MP3 3CDC Mini System

FWM352,FWM371

all versions

Service
Service
Service

Service Manual

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CLASS 1
LASER PRODUCT

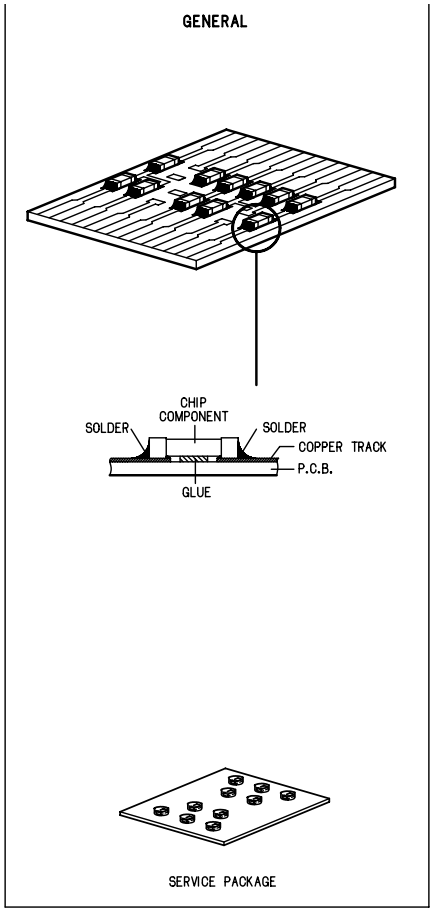
Published by LX 0729 Service Audio Printed in The Netherlands Subject to modification

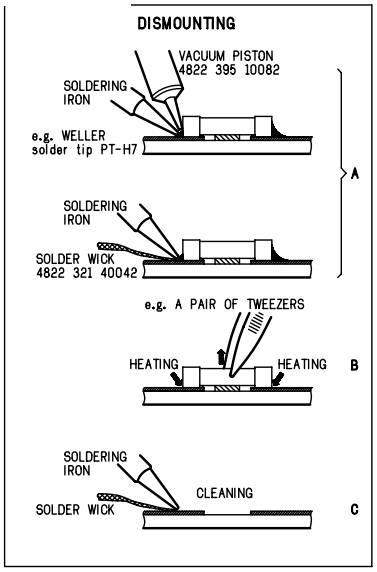
3141 785 30763

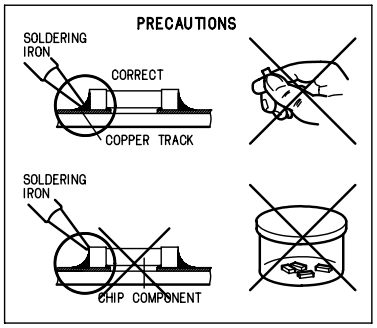
Version 1.3

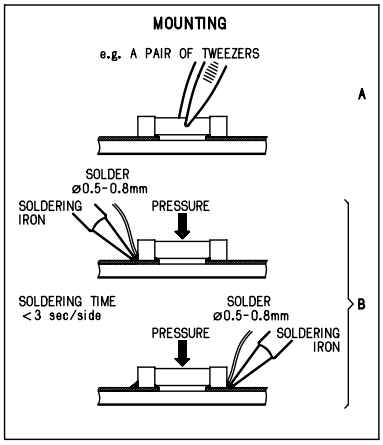
PHILIPS

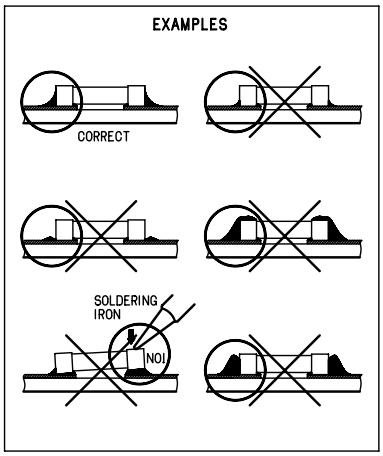
HANDLING CHIP COMPONENTS











(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

GENERAL

Mains voltage	FWM352/12	:	230V
	FWM352/55	:	120/230V
	FWM352/98	:	120/230V
	FWM371/55	:	120/230V
Mains frequency	FWM352/12	:	50 Hz
	FWM352/55	:	50/60 Hz
	FWM352/98	:	50/60 Hz
	FWM371/55	:	50/60 Hz
Battery	remote	:	3 V (AAA x 2)
Power consumption	normal	:	< 70W (FWM352)
	normal	:	< 80W (FWM371)
	Standby	:	< 15 W
Dimension (W x H x D)		:	265 x 310 x 384 mm
Weight (excluding packing and batteries)		:	5.5 Kg

AMPLIFIER

Output power	mains	:	2 x 50W
Speaker impedance	mains	:	2 x 4 ohm
Frequency response		:	20 Hz - 20 kHz (±3dB)

TUNER - FM SECTION

Tuning range		:	87.5 - 108 MHz
IF frequency		:	10.7 MHz ± 0.02 MHz
Sensitivity		:	< 22 dBf at 26dB
Selectivity	300kHz	:	> 33 dB
IF Rejection		:	> 60 dB
Image Rejection		:	> 25dB
Distortion		:	< 3 %
Tuning Grid		:	50K Hz

TUNER - AM SECTION

Tuning range	:	531 - 1602 kHz
	:	530 - 1700 kHz
Tuning Grid	:	9/10K Hz
IF frequency	:	450 kHz ± 1 kHz
Sensitivity	:	≤ 3.25 mV/m at 26dB
Selectivity S9/300kHz	:	> 12 dB
IF rejection	:	> 24 dB
Distortion	:	< 5%
Image rejection	:	> 20 dB

AUDIO CASSETTE RECORDER

Number of tracks		:	1 stereo
Tape speed		:	4.76 cm/sec + 3/-2%
Wow & flutter		:	< 0.4 % JIS Unwtd.
Fast wind/rewind C60		:	< 130 sec.
Frequency response	P/B	:	100 - 8000 Hz
S/N ratio		:	> 36 dB

COMPACT DISC

S/N ratio unwtd.		:	> 50 dB
Channel difference	1 kHz	:	< 2 dB
Crosstalk	1 kHz	:	> 30 dB
Frequency response		:	± 2dB at 100Hz
THD(1kHz,0dB)		:	1.5%

SERVICE TOOLS

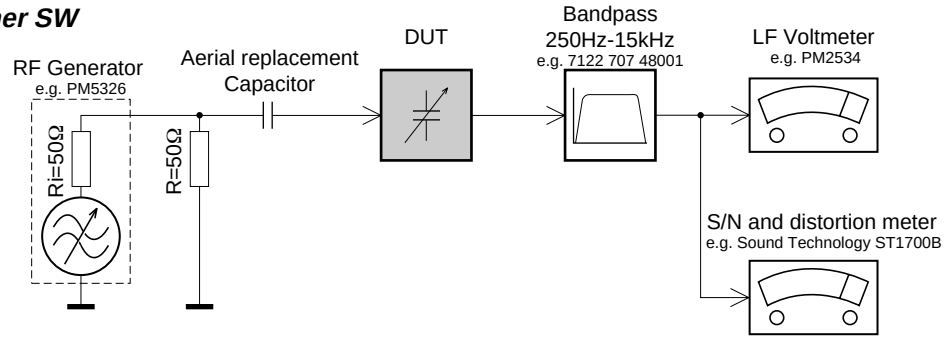
Audio signal disc SBC 429.....4822 397 30184
Playability test disc SBC 444.....4822 397 30245
Test disc 5 (disc without errors) +
Test disc 5A (disc with dropout errors, black spots and fingerprints)
SBC 426/426A.....4822 397 30096
Burn in test disc (65 min. 1kHz signal at -30 dB level without “pause”).....4822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

AVAILABLE ESD PROTECTION EQUIPMENT

anti-static table mat	large 1200x650x1.25mm	4822 466 10953
	small 600x650x1.25m	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

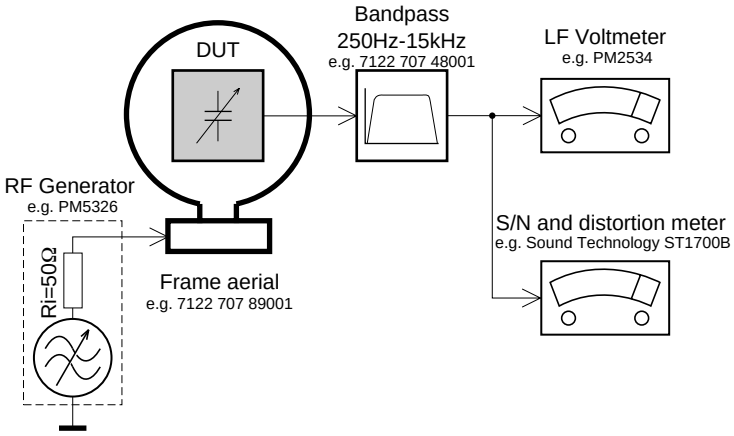
SERVICE MEASUREMENT

Tuner SW



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).

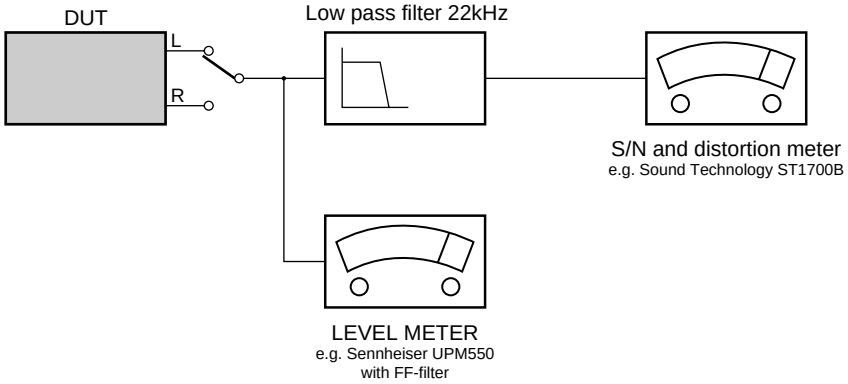
Tuner AM (MW,LW)

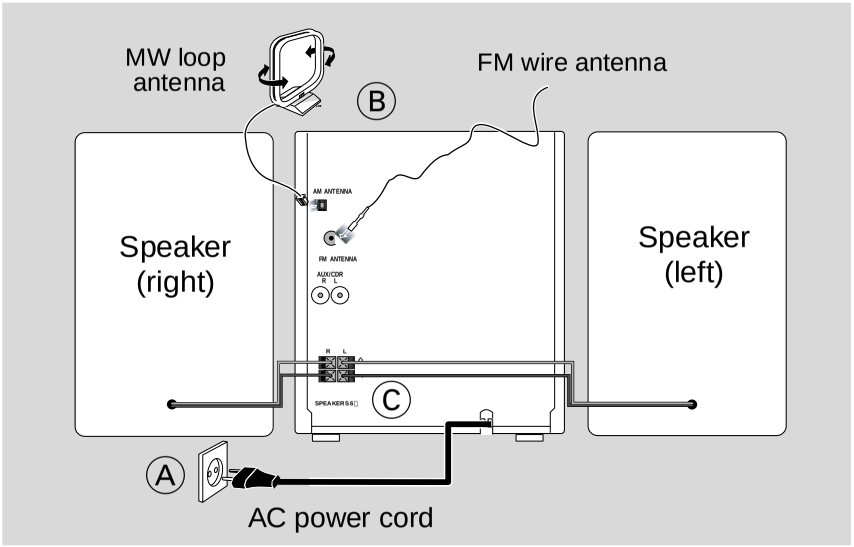


To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday«s cage.

CD

Use Audio Signal Disc SBC429 4822 397 30184 (replaces test disc 3)
L.P.F. = 13 th order filter 4822 395 30204





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.

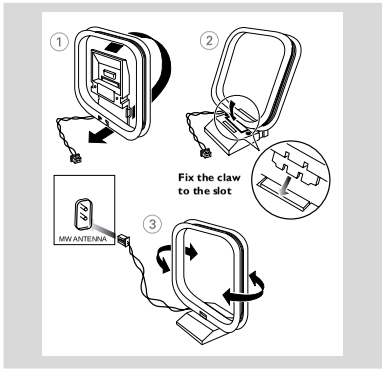
WARNING!
– For optimal performance, use only the original power cable.
– Never make or change any connections with the power switched on.
– High voltage! Do not open. You run the risk of getting an electric shock.
– The machine does not contain any user-serviceable parts.
– Modification of the product could result in hazardous radiation of EMC or other unsafe operation.

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

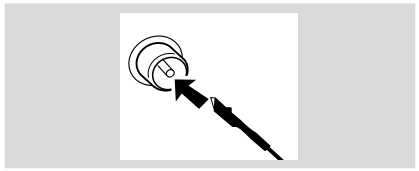
Connect the supplied MW loop antenna and FM antenna to the respective terminals. Adjust the position of the antenna for optimal reception.

MW Antenna



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

FM Antenna

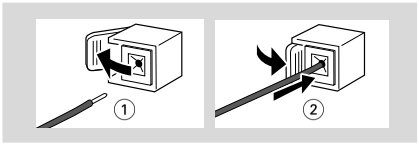


For better FM stereo reception, connect an outdoor FM antenna to the FM ANTENNA terminal.

Ⓒ 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.

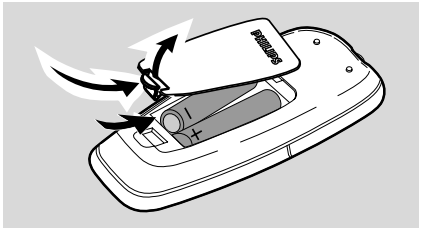
Connecting other equipment to your system

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

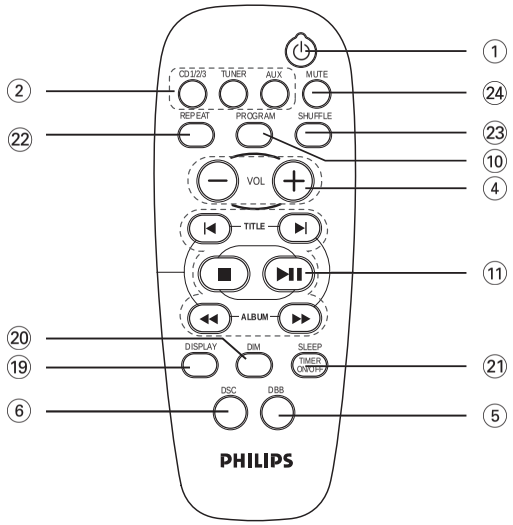
Note:
– If you are connecting equipment with a mono output (a single audio out terminal), connect it to the AUX/CDR left terminal. Alternatively, you can use a "single to double" cinch cable (the output sound still remain mono).

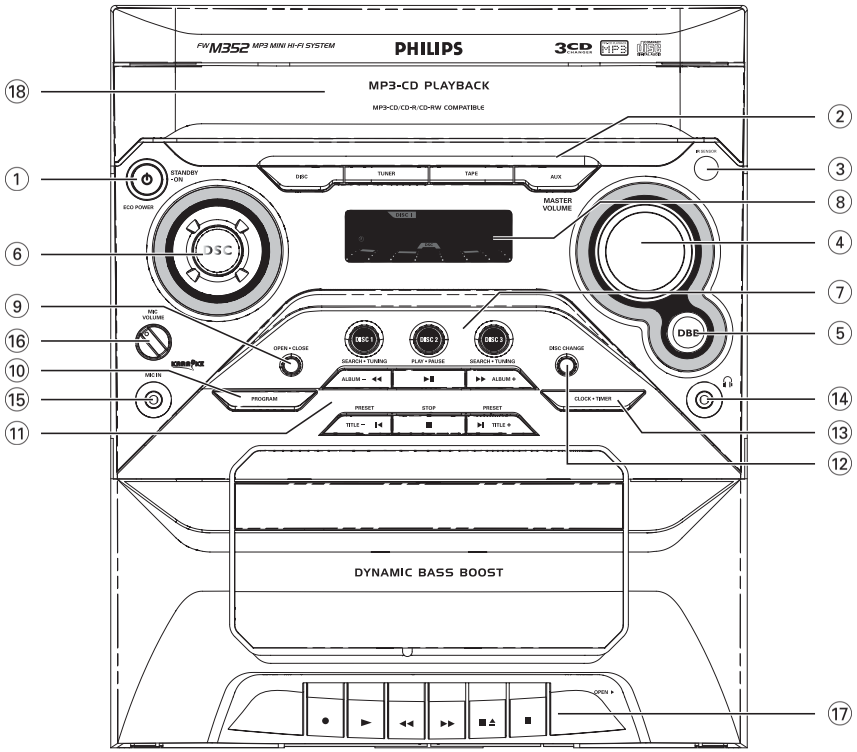
Inserting batteries into the remote control

Insert two batteries (Type R03 or AAA) into the remote control with the correct polarity as indicated by the "**+**" and "**–**" symbols inside the battery compartment.



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





Controls *(illustrations on page 3)*

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 **Source selection** – to select the following:

DISC (CD 1/2/3)
– to select disc tray 1, 2 or 3.

TUNER
– to select waveband: FM or MW.

TAPE
– to select tape deck.

AUX
– to select the input for an additional appliance: AUX.

③ **iR SENSOR**
– infrared sensor for remote control.

④ **VOLUME (VOL +/–)**
– to increase or decrease the volume.

⑤ **DBB**
– to select the desired bass boost level. (DBB 1, DBB 2, DBB 3 or DBB OFF).

⑥ **DSC**
– Selects different types of preset sound equaliser settings (OPTIMAL, TECHNO, ROCK or JAZZ).

⑦ **DISC 1/2/3**
– to select a disc tray for playback.

⑧ **Display screen**
– to view the current status of the system.

⑨ **OPEN•CLOSE**
– to open or close the disc tray.

⑩ **PROGRAM**
for CD/ MP3-CD .. to programme disc tracks.
for Tuner ..... to programme preset radio stations.

⑪ **Mode Selection**

ALBUM (–/ +) ◂◂ ▸▸
SEARCH•TUNING
for MP3-CD ..... to select previous/next album.
for CD/ MP3-CD .. (press and hold) to search backward/forward.
for Tuner ..... to tune to a lower or higher radio frequency.
for Clock ..... to set the hour.

