

Service  
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**Service**



# Service Manual

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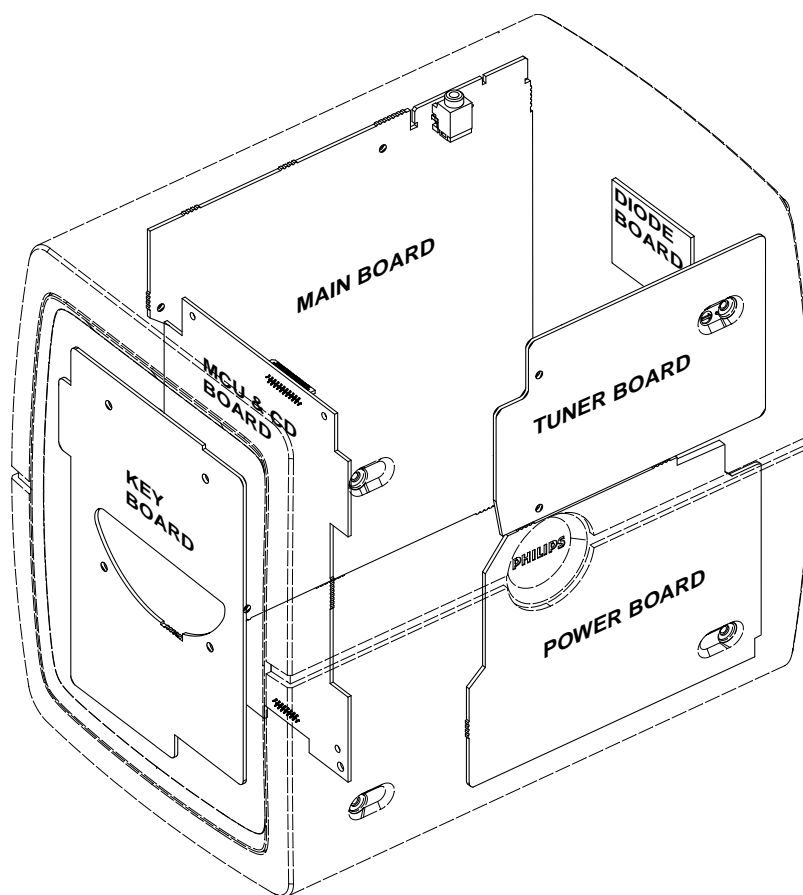


3140 785 32550

Version 1.0



# PHILIPS

**LOCATION OF PRINTED CIRCUIT BOARDS****VERSION VARIATIONS**

Type/Versions	MC-M350				
	/21	/22	/25		
Features & Board in used					
RDS function		X	X		
ECO Standby		X	X		
Aux Input	X	X	X		
Digital Coaxial Out					
Line Out					
Subwoofer Out					
Headphone Out	X	X	X		
AC Voltage Selector	X				
Non-Cenelec Tuner	X				
Cenelec Tuner		X	X		

**SPECIFICATIONS****GENERAL:**

Mains voltage	/21 : 120V / 230V $\pm$ 15% Switchable /22/25 : 230V $\pm$ 10%
Mains frequency	/21 : 50/60Hz /22/25 : 50Hz
Power consumption	/22/25 : < 1W at ECO Standby : < 9W at Standby (DEMO mode off) : 53W at Active
Clock accuracy	: < 4 seconds per day
Dimension centre unit	: 155 x 220 x 270mm

**TUNER:****FM**

Tuning range	: 87.5-108MHz
IF frequency	: 10.7MHz $\pm$ 20kHz
Aerial input	: 75 $\Omega$ Coaxial
Sensitivity at 26dB S/N	: < 22dBf
Selectivity at S9/300kHz	: > 33dB
IF Rejection	: > 60dB
Image Rejection	: > 20dB
Distortion at RF=1mV, dev. 75kHz	: < 3%
-3dB Limiting point	: < 23.5dB
Crosstalk at RF=1mV, dev. 40kHz	: > 26dB
Modulation Hum	: > 45dB
AM Suppression I/P: 48~82dBf	: > 25dB

**AM (MW)**

Tuning range	/21/22/25 : 531-1602kHz /21 : 530-1700kHz
Grid	/21 : 9kHz / 10kHz /22/25 : 9kHz
IF frequency	: 450kHz $\pm$ 1kHz
Aerial input	: Frame aerial 18.1 $\mu$ H
Sensitivity at 26dB S/N	: < 3.25mV/M
Selectivity at S9/300kHz	: > 15dB
AGC Figure of Merit	: > 25dB
IF rejection	: > 24dB
Image rejection	: > 20dB
Distortion at RF=50mV, m=80%	: < 5%
Mudulation Hum with REC or	: > 40dB
Spurious Response Rejection	: > 28dB

**LW (Only for /22/25 )**

Tuning range	: 153-279kHz
Grid	: 3kHz
IF frequency	: 450kHz $\pm$ 1kHz
Aerial input	: Frame aerial 18.1 $\mu$ H

Maximum Sensitivity	: < 1.5mV/M
Sensitivity at 26dB S/N	: < 6.0mV/M
Selectivity at S9/300kHz	: > 24dB
IF rejection	: > 26dB
Image rejection	: > 20dB
Distortion I/P:5~50mV	: < 5%
Modulation Hum with REC on	: > 40dB

**AMPLIFIER:**

Output power (6 $\Omega$ , 1kHz, 10% THD)	: 30W
Frequency response within -3dB	: 60Hz-14kHz
Digital Sound Control (DSC)	: Optimal,Classic,Jazz, Rock
DBB	: ON/OFF
Incredible Surround (IS)	: ON/OFF
Input sensitivity ( $\pm$ 3dB) for Rated Output Power at 1kHz	
Aux in	: 500mV; Rs=600 $\Omega$
Tuner in	: FM67.5kHz, AM80%Modulation
CD in	: -6dB track
Tape in	: 250nWb/m
Output sensitivity	
Headphone output at 32 $\Omega$	: 15mW $\pm$ 2dB

**CASSETTE RECORDER:**

Number of track	: 2 Tracks (Stereo)
Tape speed	: 4.76 cm/sec $\pm$ 2%
Wow and flutter	: < 0.4% DIN
Fast-wind/Rewind time C60	: 130 sec
Bias system	: 78kHz $\pm$ 10kHz
Rec/Pb freq. response within 8dB	: 80Hz - 10kHz
Signal to Noise Ratio (A-weighted)	: $\geq$ 48dBA
Distortion 250nWb/m	: < 5%
Channel Difference at overall	: < 4dB

**COMPACT DISC:**

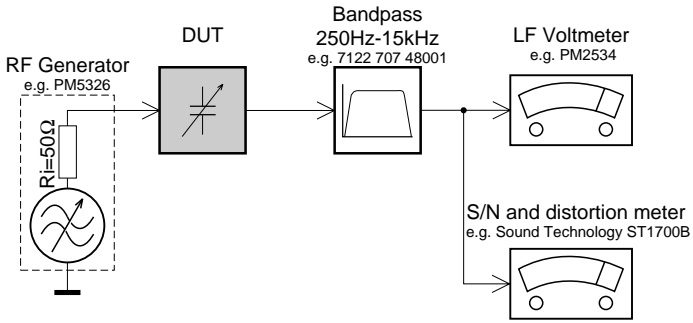
Frequency response within $\pm$ 3dB	: 63Hz - 14kHz
Output level (in Vrms)	: 500mV, Z <sub>out</sub> = 100 $\Omega$
Signal/Noise ratio (A-weighted)	: > 62dBA
Distortion at 1kHz	: < 0.02%
Channel unbalance at 1kHz	: $\leq$ 2dB
Channel separation at 1kHz	: > 30dB
Emphasis	: 15/50 $\mu$ S (switched automatically)
THD Noise(1kHz)	: 1.00%
Outband Attenuation	: > 20dB for Freq. > 40kHz

**MP3 - CD :**

Bit rates	: 32K - 320Kps
Sampling rates	: 32KHz/44.1KHz/48KHz

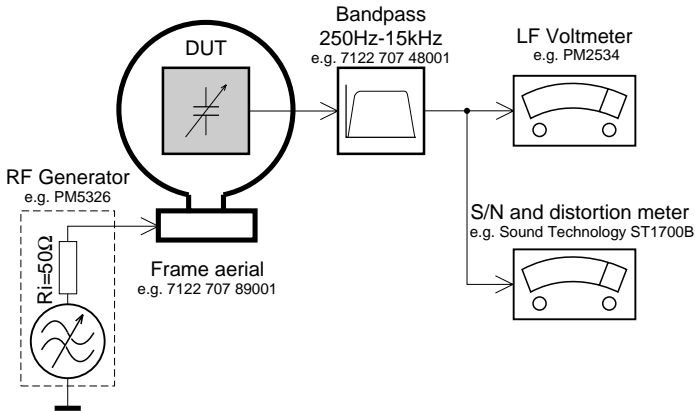
# MEASUREMENT SETUP

## Tuner FM



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

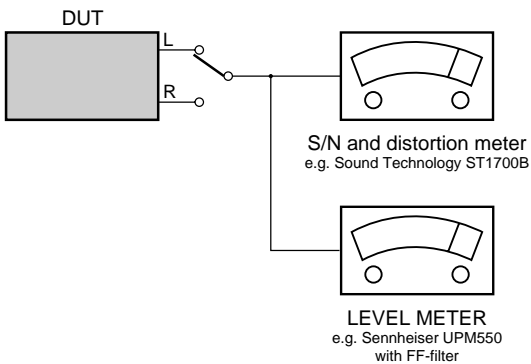
## Tuner AM (MW,LW)



To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday's cage. Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

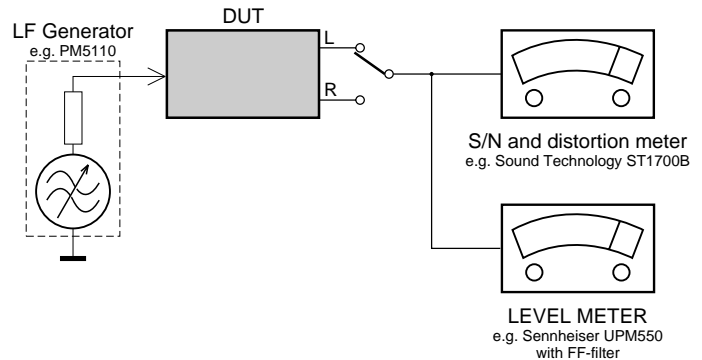
## CD

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



## Recorder

Use Universal Test Cassette **CrO2** SBC419 4822 397 30069 or Universal Test Cassette **Fe** SBC420 4822 397 30071





## SERVICE AIDS

### Service Tools:

Universal Torx driver holder .....	4822 395 91019
Torx bit T10 150mm .....	4822 395 50456
Torx driver set T6 - T20 .....	4822 395 50145
Torx driver T10 extended .....	4822 395 50423

### Cassette:

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

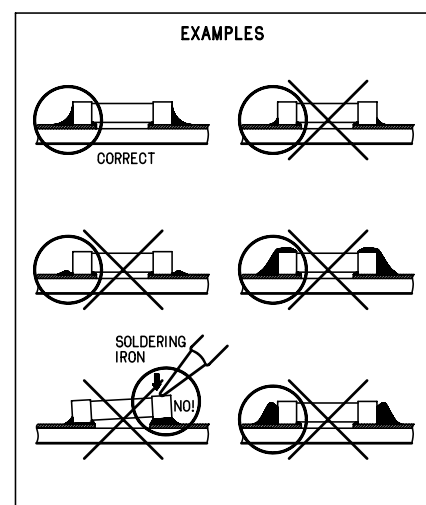
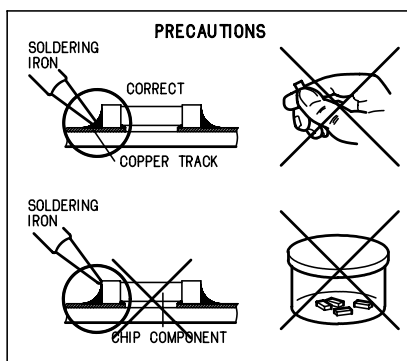
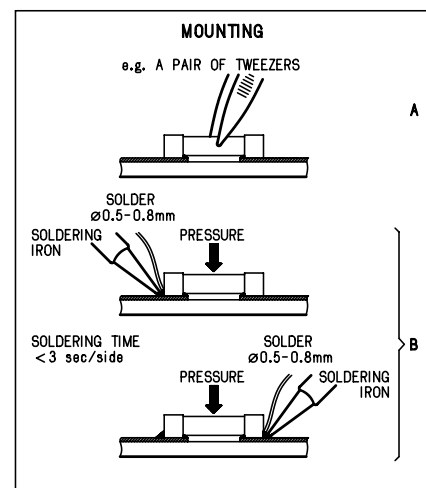
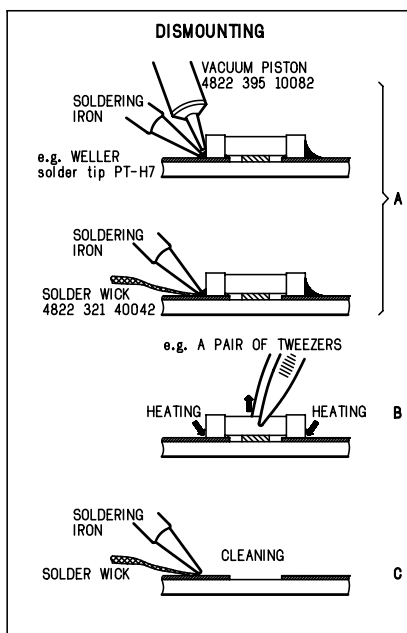
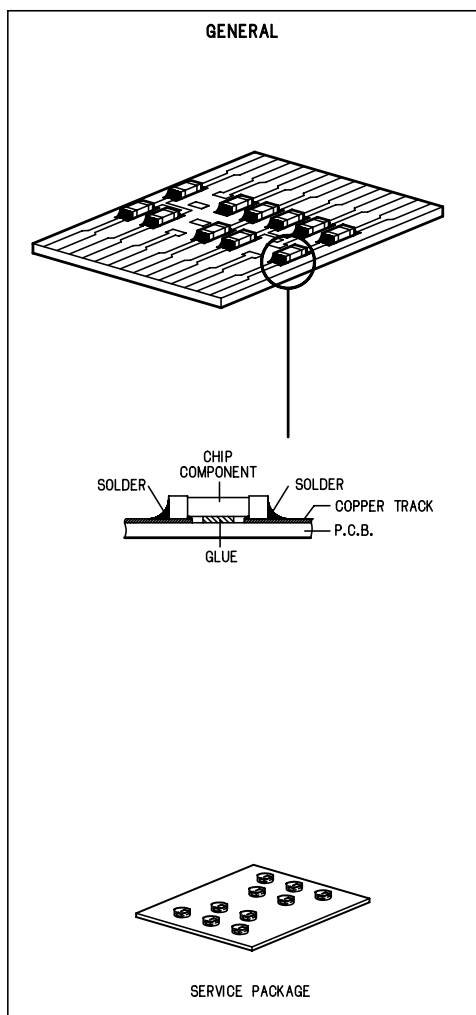
### Compact Disc:

SBC426/426A Test disc 5 + 5A .....	4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz .....	4822 397 30155
SBC429 Audio Signals disc .....	4822 397 30184
Dolby Pro-logic Test Disc .....	4822 395 10216

### ESD Equipment:

Anti-static table mat - large 1200x650x1.25mm ...	4822 466 10953
Anti-static table mat - small 600x650x1.25mm .....	4822 466 10958
Anti-static wristband .....	4822 395 10223
Connector box (1M $\Omega$ ) .....	4822 320 11307
Extension cable (to connect wristband to conn. box) .....	4822 320 11305
Connecting cable (to connect table mat to conn. box) .....	4822 320 11306
Earth cable (to connect product to mat or box) ....	4822 320 11308
Complete kit ESD3 (combining all above products) .....	4822 320 10671
Wristband tester .....	4822 344 13999

## HANDLING CHIP COMPONENTS



**(GB) WARNING**

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.

When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools also at this potential.

**ESD****(NL) WAARSCHUWING**

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).

Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.

Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

**(F) ATTENTION**

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).

Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.

Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfilez 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).

Unvorsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.

Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.

Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

**(I) AVVERTIMENTO**

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).

La loro longevità potrebbe essere fortemente ridotta in caso di non osservazione della più grande cauzione alla loro manipolazione.

Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.

Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

**(GB)**

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified, be used.

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

**(NL)**

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

**(F)**

Les normes de sécurité exigent que l'appareil soit remis à l'état d'origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.

**(GB) Warning !**

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

**(S) Varning !**

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

**(SF) Varoitus !**

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

**(D)**

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

**(DK) Advarse !**

Usynlig laserstrålning ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for strålning.

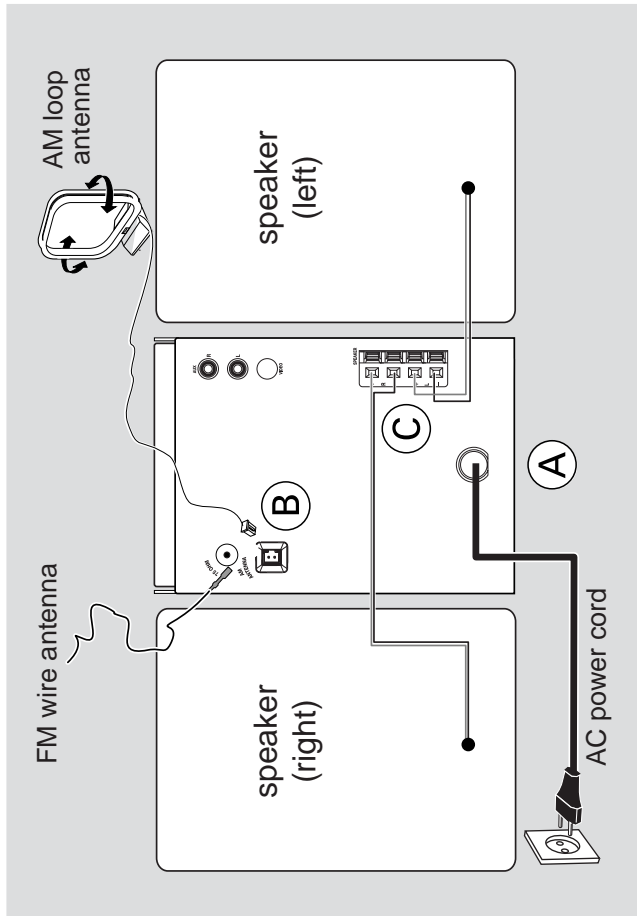
**(I)**

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

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

# PREPARATIONS AND CONTROLS

## Preparations



### Rear connections

The type plate is located at the rear of the system.

#### (A) Power

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

#### WARNING!

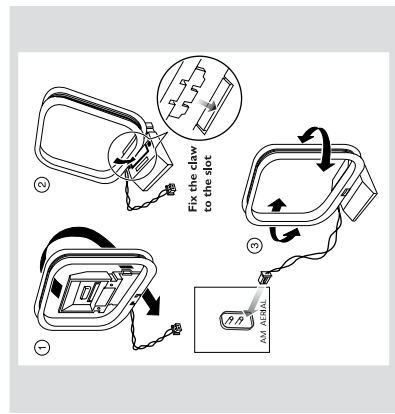
- For optimal performance, use only the original power cable.
- Never make or change any connections with the power switched on.

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

#### (B) Antennas Connection

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

#### AM Antenna

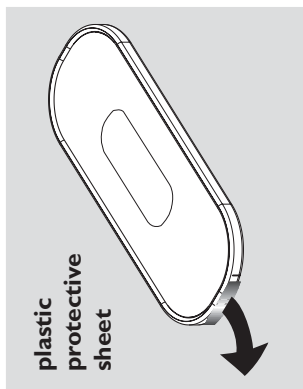


Position the antenna as far as possible from a TV, VCR or other radiation source.

## Preparations

### Before using the remote control

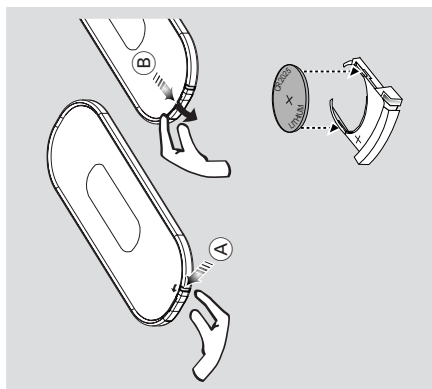
- 1 Pull out the plastic protective sheet.
- 2 Select the source you wish to control by pressing one of the source select keys on the remote control (for example CD TUNER).
- 3 Then select the desired function (for example >||, I<, >I).



plastic protective sheet

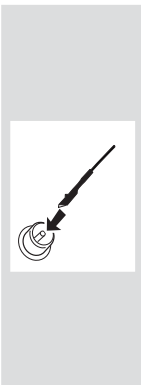
### Replacing battery (lithium CR2025) into the remote control

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



**CAUTION!**  
Batteries contain chemical substances, so they should be disposed off properly.

#### FM Antenna



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

#### (C) Speakers Connection

##### Front Speakers

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



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

#### Notes:

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

#### Optional connection

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

#### Connecting other equipment to your system

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

#### Note:

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

# PREPARATIONS AND CONTROLS

## Controls

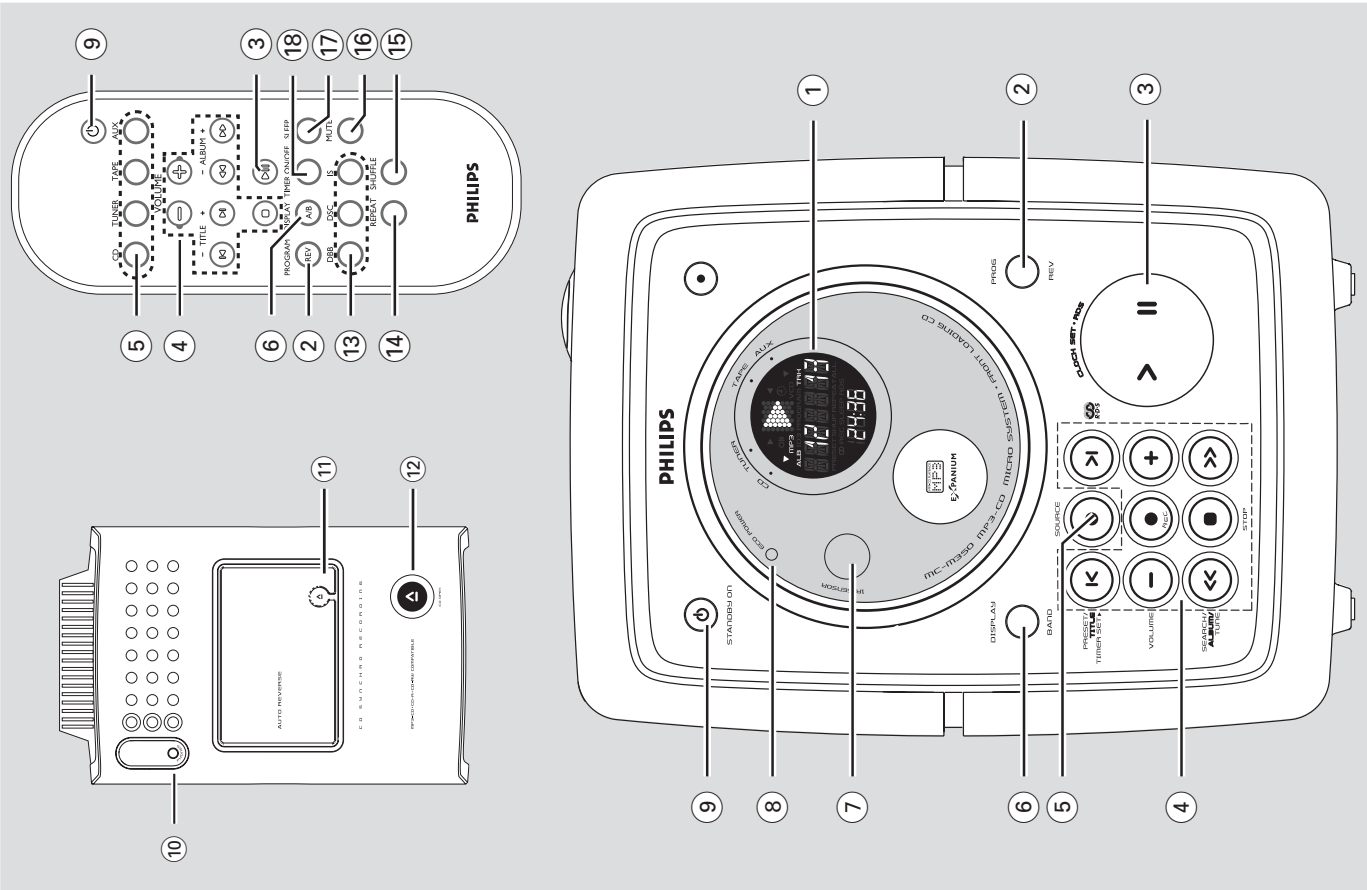
### Controls on the system and remote control

- 1 **Display** - shows the status of the system.
- 2 **PROG/REV** for CD/MP3-CD ..... programmes tracks and reviews the programme.  
for TUNER ..... programmes tuner stations manually or automatically.  
for TAPE ..... sets tape reverse modes
- 3 **CLOCK SET • RDS / > II** for CLOCK ..... set the clock function.  
for CD/MP3-CD ..... starts or interrupts CD playback  
for TAPE ..... starts the tape playback  
for TUNER ..... displays RDS information
- 4 **Mode Selection**  
**VOLUME ( - / + )** - adjusts the volume level.  
- on the system only - adjusts the hour and minutes for the clock/ timer functions.  
**PRESET/TITLE/TIMER SET | < / > |** (on the remote control | < / > |)  
for TUNER ..... selects a preset radio station.  
for CD ..... skips to the beginning of a current track/previous/ later track  
for MP3-CD ..... to select previous/ next title for Timer (| < only) to set timer under standby  
**SEARCH/ALBUM/TUNE << / >>** (on the remote control << / >>)  
for TUNER ..... Tune to a station  
for CD ..... to search backward or forward.  
for MP3-CD ..... select previous/ next album.  
for TAPE ..... fast rewind/ wind tape
- STOP ■** ..... stops CD/ MP3-CD playback or erase a CD programme.  
..... stops tape playback/ recording.
- REC** ..... starts recording.
- 5 **SOURCE** - selects the respective sound source for CD/ TUNER/TAPE/AUX.  
- switches on the system.

- 6 **DISPLAY-BAND** (on the remote control **DISPLAY A/B**)  
for TUNER ..... change the tuner radio band (FM/ MW/ LW)  
for CD/MP3-CD ..... change the CD display mode  
for TAPE ..... switches tape direction
- 7 **IR SENSOR** - infrared sensor for remote control.
- 8 **ECO POWER indicator**
- 9 **STANDBY ON (⏻)** - switches the system to standby.
- 10 **PHONES** - connects to headphone.
- 11 **▲** - open/ close the cassette door.
- 12 **CD OPEN ▲** - open the CD door.
- 13 **INTERACTIVE SOUND controls:**  
**DBB** ..... (Dynamic Bass Boost) enhances the bass.  
**DSC** ..... (Digital Sound Control) selects sound characteristics: CLASSIC/ JAZZY ROCK/ OPTIMAL.
- INCREDIBLE SURR.**  
**(IS)** ..... creates a super-enhanced stereo effect.
- 14 **REPEAT** - repeats a track/ CD programme/ entire CD.
- 15 **SHUFFLE** - plays CD tracks in random order.
- 16 **MUTE** - interrupts and resumes sound reproduction.
- 17 **SLEEP** - activates/deactivates or selects the sleeper time.
- 18 **TIMER ON / OFF** - activates/deactivates the timer function.

### 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, | <, > I).



## PREPARATIONS AND CONTROLS

**Important notes for users in the U.K.****Mains plug**

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

- 1** Remove fuse cover and fuse.
- 2** Fix new fuse which should be a BS1362 5 Amp, A.S.T.A. or BSI approved type.
- 3** Refit the fuse cover.

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

If the mains plug contains a fuse, this should have a value of 5 Amp. If a plug without a fuse is used, the fuse at the distribution board should not be greater than 5 Amp.

