Micro System

MC-320

All Version

Service
Service
Service

Service Manual

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CLASS 1
LASER PRODUCT

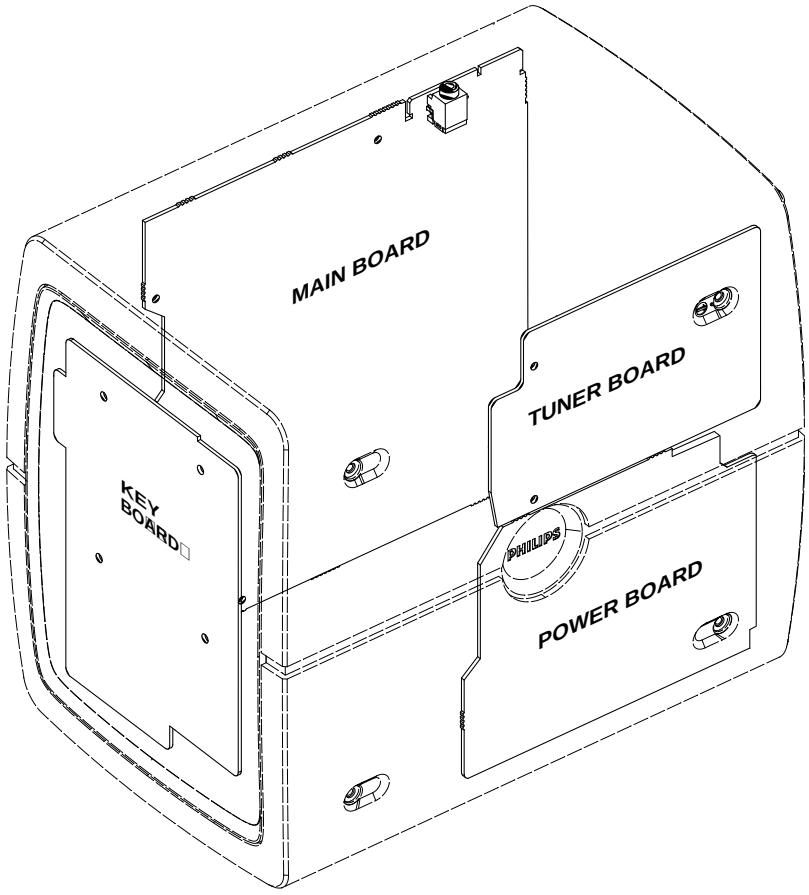
Published by SL 0321 Service Audio Printed in The Netherlands Subject to modification

GB 3140 785 32530

Version 1.0

PHILIPS

LOCATION OF PRINTED CIRCUIT BOARDS



VERSION VARIATIONS

Type/Versions / Features & Board in used	MC-320				
	/21	/22	/25	/30	/37
RDS function		x	x		
ECO Standby		x	x		
Aux Input	x	x	x	x	x
Digital Coaxial Out					
Line Out					
Subwoofer Out					
Headphone Out	x	x	x	x	x
AC Voltage Selector	x				
Non-Cenelec Tuner	x			x	x
Cenelec Tuner		x	x		

SPECIFICATIONS

GENERAL:

Mains voltage	/21 :	110V ~ 127V / 220V ~ 240V Switchable
	/22/25 :	220V ~ 230V
	/30 :	240V
	/15/33 :	220V
	/37 :	120V
Mains frequency	/22/25/30 :	50Hz
	/15/21/33 :	50/60Hz
	/37 :	60Hz
Power consumption		
	/22/25 :	< 1W at ECO Standby
	:	< 7W at Standby (DEMO mode off)
	:	40W 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 ± 20kHz
Aerial input		
/15/21/22/25/37	:	75Ω Coaxial
/37	:	300Ω Dipole
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	:	> 30dB

AM (MW)

Tuning range		
/15/21/22/25/30	:	531-1602kHz
/21/37	:	530-1700kHz
Grid /21	:	9kHz / 10kHz
/15/22/25/30	:	9kHz
/37	:	10kHz
IF frequency	:	450kHz ± 1kHz
Aerial input	:	Frame aerial 18.1μH
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

Tuning range	:	153-279kHz
Grid	:	3kHz
IF frequency	:	450kHz ± 1kHz
Aerial input	:	Frame aerial 18.1μH
Maximum Sensitivity	:	< 1.5mV/M
Sensitivity at 26dB S/N	:	< 6.0mV/M
Selectivity at S9/300kHz	:	> 24dB
IF rejection	:	> 26dB
Image rejection	:	> 30dB
Distortion I/P:5~50mV	:	< 5%
Modulation Hum with REC or	:	> 40dB

AMPLIFIER:

Output power (6Ω, 1kHz, 10% THD)	:	2X18W
Frequency response within -3dB	:	60Hz-14kHz
Digital Sound Control (DSC)	:	Optimal,Classic,Jazz, Rock
DBB	:	ON/OFF
Incredible Surround (IS)	:	ON/OFF
Input sensitivity (±3dB) for Rated Output Power at 1kHz		
Aux in	:	500mV; Rs=600Ω
Tuner in	:	FM67.5kHz, AM80%Modulation
CD in	:	-6dB track
Tape in	:	250nWb/m
Output sensitivity		
Headphone output at 32Ω	:	15mW ± 1dB

CASSETTE RECORDER:

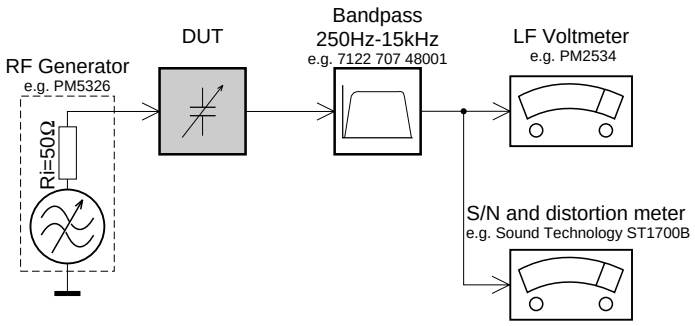
Number of track	:	2 Tracks (Stereo)
Tape speed	:	4.76 cm/sec ± 2%
Wow and flutter	:	< 0.4% DIN
Fast-wind/Rewind time C60	:	130 sec
Bias system	:	80Hz - 10kHz
Rec/Pb freq. response within 8dB	:	78kHz ± 10kHz
Signal to Noise Ratio (A-weighted)	:	> 48dBA
Distortion 250nWb/m	:	< 5%
Channel Difference at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

COMPACT DISC:

Frequency response within ± 3dB	:	63Hz - 14kHz
Output level (in Vrms)	:	500mV, Z_{out} = 100Ω
Signal/Noise ratio (A-weighted)	:	> 70dBA
Distortion at 1kHz	:	< 0.02%
Channel unbalance at 1kHz	:	< ±2dB
Channel separation at 1kHz	:	> 55dB
Emphasis	:	15/50 μS (switched automatically by CD10)
THD Noise(1kHz)	:	> 70dB
Outband Attenuation	:	> 20dB for Frequency > 40kHz

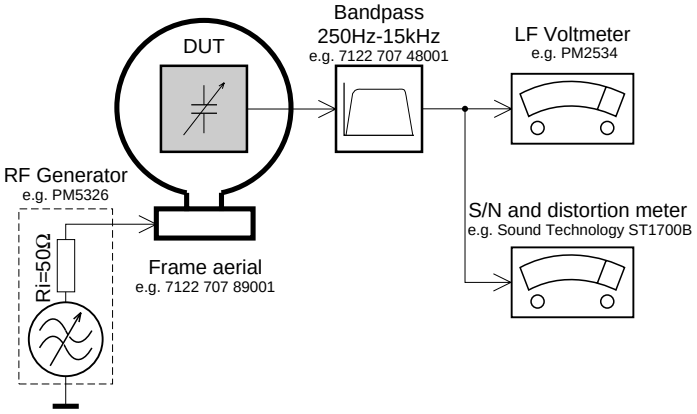
MEASUREMENT SETUP

Tuner FM



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

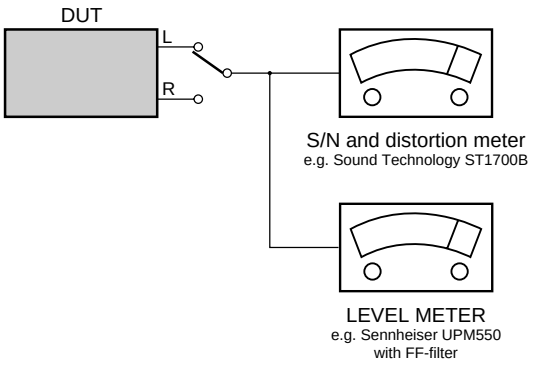
Tuner AM (MW,LW)



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

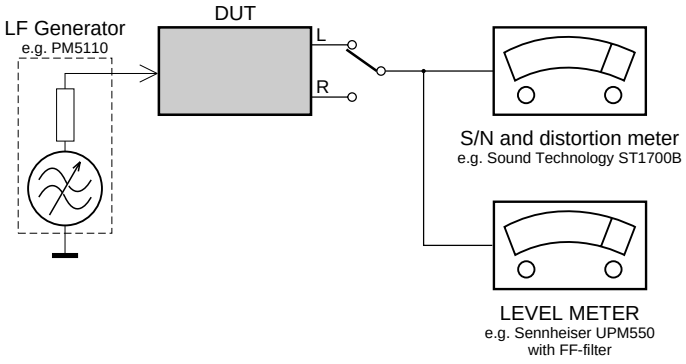
CD

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

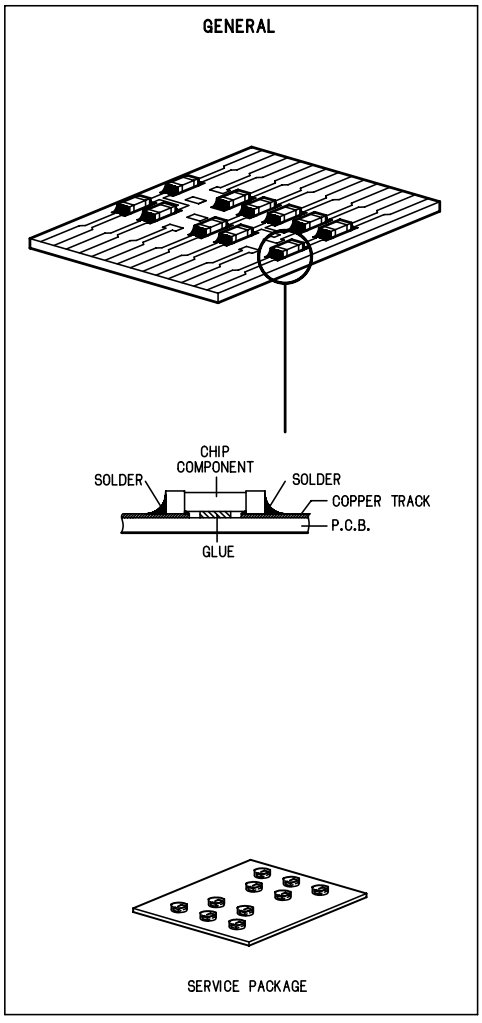
Compact Disc:

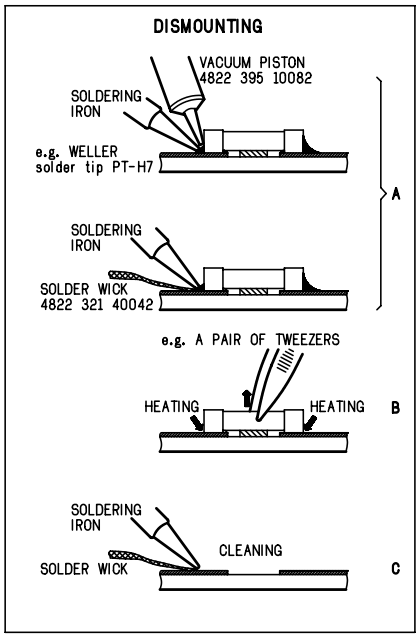
SBC426/426A Test disc 5 + 5A 4822 397 30096
SBC442 Audio Burn-in Test disc 1kHz 4822 397 30155
SBC429 Audio Signals disc 4822 397 30184
Dolby Pro-logic Test Disc 4822 395 10216

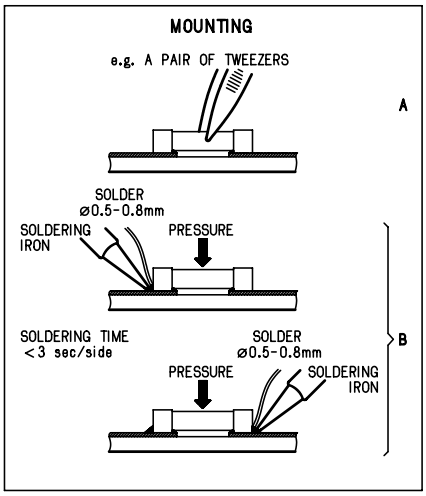
ESD Equipment:

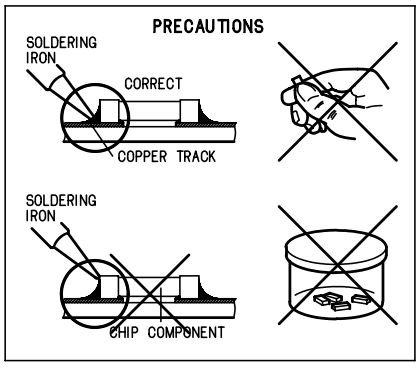
Anti-static table mat - large 1200x650x1.25mm ... 4822 466 10953
Anti-static table mat - small 600x650x1.25mm 4822 466 10958
Anti-static wristband 4822 395 10223
Connector box (1MΩ) 4822 320 11307
Extension cable
(to connect wristband to conn. box) 4822 320 11305
Connecting cable
(to connect table mat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

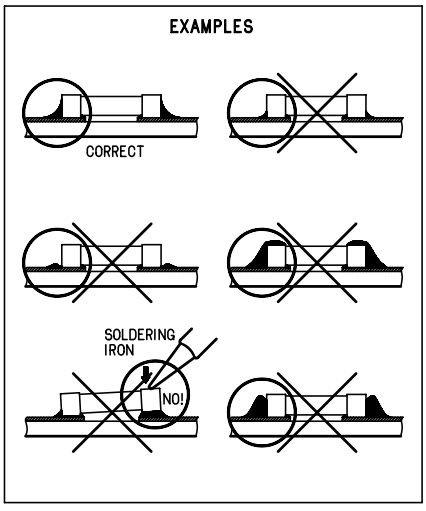
HANDLING CHIP COMPONENTS











ESD

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.

F ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD).
Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.
Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

D WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan 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.

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.

I AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un 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.

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 utiliséés les piéces de rechange identiques à celles spécifiées.

D

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

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."

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

GB Warning !

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

S Varning !

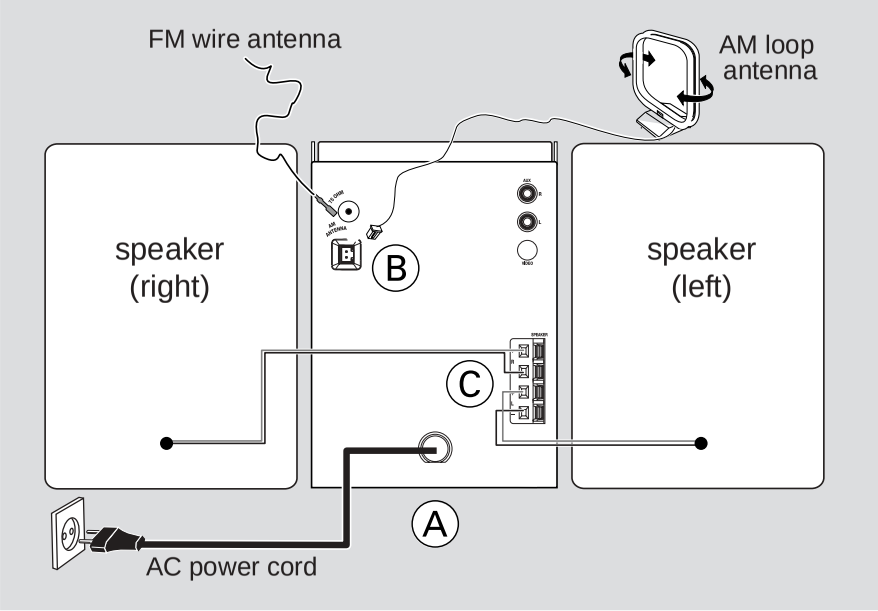
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

SF Varoitus !

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

DK Advarse !

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



Rear connections

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

Ⓐ **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.

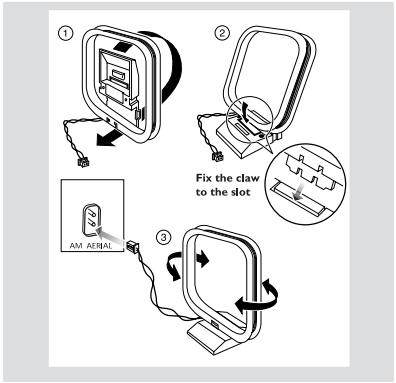
– Never make or change any connections with the power switched on.

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)*.

Ⓑ **Antennas Connection**

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

AM Antenna



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

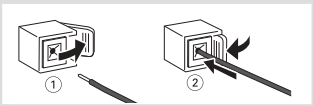
FM Antenna

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

Ⓒ **Speakers Connection**

Front Speakers

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



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

Notes:

– For optimal sound performance, use the supplied speakers.

– Do not connect more than one speaker to any one pair of + / – speaker terminals.

– Do not connect speakers with an impedance lower than the speakers supplied. Please refer to the SPECIFICATIONS section of this manual.

Optional connection

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

Connecting other equipment to your system

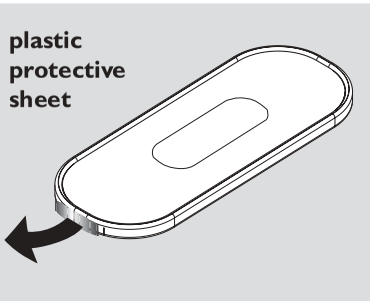
Connect the audio left and right OUT terminals of a TV, VCR, Laser Disc player, DVD player or CD Recorder to the **AUX** terminals.

