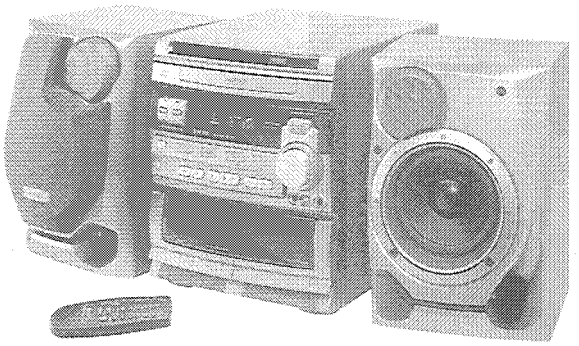
Mini System

FW325/22

FW326/21/21M/22/34

Service
Service
Service



Manual #1888
FW325/326

Service Manual

COMPACT disc DIGITAL AUDIO

TABLE OF CONTENTS

CLASS 1
LASER PRODUCT

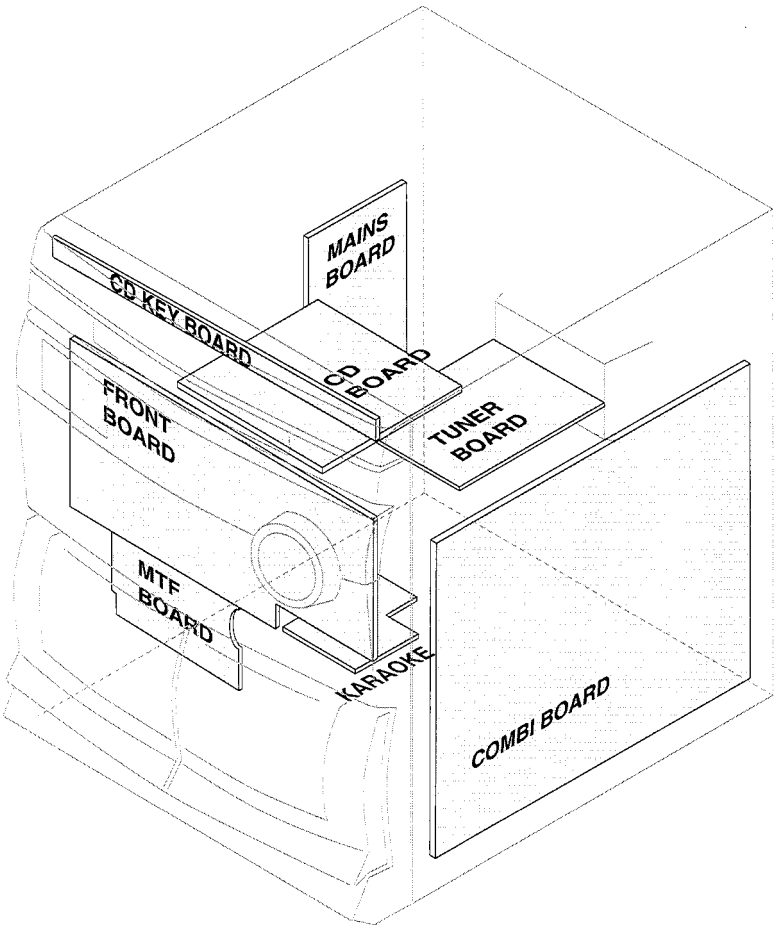
Published by KC 9819 Service Audio Printed in The Netherlands Subject to modification

GB 4822 725 25798

PCS 100 273

PHILIPS

LOCATION OF PC BOARDS



VERSION VARIATIONS:

Type /Versions: / Features & Board in used:	FW326						FW325	
	/21	/21M	/22	/34			/22	
Aux Input	x	x	x	x			x	
Line Output								
Subwoofer Output								
Surround Output								
Digital Output								
Dolby B								
RDS			x					
Incredible Surround	x	x	x	x				
Karaoke Feature	x	x						
Tuner board - ECO5 Sys	x	x		x				
Tuner board - Tuner 95			x				x	
Remote Control RC0797/01	x	x	x	x				
Remote Control RC0798/01							x	

SPECIFICATIONS

GENERAL:

Mains voltage : 100V for /26
110-127V/220-240V Switchable for /21
120V for /37
220V for /33
220-230V for /22/34
230V for /25
230-240V for /30

Mains frequency : 50/60Hz
Power consumption : < 15 W at power mode "OFF"
< 45 W at 1/8 rated power out
Clock accuracy : < 4 seconds per day
Dimension centre unit : 265 x 310 x 330mm

TUNER:

FM

Tuning range : 87.5-108MHz
65.81-74MHz for /34
Grid : 50kHz (& 30kHz for /34)
100kHz for /37
IF frequency : 10.7MHz ± 25kHz
Aerial input : 75ohm coaxial
300ohm click fit for /37
Sensitivity at 26dB S/N : < 7µV
Selectivity at 600kHz bandwidth : > 50dB
Image rejection : > 25dB [> 75dB]
Distortion at RF=1mV, dev. 75kHz : < 3% [< 2%]
-3dB Limiting point : < 7µV
Crosstalk at RF=1mV, dev. 40kHz : > 18dB [> 26dB]

MW

Tuning range : 531-1602kHz
530-1700kHz for /21/37
Grid : 9kHz
10kHz for /21/37
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : < 4.0mV/M
Selectivity at 18kHz bandwidth : > 18dB
IF rejection : > 45dB
Image rejection : > 28dB
Distortion at RF=50mV, m=80% : < 5% [< 7%]

LW

Tuning range : 153-279kHz
Grid : 3kHz
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : [< 7.0mV/M]
Selectivity at 18kHz bandwidth : [> 24dB]
IF rejection : [> 26dB]
Image rejection : [> 35dB]
Distortion at RF=50mV, m=80% : [< 7%]

AMPLIFIER:

Output power (6ohm, 1 kHz, 10% THD) : 2 x 25W ± 1dB
Frequency response within -3dB : 50Hz-15kHz
Dynamic Bass Boost : DBB ON, DBB Off [1)]
Digital Sound Control : Jazz, Techno, Optimal, Rock [1)]
Incredible Surround : IS ON, IS Off [1)]
Headphone output at 32 ohm : 16.5mW
Input sensitivity
Aux/Line-in : 700mV ± 2dB at 600ohm
Mic : 2.5mV ± 2dB at 600ohm

CASSETTE RECORDER:

Number of track : 2 x 2 stereo
Tape speed : 4.76 cm/sec ± 2%
1.7 x 4.76 cm/sec
Wow and flutter : < 0.4% DIN
Fast-wind/rewind time C60 : 110 sec
Bias system : 75kHz ± 5kHz
Rec/Pb frequency response within 8dB : 80Hz - 12.5kHz
Signal to noise ratio : > 43dB

COMPACT DISC:

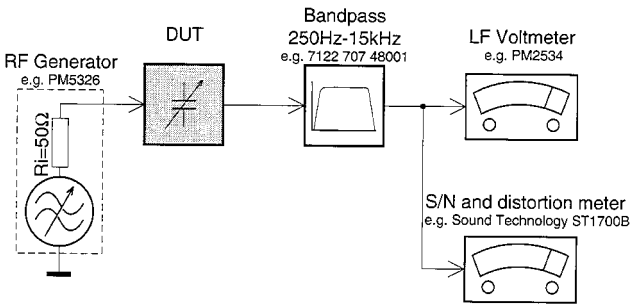
Measurement done at output conn. of the CDC module.
Frequency response within ± 1.5dB : 20Hz - 20kHz
Output level (in Vrms) : 550mV ± 1dB unloaded
Signal/Noise ratio (A-weighted) : > 80dBA
Distortion at 1kHz : < 0.5%
Channel difference at 1kHz : < 1dB
Channel crosstalk at 1kHz : > 45dB
De-emphasis : 0 or 15/50 mS (Switched by subcode on the disc)

[....] Values indicated are for "Tuner 95 Board" only

1) Frequency response in each setting is software controlled.

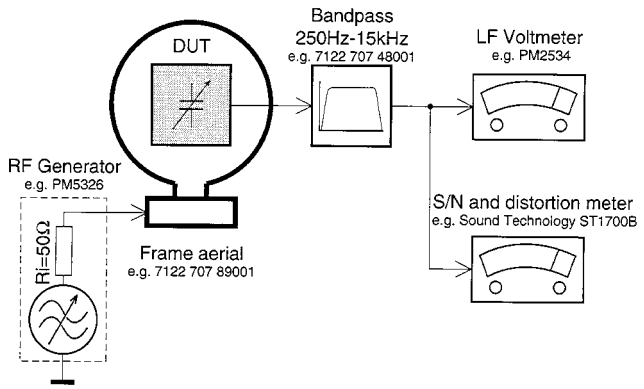
MEASUREMENT SETUP

Tuner FM



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

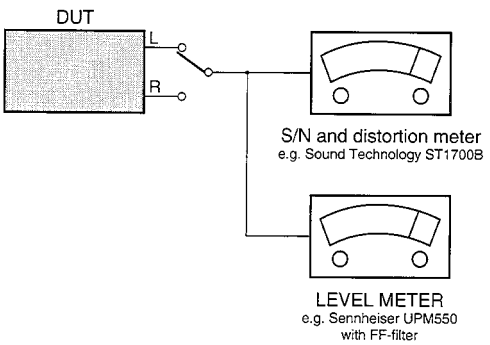
Tuner AM (MW,LW)



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).

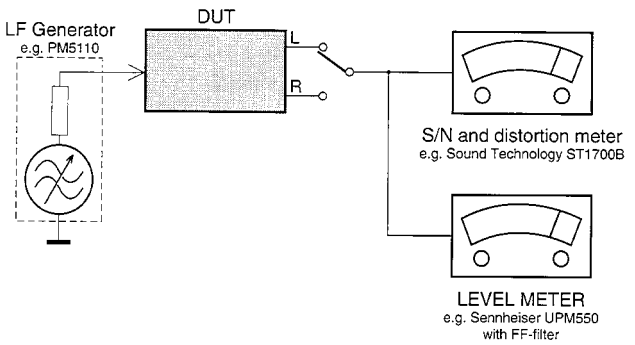
CD

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

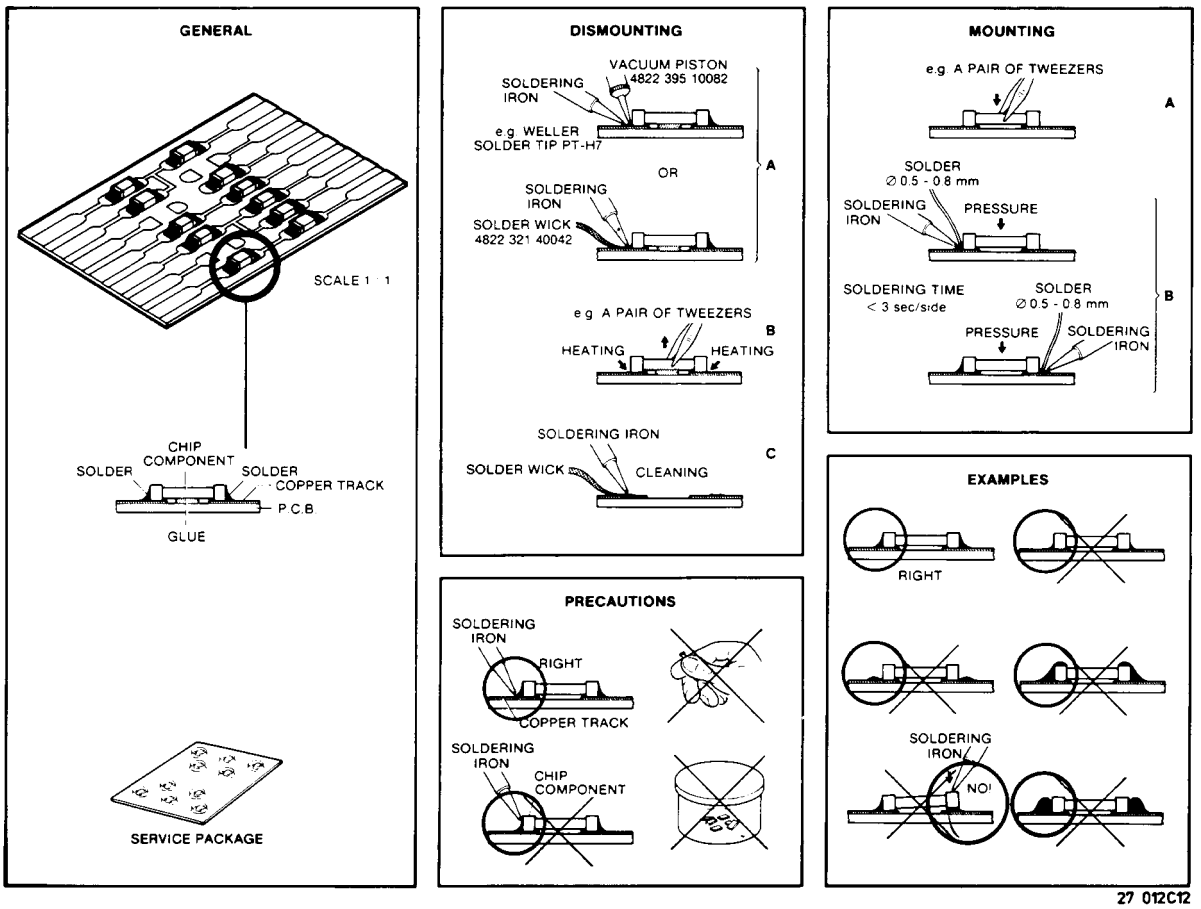
Compact Disc:

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



27 012C12

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.

(NL) WAARSCHUWING

Alle IC's en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

(F) ATTENTION

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

(D) WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
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.

(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.

INDEX

GENERAL INFORMATION

General Information

- ***The type plate (which contains the serial number) is located at the rear of the system.***
- ***Recording is permissible if copyright or other rights of third parties are not infringed.***
- ***This product complies with the radio interference requirements of the European Community.***

Environmental Information

All unnecessary packaging material has been omitted. We have done our utmost to make the packaging easily separable into three mono-materials: cardboard (box), polystyrene foam (buffer) and polythene (bags, protective foam sheet).

Your system consists of materials which can be recycled and reused if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packaging materials, exhausted batteries and old equipment.

Accessories *(Supplied)*

- Remote control
- Batteries (2 x AAA size) for remote control
- AM loop antenna
- FM antenna wire
- AC power cord

SAFETY INFORMATION

English

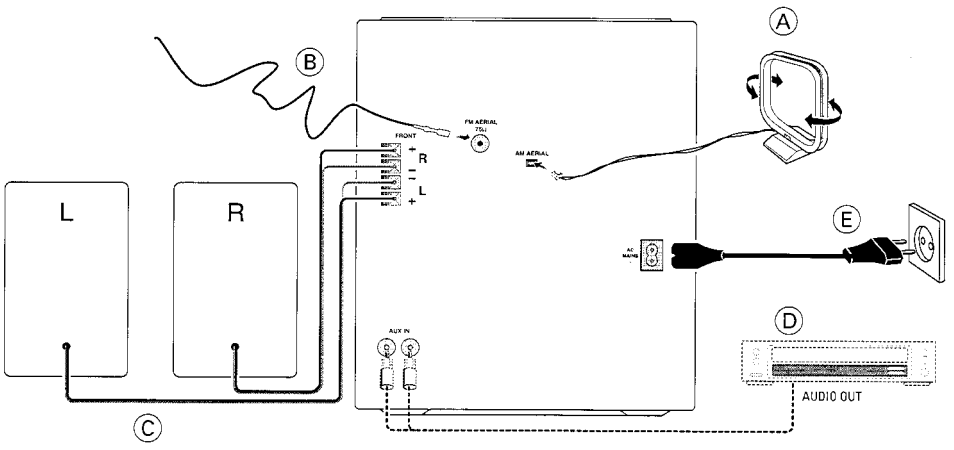
Safety Information

- Before operating the system, check that the operating voltage indicated on the typeplate (or the voltage indication beside the voltage selector) of your system is identical with the voltage of your local power supply. If not, please consult your dealer. The type plate is located at the rear of your system.
- When the system is switched on, do not move it around.
- Place the system on a solid base (e.g. a cabinet).
- Place the system in a location with adequate ventilation to prevent internal heat build-up in your system.
- Do not expose the system to excessive moisture, rain, sand or heat sources.
- Under no circumstances should you repair the system yourself, as this will invalidate the warranty!
- If the system is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the lens of the CD unit inside the system. Should this occur, the CD player will not operate normally. Leave the power on for about one hour with no disc in the system until normal playback is possible.
- Electrostatic discharge may cause unexpected problems. See whether these problems disappear if you unplug the AC power cord and plug it in again after a few seconds.
- **To disconnect the system from the power supply completely, remove the AC power plug from the wall socket.**

PREPARATION

English

Rear Connections



PREPARATION

English

Ⓐ AM Antenna Connection

Connect the supplied loop antenna to the AM AERIAL terminal. Place the AM loop antenna far away from the system and adjust its position for the best reception.

Ⓑ FM Wire Antenna Connection

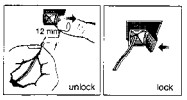
Connect the supplied FM wire antenna to the FM 75 Ω terminal. Adjust the position of the FM antenna for the best reception.

Outdoor Antenna

For better FM stereo reception connect an outdoor FM antenna to the FM AERIAL 75 Ω terminal using a 75 Ω coaxial wire.

Ⓒ Speaker Connections

- Connect the right speaker to Front terminal R, with the red wire to + and the black wire to −.
- Connect the left speaker to Front terminal L, with the red wire to + and the black wire to −.
- Clip the stripped portion of the speaker wire as shown.



Ⓓ Connecting other equipment to your system

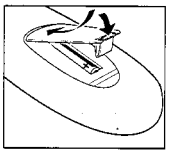
You can connect the audio left and right OUT terminals of a TV, VCR, Laser Disc or DVD player to the AUX IN terminals at the rear of the system.

Ⓔ AC Power Supply

After all other connections have been made, connect the AC power cord to the system and to the wall outlet.

Inserting batteries into the Remote Control

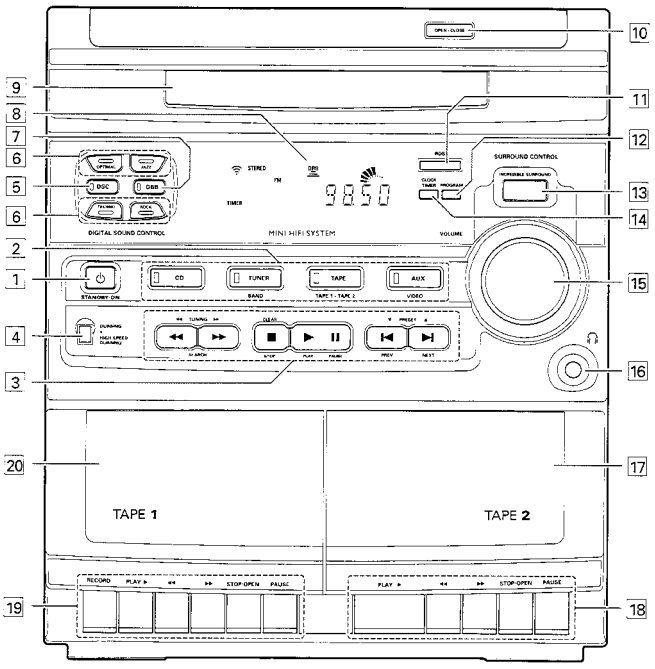
- Insert the batteries (Type R03 or AAA) into the remote control as shown in the battery compartment.

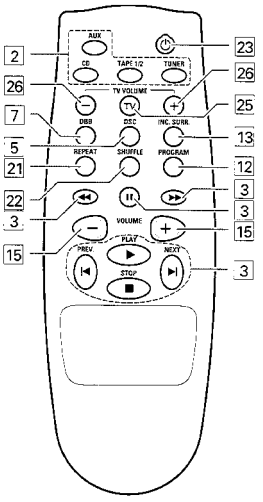


- To avoid damage from possible battery leakage, remove dead batteries or batteries that will not be used for a long time. For replacement, use type R03 or AAA batteries.

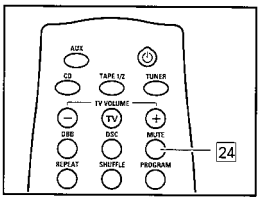
CONTROLS

English





FW 326



FW 306
FW 325

CONTROLS

English

Controls on the system and remote control

1 **STANDBY-ON**
– to switch the system on or to standby mode.
– to store radio stations automatically by pressing and holding for 2 seconds.

2 **SOURCE** : to select the following.
CD
– to select CD mode.
TUNER / (BAND)
– to select Tuner mode. When in tuner mode; to select the waveband: FM, MW or LW.
TAPE / (TAPE 1•TAPE 2)
– to select Tape mode.
AUX / (VIDEO)
– to select sound from an external source (e.g. TV, Laser Disc, DVD or VCR player).

3 **MODE SELECTION**
SEARCH ◄◄ ►► (TUNING ◄◄ ►►)
for CD ..... to search backward/forward.
for TUNER ..... to tune to a lower or higher radio frequency.
STOP ■ (CLEAR)
for CD ..... to stop CD playback or clear a program.
for TUNER ..... to stop programming.
PLAY PAUSE ► ❚❚
for CD ..... to start or interrupt playback.
PREV ⏮ / NEXT ⏭ (PRESET ▲▼)
for CD ..... to skip to the beginning of the current or previous/next track.
for TUNER ..... to select a preset station in memory.

4 **DUBBING**
– to dub a tape in normal or high speed.

5 **DIGITAL SOUND CONTROL (DSC)**
– to select the desired sound effect : OPTIMAL, JAZZ, ROCK or TECHNO.

6 **DIGITAL SOUND CONTROL DISPLAY PANEL**
– to view the selected DSC display.

7 **DYNAMIC BASS BOOST (DBB)**
– to switch on bass boost to enhance bass response or to switch off bass boost.

8 **DISPLAY**
– to view the current setting of the system.

9 **CD TRAY**

10 **OPEN•CLOSE**
– to open or close the CD tray.

11 **RDS** *(available in model FW326 only)*
– to select RDS data.

12 **PROGRAM**
– to program CD tracks in CD mode or preset radio stations in tuner mode.

13 **INCREDIBLE SURROUND** *(available in model FW326 only)*
– to switch on or off the surround sound effect.

14 **CLOCK•TIMER**
– to view clock, set clock or timer.

15 **VOLUME**
– to adjust the volume level.

16 🎧
– to connect headphones.

17 **TAPE DECK 2**

18 **TAPE DECK 2 OPERATION**
PLAY ► ..... to start playback.
◄◄ ..... to rewind the tape.
►► ..... to fast forward the tape.
STOP•OPEN ..... to stop playback or to open the tape door.
PAUSE ..... to interrupt playback.

19 **TAPE DECK 1 OPERATION**
RECORD ..... to start recording.
PLAY ► ..... to start playback.
◄◄ ..... to rewind the tape.
►► ..... to fast forward the tape.
STOP•OPEN ..... to stop playback/recording or to open the tape door.
PAUSE ..... to interrupt playback or recording.

20 **TAPE DECK 1**

21 **REPEAT**
– to repeat a CD track.

22 **SHUFFLE**
– to play all the tracks in random order.

23 ⏻
– to switch the system to standby mode.

24 **MUTE** *(available in model FW306 and FW325 only)*
– to switch off the sound temporarily.

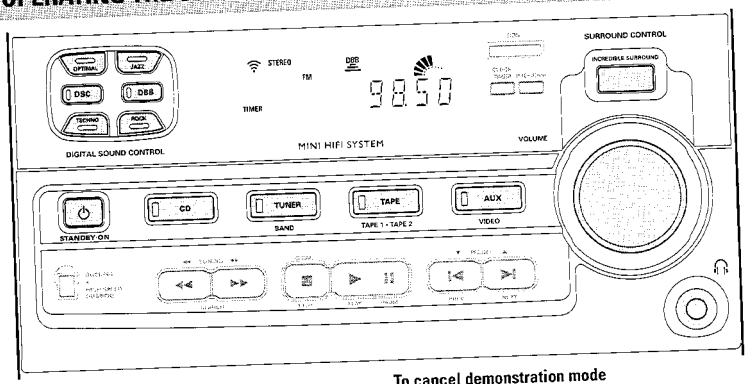
25 **TV** *(RC 5 code only)*
– to select TV mode.

26 **TV VOLUME** *(RC 5 code only)*
– to adjust the TV volume level.

Notes for remote control:
– *First select the source you wish to control by pressing one of the source select keys on the remote control (e.g. CD, TUNER, TAPE 1/2 or AUX).*
– *Then select the desired function (PLAY, NEXT, etc.).*

OPERATING THE SYSTEM

English



Important:
Before you begin operating the system, complete the preparation procedures.

Demonstration mode

The system has a demonstration mode that shows the various features offered by the system. ***Whenever the system is switched on from the wall socket, the demonstration mode will start automatically.***

Note:
– *During demonstration mode, if you press any source (or standby-on) button, the system will switch to the respective (or standby) mode.*
– *When the system is switched to standby mode, 5 seconds later, the demonstration mode will resume.*

To cancel demonstration mode
- Press and hold **STOP ■** *(on the system only)* for ***3 seconds*** to stop the demonstration.
  → The demonstration mode will be switched off permanently.
  → The system will switch to standby mode.

Easy Set

EASY SET allows you to store all available radio stations in a particular band (FM, MW or LW) automatically.

- Press and hold **STANDBY•ON** *(on the system only)* for 2 seconds; when the system is in standby or demonstration mode.
  → "EASY SET" will be displayed and followed by "TUNER".
  → EASY SET will start with the last active band.
  → All available radio stations with sufficient signal strength will be stored or until 40 presets are filled.

Notes :
– *When EASY SET is used, all previously stored stations will be erased.*
– *The last preset station will appear on the display when EASY SET is completed.*

Switching the system ON

- Press **STANDBY•ON** *(on the system only)*, **CD**, **TUNER**, **TAPE** or **AUX**.

Switching the system to standby mode

- Press **STANDBY•ON** again.
  → The system will switch to standby mode.

Selecting the Source

- Press the respective source selection button: **CD**, **TUNER**, **TAPE** or **AUX**.
  → The display indicates the selected source.

Note:
– *For an external source, make sure that you have connected the audio left and right OUT terminals of the external equipment (TV, VCR, Laser Disc or DVD player) to the AUX IN terminals.*

Sound Control

Volume Adjustment

Adjust **VOLUME** to increase or decrease the sound level.

For Personal Listening

Connect the headphones plug to the 🎧 socket at the front of the system. The speakers will be muted.

Digital Sound Control (DSC)

The DSC feature enables you to enjoy special sound effects that have preset equalizer settings, providing the best music reproduction.

- Press **DIGITAL SOUND CONTROL (DSC)** to select OPTIMAL, JAZZ, ROCK or TECHNO.
  → The Digital Sound Control display panel will light up respectively.
  → "OPTIMAL, JAZZ, ROCK or TECHNO" will be displayed.

Automatic DSC-DBB selection

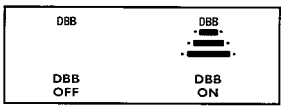
The best setting for the DBB is automatically generated for the respective DSC selection. You can manually select the DBB setting that best suits your listening environment.

DSC Selection	DBB On/Off
Optimal	On
Techno	On
Rock	Off
Jazz	Off

Dynamic Bass Boost (DBB)

The DBB mode enhances the bass response.

- Press **DBB** to switch on bass boost.
  → The DBB button lights up.
  → "DBB ON" will be displayed.



To switch off DBB

- Press **DBB** again.
  → The DBB button light is switched off.
  → "DBB OFF" will be displayed.

Note:

– *Some CDs or tapes might be recorded in high modulation. It may cause a distortion at high volume. If this occurs, switch off Incredible Surround (if available), DBB level or reduce the volume.*

Incredible Surround *(available in model FW326 only)*

Normal stereo sound is determined by the distance between the front speakers. When Incredible Surround is switched on, it magnifies the virtual distance between the front speakers for an incredibly wide, enveloping, stereo effect.

- Press **INCREDIBLE SURROUND** to switch on.
  → The INCREDIBLE SURROUND button lights up.
  → "IS" will be displayed.

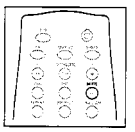
To switch off Incredible Surround

- Press **INCREDIBLE SURROUND** again.
  → The INCREDIBLE SURROUND button light is switched off.
  → "IS OFF" will be displayed.

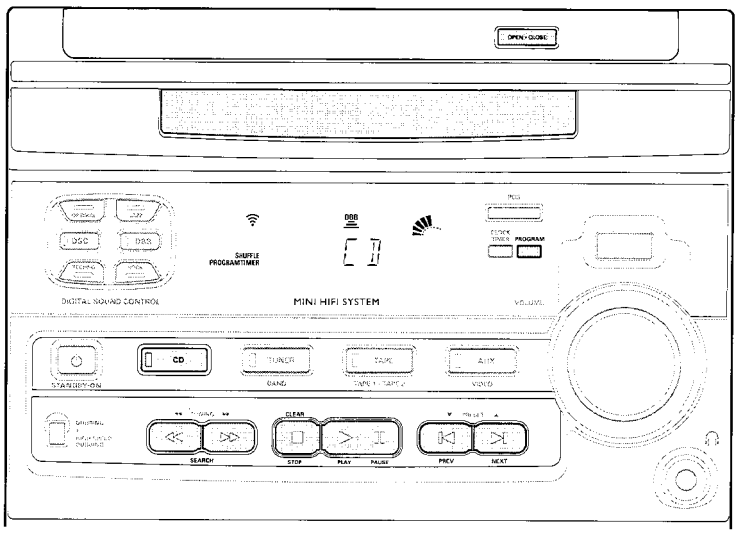
Mute *(available in models FW306 and FW325 remote control only)*

This feature allows you to temporarily switch off the sound of the system without switching off the system when you require a moment of silence.

- Press **MUTE** on the remote control to switch off the sound.
  → "MUTE" will be displayed.
- Press **MUTE** again on the remote control or increase the **VOLUME** level to switch on the sound.



CD



Warning!

1) This system is designed for conventional CDs. Do not use any accessories like disc stabilizer rings or CD treatment sheets, etc., which may damage the CD mechanism.

2) Do not load more than one disc into the tray.

3) When the CD tray is loaded with a CD, do not turn over or shake the system. This may jam the CD mechanism.

Loading the CD

1 Press **CD** to select CD mode.
2 Press **OPEN•CLOSE**.
  → The CD tray slides out.
3 Load a CD with the ***printed side up*** in the tray.
4 Press **OPEN•CLOSE** to close the CD tray.
  → The total number of tracks and playing time appear on the display.

Playing a CD

1 Press **PLAY** ▶ to start playback.
  → The track number and elapsed playing time of the current track appear on the display.
- To interrupt playback, press **PAUSE** ❚❚.
  → The playing time flashes.
- To resume playback, press **PLAY** ▶ again.

2 To stop playback, press **STOP** ■.

Note:

– *When the CD has stopped playing, the system will switch to the standby mode after 15 minutes if no button is pressed.*

Selecting a desired track

Selecting a desired track at the stop mode

1 Press **PREV** |◀ or **NEXT** ▶| until the desired track appears on the display.
2 Press **PLAY** ▶ to start playback.
  → The selected track number and elapsed playing time appear on the display.

CD

English

Selecting a desired track during playback

1 Press **PREV** ⏮ or **NEXT** ⏭ until the desired track appears on the display.
→ The selected track number and elapsed playing time appear on the display.
- If you press **PREV** ⏮ once it will skip to the beginning of the current track and play the track again.

Searching for a particular passage during playback

- Press and hold ◀◀ or ▶▶ until the desired passage is located.
→ The volume will be reduced.
- Play returns to normal when ◀◀ or ▶▶ is released.

Programming Tracks

Programming tracks of a loaded CD is possible in the stop mode. The display will indicate the total tracks stored in the program. Up to 20 tracks can be stored in the memory in any order. When 20 tracks are stored and you attempt to store another track, the display will show "PROGRAM FULL".

1 Load the desired disc in the disc tray.
2 Press **PROGRAM** to start programming.
→ The PROGRAM flag starts flashing.
3 Press **PREV** ⏮ or **NEXT** ⏭ to select the desired track.
4 Press **PROGRAM** to store the track.
- Repeat steps *3* to *4* to store other tracks.
5 Press **STOP** ■ once to end programming mode.
→ The total number of tracks programmed and total playing time appear on the display.

Notes:
- *If the total playing time is more than "99:59" or if one of the programmed tracks has a number greater than 30, then "- -:- -" appears in the display instead of the total playing time.*
- *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*

Playing the program

1 Press **PLAY** ▶ to start program playback.
→ "PLAY PROGRAM" appears on the display.
→ The track number and elapsed playing time of the current track will appear on the display.
- If you press **REPEAT** during program playback, the current track will be played repeatedly.
→ The REPEAT and PROGRAM flags will be displayed.
2 Press **STOP** ■ to stop program playback.

Reviewing the program

Reviewing of the program is only possible in the stop mode.
- Press **PREV** ⏮ or **NEXT** ⏭ repeatedly to review the programmed tracks.
- Press **STOP** ■ to exit review mode.

Erasing the program (in the stop mode)

- Press **CLEAR** on the system.
→ "PROGRAM CLEARED" will be displayed.

Note:
- *The program will be erased when the system is disconnected from the power supply. If the CD tray is opened, the program will be erased and the display will show "PROGRAM CLEARED".*

Shuffle *(only on remote control)*

It will play all the tracks in random order. Shuffle may also be used when tracks are programmed.

To shuffle all the tracks

1 Press **SHUFFLE**.
→ "SHUFFLE" will be displayed.
→ The SHUFFLE flag, the track selected at random appears on the display.
- The tracks will now be played in random order until you press **STOP** ■.
- If you press **REPEAT** during shuffling, the current track will be played repeatedly.
→ The REPEAT and SHUFFLE flags will be displayed.
2 Press **SHUFFLE** again to resume normal playback.
→ The SHUFFLE flag disappears from the display.

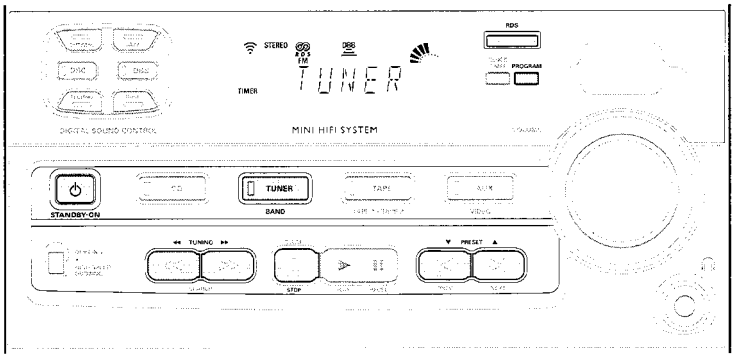
Repeat *(only on remote control)*

It will play the current track repeatedly.

1 Press **REPEAT** during CD playback.
→ "REPEAT TRACK" will be displayed.
→ The REPEAT flag appears on the display.
- The track will now be played repeatedly until you press **STOP** ■.
2 Press **REPEAT** again to resume normal playback.
→ The REPEAT flag disappears from the display.

TUNER

English



Easy Set

EASY SET allows you to store all available radio stations and RDS stations in a particular band (FM, MW or LW) automatically.

1 Press and hold **STANDBY•ON** *(on the system only)* for 2 seconds.
→ "EASY SET" will be displayed and followed by "TUNER".
→ Easy set will start with the last active band.
→ All available radio stations with sufficient signal strength will be stored or until 40 presets are filled.

Searching for RDS stations is only available for model FW326.

2 The system will search once again for the first available RDS station and to set the RDS time automatically.
- When searching RDS station;
→ "SEARCH RDS STATION" will be displayed. If no RDS station is available, the program will exit automatically and "NO RDS STATION" will be displayed.
→ After a station is found, "EASY SET" will be displayed and followed by "TIME".
- When searching RDS time;
→ "SEARCH RDS TIME" will be displayed.
→ When RDS time is read, "RDS TIME" will be displayed. The current time is displayed for 2 seconds and will be stored automatically.

Notes :
- *When EASY SET is used, all previously stored stations will be erased.*
- *The last preset station or the first available RDS will appear on the display when Easy Set is completed.*
- *If RDS station does not transmit RDS time within 90 seconds, the program will exit automatically and the display will show "NO RDS TIME".*

Tuning to radio stations

1 Press **TUNER** to select TUNER mode.
→ "TUNER" will be displayed.
A few seconds later, the current frequency or the radio station name if available will be displayed.
2 Press **TUNER** (BAND) again to select the desired waveband : FM, MW or LW.
3 Press **TUNING** ◀◀ or ▶▶ for more than one second, then release.
→ The display will show 'SEARCH' until a radio station with sufficient signal strength is found.
- Repeat this procedure until the desired station is reached.
- To tune to a weak station, briefly press **TUNING** ◀◀ or ▶▶ until the display shows the desired frequency and/or when the best reception has been obtained.

Storing Preset Stations

You can store up to 40 radio stations in the memory. When a preset radio station is selected, the preset number appears next to the frequency on the display.

Automatic programming

1 Press **TUNER**.
2 Press **TUNER** (BAND) again to select the desired waveband : FM, MW or LW.
3 Press **PROGRAM** for more than one second.
→ PROGRAM flag starts flashing and 'AUTO' will be displayed.
→ Every available station for the selected waveband will be stored automatically. The frequency and preset number will be displayed briefly.
→ The system will stop searching when all the available radio stations are stored or when the memory for 40 preset radio stations is used.
→ The system will remain tuned to the last stored preset radio station.

- Repeat the above procedure to store other preset radio stations for the other waveband. Remember to select the next available preset number before proceeding. If not, some of the preset radio stations may be erased.