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

**How to connect a plug**

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

- As these colours may not correspond with the colour markings identifying the terminals in your plug, proceed as follows:
  - Connect the blue wire to the terminal marked N or coloured black.
  - Connect the brown wire to the terminal marked L or coloured red.
  - Do not connect either wire to the earth terminal in the plug, marked E (or  $\perp$ ) or coloured green (or green and yellow).

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

**Copyright in the U.K.**

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

**Italia****DICHIARAZIONE DI CONFORMITA'**

Si dichiara che l'apparecchio MC-M350 Philips risponde alle prescrizioni dell'art. 2 comma 1 del D.M. 28 Agosto 1995 n. 548.

Fatto a Eindhoven

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

**Norge**

Typeskilt finnes på apparatens underside.

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

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

**CAUTION**

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

## Maintenance

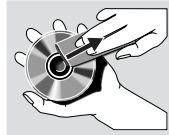
### Cleaning the Cabinet

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

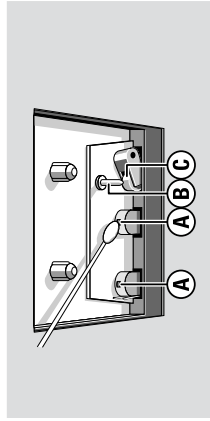
After prolonged use, dirt or dust may accumulate at the disc lens. To ensure good playback quality, clean the disc lens with Philips CD Lens Cleaner or any commercially available cleaner. Follow the instructions supplied with cleaner.

### 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.



### 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 service center.**

### Problem

### Solution

### CD OPERATION

"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.

## TROUBLESHOOTING

## Troubleshooting

### RADIO RECEPTION

**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.

### TAPE OPERATION / RECORDING

**Recording or playback cannot be made.**

- Clean deck parts, see "Maintenance".
- Use only normal (IEC I) tape for recording.

"CHECK 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.

### GENERAL

**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.
- Check the speaker connections and location.

**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).
- Reduce the distance between the remote control and the system.
- Insert the battery with its polarities (+/- signs) aligned as indicated.
- Replace the battery.
- 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 ON / OFF to switch on the timer.
- If a recording is in progress, stop the recording.

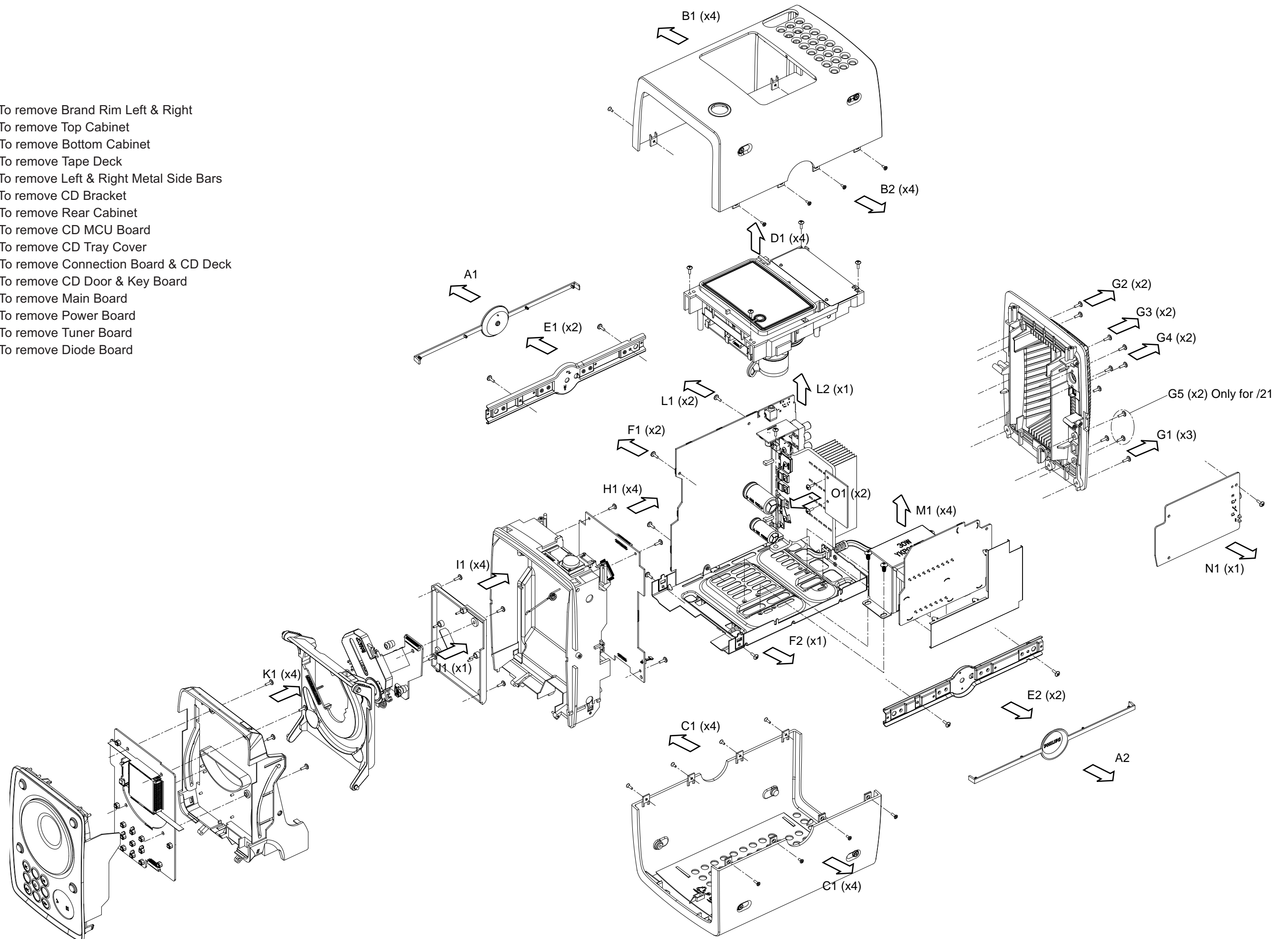
**The Clock/Timer setting is erased.**

- Power has been interrupted or the power cord has been disconnected. Reset the clock/timer.



## DISASSEMBLY INSTRUCTIONS

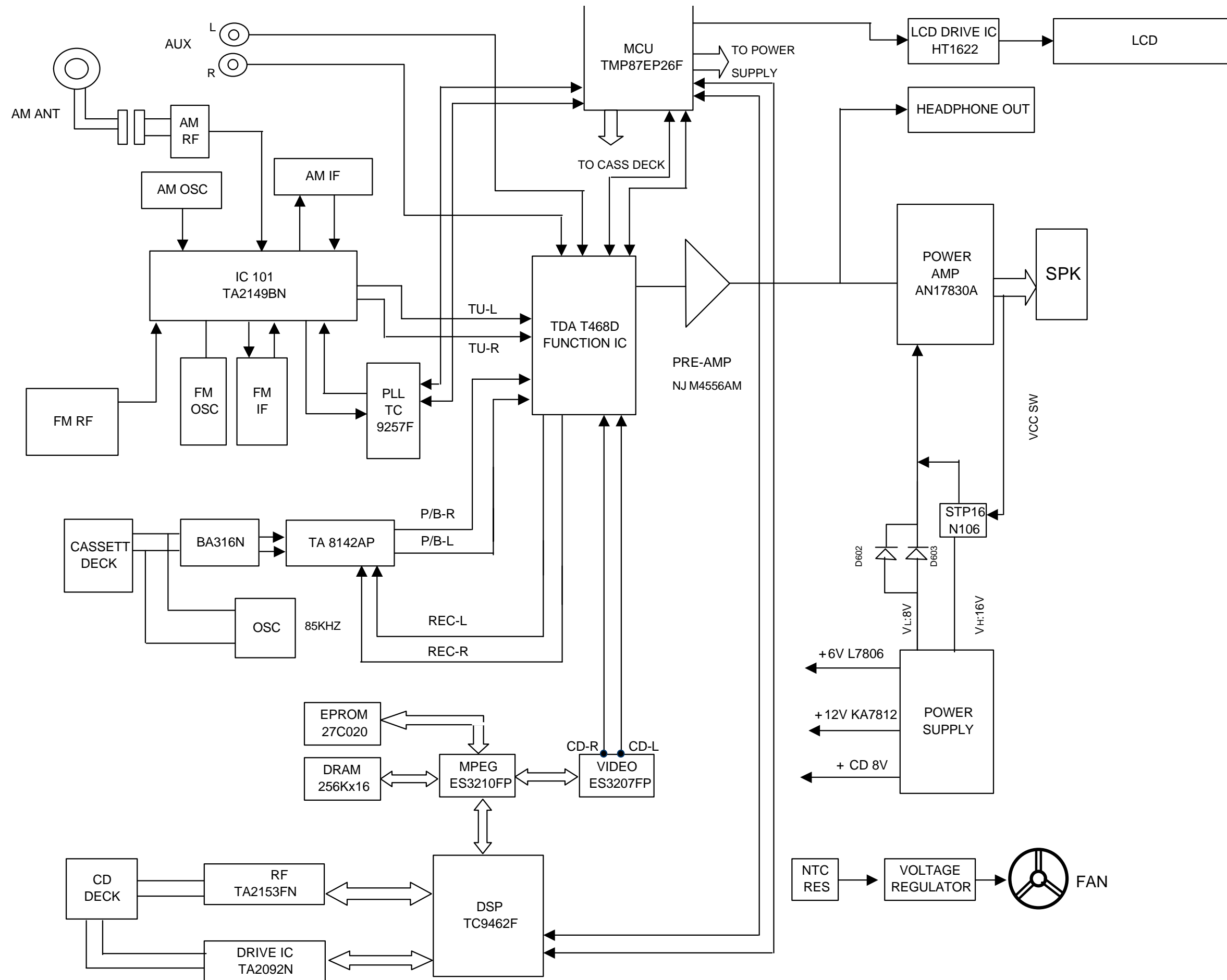
- A. To remove Brand Rim Left & Right
- B. To remove Top Cabinet
- C. To remove Bottom Cabinet
- D. To remove Tape Deck
- E. To remove Left & Right Metal Side Bars
- F. To remove CD Bracket
- G. To remove Rear Cabinet
- H. To remove CD MCU Board
- I. To remove CD Tray Cover
- J. To remove Connection Board & CD Deck
- K. To remove CD Door & Key Board
- L. To remove Main Board
- M. To remove Power Board
- N. To remove Tuner Board
- O. To remove Diode Board



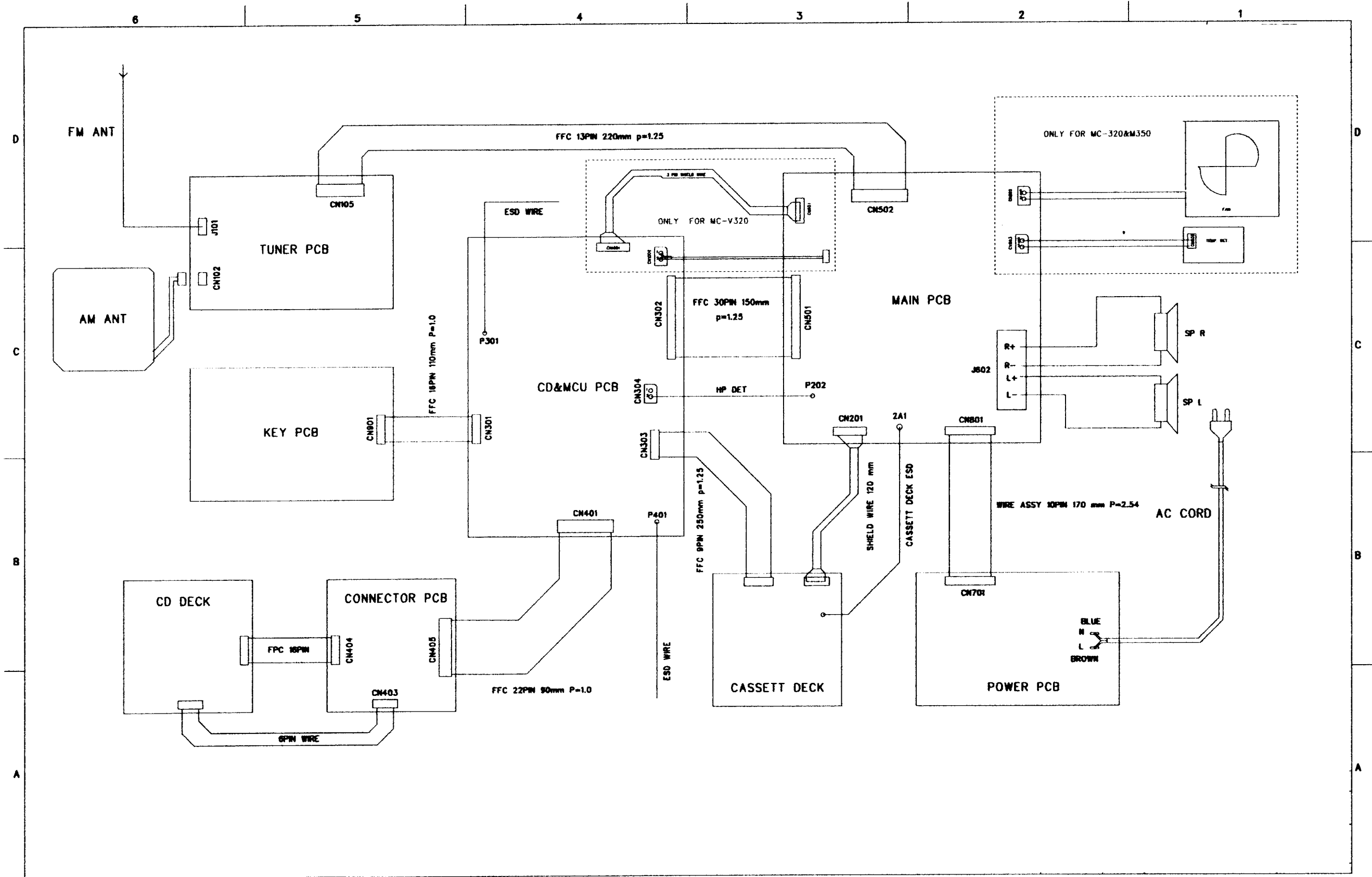




# SET BLOCK DIAGRAM



# SET WIRING DIAGRAM



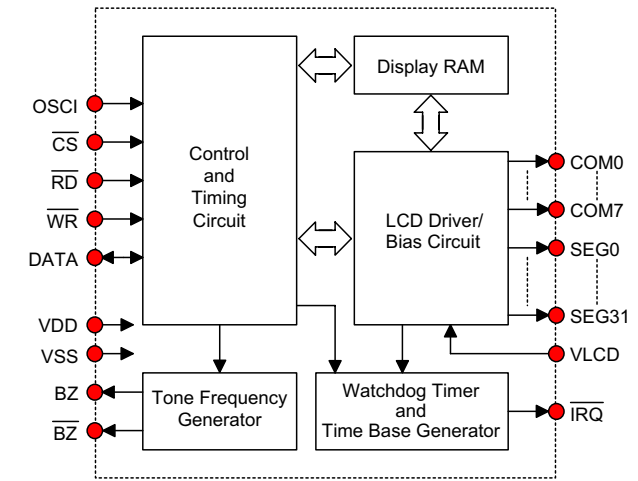
# KEY BOARD

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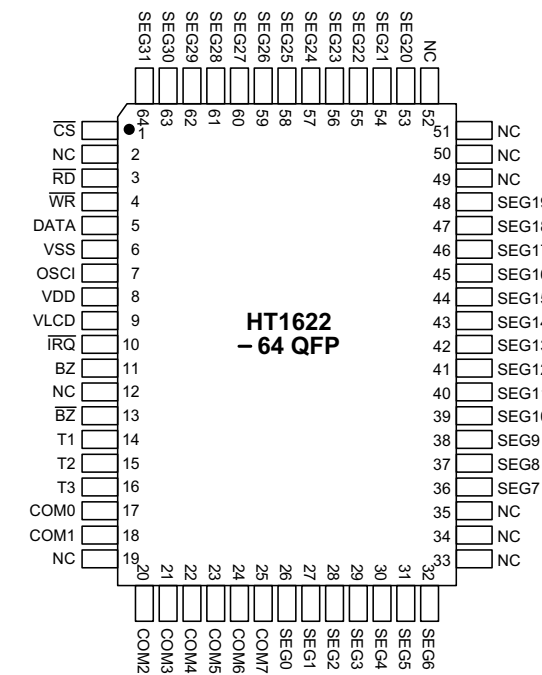
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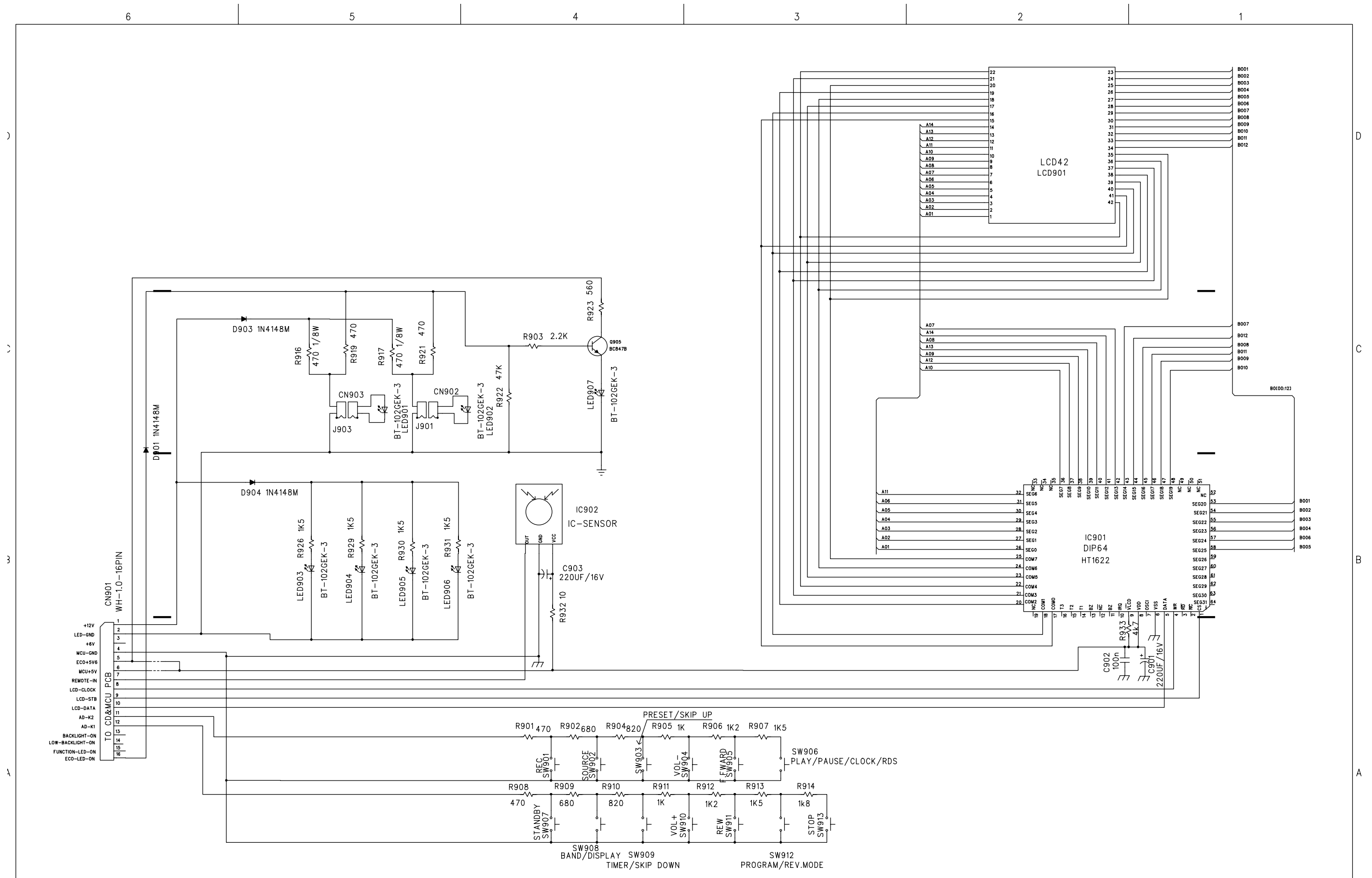
## Block Diagram



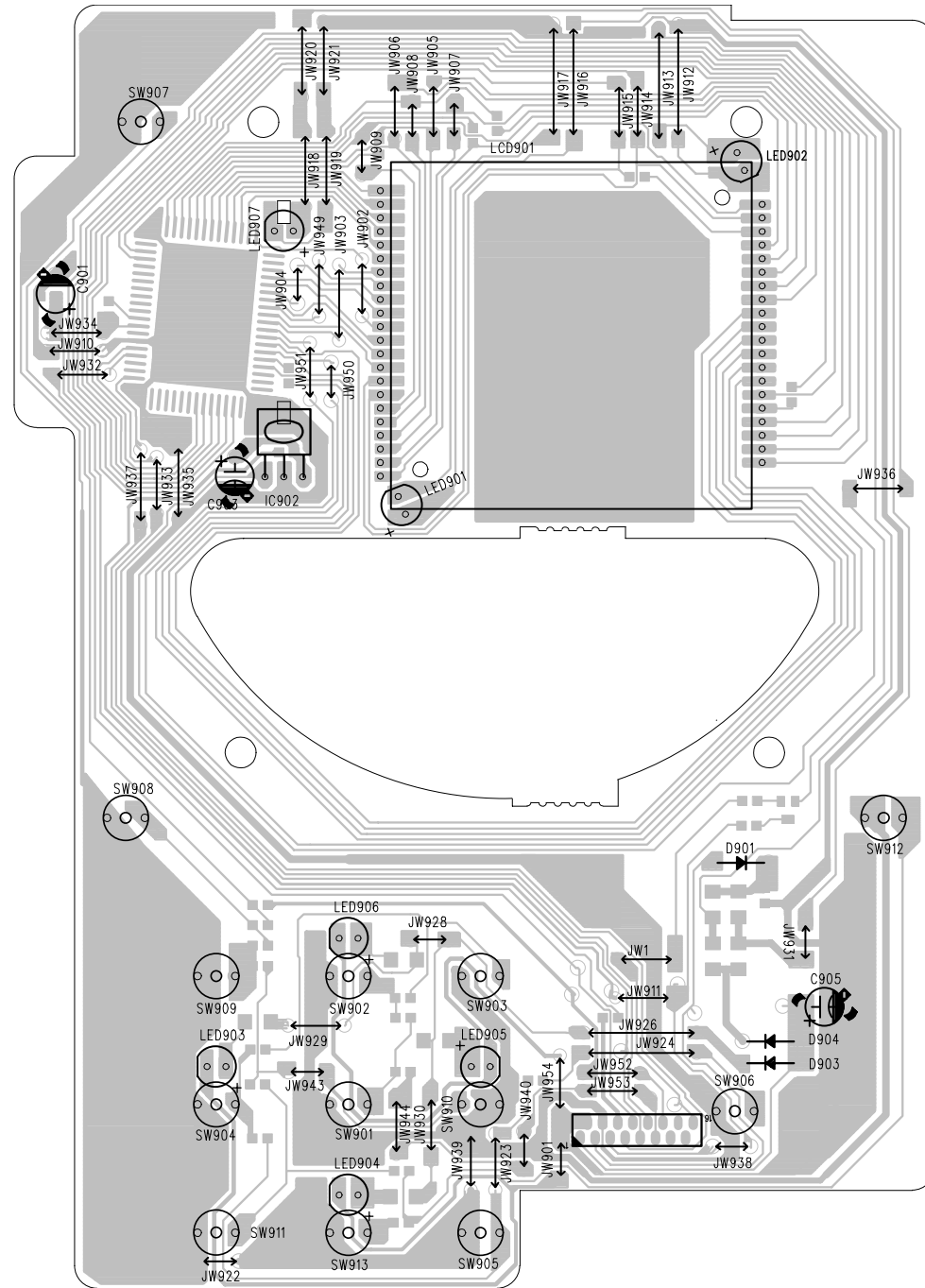
## Pin Assignment



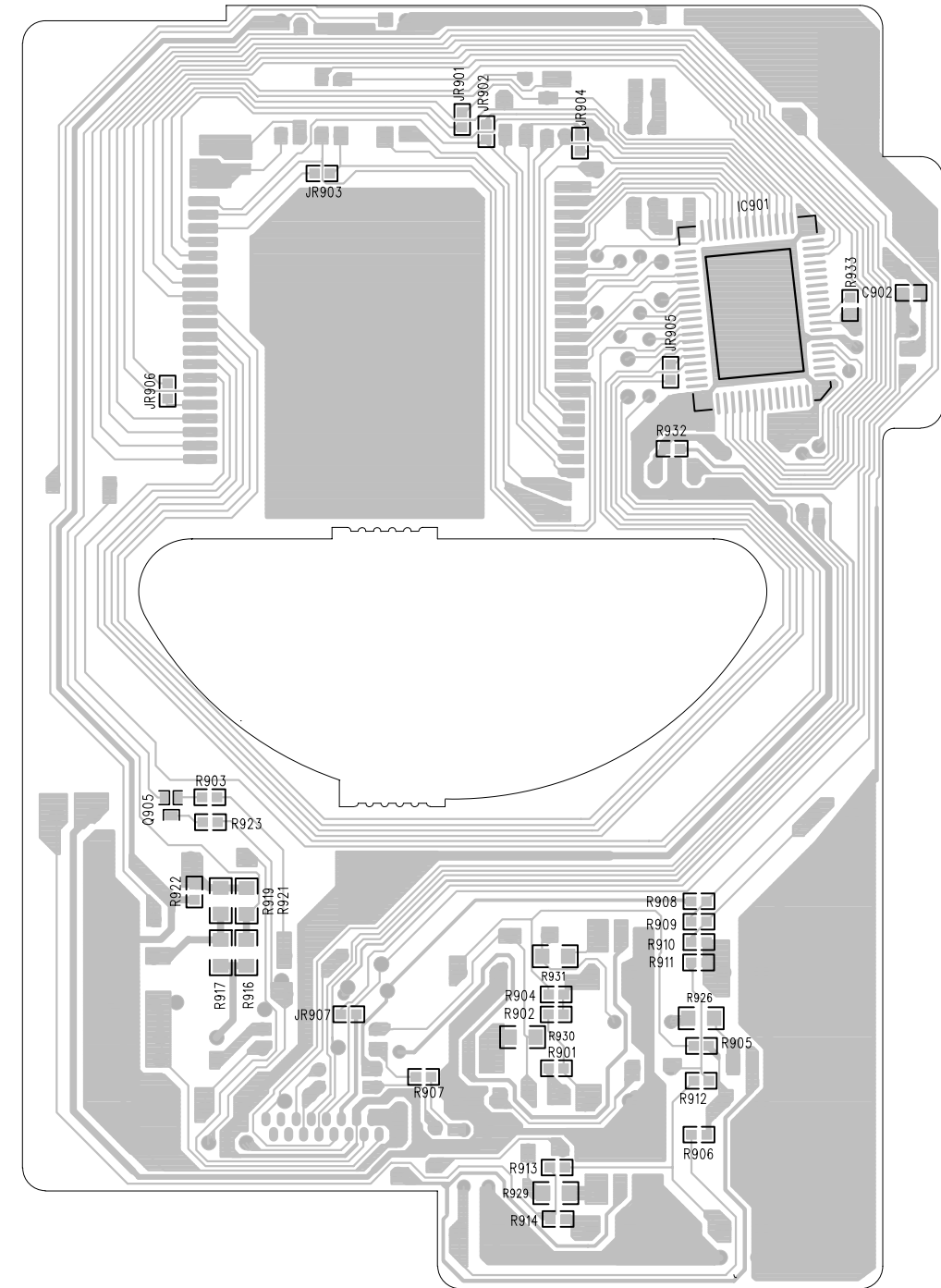
# CIRCUIT DIAGRAM - FRONT BOARD



### LAYOUT DIAGRAM - FRONT BOARD COMPONENT SIDE



### LAYOUT DIAGRAM - FRONT BOARD SMD SIDE



**ELECTRICAL PARTSLIST - KEY BOARD****- MISCELLANEOUS -**

CN901	9965 000 18230	CONN 16P H P=1.0
LCD901	9965 000 18252	LCD MC320
LED901	9965 000 18253	LED WHITE
LED902	9965 000 18253	LED WHITE
LED903	9965 000 18254	LED GREEN
LED904	9965 000 18254	LED GREEN
LED905	9965 000 18254	LED GREEN
LED906	9965 000 18254	LED GREEN
LED907	9965 000 18304	LED BT-H203D-31 RED
SW901	4822 276 13775	SWITCH
SW902	4822 276 13775	SWITCH
SW903	4822 276 13775	SWITCH
SW904	4822 276 13775	SWITCH
SW905	4822 276 13775	SWITCH
SW906	4822 276 13775	SWITCH
SW907	4822 276 13775	SWITCH
SW908	4822 276 13775	SWITCH
SW909	4822 276 13775	SWITCH
SW910	4822 276 13775	SWITCH
SW911	4822 276 13775	SWITCH
SW912	4822 276 13775	SWITCH
SW913	4822 276 13775	SWITCH