STOP ■
for CD/ MP3-CD .. to stop playback or to clear a programme.
for Tuner ..... *(on the system only)* to stop programming.
for Demo ..... *(on the system only)* to activate/deactivate the demonstration.
for Clock ..... to exit clock setting.
for Plug&Play ..... *(on the system only)* to exit plug&play mode.

PLAY•PAUSE ▶II
for CD/ MP3-CD .. to start or interrupt playback.

PRESET ⏮/ ⏭ (TITLE)
for MP3-CD ..... to select previous/next title.
for CD ..... to skip to the beginning of the current, previous, or next track.
for Tuner ..... to select a preset radio station.
for Clock ..... to set the minute.

⑫ **DISC CHANGE**
– to change disc(s).

⑬ **CLOCK•TIMER**
– to view the clock.
– set the clock or set the timer (on the set only).

⑭ 🎧
– to connect headphones.

⑮ **MIC IN**
– to connect microphone

⑯ **MIC VOLUME**
– to adjust the mixing level for Karaoke

⑰ **Tape Deck Operation**
RECORD ● ... starts recording.
PLAY ▶ ..... starts playback.
SEARCH ◀◀/▶▶ fast rewinds/winds the tape.
STOP•OPEN ■ ⏏
..... stops the tape; opens the tape compartment.
PAUSE II ..... interrupts recording or playback.

⑱ **Disc tray**

⑲ **DISPLAY**
– to select disc information display mode.

⑳ **DIM MODE**
– to select different brightness for the display screen : DIM 1, DIM 2, DIM 3 or DIM OFF.

㉑ **SLEEP (TIMER ON/OFF)**
– to activate/deactivate or set the sleep timer.
– activates/deactivates the timer function.

㉒ **REPEAT**
– to playback track(s)/disc(s)/programme repeatedly.

㉓ **SHUFFLE**
– turns on/off the random play mode.

㉔ **MUTE**
– mutes or restores the volume.

Notes for remote control:
– First, select the source you wish to control by pressing one of the source select keys on the remote control (CD or TUNER, for example).
– Then select the desired function (⏯ , ⏮ , ⏭ , for example).

Maintenance

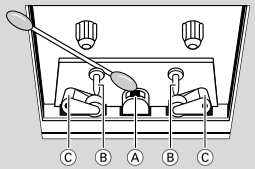
Cleaning the Cabinet
Use a soft cloth slightly moistened with a mild detergent solution. Do not use a solution containing alcohol, spirits, ammonia or abrasives.

Cleaning Discs

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

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

Cleaning the Heads and the Tape Paths
To ensure good recording and playback quality, clean the heads (A), the capstan(s) (B), and pressure roller(s) (C) after every 50 hours of tape operation.
Use a cotton swab slightly moistened with cleaning fluid or alcohol.
You also can clean the heads by playing a cleaning tape once.



Demagnetising the heads
Use a demagnetising 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.

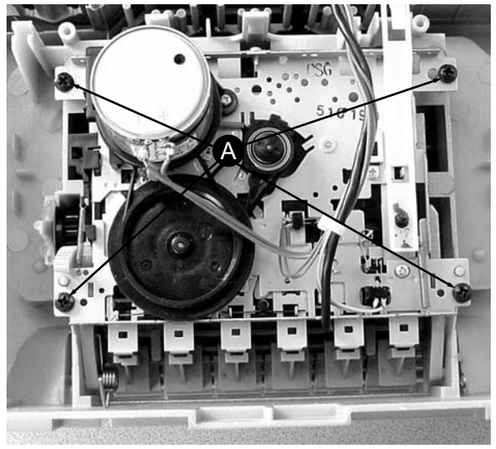
If a fault occurs, first check the points listed below before taking the system for repair. If you are unable to remedy a problem by following these hints, consult your dealer or Philips for help.

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 finalized CD-RW or a correct MP3-CD format disc.
"DISC NOT FINALIZED" is displayed.	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 Mini HiFi System and your TV or VCR.
Recording or playback cannot be made.	Clean deck parts, see "Maintenance". Use only NORMAL (IEC I) tape. Apply a piece of adhesive tape over the missing tab space.
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 connec ted 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 (▶, ⏮, ⏭). Reduce the distance between the remote control and the system. Insert the batteries with their polarities (+/– signs) aligned as indicated. Replace the batteries. Point the remote control directly towards the IR sensor.
The time is not working.	Set the clock correctly. Press and hold TIMER ON/OFF to switch on the timer. If recording or tape dubbing is in progress, stop recording.
Not all lighted buttons are showing light.	Press DIM to select DIM OFF display mode.
The Clock/Timer setting is erased.	Power has been interrupted or the power cord has been disconnected. Reset the clock/timer.

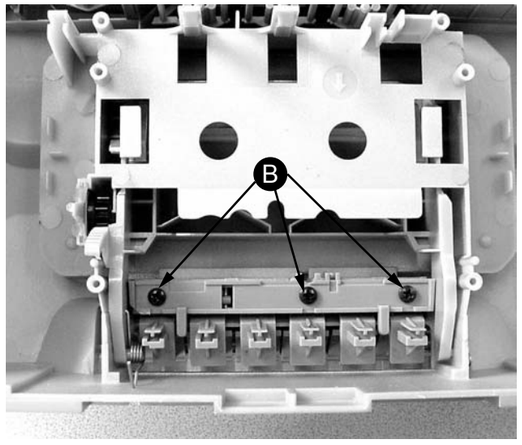
DISASSEMBLY DIAGRAM

Dismantling of the Cassette Cover

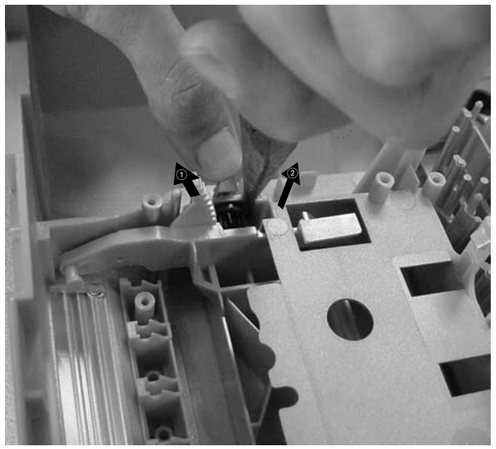
1) Loosen 4 screws to remove the Cassette Deck.



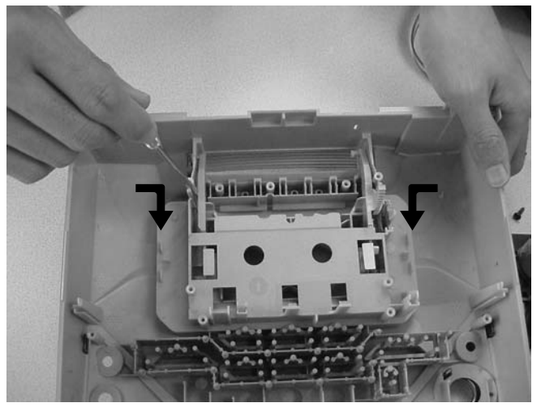
2) Loosen 4 screws to remove the Cassette Keys .



3) Push the catch outside and take out damper gear assembly as indicated.

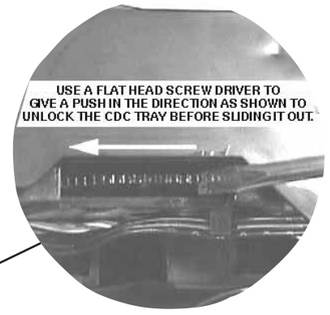


4) Remove the Cassette Cover as indicated.



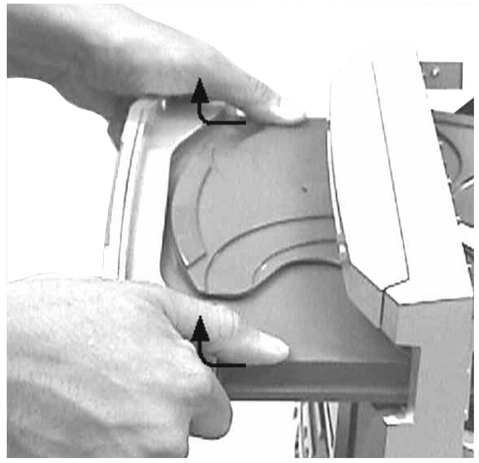
Dismantling of the CDC Module and Front Panel

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



Sliding Out The CDC Tray

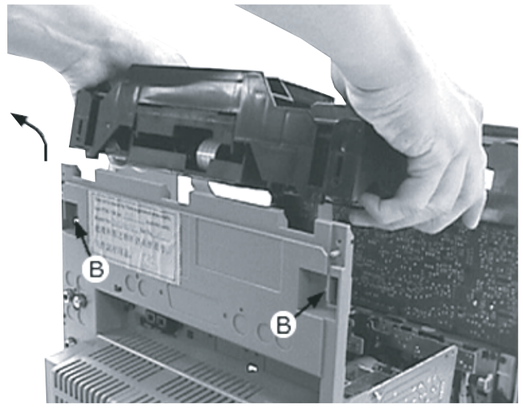
4) Remove the Cover Tray CDC as indicated.



Remove Cover Tray CDC

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

Front View CDC



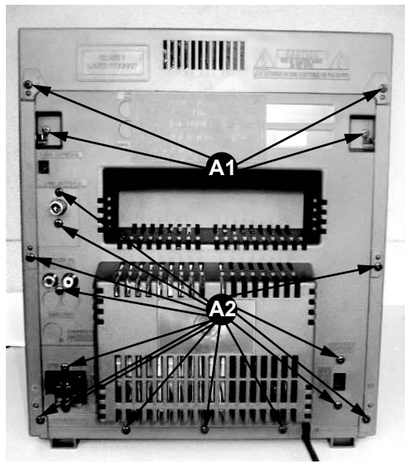
Remove CDC Module

4 - 2

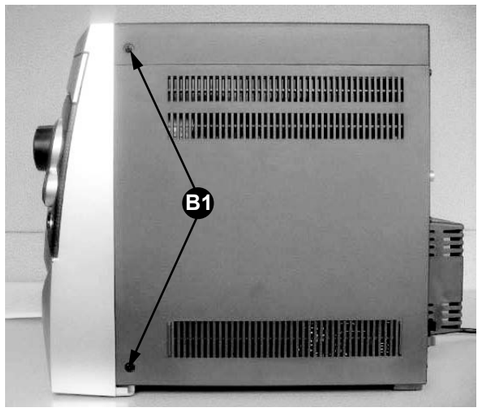
DISASSEMBLY DIAGRAM

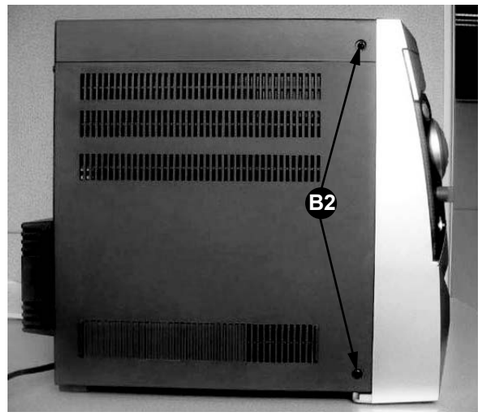
Dismantling of Rear Portion

A Remove the back panel :
A1 Remove screws M3x12 (4pcs)
A2 Remove screws M3x10 (14pcs)



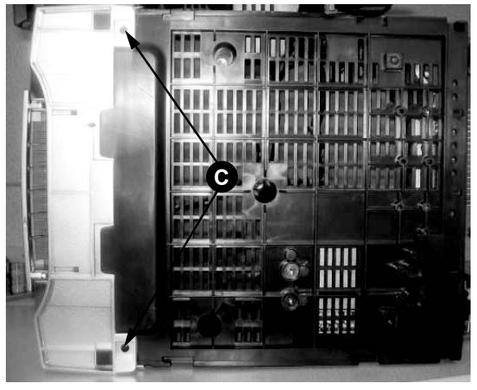
B Remove Left and Right panel :
B1 Remove screws M3x10 (2pcs)
B2 Remove screws M3x10 (2pcs)



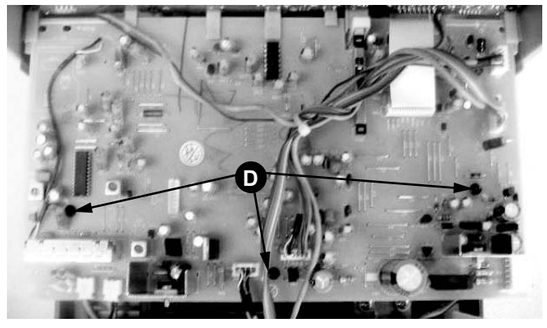


Dismantling of the Front Cabinet and PCB Boards

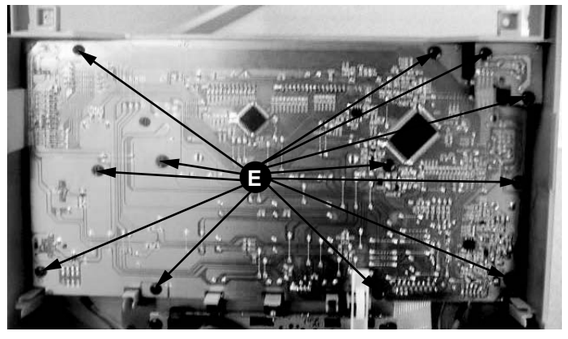
C Remove Front Cabinet:
Remove screws M3x10 (2pcs)



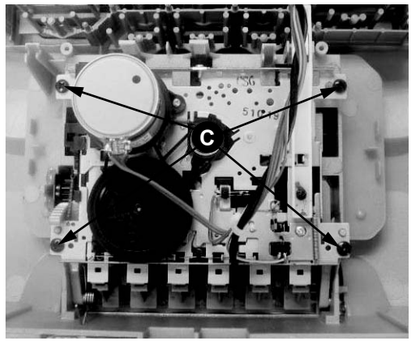
D Remove screws M3x10 (3pcs)



E Remove screws M3x10 (12pcs)

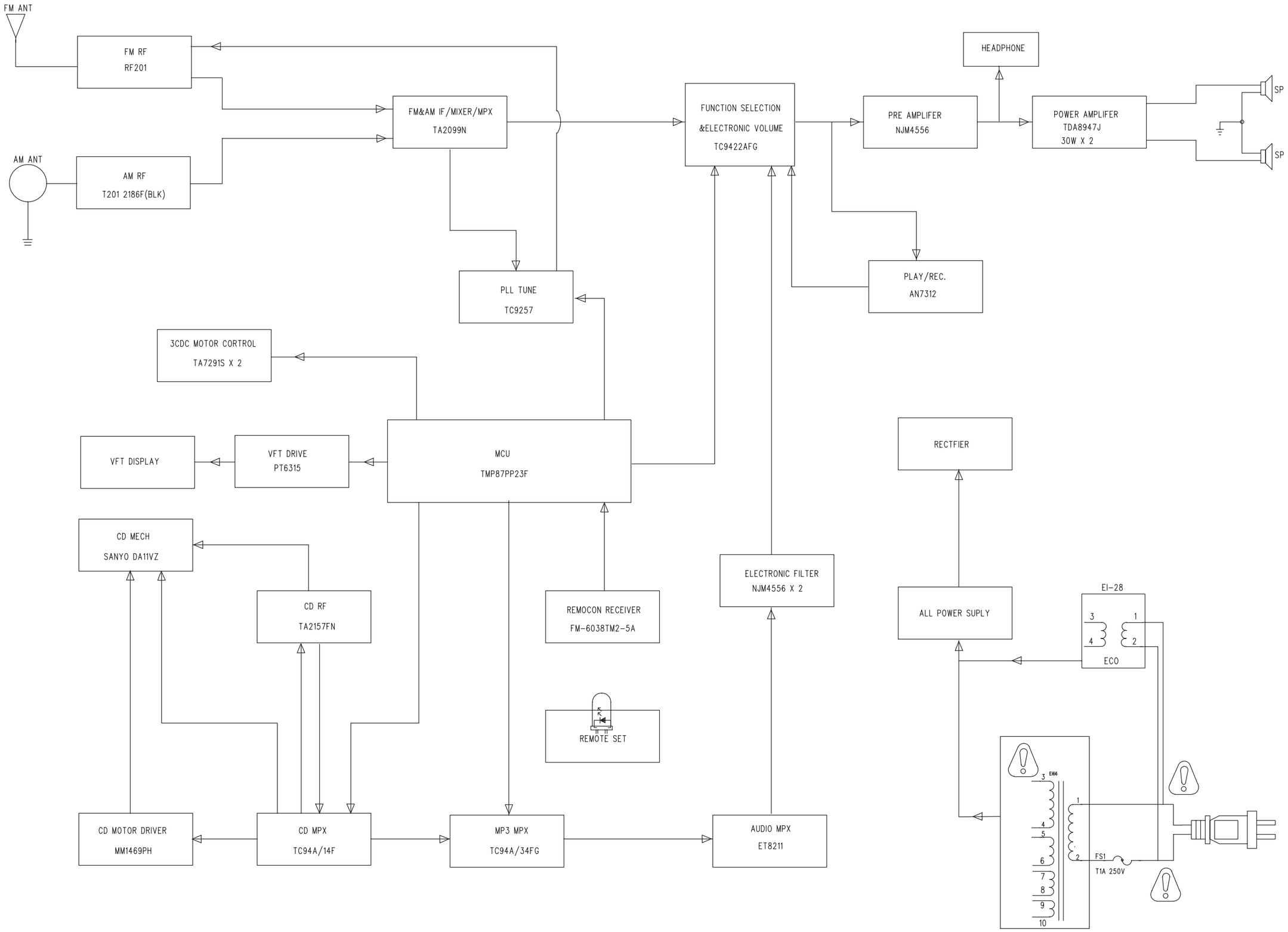


F Remove screws M3x10 (4pcs)



