

Service  
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**Service**



# Service Manual

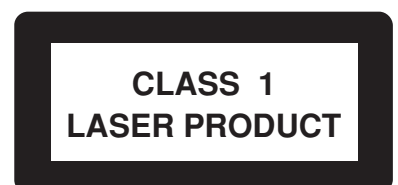
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3141 785 30331

**Version 1.1**



# PHILIPS



## SPECIFICATIONS

### GENERAL:

Mains voltage : 120/240V  $\pm$  15% Switchable for /15/21/21M  
 120V  $\pm$  10% for /37  
 230V  $\pm$  10% for /22/25  
 240V  $\pm$  10% for /30

Mains frequency : 50/60Hz  
 Clock accuracy : < 4 seconds per day  
 Dimension centre unit : 250 x 245 x 96 (mm)

Power consumption  
 Active : 15W for /15/21/21M/22/25/37/30  
 Standby : < 6W (DEMO mode off)  
 ECO Power Standby : < 1W for /22/25

### TUNER:

#### FM

Tuning range : 87.5-108MHz  
 Grid : 50kHz  
 100kHz for /15/21/37  
 IF frequency : 10.7MHz  $\pm$  20kHz  
 Aerial input : 75  $\Omega$  coaxial  
 300  $\Omega$  for /37

Sensitivity at 26dB S/N : < 22dBf  
 Selectivity at 300kHz bandwidth : > 33dB  
 Image rejection : > 20dB [> 25dB]  
 Distortion at RF=1mV, dev. 75kHz : < 3%  
 -3dB Limiting point : < 23.5dB  
 Crosstalk at RF=1mV, dev. 40kHz : > 26dB

#### MW

Tuning range : 531-1602kHz  
 530-1700kHz for /15/21/37  
 Grid : 9kHz  
 10kHz for /15/21/37  
 IF frequency : 450kHz  $\pm$  1kHz  
 Aerial input : Frame aerial 18.1 $\mu$ H  
 Sensitivity at 26dB S/N : < 4.0mV/M  
 [> 3.25mV/M]  
 Selectivity at 300kHz bandwidth : > 20dB  
 IF rejection : > 24dB  
 Image rejection : > 20dB [> 28 dB]  
 Distortion at RF=50mV, M=80% : < 5%

### AMPLIFIER:

Output power  
 L & R : 2 x 5W (4 $\Omega$ , 1kHz, 10% THD)  
 Frequency response within -3dB : 125Hz-16kHz  
 Digital Sound Control (DSC) : Jazz / Rock / Pop / Classic  
 Dynamic Bass Boost (DBB) : ON / OFF

Input sensitivity  
 Aux in (at 1kHz) : 500mV at 600  $\Omega$   
 Output sensitivity  
 Headphone output at 32 k $\Omega$  : 15mW  $\pm$  2dB (Max. vol.)

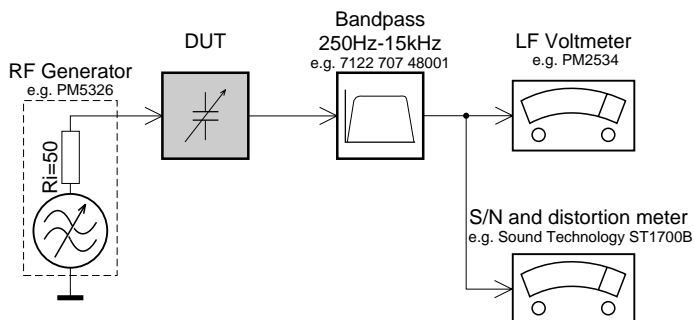
### COMPACT DISC:

Frequency response within  $\pm$  3dB : 125Hz - 16kHz  
 Output level (in Vrms) : 500mV,  $Z_{out} = 100\Omega$   
 Signal/Noise ratio (A-weighted): > 58dBA  
 Distortion at 1kHz : < 0.02%  
 Channel unbalance at 1kHz : <  $\pm$ 3dB  
 Channel separation at 1kHz : > 30dB  
 Emphasis : 15/50  $\mu$ S (switched  
 automatically by CD10)  
 THD Noise(1kHz) : < 1.0%  
 Outband Attenuation : > 35dB  
 MP3-CD Bit Rate : 8-320 kbps  
 WMA-CD Bit Rate : 64-192 kbps  
 Sampling Rate : 8, 11.025, 12, 16, 22.05,  
 24, 32, 44.1, 48, 96 kHz  
 Format : ISO9660, Joliet

[...] Values indicated are for /22/25 only.

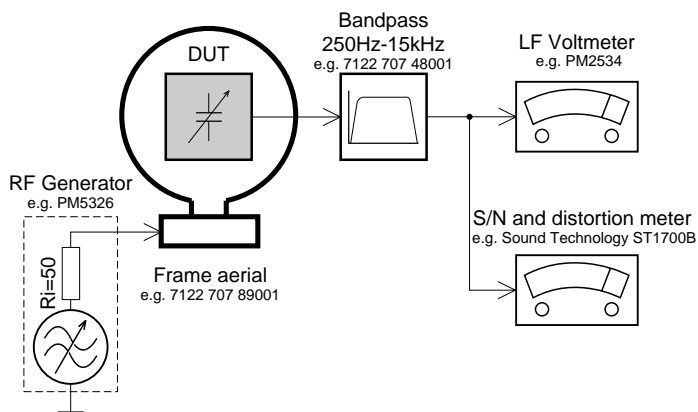
## MEASUREMENT SETUP

### Tuner FM



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

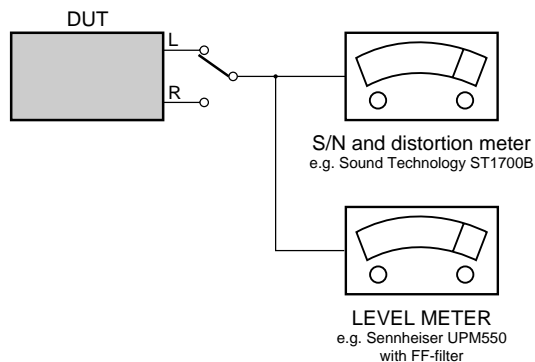
### Tuner AM (MW,LW)



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

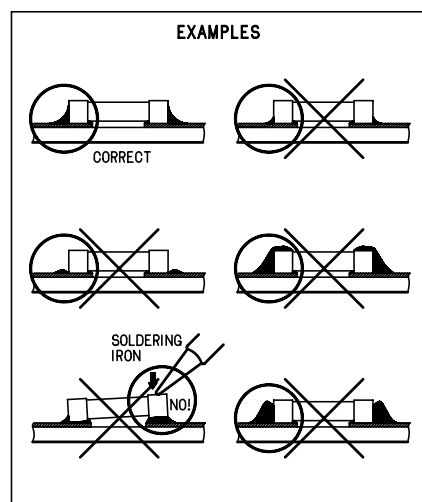
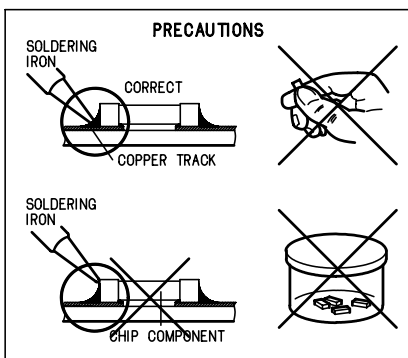
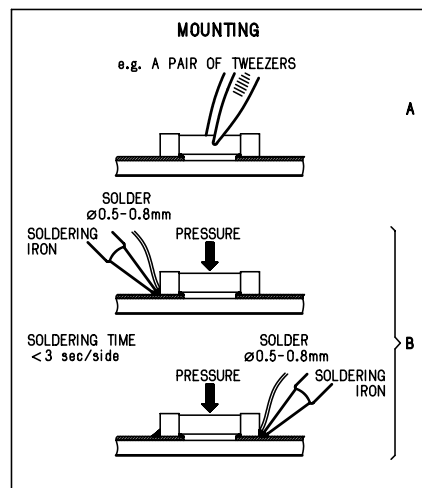
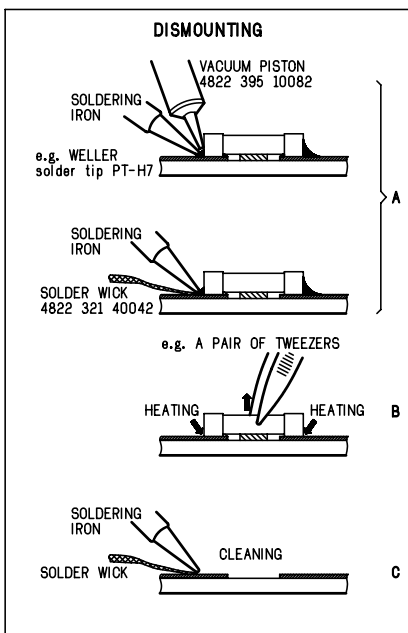
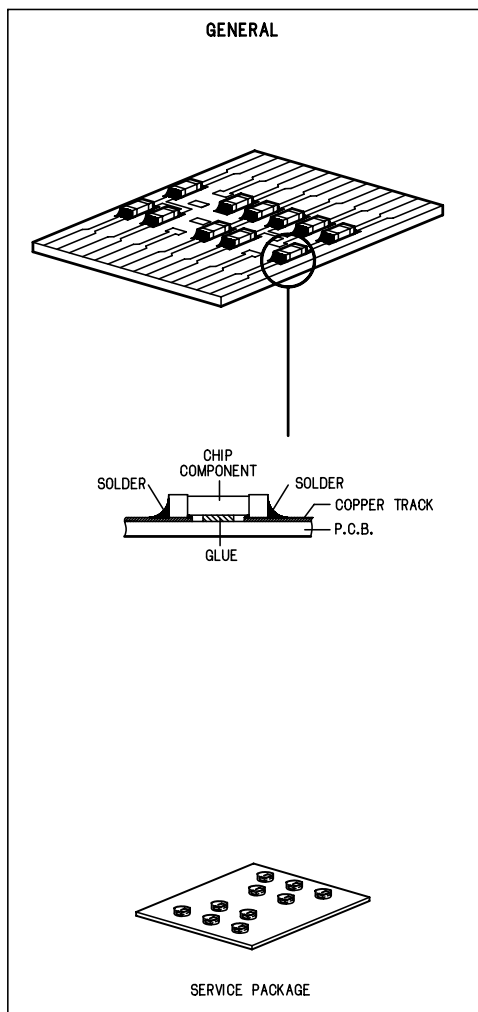
### Compact Disc:

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 (1M $\Omega$ ) .....	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 Advare !**

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

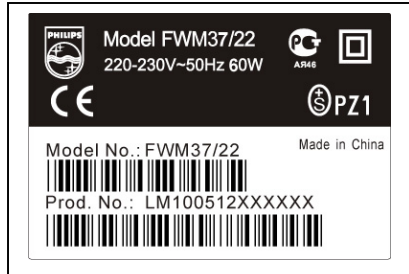
Philips CE is producing lead-free sets from 1.1.2005 onwards.

### 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 (lead-ed/ 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 lead-ed solder alloy / parts is possible but PHILIPS recommends strongly to avoid mixed solder alloy types (lead-ed 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 lead-ed solder-alloy and components, all needed spare-parts will be available till the end of the service-period. For repair of such sets nothing changes.
- On our website [www.atyourservice.ce.Philips.com](http://www.atyourservice.ce.Philips.com) you find more information to:
  - \* BGA-de-/soldering (+ baking instructions)
  - \* Heating-profiles of BGAs and other ICs used in Philips-sets

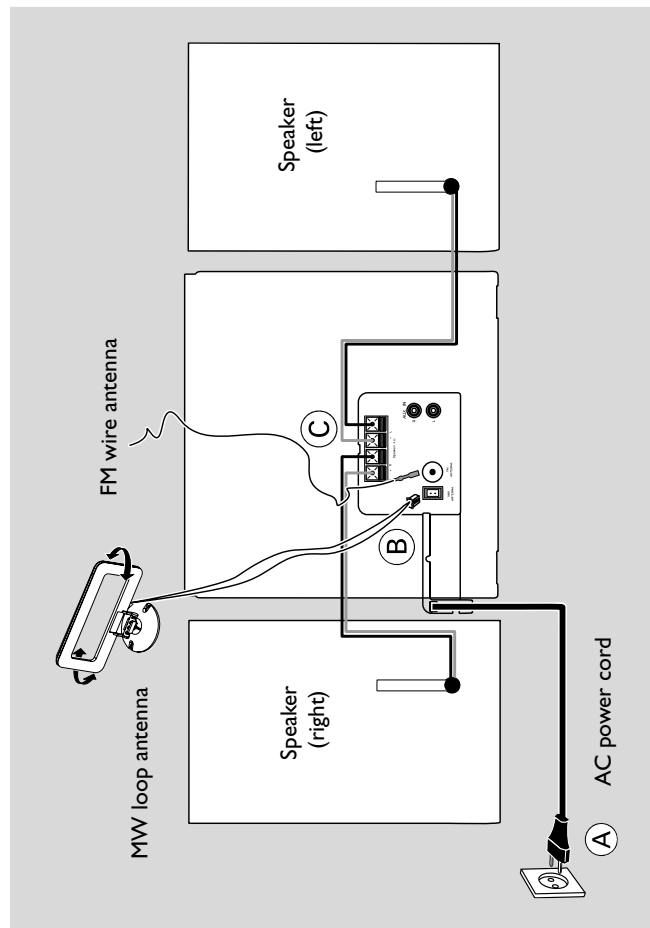
You will find this and more technical information within the "magazine", chapter "workshop news".

For additional questions please contact your local repair-helpdesk.

## 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.**  
**For users in the U.K.: please follow the instructions.**

### (A) Power

Before connecting the AC power cord to the wall outlet, ensure that all other connections have been made.

### Warning!

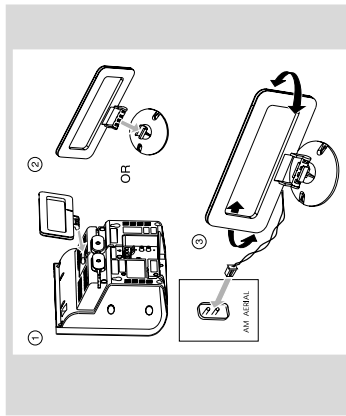
- For optimal performance, use only the original power cable.
- Never make or change any connections with the power switched on.

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

### MW Antenna



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

### 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 "-".



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 other equipment to your system

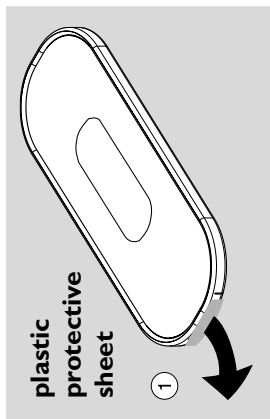
Connect the audio left and right OUT terminals of a TV, VCR, Laser Disc player, DVD player or CD Recorder to the AUX terminals.

### 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).

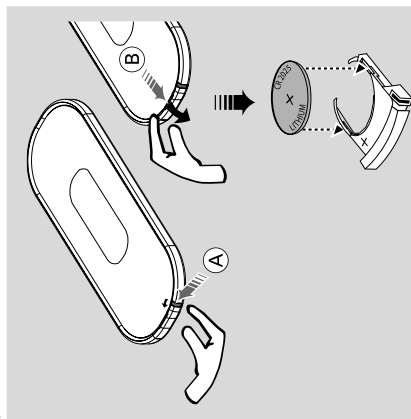
### Before using the remote control

- 1 Pull out the plastic protective sheet.
- 2 Select the source you wish to control by pressing one of the source select keys on the remote control (for example CD, TUNER).
- 3 Then select the desired function (for example ►, ◀, ◂, ▸).



### Replacing battery (lithium CR2025) into the remote control

- 1 Pull out the knob (A) slightly to the left.
- 2 Pull out the battery compartment (B).
- 3 Replace a new battery and fully insert the battery compartment back to the original position.



### CAUTION!



Batteries contain chemical substances, so they should be disposed of properly.