Notes:
- *You can cancel the automatic programming by pressing PROGRAM or STOP ■ (on the system only).*
- *If you want to reserve a section of preset numbers, for example preset numbers 1 to 9, select preset 10 before starting automatic programming: now only the preset numbers 10 to 40 will be programmed.*

Manual programming

1 Press **TUNER**.
2 Press **TUNER** (BAND) to select the desired waveband : FM, MW or LW.
3 Press **PROGRAM** for less than one second.
→ PROGRAM flag, the frequency and preset number start flashing.
→ The next available preset number will be displayed for selection.
4 Press **TUNING** ◀◀ or ▶▶ to tune to the desired frequency.
- If you wish to store the radio station to another preset number, press **PRESET** ▼ or ▲ to select the desired preset number.

5 Press **PROGRAM** again.
→ PROGRAM flag will stop flashing, and the radio station will be stored.

- Repeat the above procedure to store other preset radio stations.

Notes:
- *When 40 radio stations are stored and you attempt to store another radio station, the display will show "PROGRAM FULL". If you want to change an existing preset number; repeat steps 4 and 5.*
- *You can cancel manual programming by pressing STOP ■ (on the system only).*
- *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*

English

Tuning to Preset Radio Stations

- Press **PRESET** ▼ or ▲ to select the desired preset number.
→ The preset number, frequency and waveband appear on the display

Receiving RDS radio station

(for model FW326 only)

RDS (Radio Data System) is a broadcasting service that allows FM stations to send additional information along with the regular FM radio signal. This additional information can contain:

- **STATION NAME:** The station name is displayed.
- **FREQUENCY:** The frequency of the station is displayed.
- **PROGRAM TYPE:** The following program types exist and can be received by your tuner: News, Affairs, Info, Sport, Educate, Drama, Culture, Science, Varied, Pop M, Rock M, M.O.R. (middle of the road music), Light M, Classics, Other M, No type.
- **RADIO TEXT (RT):** text messages appear in the display.

When you have tuned to a RDS station, the RDS logo (RDS) and the station name will appear on the display:

- The display normally shows the radio station name if available. By repeatedly pressing **RDS** button you can change the type of display information:
→ The display shows in turn:
STATION NAME → FREQUENCY → PROGRAM TYPE → RADIO TEXT → STATION NAME ...

English

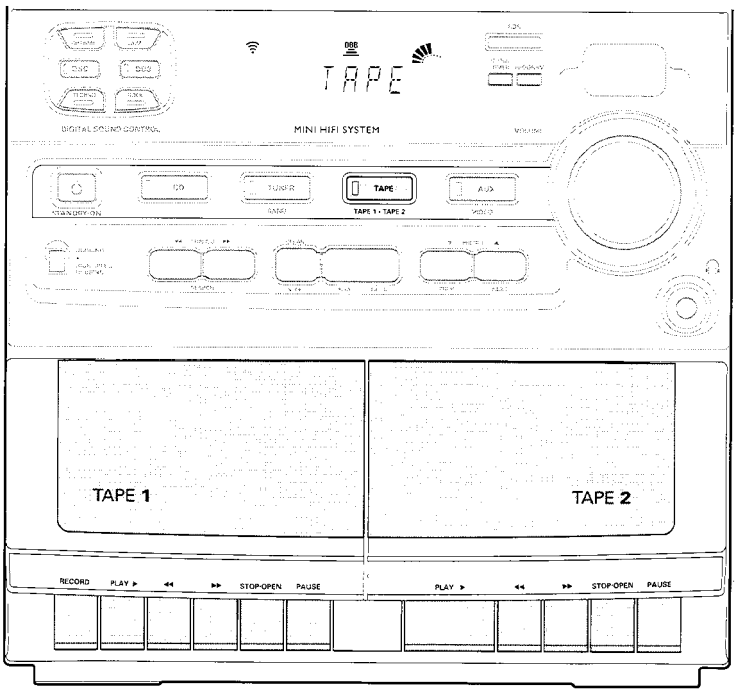
Note:
- *When you press the RDS button and the display shows "NO RDS", it indicates that either the tuned station is not transmitting RDS signal or it is a non RDS station.*

RDS Time

Some RDS station may be transmitting a real time clock at an interval of every minute.

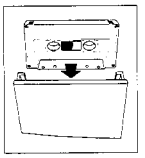
Setting the time with RDS clock

1 Press **CLOCK•TIMER**.
→ "- - : - -" or current time appears on the display.
2 Press **CLOCK•TIMER** once more to enter clock setting mode.
→ "00:00" or current time starts flashing.
3 Press **RDS**.
→ The message "SEARCH RDS TIME" will be displayed.
→ If the station does not transmit RDS clock, "NO RDS TIME" will be displayed.
→ When the RDS clock is read, "RDS TIME" will be displayed. The current clock time is displayed for 2 seconds and will be stored automatically.



TAPE

Loading a tape



- Press **STOP•OPEN**.
- The tape deck door opens.
- Load the tape with the open side downward and the full spool to the left.
- Close the tape deck door.

Tape Playback

1 Press **TAPE** to select TAPE mode.
→ "TAPE" will be displayed.
2 Load the tape into the selected tape deck.
3 Press **PLAY ▶** to start playback.
- To interrupt playback, press **PAUSE**.
- To resume playback, press **PAUSE** again.

4 Press **STOP•OPEN** to end playback.

Rewind/Fast Forward

At the stop mode

1 You can rewind or fast forward a tape by pressing ◀◀ or ▶▶ respectively.
→ The tape will stop automatically at the end of rewinding or fast forwarding.
2 Press **STOP•OPEN** to stop rewinding or fast forwarding.

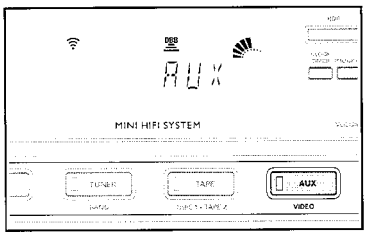
Continuous Playback From Tape Deck 2 to Tape Deck 1

1 Press **TAPE** to select TAPE mode.
2 Load the tapes in **tape deck 1** and **2**.
3 Press **PLAY ▶** on **tape deck 2**.
4 Press **PAUSE** on **tape deck 1**.
5 Press **PLAY ▶** on **tape deck 1**.
→ Playback will begin with tape deck 2 and will continue with tape deck 1 when playback on tape deck 2 ends.
6 Press **STOP•OPEN** if you want to stop playback before the end of the tape in **tape deck 1** or **tape deck 2**.

Notes:
- *During rewinding or fast forwarding of a tape, it is also possible to select another source mode (e.g. CD, TUNER or AUX mode).*
- *Check and tighten slack tape before use with a pencil. Slack tape may get jammed or may burst in the mechanism.*
- *C-120 tape is extremely thin and is easily deformed or damaged. It is not recommended for use in this system.*
- *Store the tapes at room temperature and do not put them too close to a magnetic field (for example, a transformer, TV or loudspeaker boxes).*

AUX

English



Selecting External Equipment

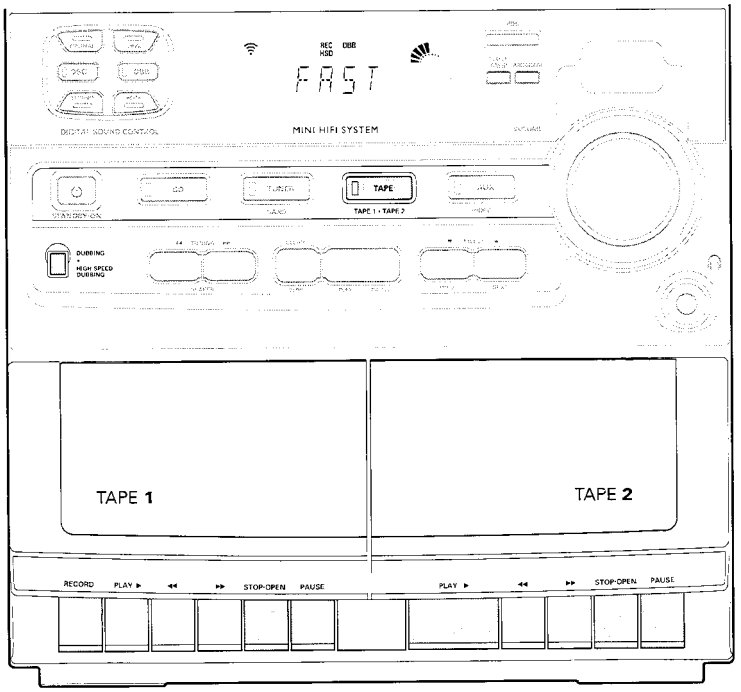
If you have connected the audio out terminals of the external equipment (TV, VCR, Laser Disc or DVD player) to the AUX IN terminals, you can hear the enhanced sound from the system.

- Press **AUX** to select the external mode.
→ "AUX" will be displayed.

Note:
- *All the sound control features (e.g. DSC, DBB, etc.) are available for selection.*

RECORDING

English



Notes:
- *For recording, use only tape of IEC type I (normal tape).*
- *The tape is secured at both ends with leader tape. At the beginning and end of tape, nothing will be recorded for six to seven seconds.*
- *The recording level is set automatically, regardless of the position of VOLUME, DBB or Incredible Surround (if available).*
- *To prevent accidental recording, break out the tab on the left shoulder of the tape side you want to protect.*

One Touch Recording

- For One Touch Recording, as soon as you press RECORD, the current source will be recorded on tape deck 1.

1 Load a blank tape in tape deck 1.
2 Press **RECORD** on tape deck 1 to start recording.
→ The REC flag starts flashing.
3 Press **PAUSE** to interrupt recording.
4 Press **STOP•OPEN** on tape deck 1 to stop recording.

Dubbing tapes *(from tape deck 2 to tape deck 1)*

1 Load the prerecorded tape into tape deck 2 and a blank tape into tape deck 1.
→ Make sure that both tapes have their full spool to the left.
2 Press **DUBBING** to switch between normal and high speed dubbing.
→ "NORMAL" (normal speed) or "FAST" (high speed) will be displayed.
→ HSD flag appears on the display for high speed dubbing.

RECORDING

3 Press **PAUSE** on tape deck 1.
4 Press **RECORD** on tape deck 1.
5 Press **PLAY** on tape deck 2.
→ Recording will start automatically.
→ The REC flag starts flashing.
6 Press **STOP•OPEN** on tape deck 1 and tape deck 2 to stop dubbing.

Notes:
- *At the end of side A, flip the tapes to side B and repeat the procedure.*
- *Dubbing of tapes is only possible from tape deck 2 to tape deck 1.*
- *To ensure good dubbing, use tapes of the same length.*
- *During high speed dubbing in Tape mode, the sound is reduced to a low volume.*

CD Synchro Start Recording

During CD synchro start recording,
- It is not advisable to fast forward/rewind your tape in tape deck 2.
- It is not possible to listen to another source.

1 Load a blank tape into tape deck 1 and a disc into the disc tray.
2 Press **CD**.
- You can program the tracks in the order you want them to be recorded (see Programming Tracks). If not, the tracks are recorded according to the disc.

3 Press **RECORD** on tape deck 1 to start recording.
4 Press **STOP•OPEN** on tape deck 1 to stop recording and **STOP** ■ to stop CD playback.

Recording from other sources *(only on tape deck 1)*

1 Load a blank tape into tape deck 1.
2 Press **CD**, **TUNER** or **AUX**.
- Start playback of the selected source.

3 Press **RECORD** on tape deck 1 to start recording.
→ The REC flag is flashing.
4 Press **PAUSE** to interrupt recording.
5 Press **STOP•OPEN** on tape deck 1 to stop recording.

Note:
- *During recording, it is not possible to listen to another sound source.*

CLOCK

English

View Clock

You can view the clock (if it is set) at standby or any source mode. It will be displayed for about 7 seconds.

- Press **CLOCK•TIMER** briefly.
→ "10:25" (the current time) will be displayed.
→ "- - : - -" will be displayed if the clock is not set.

Clock Setting

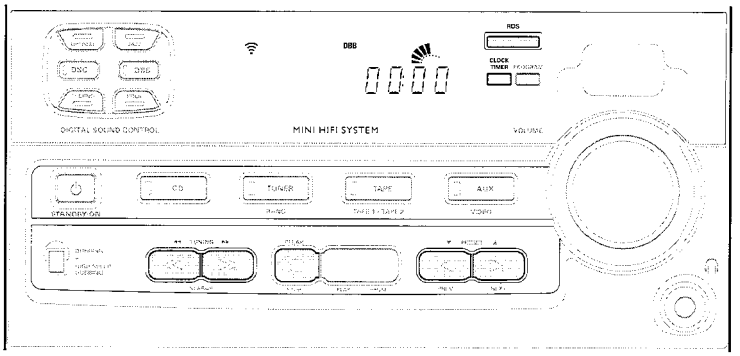
The clock is set in 24-hour mode, e.g. "00:00" or "23:59". Before setting the clock, you must be in the View Clock mode.

1 Press **CLOCK•TIMER** to select clock mode.
→ "00:00" or the current time starts flashing.
→ "◀◀, ▶▶, |◀, ▶|, ■ light up *(for models FW325 and FW326 only)*.
2 Set the hour with ◀◀ or ▶▶.
3 Set the minute with |◀ or ▶|.
4 Press **CLOCK•TIMER** again to store the setting.
→ The clock starts running.
- To exit without storing the setting, press **STOP** ■.

Notes:
- *During clock setting, if no button is pressed within 90 seconds, the system will exit clock setting mode automatically.*
- *When a power interruption occurs, the clock setting is erased.*
- *To set the time with RDS clock, see "Receiving RDS Radio Station" under TUNER section. (for model FW326 only)*

TIMER

English



Timer Setting

- The system can switch on to CD or TUNER mode automatically at a preset time. It can serve as an alarm to wake you up. After half an hour from the preset time, the system will return to the standby mode if no button is pressed.
- Before setting the timer, make sure the clock is set correctly.
- The timer has to be reset or start again for each subsequent preset time.
- **The volume of the timer will be at the last setting before the set is switched to standby mode.**

1 Press and hold **CLOCK•TIMER** for more than 2 seconds to select timer mode.
→ "ON 00:00" or the last set timer starts flashing. The TIMER flag flashes.
→ The last selected source is lighted while other available sources are flashing.
→ "◀◀, ▶▶, |◀, ▶|, ■ " light up *(for models FW325 and FW326 only)*.
2 Press **CD** or **TUNER** to select the desired source.
3 Press ◀◀ or ▶▶ to set the hour for the timer to start.
4 Press |◀ or ▶| to set the minute for the timer to start.
5 Press **CLOCK•TIMER** to store the start time.
→ The TIMER is now set.
→ The TIMER flag remains on the display.
- To exit without storing the setting, press **STOP** ■.

- At the preset time, the TIMER will be activated.
→ The selected source will be played.
→ The TIMER flag disappears from the display.

Notes:
- *During timer setting, if no button is pressed within 90 seconds, the system will exit timer setting mode automatically.*
- *If the source selected is TUNER, the last tuned frequency will be switched on.*
- *If the source selected is CD, the first track of the disc will be played. If the CD tray is empty, the TUNER source will be selected instead.*

To cancel the TIMER
1 Press **CLOCK•TIMER** for more than 2 seconds.
2 Press **PAUSE** ❚❚ to cancel the timer.
→ "CANCEL" will be displayed.
→ The TIMER flag disappears from the display.

To start the TIMER again *(for the same time)*
1 Press **CLOCK•TIMER** for more than 2 seconds.
2 Press **CLOCK•TIMER** again to store the start time and the selected source.

TROUBLESHOOTING

English

Warning! Under no circumstances should you try to repair the system yourself, as this will invalidate the warranty.

- If a fault occurs, check the points listed below before taking the system for repair.
- Should any problems persist after you have made these checks, consult your nearest dealer or service center.

CD Player Operation

"NO DISC" is displayed.
- The disc is inserted upside down.
→ *Place CD with printed side up.*
- Moisture condensation.
→ *Wait until lens has adjusted to normal room temperature.*
- There is no disc in the CD tray.
→ *Insert a CD.*
- The CD is dirty, badly scratched or warped.
→ *Clean or replace the CD.*

Radio Reception

Poor radio reception
- The signal strength is too weak.
→ *Adjust the antenna.*
- The TV or VCR is too close to the stereo system.
→ *Separate the stereo system from the TV or VCR.*
→ *Connect an external antenna for better reception.*

Tape Deck Operation

"RECORDING ACTIVE" is displayed.
- A recording is in progress.
→ *Stop the recording or wait until it is finished.*

"TAPE DUBBING ONLY" is displayed.
- Tape dubbing is only possible in tape mode.
→ *Switch source to tape mode.*

Recording or playback cannot be made or there is a decrease in audio level.
- *Dirty tape heads, capstans or pressure rollers.*
→ *See section on tape deck maintenance.*
- Magnetic build-up in the record/playback head.
→ *Use demagnetizing tape.*

General

System does not react when any button is pressed.
- Electrostatic discharge.
→ *Press STANDBY-ON to switch the system off. Remove the AC power plug from the wall outlet, then reconnect and switch on the system again.*

No or poor sound.
- Volume is not turned up.
→ *Adjust VOLUME.*
- The headphones are connected.
→ *Disconnect the headphones.*
- Speakers are not connected or are connected wrongly.
→ *Check that the speakers are connected correctly.*
→ *Make sure that the stripped speaker wire is clamped.*

Reversed left and right sound.
- Speakers are connected wrongly.
→ *Check the speaker connections and location.*

Lack of bass sound or apparently imprecise physical location of musical instruments.
- Speakers are connected wrongly.
→ *Check the speaker connection for proper phasing, red/black wires to red/black terminals.*

Remote control has no effect on the system.
- The distance to the system is too large.
→ *Reduce the distance.*
- Batteries are inserted incorrectly.
→ *Insert the batteries with their polarities (+/– signs) as indicated..*
- Batteries are exhausted.
→ *Replace the batteries.*
- Wrong source is selected.
→ *Select the source (CD, TUNER, etc.) before pressing the function button, (PLAY, PREV/NEXT, etc.).*

Timer not working.
- Timer is not switched on.
→ *Press CLOCK•TIMER to switch on the timer.*
- Dubbing/recording is in progress.
→ *Stop dubbing/recording.*

System displays features automatically; buttons flash continuously.
- Demonstration mode is switched on.
→ *Press and hold STOP ■ for 3 seconds to switch off the demonstration.*

ADDITIONAL FEATURES (*For /21/21M only*)

English

Adjusting the Operating Voltage

Before connecting the AC power cord to the wall outlet, make sure that the voltage selector at the rear of the system is set to the local power line voltage. If not, reset the selector before connecting to the wall outlet.

Changing the MW tuning grid

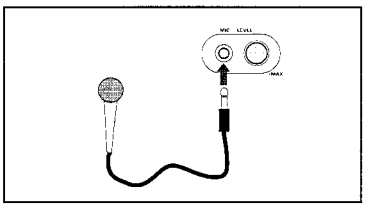
The frequency step can be changed if necessary. In North and South America, the frequency step between adjacent channels in the MW band is 10 kHz. In other parts of the world, it is 9 kHz. The frequency step preset in the factory is 9 KHz.

For MW Band
To change from 9 kHz to 10 kHz or vice versa

Changing of tuning grid will erase all previously stored preset stations.

1 Disconnect the system from the AC power supply *(pull out the AC power cord).*
2 Press and hold **TUNER** and **TUNING ▶▶** while reconnecting the system to the AC power supply.
→ Display will show "GRID 10" or "GRID 9".

Notes:
– *GRID 9 indicates that the tuning grid is in step of 9 kHz in MW band. GRID 10 indicates that the tuning grid is in step of 10 kHz in MW band.*
– *FM tuning grid will also be changed from 50 kHz to 100 kHz or vice versa. All preset stations will also be erased.*



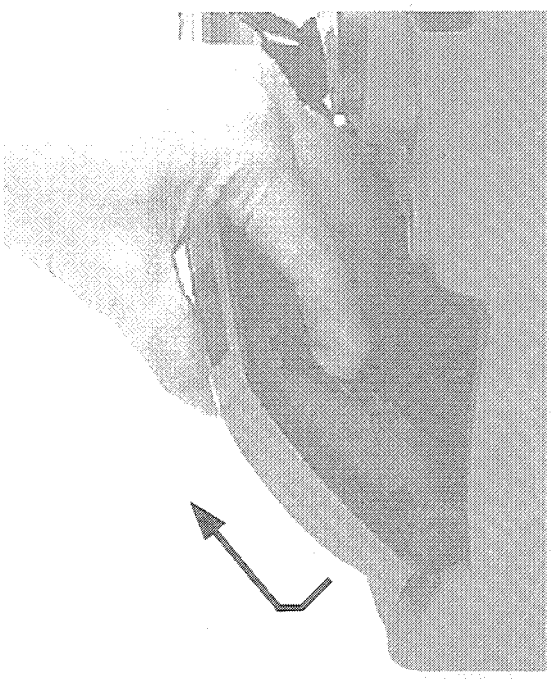
Microphone Mixing

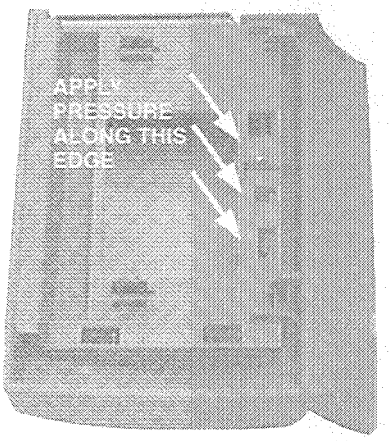
(not available for model FW306)

1 Set the **MIC LEVEL** control to the minimum level to prevent acoustic feedback (e.g. a loud howling sound) before you connect the microphone.
2 Connect a microphone to the **MIC** socket.
3 Press **CD**, **TUNER**, **TAPE** or **AUX**.
4 Play the selected source.
5 Adjust the volume level with **VOLUME** control.
6 Adjust the **MIC LEVEL** control to the mixing level that you want.
7 Start singing or talking through the microphone.

DISMANTLING INSTRUCTIONS

Dismantling of the Cassette Cover

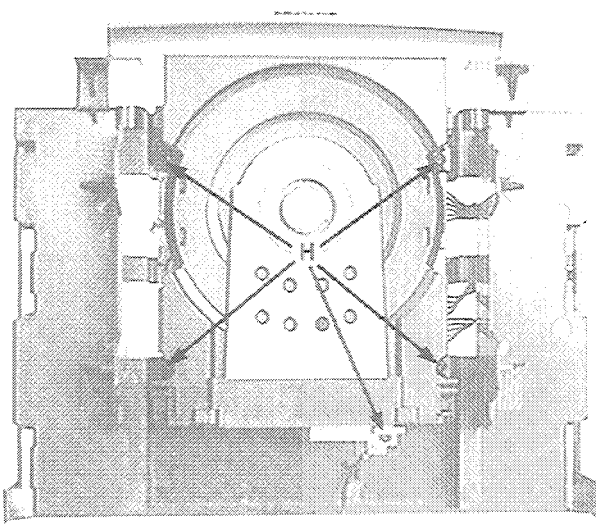




Cassette door

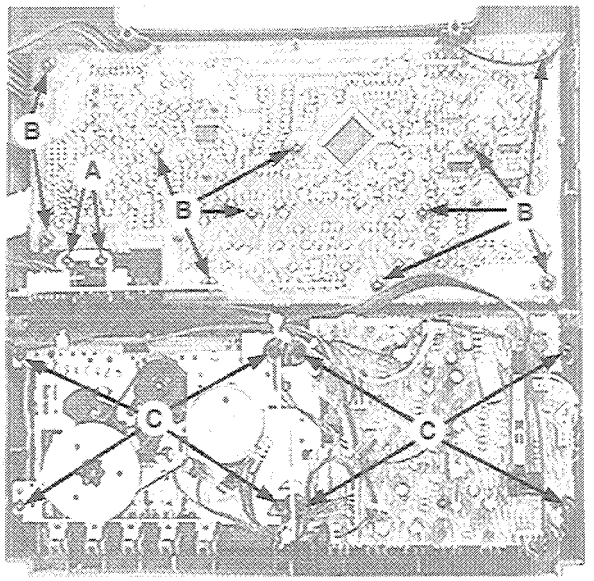
Dismantling of the Front Panel

1) Loosen the 6 screws to separate the Front Panel from the rear portion.
   - 2 screws each on the left & right side
   - 2 screws at the bottom
2) Pull out the CD Short Loader assembly from the Rear Cabinet (pos 280).
3) Remove 5 screws H to separate the CD Short Loader Module from the bracket (pos 312).



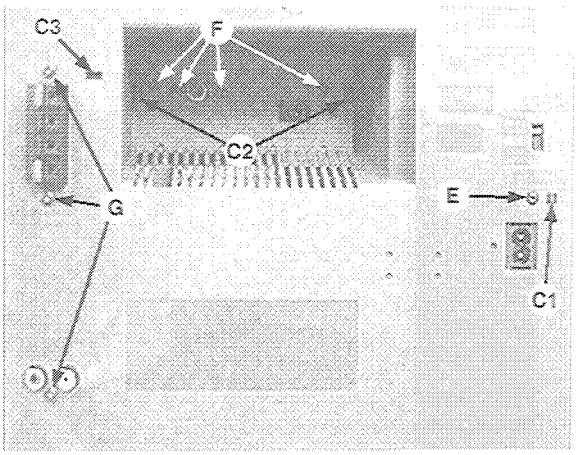
Dismantling of Assemblies on the Front Panel

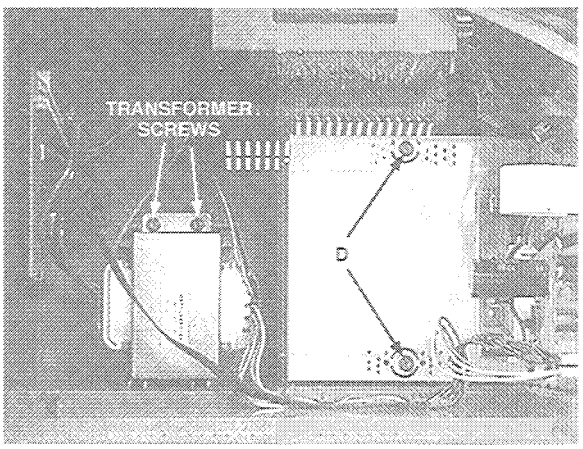
1) Remove 2 screw A to loosen the Karaoke board.
2) Remove 11 screws B as indicated to loosen the Front board.
3) Remove 8 screws C to loosen the MTF Module



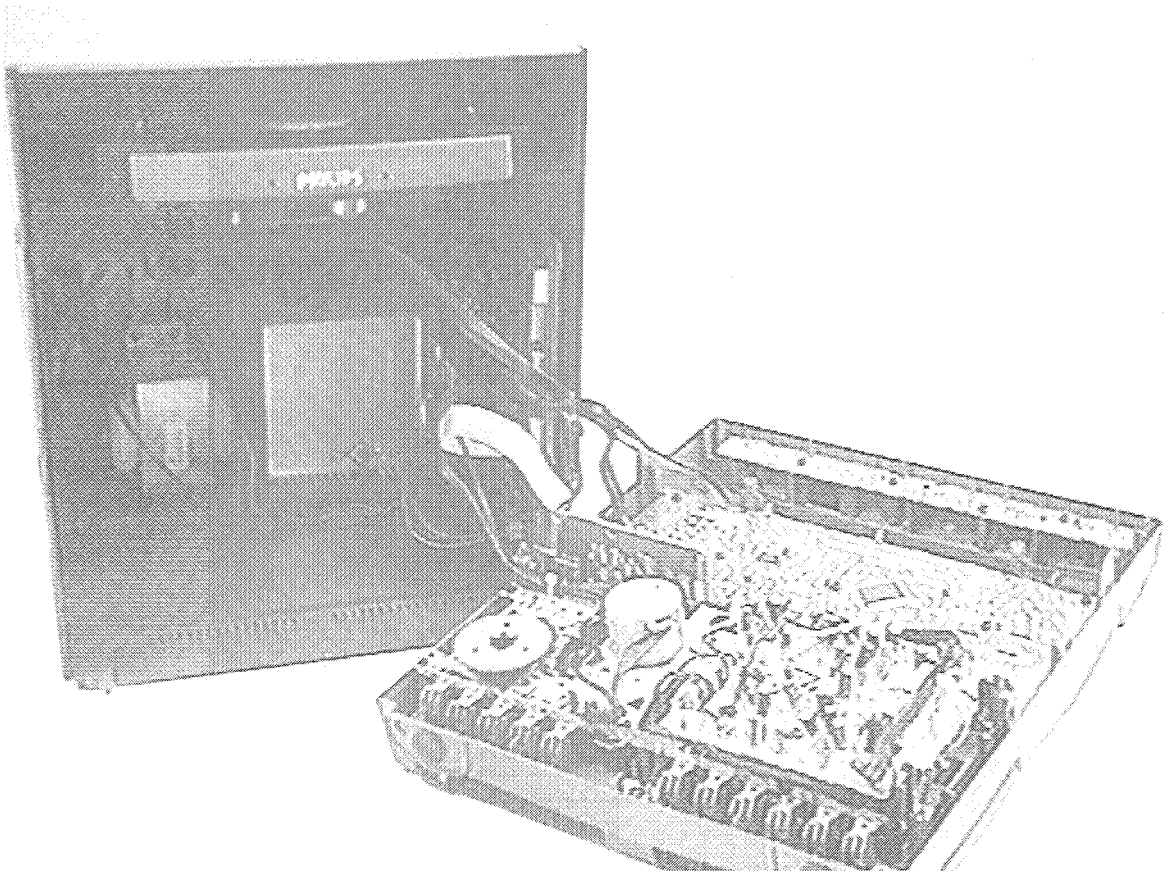
Dismantling of Rear Portion

1) Remove 1 screw E & uncatch C1 to loosen the Mains socket pc board.
3) Remove 4 screws F & uncatch C2 to loosen the Tuner pc board assembly.
4) Remove 5 screws (3x screw G and 2x screw D on the heatsink) & uncatch C3 to loosen the Combi board (Main part).

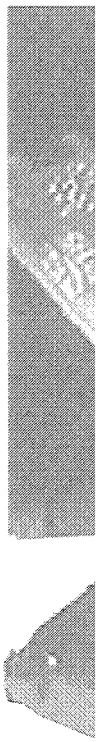




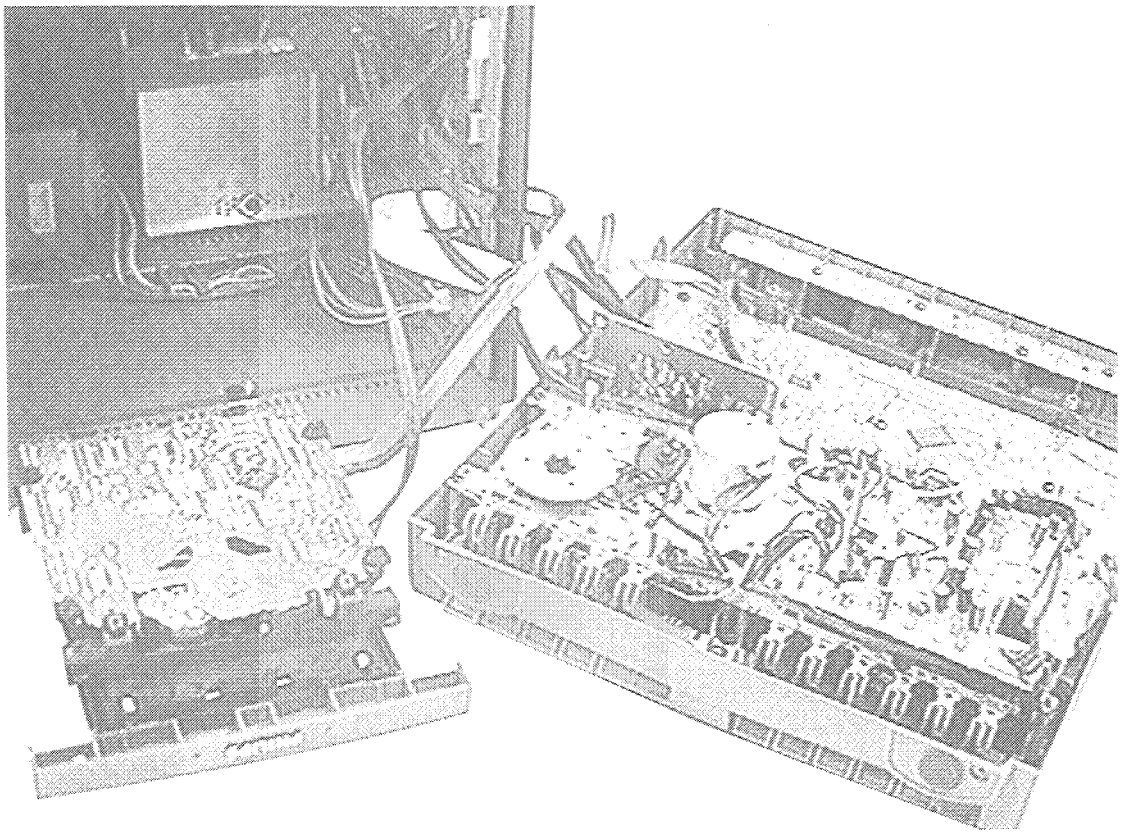
Service pos A



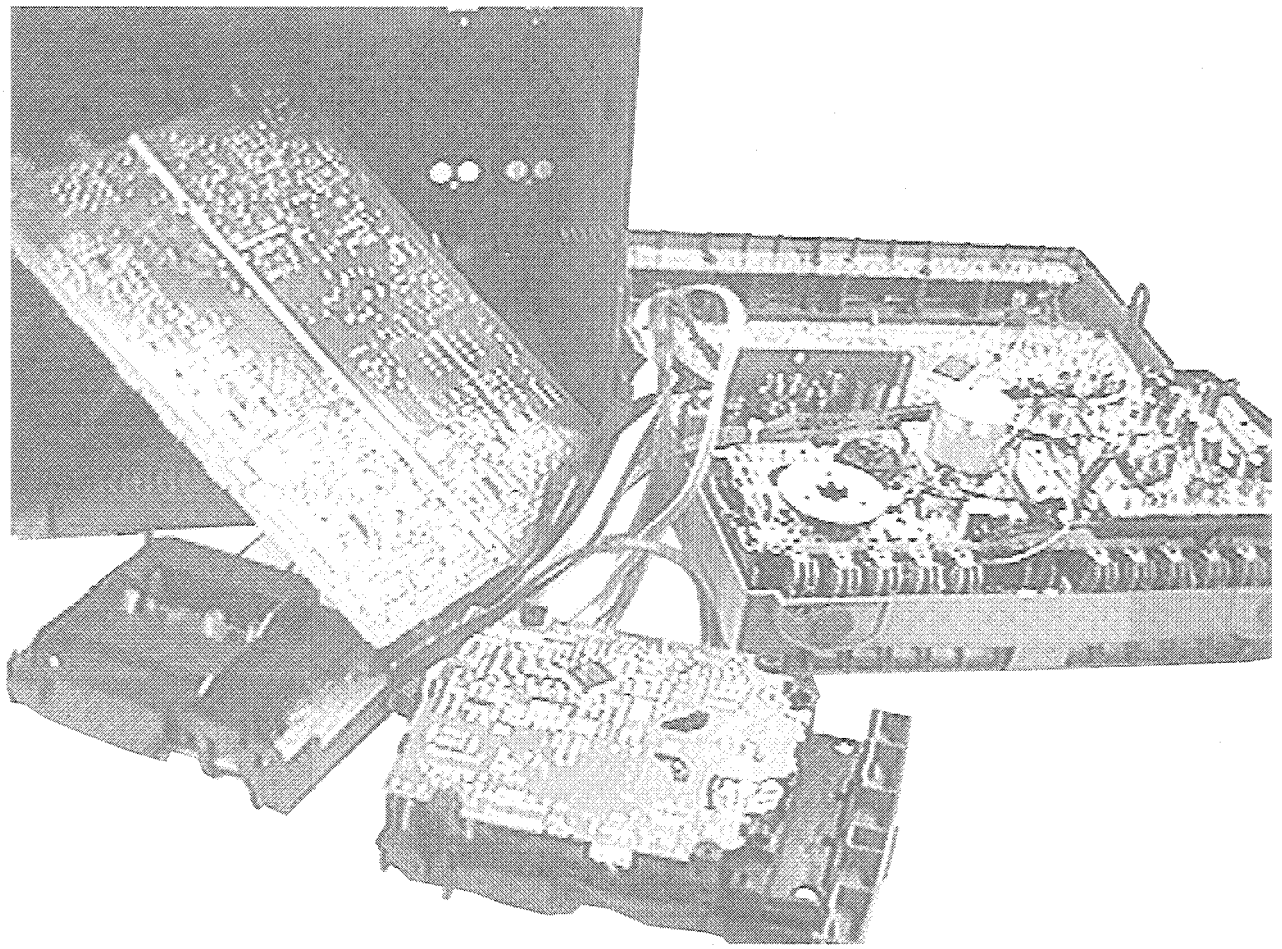
Service pc



Service pos B

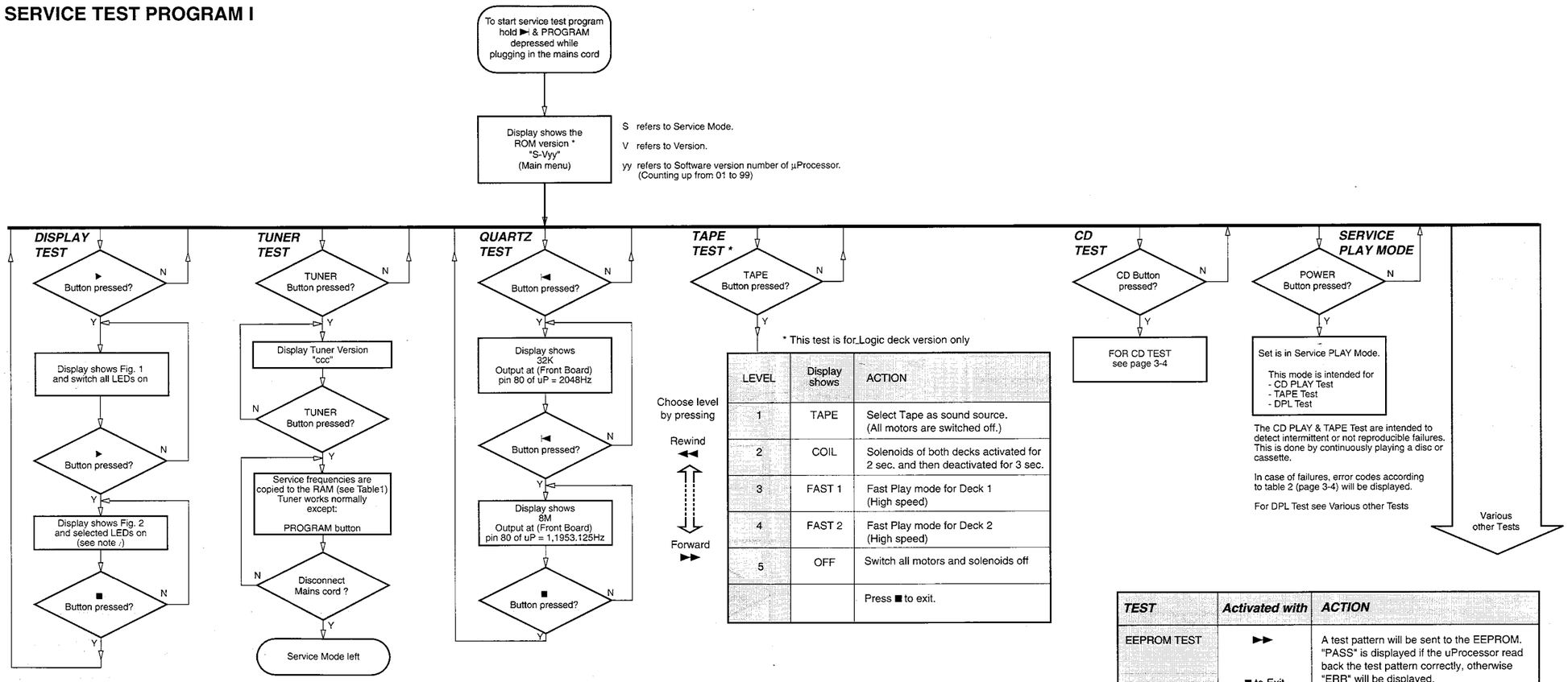


Service pos C



3-3

SERVICE TEST PROGRAM I



LEVEL	Display shows	ACTION
1	TAPE	Select Tape as sound source. (All motors are switched off.)
2	COIL	Solenoids of both decks activated for 2 sec. and then deactivated for 3 sec.
3	FAST 1	Fast Play mode for Deck 1 (High speed)
4	FAST 2	Fast Play mode for Deck 2 (High speed)
5	OFF	Switch all motors and solenoids off
		Press ■ to exit.

