
1431	9940 000 01243	TACT SWITCH
1432	9940 000 01243	TACT SWITCH
1434	9940 000 01243	TACT SWITCH

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

BLOCK DIAGRAM



ECO6 Tuner Board

version: **SYSTEMS non-CENELEC**

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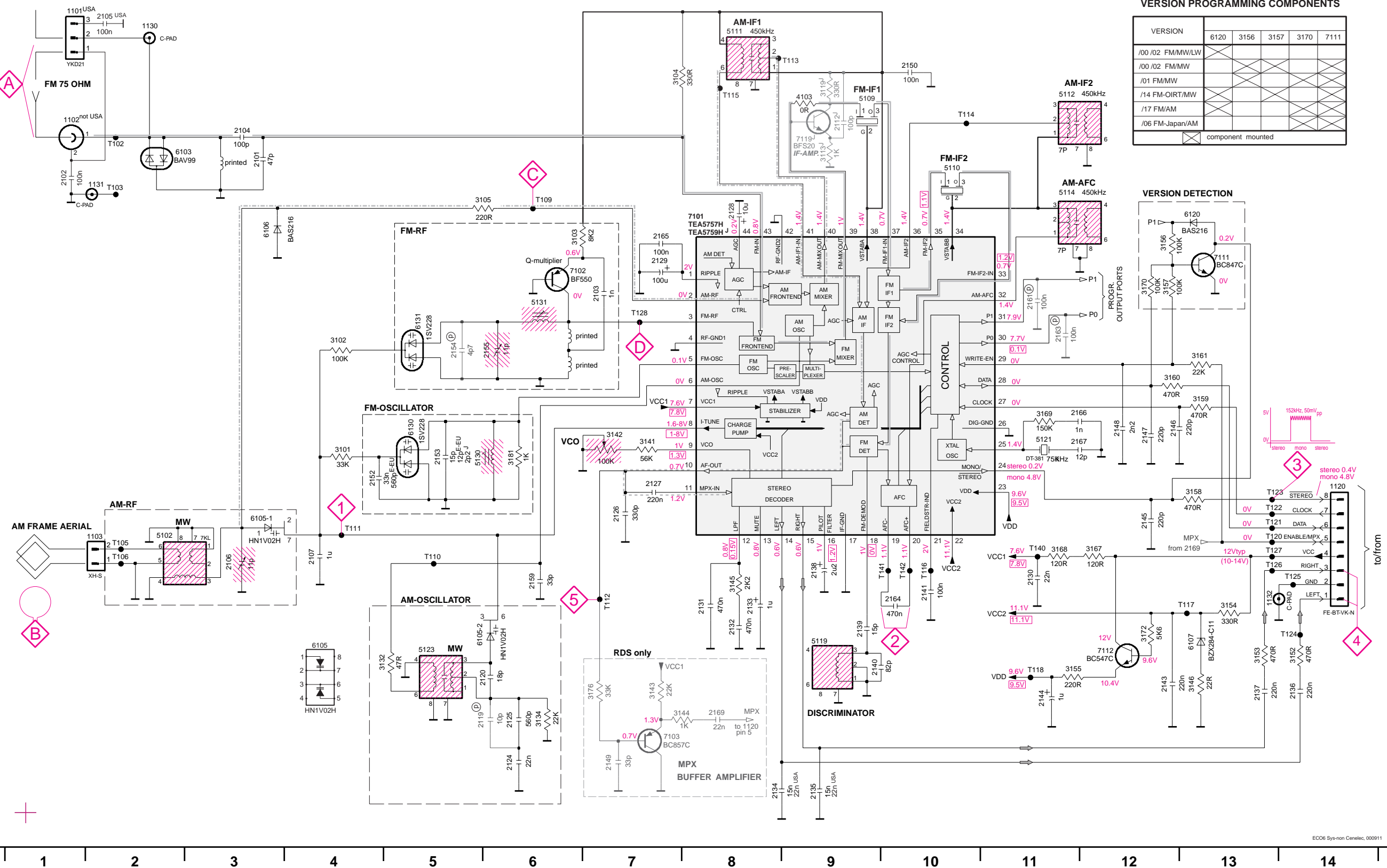
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Adjustment table7A-3

Electrical Partslist.....7A-4

TUNER BOARD ECO6 / SYSTEMS NON CENELEC



LEGEND

Ⓟ...for provision only

USA ... for USA version only

E-EU ... for East European version only

J ... for Japanese version only



...V FM mode stereo

...V MW mode

...V LW mode

voltages measured while
set is tuned to a strong transmitter

Signal path

— FM

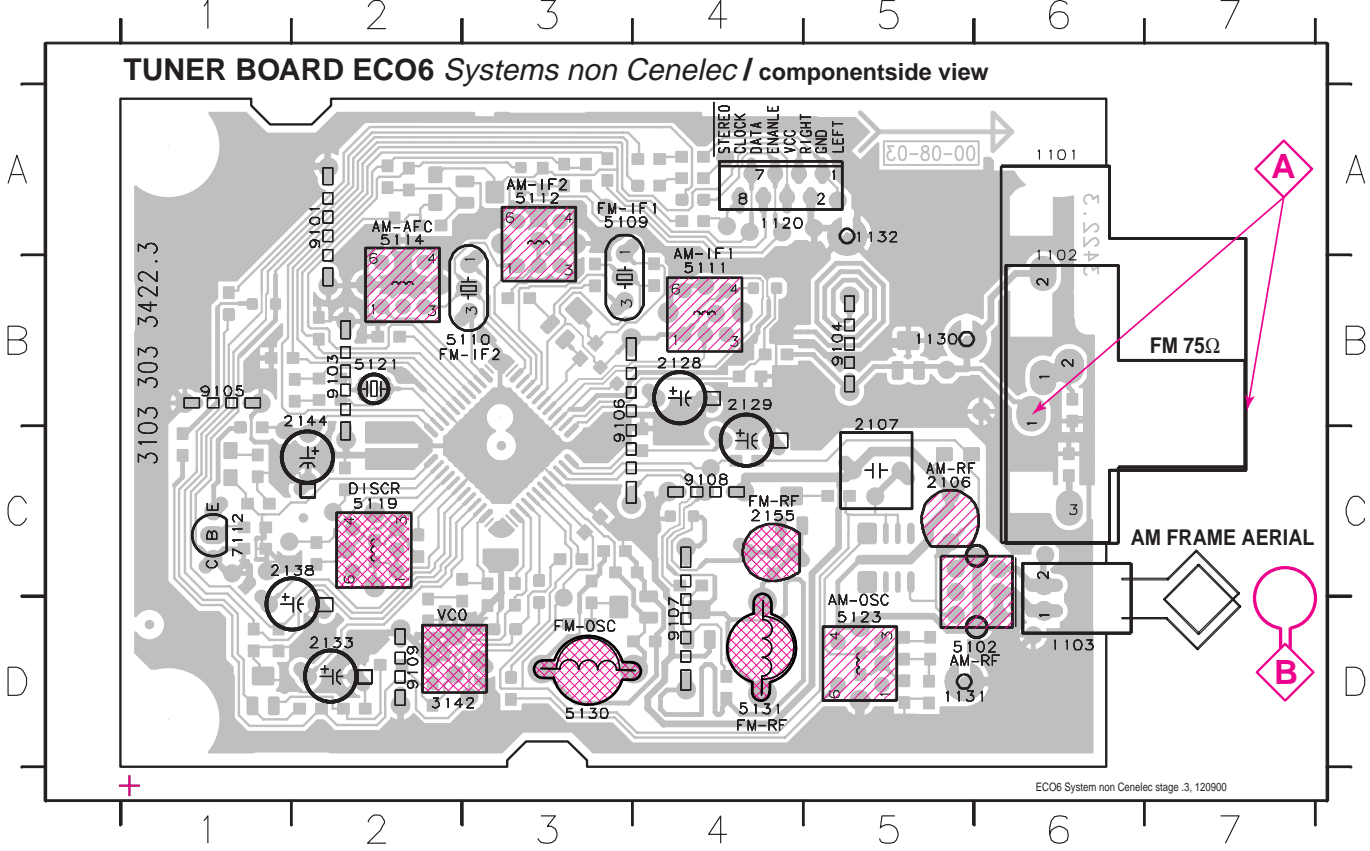
--- AM

- - - MPX (Audio Frequency)

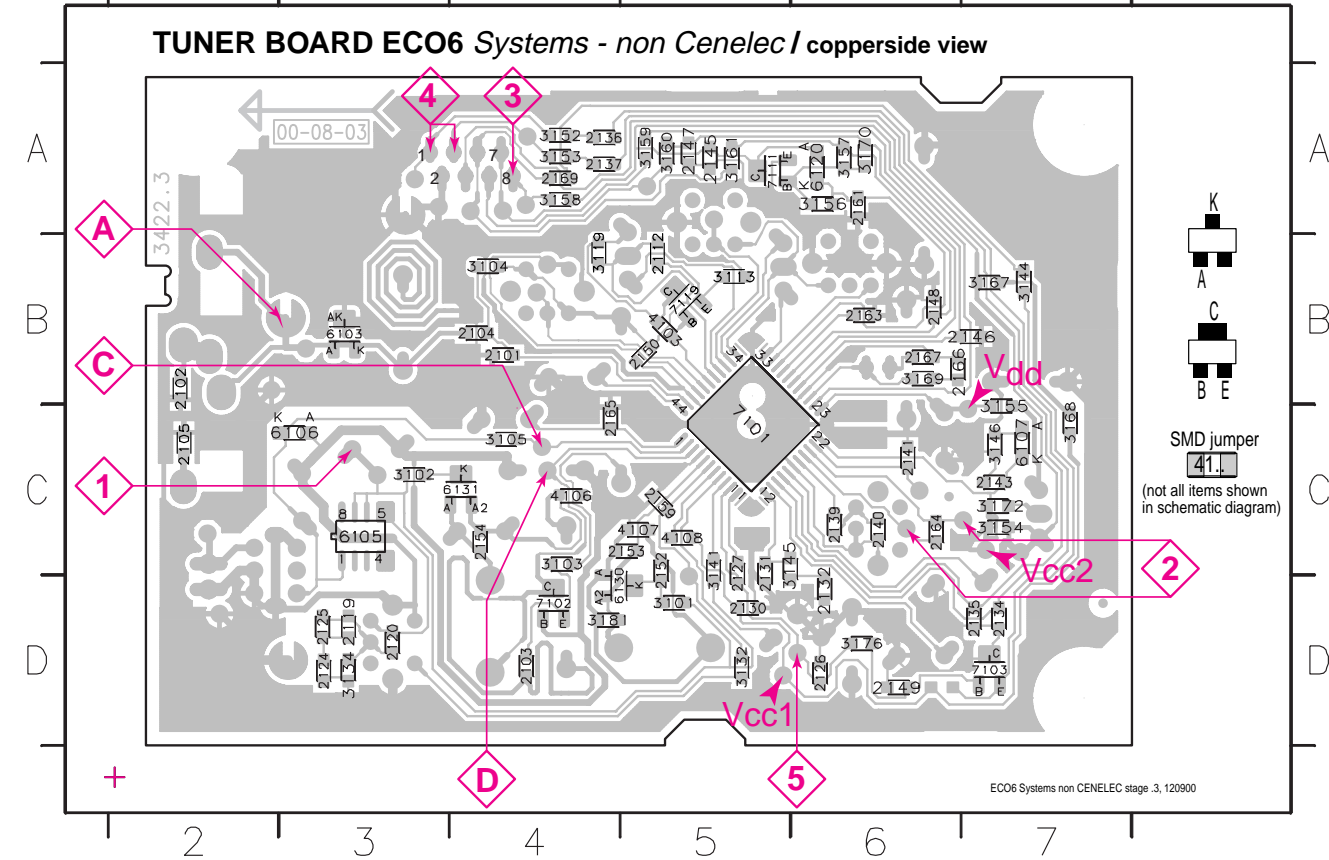
⇒ AF - left/right

1101 A1
1102 B1
1103 F2
1120 E14
1130 A2
1131 B2
1132 G13
2101 B3
2102 B1
2103 C7
2104 B3
2105 A2
2106 F3
2107 F4
2119 H6
2120 G6
2124 H6
2125 H6
2126 F7
2127 E7
2128 C8
2129 C7
2130 F11
2131 G8
2132 G8
2133 G8
2134 H8
2135 H9
2136 G14
2137 G13
2138 F9
2139 G9
2140 G9
2141 F10
2142 G12
2144 G11
2145 F12
2146 E12
2147 E12
2148 E12
2149 H7
2150 A10
2152 E4
2153 E5
2154 D5
2155 D5
2159 F6
2161 C11
2163 D11
2164 F10
2165 C7
2166 E11
2167 E11
2169 H8
3101 E4
3102 D4
3103 C6
3104 A7
3105 B6
3132 G5
3134 H6
3141 E7
3142 E7
3143 G7
3144 H7
3145 F8
3146 G13
3152 G14
3153 G13
3154 G13
3155 G11
3156 C12
3157 C12
3158 F13
3159 D13
3160 D12
3161 D13
3167 F12
3168 F11
3169 E11
3170 C12
3172 G12
3176 G7
3181 E6
5102 F2
5109 B9
5110 B10
5111 A8
5112 A11
5114 B11
5119 G9
5121 E11
5123 G5
5130 E5
5131 C6
5132 B2
6105-1 F3
6105-2 G5
6106 C3
6107 G13
6120 C13
6130 E5
6131 D5
7101 C8
7102 C6
7103 H7
7111 C13
7112 G12
T102 B2
T103 B2
T105 F2
T106 F2
T109 B6
T110 F5
T111 F4
T112 F7
T113 A8
T114 B10
T115 A8
T116 F10
T117 G13
T118 G11
T120 F13
T121 F13
T122 F13
T123 E13
T124 G14
T125 F14
T126 F13
T127 F13
T128 D7
T140 F11
T141 F10
T142 F10

