

Service
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Service Manual

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PHILIPS

SPECIFICATIONS

GENERAL:

Mains voltage : 110-127V/220-240V Switchable for /55/98
 117V \pm 10% for /37
 220V \pm 10% for /61/93
 230 \pm 10% for /05/12
 240 \pm 10% for /79

Mains frequency : 50/60Hz

Power consumption : 30W at $1/8 P_{rated}$
 < 1W at ECO Standby

Clock accuracy : < 4 seconds per day

Dimension centre unit : : 430 x 110 x 290 mm (L x D x H)

TUNER:

FM

Tuning range : 87.5-108MHz

Grid : 50kHz
 100kHz for /37

IF frequency : 10.7MHz \pm 25kHz

Aerial input : 75 ohm coaxial
 300 ohm click fit for /37

Sensitivity at 26dB S/N : < 22uV

Selectivity at 600kHz bandwidth : > 25dB

Image rejection : > 20dB

Distortion at RF=1mV, dev. 75kHz : < 7%

-3dB Limiting point : < 26dBf

Crosstalk at RF=1mV, dev. 40kHz : > 18dB

AM

Tuning range : 531-1602kHz
 530-1700kHz for /98/37

Grid : 9kHz
 10kHz for /98/37

IF frequency : 450kHz \pm 1kHz

Aerial input : Frame aerial

Sensitivity at 26dB S/N : < 22uV

Selectivity at 18kHz bandwidth : > 18dB

IF rejection : > 45dB

Image rejection : > 28dB

Distortion at RF=50mV, M=80% : < 5%

AMPLIFIER:

Output power (4 ohm, 1kHz, 10% THD)
 L & R : 2 x 10W RMS

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

DSC : Rock, Pop, Jazz, Classic

Incredible Surround : On / Off

Input sensitivity

Aux in (at 1kHz) : 500mV at 600 ohm
 CD (Audio Disc1) : 0dB track (Trk 35)
 Tuner : FM67.5kHz DEV/AM 8

Output sensitivity

Headphone output at 32 ohm : 700mV \pm 2dB (Max. vol.)

COMPACT DISC:

Measurement done directly at the connector on the board.

Output Resistance : < 100 ohm

Output Voltage (0dB, 1kHz) : 0.5Vrms \pm 1dB (unloaded)

Channel Unbalance : < 3dB

Channel Separation (1kHz) : > 40dB

Frequency Response (\pm 3dB) : 125Hz-16kHz

Signal to Noise Ratio : > 58dBA

MP3-CD Bit Rate : 8-320 kbps

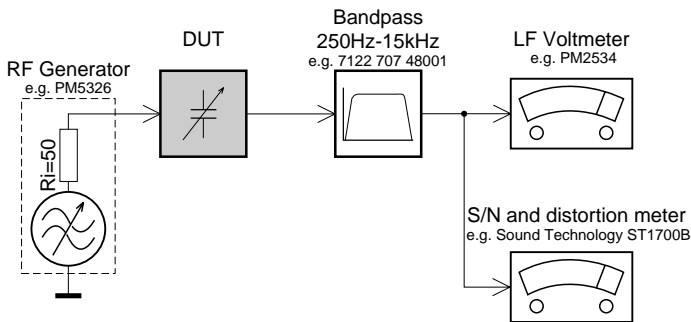
WMA-CD Bit Rate : 64-192 kbps

Sampling Frequencies : 8,11.025,12,16,22.05,24,
 32,44.1,48kHz

Recording Format : ISO9660 UDF format not supported

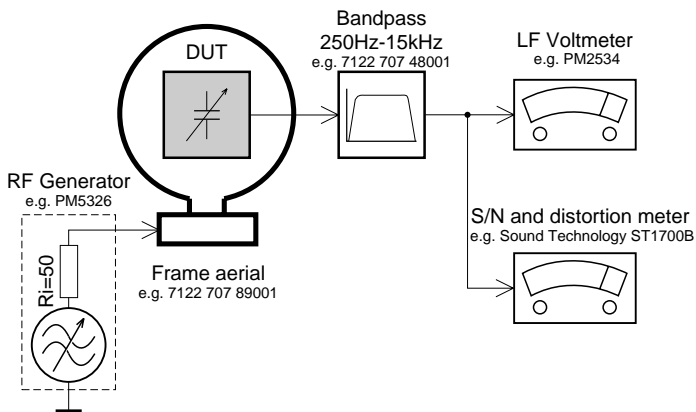
MEASUREMENT SETUP

Tuner FM



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

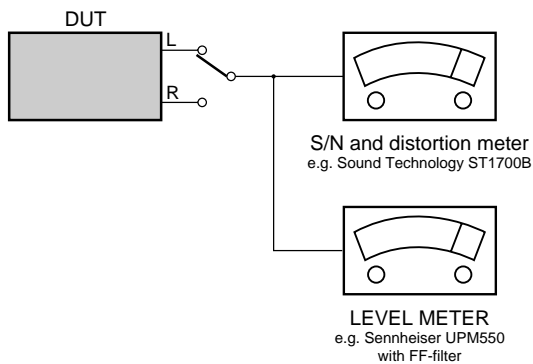
Tuner AM (MW,LW)



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)



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

Cassette:

SBC419 Test cassette CrO2	4822 397 30069
SBC420 Test cassette Fe	4822 397 30071
MTT150 Dolby level 200nWb/M	4822 397 30271

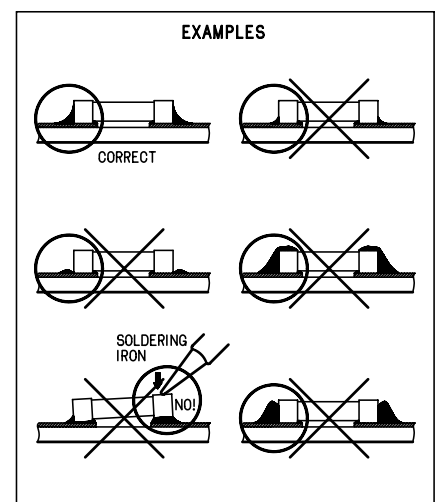
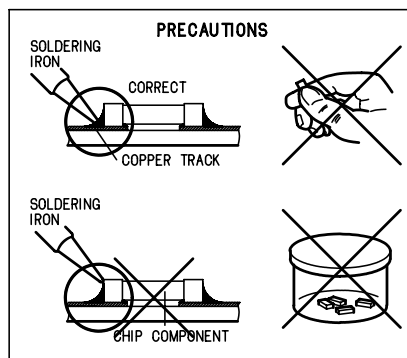
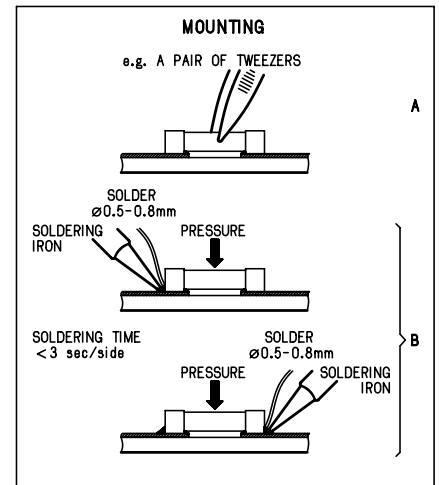
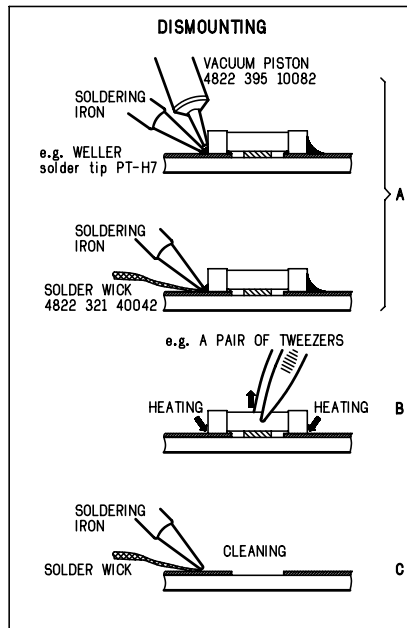
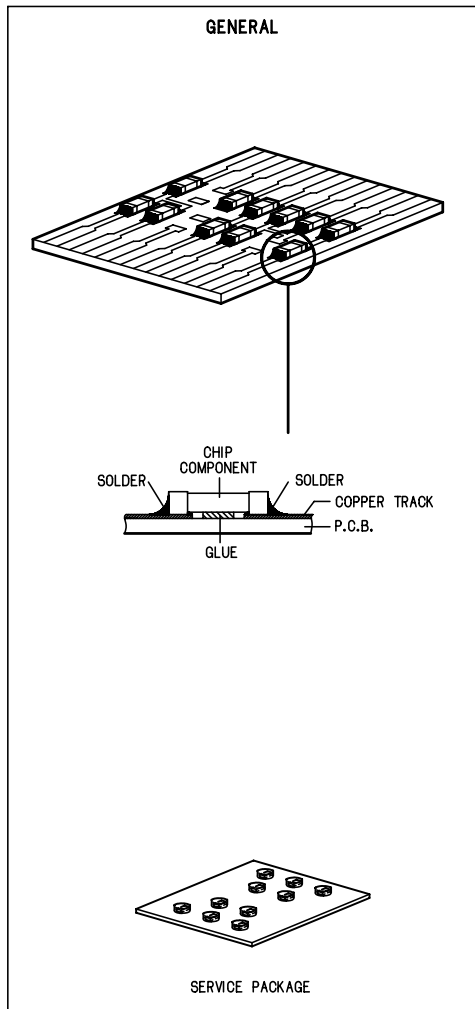
Compact Disc:

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
Connector box (1MΩ)	4822 320 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.

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 ditzelfde potentiaal.

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.

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 bracciale 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

Safety components are marked by the symbol \triangle .

NL

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

De Veiligheidsonderdelen zijn aangeduid met het symbool \triangle

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.

Les composants de sécurité sont marqués \triangle

D

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

Sicherheitsbauteile sind durch das Symbol \triangle markiert.

I

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

Componenti di sicurezza sono marcati con \triangle

GB

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

**GB Warning !**

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

S Varning !

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

SF Varoitus !

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

DK Advarse !

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

F

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

INFORMATION ABOUT LEAD-FREE SOLDERING

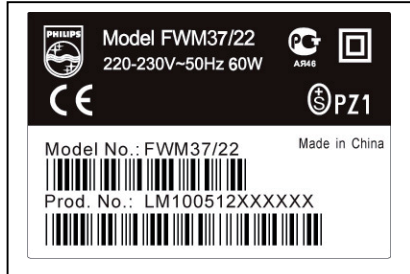
Philips CE is producing lead-free sets from 1.1.2005 onwards.

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 (leaded/ lead-free). So best to always use SAC305 and the higher temperatures belong to this.

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

- Use only lead-free solder alloy Philips SAC305 with order code 0622 149 00106. If lead-free solder-paste is required, please contact the manufacturer of your solder-equipment. In general use of solder-paste within workshops should be avoided because paste is not easy to store and to handle.
- Use only adequate solder tools applicable for lead-free solder alloy. The solder tool must be able
 - To reach at least a solder-temperature of 400°C,
 - To stabilize the adjusted temperature at the solder-tip
 - To exchange solder-tips for different applications.
- Adjust your solder tool so that a temperature around 360°C – 380°C is reached and stabilized at the solder joint. Heating-time of the solder-joint should not exceed ~ 4 sec. Avoid temperatures above 400°C otherwise wear-out of tips will rise drastically and flux-fluid will be destroyed. To avoid wear-out of tips switch off 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 'dry-packaging' (sealed pack including a silica gel pack) to protect the IC against moisture. After opening, dependent of MSL-level seen on indicator-label in the bag, the BGA-IC possibly still has to be baked dry. (MSL=Moisture Sensitivity Level). This will be communicated via AYS-website.
Do not re-use BGAs at all.
- For sets produced before 1.1.2005 (except products of 2004), containing leaded solder-alloy and components, all needed spare-parts will be available till the end of the service-period. For repair of such sets nothing changes.
- On our website www.atyourservice.ce.Philips.com you find more information to:
 - * BGA-de-/soldering (+ baking instructions)
 - * Heating-profiles of BGAs and other ICs used in Philips-sets

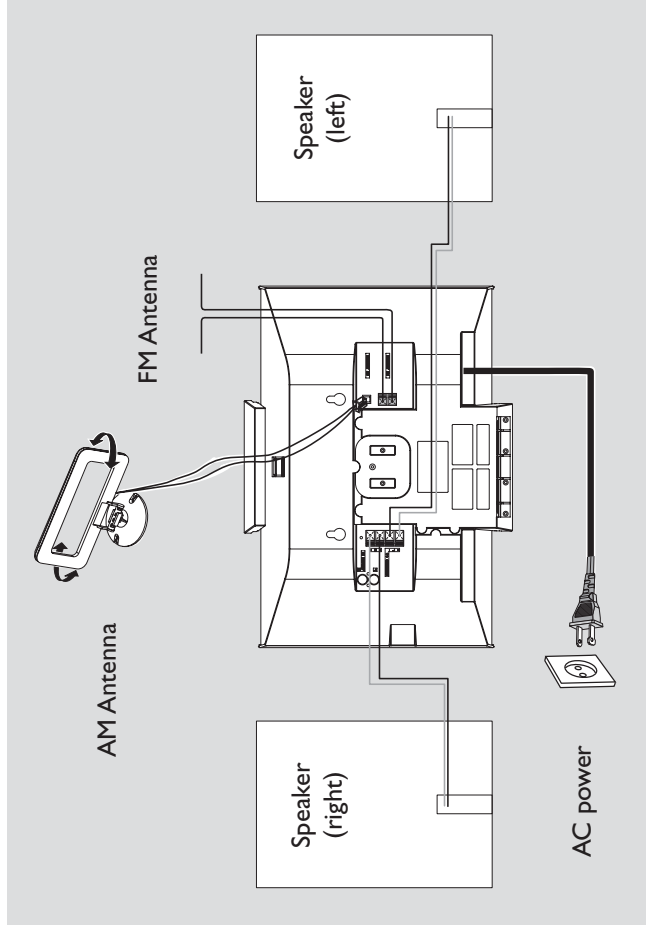
You will find this and more technical information within the "magazine", chapter "workshop news".

For additional questions please contact your local repair-helpdesk.

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.



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.

Warning!

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

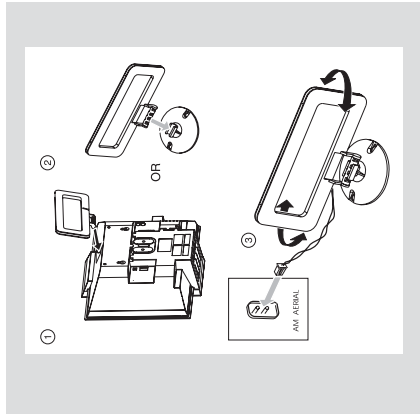
To avoid overheating of the system, a safety circuit has been built in. Therefore, your system may switch to Standby mode automatically under extreme conditions. If this happens, let the system cool down before reusing it (not available for all versions).

(B) Antennas Connection

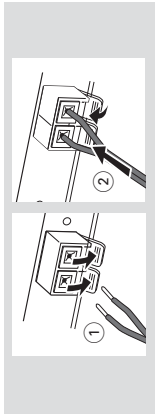
Connect the supplied AM loop antenna and FM antenna to the respective terminals. Adjust the position of the antenna for optimal reception.

AM Antenna

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



FM Antenna

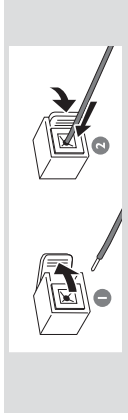


- For better FM stereo reception, connect an outdoor FM antenna to the FM ANTENNA terminal.

(C) Speakers Connection

Front Speakers

Connect the speaker wires to the SPEAKERS terminals, right speaker to "RIGHT" and left speaker to "LEFT", colored (marked) wire to "+" and black (unmarked) wire to "-".



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

Notes:

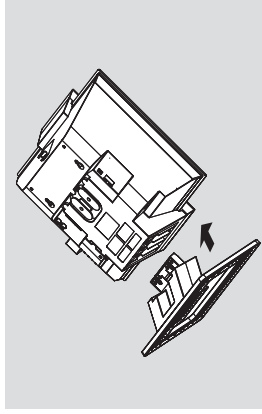
- For optimal sound performance, use the supplied speakers.
- Do not connect more than one speaker to any one pair of +/- speaker terminals.
- Do not connect speakers with an impedance lower than the speakers supplied. Please refer to the SPECIFICATIONS section of this manual.

Placing the set and speakers

With the supplied detachable stands and wall mounting kit, you can either place the main set and speakers on desktop or mount them onto wall. Desktop installation is taken for example here. For how to mount the system onto wall, please refer to Appendix and the attached Wall Mounting Instructions.

Preparations

- 1 Align the side marked PRESS of the larger-size stand with the slots at the bottom of the main set.



- 2 Push the stand down into the slots until you hear a click.
- 3 Attach the two smaller-size stands to the speakers in the same way.
- 4 Place the main set and speakers upright on the desktop with the support of the stands.

Note:

To remove the stand from the main set or either speaker, while pressing down PRESS, pull the stand out from the slots.

Optional connection

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

Connecting other equipment to our system

Connect the audio left and right OUT terminals of a TV, VCR, Laser Disc player, DVD player or CD Recorder to the AUX/CD IN terminals.