# PREPARATIONS AND CONTROLS

## Controls

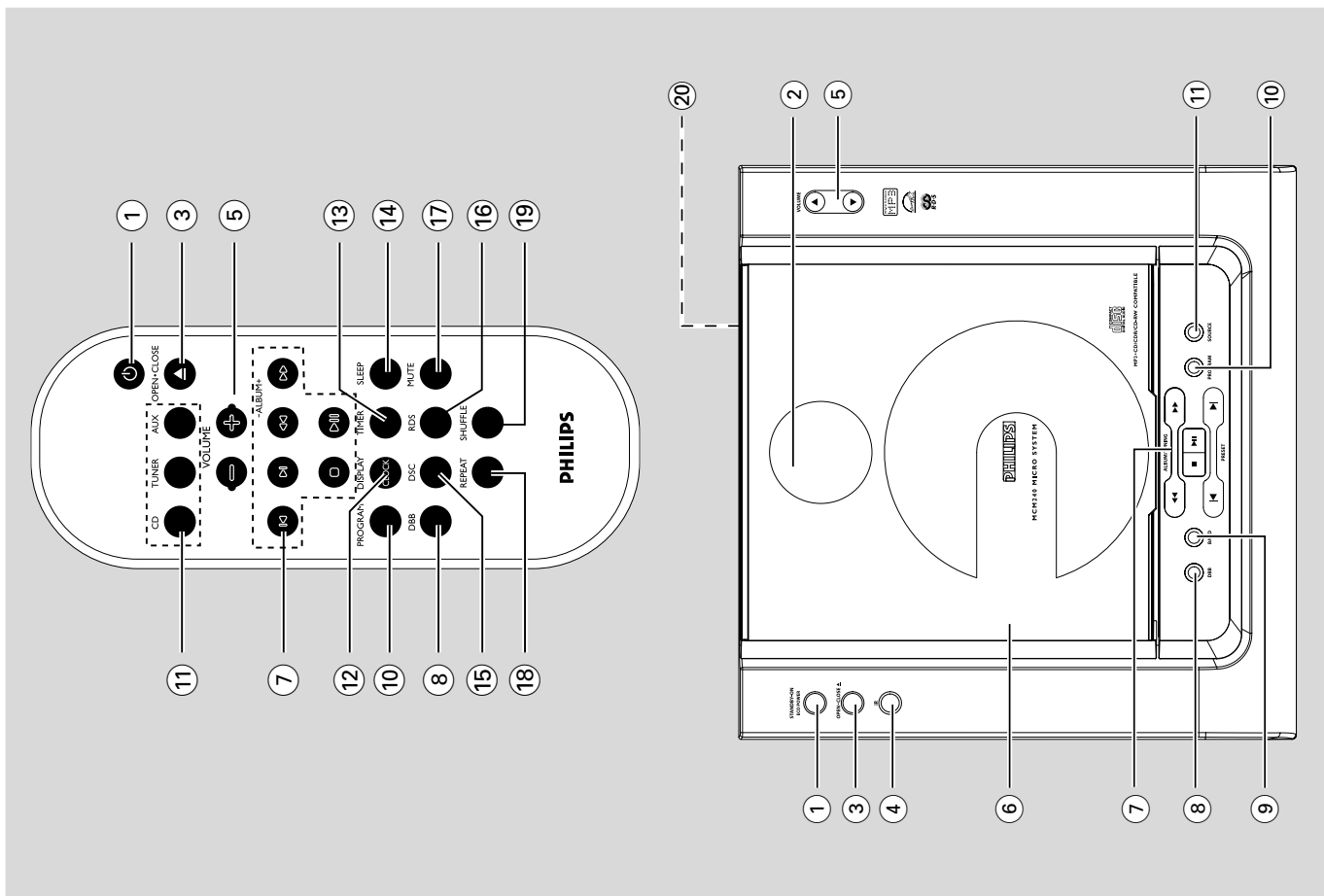
### Controls on the system and remote control

- ① **STANDBY-ON/ ECO POWER (⏻)**  
switches the system on or to Eco Power standby/normal standby with clock display.
- ② **Display screen**  
shows the status of the system.
- ③ **OPEN • CLOSE**   
opens/closes the CD door.
- ④ **IR**  
remote sensor
- ⑤ **VOLUME (▲ / ▼) (+ / -)**  
adjusts the volume level.
- ⑥ **CD Door**  
adjusts the hours and minutes for the clock/timer function.
- ⑦ **Mode Selection**  
**ALBUM/TUNE/ALBUM - / + (◀ / ▶)**  
for TUNER ..... tunes to a station  
for CD/MP3-CD fast searches back and forward within a track/disc (press and hold).
- ⑧ **DBB (Dynamic Bass Boost)**  
enhances the bass.
- ⑨ **BAND**  
selects a waveband.
- ⑩ **PROGRAM**  
for CD/MP3-CD programmes tracks and reviews the programme.  
for TUNER ..... programmes tuner stations.
- ⑪ **SOURCE**  
selects the respective sound source for CD/ TUNER/ AUX.
- ⑫ **DISPLAY/CLOCK**  
sets the clock function.  
displays disc information during playback.
- ⑬ **TIMER**  
activates/ deactivates or sets the timer function.
- ⑭ **SLEEP**  
activates/deactivates or selects the sleeper time.
- ⑮ **DSC (Digital Sound Control)**  
selects sound characteristics: ROCK/ JAZZ/ POP/ CLASSIC.
- ⑯ **RDS**  
for tuner, displays RDS information.
- ⑰ **MUTE**  
interrupts and resumes sound reproduction.
- ⑱ **REPEAT**  
repeats a track/disc programme/entire disc.
- ⑲ **SHUFFLE**  
plays disc tracks in random order.
- ⑳   
connects headphones

- ..... stops disc playback or erases a disc programme.
- ▶ **II** ..... starts or interrupts playback.
- PRESET (◀ / ▶)**  
for TUNER ..... selects a preset radio station.  
for CD/MP3-CD skips to the beginning of a current/previous/subsequent track
- ⑧ **DBB (Dynamic Bass Boost)**  
enhances the bass.
- ⑨ **BAND**  
selects a waveband.
- ⑩ **PROGRAM**  
for CD/MP3-CD programmes tracks and reviews the programme.  
for TUNER ..... programmes tuner stations.
- ⑪ **SOURCE**  
selects the respective sound source for CD/ TUNER/ AUX.

**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.	<p>Insert a disc.</p> <p>Check if the disc is inserted upside down.</p> <p>Wait until the moisture condensation at the lens has cleared.</p> <p>Replace or clean the disc, see "Maintenance".</p> <p>Use a finalised CD-RW or a correct MP3-CD format disc.</p> <p>If the signal is too weak, adjust the antenna or connect an external antenna for better reception.</p> <p>Increase the distance between the Micro HiFi System and your TV or VCR.</p>
Radio reception is poor.	<p>Remove and reconnect the AC power plug and switch on the system again.</p> <p>Adjust the volume.</p> <p>Disconnect the headphones.</p> <p>Check that the speakers are connected correctly.</p> <p>Check if the stripped speaker wire is clamped.</p> <p>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.</p>
The system does not react when buttons are pressed.	<p>Check the speaker connections and location.</p> <p>Select the source (CD or TUNER, for example) before pressing the function button (▶▶, ◀◀, ▶◀, ◀▶).</p>
Sound cannot be heard or is of poor quality.	<p>Reduce the distance between the remote control and the system.</p> <p>Insert the battery with its polarities (+/- signs) aligned as indicated.</p> <p>Replace the battery.</p> <p>Point the remote control directly toward IR sensor on the front of the system.</p> <p>Set the clock correctly.</p> <p>Press TIMER to switch on the timer.</p> <p>Power has been interrupted or the power cord has been disconnected. Reset the clock/timer.</p>
The left and right sound outputs are reversed.	<p>Check the speaker connections and location.</p>
The remote control does not function properly.	<p>Select the source (CD or TUNER, for example) before pressing the function button (▶▶, ◀◀, ▶◀, ◀▶).</p>
The timer is not working.	<p>Set the clock correctly.</p> <p>Press TIMER to switch on the timer.</p>
The Clock/Timer setting is erased.	<p>Power has been interrupted or the power cord has been disconnected. Reset the clock/timer.</p>

### Italia

#### DICHIARAZIONE DI CONFORMITA'

Si dichiara che l'apparecchio MCM240 Philips risponde alle prescrizioni dell'art. 2 comma 1 del D.M. 28 Agosto 1995 n. 548.

Fatto a Eindhoven

Philips Consumer Electronics  
Philips, Glaslaan 2  
5616 JB Eindhoven, The Netherlands

### Norge

Typeskilt finnes på apparatens underside.

**Observer: Nettbryteren er sekundert innkoplet. Den innebygde nettdelen er derfor ikke frakoplet nettet så lenge apparatet er tilsluttet nettkontakten.**

For å redusere faren for brann eller elektrisk støt, skal apparatet ikke utsettes for regn eller fuktighet.

### CAUTION

**Use of controls or adjustments or performance of procedures other than herein may result in hazardous radiation exposure or other unsafe operation.**

### VAROITUS

**Muiden kuin tässä esitettyjen toimintojen säädön tai asetusten muutto saattaa altistaa vaaralliselle säteilylle tai muille vaarallisille toiminnoille.**

### Important notes for users in the U.K.

#### Mains plug

This apparatus is fitted with an approved 13 Amp plug. To change a fuse in this type of plug proceed as follows:

- 1 Remove fuse cover and fuse.
- 2 Fix new fuse which should be a BS1362 3 Amp, A.S.T.A. or BSI approved type.
- 3 Refit the fuse cover.

If the fitted plug is not suitable for your socket outlets, it should be cut off and an appropriate plug fitted in its place.

If the mains plug contains a fuse, this should have a value of 3 Amp. If a plug without a fuse is used, the fuse at the distribution board should not be greater than 3 Amp.

**Note: The severed plug must be disposed of to avoid a possible shock hazard should it be inserted into a 13 Amp socket elsewhere.**

#### How to connect a plug

The wires in the mains lead are coloured with the following code: blue = neutral (N), brown = live (L).

As these colours may not correspond with the colour markings identifying the terminals in your plug, proceed as follows:

- Connect the blue wire to the terminal marked N or coloured black.
- Connect the brown wire to the terminal marked L or coloured red.
- Do not connect either wire to the earth terminal in the plug, marked E (or -) or coloured green (or green and yellow).

Before replacing the plug cover, make certain that the cord grip is clamped over the sheath of the lead - not simply over the two wires.

#### Copyright in the U.K.

Recording and playback of material may require consent. See Copyright Act 1956 and The Performer's Protection Acts 1958 to 1972.

## DISMANTLING INSTRUCTIONS

### Dismantling of the Rear Portion

- 1) Remove 11 screws A and B as indicated to remove the Rear Cabinet.
- 2) Remove 2 screws C as indicated to loosen the Speaker Wire Holder.
- 3) Remove 2 screws D as indicated to loosen the Speaker Board .
- 4) Remove 2 screws E as indicated to loosen the AUX IN jack.

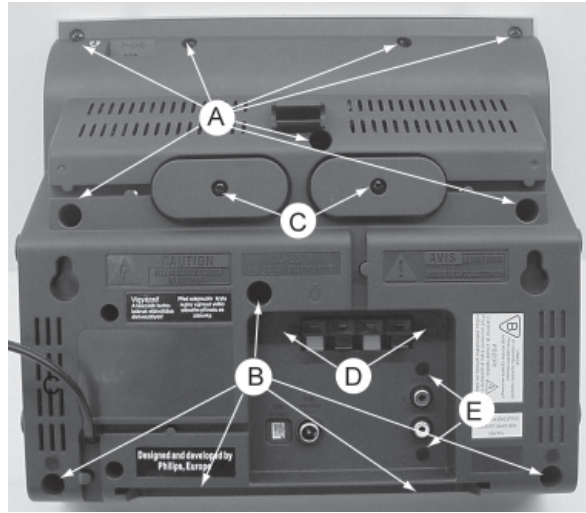


Figure 1

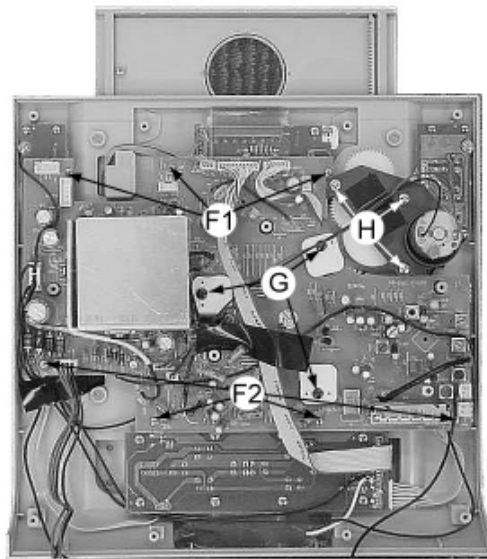


Figure 2

### Dismantling of the Front Boards and CD Door

- 1) Loosen 3 screws G each to remove the CD Mechanism Holder Bracket.
- 2) Loosen 7 screws F1 and F2 as indicated to remove the Main Board.
- 3) Remove 3 screws H as indicated to loosen the Gear Motor Module.
- 4) Loosen 4 screws I (see Figure 3) to remove the Key\_C Board.
- 5) Loosen 2 screws J (see Figure 3) to remove the Display Board.

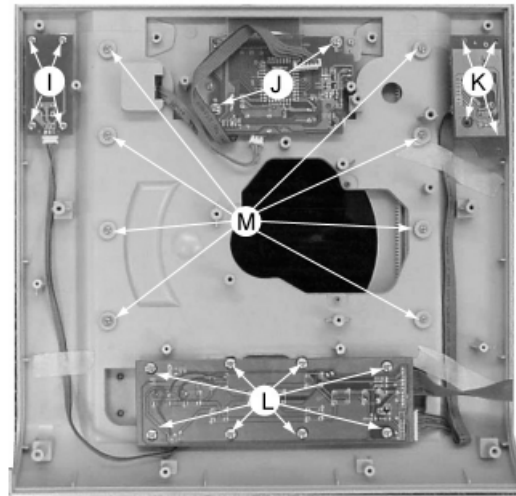


Figure 3

- 6) Loosen 4 screws K (see Figure 3) to remove the Key\_B Board.
- 7) Loosen 8 screws L (see Figure 3) to remove the Key\_A Board.
- 8) Loosen 8 screws M (see Figure 3) to remove the Door Eject Lever Bracket Right/Left, then remove CD door.