1101 A6 1120 A4 1132 A5 2128 C4 2138 C2 3142 D2 5110 B3 5114 A2 5123 D5 7112 C1 9104 B5 9107 D4
1102 B6 1130 B5 2106 C5 2129 B4 2144 B2 5102 D6 5111 B4 5119 C2 5130 D3 9101 A2 9105 B1 9108 C4
1103 D6 1131 D5 2107 B5 2133 D2 2155 C4 5109 A3 5112 A3 5121 B2 5131 D4 9103 B2 9106 B3 9109 D2

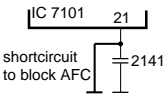
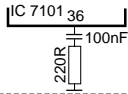
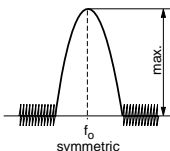
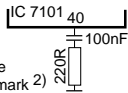

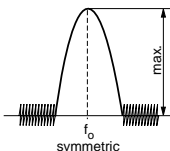


2101 B4 2119 D3 2130 D5 2137 A4 2146 B7 2153 C5 2165 C4 3103 C4 3134 D3 3152 A4 3158 A4 3169 B6 4106 C4 6107 C7 7103 D7
2102 B1 2120 D3 2131 C5 2139 C6 2147 A5 2154 C4 2166 B6 3104 B4 3141 C5 3153 A4 3159 A5 3170 A6 4107 C5 6120 A6 7111 A5
2103 D4 2124 D3 2132 D6 2140 C6 2148 B6 2159 C5 2167 B6 3105 C4 3143 D6 3154 C7 3160 A5 3172 C7 4108 C5 6130 D4 7119 B5
2104 B4 2125 D3 2134 D7 2141 C6 2149 D6 2161 A6 2169 A4 3113 B5 3144 B7 3155 C7 3161 A5 3176 D6 6103 B3 6131 C4
2105 C1 2126 D6 2135 D7 2143 C7 2150 B5 2163 B6 3101 D5 3119 B5 3145 C5 3156 A6 3167 B7 3181 D4 6105 C3 7101 C5
2112 B5 2127 C5 2136 A4 2145 A5 2152 C5 3102 C3 3132 D5 3146 C7 3157 A6 3168 C7 4103 B5 6106 C3 7102 D4



These assembly drawings show a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

TUNER ADJUSTMENT TABLE (ECO6 FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)			108MHz	5130	<div>1</div>	8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V (1.2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123		6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz		1602kHz	5123	8V ±0.2V		
		531kHz	check	1.1V ±0.4V		
FM IF						
FM	10.7MHz, 45mV continuous wave	<div>D</div>	<div></div>	5119	<div>2</div>	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	<div>A</div> mod=1kHz Δf=±22.5kHz	108MHz	2155	<div>4</div>	MAX
	87.5MHz (65.81MHz)		87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	<div>A</div>	98MHz	3142	<div>3</div>	152kHz ±1kHz ¹⁾
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc	<div>C</div> Δf=±10kHz V _{RF} = 0.5mV (as low as possible)	<div></div>	5111	<div>5</div>	<div></div>
			<div></div> see remark 2)	5112		
AM AFC MW		<div>C</div> continuous wave V _{RF} = 2mV		5114	<div>2</div>	0 ± 2 mV DC
AM RF ³⁾						
MW ⁴⁾ FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	<div>B</div> <div></div>	1494kHz	2106	<div>5</div>	<div></div>
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz		Δf = ±30kHz V _{RF} as low as possible	1500kHz		
	560kHz	560kHz	5102			

Use Service Testprogram. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

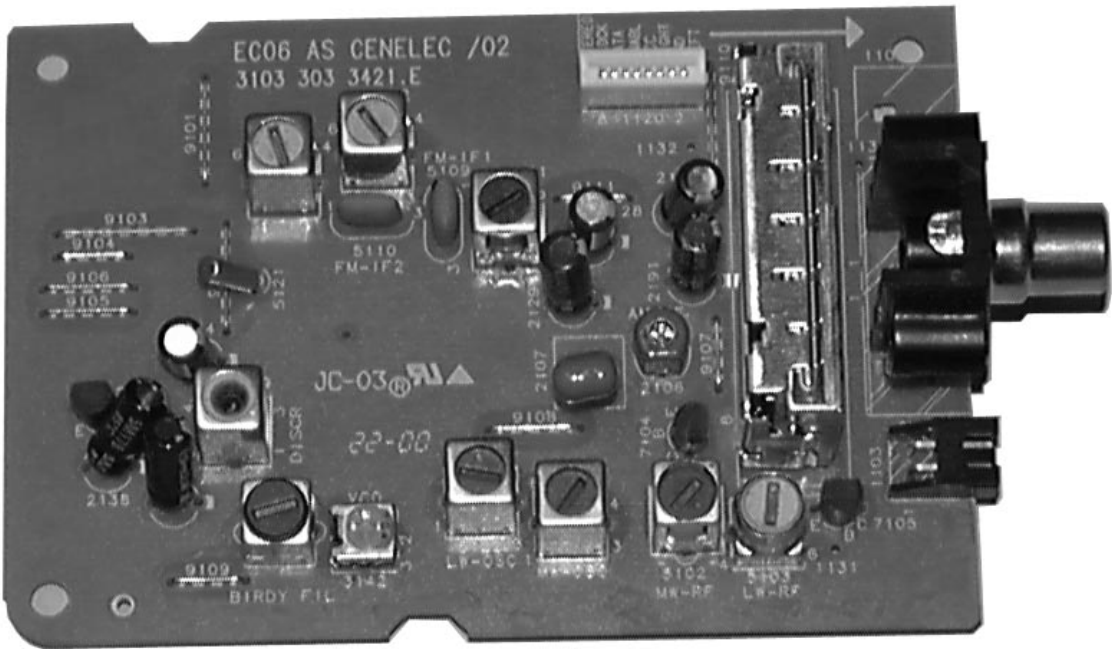
¹⁾ If sensitivity of frequency counter is too low adjust to max. channel separation
(input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

²⁾ RC network serves for damping the IF-filter while adjusting the other one.

³⁾ For AM RF adjustments the original frame antenna has to be used !

⁴⁾ MW has to be aligned before LW.

↑ Repeat



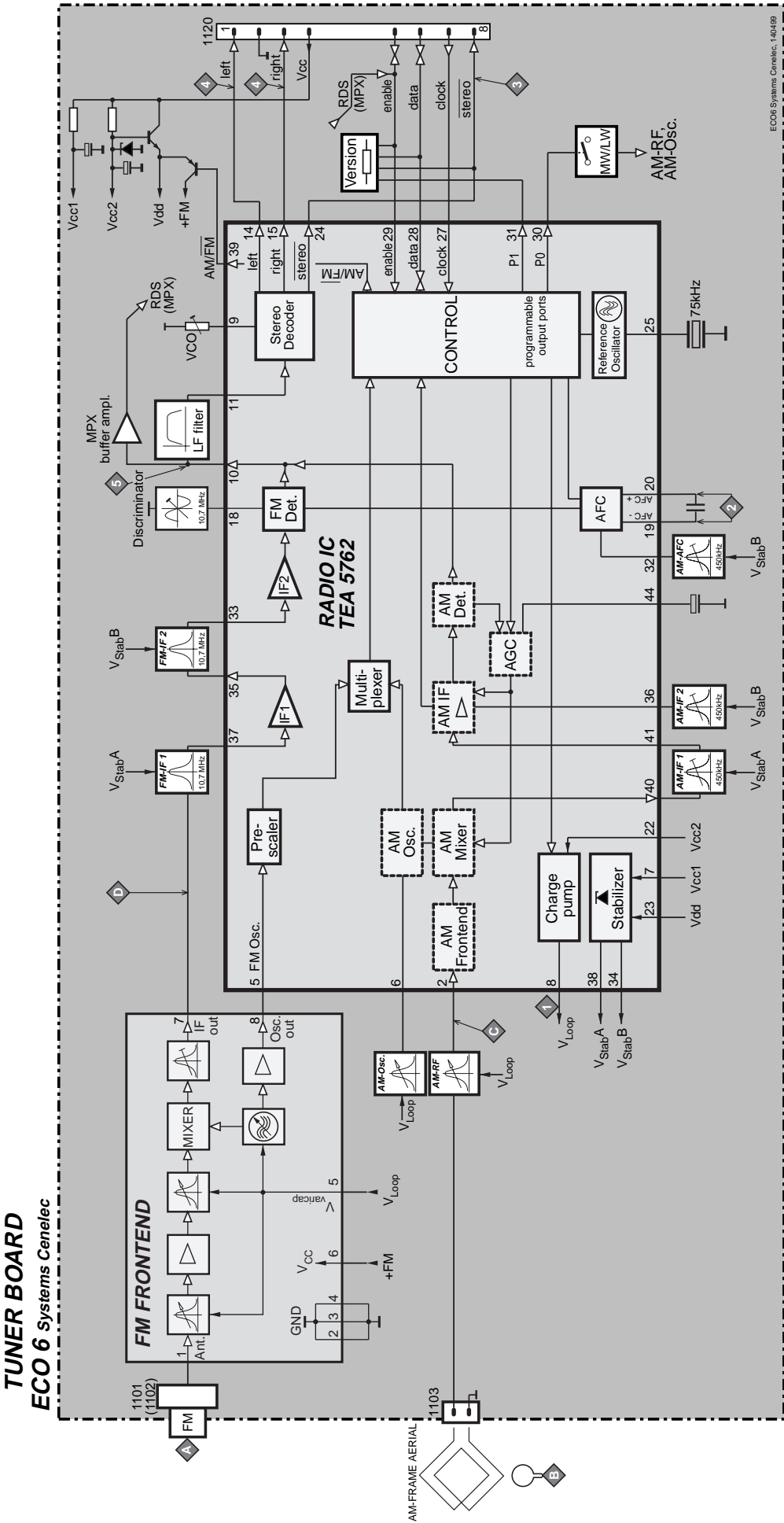
ECO6 Tuner Board

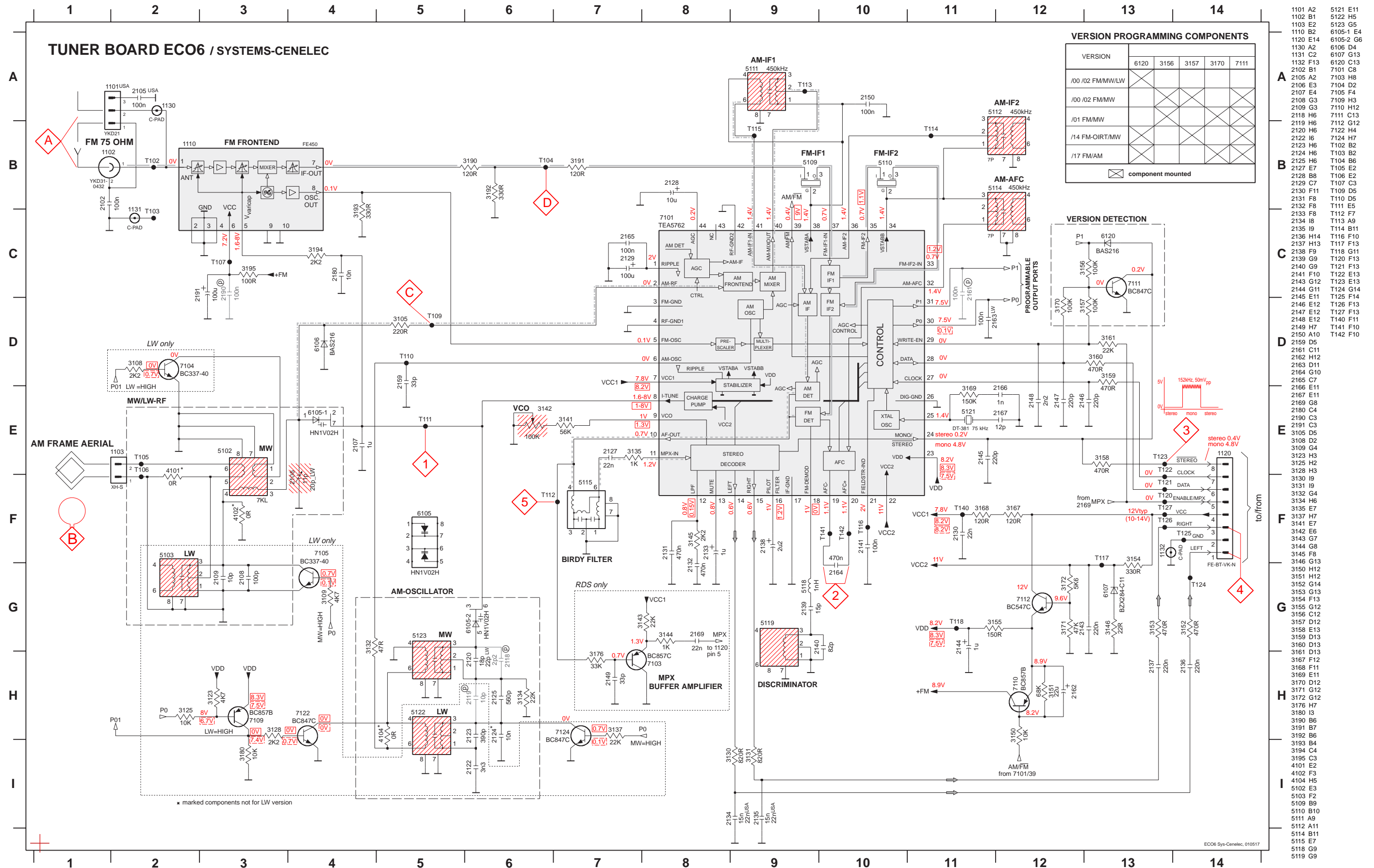
version: **SYSTEMS CENELEC**

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Component Layout.....	7B-3
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Electrical Partslist.....	7B-4