Note:

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

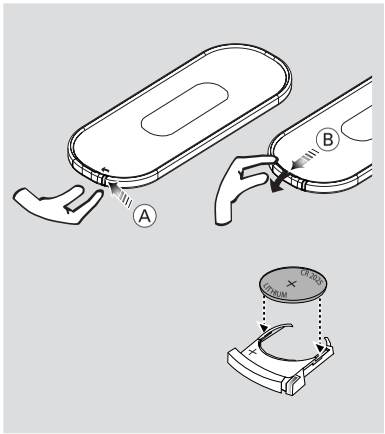
Before using the remote control

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



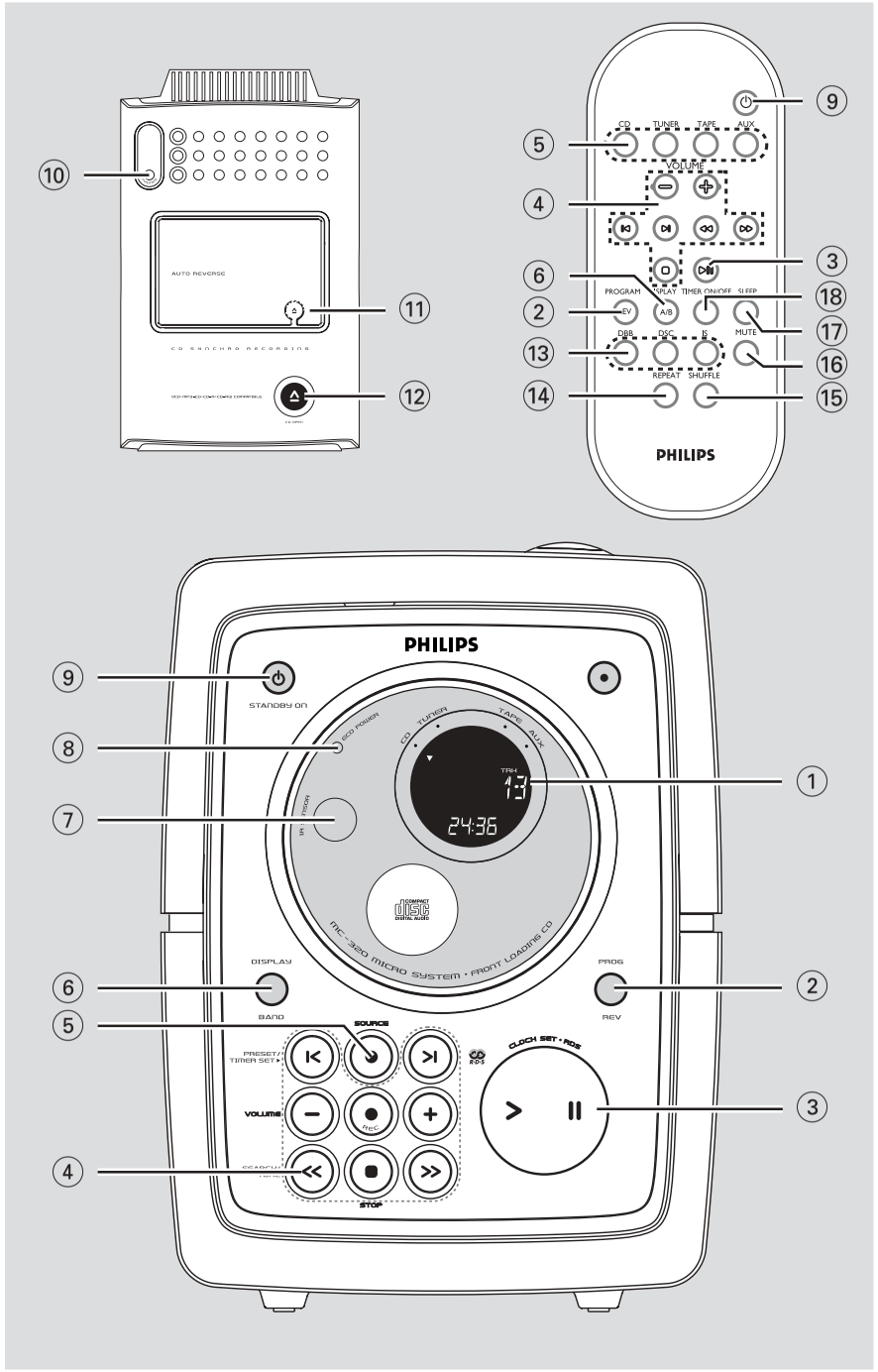
Replacing battery (lithium CR2025) into the remote control

1. Pull out the knob Ⓐ slightly to the left.
2. Pull out the battery compartment Ⓑ .
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.



Controls

Controls on the system and remote control

① **Display**
– shows the status of the system.
② **PROG/ REV**
for 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 ..... starts or interrupts CD playback
for TAPE ..... starts the tape playback
④ **Mode Selection**
VOLUME (−/+)
– adjusts the volume level.
– *on the system only* - adjusts the hour and minutes for the clock/ timer functions.
PRESET/ TIMER SET I< / >I
for TUNER ..... selects a preset radio station.
for CD ..... skips to the beginning of a current track/previous/ subsequent track
for Timer (**I<** only) to set timer under standby
SEARCH/ TUNE << / >>
for TUNER ..... Tune to a station
for CD ..... fast searches back and forward within a track/CD.
for TAPE ..... fast rewind/ wind tape
STOP ■
..... stops 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 ..... 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/ JAZZ/ 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<, >I).

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 ⏚) 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-320 Philips risponde alle prescrizioni dell'art. 2 comma 1 del D.M. 28 Agosto 1995 n. 548.

Fatto a Eindhoven

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

Norge

Typeskilt finnes på apparatens underside.

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

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

CAUTION

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

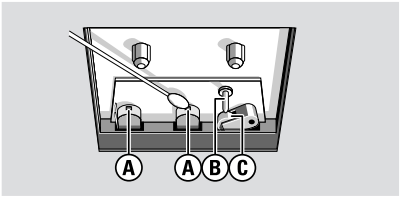
Maintenance

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.

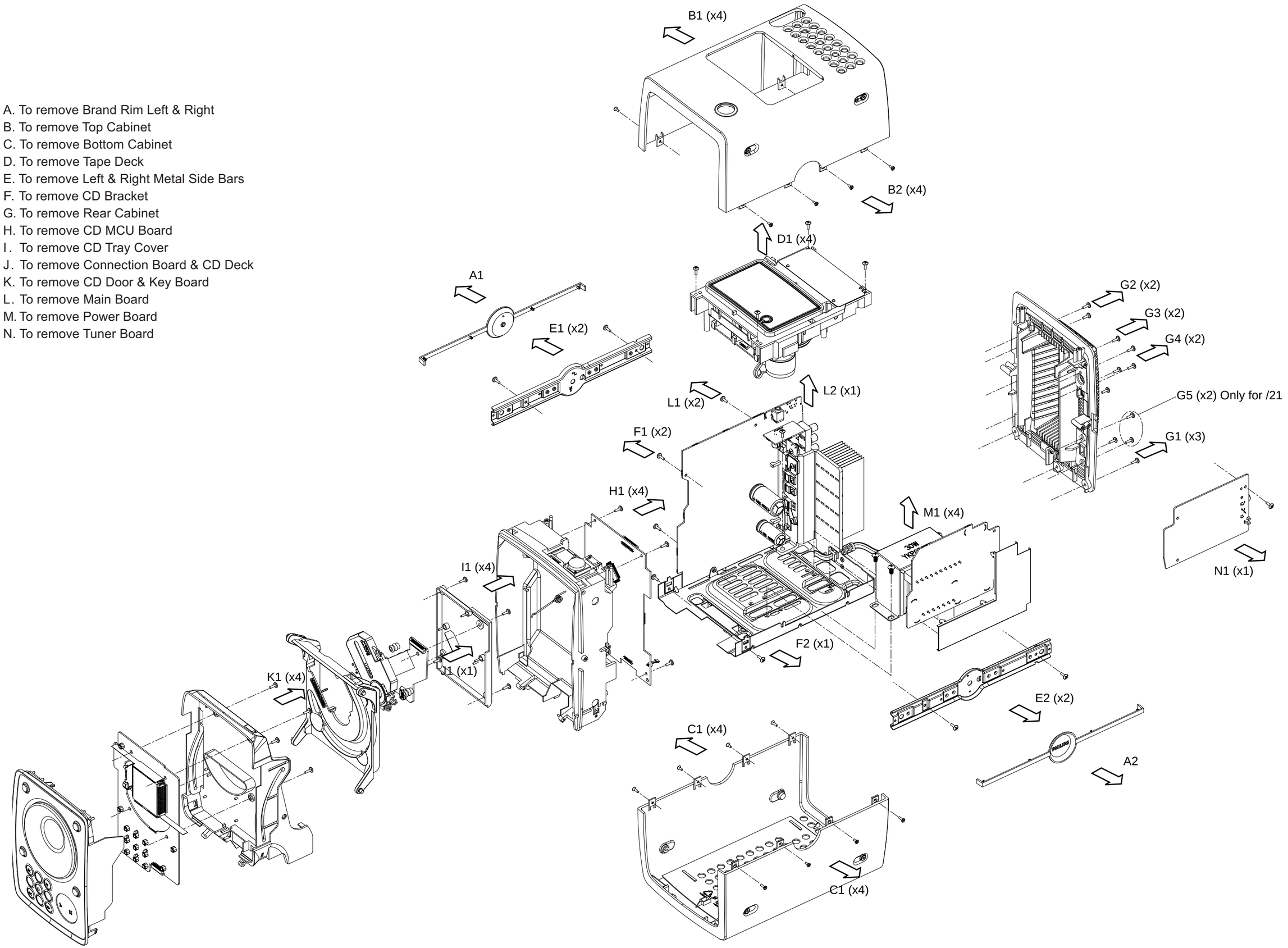
Problem	Solution
CD OPERATION	
"NO DISC" **is displayed.**	– Insert a disc. – Check if the disc is inserted upside down. – Wait until the moisture condensation at the lens has cleared. – Replace or clean the disc, see "Maintenance". – Use a finalised CD-RW or CD-R.

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.
The left and right sound outputs are reversed.	– Check the speaker connections and location.
The remote control does not function properly.	– Select the source (CD or TUNER, for example) before pressing the function button (>II, I<, >I). – Reduce the distance between the remote control and the system. – Insert the 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.

2-1

DISASSEMBLY INSTRUCTIONS

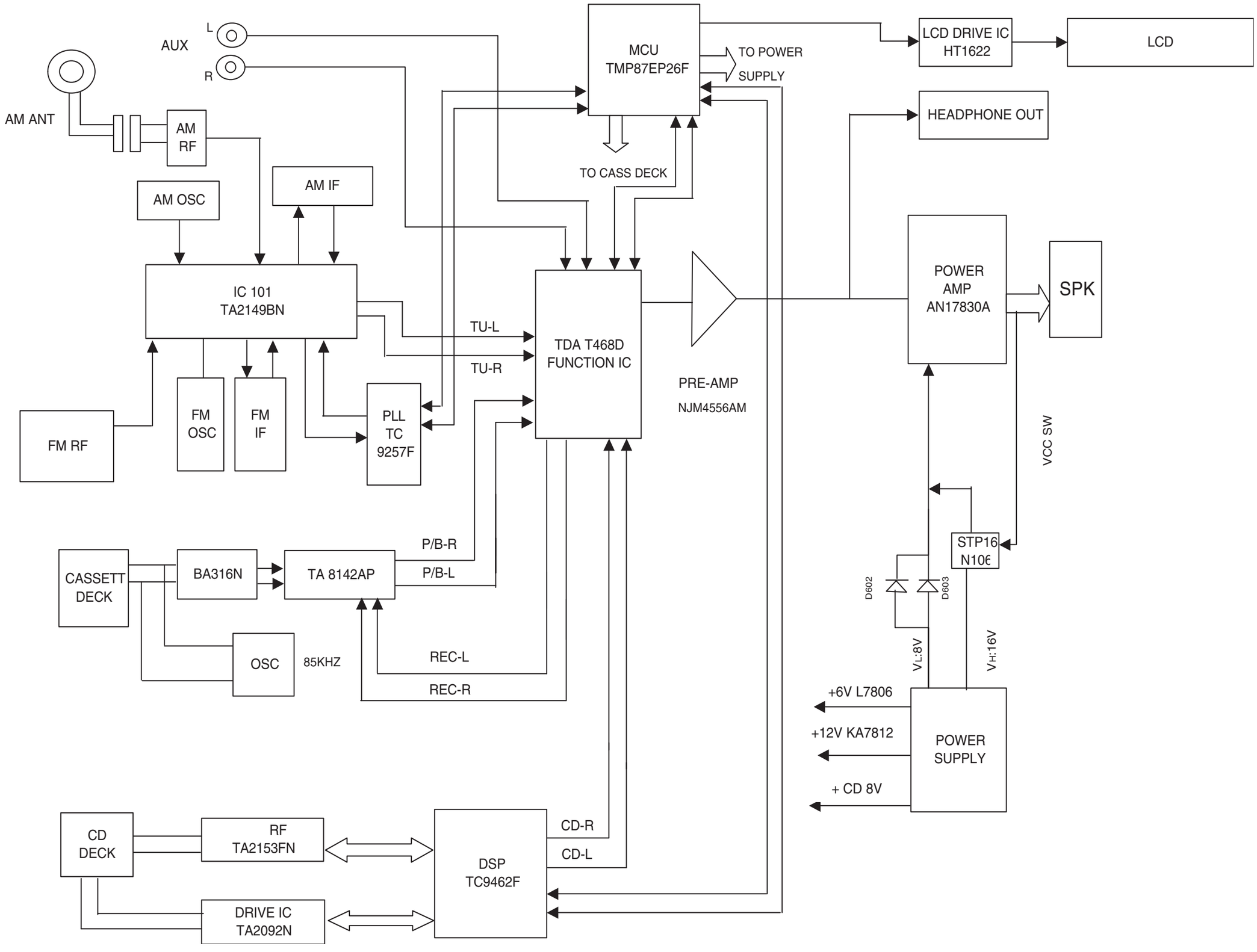
A. To remove Brand Rim Left & Right
B. To remove Top Cabinet
C. To remove Bottom Cabinet
D. To remove Tape Deck
E. To remove Left & Right Metal Side Bars
F. To remove CD Bracket
G. To remove Rear Cabinet
H. To remove CD MCU Board
I. To remove CD Tray Cover
J. To remove Connection Board & CD Deck
K. To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



2-2

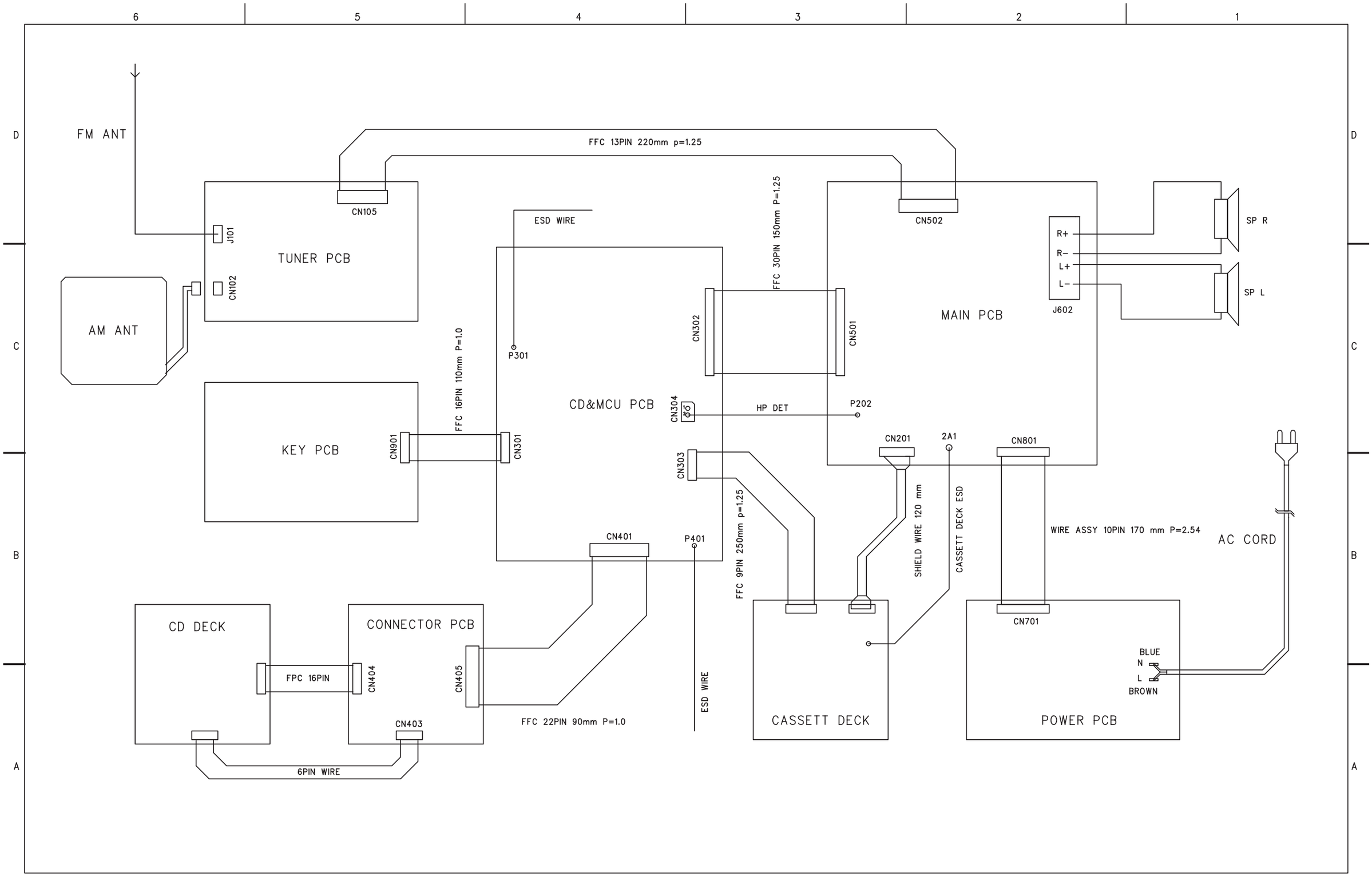
3-1

SET BLOCK DIAGRAM



4-1

SET WIRING DIAGRAM



KEY BOARD

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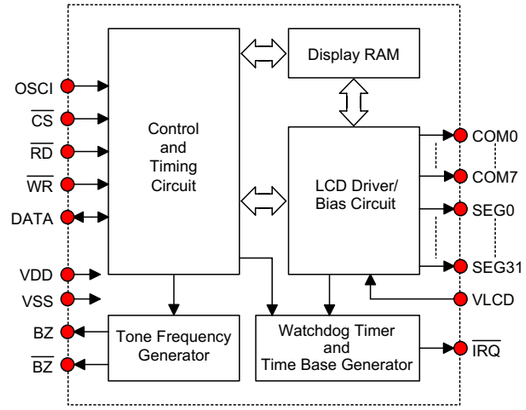
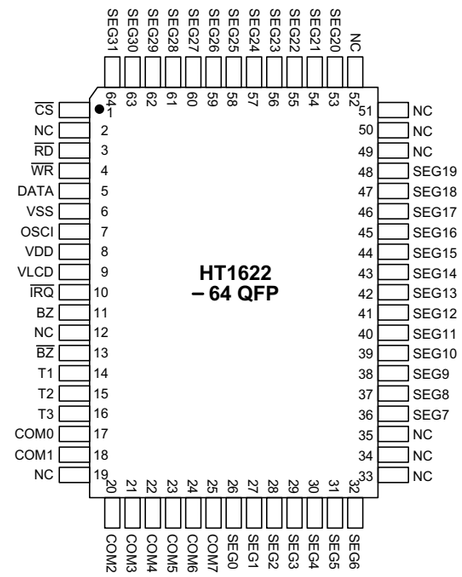
5-1