## DISMANTLING INSTRUCTIONS

### Repair Hints & Service Positions

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



Figure 4

#### Service position B

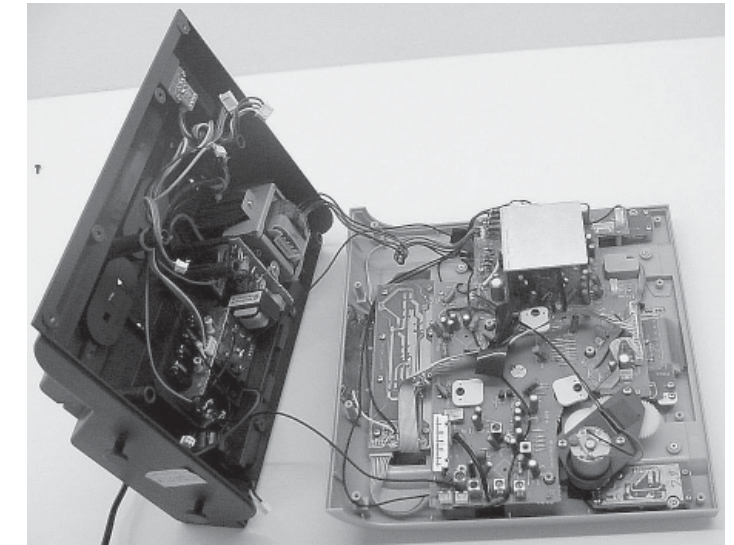


Figure 5

#### Service position C

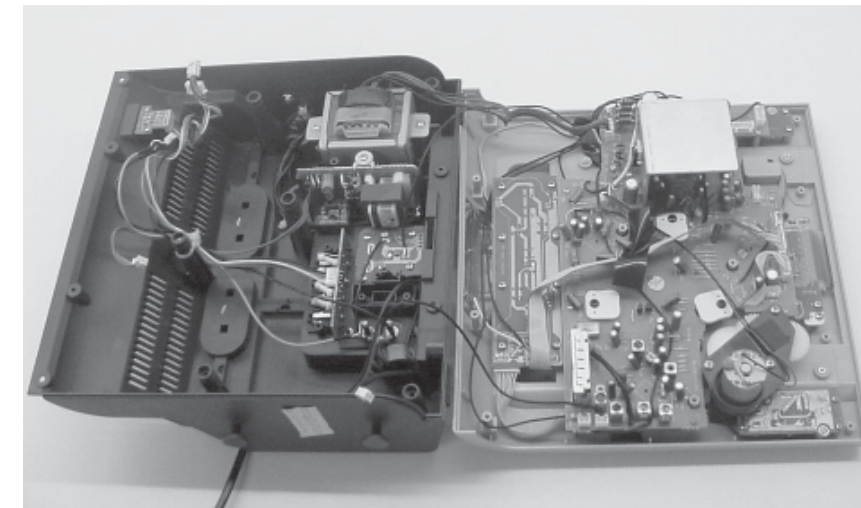
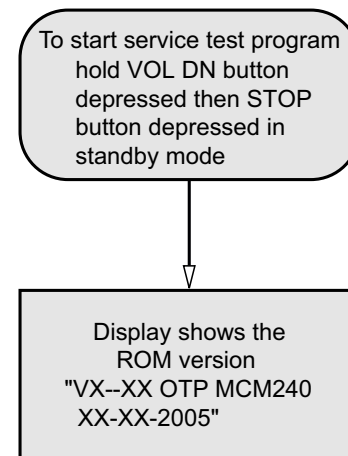


Figure 6

## SERVICE TEST PROGRAM

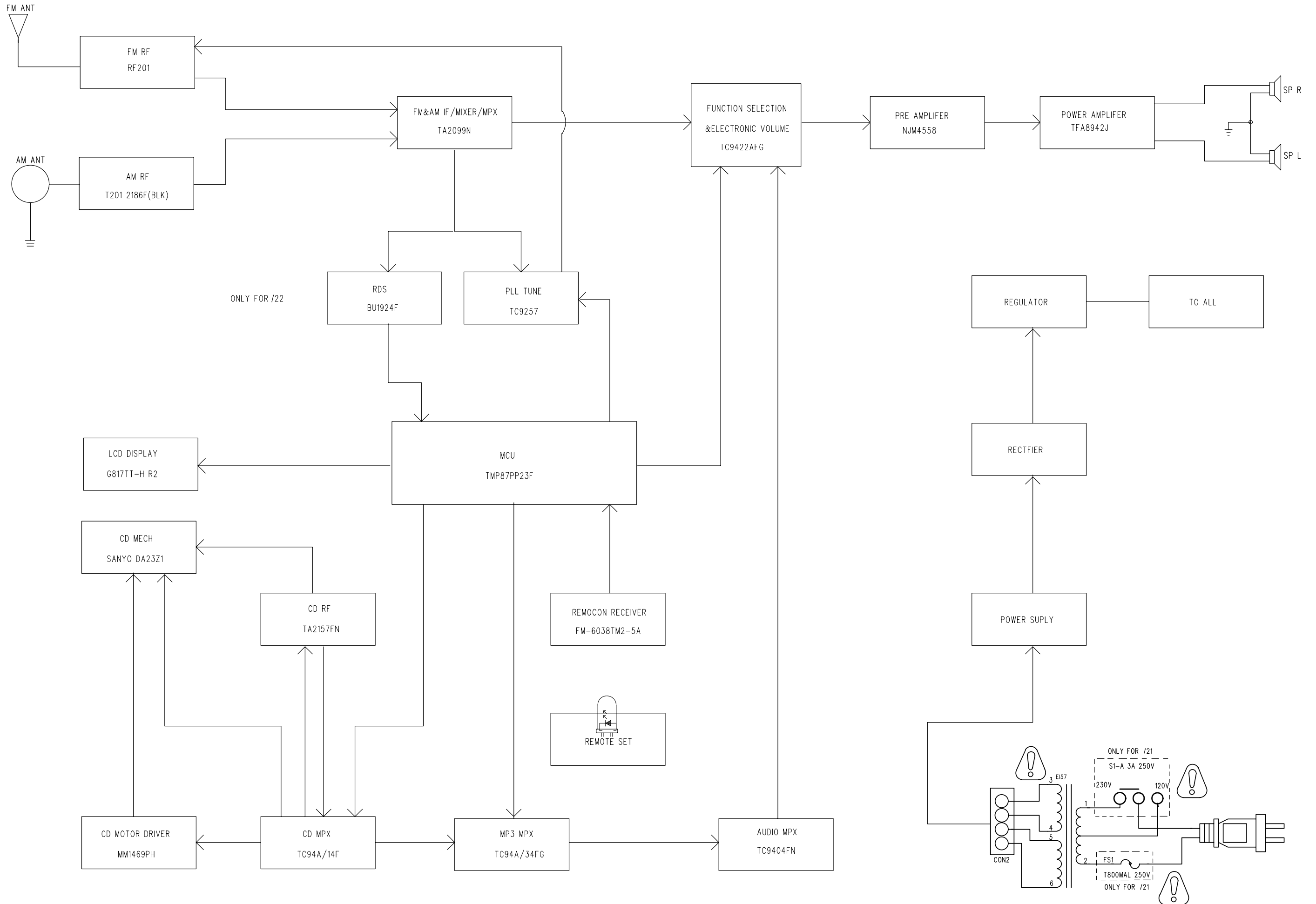


V refers to Version

X--XX refers to Software version number of the uProcessor  
eg. V1-7E

XX-XX-200X refers to Date, eg. 25-5-2005

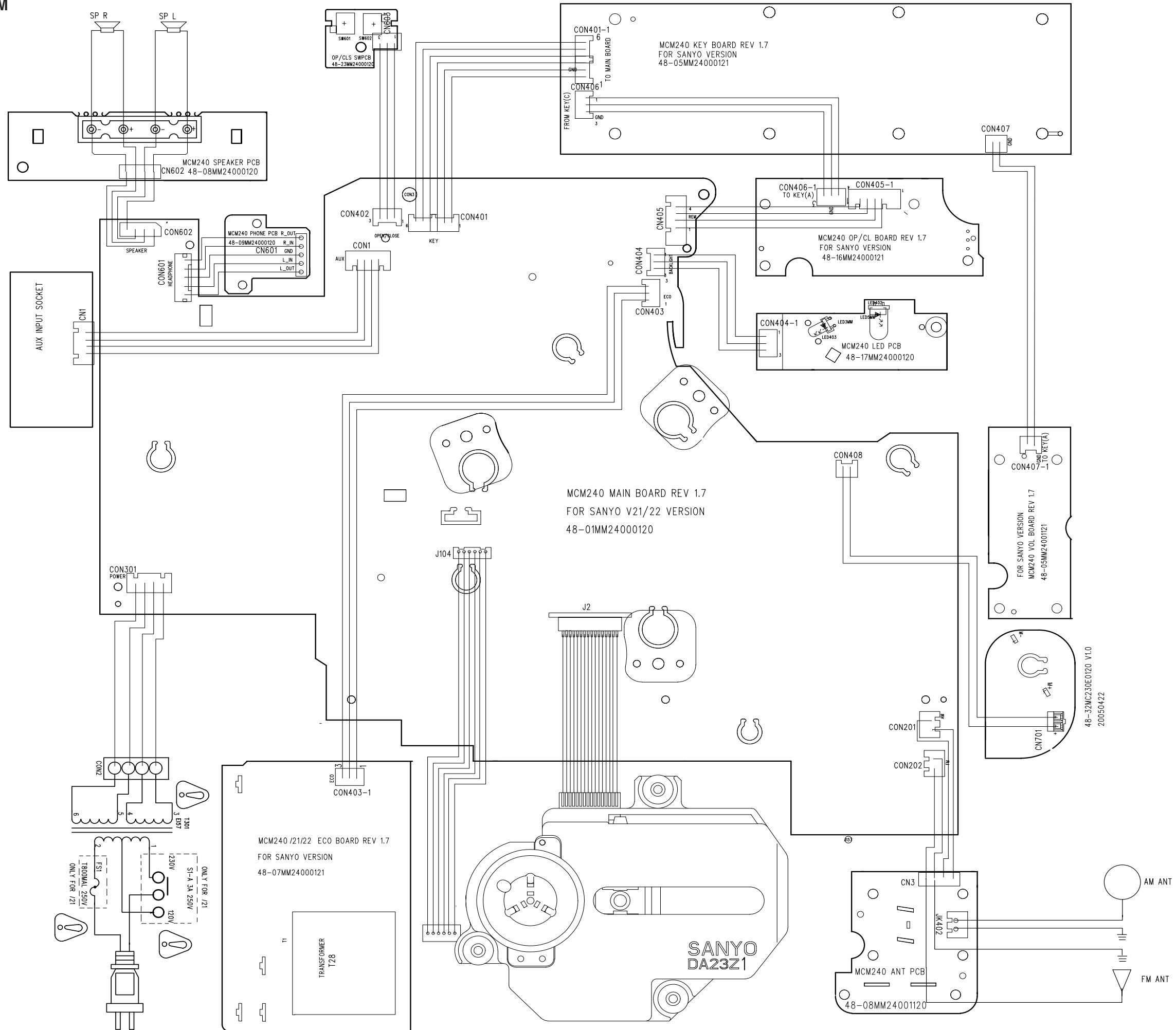
### SET BLOCK DIAGRAM



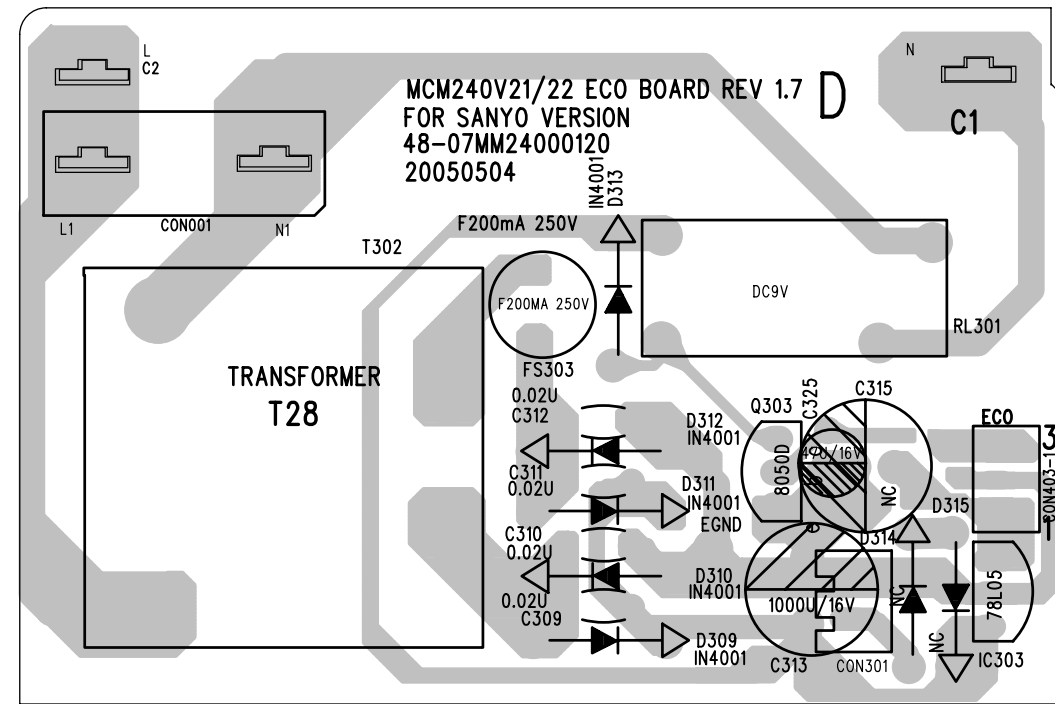
SET WIRING DIAGRAM

5-1

5-1



Printed Circuit Board - Side A



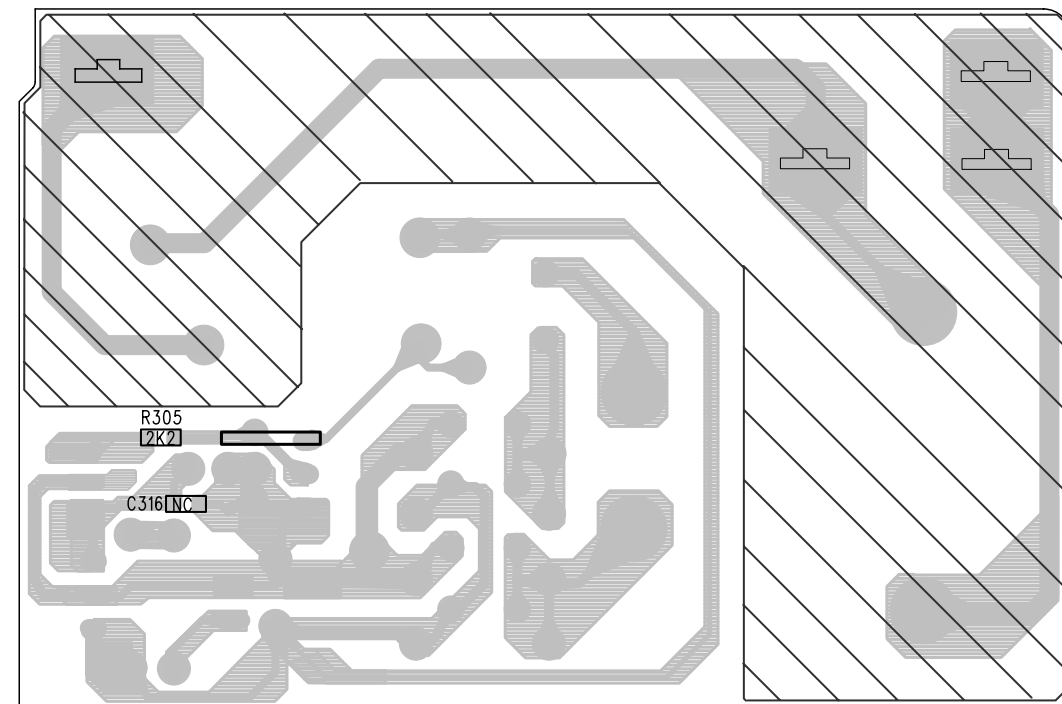
**POWER BOARD**

The board is not intended to be repaired on component level.  
Circuit Diagram and Printed Circuit Board drawings  
are published for orientation only.

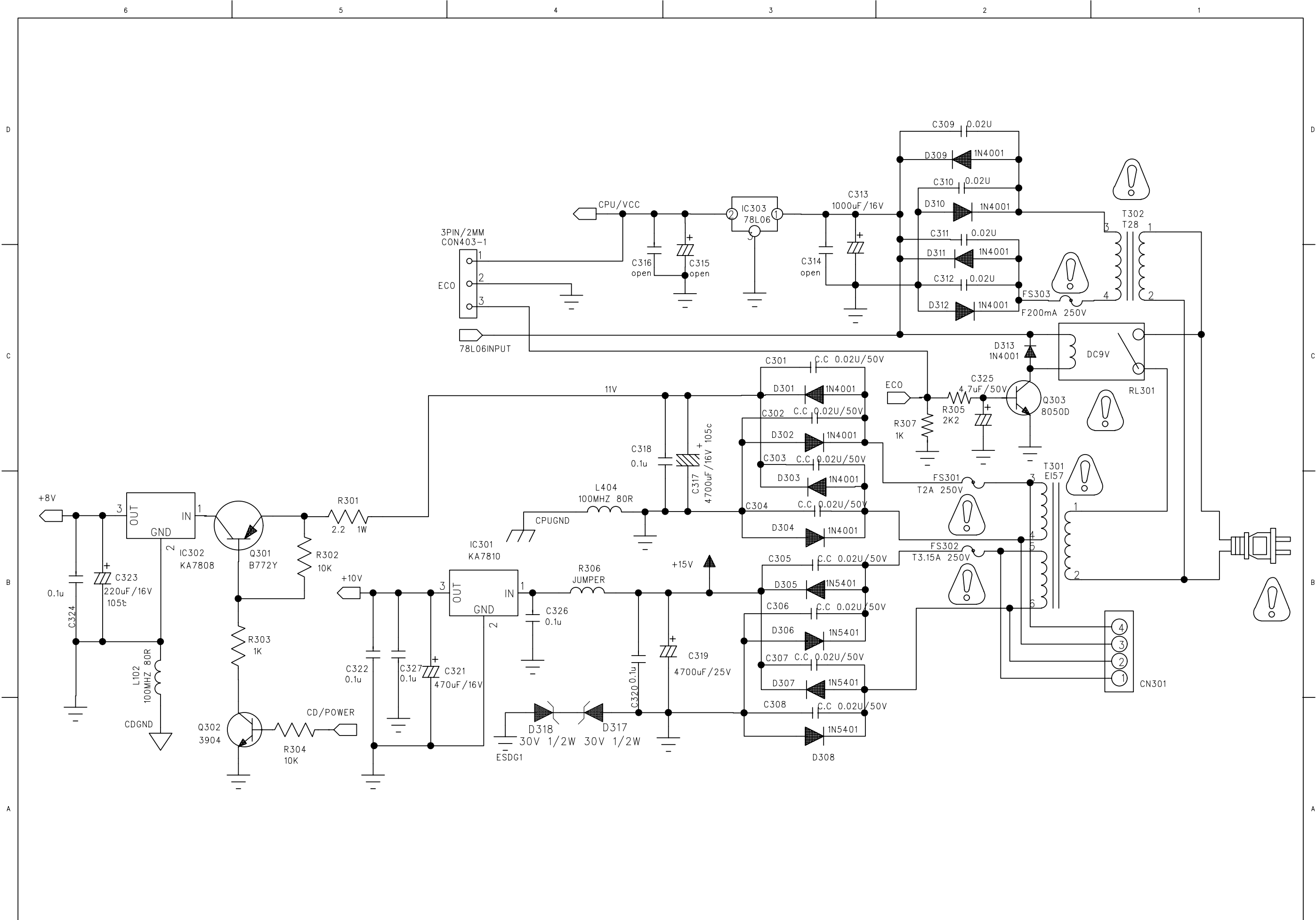
In case of defects please replace the entire board.