BLOCK DIAGRAM



**LEGEND**

* ... only assembled in FM/AM-version
 (P) ... for provision only
 USA ... for USA version only
 LW ... for LW version only

SMD jumper

41xx
OR

EVM

V

...V FM mode stereo
 ...V MW mode
 ...V LW mode
 voltages measured while
 set is tuned to a strong transmitter

Signal path

— FM
 --- AM
 - - - MPX (Audio Frequency)
 ⇒ AF - left/right

1101 A2
1102 B1
1103 E2
1110 B2
1120 E14
1130 A2
1131 C2
1132 F13
1102 B1
2105 A2
2106 E3
2107 E4
2108 G3
2109 G3
2118 H6
2119 H6
2120 H6
2122 I6
2123 H6
2124 H6
2125 H6
2127 E7
2128 B8
2129 C7
2130 F11
2131 F8
2132 F8
2133 F8
2134 I8
2135 I9
2136 H14
2137 H13
2138 F9
2139 G9
2140 G9
2141 F10
2143 G12
2144 G11
2145 E11
2146 E12
2147 E12
2148 E12
2149 H7
2150 A10
2159 D5
2161 C1
2162 H12
2163 D11
2164 G10
2165 C7
2166 E11
2167 E11
2169 G8
2180 C4
2190 C3
2191 C3
3105 D5
3108 D2
3109 G4
3123 H3
3125 H2
3128 H3
3130 I9
3131 I9
3132 G4
3134 H6
3135 E7
3137 H7
3141 E7
3142 E6
3143 G7
3144 G8
3145 F8
3146 G13
3150 H12
3151 H12
3152 G14
3153 G13
3154 F13
3155 G12
3156 C12
3157 D12
3158 E13
3159 D13
3160 D13
3161 D13
3167 F12
3168 F11
3169 E11
3170 D12
3171 G12
3172 G12
3176 H7
3180 I3
3190 B6
3191 B7
3192 B6
3193 B4
3194 C4
3195 C3
4101 E2
4102 F3
4104 H5
5102 E3
5103 F2
5109 B9
5110 B10
5111 A9
5112 A11
5114 B11
5115 E7
5118 G9
5119 G9

5121 E11
5122 H5
5123 G5
6105-1 E4
6105-2 G6
6106 D4
6107 G13
6120 C13
7101 C8
7103 H8
7104 D2
7105 F4
7109 H3
7110 H12
7111 C13
7112 G12
7122 H4
7124 H7
T102 B2
T103 B2
T104 B6
T105 E2
T106 E2
T107 C3
T109 D5
T110 D5
T111 E5
T112 F7
T113 A9
T114 B11
T116 F10
T117 F13
T118 G11
T120 F13
T121 F13
T122 E13
T123 E13
T124 G14
T125 F14
T126 F13
T127 F13
T140 F11
T141 F10
T142 F10

These assembly drawings show a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

ECO6 Sys Cenelec. 190599

Repeat

TAPE BOARD

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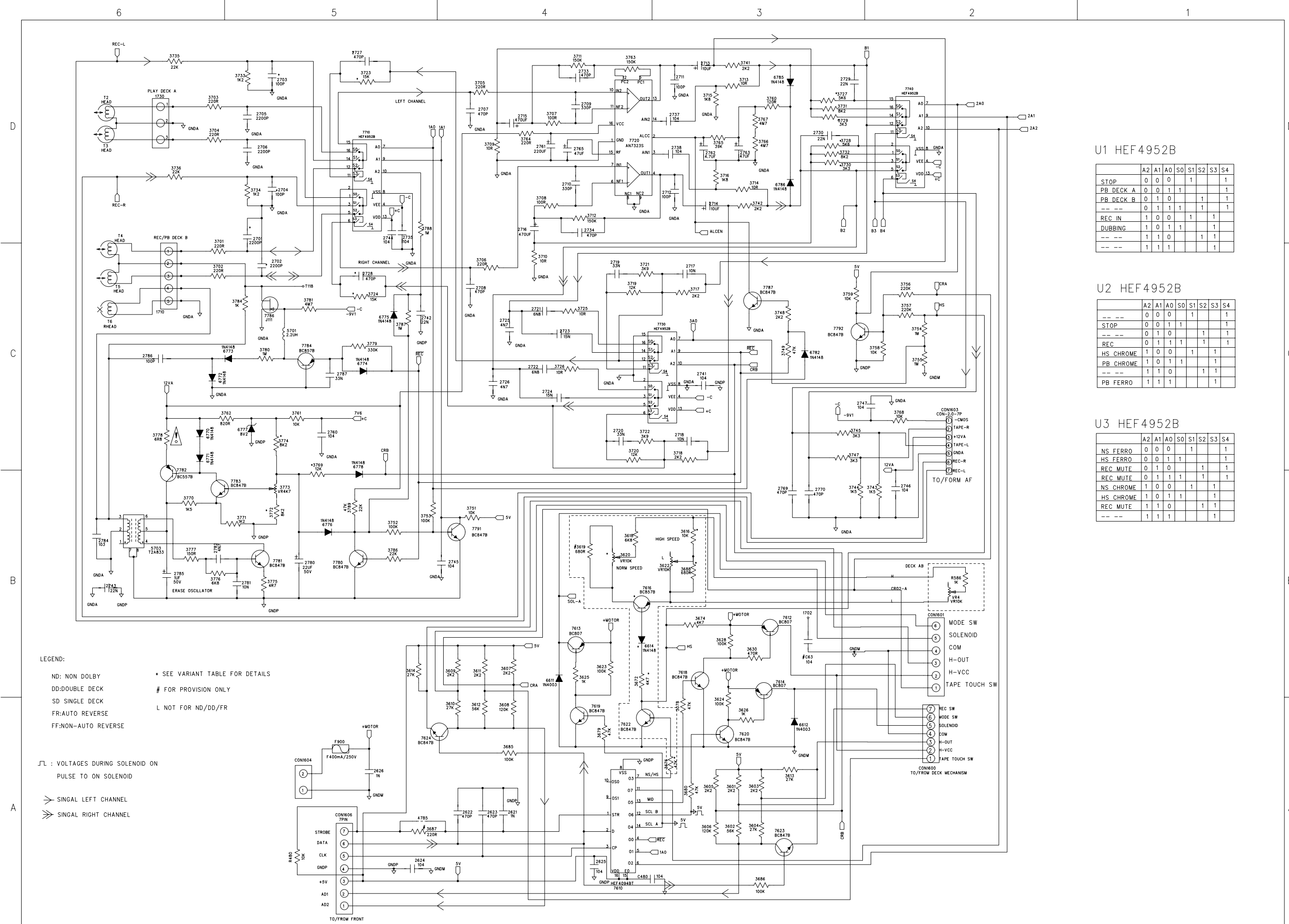
PCB Layout Bottom View 8-2

Circuit Diagram 8-3

Electrical Parts List 8-4

Remark: The chapter 8 for reference only , the whole Tape Board Ass'y can be orderd with
12nc: 9940 000 04485

CIRCUIT DIAGRAM - TAPE BOARD



U1 HEF4952B

	A2	A1	A0	S0	S1	S2	S3	S4
STOP	0	0	0		1			1
PB DECK A	0	0	1	1				1
PB DECK B	0	1	0			1		1
-- --	0	1	1	1			1	1
REC IN	1	0	0		1		1	
DUBBING	1	0	1	1			1	1
-- --	1	1	0			1	1	
-- --	1	1	1				1	

U2 HEF4952B

	A2	A1	A0	S0	S1	S2	S3	S4
-- --	0	0	0		1			1
STOP	0	0	1	1				1
-- --	0	1	0			1		1
REC	0	1	1	1			1	1
HS CHROME	1	0	0		1		1	
PB CHROME	1	0	1	1			1	
-- --	1	1	0			1	1	
PB FERRO	1	1	1				1	

U3 HEF4952B

	A2	A1	A0	S0	S1	S2	S3	S4
NS FERRO	0	0	0		1			1
HS FERRO	0	0	1	1				1
REC MUTE	0	1	0			1		1
REC MUTE	0	1	1	1			1	1
NS CHROME	1	0	0		1		1	
HS CHROME	1	0	1	1			1	
REC MUTE	1	1	0			1	1	
-- --	1	1	1				1	

ELECTRICAL PARTS - CASS DECK BOARD

3778	△ 9940 000 01249	FUSE RES. 6.8Ω 1/4W +/-5%
5703	9940 000 01251	IFT OSC COIL 100KHZ
7610	5322 209 11306	HEF4094BT
7710	9940 000 01248	IC HF4952
7720	9322 140 00668	IC SM AN7323S (MATJ)
7730	9940 000 01248	IC HF4952
7740	9940 000 01248	IC HF4952
7786	4822 130 63494	FET J111
F900	△ 9940 000 01252	FUSE RADIAL F400MA/250V

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

MAINS BOARD

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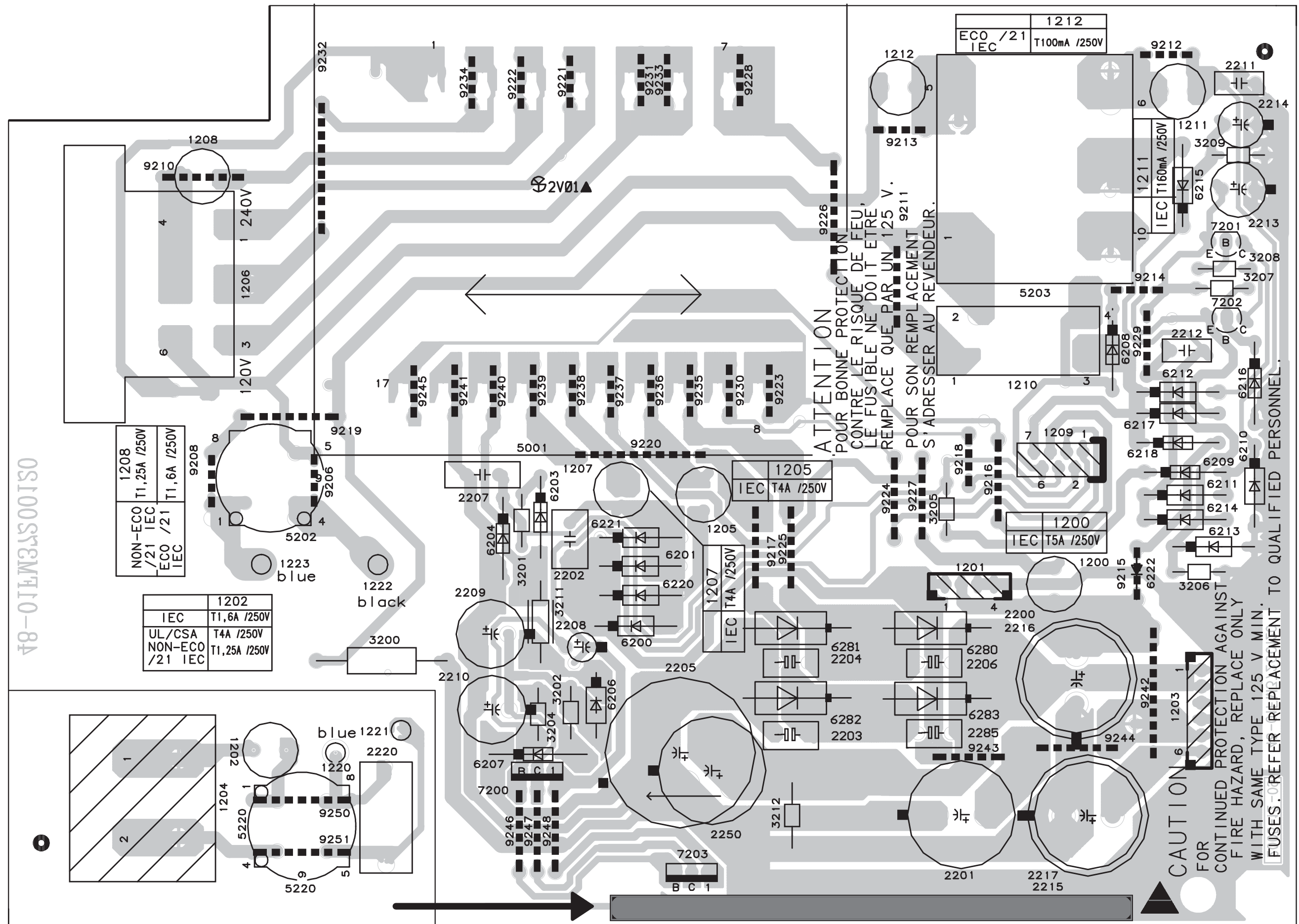
Circuit Diagram FWM372 6-3