PRESET	Europe "EUR"	East Eur. 3-band "EAS"	East Eur. 2-band "EAS"	USA "USA"	Oversea "OSE"	Korea "KOR"	Japan "JAP"
1	87.5MHz	65.81MHz	65.81MHz	87.5MHz	87.5MHz	87.5MHz	76MHz
2	108MHz	108MHz	108MHz	108MHz	108MHz	108MHz	CH3 107.75MHz
3	531kHz	74MHz	74MHz	530kHz	531/530kHz	531kHz	90MHz
4	1602kHz	87.5MHz	87.5MHz	1700kHz	1602/1700kHz	1602kHz	CH1 95.75MHz
5	558kHz	531kHz	531kHz	560kHz	558/560kHz	558kHz	CH2 101.75MHz
6	1494kHz	1602kHz	1602kHz	1500kHz	1494/1500kHz	1494kHz	531kHz
7	153kHz	558kHz	558kHz	98MHz	87.5MHz	87.5MHz	1602kHz
8	279kHz	1494kHz	1494kHz	87.5MHz	87.5MHz	87.5MHz	558kHz
9	198kHz	153kHz	98MHz	87.5MHz	87.5MHz	87.5MHz	1494kHz
10	98MHz	279kHz	70.01MHz	87.5MHz	87.5MHz	87.5MHz	80MHz
11	87.5MHz	198kHz	65.81MHz	87.5MHz	98MHz	98MHz	76MHz

Table 1

East Europe TUNER IF offset correction

1) Input a reference frequency 87.5MHz from the generator.

2) Proceed to the Tuner Test Mode

3) Hold TUNER button down for > 3 seconds

4) The set will self-calibrate automatically and display "OFS-xx" when calibration is successful, otherwise it will display "00E".

xx : offset value between -3 to +3

Note: This has to be done whenever the Eeprom, Microprocessor or the components in the oscillator circuitry are replaced.

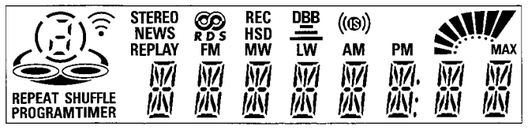
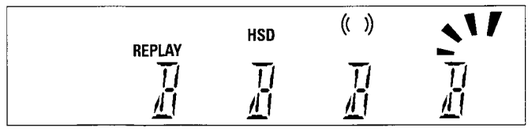


Figure 1



note /: CDC1, CDC3, Tuner, Optimal, Rock, ◀◀, ■ and |◀.

Figure 2

TEST	*Activated with*	*ACTION*
EEPROM TEST	▶▶ ■ to Exit	A test pattern will be sent to the EEPROM. "PASS" is displayed if the uProcessor read back the test pattern correctly, otherwise "ERR" will be displayed.
EEPROM FORMAT	◀◀	Load default data. Display shows "NEW" for 1 second. ***Caution!*** ***All presets from the customer will be lost!!***
KEY TEST	▶| ■ to Exit	Key numbers according table 3 are shown on the display. (see Chapter 3-4)
FAST CLOCK TEST	CLOCK/TIMER	The clock is switched to fast mode. "FAST" is displayed for 1 sec. Press CLOCK/TIMER again to reset the clock to normal. "NORMAL" displayed for 1 sec.
VOLUME TEST	Volume Knob	Display shows volume value for 2 seconds. Volume increases or decreases in steps of 1 until 0 (Min.) or 40 (Max.) is reached.
LEAVE SERVICE TESTPROGRAM	Disconnect mains cord	

Error code	Type	Error Description
E1000	W	Focus Error Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play.
E1001	W	Radial Error Triggered when the radial servo is off-track for a certain time during play.
E1002	W	Sledge In Error The sledge did not reach its inner position (inner-switch is still close) before approximately 6 Sec. have passed. Inner-switch or sledge motor problem.
E1003	W	Sledge Out Error The sledge did not come out of its inner position (inner-switch is still open) before approximately 250 mSec. have passed by. Inner-switch or sledge motor problem.
E1005	W	Jump-offtrack error Triggered in normal play when the jump destination could not be found within a certain time.
E1006	W	Subcode Error (no subcode within time) Triggered when a new subcode was missing for a certain time during play.
E1007	W	PLL Error The Phase Lock Loop could not lock within a certain time.
E1008	W	Turntable Motor Error Generated when the CD could not reached 75% of speed during startup within a certain time. Discmotor problem.
E1020	F	Focus Search Error The focus point has not been found within a certain time.
E1070	W	The carousel switch is not open within time. This can happen when either the switch is defective and closed all the time, or when the carousel is blocked when located exactly at a disc position.
E1071	W	The carousel position switch did not close within a certain time. This can happen when the switch is defective and never closes electrically, or when the carousel is blocked in between two disc positions. The time-out is approximately 5 Sec.
E1079	W	The drawer could not enter the inside position is opening again. This can be caused because the drawer is blocked by something and cannot go fully inside, or the drawer switch is defective and does not close.
E2020	F	Head Movement Error Deck 1 Generated if the head does not reach the desired position within a certain time.
E2021	F	Head Movement Error Deck 2 Generated if the head does not reach the desired position within a certain time.

F = Fatal error & the set stop play function W = Warning

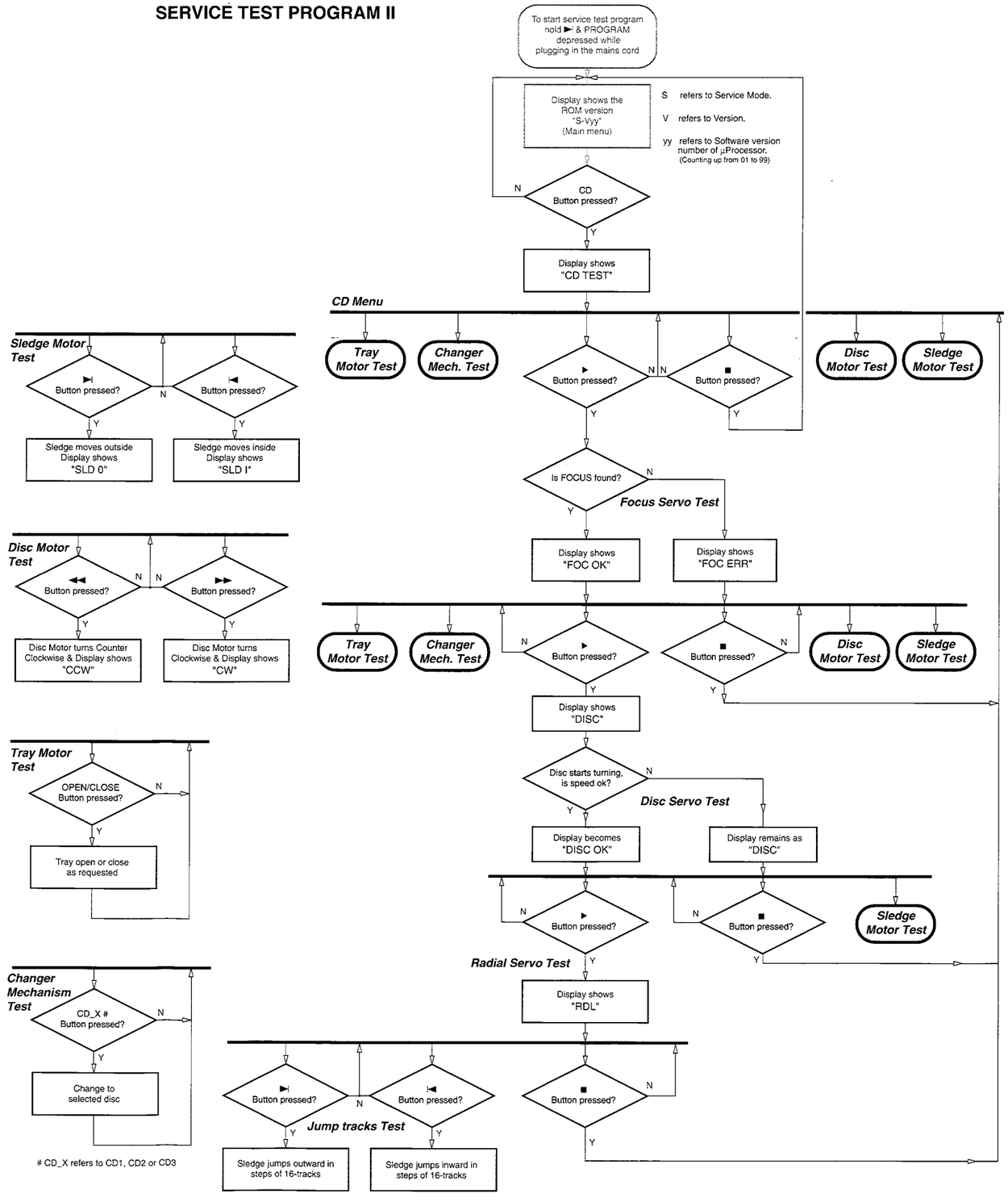
Table 2

Keys activated	Display shows	Keys activated	Display shows	Keys activated	Display shows
No Key pressed	--	CLOCK /TIMER	10	RECORD *	21
Any Remote control key	RC	PROGRAM	11	REPLAY *	22
CD1 *	1	INCRSURROUND *	12	◄◄	23
CD2 *	2	VOLUME UP *	13	►►	24
CD3 *	3	VOLUME DOWN *	14	■	Exit
CHANGE CD	4	STANDBY - ON	15	►II	26
OPEN / CLOSE	5	CD	16	I◄	27
DSC	6	TUNER	17	►I	28
DBB	7	TAPE	18		
RDS *	8	AUX	19		
NEWS *	9	HSD	20		

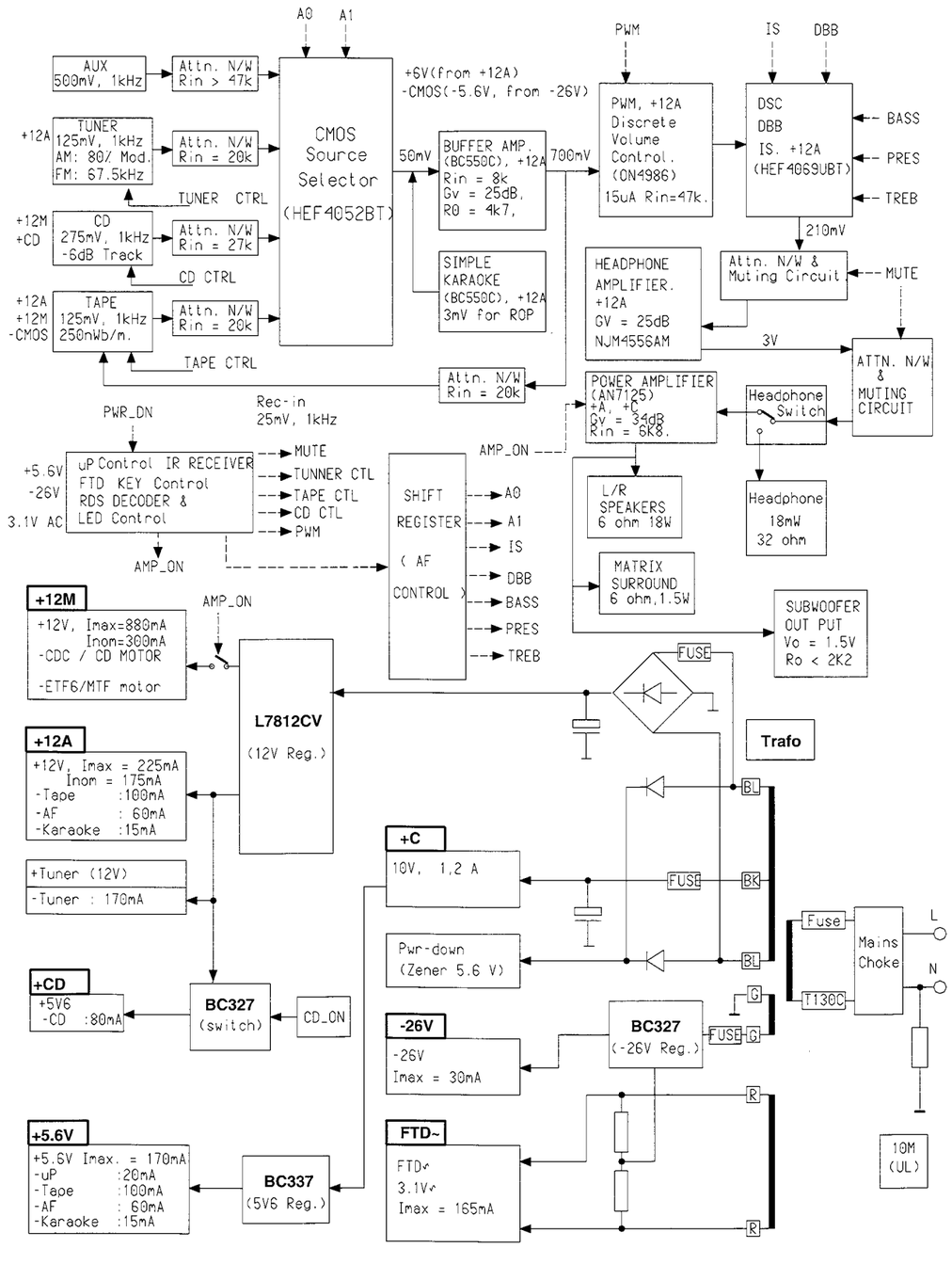
* Not for all type/version

Table 3

SERVICE TEST PROGRAM II



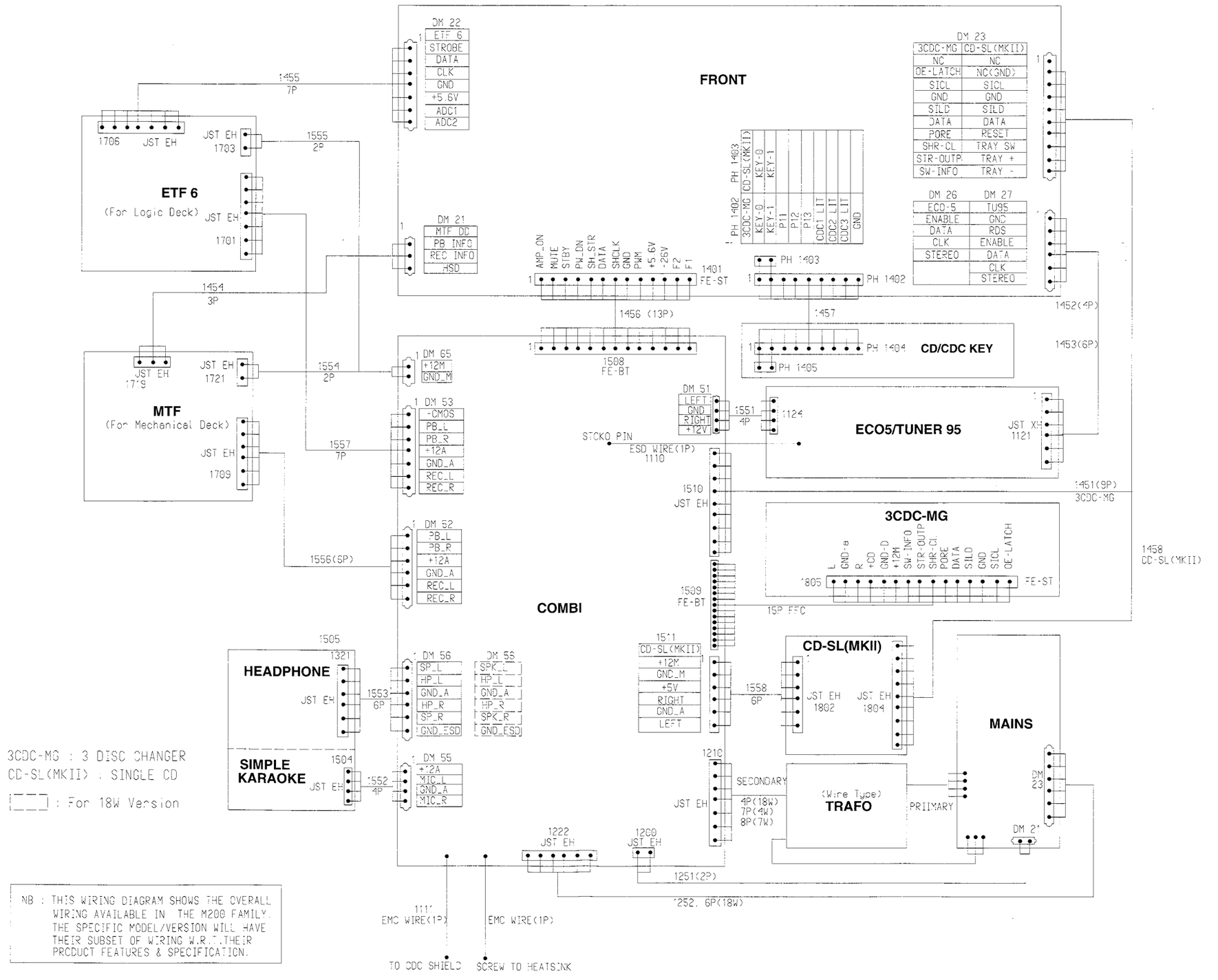
SET BLOCK DIAGRAM



NOTES:

5-1

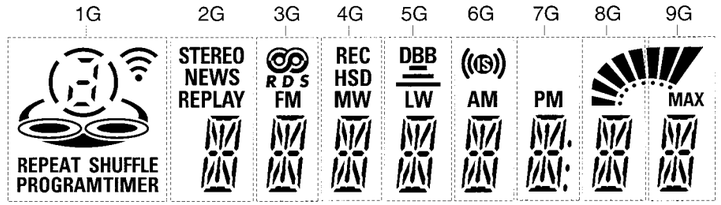
SET WIRING DIAGRAM

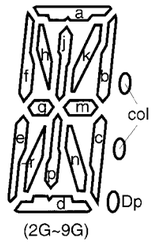


FRONT BOARD

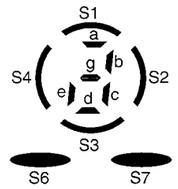
TABLE OF CONTENTS

LCD DISPLAY PIN CONNECTIONS

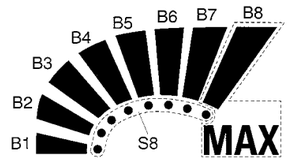




(2G~9G)



(1G)

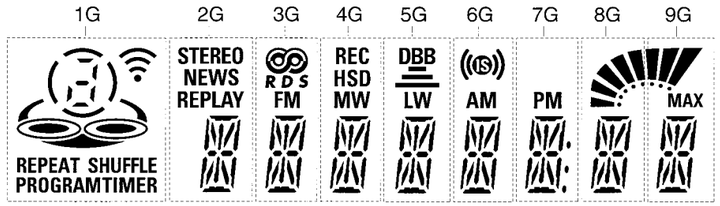


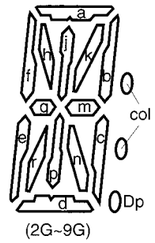
(8G , 9G)

	1G	2G	3G	4G	5G	6G	7G	8G	9G
P1	S1	a	a	a	a	a	a	a	a
P2	S2	h	h	h	h	h	h	h	h
P3	S3	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p
P4	S4	k	k	k	k	k	k	k	k
P5	b	b	b	b	b	b	b	b	b
P6	c	f	f	f	f	f	f	f	f
P7	a , d , g	m	m	m	m	m	m	m	m
P8	e	g	g	g	g	g	g	g	g
P9	S5	c	c	c	c	c	c	c	c
P10	S6	e	e	e	e	e	e	e	e
P11	S7	r	r	r	r	r	r	r	r
P12	SHUFFLE	n	n	n	n	n	n	n	n
P13	REPEAT	d	d	d	d	d	d	d	d
P14	TIMER	STEREO	RDS	REC	DBB	AM	PM	S8	
P15	PROGRAM	REPLAY	FM	HSD			col	B5	
P16		NEWS	-	MW	LW	AM	Dp	B6	
P17	-	-	-	-	-	-	-	B1	-
P18	-	-	-	-	-	-	-	B2	-
P19	-	-	-	-	-	-	-	B3	-
P20	-	-	-	-	-	-	-	B4	-
P21	-	-	-	-	-	-	-	-	B7
P22	-	-	-	-	-	-	-	-	B8

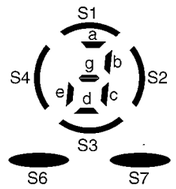
NOTES:

LCD DISPLAY PIN CONNECTIONS

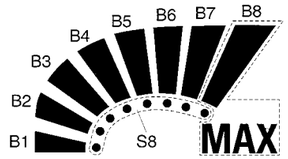




(2G~9G)



(1G)



(8G , 9G)

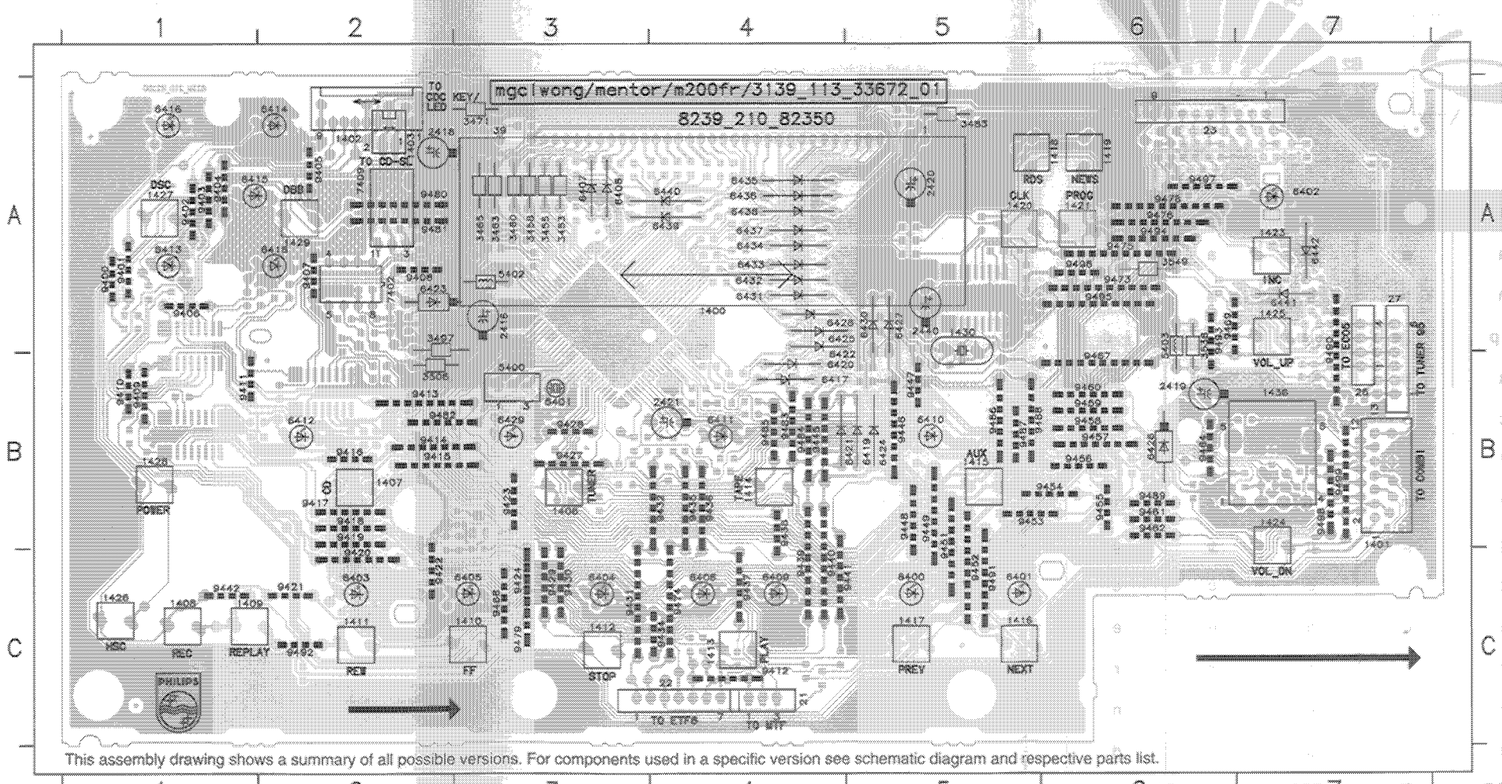
	1G	2G	3G	4G	5G	6G	7G	8G	9G
P1	S1	a	a	a	a	a	a	a	a
P2	S2	h	h	h	h	h	h	h	h
P3	S3	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p
P4	S4	k	k	k	k	k	k	k	k
P5	b	b	b	b	b	b	b	b	b
P6	c	f	f	f	f	f	f	f	f
P7	a , d , g	m	m	m	m	m	m	m	m
P8	e	g	g	g	g	g	g	g	g
P9	S5	c	c	c	c	c	c	c	c
P10	S6	e	e	e	e	e	e	e	e
P11	S7	r	r	r	r	r	r	r	r
P12	SHUFFLE	n	n	n	n	n	n	n	n
P13	REPEAT	d	d	d	d	d	d	d	d
P14	TIMER	STEREO	RDS FM	REC	DBB	AM	PM	S8	
P15	PROGRAM	REPLAY	FM	HSD		col		B5	
P16		NEWS	-	MW	LW	AM	Dp	B6	
P17	-	-	-	-	-	-	-	B1	-
P18	-	-	-	-	-	-	-	B2	-
P19	-	-	-	-	-	-	-	B3	-
P20	-	-	-	-	-	-	-	B4	-
P21	-	-	-	-	-	-	-	-	B7
P22	-	-	-	-	-	-	-	-	B8

6-1

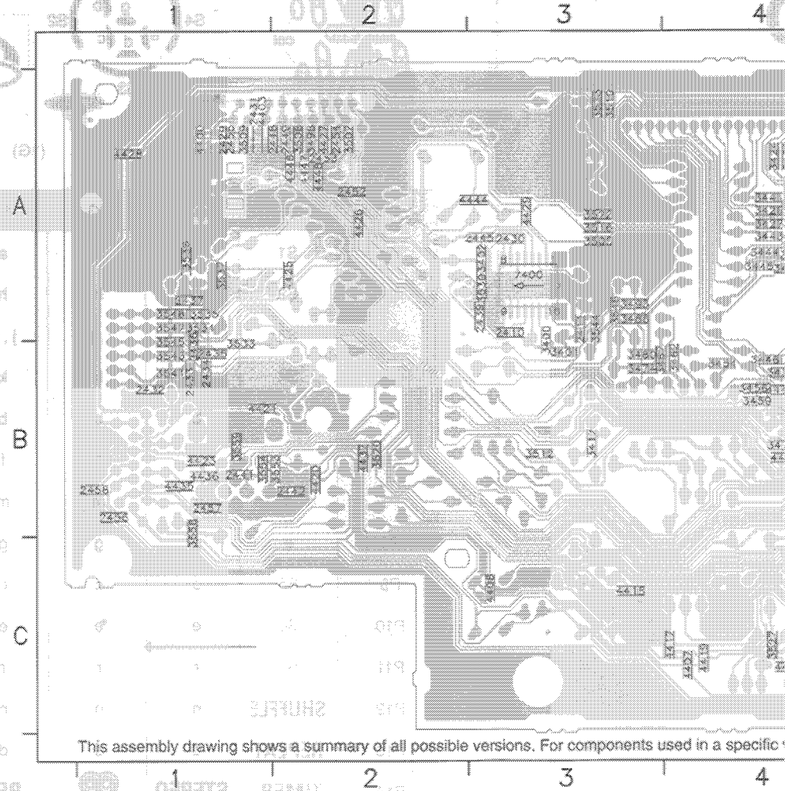
NOTES:

COMPONENT LAYOUT

CHIP LAYOUT



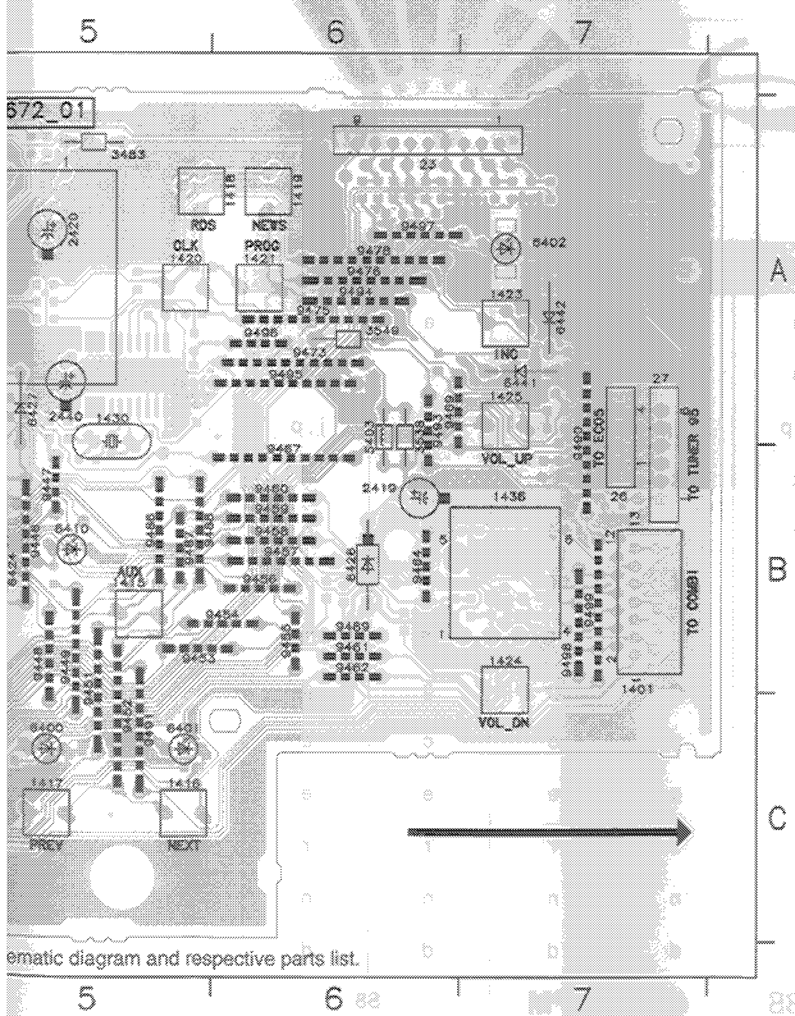
This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.



This assembly drawing shows a summary of all possible versions. For components used in a specific

CHIP LAYOUT

9409	B1	9419	B2	9431	C3	9442	C1	9455	B6	9468	C3	9482	B2	9492	C2
9410	B1	9420	C2	9432	B4	9445	B4	9456	B6	9469	A6	9483	B4	9493	A6
9411	B1	9421	C2	9434	C4	9446	B5	9457	B6	9473	A6	9484	B4	9494	A6
9412	C4	9422	C2	9435	B4	9447	B5	9458	B6	9474	C4	9485	B4	9495	A6
9413	B2	9423	B3	9436	B4	9448	B5	9459	B6	9475	A6	9486	B5	9496	A6
9414	B2	9424	C3	9437	C4	9449	B5	9460	B6	9476	A6	9487	B5	9497	A6
9415	B2	9427	B3	9438	B4	9451	B5	9461	B6	9478	A6	9488	B5	9498	B7
9416	B2	9428	B3	9439	C4	9452	C5	9462	B6	9479	C3	9489	B6	9499	B7
9417	B2	9429	C3	9440	C4	9453	B5	9464	B6	9480	A2	9490	A7		
9418	B2	9430	C3	9441	C5	9454	B6	9467	B6	9481	A2	9491	C5		

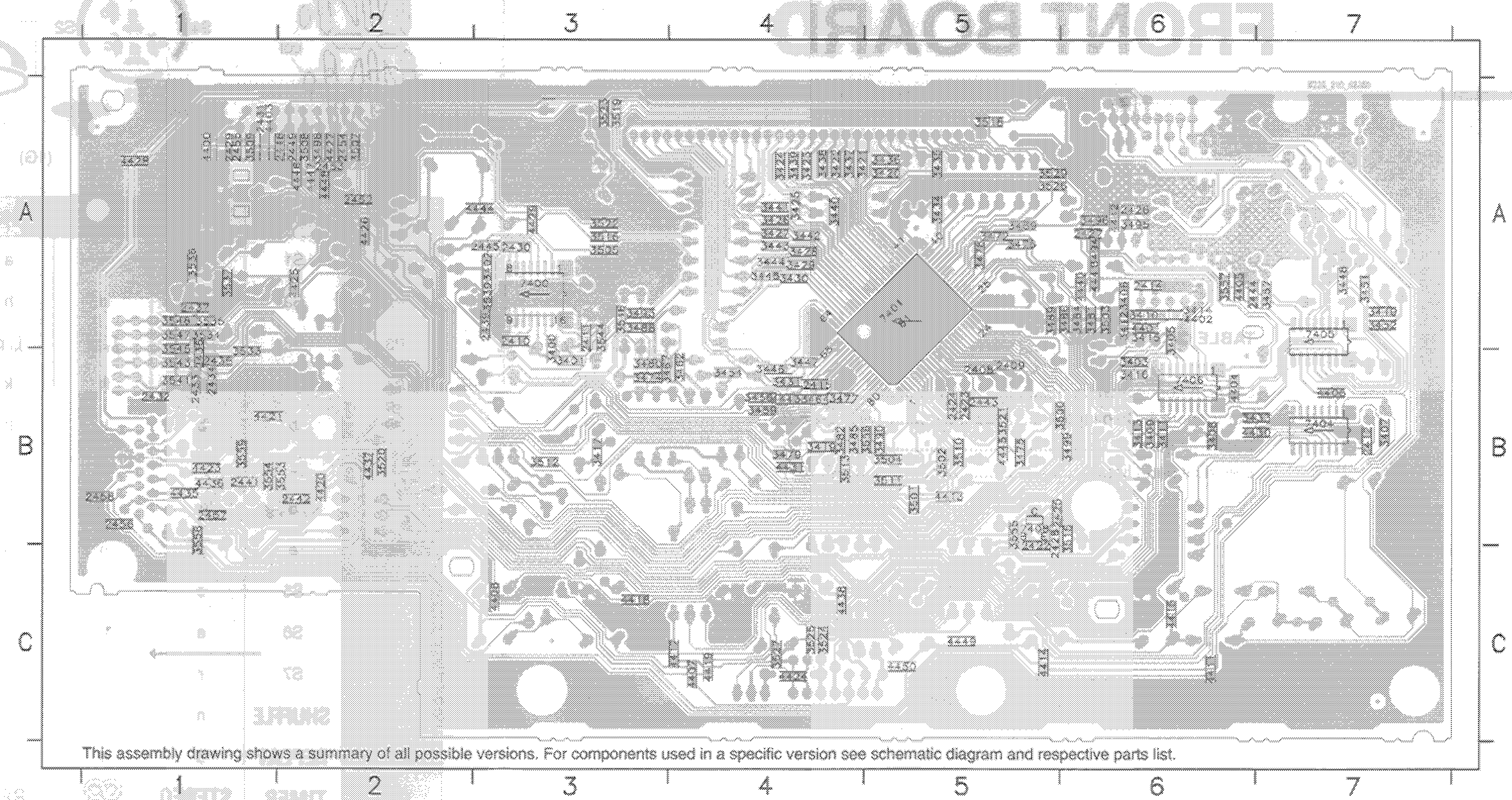


ematic diagram and respective parts list.