Block Diagram

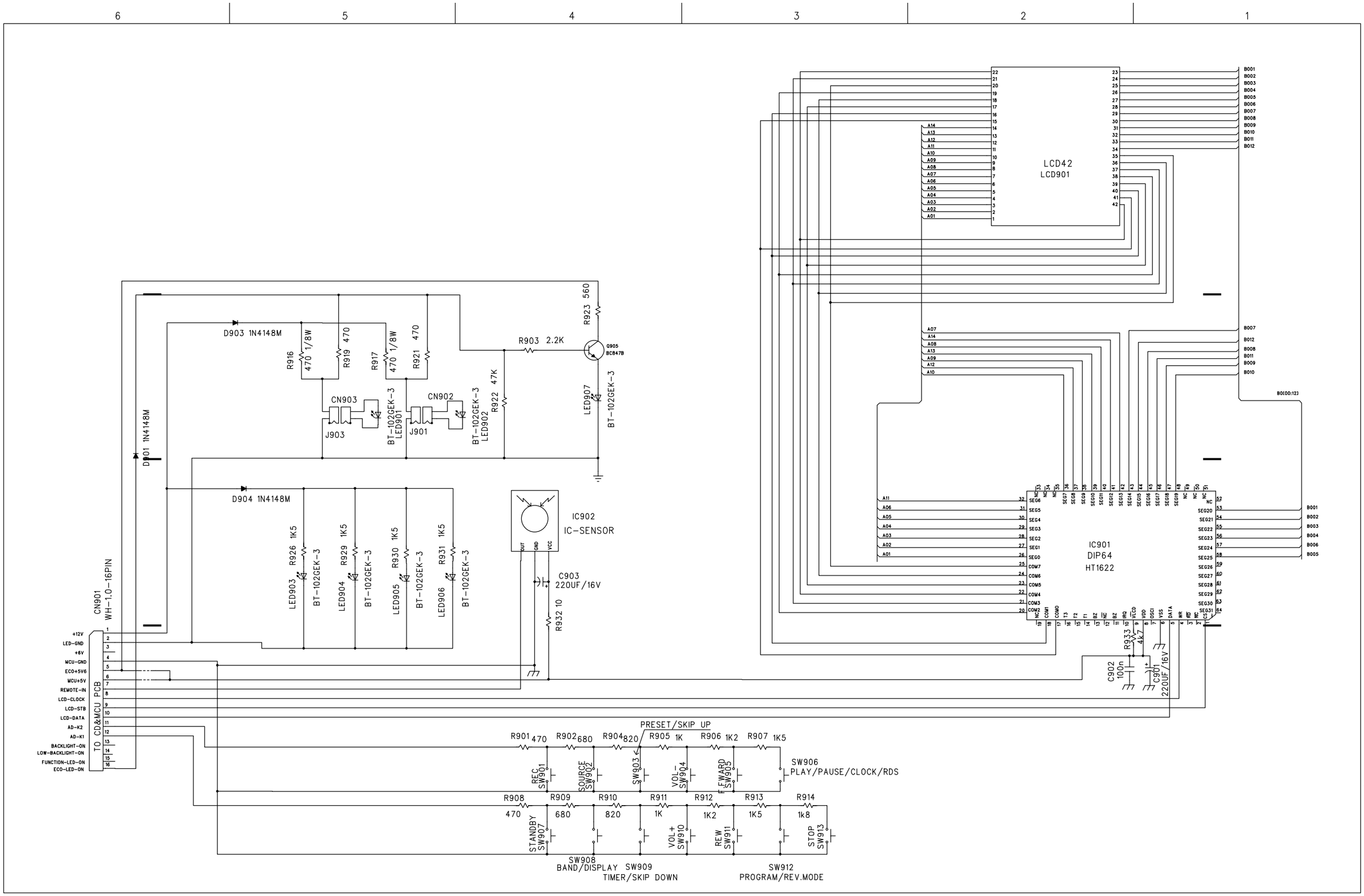


Pin Assignment

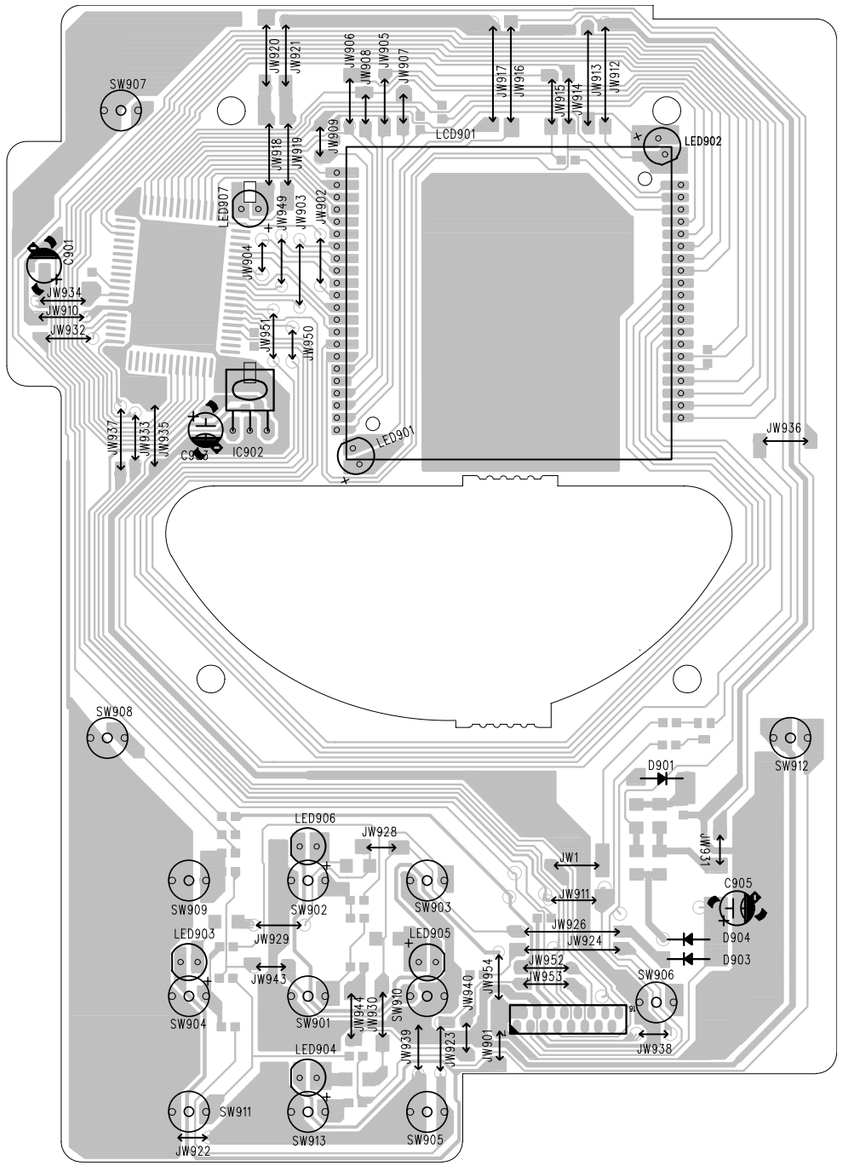


5-2

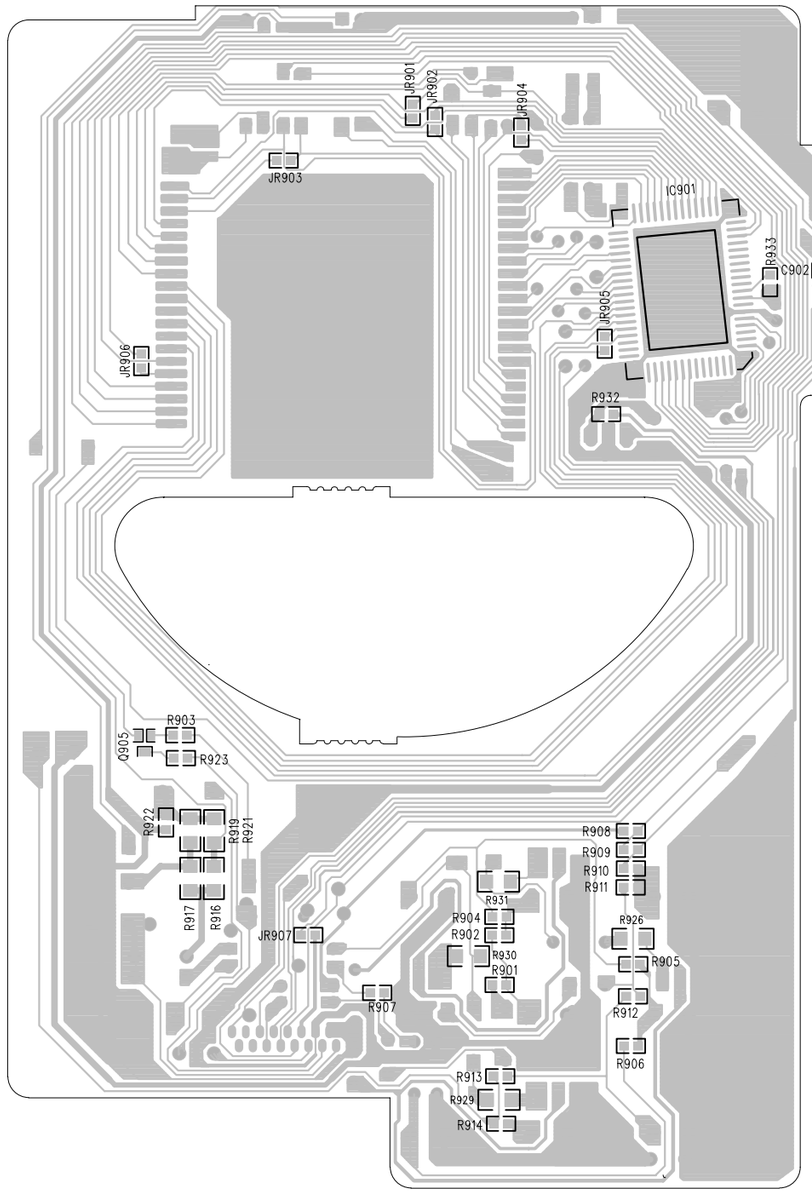
CIRCUIT DIAGRAM - FRONT BOARD



LAYOUT DIAGRAM - FRONT BOARD
COMPONENT SIDE



LAYOUT DIAGRAM - FRONT BOARD
SMD SIDE



5-4

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.

6-1

POWER BOARD

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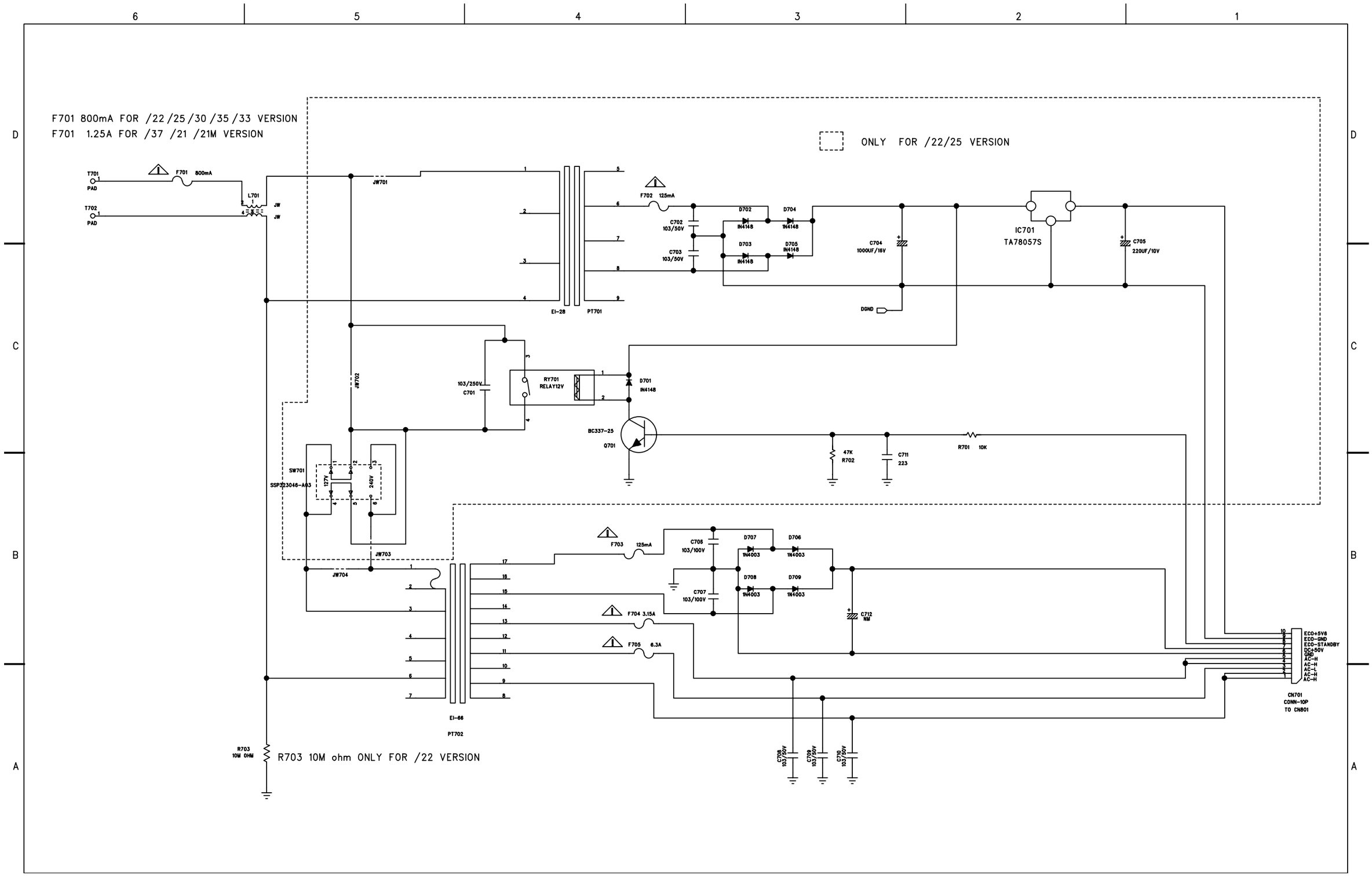
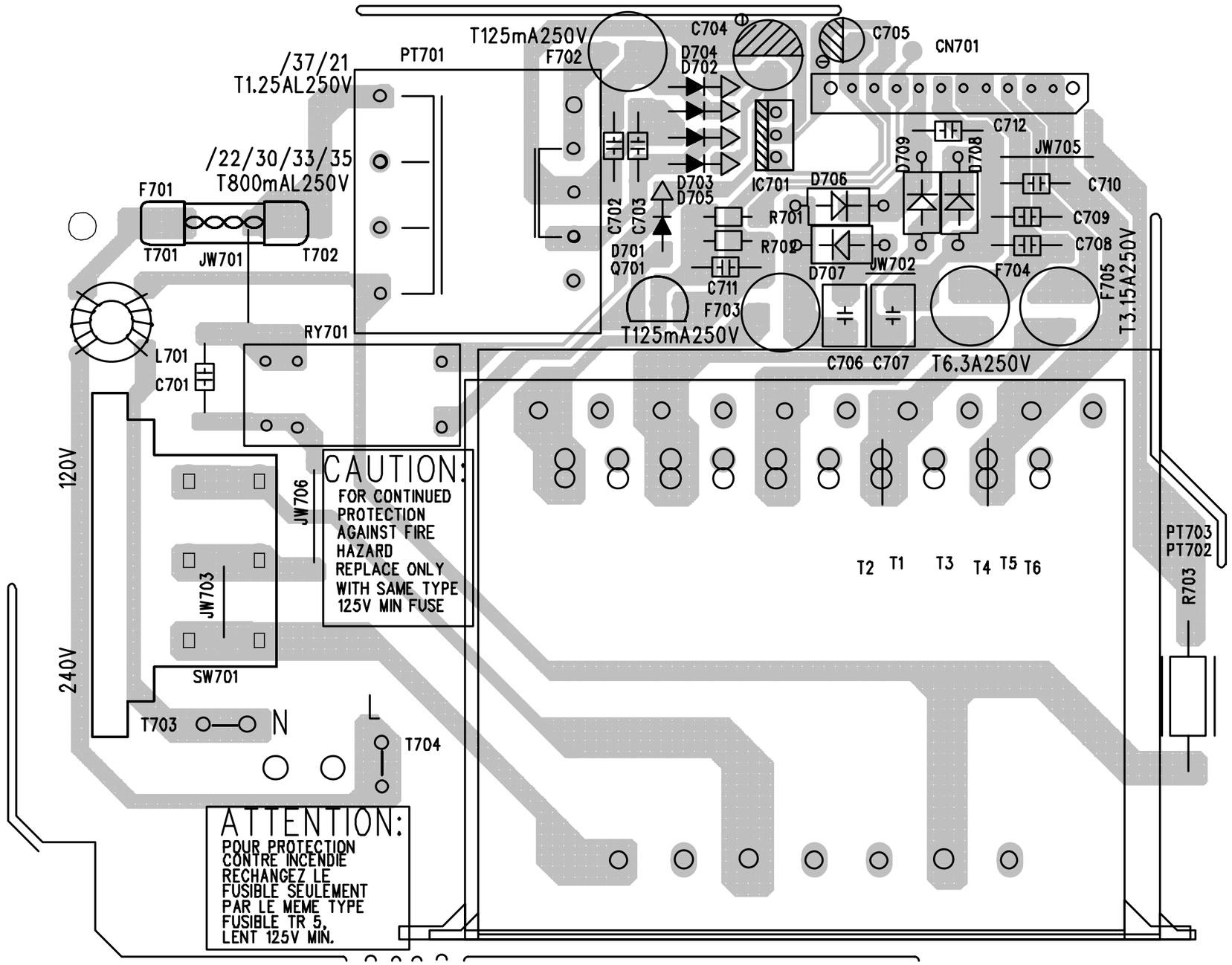
6-2

CIRCUIT DIAGRAM



6-3

POWER PCB LAYOUT



MC320POWER-MP.pcb – Wed Apr 02 20:04:13 2003

6-4

ELECTRICAL PARTSLIST - POWER BOARD

- MISCELLANEOUS -

CN701		9965 000 18244	CONN BASE 10P P=2.54
F701	⚠	9965 000 18245	FUSE 1.25A TSD 250V /21/37
F701	⚠	9965 000 11351	FUSE 800mA 250V /22/25/30
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

- 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.

