

Service
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Service Manual

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**CLASS 1
LASER PRODUCT**

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GB

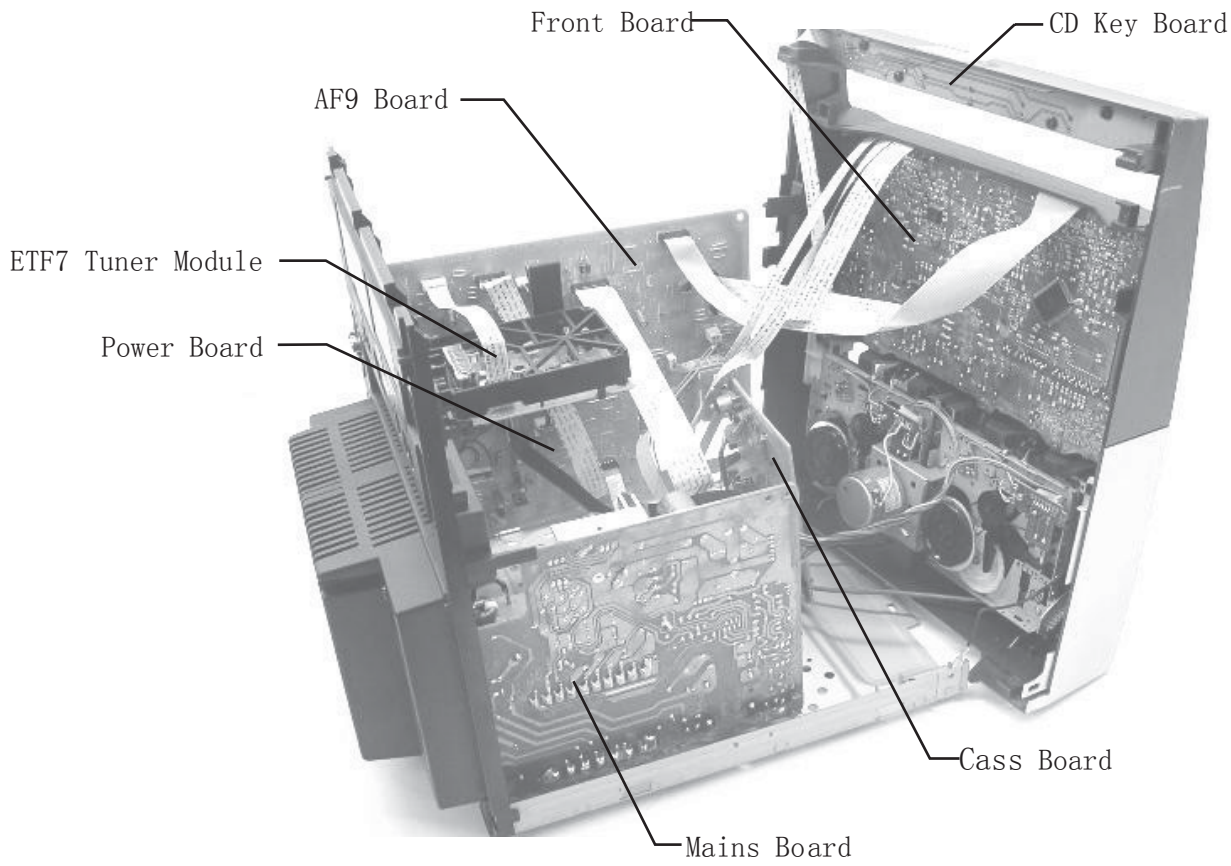
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Version 1.2



PHILIPS

LOCATION OF PCBS



VERSION VARIATIONS:

Type /Versions:		FWM372/FWM572									
Board in used:	Service policy	/05	/12	/37	/55	/58	/61			/93	/98
CD KEY BOARD		C	C		C						
TUNER BOARD		M	M		M						
AF9 BOARD		C	C		C						
FRONT BOARD		C	C		C						
POWER BOARD		C	C		C						
USB JACK BOARD		M	M		M						
CASS DECK BOARD		C	C		C						
MAINS BOARD		C	C		C						
Type /Versions:		FWM372/FWM572									
Features	Feature difference	/05	/12	/37	/55	/58	/61			/93	/98
RDS/NEWS		√	√								
VOLTAGE SELECTOR					√						
ECO STANDBY - DARK		√	√								
* TIPS : C -- Component Lever Repair. M -- Module Lever Repair √ -- Used											

SPECIFICATION

GENERAL:

Mains voltage : 230V $\pm$ 10% /05/12
127V $\pm$ 15% / 240V $\pm$ 10% /55/98

Mains frequency : 50/60Hz

Power consumption : < 1W at ECO Standby /05/12
< 15W Standby w/Clock on
< 60W Active /FWM372
< 110W Active /FWM572

Clock accuracy : < 2 seconds per day

Dimension centre unit : 265(W) x 310(H) x 367(D)mm

TUNER:

FM

Tuning range	: 87.5-108MHz
Grid	: 100kHz
IF frequency	: 10.7MHz $\pm$ 20kHz
Aerial input	: 75 Ω coaxial
Sensitivity at 26dB S/N	: < 22dBf
Selectivity at 300kHz bandwidth	: > 25dB
IF rejection	: > 75dB
Image rejection	: > 25dB
Distortion at RF=1mV, dev. 75kHz	: < 3%
-3dB Limiting point	: < 23.5dBf
Crosstalk at RF=1mV, dev. 40kHz	: > 18dB

AM

Tuning range	: 531-1602kHz 530-1700kHz for /55/98
Grid	: 9kHz 10kHz for /55/98
IF frequency	: 450kHz $\pm$ 1kHz
Aerial input	: Frame aerial 18.1 μ H
Sensitivity at 26dB S/N	: < 4.0mV/M
Selectivity at 18kHz bandwidth	: > 18dB
IF rejection	: > 45dB
Image rejection	: > 28dB
Distortion at RF=50mV, m=80%	: < 5%

AMPLIFIER:

Output power (6Ω, 1 kHz, 10% THD) : 2 x 60W RMS
/FWM372
: 2 x 110W RMS
/FWM572

Frequency response within -3dB : 125Hz-16kHz

Dynamic Bass Boost : DBB OFF, DBB 1, DBB 2, DBB 3 ²⁾

Digital Sound Control : Jazz, Rock, Techno, Optimal ²⁾

Headphone output at 32KΩ : 700mV ± 2dB

Input sensitivity
Aux / CDR : 350mV /900mV

CASSETTE RECORDER:

Number of track	: 2 x 2 stereo
Tape speed	: 4.76 cm/sec $\pm$ 2%
Wow and flutter	: < 0.4% DIN
Fast-wind/rewind time C60	: 130 sec
Bias system	: 75kHz $\pm$ 10kHz
Rec/Pb frequency response within 8dB	: 80Hz - 12.5kHz
Signal to noise ratio	Type : > 48dBA

COMPACT DISC:

Measurement done at output conn. of the CDC module.	
Frequency response within $\pm 1.5\text{dB}$: 20Hz - 20kHz	
Output level (in Vrms)	: 550mV $\pm 1\text{dB}$, $R_{\text{out}} = 100\Omega$
Signal/Noise ratio (A-weighted)	: > 70dB
Distortion at 1kHz	: < 0.003%
Channel unbalance at 1kHz	: $\pm 2\text{dB}$
Crosstalk at 1kHz	: > 55dB
De-emphasis	: 0 or 15/50 mS (Switched by subcode on the disc)
MPEG 1 Layer 3 (MP3-CD)	: MPEG AUDIO
MP3-CD Bit Rate	: 56-256 kbps
MP3-CD Sampling Frequencies	: 32 kHz, 44.1kHz, 48kHz
Recording Format	: ISO 9660 UDF format not supported

USB:

Measurement done at speaker terminals across 6Ω load
w/ 500mW output and DSC setting in Jazz Mode.

Frequency response within ± 3dB : 100Hz - 16kHz

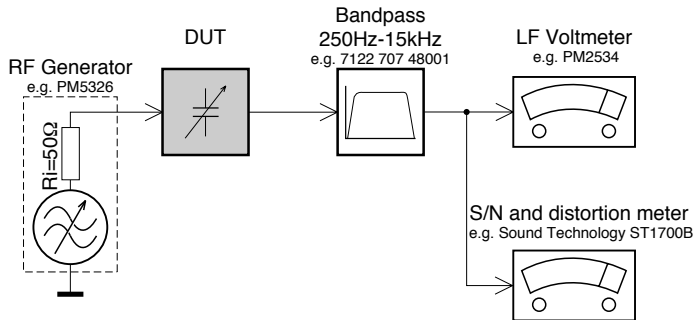
Signal/Noise ratio (A-weighted) : > 60dBA

Channel crosstalk at 1kHz : > 35dB

Channel unbalance at 1kHz : ±3dB

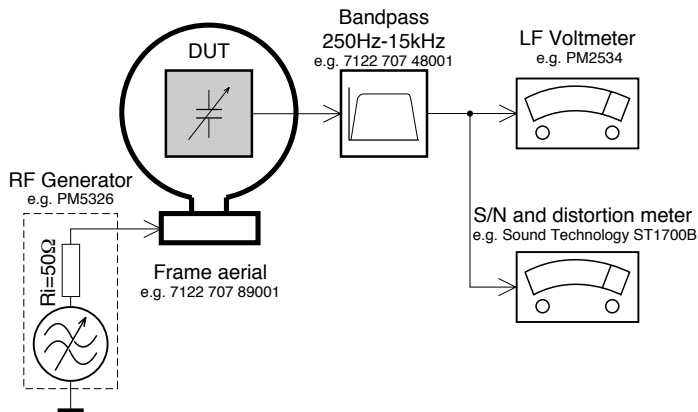
MEASUREMENT SETUP

Tuner FM



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

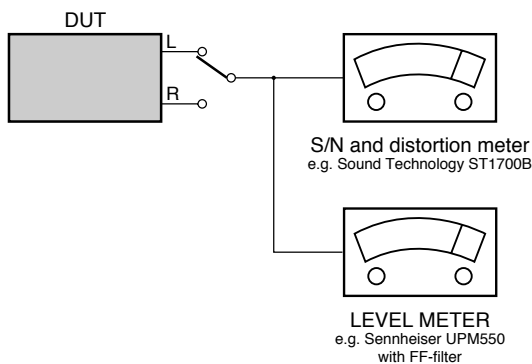
Tuner AM (MW,LW)



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).

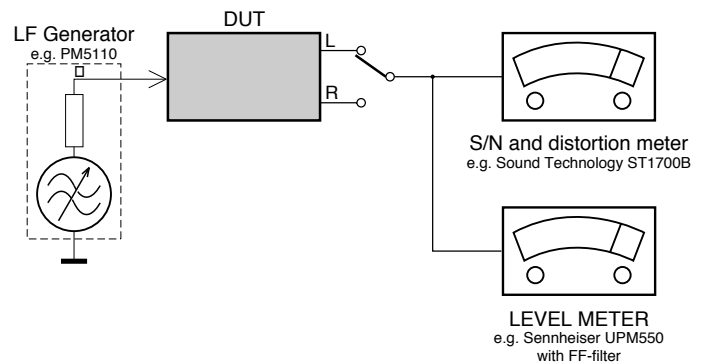
CD

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

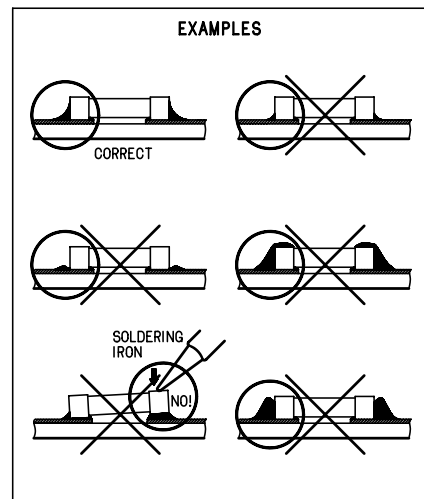
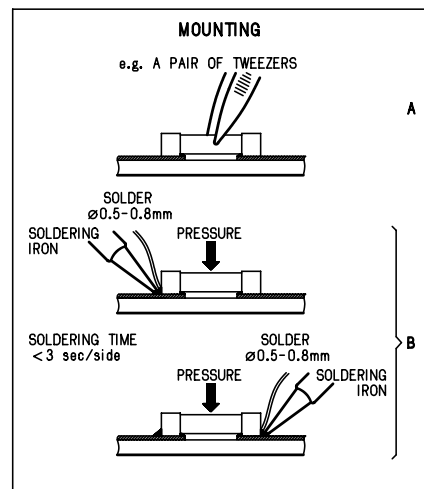
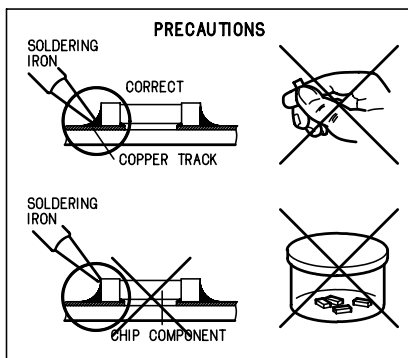
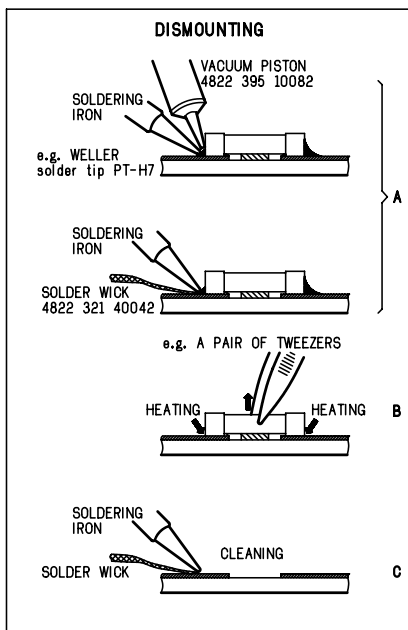
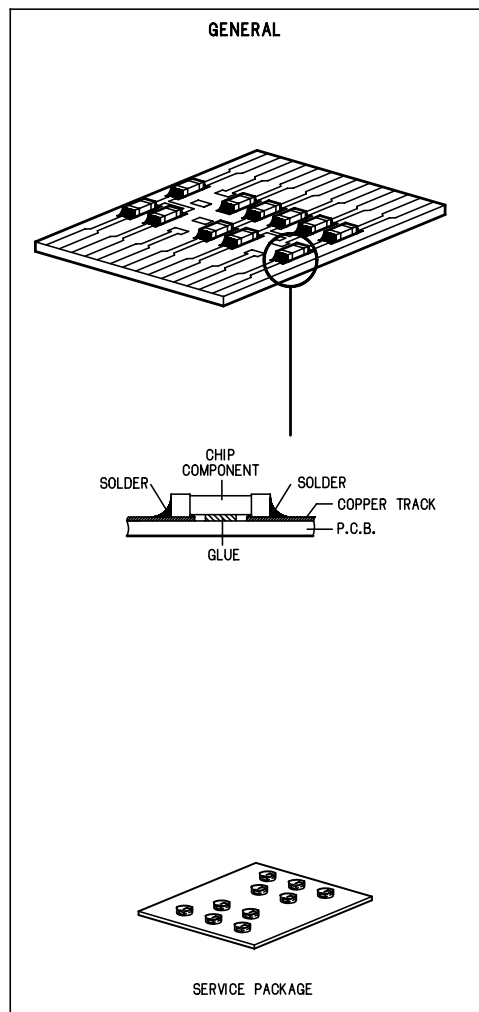
Compact Disc:

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



(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).

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.

ESD**(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)

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".

(NL)

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

(F)

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.

(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.

(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.

"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) Varoitut !

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

(DK) Advarse !

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

INFORMATION ABOUT LEAD-FREE SOLDERING

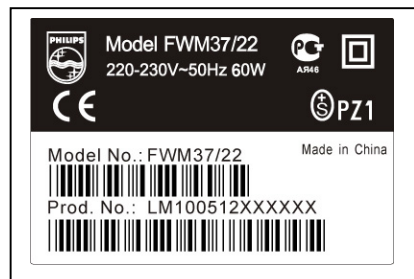
Philips CE is producing lead-free sets from 1.1.2005 onwards.

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*!

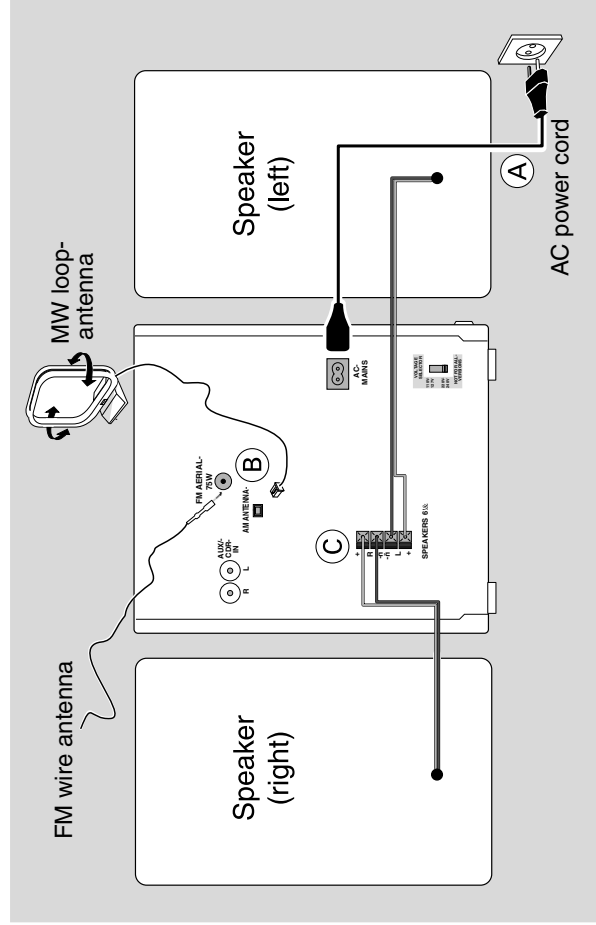
For additional questions please contact your local repair-helpdesk.

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

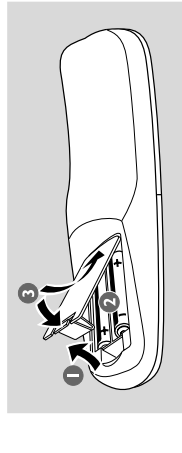
- OR
- for the devices with USB cables:**
- 1 Insert one plug of the USB cable (not supplied) to the  socket on the set.
 - 2 Insert the other plug of the USB cable to the USB output terminal of the USB device.
- OR
- for the memory card:**
- 1 Insert the memory card into a card reader (not supplied).
 - 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!

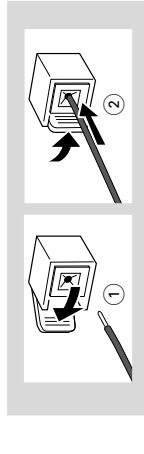
- Remove batteries if they are exhausted or will not be used for a long time.
- Do not use old and new or different types of batteries in combination.
- Batteries contain chemical substances, so they should be disposed of properly.

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

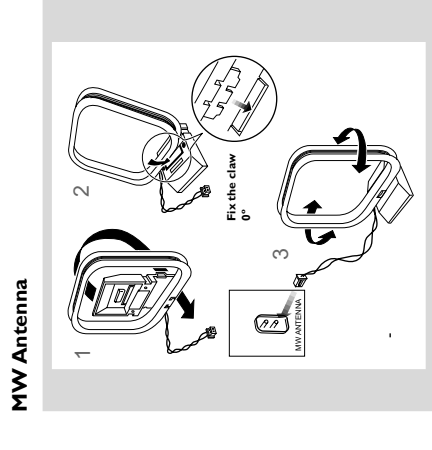
The optional equipment and connecting cords are not supplied. Refer to the operating instructions of the connected equipment for details.

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.



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.

- A 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.

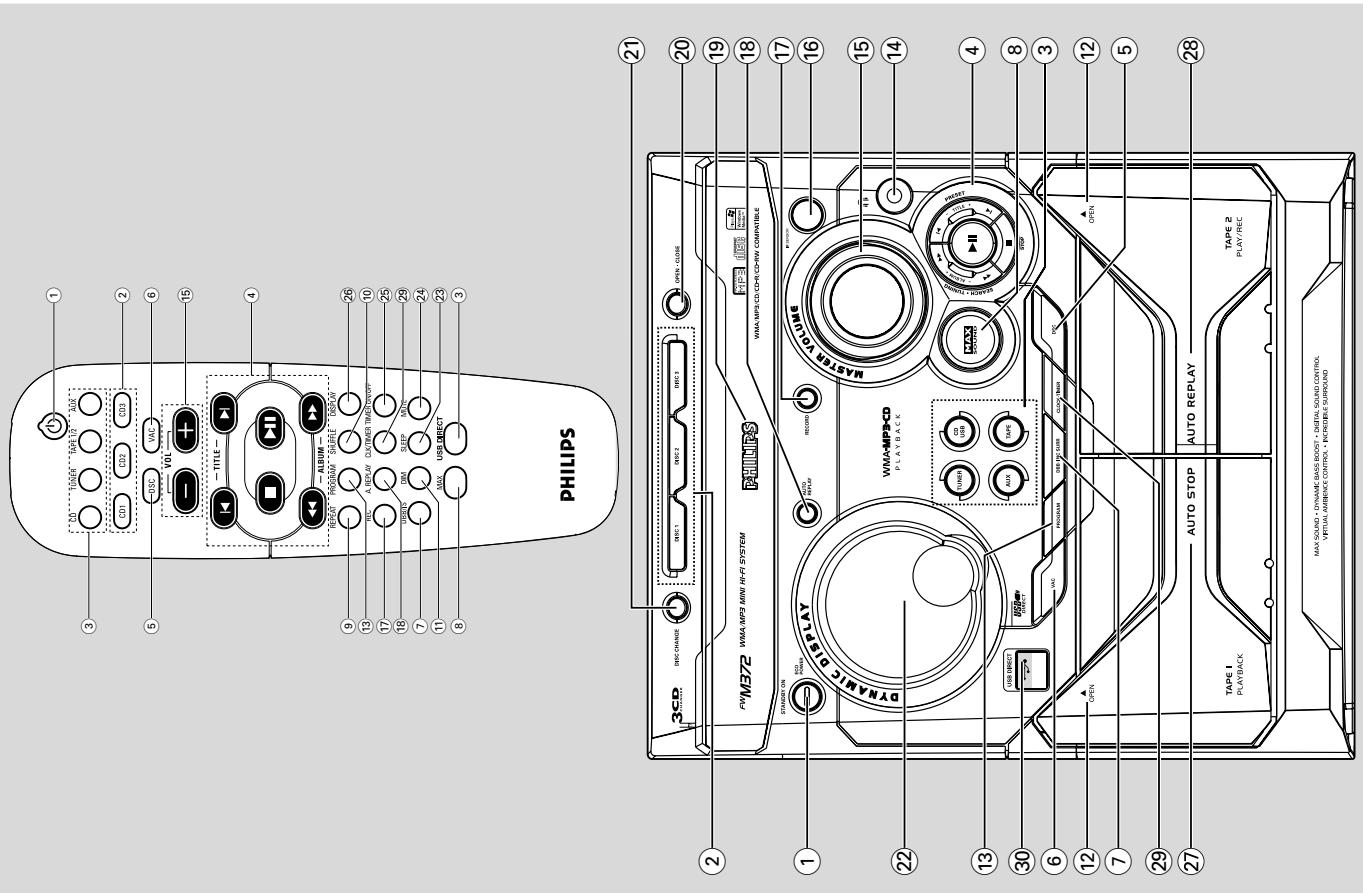
To avoid overheating of the system, a safety circuit has been built in. Therefore, your system may switch to Standby mode automatically under extreme conditions. If this happens, let the system cool down before reusing it (not available for all versions).

