MP3 Micro System

MCM720

all versions

Service
Service
Service

Service Manual

MP3-CD PLAYBACK MP3 | COMPACT disc DIGITAL AUDIO Recordable | COMPACT disc DIGITAL AUDIO ReWritable

USB DIRECT | COMPACT disc DIGITAL VIDEO | COMPACT disc DIGITAL AUDIO

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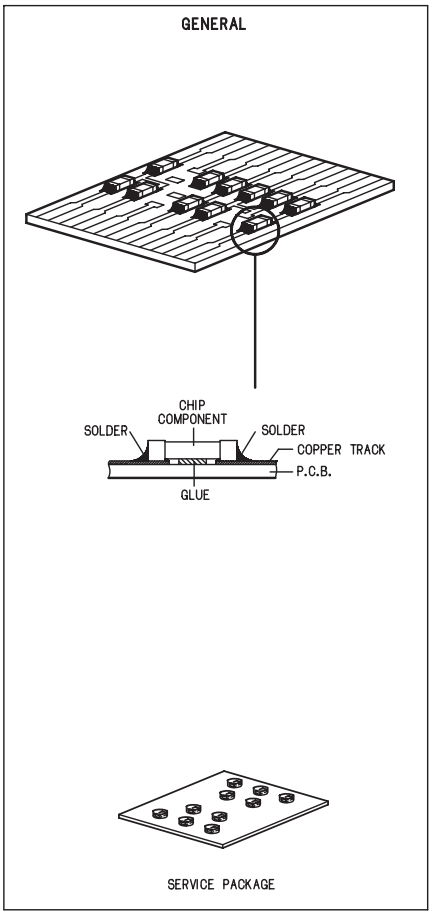
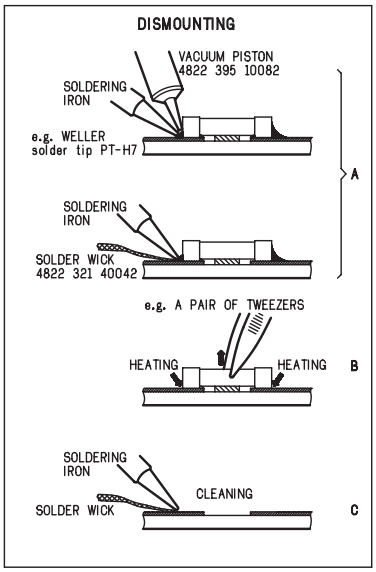
GB 3141 785 31001

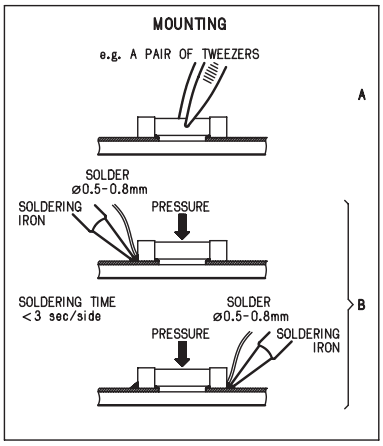
Version 1.1

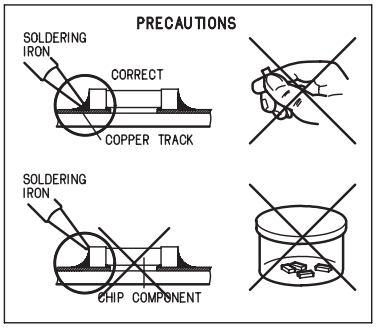
PHILIPS

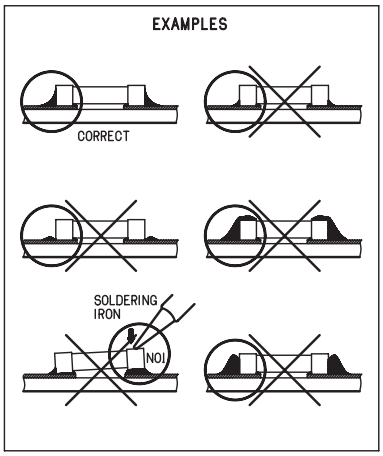
HANDLING CHIP COMPONENTS











(GB) WARNING
All ICs and many other semiconductors 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 wristband with resistance. Keep components and tools 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 vermindern. 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 longévite pourrait être considérablement écourtée par le fait qu´aucune précaution nést prise à leur manipulation.
Lors de réparations, s´assurer de bien être relié au même potentiel que la masse de l´appareil et enfileer le bracelet serti d´une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l´on utilise soient également à ce potentiel.

(D) WARNUNG
Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

(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 riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

SAFETY

(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 ⚠

(NL)
Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.
De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

(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 ⚠

(I)
Le norme di sicurezza estigono che l´apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

CLASS 1 LASER PRODUCT

(GB) **DANGER**: 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.

(DK) Advarsel !
Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

(FIN) Varoitus !
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

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

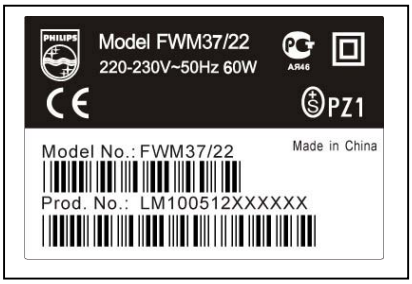
(F)
"Pour votre sécurite, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

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.

TECHNICAL SPECIFICATIONS

AMPLIFIER

Output power ..... 2 x 50 W RMS*
..... 2 x 100 W MPO
Signal-to-noise ratio ..... ⩾62 dBA (IEC)
Frequency response ..... 40 – 15000 Hz, ± 3 dB
Impedance loudspeakers ..... 6 Ω
Impedance headphones ..... 32 Ω
* (4 Ω, 1 kHz, 10% THD)

CD/MP3-CD PLAYER

Number of programmable tracks 20
Frequency range ..... 20 – 20000 Hz
Signal-to-noise ratio ..... 75 dBA
Channel separation .....⩾60 dB (1 kHz)
Total harmonic distortion ..... < 0.003%
MPEG 1 Layer 3 (MP3-CD) ..... MPEG AUDIO
MP3-CD bit rate ..... 32-256 kbps
(128 kbps advised)
Sampling frequencies ..... 32, 44.1, 48 kHz

TUNER

FM wave range ..... 87.5 – 108 MHz
LW wave range ..... 153 – 279 kHz
MW wave range ..... 531 – 1602 kHz
Sensitivity at 75 Ω
– mono, 26 dB signal-to-noise ratio ..... 2.8 µV
– stereo, 46 dB signal-to-noise ratio ..... 61.4 µV
Selectivity .....⩾28 dB
Total harmonic distortion .....⩽5%
Frequency response ..... 63 – 12500 Hz (± 3 dB)
Signal-to-noise-ratio .....⩾50 dBA

USB PLAYER

USB 12Mb/s, V1.1
..... support MP3 and WMA files
Number of albums/folders ..... maximum 99
Number of tracks/titles ..... maximum 500

TAPE DECK

Frequency response
Normal tape (type I) ..... 80 – 12500 Hz (8 dB)
Signal-to-noise ratio
Normal tape (type I) ..... 50 dBA
Wow and flutter .....⩽0.4% DIN

SPEAKERS

2-way Bass reflex system
Dimensions (w x h x d) . 170 x 252 x 214 (mm)

GENERAL INFORMATION

AC Power -/12..... 220 – 230 V / 50 Hz
AC Power -/05..... 220 – 230 V / 50 Hz
Dimensions (w x h x d) .. 175 x 252 x 305 (mm)
Weight (with/without speakers)
..... approx. 8.96 / 4.84 kg
Eco Power Standby ..... < 1 W

Specifications and external appearance are subject to change without notice.

SERVICE TOOLS

TORX T10 screwdriver with shaftlength 150mm.....4822 395 50423
TORX screwdriver set SBC 163.....4822 295 50145

Audio signal disc SBC 429.....4822 397 30184
Playability test disc SBC 444.....4822 397 30245
Test disc 5 (disc without errors) +
Test disc 5A (disc with dropout errors, black spots and fingerprints)
SBC 426/426A.....4822 397 30096
Burn in test disc (65 min. 1kHz signal at -30 dB level without “pause”).....4822 397 30155

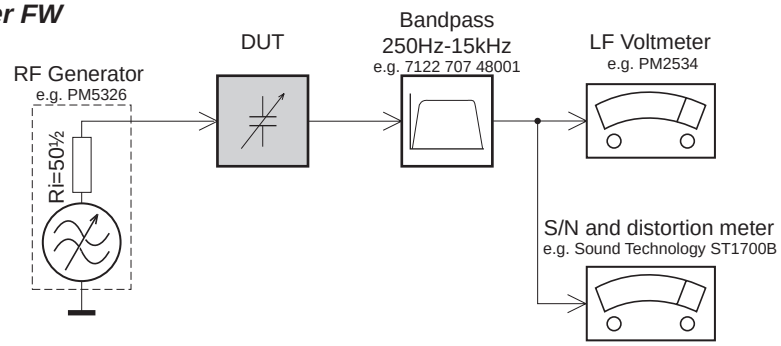
Universal test cassette Fe SBC 420.....4822 397 30071

AVAILABLE ESD PROTECTION EQUIPMENT

anti-static table mat	large 1200x650x1.25mm	4822 466 10953
	small 600x650x1.25mm	4822 466 10958
anti-static wristband		4822 395 10223
connection box (3 press stud connections, 1MΩ)		4822 320 11307
extendible cable (2m, 2MΩ, to connect wristband to connection box)		4822 320 11305
connecting cable (3m, 2MΩ, to connect table mat to connection box)		4822 320 11306
earth cable (1MΩ, to connect any product to mat or to connection box)		4822 320 11308
KIT ESD3 (combining all 6 prior products - small table mat)		4822 310 10671
wristband tester		4822 344 13999

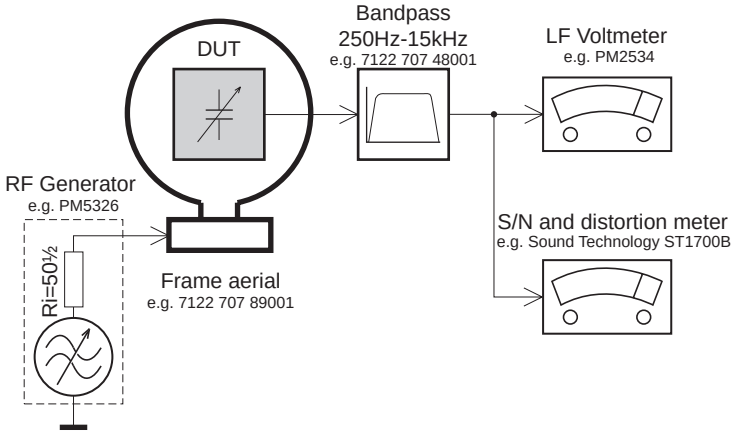
SERVICE MEASUREMENT

Tuner FW



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

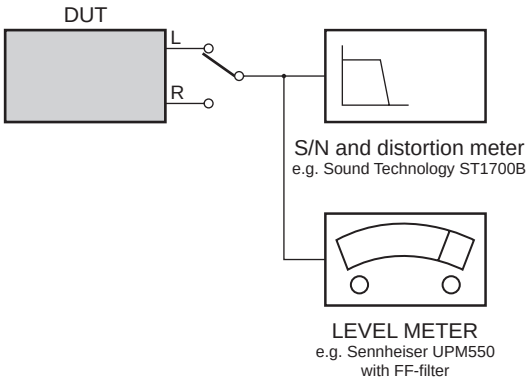
Tuner AM (MW,LW)



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 250kHz) to eliminate hum (50Hz, 100Hz).

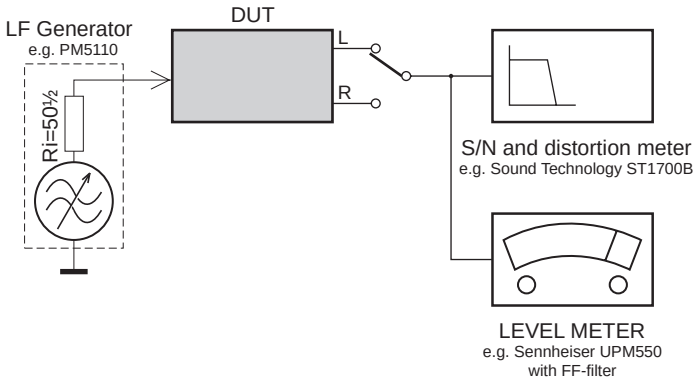
CD

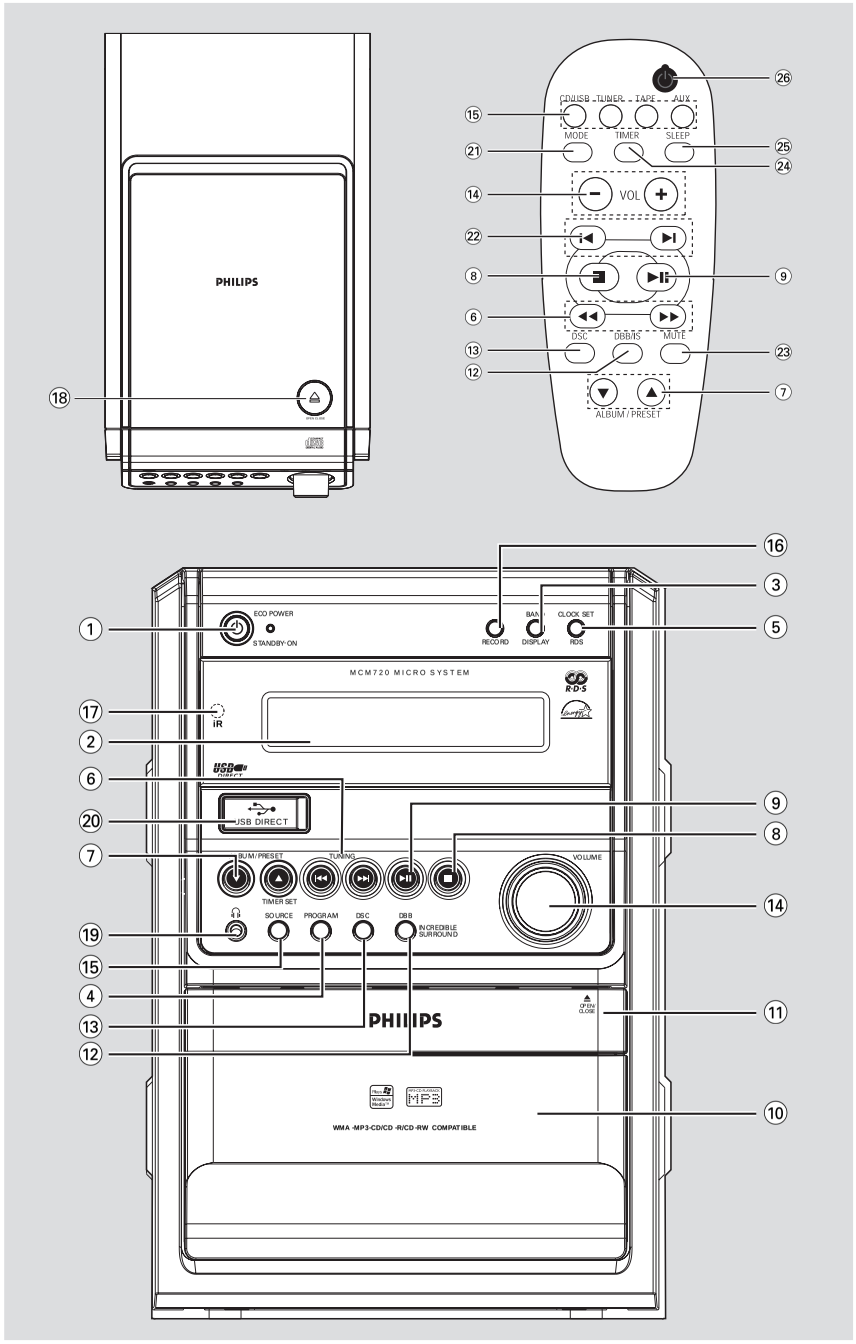
Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)



RECORDER

Use Universal Test Cassette Fe SBC420 4822 397 30071





Controls *(illustrations on page 3)*

Controls on the system and remote control

① **Eco Power/STANDBY ON** ⏻
– to switch the system on or to Eco Power standby/normal standby with clock display.

② **Display screen**
– to view the current status of the system.

③ **BAND/DISPLAY**
for Tuner ..... to select waveband : FM, MW or LW.
for CD/MP3-CD… to select disc information display mode.