TUNER BOARD

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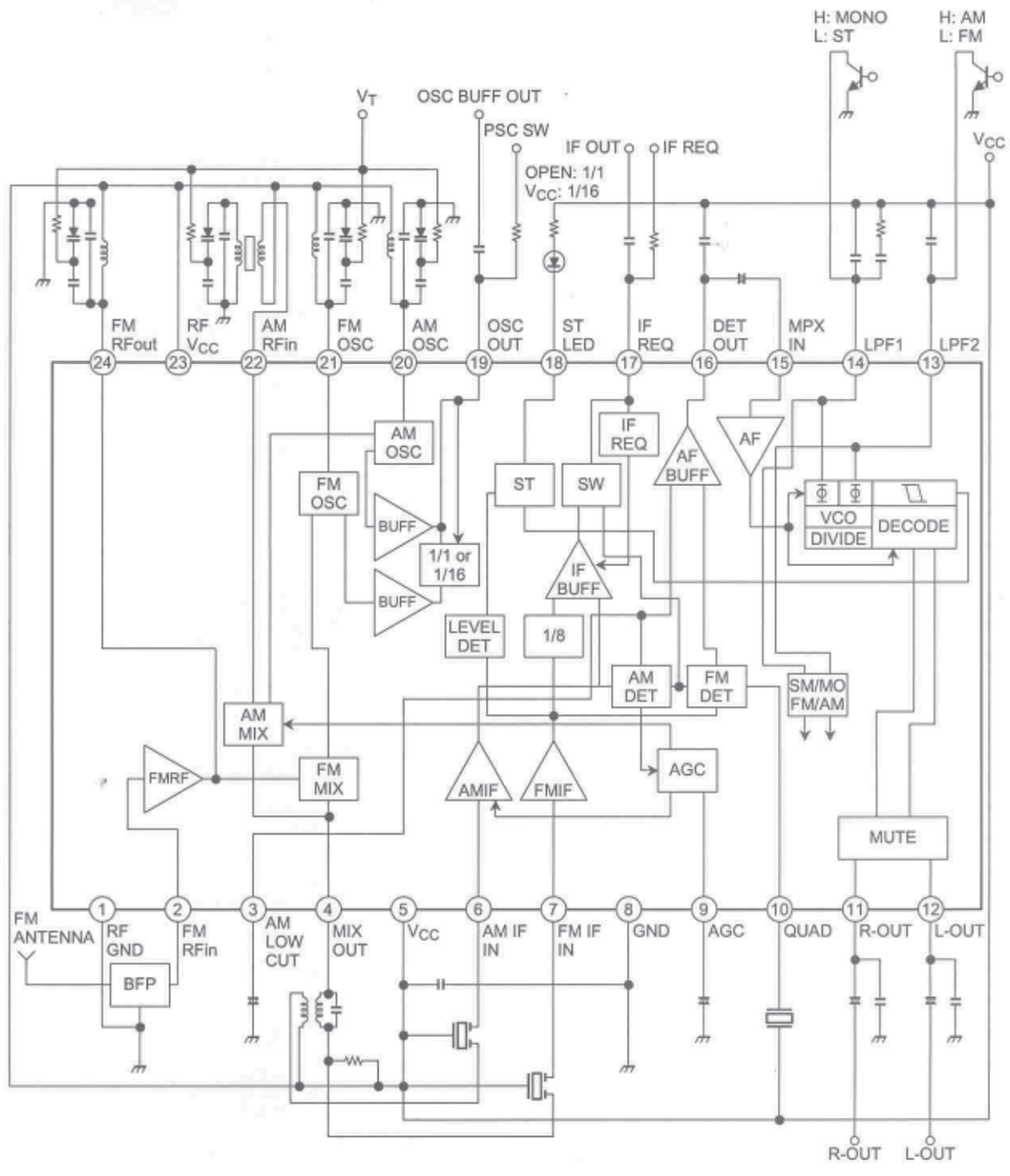
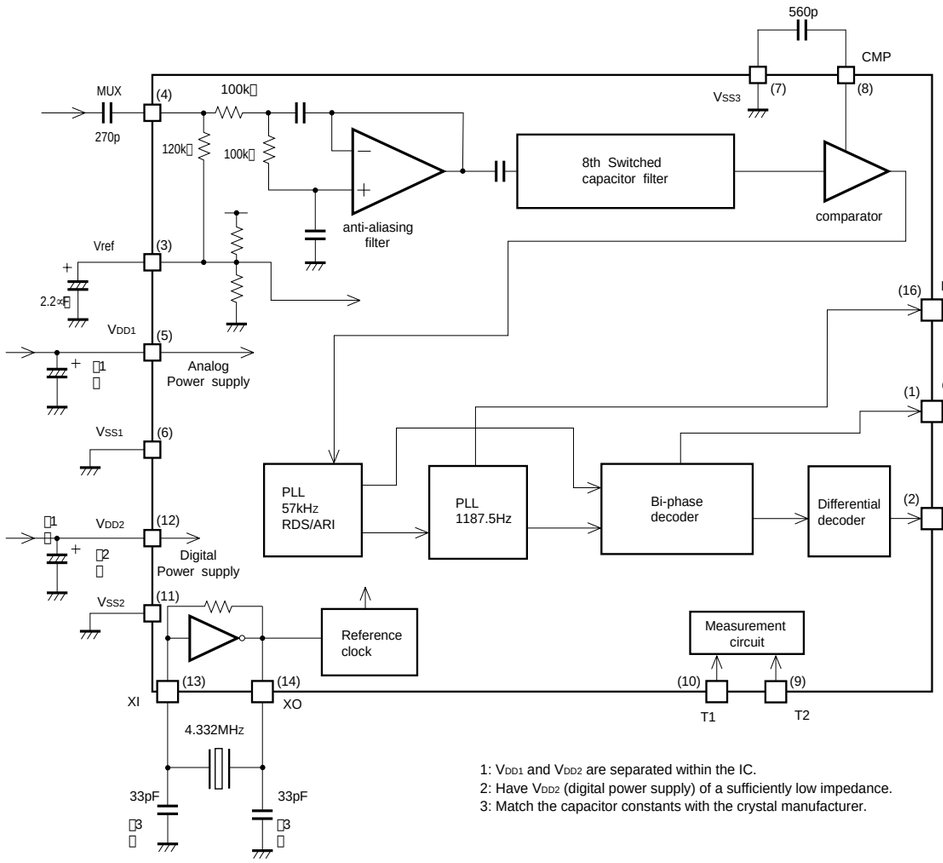
AM/FM TUNER IC
TA2149BN

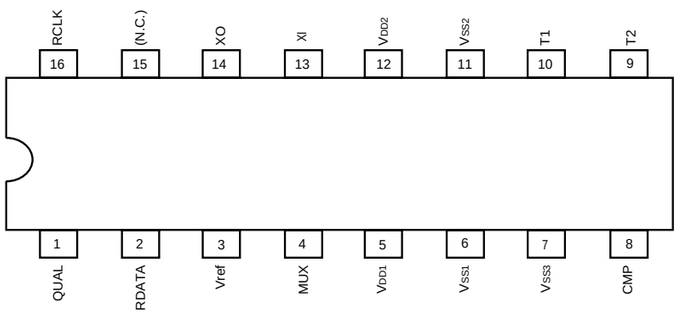


RDS/RBDS DECODER
BU1923F

BLOCK DIAGRAM



1: V_{DD1} and V_{DD2} are separated within the IC.
2: Have V_{DD2} (digital power supply) of a sufficiently low impedance.
3: Match the capacitor constants with the crystal manufacturer.



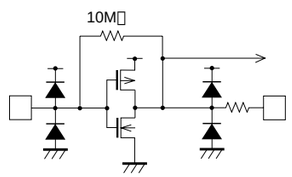
7-2

RDS/RBDS DECODER
BU1923F

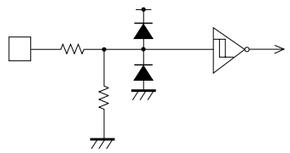
Pins Description

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_{DD1} (refer to input/output circuits)	Type E
4	MUX	Input	Composite signal input (refer to input/output circuits)	Type D
5	V_{DD1}	Analog power supply	4.5V to 5.5V	
6	V_{SS1}			
7	V_{SS3}	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_{DD2}	Digital power supply	4.5V to 5.5V	
12	V_{SS2}			
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

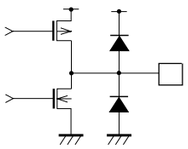
Type A



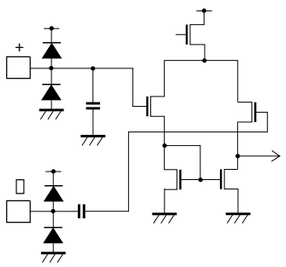
Type B



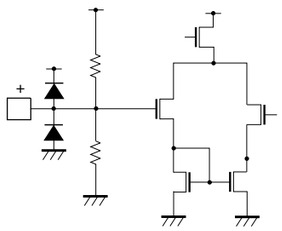
Type C



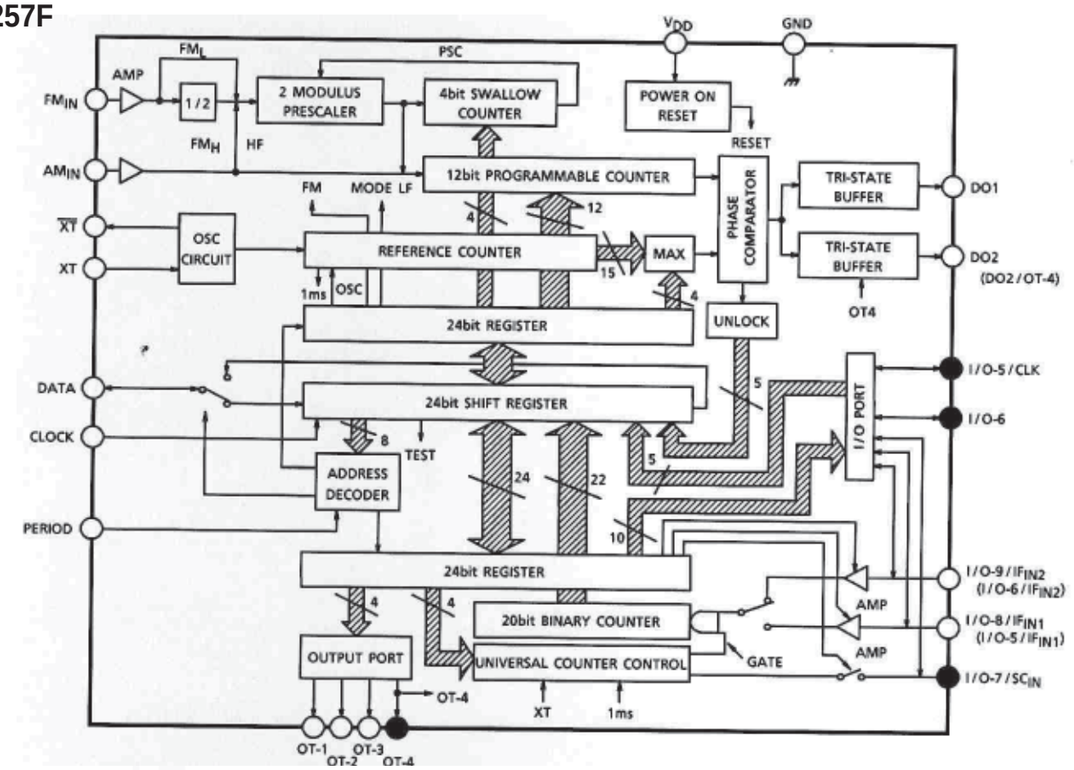
Type D



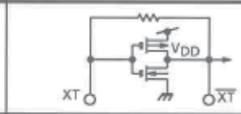
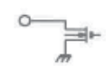
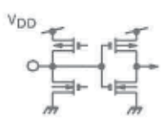
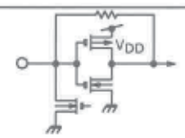
Type E



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	$\overline{XT}$			
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.)	
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}			

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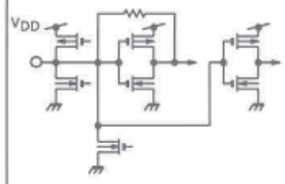
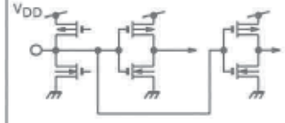
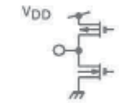
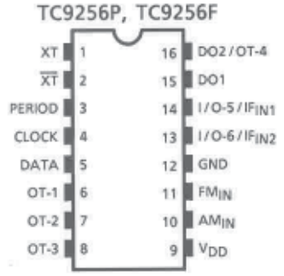
DIGITAL TUNING IC
TC9257F

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)	V_{DD}			

(*) 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

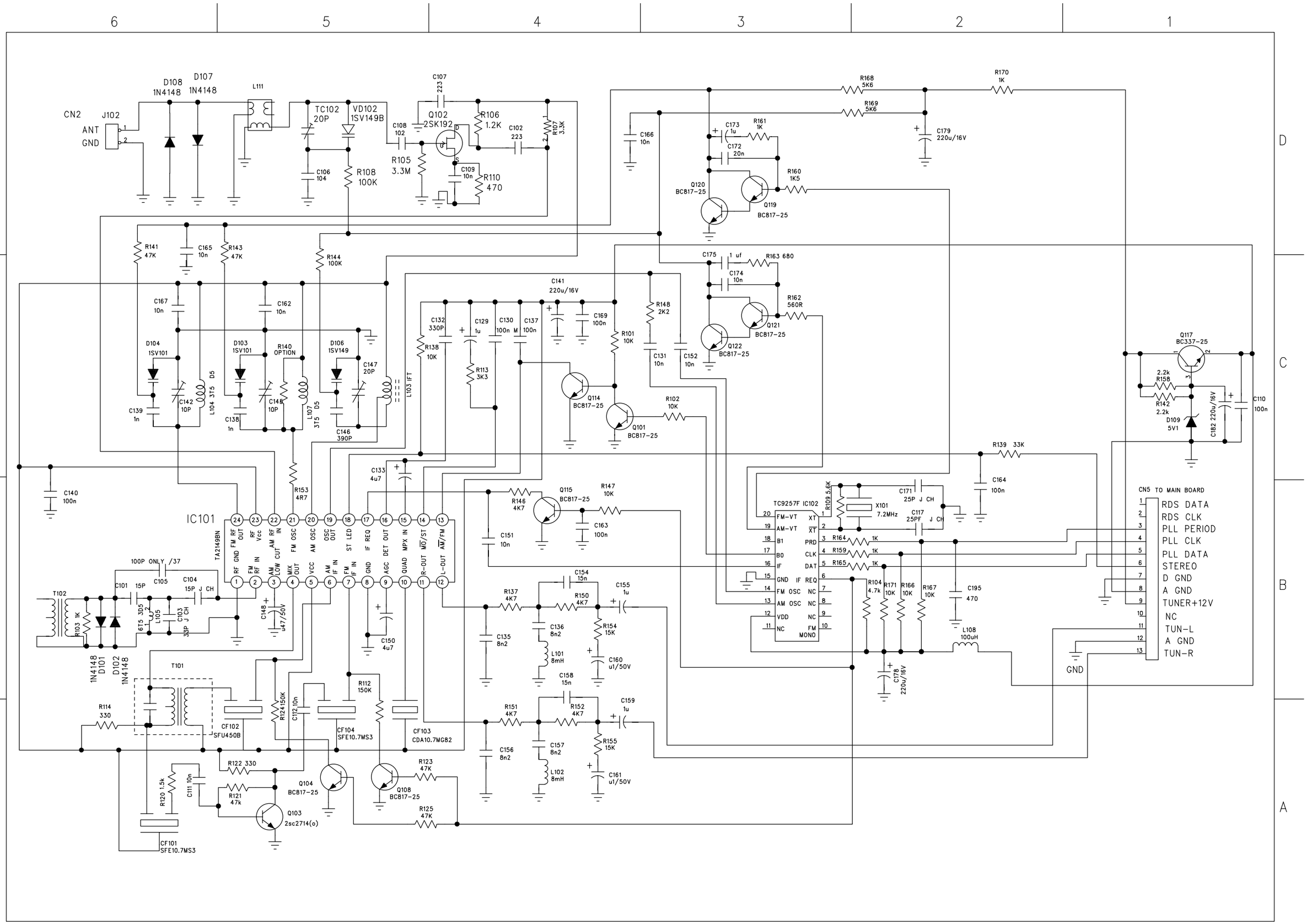
TC9256P, TC9256F



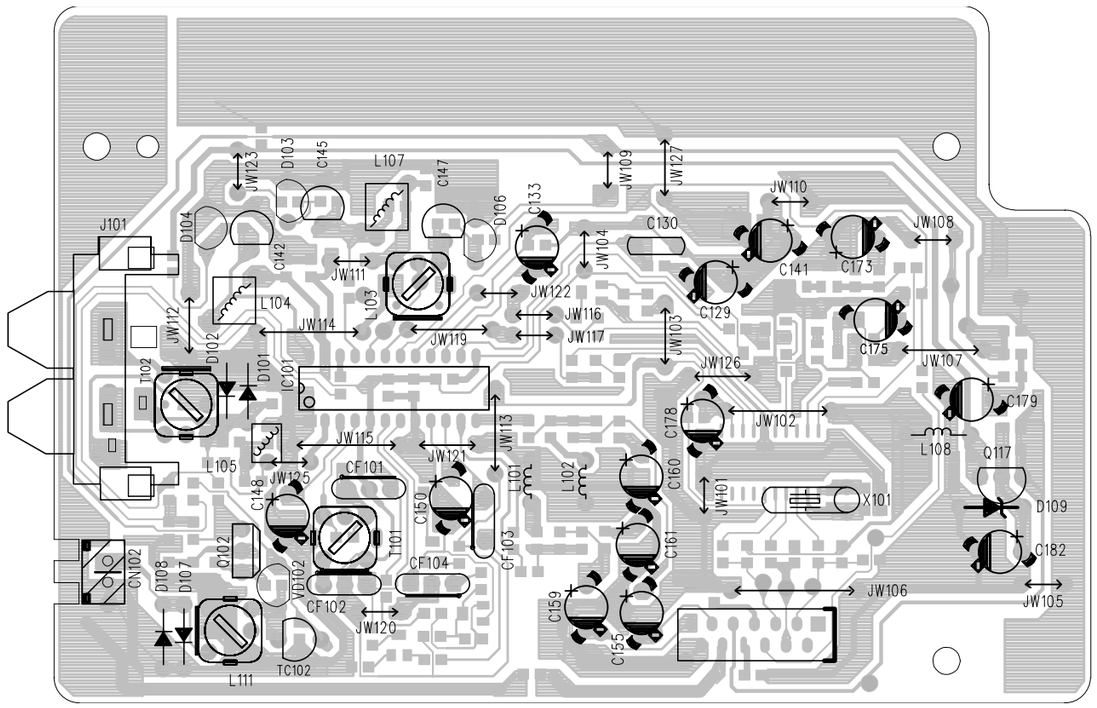
Top View
DIP-16PIN/SOP-16PIN

7-4

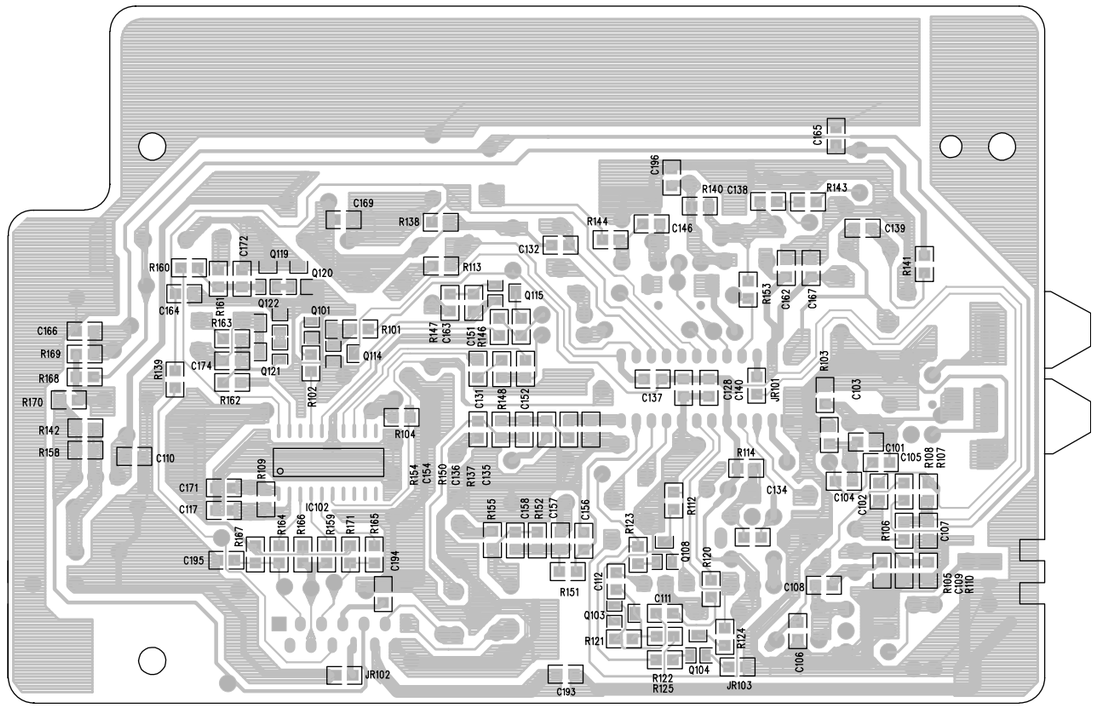
CIRCUIT DIAGRAM - TUNER BOARD (NON CENELEC)