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.
- ㉔ **DISPLAY**

– to display the album and title name for MP3 disc.

≥ **Tape deck 1**

㉖ **Tape deck 2**

㉗ **CLOCK•TIMER (CLK/TIMER)**

– to view the clock.

㉘ **USB DIRECT** 

– jack for the external USB mass storage device.

Notes for remote control:

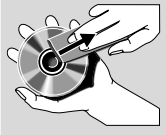
- First, select the source you wish to control by pressing one of the source select keys on the remote control (CD or TUNER, for example).
- Then select the desired function (, , , , for example).

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.



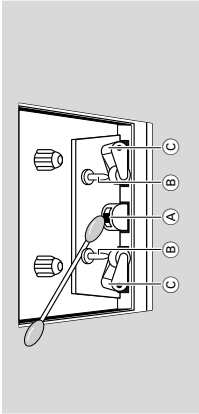
Cleaning Discs

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.

- If the signal is too weak, adjust the antenna or connect an external antenna for better reception.
- Increase the distance between the Mini HiFi System and your TV or VCR.
- Clean deck parts, see "Maintenance".
- Use only NORMAL (IEC I) tape.
- Apply a piece of adhesive tape over the missing tab space.
- Remove and reconnect the AC power plug and switch on the system again.
- Remove and reconnect the AC power plug and switch on the system again.
- Adjust the volume.
- Disconnect the headphones.
- Check that the speakers are connected correctly.
- Check if the stripped speaker wire is clamped.
- Make sure the MP3-CD was recorded within 32-256 kbps bit rate with sampling frequencies at 48 kHz, 44.1 kHz or 32 kHz.
- Check the speaker connections and location.
- Select the source (CD or TUNER, for example) before pressing the function button (▶, ◀, ▶▶, ◀◀).
- Reduce the distance between the remote control and the system.
- Insert the batteries with their polarities (+/- signs) aligned as indicated.
- Replace the batteries.
- Point the remote control directly towards the IR sensor.
- Set the clock correctly.
- Press and hold CLOCK•TIMER to switch on the timer.
- If recording or tape dubbing is in progress, stop recording.
- Press DIM to select DIM OFF display mode.
- Power has been interrupted or the power cord has been disconnected. Reset the clock/timer.
- Press and hold ■ on the system to switch off the demonstration.

Troubleshooting

WARNING

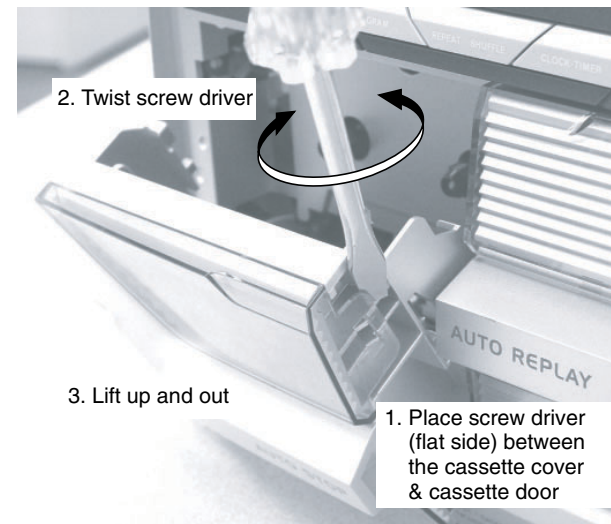
Under no circumstances should you try to repair the system yourself, as this will invalidate the warranty. Do not open the system as there is a risk of electric shock.

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.

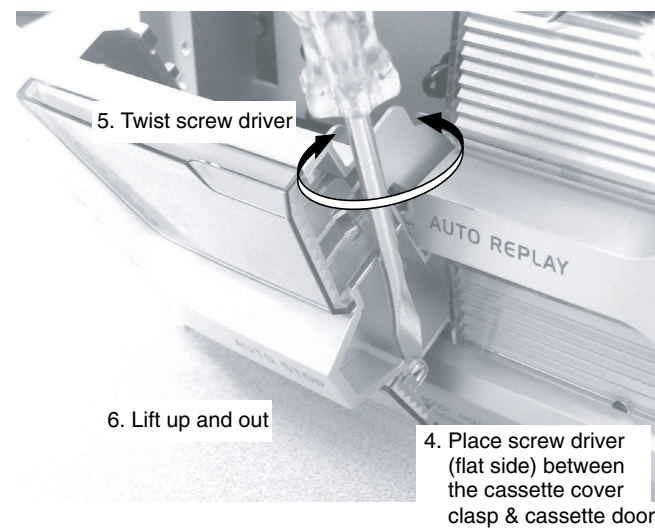
Problem	Solution
"NO DISC" is displayed.	Insert a disc. Check if the disc is inserted upside down. Wait until the moisture condensation at the lens has cleared. Replace or clean the disc, see "Maintenance". Use a finalized CD-RW or a correct MP3-CD format disc. Use a finalised CD-RW or CD-R.
"DISC NOT 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



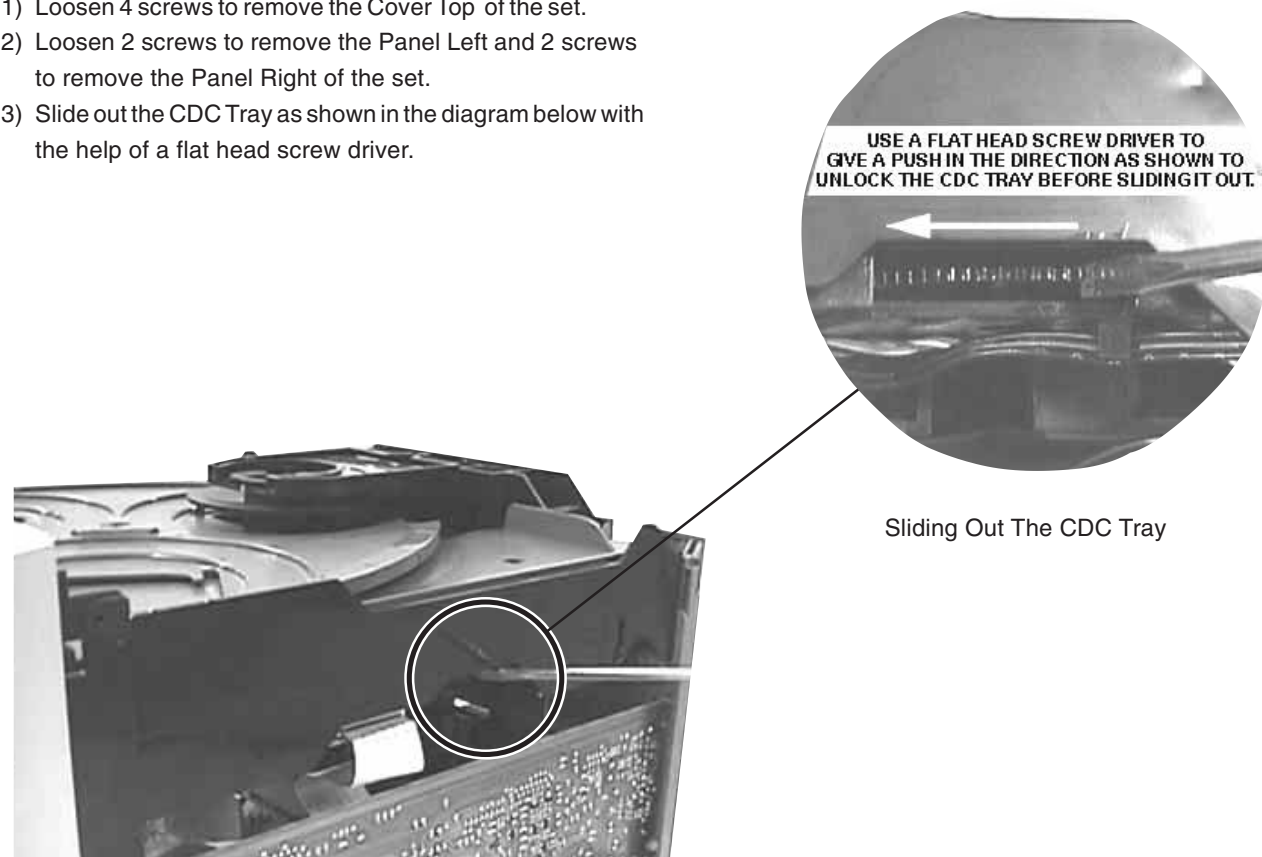
Remove Cassette Upper Cover



Remove Cassette Nether Cover

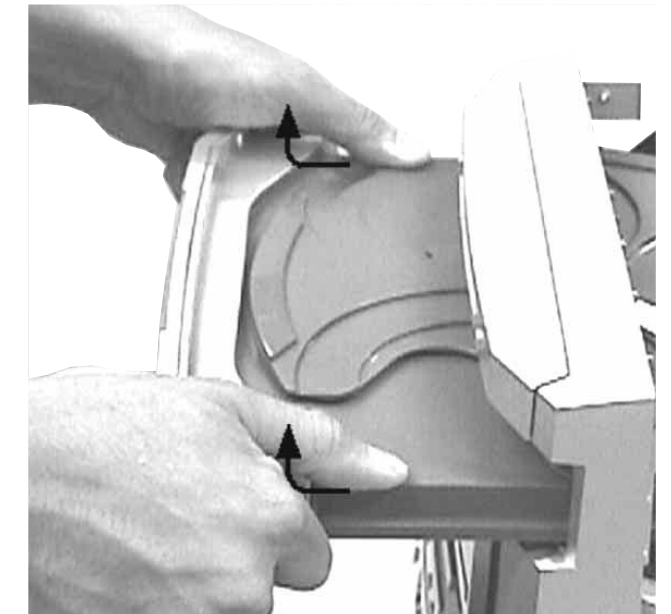
Dismantling of the CDC Module and Front Panel

- 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.

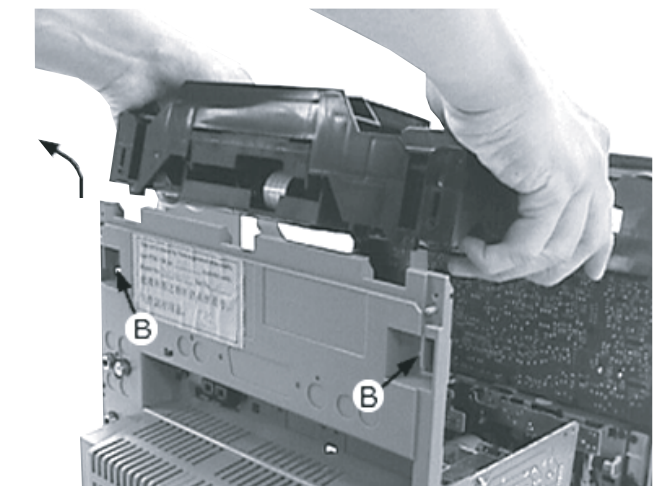


Remove Cover Tray CDC

- 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.



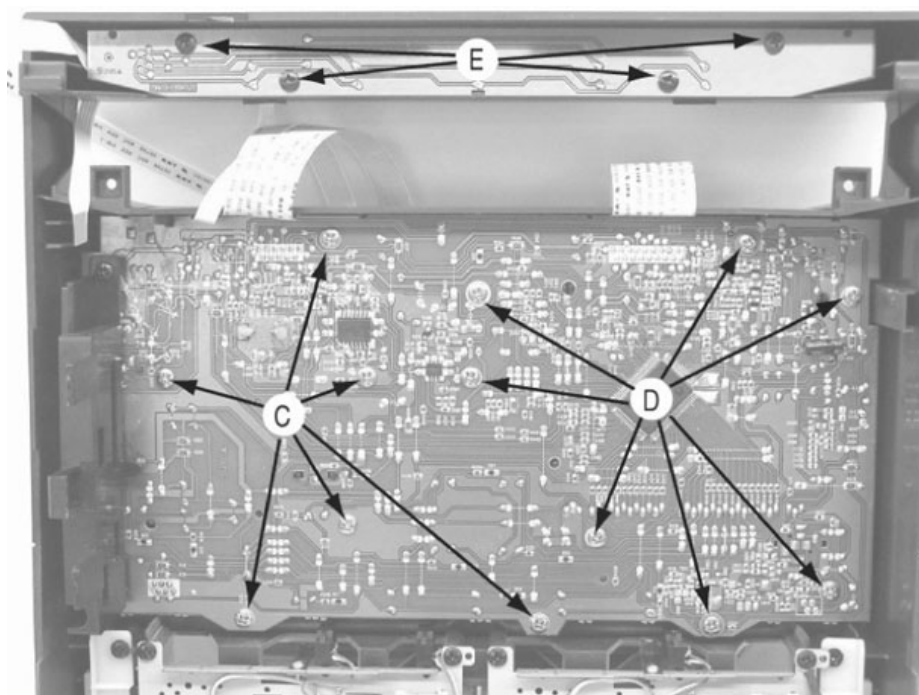
Front View CDC



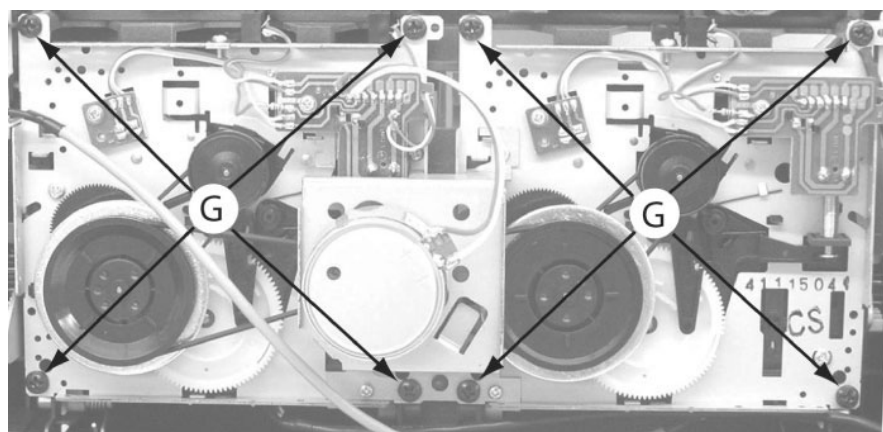
Remove CDC Module

Dismantling of the Front Board

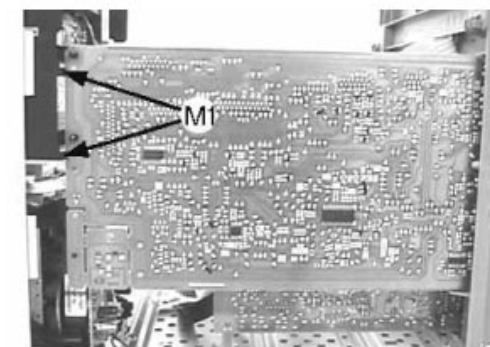
- 1) Remove 6 screws C and 7 screws D as indicated to loosen the Front Board.
- 2) Remove 4 screws E as indicated to loosen the Front Board.

**Dismantling of the ETF Tape Module**

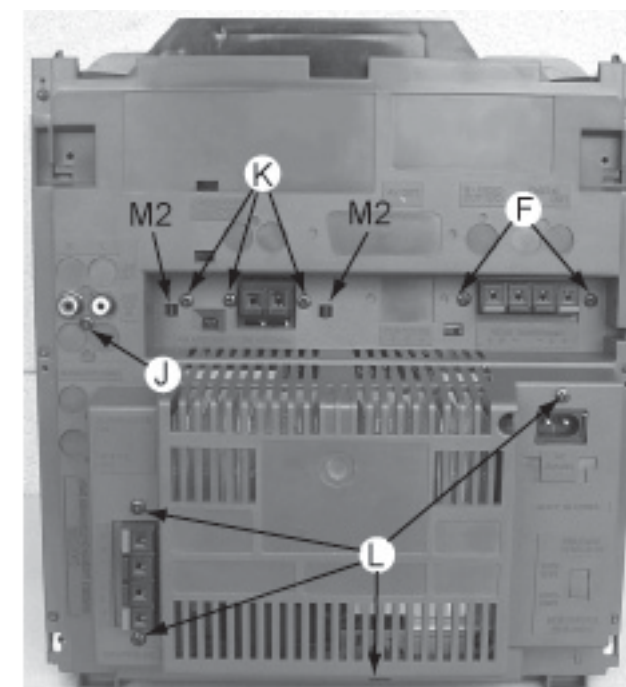
- 1) Remove 8 screws G as indicated to loosen the ETF Tape Module.

**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.

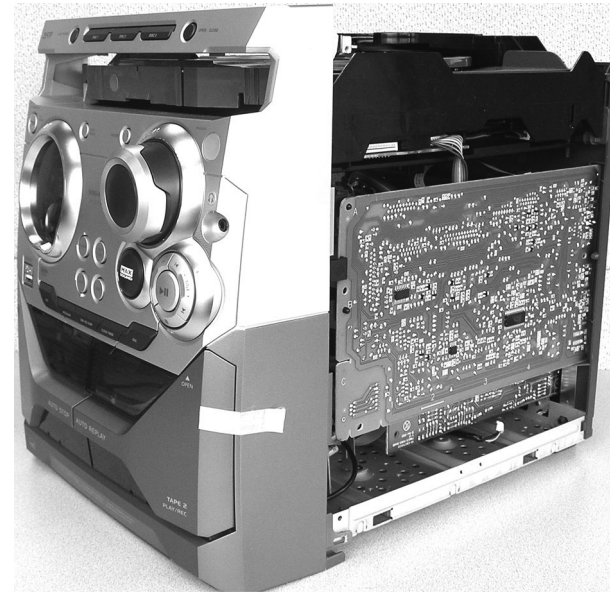


Repair Hints

- 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.