**- DIODES -**

D901	4822 130 30621	1N4148
D903	4822 130 30621	1N4148
D904	4822 130 30621	1N4148

**- IC & TRANSISTORS -**

IC901	9965 000 18251	IC HT1622-64-QFP
IC902	9965 000 14545	SENSOR RECEIVER
Q905	5322 130 60159	BC846B

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

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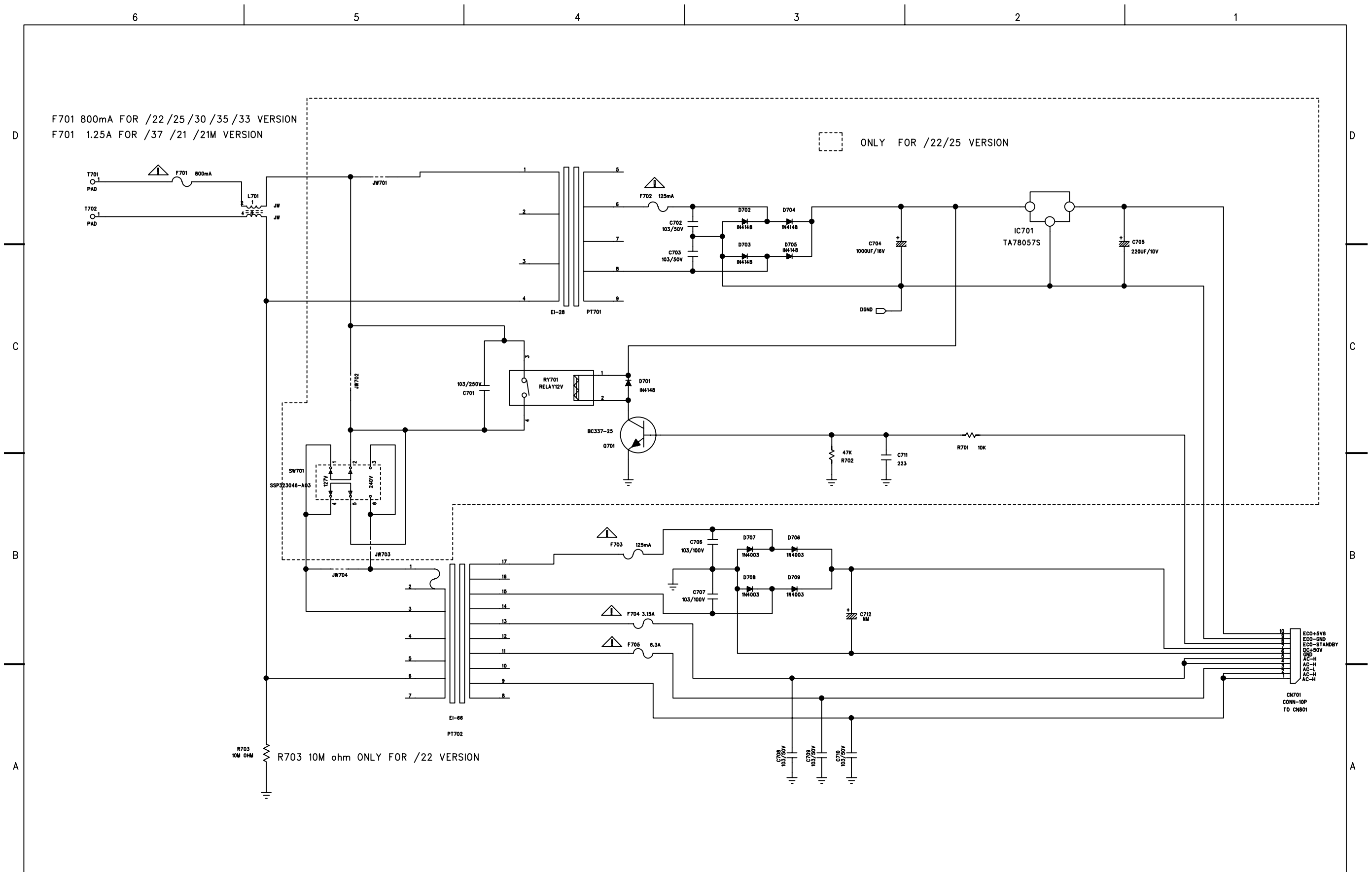
# POWER BOARD

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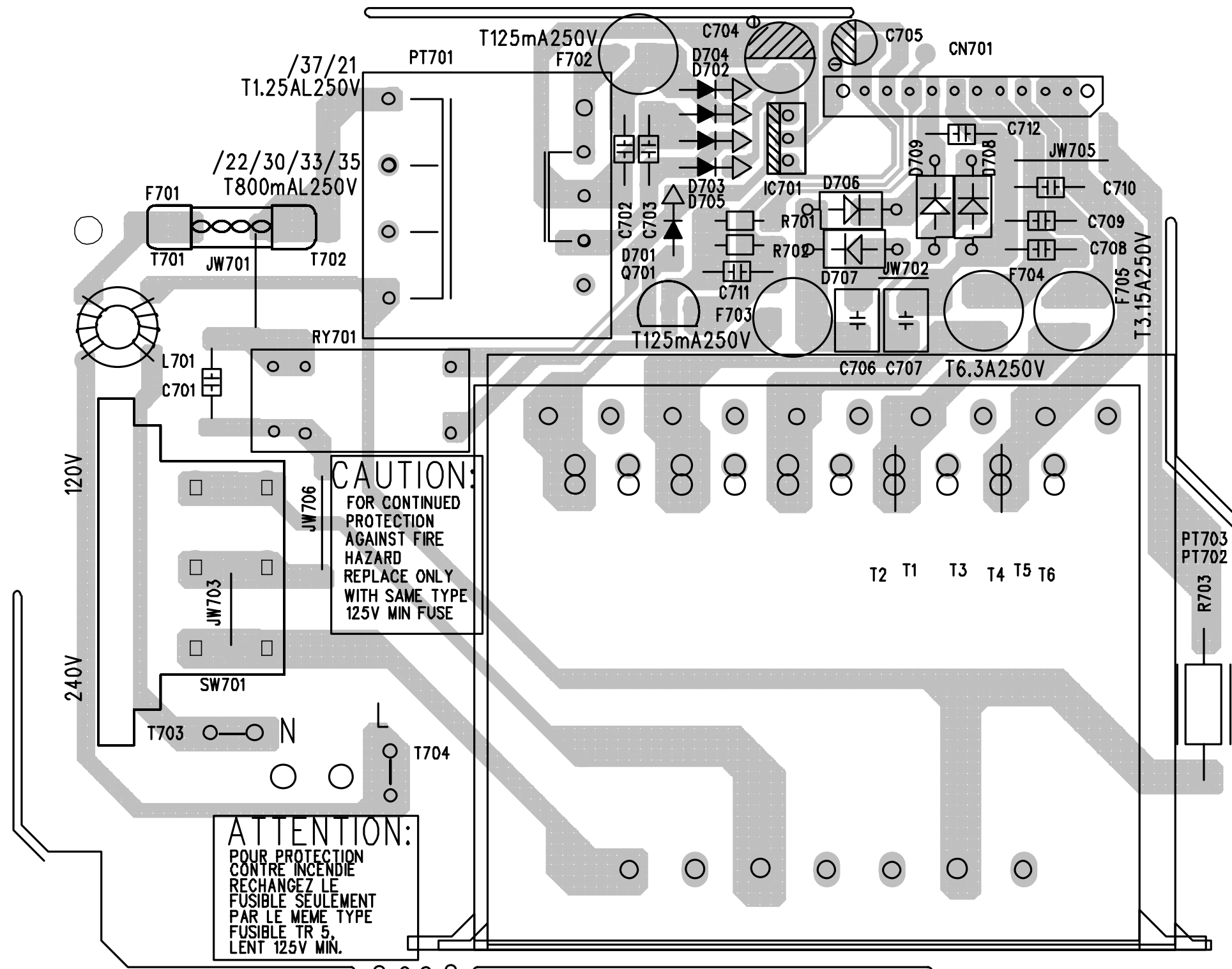
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Electrical Parts List.....	6-4

# CIRCUIT DIAGRAM





# POWER PCB LAYOUT



**ELECTRICAL PARTSLIST - POWER BOARD****- MISCELLANEOUS -**

CN701	9965 000 18244	CONN BASE 10P P=2.54
F701	△ 9965 000 18245	FUSE 1.25A TSD 250V /21
F701	△ 9965 000 11351	FUSE 800mA 250V /22/25
F703	△ 9965 000 18246	FUSE 125mA TAPPING
F704	△ 9965 000 18247	FUSE 6.3A TAPPING
F705	△ 9965 000 18248	FUSE 3.15A TAPPING
PT701	△ 9965 000 18302	POWER TRANS. EI-28 /22
RY701	9965 000 18303	RELAY /22/25
T701	△ 9965 000 18249	FUSE CLAMP
T702	△ 9965 000 18249	FUSE CLAMP
T703	9965 000 18250	CONNECTOR
T704	9965 000 18250	CONNECTOR
	△ 9965 000 11348	VOLTAGE SELECTOR 2P 5A /21

**- CAPACITORS -**

C701	△ 9965 000 18300	CAP CER. 0.01MF 250V 20%/22/25
------	------------------	--------------------------------

**- COILS & FILTERS -**

L701	△ 9965 000 11379	FILTER MAINS 400μH
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**- DIODES -**

D701	4822 130 30621	1N4148 /22/25
D702	4822 130 30621	1N4148 /22/25
D703	4822 130 30621	1N4148 /22/25
D704	4822 130 30621	1N4148 /22/25
D705	4822 130 30621	1N4148 /22/25
D706	4822 130 31878	1N4003G
D707	4822 130 31878	1N4003G
D708	4822 130 31878	1N4003G
D709	4822 130 31878	1N4003G

**- IC & TRANSISTORS -**

IC701	9965 000 18301	TA78057S /22/25
Q701	4822 130 40981	BC337-25 /22/25

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

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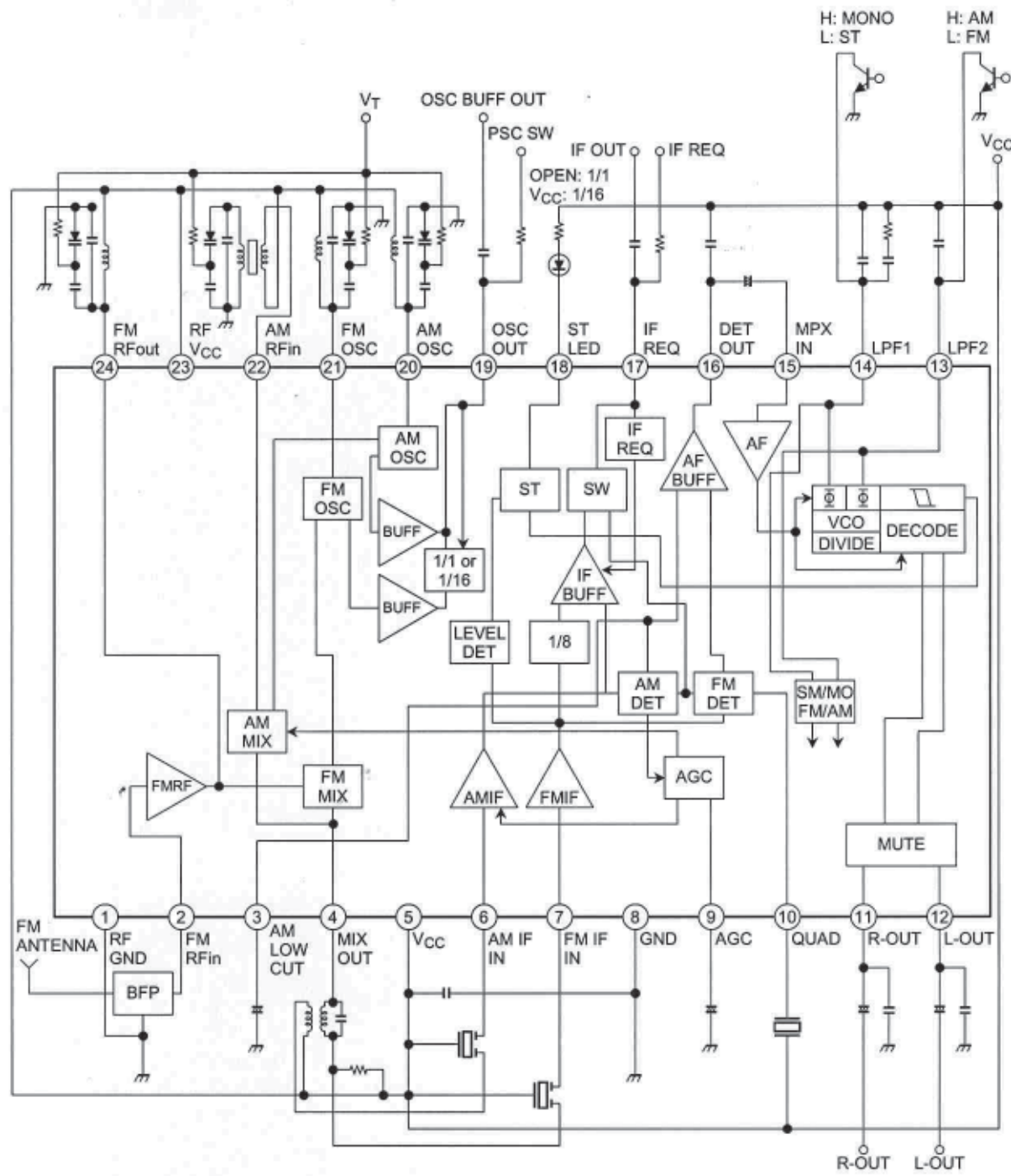
# TUNER BOARD

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**AM / FM TUNER IC  
TA2149BN  
BLOCK DIAGRAM**



**AM / FM TUNER IC  
TA2149BN  
Pins Description**

PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V)	
			AM	FM
1	RF GND (GND for FM RF stage)	—	0	0
2	FM-RFin		0	0.8
3	AM LOW CUT		1.0	—
4	MIX OUT		3.0	3.0
5	Vcc (Vcc for AM, FM IF, MPX)	—	3.0	3.0
6	AM IF IN		2.3	2.5

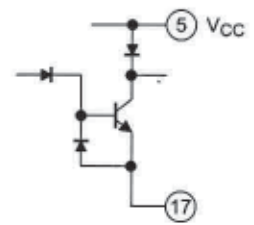
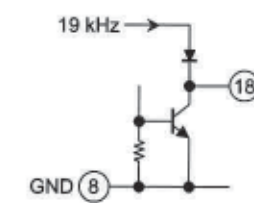
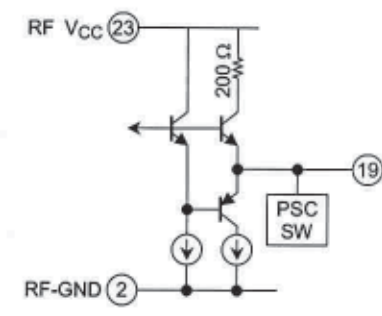
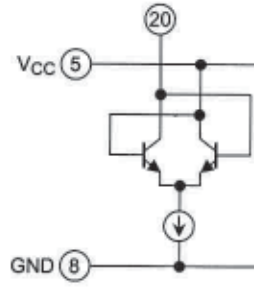
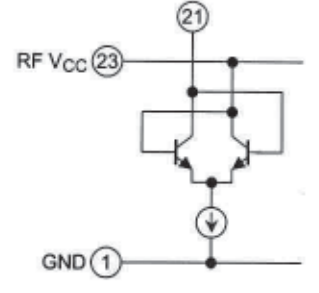
AM / FM TUNER IC  
TA2149BN  
Pins Description

PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V)	
			AM	FM
7	FM IF IN		3.0	3.0
8	GND (GND for AM, FM IF, MPX)	—	0	0
9	AGC		0	0
10	QUAD		2.5	2.2
11 12	R-OUT L-OUT		1.2	1.2

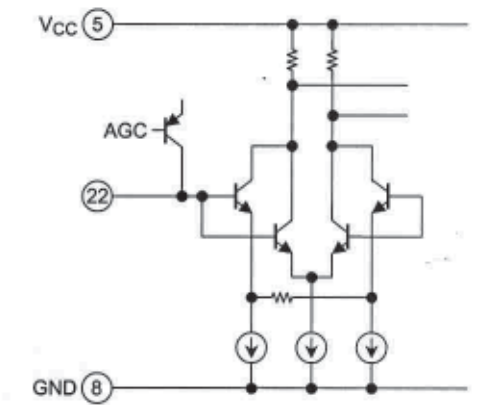
AM / FM TUNER IC  
TA2149BN  
Pins Description

PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V)	
			AM	FM
13	LPF2 • LPF terminal for phase detector • Bias terminal AM/FM SW circuit $V_{13} = \text{GND} \rightarrow \text{AM}$ $V_{13} = \text{OPEN} \rightarrow \text{FM}$		0	2.2
14	LPF1 • LPF terminal for synchronous detector • VCO stop terminal $V_{14} = \text{GND} \rightarrow \text{VCO STOP}$		0.7	2.4
15	MPX IN		0.7	0.7
16	DET OUT	<p>           (a) LOW <math>\rightarrow</math> FM, HIGH <math>\rightarrow</math> AM            (b) LOW <math>\rightarrow</math> AM, HIGH <math>\rightarrow</math> FM         </p>	1.0	0.9

AM / FM TUNER IC  
TA2149BN  
Pins Description

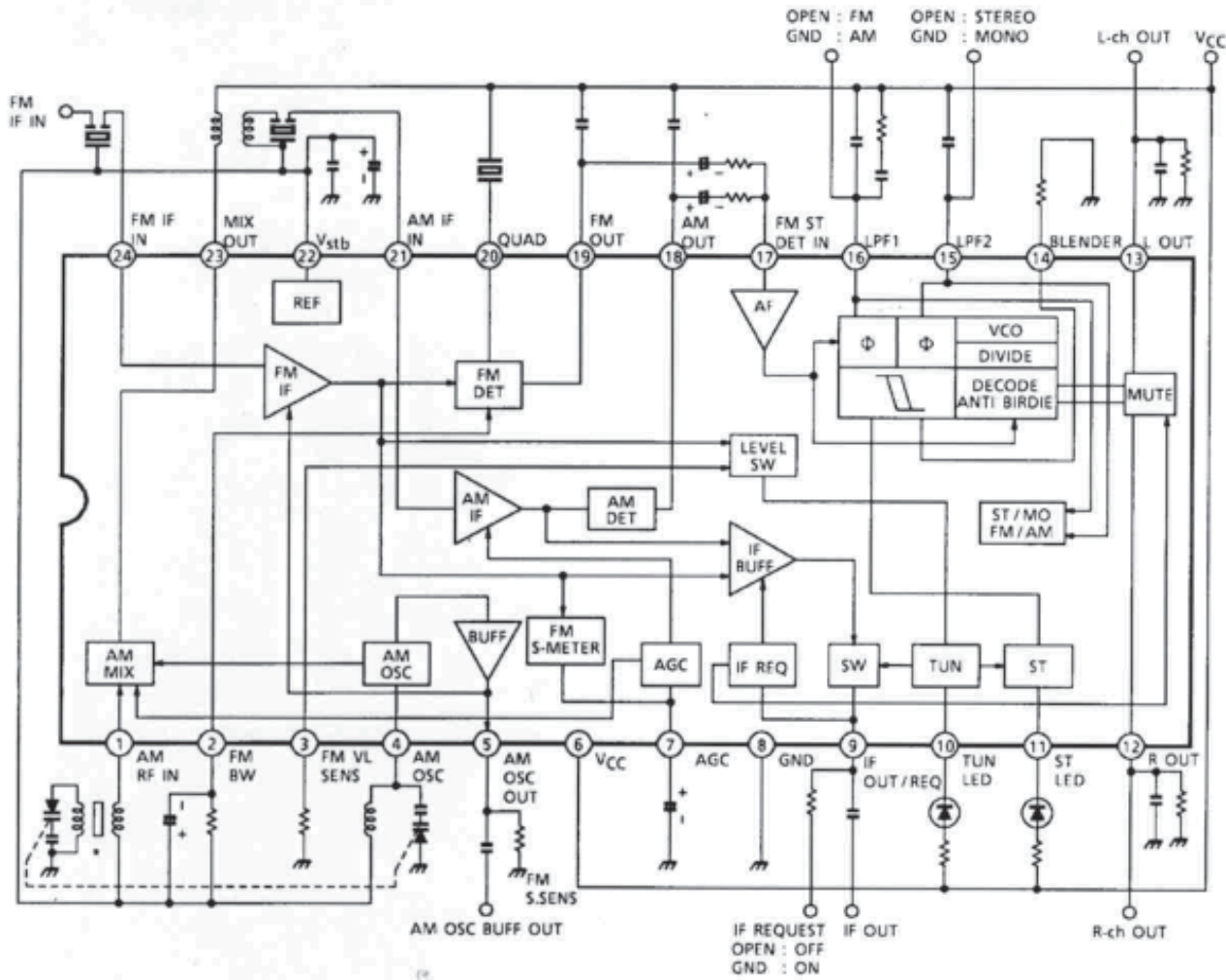
PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V)	
			AM	FM
17	IF REQ		—	—
18	ST LED		—	—
19	OSC OUT		2.8	2.7
20	AM OSC		3.0	3.0
21	FM OSC		3.0	3.0

AM / FM TUNER IC  
TA2149BN  
Pins Description

PIN No.	Characteristic	Internal Circuit	Terminal Voltage (Typ.) (V)	
			AM	FM
22	AM RFin		3.0	3.0
23	RF Vcc (Vcc for FM RF stage)	—	3.0	3.0
24	FM RFout	cf. pin 1	3.0	3.0



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



**AM / FM IF + FM STEREO DETECTOR  
TA2099N  
Pins Description**

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			FM	AM
1	AM RF IN		2.0	2.0
2	FM BW • FM band width adjust terminal		2.0	2.0
3	FM VL SENS • FM LED ON sensitivity adjust terminal		0.1	0.1
4	AM OSC		2.0	2.0

# AM / FM IF + FM STEREO DETECTOR TA2099N

## Pins Description

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			FM	AM
5	<b>AM OSC OUT/FM S.SENS</b> <ul style="list-style-type: none"> <li>• AM OSC Buff Output Terminal</li> <li>• FFM IF Count Output Sensitivity Adjust Terminal</li> </ul>		1.3	1.3
6	V <sub>CC</sub>	—	5.0	5.0
7	<b>AGC (FM S-METER)</b>		0.2	1.3
8	GND	—	0	0
9	<b>IF OUT/REQ</b> <ul style="list-style-type: none"> <li>• IF Count Output Terminal</li> <li>• IF Count Output/FM ST DET Mute Circuit Control Terminal</li> </ul> SW <sub>3</sub> : GND → ON SW <sub>3</sub> : Open → OFF		—	—
10	TUN LED		—	—

# AM / FM IF + FM STEREO DETECTOR TA2099N

## Pins Description

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			FM	AM
11	ST LED		—	—
12	R OUT		1.2	1.2
13	L OUT		1.2	1.2
14	<b>BLENDER</b> <ul style="list-style-type: none"> <li>• FM Blender Control Adjust Terminal</li> </ul>		0.3	0.3
15	<b>LPF2</b> <ul style="list-style-type: none"> <li>• LPF Terminal for Synchronous Detector</li> <li>• VCO Stop Terminal</li> </ul> V <sub>15</sub> = GND → VCO Stop (Monaural) V <sub>15</sub> = Open → VCO Run (Stereo)		3.5	1.4
16	<b>LPF1</b> <ul style="list-style-type: none"> <li>• LPF Terminal for Phase Detector</li> <li>• Bias Terminal for AM/FM Switch Circuit</li> </ul> V <sub>16</sub> = GND → AM V <sub>16</sub> = Open → FM		3.5	0
17	FM ST DET IN		1.2	1.2



AM / FM IF + FM STEREO DETECTOR  
TA2099N

Pins Description

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			FM	AM
18	AM DET OUT		0	1.3
19	FM DET OUT		1.4	2.0
20	QUAD		1.8	2.3
21	AM IF IN		2.0	2.0
22	V <sub>stb</sub>		2.0	2.0

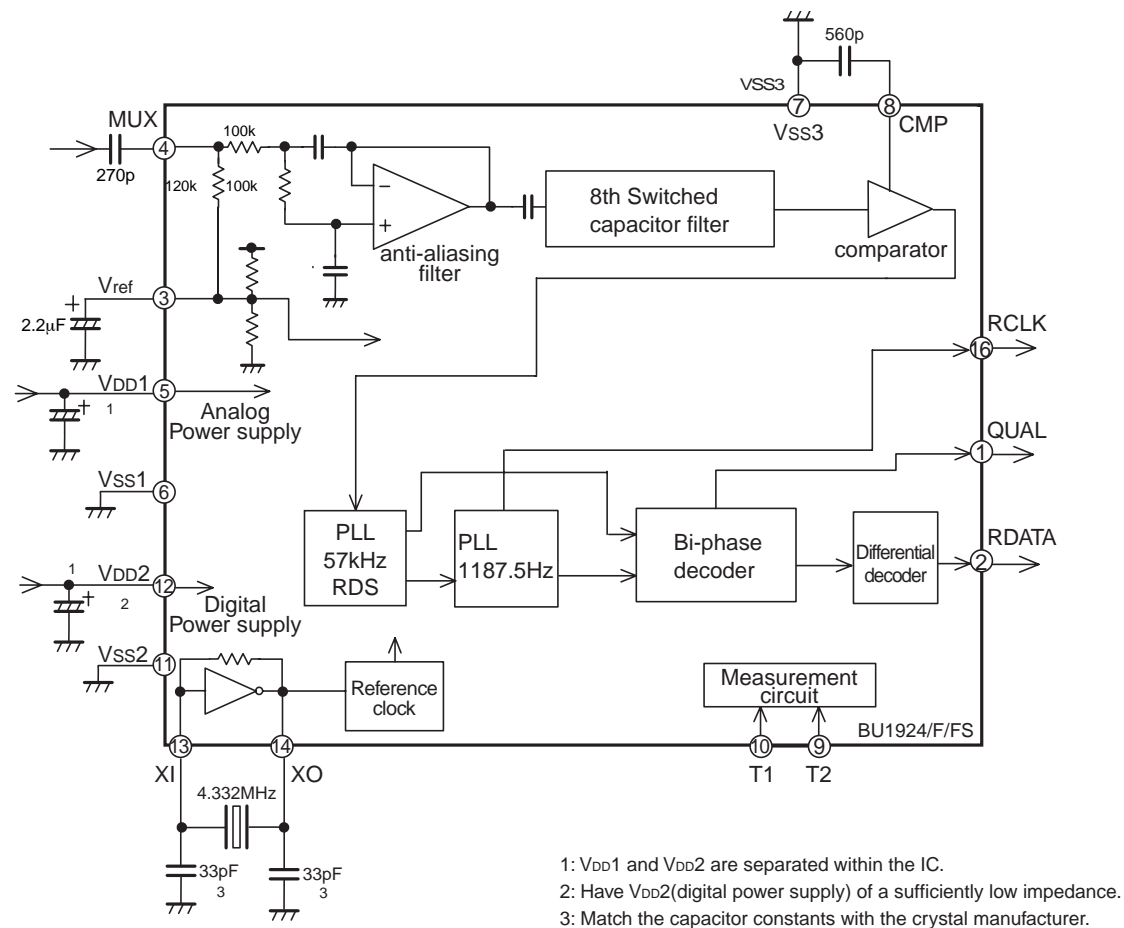
AM / FM IF + FM STEREO DETECTOR  
TA2099N

Pins Description

Pin No.	Characteristics	Internal Circuit	DC Voltage (V)	
			FM	AM
23	AM MIX OUT		5.0	5.0
24	FM IF IN		2.0	2.0