LAYOUT DIAGRAM - TUNER BOARD (NON CENELEC)
COMPONENT SIDE

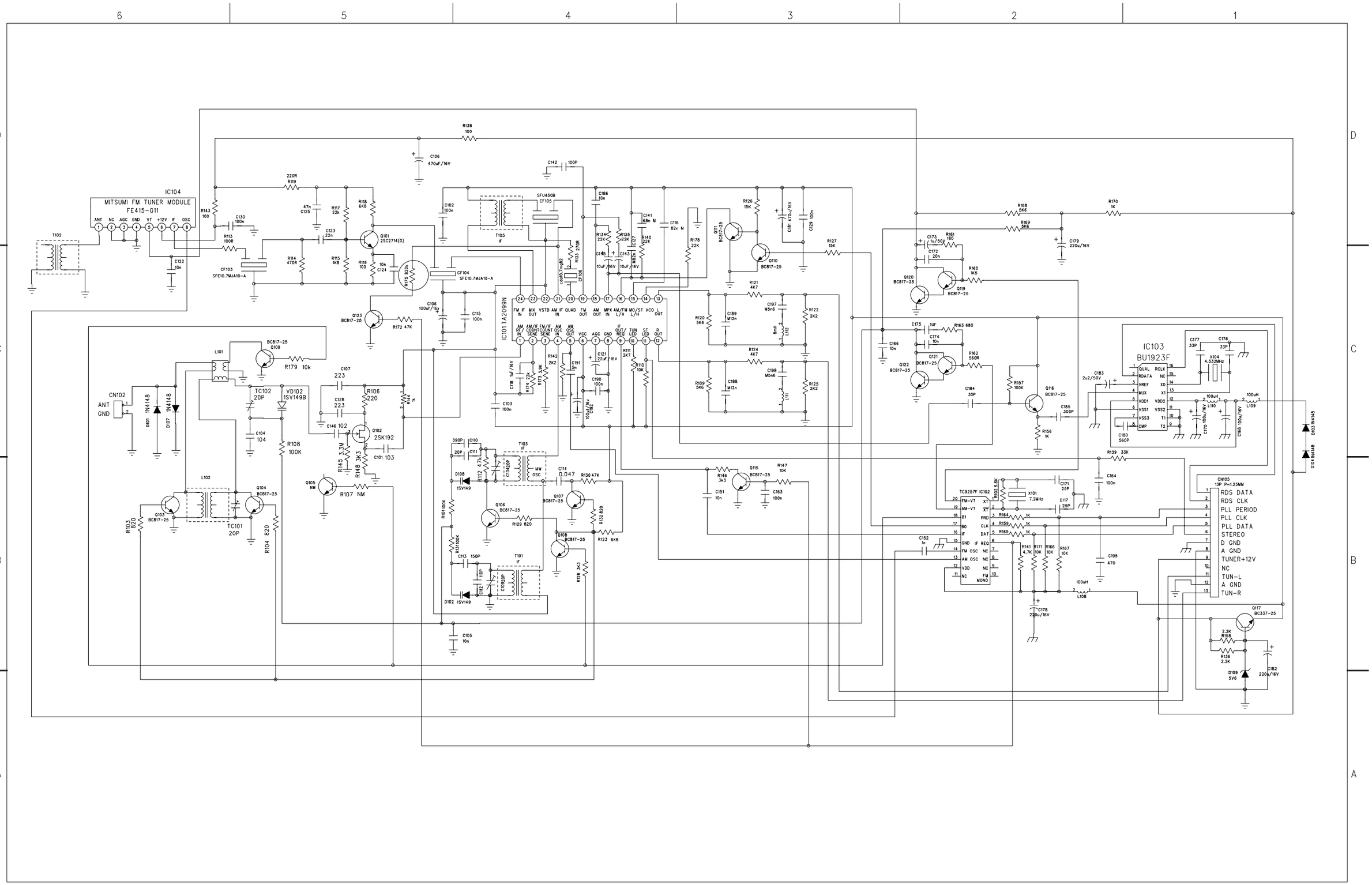


LAYOUT DIAGRAM - TUNER BOARD (NON CENELEC)
COPPER SIDE

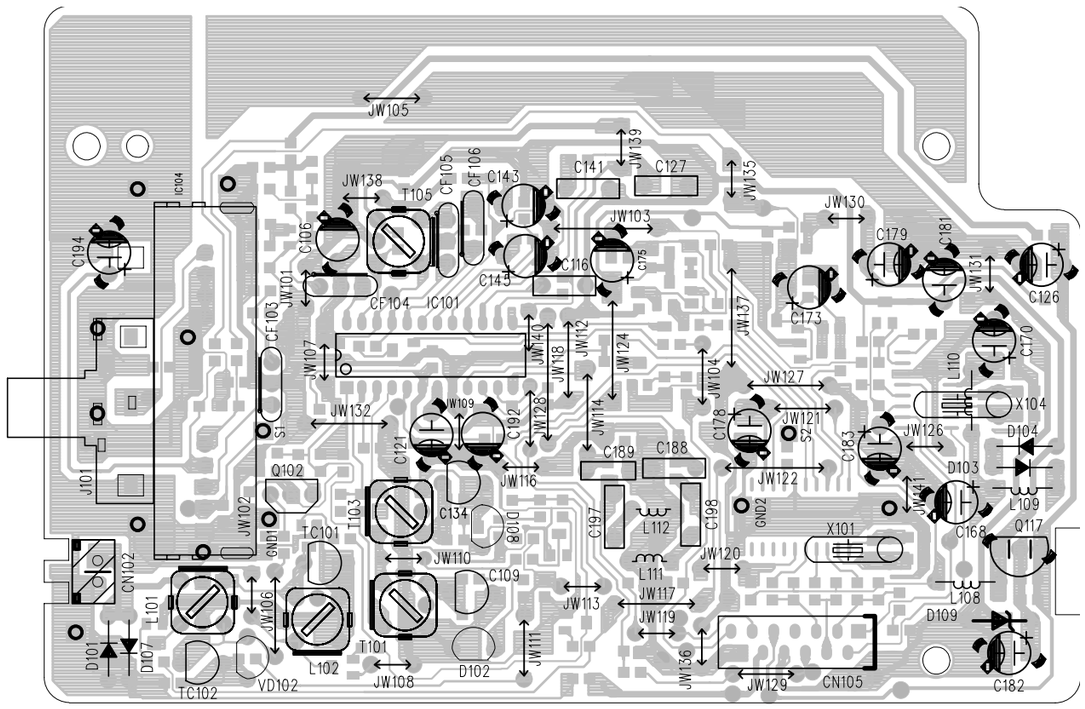


7-6

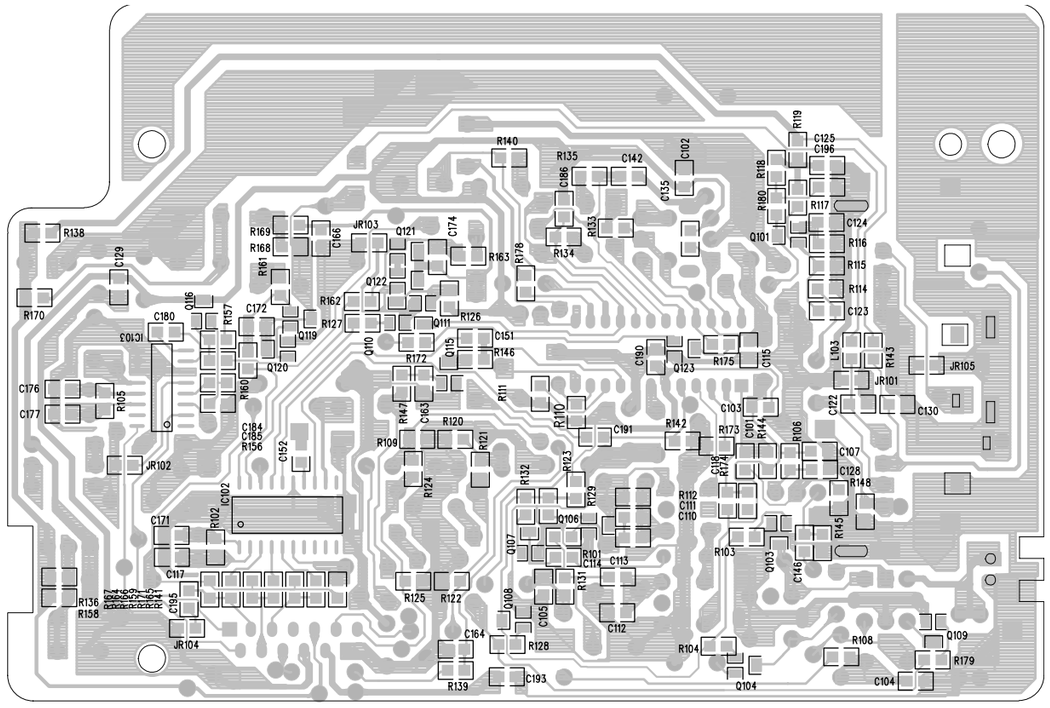
CIRCUIT DIAGRAM - TUNER BOARD (CENELEC)



LAYOUT DIAGRAM - TUNER BOARD (CENELEC)
COMPONENT SIDE



LAYOUT DIAGRAM - TUNER BOARD (CENELEC)
COPPER SIDE



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 -

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 18271	X'TAL 7.2MHZ

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

- IC & TRANSISTORS -

Q122	4822 130 42804	BC817-25

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

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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
	9965 000 18316	CONNECTOR WIRE 75MM

- 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	9965 000 18306	FILTER LTF450A
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 18262	FIXED IND 8MH
L112	9965 000 18262	FIXED IND 8MH
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 18271	X'TAL 7.2MHZ
X104	9965 000 18315	X'TAL 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
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

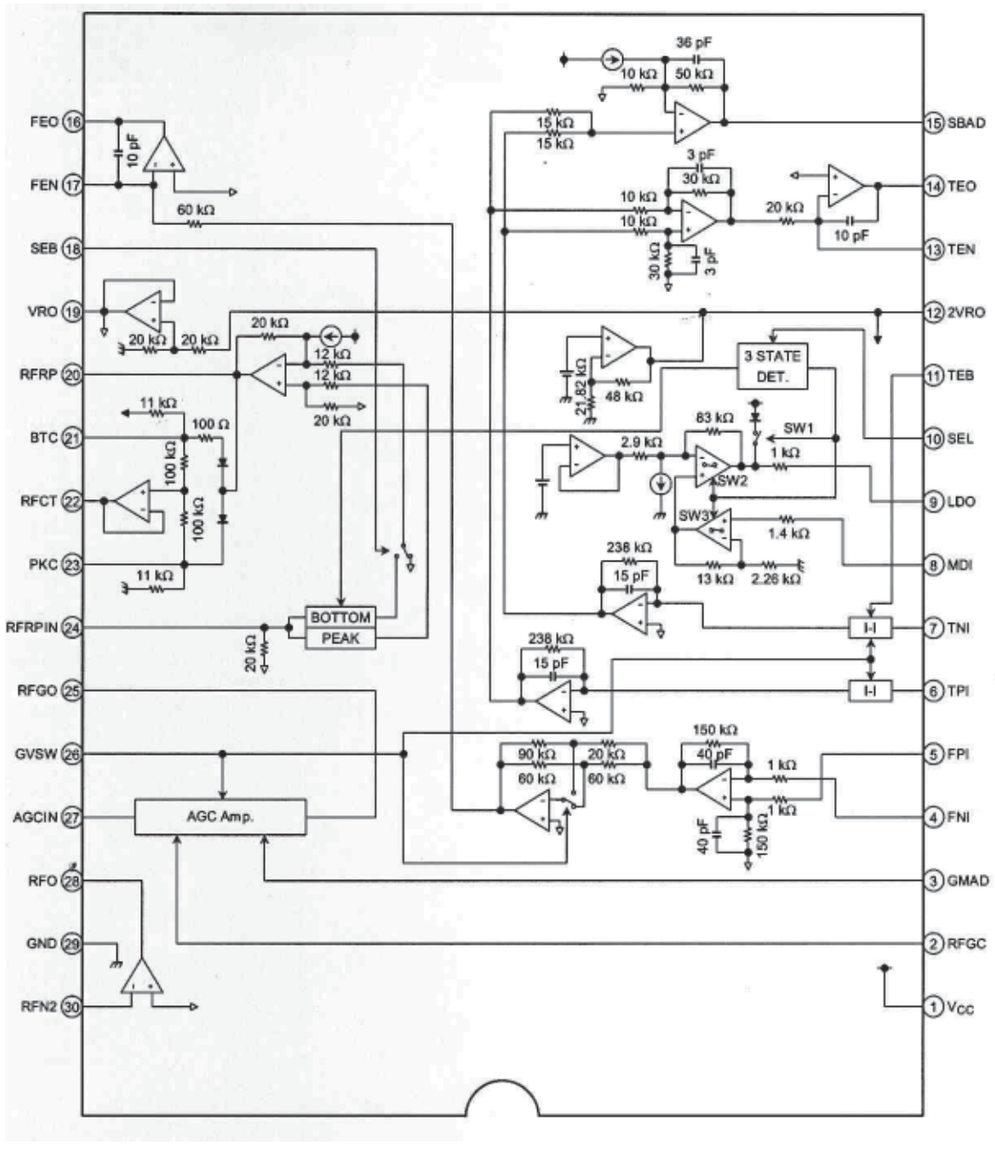
Note: Only these parts mentioned in the list are normal service parts.

MCU & CD BOARD

TABLE OF CONTENTS

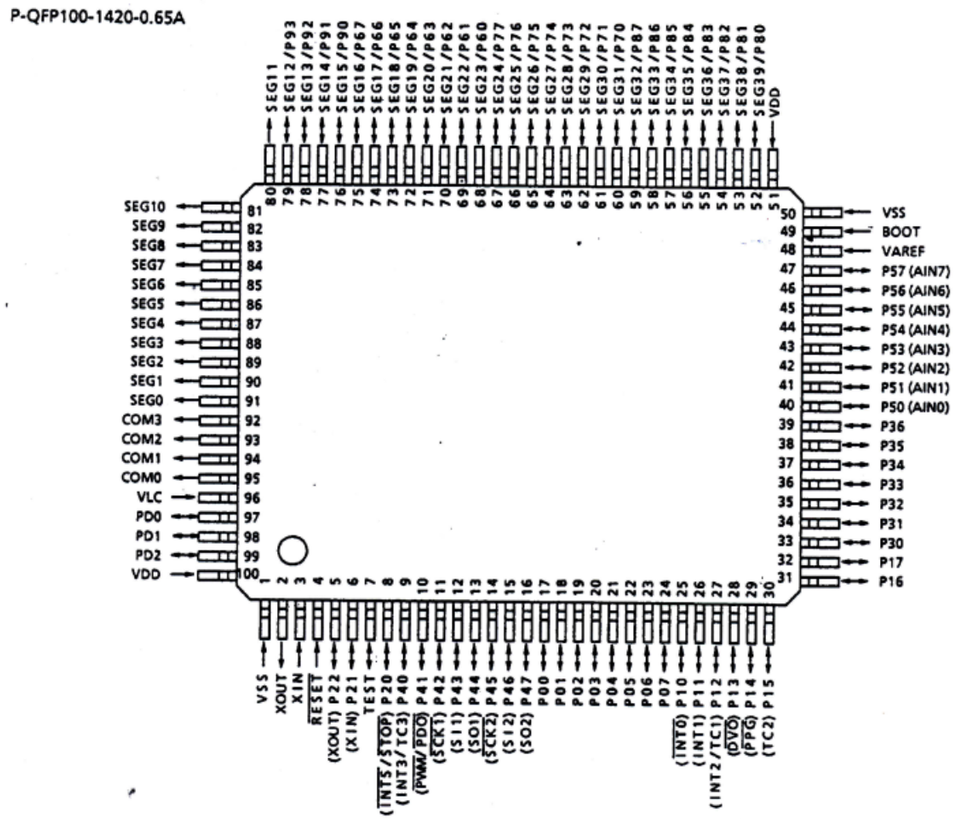
MICROPROCESSOR
TA2153FN

BLOCK DIAGRAM



MICROPROCESSOR
TMP87EP26F

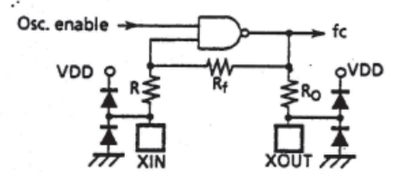
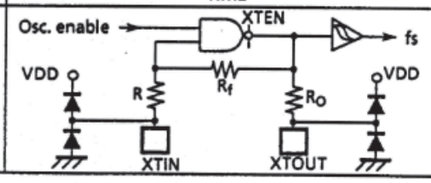
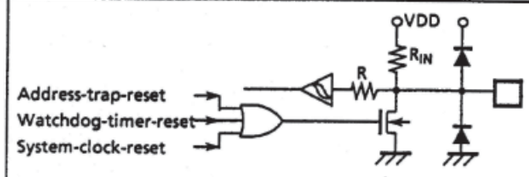
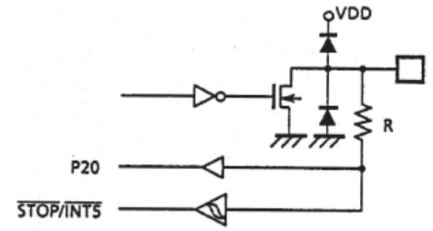
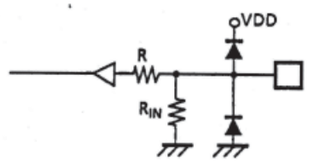
BLOCK DIAGRAM



8-2

MICROPROCESSOR
TMP87EP26F

PINS DESCRIPTION

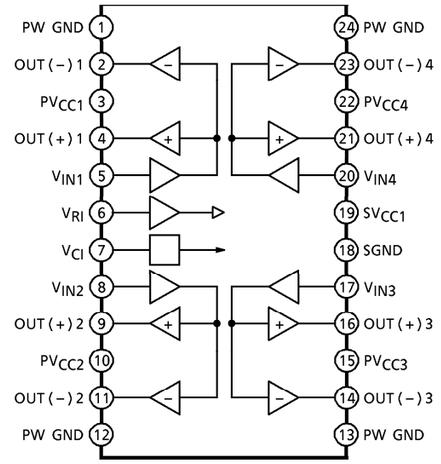
Control Pin	I/O	Input / Output Circuitry and Code	Remarks
XIN XOUT	Input Output		Resonator connecting pins (high-frequency) R_f = 1.2 MΩ (typ.) R_O = 1.5 kΩ (typ.) R = 1 kΩ (typ.)
XTIN XTOUT	Input Output	NM1: Refer to port P2 NM2: 	Resonator connecting pins (low-frequency) R_f = 6 MΩ (typ.) R_O = 220 kΩ (typ.) R = 1 kΩ (typ.)
$\overline{\text{RESET}}$	I/O		Sink open drain output Hysteresis input Pull-up resistor R_{IN} = 220 kΩ (typ.) R = 1 kΩ (typ.)
$\overline{\text{STOP}}$/$\overline{\text{INT5}}$	Input		Hysteresis input R = 1 kΩ (typ.)
TEST BOOT	Input		Pull-down resistor R_{IN} = 70 kΩ (typ.) R = 1 kΩ (typ.)