2408	B5	2427	A6	2441	B1	2457	B1	3411	B6	3424	A4
2409	B5	2428	B5	2442	B2	2458	B1	3412	A6	3425	A4
2410	A3	2429	A1	2443	B5	3400	B3	3413	B6	3426	A4
2411	A3	2430	A3	2444	A6	3401	B3	3414	A6	3427	A4
2412	B7	2431	A1	2445	A3	3402	A3	3415	A6	3428	A4
2414	A5	2432	B1	2448	A2	3403	B6	3416	B6	3429	A4
2415	B4	2433	B1	2449	A2	3405	A6	3417	B3	3430	A4
2422	C5	2434	B1	2452	A2	3406	A6	3419	B4	3431	B4
2423	B5	2435	B1	2453	A2	3407	B7	3420	A5	3433	B7
2424	B5	2436	B1	2454	A2	3408	B6	3421	A4	3434	A5
2425	B5	2437	A1	2455	A1	3409	B6	3422	A4	3435	A5
2426	A6	2439	A3	2456	B1	3410	A6	3423	A4	3436	A5

3437	A4	3449	A7	3474	B3	3488	A3	3503	A6	3518	A5
3438	A4	3451	A7	3475	B5	3489	A5	3504	B5	3519	A3
3439	A4	3452	A7	3476	A5	3490	B5	3505	A3	3520	B2
3440	A4	3454	B4	3477	B4	3493	A3	3507	A2	3521	B5
3441	A4	3456	B4	3478	A5	3494	A6	3508	A2	3522	A3
3442	A4	3457	A7	3479	B4	3495	A6	3509	A1	3523	A3
3443	A4	3459	B4	3480	B3	3496	A6	3510	B5	3524	C4
3444	A4	3462	B4	3481	A6	3498	A2	3511	B5	3525	C4
3445	A4	3464	B4	3482	B4	3499	B6	3512	B3	3526	A5
3446	B4	3467	B3	3484	A6	3500	B5	3513	B4	3527	C4
3447	B4	3469	A5	3485	B4	3501	B5	3515	B6	3529	A5
3448	A7	3472	A5	3486	A6	3502	B5	3516	A3	3533	B1

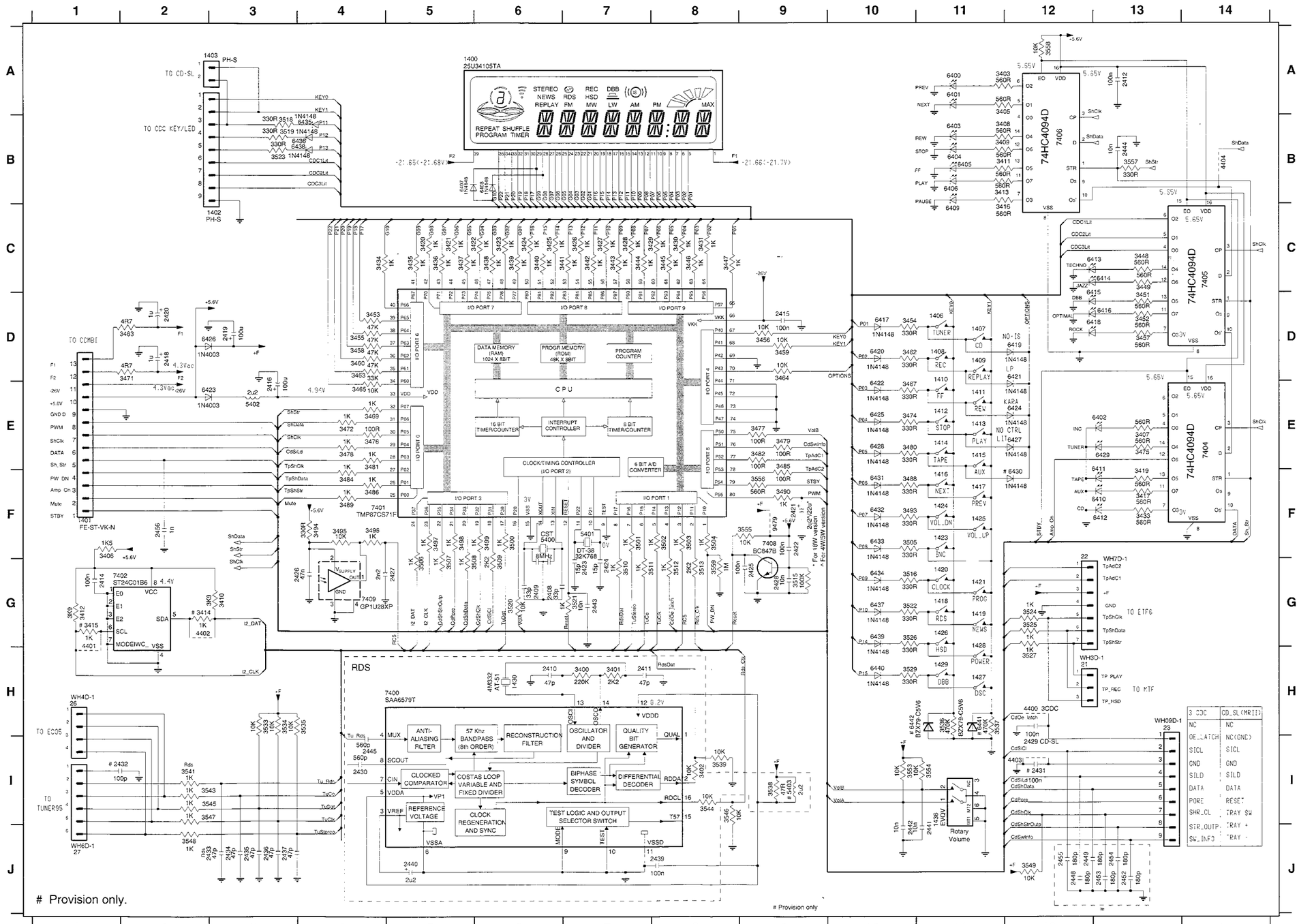
3534	A1	3553	B2	4405	A6	4421	B1	4437	B2	4450	C5
3535	A1	3554	B1	4406	B7	4423	B1	4438	C4	7400	A3
3536	A1	3555	B5	4407	C4	4424	C4	4440	A6	7401	A5
3537	A1	3556	B5	4408	C3	4425	A2	4441	A6	7404	B7
3539	A3	3557	A6	4411	C6	4426	A2	4442	A6	7405	A7
3541	B1	3558	B1	4413	B5	4427	A2	4443	B4	7406	B6
3543	B1	3559	B1	4414	C5	4428	A1	4444	A3	7408	B5
3544	A3	4400	A1	4415	C5	4429	A3	4445	B5		
3545	B1	4401	A6	4417	C4	4430	B7	4446	A2		
3546	A3	4402	A6	4418	C3	4431	B4	4447	A2		
3547	A1	4403	A1	4419	C4	4435	B1	4448	A2		
3548	A1	4404	B6	4420	B2	4436	B1	4449	C5		



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

6-3

CIRCUIT DIAGRAM



21 H12	3447 C8	6418 D13
22 G12	3448 C13	6419 D12
23 H13	3449 C13	6420 D10
26 H1	3451 D13	6421 D12
27 J1	3452 D13	6422 E10
1400 A5	3453 D4	6423 E2
1401 F1	3454 D10	6424 E12
1402 C2	3455 D4	6425 E10
1403 A2	3456 D9	6426 D2
1406 D11	3457 D13	6427 E12
1407 D11	3458 D4	6428 E10
1408 D11	3459 D9	6429 E13
1409 D11	3460 D4	6430 F12
1410 E11	3462 D10	6431 F10
1411 E11	3463 D4	6432 F10
1412 E11	3464 D9	6433 F10
1413 E11	3465 E4	6434 G10
1414 E11	3467 E10	6435 B4
1415 E11	3469 E4	6436 B4
1416 F11	3471 D2	6437 G10
1417 F11	3472 E4	6438 B4
1418 G11	3474 E10	6439 G10
1419 G11	3475 E13	6440 H10
1420 G11	3476 E4	6441 H11
1421 G11	3477 E9	6442 H10
1423 F11	3478 E4	7400 H4
1424 F11	3479 E9	7401 F4
1425 F11	3480 E10	7402 G1
1426 G11	3481 E4	7404 E14
1427 H11	3482 E9	7405 C14
1428 H11	3483 D2	7406 B12
1429 H11	3484 F4	7408 F9
1430 H6	3485 E9	7409 G4
1436 J11	3486 F4	9479 F9
2408 G6	3488 F10	
2409 G6	3489 F4	
2410 H6	3490 F9	
2411 H7	3493 F10	
2412 A13	3494 F4	
2414 G1	3495 F4	
2415 D9	3496 F4	
2416 E3	3497 F5	
2418 D2	3498 F5	
2419 D3	3499 F6	
2420 D2	3500 F6	
2421 F9	3501 F7	
2422 F9	3502 F8	
2423 G7	3503 F8	
2424 G7	3504 F8	
2425 G9	3505 F10	
2426 G3	3506 G5	
2427 G5	3507 G5	
2428 G9	3508 G5	
2429 I12	3509 G6	
2430 I4	3510 G7	
2431 I12	3511 G7	
2432 I1	3512 G8	
2433 J2	3513 G8	
2434 J3	3515 G9	
2435 J3	3516 G10	
2436 J3	3518 B3	
2437 J3	3519 B3	
2439 J8	3520 G6	
2440 J5	3521 G7	
2441 J11	3522 G10	
2442 J10	3523 B3	
2443 G7	3524 G12	
2444 B13	3525 G12	
2445 I4	3526 G10	
2448 J12	3527 H12	
2449 J12	3529 H10	
2452 J13	3533 H3	
2453 J13	3534 H3	
2454 J13	3535 H4	
2455 J12	3536 H11	
2456 F2	3537 H11	
3400 H7	3538 I9	
3401 H7	3539 I8	
3402 I8	3541 I2	
3403 A11	3543 I2	
3405 A11	3544 I8	
3406 F1	3545 I2	
3407 E13	3546 I8	
3408 B11	3547 I2	
3409 B11	3548 J2	
3410 G3	3549 J12	
3411 B11	3553 I10	
3412 G1	3554 I11	
3413 B11	3555 F9	
3414 G2	3556 F9	
3415 G1	3557 B13	
3416 C11	3558 A12	
3417 F13	3559 G8	
3419 E13	3400 H12	
3420 C5	4401 H1	
3421 C5	4402 G2	
3422 C6	4403 I12	
3423 C6	4404 B14	
3424 C6	5400 F6	
3425 C6	5401 F7	
3426 C7	5402 E3	
3427 C7	5403 I9	
3428 C7	6400 A11	
3429 C8	6401 A11	
3430 C8	6402 E13	
3431 C8	6403 B11	
3433 F13	6404 B11	
3434 C4	6405 B11	
3435 C5	6406 B11	
3436 C5	6407 B5	
3437 C5	6408 B6	
3438 C6	6409 C11	
3439 C6	6410 F13	
3440 C6	6411 F13	
3441 C7	6412 F13	
3442 C7	6413 C13	
3443 C7	6414 C13	
3444 C7	6415 D13	
3445 C8	6416 D13	
3446 C8	6417 D10	

D.C. VOLTAGES DURING ACTIVE PLAY
VALUES IN BRACKET ARE D.C. VOLTAGES AT STANDBY.

6-4

ELECTRICAL PARTS LIST - FRONT BOARD

ELECTRICAL PARTS LIST - FRONT BOARD

MISCELLANEOUS

1400	4822 135 00171	FTD Display
1401	4822 267 10756	Flex Connector 13 pin
1406	4822 276 13114	Tact Switch
1407	4822 276 13114	Tact Switch
1408	4822 276 13114	Tact Switch
1410	4822 276 13114	Tact Switch
1411	4822 276 13114	Tact Switch
1412	4822 276 13114	Tact Switch
1413	4822 276 13114	Tact Switch
1414	4822 276 13114	Tact Switch
1415	4822 276 13114	Tact Switch
1416	4822 276 13114	Tact Switch
1417	4822 276 13114	Tact Switch
1418	4822 276 13114	Tact Switch
1420	4822 276 13114	Tact Switch
1421	4822 276 13114	Tact Switch
1423	4822 276 13114	Tact Switch
1426	4822 276 13114	Tact Switch
1427	4822 276 13114	Tact Switch
1428	4822 276 13114	Tact Switch
1429	4822 276 13114	Tact Switch
1430	4822 242 72195	Quartz 4,332 MHz
1436	4822 101 21261	Rotary Encoder 24P

CAPACITORS

2408	5322 122 32659	33pF 5% 50V
2409	5322 122 32659	33pF 5% 50V
2410	4822 126 13692	47pF 1% 63V
2411	4822 126 13692	47pF 1% 63V
2412	4822 126 10002	100nF 20% 25V
2414	4822 126 10002	100nF 20% 25V
2415	4822 126 10002	100nF 20% 25V
2416	4822 124 42446	100µF 20% 10V
2418	4822 124 22651	1,0µF 20% 50V
2419	4822 124 42446	100µF 20% 10V
2420	4822 124 22651	1,0µF 20% 50V
2421	4822 124 41796	22µF 20% 16V
2422	4822 126 10002	100nF 20% 25V
2423	4822 126 13486	15pF 2% 63V
2424	4822 126 13486	15pF 2% 63V
2425	4822 126 10002	100nF 20% 25V
2426	4822 126 13751	47nF 10% 63V
2427	4822 122 33175	2,2nF 20% 50V
2428	4822 122 33177	10nF 20% 50V
2429	4822 126 10002	100nF 20% 25V
2430	4822 122 33173	560pF 10% 50V
2432	5322 122 32531	100pF 5% 50V
2433	4822 126 13692	47pF 1% 63V
2434	4822 126 13692	47pF 1% 63V
2435	4822 126 13692	47pF 1% 63V
2436	4822 126 13692	47pF 1% 63V
2437	4822 126 13692	47pF 1% 63V
2439	4822 126 10002	100nF 20% 25V
2440	4822 124 22652	2,2µF 20% 50V
2441	4822 122 33177	10nF 20% 50V
2442	4822 122 33177	10nF 20% 50V
2443	4822 122 33177	10nF 20% 50V
2444	4822 122 33177	10nF 20% 50V
2445	4822 122 33173	560pF 10% 50V
2456	5322 122 34123	1nF 10% 50V

RESISTORS

3400	4822 051 20224	220k 5% 0,1W
3401	4822 117 11449	2k2 1% 0,1W
3402	4822 117 10833	10k 1% 0,1W
3403	4822 117 11503	220R 1% 0.1W
3405	4822 117 11503	220R 1% 0.1W
3406	4822 117 11139	1k5 1% 0,1W
3407	4822 051 20561	560R 5% 0,1W
3408	4822 117 11503	220R 1% 0.1W
3409	4822 117 11503	220R 1% 0.1W
3410	4822 051 20392	3k9 5% 0,1W
3411	4822 117 11503	220R 1% 0.1W
3412	4822 051 20392	3k9 5% 0,1W
3413	4822 117 11503	220R 1% 0.1W
3416	4822 117 11503	220R 1% 0.1W
3417	4822 051 20561	560R 5% 0,1W
3419	4822 051 20561	560R 5% 0,1W
3420	4822 051 10102	1k 2% 0,25W
3421	4822 051 10102	1k 2% 0,25W
3422	4822 051 10102	1k 2% 0,25W
3423	4822 051 10102	1k 2% 0,25W
3424	4822 051 10102	1k 2% 0,25W
3425	4822 051 10102	1k 2% 0,25W
3426	4822 051 10102	1k 2% 0,25W
3427	4822 051 10102	1k 2% 0,25W
3428	4822 051 10102	1k 2% 0,25W
3429	4822 051 10102	1k 2% 0,25W
3430	4822 051 10102	1k 2% 0,25W
3431	4822 051 10102	1k 2% 0,25W
3433	4822 051 20561	560R 5% 0,1W
3434	4822 051 10102	1k 2% 0,25W
3435	4822 051 10102	1k 2% 0,25W
3436	4822 051 10102	1k 2% 0,25W
3437	4822 051 10102	1k 2% 0,25W
3438	4822 051 10102	1k 2% 0,25W
3439	4822 051 10102	1k 2% 0,25W
3440	4822 051 10102	1k 2% 0,25W
3441	4822 051 10102	1k 2% 0,25W
3442	4822 051 10102	1k 2% 0,25W
3443	4822 051 10102	1k 2% 0,25W
3444	4822 051 10102	1k 2% 0,25W
3445	4822 051 10102	1k 2% 0,25W
3446	4822 051 10102	1k 2% 0,25W
3447	4822 051 10102	1k 2% 0,25W
3448	4822 051 20561	560R 5% 0,1W
3449	4822 051 20561	560R 5% 0,1W
3451	4822 051 20561	560R 5% 0,1W
3452	4822 051 20561	560R 5% 0,1W
3453	4822 116 83884	47k 5% 0,5W
3454	4822 051 20331	330R 5% 0,1W
3455	4822 116 83884	47k 5% 0,5W
3456	4822 117 10833	10k 1% 0,1W
3457	4822 051 20561	560R 5% 0,1W
3458	4822 116 83884	47k 5% 0,5W
3459	4822 117 10833	10k 1% 0,1W
3460	4822 116 83884	47k 5% 0,5W
3462	4822 051 20331	330R 5% 0,1W
3463	4822 116 52271	33k 5% 0,5W
3464	4822 117 10833	10k 1% 0,1W
3465	4822 116 83864	10k 5% 0,5W
3467	4822 051 20331	330R 5% 0,1W
3469	4822 051 10102	1k 2% 0,25W
3471	4822 050 24708	4R7 1% 0,6W
3472	4822 051 10102	1k 2% 0,25W
3474	4822 051 20331	330R 5% 0,1W
3475	4822 051 20561	560R 5% 0,1W
3476	4822 051 20101	100R 5% 0,1W
3477	4822 051 20101	100R 5% 0,1W
3478	4822 051 10102	1k 2% 0,25W
3479	4822 051 20101	100R 5% 0,1W
3480	4822 051 20331	330R 5% 0,1W
3481	4822 051 10102	1k 2% 0,25W
3482	4822 051 20101	100R 5% 0,1W
3483	4822 050 24708	4R7 1% 0,6W
3484	4822 051 10102	1k 2% 0,25W
3485	4822 051 20101	100R 5% 0,1W
3486	4822 051 10102	1k 2% 0,25W
3488	4822 051 20331	330R 5% 0,1W
3489	4822 051 10102	1k 2% 0,25W
3490	4822 051 10102	1k 2% 0,25W
3493	4822 051 20331	330R 5% 0,1W
3494	4822 051 20331	330R 5% 0,1W
3495	4822 117 10833	10k 1% 0,1W
3496	4822 051 10102	1k 2% 0,25W
3497	4822 050 11002	1k 1% 0,4W
3498	4822 051 10102	1k 2% 0,25W
3499	4822 051 10102	1k 2% 0,25W
3500	4822 051 10102	1k 2% 0,25W
3501	4822 051 10102	1k 2% 0,25W
3502	4822 051 10102	1k 2% 0,25W
3503	4822 051 10102	1k 2% 0,25W
3504	4822 051 10102	1k 2% 0,25W
3505	4822 051 20331	330R 5% 0,1W
3506	4822 050 11002	1k 1% 0,4W
3507	4822 051 10102	1k 2% 0,25W
3508	4822 051 10102	1k 2% 0,25W
3509	4822 117 11449	2k2 1% 0,1W
3510	4822 051 10102	1k 2% 0,25W
3511	4822 051 10102	1k 2% 0,25W
3512	4822 051 10102	1k 2% 0,25W
3513	4822 117 11449	2k2 1% 0,1W
3515	4822 051 20104	100k 5% 0,1W
3516	4822 051 20331	330R 5% 0,1W
3518	4822 051 20331	330R 5% 0,1W
3519	4822 051 20331	330R 5% 0,1W
3520	4822 117 10833	10k 1% 0,1W
3521	4822 051 10102	1k 2% 0,25W
3522	4822 051 20331	330R 5% 0,1W
3523	4822 051 20331	330R 5% 0,1W
3524	4822 051 10102	1k 2% 0,25W
3525	4822 051 10102	1k 2% 0,25W
3526	4822 051 20331	330R 5% 0,1W
3527	4822 051 10102	1k 2% 0,25W
3529	4822 051 20331	330R 5% 0,1W
3533	4822 117 10833	10k 1% 0,1W
3534	4822 117 10833	10k 1% 0,1W
3535	4822 117 10833	10k 1% 0,1W
3536	4822 051 20474	470k 5% 0,1W
3537	4822 051 20474	470k 5% 0,1W
3538	4822 116 52195	47R 5% 0,5W
3539	4822 117 10833	10k 1% 0,1W
3541	4822 051 10102	1k 2% 0,25W
3543	4822 051 10102	1k 2% 0,25W
3544	4822 117 10833	10k 1% 0,1W
3545	4822 051 10102	1k 2% 0,25W
3546	4822 117 10833	10k 1% 0,1W
3547	4822 051 10102	1k 2% 0,25W
3548	4822 051 10102	1k 2% 0,25W
3549	4822 116 83864	10k 5% 0,5W
3553	4822 117 10833	10k 1% 0,1W
3554	4822 117 10833	10k 1% 0,1W
3555	4822 117 10833	10k 1% 0,1W
3556	4822 051 20561	560R 5% 0,1W
3557	4822 051 20331	330R 5% 0,1W
3558	4822 117 10833	10k 1% 0,1W
3559	4822 051 20105	1M 5% 0,1W
4401	4822 051 20008	0R Jumper 0805
4402	4822 051 20008	0R Jumper 0805
4403	4822 051 20008	0R Jumper 0805
4405	4822 051 20008	0R Jumper 0805
4406	4822 051 20008	0R Jumper 0805
4407	4822 051 20008	0R Jumper 0805
4408	4822 051 20008	0R Jumper 0805
4411	4822 051 20008	0R Jumper 0805
4413	4822 051 20008	0R Jumper 0805
4414	4822 051 20008	0R Jumper 0805

ELECTRICAL PARTS LIST - FRONT BOARD

4415	4822 051 20008	0R Jumper 0805
4417	4822 051 20008	0R Jumper 0805
4418	4822 051 20008	0R Jumper 0805
4419	4822 051 20008	0R Jumper 0805
4420	4822 051 20008	0R Jumper 0805
4421	4822 051 20008	0R Jumper 0805
4423	4822 051 20008	0R Jumper 0805
4424	4822 051 20008	0R Jumper 0805
4425	4822 051 20008	0R Jumper 0805
4426	4822 051 20008	0R Jumper 0805
4427	4822 051 20008	0R Jumper 0805
4428	4822 051 20008	0R Jumper 0805
4429	4822 051 20008	0R Jumper 0805
4430	4822 051 20008	0R Jumper 0805
4431	4822 051 20008	0R Jumper 0805
4435	4822 051 20008	0R Jumper 0805
4436	4822 051 20008	0R Jumper 0805
4437	4822 051 20008	0R Jumper 0805
4438	4822 051 20008	0R Jumper 0805
4440	4822 051 20008	0R Jumper 0805
4441	4822 051 20008	0R Jumper 0805
4442	4822 051 20008	0R Jumper 0805
4443	4822 051 20008	0R Jumper 0805
4444	4822 051 20008	0R Jumper 0805
4445	4822 051 20008	0R Jumper 0805
4446	4822 051 20008	0R Jumper 0805
4447	4822 051 20008	0R Jumper 0805
4448	4822 051 20008	0R Jumper 0805
4449	4822 051 20008	0R Jumper 0805
4450	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5400	4822 242 72066	Ceram Resonator 8MHz
5401	4822 242 70938	X'tal Resonator 32,768kHz
5402	4822 157 11477	Coil 2,2µH 5%

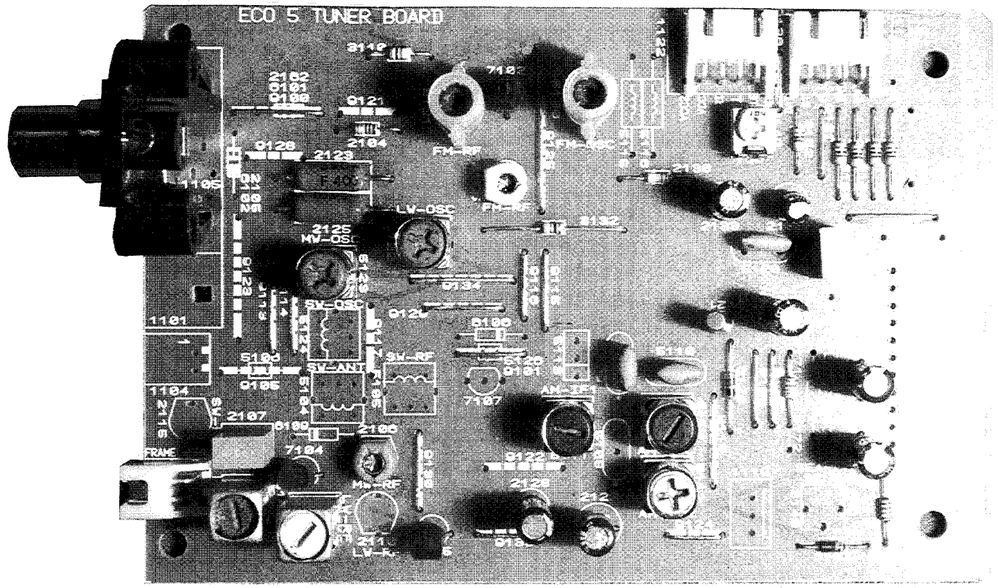
DIODES

6400	4822 130 10791	LTL-1CHGE
6401	4822 130 10791	LTL-1CHGE
6402	4822 130 10791	LTL-1CHGE
6403	4822 130 10791	LTL-1CHGE
6404	4822 130 10791	LTL-1CHGE
6405	4822 130 10791	LTL-1CHGE
6406	4822 130 10791	LTL-1CHGE
6407	4822 130 30621	1N4148
6408	4822 130 30621	1N4148
6409	4822 130 10791	LTL-1CHGE
6410	4822 130 10792	LTL-1CHPE
6411	4822 130 10792	LTL-1CHPE
6412	4822 130 10792	LTL-1CHPE
6413	4822 130 10792	LTL-1CHPE
6414	4822 130 10792	LTL-1CHPE
6415	4822 130 10791	LTL-1CHGE
6416	4822 130 10792	LTL-1CHPE
6417	4822 130 30621	1N4148
6418	4822 130 10792	LTL-1CHPE
6419	4822 130 30621	1N4148
6420	4822 130 30621	1N4148
6421	4822 130 30621	1N4148
6422	4822 130 30621	1N4148
6423	4822 130 31878	1N4003G
6424	4822 130 30621	1N4148
6425	4822 130 30621	1N4148
6426	4822 130 31878	1N4003G
6428	4822 130 30621	1N4148
6429	4822 130 10792	LTL-1CHPE
6431	4822 130 30621	1N4148
6432	4822 130 30621	1N4148
6433	4822 130 30621	1N4148
6434	4822 130 30621	1N4148
6435	4822 130 30621	1N4148
6436	4822 130 30621	1N4148
6437	4822 130 30621	1N4148
6438	4822 130 30621	1N4148
6439	4822 130 30621	1N4148
6440	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7400	4822 209 31981	SAA6579T
7401	4822 209 16463	TMP87CP71F "326S51651"
7402	4822 209 31508	ST24C01B1
7404	4822 209 15449	74HC4094D
7405	4822 209 15449	74HC4094D
7406	4822 209 15449	74HC4094D
7408	4822 130 60511	BC847B
7409	4822 130 10165	GP1U28XP

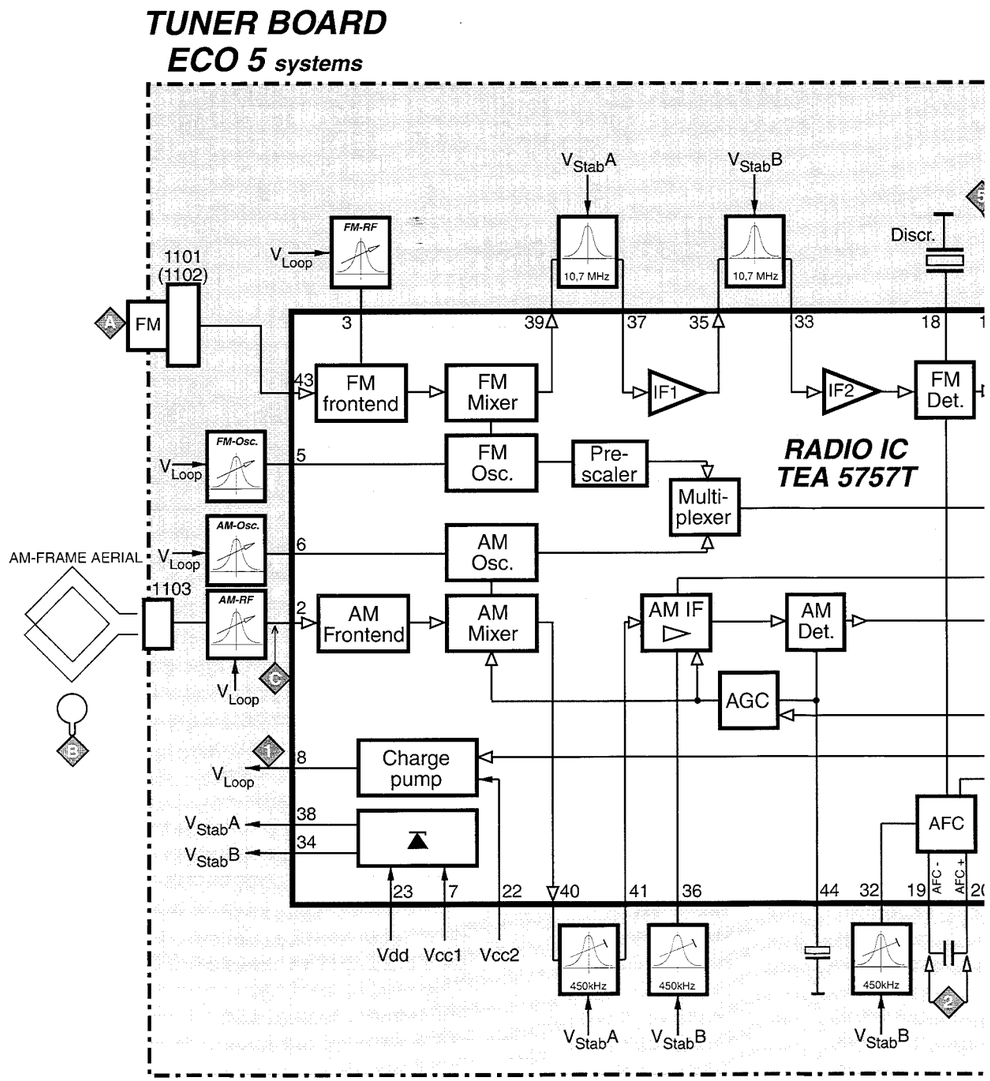
Note : Only the parts mentioned in this list are normal service parts.