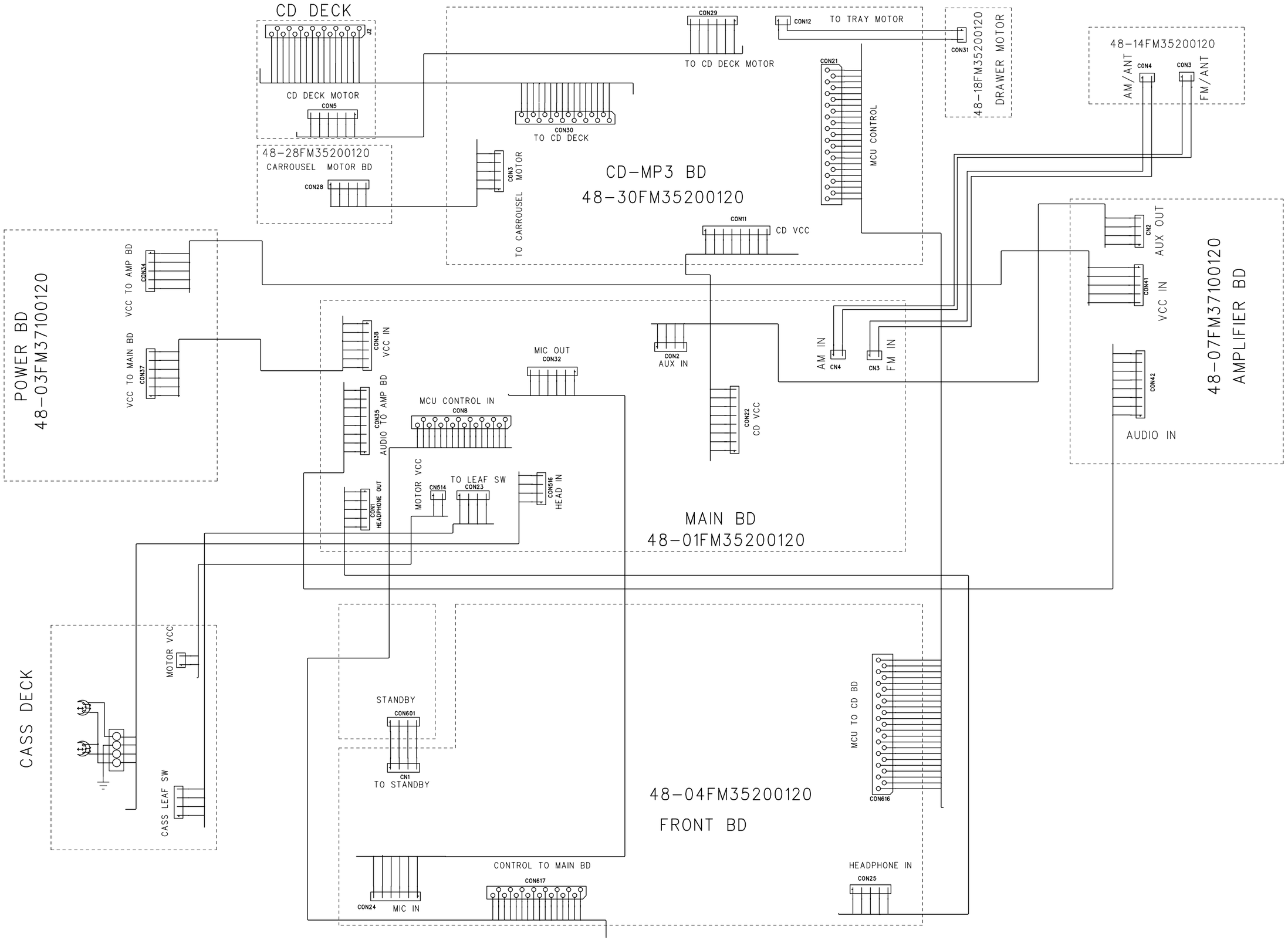
5 - 1

SET BLOCK DIAGRAM



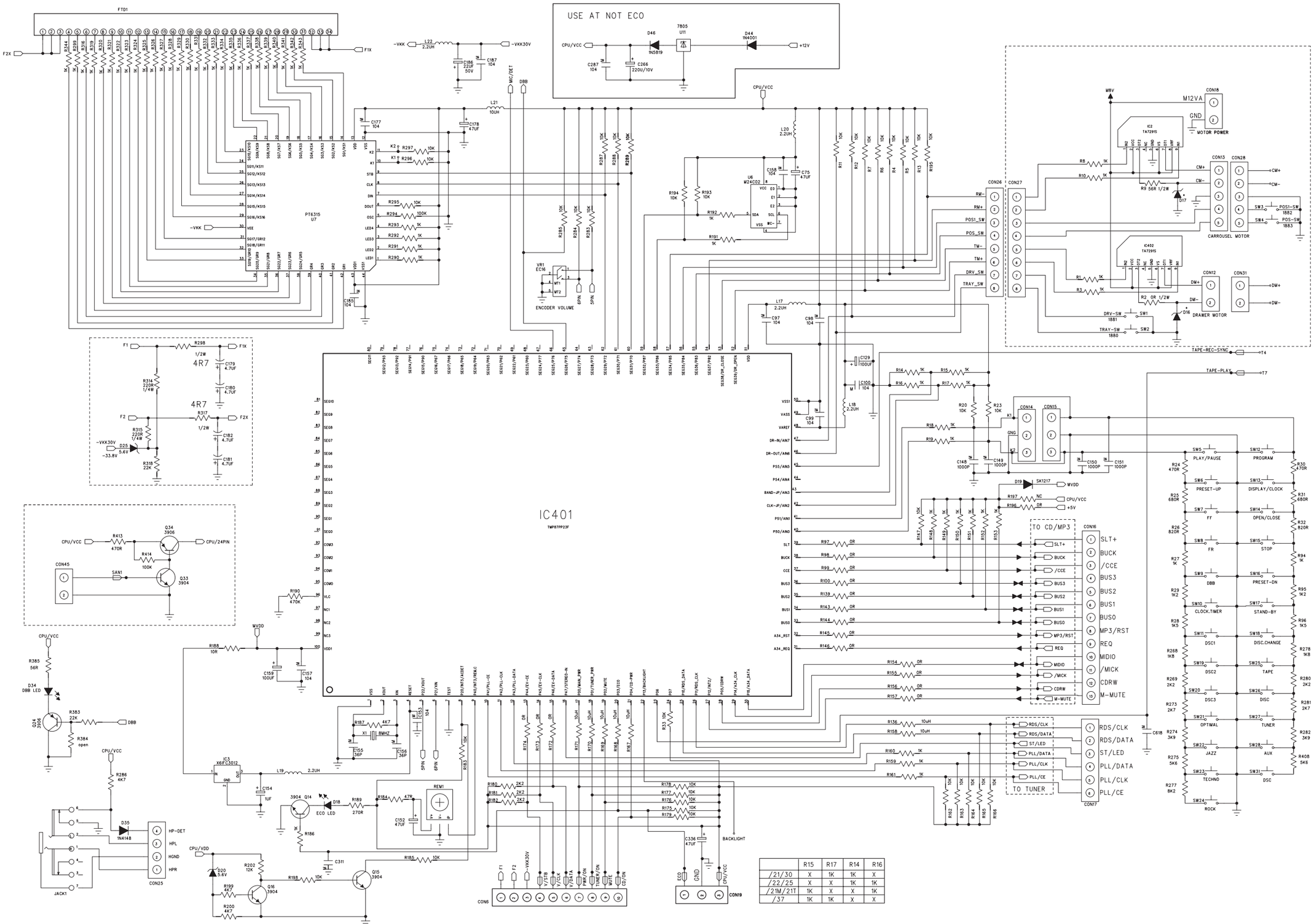
5 - 2

SET WIRING DIAGRAM



6 - 1

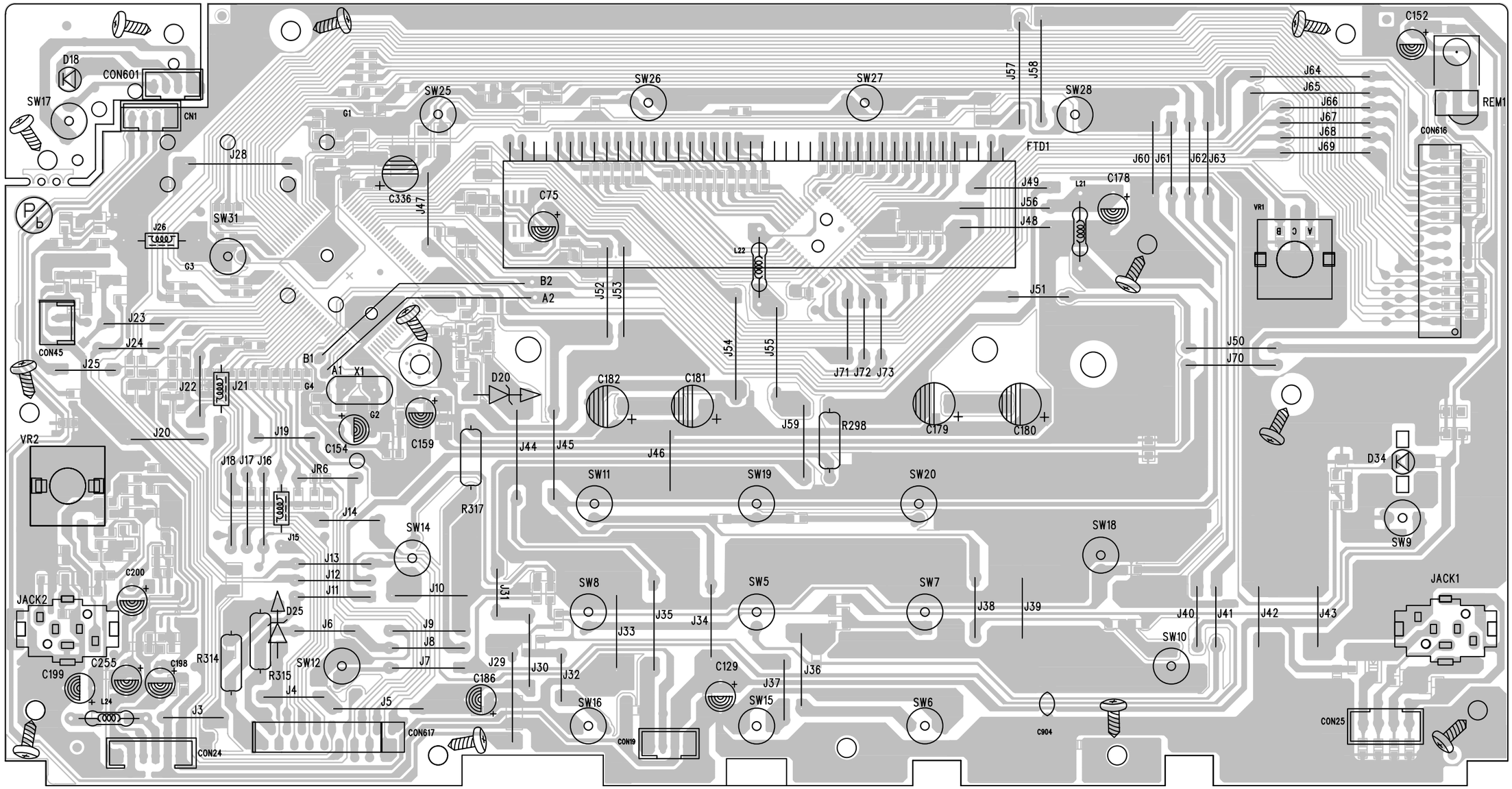
CIRCUIT DIAGRAM - FRONT BOARD



	R15	R17	R14	R16
/21/30	X	1K	1K	X
/22/25	X	X	1K	1K
/21M/21T	1K	X	X	1K
/37	1K	1K	X	X

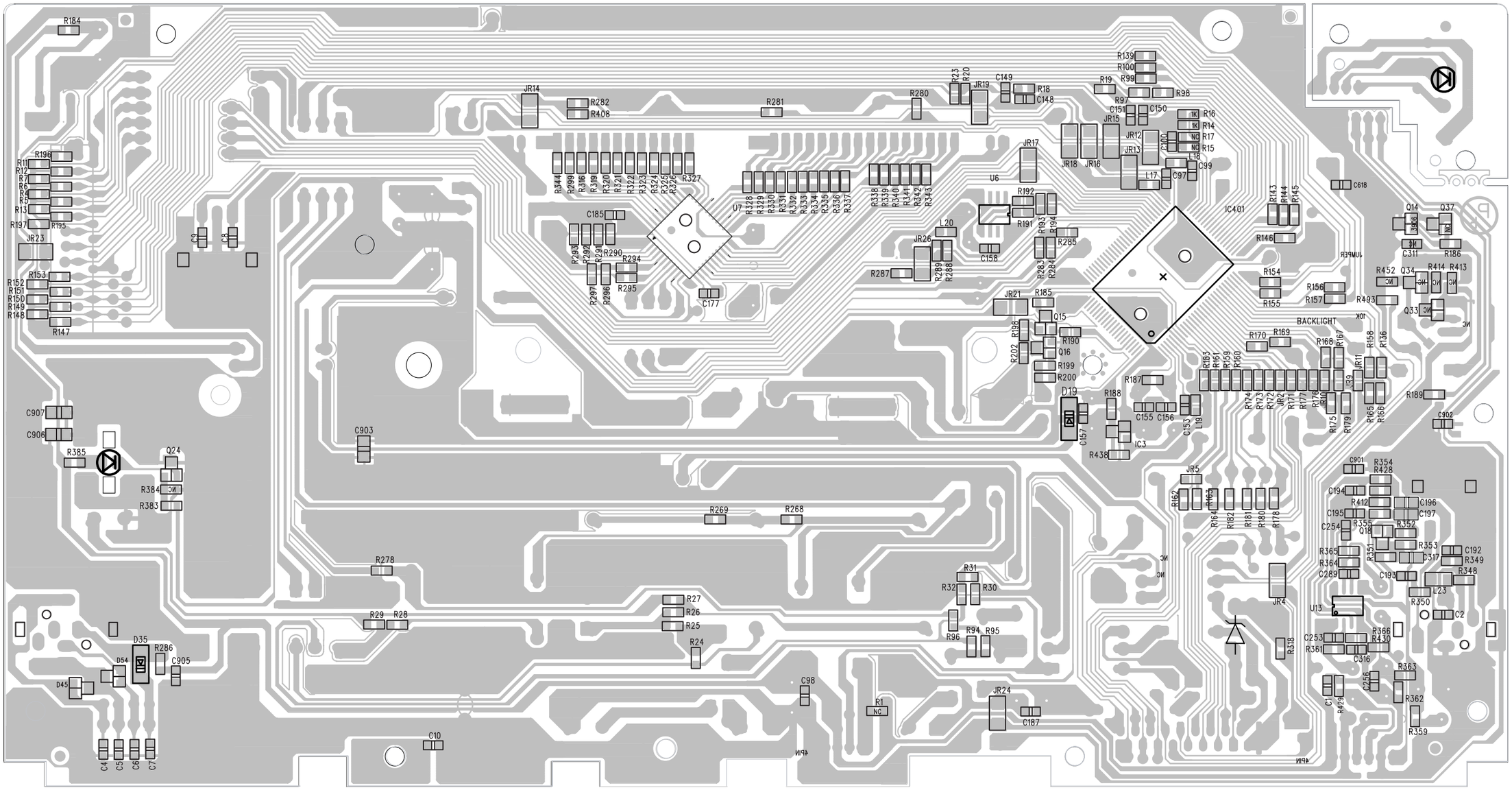
6 - 2

CIRCUIT DIAGRAM - FRONT BOARD

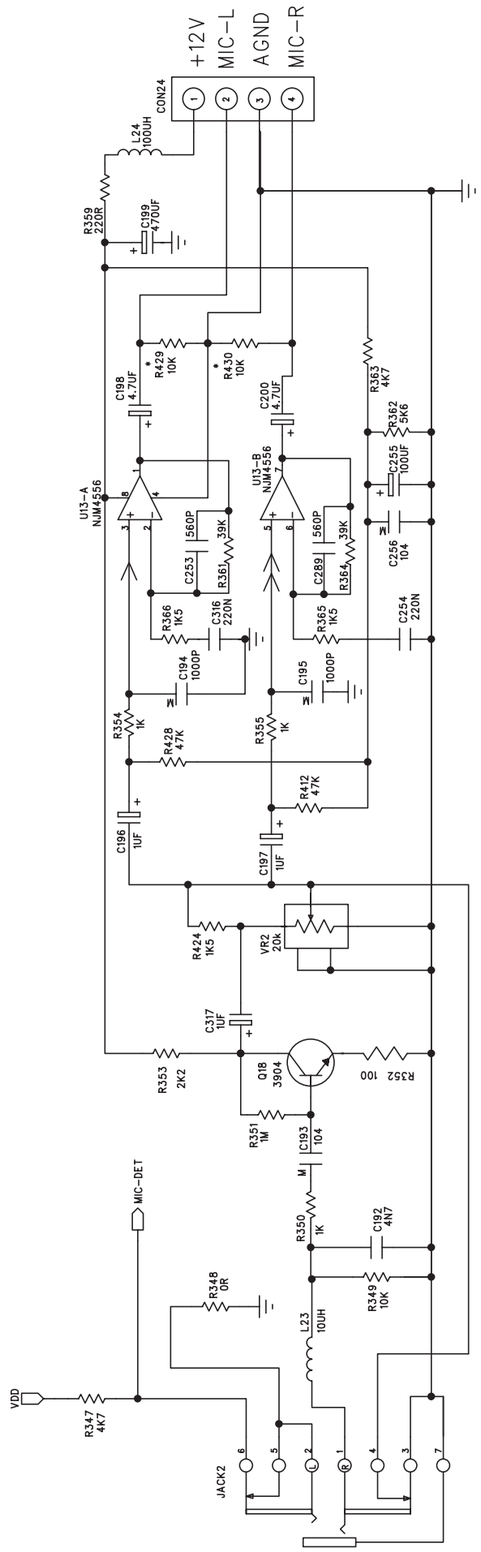


6 - 3

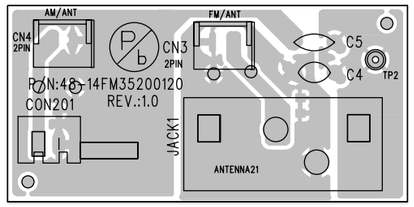
LAYOUT DIAGRAM - FRONT BOARD



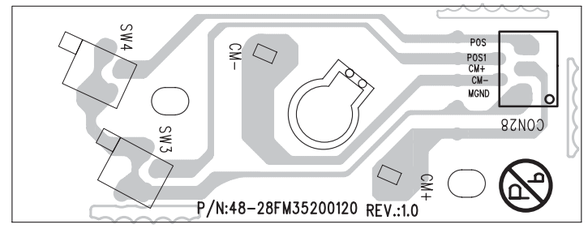
LAYOUT DIAGRAM - FRONT BOARD