RDS/RBDS DECODER  
BU1924F

BLOCK DIAGRAM

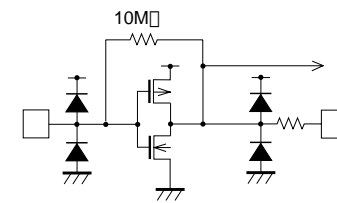


RDS/RBDS DECODER  
BU1924F

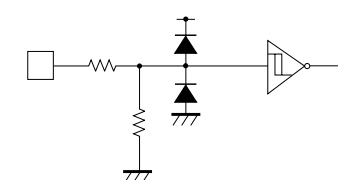
Pins Description

Pin No.	Symbol	Pin name	Functions	Input/Output type
1	QUAL	Demodulator quality	Good data: High, bad data : Low	Type C
2	RDATA	Demodulator data	Refer to output data timing	□
3	Vref	Reference voltage	1/2 V <sub>DD1</sub> (refer to input/output circuits)	Type E
4	MUX	Input	Composite signal input (refer to input/output circuits)	Type D
5	V <sub>DD1</sub>	Analog power supply	4.5V to 5.5V	□
6	V <sub>SS1</sub>			□
7	V <sub>SS3</sub>	GND		□
8	CMP	Comparator input	C-junction (refer to input/output circuits )	Type D
9	T2	Test input	Open or connected to ground	Type B
10	T1			
11	V <sub>DD2</sub>	Digital power supply	4.5V to 5.5V	□
12	V <sub>SS2</sub>			□
13	XI	Crystal oscillator	Connects to 4.332MHz oscillator (refer to input/output circuits)	Type A
14	XO			
15	(N.C.)			□
16	RCLK	Demodulator clock	1187.5Hz clock (refer to the timing diagram)	Type C

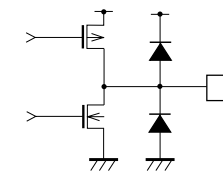
Type A



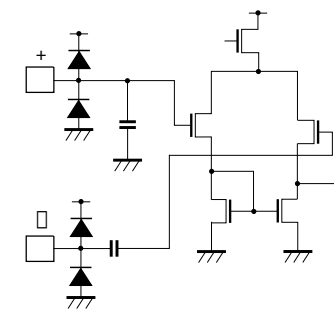
Type B



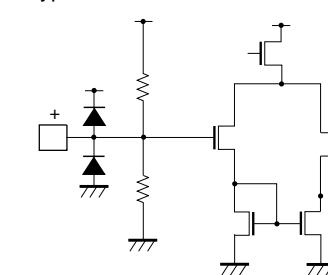
Type C



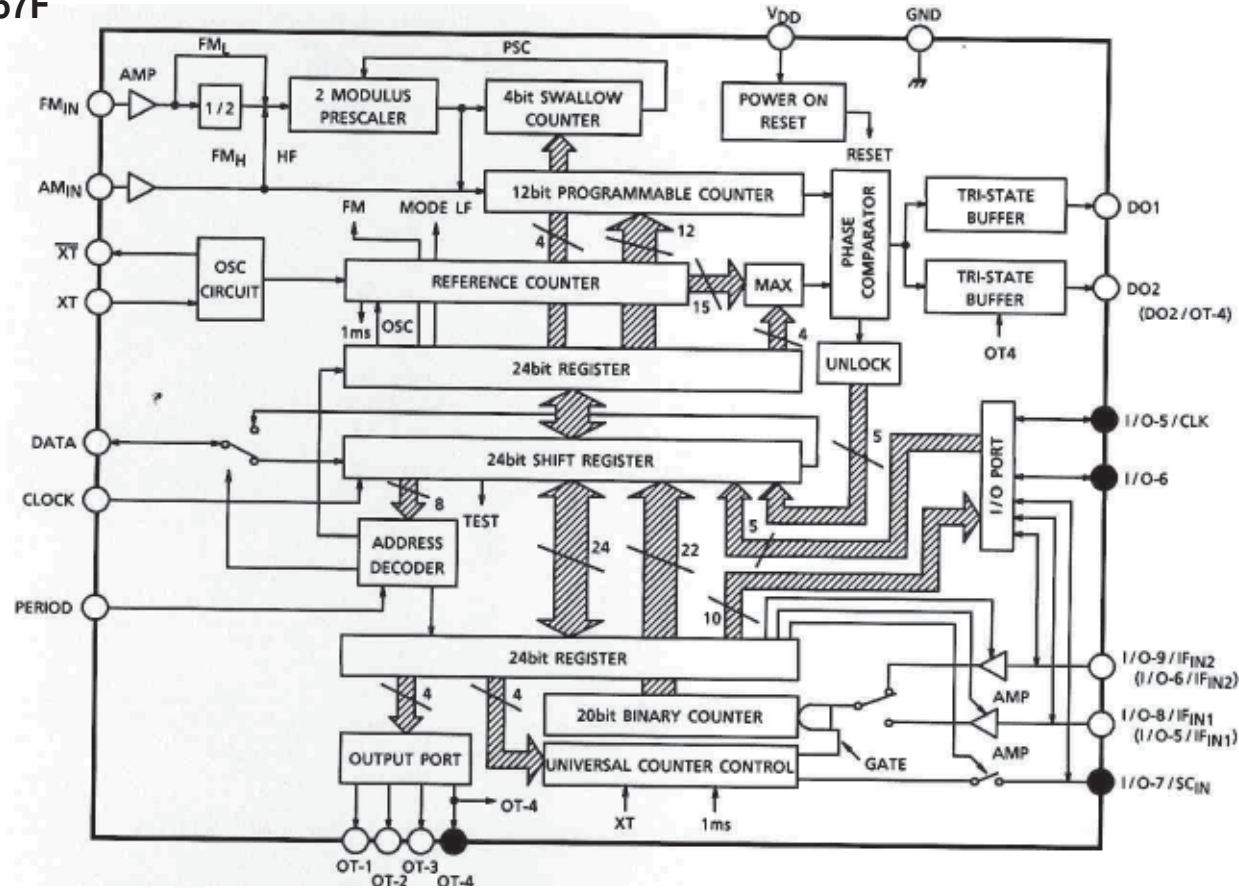
Type D



Type E



**DIGITAL TUNING IC  
TC9257F**



**PIN FUNCTION**

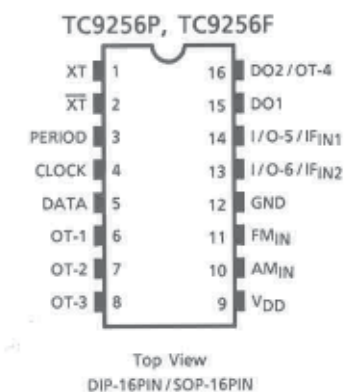
PIN No.	SYMBOL	PIN NAME	FUNCTION	CIRCUIT DIAGRAM
1	XT	Crystal oscillator pins	Connects 3.6MHz, 4.5MHz, 7.2MHz or 10.8MHz crystal oscillator to supply reference frequency and internal clock.	
2	XT-bar			
3	PERIOD	Period signal input	Serial I/O ports. These pins transfer data to and from the controller to set divisors and dividing modes, and to control the general-purpose counter and general-purpose I/O ports.	
4	CLOCK	Clock signal input		
5	DATA	Serial data input/output		
6	OT-1	General-purpose output ports N channel open drain port pins, for such uses as control signal output. These pins are set to the OFF state when power is turned on. (On TC9256P and TC9256F, OT-4 can be used as a CMOS output pin by switching it with DO2.)	These pins are set to the OFF state when power is turned on. (On TC9256P and TC9256F, OT-4 can be used as a CMOS output pin by switching it with DO2.)	
7	OT-2			
8	OT-3			
9 (-)	OT-4			
10 (-)	I/O-5/CLK	General-purpose I/O ports	CMOS structure allows free use of these ports for input or output. Ports are set for input when the power is turned on. On TC9257P and TC9257F, I/O-5 can be switched for use as a system clock output pin.	
11 (-)	I/O-6			
13 (10)	AM_IN	Programmable counter input	These pins input FM and AM band local oscillator signals by capacitor coupling. FM_IN and AM_IN operate at low amplitude.	
14 (11)	FM_IN			

**DIGITAL TUNING IC  
TC9257F**

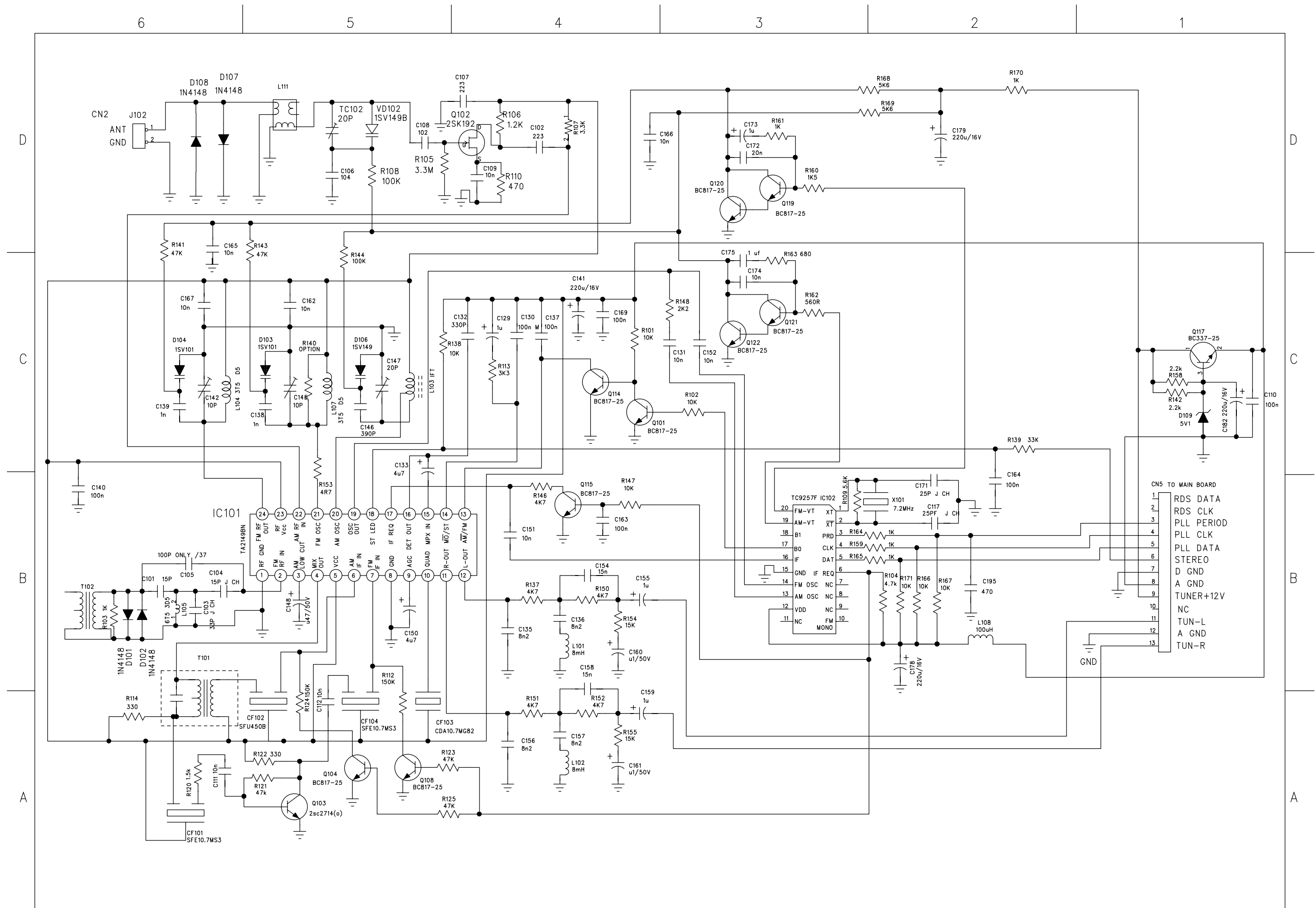
PIN No.	SYMBOL	PIN NAME	FUNCTION	CIRCUIT DIAGRAM
16 (13)	I/O-9 (-6) / IF_IN2	General-purpose I/O ports / General-purpose counter frequency measurement input	General-purpose I/O port input/output pins. Can be switched for use as input pins to measure general-purpose counter frequencies. The frequency measurement function has such uses as measuring intermediate frequencies (IF). These pins feature built-in amps. Data are input by capacitor coupling. FM_IN and AM_IN operate at low amplitude. (Note) Pins are set for input when power is turned on.	
17 (14)	I/O-8 (-5) / IF_IN1			
18 (-)	I/O-7 / SC_IN	General-purpose I/O ports / General-purpose counter cycle measurement input	General-purpose I/O port input/output pin. Can be switched for use as signal input pin to measure low-frequency signal cycles. (Not available on TC9256P and TC9256F.) (Note) This pin is set for input when power is turned on.	
19 (15)	DO1*	Phase comparator output (General-purpose output ports)	These pins are for phase comparator tristate output. DO1 and DO2 are output in parallel. (On TC9256P and TC9256F, DO2 can be switched for use as a general-purpose output port.)	
20 (16)	DO2 (DO2 / OT-4)			
15 (12)	GND	Power supply pins	Applies 5.0V ± 10%.	—
12 (9)	VDD			

(\*) Pin numbers 1~8 are common to TC9256P, TC9256F, TC9257P and TC9257F.  
 (\*) Pin names and numbers in parentheses apply to TC9256P and TC9256F.

**PIN CONNECTION**

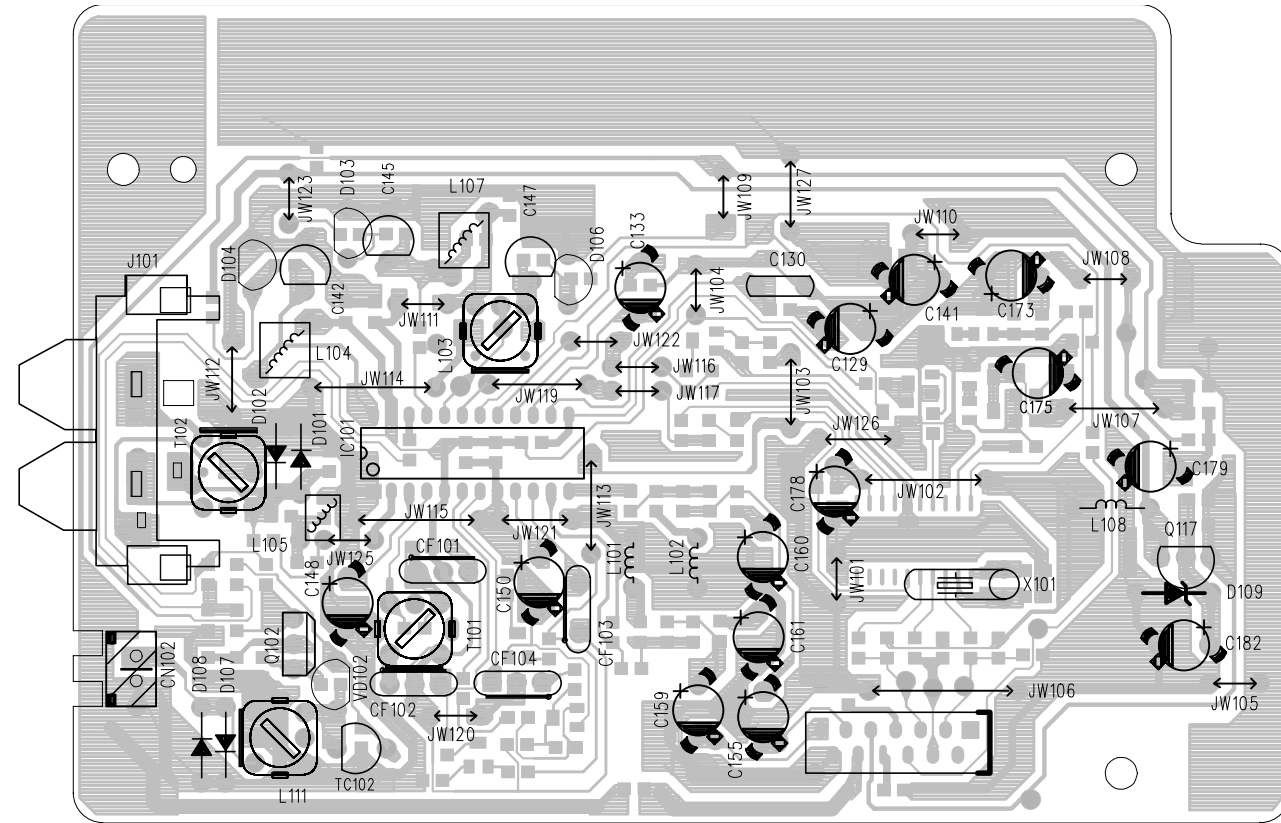


# CIRCUIT DIAGRAM - TUNER BOARD (NON CENELEC)

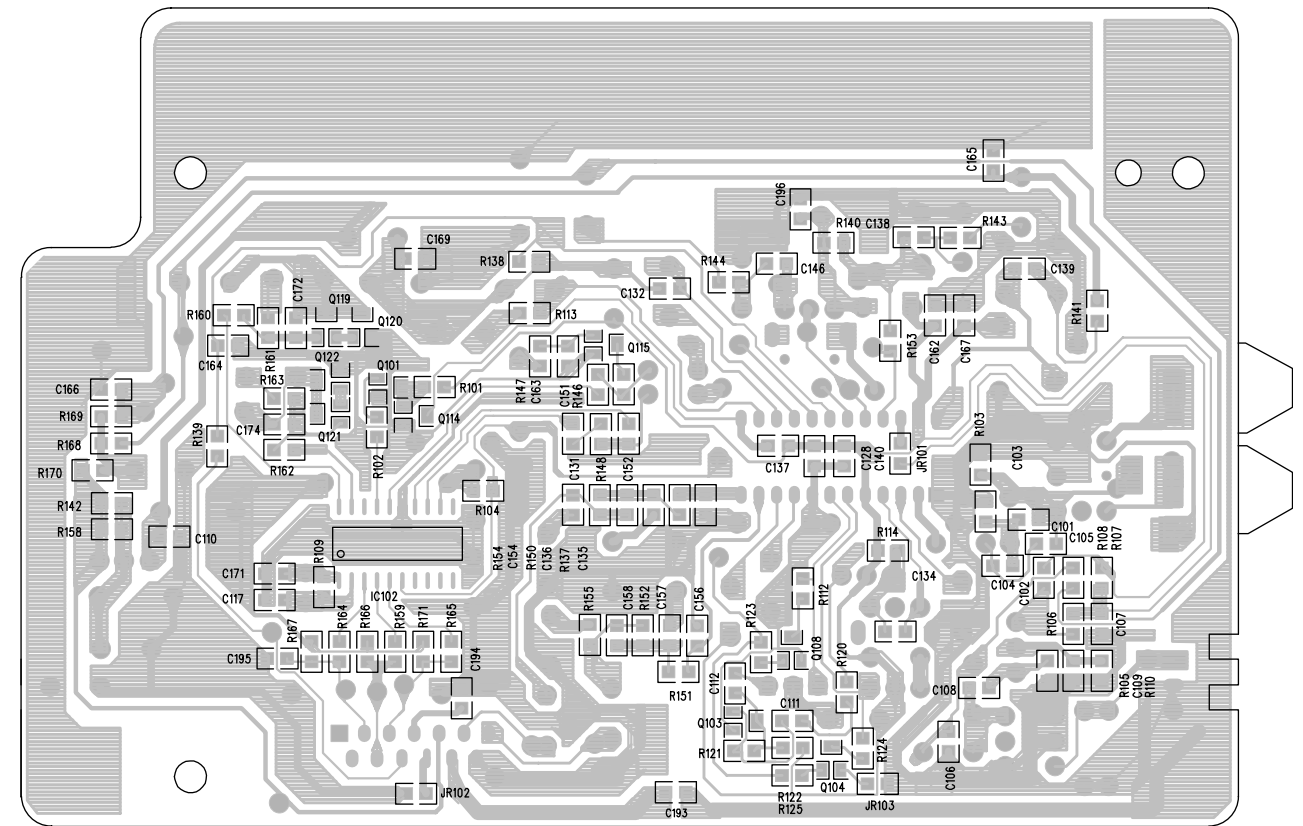




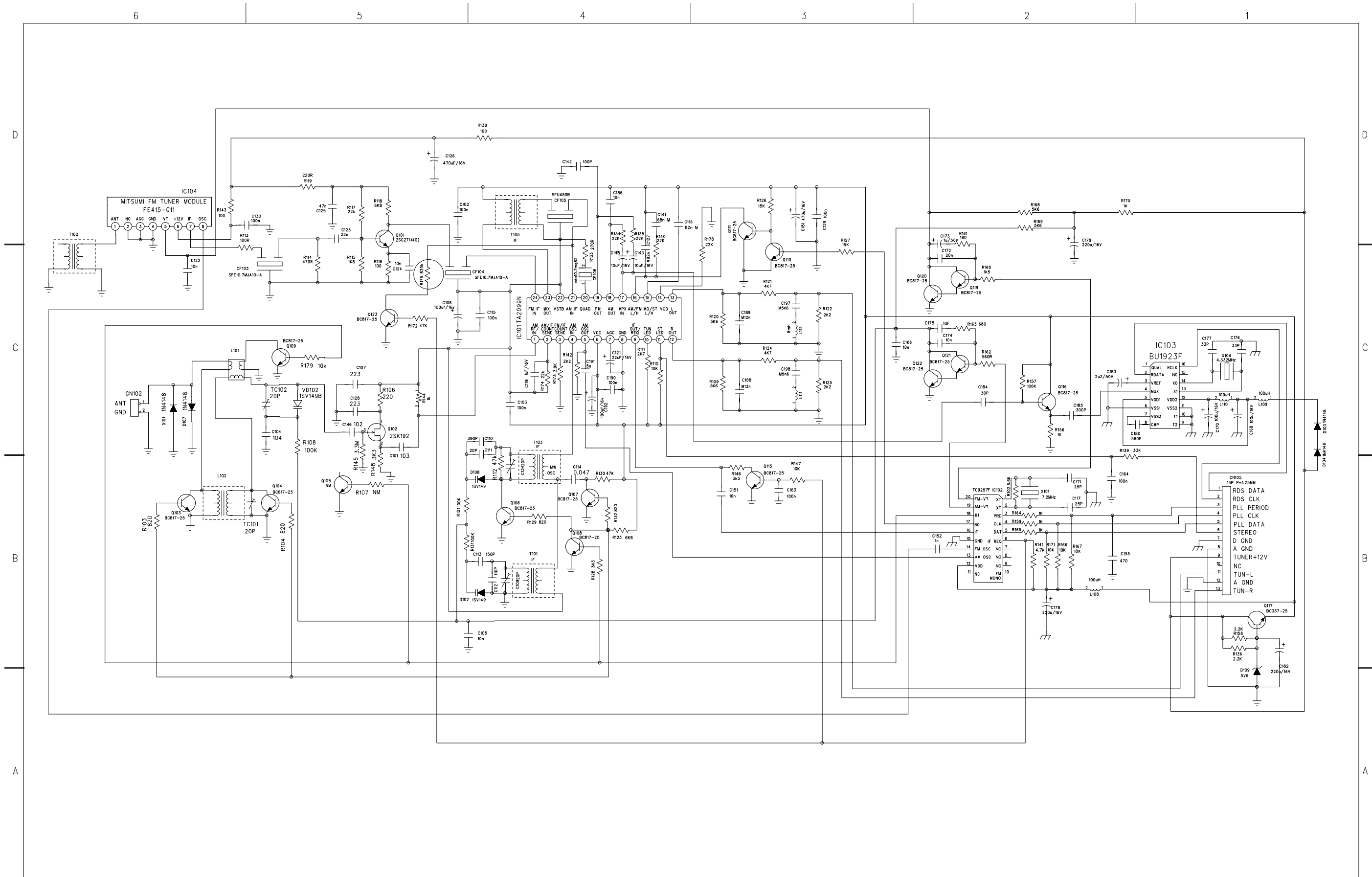
LAYOUT DIAGRAM - TUNER BOARD (NON CENELEC)  
COMPONENT SIDE



LAYOUT DIAGRAM - TUNER BOARD (NON CENELEC)  
COPPER SIDE



# CIRCUIT DIAGRAM - TUNER BOARD (CENELEC)





**ELECTRICAL PARTSLIST - TUNER BOARD (NON CENENLEC)****- MISCELLANEOUS -**

CN102	9965 000 18259	AM ANT TERMINAL 2P
CN105	9965 000 18233	CONN 13P P=1.25 V
J101	9965 000 11365	FM ANTENNA SOCKET

**- CAPACITORS -**

C142	4822 125 60101	3P0-11P N450 100V
C145	4822 125 60101	3P0-11P N450 100V
C147	9965 000 16264	CER TRIMMER 20P 6.15X5.9
TC102	9965 000 16264	CER TRIMMER 20P 6.15X5.9

**- COILS & FILTERS -**

CF101	9965 000 18257	FILTER SFE10.7MHZ
CF102	4822 242 80989	SFU450B
CF103	9965 000 18258	FILTER JT10.7MHZ
CF104	9965 000 18257	FILTER SFE10.7MHZ
L101	9965 000 18262	FIXED IND 8MH
L102	9965 000 18262	FIXED IND 8MH
L103	9965 000 18263	IFT 2B
L104	9965 000 18264	SPRING COIL 3.5XDIA5
L105	9965 000 18265	FM BPF DIA2.2X6.5T
L107	9965 000 18266	SPRING COIL 3T5
L108	9965 000 18267	FIXED IND 100μH
L111	9965 000 18268	AM RF IFT 2B/3B
T101	9965 000 18270	AM IFT 2B
X101	9965 000 19728	XTAL 7.2MHZ
	9965 000 19729	FERRITE BEAD 1KΩ 100MHZ

**- DIODES -**

D101	4822 130 30621	1N4148
D102	4822 130 30621	1N4148
D103	4822 130 70056	1SV101
D104	4822 130 70056	1SV101
D106	4822 130 81673	1SV149
D107	4822 130 30621	1N4148
D108	4822 130 30621	1N4148
D109	4822 130 80317	MTZJ5.1B
VD102	4822 130 81673	1SV149

**- IC & TRANSISTORS -**

IC101	9965 000 18260	TUNER IC TA2149BN
IC102	9965 000 18261	IC TC9257F
Q101	4822 130 42804	BC817-25
Q102	4822 130 63173	2SK192AY
Q103	9965 000 18269	2SC2714O
Q104	4822 130 42804	BC817-25
Q108	4822 130 42804	BC817-25
Q114	4822 130 42804	BC817-25
Q115	4822 130 42804	BC817-25
Q117	4822 130 40981	BC337-25
Q119	4822 130 42804	BC817-25

**- IC & TRANSISTORS -**

Q120	4822 130 42804	BC817-25
Q121	4822 130 42804	BC817-25
Q122	4822 130 42804	BC817-25

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

**ELECTRICAL PARTSLIST - TUNER BOARD (CENENLEC)****- MISCELLANEOUS -**

CN102	9965 000 18259	AM ANT TERMINAL 2P
CN105	9965 000 18233	CONN 13P P=1.25
J101	9965 000 11365	FM ANTENNA SOCKET

**- CAPACITORS -**

C109	9965 000 16264	CER TRIMMER 20P 6.15X5.9
C134	9965 000 16264	CER TRIMMER 20P 6.15X5.9
TC101	9965 000 18314	CER TRIMMER 50P
TC102	9965 000 16264	CER TRIMMER 20P 6.15X5.9