PCB - Layout Diagram FWM572 6-4

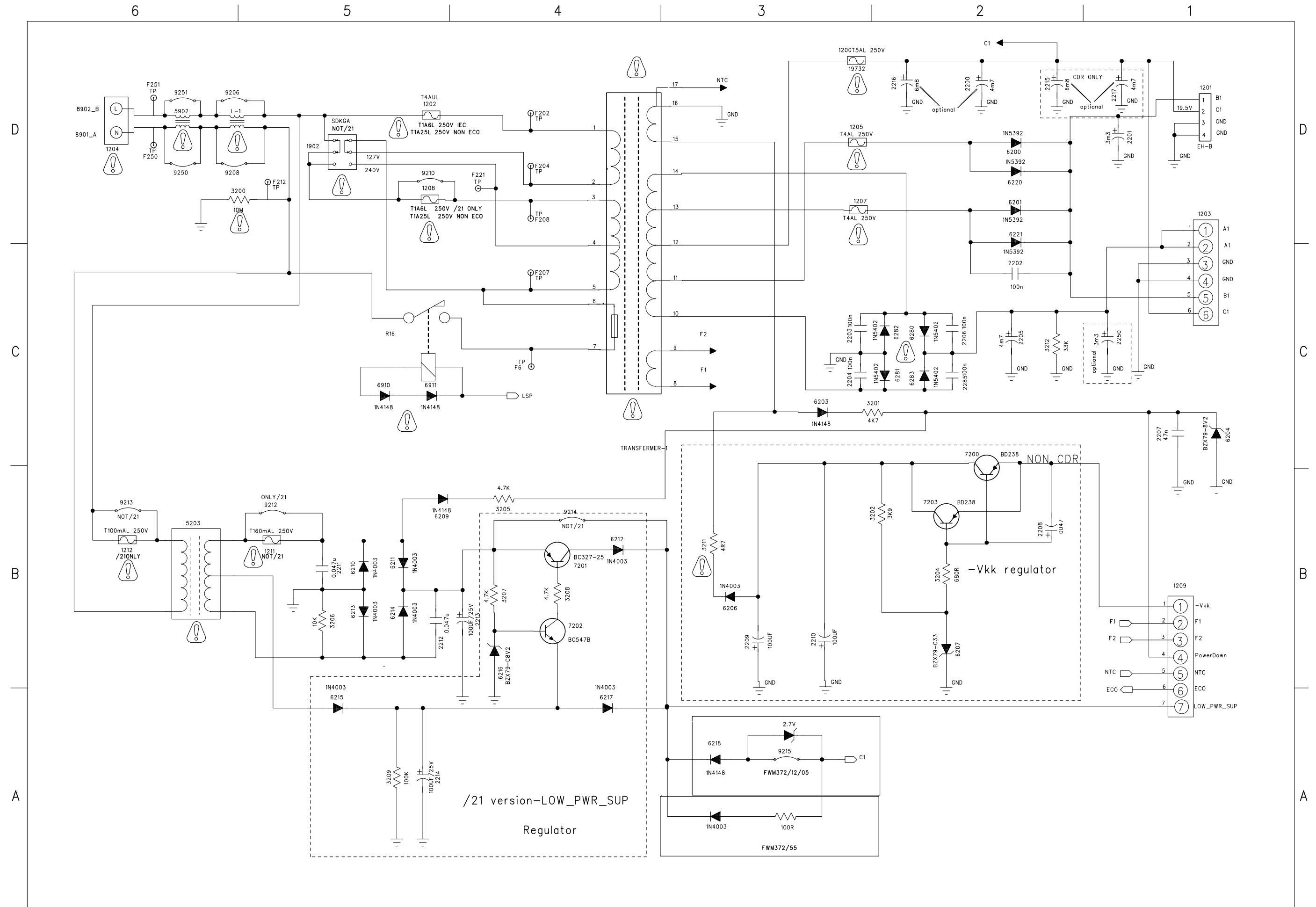
Circuit Diagram FWM572 6-5

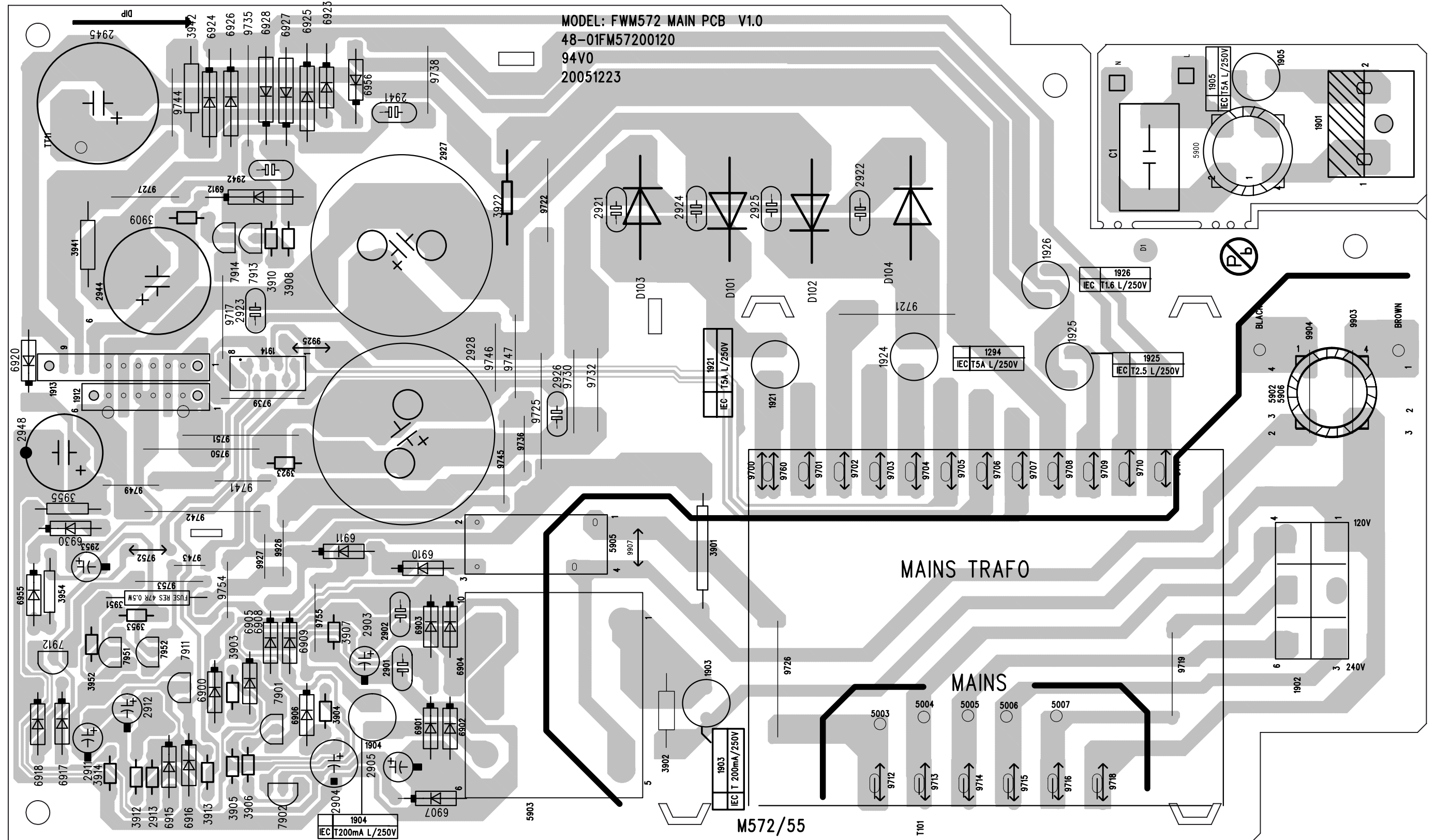
Electrical Parts List 6-6

PCB LAYOUT - MAINS BOARD_FWM372



CIRCUIT DIAGRAM - MAINS BOARD_FWM372





The schematic diagram illustrates the internal circuitry of a power supply unit (PSU) for a computer system. The diagram is organized into a grid with columns labeled 1 through 6 and rows labeled A through D.

Input Section (Top Left): The input is connected to a power cord (J1) with lines 8901_A (N) and 8902_B (L). The input is protected by a fuse (F1, 1924 T5A) and a thermal fuse (T6.3A UL, 1905 IEC). The input is connected to a transformer (T2) with a primary winding of 240V and a secondary winding of 127V. A switch (5905) is used to select the input voltage.

Rectification and Filtering (Top Right): The secondary winding of the transformer is connected to a full-bridge rectifier (D101, D102, D103, D104, IM5402). The output of the rectifier is filtered by a capacitor (2922 0.1u) and a resistor (3923 33K). The output is connected to a terminal block (1912) with pins 1 (+48V), 2 (+48V), 3 (GND_D), 4 (GND_D), 5 (-48V), 6 (-48V), 7 (+D), 8 (GND), and 9 (+D2).

Regulation and Control (Middle Right): The output of the rectifier is connected to a voltage divider (3924 100K, 3925 100K) and a feedback network (3926 100K, 3927 100K). The feedback network is connected to a feedback pin (F1) of a voltage regulator (7912 BC547B). The output of the regulator is connected to a terminal block (1913) with pins 1 (+48V), 2 (+48V), 3 (GND_D), 4 (GND_D), 5 (-48V), 6 (-48V), 7 (+D), 8 (GND), and 9 (+D2).

Protection and Monitoring (Bottom Left): The input is connected to a fuse (F2, 1925 T2A5) and a thermal fuse (T6.3A UL, 1905 IEC). The input is connected to a transformer (T2) with a primary winding of 240V and a secondary winding of 127V. A switch (5905) is used to select the input voltage. The output of the transformer is connected to a rectifier (D101, D102, D103, D104, IM5402) and a filter capacitor (2922 0.1u). The output is connected to a terminal block (1912) with pins 1 (+48V), 2 (+48V), 3 (GND_D), 4 (GND_D), 5 (-48V), 6 (-48V), 7 (+D), 8 (GND), and 9 (+D2).

Output Section (Bottom Right): The output of the rectifier is connected to a voltage divider (3924 100K, 3925 100K) and a feedback network (3926 100K, 3927 100K). The feedback network is connected to a feedback pin (F1) of a voltage regulator (7912 BC547B). The output of the regulator is connected to a terminal block (1913) with pins 1 (+48V), 2 (+48V), 3 (GND_D), 4 (GND_D), 5 (-48V), 6 (-48V), 7 (+D), 8 (GND), and 9 (+D2).

Component List:

- Resistors: 3902 470R/1W, 3907 10K, 3908 10K, 3909 10K, 3910 10K, 3911 10K, 3912 10K, 3913 10K, 3914 10K, 3915 10K, 3916 10K, 3917 10K, 3918 10K, 3919 10K, 3920 10K, 3921 10K, 3922 10K, 3923 10K, 3924 100K, 3925 100K, 3926 100K, 3927 100K, 3928 100K, 3929 100K, 3930 100K, 3931 100K, 3932 100K, 3933 100K, 3934 100K, 3935 100K, 3936 100K, 3937 100K, 3938 100K, 3939 100K, 3940 100K, 3941 100K, 3942 100K, 3943 100K, 3944 100K, 3945 100K, 3946 100K, 3947 100K, 3948 100K, 3949 100K, 3950 100K, 3951 100K, 3952 100K, 3953 100K, 3954 100K, 3955 100K, 3956 100K, 3957 100K, 3958 100K, 3959 100K, 3960 100K, 3961 100K, 3962 100K, 3963 100K, 3964 100K, 3965 100K, 3966 100K, 3967 100K, 3968 100K, 3969 100K, 3970 100K, 3971 100K, 3972 100K, 3973 100K, 3974 100K, 3975 100K, 3976 100K, 3977 100K, 3978 100K, 3979 100K, 3980 100K, 3981 100K, 3982 100K, 3983 100K, 3984 100K, 3985 100K, 3986 100K, 3987 100K, 3988 100K, 3989 100K, 3990 100K, 3991 100K, 3992 100K, 3993 100K, 3994 100K, 3995 100K, 3996 100K, 3997 100K, 3998 100K, 3999 100K, 4000 100K.
- Capacitors: 2922 0.1u, 2923 0.1u, 2924 0.1u, 2925 0.1u, 2926 0.1u, 2927 0.1u, 2928 0.1u, 2929 0.1u, 2930 0.1u, 2931 0.1u, 2932 0.1u, 2933 0.1u, 2934 0.1u, 2935 0.1u, 2936 0.1u, 2937 0.1u, 2938 0.1u, 2939 0.1u, 2940 0.1u, 2941 0.1u, 2942 0.1u, 2943 0.1u, 2944 0.1u, 2945 0.1u, 2946 0.1u, 2947 0.1u, 2948 0.1u, 2949 0.1u, 2950 0.1u, 2951 0.1u, 2952 0.1u, 2953 0.1u, 2954 0.1u, 2955 0.1u, 2956 0.1u, 2957 0.1u, 2958 0.1u, 2959 0.1u, 2960 0.1u, 2961 0.1u, 2962 0.1u, 2963 0.1u, 2964 0.1u, 2965 0.1u, 2966 0.1u, 2967 0.1u, 2968 0.1u, 2969 0.1u, 2970 0.1u, 2971 0.1u, 2972 0.1u, 2973 0.1u, 2974 0.1u, 2975 0.1u, 2976 0.1u, 2977 0.1u, 2978 0.1u, 2979 0.1u, 2980 0.1u, 2981 0.1u, 2982 0.1u, 2983 0.1u, 2984 0.1u, 2985 0.1u, 2986 0.1u, 2987 0.1u, 2988 0.1u, 2989 0.1u, 2990 0.1u, 2991 0.1u, 2992 0.1u, 2993 0.1u, 2994 0.1u, 2995 0.1u, 2996 0.1u, 2997 0.1u, 2998 0.1u, 2999 0.1u, 3000 0.1u.
- Diodes: 1N4148, 1N4003, 1N4004, 1N4005, 1N4006, 1N4007, 1N4008, 1N4009, 1N4010, 1N4011, 1N4012, 1N4013, 1N4014, 1N4015, 1N4016, 1N4017, 1N4018, 1N4019, 1N4020, 1N4021, 1N4022, 1N4023, 1N4024, 1N4025, 1N4026, 1N4027, 1N4028, 1N4029, 1N4030, 1N4031, 1N4032, 1N4033, 1N4034, 1N4035, 1N4036, 1N4037, 1N4038, 1N4039, 1N4040, 1N4041, 1N4042, 1N4043, 1N4044, 1N4045, 1N4046, 1N4047, 1N4048, 1N4049, 1N4050, 1N4051, 1N4052, 1N4053, 1N4054, 1N4055, 1N4056, 1N4057, 1N4058, 1N4059, 1N4060, 1N4061, 1N4062, 1N4063, 1N4064, 1N4065, 1N4066, 1N4067, 1N4068, 1N4069, 1N4070, 1N4071, 1N4072, 1N4073, 1N4074, 1N4075, 1N4076, 1N4077, 1N4078, 1N4079, 1N4080, 1N4081, 1N4082, 1N4083, 1N4084, 1N4085, 1N4086, 1N4087, 1N4088, 1N4089, 1N4090, 1N4091, 1N4092, 1N4093, 1N4094, 1N4095, 1N4096, 1N4097, 1N4098, 1N4099, 1N4100, 1N4101, 1N4102, 1N4103, 1N4104, 1N4105, 1N4106, 1N4107, 1N4108, 1N4109, 1N4110, 1N4111, 1N4112, 1N4113, 1N4114, 1N4115, 1N4116, 1N4117, 1N4118, 1N4119, 1N4120, 1N4121, 1N4122, 1N4123, 1N4124, 1N4125, 1N4126, 1N4127, 1N4128, 1N4129, 1N4130, 1N4131, 1N4132, 1N4133, 1N4134, 1N4135, 1N4136, 1N4137, 1N4138, 1N4139, 1N4140, 1N4141, 1N4142, 1N4143, 1N4144, 1N4145, 1N4146, 1N4147,