MIC PART



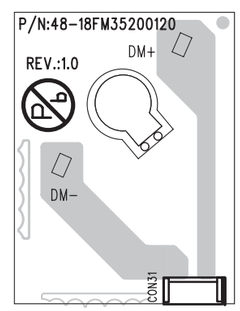
LAYOUT DIAGRAM - ANT BOARD



LAYOUT DIAGRAM - CURROUSE MOTOR BOARD

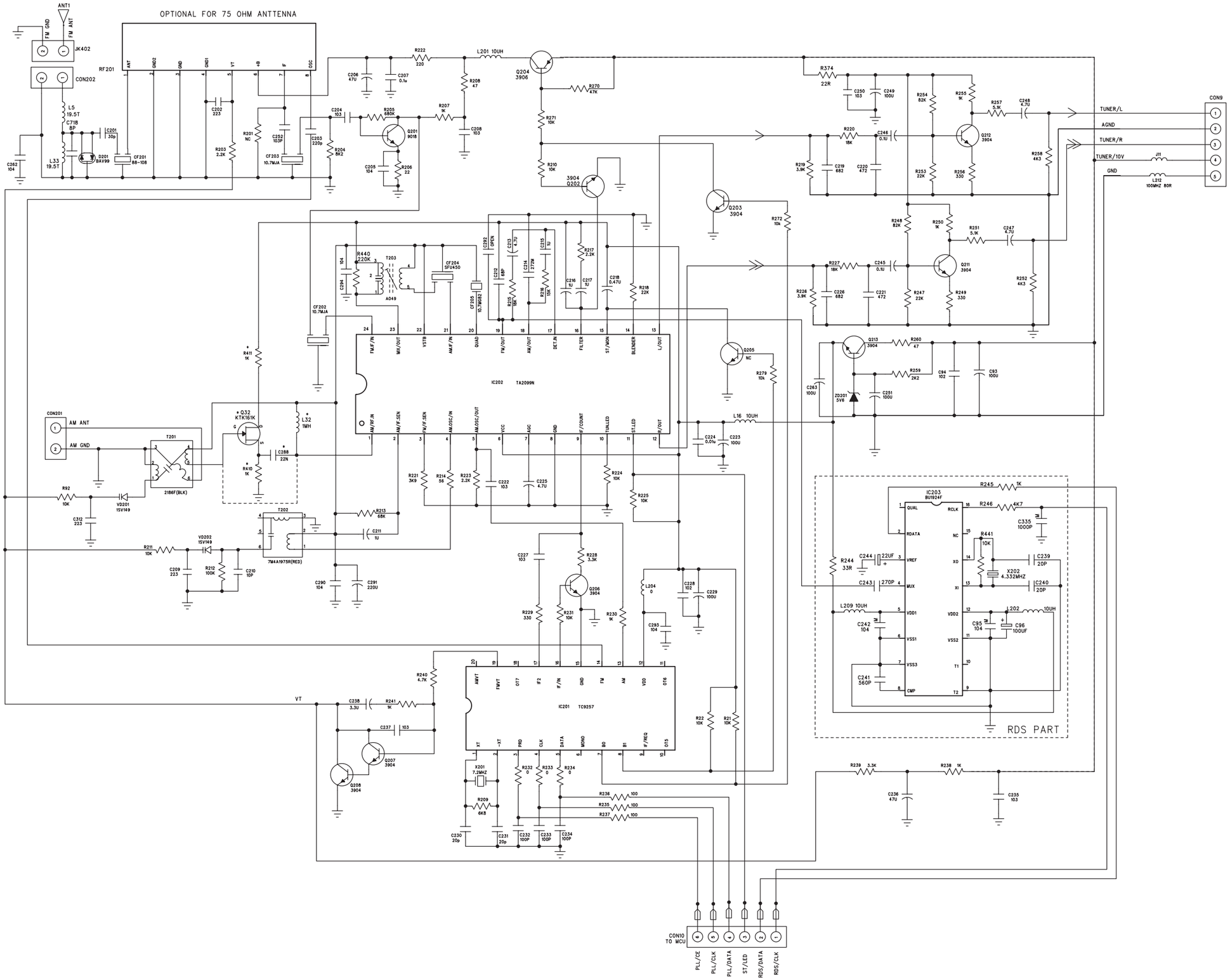


LAYOUT DIAGRAM - DRAWER MOTOR BOARD



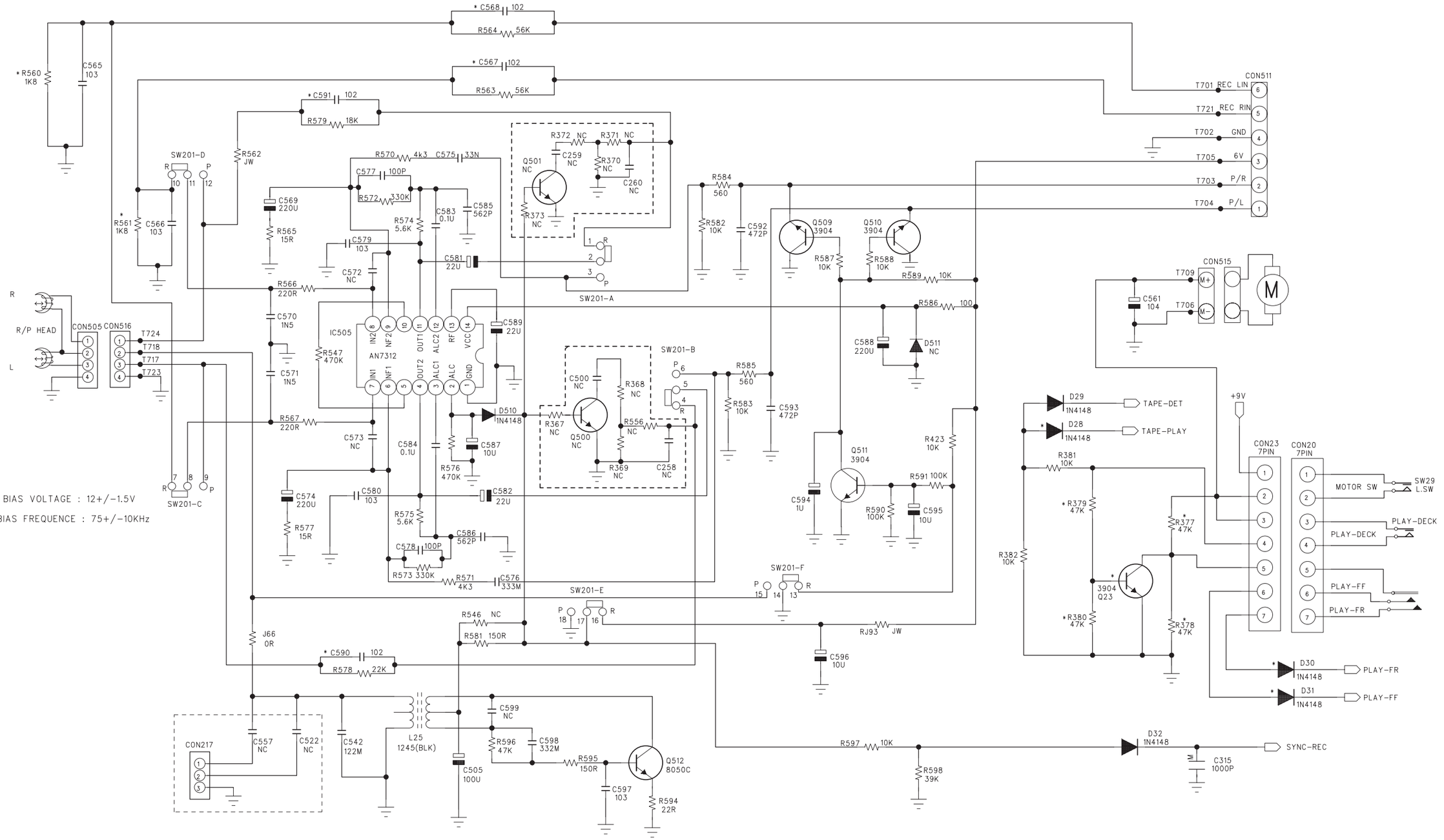
7 - 1

CIRCUIT DIAGRAM - MAIN BOARD
TUNER PART



7 - 2

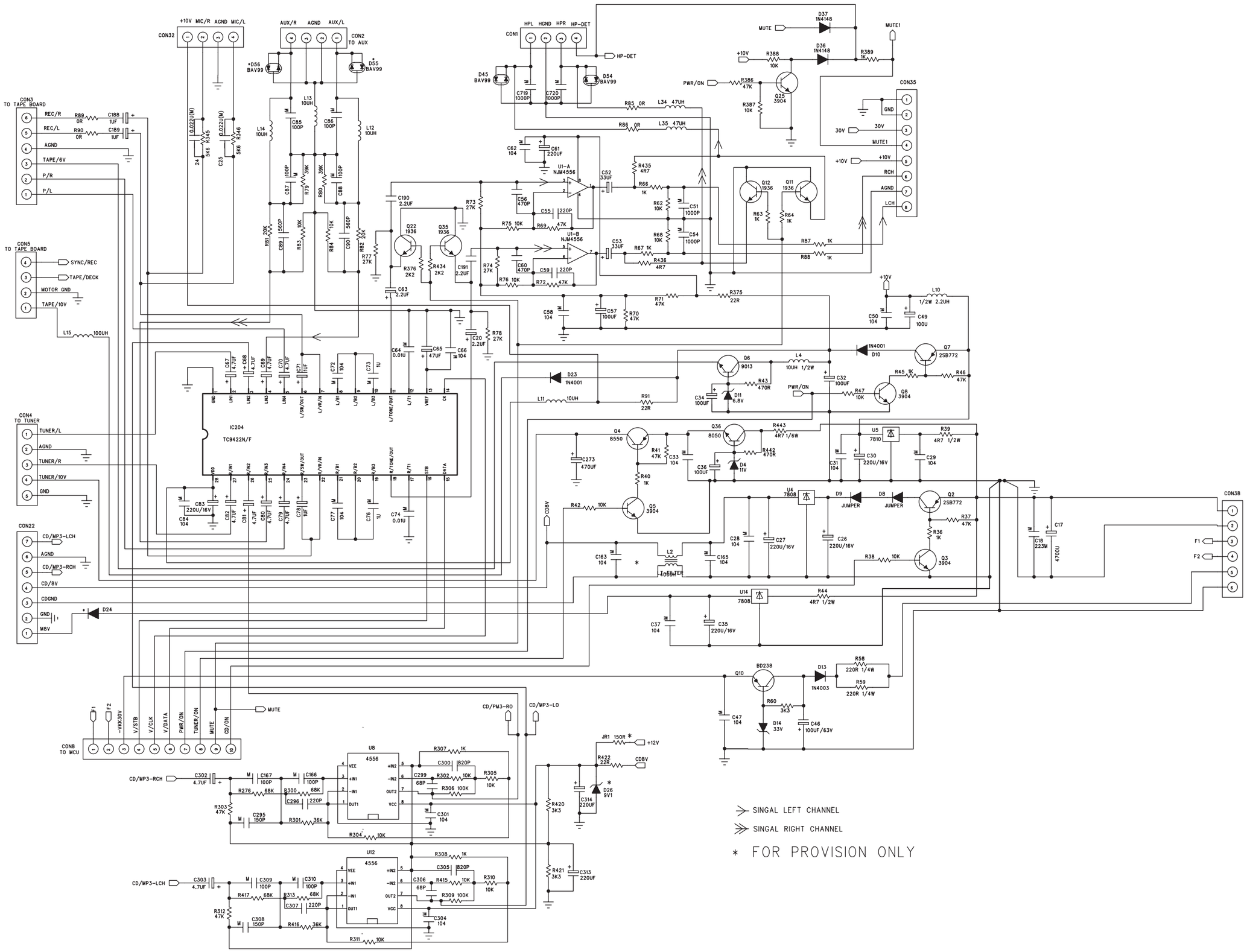
CIRCUIT DIAGRAM - MAIN BOARD
TAPE PART



* FOR PROVISION ONLY

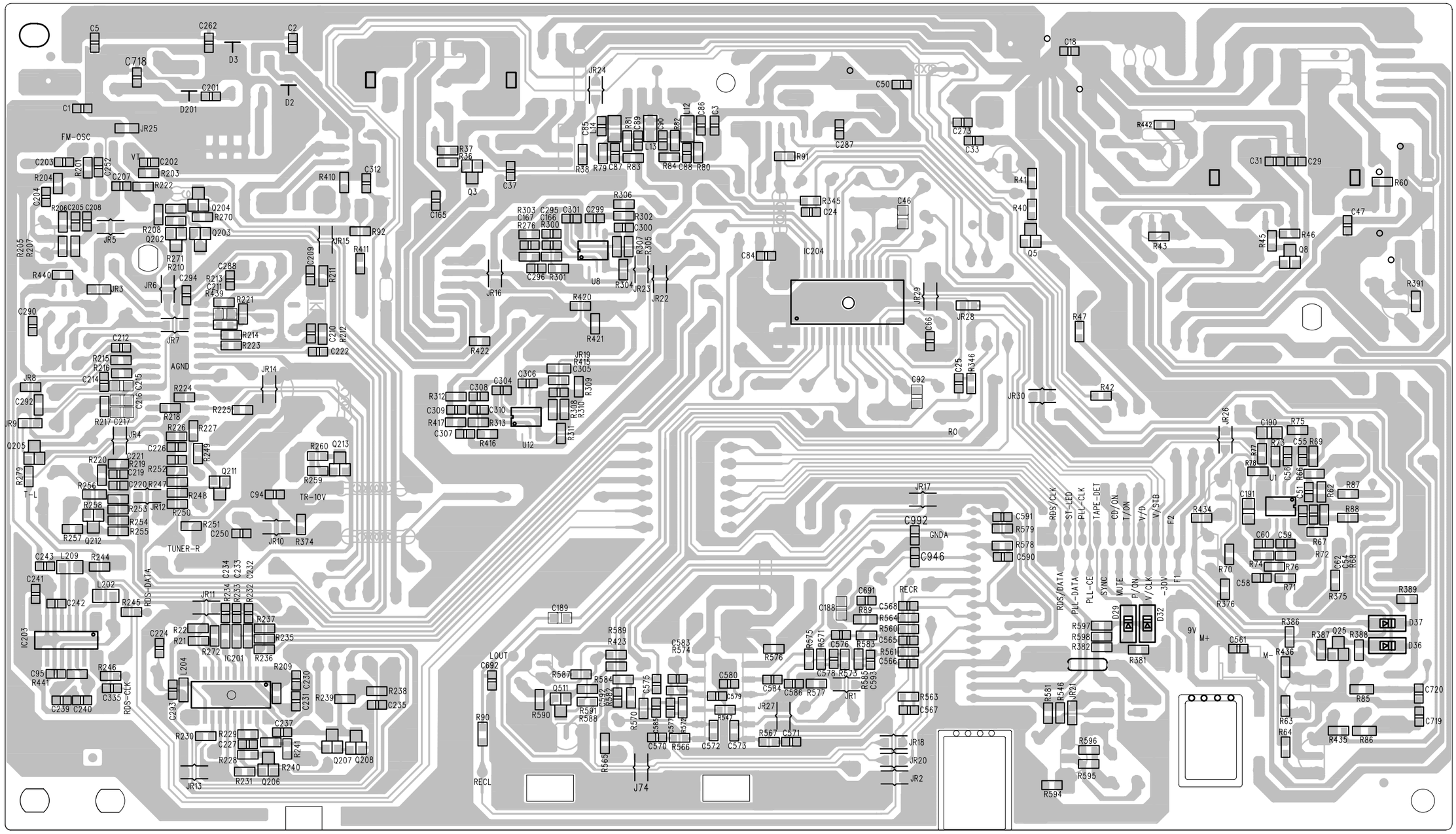
7 - 3

CIRCUIT DIAGRAM - MAIN BOARD



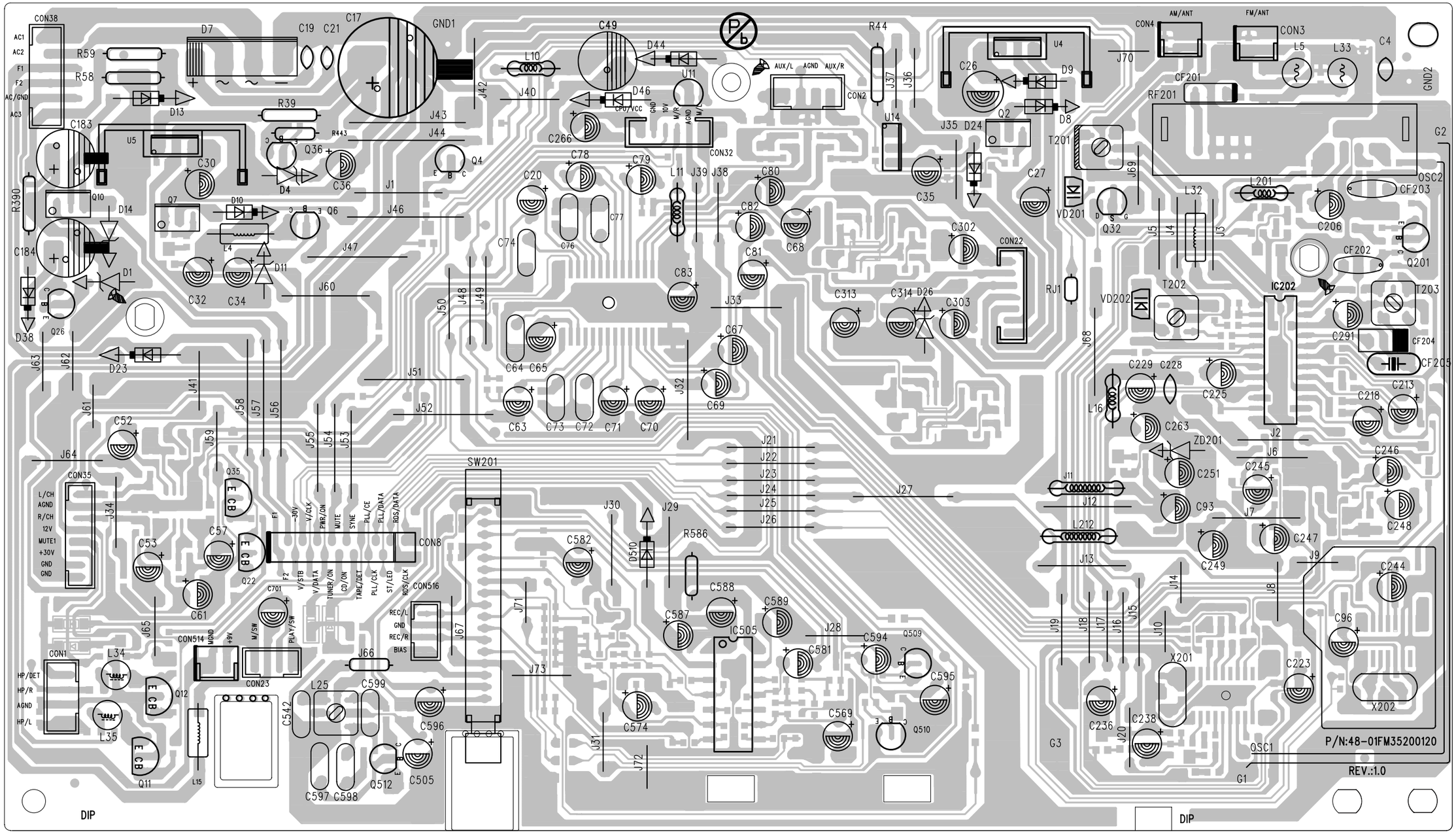
7 - 4

LAYOUT DIAGRAM - MAIN BOARD



7 - 5