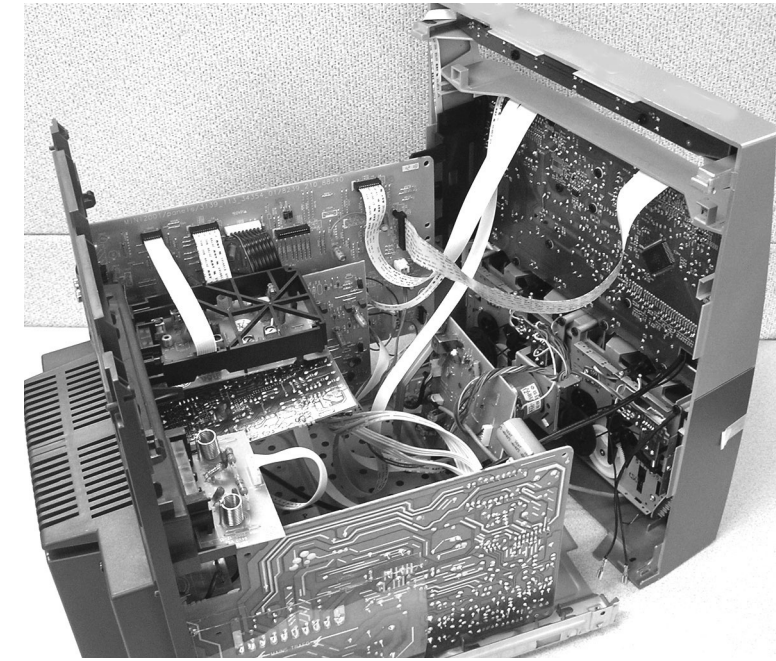
Service pos A



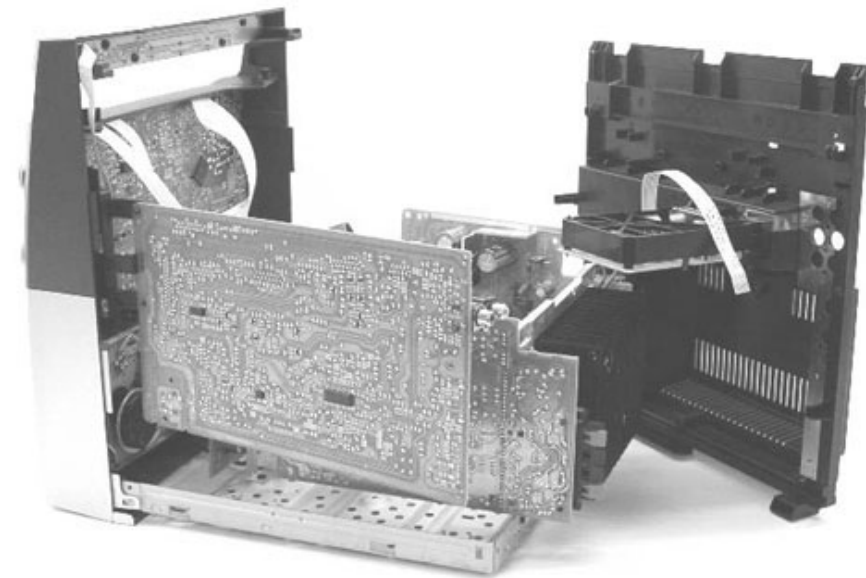
Service pos B



Service pos C



Service pos D



SERVICE TEST PROGRAM

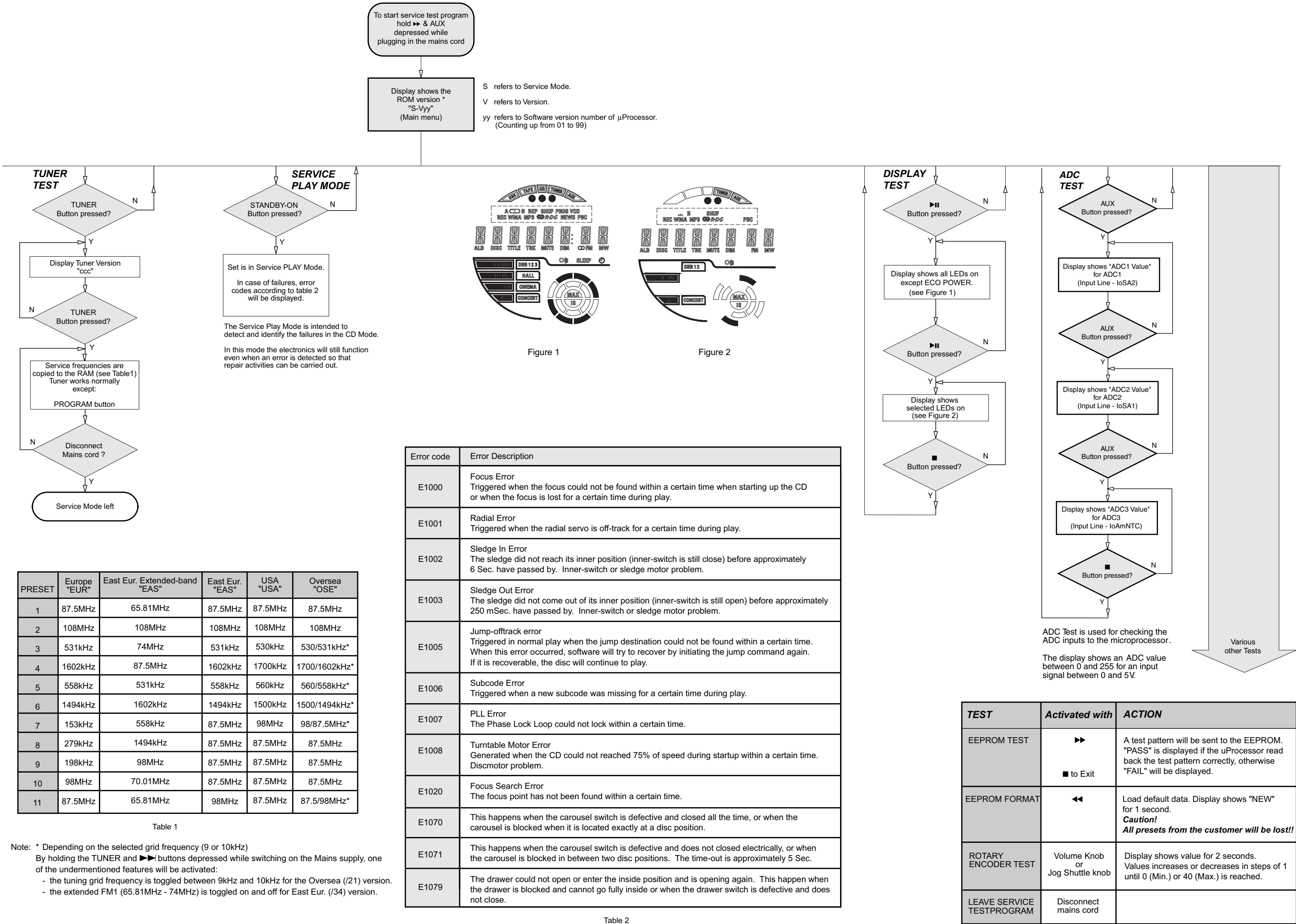
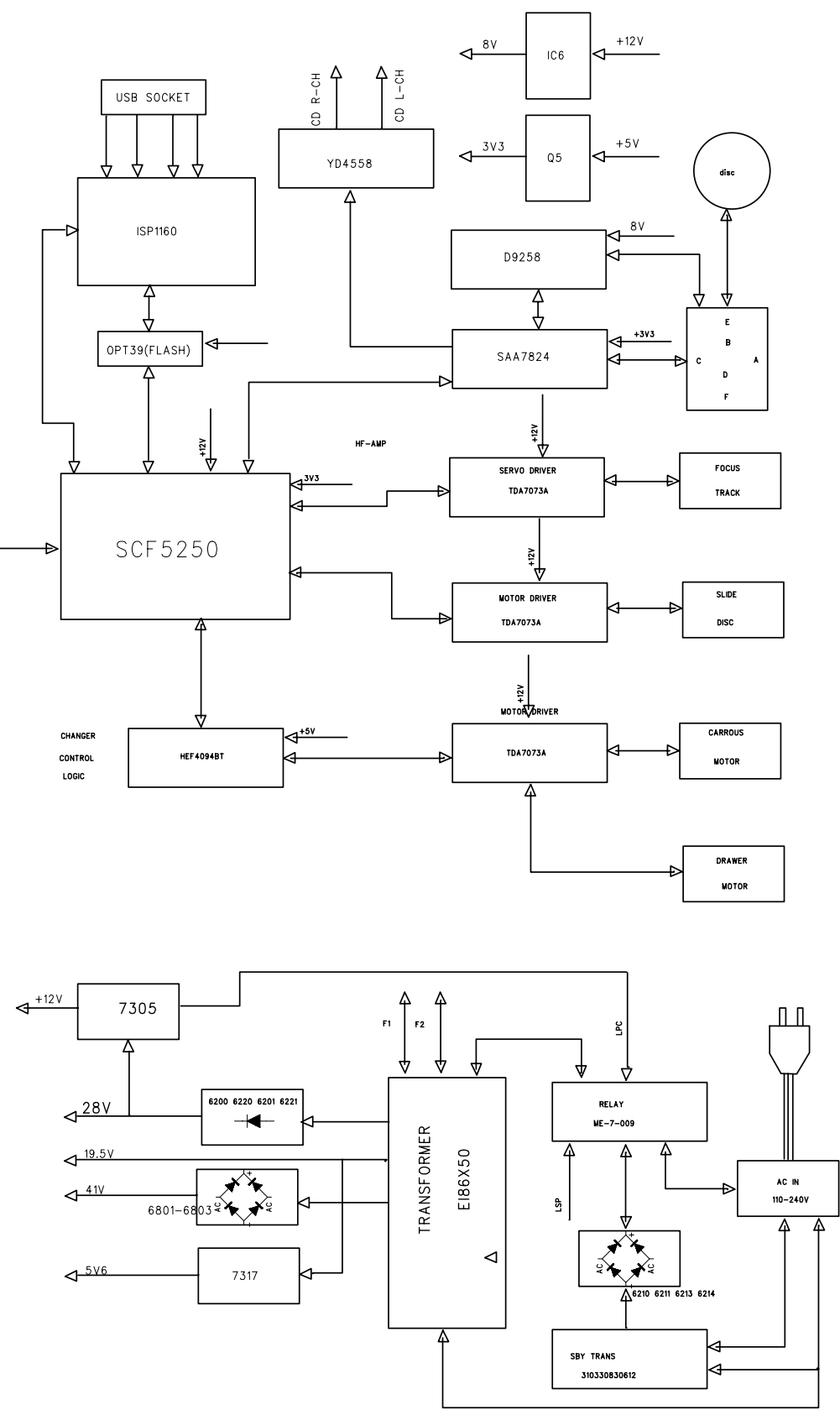
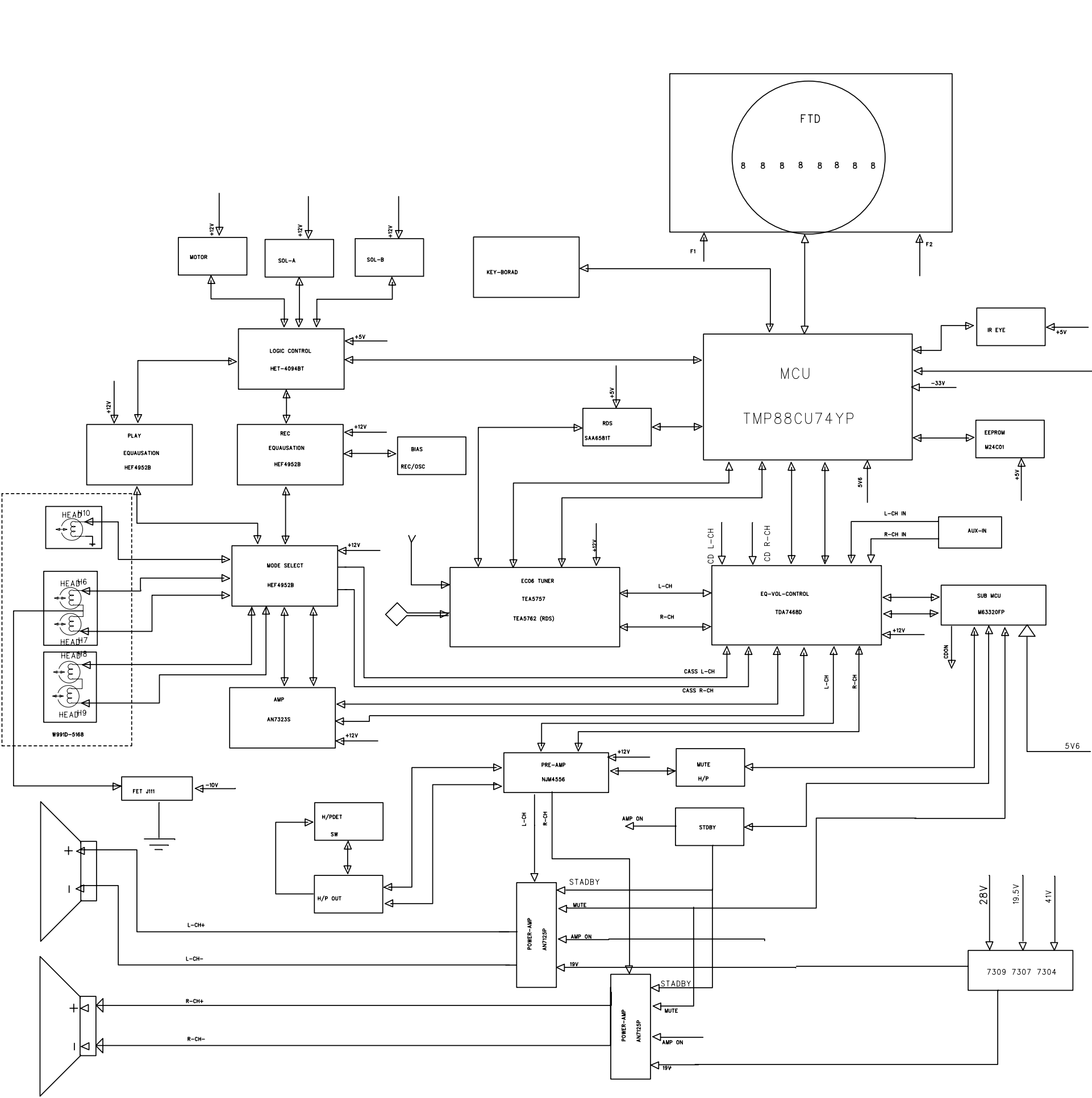
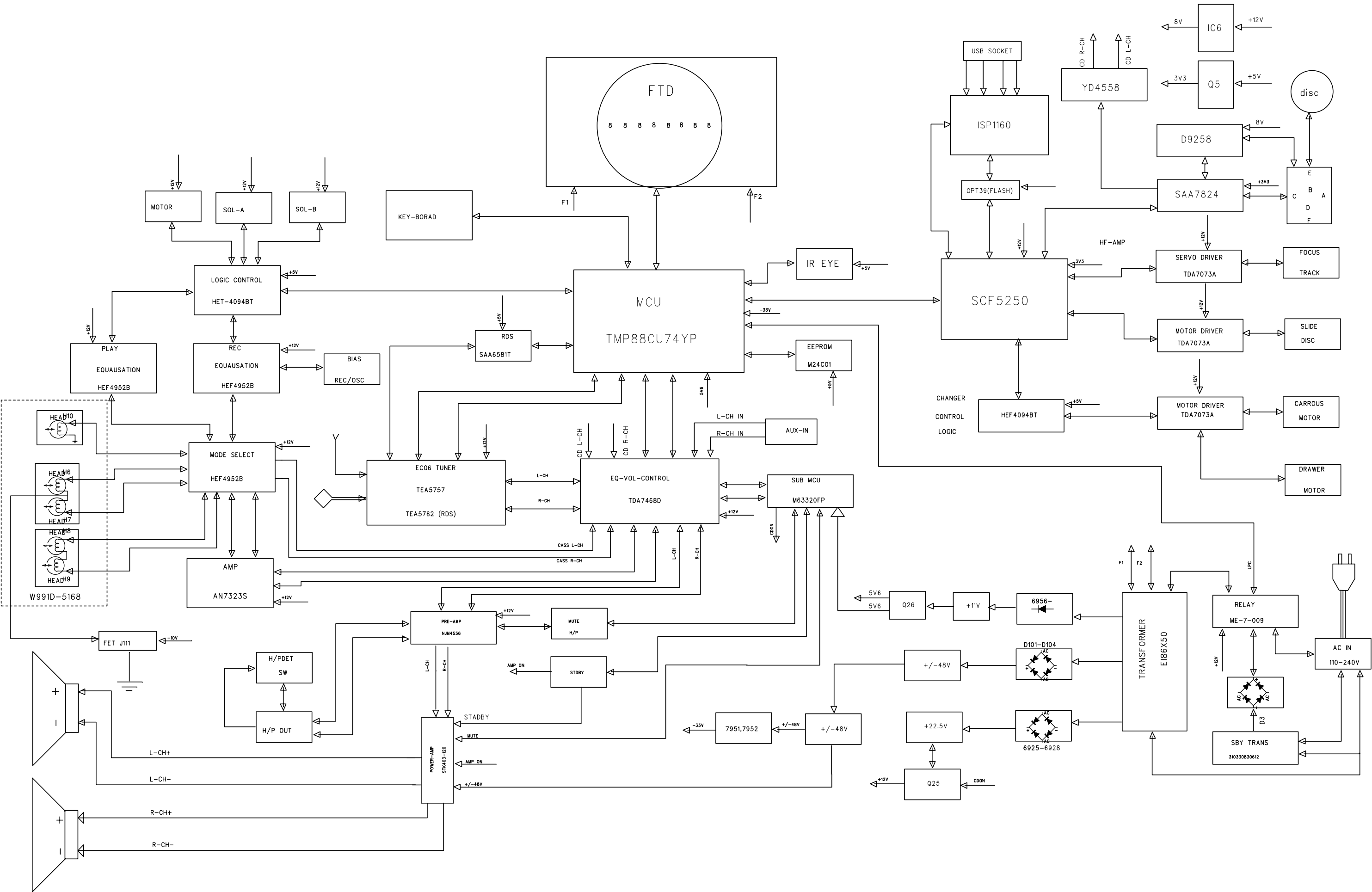