④ **PROGRAM**
for CD/MP3-CD… to programme disc tracks.
for Tuner ..... to programme preset radio stations.

⑤ **CLOCK SET/RDS**
for Tuner ..... to activate RDS news.
for Clock ..... *(on the system only)* to set the clock function.

⑥ **TUNING ⏮/⏭ (◂◂/▸▸)**
for CD ..... to fast reverse/forward the disc.
for CD/MP3 CD… *(on the system only)* to select a desired track.
for Tuner ..... to tune to a lower or higher radio frequency.
for Tape ..... to rewind or fast forward.

⑦ **ALBUM/PRESET/TIMER SET ▼/▲**
for MP3-CD ..... to select previous/next album.
for Tuner ..... to select a preset radio station.
for Timer Set (▲) *(on the system only)* to set the timer function.

⑧ **STOP ■**
for CD/MP3-CD… to stop playback or to clear a programme.
for Tape ..... to stop playback or recording.

⑨ **PLAY/PAUSE ▶II**
for CD/MP3 CD… to start or interrupt playback.
for Tape ..... to start playback.

⑩ **Tape deck**

⑪ **OPEN/CLOSE ⏏**
– to open tape compartment.

⑫ **DBB/INCREDIBLE SURROUND (IS)**
– to create a super-enhanced stereo effect.
– to enhance the bass.

⑬ **DSC (Digital Sound Control)**
– to select the desired sound effect : OPTIMAL/ ROCK/JAZZ/POP.

⑭ **VOLUME (VOL + / -)**
– to increase or decrease the volume.
– *(on the system only)* to adjust the hours and minutes for the clock/timer functions.

⑮ **SOURCE**
– to select the respective sound source : USB/CD, TUNER, TAPE or AUX.

⑯ **RECORD**
– to start recording.

⑰ **iR sensor**
– infrared sensor for remote control.

⑱ **OPEN•CLOSE ⏏**
– to open or close the disc tray.

⑲ **Headphone**
– Plugs in the headphones jack. The speakers output will be cancelled.

⑳ **USB DIRECT**
– jack for the external USB mass storage device.

㉑ **MODE**
– to shuffle and repeat a track/disc.

㉒ **⏮ / ⏭**
– to select a desired track.

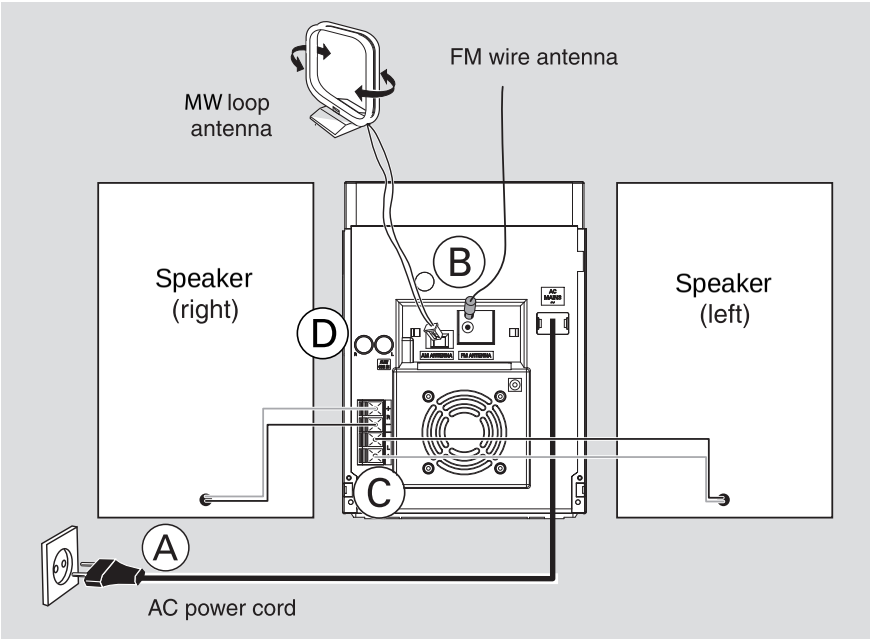
㉓ **MUTE**
– interrupts and resumes sound reproduction.

㉔ **TIMER**
– to activate/deactivate the timer function.

㉕ **SLEEP**
– to activate/deactivate or set the sleep timer.

㉖ ⏻
– to switch the system to standby mode.

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, ⏮, ⏭).



Rear connections

The type plate is located at the rear of the system.
For users in the U.K.: please follow the instructions on page 2.

Ⓐ Power

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

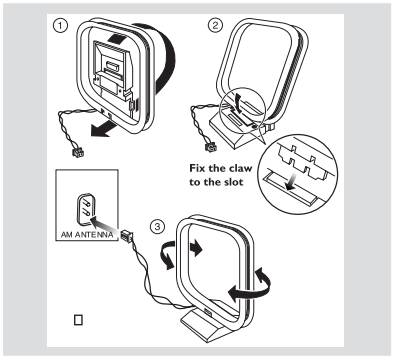
WARNING!
– For optimal performance, use only the original power cable.
– Never make or change connections with the power switched on.

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)*.

Ⓑ Antennas Connection

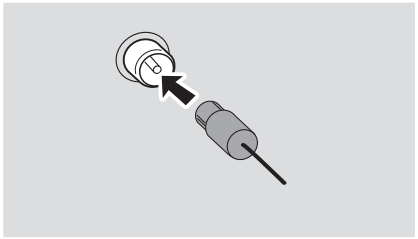
Connect the supplied MW loop antenna and FM antenna to the respective terminals. Adjust the position of the antenna for optimal reception.

MW Antenna



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

FM Antenna

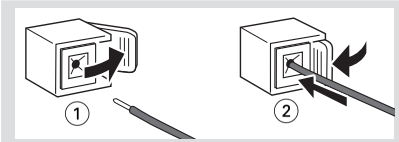


- For better FM stereo reception, connect an outdoor FM antenna to the FM AERIAL (FM ANTENNA) terminal.

Ⓒ Speakers Connection

Front Speakers

Connect the speaker wires to the SPEAKERS terminals, right speaker to "**R**" and left speaker to "**L**", coloured (marked) wire to "**+**" and black (unmarked) wire to "**–**".



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

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

Optional connection

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

Connecting a USB device or memory card

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

- Insert the USB device's USB plug into the ⇽●⇾ socket on the set.

OR

for the devices with USB cables:

1 Insert one plug of the USB cable (not supplied) to the ⇽●⇾ socket on the set.
2 Insert the other plug of the USB cable to the USB output terminal of the USB device.

for the memory card:

1 Insert the memory card into a card reader (not supplied).
2 Use a USB cable (not supplied) to connect the card reader into the ⇽●⇾ socket on the set.

Connecting a non-USB device

Use a cinch cable to connect **AUX IN** to the analogue audio out terminals of an external equipment (TV, VCR, Laser Disc player, DVD player or CD Recorder).

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

Troubleshooting

Problem	Solution
Recording or playback cannot be made.	✔ Clean deck parts, see "Maintenance". ✔ Use only normal (IEC I) tape for recording.
"CHK TAPE " is displayed.	✔ Apply a piece of adhesive tape over the missing tab space.
The tape deck door cannot open.	✔ Remove and reconnect the AC power plug and switch on the system again.
The system does not react when buttons are pressed.	✔ Remove and reconnect the AC power plug and switch on the system again.
Sound cannot be heard or is of poor quality.	✔ Adjust the volume. ✔ Disconnect the headphones. ✔ Check that the speakers are connected correctly. ✔ Check if the stripped speaker wire is clamped. ✔ Make sure the MP3-CD was recorded within 32-256 kbps bit rate with sampling frequencies at 48 kHz, 44.1 kHz or 32 kHz.
The left and right sound outputs are reversed.	✔ Check the speaker connections and location.
The remote control does not function properly.	✔ Select the source (CD or TUNER, for example) before pressing the function button (▶II, I◀, ▶I). ✔ Reduce the distance between the remote control and the system. ✔ Insert the batteries with their polarities (+/– signs) aligned as indicated. ✔ Replace the batteries. ✔ Point the remote control directly toward IR sensor on the front of the system.
The timer is not working.	✔ Set the clock correctly. ✔ Press TIMER SET ▲ (TIMER on the remote control) to switch on the timer. ✔ If a recording is in progress, stop the recording.
The Clock/Timer setting is erased.	✔ Power has been interrupted or the power cord has been disconnected. Reset the clock/timer.
Some files on the USB device are not displayed.	✔ Check if the number of folders exceeds 99 or the number of titles exceeds 500.
"DEVICE NOT SUPPORTED " scrolls on the display.	✔ Remove the USB mass storage device or select another source..

Maintenance

Cleaning the Cabinet

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

Cleaning Discs

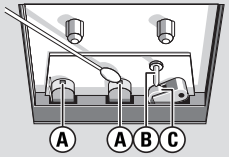
- When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the centre out.
- Do not use solvents such as benzene, thinner, commercially available cleaners, or antistatic spray intended for analogue records.

Cleaning the disc lens

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

Cleaning the Heads and the Tape Paths

- To ensure good recording and playback quality, clean the heads (A), the capstan(s) (B), and pressure roller(s) (C) after every 50 hours of tape operation.
  Caution: Do not rotate the heads during cleaning.
- Use a cotton swab slightly moistened with cleaning fluid or alcohol.
- You can also clean the heads by playing a cleaning tape once.



Demagnetizing the heads

- Use a demagnetizing tape available at your dealer.

Troubleshooting

WARNING

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

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

Problem	Solution
"NO DISC " is displayed.	✔ Insert a disc. ✔ Check if the disc is inserted upside down. ✔ Wait until the moisture condensation at the lens has cleared. ✔ Replace or clean the disc, see "Maintenance". ✔ Use a finalised CD-RW or CD-R.
Radio reception is poor.	✔ If the signal is too weak, adjust the antenna or connect an external antenna for better reception. ✔ Increase the distance between the Micro HiFi System and your TV or VCR.

4-1

DISMANTLING INSTRUCTIONS

Dismantling of the Cover Cassette and Universal Loader

1) Push 1 catch each on the left & right side then remove the Cover Cassette in the direction as shown in Figure 1 and Figure 1A.

2) Loosen 8 screws to remove the Cover Top by sliding it out towards the rear before lifting up.
   - 6 screws on the rear
   - 1 screw each on the left & right side

3) Loosen 2 screws each to remove the Panel Left and Panel Right. The Panels are removed by sliding it towards the rear and outwards.
   - 1 screw on the rear
   - 1 screw on the side
   - see Service position A

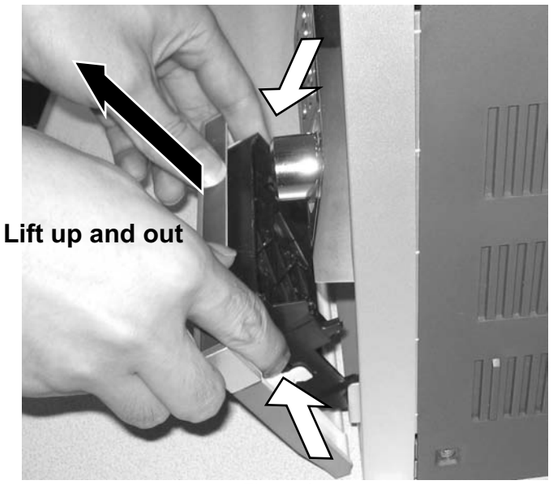


Figure 1

6) Loosen 2 screws A (see Figure 2) to remove the Bracket Module Mounting and CD Module.
   - 1 screw each on the left & right side

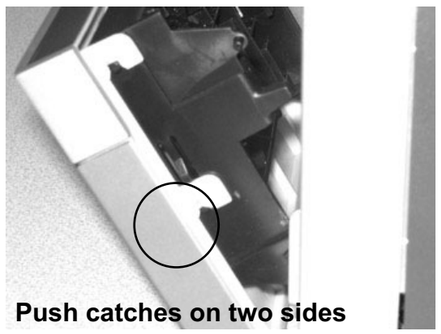


Figure 1A

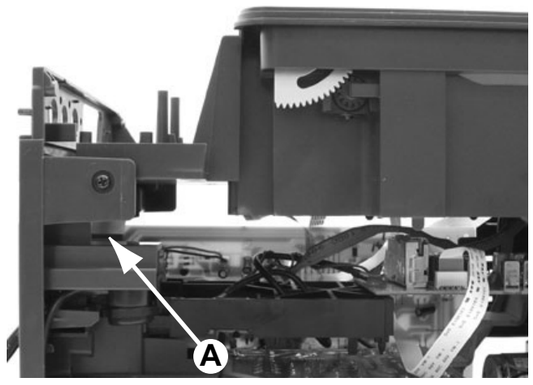


Figure 2

Detaching the Front Panel assembly from the Bottom/Rear assembly

1) Remove 2 screws B (see Figure 3) from the bottom of the Cabinet Front.

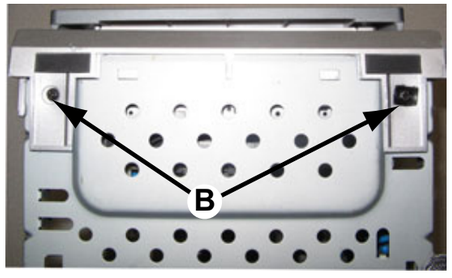


Figure 3

2) Release the fixation of the Combi Board (pos1102-1003) to Bracket Combi (pos 155) by releasing the 2 catches C1 (see Figure 7) and pulling the Combi Board outwards as shown in Figure 7A.
3) Uncatch 2 catches C2 (see Figure 7) on the left & right sides of the Cabinet Front (pos 101) and slides the Front Panel assembly out towards the front.
   - see Service position C

Detaching the Front Panel assembly from the Bottom/Rear assembly

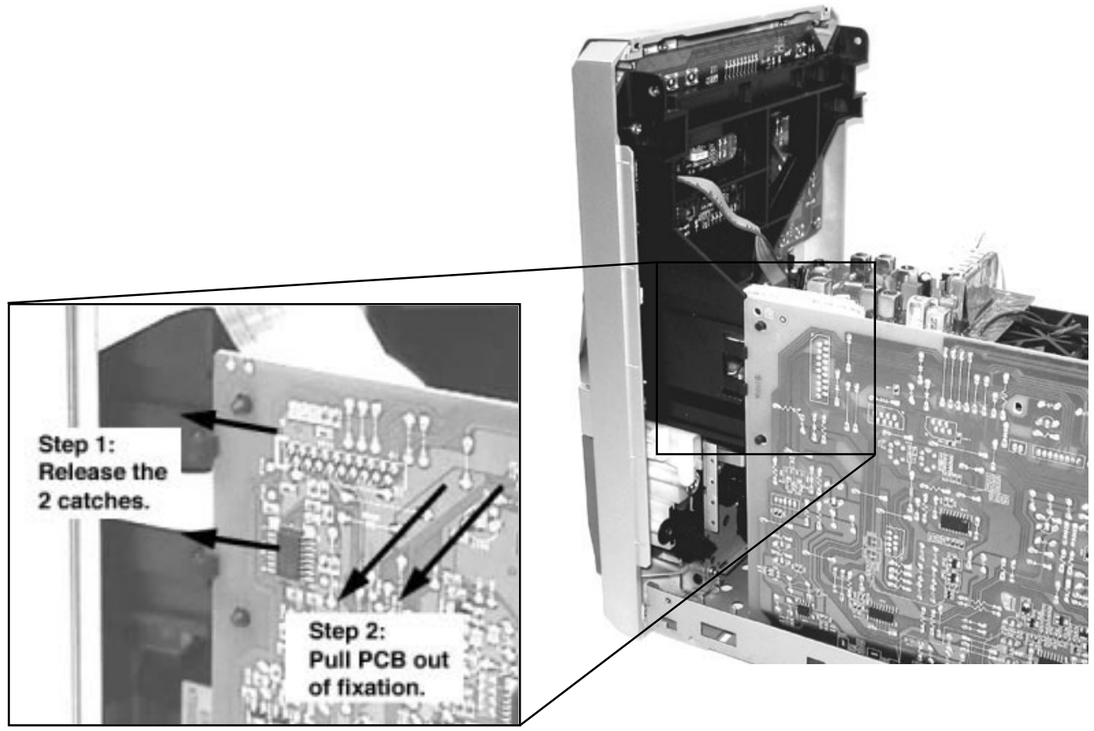


Figure 4A

Figure 4

Dismantling of the Front Panel assembly

1) The Knob Volume can be remove by pulling it out in the direction as shown in Figure 5.
2) Loosen 3 screws C (see Figure 6) to remove the Bracket Front Cabinet Display.
3) Loosen 3 screws D (see Figure 6) to remove Front Display Board.
4) Loosen 2 screws E (see Figure 6) to remove the Headphone Board.
5) Loosen 4 screws F (see Figure 7) to remove the Module Tape Deck.