LAYOUT DIAGRAM - MAIN BOARD



8 - 1

CIRCUIT DIAGRAM - AMP BOARD

SINGAL LEFT CHANNEL

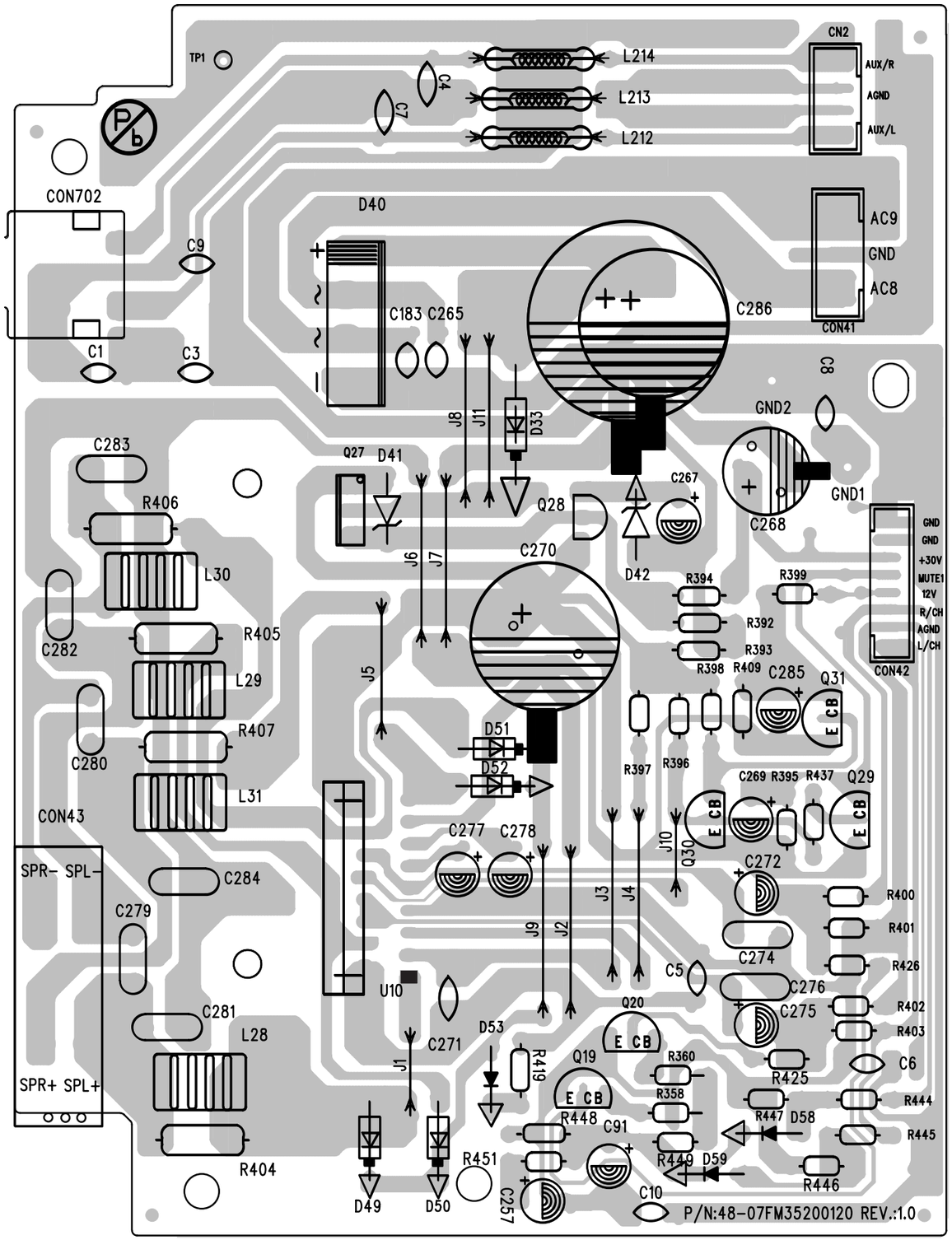
SINGAL RIGHT CHANNEL

* FOR PROVISION ONLY

ONLY /12/05 USE

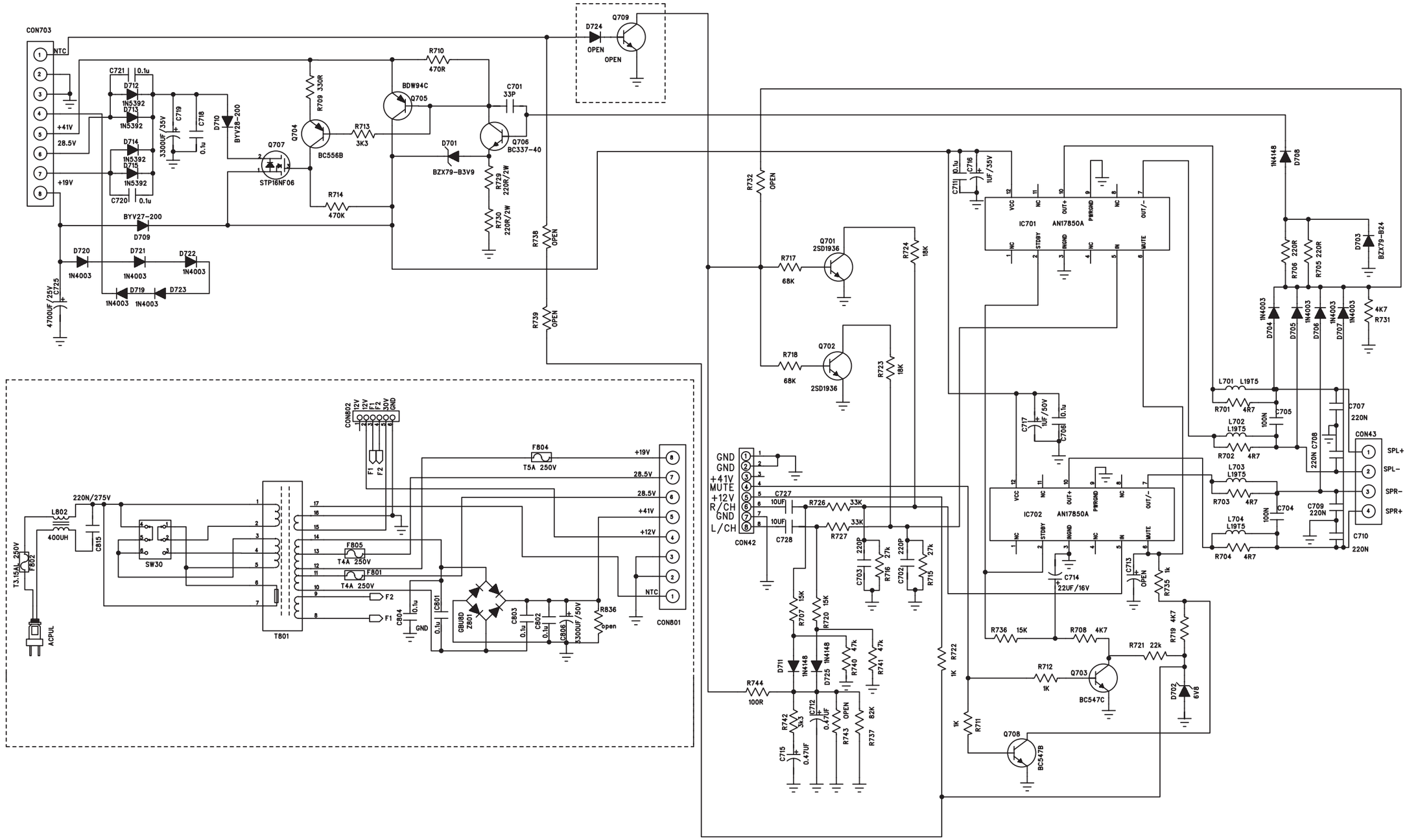
8 - 2

LAYOUT DIAGRAM - AMP BOARD

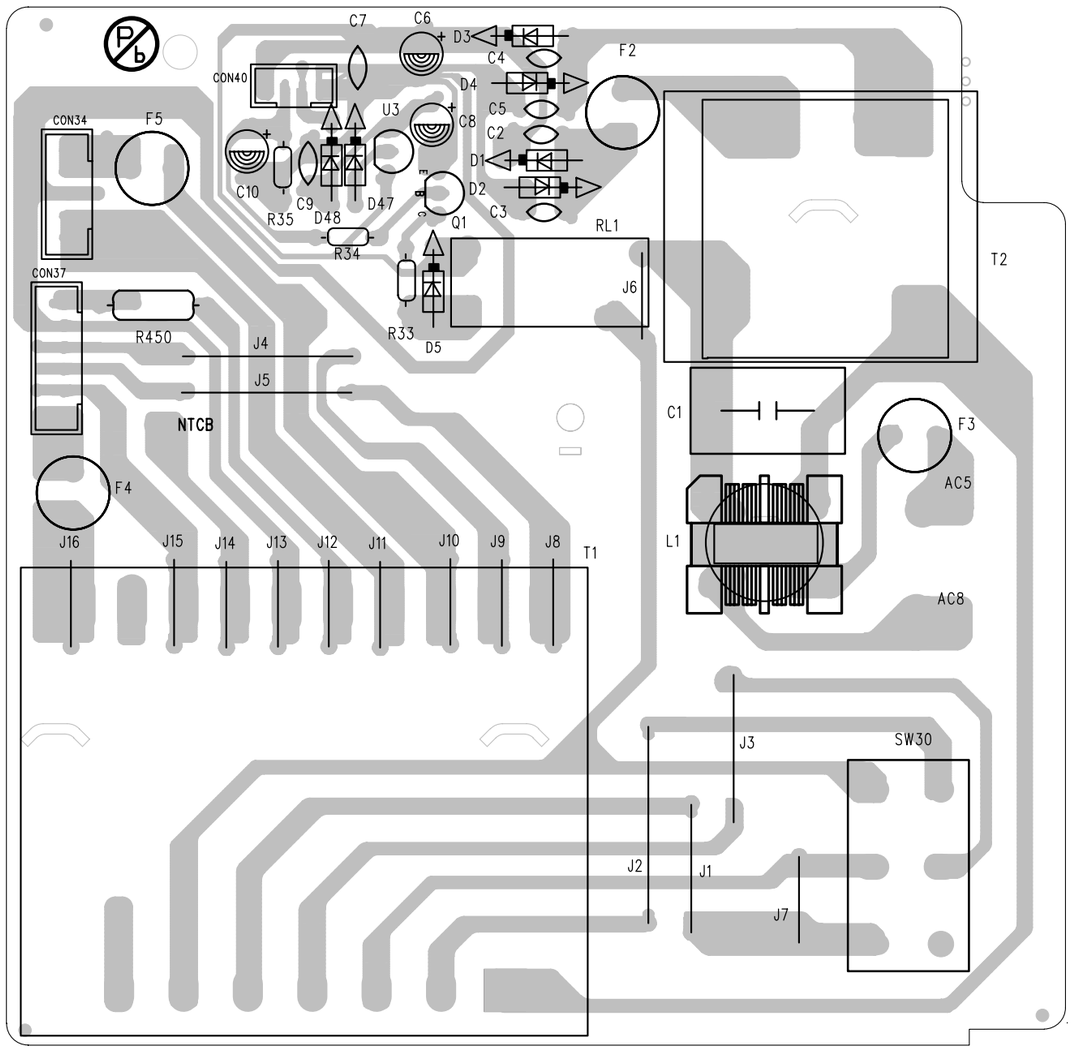


9 - 1

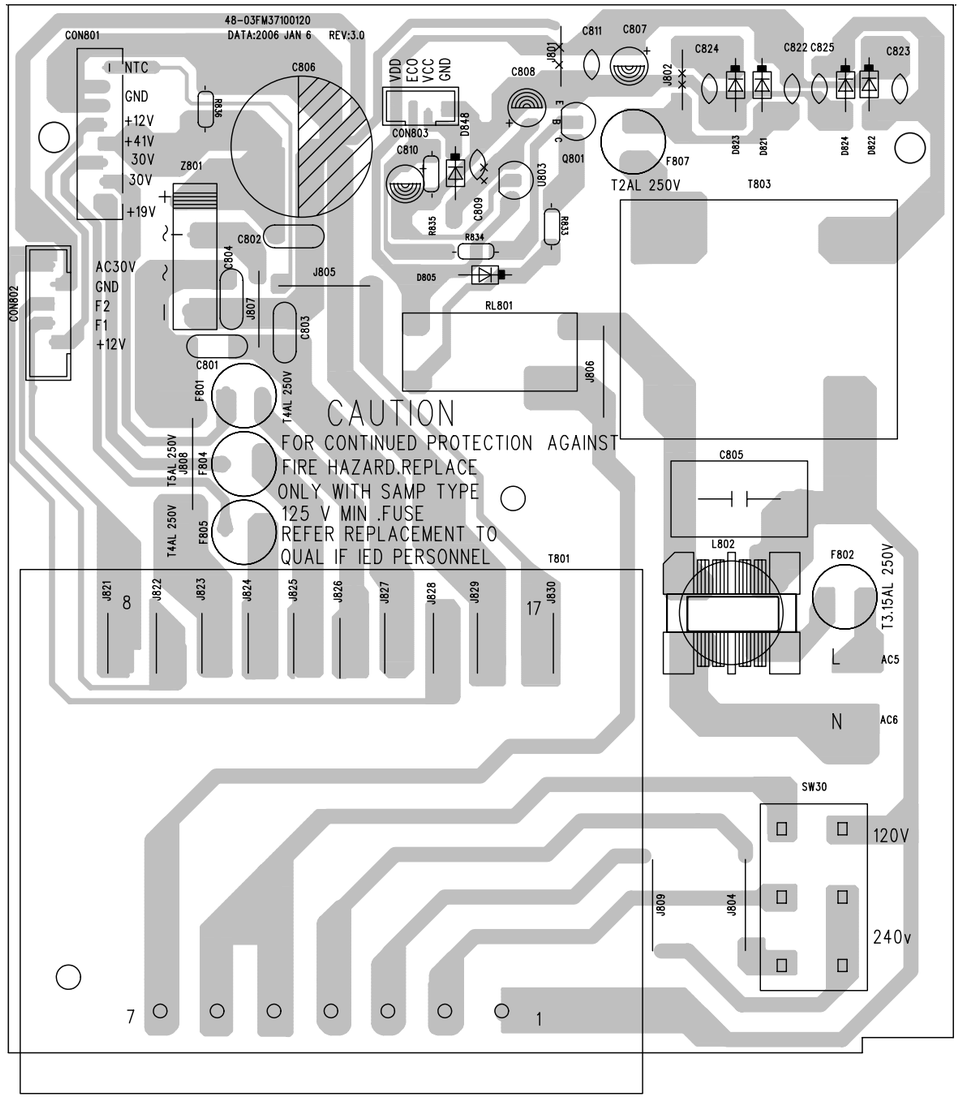
CIRCUIT DIAGRAM - POWER BOARD



LAYOUT DIAGRAM - POWER BOARD
ONLY FOR FWM352

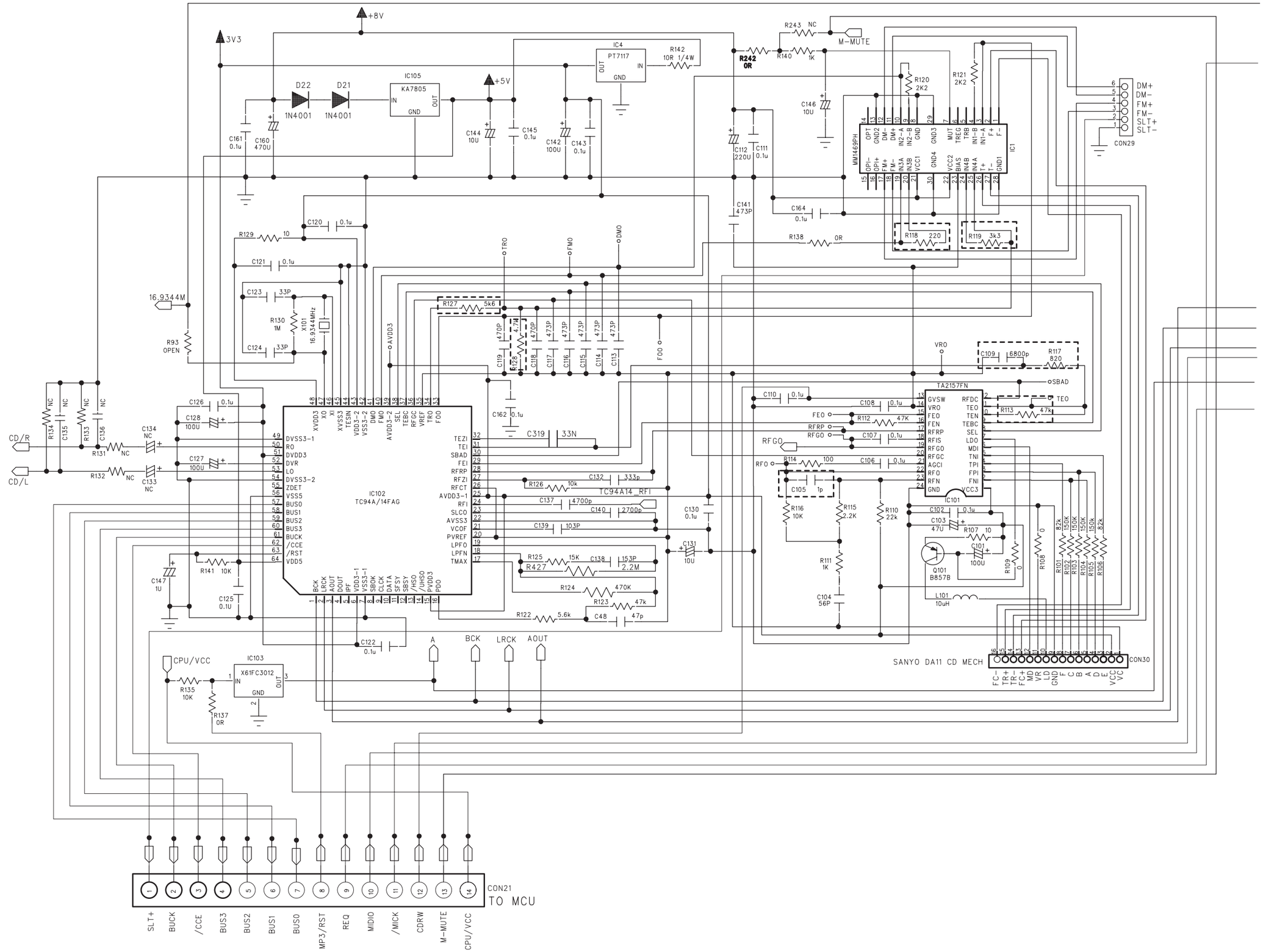


LAYOUT DIAGRAM - POWER BOARD
ONLY FOR FWM371



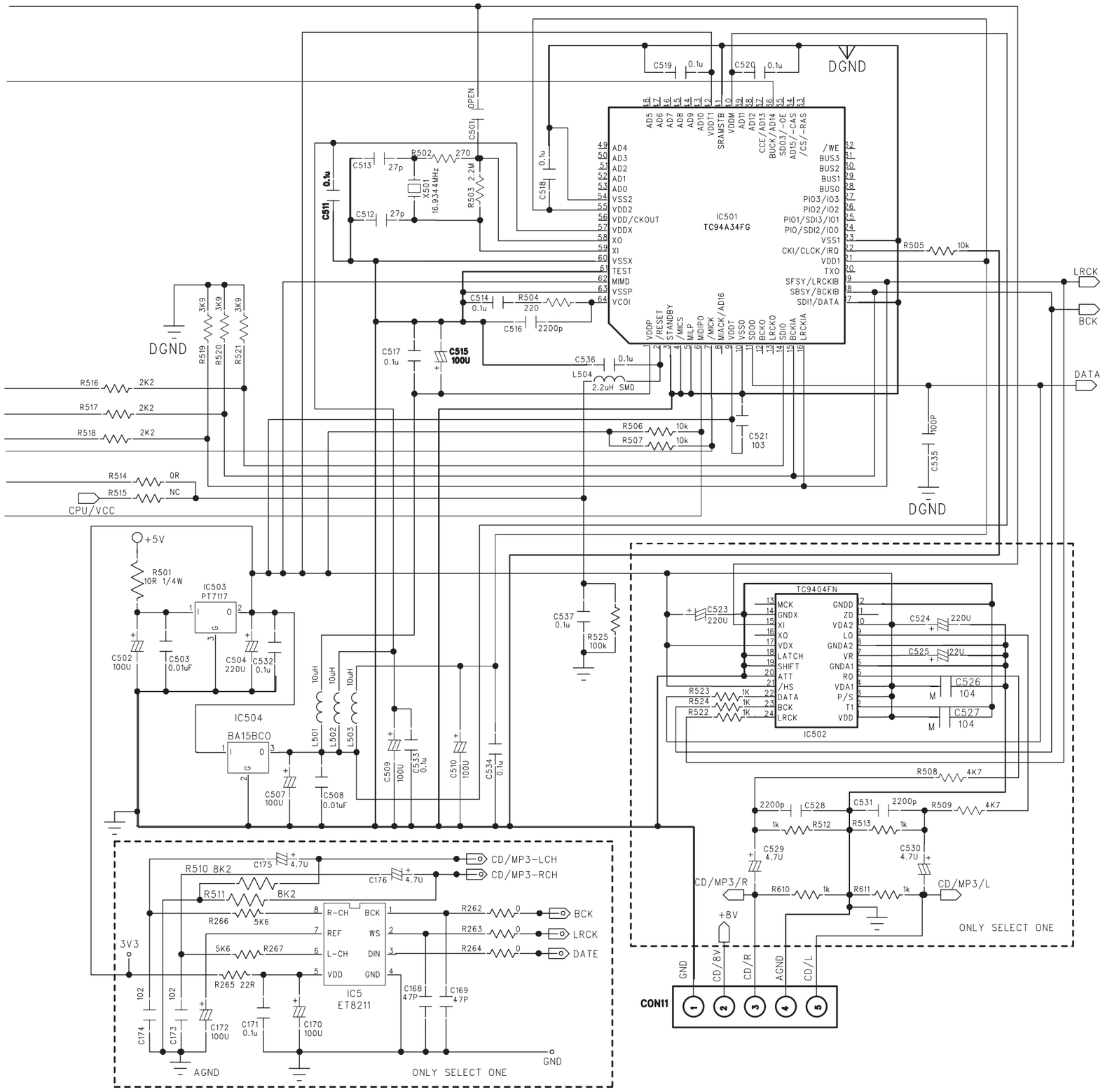
10 - 1