TUNER BOARD ECO5

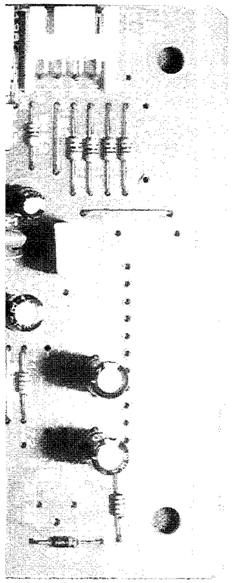
TABLE OF CONTENTS

BLOCKDIAGRAM

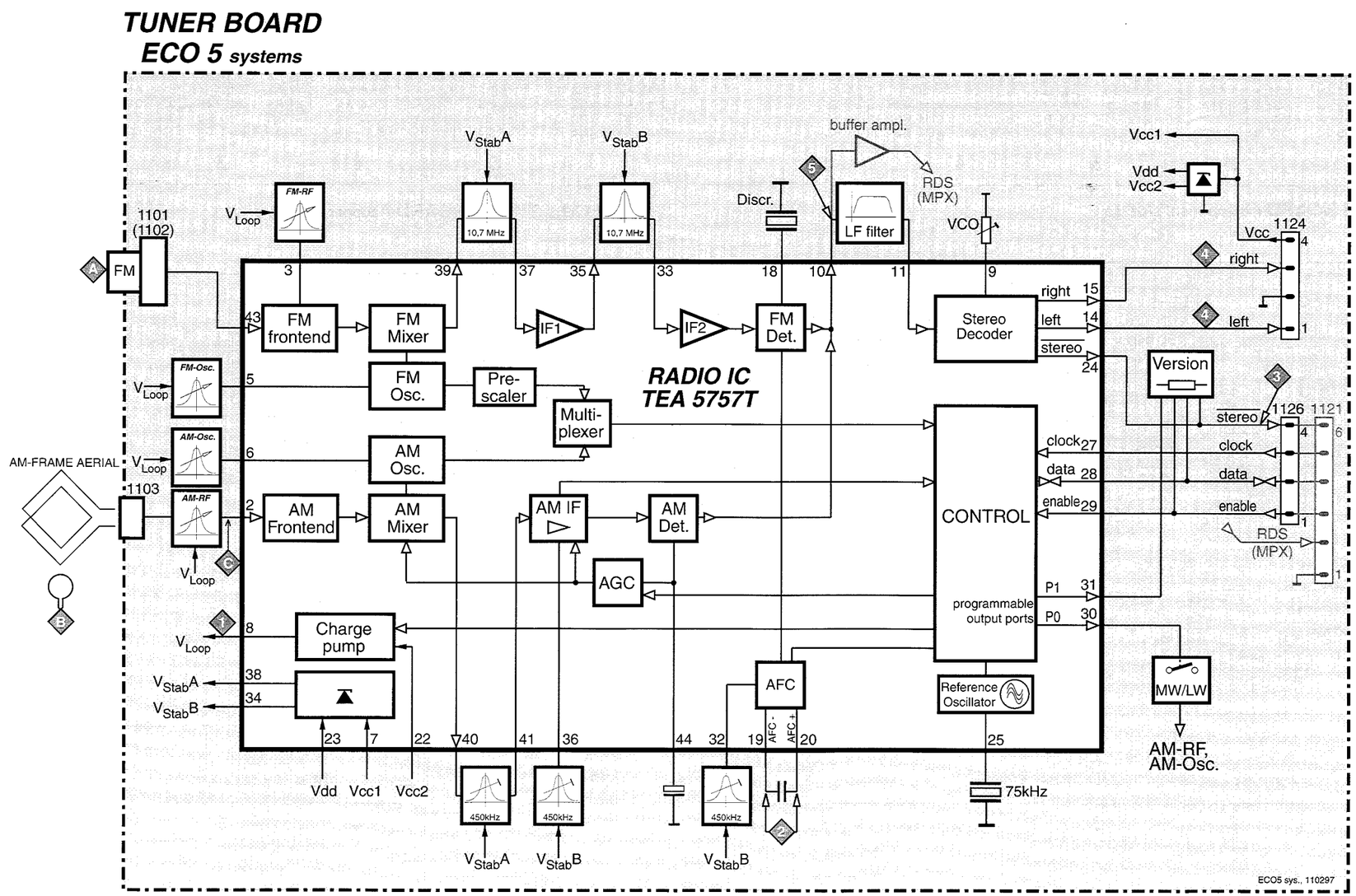


7B-1

BLOCKDIAGRAM



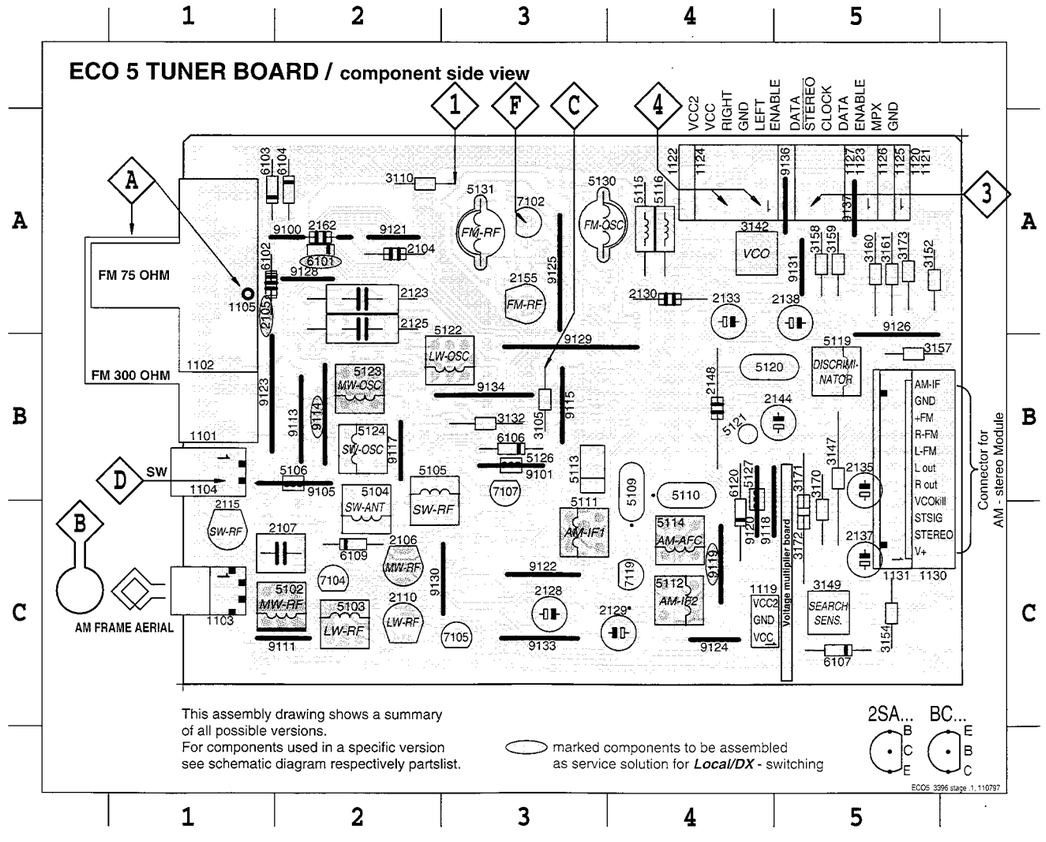
5

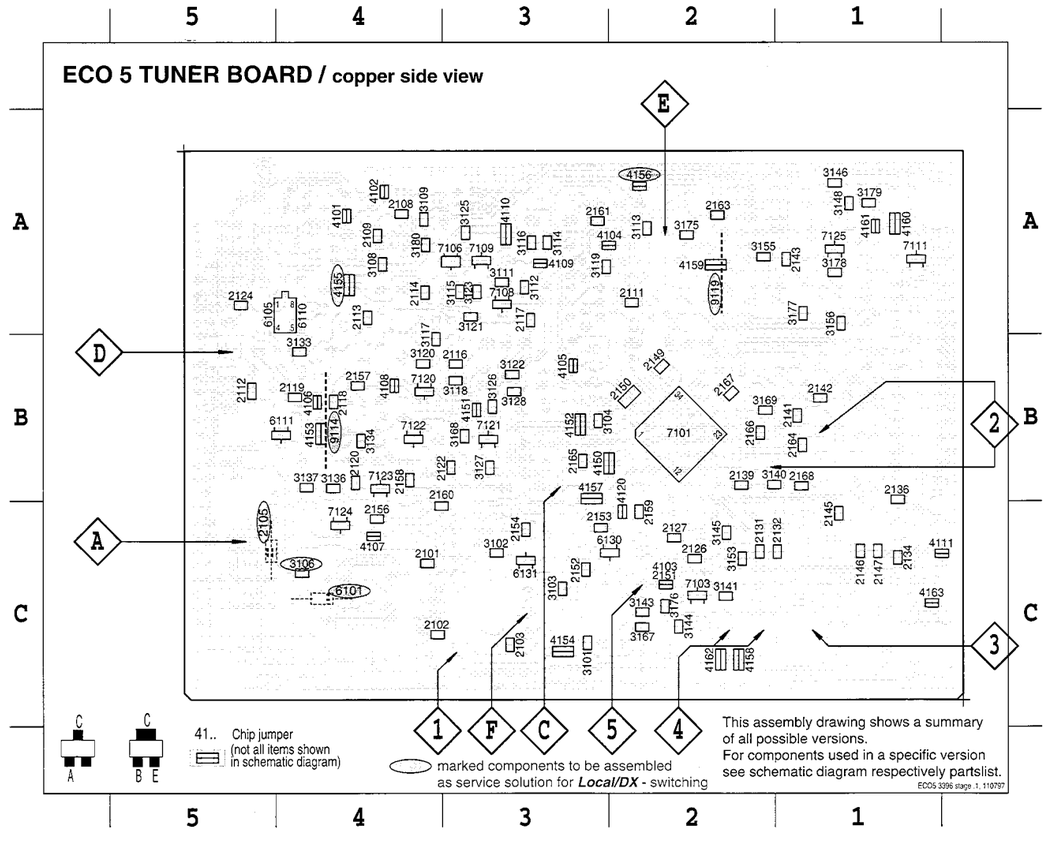


7B-2

1101 A1	2106 C2	2137 C5	3149 C5	3173 A5	5114 C4	5130 A3	7104 C2	9117 B2	9129 B3		
1102 A1	2107 C2	2138 A5	3152 A5	5102 C2	5115 A4	5131 A3	7105 C3	9118 B4	9130 C3		
1103 C1	2110 C2	2144 B5	3154 C5	5103 C2	5116 A4	6101 A2	7107 B3	9119 C4	9131 A5		
1104 B1	2115 C1	2148 B4	3157 B5	5104 C2	5119 B5	6102 A1	7119 C4	9120 B4	9133 C3		
1105 A1	2123 A2	2155 A3	3158 A5	5105 B2	5120 B4	6103 A1	9100 A2	9121 A2	9134 B3		
1119 C5	2125 A2	2162 A2	3159 A5	5106 B2	5121 B4	6104 A2	9101 B3	9122 C3	9136 A5		
1120 A5	2128 C3	3105 B3	3160 A5	5109 B4	5122 B3	6106 B3	9105 B2	9123 B1	9137 A5		
1130 B5	2129 C4	3110 A2	3161 A5	5110 B4	5123 B2	6107 C5	9111 C2	9124 C4			
1131 B5	2130 A4	3132 B3	3170 C5	5111 C3	5124 B2	6109 C2	9113 B2	9125 A3			
2104 A2	2133 A4	3142 A4	3171 C5	5112 C4	5126 B3	6120 C4	9114 B2	9126 B5			
2105 A1	2135 B5	3147 B5	3172 C5	5113 B3	5127 B4	7102 A3	9115 B3	9128 A2			

2101 C4	2118 B4	2139 B2	2153 C3	2166 B2	3112 A3	3123 A3	3143 C2	3175 A2	4106 B4	4154 C3	6110 A4	7121 B3
2102 C4	2119 B4	2141 B1	2154 C3	2167 B2	3113 A2	3125 A3	3144 C2	3176 C2	4107 C4	4155 A4	6111 B4	7122 B4
2103 C3	2120 B4	2142 B1	2156 C4	2168 B1	3114 A3	3126 B3	3145 C2	3177 A1	4108 B4	4156 A2	6130 C2	7123 B4
2108 A4	2122 B3	2143 A1	2157 B4	3101 C3	3115 A3	3127 B3	3146 A1	3178 A1	4109 A3	4157 B3	6131 C3	7124 C4
2109 A4	2124 A5	2145 C1	2158 B4	3102 C3	3116 A3	3128 B3	3148 A1	3179 A1	4110 A3	4158 C2	7101 B2	7125 A1
2111 A2	2126 C2	2146 C1	2159 C2	3103 C3	3117 B4	3133 B4	3153 C2	3180 A4	4111 C1	4159 A2	7103 C2	
2112 B5	2127 C2	2147 C1	2160 C4	3104 B3	3118 B3	3134 B4	3155 A2	4101 A4	4120 C2	4160 A1	7106 A3	
2113 A4	2131 C2	2149 B2	2161 A3	3106 C4	3119 A3	3136 B4	3156 A1	4102 A4	4150 B2	4161 A1	7108 A3	
2114 A4	2132 C1	2150 B2	2163 A2	3108 A4	3120 B4	3137 B4	3167 C2	4103 C2	4151 B3	4162 C1	7109 A3	
2116 B3	2134 C1	2151 C2	2164 B1	3109 A4	3121 A3	3140 B2	3168 B3	4104 A2	4152 B3	4163 C1	7111 A1	
2117 A3	2136 B1	2152 C3	2165 B3	3111 A3	3122 B3	3141 C2	3169 B2	4105 B3	4153 B4	6105 A4	7120 B4	





TUNER ADJUSTMENT

Waverange	Input
VARICAP ALIGNMENT	
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	
MW FM/AM-version, 10kHz grid 530 - 1700kHz	
FM/MW-version, 9kHz grid 531 - 1602kHz	
LW 153 - 279kHz	
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz	
FM IF	
FM	10.7I conti
FM RF	
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	1 ..... 8 (
VCO	
FM	98I conti
AM IF	
MW	conr IC 71(with gro
AM AFC **MW**	
AM RF 3)	
MW 4) FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1 .....
LW	
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1 .....

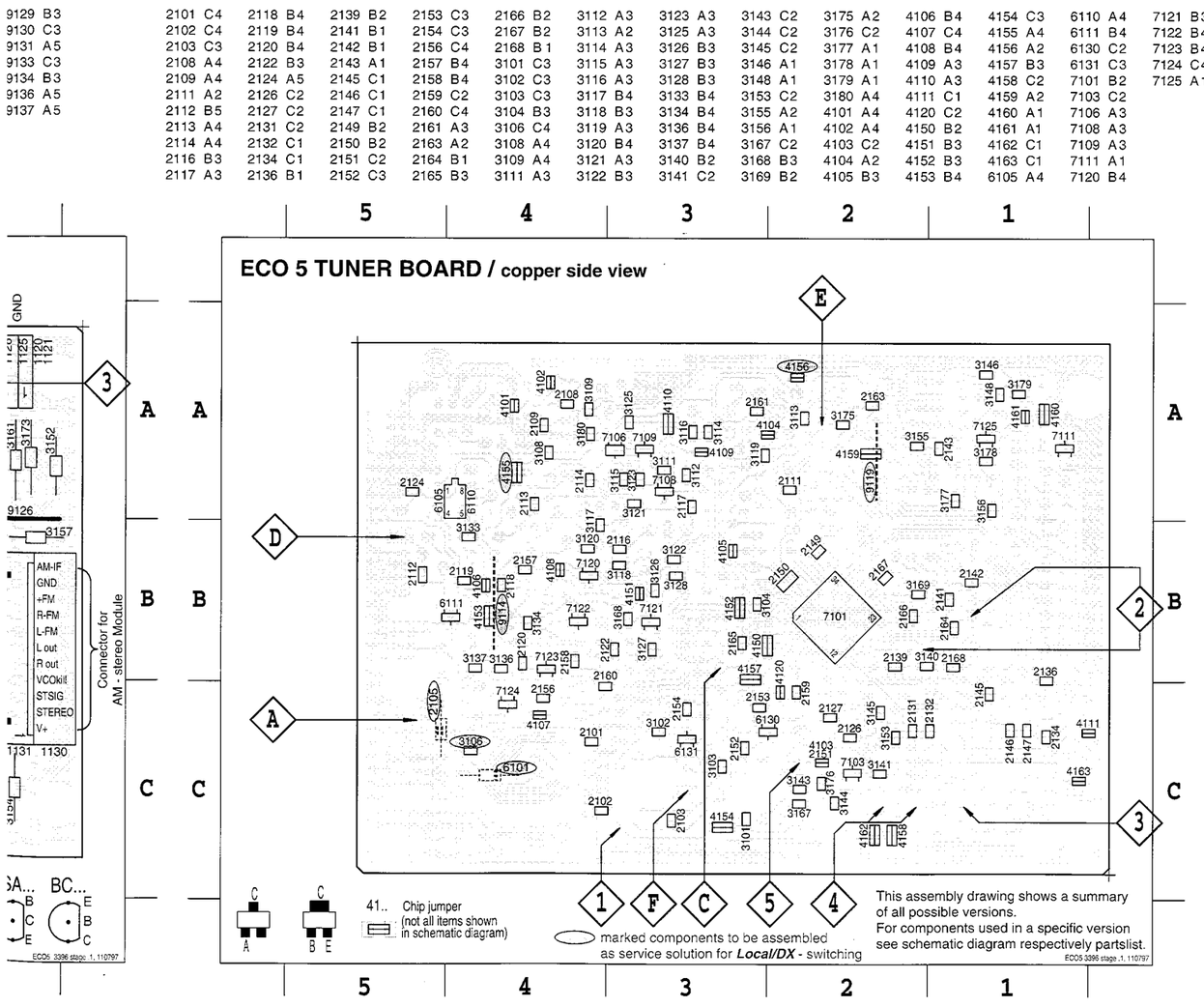
Use service test program. By selecting

1) If sensitivity of frequency counter is t (input signal: stereo left 90% + 9%, a

3) For AM RF adjustments the original f

↕ Repeat

7B-2



TUNER ADJUSTMENT TABLE (ECO5 FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)			108MHz	5130	◇1	8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V (1.2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123		6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM IF						
FM	10.7MHz, 50mV continuous wave	◇F	IC 7101 21 shortcircuit to block AFC 2141	5119	◇2	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	◇A	108MHz	2155	◇4	MAX
	87.5MHz (65.81MHz)	mod=1kHz Δf=±22.5kHz	87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	◇A	98MHz	3142	◇3	152kHz ±1kHz 1)
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with short wire to ground (pin 4)	◇C Δf=±15kHz V_{RF} = 3mV	IC 7101 36 100nF 220R	5111	◇4	max. f_o symmetric
			IC 7101 40 100nF 220R see remark 2)	5112		
AM AFC **MW**		◇C continuous wave V_{RF} = 10mV		5114	◇2	0 ± 2 mV DC
AM RF 3)						
MW 4) FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	◇B Δf = ±30kHz V_{RF} as low as possible	1494kHz	2106	◇4	max. f_o symmetric
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz		1500kHz	2106		
	560kHz		560kHz	5102		

ECO5, discr. coil, 090797

Use service test program. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

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

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

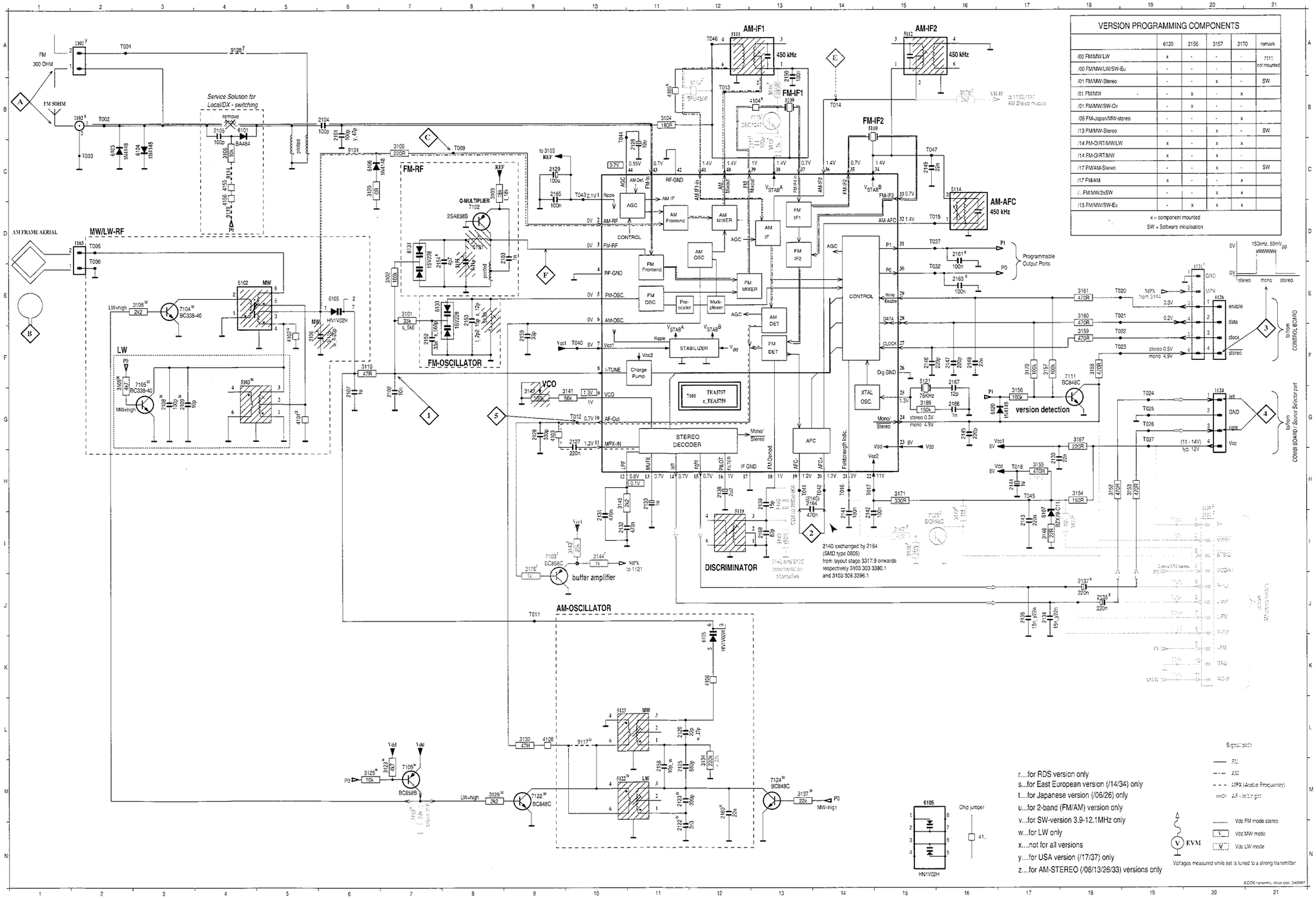
3) For AM RF adjustments the original frame antenna has to be used !

4) MW has to be aligned before LW.

↕ Repeat

7B-3

TUNER BOARD ECO5 / Systems



ELECTRICAL PARTS LIST - ECO5 TUNER BOARD

MISCELLANEOUS

1101	4822 267 31505	Antenna Socket 300R	
1102	4822 267 10283	Antenna Socket Coax IEC 75R	

CAPACITORS

2101	5322 122 32531	100pF 5% 50V	
2101	4822 126 13692	47pF 1% 63V	for USA
2102	4822 122 33177	10nF 20% 50V	
2103	5322 122 34123	1nF 10% 50V	
2104	4822 122 33195	100pF 10% 50V	
2106	4822 125 50355	Trimmer 4-20pF	for LW version
2106	4822 125 60101	Trimmer 3-11pF 100V	
2107	4822 121 51319	1µF 10% 63V	
2108	5322 122 32531	100pF 5% 50V	for LW version
2109	5322 122 32448	10pF 5% 50V	for LW version
2120	4822 126 13691	27pF 1% 63V	for LW version
2120	5322 122 32658	22pF 5% 50V	
2122	4822 122 33891	3,3nF 10% 63V	for LW version
2125	4822 121 51381	560pF 5% 400V	
2126	5322 122 31863	330pF 5% 50V	
2127	4822 126 13473	220nF +80/-20% 50V	
2128	4822 124 41579	10µF 20% 50V	
2129	4822 124 41584	100µF 20% 10V	
2130	4822 126 11585	22nF+80/- 20% 25V	
2131	4822 122 33325	470nF 16V	
2131	4822 126 13482	470nF +80/- 20% 16V	
2132	4822 126 13482	470nF +80/- 20% 16V	
2133	4822 124 40242	1µF 20% 63V	
2134	4822 126 13188	15nF 5% 63V	
2134	5322 122 32654	22nF 10% 63V	for USA
2135	4822 124 40746	0,22µF 20% 63V	
2136	4822 126 13188	15nF 5% 63V	
2136	5322 122 32654	22nF 10% 63V	for USA
2137	4822 124 40746	0,22µF 20% 63V	
2138	4822 124 41576	2,2µF 20% 50V	
2139	4822 126 14236	50V 15pF 5%	
2140	4822 121 51252	470nF 5% 63V	
2141	4822 126 10002	100nF 20% 25V	
2142	4822 126 10002	100nF 20% 25V	
2143	4822 126 13473	220nF +80/-20% 50V	
2144	4822 124 40242	1µF 20% 63V	
2145	4822 122 33575	220pF 5% 50V	
2146	4822 122 33575	220pF 5% 50V	
2147	4822 122 33575	220pF 5% 50V	
2148	4822 126 11585	22nF+80/- 20% 25V	
2149	5322 122 32654	22nF 10% 63V	
2150	4822 122 31947	100nF 20% 63V	
2152	5322 116 80853	560pF 5% 63V	for East. Europe
2152	4822 126 12105	33nF 5% 63V	
2153	4822 122 32139	12pF 2% 63V	for East. Europe
2153	4822 122 32504	15pF 2% 63V	
2155	4822 125 60101	Trimmer 3-11pF 100V	
2158	5322 122 32448	10pF 5% 50V	for LW version
2159	5322 122 32659	33pF 5% 50V	
2160	5322 122 32654	22nF 10% 63V	
2161	4822 126 10002	100nF 20% 25V	
2163	4822 126 10002	100nF 20% 25V	
2164	4822 126 13482	470nF +80/- 20% 16V	
2165	4822 126 10002	100nF 20% 25V	
2166	5322 122 34123	1nF 10% 50V	
2167	4822 122 32139	12pF 2% 63V	
2168	4822 126 13695	82pF 1% 63V	

RESISTORS

3101	4822 051 20562	5k6 5% 0,1W	for East. Europe
3101	4822 051 20333	33k 5% 0,1W	
3102	4822 051 20104	100k 5% 0,1W	
3103	4822 117 10965	18k 1% 0,1W	
3104	4822 117 11448	180R 1% 0,1W	
3105	4822 116 83872	220R 5% 0,5W	
3108	4822 117 11449	2k2 1% 0,1W	for LW version
3109	4822 051 20472	4k7 5% 0,1W	for LW version
3110	4822 116 52195	47R 5% 0,5W	
3120	4822 051 20008	0R Jumper 0805	
3123	4822 051 20472	4k7 5% 0,1W	for LW version
3125	4822 117 10833	10k 1% 0,1W	for LW version
3128	4822 117 11449	2k2 1% 0,1W	for LW version
3132	4822 116 52195	47R 5% 0,5W	
3134	4822 051 20224	220k 5% 0,1W	
3137	4822 051 20223	22k 5% 0,1W	for LW version
3140	4822 051 20008	0R Jumper 0805	
		5120=CDA10.7MG40K	
3140	4822 117 10353	150R 1% 0,1W	
		5120=CDA10.7MG61KA	
3141	4822 051 20563	56k 5% 0,1W	
3142	4822 100 11163	Trimmer 100k 30% 0,1W	
3143	4822 051 20223	22k 5% 0,1W	for RDS version
3144	4822 051 10102	1k 2% 0,25W	for RDS version
3145	4822 117 11449	2k2 1% 0,1W	
3146	4822 051 20229	22R 5% 0,1W	
3152	4822 116 83883	470R 5% 0,5W	
3153	4822 051 20471	470R 5% 0,1W	
3154	4822 116 83868	150R 5% 0,5W	
3155	4822 051 20471	470R 5% 0,1W	
3156	4822 051 20104	100k 5% 0,1W	for /21/30/33 only
3157	4822 116 52234	100k 5% 0,5W	for East. Europe
3158	4822 116 83883	470R 5% 0,5W	
3159	4822 116 83883	470R 5% 0,5W	
3160	4822 116 83883	470R 5% 0,5W	
3161	4822 116 83883	470R 5% 0,5W	
3167	4822 117 11503	220R 1% 0.1W	
3169	4822 051 20154	150k 5% 0,1W	
3170	4822 116 52234	100k 5% 0,5W	
3171	4822 116 52219	330R 5% 0,5W	

7B-4

ELECTRICAL PARTS LIST - ECO5 TUNER BOARD

3176	4822 051 10102	1k 2% 0,25W	for RDS version
4101	4822 051 20008	0R Jumper 0805	for 2-Band only
4102	4822 051 20008	0R Jumper 0805	for 2-Band only
4103	4822 051 20008	0R Jumper 0805	
4104	4822 051 20008	0R Jumper 0805	
4105	4822 051 20008	0R Jumper 0805	
4106	4822 051 20008	0R Jumper 0805	
4108	4822 051 20008	0R Jumper 0805	
4111	4822 051 20008	0R Jumper 0805	
4120	4822 051 20008	0R Jumper 0805	
4150	4822 051 10008	0R Jumper 1206	
4151	4822 051 20008	0R Jumper 0805	
4152	4822 051 10008	0R Jumper 1206	
4153	4822 051 10008	0R Jumper 1206	
4154	4822 051 10008	0R Jumper 1206	
4155	4822 051 10008	0R Jumper 1206	
4156	4822 051 20008	0R Jumper 0805	
4157	4822 051 10008	0R Jumper 1206	
4158	4822 051 10008	0R Jumper 1206	
4159	4822 051 10008	0R Jumper 1206	
4162	4822 051 10008	0R Jumper 1206	

COILS & FILTERS

5102	4822 157 71634	MW RF Coil	
5103	4822 157 71635	LW RF Coil	for LW version
5109	4822 242 70665	Ceram Filter 10,7MHz	
5110	4822 242 70665	Ceram Filter 10,7MHz	
5111	4822 158 60511	AM-IF Filter 450kHz	
5112	4822 157 70302	AM-IF Filter 450kHz	
5114	4822 157 70302	AM-IF Filter 450kHz	
5119	4822 157 11443	Discriminator 10,7MHz	
5120	4822 242 82065	Cer. Disc. 10,7MG40K	
5120	4822 242 10251	Cer. Disc.10,7MG61KA-TF21	
5121	4822 242 10261	Quartz 75kHz	
5122	4822 157 60517	Osc. Coil LW	for LW version
5123	4822 157 60517	Osc. Coil MW	
5130	4822 156 30947	RF-Coil 1.5T	
5131	4822 156 30947	RF-Coil 1.5T	

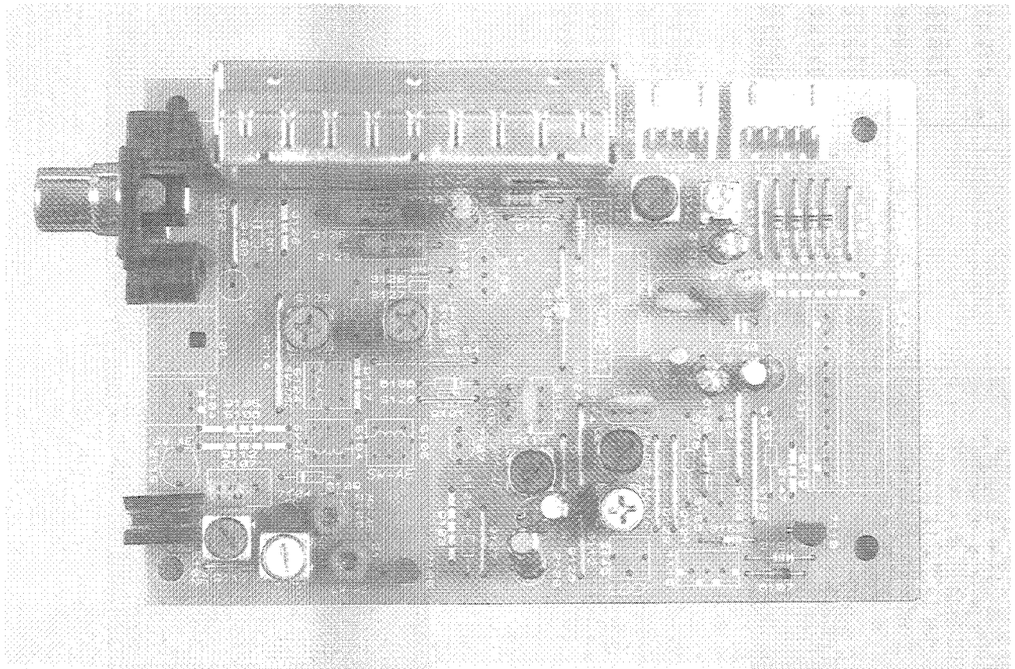
DIODES

6103	4822 130 30621	1N4148	
6104	4822 130 30621	1N4148	
6105	4822 130 83075	HN1V02H-B	
6106	4822 130 30621	1N4148	
6107	4822 130 34488	BZX79-B11	
6120	4822 130 30621	1N4148	not for /21/30/33
6130	4822 130 82833	1SV228	
6131	4822 130 82833	1SV228	

TRANSISTORS & INTEGRATED CIRCUITS

7101	4822 209 90924	TEA5757H/V1	
7102	4822 130 60093	2SA838B	
7103	4822 130 42513	BC858C	for RDS version
7104	5322 130 44779	BC338-40	for LW version
7105	5322 130 44779	BC338-40	for LW version
7109	5322 130 41983	BC858B	for LW version
7111	5322 130 42136	BC848C	
7122	5322 130 42136	BC848C	for LW version
7124	5322 130 42136	BC848C	for LW version

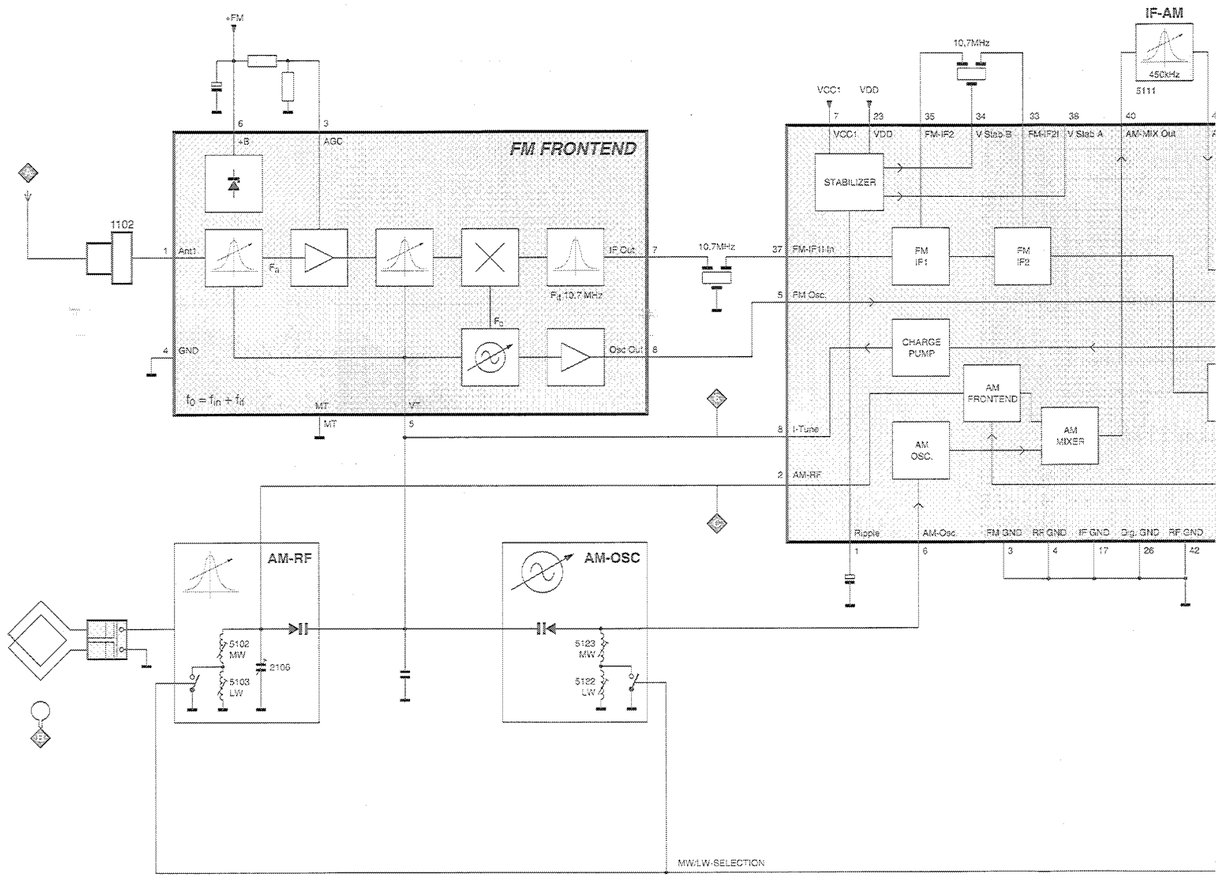
Note: Only the parts mentioned in this list are normal service spare parts.



TUNER 95 BOARD

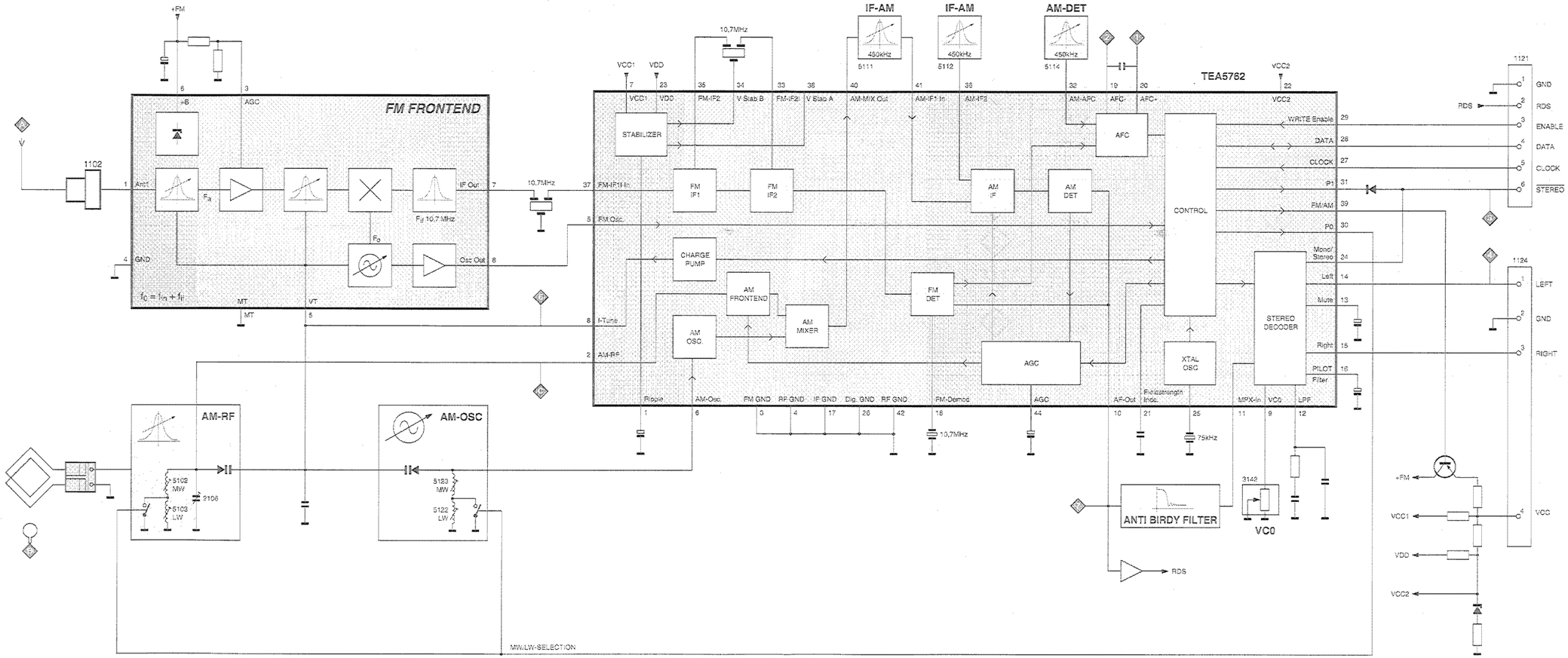
TABLE OF CONTENTS

BLOCKDIAGRAM



7D-1

BLOCKDIAGRAM



TUNER 95 bis Adjustment Table (FM, MW, LW with Frame antenna)

Waverange	Input frequency	Input	Set tuned to	Adjust	Output	Scope / Voltmeter
VARICAP ALIGNMENT						
FM (50)			108 MHz	check		7 ... 9V
87.5 - 108 MHz			87.5 MHz	check		1.3 ... 2V
MW (9)			1602 kHz	5123	◇6	8.3V ± 0.2V
531 - 1602 kHz			531 kHz	check		1V ± 0.4V
LW (3)			279 kHz	5122		8.3V ± 0.2V
153 - 279 kHz			153 kHz	check		1V ± 0.4V
FM – DETECTION						
FM	98 MHz 1mV continuous wave *short pin 21 (IC7101) to ground*	◇A	98 MHz	5107	◇1 ◇2	0mV ± 3mV
FM – VCO						
FM	98 MHz 1 mV continuous wave	◇A	98 MHz	3142	◇3	152kHz ± 1 kHz
DISTORTION						
FM	98 MHz 1 mV 90 % L + 9 % pilot mod = 1kHz	◇A	98MHz	mixcoil inside Tuner 1110	◇4	Distortion minimum
AM – IF						
MW	450kHz Δf = 10kHz Low as possible Swept signal	100nF 30E ◇C	MW	5111	◇7	symmetrical and max. height
				5112		
	450kHz continuous wave			5114	◇1 ◇2	0mV ± 2mV
AM - RF						
MW	558kHz Mod = 1kHz 30 % AM 1494 kHz	◇B	558kHz	5102	◇7	MAX
			1494kHz	2106		
LW	198kHz mod = 1kHz 30 % AM	*	198kHz	5103		MAX

adjtable for 3104 217 04121/04341

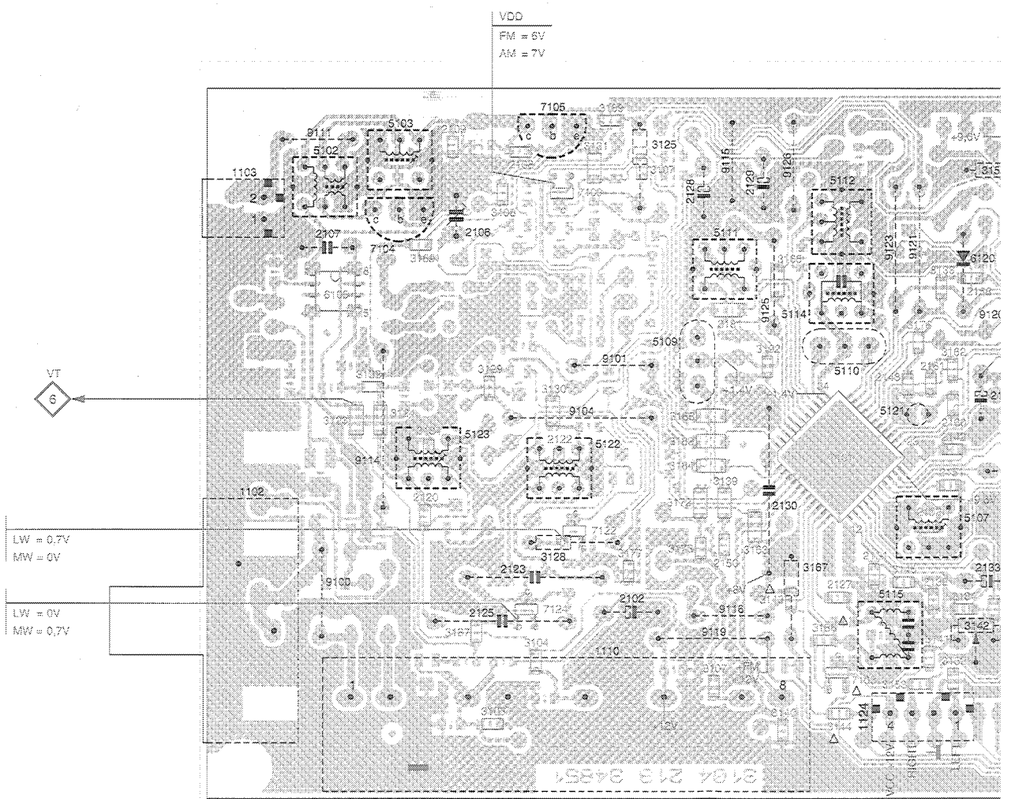
* Signal send via a frame antenna
(..) = tuning grid in kHz