Table 2

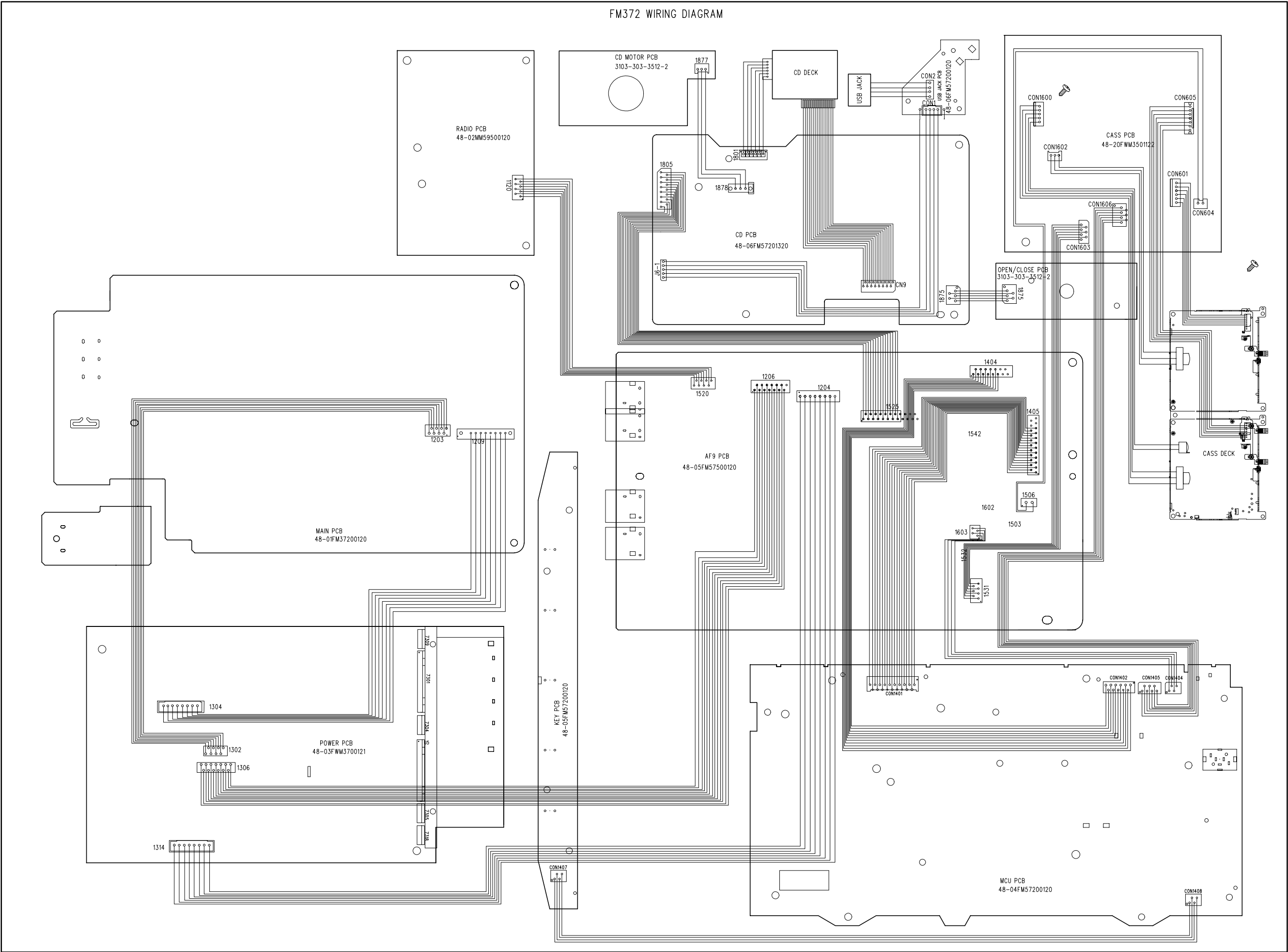
SET BLOCK DIAGRAM - FWM372



SET BLOCK DIAGRAM - FWM572



SET WIRING DIAGRAM - FWM372



5-2

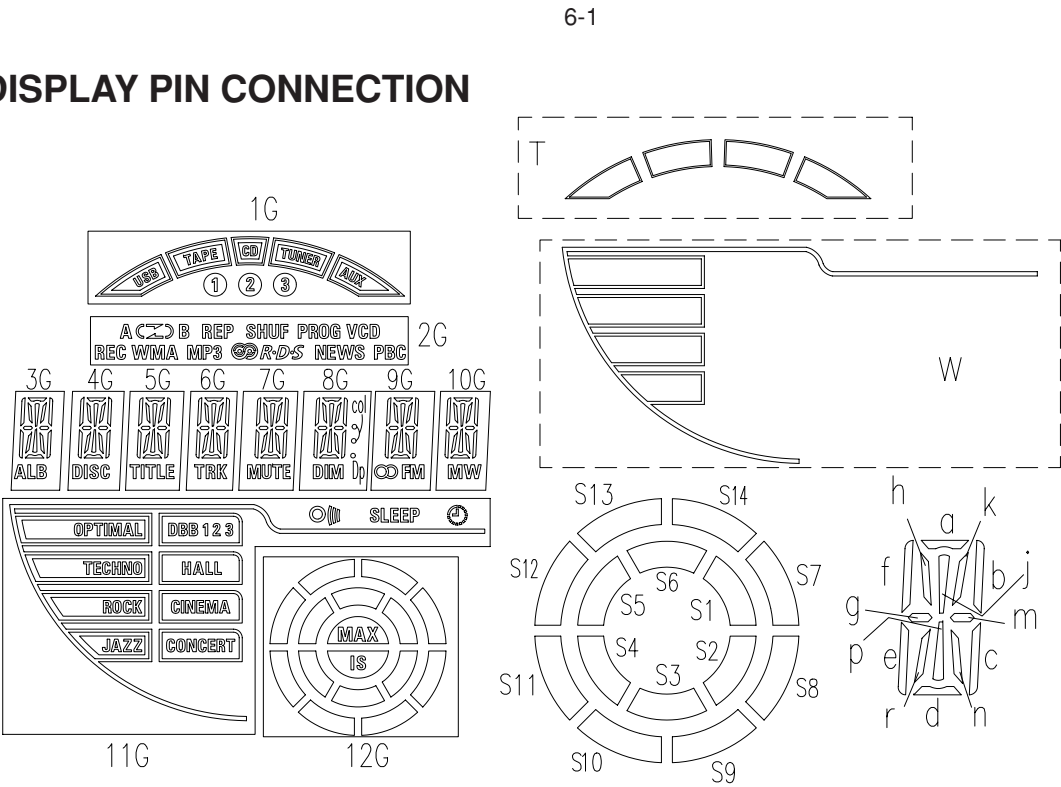


FRONT & KEY & USB BOARD

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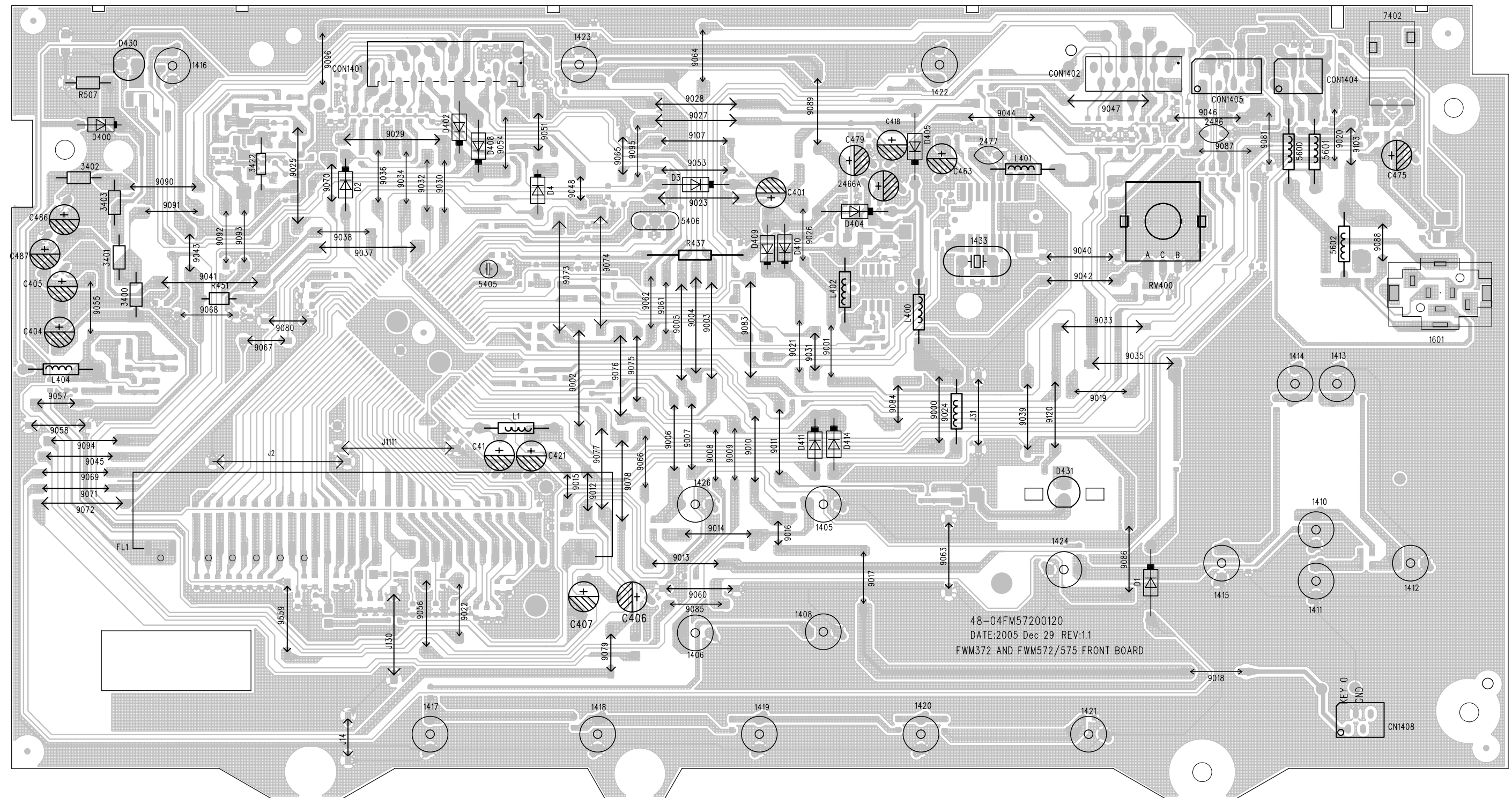
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Front PCB - Layout Top View	6-2
Front PCB - Layout Bottom View	6-3
Circuit Diagram	6-4
PCB Layout (CD Key & USB Jack Part)	6-5
Electrical Parts List	6-6

FTD DISPLAY PIN CONNECTION

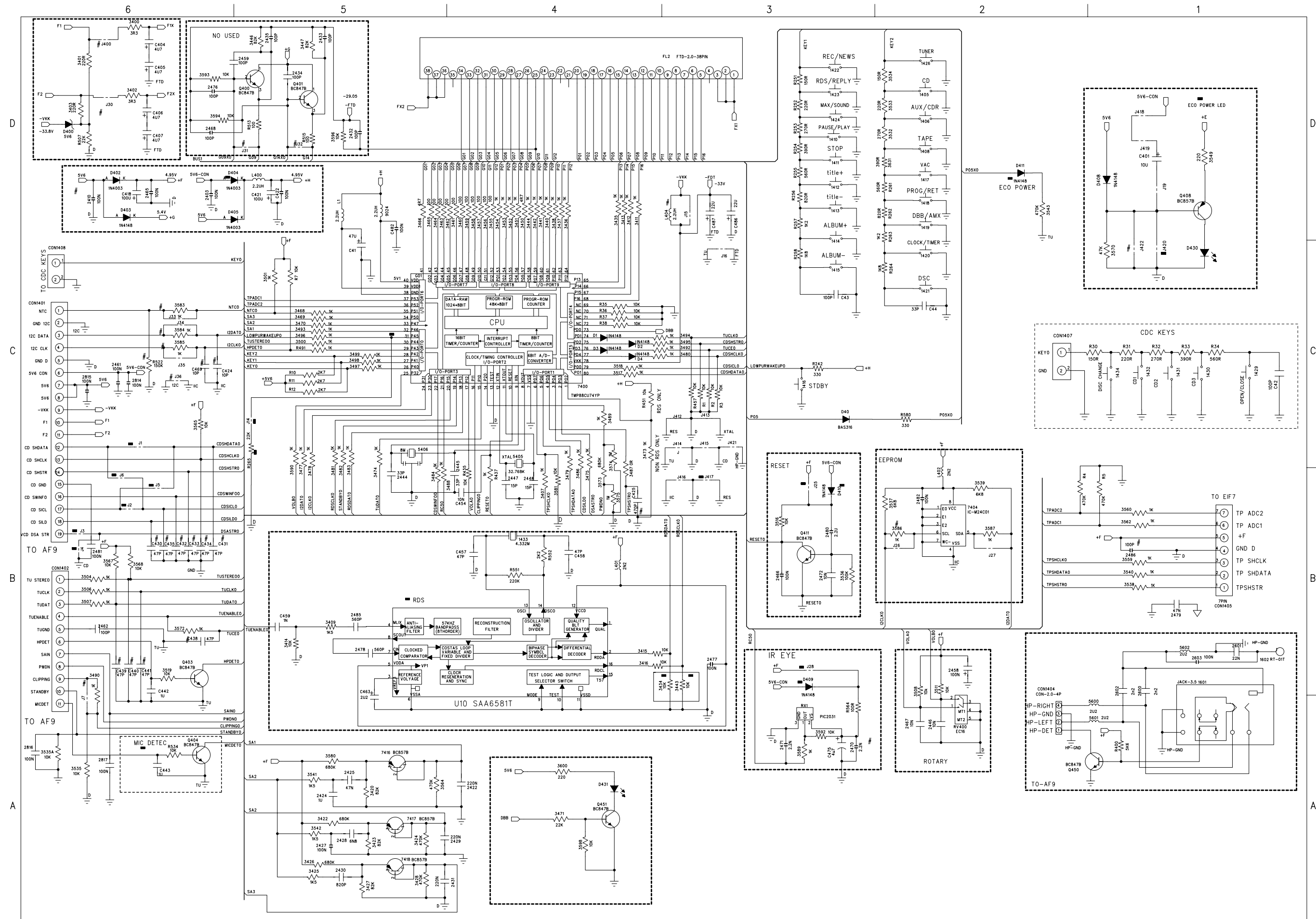


	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G
P1		PBC	a	a	a	a	a	a	a	a		S14
P2		NEWS	h	h	h	h	h	h	h	h		S13
P3		SHUF	j p	j p	j p	j p	j p	j p	j p	j p	1	S12
P4		PROG	k	k	k	k	k	k	k	k	3	S6
P5	T		b	b	b	b	b	b	b	b	2	S1
P6		VCD	f	f	f	f	f	f	f	f		S7
P7		MP3	m	m	m	m	m	m	m	m		S5
P8		REP	g	g	g	g	g	g	g	g		
P9		WMA	c	c	c	c	c	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

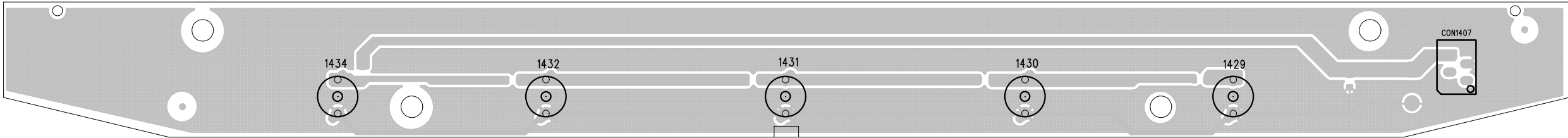
PCB LAYOUT - FRONT BOARD (TOP VIEW)



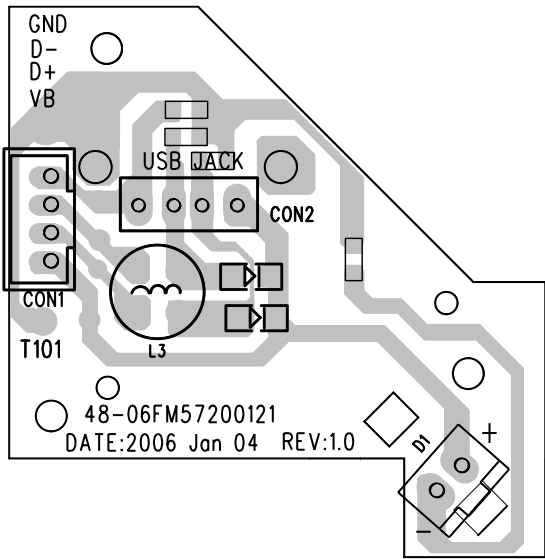
CIRCUIT DIAGRAM - FRONT & KEY BOARD



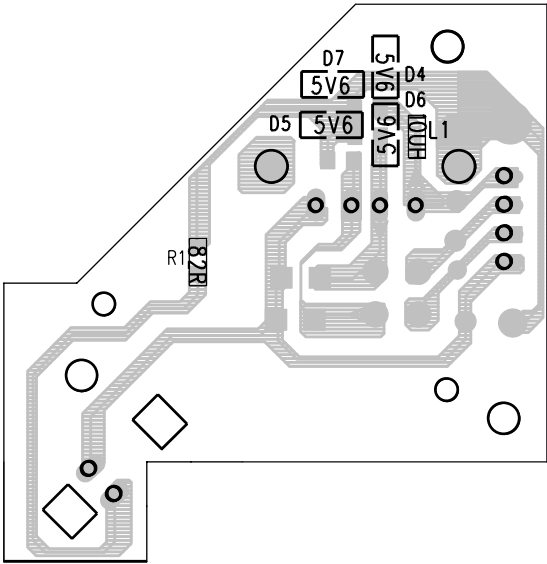
PCB LAYOUT - CDC KEY BOARD



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..)

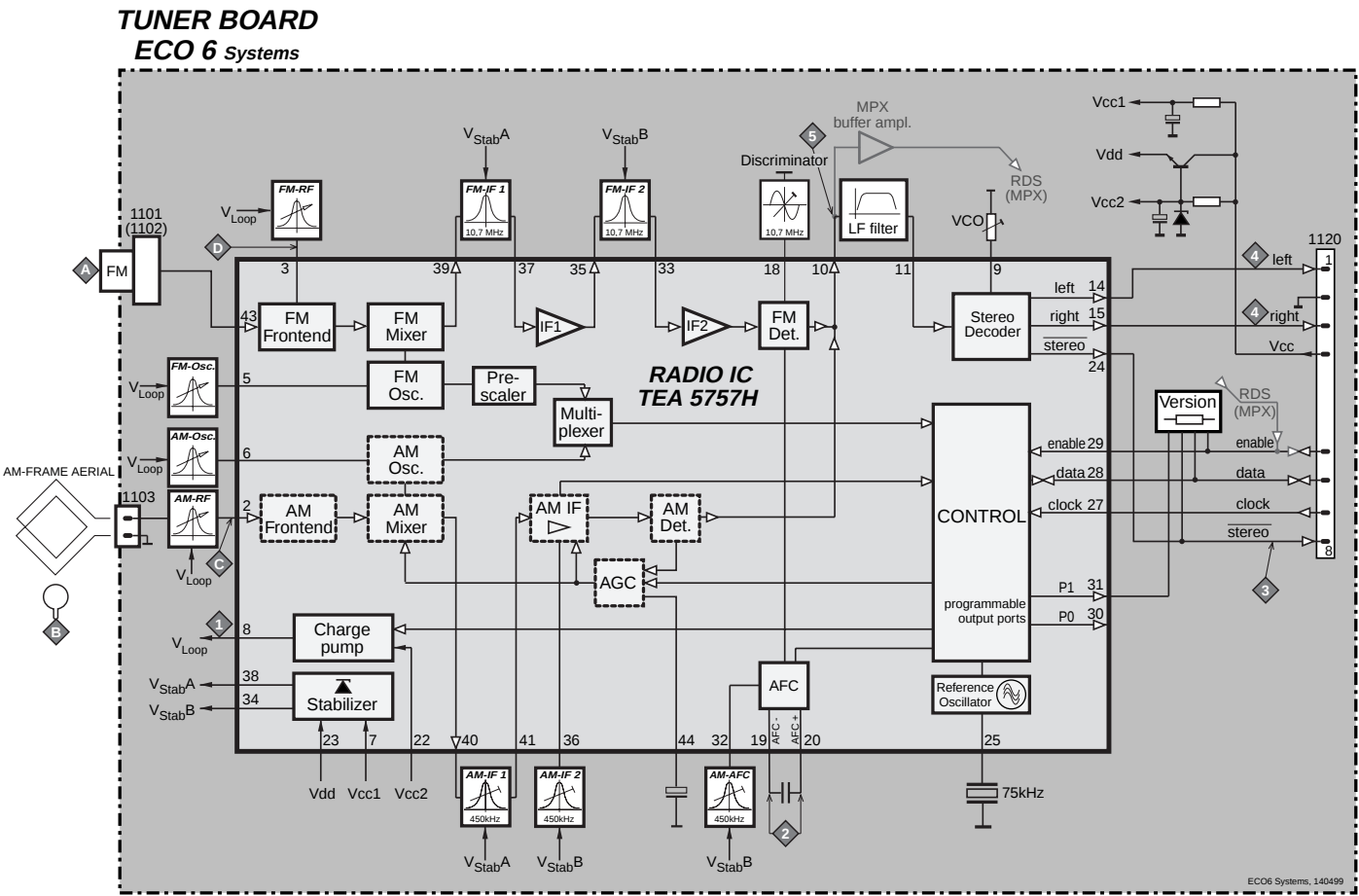
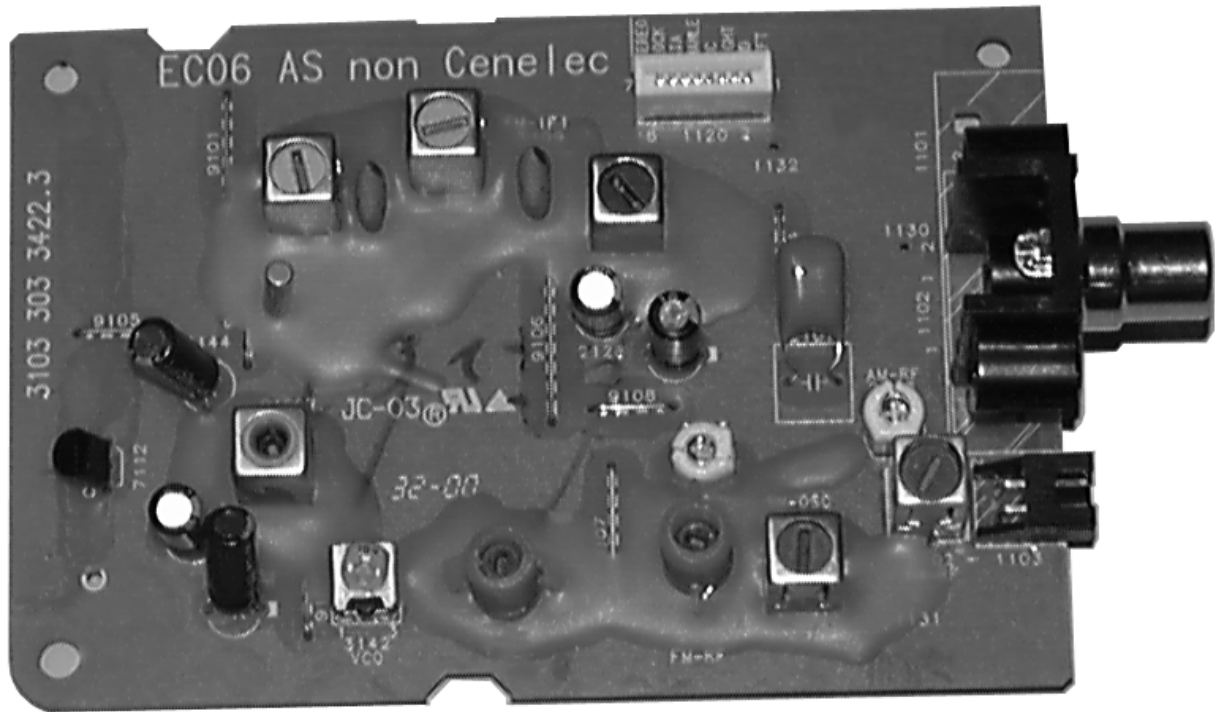
Note: Only these parts mentioned in the list are normal service parts.