MICROPROCESSOR
TMP87EP26F

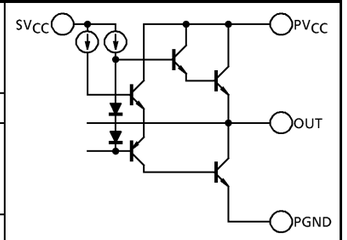
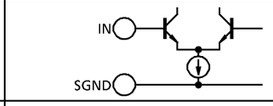
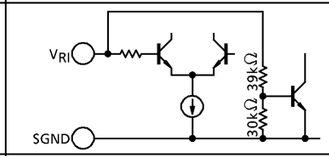
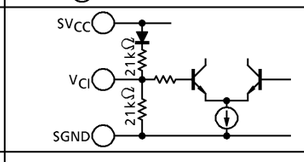
PINS DESCRIPTION

Port	I/O	Input / Output Circuitry and Code	Remarks
P0 P5	I/O	initial "Hi-Z" disable VDD R	Tri-state I/O R = 1 kΩ (typ.)
P1	I/O	initial "Hi-Z" disable VDD R	Tri-state I/O Hysteresis input R = 1 kΩ (typ.)
P3	I/O	initial "Hi-Z" VDD R	Sink open drain output Hysteresis input R = 1 kΩ (typ.)
P2	I/O	initial "Hi-Z" VDD R	Sink open drain output R = 1 kΩ (typ.)
P6 P7 P8 P9	I/O	Segment output disable VDD R	Sink open drain or Segment output R = 1 kΩ (typ.)
P4	I/O	initial "Hi-Z" p-ch Control VDD R	Sink open drain or push-pull output P41 High current output Hysteresis input
PD	I/O	initial "Hi-Z" VDD R	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, ㉔pin are connected inside.	
2	OUT (−) 1	Inverted output for CH1	
3	PV_{CC1}	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	V_{IN1}	Input for CH1 ● Not biased inside	
6	V_{RI}	Input reference voltage ● Under condition of $V_{RI} \leqq$ 1.8V, internal bias circuit is shut off. ● No signal input condition : $V_{RI} = V_{IN}$	
7	V_{CI}	Output reference voltage ● $V_{OUT} = V_{CI} = (V_{CC} - V_F) / 2$	
8	V_{IN2}	Input for CH2	Same as channel 1
9	OUT (+) 2	Non-inverted output for CH2	
10	PV_{CC2}	Supply terminal of output stage for CH2	
11	OUT (−) 2	Inverted output for CH2	
12	PW GND	Power GND	
13	PW GND	Power GND	Same as channel 1
14	OUT (−) 3	Inverted output for CH3	
15	PV_{CC3}	Supply terminal of output stage for CH3	
16	OUT (+) 3	Non-inverted output for CH3	
17	V_{IN3}	Input for CH3	
18	S GND	Supply terminal of small signal GND	—
19	S V_{CC}	Small signal GND	—
20	V_{IN4}	Input for CH4	Same as channel 1
21	OUT (+) 4	Non-inverted output for CH4	
22	PV_{CC4}	Supply terminal of output stage for CH4	
23	OUT (−) 4	Inverted output for CH4	
24	PW GND	Power GND	

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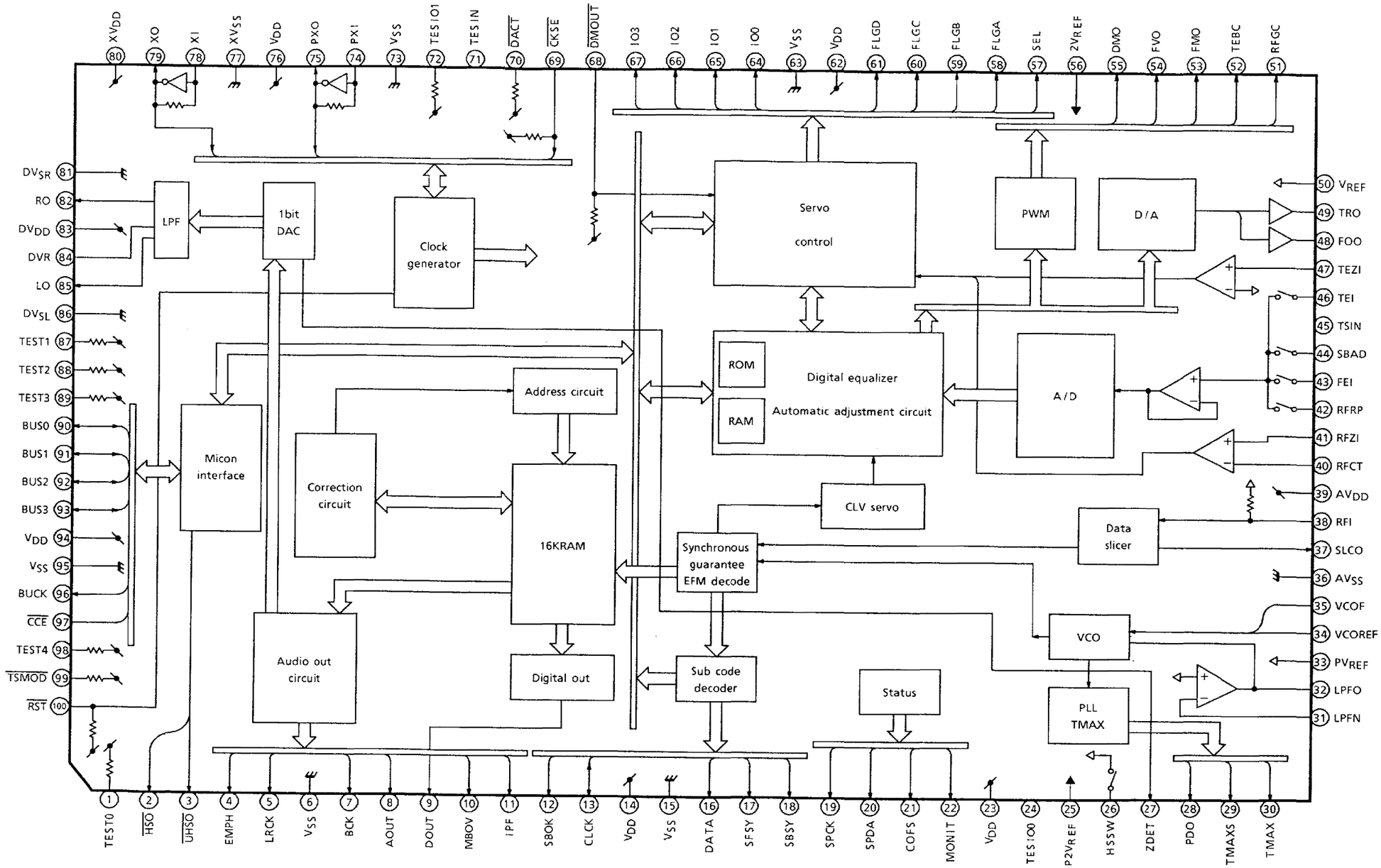
DIGITAL SERVO PROCESSOR
TC9462F

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	$\overline{HSO}$	O	Playback speed mode flag output terminal. $\overline{UHSO}$ / $\overline{HSO}$ / PLAYBACK SPEED H / H / Normal H / L / 2 times L / H / 4 times L / L / —	—
3	$\overline{UHSO}$	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_{SS}	—	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_2 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_{DD}	—	Digital power supply voltage terminal.	—
15	V_{SS}	—	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.	—

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DIGITAL SERVO PROCESSOR
TC9462F

PINS DESCRIPTION

PIN No.	SYMBOL	I/O	FUNCTIONAL DESCRIPTION	REMARKS
23	V_{DD}	—	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	$P2V_{REF}$	—	PLL double reference voltage supply terminal.	—
26	HSSW	O	2/4 times speed at "V_{REF}" voltage.	2-state output. (PV_{REF}, 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. ($P2V_{REF}$, PV_{REF}, V_{SS})
29	TMAXS	O	TMAX detection result output terminal. Selected by command bit (TMPS).	3-state output. ($P2V_{REF}$, PV_{REF}, V_{SS})
30	TMAX	O	TMAX detection result output terminal. Selected by command bit (TMPS). DIFFERENCE RESULT / TMAX OUTPUT Longer than fixed freq. / "$P2V_{REF}$" Shorter than fixed freq. / "V_{SS}" Within the fixed freq. / "HiZ"	3-state output. ($P2V_{REF}$, HiZ, V_{SS})
31	LPFN	I	LPF amplifier inverting input terminal for PLL.	Analog input.
32	LPFO	O	LPF amplifier output terminal for PLL.	Analog output.
33	PV_{REF}	—	PLL reference voltage supply terminal.	—
34	VCOREF	I	VCO center frequency reference level terminal. Normally, keep at "PV_{REF}" level.	—
35	VCOF	O	VCO filter terminal.	Analog output.
36	AV_{SS}	—	Analog GND terminal.	—
37	SLCO	O	Data slice level output terminal.	Analog output.
38	RFI	I	RF signal input terminal.	Analog input. (Z_{in} : selected by command)
39	AV_{DD}	—	Analog power supply voltage terminal.	—
40	RFCT	I	RFRP signal center level input terminal.	Analog input. (Z_{in} : 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 "V_{REF}" 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_{in} : 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. ($2V_{REF}$~AV_{SS})
49	TRO	O	Tracking servo equalizer output terminal.	
50	V_{REF}	—	Analog reference voltage supply terminal.	—
51	RFGC	O	RF amplitude adjustment control signal output terminal.	3-state PWM signal output. ($2V_{REF}$, V_{REF}, V_{SS}) (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. ($2V_{REF}$, V_{REF}, V_{SS})
56	$2V_{REF}$	—	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	Extemal flag output terminal for internal signal. Can select signal from TEZC, $\overline{FOON}$, $\overline{FOK}$ and RFZC by command.	—
59	FLGB	O	Extemal flag output terminal for internal signal. Can select signal from $\overline{DFCT}$, $\overline{FOON}$, $\overline{FMON}$ and RFZC by command.	—
60	FLGC	O	Extemal flag output terminal for internal signal. Can select signal from $\overline{TRON}$, $\overline{TRSR}$, $\overline{FOK}$ and $\overline{SRCH}$ by command.	—
61	FLGD	O	Extemal flag output terminal for internal signal. Can select signal from $\overline{TRON}$, $\overline{DMON}$, $\overline{HYS}$ and $\overline{SHC}$ by command.	—
62	V_{DD}	—	Digital power supply voltage terminal.	—
63	V_{SS}	—	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	$\overline{DMOUT}$	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	$\overline{CKSE}$	I	Normally, keep at open.	With pull-up resistor.
70	$\overline{DACT}$	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.

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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_{SS}	—	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_{DD}	—	Digital power supply voltage terminal.	—
77	XV_{SS}	—	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_{DD}	—	Oscillator power supply voltage terminal for system clock.	—
81	DV_{SR}	—	Analog GND terminal for DA converter. (R-ch)	—
82	RO	O	R channel data forward output terminal.	—
83	DV_{DD}	—	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_{SL}	—	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_{DD}	—	Digital power supply voltage terminal.	—
95	V_{SS}	—	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.

8-7

CIRCUIT DIAGRAM - MCU&CD BOARD

IC301
TMP87EP26F-XXXX

IC402
TC9462F

IC403 TA2092N

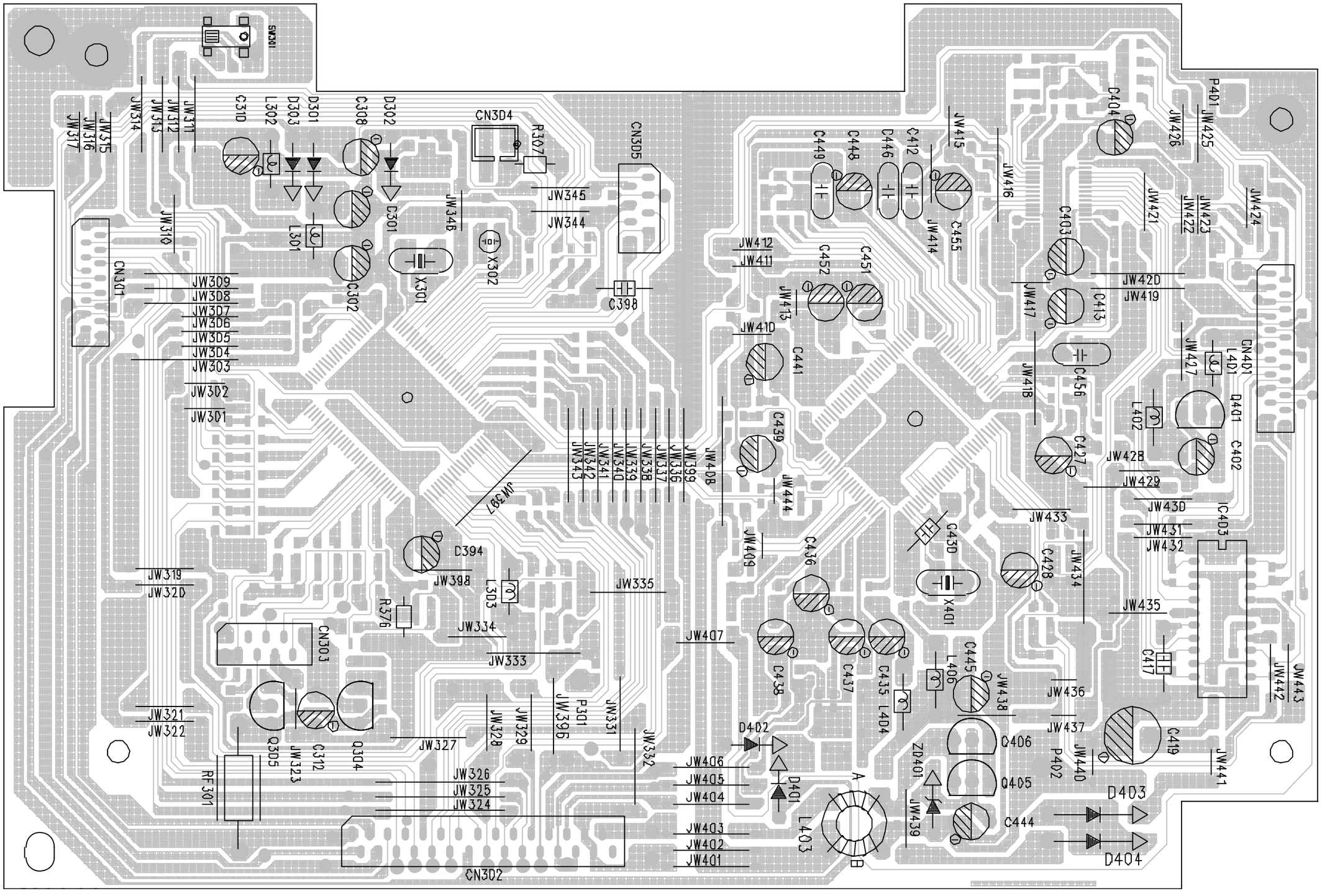
IC401
TA2153FN

REMARK NM---NO MOUNTING

NOTE (1): TA2092N WITH HEAT SINK.
NOTE (2): U1-Pin 31,32,78,79 and U2-Pin 4,5,6,7,28,30
in PCB Layout make the pattern lengrh as short as possible.

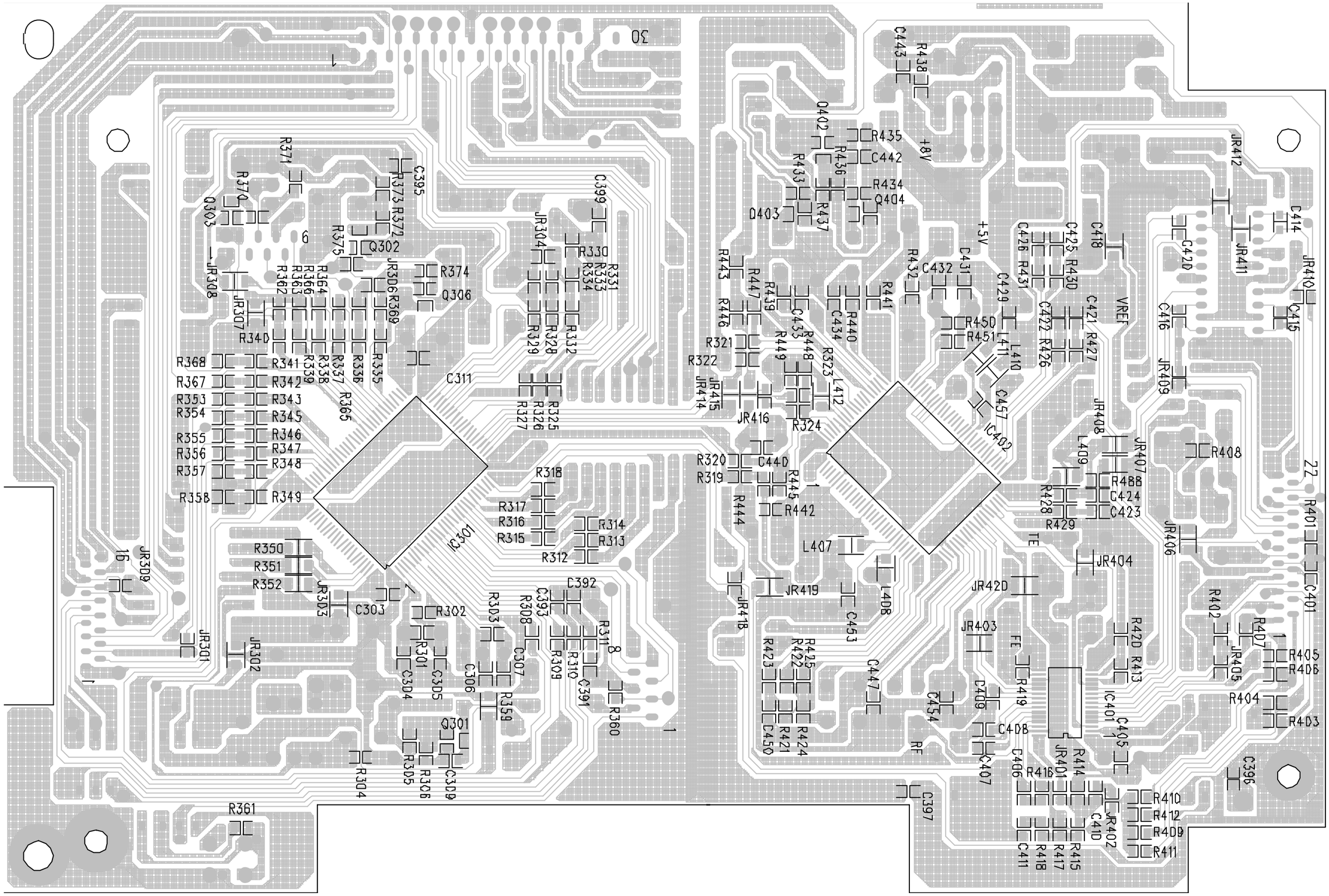
8-8

LAYOUT DIAGRAM - MCU&CD BOARD
COMPONENT SIDE



8-9

LAYOUT DIAGRAM - MCU&CD BOARD
SMD SIDE



8-10

ELECTRICAL PARTSLIST - CD MCU BOARD

- MISCELLANEOUS -

CN301	9965 000 18272	CONN 16P
CN302	9965 000 18232	CONN 30P P=1.25 V
CN303	9965 000 18273	CONN 9P
CN304	9965 000 14709	TERMINAL PIN
CN401	9965 000 18274	CONN 22P
	9965 000 18285	SWITCH SIDE SPVF130100