↕ repeat

1102	F4	2107	C4	2126	C7	2136	G10	2145	G11	2161	E9	3124	E5	3137	G5	3145	F9	3158	G11	3167	F8	3183	E7	5103	C5	5121
1103	C3	2108	C6	2129	C8	2137	E11	2147	G11	2162	C11	3125	C7	3136	D9	3146	B10	3159	G11	3169	D5	3184	E7	5107	F10	5122
1110	G7	2109	C5	2130	F8	2138	E10	2148	E9	3103	H6	3126	F6	3139	F8	3150	C11	3160	G11	3171	D11	3185	E7	5109	D7	5123
1121	H11	2120	F5	2131	F9	2140	F10	2150	F8	3104	G6	3129	E6	3140	H8	3151	C10	3161	G11	3172	F7	3186	G8	5110	E9	6105
1124	H9	2122	E6	2132	F9	2141	E10	2151	F9	3107	G7	3130	E6	3141	G9	3152	G9	3162	D9	3173	F7	3188	G11	5111	C8	6107
1126	G10	2123	F6	2133	F10	2142	E9	2152	F9	3108	C6	3131	C6	3142	G10	3153	G9	3163	F8	3176	D9	3192	D8	5112	C9	6120
2102	G7	2125	G5	2134	G10	2143	C10	2158	D10	3109	B7	3132	E5	3143	G8	3154	C10	3164	C11	3177	F7	3197	C7	5114	D8	7101
2105	C5	2127	F9	2135	G11	2144	E10	2160	E9	3123	E4	3134	E5	3144	H8	3155	C10	3165	D8	3181	D8	5102	C4	5115	G9	7103

1 2 3 4 5 6 7 8 9

TUNER 95 bis Combi: Copper side view



A B C D E F G H I J

TUNER 95 bis
3104 217 04121/04341 bl. 110 - 01

1 2 3 4 5 6 7 8 9

Voltmeter
... 9V
... 2V
± 0.2V
± 0.4V
± 0.2V
± 0.4V
± 3mV
Hz ± 1 kHz
stortion
inimum
ietrical and x. height
V ± 2mV
MAX
MAX

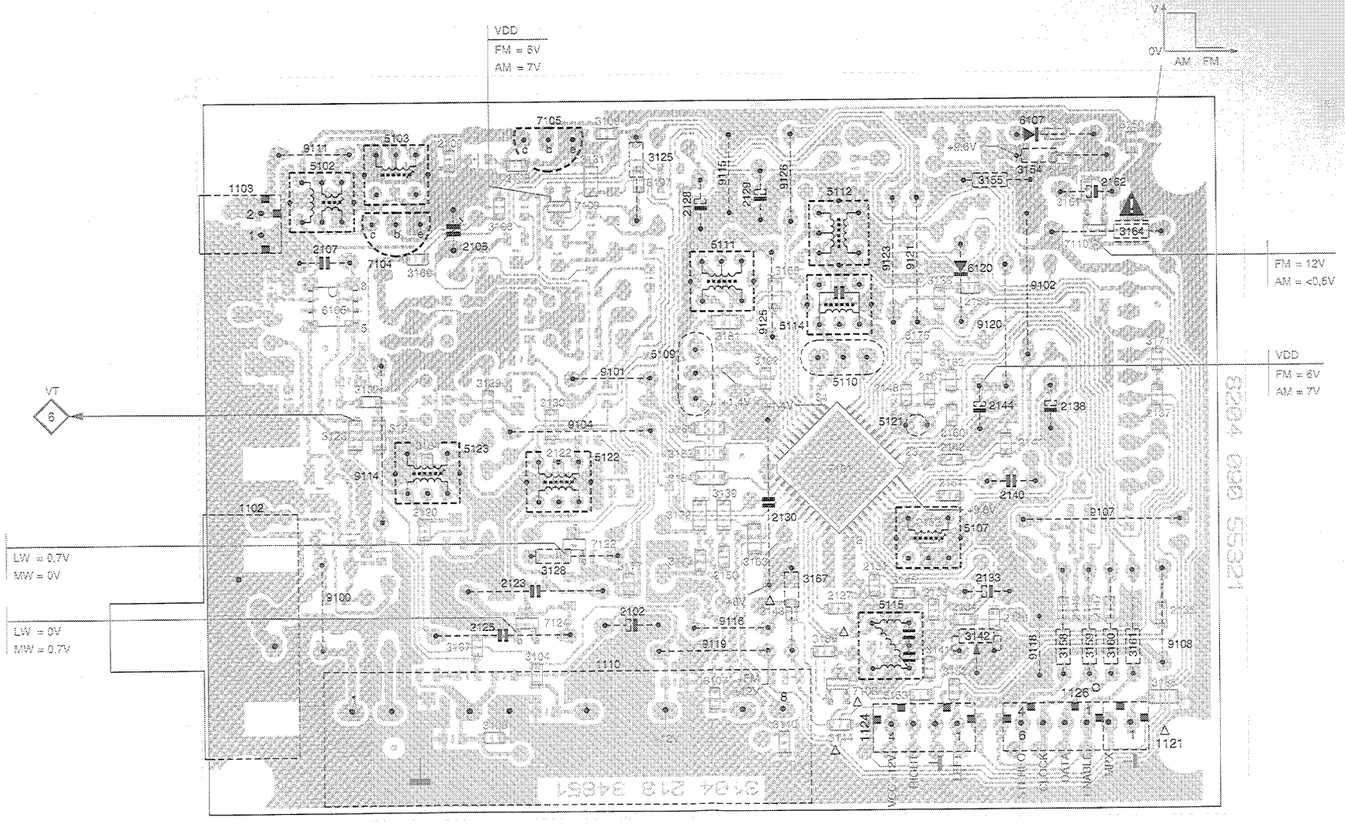
3104 217 04121/04341

7D-2

1102	F4	2107	C4	2128	C7	2136	G10	2145	G11	2161	E9	3124	E5	3137	G5	3145	F9	3158	G11	3167	F8	3183	E7	5103	C5	5121	E8	7104	D5	9102	D10	9118	G10
1103	C3	2108	C6	2129	C8	2137	E11	2147	G11	2162	C11	3125	C7	3138	D9	3146	B10	3159	G11	3169	D5	3184	E7	5107	F10	5122	E7	7105	B6	9104	E6	9119	G7
1110	G7	2109	C5	2130	F8	2138	E10	2148	E9	3103	H6	3128	F6	3139	F8	3150	C11	3160	G11	3171	D11	3185	E7	5109	D7	5123	E5	7109	C6	9107	F11	9120	D10
1121	H11	2120	F5	2131	F9	2140	F10	2150	F8	3104	G6	3129	E6	3140	H8	3151	C10	3161	G11	3172	F7	3186	G8	5110	E9	6105	D4	7110	D11	9108	G11	9121	D9
1124	H9	2122	E6	2132	F9	2141	E10	2151	F9	3107	G7	3130	E6	3141	G9	3152	G9	3162	D9	3173	F7	3188	G11	5111	C8	6107	B10	7122	F7	9111	C4	9123	D9
1126	G10	2123	F6	2133	F10	2142	E9	2152	F9	3108	C6	3131	C6	3142	G10	3153	G9	3163	F8	3176	D9	3192	D8	5112	C9	6120	D10	7124	G6	9114	E5	9125	D8
2102	G7	2125	G5	2134	G10	2143	C10	2158	D10	3109	B7	3132	E5	3143	G8	3154	C10	3164	C11	3177	F7	3197	C7	5114	D8	7101	E9	9100	F4	9115	C8	9126	C8
2106	C5	2127	F9	2135	G11	2144	E10	2160	E9	3123	E4	3134	E5	3144	H8	3155	C10	3165	D8	3181	D8	5102	C4	5115	G9	7103	G8	9101	E7	9116	G8		

7D-2

TUNER 95 bis Combi: Copper side view



TUNER 95 bis
3104 217 04121/04341 bl. 110 - 01

LEU0149
9751

1102	D1
1103	G2
1110	D4
1121	C21
1124	F21
1126	E20
2102	C2
2106	J4
2107	J6
2108	L2
2109	L3
2120	K7
2122	M7
2123	L7
2125	L7
2127	H16
2128	I13
2129	I8
2130	J20
2131	I17
2132	I17
2133	G18
2134	G19
2135	F19
2136	H19
2137	G19
2138	H18
2140	C14
2141	H15
2142	K19
2143	K20
2144	K20
2145	E19
2147	E19
2148	E19
2150	C6
2151	H12
2152	I11
2158	L18
2160	I15
2161	I15
2162	H20
3103	G3
3104	G4
3107	C6
3108	J1
3109	K1
3123	I6
3124	K7
3125	L11
3128	L9
3129	K8
3130	K8
3131	M10
3132	J7
3134	L6
3137	L5
3140	F7
3141	I16
3142	I16
3143	K17
3144	K17
3145	I17
3146	L20
3150	H19
3151	I20
3152	F20
3153	G20
3154	J20
3155	J20
3158	E19
3159	E19
3160	D19
3161	D19
3162	I15
3163	J8
3164	I20
3167	I20
3169	L5
3172	B6
3173	B6
3177	M10
3181	C7
3183	I13
3184	I8
3185	I13
3186	K16
3188	M20
3192	C12
3197	L11
5102	I3
5103	L4
5107	J12
5109	B6
5110	C9
5111	C11
5112	C12
5114	C13
5115	J15
5121	I15
5122	L7
5123	K7
6105a	I5
6105b	I6
6107	K20
6120	E17
7101	C15
7103	K17
7104	J2
7105	K2
7109	L10
7110	I19
7122	L9
7124	L6

TUNER 95 bis

7D-4

ELECTRICAL PARTS LIST - TUNER 95 BOARD

ELECTRICAL PARTS LIST - TUNER 95 BOARD

MISCELLANEOUS

1102	4822 267 10283	Socket Coaxial IEC 75R
1103	4822 265 31184	JST Connector 2 pin
1110	4822 210 10739	Frontend Assembly FE415-G23

CAPACITORS

2102	4822 124 40433	47µF 20% 25V
2106	4822 125 60102	Trimmer 5,2-30pF 100V
2107	4822 121 51252	470nF 5% 63V
2108	4822 126 13695	82pF 1% 63V
2109	4822 126 13691	27pF 1% 63V
2120	5322 122 32659	33pF 5% 50V
2122	5322 126 10465	3,9nF 10% 63V
2125	4822 121 10578	560P 1% 630V
2127	4822 122 32927	220nF +80/-20% 50V
2128	4822 124 41579	10µF 20% 50V
2129	4822 124 40242	1µF 20% 63V
2130	4822 126 11585	22nF +80/-20% 25V
2131	4822 122 33325	470nF 16V
2132	4822 122 33325	470nF 16V
2133	4822 124 40242	1µF 20% 63V
2134	4822 126 13188	15nF 5% 63V
2135	4822 122 32927	220nF +80/-20% 50V
2136	4822 126 13188	15nF 5% 63V
2137	4822 122 32927	220nF +80/-20% 50V
2138	4822 124 41576	2,2µF 20% 50V
2140	4822 121 51252	470nF 5% 63V
2141	4822 122 31947	100nF 20% 63V
2142	4822 122 31947	100nF 20% 63V
2143	4822 122 32927	220nF +80/-20% 50V
2144	4822 124 40242	1µF 20% 63V
2145	4822 122 33575	220pF 5% 50V
2147	4822 122 33575	220pF 5% 50V
2148	4822 122 33809	22nF 20% 50V
2150	4822 122 31947	100nF 20% 63V
2151	4822 126 14236	50V 15pF 5%
2152	4822 126 13695	82pF 1% 63V
2158	4822 122 31947	100nF 20% 63V
2160	4822 122 32139	12pF 2% 63V
2161	5322 122 34123	1nF 10% 50V
2162	4822 124 81151	22µF 50V

RESISTORS

3103	4822 051 20008	0R Jumper 0805
3104	4822 051 10102	1k 2% 0,25W
3107	4822 051 20829	82R 5% 0,1W
3108	4822 117 11449	2k2 1% 0,1W
3109	4822 117 11449	2k2 1% 0,1W
3123	4822 051 10008	0R 5% 0,25W
3124	4822 051 10008	0R 5% 0,25W
3125	4822 116 83864	10k 5% 0,5W
3128	4822 116 52256	2k2 5% 0,5W
3129	4822 051 20008	0R Jumper 0805
3130	4822 051 10008	0R 5% 0,25W
3131	4822 051 10008	0R 5% 0,25W
3132	4822 051 20008	0R Jumper 0805
3134	4822 051 20223	22k 5% 0,1W
3137	4822 117 10833	10k 1% 0,1W
3138	4822 051 20008	0R Jumper 0805
3139	4822 051 10008	0R 5% 0,25W
3140	4822 051 20331	330R 5% 0,1W
3141	4822 051 20563	56k 5% 0,1W
3142	4822 100 11163	Trimmer 100k 30% 0,1W
3143	4822 051 20223	22k 5% 0,1W
3144	4822 051 10102	1k 2% 0,25W
3145	4822 117 11449	2k2 1% 0,1W
3146	4822 051 20479	47R 5% 0,1W
3150	4822 051 20472	4k7 5% 0,1W
3151	4822 051 20683	68k 5% 0,1W
3152	4822 051 20471	470R 5% 0,1W
3153	4822 051 20471	470R 5% 0,1W
3154	4822 116 83872	220R 5% 0,5W
3155	4822 116 52219	330R 5% 0,5W
3158	4822 116 83883	470R 5% 0,5W
3159	4822 116 83883	470R 5% 0,5W
3160	4822 116 83883	470R 5% 0,5W
3161	4822 116 83883	470R 5% 0,5W
3162	4822 051 20224	220k 5% 0,1W
3163	4822 051 10008	0R 5% 0,25W
3164	4822 052 10478 ⚠	4R7 5% 0,33W
3165	4822 051 10008	0R 5% 0,25W
3167	4822 116 83872	220R 5% 0,5W
3169	4822 051 20008	0R Jumper 0805
3171	4822 051 20008	0R Jumper 0805
3172	4822 051 10008	0R 5% 0,25W
3173	4822 051 20008	0R Jumper 0805
3176	4822 051 20008	0R Jumper 0805
3177	4822 051 20223	22k 5% 0,1W
3181	4822 051 10008	0R 5% 0,25W
3183	4822 051 10008	0R 5% 0,25W
3184	4822 051 10008	0R 5% 0,25W
3185	4822 051 10008	0R 5% 0,25W
3186	4822 051 10102	1k 2% 0,25W
3188	4822 051 10008	0R 5% 0,25W
3192	4822 051 20008	0R Jumper 0805
3197	4822 051 20472	4k7 5% 0,1W

COILS & FILTERS

5102	4822 157 71634	MW AERIAL
5103	4822 157 71635	LW AERIAL
5107	4822 157 11443	FM Discriminator 10,7MHz
5109	4822 157 71639	Ceram Filter 10,7MHz
5110	4822 242 70665	Ceram Filter 10,7MHz
5111	4822 158 60511	AM-IF Filter 450kHz
5112	4822 157 70302	AM-IF Filter 450kHz
5114	4822 157 70302	AM-IF Filter 450kHz
5115	4822 157 71636	Anti-Birdy Filter
5121	4822 242 10261	X'tal Resonator 75kHz
5122	4822 157 60517	RF Coil AM
5123	4822 157 60517	RF Coil AM

DIODES

6105	4822 130 83075	HN1V02H-B
6107	4822 130 34488	BZX79-B11
6120	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1
7103	4822 130 42513	BC858C
7104	5322 130 44779	BC338-40
7105	5322 130 44779	BC338-40
7109	5322 130 41983	BC858B
7110	5322 130 41983	BC858B
7122	5322 130 42136	BC848C
7124	5322 130 42136	BC848C

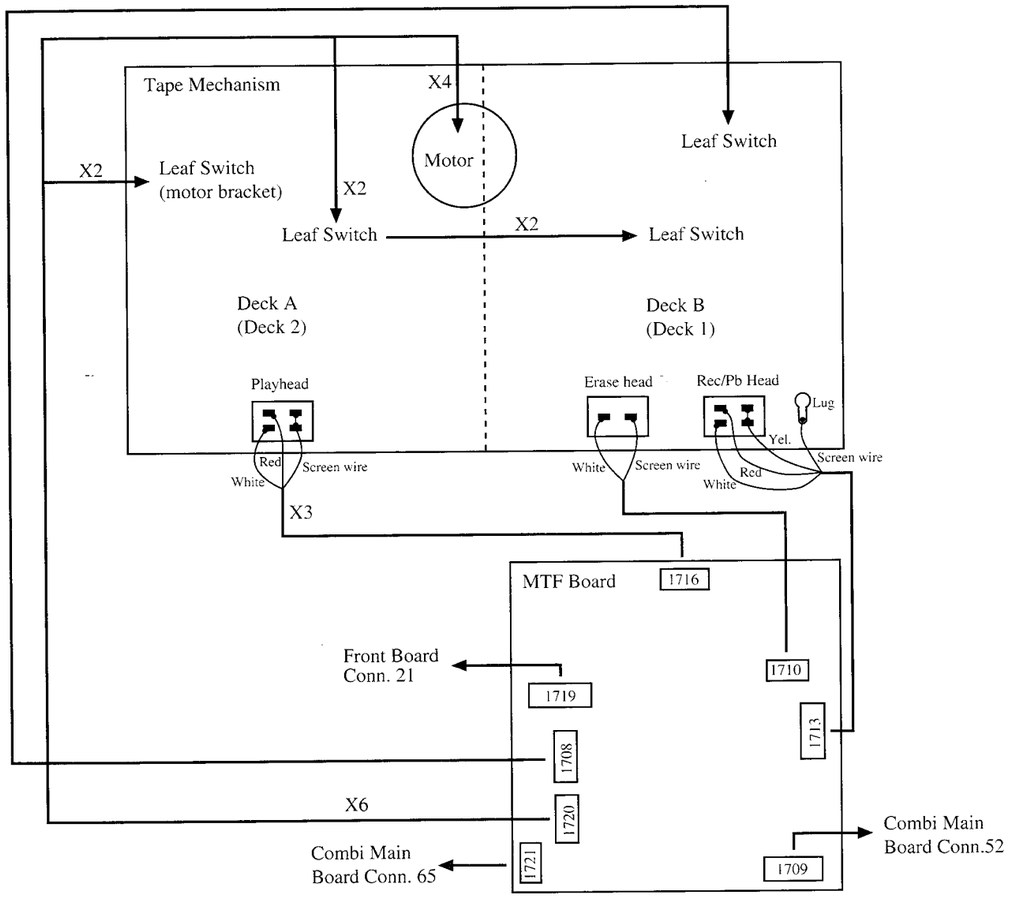
Note: Only the parts mentioned in this list are normal service spare parts.

MTF MODULE

TABLE OF CONTENTS

9-1

Tape Deck Wiring Diagram



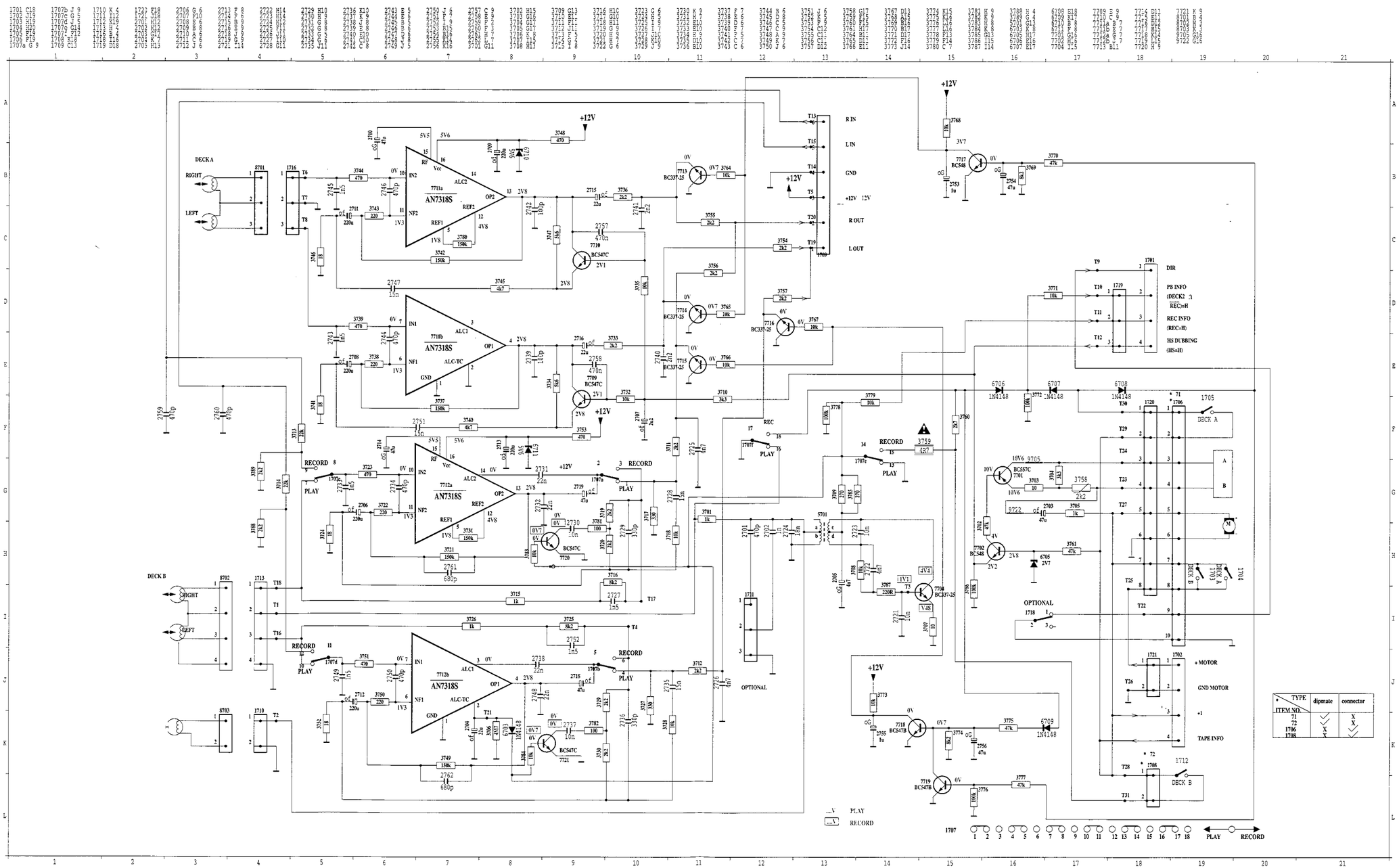
TAPE MECHANISM ADJUSTMENT

ADJUSTMENT	CASSETTE	DECK 1 (DECK B)	DECK 2 (DECK A)	MEASURE ON	READ ON	ADJUST WITH	ADJUST TO
Azimuth	10kHz	Play	-	L & R out T019/T020	mV-meter	Left hand screw of Play or R/P head	Maximum L = R
	SBC420*	-	Play				
Motor speed	3150Hz	Play	-	L & R out T019/T020	Wow and Futter meter	3758	**a
	SBC420*	-	Play				

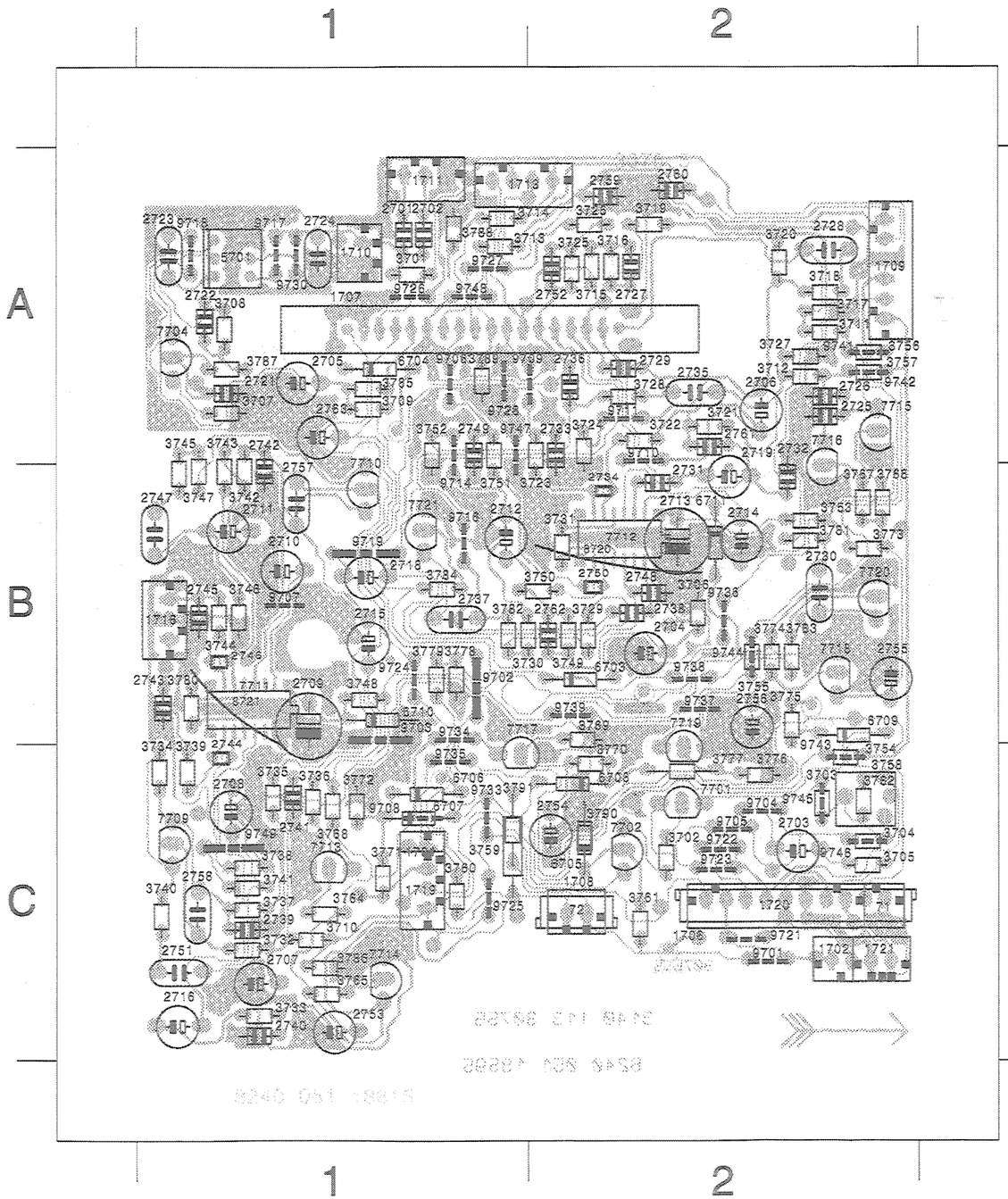
* SBC 420: 4822 397 30071
**a: The maximum permissible speed deviation is +3/-2%.
Moreover, the Wow & Flutter value can be read.
This value should not exceed 0.4%.

9-2

CIRCUIT DIAGRAM

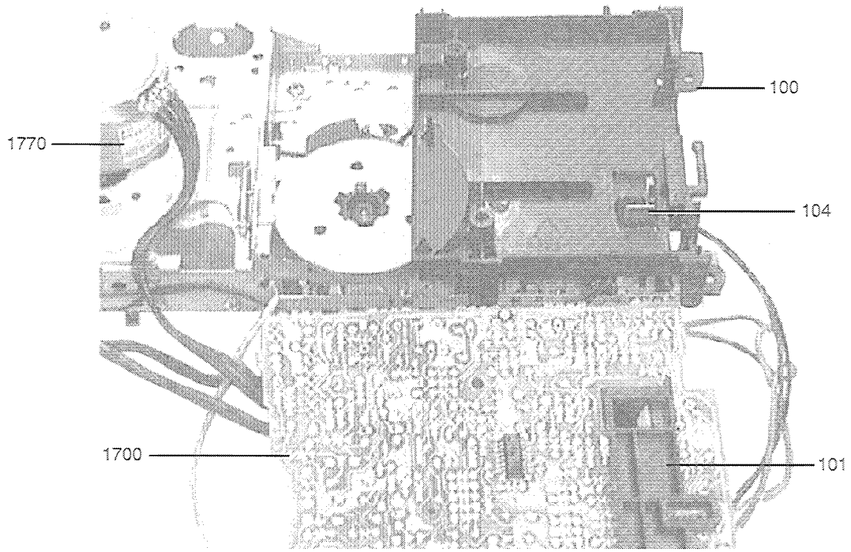


9-3



71 C 2	2744 C 1	3737 C 1	6704 A 1	9741 A 2
72 C 2	2745 B 1	3738 C 1	6705 C 2	9742 A 2
1701 C 1	2746 B 1	3739 C 1	6706 C 1	9743 C 2
1702 C 2	2747 B 1	3740 C 1	6707 C 1	9744 B 2
1706 C 2	2748 B 2	3741 C 1	6708 C 2	9745 C 2
1707 A 1	2749 A 1	3742 B 1	6709 B 2	9746 C 2
1708 C 2	2750 B 2	3743 B 1	6710 B 1	9747 A 1
1709 A 2	2751 C 1	3744 B 1	6711 B 2	9748 A 1
1710 A 1	2752 A 2	3745 B 1	7701 C 2	9749 C 1
1711 A 1	2753 C 1	3746 B 1	7702 C 2	
1713 A 1	2754 C 2	3747 B 1	7704 A 1	
1716 B 1	2755 B 2	3748 B 1	7709 C 1	
1719 C 1	2756 B 2	3749 B 2	7710 B 1	
1720 C 2	2757 B 1	3750 B 2	7711 B 1	
1721 C 2	2758 C 1	3751 A 1	7712 B 2	
2701 A 1	2759 A 2	3752 A 1	7713 C 1	
2702 A 1	2760 A 2	3753 B 2	7714 C 1	
2703 C 2	2761 A 2	3754 C 2	7715 A 2	
2704 B 2	2762 B 2	3755 B 2	7716 B 2	
2705 A 1	2763 A 1	3756 A 2	7717 C 1	
2706 A 2	3701 A 1	3757 A 2	7718 B 2	
2707 C 1	3702 C 2	3758 C 2	7719 C 2	
2708 C 1	3703 C 2	3759 C 1	7720 B 2	
2709 B 1	3704 C 2	3760 C 1	7721 B 1	
2710 B 1	3705 C 2	3761 C 2	9701 C 2	
2711 B 1	3706 B 2	3762 C 2	9702 B 1	
2712 B 1	3707 A 1	3764 C 1	9703 B 1	
2713 B 2	3708 A 1	3765 C 1	9704 C 2	
2714 B 2	3709 A 1	3766 B 2	9705 C 2	
2715 B 1	3710 C 1	3767 B 2	9706 A 1	
2716 C 1	3711 A 2	3768 C 1	9707 B 1	
2718 B 1	3712 A 2	3769 B 2	9708 C 1	
2719 B 2	3713 A 1	3770 C 2	9709 A 2	
2721 A 1	3714 A 1	3771 C 1	9710 A 2	
2722 A 1	3715 A 2	3772 C 1	9711 A 2	
2723 A 1	3716 A 2	3773 B 2	9714 A 1	
2724 A 1	3717 A 2	3774 B 2	9716 B 1	
2725 A 2	3718 A 2	3775 B 2	9717 A 1	
2726 A 2	3719 A 2	3776 C 2	9718 A 1	
2727 A 2	3720 A 2	3777 C 2	9719 B 1	
2728 A 2	3721 A 2	3778 B 1	9721 C 2	
2729 A 2	3722 A 2	3779 B 1	9722 C 2	
2730 B 2	3723 A 2	3780 B 1	9723 C 2	
2731 B 2	3724 A 2	3781 B 2	9724 B 1	
2732 B 2	3725 A 2	3782 B 1	9725 C 1	
2733 A 2	3726 A 2	3783 B 2	9726 A 1	
2734 B 2	3727 A 2	3784 B 1	9727 A 1	
2735 A 2	3728 A 2	3785 A 1	9728 A 1	
2736 A 2	3729 B 2	3786 C 1	9730 A 1	
2737 B 1	3730 B 2	3787 A 1	9733 C 1	
2738 B 2	3731 B 2	3788 A 1	9734 B 1	
2739 C 1	3732 C 1	3789 A 1	9735 C 1	
2740 C 1	3733 C 1	3790 C 2	9736 B 2	
2741 C 1	3734 C 1	3791 C 1	9737 B 2	
2742 B 1	3735 C 1	5701 A 1	9738 B 2	
2743 B 1	3736 C 1	6703 B 2	9739 B 2	

MTF MODULE PICTURE



MECHANICAL PARTS LIST - MTF MODULE

MTF MODULE		
101	4822 402 10126	Lever Recording
104	4822 492 11061	Spring Recording
1770	4822 691 10669	Tape Mechanism CDS-83WPC

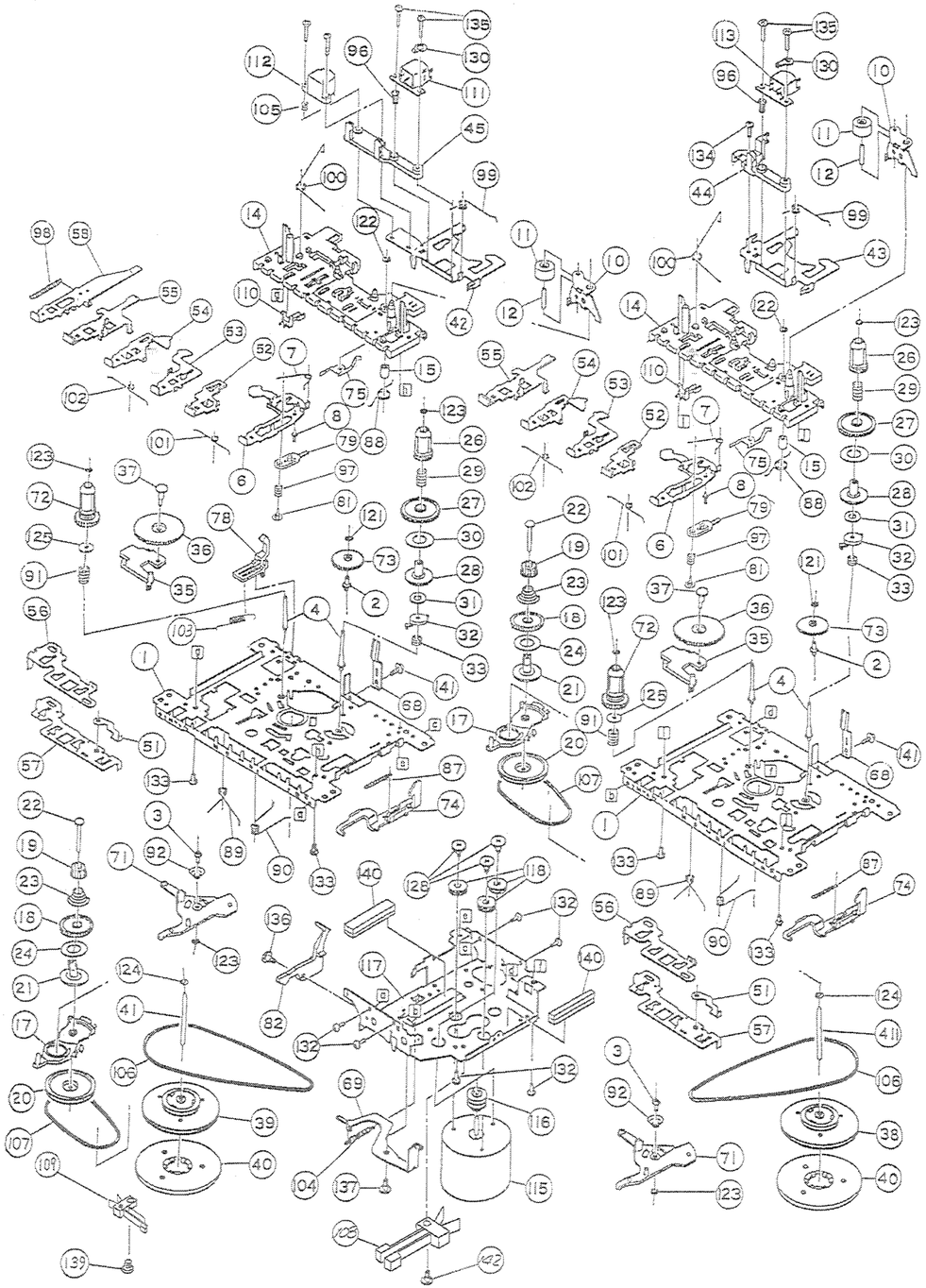
Note: Only the parts mentioned in this list are normal service spare parts.