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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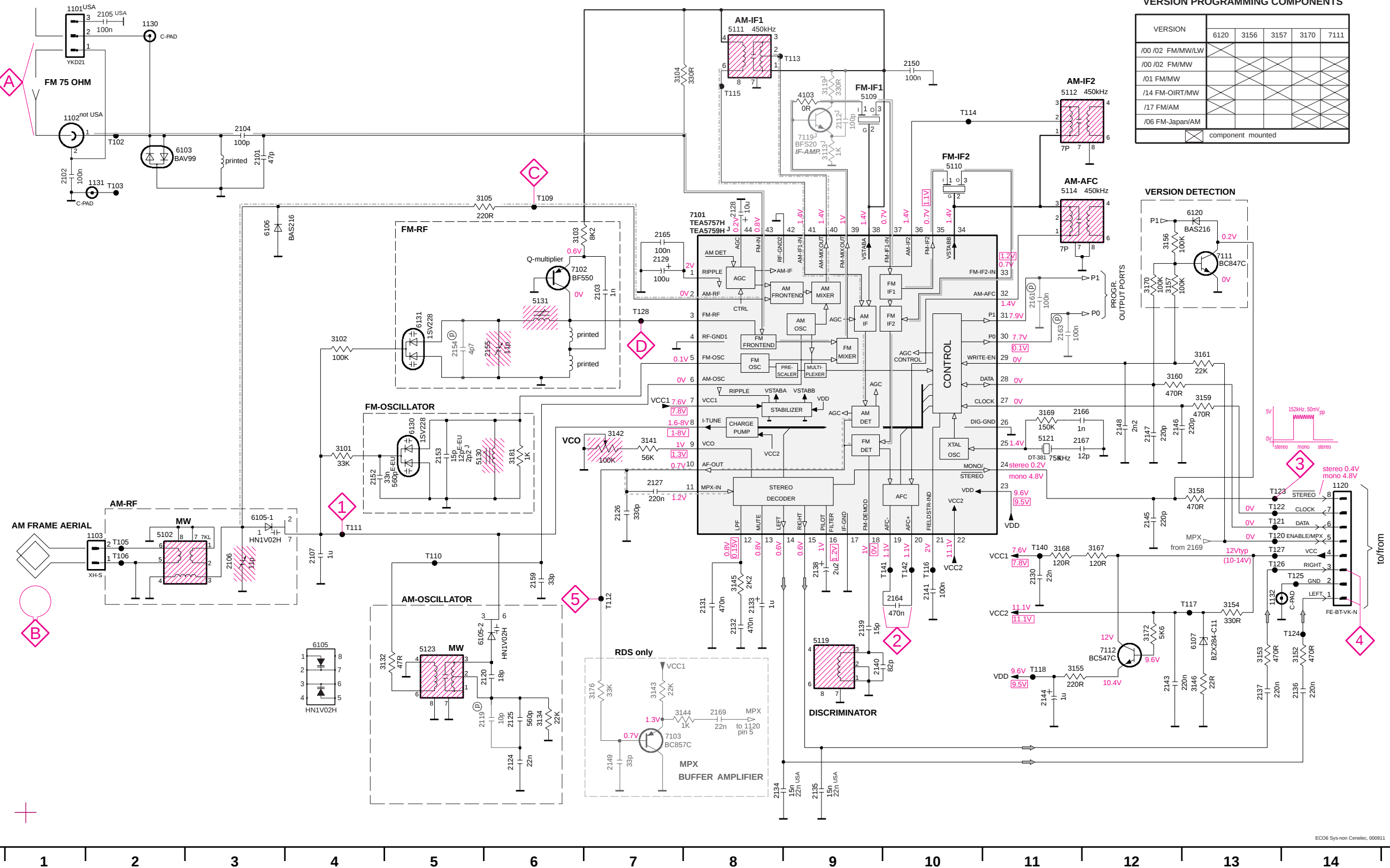
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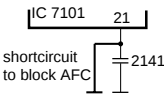
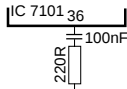
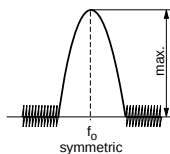
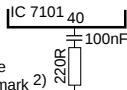
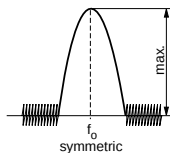
TUNER BOARD ECO6 / SYSTEMS NON CENELEC



ECO6 Sys-non Cenelec, 000911

1101 A1
 1102 B1
 1103 F2
 1120 E14
 1130 A2
 1131 B2
 1132 G3
 1101 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
 2143 G12
 2144 G11
 2145 F12
 2146 E12
 2147 E12
 2148 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 E13
 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
 7102 B2
 7103 B2
 7105 F2
 7106 F2
 7109 B6
 7110 F5
 7111 F4
 7112 F7
 7113 A8
 7114 B10
 7115 A8
 7116 F10
 7117 G13
 7118 G11
 7120 F13
 7121 F13
 7122 F13
 7123 E13
 7124 G14
 7125 F14
 7126 F13
 7127 F13
 7128 D7
 7140 F11
 7141 F10
 7142 F10

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	1	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	D		5119	2	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	A mod=1kHz Δf=±22.5kHz	108MHz	2155	4	MAX
	87.5MHz (65.81MHz)		87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz ¹⁾
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc	C Δf=±10kHz V _{RF} = 0.5mV (as low as possible)		5111	5	
			 see remark 2)	5112		
AM AFC MW		C continuous wave V _{RF} = 2mV		5114	2	0 ± 2 mV DC
AM RF ³⁾						
MW ⁴⁾ FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	B 	1494kHz	2106	5	
	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)

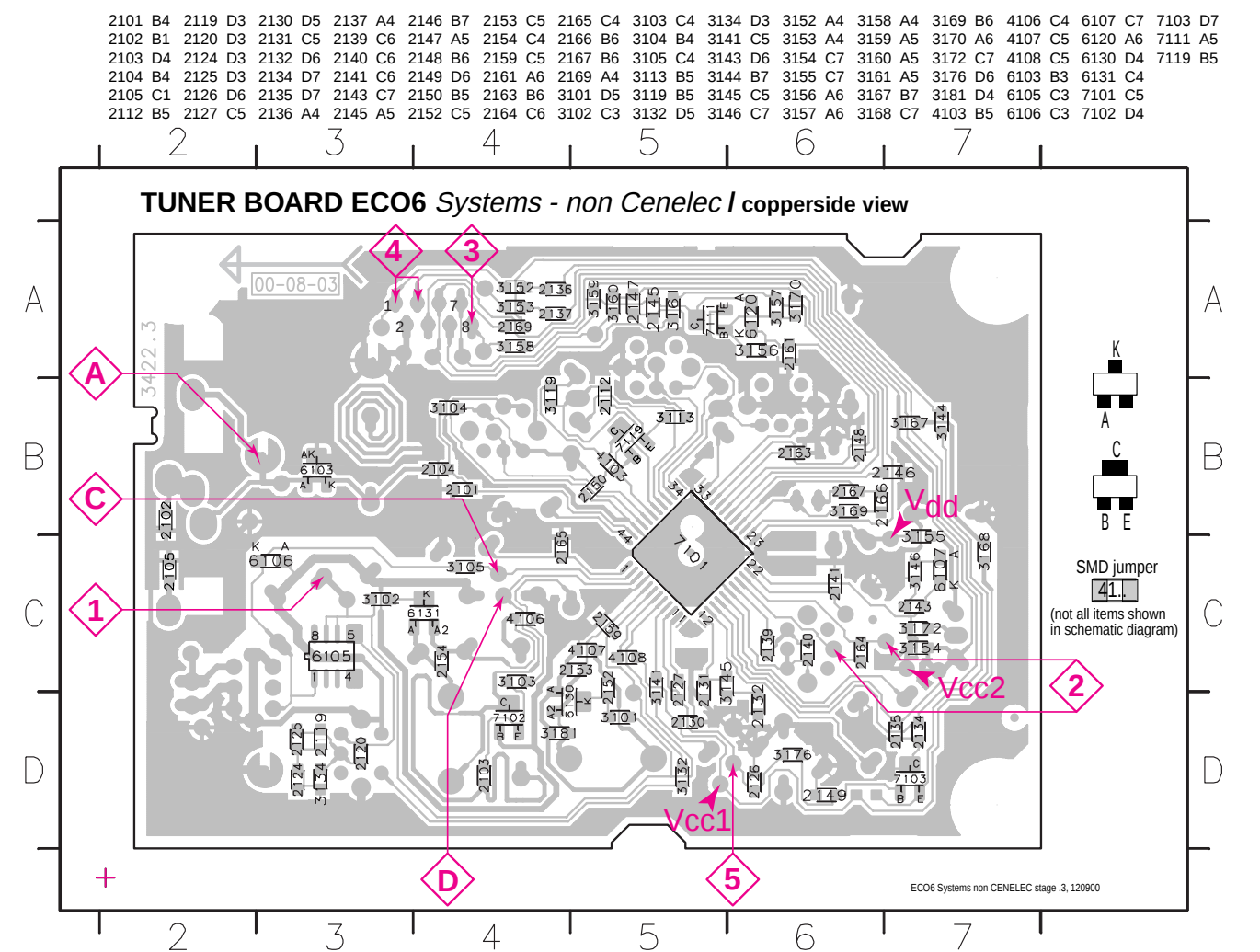
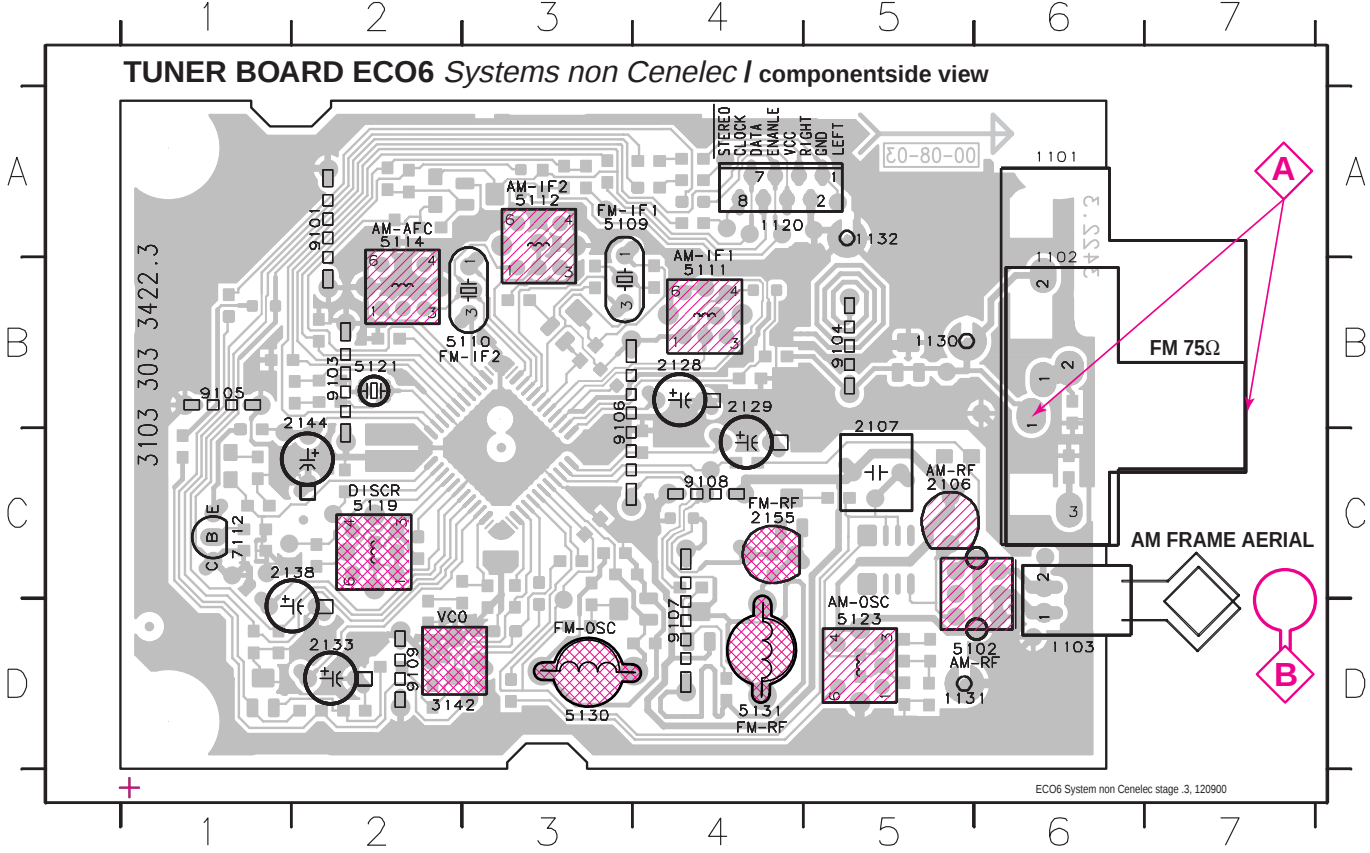
2) RC network serves for damping the IF-filter while adjusting the other one.

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

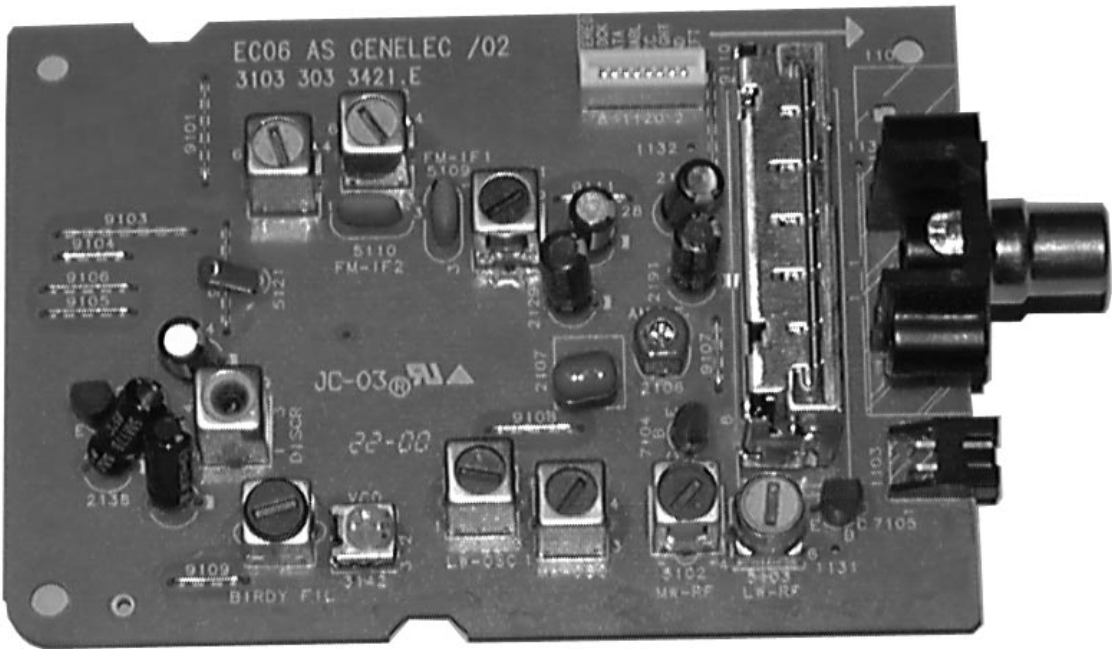
4) MW has to be aligned before LW.

↑ Repeat

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



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



ECO6 Tuner Board

version: **SYSTEMS CENELEC**

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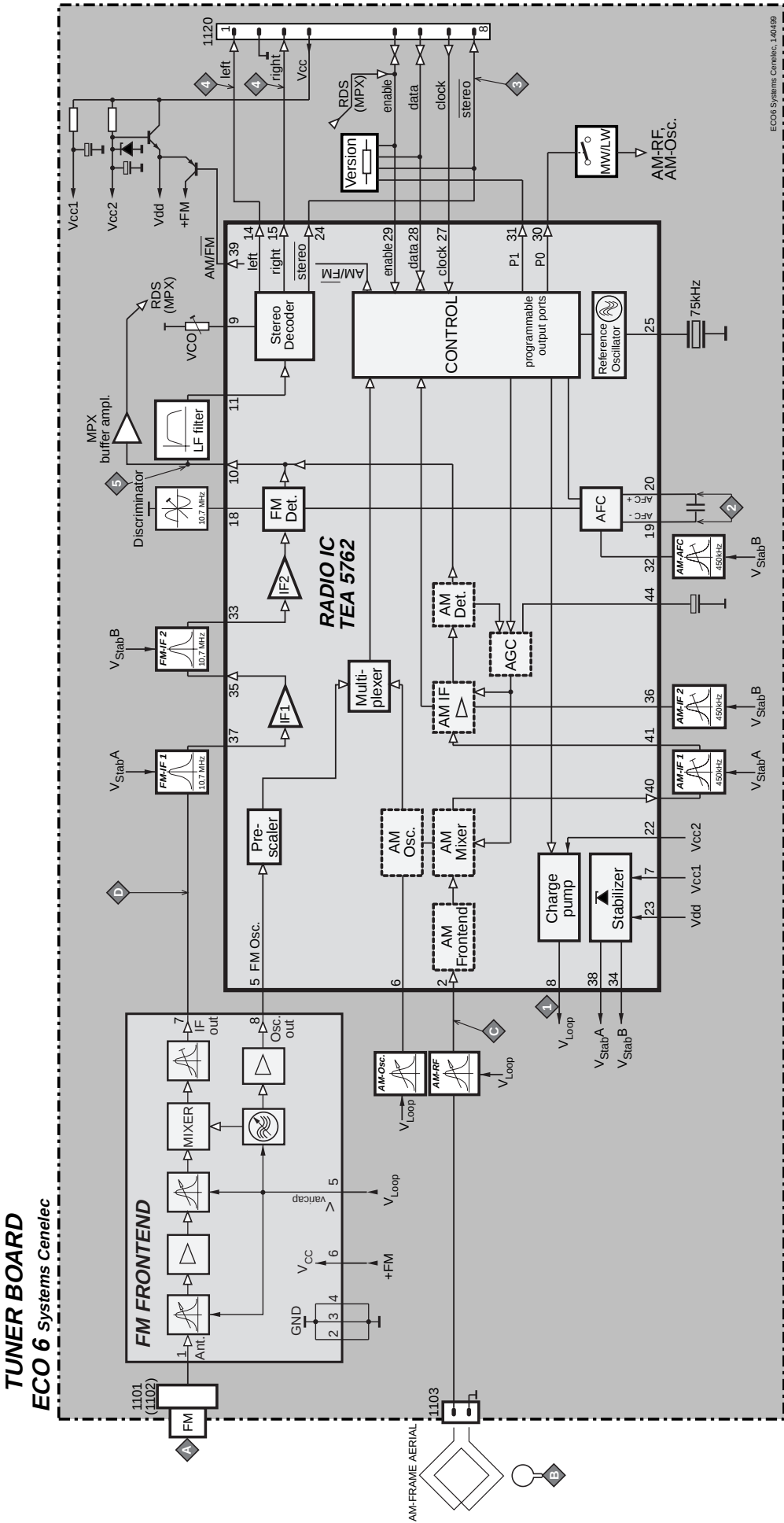
Schematic Diagram.....7B-2

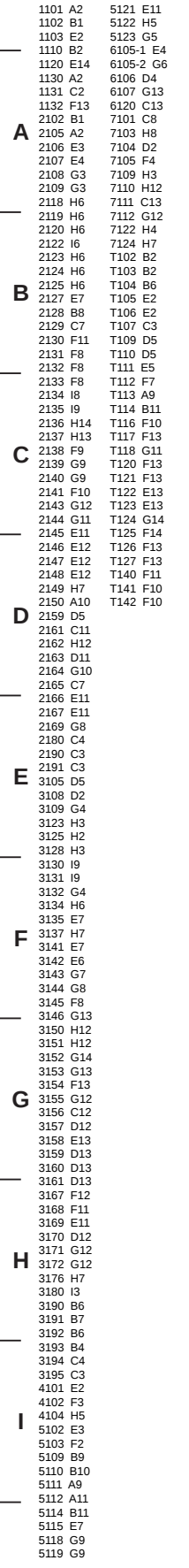
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Adjustment table7B-3

Electrical Partslist.....7B-4

BLOCK DIAGRAM





ECO6 Sys-Cenelec, 010517

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

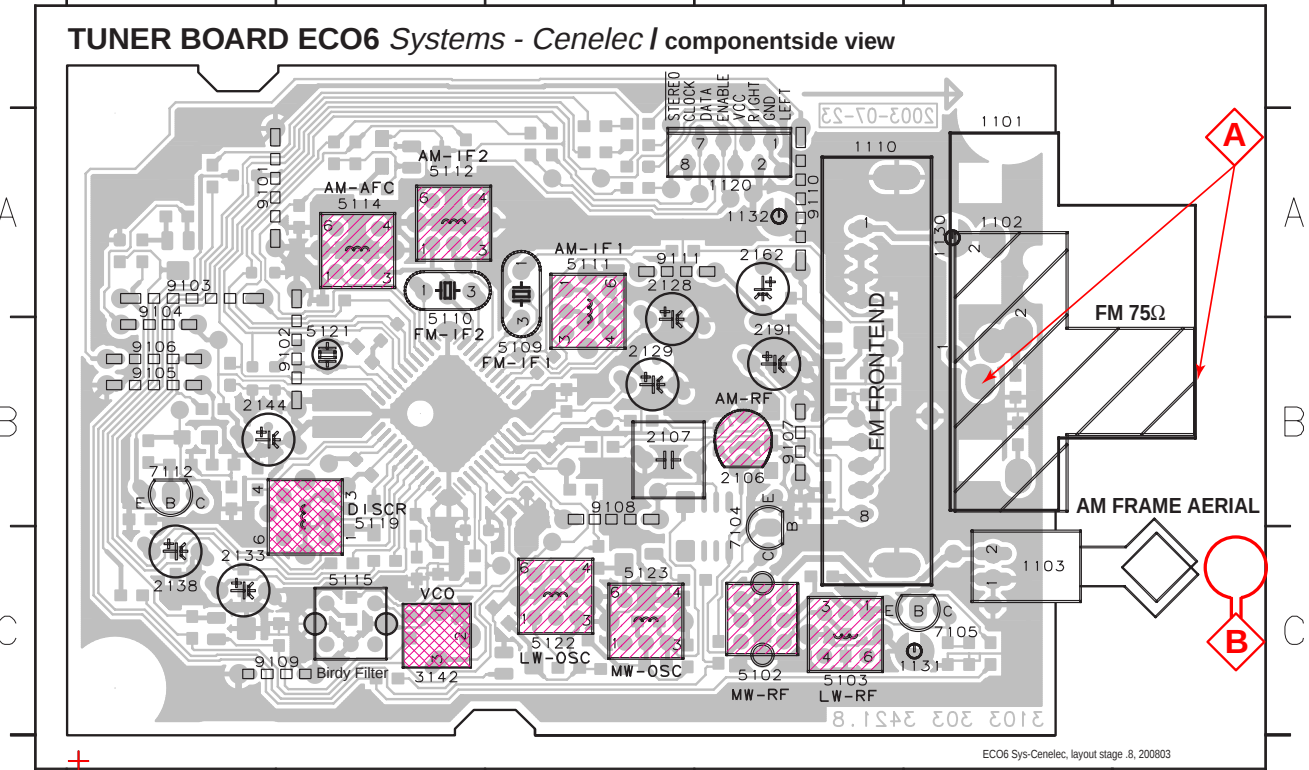
41xx
OR



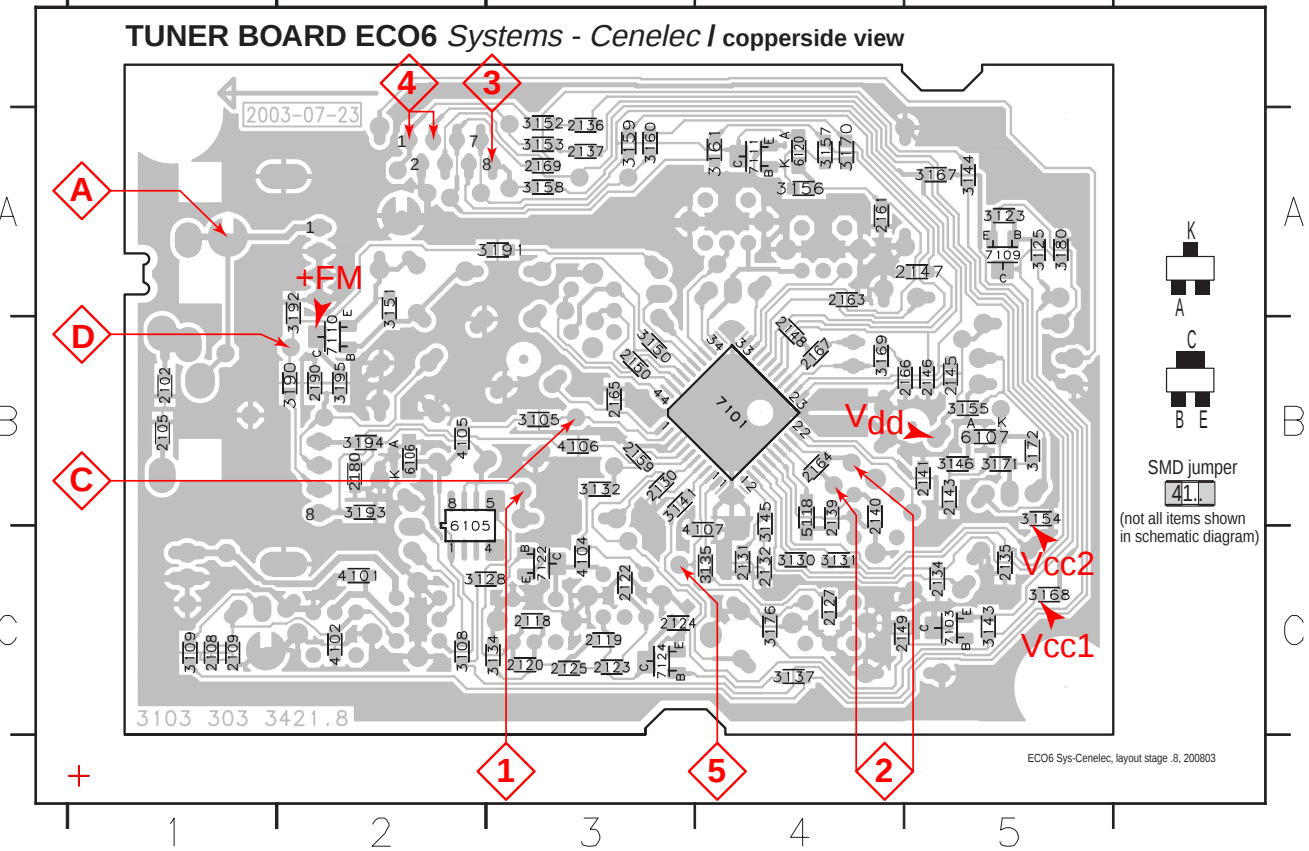
voltages measured while
set is tuned to a strong transmitter