The board can be ordered with codenumber "9940 000 02866" for /21/21M/37.  
"9940 000 02867" for /22/25.

Printed Circuit Board - Side A

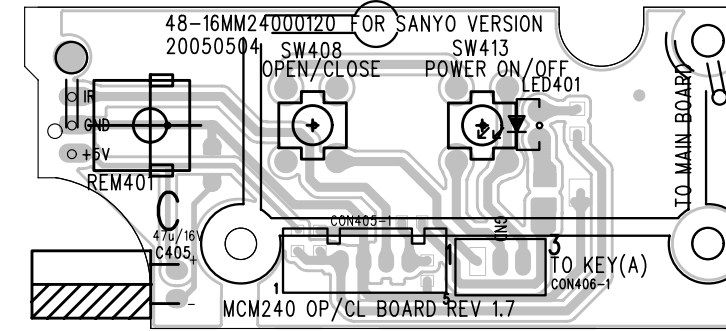


# CIRCUIT DIAGRAM

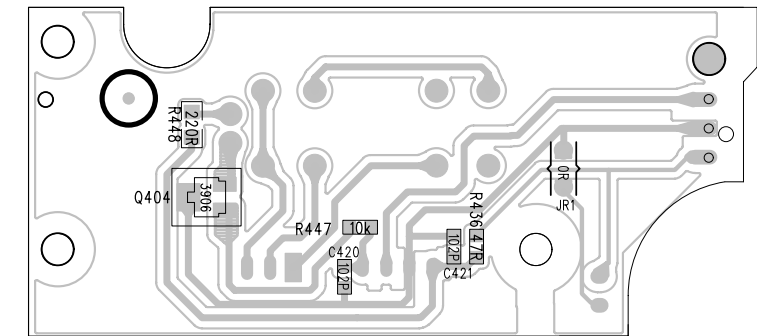




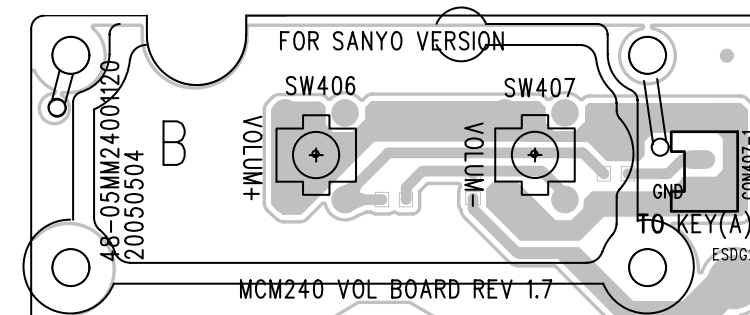
**LAYOUT DIAGRAM - OPEN/CLOSE BOARD  
TOP SIDE**



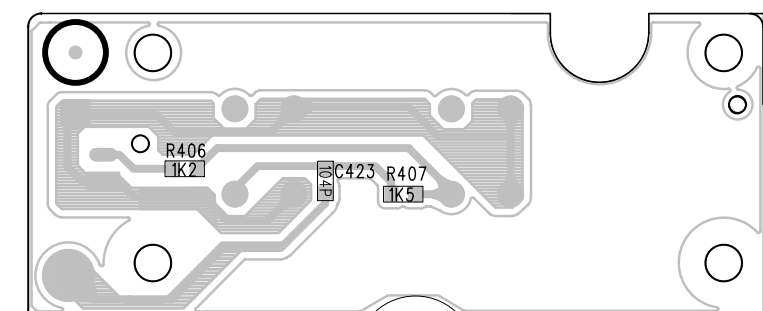
**LAYOUT DIAGRAM - OPEN/CLOSE BOARD  
BOTTOM SIDE**



**LAYOUT DIAGRAM - VOLUME BOARD  
TOP SIDE**



**LAYOUT DIAGRAM - VOLUME BOARD  
BOTTOM SIDE**



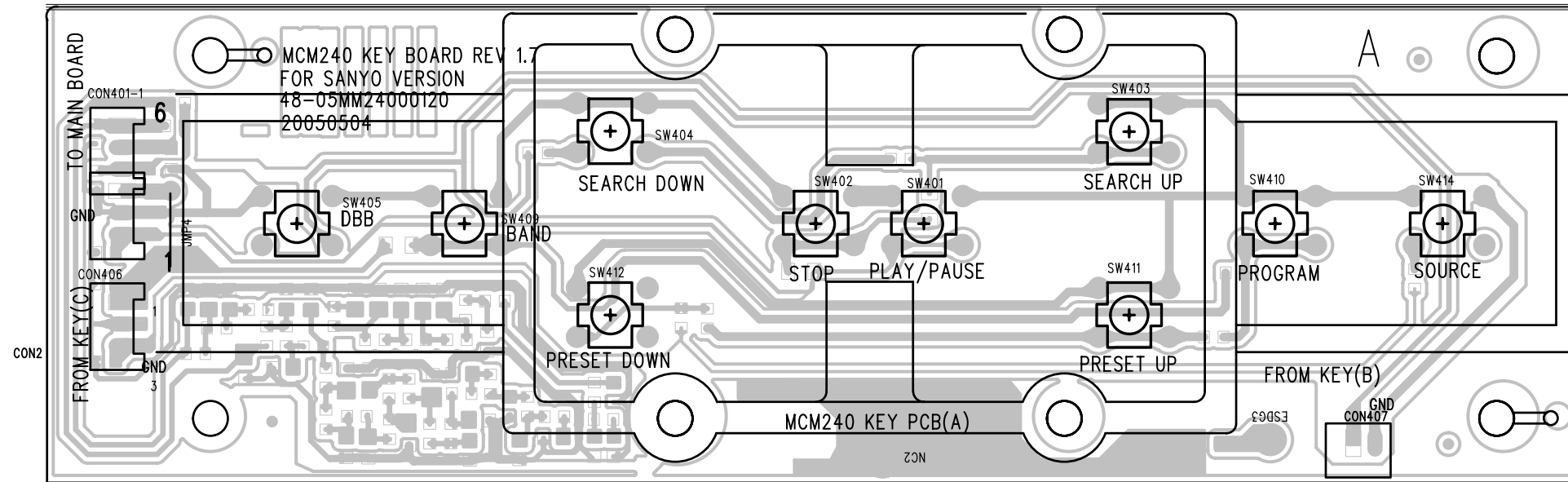
# KEY BOARD

The board is not intended to be repaired on component level.  
Circuit Diagram and Printed Circuit Board drawings  
are published for orientation only.

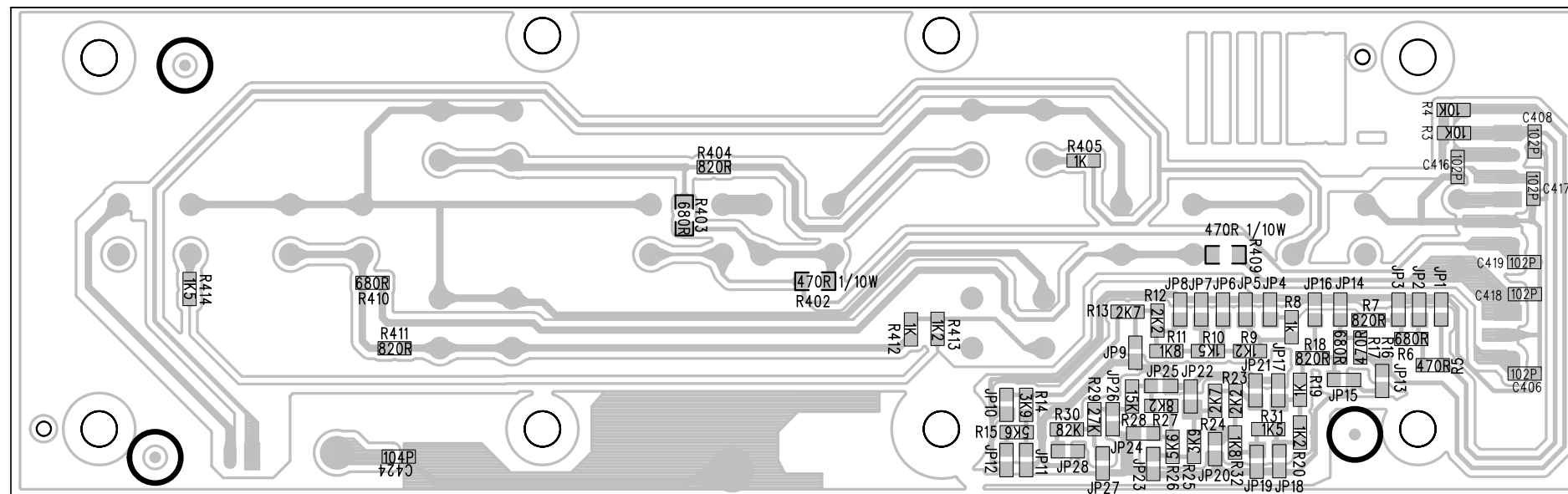
In case of defects please replace the entire board.

The board can be ordered with codenumber "9940 000 02868" for /21/21M/37.  
"9940 000 02869" for /22/25.

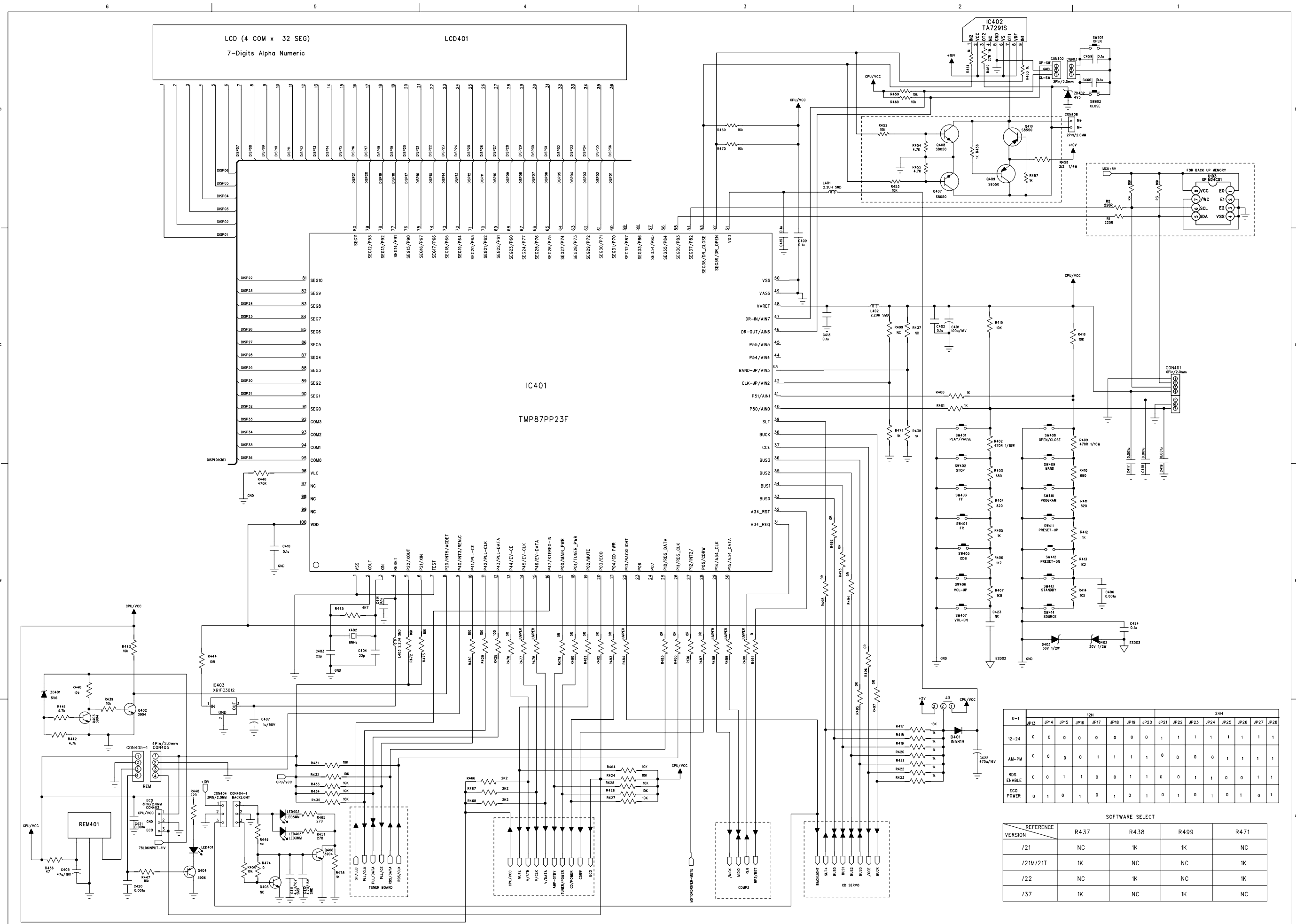
LAYOUT DIAGRAM - KEY BOARD  
TOP SIDE



LAYOUT DIAGRAM - KEY BOARD  
BOTTOM SIDE



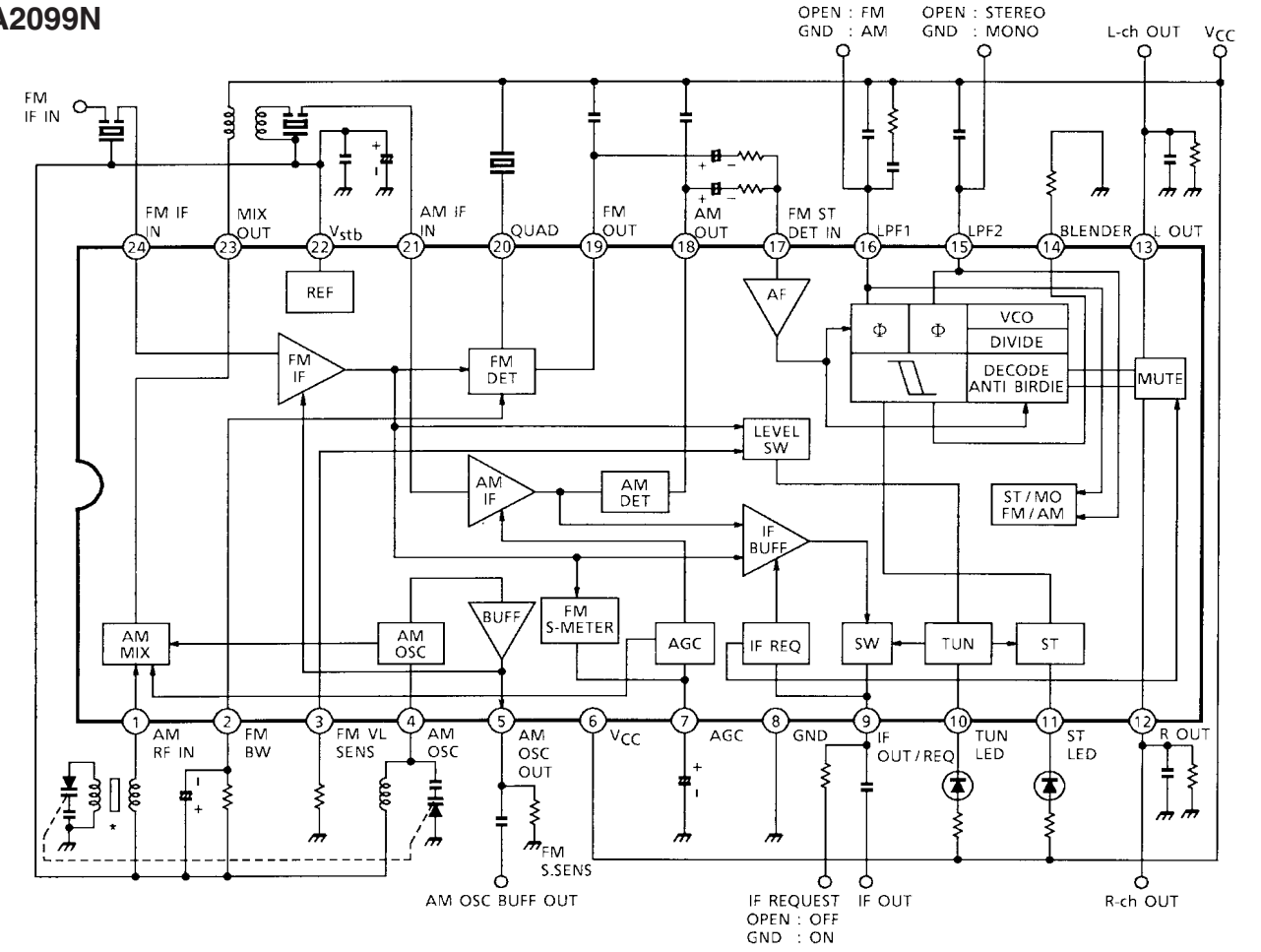
# CIRCUIT DIAGRAM



0-1	JP13	JP14	JP15	JP16	JP17	JP18	JP19	JP20	JP21	JP22	JP23	JP24	JP25	JP26	JP27	JP28
12-24	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
AM-PM	0	0	0	0	1	1	1	1	0	0	0	0	1	1	0	1
RDS ENABLE	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
ECO POWER	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