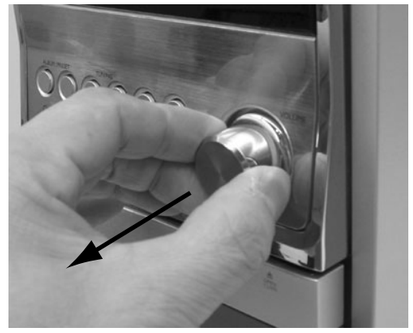


Figure 5

DISMANTLING INSTRUCTIONS

Dismantling of the Front Panel assembly

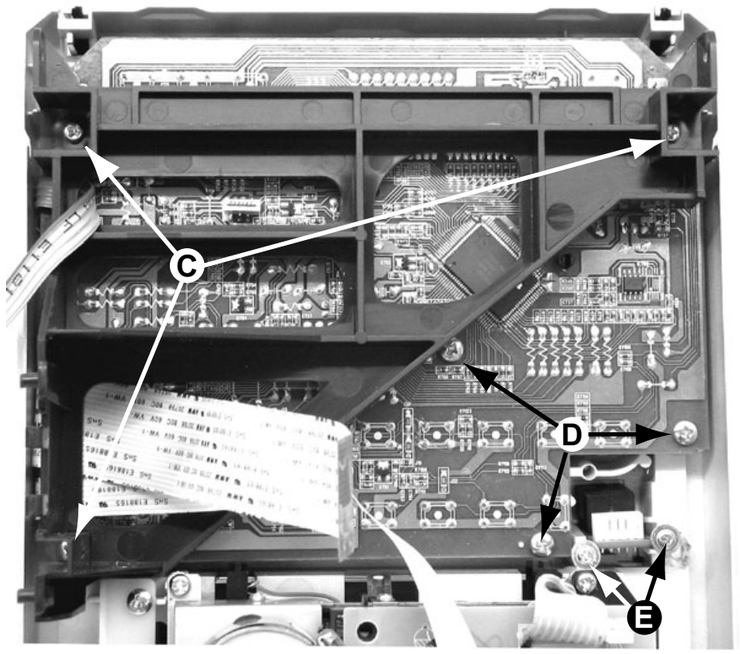


Figure 6

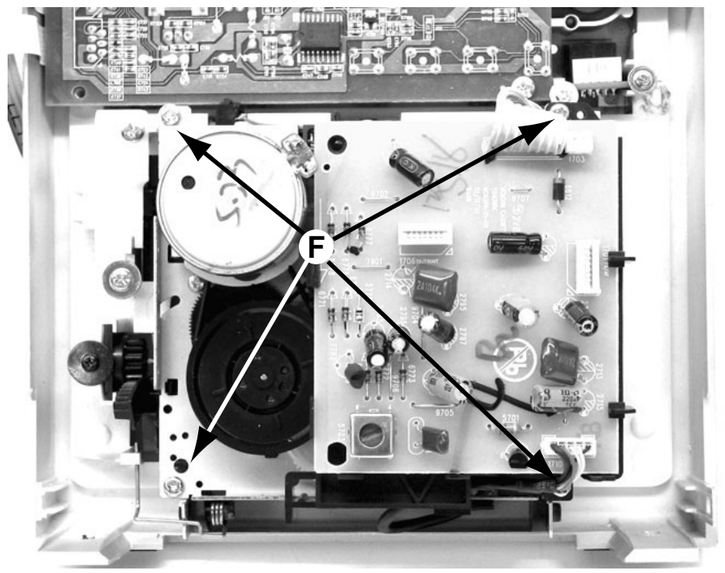


Figure 7

4-2

Dismantling of the Rear Panel assembly

1) Loosen 3 screws K and 2 catches C5 (see Figure 8) to remove the Tuner Board assembly.
2) Loosen 5 screws L (see Figure 8) to free the Main Board.
3) Loosen 1 screw M (see Figure 8) to free the Mains Socket Bracket.
4) Loosen 1 scew N and 2 catches C6 (see Figure 8) to free the Panel Rear by sliding it out towards the rear.

Note : Tuner Board assembly and Mains Socket Bracket can also be removed together with the Panel Rear.

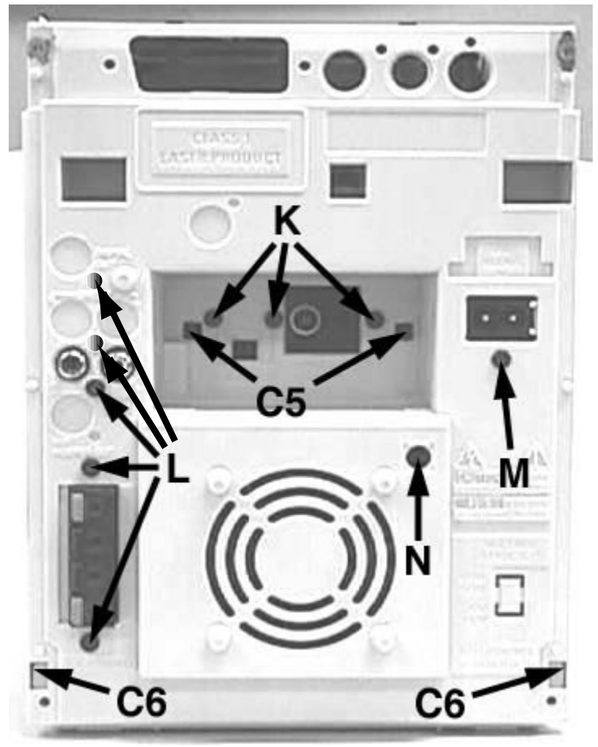


Figure 8

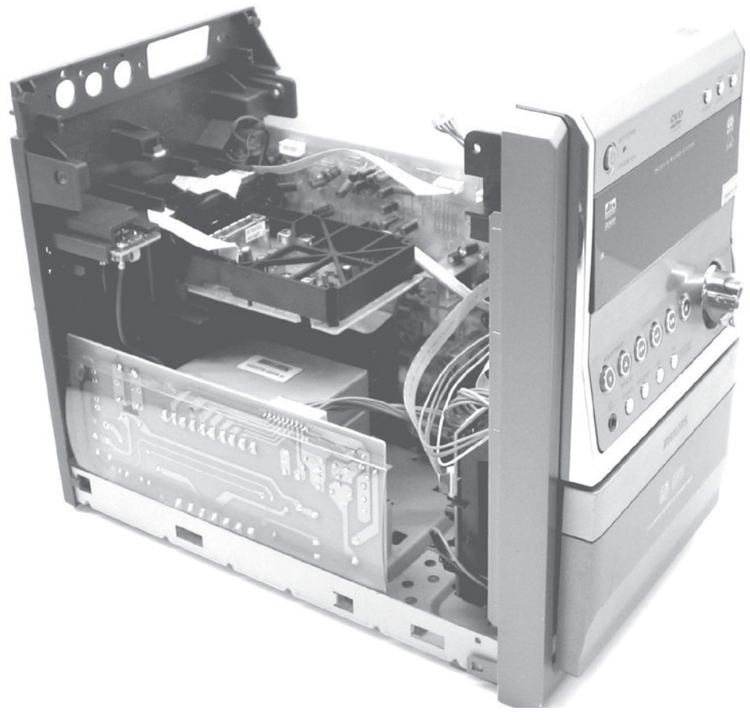
DISMANTLING INSTRUCTIONS

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.

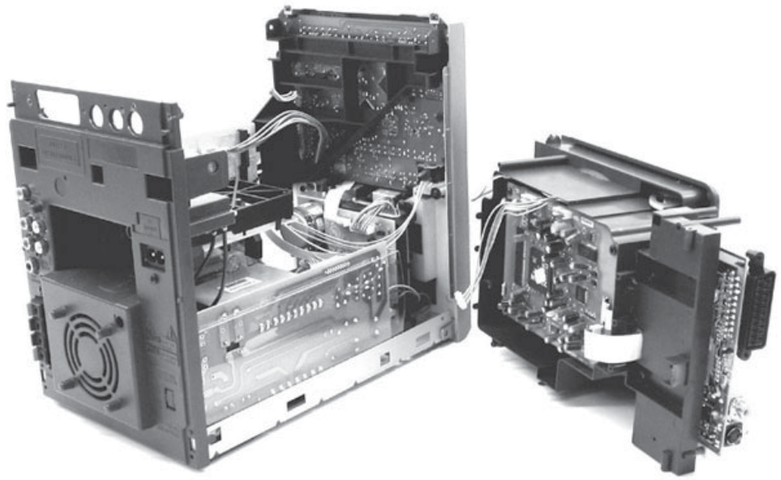
Note: The flex cables are very fragile, care should be taken not to damage them during repair. After repair, be very sure that the flex cables are inserted properly into the flex sockets before encasing, otherwise faults may occurs.

Service position A

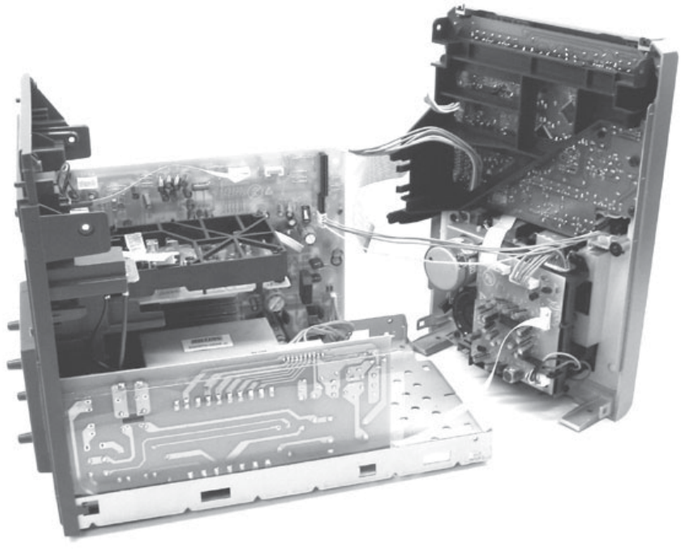


4-3

Service position B

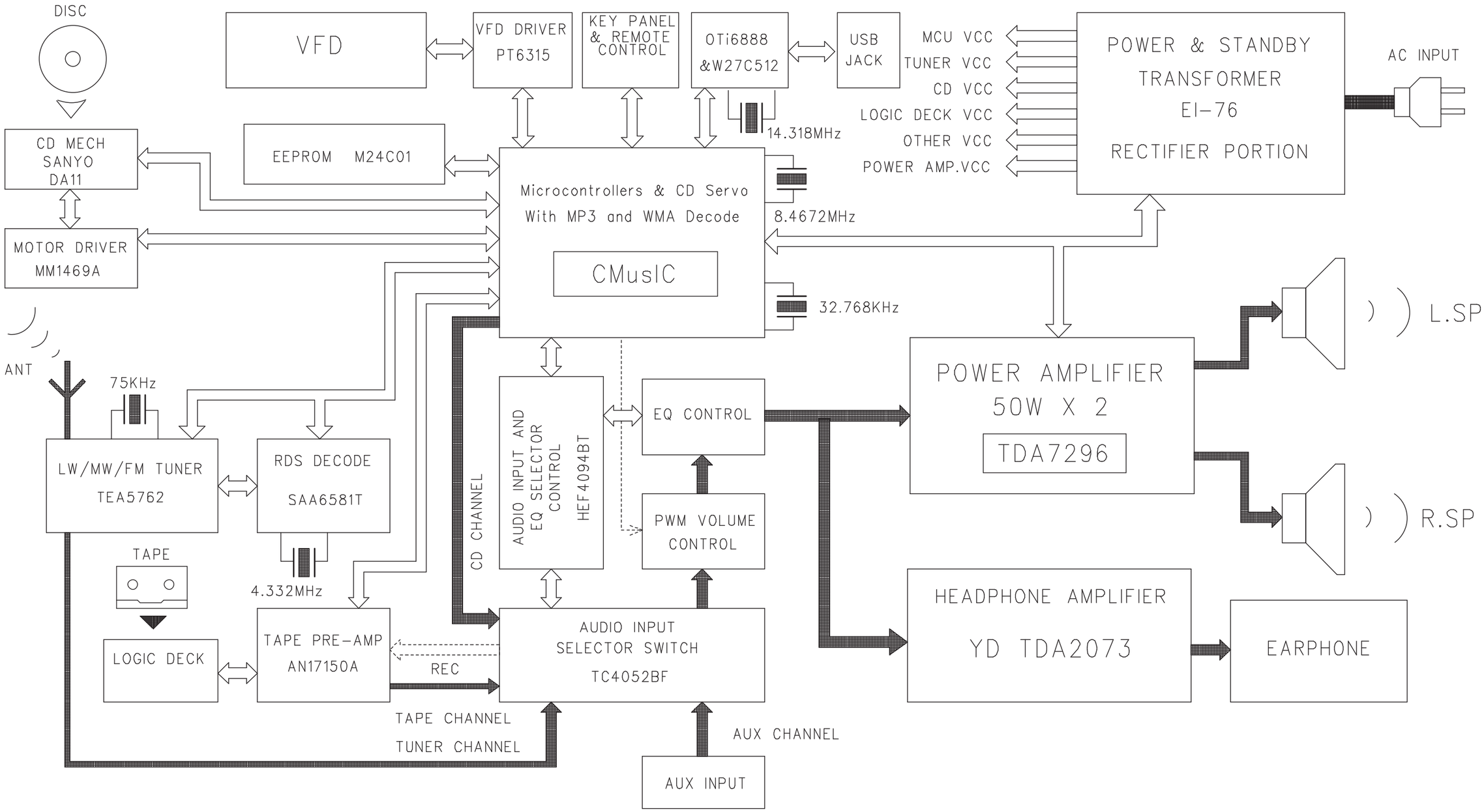


Service position C



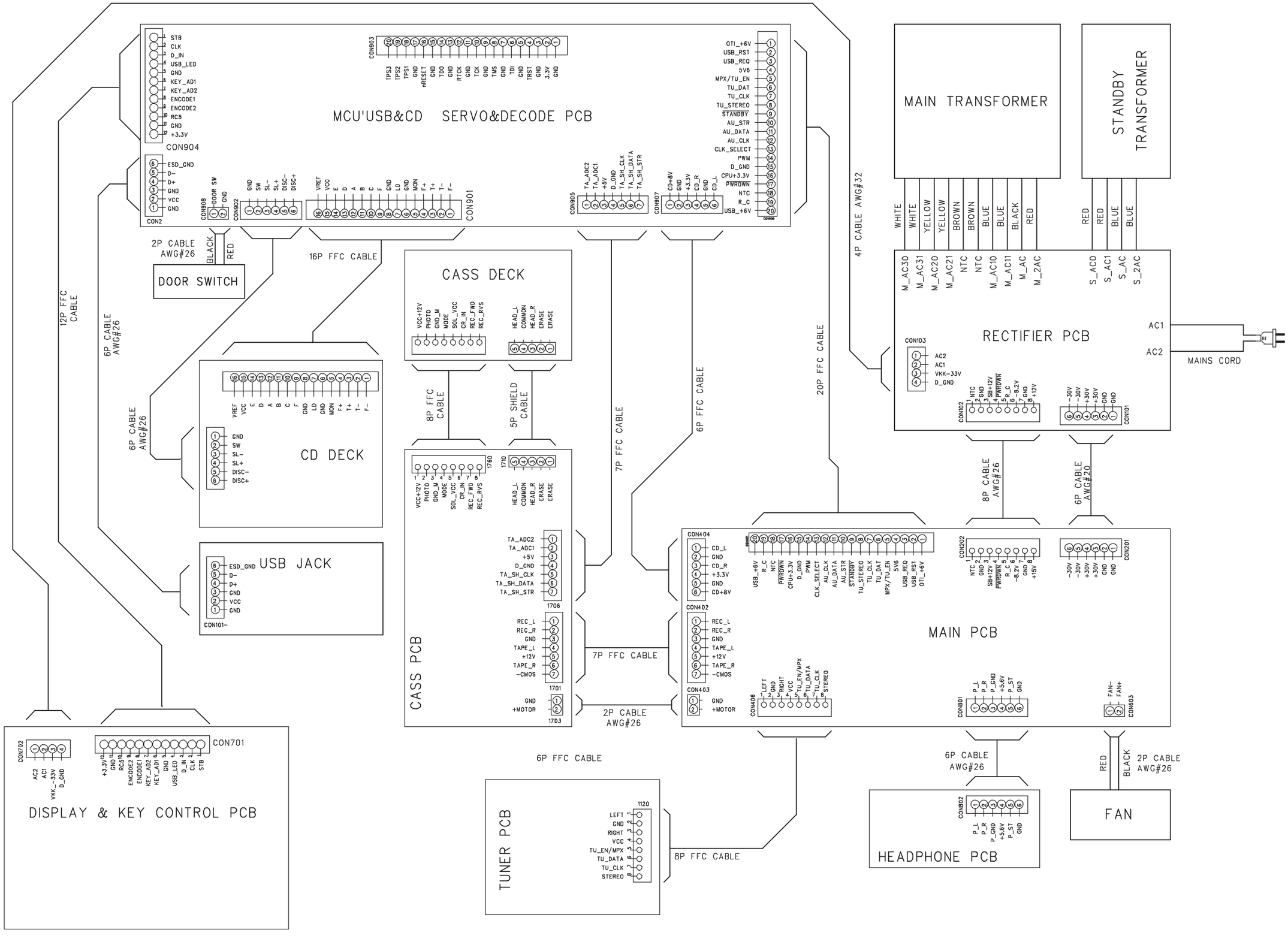
5 - 1

SET BLOCK DIAGRAM



6 - 1

SET WIRING DIAGRAM



7 - 1

CIRCUIT DIAGRAM - MAIN BOARD
PART 1

Source Selection Logic Table		
Source	A1	A0
TAPE	0	0
AUX	1	0
TUNER	0	1
CD	1	1

DSC/DBB LOGIC CONTROL TABLE					
Sound features		Control lines			
DSC	DBB	DBB	POP	BASS	JAZZ
off (flat)	off	0	0	1	0
	on	1	0	1	0
Rock	off	1	0	1	0
	on	1	0	0	0
Jazz	off	0	0	1	1
	on	1	0	1	1
Pop	off	1	1	1	1
	on	1	1	0	1