**- COILS & FILTERS -**

CF103	9965 000 18257	FILTER SFE10.7MHZ
CF104	9965 000 18257	FILTER SFE10.7MHZ
CF105	4822 242 80989	SFU450B
CF106	9965 000 18258	FILTER JT10.7MHZ
L101	9965 000 18268	AM RF IFT 2B/3B
L102	9965 000 18309	LW RF IFT 3B
L103	9965 000 18310	BEADS CORD
L108	9965 000 18267	FIXED IND 100μH
L109	9965 000 18267	FIXED IND 100μH
L110	9965 000 18267	FIXED IND 100μH
L111	9965 000 19758	COIL CB
L112	9965 000 19758	COIL CB
T101	9965 000 18311	LW OSC IFT 3B
T103	9965 000 18312	AM OSC IFT 3B
T105	9965 000 18313	AM IFT 3B
X101	9965 000 19728	XTAL 7.2MHZ
X104	9965 000 19759	XTAL 4.332MHZ

**- DIODES -**

D101	4822 130 30621	1N4148
D102	4822 130 81673	1SV149
D103	4822 130 30621	1N4148
D104	4822 130 30621	1N4148
D107	4822 130 30621	1N4148
D108	4822 130 81673	1SV149
D109	4822 130 80317	MTZJ5.1B
VD102	4822 130 81673	1SV149

**- IC & TRANSISTORS -**

IC101	9965 000 18307	TUNER IC TA2099N
IC102	9965 000 18261	IC TC9257F
IC103	9965 000 18308	CHIP IC
IC104	2422 542 90071	FM FRONTEND FE450-G01
Q101	9965 000 18269	2SC2714O
Q102	4822 130 63173	2SK192AY
Q103	4822 130 42804	BC817-25
Q104	4822 130 42804	BC817-25
Q106	4822 130 42804	BC817-25
Q107	4822 130 42804	BC817-25

**- IC & TRANSISTORS -**

Q108	4822 130 42804	BC817-25
Q109	4822 130 42804	BC817-25
Q110	4822 130 42804	BC817-25
Q111	4822 130 42804	BC817-25
Q115	4822 130 42804	BC817-25
Q116	9965 000 18269	2SC2714O
Q117	4822 130 40981	BC337-25
Q119	4822 130 42804	BC817-25
Q120	4822 130 42804	BC817-25
Q121	4822 130 42804	BC817-25
Q122	4822 130 42804	BC817-25
Q123	4822 130 42804	BC817-25

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



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# MCU & CD BOARD

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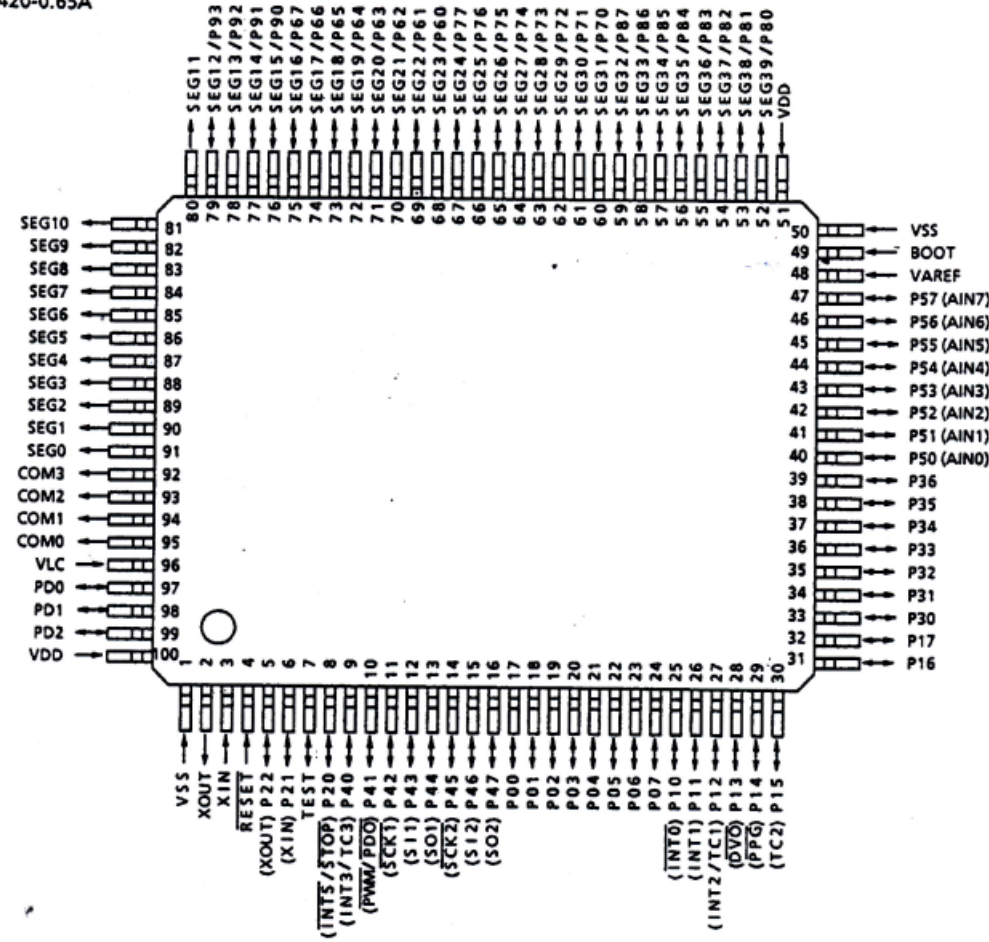
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MICROPROCESSOR  
TMP87EP26F

BLOCK DIAGRAM

P-QFP100-1420-0.65A



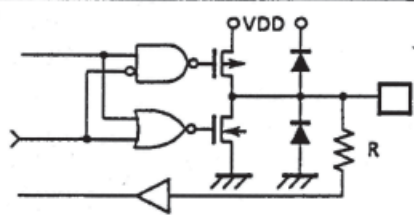
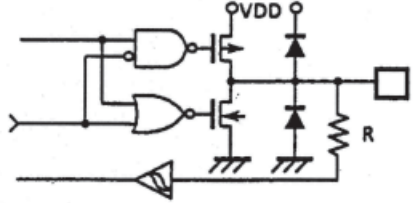
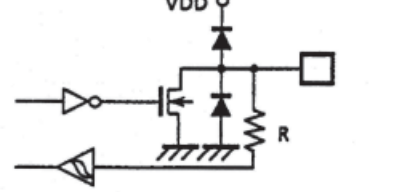
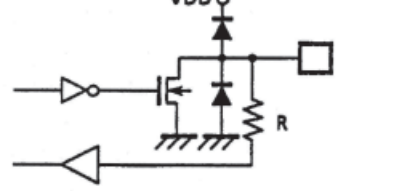
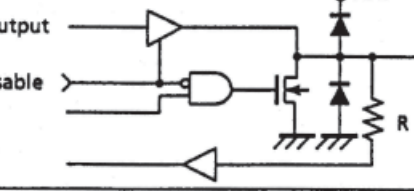
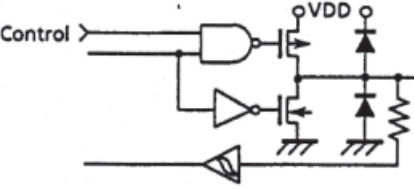
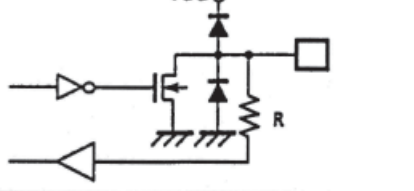
MICROPROCESSOR  
TMP87EP26F

PINS DESCRIPTION

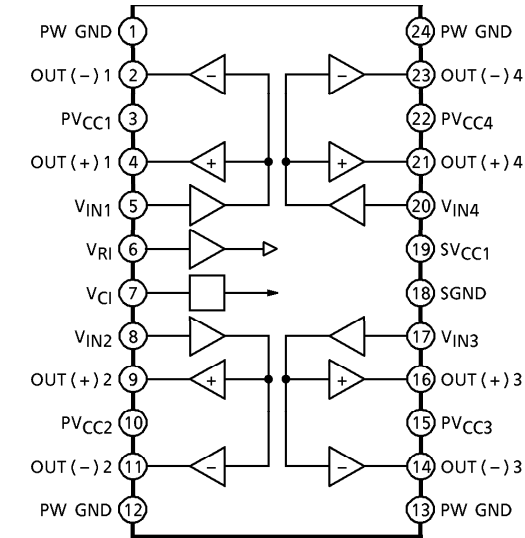
Control Pin	I/O	Input/Output Circuitry and Code	Remarks
XIN XOUT	Input Output		Resonator connecting pins (high-frequency)  $R_f = 1.2 \text{ M}\Omega$ (typ.) $R_o = 1.5 \text{ k}\Omega$ (typ.) $R = 1 \text{ k}\Omega$ (typ.)
XTIN XTOUT	Input Output	Refer to port P2 	Resonator connecting pins (low-frequency)  $R_f = 6 \text{ M}\Omega$ (typ.) $R_o = 220 \text{ k}\Omega$ (typ.) $R = 1 \text{ k}\Omega$ (typ.)
RESET	I/O		Sink open drain output  Hysteresis input Pull-up resistor $R_{IN} = 220 \text{ k}\Omega$ (typ.)  $R = 1 \text{ k}\Omega$ (typ.)
STOP/INT5	Input		Hysteresis input  $R = 1 \text{ k}\Omega$ (typ.)
TEST BOOT	Input		Pull-down resistor $R_{IN} = 70 \text{ k}\Omega$ (typ.)  $R = 1 \text{ k}\Omega$ (typ.)

**MICROPROCESSOR  
TMP87EP26F**

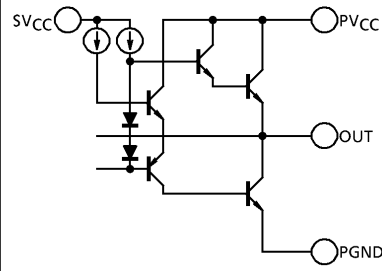
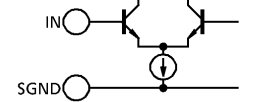
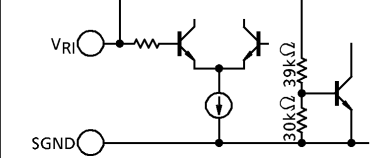
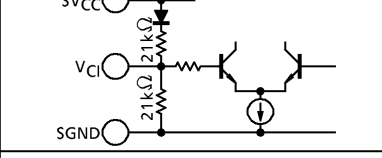
**PINS DESCRIPTION**

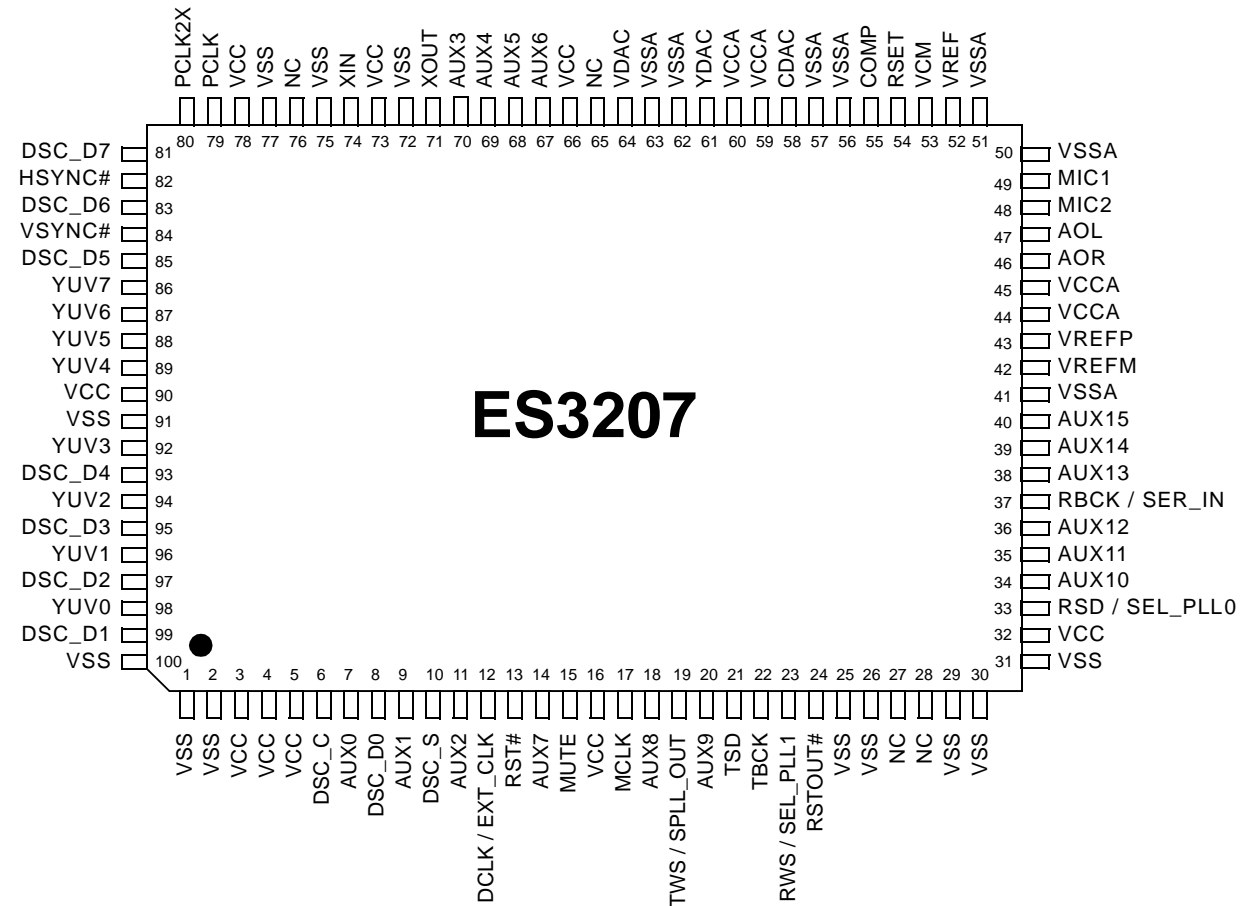
Port	I/O	Input / Output Circuitry and Code	Remarks
P0 P5	I/O	initial "Hi-Z" 	Tri-state I/O  R = 1 kΩ (typ.)
P1	I/O	initial "Hi-Z" 	Tri-state I/O Hysteresis input  R = 1 kΩ (typ.)
P3	I/O	initial "Hi-Z" 	Sink open drain output Hysteresis input  R = 1 kΩ (typ.)
P2	I/O	initial "Hi-Z" 	Sink open drain output  R = 1 kΩ (typ.)
P6 P7 P8 P9	I/O	Segment output 	Sink open drain or Segment output  R = 1 kΩ (typ.)
P4	I/O	initial "Hi-Z" 	Sink open drain or push-pull output P41 High current output Hysteresis input
PD	I/O	initial "Hi-Z" 	Sink open drain output  R = 1 kΩ (typ.)

**POWER DRIVER IC  
TA2092N**



**TERMINAL EXPLANATION**

TERMINAL No.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT
1	PW GND	Power GND ● Connected to substrate. ● ①, ⑫, ⑬, ⑭ pin are connected inside.	
2	OUT (-) 1	Inverted output for CH1	
3	PVCC1	Supply terminal of output stage for CH1 ● Supply terminal of output stage are not connected to other channel terminal.	
4	OUT (+) 1	Non-inverted output for CH1	
5	VIN1	Input for CH1 ● Not biased inside	
6	VRI	Input reference voltage ● Under condition of $V_{RI} \leq 1.8V$ , internal bias circuit is shut off. ● No signal input condition : $V_{RI} = V_{IN}$	
7	VCI	Output reference voltage ● $V_{OUT} = V_{CI} = (V_{CC} - V_F) / 2$	
8	VIN2	Input for CH2	Same as channel 1
9	OUT (+) 2	Non-inverted output for CH2	
10	PVCC2	Supply terminal of output stage for CH2	
11	OUT (-) 2	Inverted output for CH2	
12	PW GND	Power GND	Same as channel 1
13	PW GND	Power GND	
14	OUT (-) 3	Inverted output for CH3	
15	PVCC3	Supply terminal of output stage for CH3	
16	OUT (+) 3	Non-inverted output for CH3	Same as channel 1
17	VIN3	Input for CH3	
18	S GND	Supply terminal of small signal GND	
19	S VCC	Small signal GND	
20	VIN4	Input for CH4	Same as channel 1
21	OUT (+) 4	Non-inverted output for CH4	
22	PVCC4	Supply terminal of output stage for CH4	
23	OUT (-) 4	Inverted output for CH4	
24	PW GND	Power GND	

**VIDEO CD/DVD COMPANION PROCESSOR  
ES3207**
**PINOUT**

**ES3207**
**PIN DESCRIPTION**

Name	Number	I/O	Definition
VSS	1:2,25:26,29:31,72,75,77,91,100	I	Ground.
VCC	3:5,16,32,66,73,78,90	I	Voltage supply, 5 V.
DSC_C	6	I	Clock for programming to access internal registers.
AUX[15:0]	40:38,36:34,20,18,14,67:70,11,9,7	I/O	Auxiliary control pins.
DSC_D[7:0]	81,83,85,93,95,97,99,8	I/O	Data for programming to access internal registers.
DSC_S	10	I	Strobe for programming to access internal registers.
DCLK	12	O	Dual-purpose pin. DCLK is the MPEG decoder clock.
EXT_CLK		I	EXT_CLK is the external clock. EXT_CLK is an input during bypass PLL mode.
RST#	13	I	Video reset (active-low).
MUTE	15	O	Audio mute.
MCLK	17	I	Audio master clock.
TWS	19	I	Dual-purpose pin. TWS is the transmit audio frame sync.
SPLL_OUT		O	SPLL_OUT is the select PLL output.

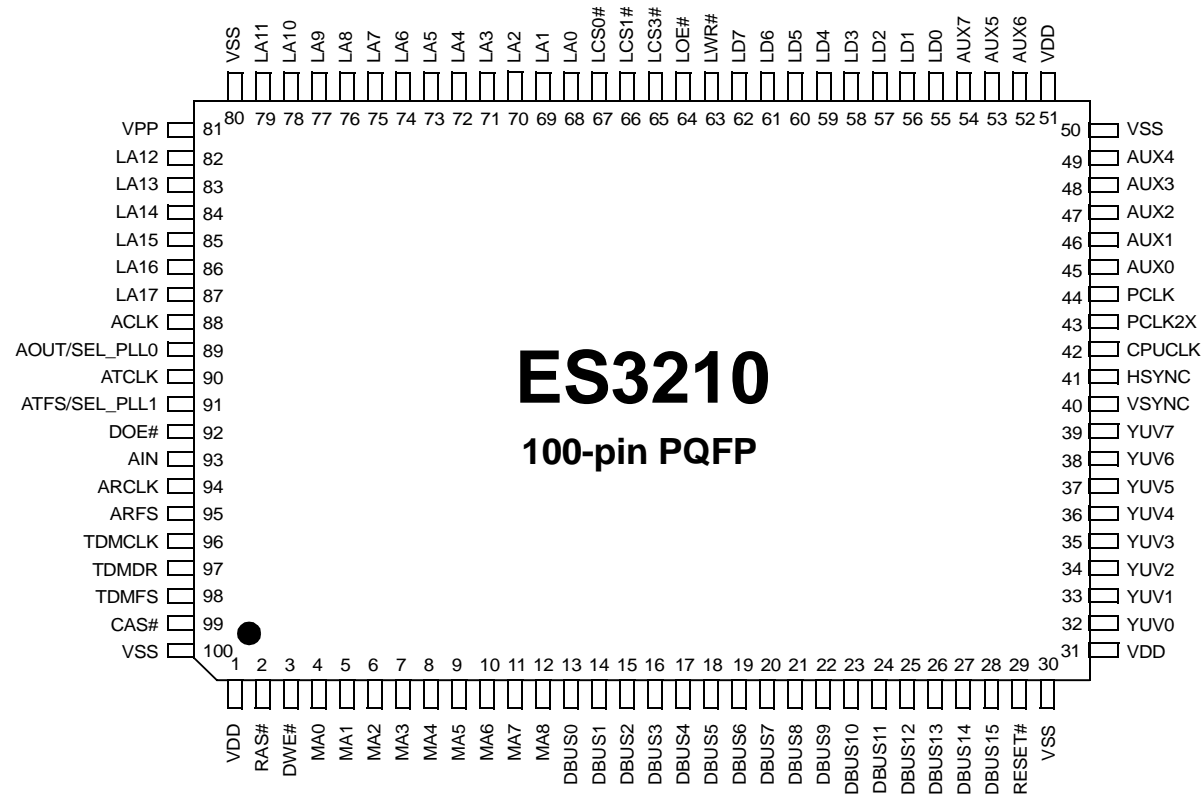
**VIDEO CD/DVD COMPANION PROCESSOR  
ES3207**
**PIN DESCRIPTION**

Name	Number	I/O	Definition														
TSD	21	I	Transmit audio data input.														
TBCK	22	I	Transmit audio bit clock.														
RWS	23	O	Dual-purpose pin. RWS is the receive audio frame sync.														
SEL_PLL1		I	Pins SEL_PLL[1:0] select the PLL clock frequency for the DCLK output. <table border="1"> <thead> <tr> <th>SEL_PLL1</th> <th>SEL_PLL0</th> <th>DCLK</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Bypass PLL (input mode)</td> </tr> <tr> <td>0</td> <td>1</td> <td>27 MHz (output mode)</td> </tr> <tr> <td>1</td> <td>0</td> <td>32.4 MHz (output mode)</td> </tr> <tr> <td>1</td> <td>1</td> <td>40.5 MHz (output mode)</td> </tr> </tbody> </table>	SEL_PLL1	SEL_PLL0	DCLK	0	0	Bypass PLL (input mode)	0	1	27 MHz (output mode)	1	0	32.4 MHz (output mode)	1	1
SEL_PLL1	SEL_PLL0	DCLK															
0	0	Bypass PLL (input mode)															
0	1	27 MHz (output mode)															
1	0	32.4 MHz (output mode)															
1	1	40.5 MHz (output mode)															
RSTOUT#	24	O	Reset output (active-low).														
NC	27:28,65:76		No connect. Do not connect to these pins.														
RSD	33	O	Dual-purpose pin. RSD is the receive audio data input.														
SEL_PLL0		I	SEL_PLL0 along with SEL_PLL1 select the PLL clock frequency for the DCLK output. See the table for pin number 23.														
RBCK	37	O	Dual-purpose pin. RBCK is the receive audio bit clock.														
SER_IN		I	SER_IN is the serial input DSC mode. 0 = Parallel DSC mode. 1 = Serial DSC mode.														
VSSA	41,50:51,56:57,62:63	I	Analog ground.														
VREFM	42	I	DAC and ADC minimum reference. Bypass to VCMR with 10 nF in parallel with 0.1 nF.														
VREFP	43	I	DAC and ADC maximum reference. Bypass to VCMR with 10 nF in parallel with 0.1 nF.														
VCCA	44:45,59:60	I	Analog VCC, 5 V.														
AOR	46	O	Right channel output.														
AOL	47	O	Left channel output.														
MIC2	48	I	Microphone input 2.														
MIC1	49	I	Microphone input 1.														
VREF	52	I	Internal resistor divider generates Common Mode Reference (CMR) voltage. Bypass to analog ground with 0.1 nF.														
VCM	53	I	ADC Common Mode Reference (CMR) buffer output. CMR is approximately 2.25 V. Bypass to analog ground with 47 nF electrolytic in parallel with 0.1 nF.														
RSET	54	I	Full scale DAC current adjustment.														
COMP	55	I	Compensation pin.														
CDAC	58	O	Modulated chrominance output.														
YDAC	61	O	Y luminance data bus for screen video port.														
VDAC	64	O	Composite video output.														
XOUT	71	O	Crystal output.														
XIN	74	I	27 MHz crystal input.														
PCLK	79	I/O	13.5 MHz pixel clock.														
PCLK2X	80	I/O	27 MHz (2 times pixel clock).														
HSYNC#	82	O	Horizontal sync (active-low).														
VSYNC#	84	O	Vertical sync (active-low).														
YUV[7:0]	86:89,92,94,96,98	I	YUV data bus for screen video port.														



**VIDEO CD PROCESSOR  
ES3210**

**ES3210 PINOUT**



**ES3210 PIN DESCRIPTION**

Name	Number	I/O	Definition
VDD	1, 31, 51	I	Voltage supply for 3.3V.
RAS#	2	O	DRAM row address strobe (active low).
DWE#	3	O	DRAM write enable (active low).
MA[8:0]	12:4	O	DRAM multiplexed row and column address bus.
DBUS[15:0]	28:13	I/O	DRAM data bus I/O [15:0].
RESET#	29	I	System reset (active low).
VSS	30, 50, 80, 100	I	Ground.
YUV[7:0]	39:32	O	YUV[7:0] pixel output data.
VSYNC	40	I/O	Vertical sync for screen video interface, programmable for rising or falling edge.
HSYNC	41	I/O	Horizontal sync for screen video interface, programmable for rising or falling edge.
CPUCLK	42	I	RISC and system clock input. CPUCLK is used only if SEL_PLL[1:0] = 00.
PCLK2X	43	I/O	Pixel clock; two times the actual pixel clock for screen video interface.