TAPE MECHANISM		
10-12	4822 528 11189	Pinch Roller Assembly
17-24	4822 402 10966	FR Arm Assembly
38-41	4822 528 11242	Flywheel (W) Assembly
39-41	4822 528 11243	Flywheel Assembly
106	4822 358 31225	Main Belt (W2) 1.1x59.5
107	4822 358 31124	Sub Belt
108	4822 277 11753	Leaf Switch
109	4822 277 11754	Leaf Switch
110	4822 278 90663	Leaf Switch
111	4822 249 30218	Rec/PB Head
112	4822 249 10548	Erase Head
113	4822 249 30218	Play Head
115-116	4822 361 11053	Motor Assembly
118	4822 466 11767	Motor Cushion
122	4822 532 12937	Washer PSW-S 1.6x3.5x0.4

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

9-4

TAPE MECHANISM



ELECTRICAL PARTS LIST - MTF BOARD

MISCELLANEOUS

1707	4822 277 11504	Recording Switch

CAPACITORS

2703	4822 124 40433	47µF 20% 25V
2704	4822 124 81151	22µF 50V
2705	4822 124 40246	4,7µF 20% 63V
2706	4822 124 12068	220µF 20% 10V
2707	4822 124 41576	2,2µF 20% 50V
2708	4822 124 12068	220µF 20% 10V
2709	4822 124 80144	220µF 20% 25V
2710	4822 124 40433	47µF 20% 25V
2711	4822 124 12068	220µF 20% 10V
2712	4822 124 12068	220µF 20% 10V
2713	4822 124 80144	220µF 20% 25V
2714	4822 124 40433	47µF 20% 25V
2715	4822 124 81151	22µF 50V
2716	4822 124 81151	22µF 50V
2718	4822 124 40433	47µF 20% 25V
2719	4822 124 40433	47µF 20% 25V
2721	4822 121 51387	10nF 20% 16V
2722	4822 126 11714	4,7nF 20%
2723	4822 121 41857	10nF 5% 250V
2724	4822 121 51306	18nF 10% 50V
2725	4822 126 11714	4,7nF 20%
2726	4822 126 11714	4,7nF 20%
2727	4822 126 12878	1,5nF 10% 16V
2728	4822 121 51305	15nF 10% 50V
2729	4822 126 12787	330pF 10% 50V
2730	4822 121 51304	10nF 10% 50V
2731	4822 126 11585	22nF +80/-20% 25V
2732	4822 126 11585	22nF +80/-20% 25V
2733	4822 126 12878	1,5nF 10% 16V
2734	5322 122 32311	470pF 10% 100V
2735	4822 121 51305	15nF 10% 50V
2736	4822 126 12787	330pF 10% 50V
2737	4822 121 51304	10nF 10% 50V
2738	4822 126 11585	22nF +80/-20% 25V
2739	4822 122 33195	100pF 10% 50V
2740	4822 126 12339	2,2nF 10% Y5R
2741	4822 126 12339	2,2nF 10% Y5R
2742	4822 122 33195	100pF 10% 50V
2743	4822 126 12878	1,5nF 10% 16V
2744	5322 122 32311	470pF 10% 100V
2745	4822 126 12878	1,5nF 10% 16V
2746	5322 122 32311	470pF 10% 100V
2747	4822 121 51305	15nF 10% 50V
2748	4822 126 11585	22nF +80/-20% 25V
2749	4822 126 12878	1,5nF 10% 16V
2750	5322 122 32311	470pF 10% 100V
2751	4822 121 51305	15nF 10% 50V
2752	4822 126 12878	1,5nF 10% 16V
2753	4822 124 40242	1µF 20% 63V
2754	4822 124 40433	47µF 20% 25V
2755	4822 124 40242	1µF 20% 63V
2756	4822 124 40433	47µF 20% 25V
2757	4822 121 51252	470nF 5% 63V
2758	4822 121 51252	470nF 5% 63V
2759	4822 122 33519	470pF 10% 50V
2760	4822 122 33519	470pF 10% 50V
2761	4822 126 14316	680pF 10% 50V
2762	4822 126 14316	680pF 10% 50V

RESISTORS

3701	4822 050 21002	1k 1% 0,6W
3702	4822 116 83884	47k 5% 0,5W
3703	4822 050 11009	10R 1% 0,4W
3704	4822 050 13302	3k3 1% 0,4W
3705	4822 050 21002	1k 1% 0,6W
3706	4822 111 30893	4M7 5% 0,2W
3707	4822 116 52176	10R 5% 0,5W
3708	4822 050 11003	10k 1% 0,4W
3709	4822 111 20434	270R
3710	4822 116 52269	3k3 5% 0,5W
3711	4822 050 12202	2k2 1% 0,4W
3712	4822 050 12202	2k2 1% 0,4W
3713	4822 116 52257	22k 5% 0,5W
3714	4822 116 52257	22k 5% 0,5W
3715	4822 050 11002	1k 1% 0,4W
3716	4822 050 18202	8k2 1% 0,4W
3717	4822 116 52219	330R 5% 0,5W
3718	4822 050 11003	10k 1% 0,4W
3719	4822 050 12202	2k2 1% 0,4W
3720	4822 050 12202	2k2 1% 0,4W
3721	4822 116 52245	150k 5% 0,5W
3722	4822 116 83872	220R 5% 0,5W
3723	4822 116 83883	470R 5% 0,5W
3724	4822 116 52184	18R 5% 0,5W
3725	4822 050 18202	8k2 1% 0,4W
3726	4822 050 11002	1k 1% 0,4W
3727	4822 116 52219	330R 5% 0,5W
3728	4822 050 11003	10k 1% 0,4W
3729	4822 050 12202	2k2 1% 0,4W
3730	4822 050 12202	2k2 1% 0,4W
3731	4822 116 52245	150k 5% 0,5W
3732	4822 116 83864	10k 5% 0,5W
3733	4822 116 52256	2k2 5% 0,5W
3734	4822 050 15602	5k6 1% 0,4W
3735	4822 116 83864	10k 5% 0,5W
3736	4822 116 52256	2k2 5% 0,5W
3737	4822 116 52245	150k 5% 0,5W
3738	4822 116 83872	220R 5% 0,5W
3739	4822 116 83883	470R 5% 0,5W
3740	4822 116 52283	4k7 5% 0,5W
3741	4822 116 52184	18R 5% 0,5W

ELECTRICAL PARTS LIST - MTF BOARD

RESISTORS

3742	4822 116 52245		150k 5% 0,5W
3743	4822 116 83872		220R 5% 0,5W
3744	4822 116 83883		470R 5% 0,5W
3745	4822 116 52283		4k7 5% 0,5W
3746	4822 116 52184		18R 5% 0,5W
3747	4822 050 15602		5k6 1% 0,4W
3748	4822 116 83883		470R 5% 0,5W
3749	4822 116 52245		150k 5% 0,5W
3750	4822 116 83872		220R 5% 0,5W
3751	4822 116 83883		470R 5% 0,5W
3752	4822 116 52184		18R 5% 0,5W
3753	4822 116 83883		470R 5% 0,5W
3754	4822 050 12202		2k2 1% 0,4W
3755	4822 050 12202		2k2 1% 0,4W
3756	4822 050 12202		2k2 1% 0,4W
3757	4822 050 12202		2k2 1% 0,4W
3758	4822 101 11166		Trimmer 2k2
3759	4822 052 10478	⚠	4R7 5% 0,33W
3760	4822 050 12702		2k7 1% 0,4W
3761	4822 116 83884		47k 5% 0,5W
3764	4822 116 83864		10k 5% 0,5W
3765	4822 116 83864		10k 5% 0,5W
3766	4822 050 11003		10k 1% 0,4W
3767	4822 050 11003		10k 1% 0,4W
3768	4822 116 83864		10k 5% 0,5W
3769	4822 050 18202		8k2 1% 0,4W
3770	4822 116 83884		47k 5% 0,5W
3771	4822 116 83864		10k 5% 0,5W
3772	4822 116 52234		100k 5% 0,5W
3773	4822 050 11003		10k 1% 0,4W
3774	4822 050 18202		8k2 1% 0,4W
3775	4822 116 83884		47k 5% 0,5W
3776	4822 050 11004		100k 1% 0,4W
3777	4822 116 83884		47k 5% 0,5W
3778	4822 116 52234		100k 5% 0,5W
3779	4822 116 83864		10k 5% 0,5W
3780	4822 050 11504		150k 1% 0,4W
3781	4822 050 11001		100R 1% 0,4W
3782	4822 050 11001		100R 1% 0,4W
3783	4822 116 83864		10k 5% 0,5W
3784	4822 116 83864		10k 5% 0,5W
3785	4822 111 20434		270R
3786	4822 116 52234		100k 5% 0,5W
3787	4822 116 83872		220R 5% 0,5W
3788	4822 050 12202		2k2 1% 0,4W
3789	4822 050 12202		2k2 1% 0,4W

COILS

5701	4822 157 10371	Osc Coil 100kHz

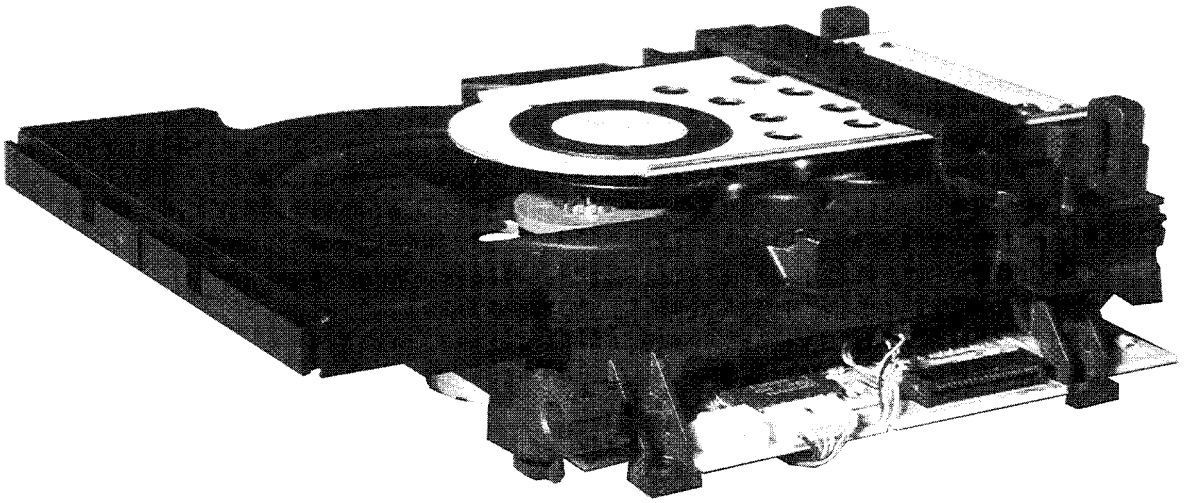
DIODES

6703	4822 130 30621	1N4148
6705	5322 130 34563	BZX79-C2V7
6706	4822 130 30621	1N4148
6707	4822 130 30621	1N4148
6708	4822 130 30621	1N4148
6709	4822 130 30621	1N4148
6710	4822 130 34173	BZX79-B5V6
6711	4822 130 34173	BZX79-B5V6

TRANSISTORS & INTEGRATED CIRCUITS

7701	4822 130 42231	BC557C
7702	4822 130 40938	BC548
7704	4822 130 40981	BC337-25
7709	4822 130 44503	BC547C
7710	4822 130 44503	BC547C
7711	4822 209 32918	AN7318S
7712	4822 209 32918	AN7318S
7713	4822 130 40981	BC337-25
7714	4822 130 40981	BC337-25
7715	4822 130 40981	BC337-25
7716	4822 130 40981	BC337-25
7717	4822 130 40938	BC548
7718	4822 130 40959	BC547B
7719	4822 130 40959	BC547B
7720	4822 130 44503	BC547C
7721	4822 130 44503	BC547C

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



ECO SHORT LOADER UNIT

for Systems

TABLE OF CONTENTS

Dismantling hints CD Short Loader

Dismantling the tray

a) Press open/close button to open the tray. If the tray doesn´t work, use a small screwdriver as shown in Fig.1 point 1 to move the tray outside. After the first centimetre it is possible to pull the tray out by hand.

b) Release two snaps and remove tray.

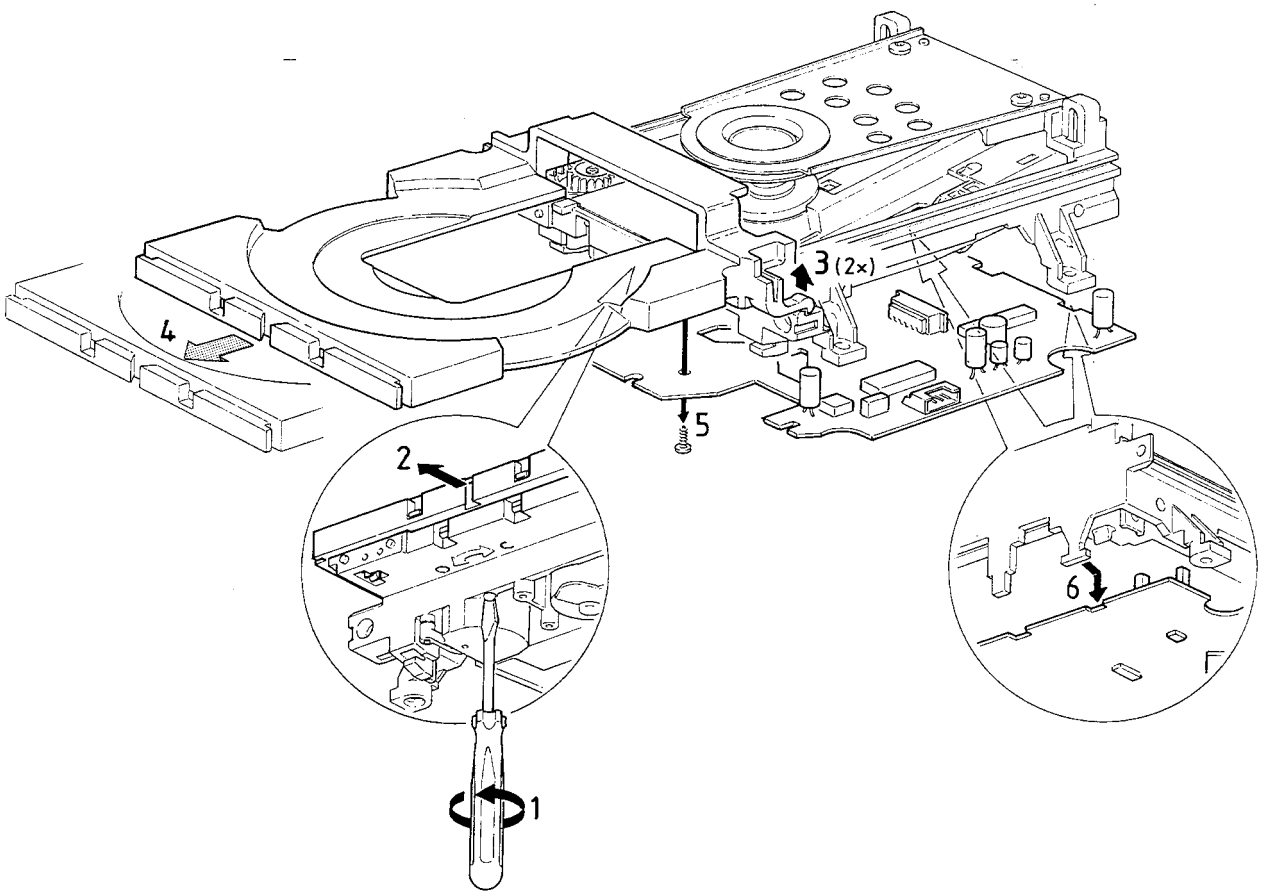


Fig. 1

Assembly of gear

a) Use a pin (e.g. a paperclip) to align the cam wheel (a) withthe gear wheel (b). See Fig. 2.

b) Fix the wheels with the small plastic whashers.

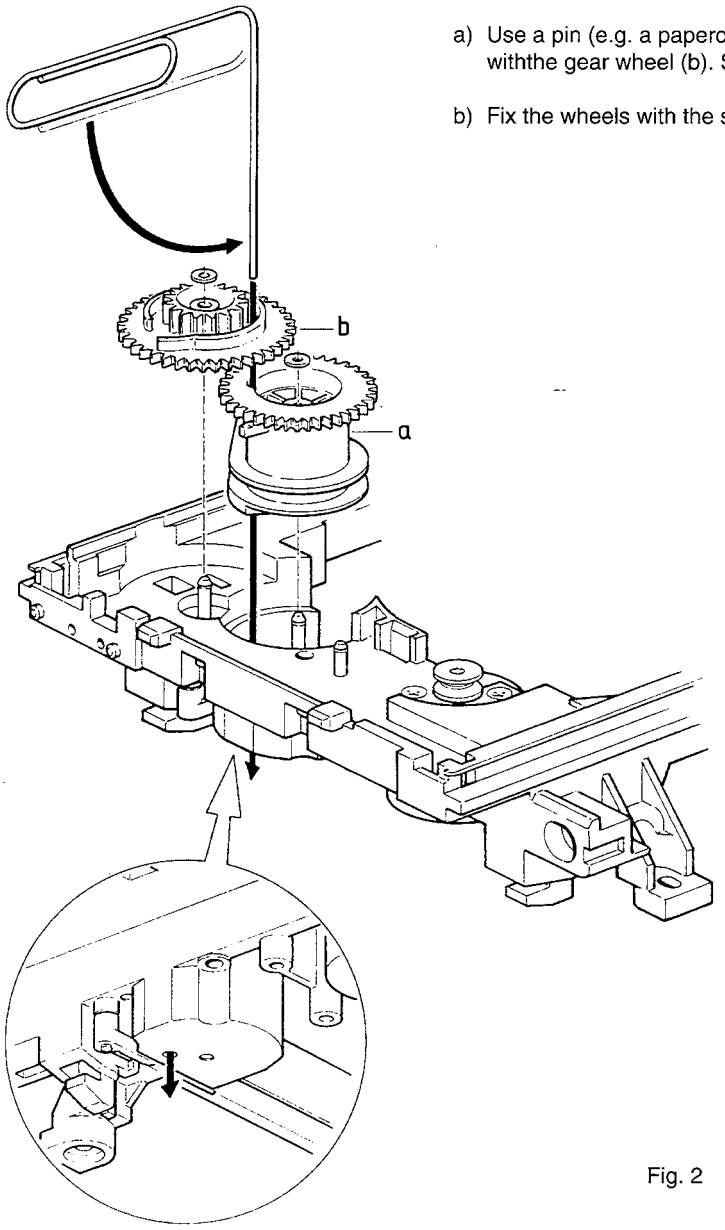


Fig. 2

c) Mount idle wheel 2 (c) and idle wheel 1 (d) in any position. See Fig. 3.

d) Fix the idle wheel 1 (d) with the small plastic whasher.

e) Mount the driving belt.

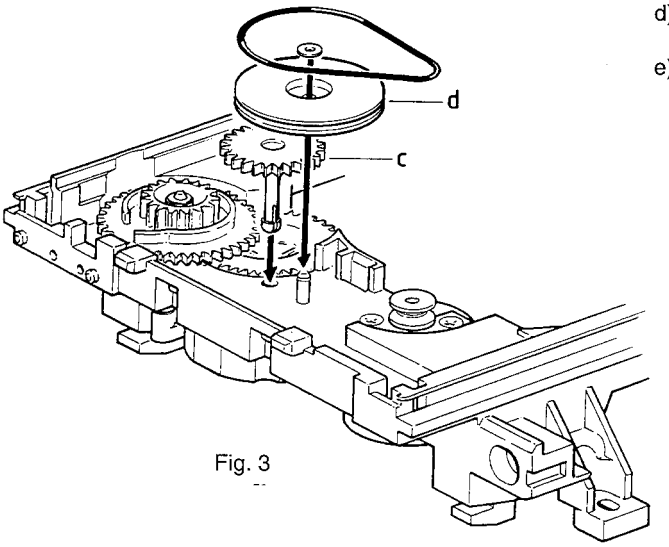


Fig. 3

f) Mount the pinion guiding assy and the cover as shown in Fig. 4.

g) Turn the gear wheel (b) counter clockwise to endposition.

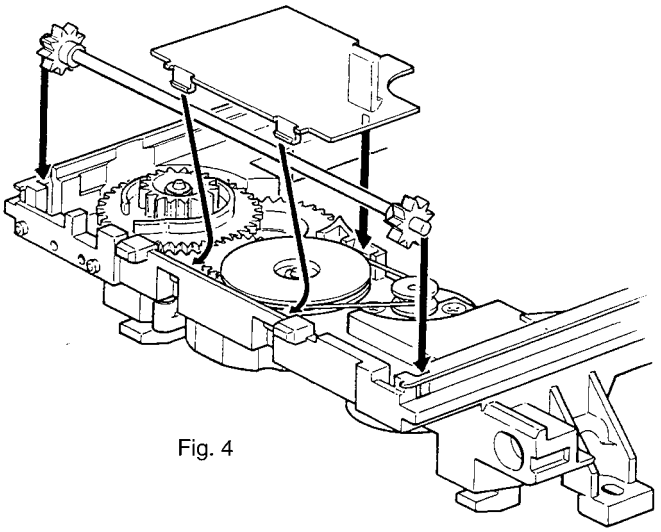


Fig. 4

h) Mount the CD Mechanism as shown in Fig. 5.

i) Mount the tray (Align the tray to the chassis and push it inside).

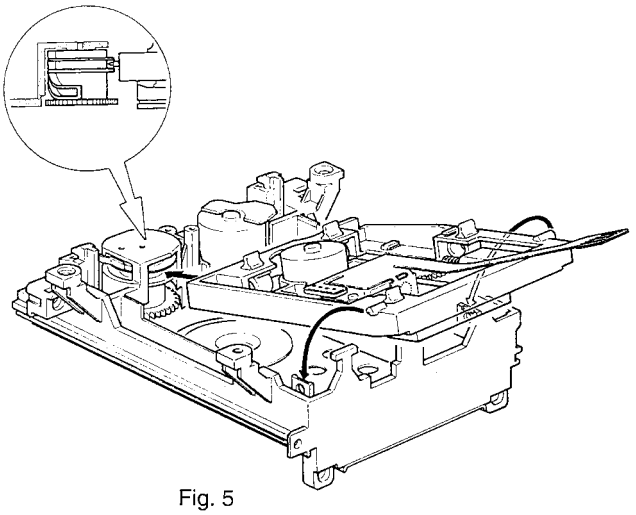


Fig. 5

Check if tray mechanism works correctly!

1) Turn the gear wheel (b) clockwise to its endposition (Use a small screwdriver as shown in Fig. 1 point 1).

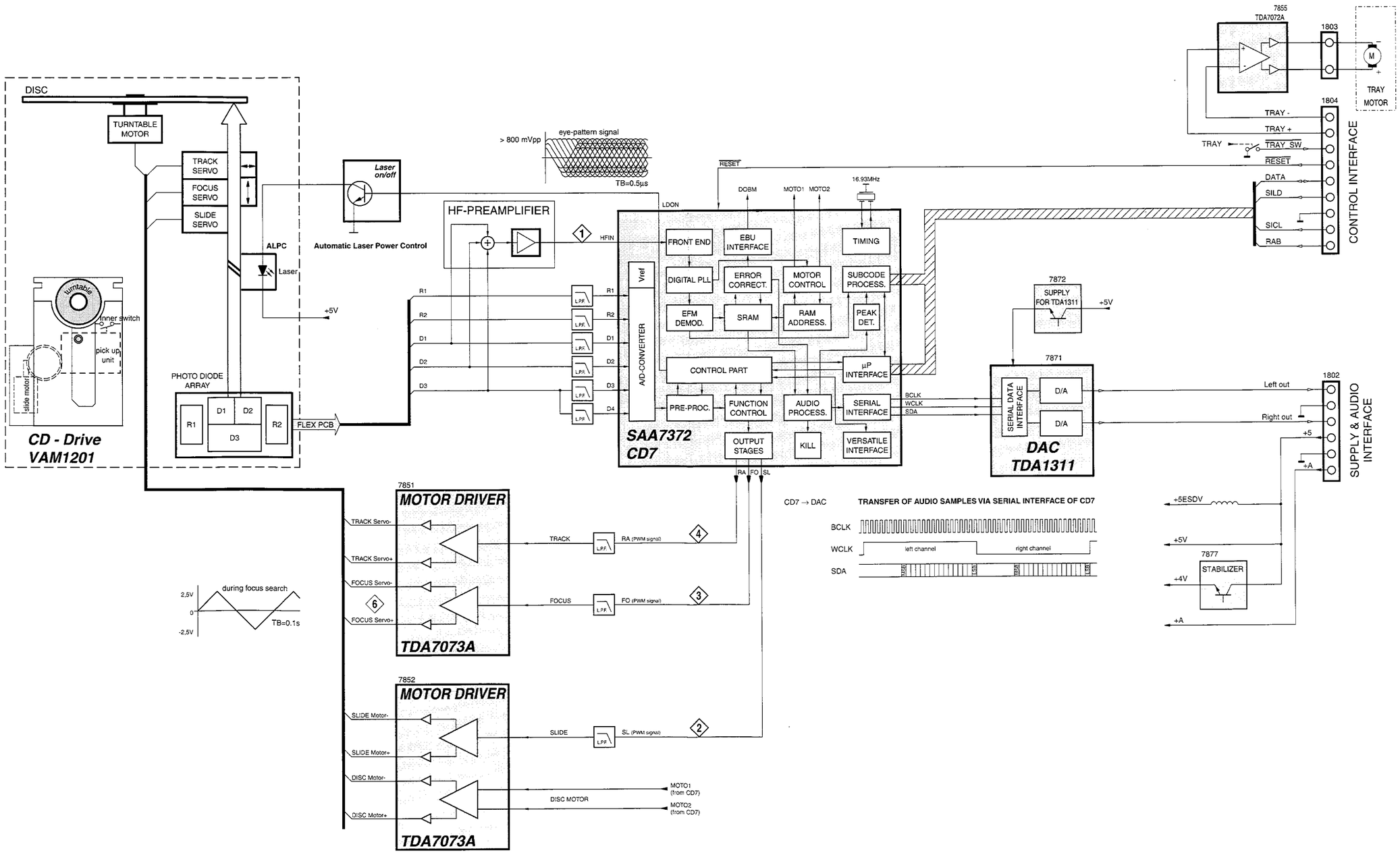
   The tray has to move to inner position first and then the CD mechanism has to move to its upper position.

2) Turn the gear wheel (b) counter clockwise to its endposition.

   The CD Mechanism has to move to its lower position first and then the tray has to move outside.

10-5

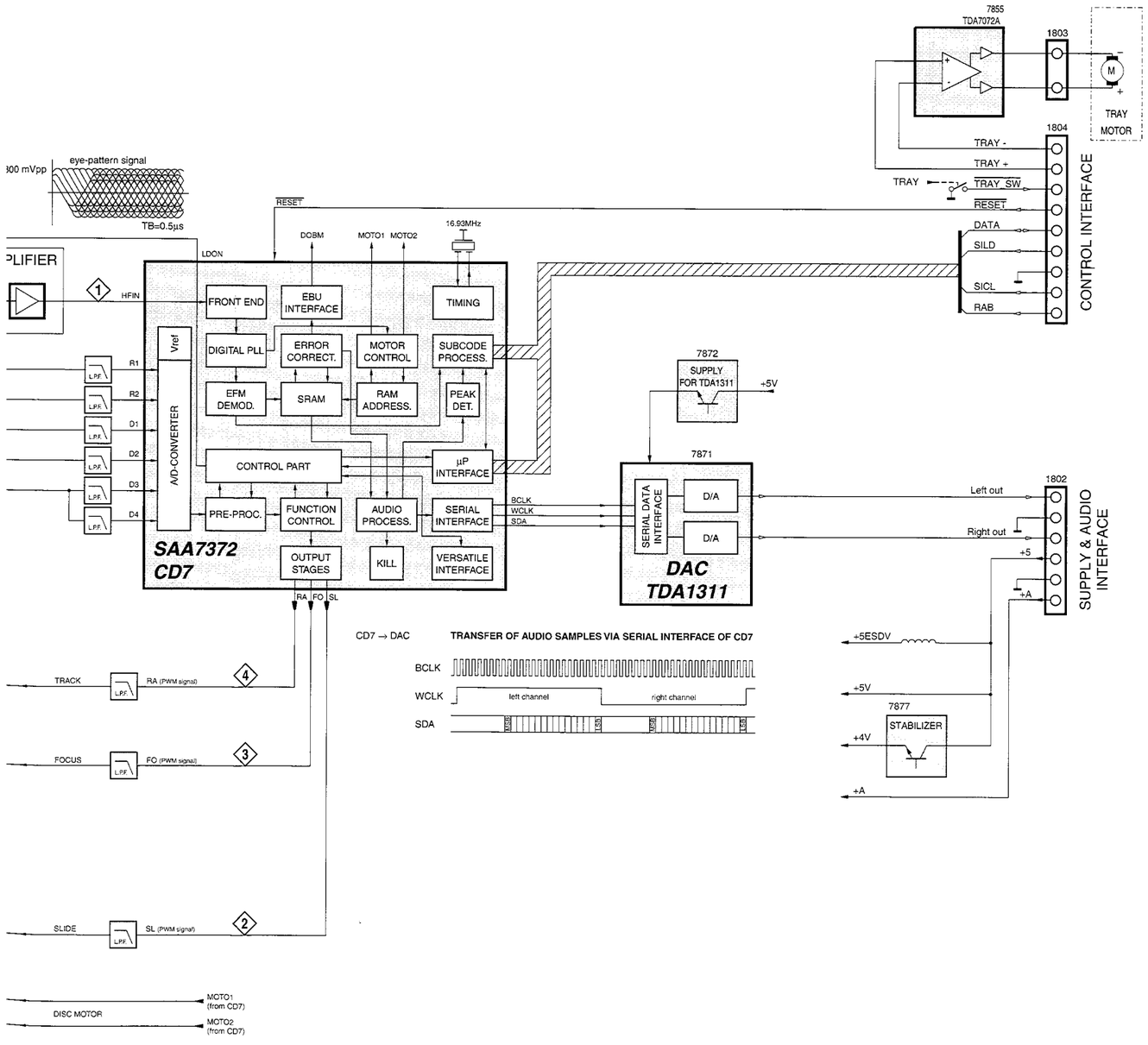
Functional Diagram *ECO Short Loader with CD7*



Abbreviatic

SAA7372 – DECC

Pin	Name
1	VSSA1
2	VDDA1
3	D1
4	D2
5	D3
6	VRL
7	D4
8	R1
9	R2
10	IREFT
11	VRH
12	VSSA2
13	SELPLL
14	ISLICE
15	HFIN
16	VSSA3
17	HFREF
18	IREF
19	VDDA2
20	TEST1
21	CRIN
22	CDOUT
23	TEST2
24	CL16
25	CL11
26	RA
27	FO
28	SL
29	TEST3
30	VDD1P
31	DOBM
32	VSS1
33	MOTO1
34	MOTO2
35	SBSY
36	SFSY
37	RCK
38	SUB
39	VSS2
40	V5
41	V4
42	V3
43	KILL
44	MISC
45	DATA
46	WCLK
47	VDD2P
48	BCLK
49	VSS3
50	CL4
51	SDA
52	SCL
53	RAB
54	SILD
55	NC
56	VSS4
57	RESET
58	STATUS
59	VDD3C
60	C2FAIL
61	CFLG
62	V1
63	V2
64	LDON

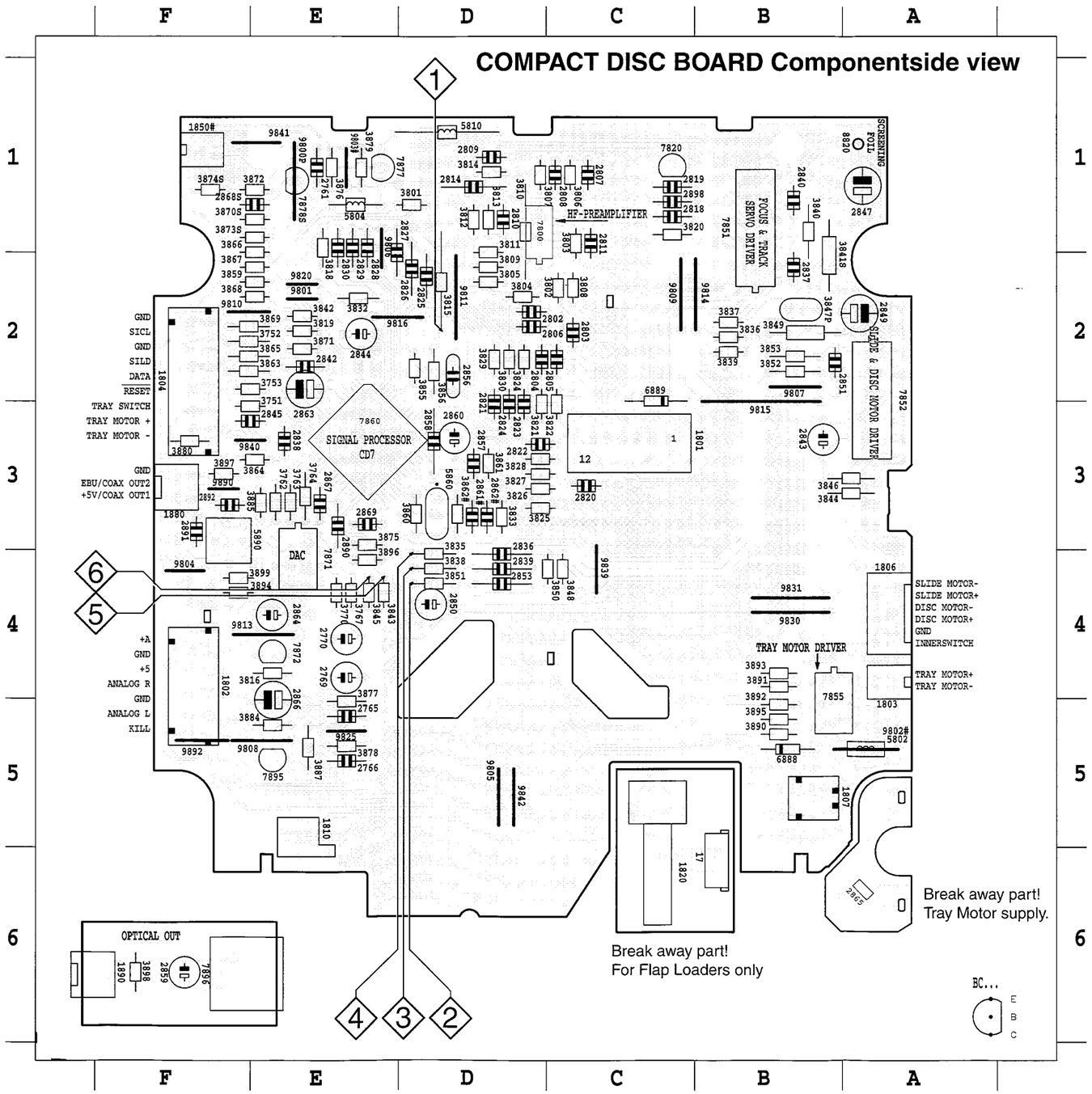


Abbreviations CD Part

SAA7372 – DECODER AND DIGITAL SERVO IC CD7

Pin	*Name*	*Direction*	*Description*
1	VSSA1	GND	supply (analog) of CD7
2	VDDA1	+4V	supply (analog) of CD7
3	D1	HF-preamp → CD7	unipolar current input (central diode signal input)
4	D2	HF-preamp → CD7	unipolar current input (central diode signal input)
5	D3	HF-preamp → CD7	unipolar current input (central diode signal input)
6	VRL	GND	reference input for ADC
7	D4	HF-preamp → CD7	unipolar current input (central diode signal input)
8	R1	HF-preamp → CD7	unipolar current input (satellite diode signal input)
9	R2	HF-preamp → CD7	unipolar current input (satellite diode signal input)
10	IREFT	→ CD7	current reference for calibration ADC
11	VRH	not connected	reference output from ADC
12	VSSA2	GND	supply (analog) of CD7
13	SELPLL	+4V	selects whether internal clock multiplier PLL is used
14	ISLICE	CD7 →	current feedback from data slicer
15	HFIN	→ CD7	comparator signal input
16	VSSA3	GND	supply (analog) of CD7
17	HFREF	→ CD7	comparator common mode input
18	IREF	→ CD7	reference current pin (nom. VDD/2)
19	VDDA2	+4V	supply (analog) of CD7
20	TEST1	GND	test control input
21	CRIN	X-Tal → CD7	crystal/resonator input
22	CDOUT	X-Tal → CD7	crystal/resonator output
23	TEST2	GND	test control input
24	CL16	not connected	16.9344MHz system clock output
25	CL11	not connected	11.2896MHz or 5.6448MHz clock output (3-state)
26	RA	CD7 → servo driver	radial actuator output
27	FO	CD7 → servo driver	focus actuator output
28	SL	CD7 → servo driver	slide actuator output
29	TEST3	GND	test control input
30	VDD1P	+4V	supply (digital) of CD7
31	DOBM	CD7 → digital output	bi-phase mark output (3-state)
32	VSS1	GND	supply (digital) of CD7
33	MOTO1	CD7 → servo driver	motor output1 of CD7; versatile (3-state)
34	MOTO2	CD7 → servo driver	motor output2 of CD7; versatile (3-state)
35	SBSY	not connected	subcode block sync (3-state)
36	SFSY	not connected	subcode frame sync (3-state)
37	RCK	GND	subcode clock input
38	SUB	not connected	P to W subcode bits (3-state)
39	VSS2	GND	supply (digital) of CD7
40	V5	not connected	versatile output pin of CD7
41	V4	not connected	versatile output pin of CD7
42	V3	not connected	versatile output pin of CD7 (open drain)
43	KILL	CD7 →	kill output; programmable (open drain)
44	MISC	not connected	C2 error flag; output only defined in CD-ROM modes (3-state)
45	DATA	CD7 → DAC	serial data output (3-state)
46	WCLK	CD7 → DAC	word clock output (3-state)
47	VDD2P	+4V	supply (digital) of CD7
48	BCLK	CD7 → DAC	serial bit clock output (3-state)
49	VSS3	GND	supply (digital) of CD7
50	CL4	not connected	4.2336MHz µP clock output
51	SDA	µP → CD7	µP interface data I/O line (open drain output)
52	SCL	µP → CD7	µP interface clock line
53	RAB	µP → CD7	µP interface R/W and load control line
54	SILD	µP → CD7	µP interface R/W and load control line
55	NC		no connection
56	VSS4	GND	supply (digital) of CD7
57	RESET	µP → CD7	power-on reset input (active low)
58	STATUS	not connected	servo interrupt request line/CD7 status register output (open drain)
59	VDD3C	+4V	supply core (digital)
60	C2FAIL	not connected	indication of correction failure (open drain)
61	CFLG	not connected	correction flag output (open drain)
62	V1	→ CD7	versatile input pin
63	V2	→ CD7	versatile input pin
64	LDON	CD7 → 7820	laser drive on output (open drain)