EXPANDER_1 LOGIC

EXPANDER_2 CIRCUIT

RADIO PCB

CPU&KEY PCB

CASSETTE PCB

CD PCB

AUX INPUT

EARPHONE POWER AMPLIFIER

HEADPHONE PCB

SOURCE SELECTOR

ELECTRONIC VOLUME CONTROL

IC402 TC4052BF

EXPANDER_1 CIRCUIT

uP port Extension

RECTIFIER PCB

POWER SUPPLY

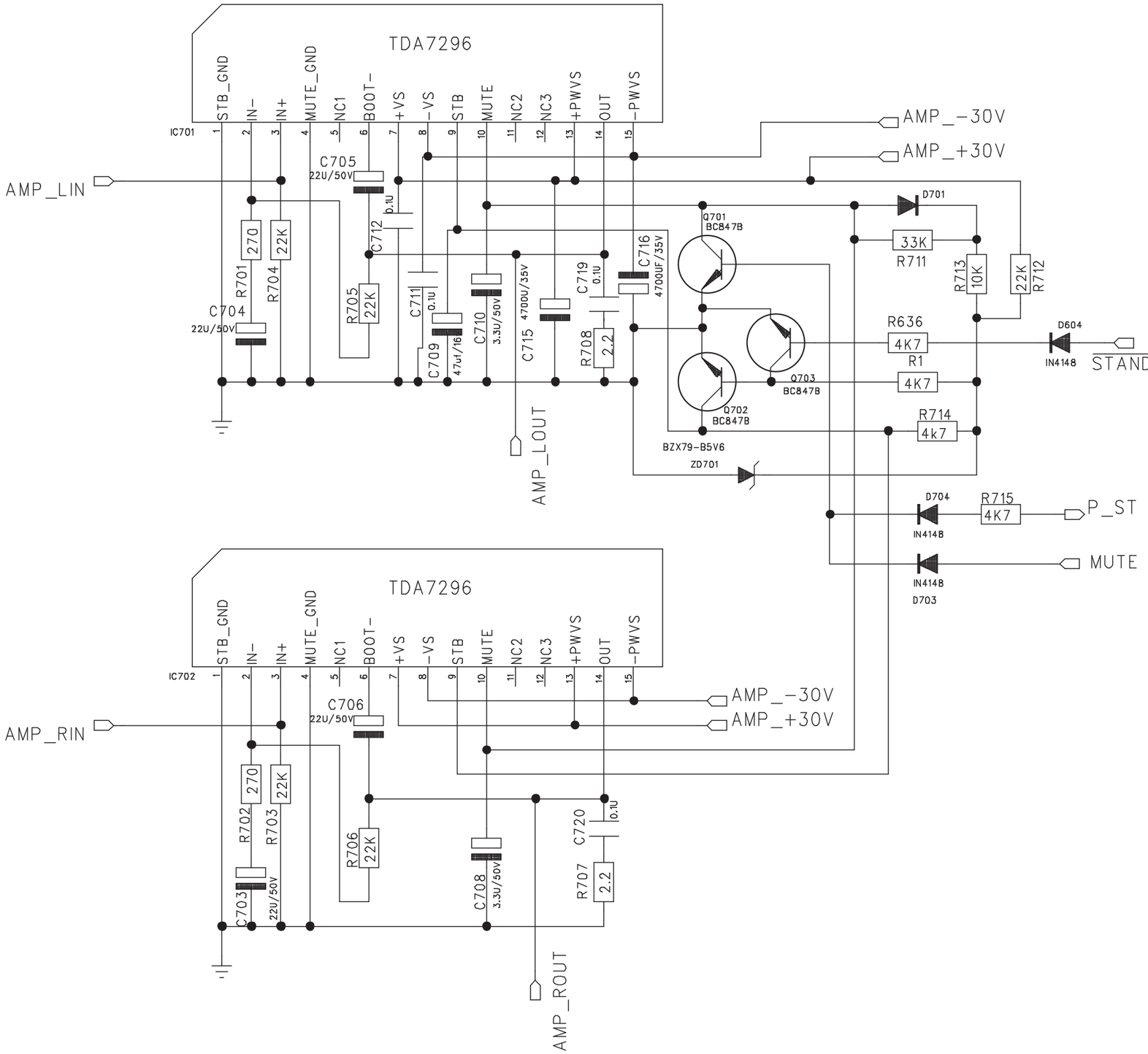
50W POWER OUTPUT

RADIATOR FAN

SPEAK BOX

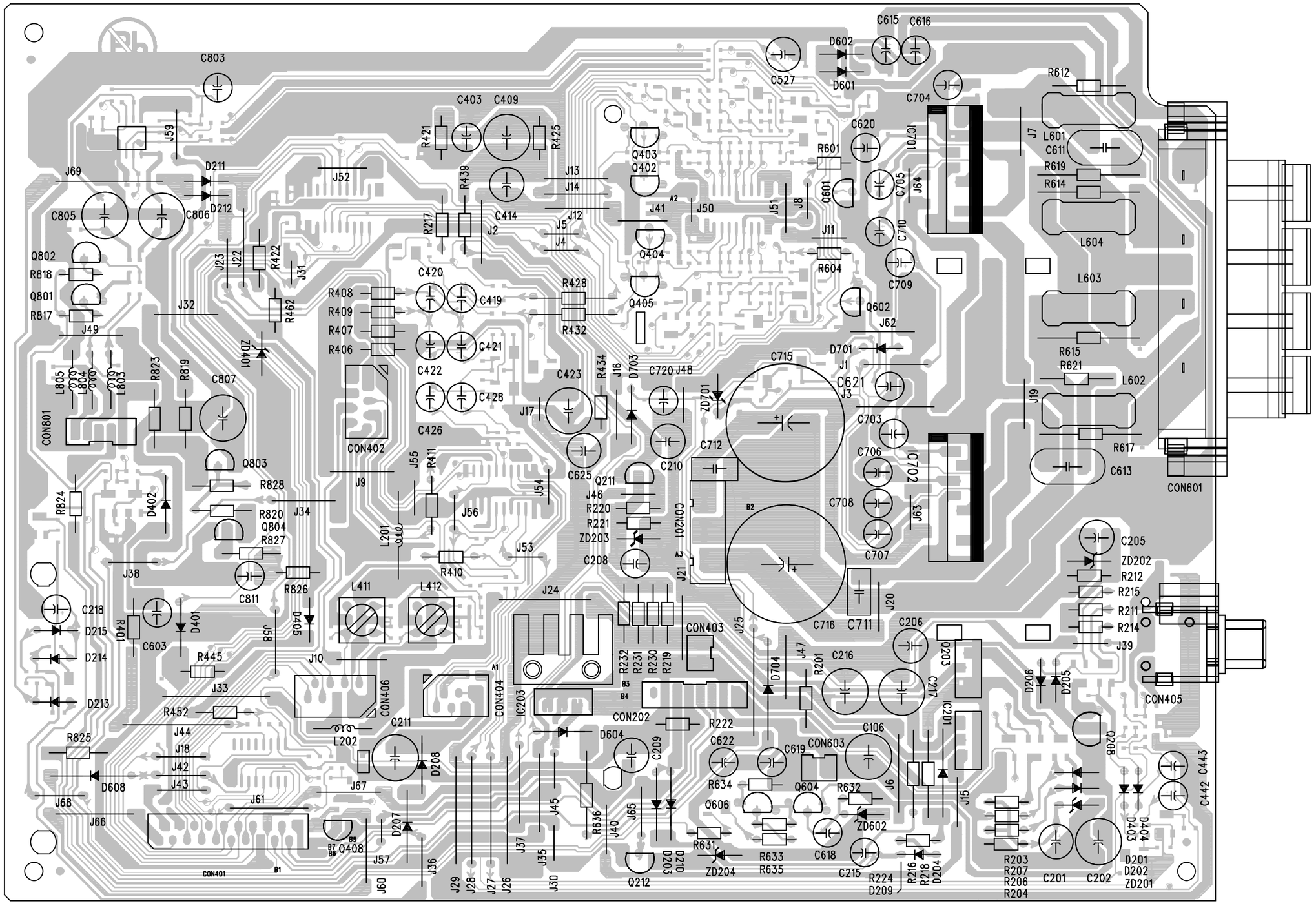
7 - 2

CIRCUIT DIAGRAM - MAIN BOARD
PART 2



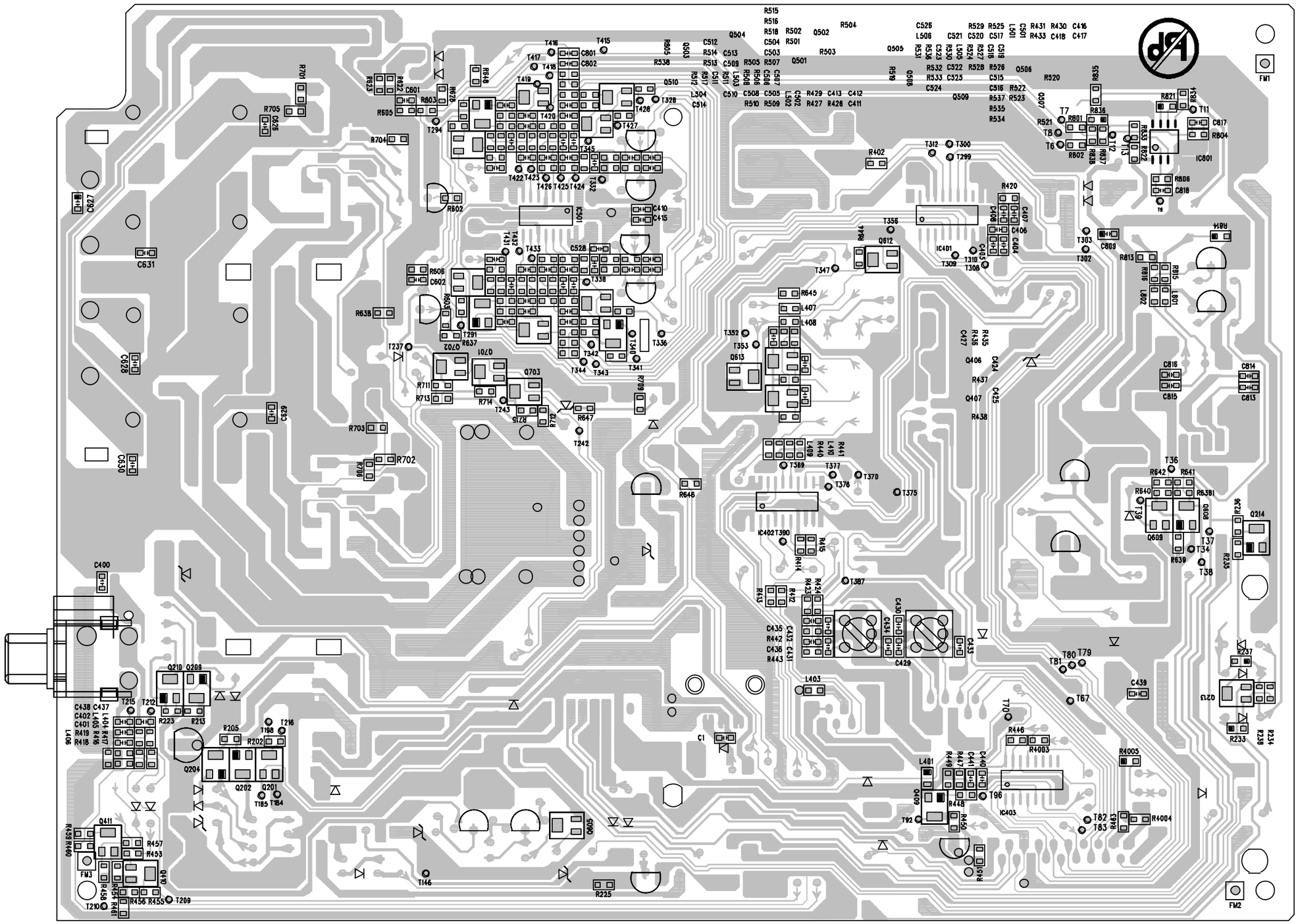
7 - 3

LAYOUT DIAGRAM - MAIN BOARD
COMPONENT SIDE



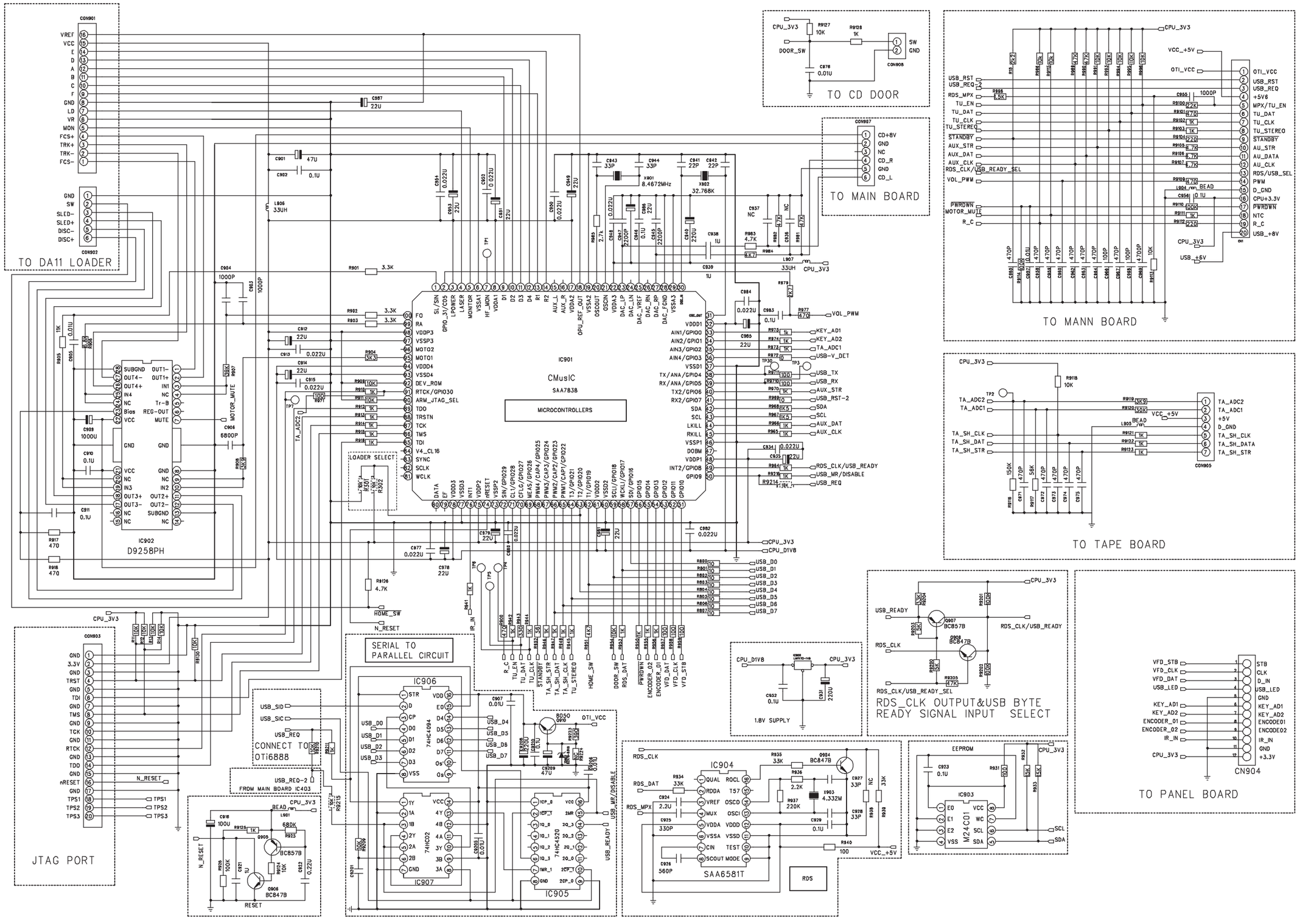
7 - 4

LAYOUT DIAGRAM - MAIN BOARD