REFERENCE VERSION	R437	R438	R499	R471
/21	NC	1K	1K	NC
/21M/21T	1K	NC	NC	1K
/22	NC	1K	NC	1K
/37	1K	NC	1K	NC

**BLOCK DIAGRAM - AM/FM IF + FM STEREO DETECTOR  
TA2099N**

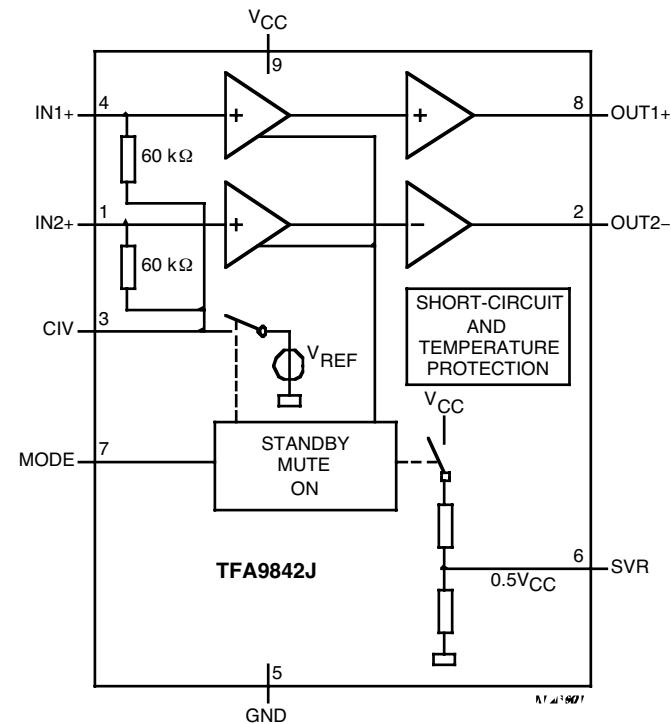


**MAIN BOARD**

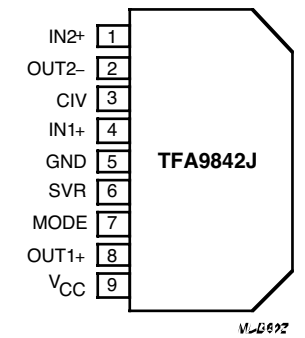
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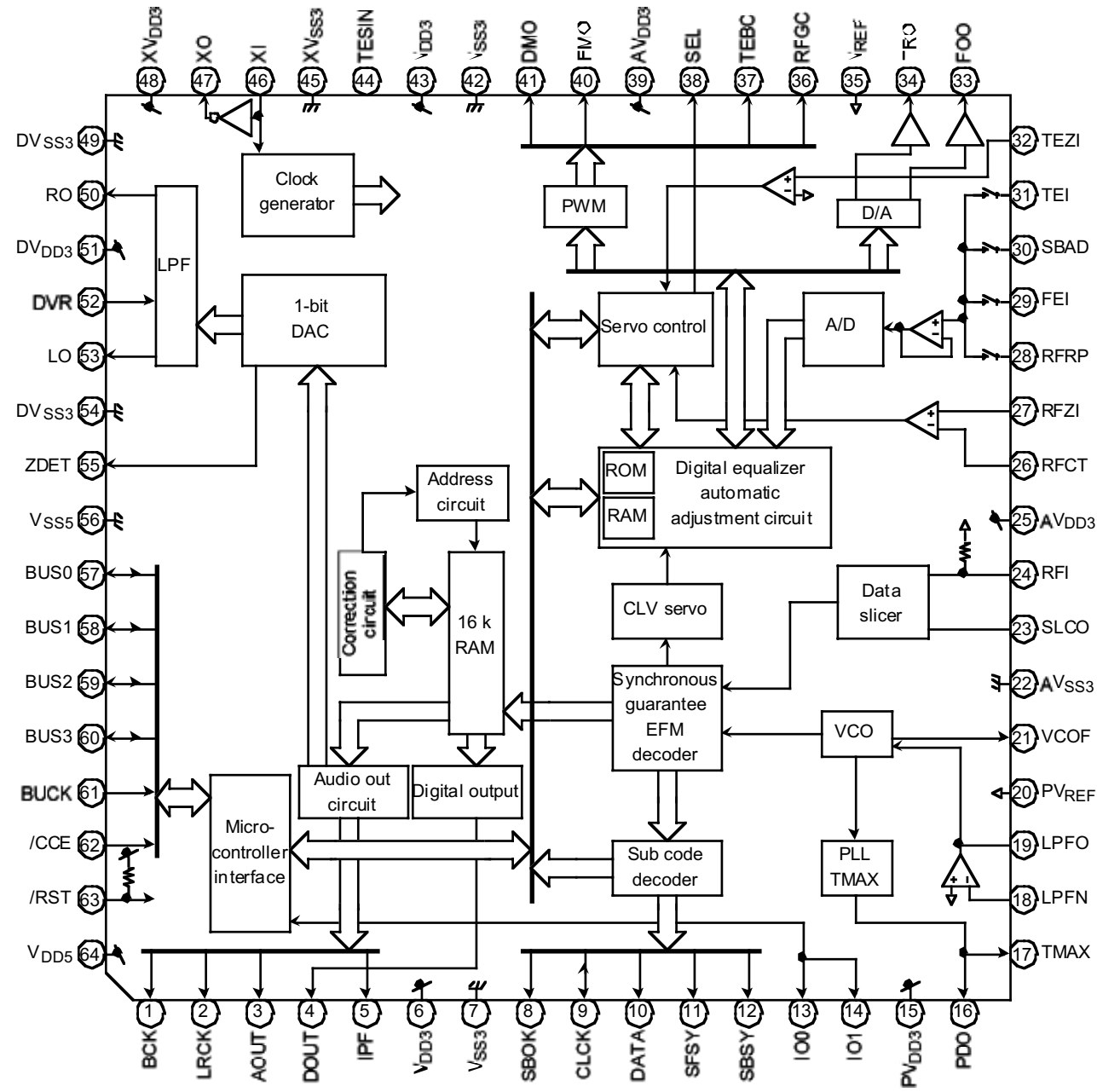
**BLOCK DIAGRAM - 2-CHANNEL AUDIO  
AMPLIFIER TFA9842J**



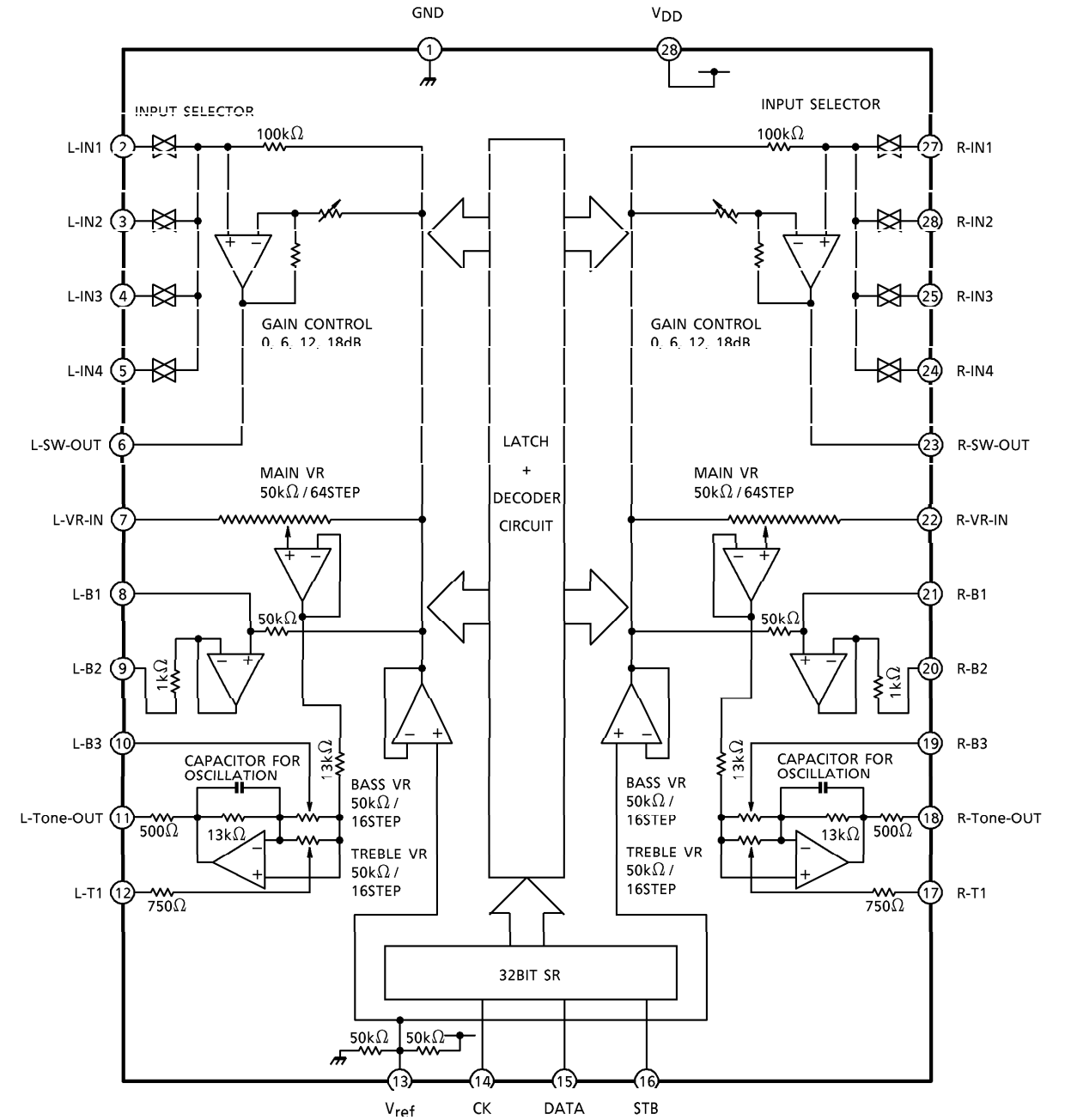
**PIN CONFIGURATION - 2-CHANNEL AUDIO  
AMPLIFIER TFA9842J**



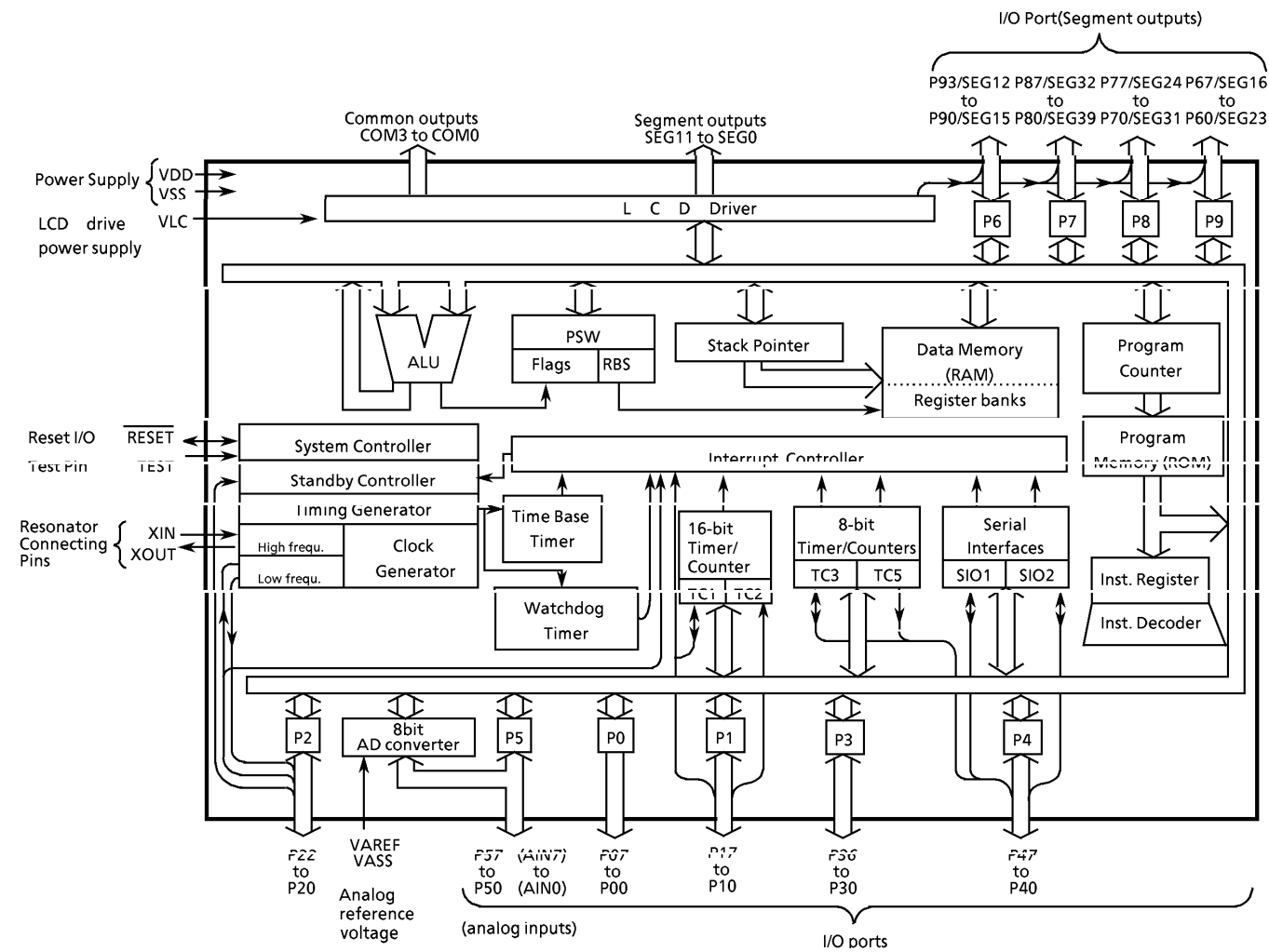
**BLOCK DIAGRAM - CD Player Processor**  
**TC94A14FA**