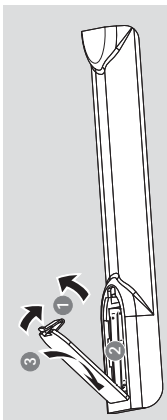
Note:

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).

PREPARATIONS & CONTROLS

Preparations

Inserting batteries into the Remote Control



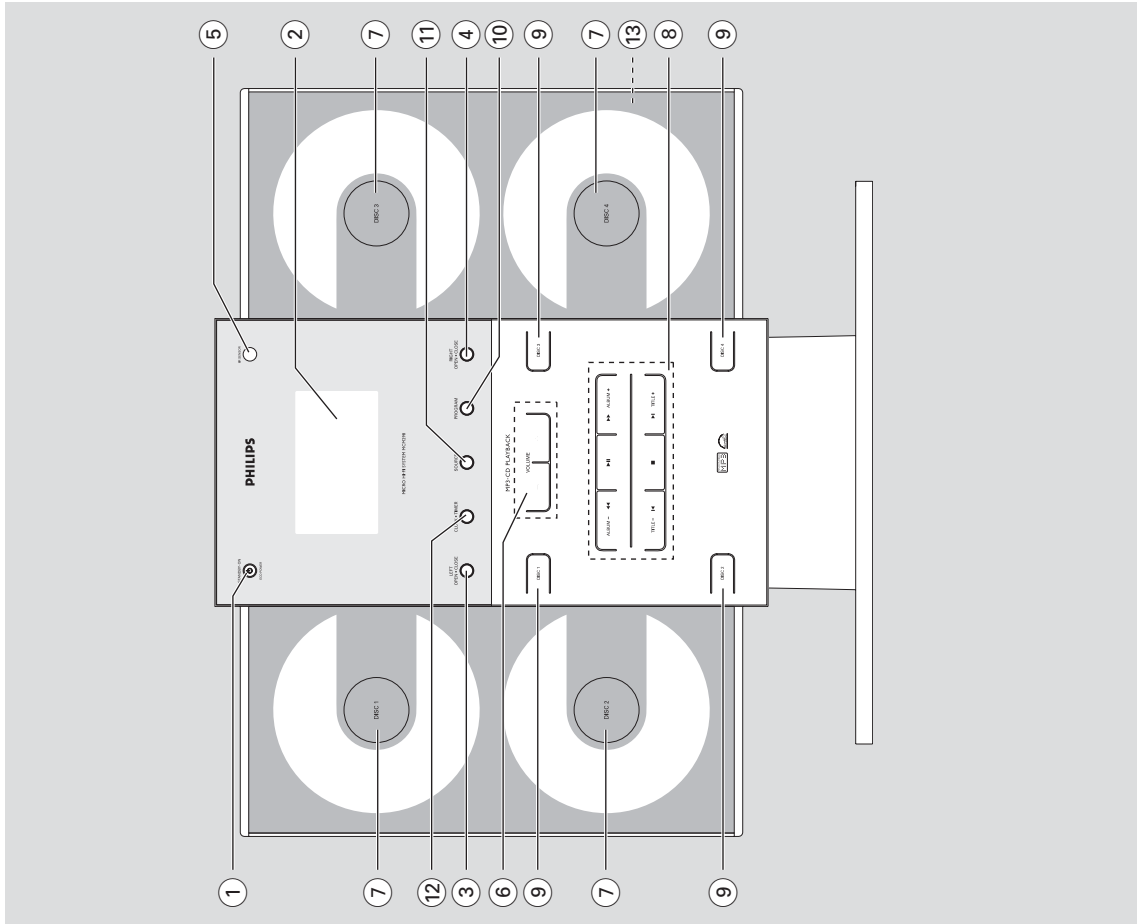
- 1 Open the battery compartment.
- 2 Insert two AAAA batteries following the indications (+/-) inside the compartment.
- 3 Close the cover.

Using the Remote Control to operate the Player

- 1 Aim the Remote Control directly at the remote sensor (IR) on the front panel.
- 2 Do not put any objects between the Remote Control and the stem while operating the stem.

CAUTION!

- Remove batteries if they are exhausted or if the Remote Control is not being 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.



CONTROLS

Controls

Controls on the s stem (illustrations on page 3)

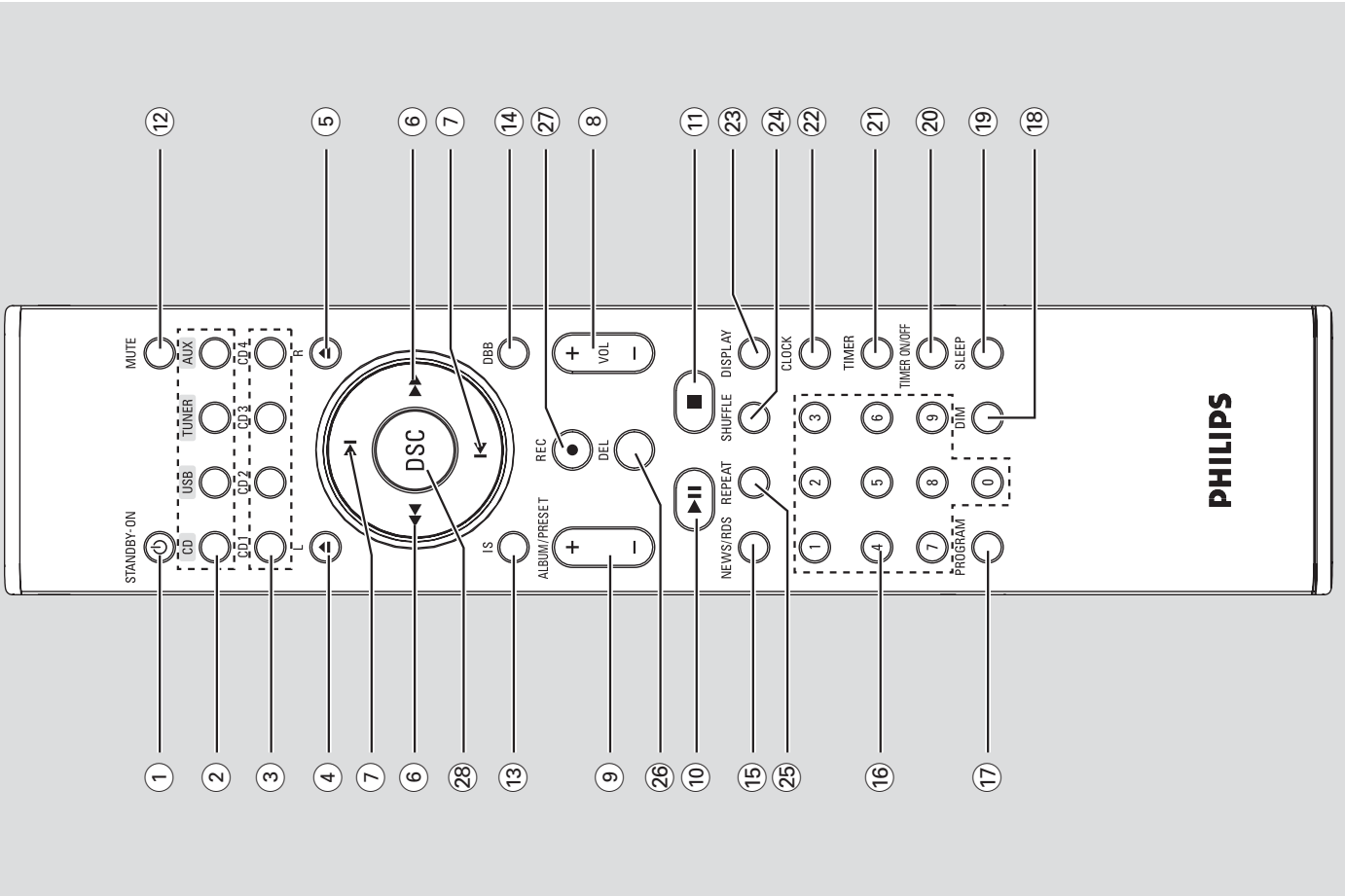
- 1 **STANDBY-ON/ECO POWER** switches the s stem on or to Eco Power standb /normal standb with clock displa .
- 2 **Displa screen** shows the status of the s stem.
- 3 **LEFT OPEN CLOSE** opens/closes the left CD door.
- 4 **RIGHT OPEN CLOSE** opens/closes the right CD door.
- 5 **IR** remote sensor
- 6 **VOLUME -/+** adjusts the volume level.
- 7 **Disc tra s**
- 8 **Mode Selection** **ALBUM -/+** tunes to a station. for CD/MP3-CD fast searches back and forward within a track/disc (press and hold). for MP3-CD skips to the beginning of a current/previous/ subsequent album. stops disc pla back or erases a disc program. starts or interrupts pla back. **TITLE -/+** selects a preset radio station. for CD/MP3 -CD skips to the beginning of a current/previous/ subsequent track. for Clock/Timer sets the minute.
- 9 **DISC 1/2/3/4** selects a disc tra for pla back.
- 10 **PROGRAM** for CD/MP3-CD programmes tracks and reviews the program. for TUNER programmes tuner stations.
- 11 **SOURCE** selects the respective sound source for CD/ TUNER (FM/AM)/ AUX.

12 CLOCK TIMER

- Y sets the clock or timer function.
- 13 connects headphones

Controls on the remote (illustrations on page 4)

- 1 **STANDBY-ON** switches the s stem on or to Eco Power standb /normal standb with clock displa .
- 2 **Source selection (USB unavailable for this version)** selects the respective sound source for CD/ TUNER (FM/AM)/ AUX.
- 3 **CD 1/2/3/4** selects a disc tra for pla back.
- 4 **L ▲** opens/closes the left CD door.
- 5 **R ▲** opens/closes the right CD door.
- 6 **◀◀/▶▶** for TUNER tunes to a station. for CD/MP3-CD fast searches back and forward within a track/disc (press and hold). for MP3-CD skips to the beginning of a current/previous/ subsequent album. for Clock/Timer sets the hour.
- 7 **◀/▶** for CD/MP3 -CD skips to the beginning of a current/previous/ subsequent track.
- 8 **VOL +/-** adjusts the volume level.
- 9 **ALBUM/PRESET +/-** for TUNER selects a preset radio station. for MP3-CD skips to the beginning of a current/previous/ subsequent album. for Clock/Timer sets the minute.



CONTROLS AND TROUBLESHOOTING

Controls

- ⑩ **▶ II**
Y starts or interrupts pla back.
- ⑪ **■**
Y stops disc pla back or erases a disc program.
- ⑫ **MUTE**
Y interrupts and resumes sound reproduction.
- ⑬ **IS (Incredible Surround)**
Y activates or deactivates the surround sound effect.
- ⑭ **DBB (D namic Bass Boost)**
Y enhances the bass.
- ⑮ **NEWS/RDS (unavailable for this version)**
- ⑯ **Numeric Ke pad (0-9)**
for CD/MP3-CD selects a track for pla back directl .
- ⑰ **PROGRAM**
for CD/MP3-CD programs tracks and reviews the program.
for TUNER programs tuner stations.
- ⑱ **DIM**
Y turns on or off the dim function for the displa screen.
- ⑲ **SLEEP**
Y activates/deactivates or selects the sleeper time.
- ⑳ **TIMER ON/OFF**
Y activates/deactivates the timer function.
- ㉑ **TIMER**
Y sets the timer function.
- ㉒ **CLOCK**
Y sets the clock function.
- ㉓ **DISPLAY**
Y displa s disc information during pla back.
- ㉔ **SHUFFLE**
Y pla s disc tracks in random order.
- ㉕ **REPEAT**
Y repeats a track/disc program/entire disc.
- ㉖ **DEL (unavailable for this version)**
- ㉗ **REC (unavailable for this version)**
- ㉘ **DSC (Digital Sound Control)**
Y selects sound characteristics: ROCK/JAZZ/POP/CLASSIC.

- Notes for remote control:**
- First select the source you wish to control by pressing one of the source select keys on the remote control (for example CD, TUNER).
 - Then select the desired function (for example ▶ II, ↵ ▶).

Troubleshooting

WARNING

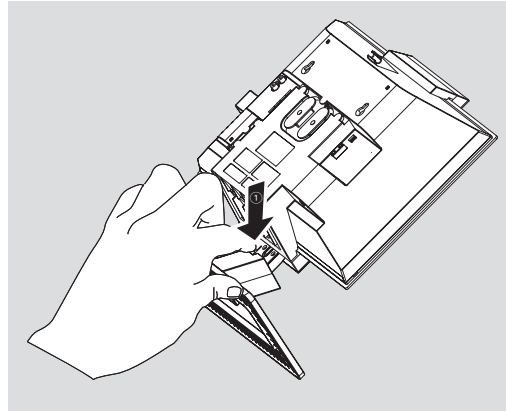
Under no circumstances should you try to repair the system yourself, as this will invalidate the warranty. Do not open the system as there is a risk of electric shock.
If a fault occurs, first check the points listed below before taking the system for repair. If you are unable to remedy a problem by following these hints, consult your dealer or Philips for help.

Problem	Solution
“NO DISC” is displayed.	<ul style="list-style-type: none"> ✓ 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 finalised CD-RW or a correct MP3-CD format disc. ✓ If the signal is too weak, adjust the antenna or connect an external antenna for better reception. ✓ Increase the distance between the Micro HiFi S stem and our TV or VCR. ✓ Remove and reconnect the AC power plug and switch on the s stem again. ✓ Adjust the volume. ✓ Disconnect the headphones. ✓ Check that the speakers are connected correctl . ✓ 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.
Radio reception is poor.	<ul style="list-style-type: none"> ✓ Select the source (CD or TUNER, for example) before pressing the function button (▶ II, ↵, ▶). ✓ Reduce the distance between the remote control and the s stem. ✓ Insert the batter with its polarities (+/- signs) aligned as indicated. ✓ Replace the batter . ✓ Point the remote control directl toward IR sensor on the front of the s stem. ✓ Set the clock correctl . ✓ Press TIMER to switch on the timer. ✓ Power has been interrupted or the power cord has been disconnected. Reset the clock/timer.
The s stem 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 timer is not working.	
The Clock/Timer setting is erased.	

DISMANTLING INSTRUCTIONS

Detaching the Stands from the Speakers and Main Sets

- 1 To detach the stand from the main unit,
 - a. As shown, hold down **PRESS ▼**
 - b. Move out the stand to detach.



- 2 Detach the speaker stands in the same way as you do the main unit stand.

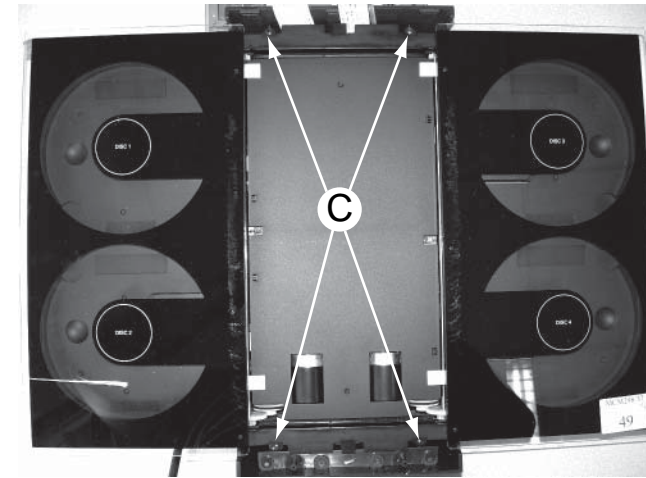
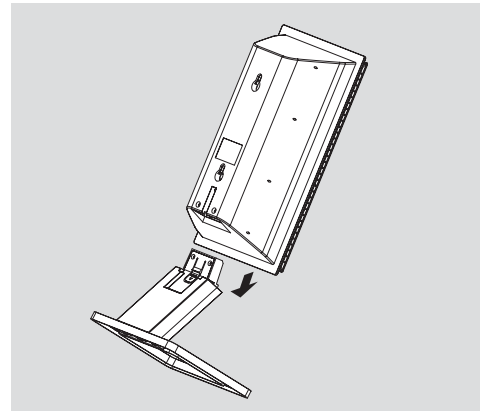


Figure 2

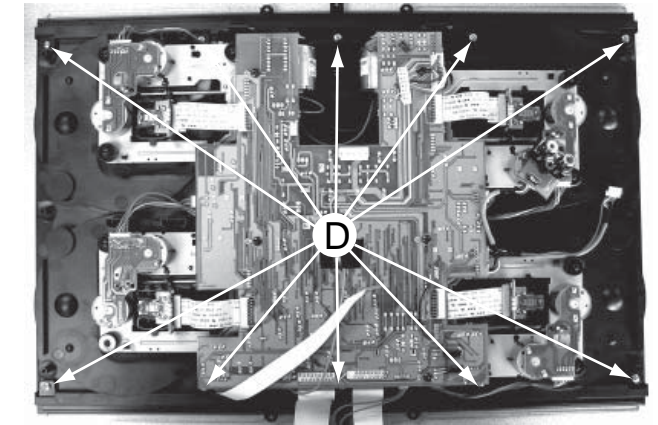


Figure 3

Dismantling of the Front and Rear Panel assembly

- 1) Loosen 4 screws A to remove the Front Panel Ass'y by sliding it out towards the underside before lifting up as shown in Figure 1.
- 2) Loosen 7 screws B and 4 screws C to remove the Rear Panel Ass'y .
 - 7 screws on the rear
 - 2 screws each on the upside & downside as shown in Figure 2.
- 3) Loosen 10 screws D (see Figure 3) to remove the CD Door Track, then remove Left and Right CD Door.
 - 5 screws each on the upper & under side.