COPPER SIDE



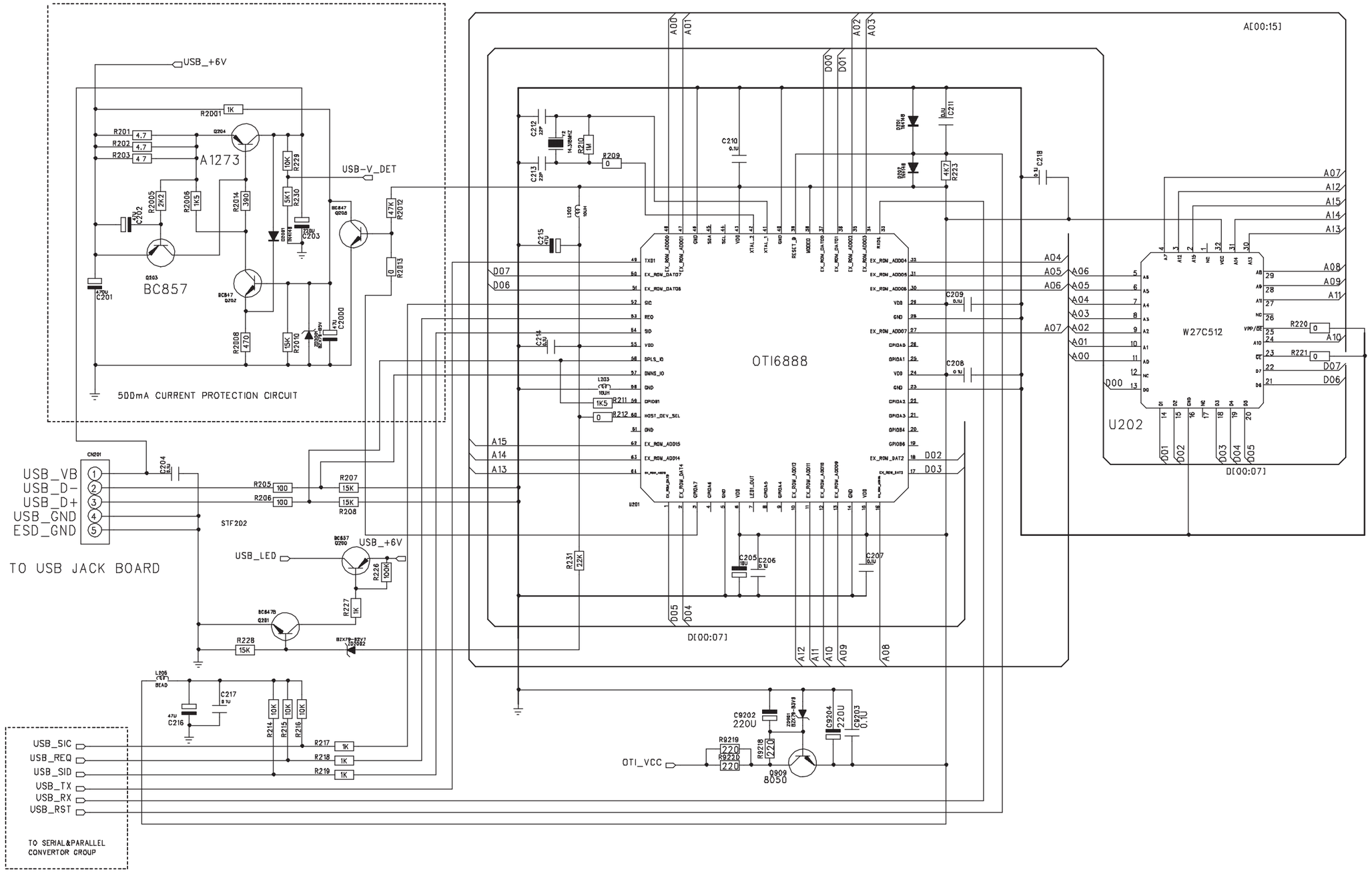
8 - 1

CIRCUIT DIAGRAM - C MUSIC BOARD
PART 1



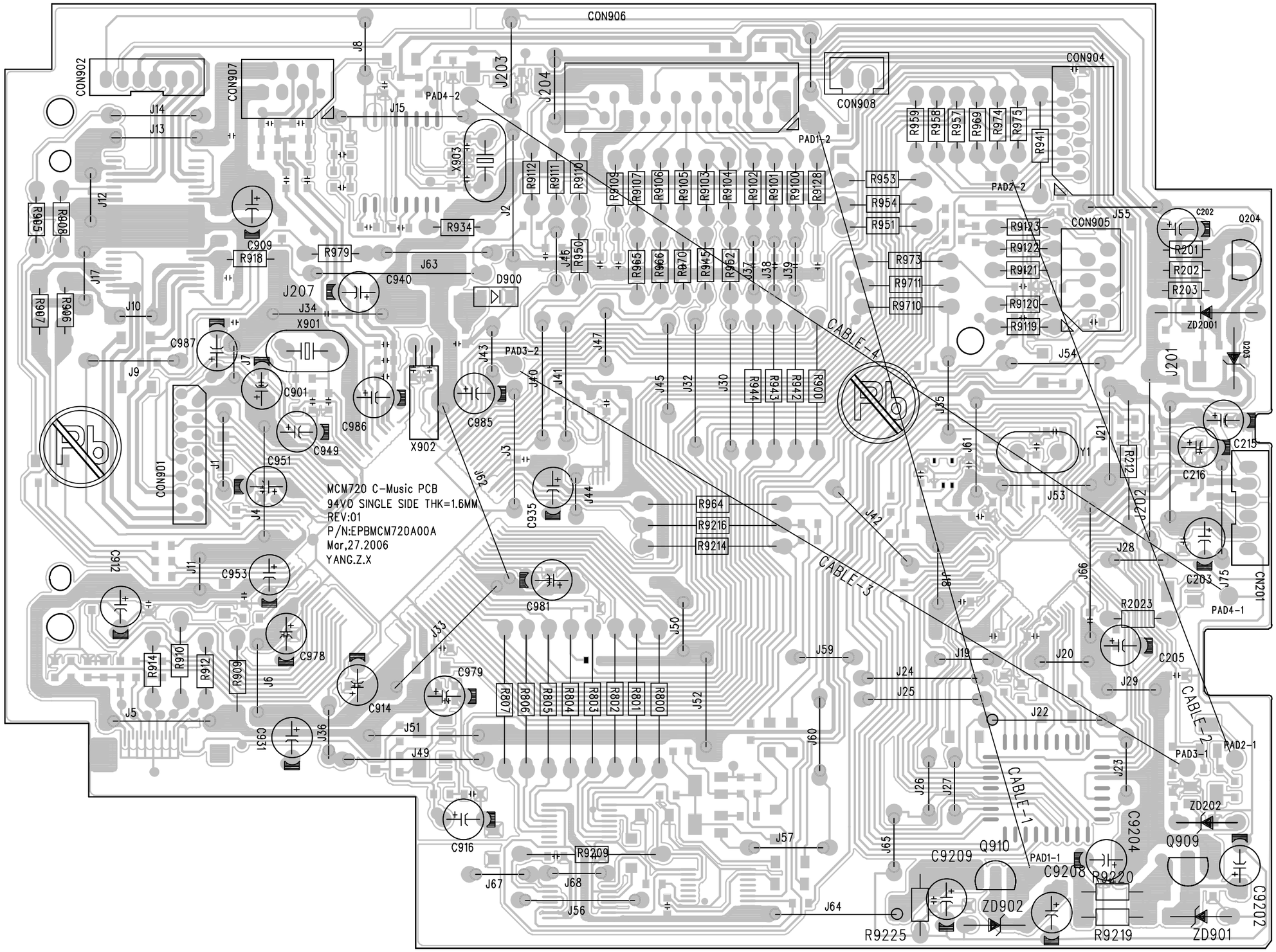
8 - 2

CIRCUIT DIAGRAM - C MUSIC BOARD
PART 2



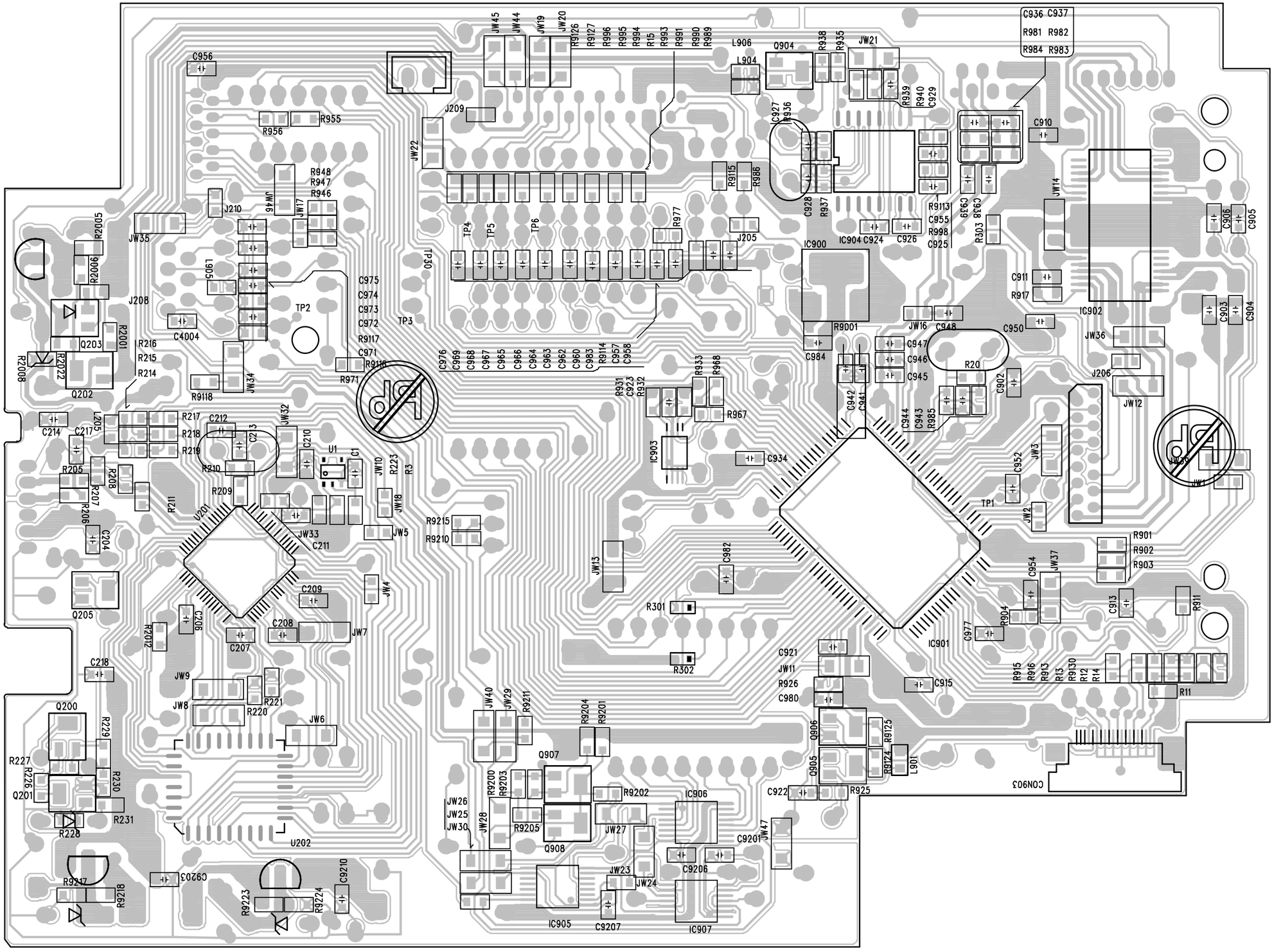
8 - 3

LAYOUT DIAGRAM - C MUSIC BOARD
COMPONENT SIDE



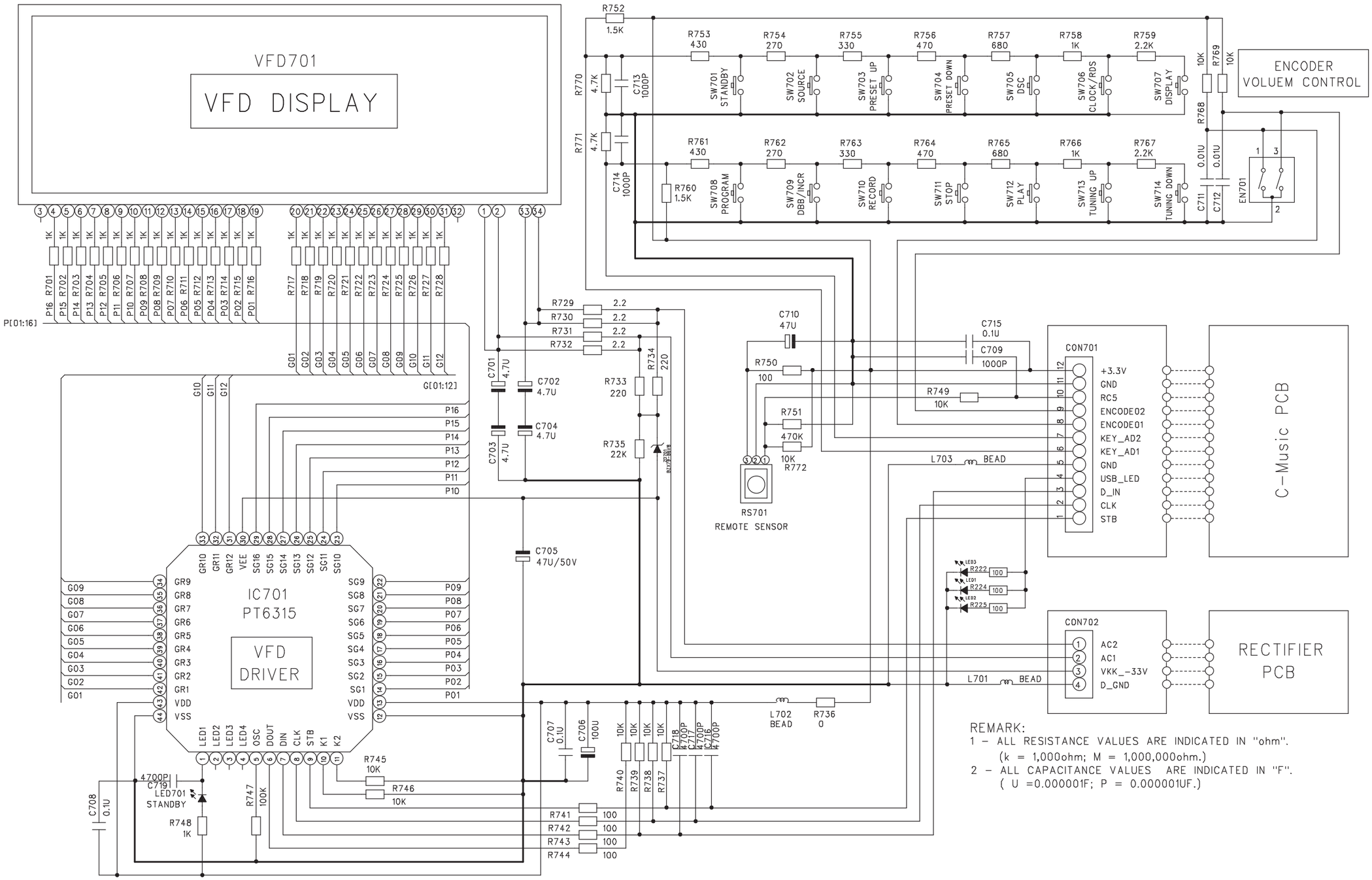
8 - 4

LAYOUT DIAGRAM - C MUSIC BOARD
COPPER SIDE



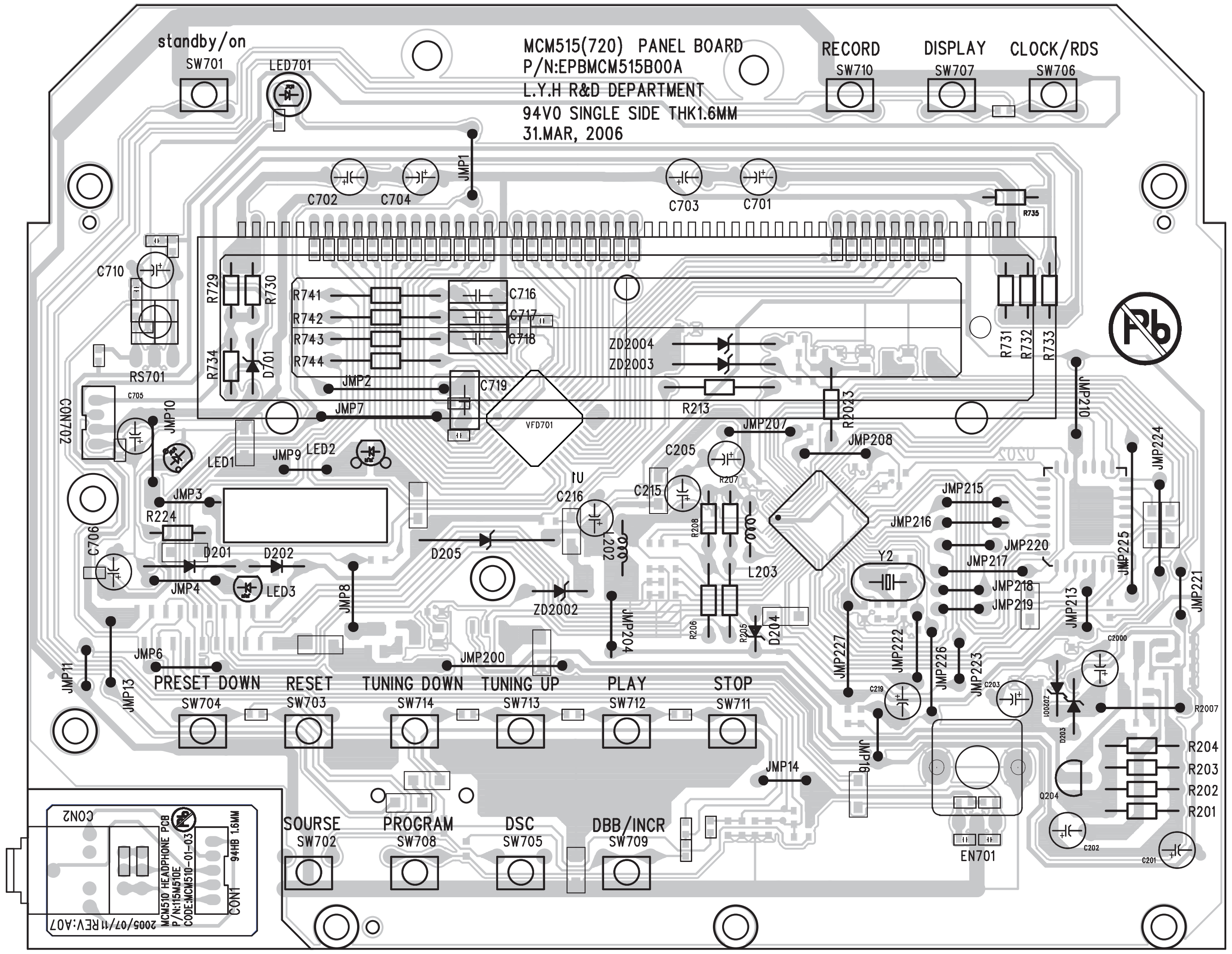
9 - 1

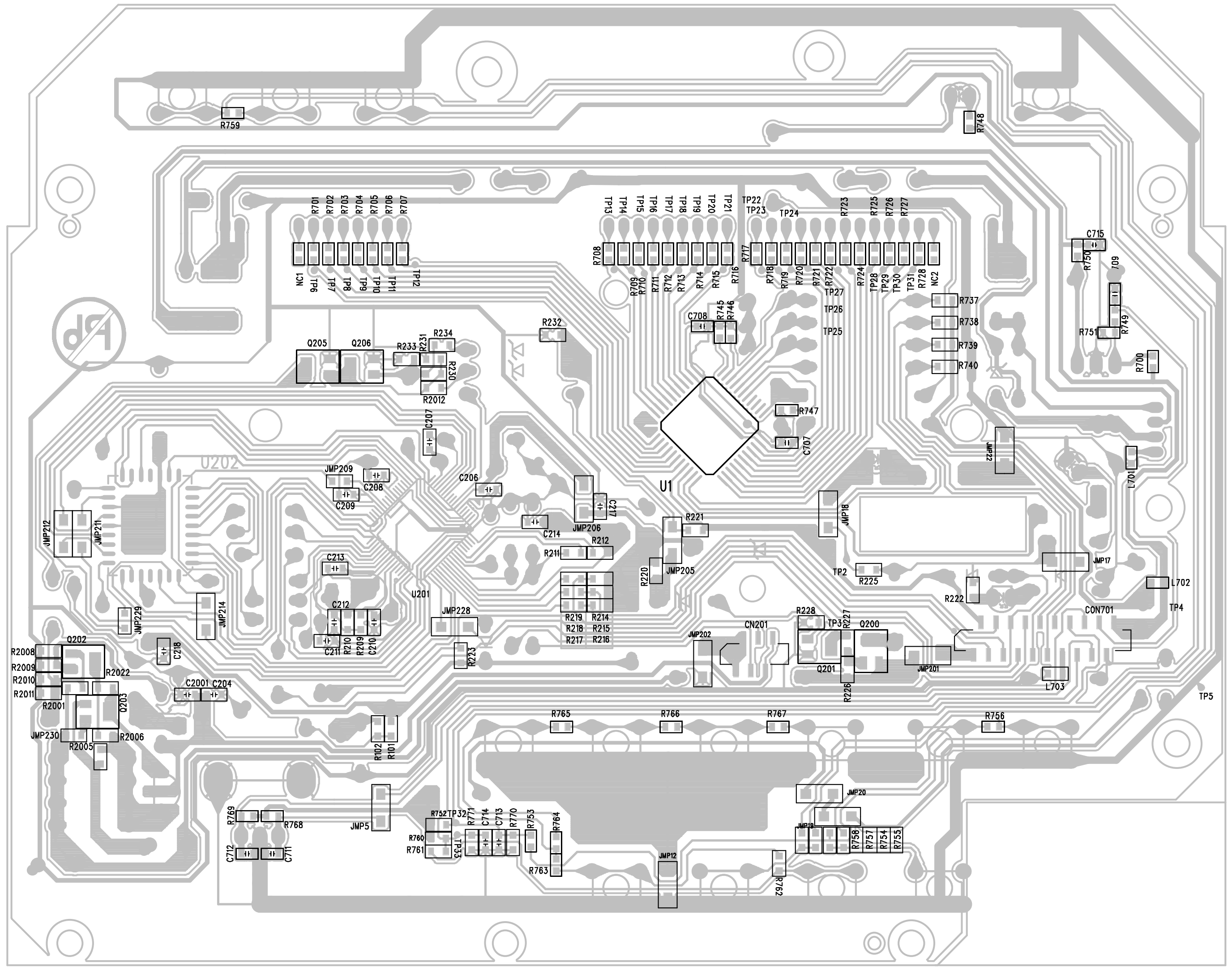
CIRCUIT DIAGARM - PANEL BOARD



9 - 2

LAYOUT DIAGARM - PANEL BOARD





10 - 1

CIRCUIT DIAGRAM - CASSETTE BOARD