ELECTRICAL PARTS - MAINS BOARD_FWM372

1200	△	9940 000 01223	FUSE RADIAL T5A 250V
1202	△	9940 000 01349	FUSE RADIAL T1.6A 250V /12/05
1202	△	9940 000 01231	FUSE RADIAL T1.25A 250V /55
1204	△	9940 000 01347	AC SOCKET 2P 2.5A 250V
1205	△	9940 000 01351	FUSE RADIAL T4A 250V
1206		9940 000 01323	SWITCH /55
1207	△	9940 000 01351	FUSE RADIAL T4A 250V
1208	△	9940 000 01231	FUSE RADIAL T1.25A 250V /55
1210	△	9940 000 00264	RELAY /12/05
1211	△	9940 000 01348	FUSE RADIAL T160MA 250V /12/05
2200		9940 000 01346	E.CAP 4700UF 25V +/-20%
2201		9940 000 01205	E.CAP 3300UF 35V +/-20%
2220	△	9940 000 01225	SAFETY CAP 275V 0.22UF +/-20%
2250		9940 000 01206	E.CAP 3300UF 50V +/-20%
3211	△	9940 000 04441	FUSE RES 4.7R 1/2W +/-5%
5203	△	9940 000 01359	STANDBY TRASFO. 230V /12/05
5220		9940 000 01226	AC LINE FILTER IND. 400μH 3A
7200		9940 000 04439	TRANSISTOR BD238

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

ELECTRICAL PARTS - MAINS BOARD_FWM572

1901	△	9940 000 01347	AC SOCKET H 2P 2.5A 250V
1902		9940 000 02821	SWITCH W/O NUT /55
1905	△	9940 000 01223	FUSE RADIAL T5A 250V
1921	△	9940 000 01223	FUSE RADIAL T5A 250V
1924	△	9940 000 01223	FUSE RADIAL T5A 250V
1925	△	9940 000 01356	FUSE RADIAL T2.5A/250V
1926	△	9940 000 01356	FUSE RADIAL T2.5A/250V
2927		9940 000 04475	E.CAP 8200μF 63V +80-20%
2928		9940 000 04475	E.CAP 8200μF 63V +80-20%
2944		9940 000 01205	E.CAP 3300μF 35V +/-20%
2945		9940 000 04474	E.CAP 6800UF 35V +/-20%
3941		9940 000 04473	RES. METAL 0.33Ω 1W +/-1%
3942		9940 000 04473	RES. METAL 0.33Ω 1W +/-1%
3951	△	9940 000 04472	RES. FUSIBLE 47Ω 1W +/-1%
5900		9940 000 01226	AC LINE FILTER IND. 400μH 3A
5903	⌘	9940 000 01359	STANDBY TRANS. 230V /12/05
5905	⌘	9940 000 00264	RELAY /12/05
6922		4822 130 11139	GBU8D

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

POWER BOARD

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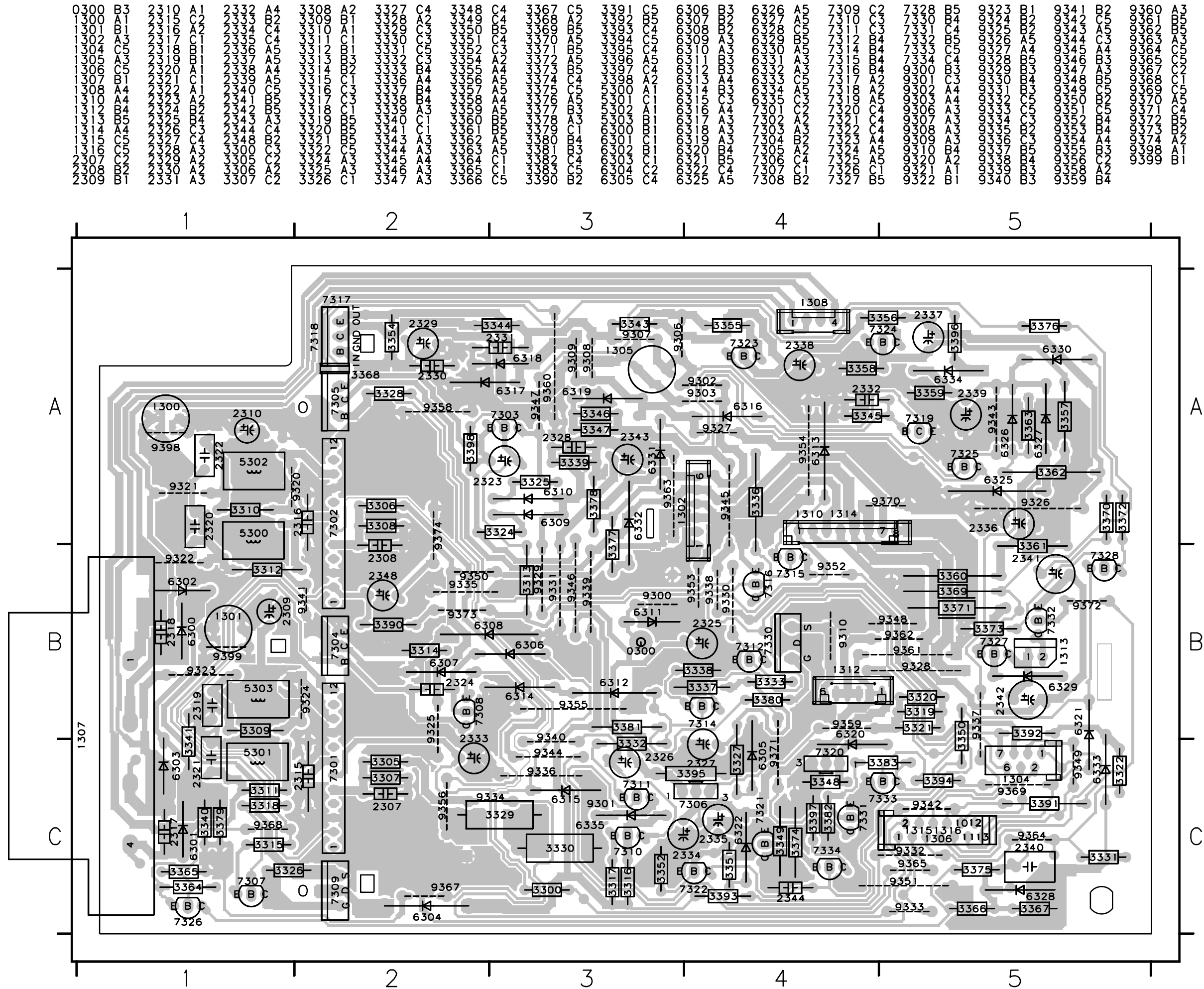
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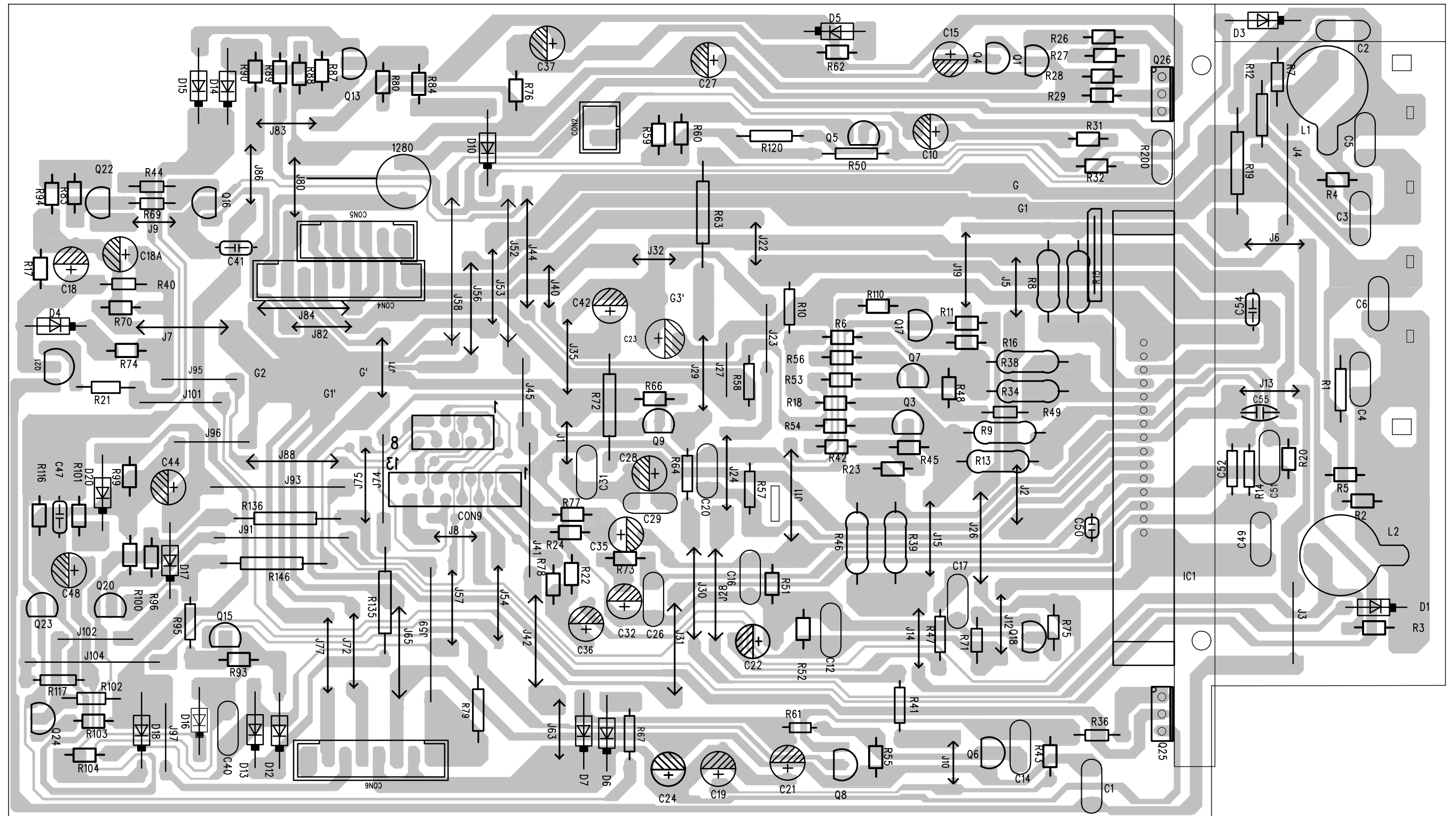
Electrical Parts List 11-7