CIRCUIT DIAGRAM - 3CDC BOARD
PART1



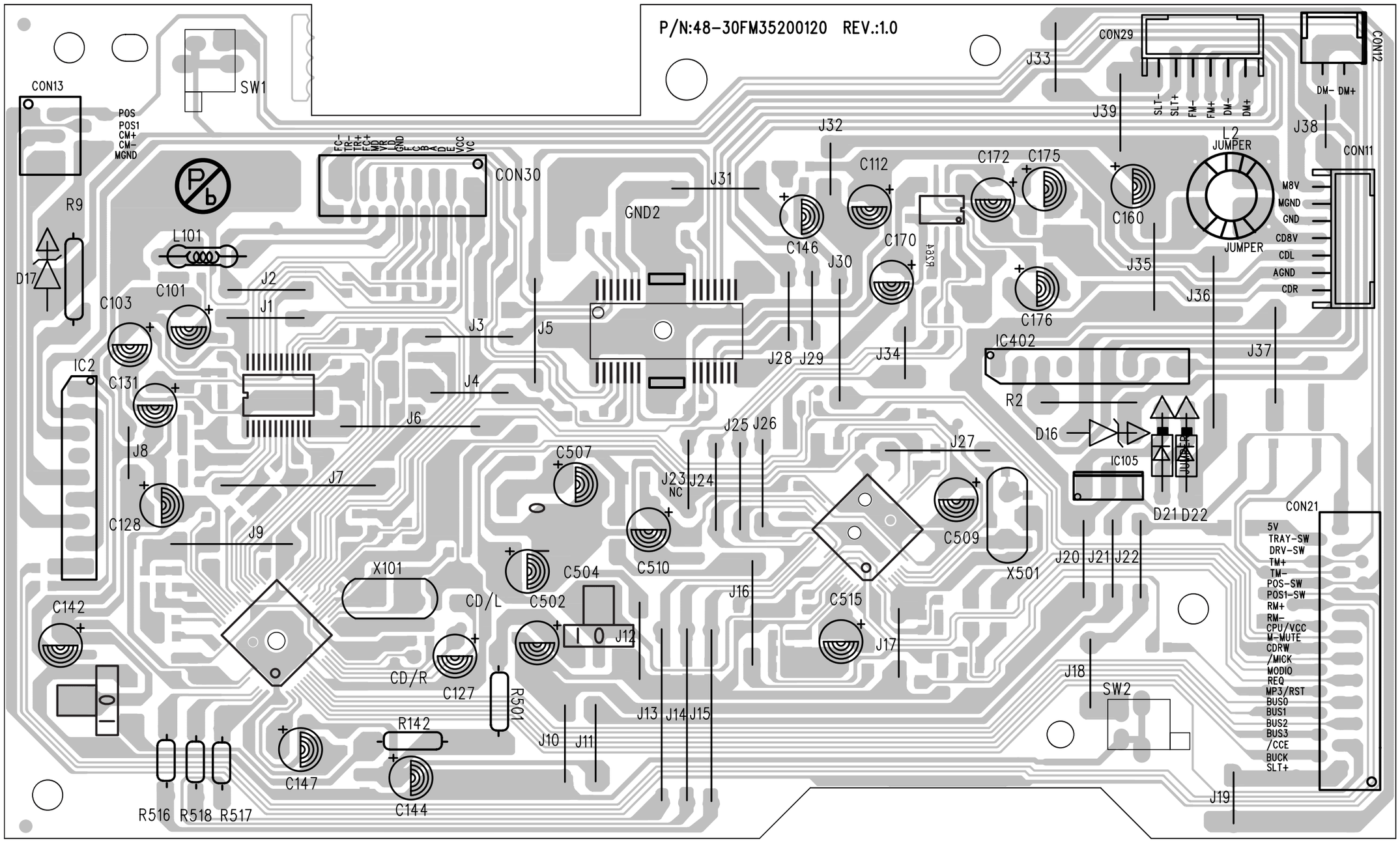
10 - 2

CIRCUIT DIAGRAM - 3CDC BOARD
PART2



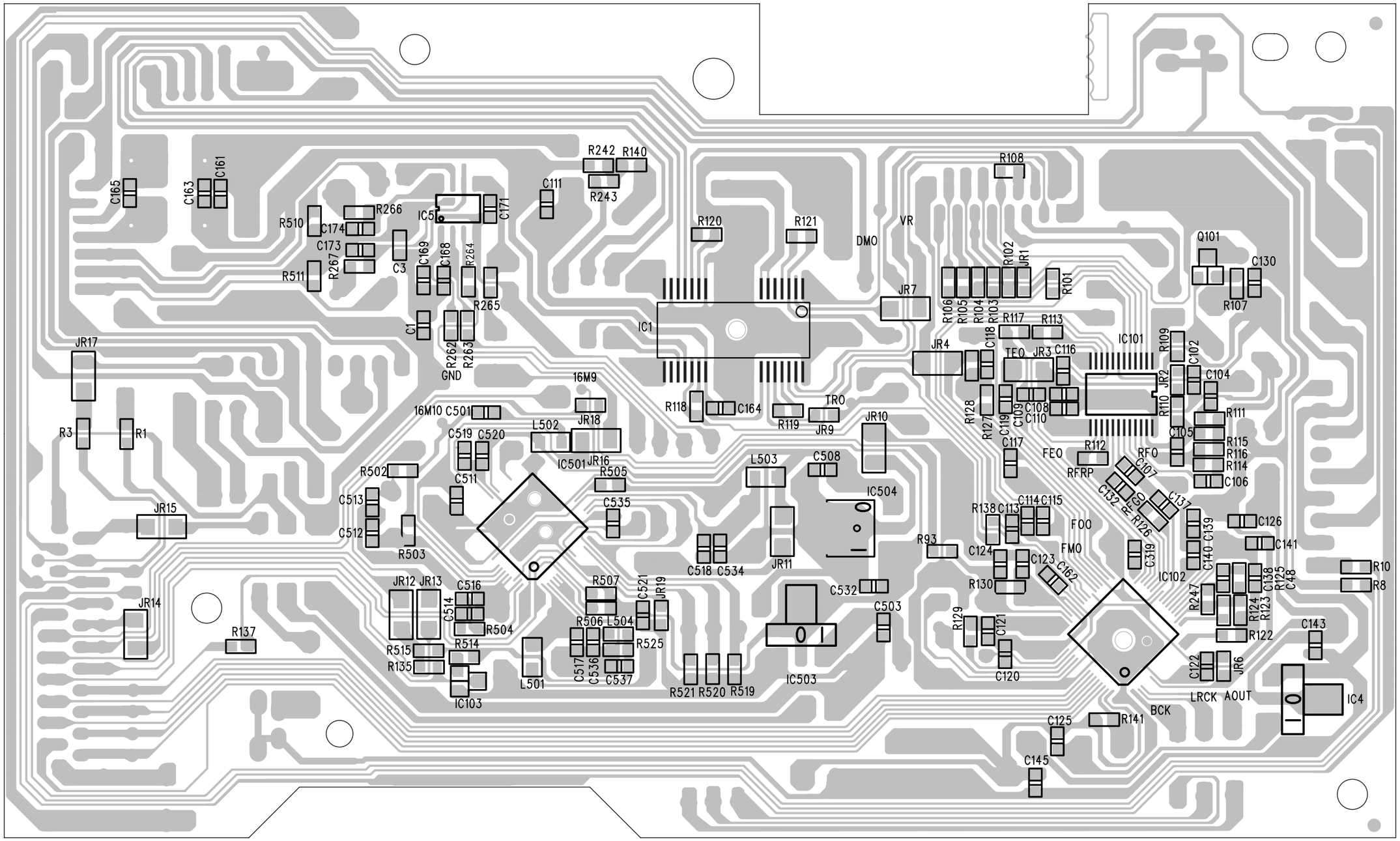
10 - 3

LAYOUT DIAGRAM - 3CDC BOARD



10 - 4

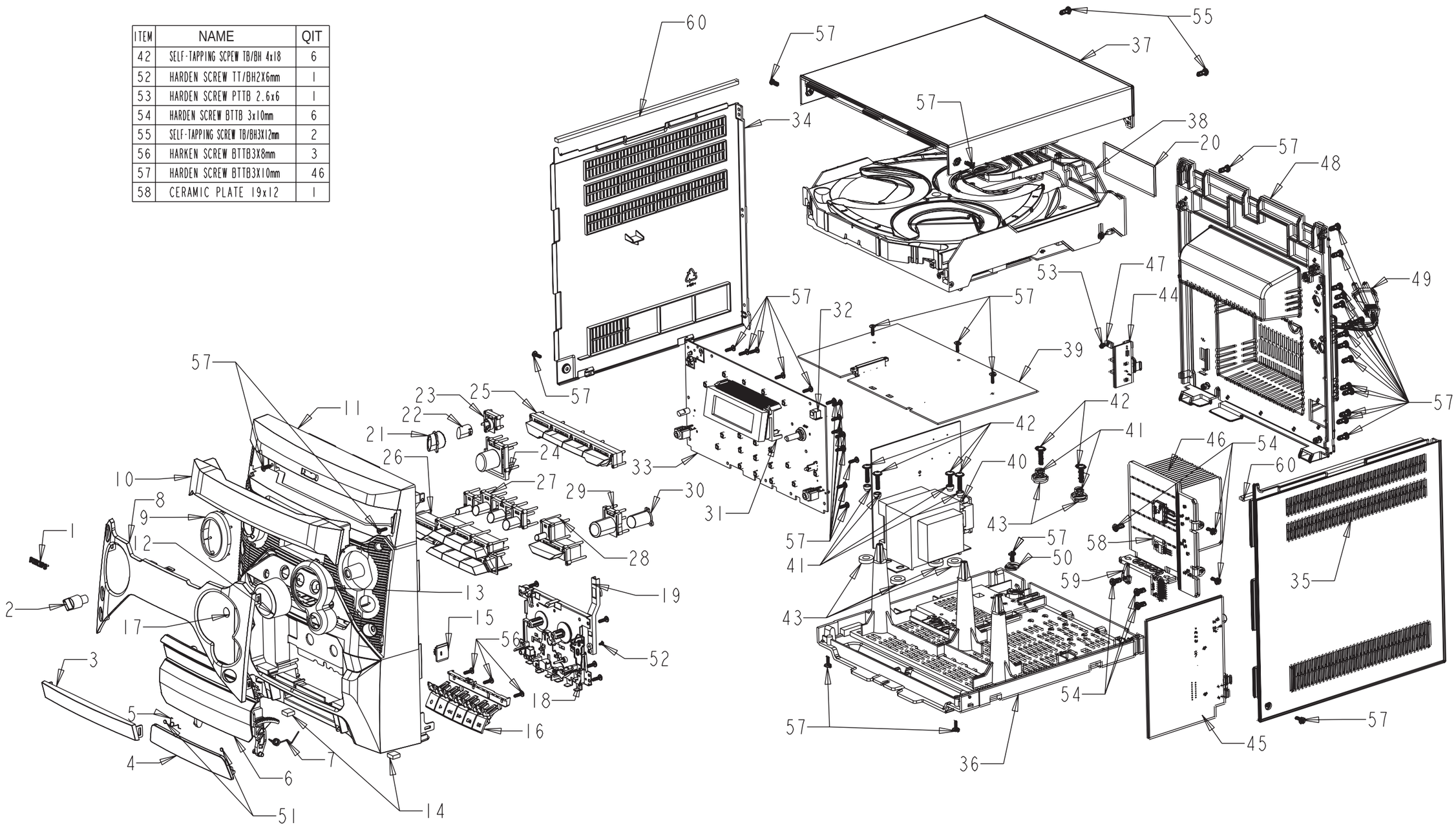
LAYOUT DIAGRAM - 3CDC BOARD



11 - 1

EXPLODED VIEW DIAGRAM

ITEM	NAME	QIT
42	SELF-TAPPING SCPEW TB/BH 4x18	6
52	HARDEN SCREW TT/BH2X6mm	1
53	HARDEN SCREW PTTB 2.6x6	1
54	HARDEN SCREW BTTB 3x10mm	6
55	SELF-TAPPING SCREW TB/BH3X12mm	2
56	HARKEN SCREW BTTB3X8mm	3
57	HARDEN SCREW BTTB3X10mm	46
58	CERAMIC PLATE 19x12	1