**BLOCK DIAGRAM - SYSTEM ELECTRONIC VOLUME**  
**TC9422N**



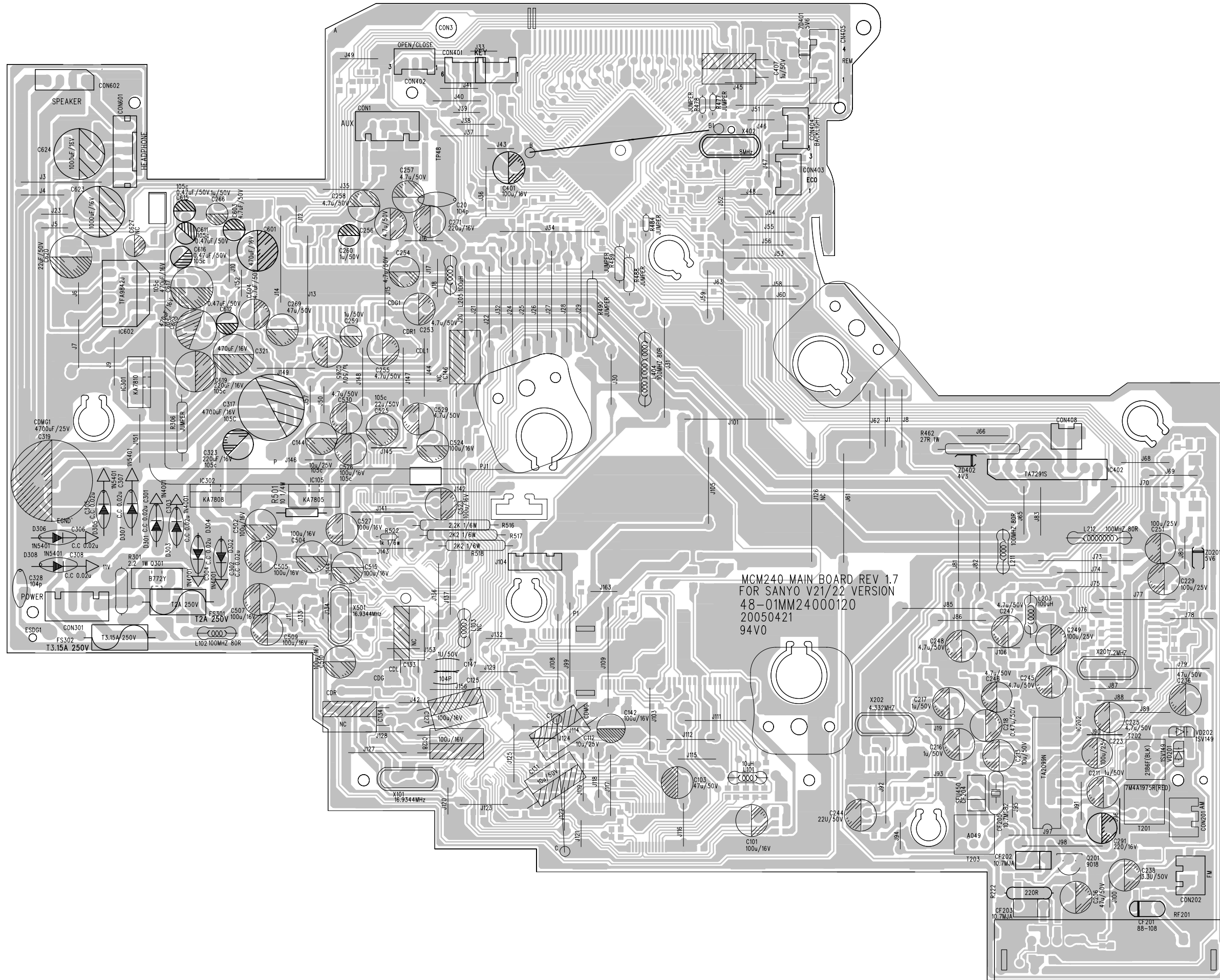
**BLOCK DIAGRAM - MICROCONTROLLER UNIT  
TMP87PP23F**



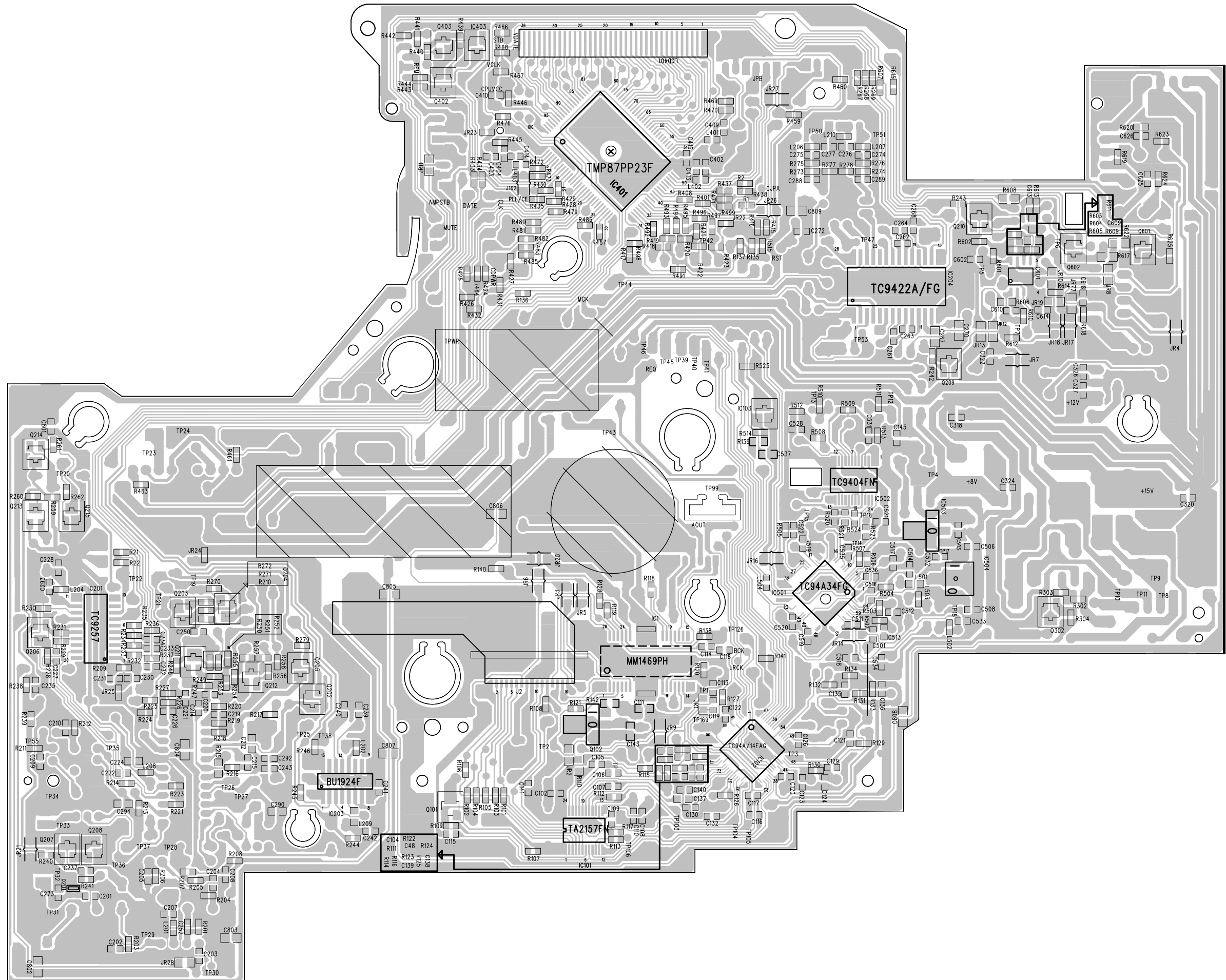
**Pin Function**

Pin Name	Input / Output	Function
P07 to P00	I/O	8-bit programmable input/output ports (tri-state).
P17, P16	I/O (Input)	Timer/Counter 2 input
P15 (TC2)	I/O (Input)	Each bit of these ports can be individually configured as an input or an output under software control.
P14 (PPG)	I/O (Output)	Programmable pulse generator output
P13 (DVO)	I/O (Output)	Divider output
P12 (INT2 / TC1)	I/O (Input)	External interrupt 2 input or Timer/Counter 1 input
P11 (INT1)	I/O (Input)	External interrupt 1 input
P10 (INT0)	I/O (Input)	External interrupt 0 input
P22 (XTOUT)	I/O (Output)	3-bit input/output port with latch. Resonator connecting pins (32.768kHz). For inputting external clock, XTIN is used and XTOUT is opened.
P21 (XTIN)	I/O (Input)	When used as an input port, external interrupt input or STOP mode release input, the output latch must be set to "1".
P20 (INT5 / STOP)	I/O (Input)	External interrupt 5 input or STOP mode release signal input
P36 to P30	I/O	7-bit input/output port with latch. When used as input port, the output latch must be set to "1".
P47 (SO2)	I/O (Output)	8-bit input/output port with latch. SIO2 serial data output
P46 (SI2)	I/O (Input)	SIO2 serial data input
P45 (SCK2)	I/O (I/O)	When used as serial interface output or timer/counter output, the P4CR1 must be set to "1" after setting output latch to "1". SIO2 serial clock input/output
P44 (SO1)	I/O (Output)	SIO1 serial data output
P43 (SI1)	I/O (Input)	When used as an input port, serial interface input or external interrupt input, the P4CR1 must be set to "0". SIO1 serial data input
P42 (SCK1)	I/O (I/O)	SIO1 serial clock input/output
P41 (PWM/PDO)	I/O (Output)	8-bit PWM output, 8-bit programmable divider output
P40 (INT3/TC3)	I/O (Input)	External interrupt 3 input, Timer/Counter 3 input
P57 (AIN07) to P50 (AIN00)	I/O (Input)	8-bit programmable input/output port (tri-state). Each bit of the port can be individually configured as an input or an output under software control. When used as analog input, the P5CR must be set to "0".
SEG39 (P80) to SEG32 (P87)	Output (I/O)	8-bit input/output port with latch. When used as an input port, the segment output control register must be set to "0" after setting output latch to "1".
SEG31 (P70) to SEG24 (P77)	Output (I/O)	LCD segment outputs. When used as segment output, the segment output control register must be set to "1".
SEG23 (P60) to SEG16 (P67)	Output (I/O)	
SEG15 (P90) to SEG12 (P93)	Output (I/O)	4-bit input/output port with latch. When used as an input port, the segment output control register must be set to "1" after setting output latch to "1".
SEG11 to SEG0	Output	LCD segment outputs
COM3 to COM0	Output	LCD common outputs
XIN, XOUT	Input, Output	Resonator connecting pins for high-frequency clock. For inputting external clock, XIN is used and XOUT is opened.
RESET	I/O	Reset signal input or watchdog timer output/address-trap-reset output
TEST	Input	Test pin for out-going test. Be fixed to low.
VDD, VSS	Power Supply	+ 5 V, 0 V (GND)
VAREF, VASS	Power Supply	Analog reference voltage inputs (High, Low)
VLC		LCD drive power supply.