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

1101 B5 1110 B4 1131 C5 2107 B3 2133 C1 2162 A4 5102 C4 5110 A2 5114 A2 5121 B2 7104 C4 9101 A2 9104 B1 9107 B4 9110 A4
1102 B5 1120 A4 1132 A4 2128 A3 2138 B1 2191 B4 5103 C4 5111 A3 5115 C2 5122 C3 7105 C5 9102 B2 9105 B1 9108 B3 9111 A3
1103 C5 1130 A5 2106 B4 2129 B3 2144 B1 3142 C2 5109 B3 5112 A2 5119 B2 5123 C3 7112 B1 9103 A1 9106 B1 9109 C2

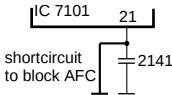
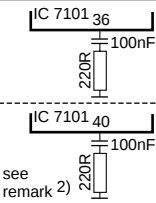
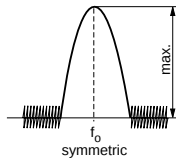
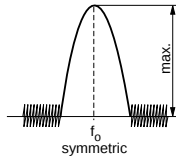


2102 B1 2120 C3 2130 B3 2137 A3 2146 B5 2161 A4 2169 A3 3123 A5 3134 C3 3145 C4 3154 B5 3160 A3 3171 B5 3192 A2 4104 C3 6106 B2 7110 B2
2105 B1 2122 C3 2131 C4 2139 B4 2147 A5 2163 A4 2180 B2 3125 A5 3135 C4 3146 B5 3155 B5 3161 A4 3172 B5 3193 B2 4105 B2 6107 B5 7111 A4
2108 C1 2123 C3 2132 C4 2140 B4 2148 B4 2164 B4 2190 B2 3128 C2 3137 C4 3150 B3 3156 A4 3167 A5 3176 C4 3194 B2 4106 B3 6120 A4 7122 C3
2109 C1 2124 C3 2134 C5 2141 B5 2149 C4 2165 B3 3105 B3 3130 C4 3141 B3 3151 A2 3157 A4 3168 C5 3180 A5 3195 B2 4107 C4 7101 B4 7124 C3
2118 C3 2125 C3 2135 C5 2143 B5 2150 B3 3108 C2 3131 C4 3143 C5 3152 A3 3158 A3 3169 B4 3190 B2 4101 C2 5118 C4 7103 C5
2119 C3 2127 C4 2136 A3 2145 B5 2159 B3 2167 B4 3109 C1 3132 B3 3144 A5 3153 A3 3159 A3 3170 A4 3191 A3 4102 C2 6105 B2 7109 A5



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 Cenelec 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 (50kHz grid)			108MHz	check	1	8V ±1.2V
			87.5MHz	check		1.6V ±0.5V
MW 531 - 1602kHz (9kHz grid)			1602kHz	5123		8V ±0.2V 3-band 6.9V ±0.2V 2-band
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz (3kHz grid)			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
FM - IF						
FM	10.7MHz, 45mV continuous wave	D		5119	2	0mV ±3mV
FM - VCO						
FM	98MHz, 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz ¹⁾
FM RF (channel separation) Note: The FM-frontend unit has already been adjusted by the factory and needs therefore no further adjustments for service purposes.						
FM	98MHz, 1mV 90% Left + 9% pilot mod=1kHz	A	98MHz	IF coil inside FM frontend 1110	4	right channel min.
AM IF						
MW	450kHz	C		5111	5	
	connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc			5112		
AM AFC MW		C	continuous wave V _{RF} = 2mV	5114	2	0mV ±2mV
AM RF ³⁾						
MW	1494kHz	B	1494kHz	2106	5	
	558kHz		558kHz	5102		
LW	198kHz	Δf = ±30kHz V _{RF} as low as possible	198kHz	5103		

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!
MW has to be aligned before LW.

↑ Repeat

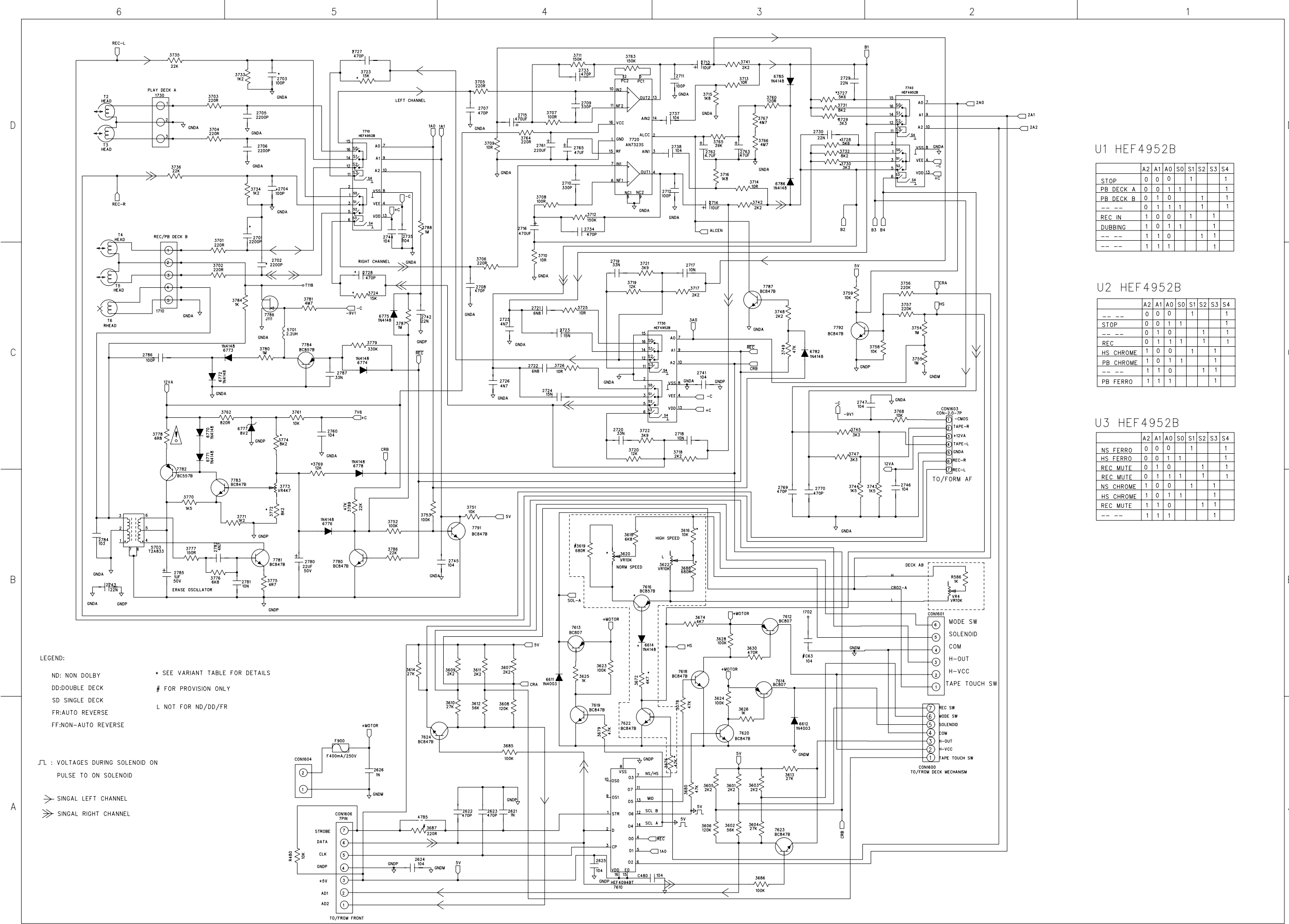
TAPE BOARD

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PCB Layout Top View 8-2
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



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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PCB - Layout Diagram FWM372 6-2

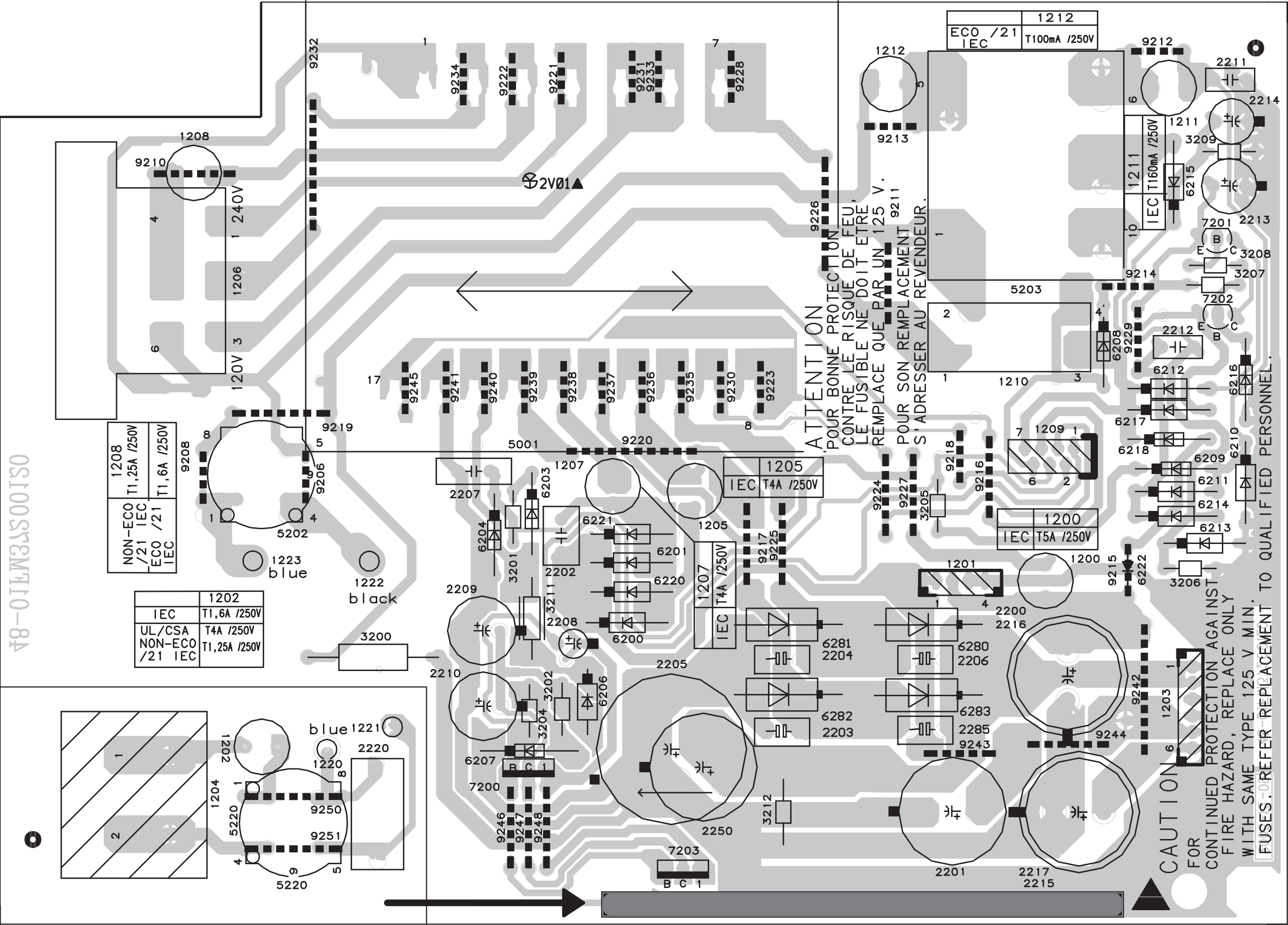
Circuit Diagram FWM372 6-3

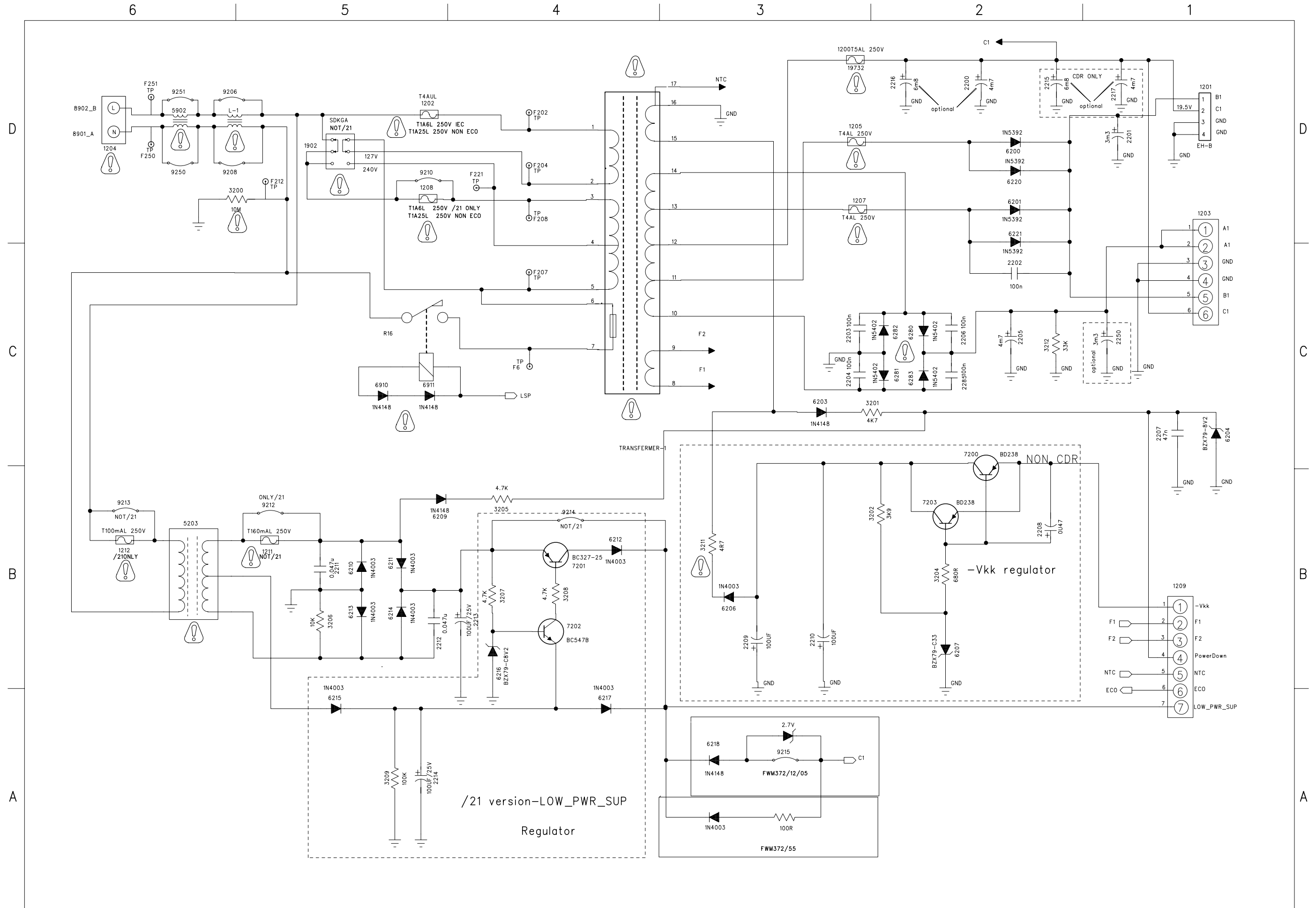
PCB - Layout Diagram FWM572 6-4

Circuit Diagram FWM572 6-5

Electrical Parts List 6-6

PCB LAYOUT - MAINS BOARD_FWM372





[illegible]

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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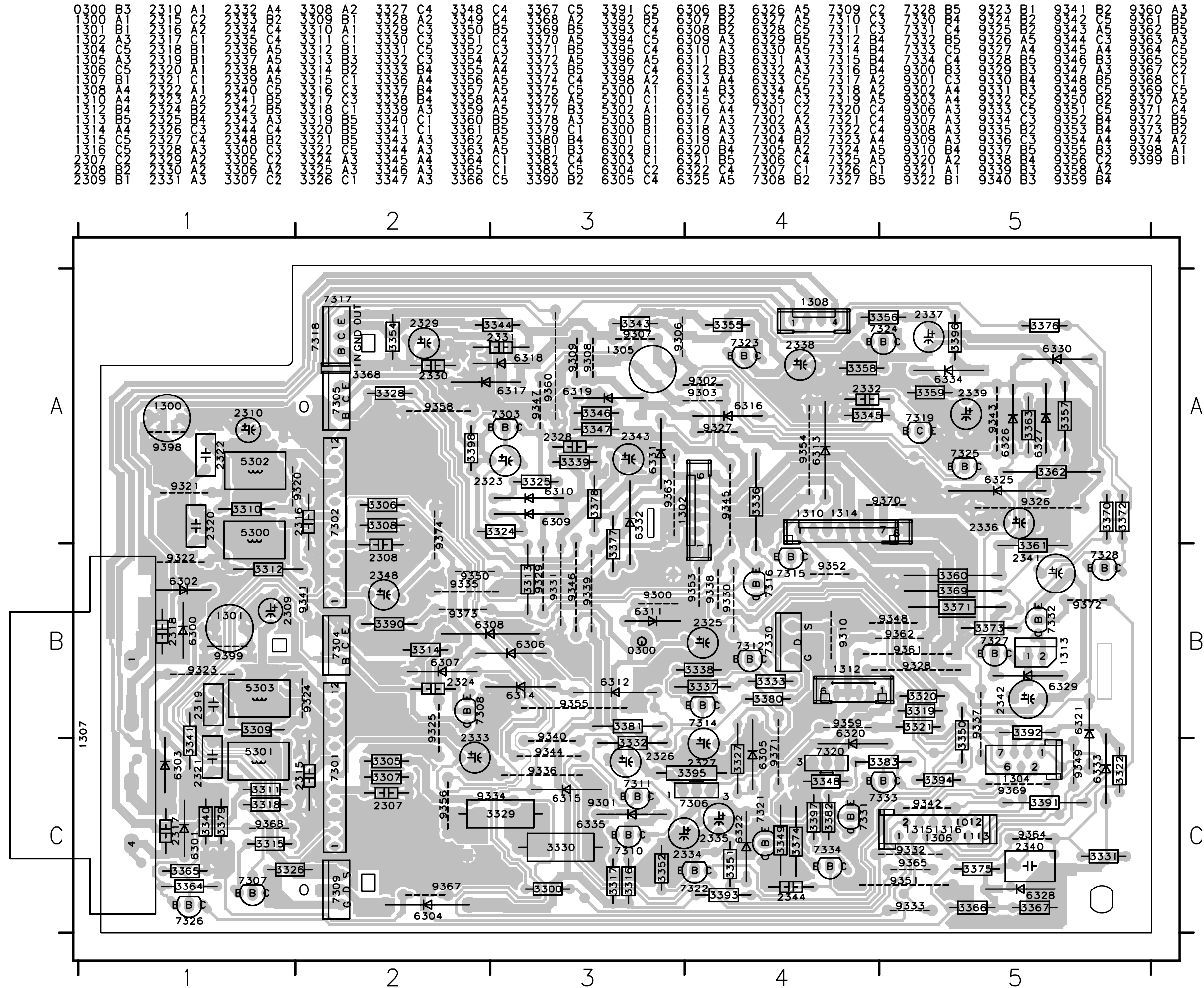
PCB Layout Diagram-FWM572 11-4