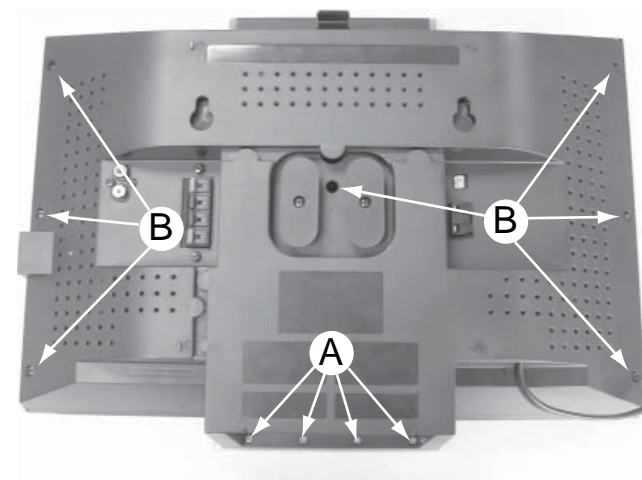


Figure 1

Detaching the Control Panel Ass'y from the Front Panel Ass'y

- 1) Loosen 11 screws E (see Figure 4) to remove the Control Panel Ass'y .

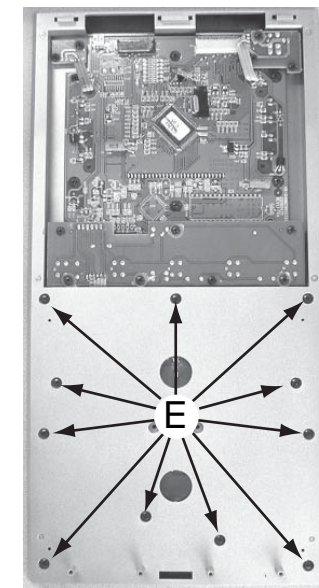


Figure 4

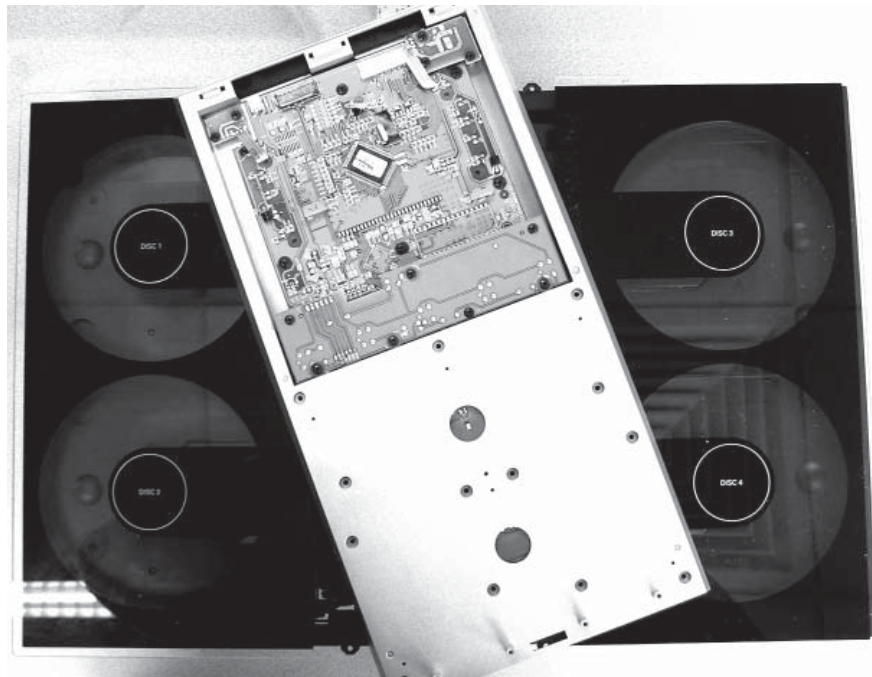
DISMANTLING INSTRUCTIONS

Repair Hints & Service Positions

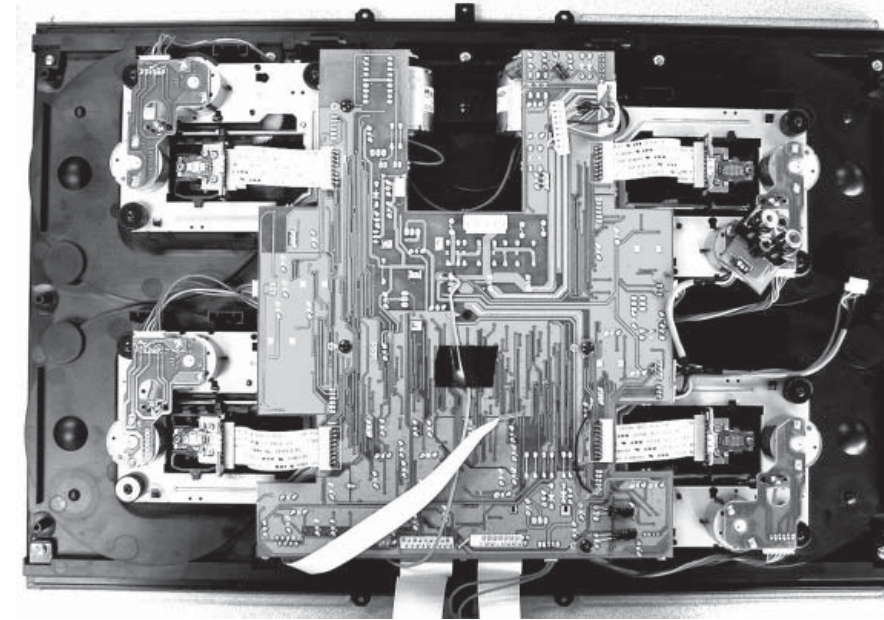
- 1) During repair it is possible to disconnect the Tuner Board and/or CD Module completely unless the fault is suspected to be in that area. This will not affect the performance of the rest of the set.

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.

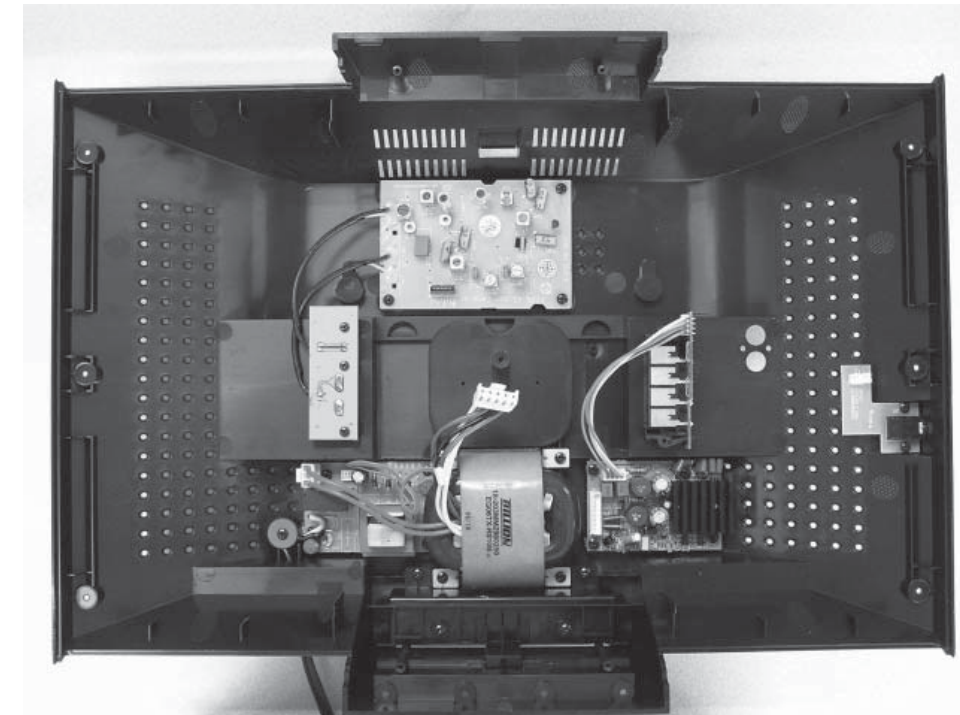
Service position A



Service position B



Service position C



SERVICE TEST PROGRAM

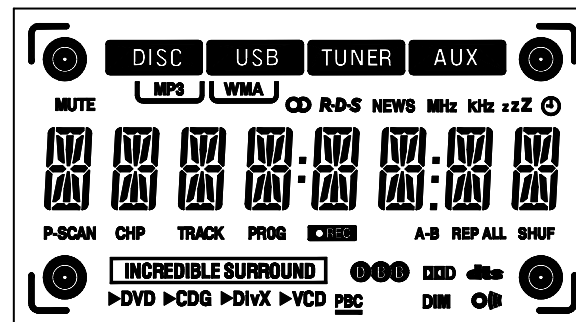
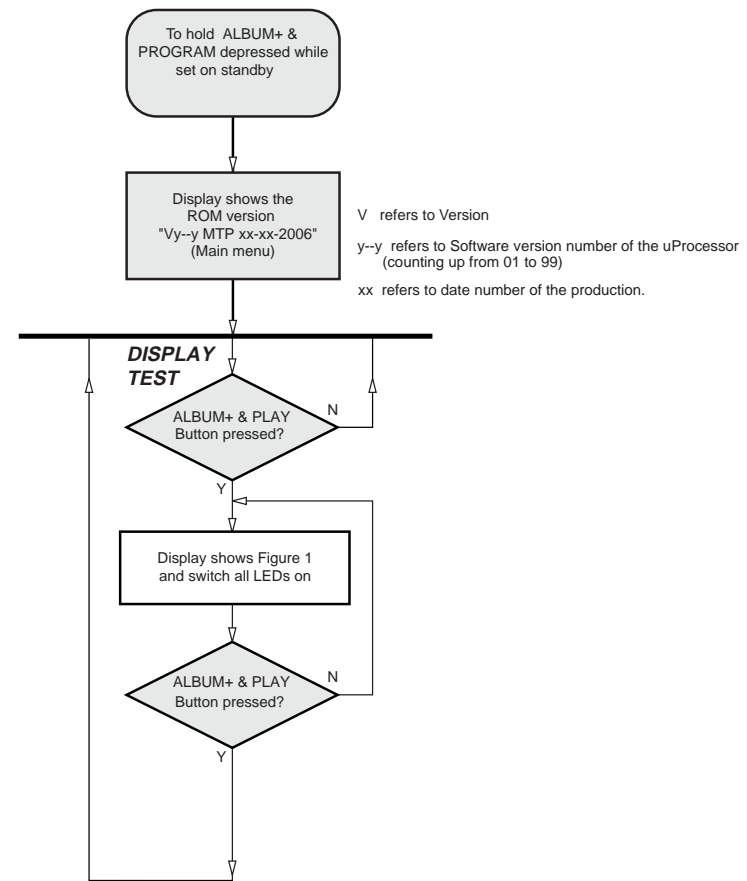
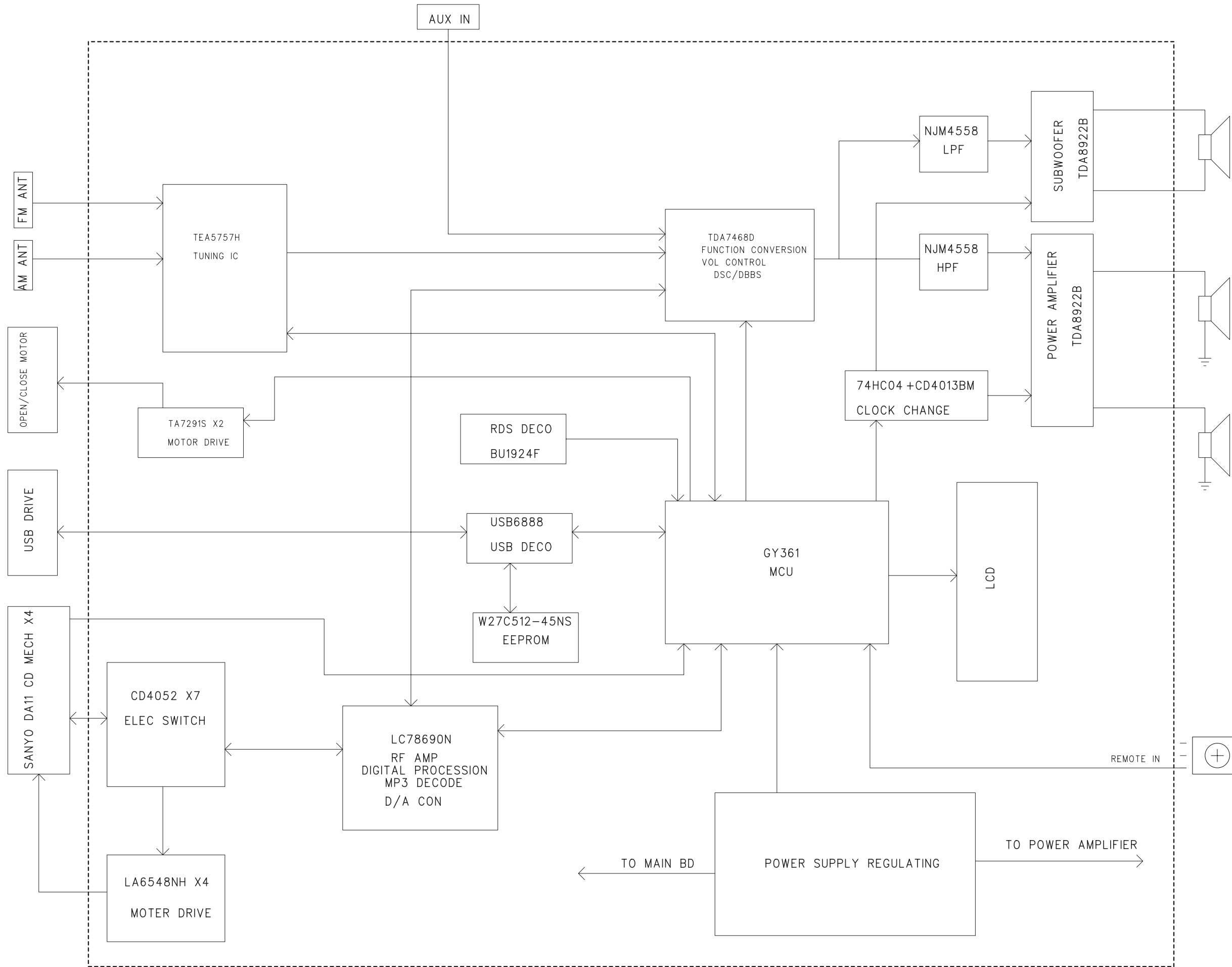
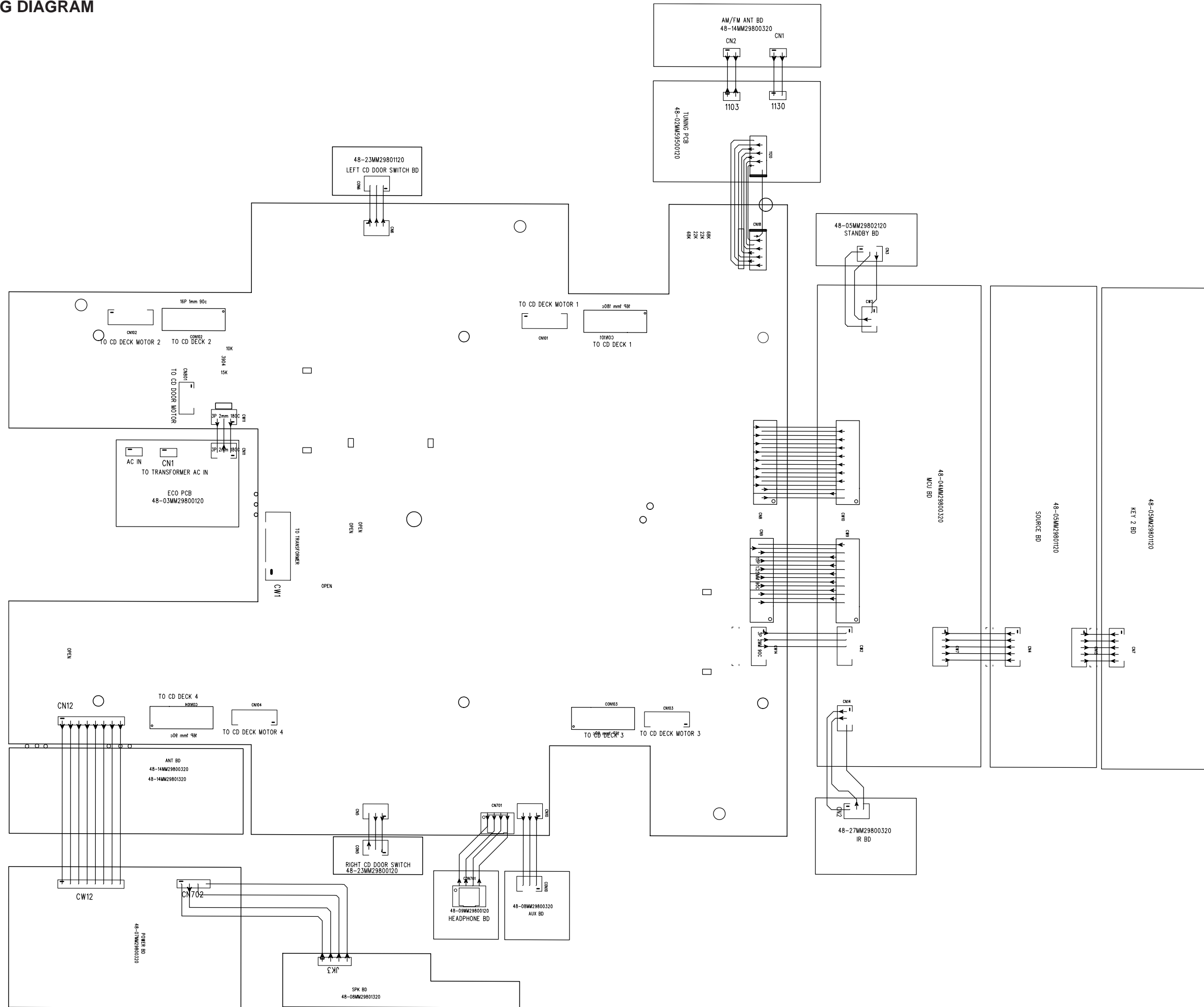