LAYOUT DIAGRAM - MAIN BOARD  
TOP SIDE

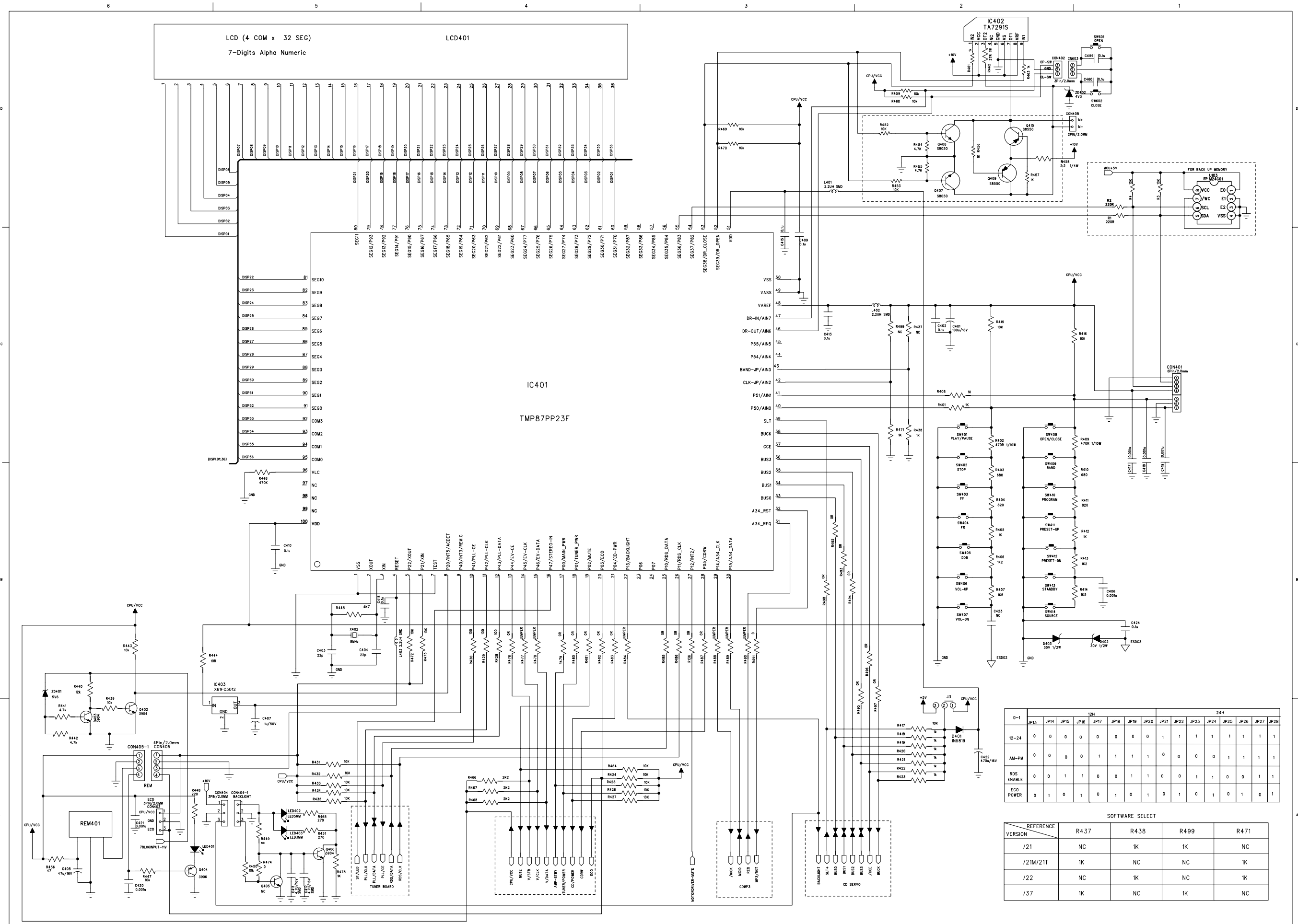


# LAYOUT DIAGRAM - MAIN BOARD BOTTOM SIDE





# CIRCUIT DIAGRAM - MAIN BOARD MCU PART

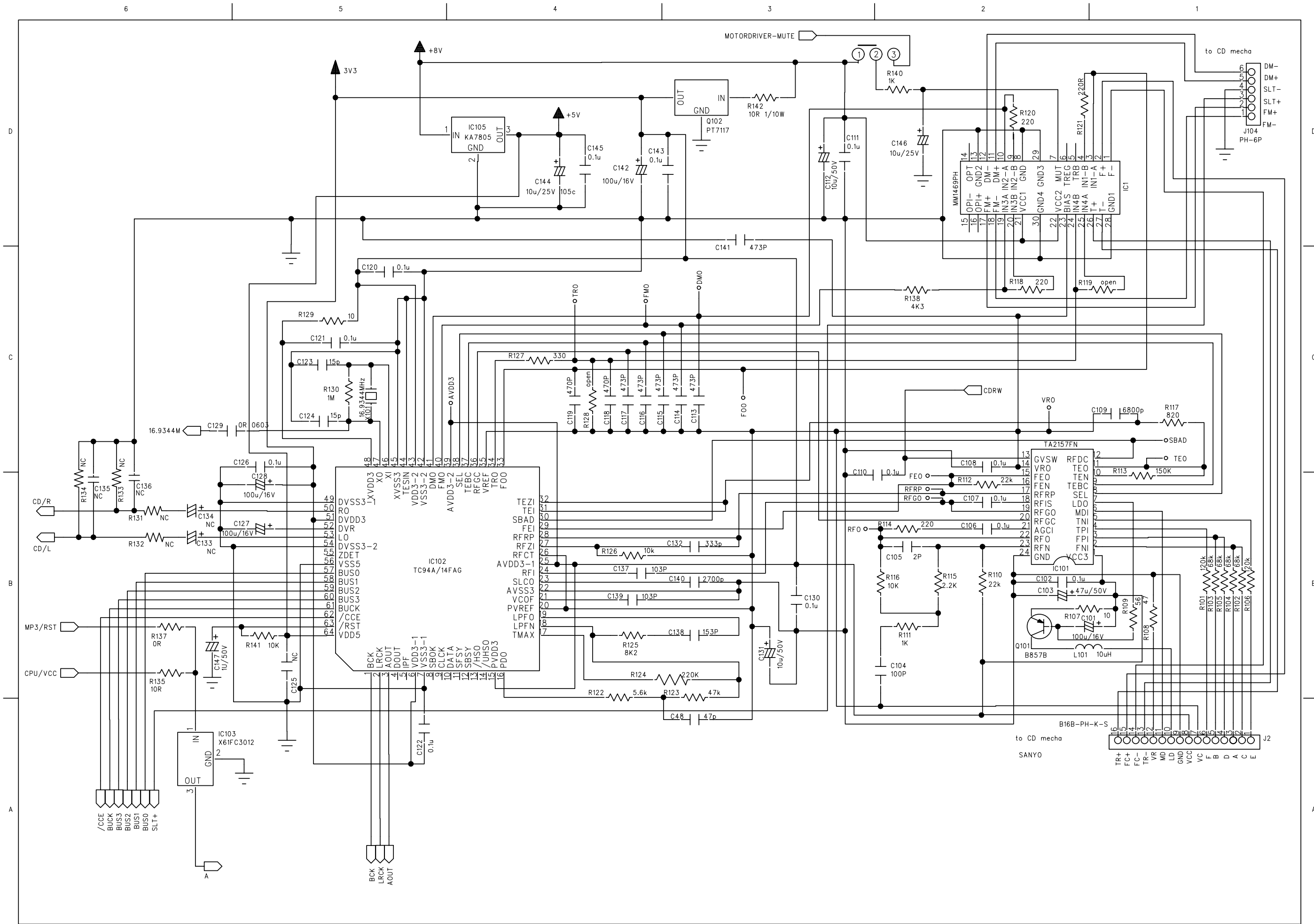


0-1	JP13	JP14	JP15	JP16	JP17	JP18	JP19	JP20	JP21	JP22	JP23	JP24	JP25	JP26	JP27	JP28
12-24	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
AM-FM	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
RDS ENABLE	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
ECO POWER	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