Circuit Diagram Part1-FWM572 11-5

Circuit Diagram Part2-FWM572 11-6

Electrical Parts List 11-7

LAYOUT DIAGRAM - POWER BOARD_FWM372



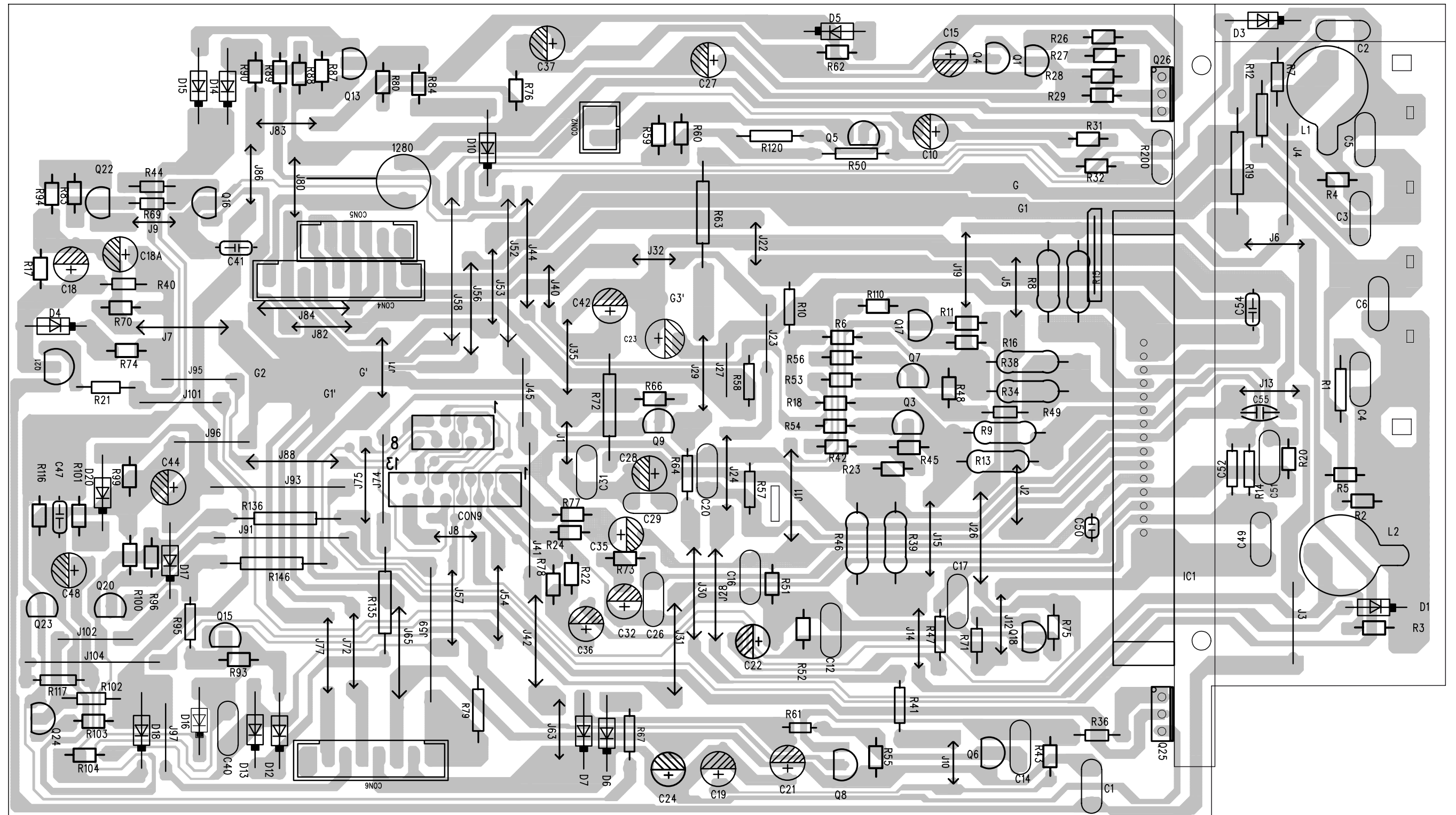
The schematic diagram illustrates the internal circuitry of a P2001 30-70W amplifier. It is organized into several key functional sections:

- Power Regulation and Protection:** Includes a +12V Regulator, a 5V6 Regulator, and a 5V Regulation section. It also features an Overvoltage Protection (S00) and a Fan Control circuit.
- Audio Processing and Amplification:** Contains an LF-POWER AMP (7301 AN17850A), an Amplifier Part (7304 BDW94C), and a Clipping Detection (A11) circuit.
- Protection and Monitoring:** Includes an Overvoltage Protection (S00), a 5V VCD short circuit detection circuit, and a Clipping Detection (A11) circuit.
- Control and Monitoring:** Features a Fan Control circuit, a 5V VCD short circuit detection circuit, and a Clipping Detection (A11) circuit.
- Power and Grounding:** Shows connections for +12V, +5V, and ground, along with various power and ground planes.

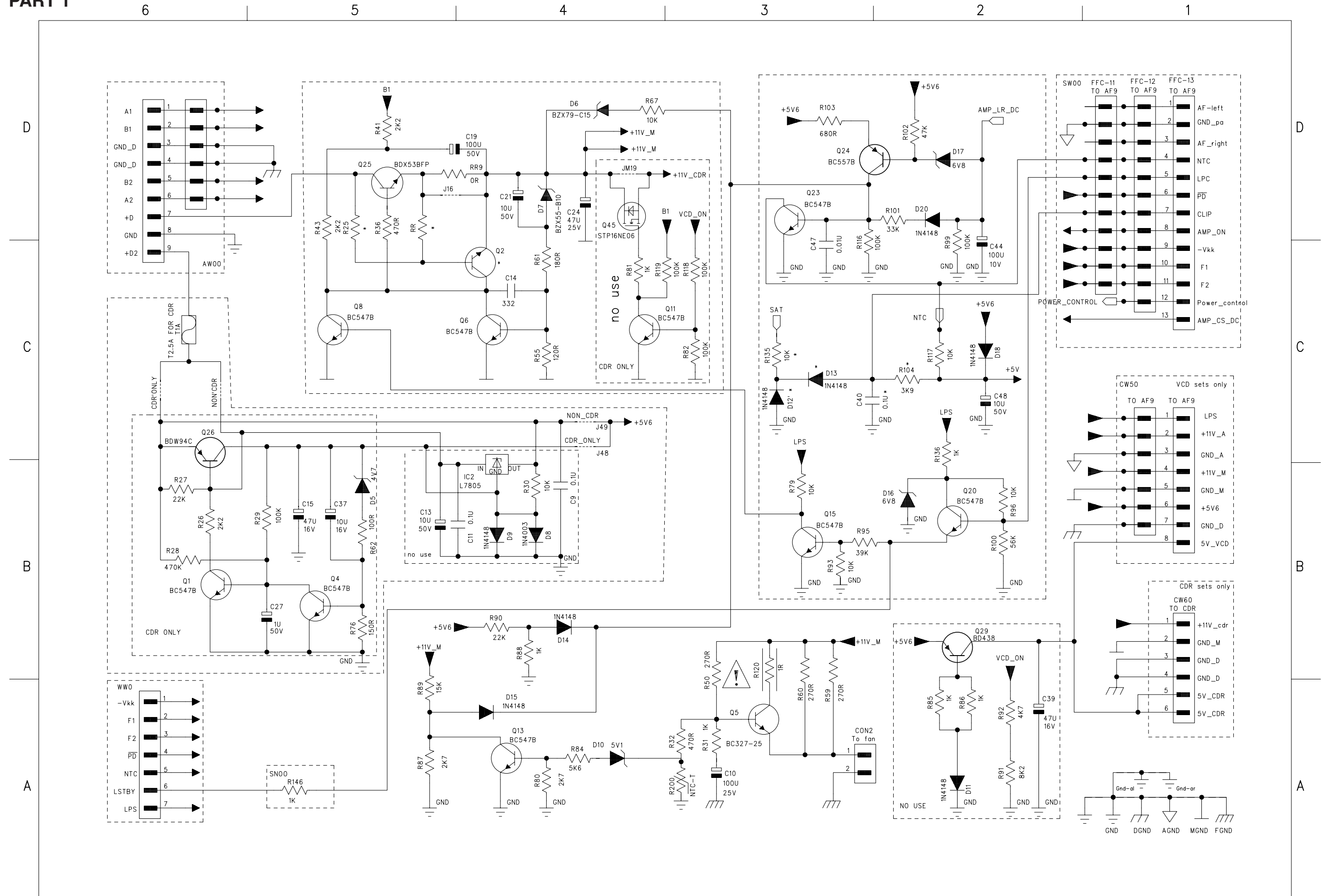
The diagram uses standard electronic symbols for components like resistors, capacitors, diodes, and integrated circuits. It also includes a pinout for the P2001 30-70W connector, showing connections for power, ground, and various control signals.

0300 D20	6303 E12
1300 E09	6304 A11
1301 B99	6305 A6E
1302 B10	6306 B13
1303 C14	6307 B03
1305 D3	6308 C11
1306 D10	6309 B14
1307 F14	6310 C14
1308 F12	6311 C09
1309 F12	6312 C13
1310 F12	6313 B14
1312 H11	6314 D03
1313 J9	6315 D14
1314 G11	6316 F5
1316 D1	6318 E6
2307 D8	6319 D43
2308 D8	6320 G13
2309 D10	6321 G03
2310 E9	6322 H5
2315 D59	6325 E5
2316 D10	6326 E10
2317 F13	6327 D3
2318 F13	6328 H13
2321 F13	6329 B17
2322 F14	6330 A11
2322 F13	6332 A11
2323 A5	6333 B32
2324 A5	6334 B32
2325 A5	6335 B8
2326 A3	7300 B12
2328 D4	7303 A4
2329 E5	7304 A13
2329 E5	7305 A3
2330 H5	7306 A5
2332 F5	7307 B12
2333 F7	7308 B14
2334 H6	7309 B12
2335 H6	7310 D1
2337 E4	7311 B3
2338 E4	7312 B86
2341 F13	7313 C3
2342 D12	7315 C5
2343 D13	7316 C5
2344 D13	7319 F6
2345 D13	7320 G4
2346 B7	7321 H44
2347 D10	7322 B
2348 F3	7323 F3
2350 G67	7324 F4
2351 G67	7325 B1
2353 G8	7326 H12
2359 B10	7327 H12
3310 F12	7328 H10
3312 F10	7331 A1
3313 A5	7332 B9
3314 A14	7333 A12
3315 A12	7334 B1
3316 A3	8300 D9
3317 A3	9001 B3
3318 A3	9002 B3
3319 B4	9003 D2
3320 B5	9006 D3
3321 B5	9007 E3
3322 B5	9008 E3
3323 B4	9009 D4
3325 B4	9010 A7
3326 B12	9011 E9
3327 B12	9012 B9
3328 B5	F300 A1
3329 C14	F301 A1
3330 C14	F302 A1
3331 B2	F303 A1
3332 C3	F304 A1
3333 B6	F305 A4
3334 B6	F306 B9
3335 B6	F307 B13
3336 C2	F308 C2
3339 D4	F309 C2
3340 D4	F310 D3
3341 F13	F311 C3
3342 F13	F312 C1
3343 F13	F313 C3
3345 F5	F314 C1
3346 G12	F315 D1
3347 G2	F316 D1
3351 H5	F319 B3
3352 H5	F320 D2
3353 H5	F321 D3
3354 B3	F324 E2
3355 E3	F325 E11
3356 E3	F326 E11
3357 F5	F327 E2
3358 F5	F328 F11
3359 B3	F329 F2
3360 B3	F330 F2
3361 H3	F331 F11
3362 H3	F332 F1
3363 H3	F333 G1
3364 H12	F334 G1
3365 H12	F335 H4
3366 H13	F336 G4
3367 H13	F337 G4
3368 H7	F340 F9
3369 H7	F341 H5
3370 H7	F342 D3
3371 H7	F343 E4
3372 H11	F344 D6
3373 H10	F345 H14
3374 H4	F346 H7
3375 H4	F347 B9
3376 H7	F348 E2
3377 H10	F349 H1
3378 D3	
3379 D3	
3380 A7	
3381 A8	
3382 A8	
3383 A8	
3384 A9	
3385 A9	
3386 A4	
3387 H4	
3388 A4	
3389 A10	
5000 C10	
5002 F10	
5003 B10	
5004 B12	
6001 E12	
6002 E3	

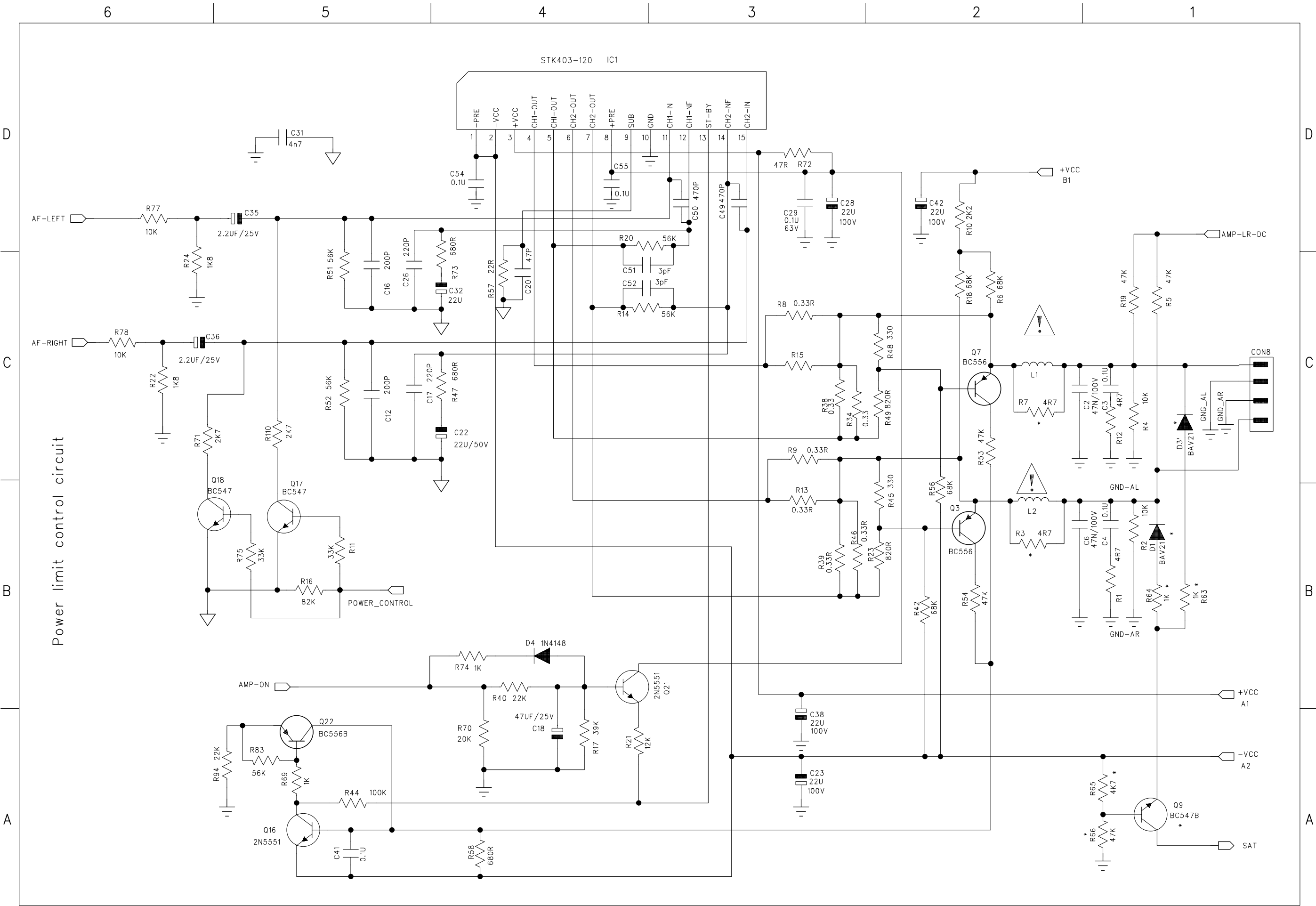
LAYOUT DIAGRAM - POWER BOARD_FWM572



CIRCUIT DIAGRAM - POWER BOARD_FWM572



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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AF9 Board - Circuit Diagram (Part 2) 12-5

Video Out Cinch part - Layout & Circuit diagram 12-6

Electrical parts list..... 12-6

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.

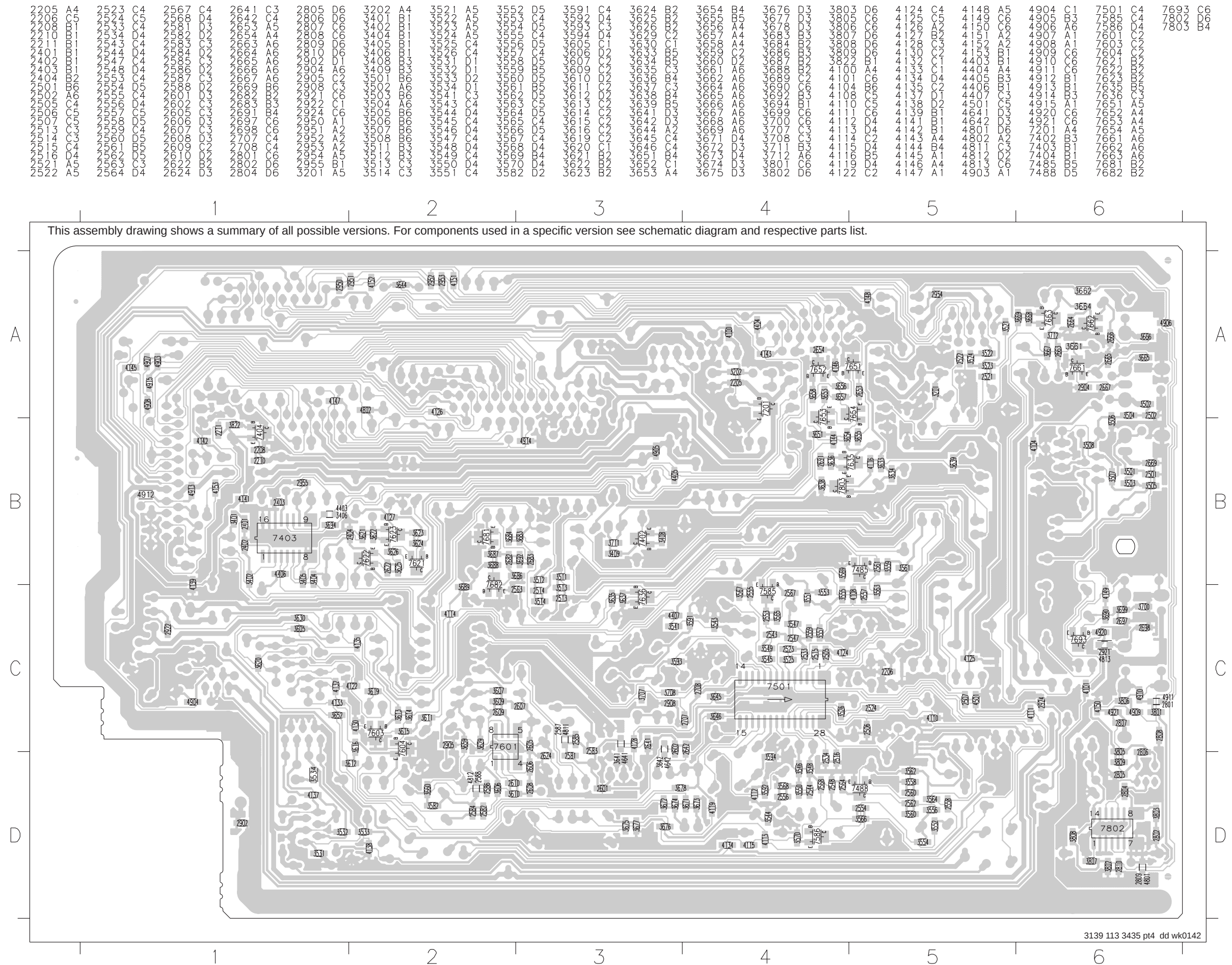
The TDA7468D IC caters for 4 input sources namely TUNER, TAPE, CD and AUX. It also has a Mic mix input. In our application, software will switch the input source to previous source MUTE during STANDBY mode and some other occasions where noise from other input source is undesirable.

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.