Variant Parts beween AR d NAR version :please refer to lable below

	AR	NAR
3723	18K	22K
3724	18K	22K
3723	1.2K	jumper (4732)
3717	1.2K	jumper (4735)
3718	15n	open
2717	15n	open
2790	1n5	open
2791	1n5	open
3769	18K	18K
3772	12K	15K

*2725/220p

SHIFT REGISTER

TO/FROM MECHANISM
FE-BT-VK-N
1760

REC/PB
FE-BT-VK-N
1710

TO/FROM FRONT BOARD
FE-BT-VK-N
1706

TO /FROM AF BOARD
FE-BT-VK-N
1701

MUTE CIRCUIT

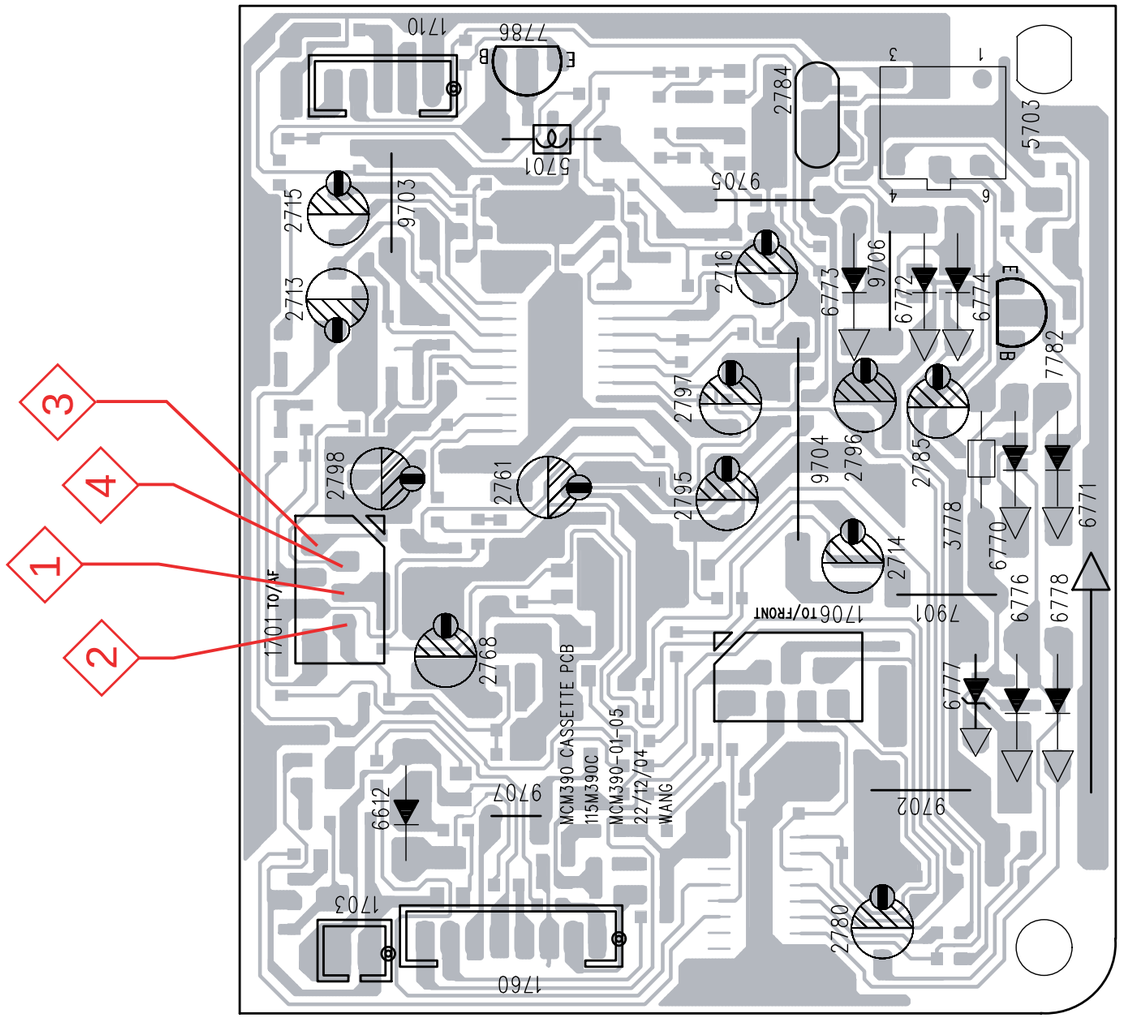
TAPE PRE-AMP

REMARK:
1 - ALL RESISTANCE VALUES ARE INDICATED IN "ohm".
(k = 1,000ohm; M = 1,000,000ohm.)
2 - ALL CAPACITANCE VALUES ARE INDICATED IN "F".
(U =0.000001F; P = 0.000001UF.)