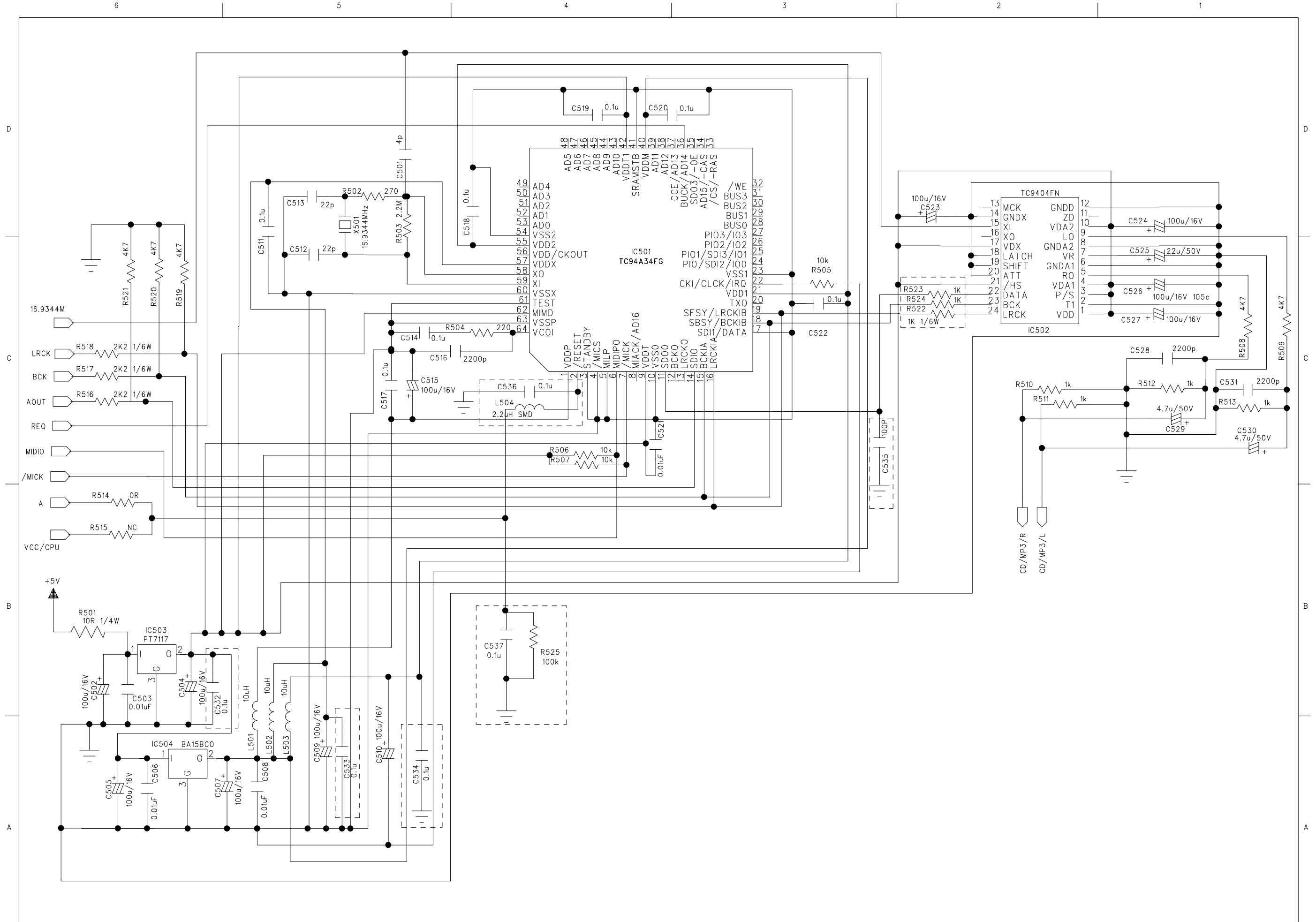
SOFTWARE SELECT

REFERENCE	R437	R438	R499	R471
VERSION /21	NC	1K	1K	NC
/21M/21T	1K	NC	NC	1K
/22	NC	1K	NC	1K
/37	1K	NC	1K	NC

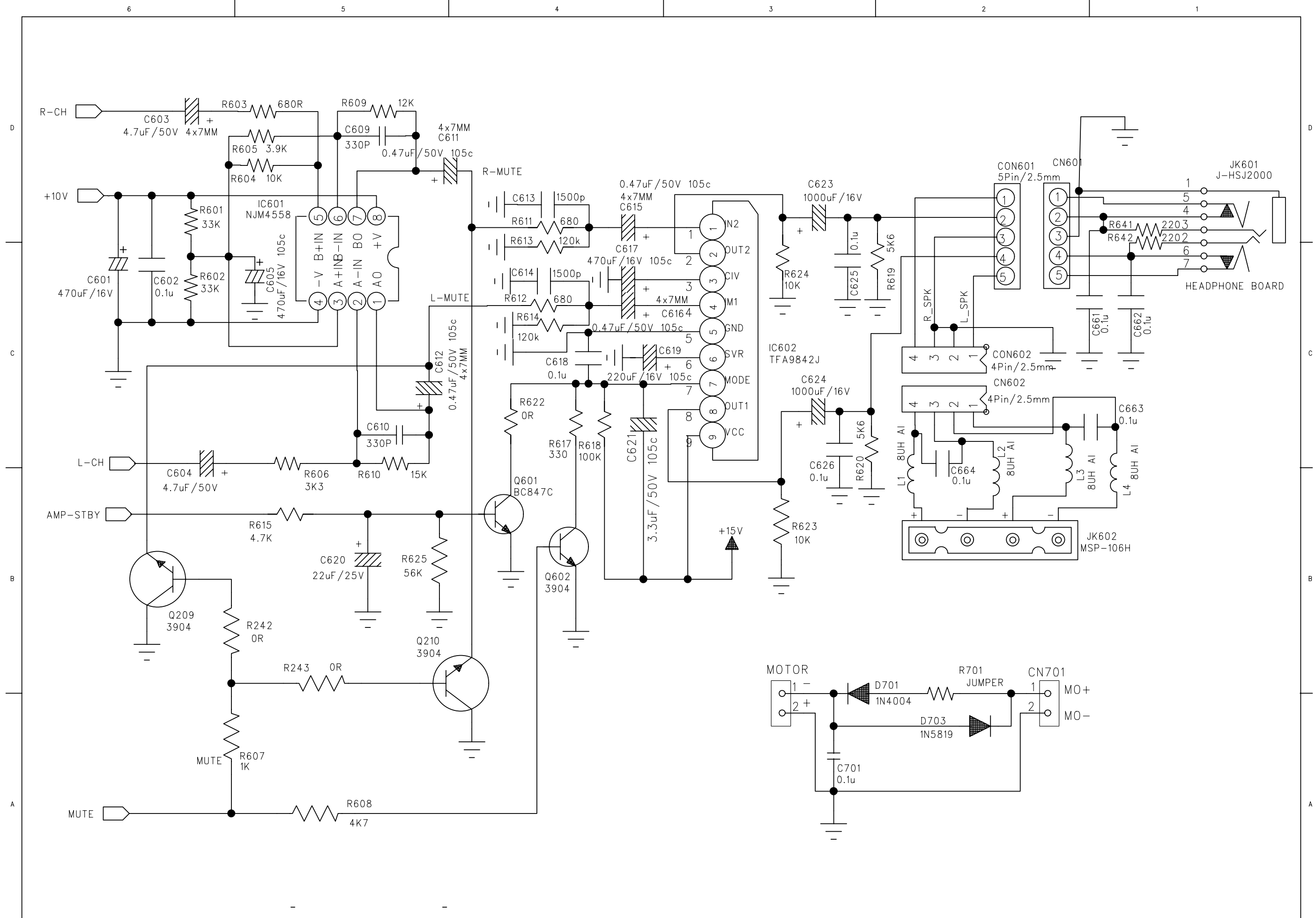
# CIRCUIT DIAGRAM - MAIN BOARD CD PART



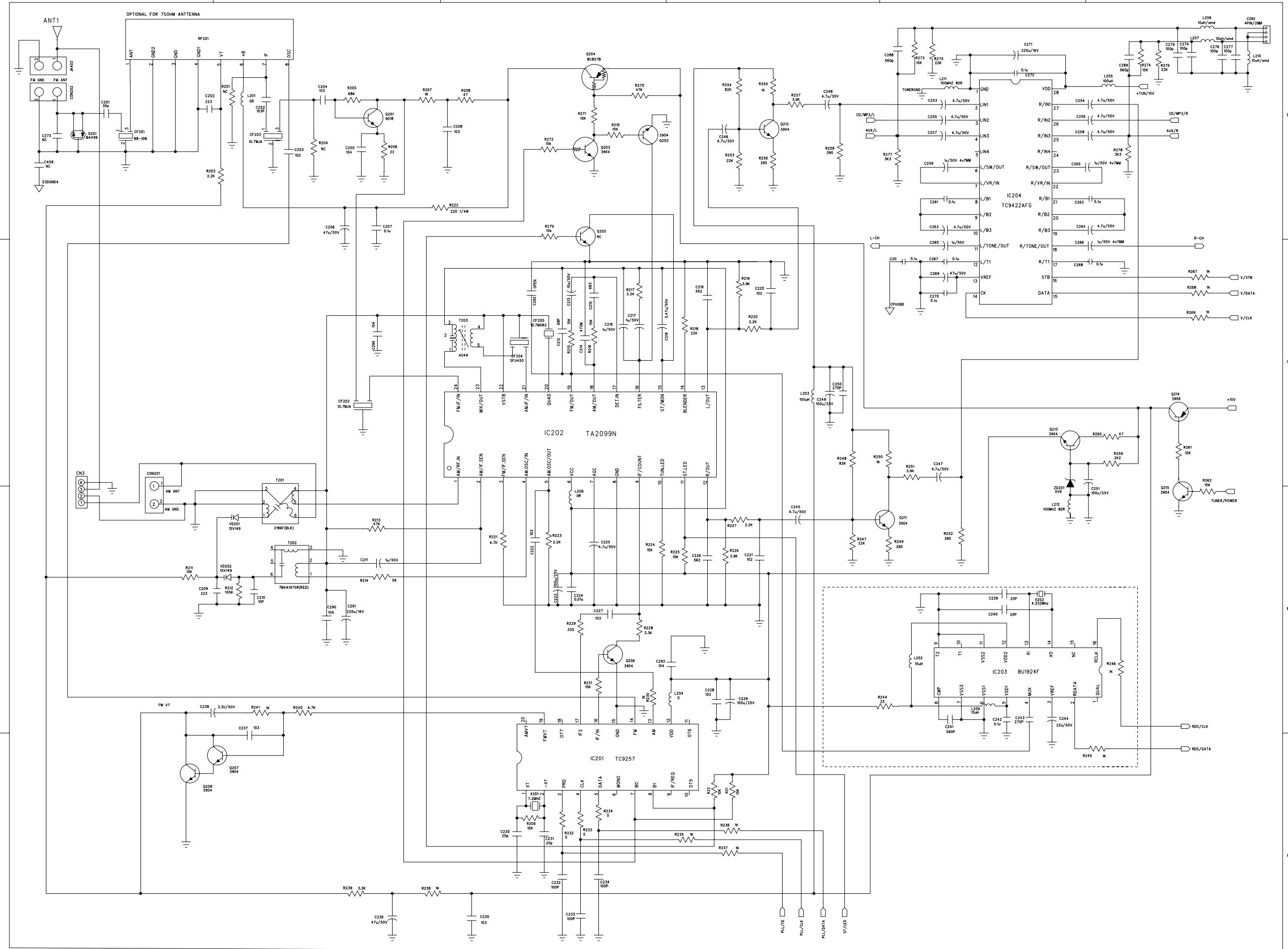
# CIRCUIT DIAGRAM - MAIN BOARD MP3 PART



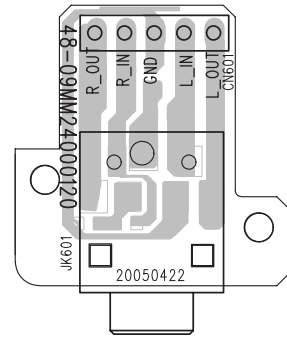
# CIRCUIT DIAGRAM - MAIN BOARD AMP PART



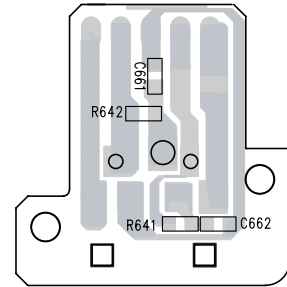
# CIRCUIT DIAGRAM - MAIN BOARD TUNER PART



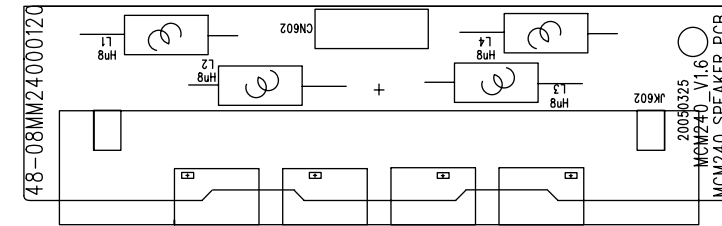
LAYOUT DIAGRAM - HEADPHONE BOARD  
TOP SIDE



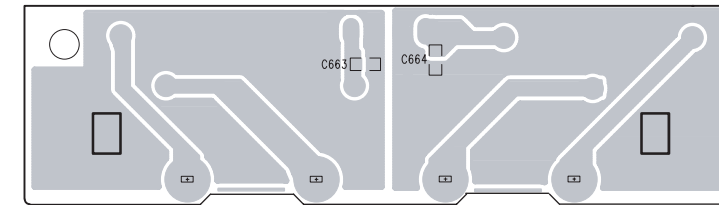
LAYOUT DIAGRAM - HEADPHONE BOARD  
BOTTOM SIDE



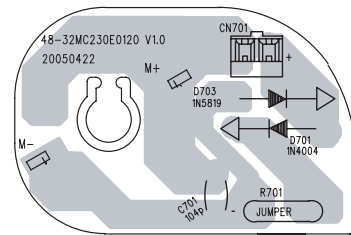
LAYOUT DIAGRAM - SPEAKER BOARD  
TOP SIDE



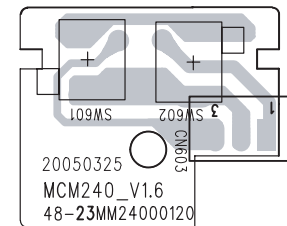
LAYOUT DIAGRAM - SPEAKER BOARD  
BOTTOM SIDE



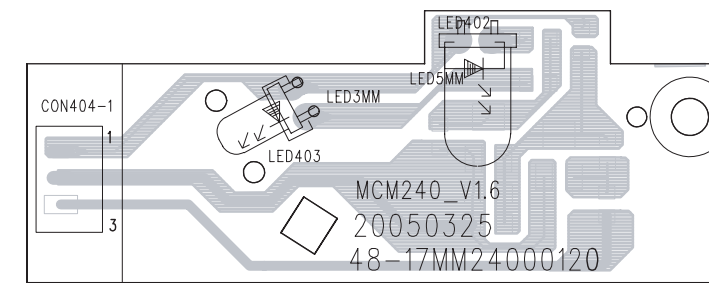
LAYOUT DIAGRAM - MOTOR BOARD



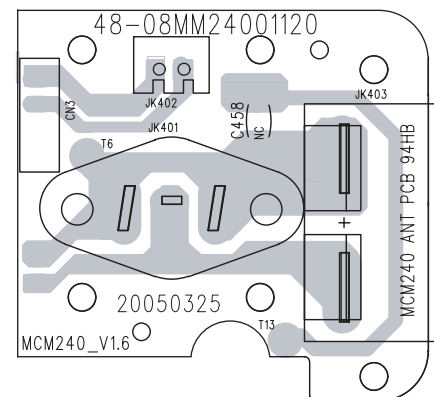
LAYOUT DIAGRAM - SWITCH BOARD



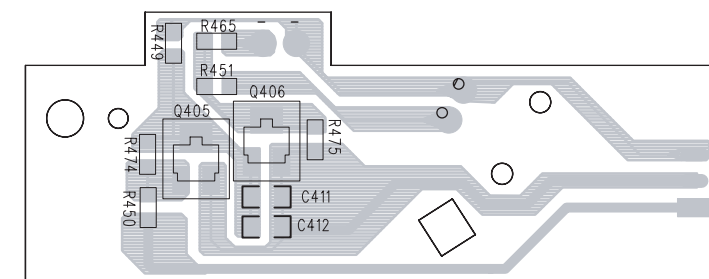
LAYOUT DIAGRAM - LED BOARD  
TOP SIDE



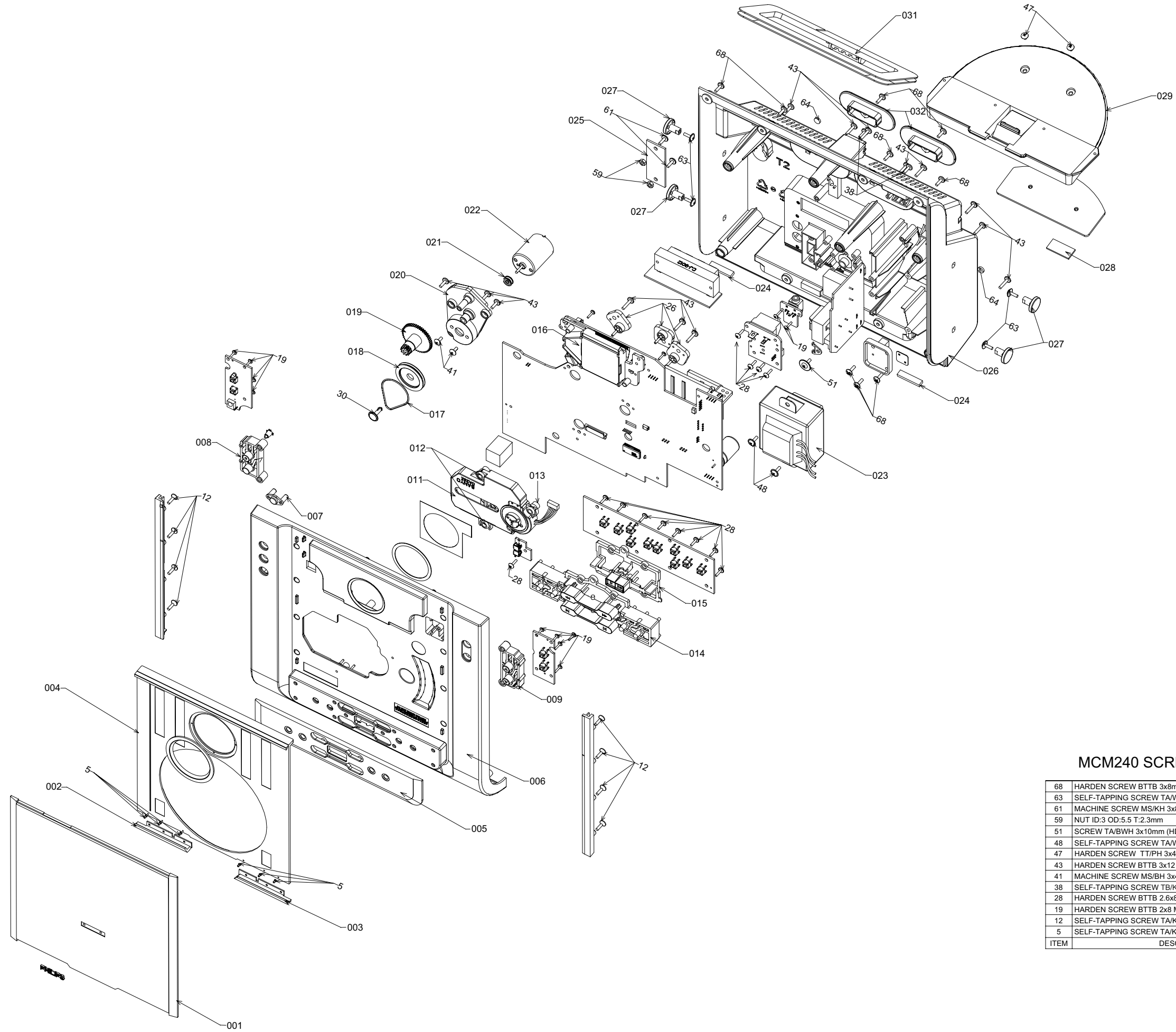
LAYOUT DIAGRAM - ANTENNA BOARD



LAYOUT DIAGRAM - LED BOARD  
BOTTOM SIDE



SET EXPLODED VIEW



MCM240 SCREW LIST

ITEM	DESCRIPTION	QTY
68	HARDEN SCREW BTTB 3x8mm AB	9
63	SELF-TAPPING SCREW TA/WH 3x10mm(H D:10mm)	4
61	MACHINE SCREW MS/KH 3x8mm HD 5mm	2
59	NUT ID:3 OD:5.5 T:2.3mm	2
51	SCREW TA/BWH 3x10mm (HD:12mm)	1
48	SELF-TAPPING SCREW TA/WH 3x12mm	2
47	HARDEN SCREW TT/PH 3x4	2
43	HARDEN SCREW BTTB 3x12 AB	14
41	MACHINE SCREW MS/BH 3x4 mm	1
38	SELF-TAPPING SCREW TB/KH 3x8 HD5mm	2
28	HARDEN SCREW BTTB 2.6x8mm MC	15
19	HARDEN SCREW BTTB 2x8 MC	17
12	SELF-TAPPING SCREW TA/KH 2.6x8mm	8
5	SELF-TAPPING SCREW TA/KH 1.4x3.5 mm	6

**MECHANICAL & ACCESSORIES PARTS LIST**

001	994000002809	CD DOOR LENS W/HOT FOIL	994000000275	RCA PIN JACK
002	994000002805	CD DOOR COVER -LEFT	△994000000317	AC CORD CUL 6FT /37
003	994000002806	CD DOOR COVER -RIGHT	△994000000512	AC CORD BS PLUG 2M /25
004	994000002804	CD DOOR CARRIER	△994000002819	AC CORD 2.4M /21/21M/22
005	994000002811	CONTL PANEL LENS W/HOT FOIL	△996500041861	AC CORD 1.8M /15
006	994000002803	FRONT CABINET /15/21/21M/30	994000002824	REMOTE CONTROL UNIT
006	994000002863	FRONT CABINET /22/25	994000002825	SPEAKER BOX L+R
006	994000002831	FRONT CABINET /37		
007	994000000305	SENSOR LENS		
008	994000000321	POWER /CD OPEN BUTTON		
009	994000000322	VOL +/- BUTTON		
011	994000002822	CD MECHANISM DA23Z1		
012	994000002816	SHOCK ABSORBER (BLACK)		
013	994000002817	SHOCK ABSORBER (GRAY)		
014	994000000324	FUNCTION BUTTON D./B./S./P./S.		
015	994000000323	FUNCTION BUTTON STOP/PLAY		
016	994000002837	LCD DISPLAY		
017	994000002814	DRIVE BELT		
018	994000002808	DRIVER PULLEY GEAR	<b>Note: Only these parts mentioned in the list are</b>	
019	994000002807	DRIVING GEAR	<b>normal service parts.</b>	
020	994000002832	MOTOR BRACKET		
021	994000002818	DOOR MOTOR PULLY		
022	994000002815	DC MOTOR 5V		
023	△994000000597	TRANSFORMER 120/230V /15/21/21M		
023	△994000000278	TRANSFORMER 230V /22/25		
023	△994000000316	TRANSFORMER EI-57 120V /37		
024	994000000284	RUBBER FOOT		
025	994000000281	RCA JACK BD 2P (RD/WH)		
026	994000000592	REAR CABINET /15/21/21M		
026	994000000291	REAR CABINET /22/25		
026	994000000319	REAR CABINET /37		
027	994000000283	SPEAKER HOLDER		
028	994000002813	RUBBER FOOT 24x11x1.6mm		
029	994000002812	UNIT STAND		
031	994000002823	AM/FM ANT 75R ASS'Y PACKING		
032	994000000307	SPEAKER WIRE HOLDER		

**ELECTRICAL PARTSLIST**

C317	994000002856	E.CAP 4700UF 16V +-20%	Q208	996500020152	TRANSISTORS MMBT3904LT1
C319	994000001346	E.CAP 4700UF 25V +-20%	Q209	996500020152	TRANSISTORS MMBT3904LT1
CF201	994000000245	BAND PASS FILTER	Q210	996500020152	TRANSISTORS MMBT3904LT1
CF204	994000002857	CERAMIC FILTER SFU450B	Q211	996500020152	TRANSISTORS MMBT3904LT1
FS300	△994000000588	FUSE T800mA/250V /21/21M/37	Q212	996500020152	TRANSISTORS MMBT3904LT1
FS301	△994000000585	CERAMIC FUSE 2A/250V	Q213	996500020152	TRANSISTORS MMBT3904LT1
FS302	△994000000586	GLASS FUSE 3.15A/250V	Q214	994000002835	TRANSISTORS MMBT3906LT1
FS303	△994000002865	SUBMINI. FUSE 200mA/250V /22	Q215	996500020152	TRANSISTORS MMBT3904LT1
IC1	932218179668	IC MM1469PH	Q301	994000001193	TRANSISTORS KSB772YS
IC101	994000002844	IC TA2157FN	Q302	996500020152	TRANSISTORS MMBT3904LT1
IC102	994000002849	IC TC94A14FAG	Q402	996500020152	TRANSISTORS MMBT3904LT1
IC103	994000002853	IC XC61FC3012MR	Q403	996500020152	TRANSISTORS MMBT3904LT1
IC105	994000001197	IC KA7805	Q404	996500020152	MMBT3904LT1/21/21M/37
IC201	996500018261	IC TC9257F	Q404	994000002835	MMBT3906LT1 /22/25
IC202	996500018307	IC TA2099N	Q405	996500020152	TRANSISTORS MMBT3904LT1
IC204	994000002848	IC TC9422AFG	Q406	996500020152	TRANSISTORS MMBT3904LT1
IC301	994000002841	IC KA7810	Q602	996500020152	TRANSISTORS MMBT3904LT1
IC301	996500038611	IC KA7810E /15	Q900	482213063664	TRANSISTORS 2W 8050C
IC302	994000000253	IC KA7808	R301	△994000002854	FUSE RES. 2.2R 1W +-5%
IC303	994000000277	IC LM78L05	R462	△994000002855	FUSE RES. 27R 1W +-5%
IC401	994000002852	IC TMP87PP23F (OTP)	REM401	994000001239	OPTIC SENSER (OPTO..)
IC402	482220930619	IC TA7291S	RF201	994000000256	TUNER (MITSUMI) FE450-G01
IC403	994000002853	IC XC61FC3012MR	RF201	994000004442	TUNER FE450-G11 /15
IC501	994000002851	IC TC94A34FG-006	RL301	△994000000264	RELAY 9V 10A /22/25
IC502	994000002847	IC TC9404FN	SW401	994000000274	TACT SWITCH
IC503	994000002839	IC H1117SJ-3.3V	SW402	994000000274	TACT SWITCH
IC504	994000002838	IC BA15BC0FP	SW403	994000000274	TACT SWITCH
IC601	994000000249	IC BA4558F	SW404	994000000274	TACT SWITCH
IC602	994000000367	IC TFA9842J	SW405	994000000274	TACT SWITCH
JK601	994000000257	PHONE JACK 7PIN	SW406	994000000274	TACT SWITCH
JK602	994000000315	SPK JACK (R/B/R/B)	SW407	994000000274	TACT SWITCH
LED401	994000001233	LED LAMP (RED)	SW408	994000000274	TACT SWITCH
LED402	994000000267	LED LAMP 5mm (BLUE)	SW409	994000000274	TACT SWITCH
LED403	994000000266	LED LAMP 3mm (BLUE)	SW410	994000000274	TACT SWITCH
Q102	994000002839	IC H1117SJ-3.3V	SW411	994000000274	TACT SWITCH
Q201	994000002833	TRANSISTORS 9018G	SW412	994000000274	TACT SWITCH
Q202	996500020152	TRANSISTORS MMBT3904LT1	SW413	994000000274	TACT SWITCH
Q203	996500020152	TRANSISTORS MMBT3904LT1	SW414	994000000274	TACT SWITCH
Q206	996500020152	TRANSISTORS MMBT3904LT1	SW601	994000000273	MICRO SWITCH 1120B



**ELECTRICAL PARTS LIST**

T201	994000002858	I.F.T 7mm #7M1A2186F (BLK)
T202	994000002859	I.F.T 7mm #7M4A1975R (ORANGE)
T203	994000002861	I.F.T 7mm A049 (YELLOW)
T302	△ 994000000262	TRANSFORMER AC230V /22/25
VD201	994000002836	VARICAP DIODE 1SV-149
VD202	994000002836	VARICAP DIODE 1SV-149
X101	9940 000 04551	X'TAL 16,9344MHZ +/-20PPM
X201	9940 000 04535	X'TAL 7,2MHZ +/-30PPM
X402	9965 000 38613	X'TAL 7.99968MHZ
X501	9940 000 04551	X'TAL 16,9344MHZ +/-20PPM
	994000002866	POWER BOARD ASS'Y /15/21/21M/37
	994000002867	POWER BOARD ASS'Y /22/25
	994000002868	KEY BOARD ASS'Y /15/21/21M/30/37
	994000002869	KEY BOARD ASS'Y /22/25

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

## **REVISION LIST**

### **1.0 Manual 3141 785 30330**

Initial Service Manual released.

### **1.1 Manual 3141 785 30331**

In this version, the type version /15 are added.

P9-2 : Mechanical Partslist updated

P9-3 : Electrical Partslist updated