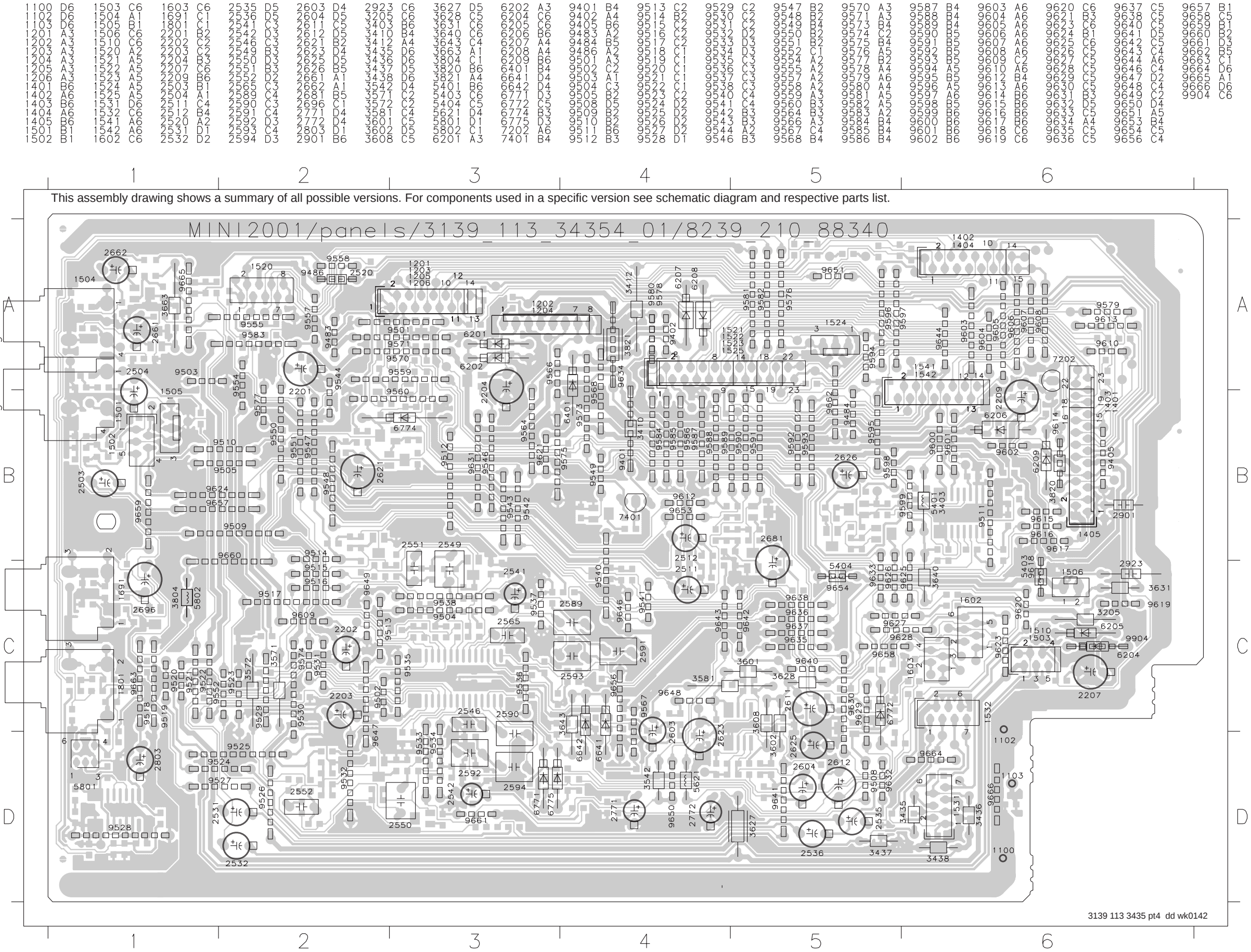
CHIP LAYOUT

12-2

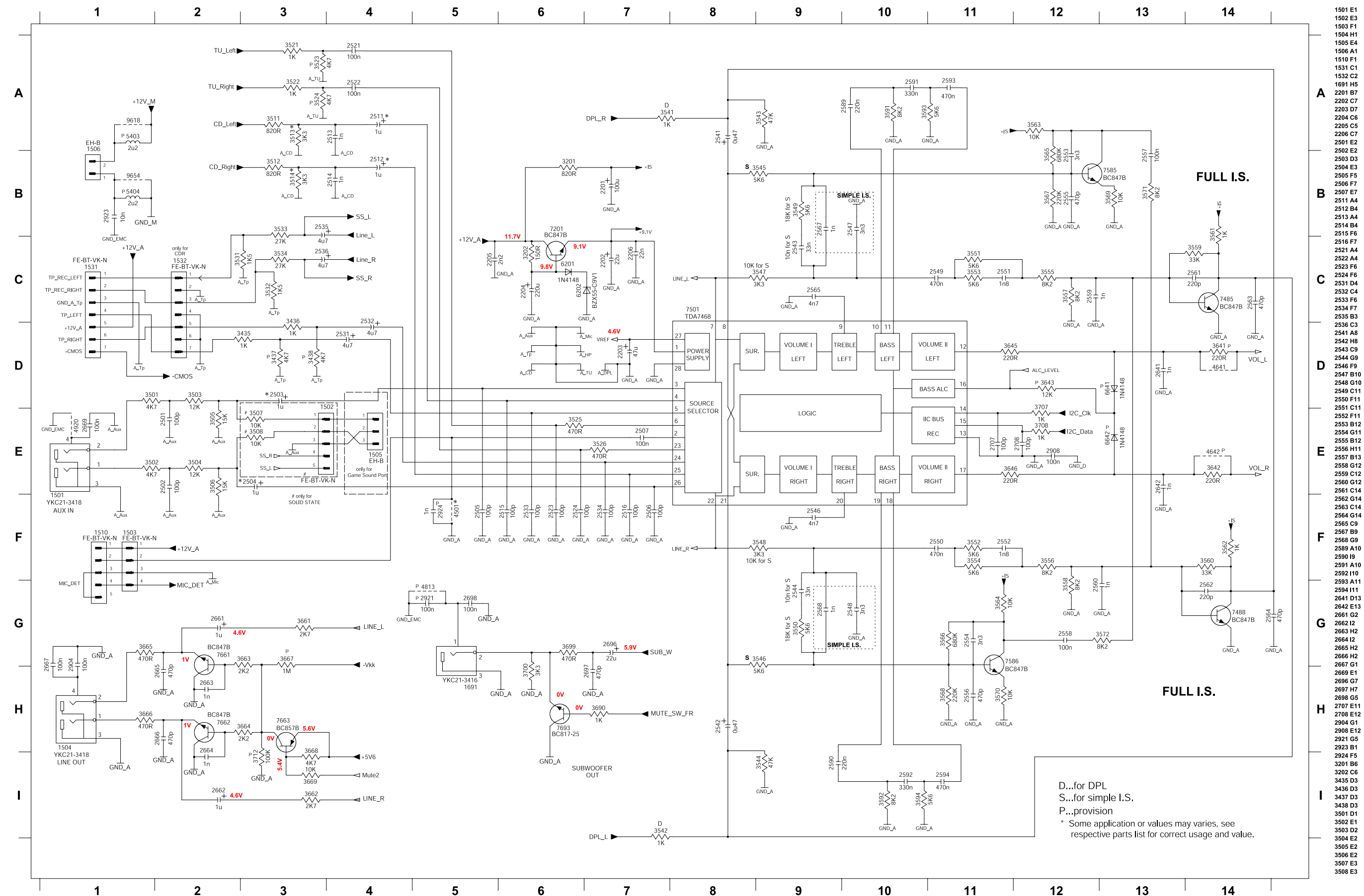
12-2



COMPONENT LAYOUT

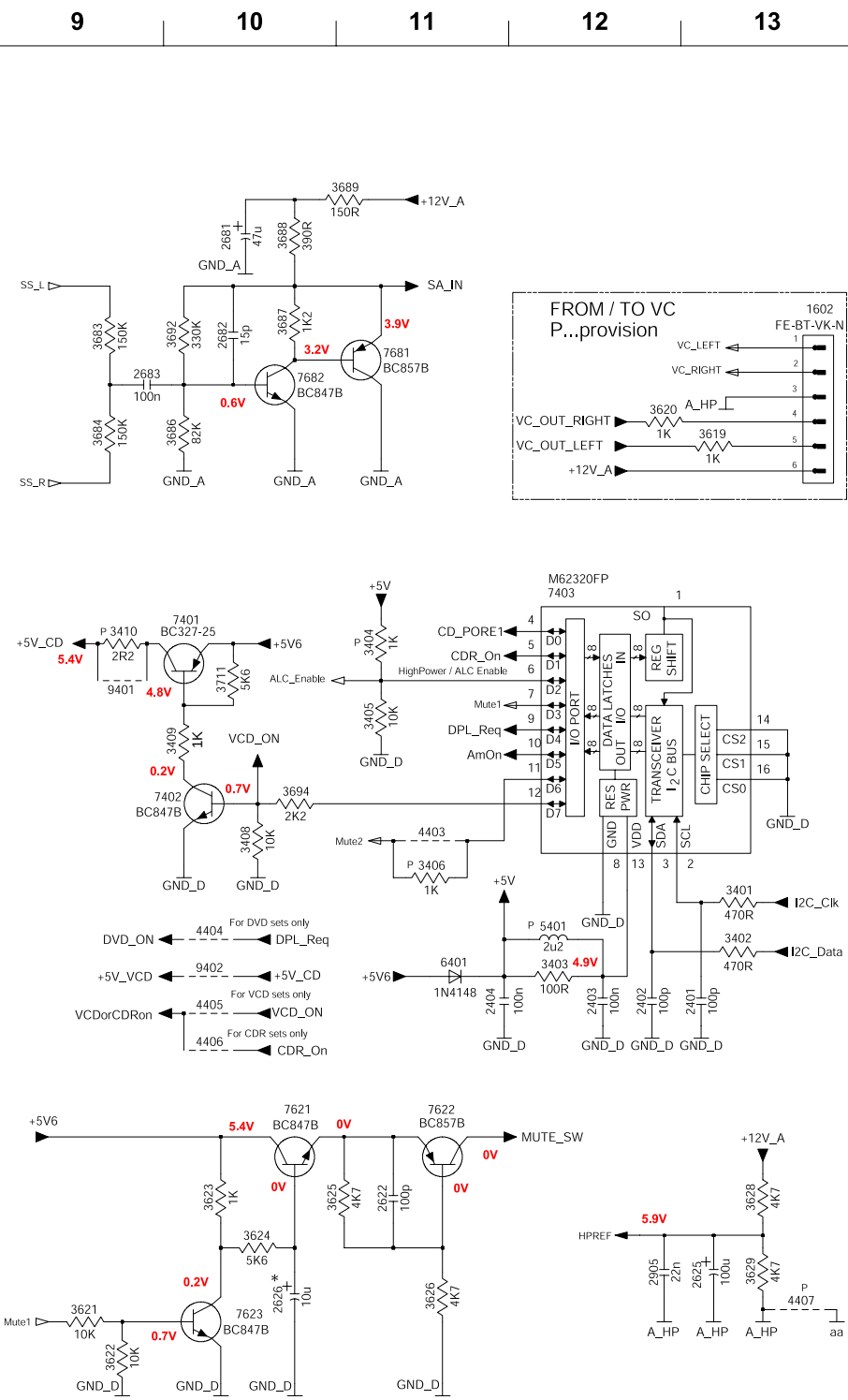
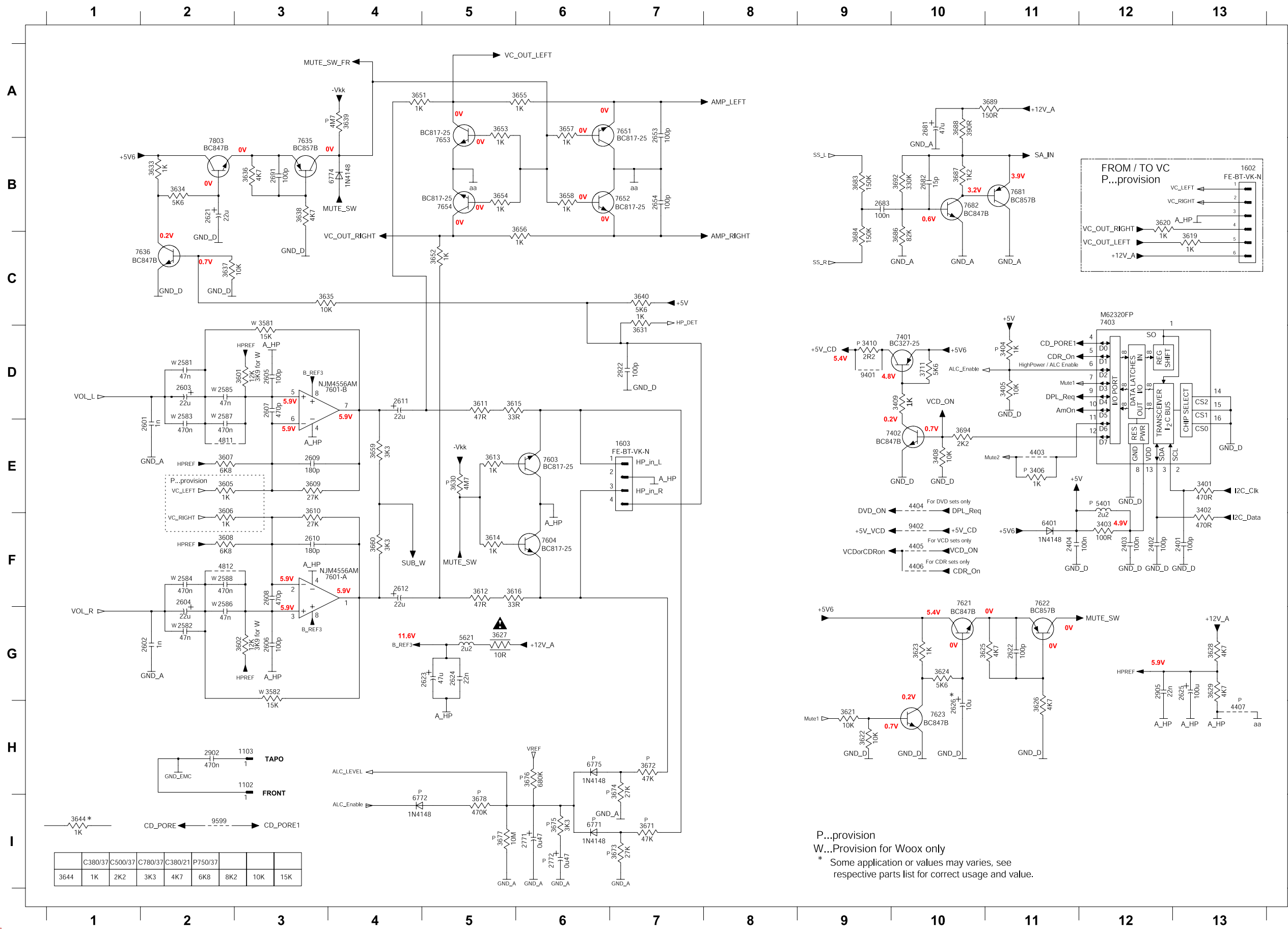


SOURCE SELECTION & SOUND PROCESSING CIRCUIT



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	3645 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	
3437 D3	
3438 D3	
3501 D1	
3502 E1	
3503 D2	
3504 E2	
3505 E2	
3506 E2	
3507 E3	
3508 E3	

HEADPHONE AMPLIFIER & I²C EXPANDER CIRCUIT



- 1102 H3
- 1103 H3
- 1602 B13
- 1603 E7
- 2401 F13
- 2402 F12
- 2403 F12
- 2404 F11
- 2581 D2
- 2582 G2
- 2583 D2
- 2584 F2
- 2585 D2
- 2586 F2
- 2587 D2
- 2588 F2
- 2601 E2
- 2602 G2
- 2603 D2
- 2604 F2
- 2605 D3
- 2606 G3
- 2607 D3
- 2608 F3
- 2609 E3
- 2610 F3
- 2611 D4
- 2612 F4
- 2621 B2
- 2622 G11
- 2623 G5
- 2624 G5
- 2625 G13
- 2626 H10
- 2653 A7
- 2654 B7
- 2681 A10
- 2682 B10
- 2683 B9
- 2691 B3
- 2771 I6
- 2772 I6
- 2902 H2
- 2905 G12
- 2922 D7
- 3401 E13
- 3402 E13
- 3403 F12
- 3404 D11
- 3405 D11
- 3406 E11
- 3408 E10
- 3409 D10
- 3410 D9
- 3581 D3
- 3582 G3
- 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
- 3658 B6
- 3659 E4
- 3660 F4
- 3671 I7
- 3672 H7
- 3673 I7
- 3674 H7
- 3675 I6
- 3676 H6
- 3677 I5
- 3678 I5
- 3683 B9
- 3684 C9
- 3686 C10
- 3687 B10
- 3688 A10
- 3689 A11
- 3692 B10
- 3694 E10
- 3711 D10
- 4403 E11
- 4404 E10
- 4405 F10
- 4406 F10
- 4407 H13
- 4811 E2
- 4812 F2
- 5401 E12
- 5621 G5
- 6401 F11
- 6771 I6
- 6772 I4
- 6774 B4
- 6775 H6
- 7401 D10
- 7402 E10
- 7403 C12
- 7601-A G3
- 7601-B D3
- 7603 E6
- 7604 F6
- 7621 F10
- 7622 F11
- 7623 H10
- 7635 B3
- 7636 C2
- 7651 A7
- 7652 B7
- 7653 B5
- 7654 B5
- 7681 B11
- 7682 B10
- 7803 B2
- 9401 D9
- 9402 F10
- 9599 I2

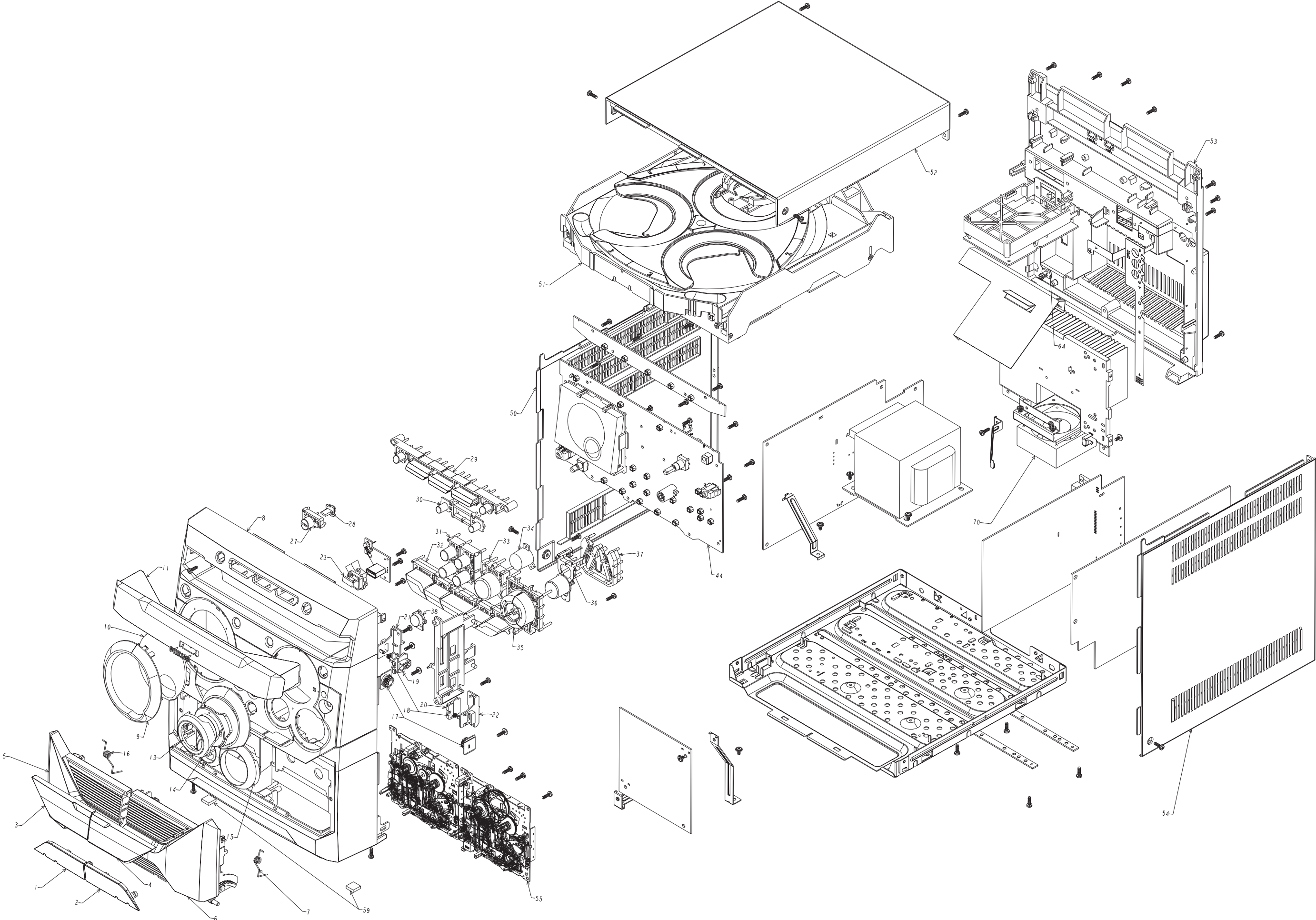
1100 F6	T054 C1
1201 C1	T055 C1
1202 E1	T056 C1
1203 C1	T057 C1
1204 E1	T058 D1
1205 C1	T059 D1
1206 C1	T060 D1
1401 A9	T061 D1
1402 D9	T062 D1
1403 A9	T063 D1
1404 D9	T064 D1
1405 A9	T065 E1
1520 E6	T066 E1
1521 A7	T067 E1
1522 A6	T068 F1
1523 D6	T069 F1
1524 A5	T070 F1
1525 B5	T071 F1
1541 D4	T072 F1
1542 D4	T073 F1
1801 B1	T074 E4
2207 D3	T075 E4
2208 F2	T076 E4
2209 E3	T077 E4
2210 F2	T078 E4
2211 F3	T079 F4
2520 E7	T080 F4
2801 B4	T081 F4
2802 C3	T082 F4
2803 B3	T084 F4
2804 B3	T085 A6
2805 E2	T086 A7
2806 E2	T087 A7
2807 B1	T088 A7
2808 B4	T089 A6
2809 B4	T090 A6
2810 A4	T091 B6
2901 F6	T092 B6
2950 E7	T093 B6
2951 E7	T094 B6
2952 E7	T095 B6
2953 E7	T096 B6
2954 E6	T097 C6
2955 E1	T098 C6
3205 D2	T099 C6
3412 A8	T100 C6
3801 B4	T101 C6
3802 A4	T102 D6
3803 B3	T103 D6
3804 A3	T104 D6
3805 B2	T105 D6
3806 A1	T106 D6
3807 B4	T107 E6
3808 A3	T108 E6
3809 B2	T109 E6
3820 E3	T110 E6
3821 E2	T111 E6
3822 F3	T112 A8
4801 B4	T113 A8
4802 C4	T114 A8
4903 B8	T115 A8
4904 F7	T116 E3
4905 D3	T117 E8
4906 A5	T118 E8
4907 C8	T119 E8
4908 C8	T120 F8
4909 A3	T121 E1
4910 A3	T122 F6
4911 A4	T123 F6
4912 B8	T124 E1
4913 B8	T130 B8
4914 B5	
4915 C8	
4921 C1	
5801 B2	
5802 A3	
6204 F7	
6205 D3	
6206 F2	
6207 C5	
6208 C5	
6209 F3	
7202 E3	
7404 F3	
7802 A3	
9405 C8	
9483 F6	
9484 D4	
9486 E7	
9614 E3	
9634 E2	
9904 F7	
T050 B1	
T051 B1	
T052 A3	
T053 C4	

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
9965 100 30587	9965 100 30587	CD MECHANISM(SANYO) DA11VZSS (FWM372/12)(FWM572/55)
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.

1.2 Manual 3141 785 30862

Page 13-2 :Changed CDM for FWM372/12 and FWM572/55