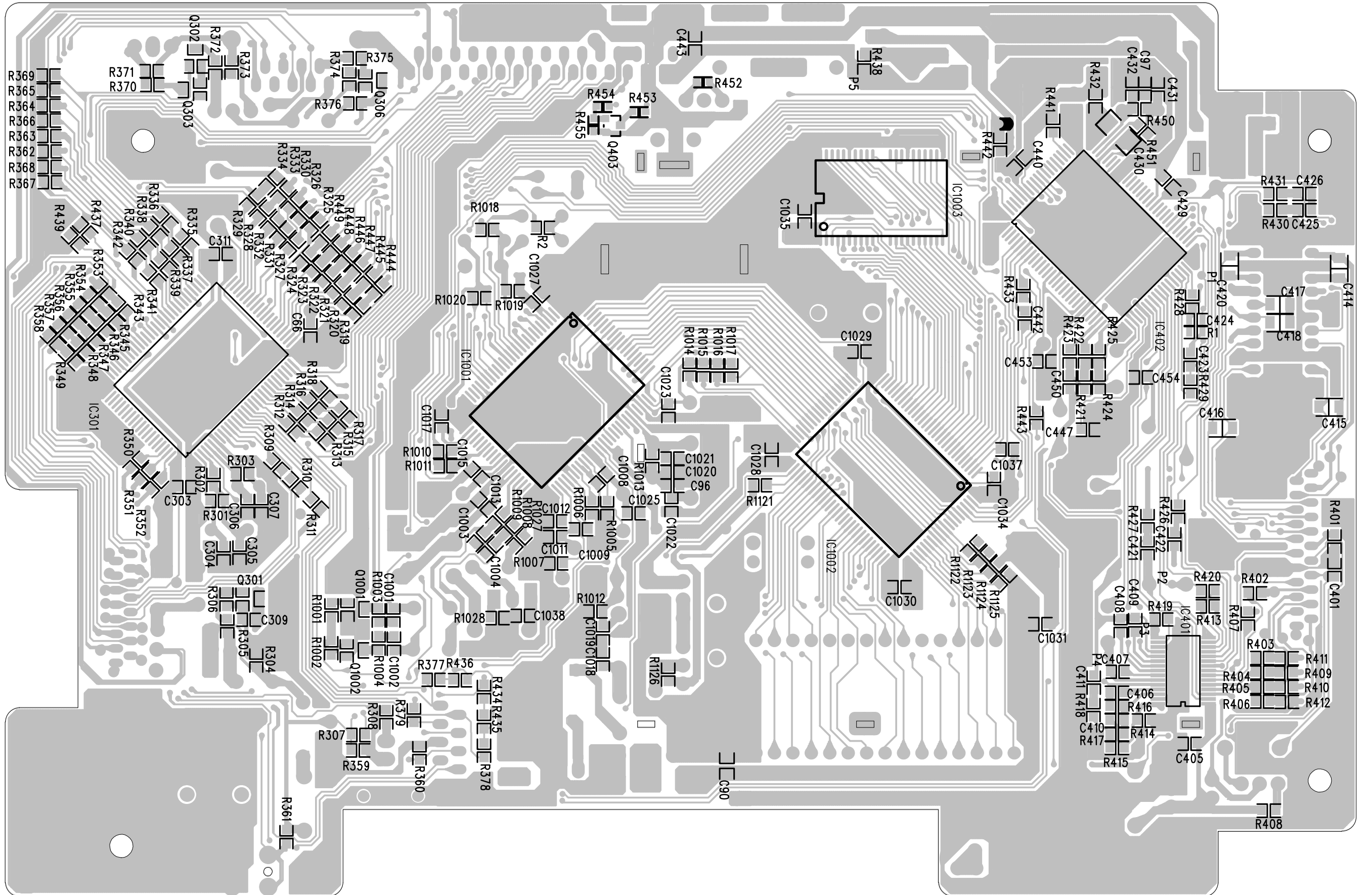
**VIDEO CD PROCESSOR  
ES3210**

**PIN DESCRIPTION (Continued)**

Name	Number	I/O	Definition															
PCLK	44	I/O	Pixel clock qualifier in for screen video interface.															
AUX[7:0]	54:52, 49:45	I/O	Auxiliary control pins (AUX0 and AUX1 are open collectors).															
LD[7:0]	62:55	I/O	RISC interface data bus.															
LWR#	63	O	RISC interface write enable (active low).															
LOE#	64	O	RISC interface output enable (active low).															
LCS[3,1,0]#	65:67	O	RISC interface chip select (active low).															
LA[17:0]	87:82, 79:68	O	RISC interface address bus.															
VPP	81	I	Digital supply voltage for 5V.															
ACLK	88	I/O	Master clock for external audio DAC (8.192 MHz, 11.2896 MHz, 12.288 MHz, 16.9344 MHz, and 18.432 MHz).															
AOUT/ SEL_PLL0	89	O I	Dual-purpose pin. AOUT is the audio interface serial data output Select PLL[0] input. The matrix below lists the available clock frequencies and their respective PLL bit settings.															
<table border="1"> <thead> <tr> <th>SEL_PLL1</th> <th>SEL_PLL0</th> <th>Clock Output</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>Bypass PLL</td> </tr> <tr> <td>0</td> <td>1</td> <td>54.0 MHz</td> </tr> <tr> <td>1</td> <td>0</td> <td>67.5 MHz</td> </tr> <tr> <td>1</td> <td>1</td> <td>81.0 MHz</td> </tr> </tbody> </table>				SEL_PLL1	SEL_PLL0	Clock Output	0	0	Bypass PLL	0	1	54.0 MHz	1	0	67.5 MHz	1	1	81.0 MHz
SEL_PLL1	SEL_PLL0	Clock Output																
0	0	Bypass PLL																
0	1	54.0 MHz																
1	0	67.5 MHz																
1	1	81.0 MHz																
ATCLK	90	I/O	Audio transmit bit clock.															
ATFS	91	O	Audio transmit frame sync.															
SEL_PLL1		I	Refer to the description and matrix for SEL_PLL0 pin 89.															
DOE#	92	O	DRAM output enable (active low).															
AIN	93	I	Audio serial data input.															
ARCLK	94	I	Audio receive bit clock.															
ARFS	95	I	Audio receive frame sync.															
TDMCLK	96	I	TDM interface serial clock.															
TDMDR	97	I	TDM interface serial data receive.															
TDMFS	98	I	TDM interface frame sync.															
CAS#	99	O	DRAM column address strobe bank 0 (active low).															

# LAYOUT DIAGRAM - MCU & CD BOARD

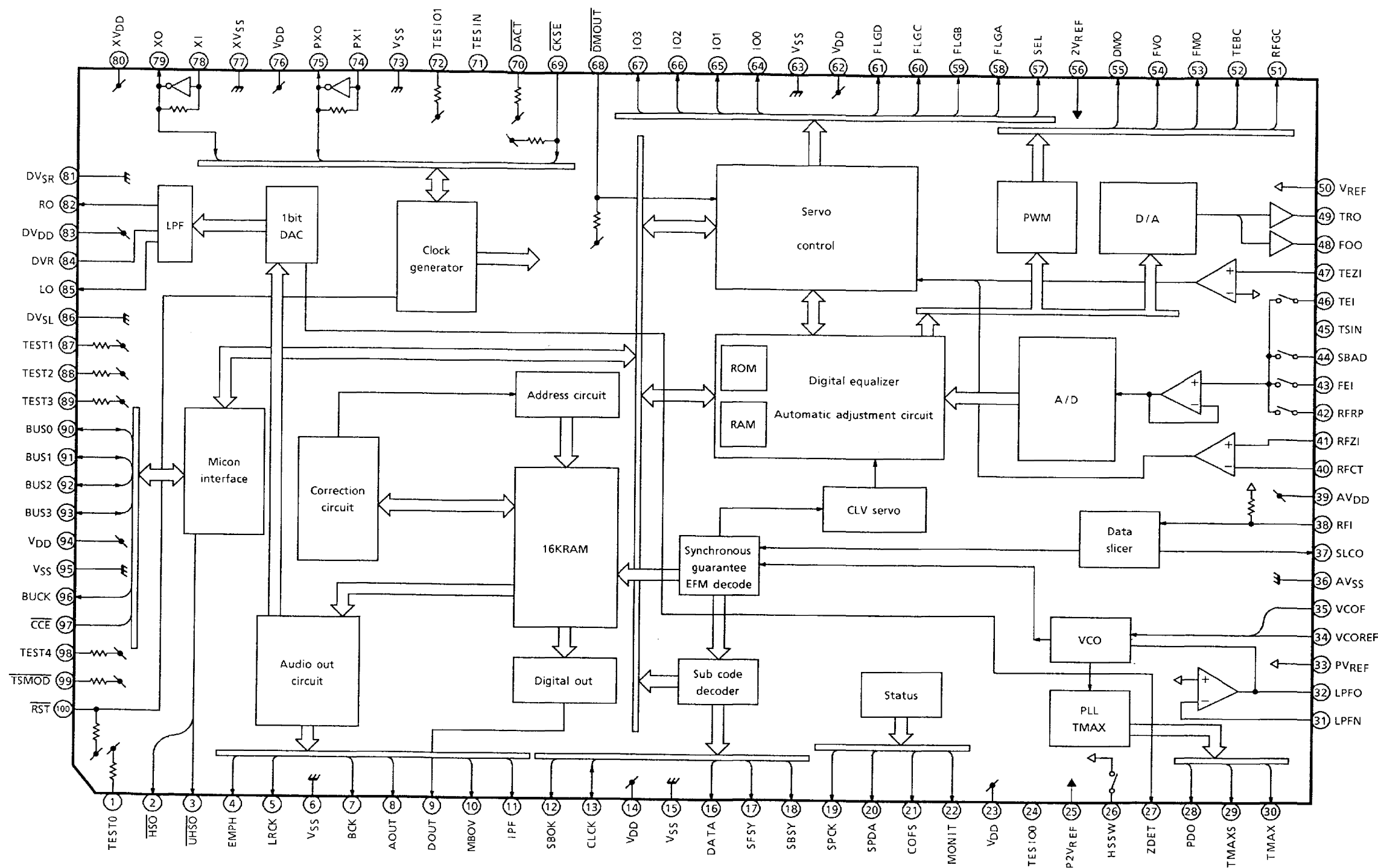
## SMD SIDE



# DIGITAL SERVO PROCESSOR TC9462F

## BLOCK DIAGRAM

BLOCK DIAGRAM (Top view)



**DIGITAL SERVO PROCESSOR  
TC9462F**
**PINS DESCRIPTION**

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS															
1	TEST0	I	Test mode terminal. Normally, keep at open.	With pull-up resistor.															
2	$\overline{\text{HSO}}$	O	Playback speed mode flag output terminal. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th><math>\overline{\text{UHSO}}</math></th> <th><math>\overline{\text{HSO}}</math></th> <th>PLAYBACK SPEED</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>H</td> <td>Normal</td> </tr> <tr> <td>H</td> <td>L</td> <td>2 times</td> </tr> <tr> <td>L</td> <td>H</td> <td>4 times</td> </tr> <tr> <td>L</td> <td>L</td> <td>—</td> </tr> </tbody> </table>	$\overline{\text{UHSO}}$	$\overline{\text{HSO}}$	PLAYBACK SPEED	H	H	Normal	H	L	2 times	L	H	4 times	L	L	—	—
$\overline{\text{UHSO}}$	$\overline{\text{HSO}}$	PLAYBACK SPEED																	
H	H	Normal																	
H	L	2 times																	
L	H	4 times																	
L	L	—																	
3	$\overline{\text{UHSO}}$	O																	
4	EMPH	O	Subcode Q data emphasis flag output terminal. Emphasis ON at "H" level and OFF at "L" level. The output polarity can invert by command.	—															
5	LRCK	O	Channel clock output terminal. (44.1 kHz) L-ch at "L" level and R-ch at "H" level. The output polarity can invert by command.	—															
6	V <sub>SS</sub>	—	Digital GND terminal.	—															
7	BCK	O	Bit clock output terminal. (1.4112 MHz)	—															
8	AOUT	O	Audio data output terminal.	—															
9	DOUT	O	Digital data output terminal.	—															
10	MBOV	O	Buffer memory over signal output terminal. Over at "H" level.	—															
11	IPF	O	Correction flag output terminal. At "H" level, AOUT output is made to correction impossibility by C <sub>2</sub> correction processing.	—															
12	SBOK	O	Subcode Q data CRCC check adjusting result output terminal. The adjusting result is OK at "H" level.	—															
13	CLCK	I/O	Subcode P~W data readout clock input/output terminal. This terminal can select by command bit.	—															
14	V <sub>DD</sub>	—	Digital power supply voltage terminal.	—															
15	V <sub>SS</sub>	—	Digital GND terminal.	—															
16	DATA	O	Subcode P~W data output terminal.	—															
17	SFSY	O	Play-back frame sync signal output terminal.	—															
18	SBSY	O	Subcode block sync signal output terminal.	—															
19	SPCK	O	Processor status signal readout clock output terminal.	—															
20	SPDA	O	Processor status signal output terminal.	—															
21	COFS	O	Correction frame clock output terminal. (7.35 kHz)	—															
22	MONIT	O	Internal signal (DSP internal flag and PLL clock) output terminal. Selected by command. This terminal output the text data with serial by command.	—															

**DIGITAL SERVO PROCESSOR  
TC9462F**
**PINS DESCRIPTION**

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS								
23	V <sub>DD</sub>	—	Digital power supply voltage terminal.	—								
24	TESIO0	I	Test input/output terminal. Normally, keep at "L" level. The terminal that inputted the clock for read of text data by command.	—								
25	P2VREF	—	PLL double reference voltage supply terminal.	—								
26	HSSW	O	2/4 times speed at "VREF" voltage.	2-state output. (P2VREF, HiZ)								
27	ZDET	O	1 bit DA converter zero detect flag output terminal.	—								
28	PDO	O	Phase difference signal output terminal of EFM signal and PLCK signal.	3-state output. (P2VREF, PVREF, V <sub>SS</sub> )								
29	TMAXS	O	TMAX detection result output terminal. Selected by command bit (TMPS).	3-state output. (P2VREF, PVREF, V <sub>SS</sub> )								
30	TMAX	O	TMAX detection result output terminal. Selected by command bit (TMPS). <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>DIFFERENCE RESULT</th> <th>TMAX OUTPUT</th> </tr> </thead> <tbody> <tr> <td>Longer than fixed freq.</td> <td>"P2VREF"</td> </tr> <tr> <td>Shorter than fixed freq.</td> <td>"V<sub>SS</sub>"</td> </tr> <tr> <td>Within the fixed freq.</td> <td>"HiZ"</td> </tr> </tbody> </table>	DIFFERENCE RESULT	TMAX OUTPUT	Longer than fixed freq.	"P2VREF"	Shorter than fixed freq.	"V <sub>SS</sub> "	Within the fixed freq.	"HiZ"	3-state output. (P2VREF, HiZ, V <sub>SS</sub> )
DIFFERENCE RESULT	TMAX OUTPUT											
Longer than fixed freq.	"P2VREF"											
Shorter than fixed freq.	"V <sub>SS</sub> "											
Within the fixed freq.	"HiZ"											
31	LPFN	I	LPF amplifier inverting input terminal for PLL.	Analog input.								
32	LPFO	O	LPF amplifier output terminal for PLL.	Analog output.								
33	PVREF	—	PLL reference voltage supply terminal.	—								
34	VCOREF	I	VCO center frequency reference level terminal. Normally, keep at "PVREF" level.	—								
35	VCOF	O	VCO filter terminal.	Analog output.								
36	AV <sub>SS</sub>	—	Analog GND terminal.	—								
37	SLCO	O	Data slice level output terminal.	Analog output.								
38	RFI	I	RF signal input terminal.	Analog input. (Z <sub>in</sub> : selected by command)								
39	AV <sub>DD</sub>	—	Analog power supply voltage terminal.	—								
40	RFCT	I	RFRP signal center level input terminal.	Analog input. (Z <sub>in</sub> : 50 kΩ)								
41	RFZI	I	RFRP zero cross input terminal.	Analog input.								
42	RFRP	I	RF ripple signal input terminal.	Analog input.								
43	FEI	I	Focus error signal input terminal.	Analog input.								
44	SBAD	I	Sub-beam adder signal input terminal.	Analog input.								
45	TSIN	I	Test input terminal. Normally, keep at "VREF" level.	Analog input.								
46	TEI	I	Tracking error signal input terminal. Take in at tracking servo on.	Analog input.								
47	TEZI	I	Tracking error zero cross input terminal.	Analog input. (Z <sub>in</sub> : 10 kΩ)								



**DIGITAL SERVO PROCESSOR  
TC9462F**
**PINS DESCRIPTION**

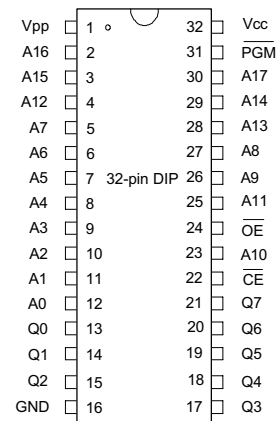
PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
48	FOO	O	Focus servo equalizer output terminal.	Analog output. (2V <sub>REF</sub> ~AV <sub>SS</sub> )
49	TRO	O	Tracking servo equalizer output terminal.	
50	V <sub>REF</sub>	—	Analog reference voltage supply terminal.	—
51	RFGC	O	RF amplitude adjustment control signal output terminal.	3-state PWM signal output. (2V <sub>REF</sub> , V <sub>REF</sub> , V <sub>SS</sub> ) (PWM carrier = 88.2 kHz)
52	TEBC	O	Tracking balance control signal output terminal.	
53	TEBC	O	Feed equalizer output terminal.	
54	TEBC	O	Speed error signal or feed search equalizer output terminal.	
55	DMO	O	Disk equalizer output terminal. (PWM carrier = 88.2 kHz for DSP, Synchronize to PXO)	3-state output. (2V <sub>REF</sub> , V <sub>REF</sub> , V <sub>SS</sub> )
56	2V <sub>REF</sub>	—	Analog double reference voltage supply terminal.	—
57	SEL	O	APC circuit ON/OFF indication signal output terminal. At the laser on time, UHF = L at "HiZ" level and UHF = H at "H" level.	—
58	FLGA	O	External flag output terminal for internal signal. Can select signal from TEZC, FOON, FOK and RFZC by command.	—
59	FLGB	O	External flag output terminal for internal signal. Can select signal from DFCT, FOON, FMON and RFZC by command.	—
60	FLGC	O	External flag output terminal for internal signal. Can select signal from TRON, TRSR, FOK and SRCH by command.	—
61	FLGD	O	External flag output terminal for internal signal. Can select signal from TRON, DMON, HYS and SHC by command.	—
62	V <sub>DD</sub>	—	Digital power supply voltage terminal.	—
63	V <sub>SS</sub>	—	Digital GND terminal.	—
64	IO0	I/O	General I/O terminal. Can change over input port or output port by command. At the input mode time can readout a state of terminal (H/L) by read command. At the output mode time can control a state of terminal (H/L/HiZ) by command.	—
65	IO1			
66	IO2			
67	IO3			
68	DMOUT	I	This terminal controls IO0~IO3 terminal. At "L" level time, IO0, 1 out feed equalizer signal of 2-state PWM, IO2, 3 out disk equalizer signal of 2-state PWM.	With pull-up resistor.
69	CKSE	I	Normally, keep at open.	With pull-up resistor.
70	DACT	I	DAC test mode terminal. Normally, keep at open.	With pull-up resistor.
71	TESIN	I	Test input terminal. Normally, keep at "L" level.	Analog input.

**DIGITAL SERVO PROCESSOR  
TC9462F**
**PINS DESCRIPTION**

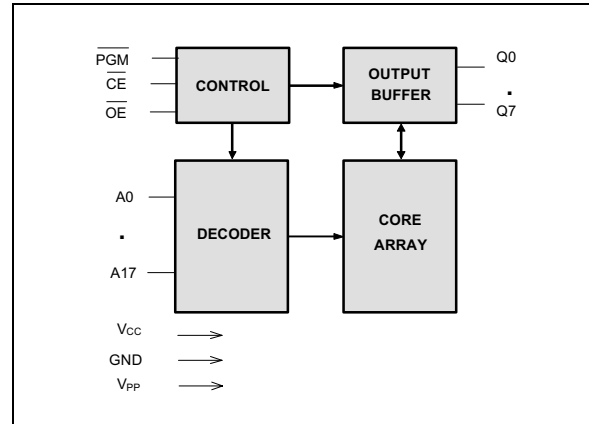
PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
72	TESIO1	I	Test input/output terminal. Normally, keep at "L" level.	Analog input.
73	V <sub>SS</sub>	—	Digital GND terminal.	—
74	PXI	I	Crystal oscillator connecting input terminal for DSP. Normally, keep at "L" level.	—
75	PXO	O	Crystal oscillator connecting output terminal for DSP.	
76	V <sub>DD</sub>	—	Digital power supply voltage terminal.	—
77	XV <sub>SS</sub>	—	Oscillator GND terminal for system clock.	—
78	XI	I	Crystal oscillator connecting input terminal for system clock.	—
79	XO	O	Crystal oscillator connecting output terminal for system clock.	—
80	XV <sub>DD</sub>	—	Oscillator power supply voltage terminal for system clock.	—
81	DV <sub>SR</sub>	—	Analog GND terminal for DA converter. (R-ch)	—
82	RO	O	R channel data forward output terminal.	—
83	DV <sub>DD</sub>	—	Analog supply voltage terminal for DA converter.	—
84	DVR	—	Reference voltage terminal for DA converter.	—
85	LO	O	L channel data forward output terminal.	—
86	DV <sub>SL</sub>	—	Analog GND terminal for DA converter. (L-ch)	—
87	TEST1	I	Test mode terminal. Normal, keep at open.	With pull-up resistor.
88	TEST2	I	Test mode terminal. Normal, keep at open.	With pull-up resistor.
89	TEST3	I	Test mode terminal. Normal, keep at open.	With pull-up resistor.
90	BUS0	I/O	Micon interface data input/output terminal.	Schmit input. With pull-up resistor.
91	BUS1	I/O		
92	BUS2	I/O		
93	BUS3	I/O		
94	V <sub>DD</sub>	—	Digital power supply voltage terminal.	—
95	V <sub>SS</sub>	—	Digital GND terminal.	—
96	BUCK	I	Micon interface clock input terminal.	Schmit input.
97	$\overline{CCE}$	I	Command and data sending/receiving chip enable signal input terminal. The bus line becomes active at "L" level.	Schmit input.
98	TEST4	I	Test mode terminal. Normal, keep at open.	With pull-up resistor.
99	$\overline{TSMOD}$	I	Local test mode selection terminal.	With pull-up resistor.
100	$\overline{RST}$	I	Reset signal input terminal. Reset at "L" level.	With pull-up resistor.

**E2PROM  
W27C020**

**PIN CONFIGURATIONS**



**BLOCK DIAGRAM**

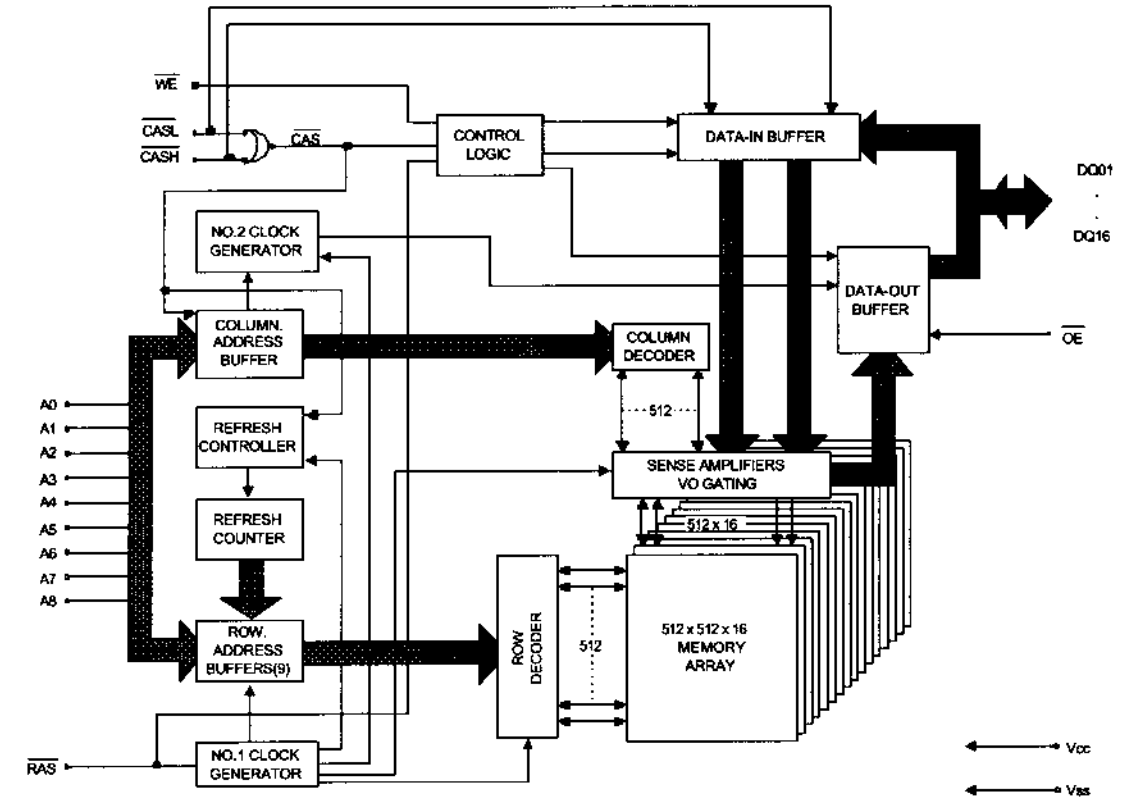


**PIN DESCRIPTION**

SYMBOL	DESCRIPTION
A0-A17	Address Inputs
Q0-Q7	Data Inputs/Outputs
$\overline{CE}$	Chip Enable
$\overline{OE}$	Output Enable
PGM	Program Enable
VPP	Program/Erase Supply Voltage
VCC	Power Supply
GND	Ground

**DRAM  
T224162B28S**

**FUNCTIONAL BLOCK DIAGRAM**

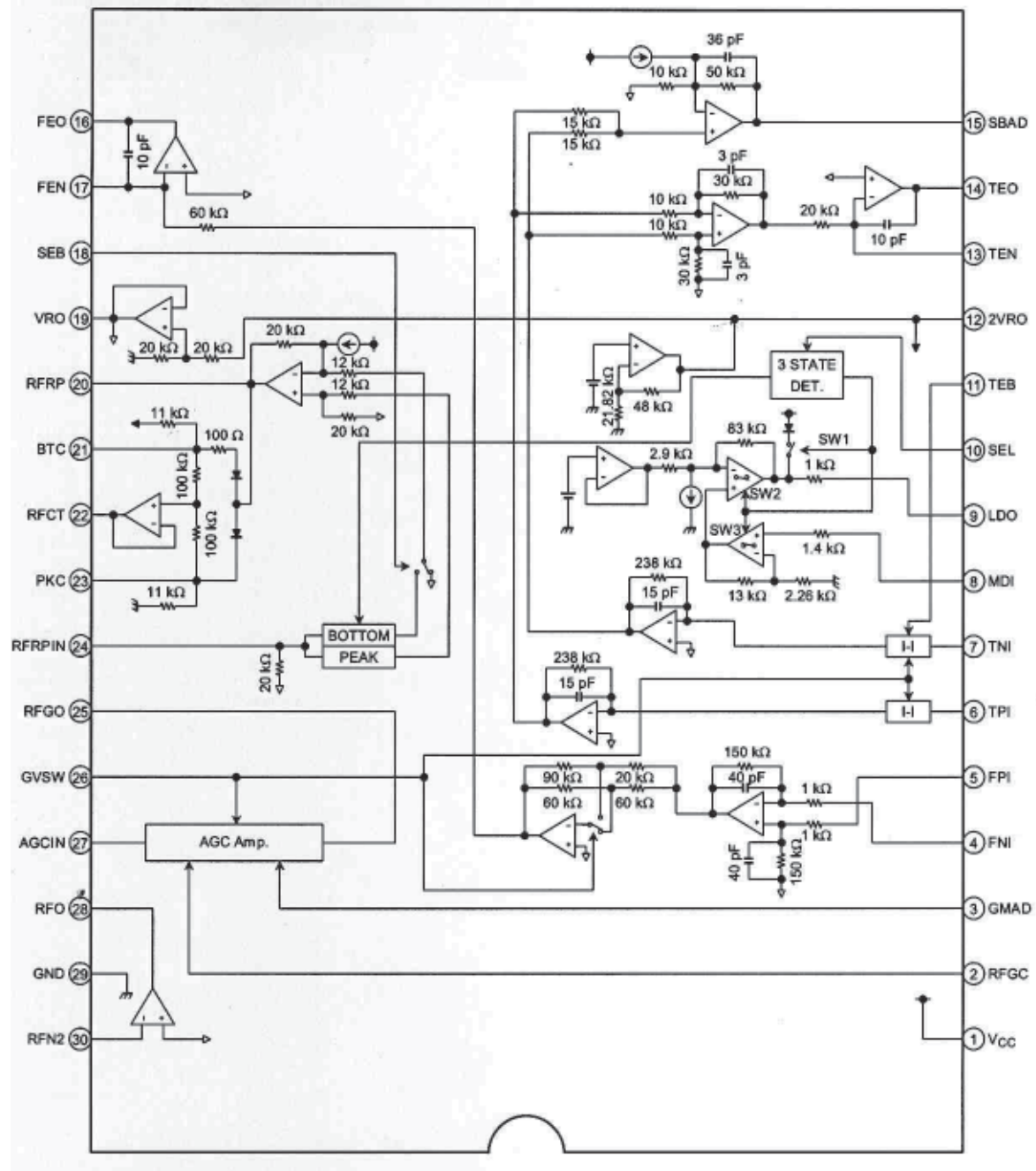


**PIN DESCRIPTIONS**

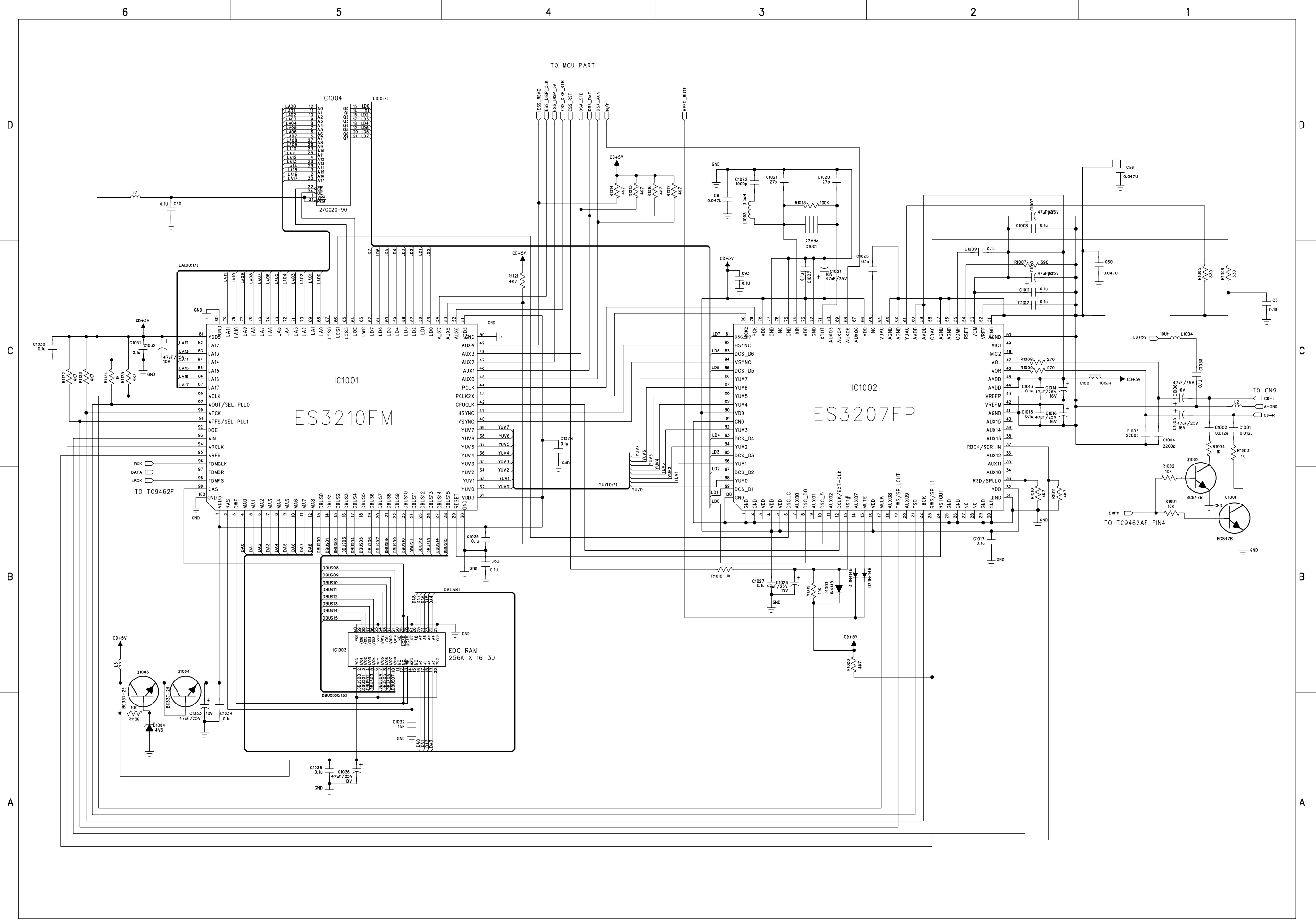
PIN NO.	SYM.	TYPE	DESCRIPTION
16~19,22~26	A0-A8	Input	Address Input
14	$\overline{RAS}$	Input	Row Address Strobe
28	$\overline{CASH}$	Input	Column Address Strobe /Upper Byte Control
29	$\overline{CASL}$	Input	Column Address Strobe /Lower Byte Control
13	$\overline{WE}$	Input	Write Enable
27	$\overline{OE}$	Input	Output Enable
2~5,6~10,31~34,36~39	I/O1 - I/O16	Input/ Output	Data Input/ Output
1,6,20	Vcc	Supply	Power, 5V
21,35,40	Vss	Ground	Ground
11,12,15,30	NC	-	No Connect