Figure 1

SET BLOCK DIAGRAM



SET WIRING DIAGRAM



FTD DISPLAY PIN CONNECTION

MAIN BOARD

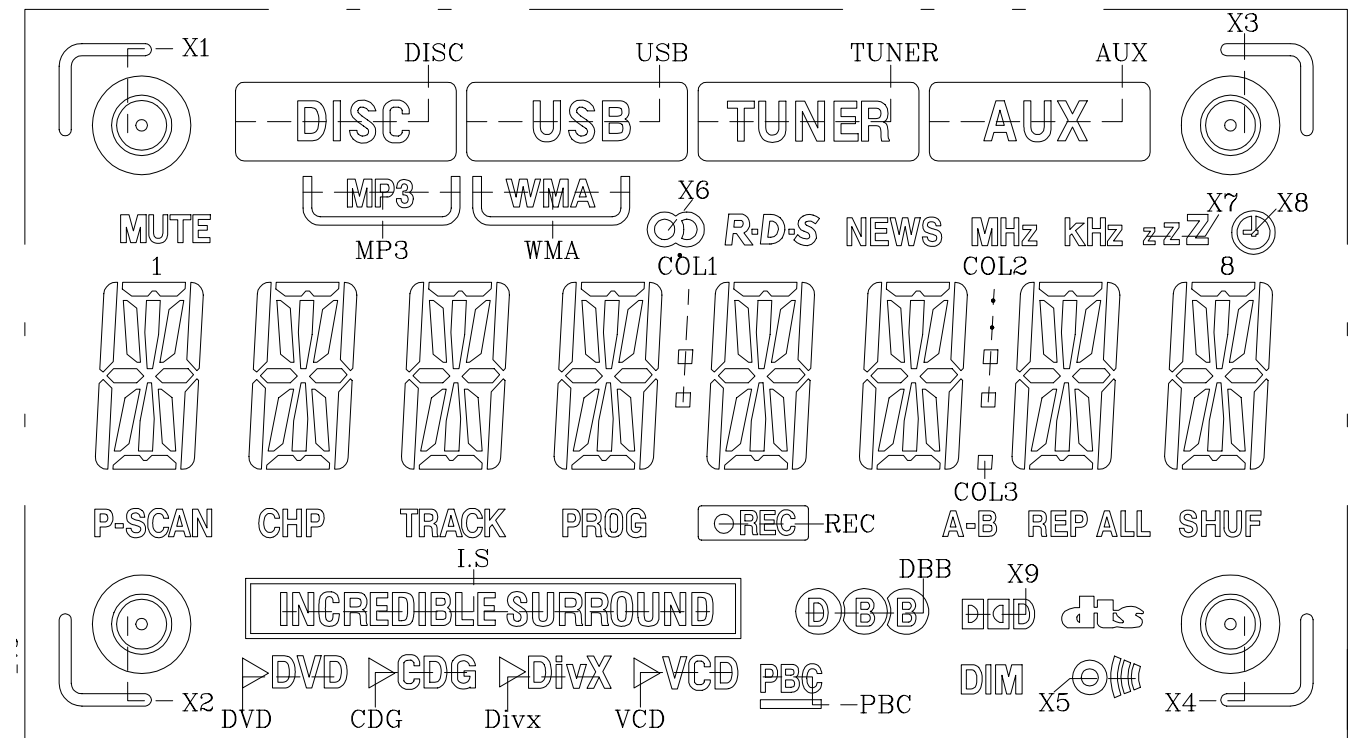
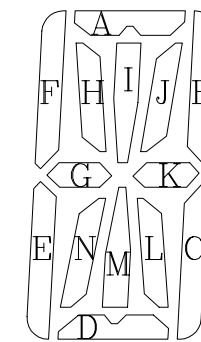


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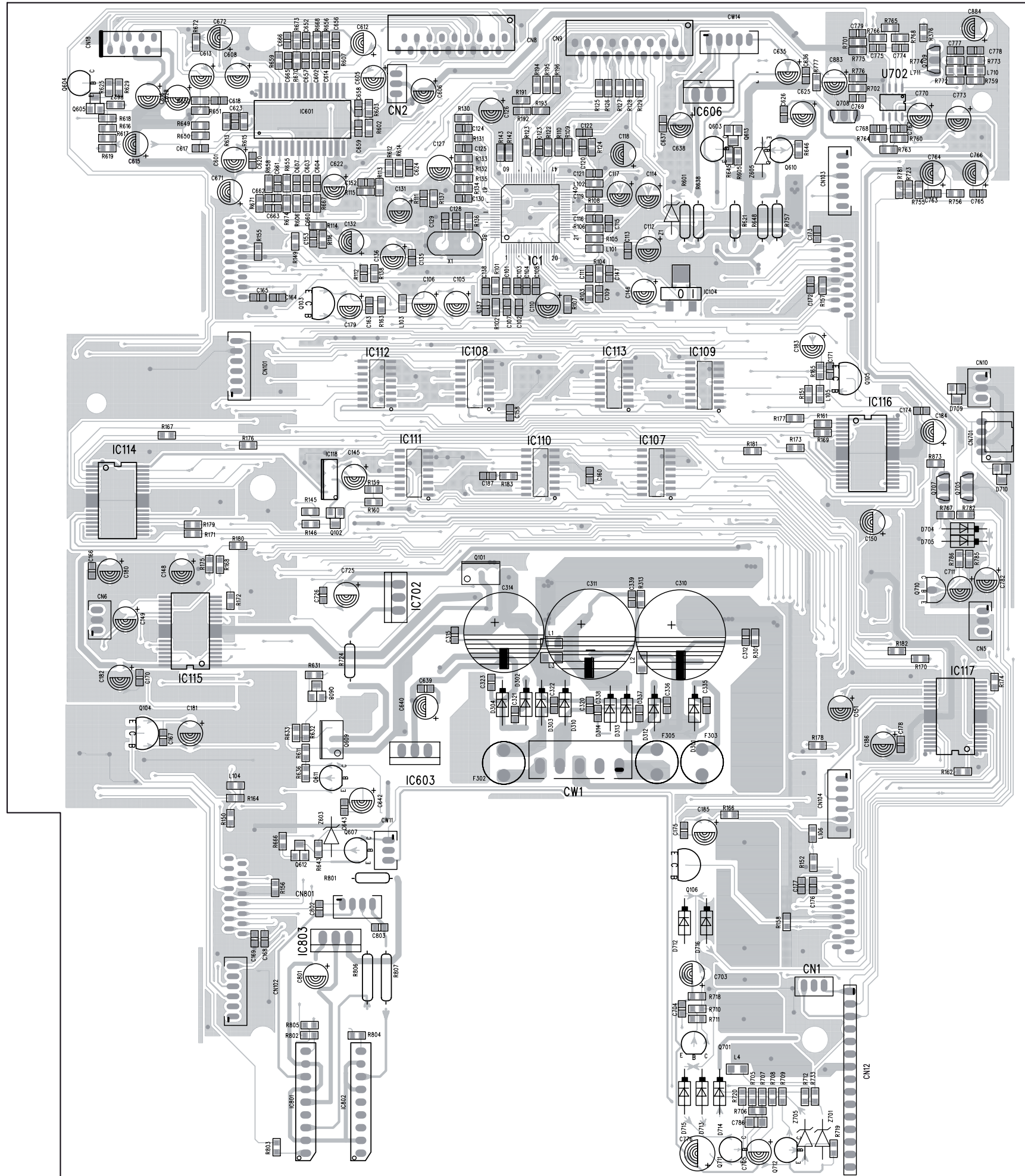
FTD Display Pin Connection 6-1
 Main PCB - Layout Top View 6-2
 Main PCB - Layout Bottom View 6-3
 Main PCB - Circuit Diagram (Audio Part) 6-4
 Main PCB - Circuit Diagram (CD Part) 6-5
 Class D Power PCB - Layout Top View 6-6



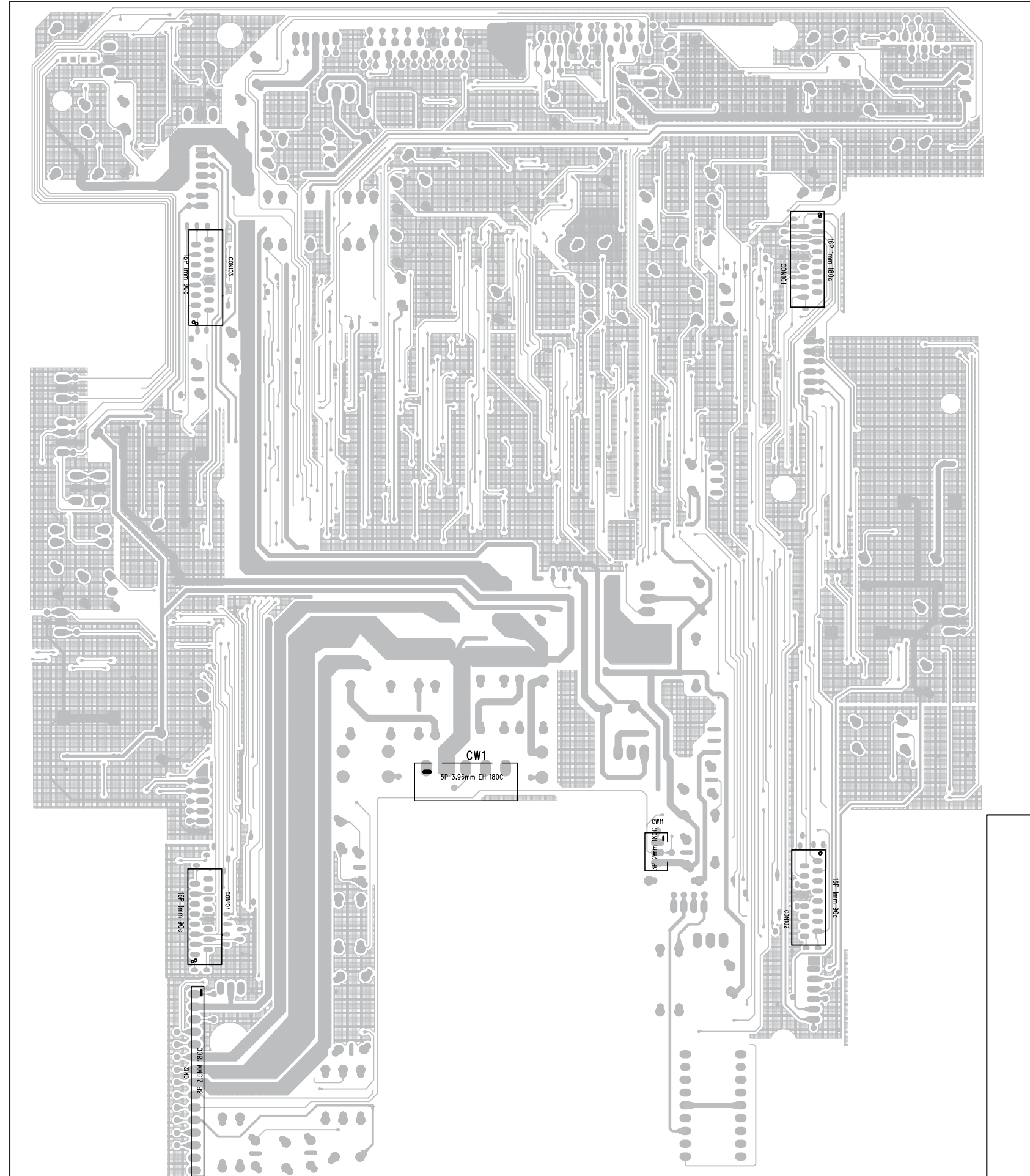
PIN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
IC NO.	COM0	COM1	COM2	COM3	COM4	COM5	COM6	COM7	SEG0	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6	SEG7	SEG8
COM0	COM0								X1	USB	WMA	CDG	PBC	Divx	TRACK	COL1	DBB
COM1		COM1							MUTE	1A	1B	2A	2B	3A	3B	4A	4B
COM2			COM2						X2	1I	1J	2I	2J	3I	3J	4I	4J
COM3				COM3					DISC	1F	1H	2F	2H	3F	3H	4F	4H
COM4					COM4				MP3	1G	1K	2G	2K	3G	3K	4G	4K
COM5						COM5				1L	1C	2L	2C	3L	3C	4L	4C
COM6							COM6		DVD	1N	1M	2N	2M	3N	3M	4N	4M
COM7								COM7	VCD	1E	1D	2E	2D	3E	3D	4E	4D

PIN	18	19	20	21	22	23	24	25	26	27	28
IC NO.	SEG9	SEG10	SEG11	SEG12	SEG13	SEG14	SEG15	SEG16	SEG17	SEG18	SEG19
COM0	TUNER	X5	DIM	PROG	AUX	MHz	kHz	A-	B	SHUF	P-SCAN
COM1	5A	5B	6A	6B	7A	7B	8A	8B	dtS	X4	CHP
COM2	5I	5J	6I	6J	7I	7J	8I	8J			REC
COM3	5F	5H	6F	6H	7F	7H	8F	8H	X7	COL2	I.S
COM4	5G	5K	6G	6K	7G	7K	8G	8K	X8	COL3	R-D-S
COM5	5L	5C	6L	6C	7L	7C	8L	8C	X3	X6	NEWS
COM6	5N	5M	6N	6M	7N	7M	8N	8M	REP	X9	
COM7	5E	5D	6E	6D	7E	7D	8E	8D	ALL		

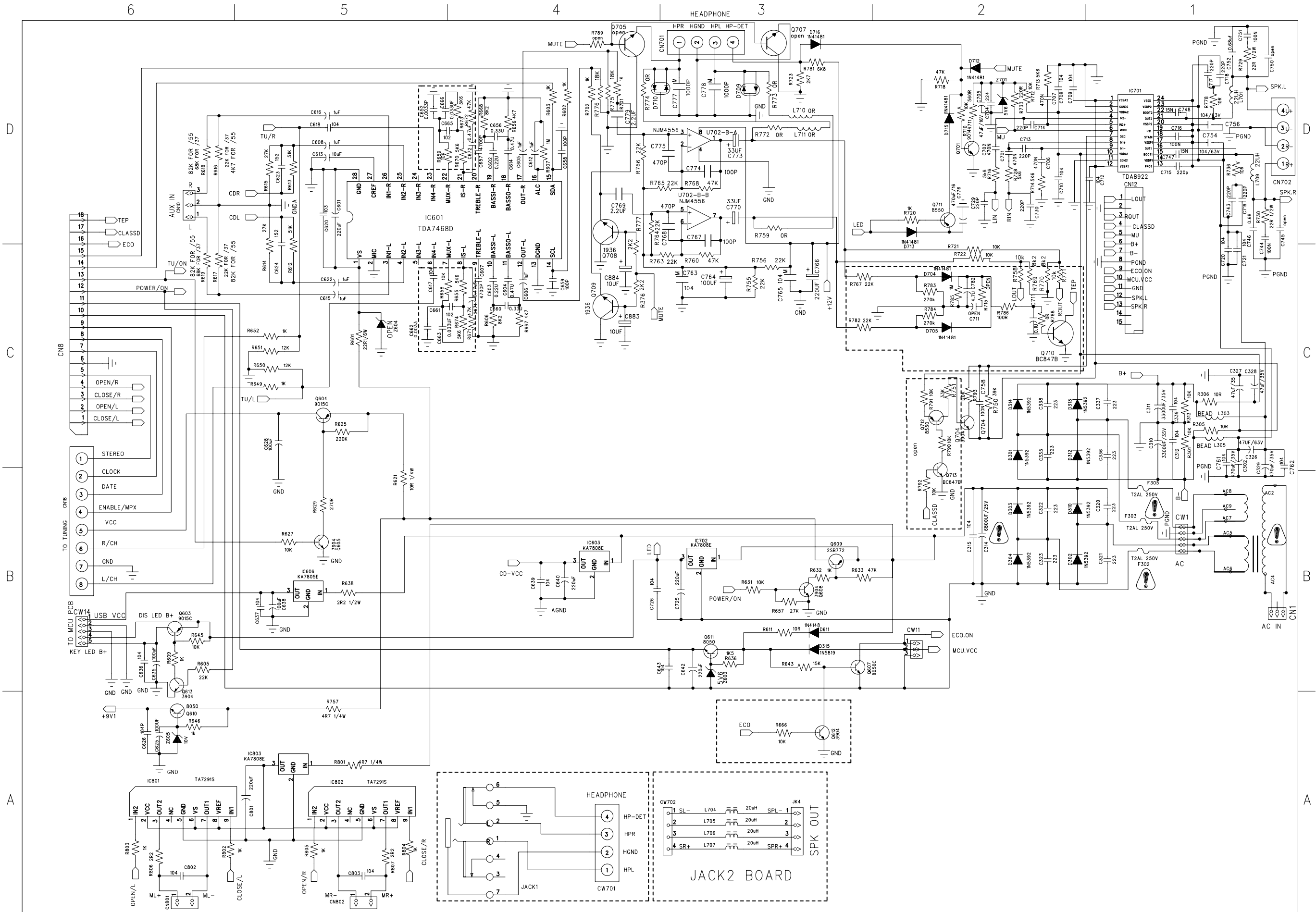
PCB LAYOUT - MAIN BOARD (TOP VIEW)