LAYOUT DIAGRAM - POWER BOARD_FWM372



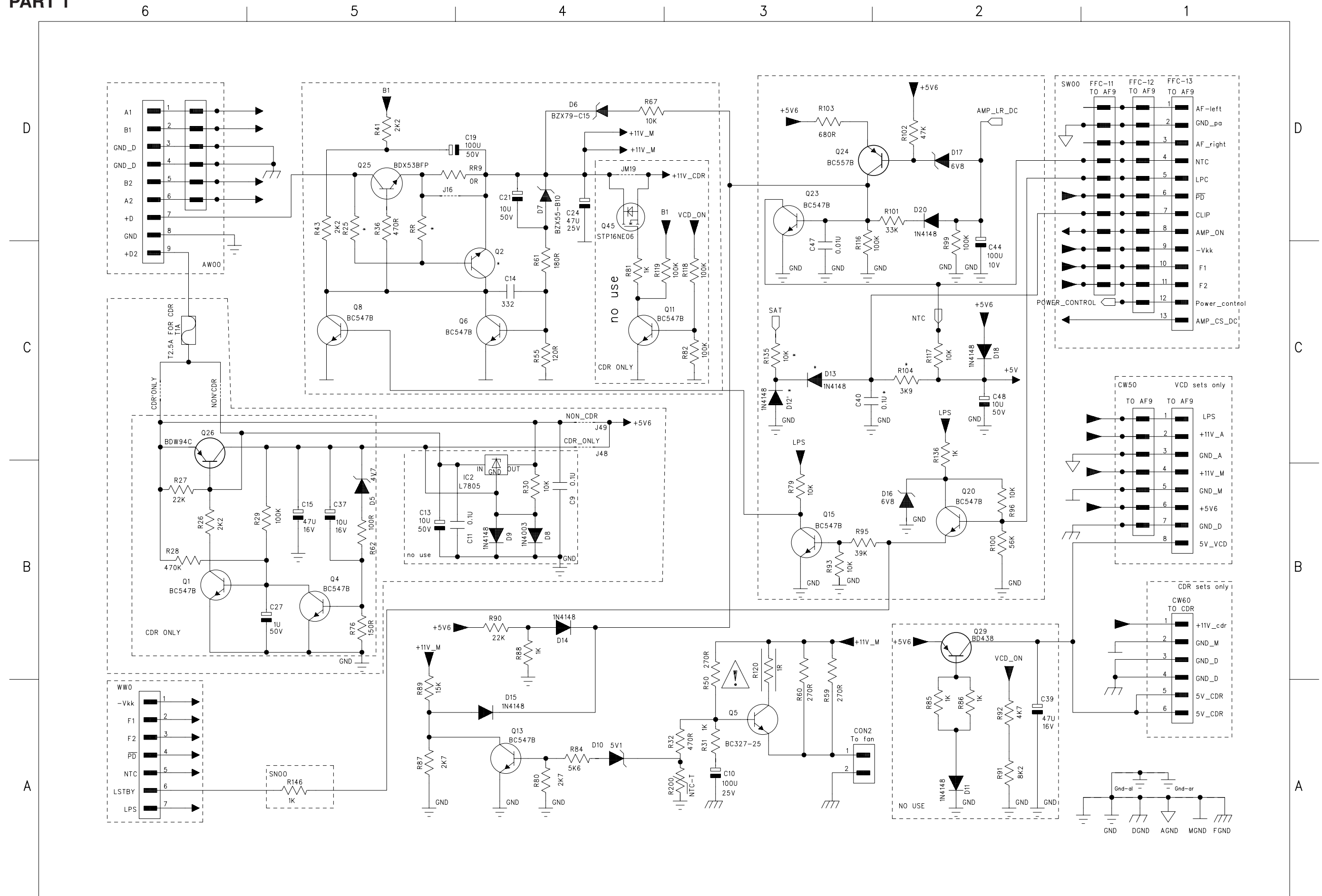
0300 D20	6303 E12
1300 E09	6304 A11
1301 B39	6305 A6E
1302 B39	6306 B13
1303 C14	6307 B13
1305 D3	6308 C11
1306 D10	6309 B14
1307 F14	6310 C14
1308 F12	6311 C09
1309 F12	6312 C13
1310 F12	6313 B13
1312 H11	6314 D03
1313 J39	6315 D14
1314 G11	6316 F15
2307 D08	6319 G13
2308 D08	6320 H04
2309 D08	6321 C05
2310 E09	6322 H05
2315 D09	6325 E05
2316 D09	6326 E05
2317 F13	6327 H03
2318 F13	6328 H13
2321 F13	6329 J17
2322 F14	6330 A11
2322 F13	6332 A11
2323 A05	6333 B02
2323 A05	6334 B02
2325 A05	6335 B02
2326 A03	7300 B18
2328 D4	7303 A45
2329 E05	7304 A13
2329 E05	7305 A03
2330 H05	7306 A05
2332 F05	7307 B12
2333 F07	7308 B14
2334 H06	7309 B12
2335 H06	7310 D03
2337 E04	7311 B03
2338 E04	7312 B06
2341 F13	7313 C03
2342 F12	7315 C05
2343 D13	7316 C05
2344 D13	7319 F06
2345 D13	7320 H04
2346 E07	7321 H04
2347 H06	7322 H05
2348 F07	7323 F03
2350 G07	7324 F04
2351 G07	7325 F03
2358 G08	7326 H18
2359 H08	7327 H12
3300 B10	7328 H10
3310 F12	7331 A01
3313 A05	7332 B19
3314 A14	7333 A09
3315 A14	7334 H05
3316 A03	8300 D09
3317 A03	9001 B03
3318 A03	9002 B03
3319 B04	9003 D02
3320 B05	9006 D03
3321 B05	9007 E03
3322 B05	9008 E03
3323 B04	9009 D04
3325 B04	9010 A07
3326 B12	9011 E09
3327 B12	9012 E09
3328 B05	F300 A1
3329 C14	F301 A1
3330 C14	F302 A1
3331 B02	F303 A1
3332 C13	F304 A1
3333 B06	F305 A4
3334 B06	F306 B09
3335 D04	F307 C12
3336 D04	F308 C12
3341 E13	F310 D13
3343 F13	F311 C13
3344 F13	F312 C11
3345 F13	F313 C09
3346 F15	F314 C11
3346 G12	F315 D11
3347 G12	F316 D11
3351 H05	F319 G13
3352 H05	F320 D02
3353 H05	F321 E02
3354 B03	F324 E02
3355 E03	F326 E11
3356 E03	F327 E11
3357 F05	F327 E02
3358 F05	F328 F11
3359 B13	F329 F12
3360 B13	F330 F12
3361 H03	F331 F11
3362 H13	F332 F11
3363 H13	F333 G11
3364 H12	F334 G11
3365 H12	F335 F12
3366 H13	F336 F04
3367 H13	F336 G13
3368 H17	F340 G09
3369 H17	F341 H05
3370 H17	F342 D13
3371 H17	F343 E14
3372 H11	F344 F06
3373 H11	F345 H14
3374 H17	F346 H17
3375 H17	F347 B19
3376 H17	F348 E12
3377 H10	F349 H11
3378 H10	
3379 D13	
3380 A07	
3381 A08	
3382 A08	
3383 A08	
3384 A08	
3385 A08	
3386 A12	
3387 H04	
3388 A04	
5300 C10	
5300 F10	
5302 B10	
5303 B10	
5304 B12	
6301 E12	
6302 E13	

LAYOUT DIAGRAM - POWER BOARD_FWM572

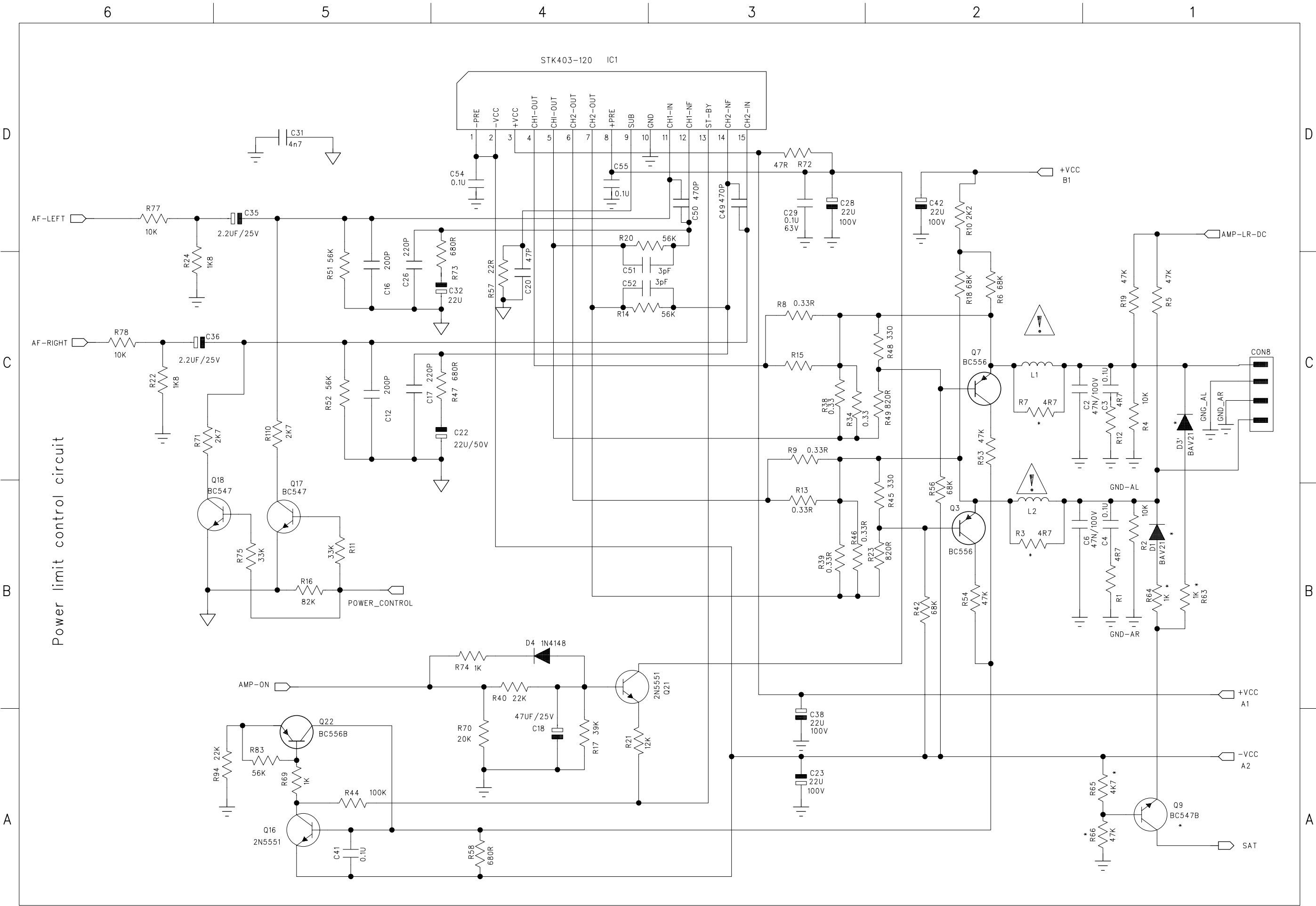


CIRCUIT DIAGRAM - POWER BOARD_FWM572

PART 1



CIRCUIT DIAGRAM - POWER BOARD_FWM572
PART 2



ELECTRICAL PARTS - POWER BOARD_FWM372

1305	△	9940 000 01356	FUSE RADIAL T2.5A/250V
1307		9940 000 01219	SPK JACK (RD/BLK/BLK/RD)
5300		9940 000 01217	AIR COIL 6X18.5T (0.5MM)
5301		9940 000 01217	AIR COIL 6X18.5T (0.5MM)
5302		9940 000 01217	AIR COIL 6X18.5T (0.5MM)
5303		9940 000 01217	AIR COIL 6X18.5T (0.5MM)
6304		9940 000 04446	RECTIFIER DIODE BYV28-200
6308		9940 000 04445	RECTIFIER DIODE BYV27-200
7301		9322 203 61682	IC AN17850A
7302		9322 203 61682	IC AN17850A
7304		9940 000 04443	TRANSISTORS BDW94C
7305		9940 000 04444	TRANSISTOR BDX53BFP
7309		4822 130 11336	IC STP16NF06FP
7318		4822 209 83824	IC NJM7805FA
		9940 000 01265	SPRING TRANS

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

ELECTRICAL PARTS - POWER BOARD_FWM572

1280	△	9940 000 01356	FUSE RADIAL T2.5A/250V
CON8		9940 000 01219	SPK JACK (RD/BLK/BLK/RD)
IC1		9940 000 04477	IC STK403-120
IC2		9940 000 04443	TRANSISTORS BDW94C
L1		9940 000 04483	FM COIL 8X11.5T (1MM)
L2		9940 000 04483	FM COIL 8X11.5T (1MM)
Q16		9940 000 04476	TRANSISTOR 2N5551
Q21		9940 000 04476	TRANSISTOR 2N5551
Q25		9940 000 04444	TRANSISTOR BDX53BFP
R120	△	9940 000 04478	FUSE RES. 1Ω 1W +/-5%
R13		9940 000 04481	RES. METAL 0.33Ω 1W +/-1%
R15		9940 000 04481	RES. METAL 0.33Ω 1W +/-1%
R200		9940 000 04482	RES. NTC 10K +/-10%
R34		9940 000 04481	RES. METAL 0.33Ω 1W +/-1%
R38		9940 000 04481	RES. METAL 0.33Ω 1W +/-1%
R39		9940 000 04481	RES. METAL 0.33Ω 1W +/-1%
R46		9940 000 04481	RES. METAL 0.33Ω 1W +/-1%
R72	△	9940 000 04479	RES. FUSIBLE 47Ω 1W +/-1%
R8		9940 000 04481	RES. METAL 0.33Ω 1W +/-1%
R9		9940 000 04481	RES. METAL 0.33Ω 1W +/-1%

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

AF9 BOARD

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BRIEF INTRODUCTION OF THE AF9 BOARD

The AF9 Board consists of the following features :

- a. TDA7468D IC
TDA7468D IC (7501) which includes functions such as source selection, loudness control, dynamic bass control, treble control, volume control and muting function. Sound features such as ALC, DBB, DSC and IS are controllable via I²C Bus from the microprocessor.