# MICROPROCESSOR TA2153FN

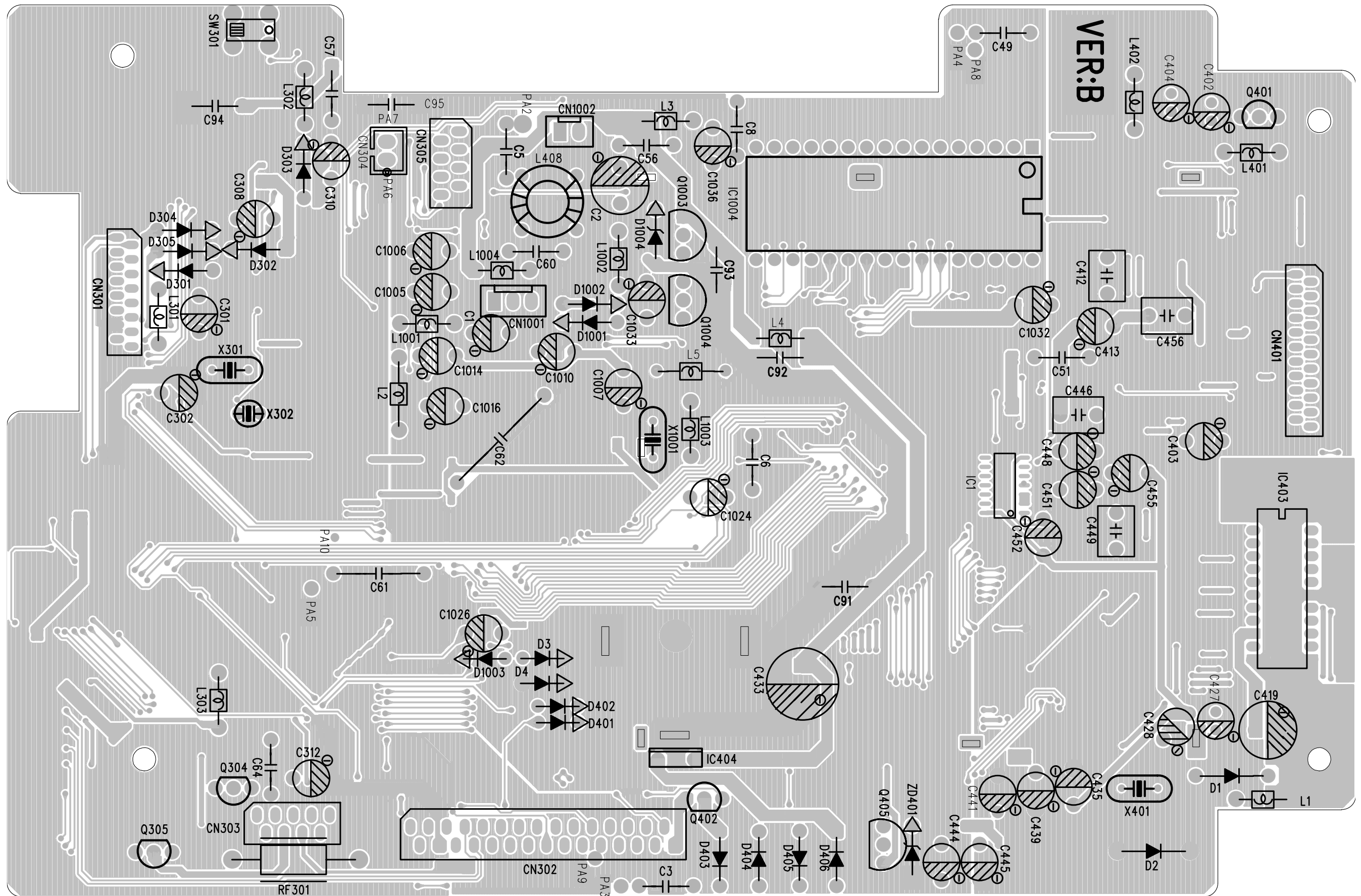
## BLOCK DIAGRAM



# CIRCUIT DIAGRAM - MCU & CD BOARD



LAYOUT DIAGRAM - MCU & CD BOARD  
COMPONENT SIDE





**ELECTRICAL PARTSLIST - CD MCU BOARD****- MISCELLANEOUS -**

CN301 9965 000 18230 CONN 16P H P=1.0  
 CN302 9965 000 18232 CONN 30P P=1.25 V  
 CN303 9965 000 18273 CONN 9P  
 CN401 9965 000 18274 CONN 22P  
 PA7 9965 000 14709 TERMINAL PIN

SW301 9965 000 18285 SWITCH SIDE SPVF130100

**- RESISTORS -**

RF301  $\Delta$  9965 000 14537 1/2W 1 $\Omega$

**- COILS & FILTERS -**

L1001 9965 000 19740 FIXED IND 100 $\mu$ H TP=52MM  
 L1002 9965 000 19760 FIXED IND 2.4 $\mu$ H (K)  
 L1003 9965 000 19761 FIXED IND 3.3 $\mu$ H CECS  
 L1004 9965 000 19762 FIXED IND 10 $\mu$ H  
 L2 9965 000 14721 FILTER EMI BL01 RN1  
 L3 9965 000 14721 FILTER EMI BL01 RN1  
 L301 9965 000 19740 FIXED IND 100 $\mu$ H TP=52MM  
 L302 9965 000 19740 FIXED IND 100 $\mu$ H TP=52MM  
 L303 9965 000 19740 FIXED IND 100 $\mu$ H TP=52MM  
 L4 9965 000 14721 FILTER EMI BL01 RN1  
 L401 9965 000 19762 FIXED IND 10 $\mu$ H  
 L402 9965 000 19763 FIXED IND 47 $\mu$ H (K) T26  
 L5 9965 000 14721 FILTER EMI BL01 RN1  
 X1001 9965 000 19764 XTAL 27MHZ  
 X301 9965 000 18282 CRYSTAL 7.3728 MHZ  
 X302 9965 000 18283 CRYSTAL 32.768KHZ  
 X401 9965 000 19766 XTAL 16.93MHZ

**- DIODES -**

D1 4822 130 31878 1N4003G  
 D1001 4822 130 30621 1N4148  
 D1002 4822 130 30621 1N4148  
 D1003 4822 130 30621 1N4148  
 D1004 4822 130 31554 BZX79-B4V3

D2 4822 130 31878 1N4003G  
 D3 4822 130 30621 1N4148  
 D301 4822 130 30621 1N4148  
 D302 4822 130 30621 1N4148  
 D303 4822 130 30621 1N4148

D305 4822 130 30621 1N4148  
 D4 4822 130 30621 1N4148  
 D401 4822 130 30621 1N4148  
 D402 4822 130 30621 1N4148  
 D403 4822 130 83883 FR202

D404 4822 130 83883 FR202  
 D405 4822 130 83883 FR202

**- DIODES -**

D406 4822 130 83883 FR202  
 ZD401 4822 130 83206 BZX79-B5V6

**- IC & TRANSISTORS -**

IC1001 9965 000 19731 IC ES320TFP  
 IC1002 9965 000 19732 IC ES3210FM  
 IC1003 9965 000 19734 IC T224162B-28S  
 IC1004 9965 000 14729 E2PROM W27C020  
 IC301 9965 000 18275 IC MCU TMP87EP26F4K76

IC401 9322 171 88668 IC SM TA2153FN  
 IC402 9965 000 18276 IC TC9462F  
 IC403 9965 000 18277 IC TA2092N  
 IC404 4822 209 80817 L7805CV  
 Q1001 5322 130 60159 BC846B

Q1002 5322 130 60159 BC846B  
 Q1003 4822 130 40981 BC337-25  
 Q1004 4822 130 40981 BC337-25  
 Q301 5322 130 60159 BC846B  
 Q302 5322 130 60159 BC846B

Q303 5322 130 60159 BC846B  
 Q304 5322 130 44593 BC369  
 Q305 5322 130 44593 BC369  
 Q306 4822 130 60373 BC856B  
 Q401 4822 130 44568 BC557B

Q402 5322 130 44593 BC369  
 Q403 5322 130 60159 BC846B  
 Q405 4822 130 40981 BC337-25

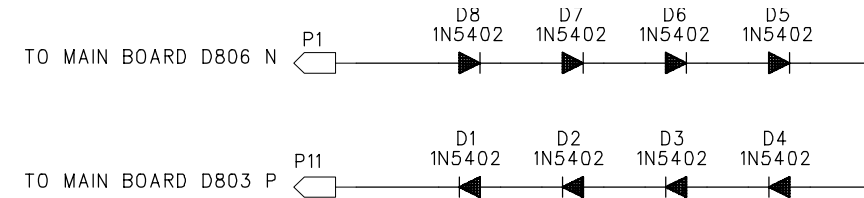
**Note: Only these parts mentioned in the list are normal service parts.**

# DIODE & CONNECTION BOARDS

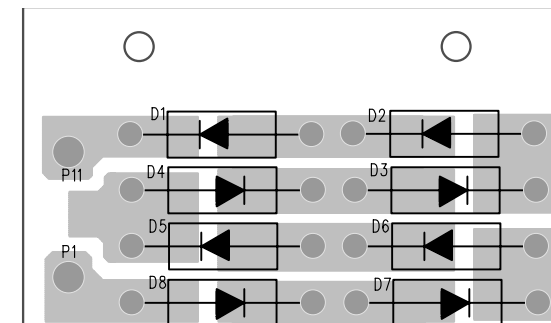
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 Diode Board - Layout Diagram..... 9-1  
 Conn. Board - Circuit Diagram ..... 9-2  
 Conn. Board - Layout Diagram..... 9-3  
 Electrical Parts List..... 9-4

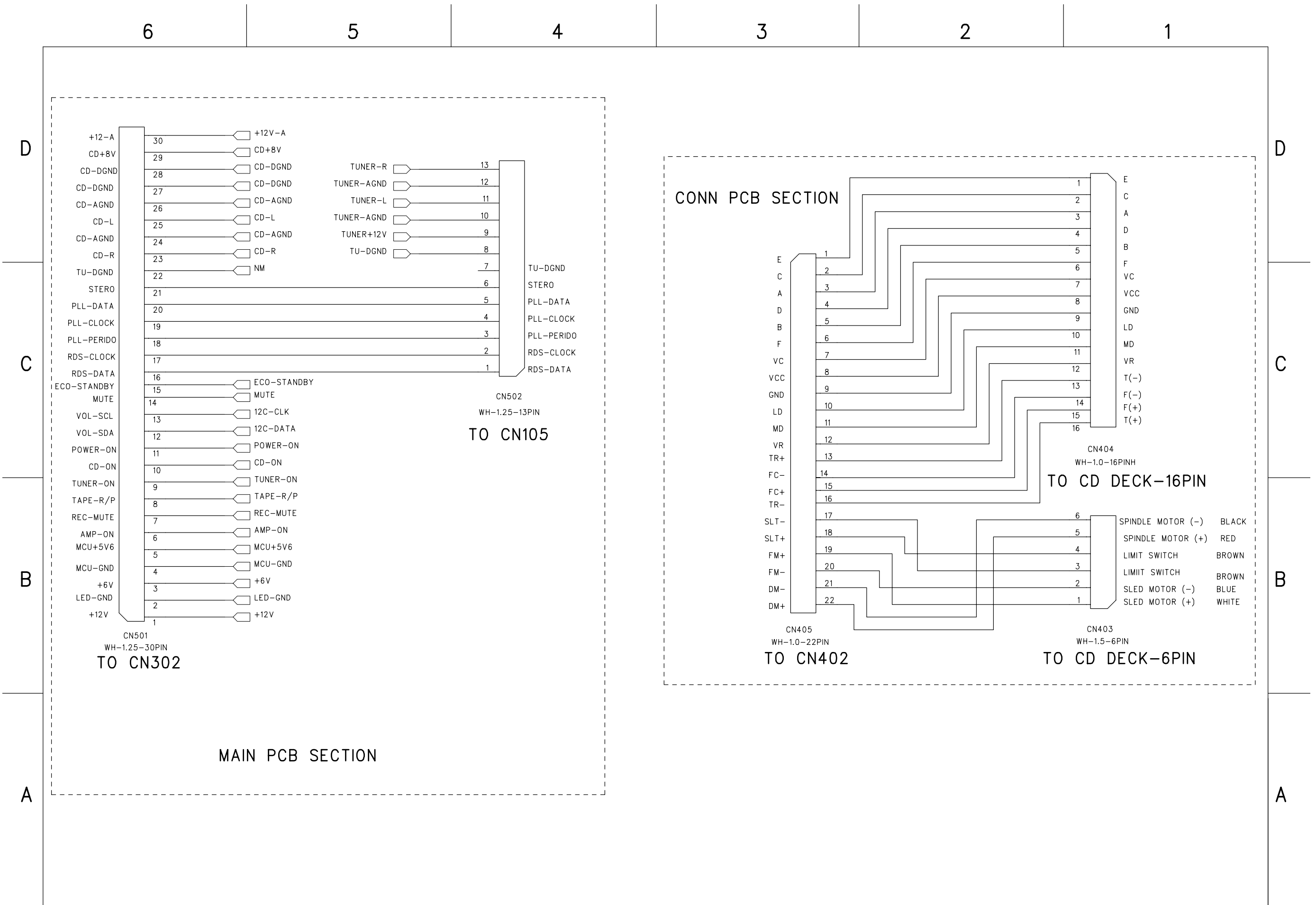
## DIODE PCB CIRCUIT DIAGRAM



## DIODE PCB LAYOUT DIAGRAM

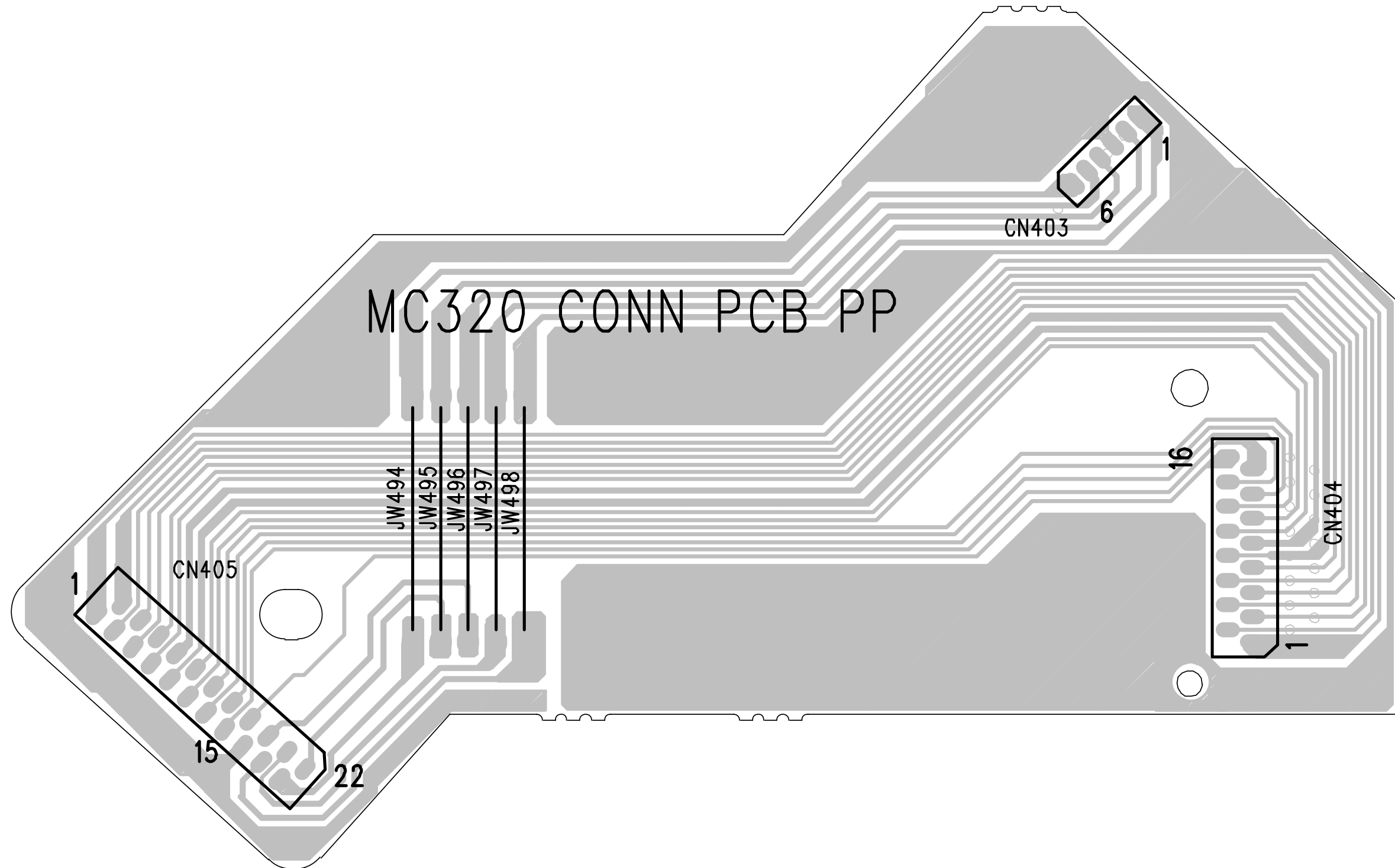


# CONNECTION PCB CIRCUIT DIAGRAM





# CONNECTION PCB LAYOUT DIAGRAM



**ELECTRICAL PARTSLIST - DIODE BOARD****- DIODES -**

D1	9965 000 19770	DIODE 1N5402GW F20
D2	9965 000 19770	DIODE 1N5402GW F20
D3	9965 000 19770	DIODE 1N5402GW F20
D4	9965 000 19770	DIODE 1N5402GW F20
D5	9965 000 19770	DIODE 1N5402GW F20
D6	9965 000 19770	DIODE 1N5402GW F20
D7	9965 000 19770	DIODE 1N5402GW F20
D8	9965 000 19770	DIODE 1N5402GW F20

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

**ELECTRICAL PARTSLIST - CONNECTION BOARD****- MISCELLANEOUS -**

CN403	9965 000 18229	CONN P=1.5 H 6PIN
CN404	9965 000 18230	CONN 16P H P=1.0
CN405	9965 000 18231	CONN 22P P=1.0 H

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

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# MAIN BOARD

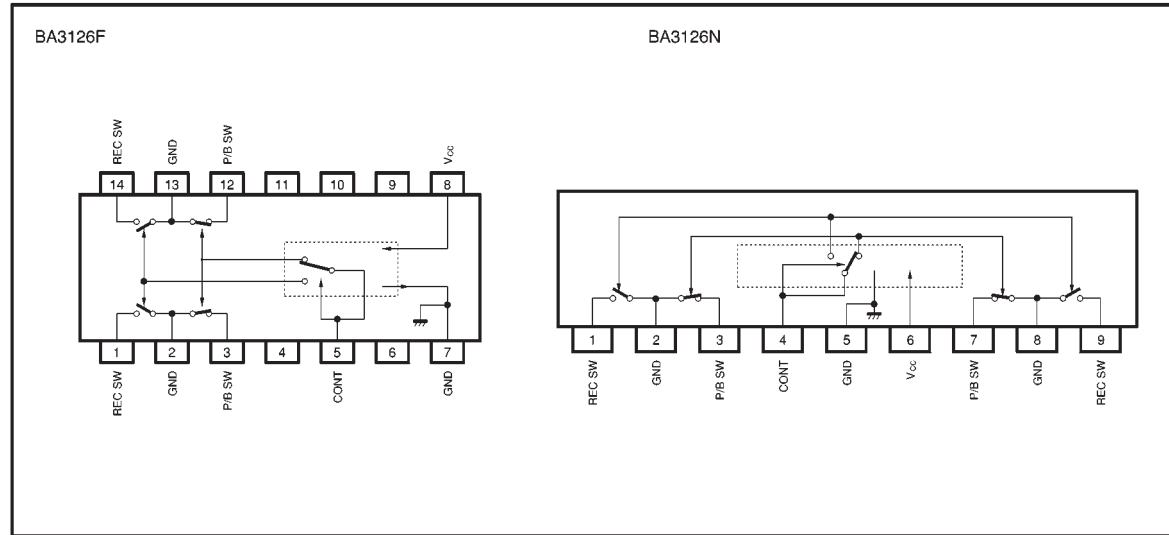
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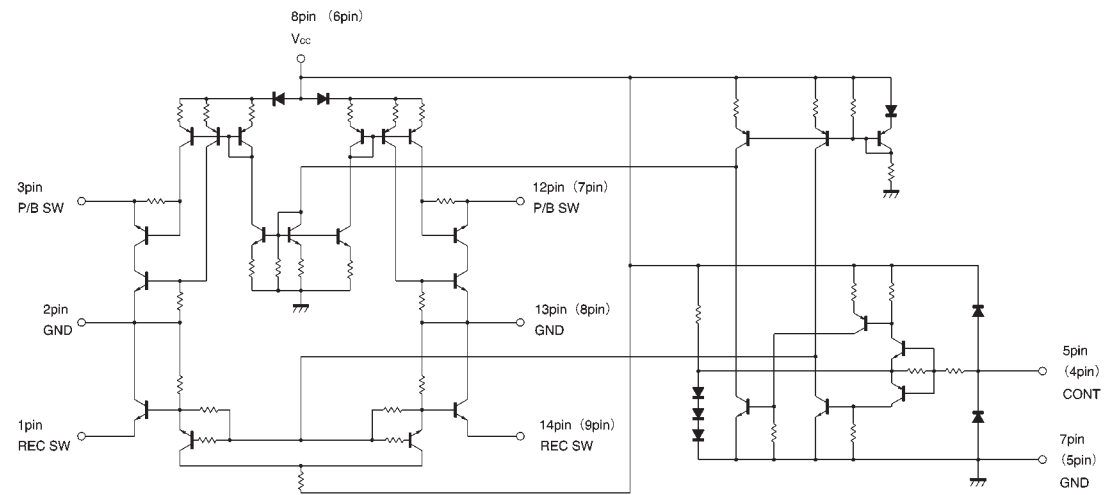
IC Block Diagram.....	10-2 to 10-3
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Circuit Diagram - Tape Part.....	10-5
Component Layout - Main PCB.....	10-6
SMD Layout - Main PCB.....	10-7
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**TAPE HEAD SWITCHING IC  
BA3126N**

Block diagram



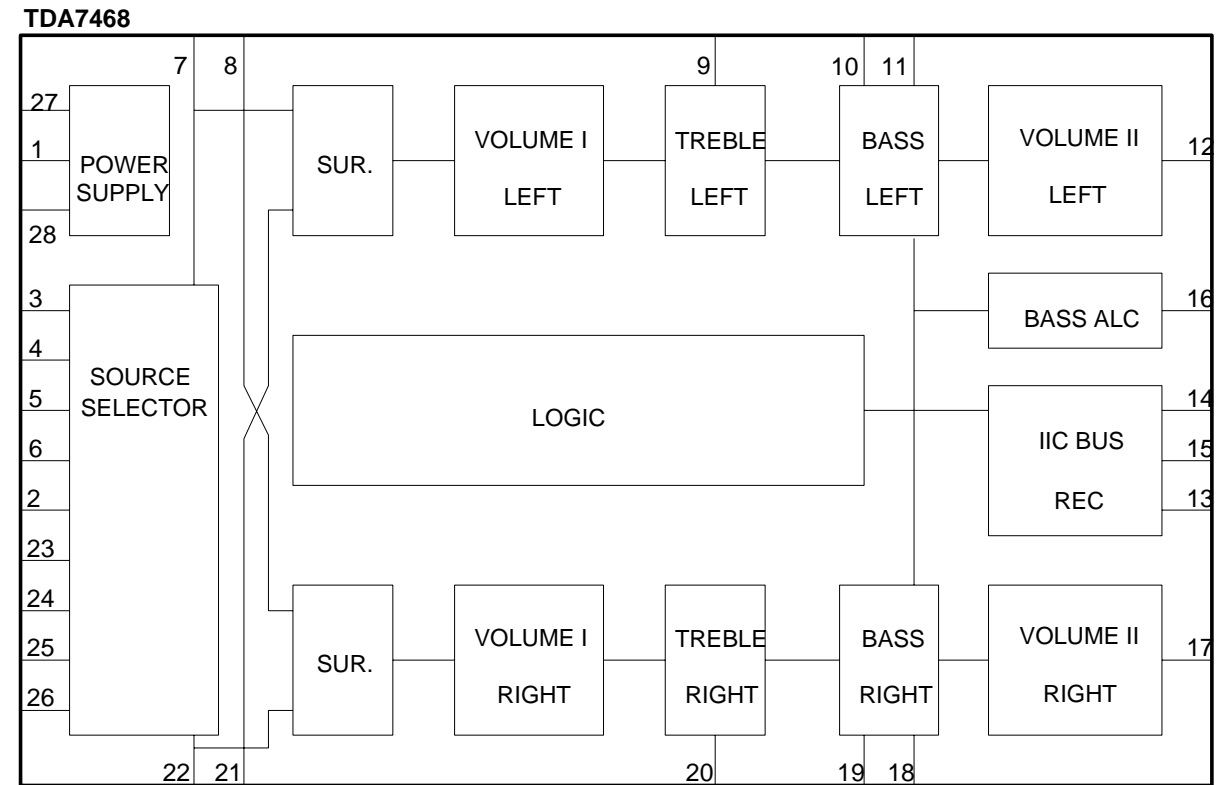
Internal circuit diagram



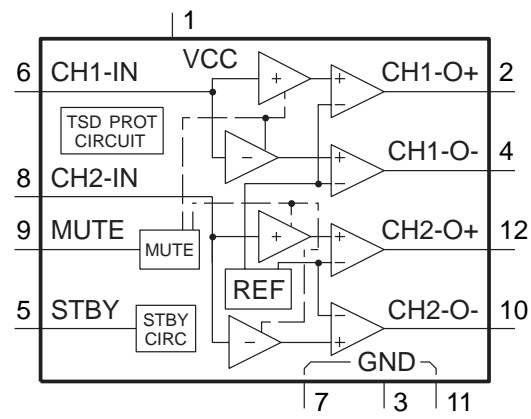
Pin numbers for the BA3126F (BA3126N pin numbers are in brackets).