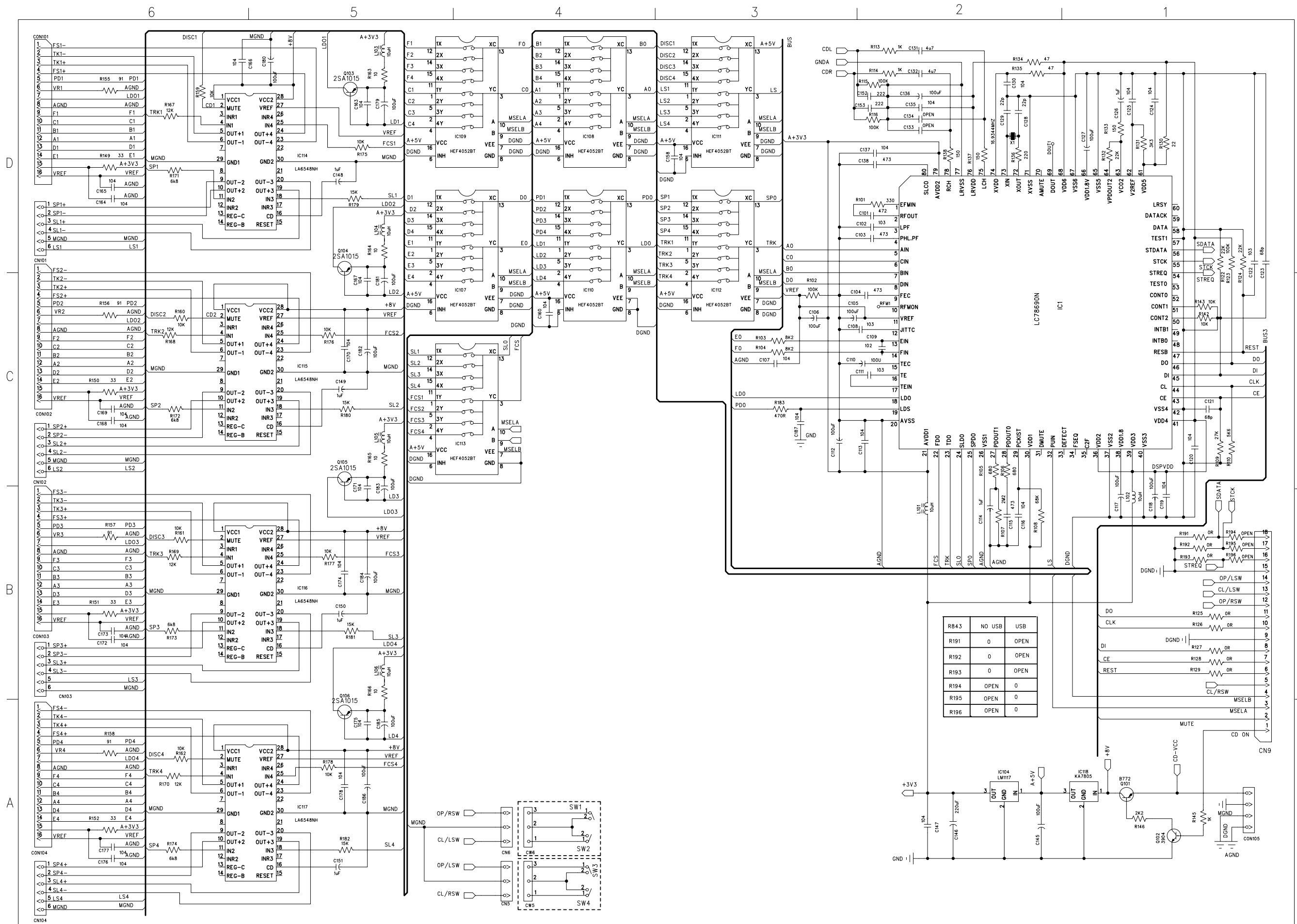
PCB LAYOUT - DISPLAY BOARD (BOTTOM VIEW)



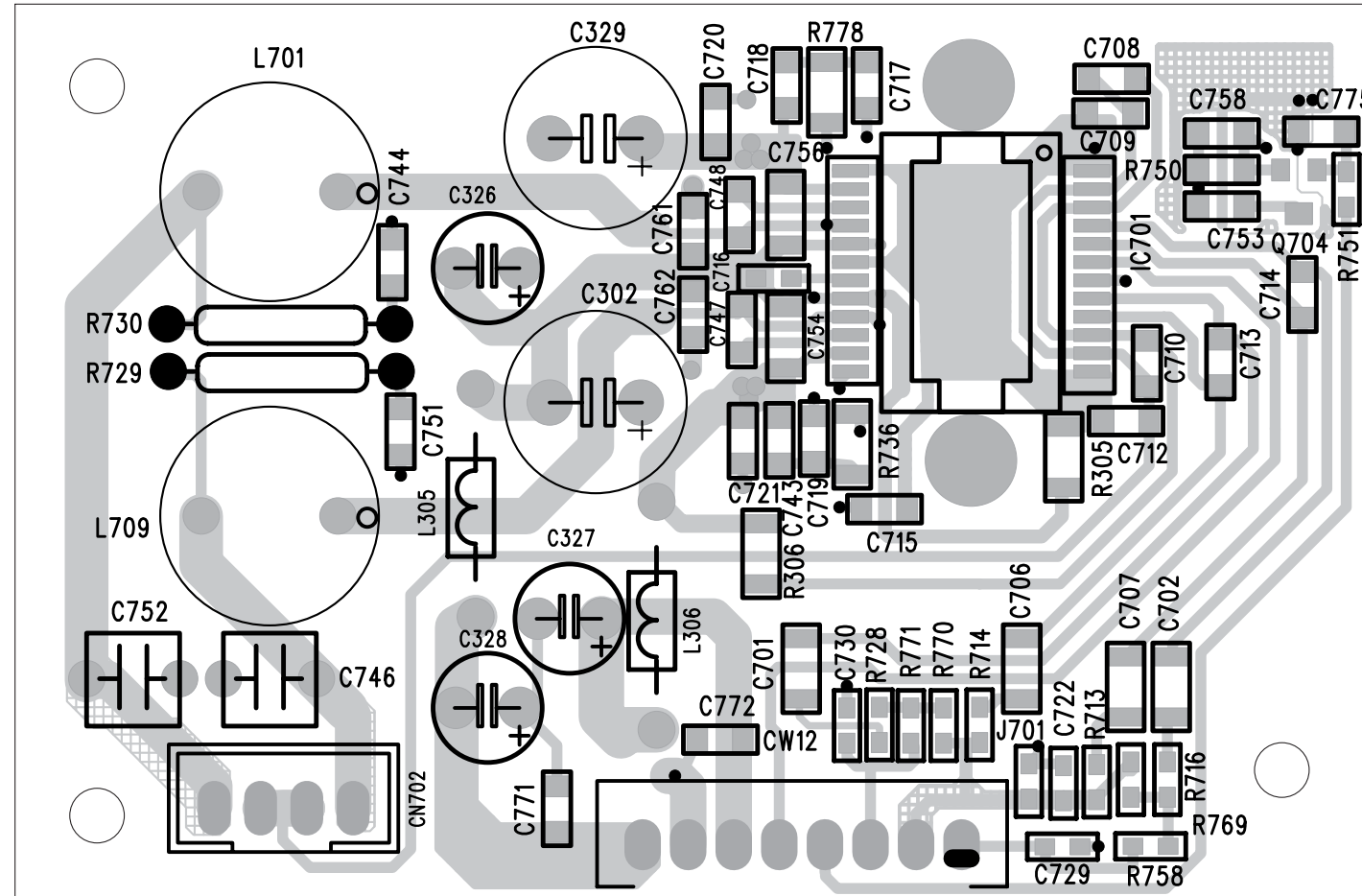
CIRCUIT DIAGRAM - MAIN BOARD AUDIO PART

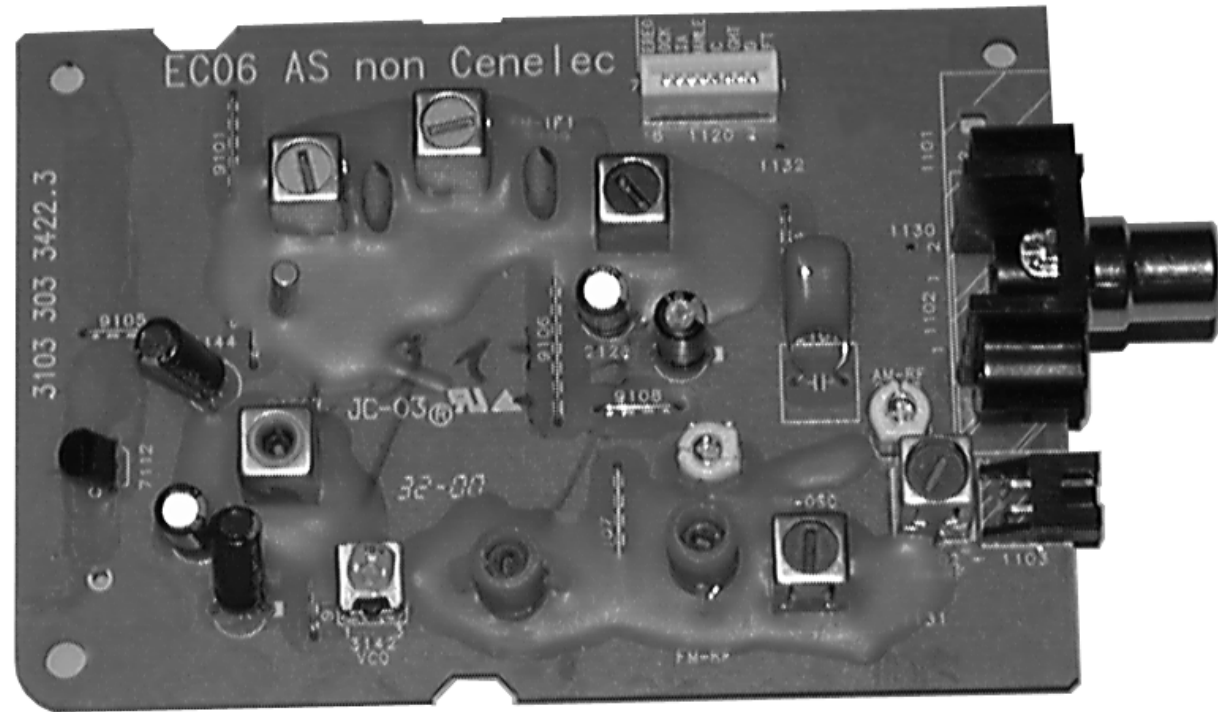


CIRCUIT DIAGRAM - MAIN BOARD CD PART

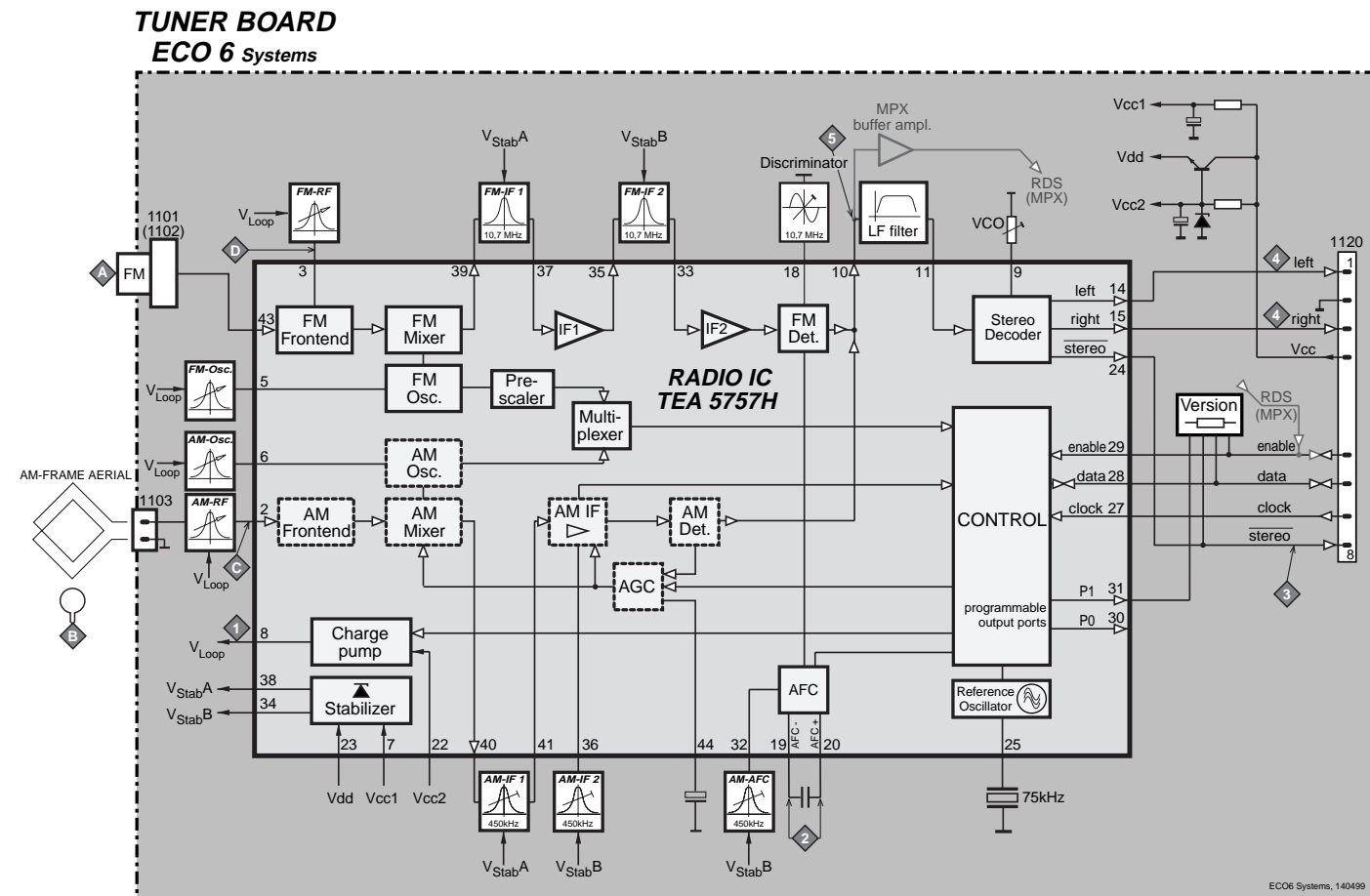


PCB LAYOUT - CLASS D POWER BOARD





BLOCK DIAGRAM



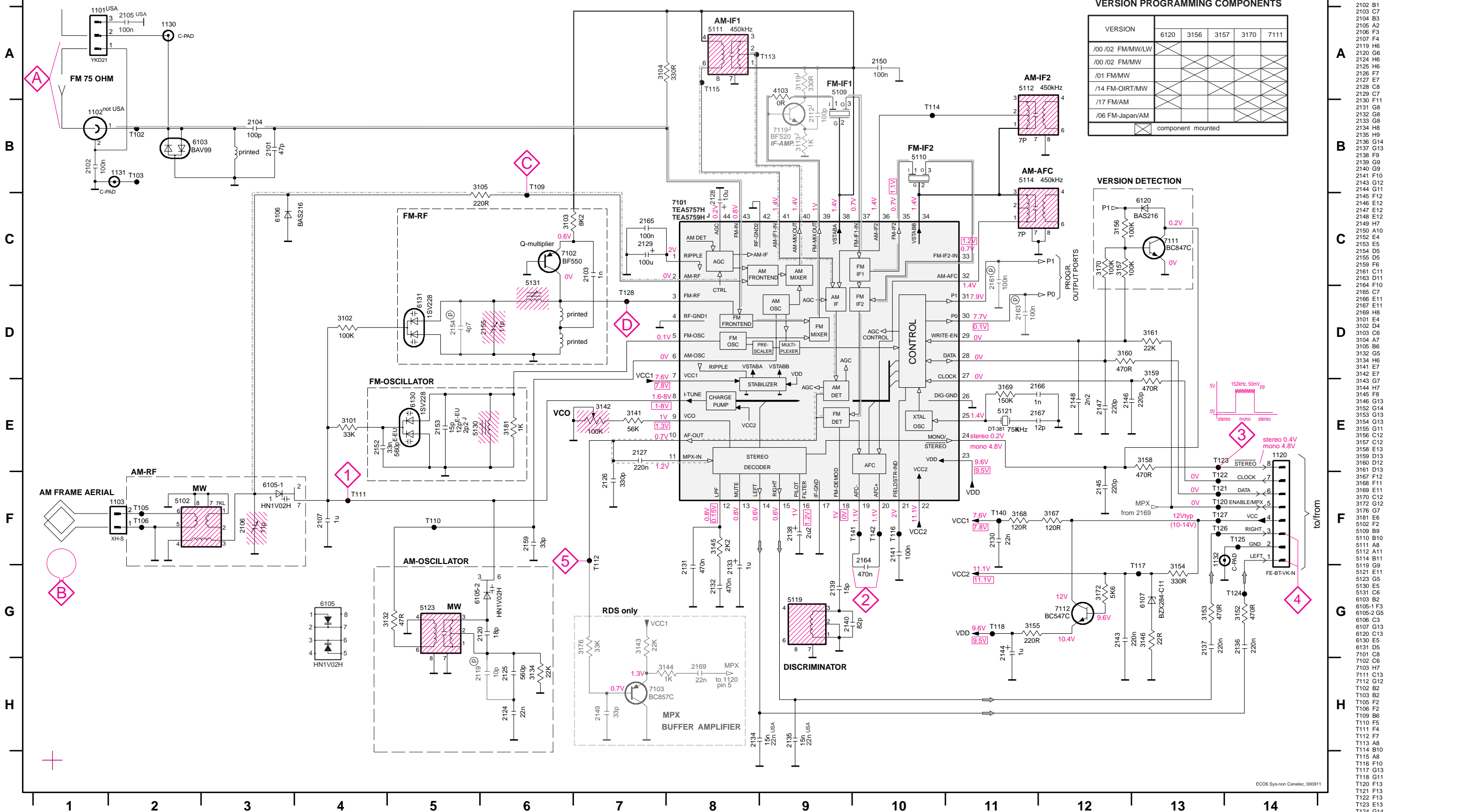
ECO6 Tuner Board

version: **SYSTEMS non-CENELEC**

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 Adjustment table7A-3
 Electrical Partslist.....7A-4