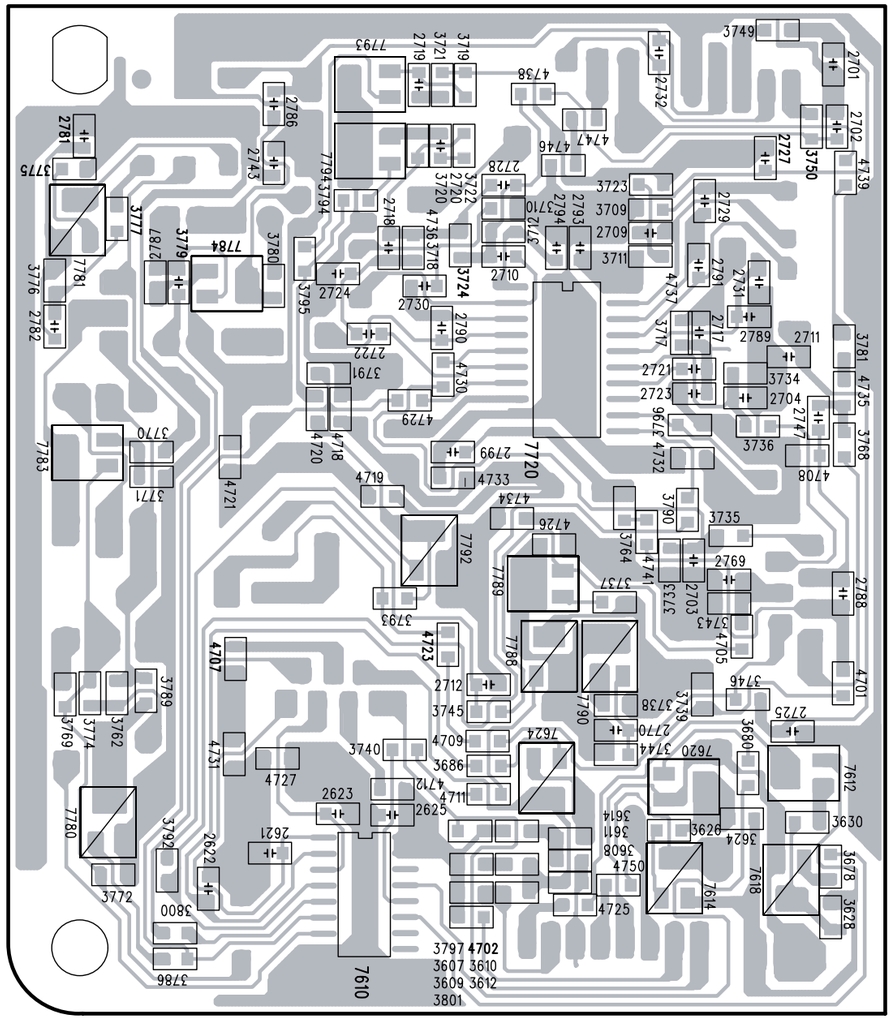
10 - 2

LAYOUT DIAGRAM - CASSETTE BOARD

COMPONENT SIDE

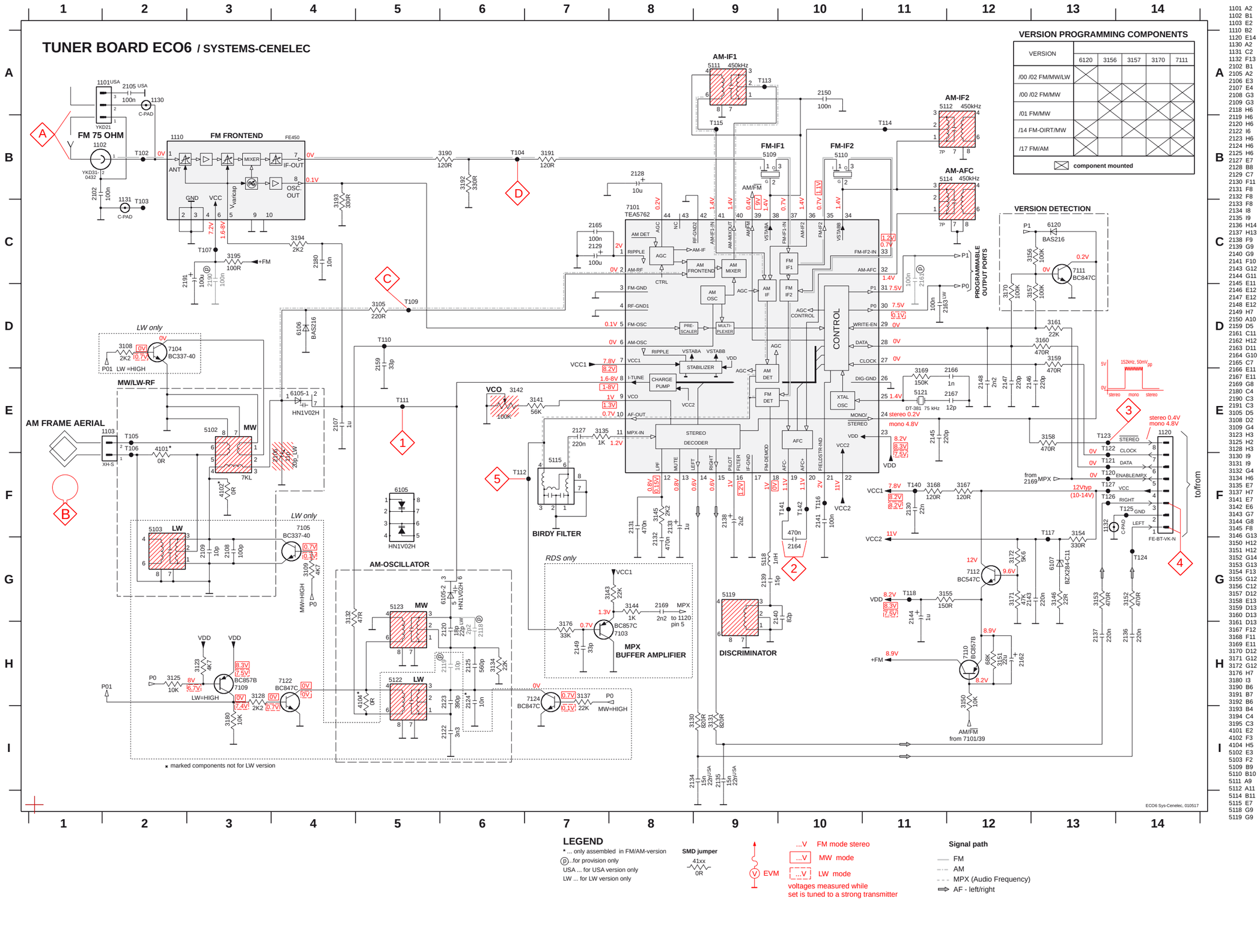


COPPER SIDE



11 - 1

CIRCUIT DIAGRAM - TUNER BOARD



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					

component mounted

LEGEND

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

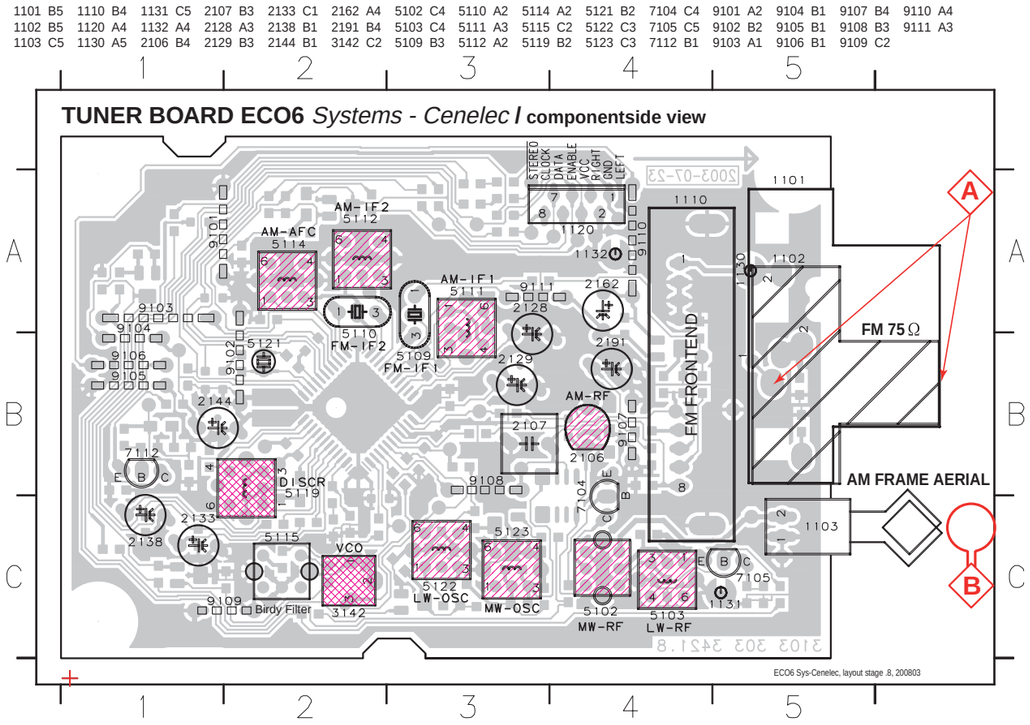
SMD jumper 41xx 0R

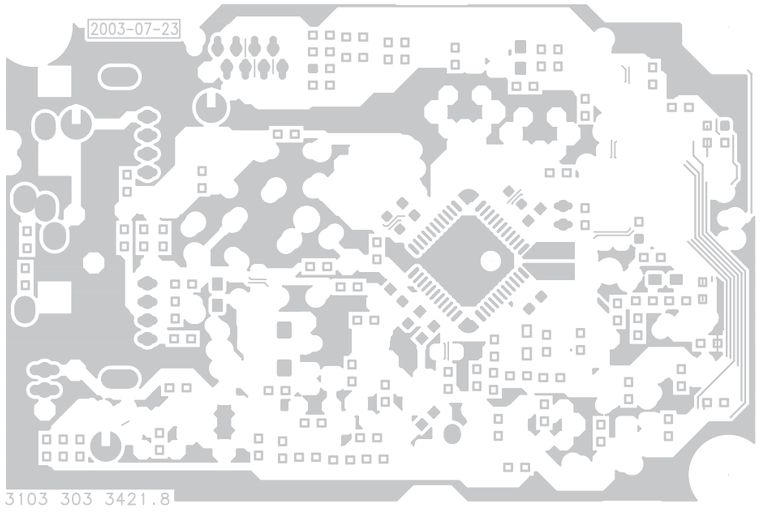
EVM

...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

LAYOUT DIAGRAM - TUNER BOARD





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

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (50kHz grid)			108MHz	check	◇1	8V±1.2V
			87.5MHz	check		1.6V±0.5V
MW 531 - 1602kHz (9kHz grid)			1602kHz	5123		8V±0.2V 3-band 6.9V±0.2V 2-band
			531kHz	check		1.1V±0.4V
LW 153 - 279kHz (3kHz grid)			279kHz	5122		8V±0.2V
			153kHz	check		1.1V±0.4V
FM - IF						
FM	10.7MHz, 45mV continuous wave	◇D	IC 7101 pin 21 shortcircuit to block AFC, 2141	5119	◇2	0mV±3mV
FM - VCO						
FM	98MHz, 1mV continuous wave	◇A	98MHz	3142	◇3	152kHz±1kHz [1]
FM RF (channel separation)	Note: The FM-frontend unit has already been adjusted by the factory and needs therefore no further adjustments for service purposes.					
FM	98MHz, 1mV 90% Left + 9% pilot mod=1kHz	◇A	98MHz	IF coil inside FM frontend 1110	◇4	right channel min.
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc	◇C Δf =±10kHz V_{RF} = 0.5mV (as low as possible)	IC 7101 pin 36, 100nF, 220R	5111	◇5	max., f_o symmetric
			IC 7101 pin 40, 100nF, 220R, see remark [2]	5112		
AM AFC **MW**		◇C continuous wave V_{RF} = 2mV		5114	◇2	0mV±2mV
AM RF [3]						
MW	1494kHz	◇B Δf =±30kHz V_{RF} as low as possible	1494kHz	2106	◇5	max., f_o symmetric
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		

ECO6 Sys Cenelec, 190599

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

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

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

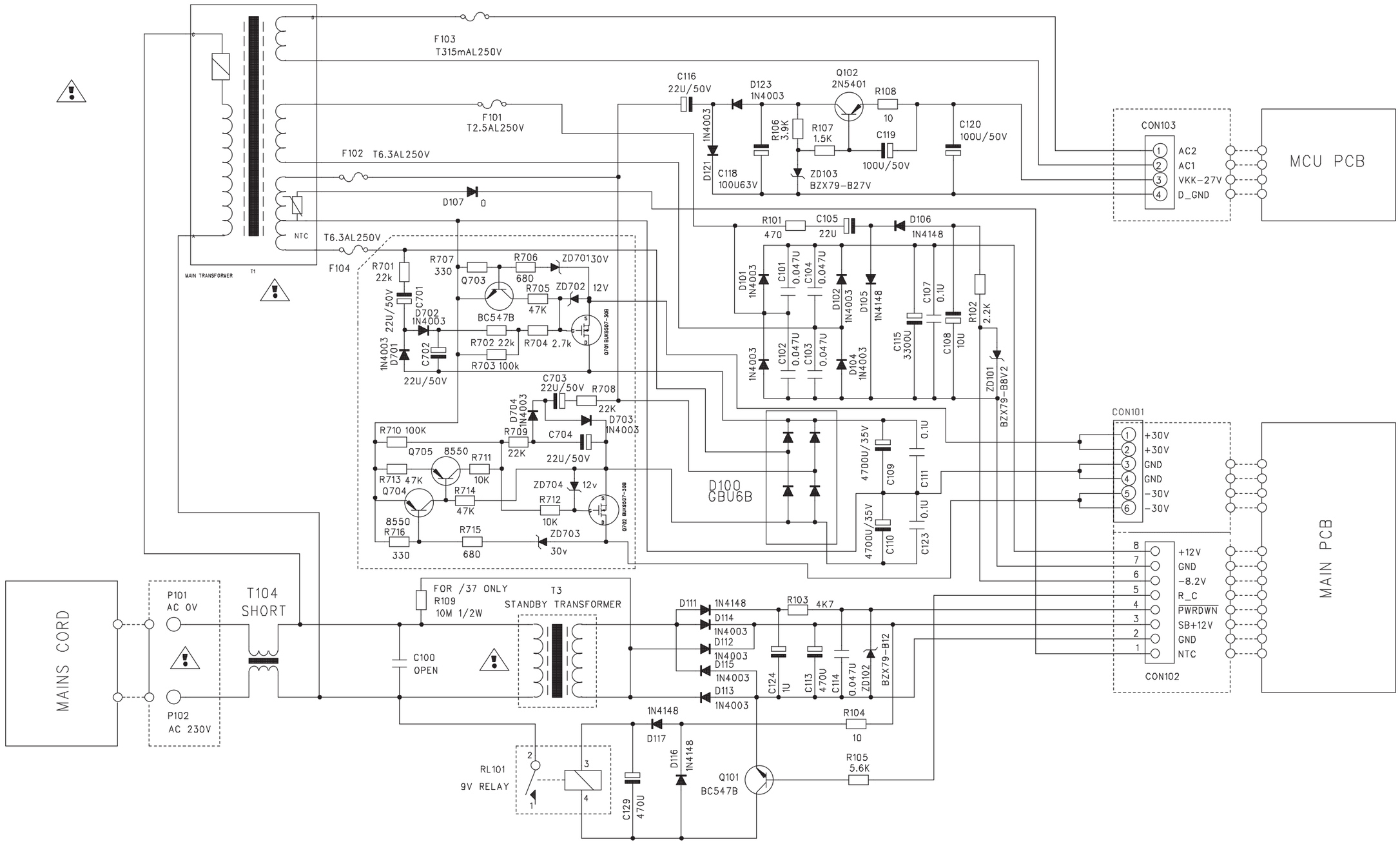
[3] For AM RF adjustments the original frame antenna has to be used! MW has to be aligned before LW.

↕ Repeat

12 - 1

CIRCUIT DIAGRAM - RECTIFIER BOARD

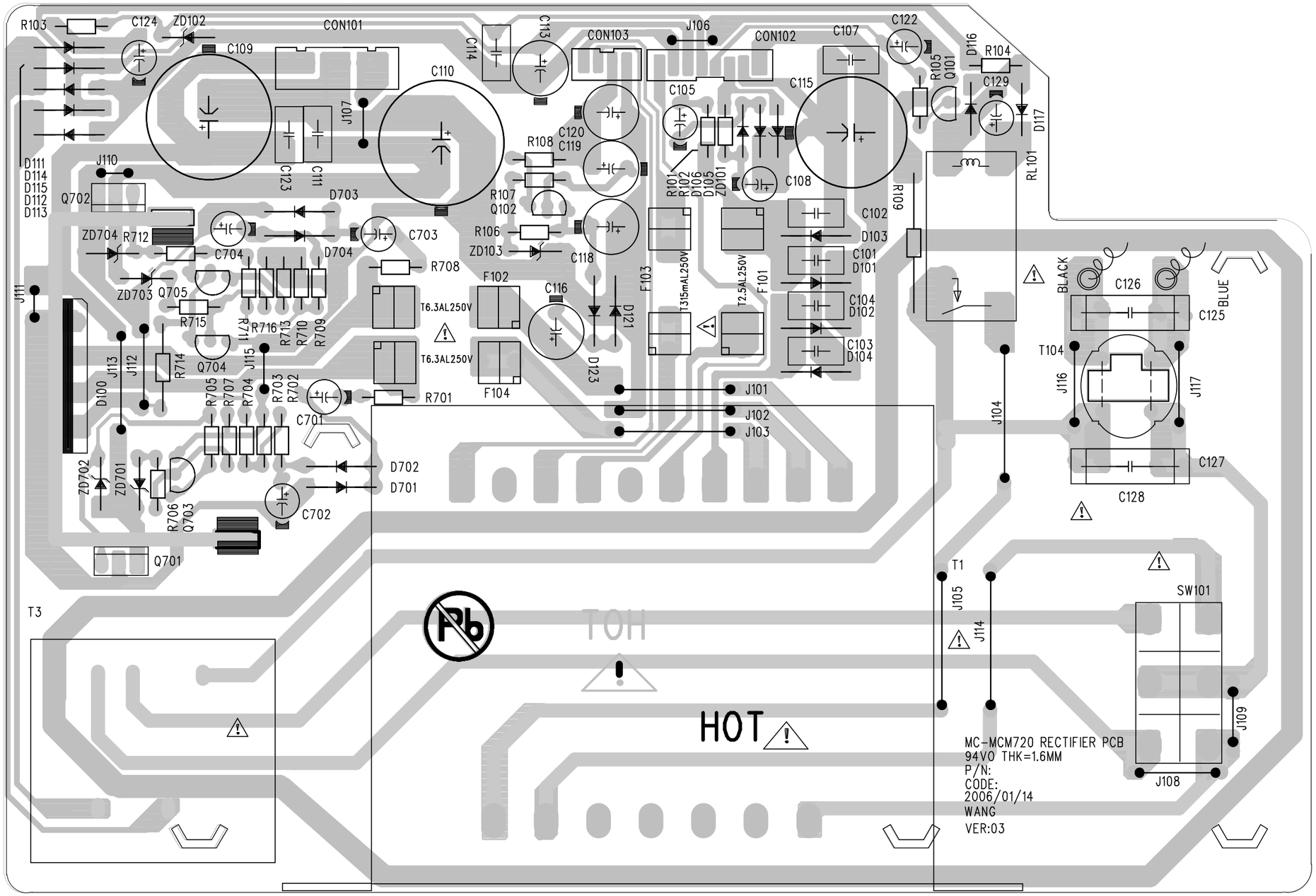
CAUTION: SAFETY USE ONLY THOSE DESCRIBED IN PART LIST
BECAUSE THE COMPONENTS MARKED BY



REMARK:
1 - ALL RESISTANCE VALUES ARE INDICATED IN "ohm".
(k = 1,000ohm; M = 1,000,000ohm.)
2 - ALL CAPACITANCE VALUES ARE INDICATED IN "F".
(U =0.000001F; P = 0.000001UF.)