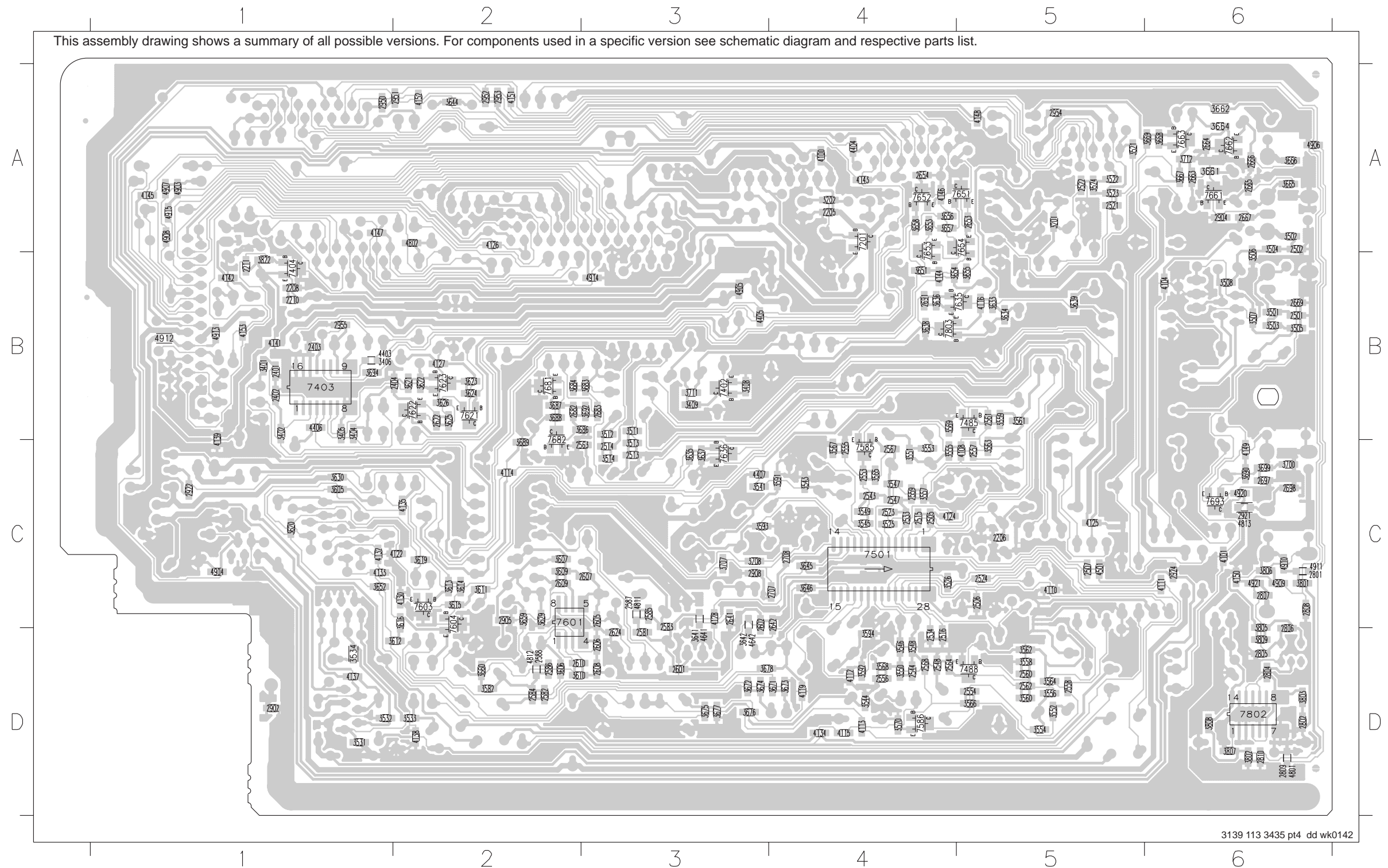
The TDA7468D IC caters for 4 input sources namely TUNER, TAPE, CD and AUX. It also has a Mic mix input. In our application, software will switch the input source to previous source MUTE during STANDBY mode and some other occasions where noise from other input source is undesirable.

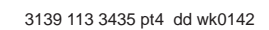
Note that the input to the TDA7468D IC must be ac coupled to prevent 'polp' noise. Input networks are included to provide appropriate attenuation for various sources.
- b. SIMPLE MIC MIXING
The AF9 Board has provisions which can be configured to cater for one of the following:
MM : which caters for Mic mixing with additional Mic amplifier board.
NM : non Mic mixing.
- c. DOLBY PRO LOGIC (DPL) INTERFACE
The AF9 Board has provisions which can be configured to cater for DPL.
- d. LINE OUT
Line out cinch socket for connection to external amplifier.
- e. SUB-WOOFER OUT
Sub-woofer out cinch socket for connection to active sub-woofer speaker.
- f. INCREDIBLE SURROUND
Incredible surround effect using transistor circuit to create phase shifting and spatial effect.
- g. HEADPHONE AMPLIFIER
Headphone amplifier to drive 32 ohm to 1kohm headphone.
- h. CD STANDBY CONTROL
CD Standby Control circuit which switches on the supply to CD servo control IC, digital out buffer IC, HF circuit and the laser light pen in CD mode only.
- i. ATTENUATION NETWORK
Attenuation network is provided at the output of the AF9 Board for interfacing with power board of different output power.
- j. CD DIGITAL OUT
CD Digital out cinch socket for connection to external digital audio decoders.

CHIP LAYOUT

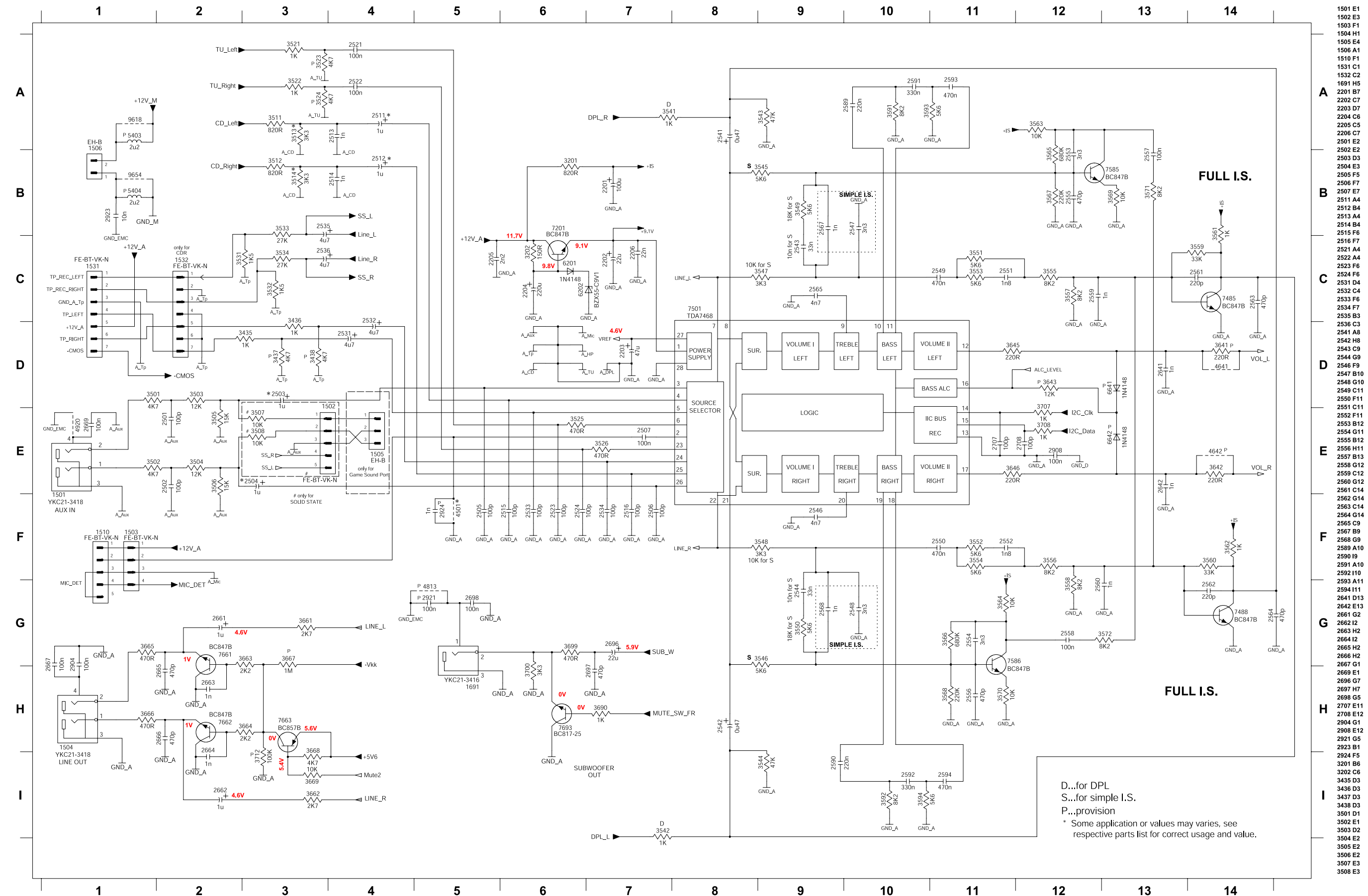
12-2

12-2





SOURCE SELECTION & SOUND PROCESSING CIRCUIT

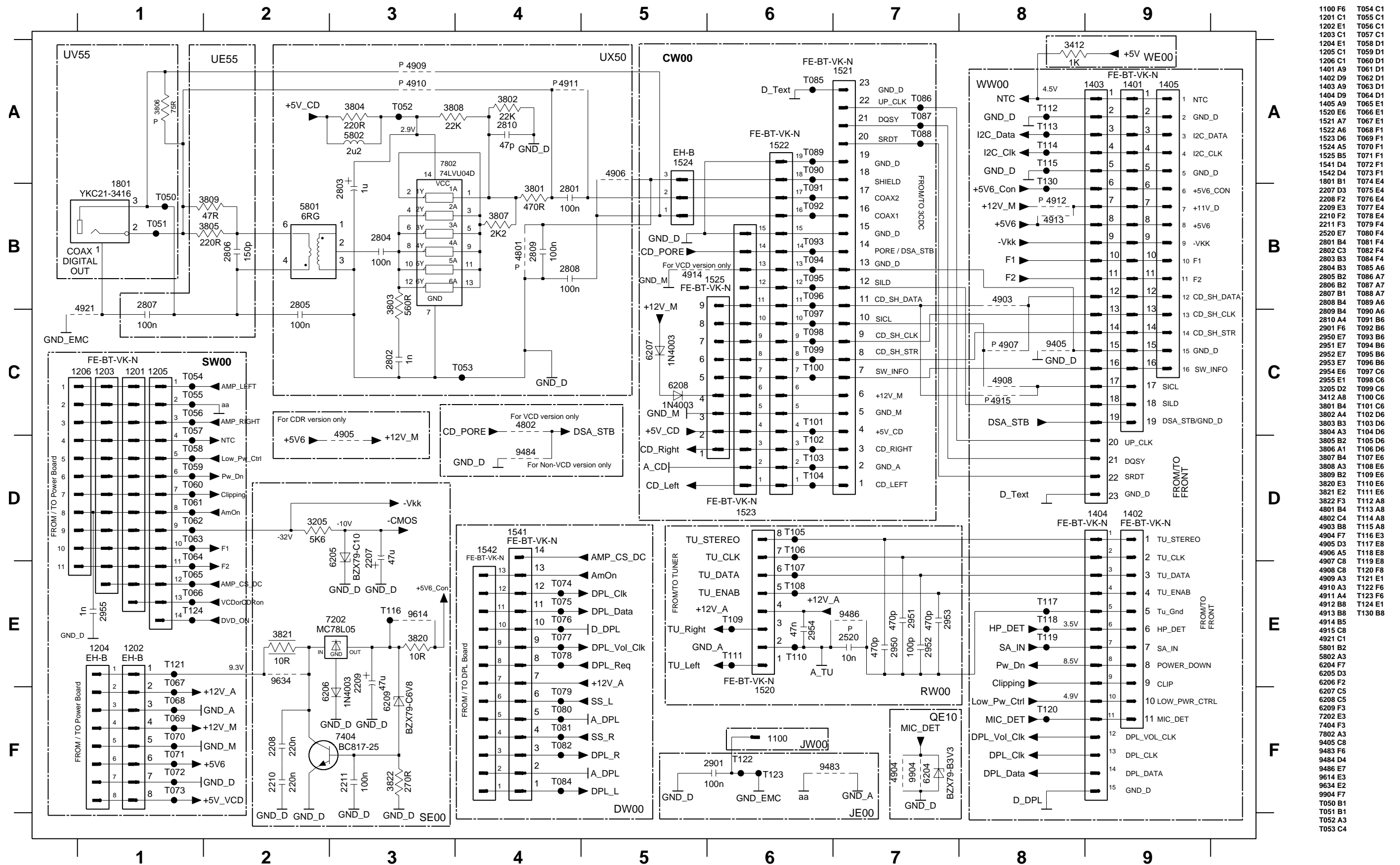


1501 E1 3511 A3
1502 E3 3512 B3
1503 F1 3513 A3
1504 H1 3514 B3
1505 E4 3521 A3
1506 A1 3522 A3
1510 F1 3523 A3
1531 C1 3524 A3
1532 C2 3525 E6
1691 H5 3526 E7
2201 B7 3531 C2
2202 C7 3532 C3
2203 D7 3533 B3
2204 C6 3534 C3
2205 C5 3541 A7
2206 C7 3542 I7
2501 E2 3543 A9
2502 E2 3544 I9
2503 D3 3545 B9
2504 E3 3546 G9
2505 F5 3547 C9
2506 F7 3548 F9
2507 E7 3549 B9
2511 A4 3550 G9
2512 B4 3551 C11
2513 A4 3552 F11
2514 B4 3553 C11
2515 F6 3554 F11
2516 F7 3555 C12
2521 A4 3556 F12
2522 A4 3557 C12
2523 F6 3558 G12
2524 F6 3559 C14
2531 D4 3560 F14
2532 C4 3561 B14
2533 F6 3562 F14
2534 F7 3563 A12
2535 B3 3564 G11
2536 C3 3565 B12
2541 A8 3566 G11
2542 H8 3567 B12
2543 C9 3568 H11
2544 G9 3569 B13
2545 F9 3570 H11
2547 B10 3571 B13
2548 G10 3572 G13
2549 C11 3591 A10
2550 F11 3592 I10
2551 C11 3593 A10
2552 F11 3594 I10
2553 B12 3641 D14
2554 H11 3642 E14
2555 B12 3643 D12
2556 H11 3643 D11
2557 B13 3646 E11
2558 G12 3661 G3
2559 C12 3662 I3
2560 G12 3663 G3
2561 C14 3664 H3
2562 G14 3665 G1
2563 C14 3666 H1
2564 G14 3667 G3
2565 C9 3668 I3
2567 B9 3669 I3
2568 G9 3690 H7
2569 A10 3699 G6
2590 I9 3700 H6
2591 A10 3707 E12
2592 I10 3708 E12
2593 A11 3712 I3
2594 I11 4501 F5
2641 D13 4641 D14
2642 E13 4642 E14
2661 G2 4813 G5
2662 I2 4920 A1
2663 H2 5403 A1
2664 I2 5404 B1
2665 H2 6201 C6
2666 H2 6202 C6
2667 G1 6641 D13
2669 E1 6642 E13
2696 G7 7201 B6
2697 H7 7485 C14
2698 G5 7488 G14
2707 E11 7501 C8
2708 E12 7585 B13
2904 G1 7586 G11
2908 E12 7661 G2
2921 G5 7662 H2
2923 B1 7663 H3
2924 F5 7693 H6
3201 B6 9618 A1
3202 C6 9654 B1
3435 D3
3436 D3
3437 D3
3438 D3
3501 D1
3502 E1
3503 D2
3504 E2
3505 E2
3506 E2
3507 E3
3508 E3