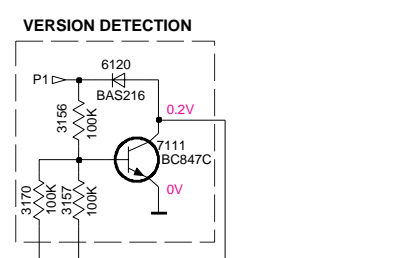
TUNER BOARD ECO6 / SYSTEMS NON CENELEC



VERSION PROGRAMMING COMPONENTS

VERSION	6120	3156	3157	3170	7111
/00 /02 FM/MW/LW					
/00 /02 FM/MW					
/01 FM/MW					
/14 FM-OIRT/MW					
/17 FM/AM					
/06 FM-Japan/AM					

component mounted



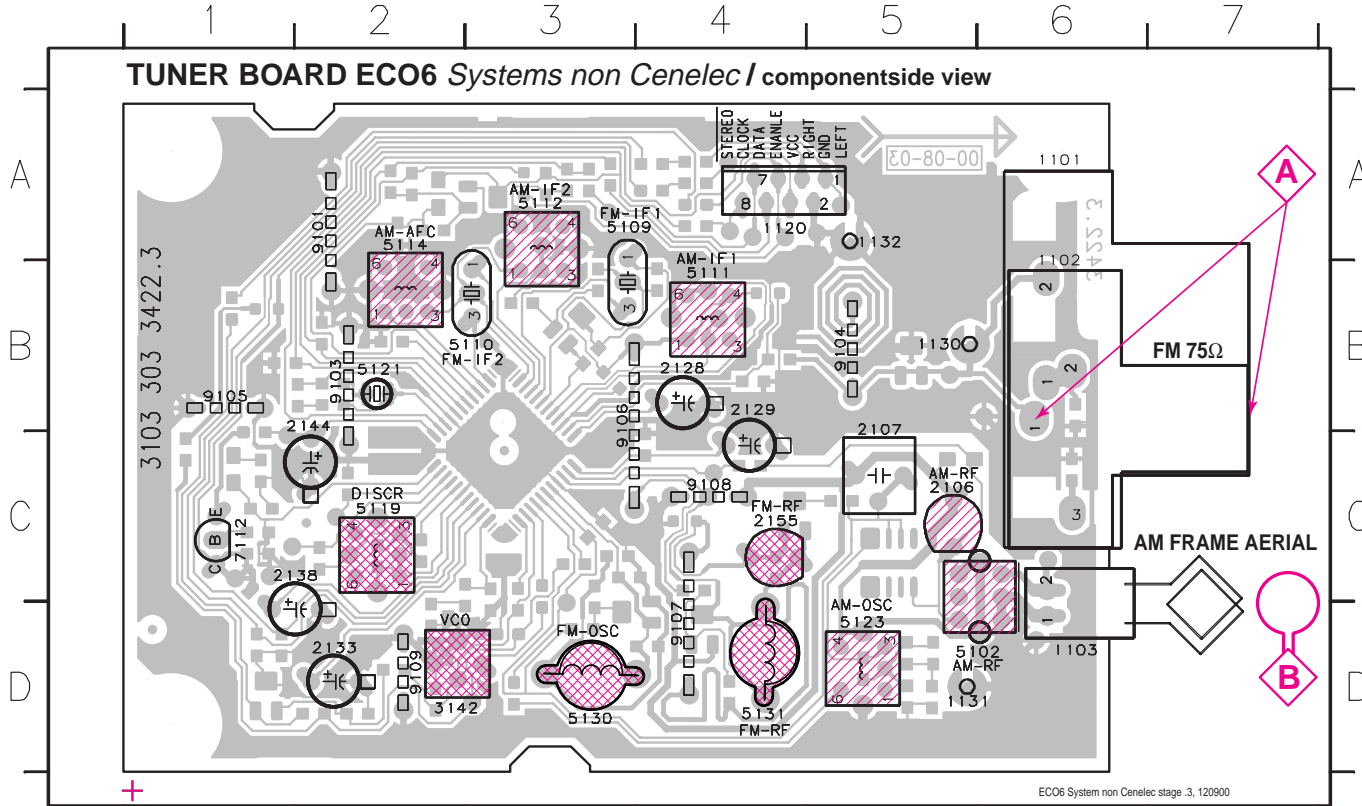
LEGEND
 (P)...for provision only
 USA ... for USA version only
 E-EU ... for East European version only
 J ... for Japanese version only

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

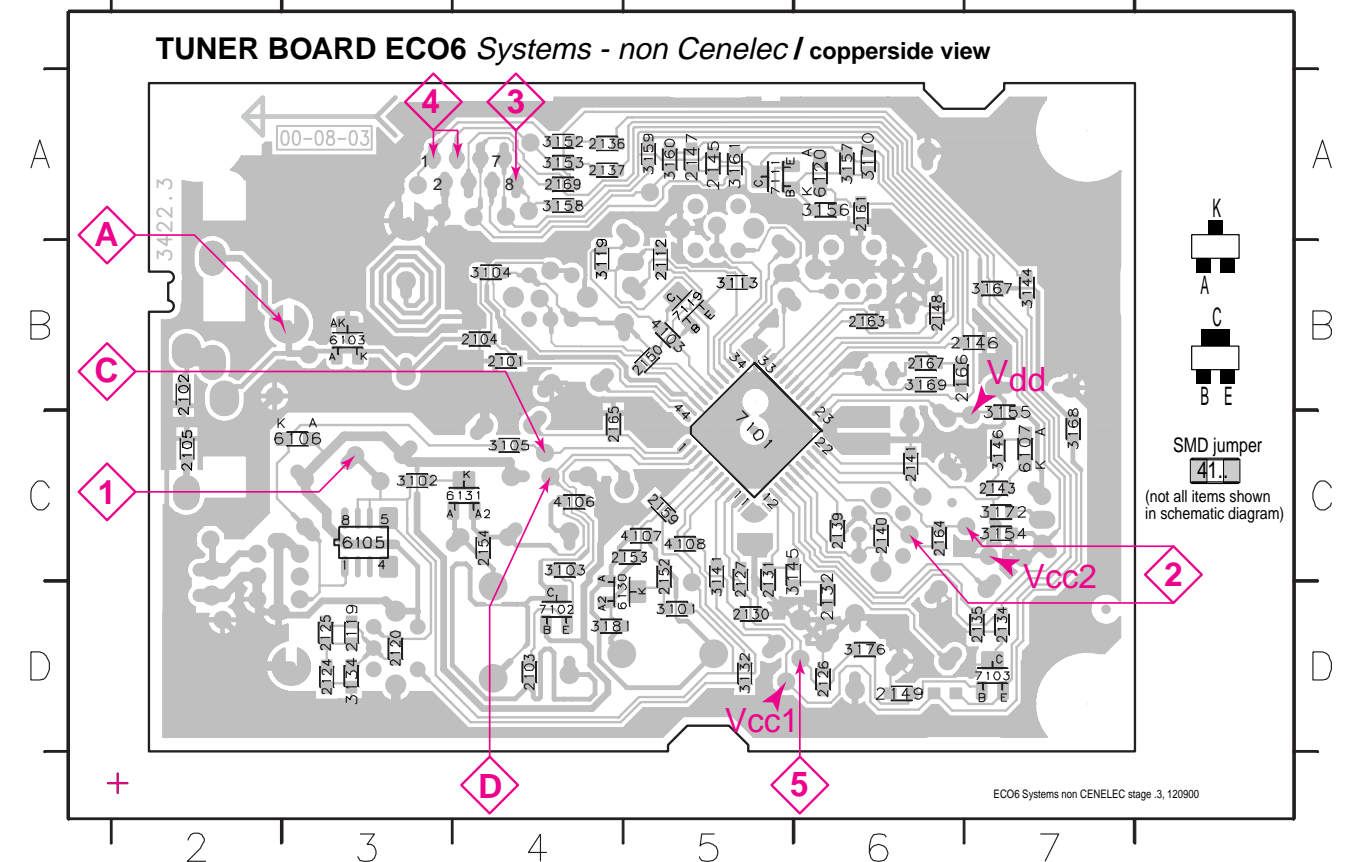
Signal path
 — FM
 - - - AM
 - - - MPX (Audio Frequency)
 ⇨ AF - left/right

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
 2143 G12
 2144 G11
 2145 F12
 2146 E12
 2147 E12
 2148 E12
 2149 H7
 2150 A10
 2152 A4
 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 E2
 6105 F3
 6105-2 G5
 6106 C3
 6107 G13
 6120 G13
 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 partlist.

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		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	1	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	108MHz	2155	4	MAX
	87.5MHz (65.81MHz)	mod=1kHz Δf=±22.5kHz	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		5111	5	
		C		5112		
AM AFC MW		C		5114	2	0 ± 2 mV DC
AM RF³⁾						
MW⁴⁾ FM/MW/LW- and FM/MW-version (9kHz grid)	1494kHz	B	1494kHz	2106	5	
	531 - 1602kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz	B	1500kHz	2106	5	
	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

MISCELLANEOUS

1101	2422 015 19376	SOCKET 2P CLICKFIT	USA only
1102	4822 267 10283	SOCKET COAX, IEC 75Ω	not USA
1103	4822 265 31184	JST CONNECTOR 2 POLE	
1120	4822 265 11515	FFC SOCKET, 8P	

CAPACITORS

2101	4822 126 13692	47pF	1%	63V	
2102	4822 126 13838	100nF	10%	50V	not USA
2103	5322 122 31647	1nF	10%	63V	
2104	5322 122 32531	100pF	5%	50V	
2105	4822 126 13838	100nF	10%	50V	USA only
2106	2020 800 00191	3-11pF TRIMCAP.,N450			
2107	4822 121 51319	1μF	20%	50V	
2120	4822 126 13689	18pF	1%	63V	
2124	5322 122 32654	22nF	10%	63V	
2125	2020 552 96199	560pF	1%	50V	
2126	5322 122 31863	330pF	5%	50V	
2127	4822 126 14076	220nF	20%	25V	
2128	4822 124 40248	10μF	20%	63V	
2129	4822 124 41584	100μF	20%	10V	
2130	5322 122 32654	22nF	10%	63V	
2131	4822 126 13482	470nF	20%	16V	
2132	4822 126 13482	470nF	20%	16V	
2133	4822 124 21913	1μF	20%	63V	
2134	4822 126 13188	15nF	5%	63V	not USA
2134	5322 122 32654	22nF	10%	63V	USA only
2135	4822 126 13188	15nF	5%	63V	not USA
2135	5322 122 32654	22nF	10%	63V	USA only
2136	4822 126 14076	220nF	20%	25V	
2137	4822 126 14076	220nF	20%	25V	
2138	4822 124 22652	2,2μF	20%	50V	
2139	4822 126 14236	15pF	5%	50V	
2140	4822 126 13695	82pF	1%	63V	
2141	4822 126 13838	100nF	10%	50V	
2143	4822 126 14076	220nF	20%	25V	
2144	4822 124 21913	1μF	20%	63V	
2145	4822 122 33575	220pF	5%	50V	
2146	4822 122 33575	220pF	5%	50V	
2147	4822 122 33575	220pF	5%	50V	
2148	4822 122 33127	2,2nF	10%	63V	
2149	5322 122 32659	33pF	5%	50V	RDS only
2150	4822 126 13838	100nF	10%	50V	
2152	4822 126 12105	33nF	5%	63V	not for East Europe
2152	5322 116 80853	560pF	5%	63V	for East Europe only
2153	4822 126 13486	15pF	2%	63V	not for East Europe
2153	4822 122 33926	12pF	2%	50V	for East Europe only
2155	2020 800 00191	3-11pF TRIMCAP.,N450			
2159	5322 122 32659	33pF	5%	50V	
2164	4822 126 13482	470nF	20%	16V	
2165	4822 126 13838	100nF	10%	50V	
2166	5322 122 31647	1nF	10%	63V	
2167	4822 122 33926	12pF	5%	50V	
2169	4822 122 33127	2,2nF	10%	63V	RDS only

RESISTORS

3101	4822 051 20333	33kΩ	5%	0,1W
3102	4822 117 10837	100kΩ	1%	0,1W
3103	4822 051 20822	8,2kΩ	5%	0,1W
3104	4822 117 13577	330Ω	1%	0,1W
3105	4822 117 11503	220Ω	5%	0,1W
3132	4822 051 20479	47Ω	5%	0,1W
3134	4822 051 20223	22kΩ	5%	0,1W
3141	4822 117 11148	56kΩ	1%	0,1W
3142	4822 100 12159	TRIMPOT. 100kΩ		

RESISTORS

3143	4822 051 20223	22kΩ	5%	0,1W	RDS only
3144	4822 051 10102	1kΩ	2%	0,25W	RDS only
3145	4822 117 11449	2,2kΩ	1%	0,1W	
3146	4822 051 20229	22Ω	5%	0,1W	
3152	4822 051 20471	470Ω	5%	0,1W	
3153	4822 051 20471	470Ω	5%	0,1W	
3154	4822 117 13577	330Ω	1%	0,1W	
3155	4822 117 11503	220Ω	5%	0,1W	
3156	4822 117 10837	100kΩ	1%	0,1W	
3157	4822 117 10837	100kΩ	1%	0,1W	
3158	4822 051 20471	470Ω	5%	0,1W	
3159	4822 051 20471	470Ω	5%	0,1W	
3160	4822 051 20471	470Ω	5%	0,1W	
3161	4822 051 20223	22kΩ	5%	0,1W	
3167	4822 051 20121	120Ω	5%	0,1W	
3168	4822 051 20121	120Ω	5%	0,1W	
3169	4822 051 20154	150kΩ	5%	0,1W	
3170	4822 117 10837	100kΩ	1%	0,1W	
3172	4822 051 20562	5,6kΩ	5%	0,1W	
3176	4822 051 20333	33kΩ	5%	0,1W	RDS only
3181	4822 051 10102	1kΩ	2%	0,25W	
4103	4822 051 20008	CHIP JUMPER 0805			
4106	4822 051 20008	CHIP JUMPER 0805			
4107	4822 051 20008	CHIP JUMPER 0805			
4108	4822 051 20008	CHIP JUMPER 0805			

COILS

5102	4822 157 71634	RF-COIL MW
5109	4822 242 70665	FM-IF FILTER 10,7MHz
5110	4822 242 70665	FM-IF FILTER 10,7MHz
5111	2422 549 44023	AM-IF FILTER 450kHz
5112	4822 157 70302	AM-IF FILTER 450kHz
5114	4822 157 70302	AM-IF FILTER 450kHz
5119	4822 157 11443	DISCRIMINATOR COIL
5121	4822 242 10261	QUARTZ 75kHz
5123	2422 549 44108	RF-COIL, AM-OSCILLATOR
5130	4822 157 11843	RF COIL 1,5 TURNS
5131	4822 157 11843	RF COIL 1,5 TURNS

DIODES

6103	5322 130 34337	BAV99
6105	4822 130 83075	HN1V02H
6106	4822 130 83757	BAS216
6107	9340 386 90115	BZX284-C11
6120	4822 130 83757	BAS216
6130	4822 130 82833	1SV228
6131	4822 130 82833	1SV228

TRANSISTORS

7102	4822 130 42131	BF550
7103	5322 130 42756	BC857C
7111	5322 130 42755	BC847C
7112	4822 130 44503	BC547C

INTEGRATED CIRCUITS

7101	9351 740 80557	TEA5757H/V1, RADIO IC
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BRIEF INTRODUCTION OF THE MAINS BOARD