12 - 2

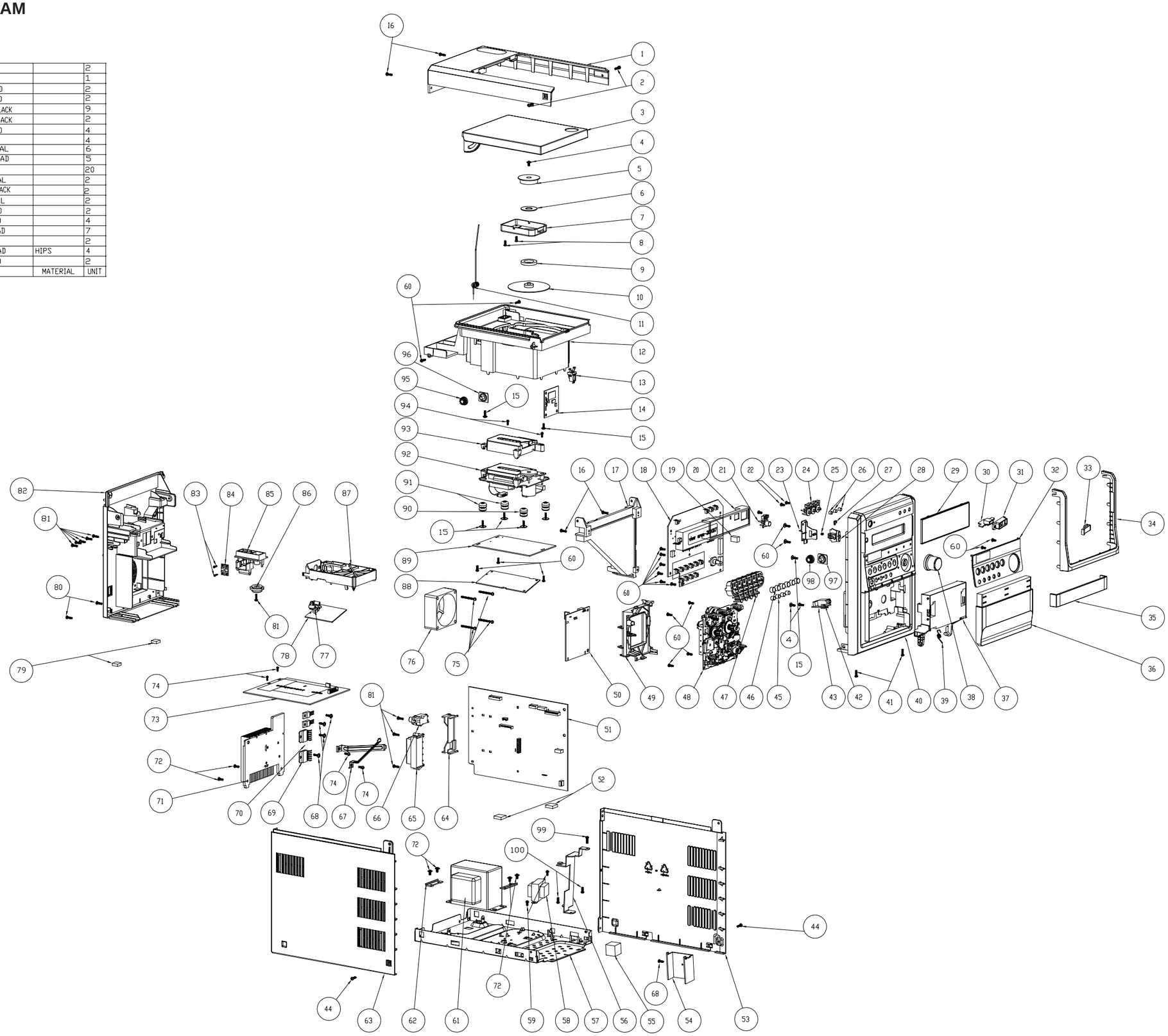
LAYOUT DIAGRAM - RECTIFIER BOARD



13 - 1

EXPLODED VIEW DIAGRAM

NO	PART NAME	MATERIAL	UNIT
100	SCREW-SMP3006		2
99	SCREW-SMP3008		1
94	SCREW-2006-NORMAL-HEAD		2
83	SCREW-2008-NORMAL-HEAD		2
81	SCREW-3010-FOR-PLASTIC-BLACK		9
80	SCREW-3010-FOR-METAL-BLACK		2
75	SCREW-3028-NORMAL-HEAD		4
74	SCREW-3008-BTTB		4
72	SCREW-3008-FOR-METAL		6
68	SCREW-3010-WASHER-HEAD		5
60	SCREW-3008-PTTB		20
59	SCREW-3006-FOR-METAL		2
44	SCREW-3008-FOR-METAL-BLACK		2
41	SCREW-3008-FOR-METAL		2
22	SCREW-3006-NORMAL-HEAD		2
16	SCREW-3014-NORMAL-HEAD		4
15	SCREW-2610-WASHER-HEAD		7
8	SCREW-3010-FLAT-HEAD		2
4	SCREW-2606-NORMAL-HEAD	HIPS	4
2	SCREW-3012-NORMAL-HEAD		2



MECHANICAL PARTSLIST

1	994000005774	TOP CABINET
3	994000005775	CD DOOR
5	994000001408	BRACKET STABILIZER
7	994000005776	BRACKET MAGNET CLAMPER
10	994000001407	STABILIZER
11	994000003232	CD DOOR SPRING
12	994000003255	CD TRAY
13	994000001422	CD DOOR SWITCH
21	994000003243	POWER KEY
25	994000005777	SWITCH SPRING FOR PUSH LOCK
26	994000003253	TOP BUTTON COVER
27	994000003247	POWER LENS
28	994000001412	PUSH LOCK FOR CASS. DOOR
29	994000005778	DISPLAY LENS
32	994000005779	CONTROL PANEL
33	994000005781	USB RUBBER COVER
34	994000003252	DECORATION RING
35	994000005782	CASSETTE DOOR TOP PANEL
36	994000005783	CASSETTE DOOR
37	994000004801	BRACKET - CASSETTE DOOR
38	994000003242	VOLUME KNOB
39	994000003231	CASSETTE DOOR SPRING
40	994000005784	FRONT CABINET
45	994000003244	SOURCE SELECTOR BUTTON COVER
46	994000003245	CD CONTROL COVER
48	994000001434	CASS DECK MECHANISM
52	994000003234	RUBBER FOOT 11x11x6mm
53	994000003239	RIGHT CABINET
63	994000003238	LEFT CABINET
79	994000003235	RUBBER FOOT 22x7x6mm
82	994000003241	REAR CABINET
90	996500017765	CD DAMPER BLACK COLOR
91	994000005785	CD DAMPER CAMBRIDGE BLUE
92	994000005786	CD MECHANISM DA11VF(SANYO)
93	994000001417	DUST COVER
95	996500017264	CD DOOR GEAR
96	996500017265	CD DOOR GEAR HOLDER
97	994000001409	CD DOOR GEAR HOLDER
98	994000001411	CD DOOR GEAR
76	994000003257	DC FANS

ACCESSORIES

994000005787	REMOTE CONTROL
994000003268	PIG TAIL ANTENNA WIRE BLACK
994000001419	AM LOOP FRAME ASSY
994000005788	WOODEN SPEAKER ONE SET

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

ELECTRICAL PARTSLIST - MAIN BOARD

- DIODES -

ZD201	994000003193	DIODE BZX79-B12V
ZD401	994000005722	ZENER DIODE 4V3 1/2W
ZD203	994000005723	ZENER DIODE 6V2 1/2W
ZD602	994000003194	ZENER DIODE 7V5 1/2W
ZD204	994000003194	ZENER DIODE 7V5 1/2W
ZD217	996500017767	ZENER DIODE 9V1 1/2W
ZD701	994000003195	DIODE BZX79-B5V6 SOD27
ZD202	994000003222	DIODE BZX79-B8V2 SOD27

- IC & TRANSISTORS -

IC501	994000003198	IC HEF4069UBT SOT108-1 SMT
IC401	994000003199	I.C. HEF4094BT
IC403	994000003199	I.C. HEF4094BT
IC801	996500021009	I.C. PT4800(L) DIP-8 PIN
IC402	994000003201	I.C. TC4052BF SWITCHING
IC203	996500017295	I.C. MC7806CT
IC201	994000005724	I.C. LD1117AL-3.3V-D
	994000005725	I.C. LD1117A-3.3V-DC
IC701	994000005726	IC TDA7296 MULTIWATT15V
IC702	994000005726	IC TDA7296 MULTIWATT15V
Q203	994000001436	TRANSISTOR 2SB1566-F
Q208	994000005727	TRANSISTOR 2SB562C TO-92MOD
	994000005728	TRANSISTOR 2SB562C TO-92NL
Q803	994000003206	TRANSISTOR 8550D
Q408	994000005729	TRANSISTOR KTA1273 TO-92L

- MISCELLANEOUS -

CON405	994000003196	8.3MM RCA JACK
CON601	994000003197	PUSH TERMINAL JACK

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

ELECTRICAL PARTSLIST - CASSETTE BOARD

- MISCELLANEOUS -

5703	994000001432	AM OSC BLACK 10M
7720	994000005719	I.C. SM AN17150A-E2V
7610	994000003199	I.C. HEF4094BT
7786	994000001433	TRANSISTOR (FET) J11

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

ELECTRICAL PARTSLIST - RECTIFIER BOARD

- DIODES -

ZD103	994000005731	ZENER DIODE 30V 1/2W DO-35
ZD101	994000003222	DIODE BZX79-B8V2 SOD27
D100	994000003223	DIODE BRIDGE RECTIFIER GBU6B

- IC & TRANSISTORS -

Q102	994000003228	TRANSISTOR 2N5401 TO-92

- MISCELLANEOUS -

F101	994000001447	FUSE 2.5A 250V GLASS UL/CSA/VDE
F102	994000003224	FUSE 6.3A 250V D5X20MM GLASS
F104	994000003224	FUSE 6.3A 250V D5X20MM GLASS
F103	994000003225	FUSE 0.315A 250V
T104	994000003226	AC LINE FILTER 400UH +-30%
RL101	994000001448	9V DC RELAY 10A ME-7-009-HL

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

ELECTRICAL PARTSLIST - TUNER BOARD

- DIODES -

6107	934038690115	DIODE BZX284-C11
6106	934025530135	SWITCHING DIODE BAS216
6120	934025530135	SWITCHING DIODE BAS216
6105	994000002414	DIODE HN1V02H-B

- COILS & FILTERS -

5109	996500017291	FM CER. FILTER SFELA10M7HA00-A0
5110	996500017291	FM CER. FILTER SFELA10M7HA00-A0
	994000005733	FM CER. FILTER SFELA10M7HA00-B0
5119	994000005734	FM CER. DISCRIMINATOR 2 PINS
5121	994000005735	CRYSTAL 75KHZ 20PF +-20PPM
	482215711443	FM IFT BLACK 7MM
5112	482215770302	AM IFT YELLOW 7MM
5114	482215770302	AM IFT YELLOW 7MM
5111	242254944023	AM IFT BLACK 7MM
5102	994000001429	AM OSC BLACK 7MM
5122	242254944108	AM OSC BROWN 7MM
5123	242254944108	AM OSC BROWN 7MM
5103	994000001431	LW OSC PINK 7MM
5115	994000001428	LOW PASS FILTER BLACK 7MM

- MISCELLANEOUS -

1102	994000001458	FM ANT. JACK
1110	994000005737	FM TUNER MODULE
7101	994000005736	I.C. TEA5762H/V1 LEAD FREE
	994000005738	TUNER MODULE #MCM390 FE450-G01

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

ELECTRICAL PARTSLIST - C MUSIC BOARD

- DIODES -

ZD202	994000005743	ZENER DIODE 2V7 1/2W (TC2V7)
ZD901	996500022620	ZENER DIODE 3V9 1/2W (TC3V9)
ZD902	996500022620	ZENER DIODE 3V9 1/2W (TC3V9)
ZD2001	994000005744	ZENER DIODE 5V1 1/2W (TC5V1)

- IC & TRANSISTORS -

IC901	994000005745	IC SAA7838 QFP-100 (SMD)
U202	994000005746	IC EPROM ICE27C512-70 PCW
U201	994000005747	IC OTI6888-G LQFP-64
IC907	994000005748	I.C. 74HC02DB SSOP14
IC906	994000005749	I.C. 74HC4094DB SSOP16
IC905	994000005751	I.C. 74HC4520DB SSOP16
IC900	994000005752	I.C. BM1117-1.8V SOT-223
IC902	994000005753	I.C. D9258PH (LEAD FREE)
IC903	994000003272	I.C. M24C01-RDW6T
IC904	994000003215	RDS IC SAA6581T/V1 SOT162-1
Q909	996500016928	TRANSISTOR KTC-8050C(KEC)
Q910	996500016928	TRANSISTOR KTC-8050C(KEC)
Q204	994000005755	TRANSISTOR KTA1273 TO-92L

- MISCELLANEOUS -

J64	994000005754	FIXED INDUCTOR 33UH-K
Y1	994000005741	CRYSTAL 14.318 MHZ 20PF
X902	994000003208	CRYSTAL 32.768KHZ 12.5PF
X903	994000003209	CRYSTAL 4.332MHZ HC-49/S
X901	994000005742	CRYSTAL 8.4672 MHZ 20PF

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

ELECTRICAL PARTSLIST - PANEL BOARD

- DIODES -

D701	994000005758	DIODE BZX79-B6V8 SOD27
LED1	994000005762	LED BLUE
LED2	994000005762	LED BLUE
LED3	994000005762	LED BLUE
LED701	994000005763	LED INGICATOR RED

- MISCELLANEOUS -

Excelza	994000005757	LCD BRACKET
RS701	994000005759	INFRARED RECEIVER IRM502H-S
VFD701	994000005761	DISPLAY VFD25-1228N
EN701	994000003211	ENCODER XRE DIA:121 DIA:3
U1	994000003214	VFD DRIVER IC PT6315
SW701	996500013779	TACT SWITCH
SW702	996500013779	TACT SWITCH
SW703	996500013779	TACT SWITCH
SW704	996500013779	TACT SWITCH
SW705	996500013779	TACT SWITCH
SW706	996500013779	TACT SWITCH
SW707	996500013779	TACT SWITCH
SW708	996500013779	TACT SWITCH
SW709	996500013779	TACT SWITCH
SW710	996500013779	TACT SWITCH
SW711	996500013779	TACT SWITCH
SW712	996500013779	TACT SWITCH
SW713	996500013779	TACT SWITCH
SW714	996500013779	TACT SWITCH

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

ELECTRICAL PARTSLIST

- MISCELLANEOUS -

	994000003229	STEREO HEADPHONE JACK
	994000001423	FFC CABLE 70MM P=1.0MM 16P
	994000003259	FFC CABLE L=120MM 6P
	994000003263	FFC CABLE 180MM 7P
	994000005764	FFC CABLE L=120MM 6P
	994000005765	FFC CABLE 7P L=160MM
	994000005766	FFC P=1.25MM L=160MM 7P
	994000005767	20 PINS FFC CABLE TYPE A
	994000005768	FFC CABLE 12PINS L=180MM
	994000005769	8PINS FFC CABLE L=190MM
CON102	994000005771	USB CONNECTOR
⚠	994000003269	AC POWER CORD -/05
⚠	994000001451	AC POWER CORD -/12
⚠	994000005772	TRANSFORMER 230V 50HZ
⚠	994000005773	TRANSFORMER EI-76 230V 50HZ
	994000003192	CASS PCB ASSEMBLY
	994000005721	MAIN PCB ASSEMBLY
	994000005732	TUNER PCB ASSEMBLY
	994000005739	C MUSIC PCB ASSEMBLY
	994000005756	PANEL PCB ASSEMBLY

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

REVISION LIST

Version 1.0 (3141 785 31000)

- Initial Release

Version 1.1 (3141 785 31001)

- Pages 13-2 : Mechanical parts list adapted.