[illegible]

1102 H3	3658 B6
1103 H3	3659 E4
1602 B13	3660 F4
1603 E7	3671 I7
2401 F13	3672 H7
2402 F12	3673 I7
2403 F12	3674 H7
2404 F11	3675 I6
2581 D2	3676 H6
2582 G2	3677 I5
2583 D2	3678 I5
2584 F2	3683 B9
2585 D2	3684 C9
2586 F2	3686 C0
2587 D2	3687 B0
2588 F2	3688 A0
2601 E2	3689 A11
2602 G2	3692 B0
2603 D2	3694 E0
2604 F2	3711 D0
2605 D3	4403 E11
2606 G3	4404 E10
2607 D3	4405 F10
2608 F3	4406 F10
2609 E3	4407 H13
2610 F3	4811 E2
2611 D4	4812 F2
2612 F4	5401 E12
2621 B2	5621 F5
2622 G11	6401 F11
2623 G5	6771 I6
2624 G5	6772 I4
2625 G13	6774 B4
2626 H10	6775 H6
2653 A7	7401 D10
2654 B7	7402 E10
2681 A10	7403 C12
2682 B10	7601-A G
2683 B9	7601-B D
2684 B9	7603 E6
2771 I6	7604 F6
2772 I6	7621 F10
2902 H2	7622 F11
2905 G12	7623 H10
2922 D7	7635 B3
3401 E13	7636 C2
3402 E13	7651 A7
3403 F12	7652 B7
3404 D11	7653 B5
3405 D11	7654 B5
3406 E11	7681 B11
3408 E10	7682 B10
3409 D10	7803 B2
3410 D9	9401 D9
3581 D3	9402 F10
3582 G3	9599 I2
3601 D3	
3602 G3	
3605 E2	
3606 F2	
3607 E2	
3608 F2	
3609 E3	
3610 F3	
3611 D5	
3612 F5	
3613 E5	
3614 F5	
3615 D5	
3616 F5	
3619 C13	
3620 B12	
3621 H9	
3622 H9	
3623 G10	
3624 G10	
3625 G10	
3626 H11	
3627 G5	
3628 G13	
3629 G13	
3630 E5	
3631 D7	
3633 B2	
3634 B2	
3635 C3	
3636 B3	
3637 C2	
3638 B3	
3639 A4	
3640 C7	
3644 I1	
3651 A4	
3652 C5	
3653 A5	
3654 B5	
3655 A6	
3656 C6	
3657 A6	

DIGITAL OUT & INTERCONNECTION CIRCUIT

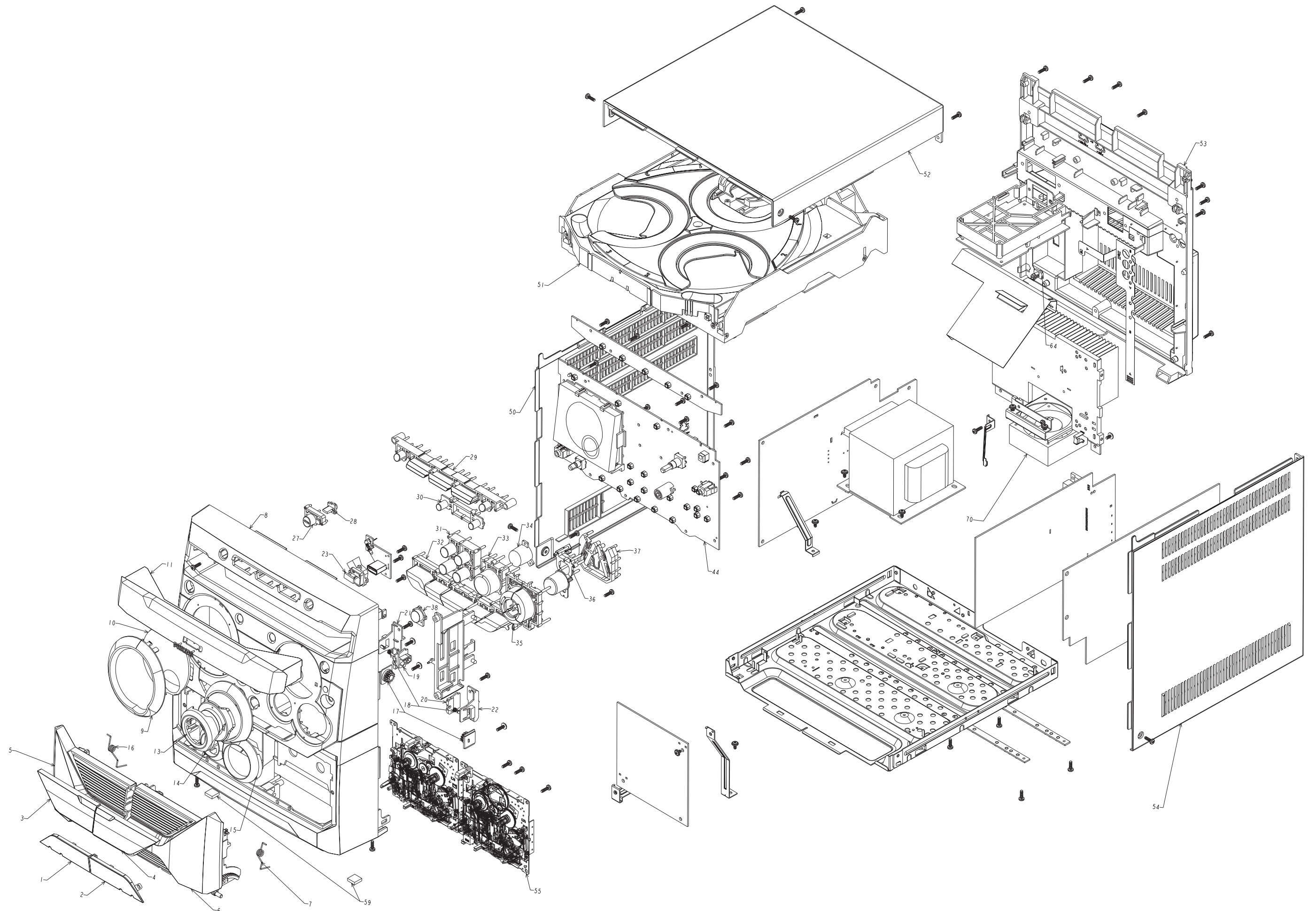


Updated on 15 SEPT 2003

ELECTRICAL PARTS - AF9 BOARD

1501	9940 000 01221	RCA JACK 2P
3627	△ 9940 000 01358	FUSE RES.10Ω 1/4W +/-5%
3821	△ 9940 000 01358	FUSE RES.10Ω 1/4W +/-5%
7202	9940 000 01357	IC LM78L05-AC
7403	4822 209 17345	IC M62320FP
7501	9322 150 74668	IC SM TDA7468D
7601	5322 209 15853	IC NJM4556AM

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

MECHANICAL EXPLODED VIEW

MECHANICAL & ACCESSORIES PARTS

	FWM372	FWM572	DESCRIPTION
1	9940 000 01292	9940 000 04503	CASS LENS BOTTOM L
2	9940 000 01291	9940 000 04502	CASS LENS BOTTOM R
3	9940 000 01289	9940 000 04501	CASS LEFT TOP LENS
4	9940 000 01288	9940 000 04499	CASS RIGHT TOP LENS
5	9940 000 01287	9940 000 04498	CASS BOX LEFT
6	9940 000 01286	9940 000 04497	CASS BOX RIGHT
7	9940 000 01267	9940 000 01267	SPRING -RIGHT
8	9940 000 04464	9940 000 04493	FRONT CAB. /12/05
8	9940 000 04794	9940 000 04516	FRONT CAB. /55
9	9940 000 01282	9940 000 01282	DISPLAY RING
10	9940 000 01308	9940 000 01308	DISPLAY LENS
11	9940 000 04463	9940 000 04489	CDC TRAY DOOR
13	9940 000 01297	9940 000 01297	VOL KNOB GRIP
14	9940 000 01296	9940 000 04505	VOL KNOB RING
15	9940 000 01281	9940 000 01281	COSMETIC RING
16	9940 000 01266	9940 000 01266	SPRING -LEFT
17	9940 000 01295	9940 000 01295	DAMPER GEAR ASS'Y
18	9940 000 01268	9940 000 01268	SPRING COMPRESSION
19	9940 000 01294	9940 000 01294	PUSH CATCH LEFT
20	9940 000 01293	9940 000 01293	PUSH CATCH
21	9940 000 01284	9940 000 01284	LEFT-BRACKET
22	9940 000 01283	9940 000 01283	RIGHT-BRACKET
23	9940 000 04466	9940 000 04495	USB DIRECT PANEL
27	9940 000 01304	9940 000 04509	STANDBY KEY
28	9940 000 01307	9940 000 01307	STANDBY LENS
29	9940 000 01305	9940 000 04511	CD DISC KEYS
30	9940 000 01302	9940 000 04508	AUTO KEYS
31	9940 000 04467	9940 000 04504	SOURCE KEYS
32	9940 000 01377	9940 000 04513	MODEL KEY
33	9940 000 01376	9940 000 04512	MAX KNOB
35	9940 000 01299	9940 000 04507	CD CONTROL KEY
36	9940 000 01298	9940 000 04506	CD PLAY KEY
50	9940 000 01276	9940 000 04491	PANEL LEFT
51	9940 000 04455	9940 000 04486	3CD MECHA ASS'Y
52	9940 000 01285	9940 000 04496	TOP COVER
53	9940 000 01375	9940 000 04494	REAR PANEL
54	9940 000 01277	9940 000 04492	PANEL RIGHT /FWM372
55	9940 000 04458	9940 000 04458	LOGIC DECK W991D-5168BF
59	9940 000 01264	9940 000 01264	FOOT RUBBER 4MM
64	9940 000 04465	9940 000 04465	STOPPER HEATSINK
70		9940 000 02001	FAN 12VDV 0.8W
△	9940 000 01487	9940 000 01487	AC CORD 1.6M /05
△	9940 000 01314	9940 000 01314	AC CORD SET 2M /12/55
	9940 000 01192	9940 000 01192	AM LOOP ANTENNA LAN-031
	9940 000 01381	9940 000 01381	FM ANT (BLACK) 1M
	9940 000 04437	9940 000 04437	REMOTE CONTROL
	9940 000 04438	9940 000 04471	SPK BOX ASS'Y L/R

ELECTRICAL PARTS - MISCELLANEOUS

FWM372	FWM572	DESCRIPTION
9940 000 01257	9940 000 01257	11P FFC 1.25MM L=260MM
9940 000 01262	9940 000 01262	19P FFC 1.25MM L=280MM
9940 000 01362	9940 000 01362	8P FFC1.25MM L=160MM
9940 000 01363	9940 000 01363	7P FFC1.25MM L=180MM
9940 000 01364	9940 000 01364	15P FFC1.25MM L=180MM
9940 000 01366	9940 000 01366	4P FFC1.25MM L=240MM
9940 000 01367	9940 000 01367	7P FFC1.25MM L=240MM
9940 000 01368	9940 000 01368	7P FFC1.25MM L=370MM
9940 000 01369	9940 000 01369	2P FLAT CABLE L=4+72+4MM
9940 000 04456	9940 000 04456	16P FFC L=170MM
9940 000 04457	9940 000 04457	5P FFC CABLE L=200MM
9940 000 04461	9940 000 04461	12P FFC 1.25MM L=220MM
9940 000 04462	9940 000 04462	4P FFC 1.25MM L=270MM
9940 000 01501	9940 000 01501	TUNER BOARD ASS'Y /12/05
9940 000 01964	9940 000 01964	TUNER BOARD ASS'Y /55
9940 000 03669	9940 000 03669	CD DRIVER DA11VF
9940 000 04442	9940 000 04442	TUNER FE450-G11 /12/05
9940 000 04452	9940 000 04484	USB JACK BOARD ASS'Y
9940 000 04454	9940 000 04454	CD USB BOARD ASS'Y
9940 000 04485	9940 000 04485	CASS BOARD ASS'Y
△ 9940 000 04459		TRASFO. EI76 230V /12
△ 9940 000 04795		TRASFO. EI76 127/240V /55
△	9940 000 04488	TRASFO. EI86 230V /12
△	9940 000 04515	TRASFO. EI86 127/240V /55

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

REVISION LIST

1.0 Manual 3141 785 30860

Initial Service Manual released.

1.1 Manual 3141 785 30861

In this version, the Chapter6 - Front Board & Key Board are added.