ECO Power

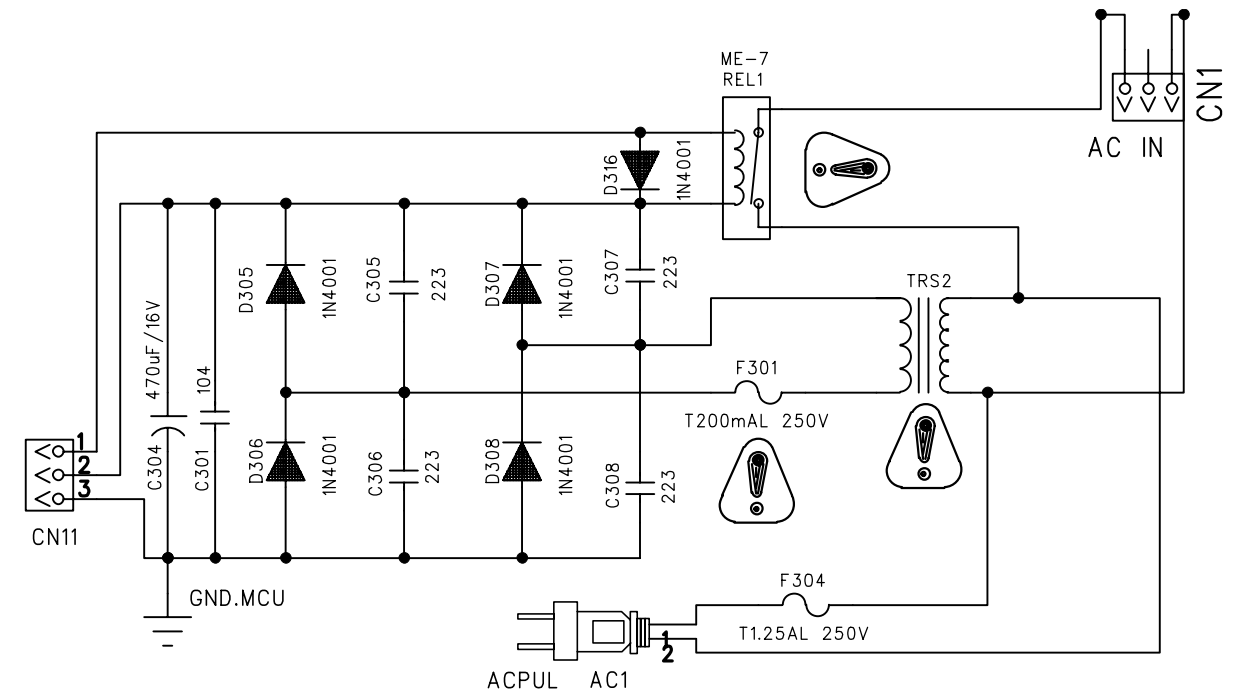
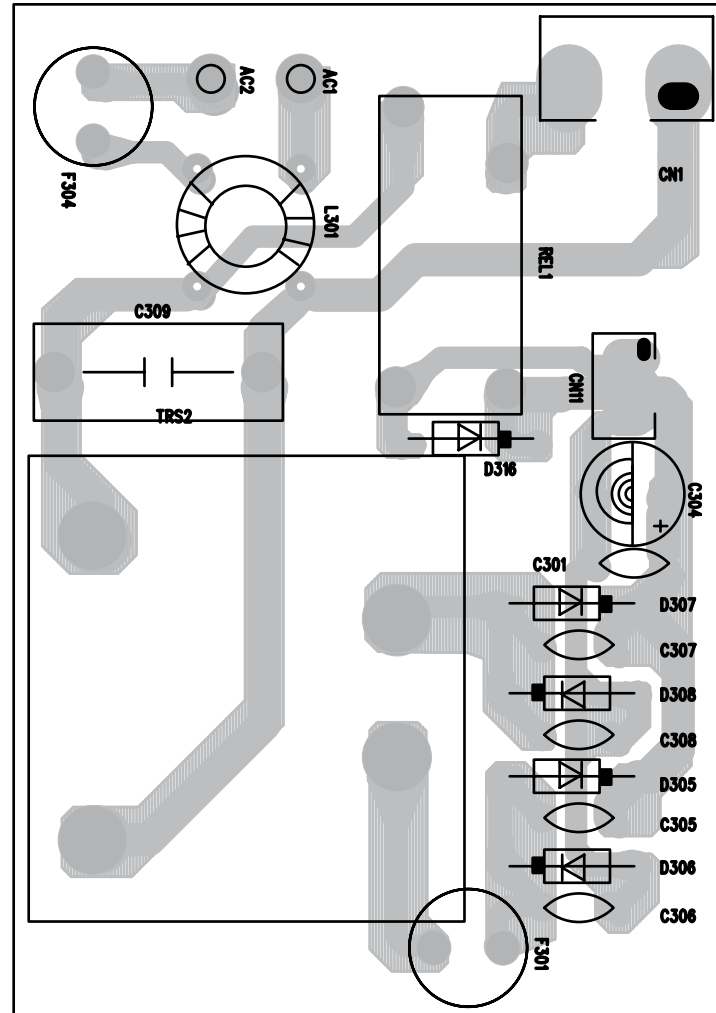
Standby Transformer TRS2 provides the LPS supply to control the relay REL1, cutting of the Mains supply to the Mains transformer during the ECO Power (standby) mode.

POWER BOARD

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PCB LAYOUT - ECO POWER BOARD

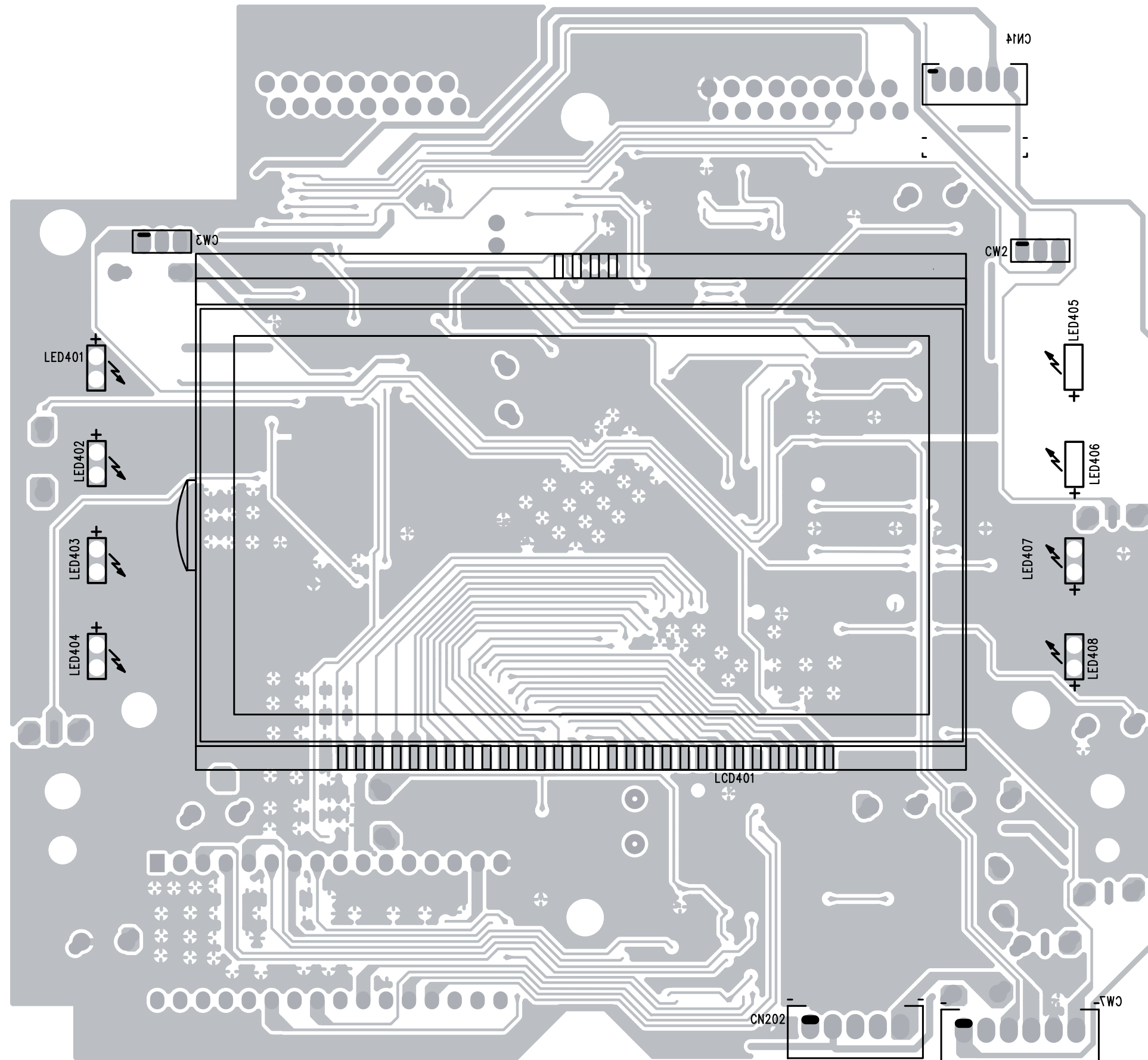


DISPLAY BOARD

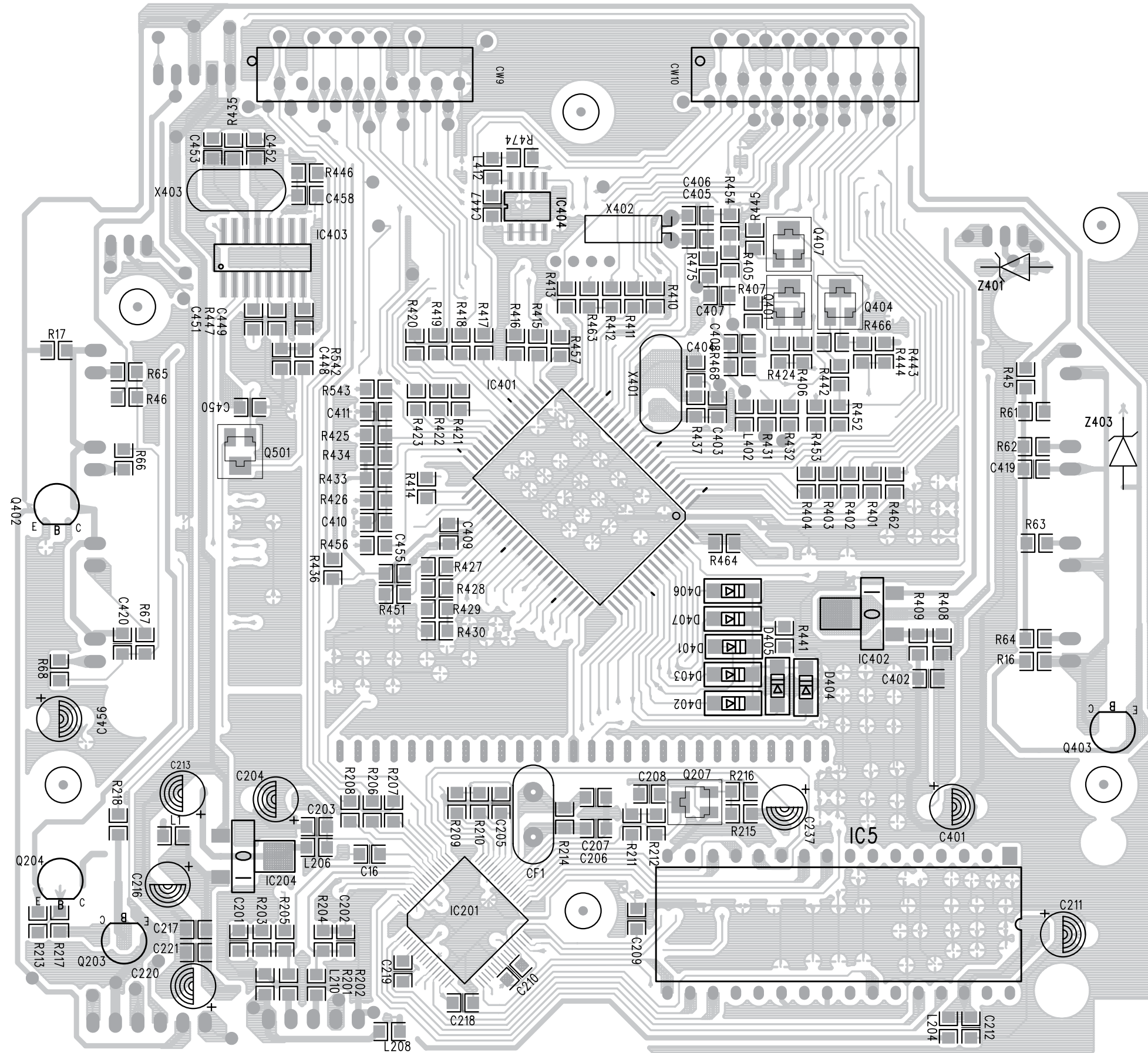
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Display PCB - Layout Top View	9-2
Display PCB - Layout Bottom View	9-3
Display PCB - Circuit Diagram	9-4

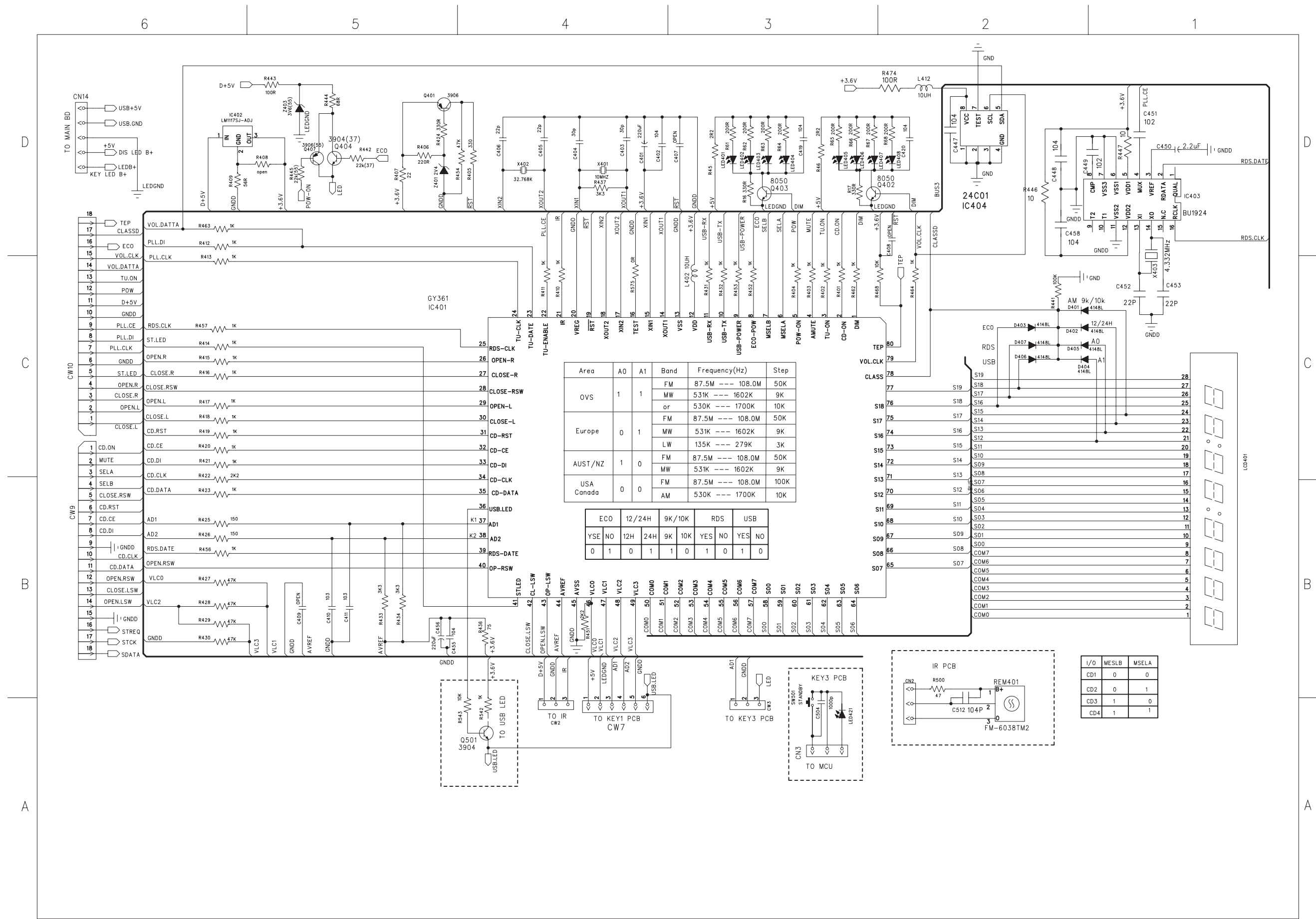
PCB LAYOUT - DISPLAY BOARD (TOP VIEW)



PCB LAYOUT - DISPLAY BOARD (BOTTOM VIEW)



CIRCUIT DIAGRAM - DISPLAY BOARD



Area	A0	A1	Band	Frequency(Hz)	Step
OVS	1	1	FM	87.5M --- 108.0M	50K
			MW	531K --- 1602K	9K
			or	530K --- 1700K	10K
Europe	0	1	FM	87.5M --- 108.0M	50K
			MW	531K --- 1602K	9K
			LW	135K --- 279K	3K
AUST/NZ	1	0	FM	87.5M --- 108.0M	50K
			MW	531K --- 1602K	9K
			AM	530K --- 1700K	10K
USA Canada	0	0	FM	87.5M --- 108.0M	100K
			MW	531K --- 1602K	9K
			AM	530K --- 1700K	10K