- RESISTORS -

RF301	⚠	9965 000 14537	1/2W 1Ω

- COILS & FILTERS -

L301	9965 000 16274	FIXED IND 100μH TP=52MM
L302	9965 000 16274	FIXED IND 100μH TP=52MM
L303	9965 000 16274	FIXED IND 100μH TP=52MM
L401	9965 000 18278	FIXED IND 10μH TP=26MM
L402	9965 000 18279	FIXED IND 47MH TP=26MM
L404	9965 000 18280	IND (AXIAL) 100MH 1.8Ω
L406	9965 000 18278	FIXED IND 10μH TP=26MM
L407	9965 000 18281	COIL 10μH
L408	9965 000 18281	COIL 10μH
L409	9965 000 18281	COIL 10μH
L410	9965 000 18281	COIL 10μH
L411	9965 000 18281	COIL 10μH
L412	9965 000 18281	COIL 10μH
X301	9965 000 18282	CRYSTAL 7.3728 MHZ
X302	9965 000 18283	CRYSTAL 32.768KHZ
X401	9965 000 18284	CER RESONATOR 16.93MHZ

- DIODES -

D301	4822 130 30621	1N4148
D302	4822 130 30621	1N4148
D303	4822 130 30621	1N4148
D403	4822 130 31878	1N4003G
D404	4822 130 31878	1N4003G
ZD401	4822 130 34173	BZX79-C5V6

- IC & TRANSISTORS -

IC301	9965 000 18275	IC MCU TMP87EP26F4K76
IC401	9322 171 88668	IC SM TA2153FN (TOSJ) R
IC402	9965 000 18276	IC TC9462F
IC403	9965 000 18277	IC TA2092N
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

- IC & TRANSISTORS -

Q401	5322 130 44593	BC369
Q405	4822 130 40981	BC337-25
Q406	4822 130 40981	BC337-25

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

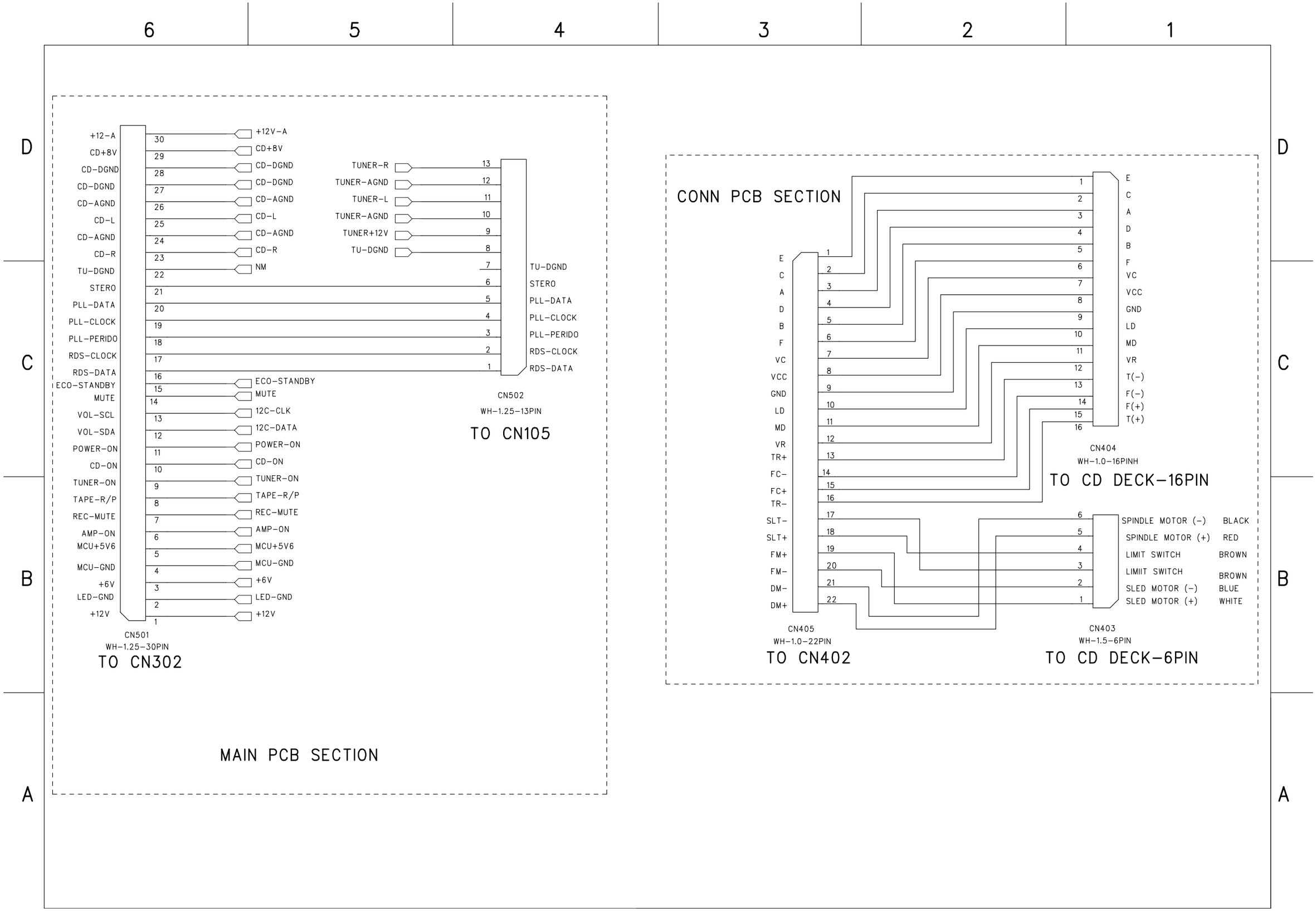
9-1

CONNECTION BOARD

TABLE OF CONTENTS

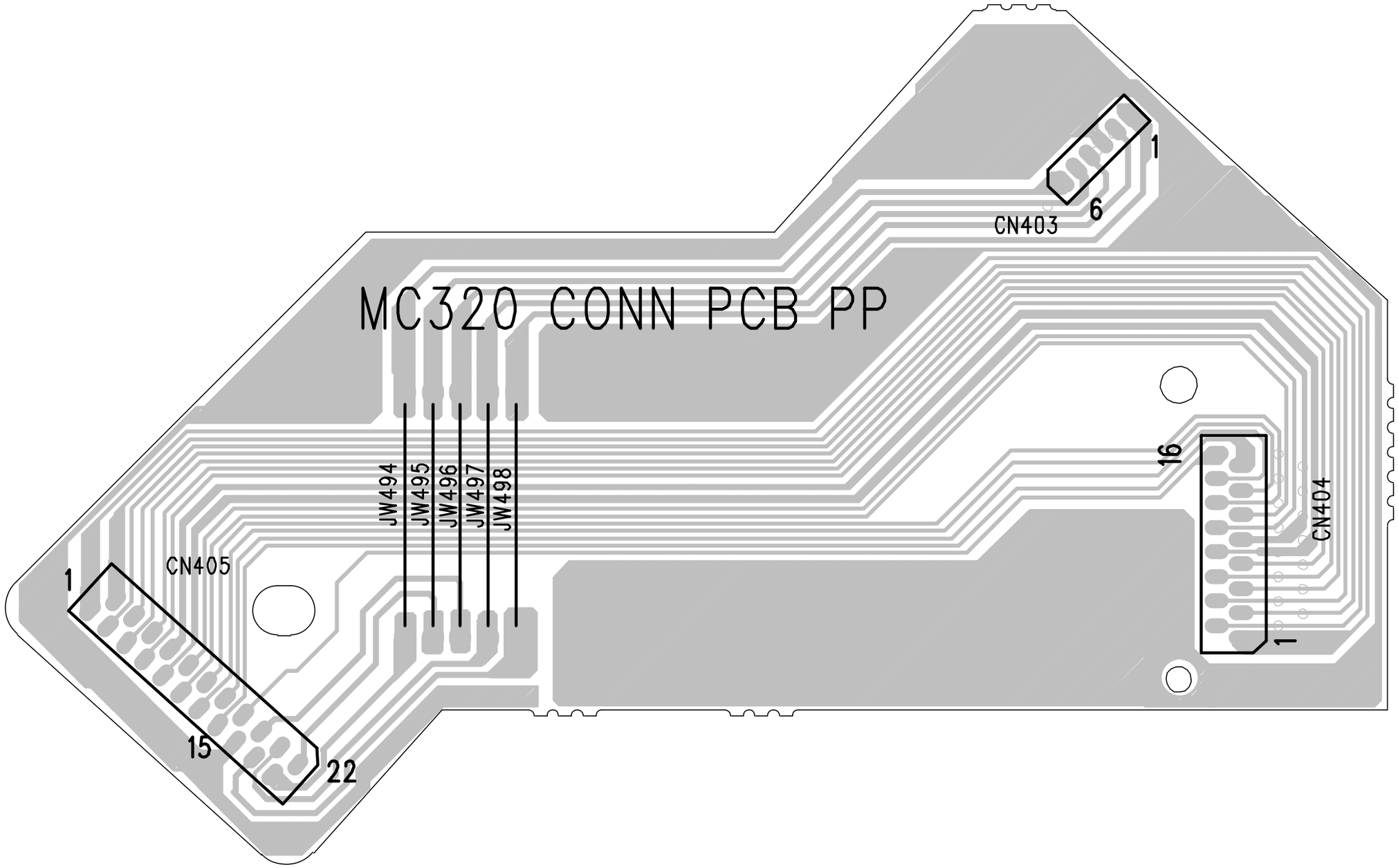
9-2

CONNECTION PCB CIRCUIT DIAGRAM



9-3

CONNECTION PCB LAYOUT DIAGRAM



9-4

ELECTRICAL PARTSLIST - CONNECTION BOARD

- MISCELLANEOUS -

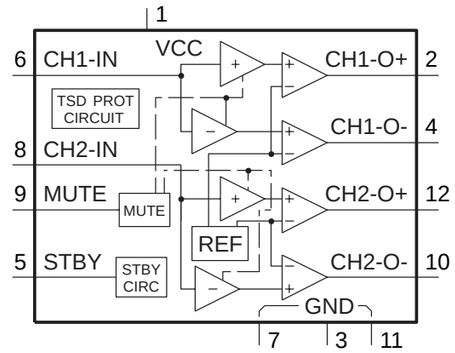
CN403	9965 000 18229	CONN P=1.5 H 6PIN
CN404	9965 000 18230	CONN 16P H P=1.0
CN405	9965 000 18231	CONN 22P P=1.0 H