**IC BLOCK DIAGRAM  
TDA7468**

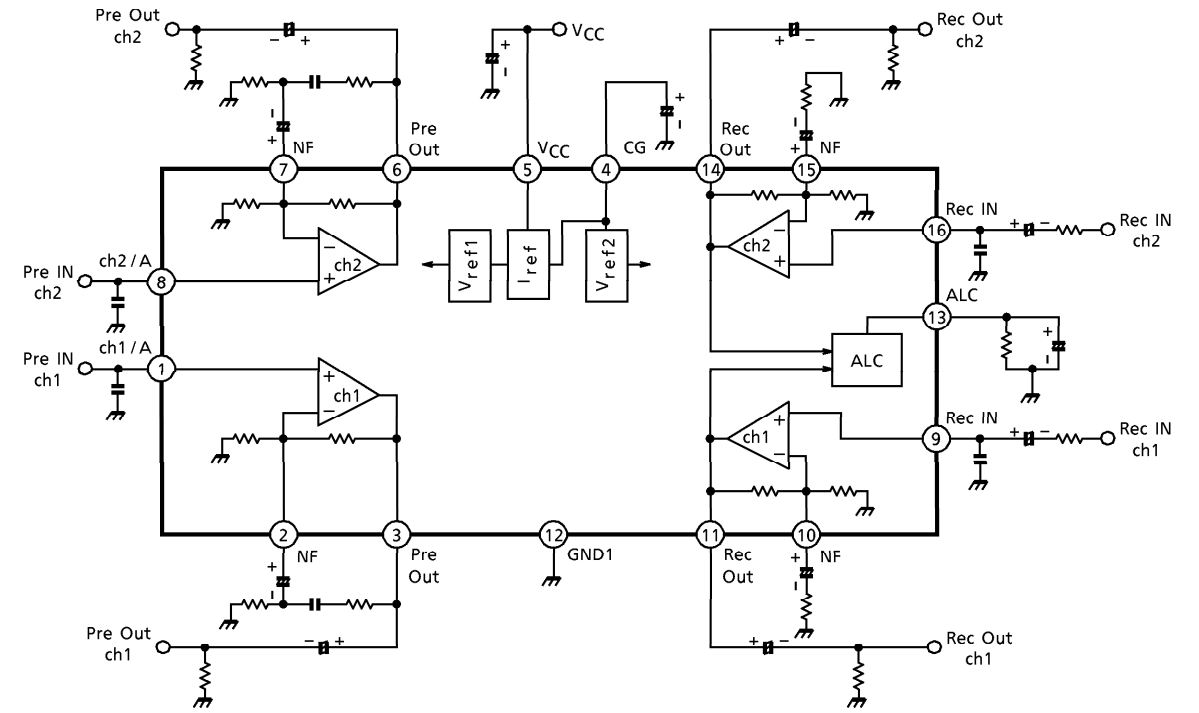
**TDA7468 INTERNAL BLOCK DIAGRAM**



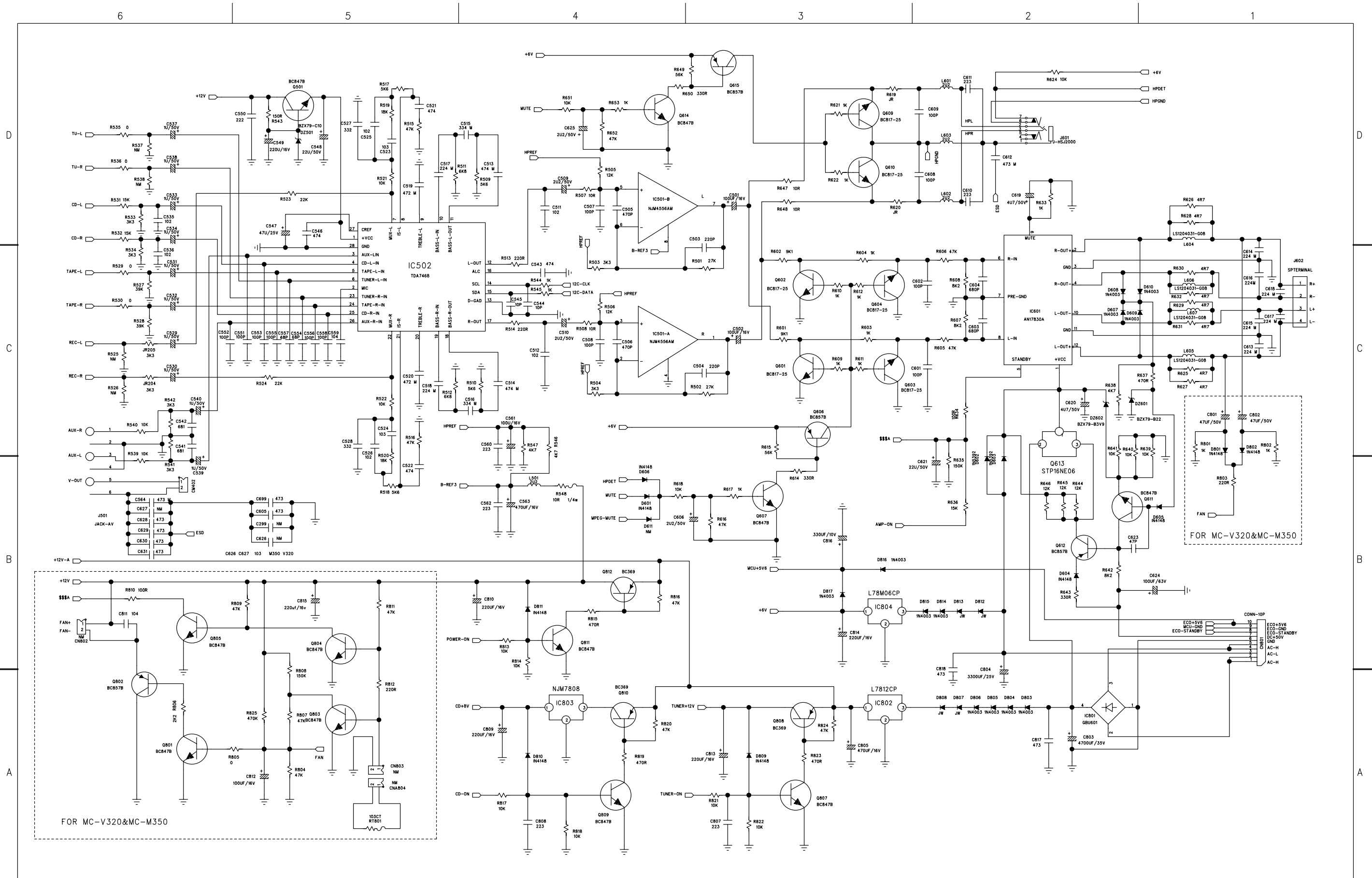
IC BLOCK DIAGRAM  
AN17830A



IC BLOCK DIAGRAM  
TA8142AP

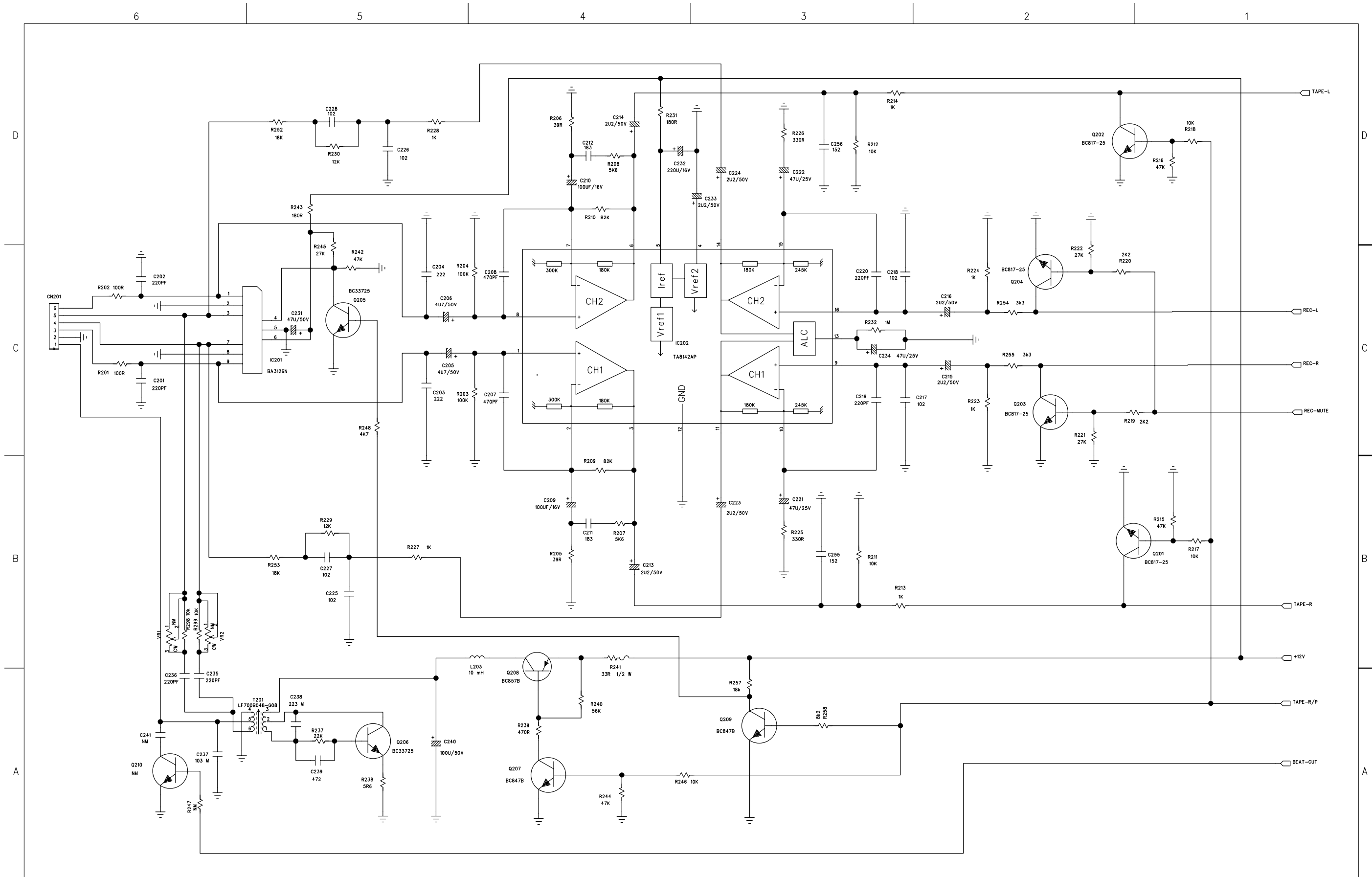


# MAIN BOARD - CIRCUIT DIAGRAM



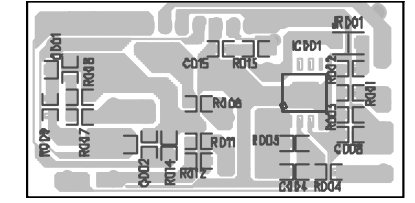
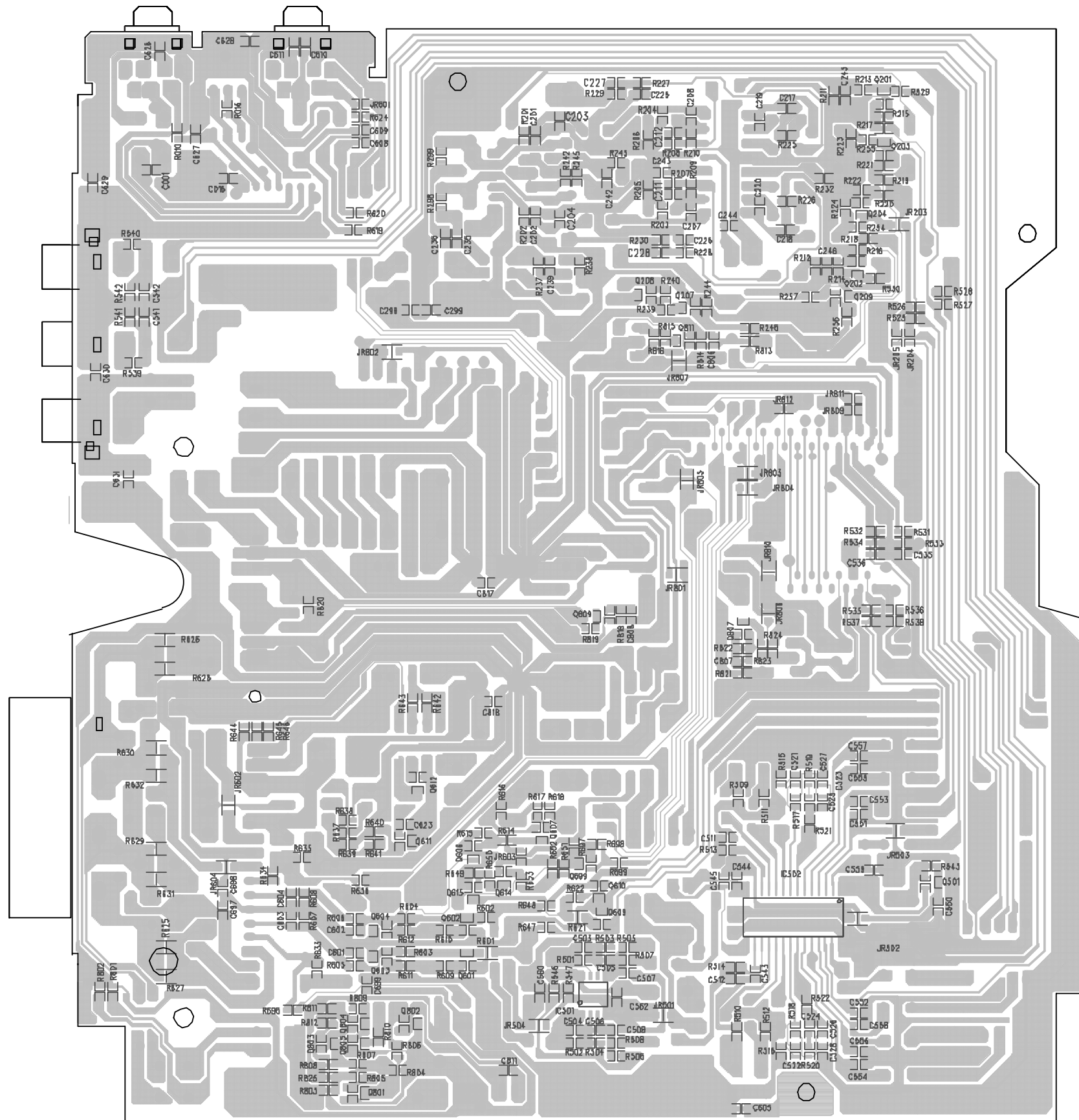


# TAPE PART - CIRCUIT DIAGRAM





# MAIN PCB - SMD LAYOUT



**ELECTRICAL PARTSLIST - MAIN BOARD****- MISCELLANEOUS -**

CN201	9965 000 14509	CON BASE 6P
CN403	9965 000 18229	CONN P=1.5 H 6PIN
CN404	9965 000 18230	CONN 16P H P=1.0
CN405	9965 000 18231	CONN 22P P=1.0 H
CN501	9965 000 18232	CONN 30P P=1.25 V
CN502	9965 000 18233	CONN 13P P=1.25 V
CN801	9965 000 18234	WIRE ASS' Y 10RL170MM
CN802	9965 000 19716	CONNECTOR BASE 2P
CN803	9965 000 19717	WIRE ASS' Y 2PIN L=250MM
CN806	9965 000 19718	CONNECTOR 2P PH-2A

J 501	9965 000 18238	JACK-AV 2 MC-320
J 601	9965 000 19719	HEAD PHONE JACK 3.5MM
J 602	9965 000 18239	SPKTERMINAL 4P 94V0
ZA1	9965 000 14709	TERMINAL PIN

**- RESISTORS -**

R241	△ 9965 000 18241	FUSE RESISTOR 33Ω 1/2W
R548	△ 9965 000 18242	FUSE RES NFR 25 A 10Ω
RT801	△ 9965 000 19722	NTC RES 10KΩ

**- COILS & FILTERS -**

L203	9965 000 18240	FIXED IND 10MH
L501	9965 000 19720	FIXED IND 2.2μH K CECS
L601	9965 000 19720	FIXED IND 2.2μH K CECS
L602	9965 000 19720	FIXED IND 2.2μH K CECS
L603	9965 000 19720	FIXED IND 2.2μH K CECS
L604	9965 000 19721	SPRING COIL 1.0μH K 4.0±1.0
L605	9965 000 19721	SPRING COIL 1.0μH K 4.0±1.0
L606	9965 000 19721	SPRING COIL 1.0μH K 4.0±1.0
L607	9965 000 19721	SPRING COIL 1.0μH K 4.0±1.0
T201	9965 000 18243	OSC 85KHZ COIL

**- DIODES -**

D601	4822 130 30621	1N4148
D602	4822 130 31878	1N4003G
D603	4822 130 31878	1N4003G
D604	4822 130 30621	1N4148
D605	4822 130 30621	1N4148
D606	4822 130 30621	1N4148
D607	4822 130 31878	1N4003G
D608	4822 130 31878	1N4003G
D609	4822 130 31878	1N4003G
D610	4822 130 31878	1N4003G
D801	4822 130 30621	1N4148
D802	4822 130 30621	1N4148
D809	4822 130 30621	1N4148
D810	4822 130 30621	1N4148
D811	4822 130 30621	1N4148

**- DIODES -**

D814	4822 130 31878	1N4003G
D815	4822 130 31878	1N4003G
D816	4822 130 31878	1N4003G
D817	4822 130 31878	1N4003G
DZ501	4822 130 61219	BZX79-B10
DZ601	4822 130 34441	BZX79-B22
DZ602	4822 130 31981	BZX79-B3V9

**- IC & TRANSISTORS -**

IC201	4822 209 30188	BA3126N
IC202	4822 209 32082	TA8142AP
IC501	5322 209 15853	NJ M4556AM
IC502	9322 150 74668	IC SM TDA7468D (ST00) R
IC601	9322 174 32682	IC AN17830A (MATJ) B

IC801	9965 000 18236	IC GBU601
IC802	4822 209 81726	MC7812CT
IC803	4822 209 33083	L7808CV
IC804	4822 209 61533	NJ M7806A
Q201	4822 130 42804	BC817-25

Q202	4822 130 42804	BC817-25
Q203	4822 130 42804	BC817-25
Q204	4822 130 42804	BC817-25
Q205	4822 130 40981	BC337-25
Q206	4822 130 40981	BC337-25

Q207	5322 130 60159	BC846B
Q208	4822 130 60373	BC856B
Q209	5322 130 60159	BC846B
Q501	5322 130 60159	BC846B
Q601	4822 130 42804	BC817-25
Q602	4822 130 42804	BC817-25
Q603	4822 130 42804	BC817-25
Q604	4822 130 42804	BC817-25
Q606	4822 130 60373	BC856B
Q607	5322 130 60159	BC846B

Q609	4822 130 42804	BC817-25
Q610	4822 130 42804	BC817-25
Q611	5322 130 60159	BC846B
Q612	4822 130 60373	BC856B
Q613	4822 130 11336	STP16NE06FP

Q614	5322 130 60159	BC846B
Q615	4822 130 60373	BC856B
Q699	5322 130 60159	BC846B
Q801	5322 130 60159	BC846B
Q802	4822 130 60373	BC856B

Q803	5322 130 60159	BC846B
Q804	5322 130 60159	BC846B
Q805	5322 130 60159	BC846B
Q807	5322 130 60159	BC846B
Q808	5322 130 44593	BC369

**ELECTRICAL PARTSLIST - MAIN BOARD****- IC & TRANSISTORS -**

Q809	5322 130 60159	BC846B
Q810	5322 130 44593	BC369
Q811	5322 130 60159	BC846B
Q812	5322 130 44593	BC369

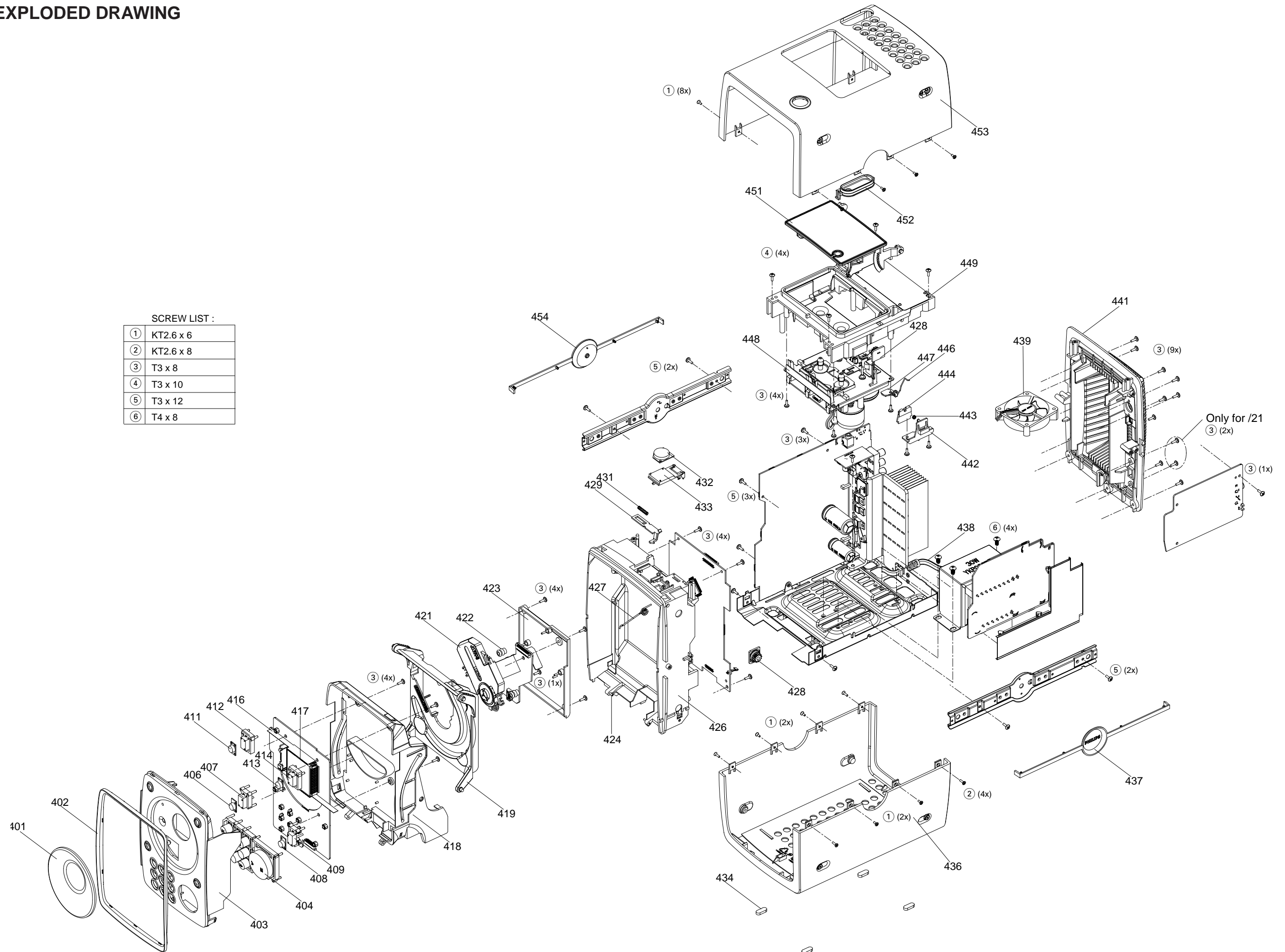
**Note:** Only these parts mentioned in the list are normal service parts.



EXPLODED DRAWING

SCREW LIST :

①	KT2.6 x 6
②	KT2.6 x 8
③	T3 x 8
④	T3 x 10
⑤	T3 x 12
⑥	T4 x 8



**MECHANICAL & ACCESSORIES PARTSLIST**

401	9965 000 19710	CD DOOR LENS /21	4822 303 50082	AM LOOP ANTENNA
401	9965 000 19752	CD DOOR LENS /22/25	9965 000 11157	FM ANTENNA WIRE
402	9965 000 18185	CD CHROME RING	9965 000 19712	IFU MC-M350/21
402	9965 000 19702	CD DOOR PANAL /21	9965 000 19755	IFU MC-M350/22/25
403	9965 000 19751	CD DOOR PANEL /22/25	9965 000 19714	SPK BOX MC-350 30W
404	9965 000 19703	KEY SET FUNCTION	9965 000 19715	REMOTE CONTROL MC-M350
406	9965 000 18194	KEY DISPLAY CAP	9965 000 18224	FFC 9P L=250MM P=1.25
407	9965 000 18203	KEY DISPLAY BRACKET	9965 000 18225	FFC 13P L=200MM P=1.25
408	9965 000 18196	KEY REC CAP	9965 000 18226	FFC P=1.0 L=115MM
409	9965 000 18205	KEY REC BRACKET	9965 000 18227	FFC 22P L=90MM P=1.0
411	9965 000 19704	KEY POWER CAP	9965 000 18228	FFC 30P L=150MM P=1.25
412	9965 000 18202	KEY POWER BRACKET	△ 9965 000 18217	AC CONVERSION /21
413	9965 000 19705	KEY IR CAP		
414	9965 000 18204	KEY IR BRACKET		
416	9965 000 18255	REFLECT LIGHT GUIDE		
417	9965 000 18256	LCD LIGHT GUIDE		
418	9965 000 18177	CD DOOR		
419	9965 000 18188	CD TRAY		
421	9965 000 18220	CD DECK DA23Z		
422	9965 000 18212	DMPR MECHA (SP)		
423	9965 000 18189	CD TRAY COVER		
424	9965 000 18213	CD DOOR SHAFT		
426	9965 000 18180	CD BRACKET		
427	9965 000 18216	CD TRAY SPRING		
428	4822 529 10322	DAMPER ASSY		
429	9965 000 18198	CD DOOR LEVER		
431	9965 000 18214	CD DOOR LEVER SPRING		
432	9965 000 19706	CD DOOR KNOB CAP		
433	9965 000 18206	CD DOOR KNOB BRACKET		
434	9965 000 18208	FOOT RUBBER		
436	9965 000 19622	CAB BOTTOM		
437	9965 000 19708	BRAND RIM RIGHT		
438	△ 9965 000 18223	AC CORD E 1750MM /21/22		
438	△ 9965 000 18319	AC CORD 1750MM /25		
439	9965 000 19713	DC FAN		
441	9965 000 19699	CAB REAR /21		
441	9965 000 19750	CAB REAR /22/25		
442	9965 000 18181	BRACKET-LEFT		
443	9965 000 18211	SPRING-C LOCK		
444	9965 000 18192	PUSH CATCH LEFT		
446	9965 000 18215	CASS DOOR SPRING		
447	9965 000 18207	CASS SPRING BKT		
448	9965 000 18221	CASS DECK CRM4304		
449	9965 000 19701	CASS BKT		
451	9965 000 19700	CASS DOOR		
452	9965 000 19709	DECORATION TOP		
453	9965 000 19698	CAB TOP		
454	9965 000 19707	BRAND RIM LEFT		

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