ECO	12/24H	9K/10K	RDS	USB					
YSE	NO	12H	24H	9K	10K	YES	NO	YES	NO
0	1	0	1	1	0	1	0	1	0

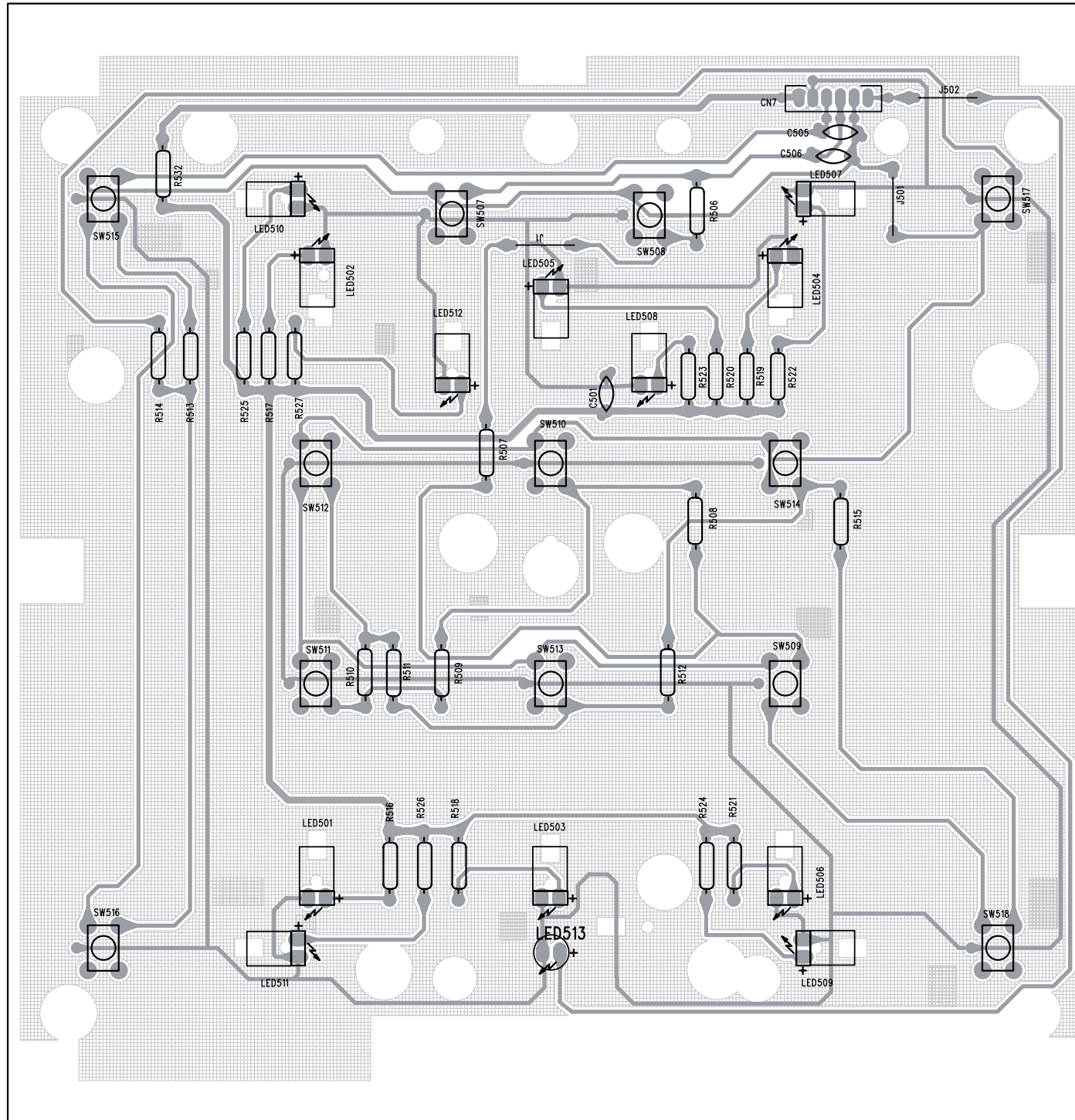
I/O	MESLB	MSELA
CD1	0	0
CD2	0	1
CD3	1	0
CD4	1	1

KEY BOARD

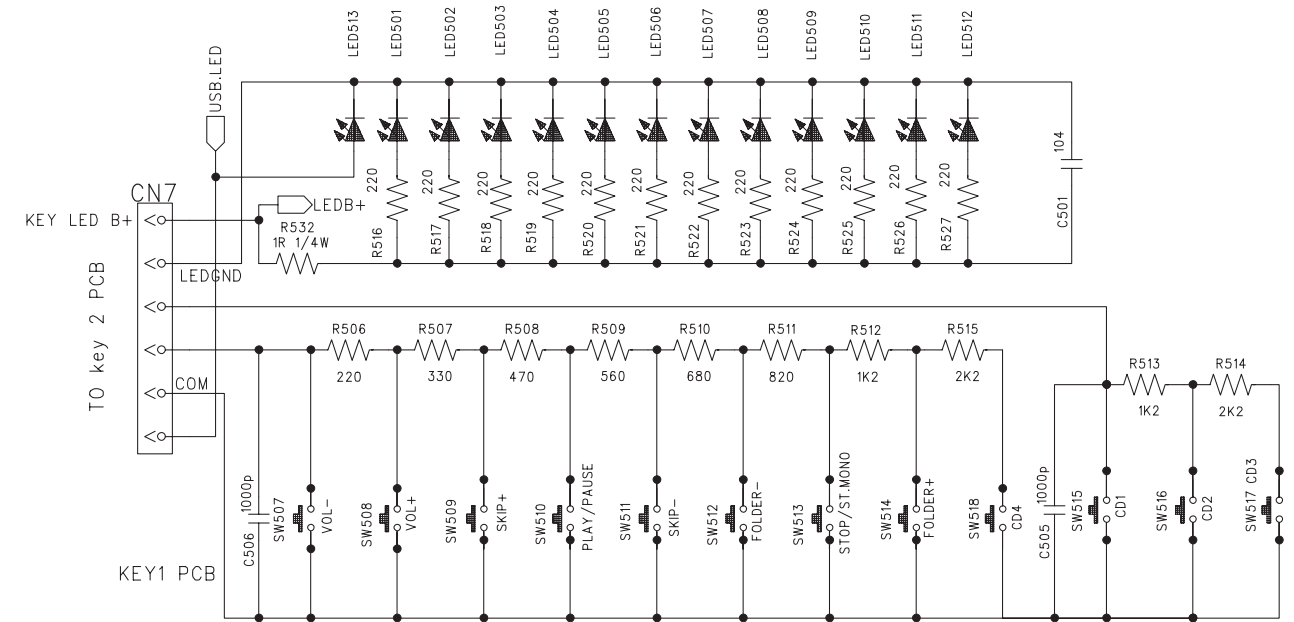
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KEY1 PCB - Circuit Diagram Part 10-2
KEY2 PCB - Layout Top View 10-3
KEY2 PCB - Circuit Diagram Part 10-3

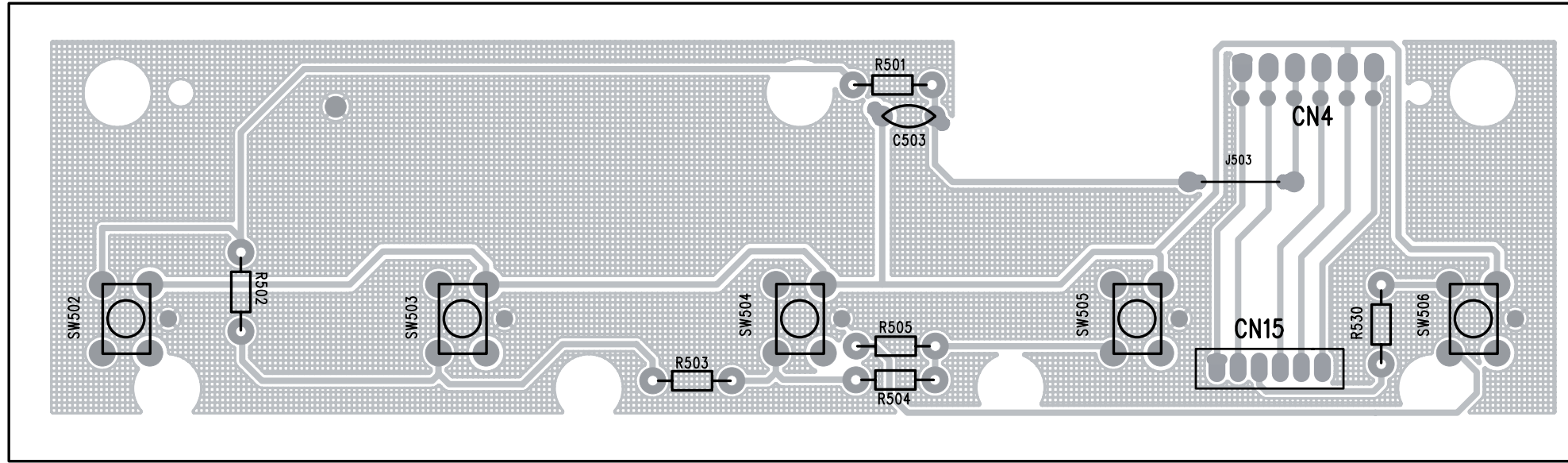
PCB LAYOUT - KEY1 BOARD (TOP VIEW)



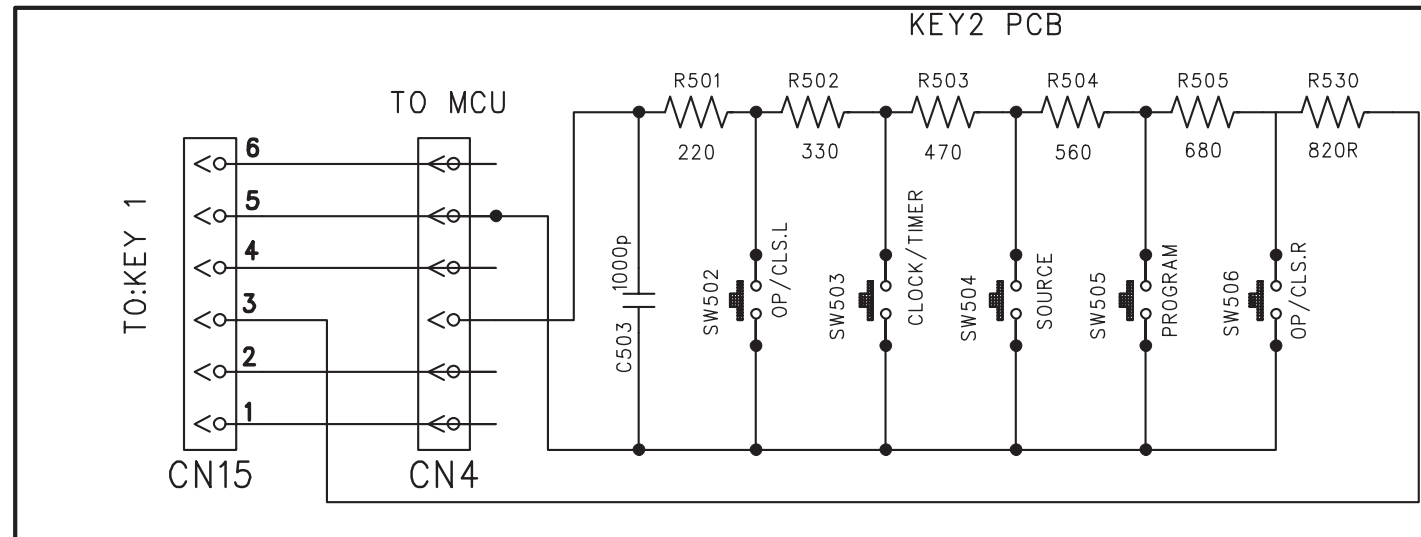
CIRCUIT DIAGRAM - KEY1 BOARD



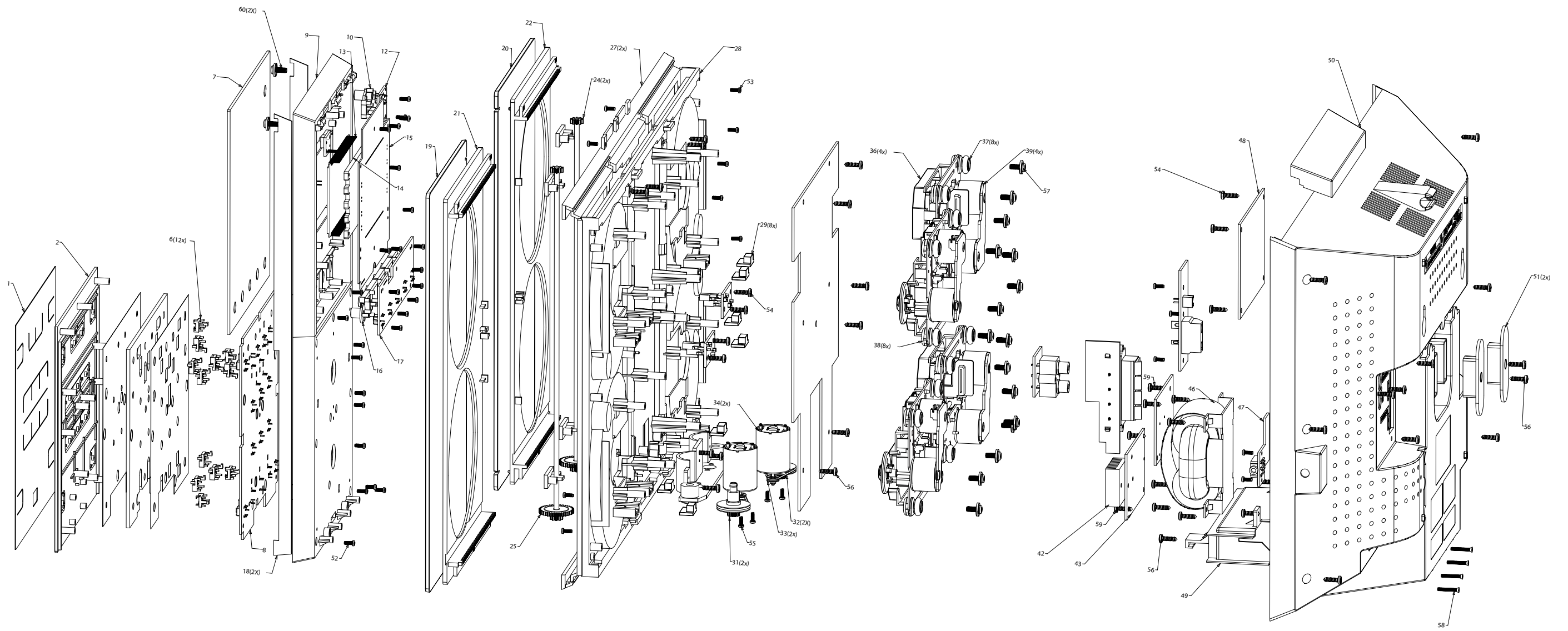
PCB LAYOUT - KEY2 BOARD



CIRCUIT DIAGRAM - KEY2 BOARD



SET MECHANICAL EXPLODED VIEW



MECHANICAL & ACCESSORIES PARTS LIST

01	9965 000 40394	PLATE SHEET
02	9965 000 40380	CONTROL PANEL
07	9965 000 40391	FRONT LENS
09	9965 000 40378	FRONT PANEL
10	9965 000 40388	STANDBY KEY
16	9965 000 40389	SOURCE KEY
19	9965 000 40393	CD DOOR LENS-R
20	9965 000 40392	CD DOOR LENS -L
21	9965 000 40384	CD DOOR RIGHT
22	9965 000 40383	CD DOOR LEFT
24	9965 000 40386	ROLLER TOP GEAR
25	9965 000 40385	ROLLER BOTTOM GEAR
28	9965 000 40379	MIDDLE PANEL
29	9965 000 40397	CD DAMPER (BLACK)
31	9965 000 40387	DRIVER PULLEY
32	9965 000 40395	BELT 29.5X1.3X1.3MM
33	9940 000 02818	DOOR MOTOR PULLY
34	9940 000 02815	DC MOTOR 5V
37	9940 000 01944	DAMPER-RUBBER (30C)
38	9965 000 40396	DAMPER-RUBBER (50C)
39	9940 000 05398	CD MECHANISM DA11B3VF
50	9965 000 40381	REAR PANEL

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

ELECTRICAL PARTS LIST - MISCELLANEOUS

46	△ 9965 000 40404	TRANSFORMER 120V R25
F301	△ 9940 000 01229	FUSE RADIAL T200MA/250V
F302	△ 9940 000 01222	FUSE RADIAL LT 2A 250V
F303	△ 9940 000 01222	FUSE RADIAL LT 2A 250V
F304	△ 9940 000 01231	FUSE RADIAL T1.25A 250V
F305	△ 9940 000 01222	FUSE RADIAL LT 2A 250V
REL1	9965 000 39818	RELAY ME-7-006-HSL 6V 10A
TRS2	9965 000 39817	TRASFO EI28 Z11 120V/60HZ
	9940 000 01362	8P FFC1.25MM L=160MM
	9965 000 40399	MAIN BOARD ASS'Y /37
	9965 000 40400	TUNING BOARD ASS'Y
	9965 000 40401	ECO-POWER BOARD ASS'Y
	9965 000 40402	DISPLAY BOARD ASS'Y /37
	9965 000 40403	KEY BOARD ASS'Y
	9965 000 40405	16P FFC 1MM L=60MM
	9965 000 40406	15P FFC 1.25MM L=130MM
	9965 000 40407	18P FFC 1.25MM L=130MM

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