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

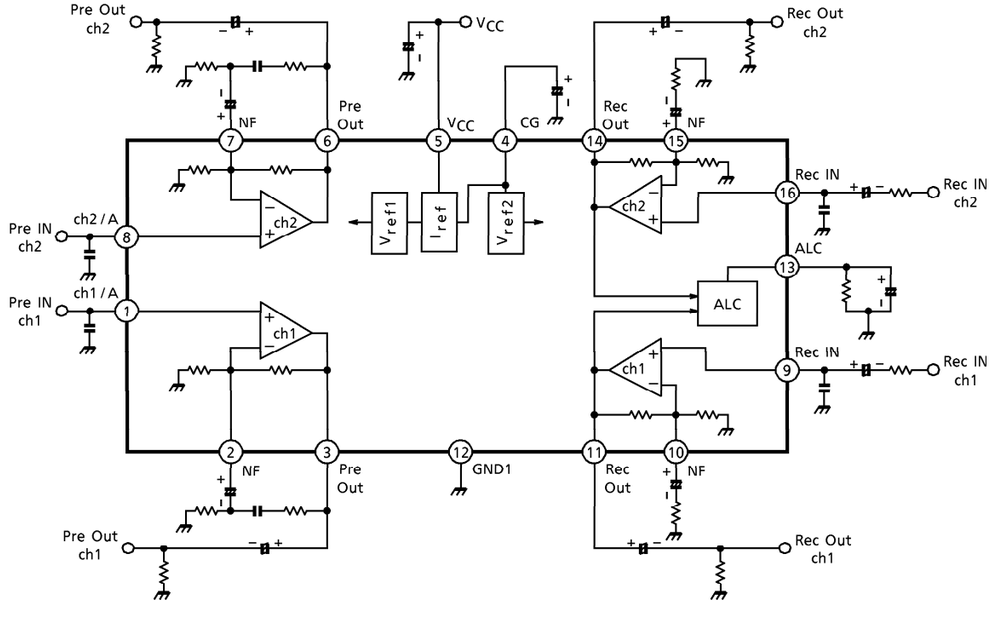
MAIN BOARD

TABLE OF CONTENTS

IC BLOCK DIAGRAM
AN17830A

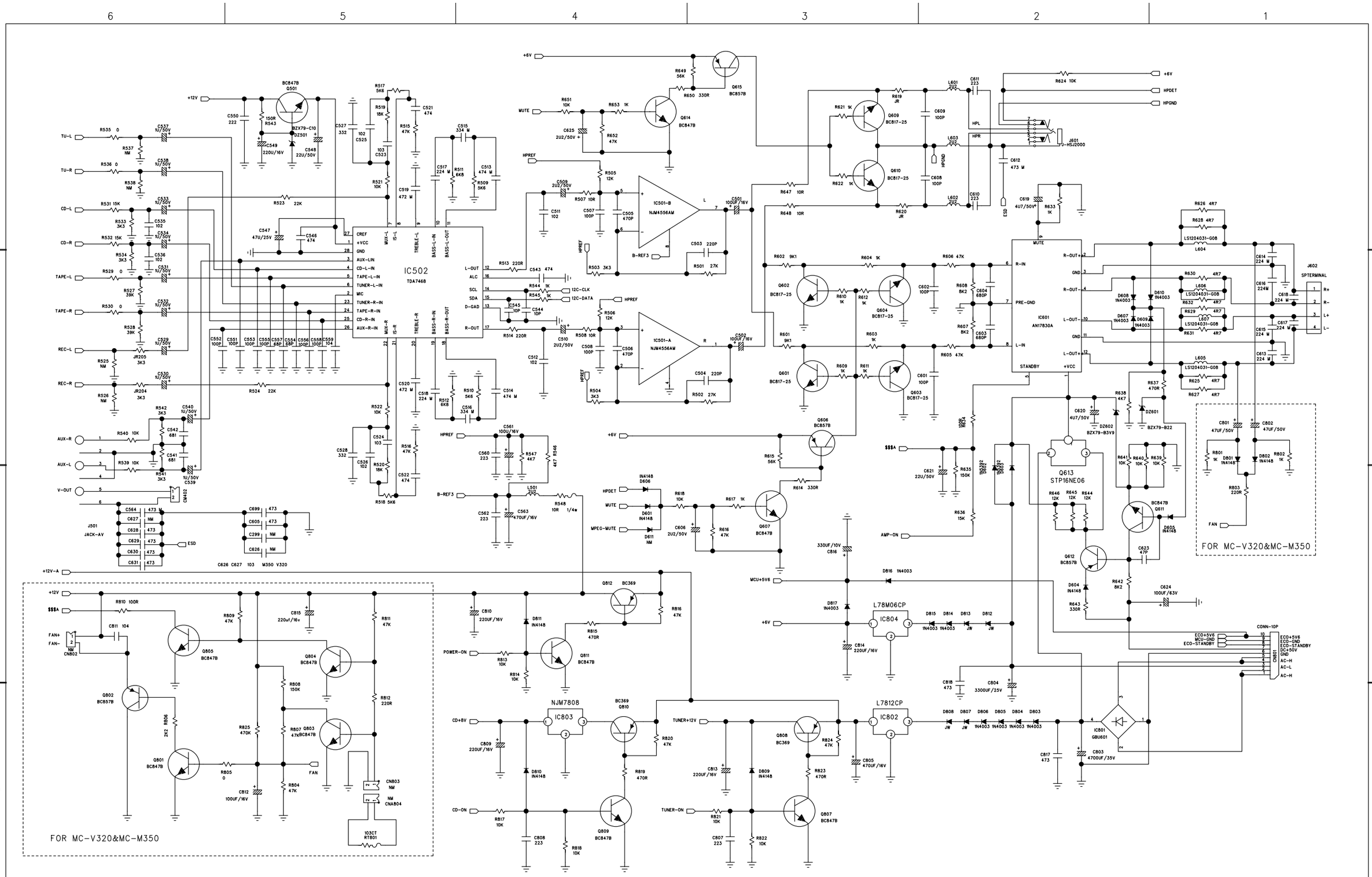


IC BLOCK DIAGRAM
TA8142AP



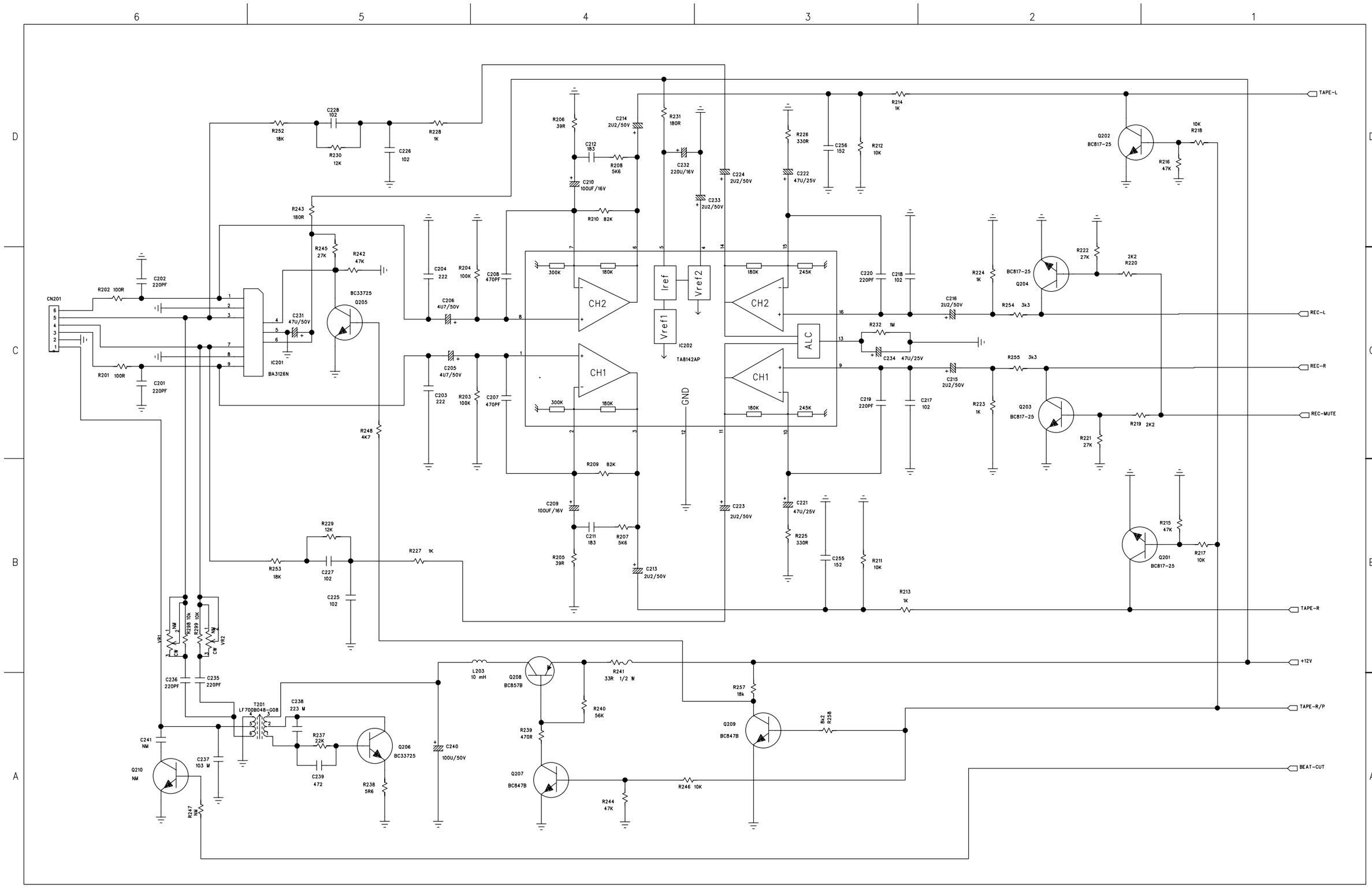
10-2

MAIN BOARD - CIRCUIT DIAGRAM



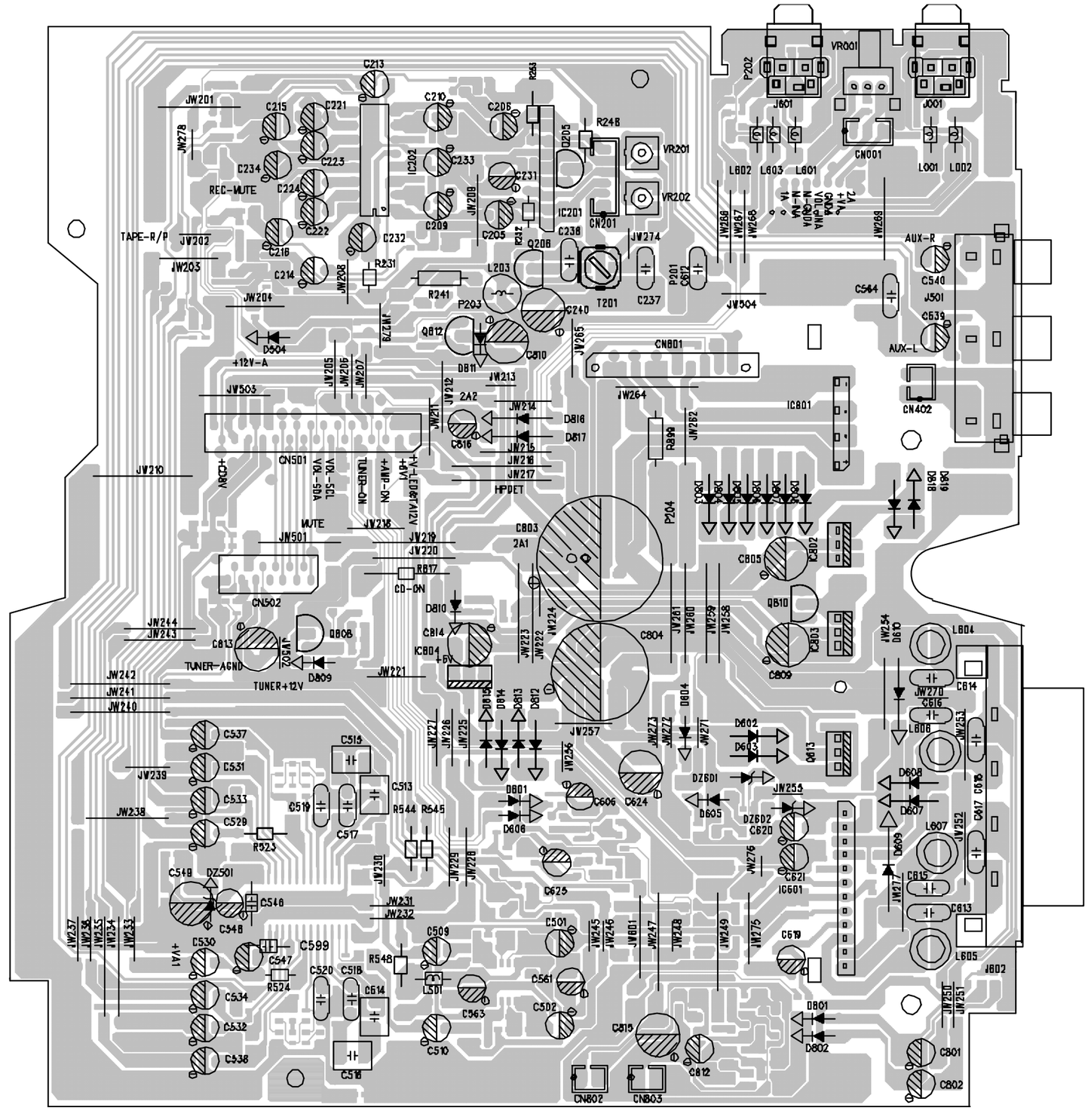
10-3

TAPE PART - CIRCUIT DIAGRAM



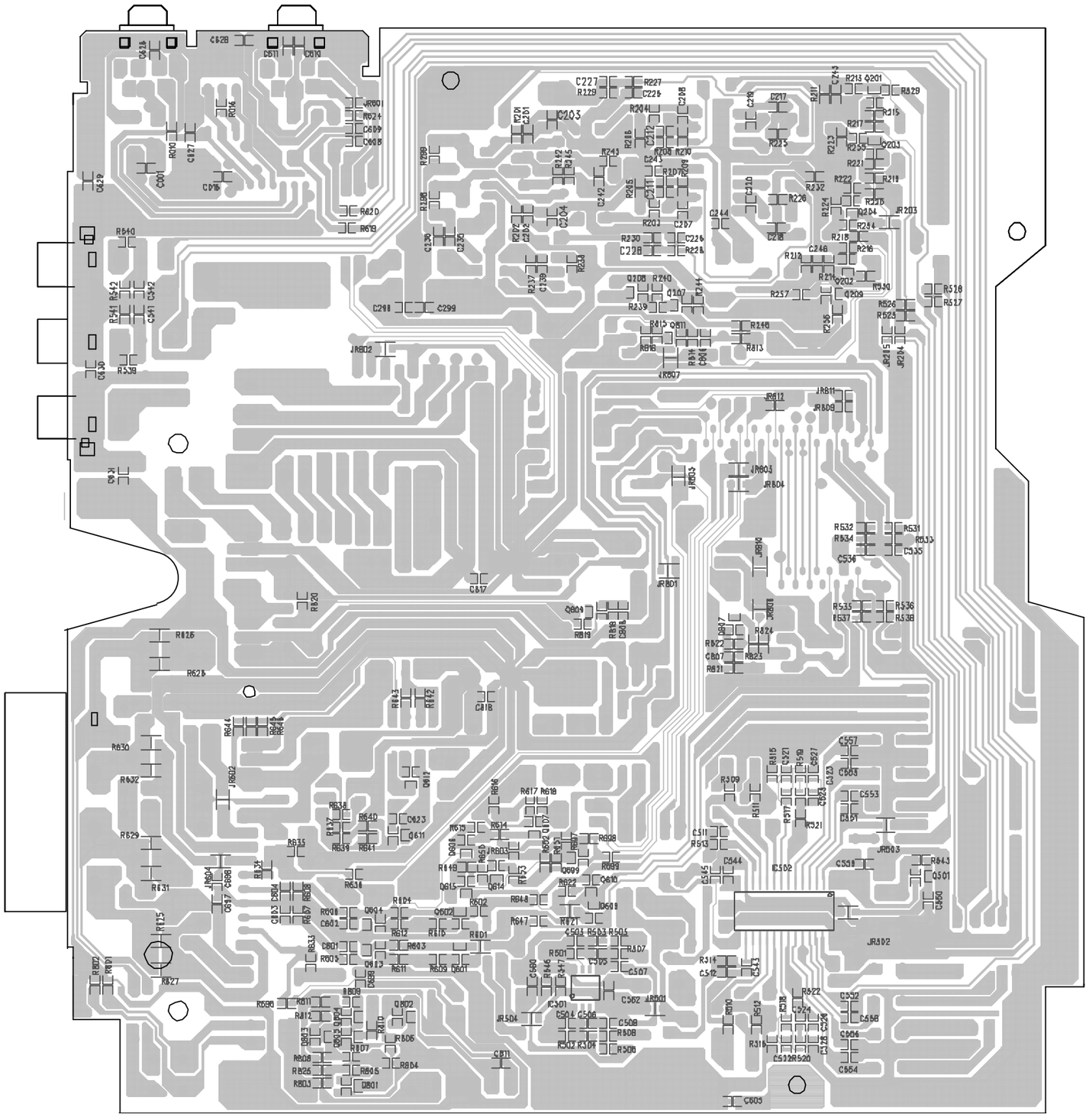
10-4

MAIN PCB - COMPONENT LAYOUT

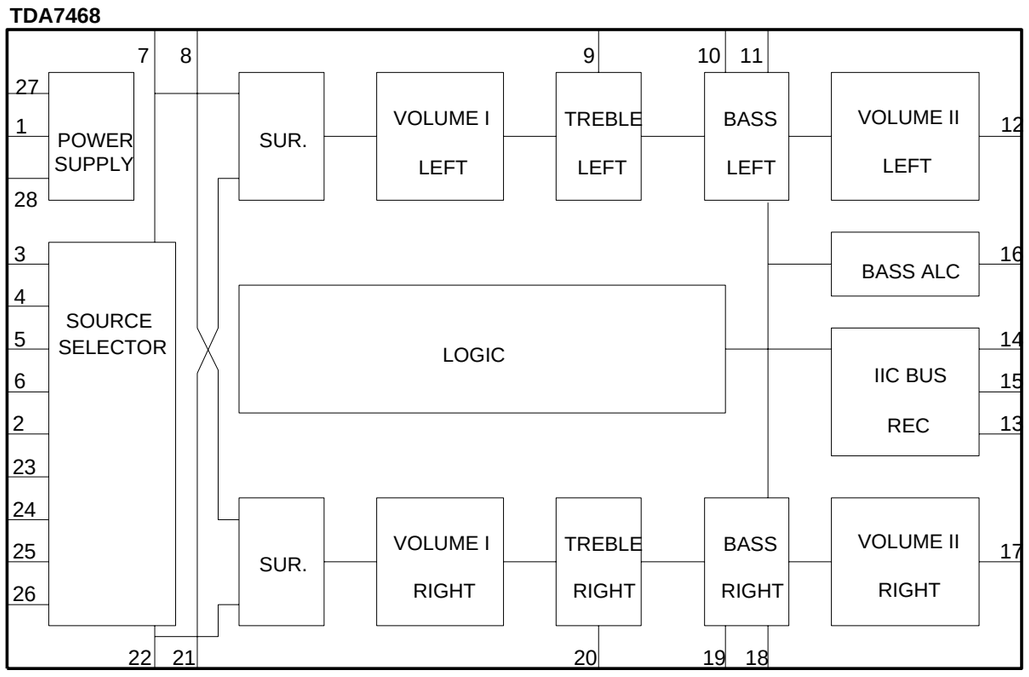


10-5

MAIN PCB - SMD LAYOUT



TDA7468 INTERNAL BLOCK DIAGRAM



10-6

ELECTRICAL PARTSLIST - MAIN BOARD

- MISCELLANEOUS -

2A1	9965 000 14709	TERMINAL PIN
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
J 501	9965 000 18238	J ACK-AV 2 MC-320
J 601	9965 000 14524	HEADPHONE J ACK
J 602	9965 000 18239	SPKTERMINAL 4P 94V0

- RESISTORS -

R241	⚠	9965 000 18241	FUSE RESISTOR 33Ω 1/2W
R548	⚠	9965 000 18242	FUSE RES NFR 25A 10Ω

- COILS & FILTERS -

L203	9965 000 18240	FIXED IND 10MH
L501	4822 157 11477	LAL02TB2R2J
L601	4822 157 11477	LAL02TB2R2J
L602	4822 157 11477	LAL02TB2R2J
L603	4822 157 11477	LAL02TB2R2J
L604	9965 000 14724	SPRING COIL 1.0μH K
L605	9965 000 14724	SPRING COIL 1.0μH K
L606	9965 000 14724	SPRING COIL 1.0μH K
L607	9965 000 14724	SPRING COIL 1.0μH K
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
D803	9965 000 18235	DIODE FR202
D805	9965 000 18235	DIODE FR202
D807	9965 000 18235	DIODE FR202
D809	4822 130 30621	1N4148
D810	4822 130 30621	1N4148
D811	4822 130 30621	1N4148
D814	4822 130 31878	1N4003G
D815	4822 130 31878	1N4003G
D816	4822 130 31878	1N4003G
D817	4822 130 31878	1N4003G
D818	9965 000 18235	DIODE FR202

- DIODES -

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	4822209 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	9965 000 18237	IC L78M06CV
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
Q807	5322 130 60159	BC846B
Q808	5322 130 44593	BC369
Q809	5322 130 60159	BC846B
Q810	5322 130 44593	BC369
Q811	5322 130 60159	BC846B
Q812	5322 130 44593	BC369

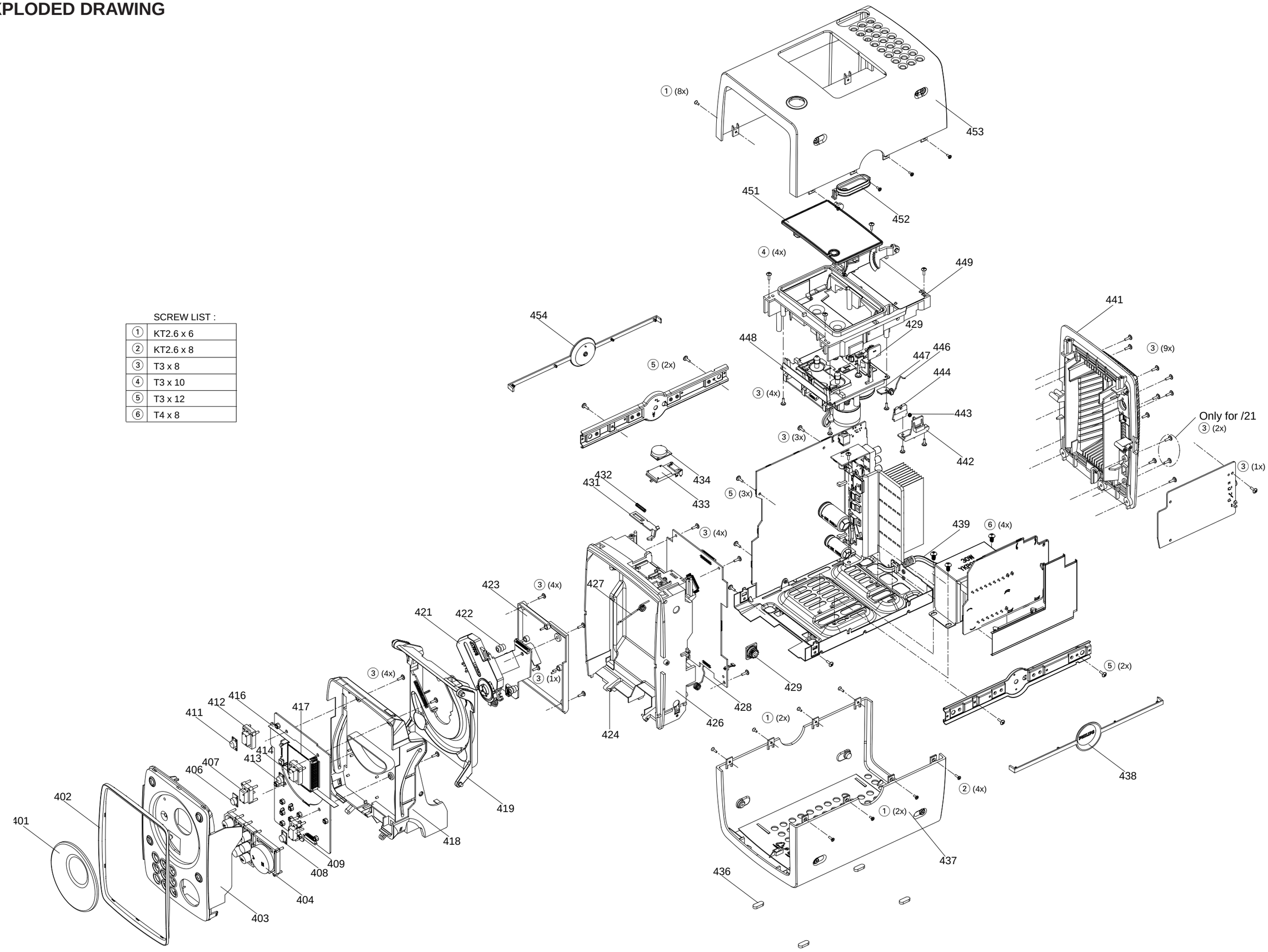
Note: Only these parts mentioned in the list are normal service parts.

11-1

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



11-2

MECHANICAL & ACCESSORIES PARTSLIST

401	9965 000 18295	CD DOOR LENS /22/25		4822 303 50082	AM LOOP ANTENNA
401	9965 000 18186	CD DOOR LENS /21/30/37		9965 000 11157	FM ANTENNA WIRE /21/22/25/30
402	9965 000 18185	CD CHROME RING		9965 000 18328	FM ANT 300Ω-75Ω /37
402	9965 000 18187	CD DOOR PANEL /21/30/37		9965 000 18210	IFU MC320/21/30
403	9965 000 18296	CD DOOR PANEL /22/25		9965 000 18298	IFU MC320/22/25
404	9965 000 18182	KEY SET FUNCTION		9965 000 18324	IFU MC320/37
406	9965 000 18194	KEY DISPLAY CAP		9965 000 18218	SPK BOX MC-320 20W L.R
407	9965 000 18203	KEY DISPLAY BRACKET	⚠	9965 000 18219	POWER TRANS. H /21
408	9965 000 18196	KEY REC CAP	⚠	9965 000 18299	POWER TRANS. H /22/25/30
409	9965 000 18205	KEY REC BRACKET	⚠	9965 000 18325	POWER TRANS. U /37
411	9965 000 18193	KEY POWER CAP		9965 000 18222	REMOTE CONTROL MC-320
412	9965 000 18202	KEY POWER BRACKET		9965 000 18224	FFC 9P L=250MM P=1.25
413	9965 000 18195	KEY IR CAP		9965 000 18225	FFC 13P L=200MM P=1.25
414	9965 000 18204	KEY IR BRACKET		9965 000 18226	FFC P=1.0 L=115MM
416	9965 000 18255	REFLECT LIGHT GUIDE		9965 000 18227	FFC 22P L=90MM P=1.0
417	9965 000 18256	LCD LIGHT GUIDE		9965 000 18228	FFC 30P L=150MM P=1.25
418	9965 000 18177	CD DOOR	⚠	9965 000 18217	AC CONVERSION /21
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			
429	4822 529 10322	DAMPER ASSY			
431	9965 000 18198	CD DOOR LEVER			
432	9965 000 18214	CD DOOR LEVER SPRING			
433	9965 000 18197	CD DOOR KNOB CAP			
434	9965 000 18206	CD DOOR KNOB BRACKET			
436	9965 000 18208	FOOT RUBBER			
437	9965 000 18178	CAB BOTTOM /21/22/25/30			
437	9965 000 18321	CAB BOTTOM /37			
438	9965 000 18200	BRAND RIM RIGHT			
439	⚠ 9965 000 18223	AC CORD E 1750MM /21/22			
439	⚠ 9965 000 18319	AC CORD 1750MM /25			
439	⚠ 9965 000 18320	AC CORD 1750MM /30			
439	⚠ 9965 000 18326	AC CORD U 1750MM /37			
441	9965 000 18190	CAB REAR /21			
441	9965 000 18297	CAB REAR /22/25/30			
441	9965 000 18323	CAB REAR /37			
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 18184	CASS BRACKET			
451	9965 000 18183	CASS DOOR			
452	9965 000 18201	DECORATION TOP			
453	9965 000 18179	CAB TOP /22/25/30			
453	9965 000 18322	CAB TOP /37			
454	9965 000 18199	BRAND RIM LEFT			

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