MECHANICAL PARTSLIST

2	994000004578	MIC KNOB
3	994000004584	CASSETTE DOOR LENS
4	994000004569	CASS KEYS DOOR (-/55/79)
4	994000004658	CASS KEYS DOOR (-/12)
5	994000004379	CASSETTE KEY COVER SPRING
6	994000004568	CASSETTE DOOR
7	994000001267	SPRING -RIGHT
8	994000004585	DISPLAY LENS(-/55/79)
8	994000004659	DISPLAY LENS(-/12)
9	994000004588	KEYS DECORTIVE RING
10	994000004571	3CDC DOOR
11	994000004565	FRONT CABINET (FWM352)
11	994000004661	FRONT CABINET (FWM371)
12	994000004582	VOLUME KNOB
13	994000004587	VOLUME DECORTIVE RING
14	994000001264	FOOT RUBBER
15	994000001295	DAMPER GEAR ASS'Y
16	994000004583	CASSETTE KEY WITH HOLDER
18	994000004561	F/CASS DECK CS-21SC-820DT
19	994000004586	RECORD ARM
21	994000004591	RING POWER
22	994000004579	POWER BUTTON
23	994000004589	POWER BUTTON BASE
24	994000004573	DSC BUTTON
25	994000004577	SOURCE BUTTON
26	994000004575	PROGRAM KEYS
27	994000004574	CONTROL KEYS (FWM352)
27	994000004662	CONTROL KEYS (FWM371)
28	994000004576	DISC CHANGE KEY
29	994000004581	DBB BUTTON
34	994000004563	PANEL LEFT
35	994000004564	PANEL RIGHT
36	994000004567	CHASSIS PLASTIC (for -/12/55)
36	996500038608	CHASSIS PLASTIC (for -/79)
37	994000004572	TOP COVER
38	994000004562	3CDC MECHA CASING ASS'Y (FWM352)
38	994000004562	3CDC MECHA CASING ASS'Y (FWM371)
48	994000004566	REAR CABINET (-/55)
48	994000004657	REAR CABINET (-/12)
48	996500038607	REAR CABINET (-/79)
49	994000004557	AC CORD BRAZIL APP 2M (-/55)
49	994000004656	AC CORD PLUG VDE 2M (-/12)
49	996500038614	AC CORD SAA APP 2M (-/79)
	994000003669	CD MECHANISM DA11VF

ACCESSORIES

996500039002	LEFT MAIN SPK BOX (FWM371)
996500039003	RIGHT MAIN SPK BOX (FWM371)
996500039004	LEFT MAIN SPK BOX (FWM352)
996500039005	RIGHT MAIN SPK BOX (FWM352)
994000004559	REMOTE CONTROL
994000001192	AM LOOP ANTENNA
994000001381	FM ANT (BLACK) 1M
994000001478	AC PLUG ADAPTOR (not for -/12)

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

ELECTRICAL PARTSLIST - MAIN BOARD

- DIODES -

VD201	994000002836	VARICAP DIODE 1SV-149
VD202	994000002836	VARICAP DIODE 1SV-149
D201	994000004341	SMD DIODE BAV99L
D29	994000004363	SMD DIODE PMLL4148L
D32	994000004363	SMD DIODE PMLL4148L
D36	994000004363	SMD DIODE PMLL4148L
D37	994000004363	SMD DIODE PMLL4148L
D7	994000002446	RECTIFIER BRIDGE RS402
D8	994000004534	RECTIFIER DIODE 1N5819

- IC & TRANSISTORS -

Q11	994000004337	TRANSISTORS 2SD1936T-AC
Q12	994000004337	TRANSISTORS 2SD1936T-AC
Q22	994000004337	TRANSISTORS 2SD1936T-AC
Q35	994000004337	TRANSISTORS 2SD1936T-AC
Q6	994000004142	TRANSISTORS 9013G 1W
Q201	994000002833	TRANSISTORS 9018G
Q2	994000001193	TRANSISTORS KSB772YS
Q7	994000001193	TRANSISTORS KSB772YS
Q10	994000001193	TRANSISTORS KSB772YS
Q204	994000003937	TRANSISTORS PMBT3906
Q512	996500038609	TRANSISTORS 2W 8050C
Q36	996500038609	TRANSISTORS 2W 8050C
Q4	996500038610	TRANSISTORS 2W 8550C
U5	996500038611	IC KA7810E
U11	994000001357	IC LM78L05-AC
U1	994000001201	IC NJM4556AM
U8	994000001201	IC NJM4556AM
U12	994000001201	IC NJM4556AM
U4	994000004532	IC KA7808E (TO-220)
U14	994000004532	IC KA7808E (TO-220)
IC202	994000002843	IC TA2099N
IC201	994000002846	IC TC9257F
IC204	994000001202	IC TDA7468D
IC505	994000004533	IC YD7312

- MISCELLANEOUS -

X201	994000004535	CRYSTAL 7,2MHZ +-30PPM
CF202	994000004536	CER. FILTER SFE10,7MJA10-A 3P
CF203	994000004536	CER. FILTER SFE10,7MJA10-A 3P
CF205	994000004537	DISCRIM. FILTER JT10,7MG82-A
CF204	994000002857	CERAMIC FILTER SFU450B
CF201	994000000245	BAND PASS FILTER #GFMB3-SE
L25	994000004538	I.F.T 10148BK7
T201	994000002858	I.F.T 7mm #7M1A2186F
T202	994000002859	I.F.T 7mm #7M4A1975R
T203	994000002861	I.F.T 7mm A049
SW201	994000004539	PUSH SWITCH
RF201	994000004442	TUNER FE450-G11

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

ELECTRICAL PARTSLIST - POWER BOARD

- MISCELLANEOUS -

C1		994000001225	SAFETY CAP 275V 0.22UF +-20% (FWM352)
C805		994000001225	SAFETY CAP 275V 0.22UF +-20% (FWM371)
L1		994000001226	FILTER INDUCTOR 400UH 3A (FWM352)
L802		994000001226	FILTER INDUCTOR 400UH 3A (FWM371)
F2	⚠	994000001229	FUSE RADIAL T200mA 250V (only for-/12)
F3	⚠	994000001222	FUSE RADIAL LT 2A 250V (FWM352)
F4	⚠	994000001222	FUSE RADIAL LT 2A 250V (FWM352)
F5	⚠	994000001223	FUSE RADIAL T5A 250V (FWM352)
F801	⚠	994000001351	FUSE RADIAL LT 4A 250V (FWM371)
F802	⚠	994000004599	FUSE RADIAL LT 3.15A 250V (FWM371)
F804	⚠	994000001223	FUSE RADIAL LT 5A 250V (FWM371)
F805	⚠	994000001351	FUSE RADIAL LT 4A 250V (FWM371)
SW30		994000001323	SWITCH #SDKPA40300

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

ELECTRICAL PARTSLIST - FRONT BOARD

- DIODES -

D45	994000004341	SMD DIODE BAV99L
D54	994000004341	SMD DIODE BAV99L
D35	994000004363	SMD DIODE PMLL4148L
D18	994000001234	LED LAMP 3mm
D34	994000001234	LED LAMP 3mm

- IC & TRANSISTORS -

Q15	994000004338	TRANSISTORS PMBT3904
Q16	994000004338	TRANSISTORS PMBT3904
Q18	994000004338	TRANSISTORS PMBT3904
Q37	994000004338	TRANSISTORS PMBT3904
Q24	994000003937	TRANSISTORS PMBT3906
U13	994000001201	IC NJM4556AM
U6	994000004541	IC M24C02-WMN6
U7	994000004542	IC PT6315
IC401	996500038612	IC TMP87CP23FG-6JJ1
IC3	994000002853	IC XC61FC3012MR SOT-23

- MISCELLANEOUS -

SW5	994000001243	TACT SWITCH
SW6	994000001243	TACT SWITCH
SW7	994000001243	TACT SWITCH
SW8	994000001243	TACT SWITCH
SW9	994000001243	TACT SWITCH
SW10	994000001243	TACT SWITCH
SW11	994000001243	TACT SWITCH
SW12	994000001243	TACT SWITCH
SW14	994000001243	TACT SWITCH
SW15	994000001243	TACT SWITCH
SW16	994000001243	TACT SWITCH
SW17	994000001243	TACT SWITCH
SW18	994000001243	TACT SWITCH
SW19	994000001243	TACT SWITCH
SW20	994000001243	TACT SWITCH
SW25	994000001243	TACT SWITCH
SW26	994000001243	TACT SWITCH
SW27	994000001243	TACT SWITCH
SW28	994000001243	TACT SWITCH
SW31	994000001243	TACT SWITCH
JACK1	994000004543	V/PHONE JACK
JACK2	994000004543	V/PHONE JACK
FTD1	994000004544	FTD DISPLAY
REM1	994000000325	OPTIC SENSER
VR2	994000001324	ROTARY VOLUME 20K
VR1	994000001241	ROTARY ENCODER
X1	996500038613	CRYSTAL 7.99968 MHZ +-20PPM

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

ELECTRICAL PARTSLIST - AMP BOARD

- IC & TRANSISTORS -

U10	994000001203	IC TDA8947J/N3
Q19	994000004337	TRANSISTORS 2SD1936T-AC
Q20	994000004337	TRANSISTORS 2SD1936T-AC
Q29	994000004337	TRANSISTORS 2SD1936T-AC
Q30	994000004337	TRANSISTORS 2SD1936T-AC
Q31	994000004337	TRANSISTORS 2SD1936T-AC
Q27	994000004545	TRANSISTORS BUK9507-30B
Q28	994000004546	TRANSISTORS PBSS4140S

- MISCELLANEOUS -

D40	994000001196	BRIDGE RECTIFIER 8A GBU8D
CON43	994000004547	SPK JACK MSP-134V-05 LF
CON702	994000001221	V/RCA JACK 2P
JACK1	994000001353	COAXIAL JACK IF-01A

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

ELECTRICAL PARTSLIST - 3CDC BOARD

- IC & TRANSISTORS -

IC5	994000004548	IC ET8211 SOP8
IC504	994000002838	IC BA15BC0FP
IC4	994000002839	IC H1117SJ-3.3V
IC503	994000002839	IC H1117SJ-3.3V
IC1	994000002842	IC MM1469PH
IC101	994000002844	IC TA2157FN
IC2	994000002845	IC TA7291S
IC402	994000002845	IC TA7291S
IC102	994000002849	IC TC94A14FAG
IC501	994000002851	IC TC94A34FG-006
IC103	994000002853	IC XC61FC3012MR SOT-23
IC105	994000004549	IC KA7805E

- MISCELLANEOUS -

X501	994000004551	CRYSTAL 16,9344MHZ +-20PPM
X101	994000004551	CRYSTAL 16,9344MHZ +-20PPM
SW1	994000004552	DETECT SWITCH
SW2	994000004552	DETECT SWITCH
SW3	994000004552	DETECT SWITCH
SW4	994000004552	DETECT SWITCH

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

ELECTRICAL PARTSLIST

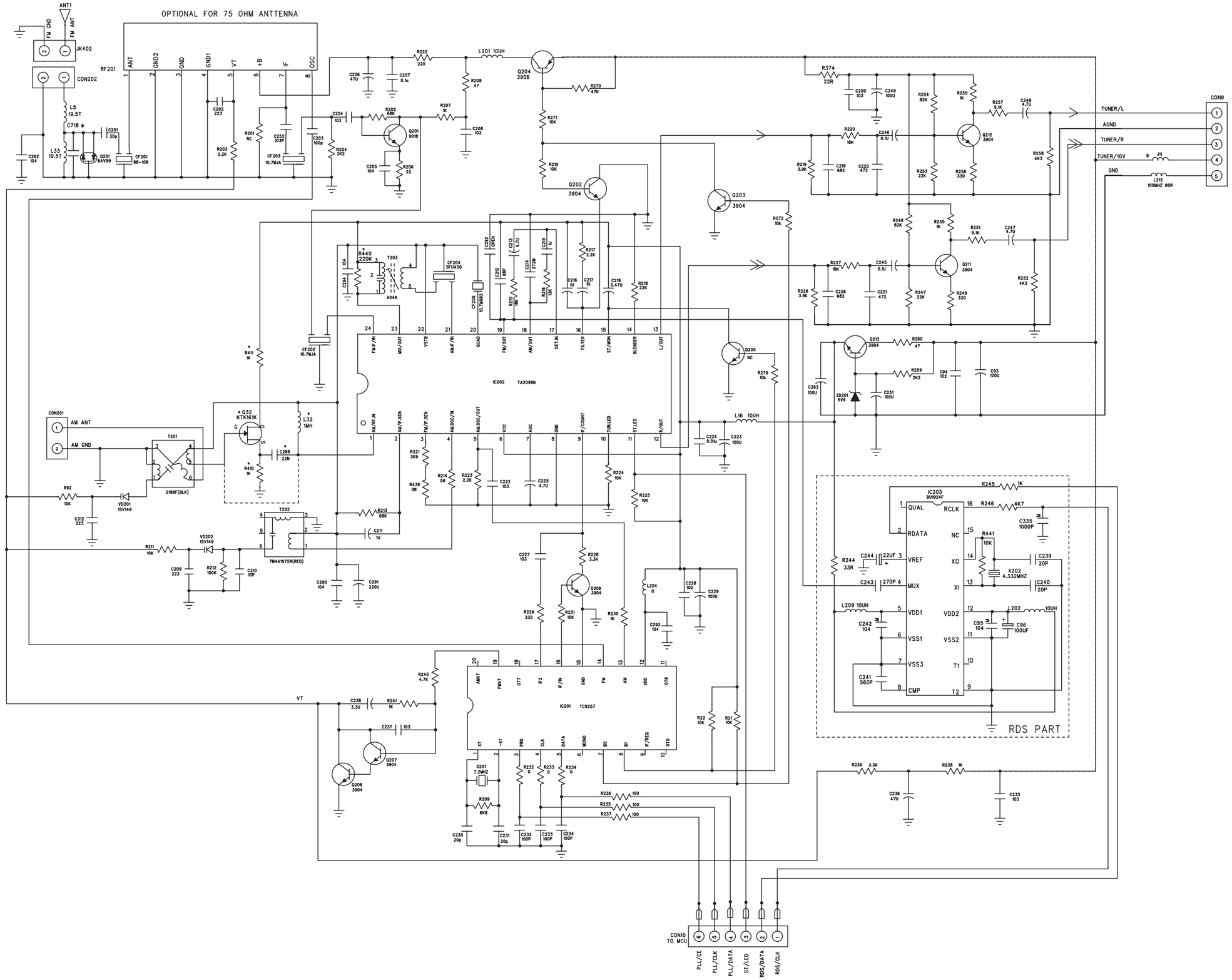
- MISCELLANEOUS -

CON8		994000004553	16P FFC CABLE L=150mm
CON21		994000004554	23P FFC CABLE L=180mm
CON30		994000004487	16P FFC CABLE L=170mm
CON13		994000004457	5P FFC CABLE L=200mm
T1	⚠	994000004555	TRANSFORMER EI66 127/240V (FWM352/55)
T1	⚠	994000004655	TRANSFORMER EI66 127/240V (FWM352/12)
T801	⚠	994000004602	TRANSFORMER 120/240V (FWM371/55)
T2	⚠	994000000262	TRANSFORMER EI-28 AC230V (FWM352/12)
	⚠	994000004557	AC CORD BRAZIL APP 2M (-/55)
	⚠	994000004656	AC CORD PLUG VDE 2M (-/12)
		996500039526	MAIN BOARD ASS'Y (FWM352/12)
		994000039527	MAIN BOARD ASS'Y (FWM352/55)
		994000039528	MAIN BOARD ASS'Y (FWM352/79)
		994000039529	MAIN BOARD ASS'Y (FWM371/55)
		994000004593	POWER BOARD ASS'Y (FWM/12)
		994000004594	FRONT BOARD ASS'Y (FWM352/55)
		996510000845	FRONT BOARD ASS'Y (FWM352/12)
		996510000971	FRONT BOARD ASS'Y (FWM371/55)
		994000004597	3CDC BOARD ASS'Y (FWM/12)
		994000004595	AMP BOARD ASS'Y (FWM/12)
		994000004596	AM/FM BOARD ASS'Y (FWM/12)

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

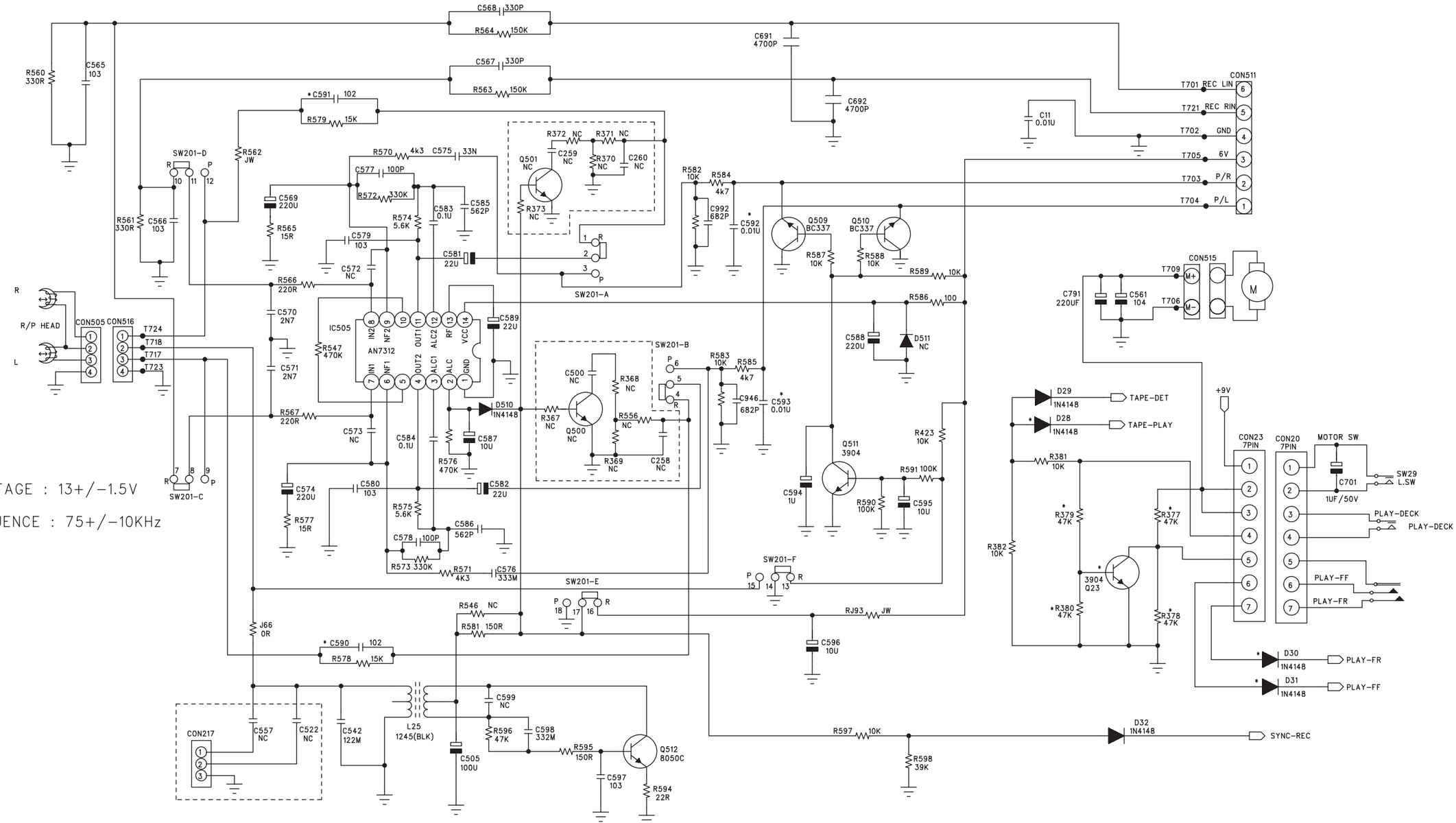
13 - 1

CIRCUIT DIAGRAM - MAIN BOARD
TUNER PART



13 - 2

CIRCUIT DIAGRAM - MAIN BOARD
TAPE PART



BIAS VOLTAGE : 13+/−1.5V

BIAS FREQUENCE : 75+/−10KHz

* FOR PROVISION ONLY

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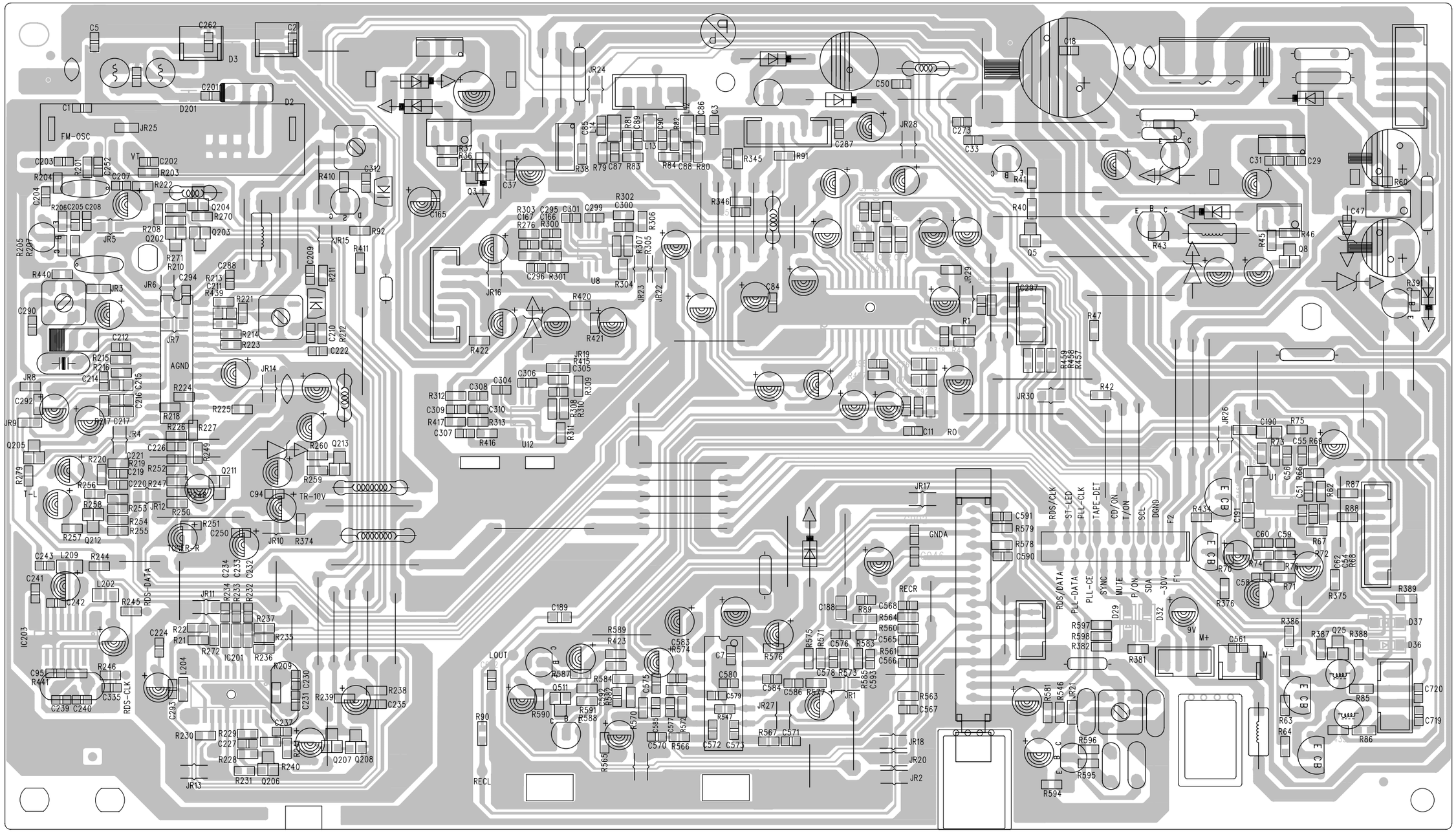
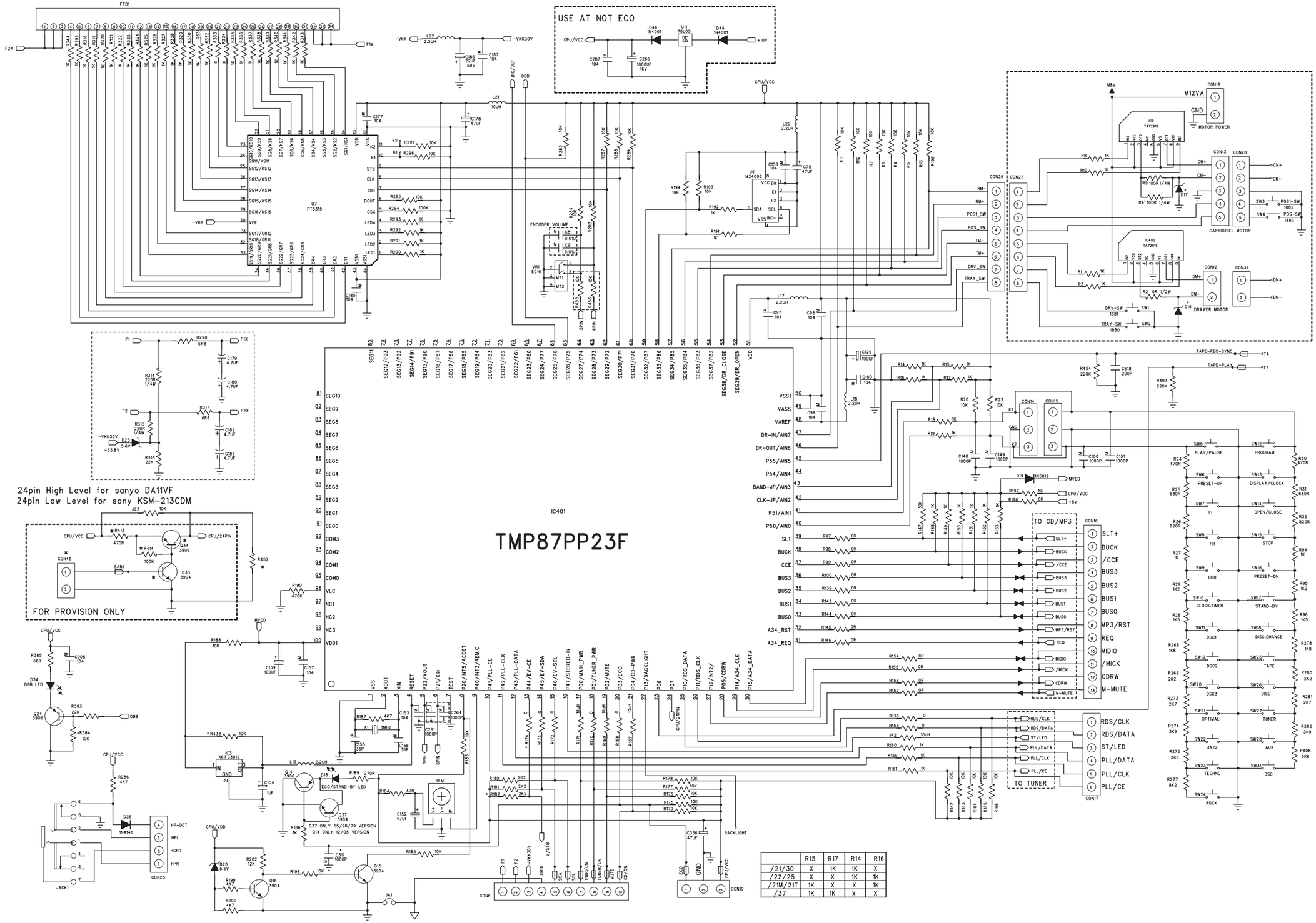
LAYOUT DIAGRAM - MAIN BOARD



13 - 4

CIRCUIT DIAGRAM - FRONT BOARD



	R15	R17	R14	R16
/21/30	X	1K	1K	X
/22/25	X	X	1K	1K
/21M/21T	1K	X	X	1K
/37	1K	1K	X	X

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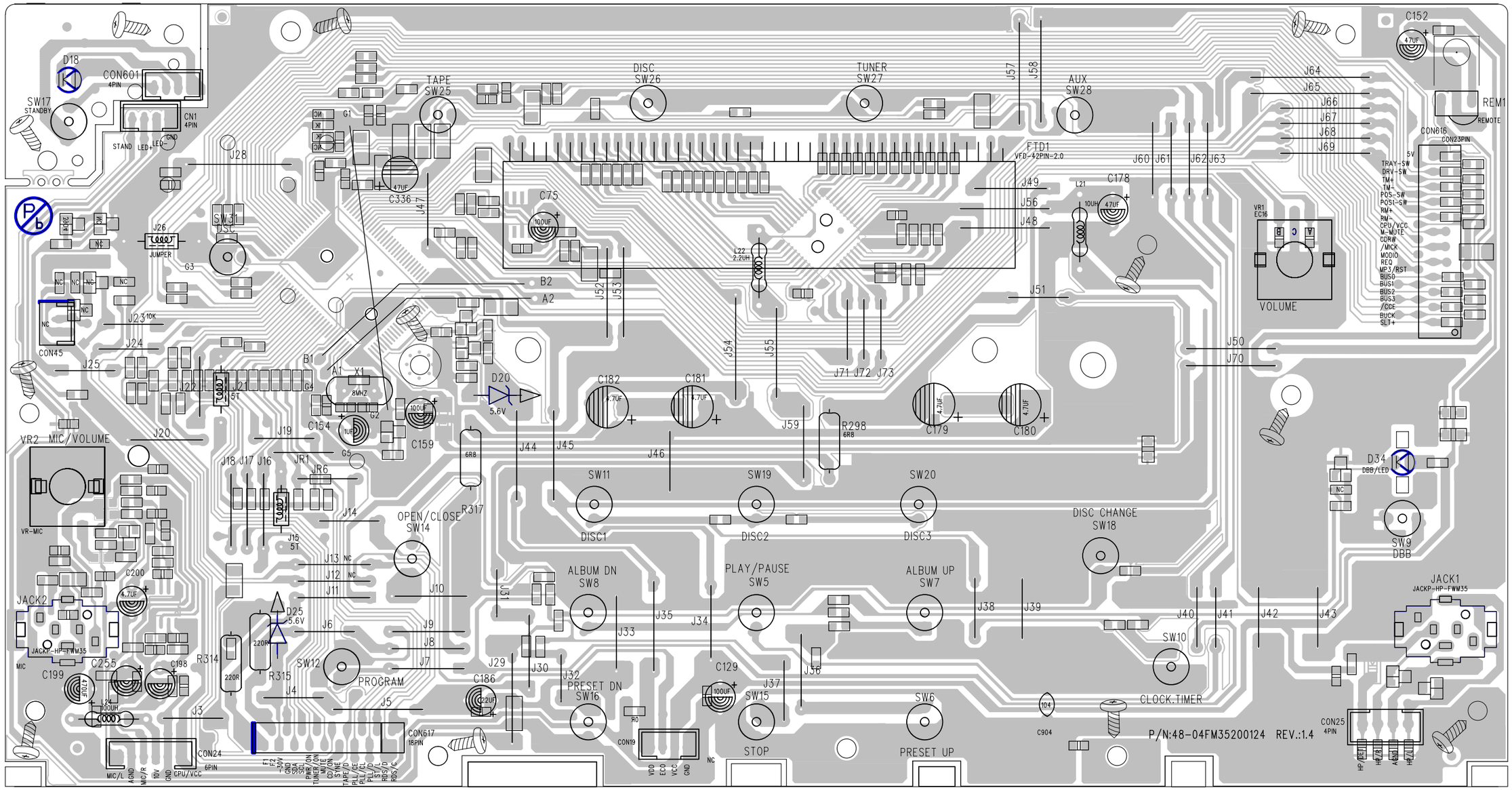
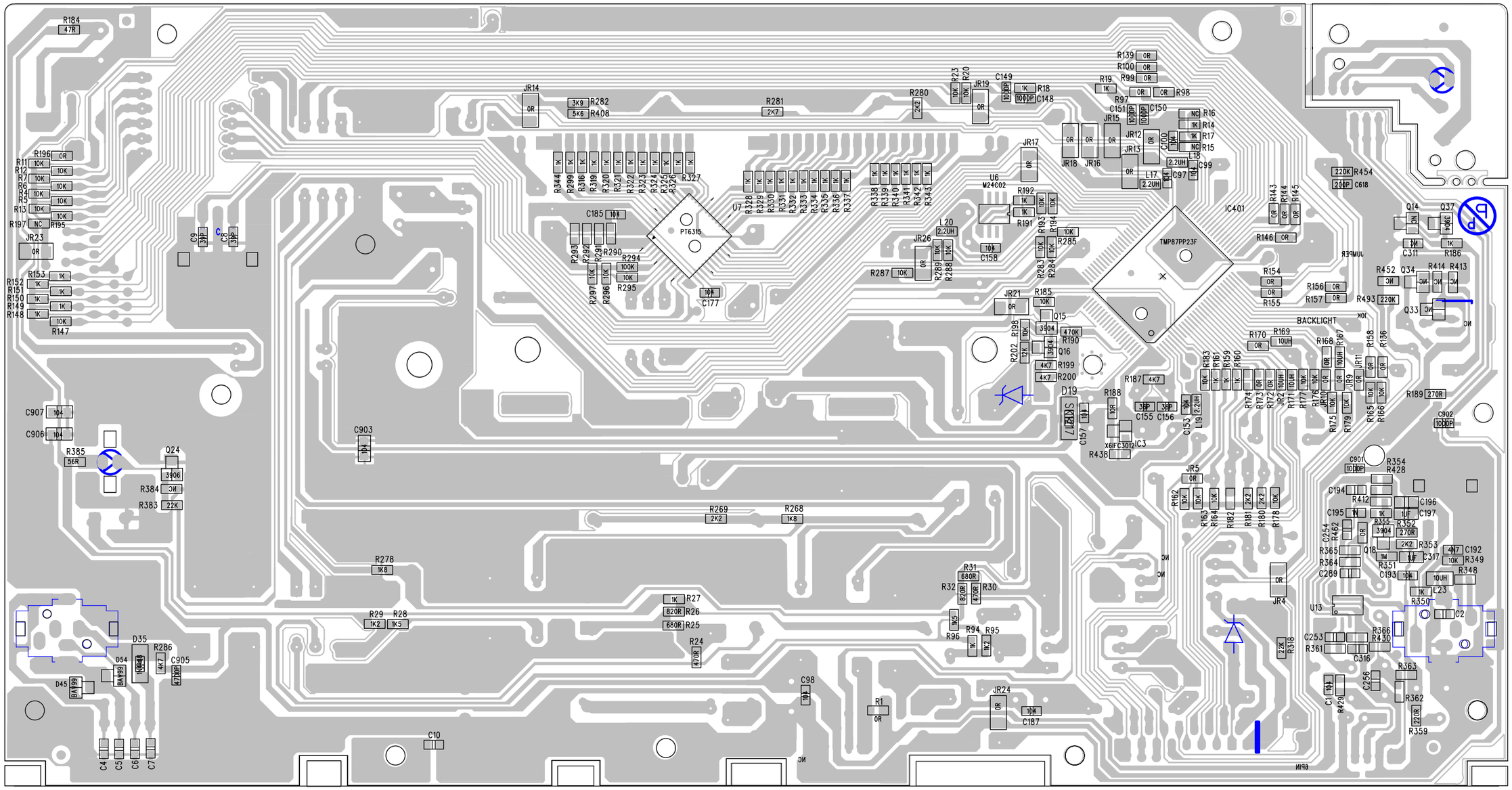
LAYOUT DIAGRAM - FRONT BOARD



13 - 6

LAYOUT DIAGRAM - FRONT BOARD



REVISION LIST

Version 1.0 (3141 785 30760)

- Initial Release

Version 1.1 (3141 785 30761)

- New version FWM352/79 is introduced.
- Pages 11-2 : Mechanical parts list adapted.
- Pages 12-1 and 12-6 : Electrical parts list adapted.

Version 1.2 (3141 785 30762)

- Pages 12-6 : Electrical parts list adapted.

Version 1.3 (3141 785 30763)

- Pages 13-1...13-6 : New main Board and new display board w/software v3.1
  Circuit diagram and Layout diagram added.