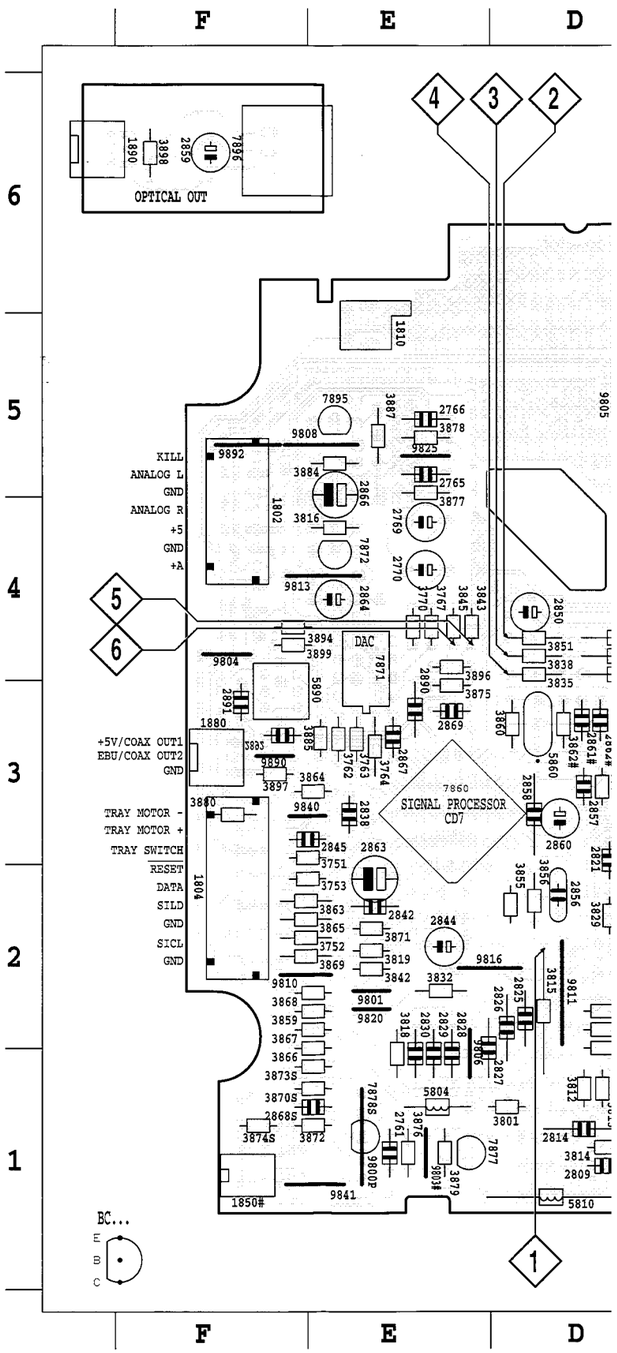
COMPACT DISC BOARD Componentside view



17	B6	3751	F3	3873S	E1
1801	C3	3752	F2	3874S	F1
1802	F4	3753	F2	3875	E3
1803	A4	3762	E3	3876	E1
1804	F2	3763	E3	3877	E5
1806	A4	3764	E3	3878	E5
1807	B5	3767	E4	3879	E1
1810	E5	3770	E4	3880	F3
1820	C5	3801	D1	3884	E5
1850#	F1	3802	C2	3885	E3
1880	F3	3803	C1	3887	E5
1890	F6	3804	D2	3888	F6
2761	E1	3805	D2	3890	B5
2765	E5	3806	C1	3891	B4
2766	E5	3807	D1	3892	B5
2769	E4	3808	C2	3893	B4
2770	E4	3809	D2	3894	F4
2802	D2	3810	D1	3895	B5
2803	C2	3811	D1	3896	E4
2804	D2	3812	D1	3897	F3
2805	C2	3813	D1	3898	F6
2806	D2	3814	D1	3899	F4
2807	C1	3815	D2	5802	A5
2808	C1	3816	E4	5804	E1
2809	D1	3818	E1	5810	D1
2810	D1	3819	E2	5860	D3
2811	C1	3820	C1	5890	F3
2814	D1	3821	D3	6888	B5
2818	C1	3822	C3	6889	C2
2819	C1	3824	D2	7800	D1
2820	C3	3825	D3	7820	C1
2821	D3	3826	D3	7851	B1
2822	D3	3827	D3	7852	A2
2823	D3	3828	D3	7855	B5
2824	D3	3829	D2	7860	E3
2825	D2	3830	D2	7871	E4
2826	D2	3832	E2	7872	E4
2827	E1	3833	D3	7877	E1
2828	E1	3835	D4	7878S	E1
2829	E1	3836	B2	7895	E5
2830	E1	3837	B2	7896	F6
2836	D4	3838	D4	9800P	E1
2837	B2	3839	B2	9801	E2
2838	E3	3840	B1	9803#	E1
2839	D4	3842	E2	9804	F4
2840	B1	3841S	B2	9805	D5
2842	E2	3843	E4	9806	E1
2843	B3	3844	A3	9802#	A5
2844	E2	3845	E4	9807	B2
2845	F3	3846	A3	9808	E5
2847	A1	3848	C4	9809	C2
2849	A2	3847P	B2	9810	F2
2850	D4	3849	B2	9811	D2
2851	B2	3850	C4	9813	E4
2853	D4	3851	D4	9814	B2
2856	D2	3852	B2	9815	B2
2857	D3	3853	B2	9816	E2
2858	D3	3855	D2	9820	E2
2859	F6	3856	D2	9825	E5
2860	D3	3859	E2	9830	B4
2863	E2	3860	D3	9831	B4
2861#	D3	3861	D3	9839	C4
2864	E4	3863	F2	9840	F3
2865	A6	3864	E3	9841	E1
2862#	D3	3862#	D3	9842	D5
2866	E5	3865	F2	9890	F3
2867	E3	3866	E1	9892	F5
2868S	E1	3867	E2		
2869	E3	3868	E2		
2890	E3	3869	F2		
2891	F3	3870S	E1		
2892	F3	3871	E2		
2898	C1	3872	E1		

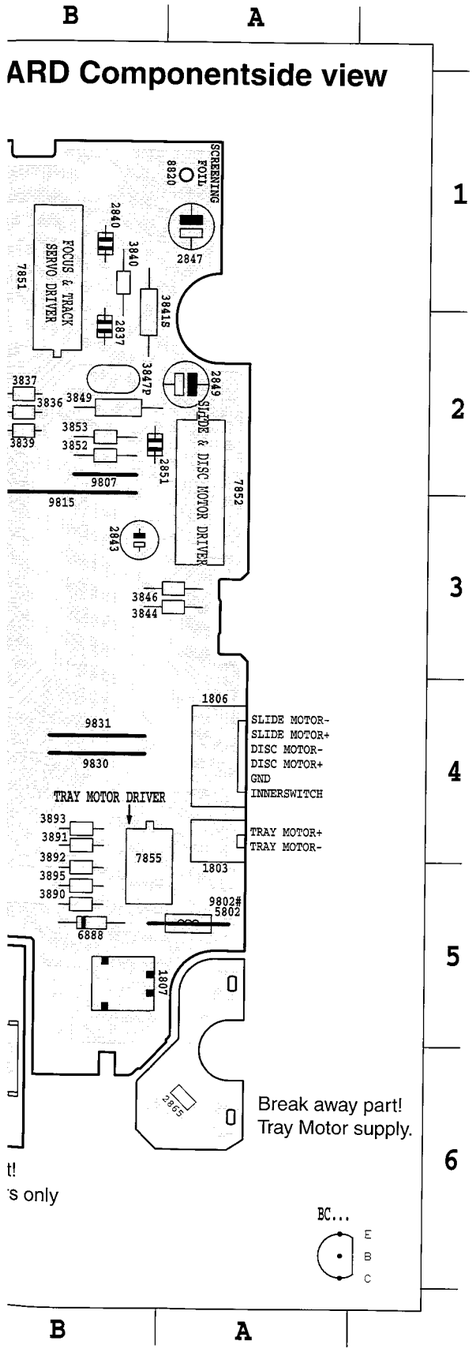
S = for Systems
P = for Portables
# = provisional

This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram respectively partslist.



10-6

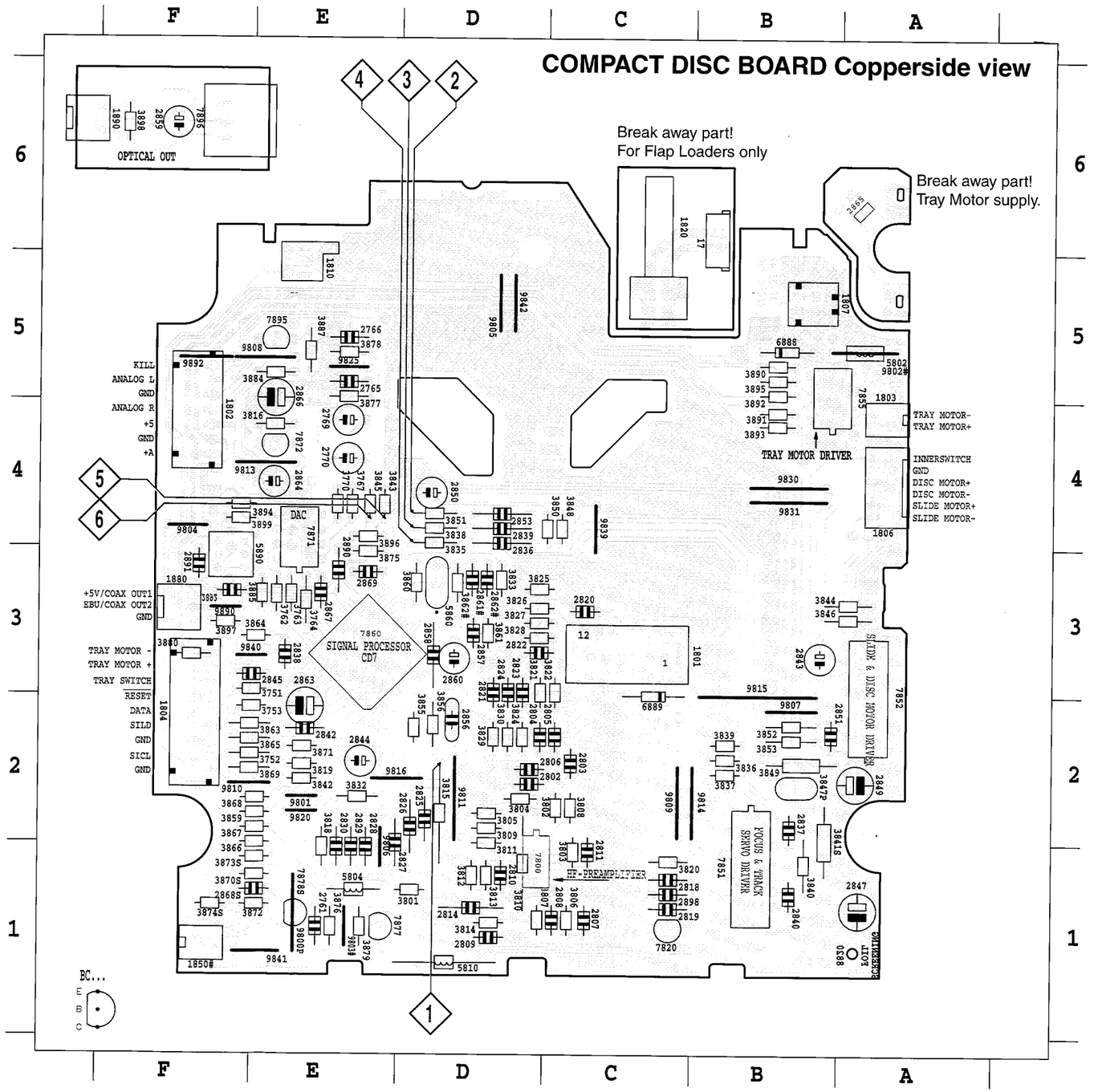
ARD Componentside view



17	B6	3751	F3	3873S	E1
1801	C3	3752	F2	3874S	F1
1802	F4	3753	F2	3875	E3
1803	A4	3762	E3	3876	E1
1804	F2	3763	E3	3877	E5
1806	A4	3764	E3	3878	E5
1807	B5	3767	E4	3879	E1
1810	E5	3770	E4	3880	F3
1820	C5	3801	D1	3884	E5
1850#	F1	3802	C2	3885	E3
1880	F3	3803	C1	3887	E5
1890	F6	3804	D2	3888	F6
2761	E1	3805	D2	3890	B5
2765	E5	3806	C1	3891	B4
2766	E5	3807	D1	3892	B5
2769	E4	3808	C2	3893	B4
2770	E4	3809	D2	3894	F4
2802	D2	3810	D1	3895	B5
2803	C2	3811	D1	3896	E4
2804	D2	3812	D1	3897	F3
2805	C2	3813	D1	3898	F6
2806	D2	3814	D1	3899	F4
2807	C1	3815	D2	5802	A5
2808	C1	3816	E4	5804	E1
2809	D1	3818	E1	5810	D1
2810	D1	3819	E2	5860	D3
2811	C1	3820	C1	5890	F3
2814	D1	3821	D3	6888	B5
2818	C1	3822	C3	6889	C2
2819	C1	3824	D2	7800	D1
2820	C3	3825	D3	7820	C1
2821	D3	3826	D3	7851	B1
2822	D3	3827	D3	7852	A2
2823	D3	3828	D3	7855	B5
2824	D3	3829	D2	7860	E3
2825	D2	3830	D2	7871	E4
2826	D2	3832	E2	7872	E4
2827	E1	3833	D3	7877	E1
2828	E1	3835	D4	7878S	E1
2829	E1	3836	B2	7895	E5
2830	E1	3837	B2	7896	F6
2836	D4	3838	D4	9800P	E1
2837	B2	3839	B2	9801	E2
2838	E3	3840	B1	9803#	E1
2839	D4	3842	E2	9804	F4
2840	B1	3841S	B2	9805	D5
2842	E2	3843	E4	9806	E1
2843	B3	3844	A3	9802#	A5
2844	E2	3845	E4	9807	B2
2845	F3	3846	A3	9808	E5
2847	A1	3848	C4	9809	C2
2849	A2	3847P	B2	9810	F2
2850	D4	3849	B2	9811	D2
2851	B2	3850	C4	9813	E4
2853	D4	3851	D4	9814	B2
2856	D2	3852	B2	9815	B2
2857	D3	3853	B2	9816	E2
2858	D3	3855	D2	9820	E2
2859	F6	3856	D2	9825	E5
2860	D3	3859	E2	9830	B4
2863	E2	3860	D3	9831	B4
2861#	D3	3861	D3	9839	C4
2864	E4	3863	F2	9840	F3
2865	A6	3864	E3	9841	E1
2862#	D3	3862#	D3	9842	D5
2866	E5	3865	F2	9890	F3
2867	E3	3866	E1	9892	F5
2868S	E1	3867	E2		
2869	E3	3868	E2	S = for Systems	
2890	E3	3869	F2	P = for Portables	
2891	F3	3870S	E1	# = provisional	
2892	F3	3871	E2		
2898	C1	3872	E1		

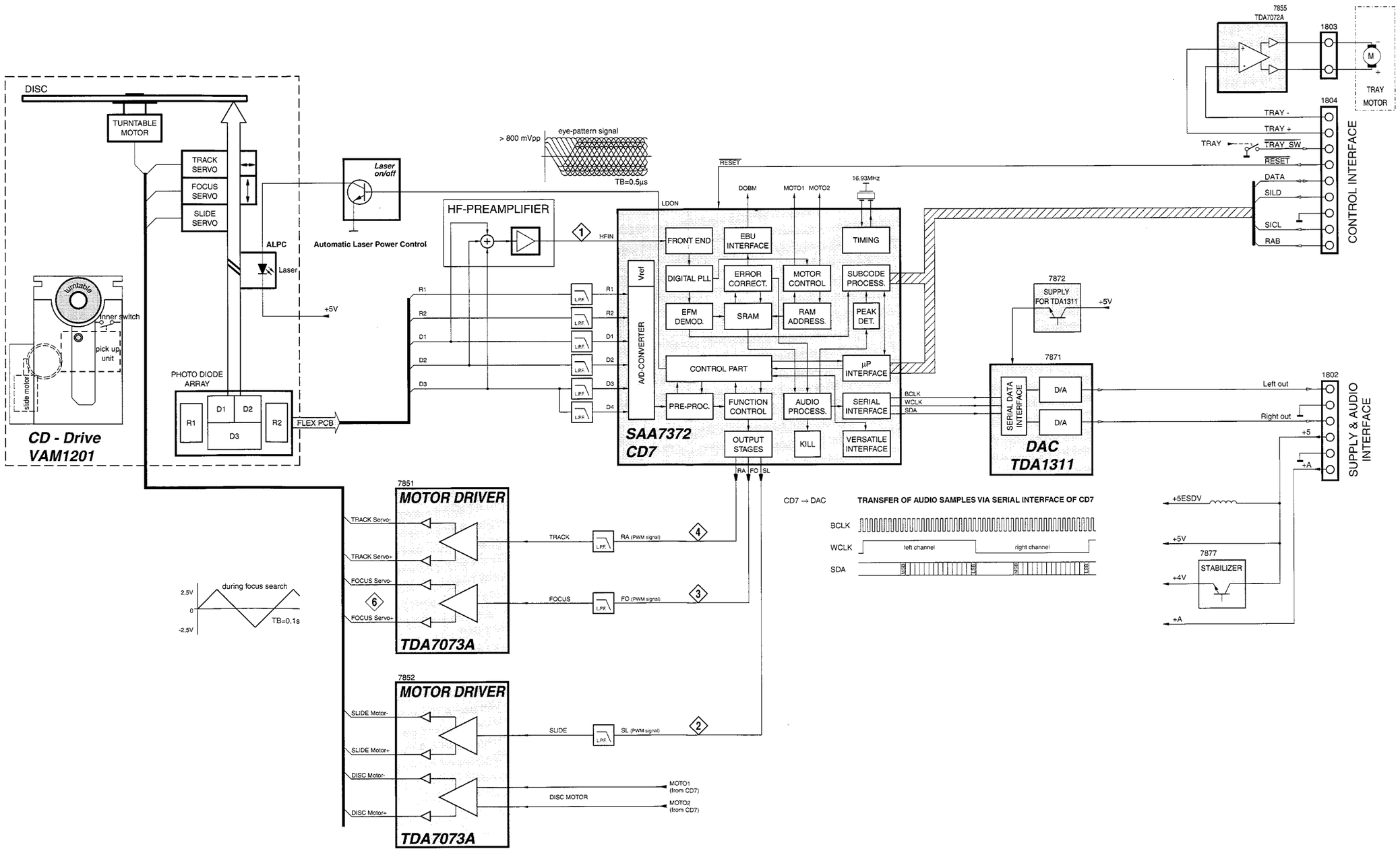
This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram respectively partslist.

COMPACT DISC BOARD Copperside view



10-5

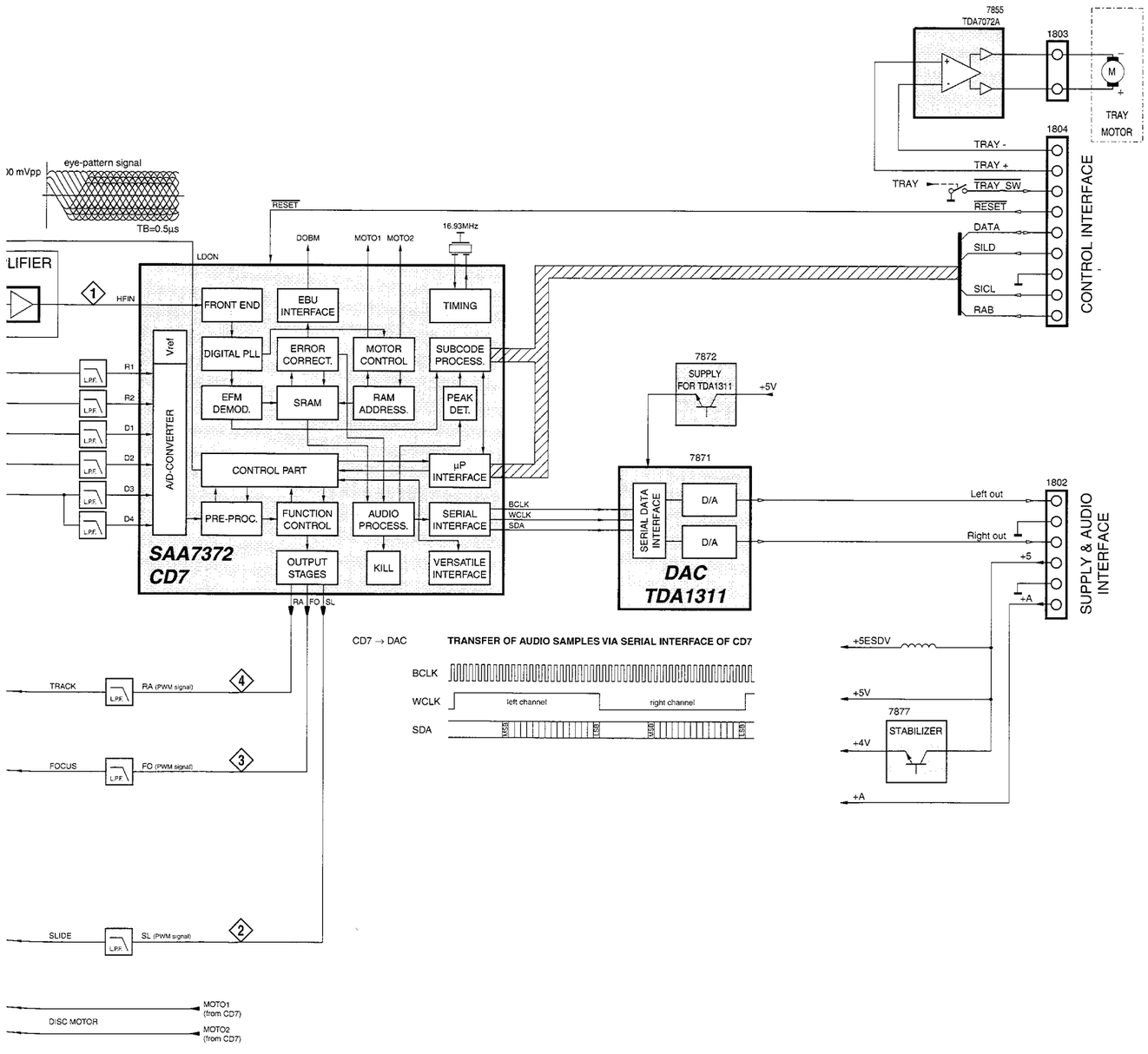
Functional Diagram *ECO Short Loader with CD7*



Abbreviati

SAA7372 – DEC(

Pin	Name
1	VSSA1
2	VDDA1
3	D1
4	D2
5	D3
6	VRL
7	D4
8	R1
9	R2
10	IREFT
11	VRH
12	VSSA2
13	SELPLL
14	ISLICE
15	HFIN
16	VSSA3
17	HFREF
18	IREF
19	VDDA2
20	TEST1
21	CRIN
22	CDOUT
23	TEST2
24	CL16
25	CL11
26	RA
27	FO
28	SL
29	TEST3
30	VDD1P
31	DOBM
32	VSS1
33	MOTO1
34	MOTO2
35	SBSY
36	SFSY
37	RCK
38	SUB
39	VSS2
40	V5
41	V4
42	V3
43	KILL
44	MISC
45	DATA
46	WCLK
47	VDD2P
48	BCLK
49	VSS3
50	CL4
51	SDA
52	SCL
53	RAB
54	SILD
55	NC
56	VSS4
57	RESET
58	STATUS
59	VDD3C
60	C2FAIL
61	CFLG
62	V1
63	V2
64	LDON



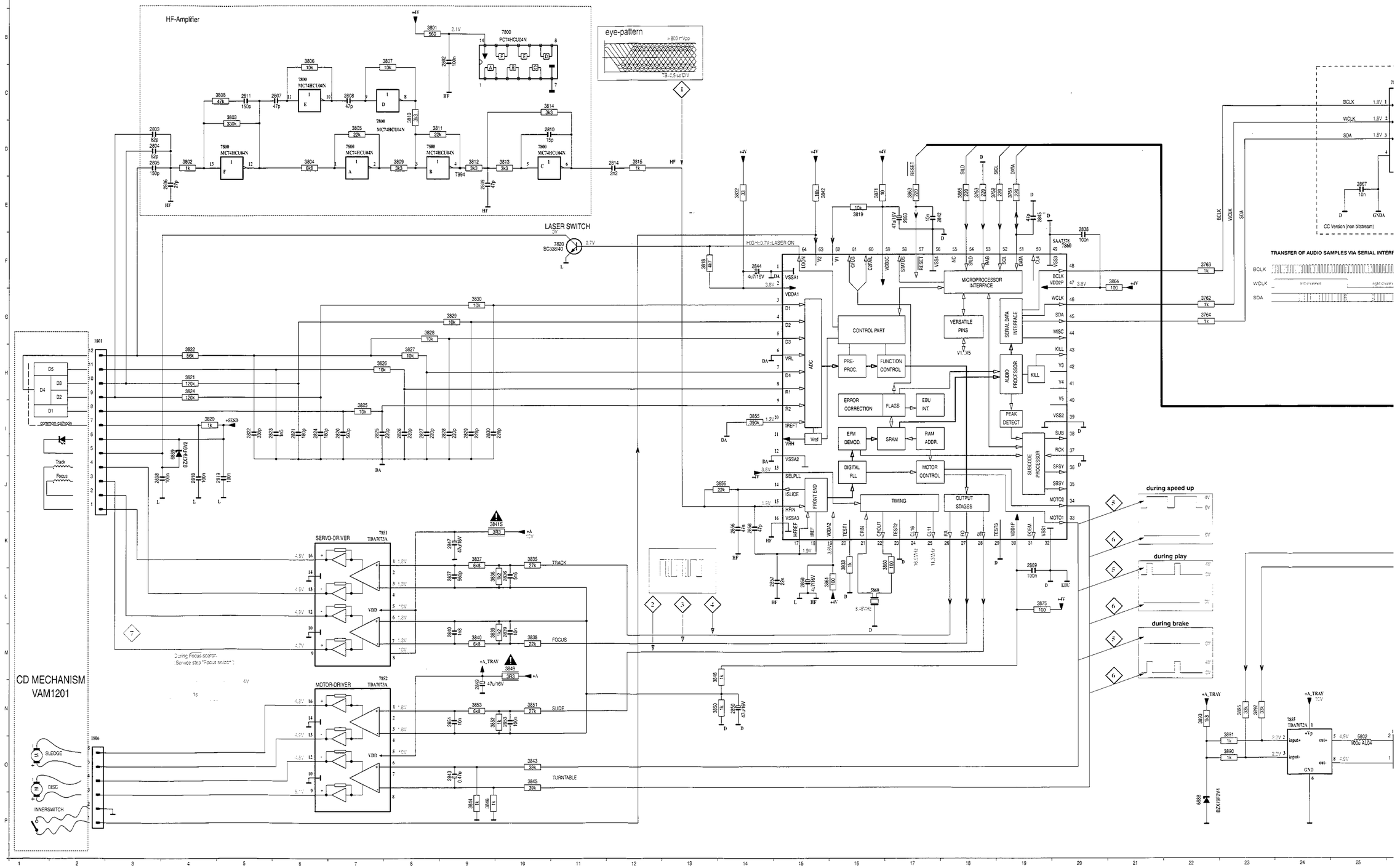
Abbreviations CD Part

SAA7372 – DECODER AND DIGITAL SERVO IC CD7

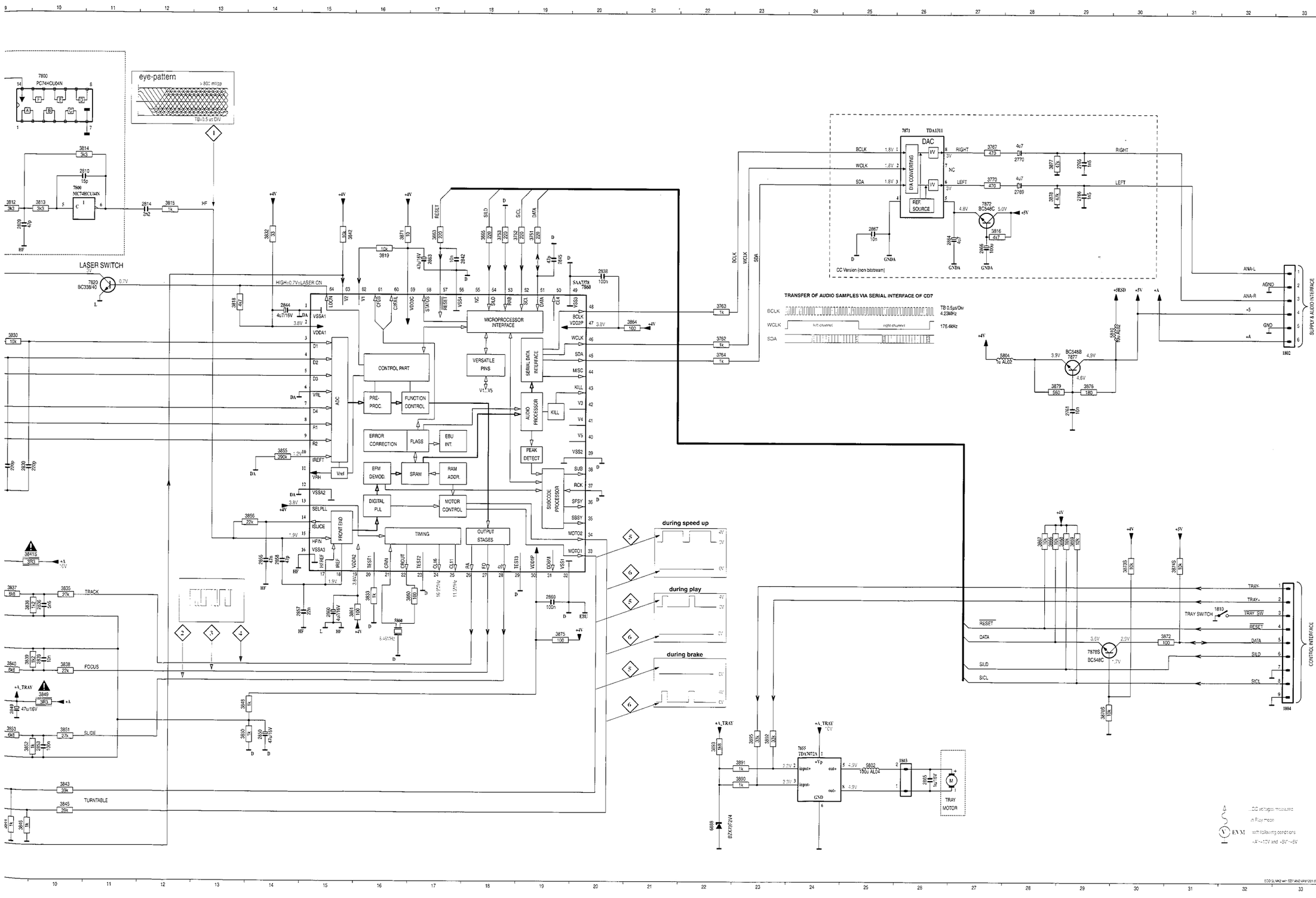
Pin	*Name*	*Direction*	*Description*
1	VSSA1	GND	supply (analog) of CD7
2	VDDA1	+4V	supply (analog) of CD7
3	D1	HF-preamp → CD7	unipolar current input (central diode signal input)
4	D2	HF-preamp → CD7	unipolar current input (central diode signal input)
5	D3	HF-preamp → CD7	unipolar current input (central diode signal input)
6	VRL	GND	reference input for ADC
7	D4	HF-preamp → CD7	unipolar current input (central diode signal input)
8	R1	HF-preamp → CD7	unipolar current input (satellite diode signal input)
9	R2	HF-preamp → CD7	unipolar current input (satellite diode signal input)
10	IREFT	→ CD7	current reference for calibration ADC
11	VRH	not connected	reference output from ADC
12	VSSA2	GND	supply (analog) of CD7
13	SELPLL	+4V	selects whether internal clock multiplier PLL is used
14	ISLICE	CD7 →	current feedback from data slicer
15	HFIN	→ CD7	comparator signal input
16	VSSA3	GND	supply (analog) of CD7
17	HFREF	→ CD7	comparator common mode input
18	IREF	→ CD7	reference current pin (nom. VDD/2)
19	VDDA2	+4V	supply (analog) of CD7
20	TEST1	GND	test control input
21	CRIN	X-Tal → CD7	crystal/resonator input
22	CDOUT	X-Tal → CD7	crystal/resonator output
23	TEST2	GND	test control input
24	CL16	not connected	16.9344MHz system clock output
25	CL11	not connected	11.2896MHz or 5.6448MHz clock output (3-state)
26	RA	CD7 → servo driver	radial actuator output
27	FO	CD7 → servo driver	focus actuator output
28	SL	CD7 → servo driver	slide actuator output
29	TEST3	GND	test control input
30	VDD1P	+4V	supply (digital) of CD7
31	DOBM	CD7 → digital output	bi-phase mark output (3-state)
32	VSS1	GND	supply (digital) of CD7
33	MOTO1	CD7 → servo driver	motor output1 of CD7; versatile (3-state)
34	MOTO2	CD7 → servo driver	motor output2 of CD7; versatile (3-state)
35	SBSY	not connected	subcode block sync (3-state)
36	SFSY	not connected	subcode frame sync (3-state)
37	RCK	GND	subcode clock input
38	SUB	not connected	P to W subcode bits (3-state)
39	VSS2	GND	supply (digital) of CD7
40	V5	not connected	versatile output pin of CD7
41	V4	not connected	versatile output pin of CD7
42	V3	not connected	versatile output pin of CD7 (open drain)
43	KILL	CD7 →	kill output; programmable (open drain)
44	MISC	not connected	C2 error flag; output only defined in CD-ROM modes (3-state)
45	DATA	CD7 → DAC	serial data output (3-state)
46	WCLK	CD7 → DAC	word clock output (3-state)
47	VDD2P	+4V	supply (digital) of CD7
48	BCLK	CD7 → DAC	serial bit clock output (3-state)
49	VSS3	GND	supply (digital) of CD7
50	CL4	not connected	4.2336MHz µP clock output
51	SDA	µP → CD7	µP interface data I/O line (open drain output)
52	SCL	µP → CD7	µP interface clock line
53	RAB	µP → CD7	µP interface R/W and load control line
54	SILD	µP → CD7	µP interface R/W and load control line
55	NC		no connection
56	VSS4	GND	supply (digital) of CD7
57	RESET	µP → CD7	power-on reset input (active low)
58	STATUS	not connected	servo interrupt request line/CD7 status register output (open drain)
59	VDD3C	+4V	supply core (digital)
60	C2FAIL	not connected	indication of correction failure (open drain)
61	CFLG	not connected	correction flag output (open drain)
62	V1	→ CD7	versatile input pin
63	V2	→ CD7	versatile input pin
64	LDON	CD7 → 7820	laser drive on output (open drain)

10-7

CD Board


HF-Amplifier
eye-pattern
LASER SWITCH
HIGH=0.7V-LASER ON
CD MECHANISM
VAM1201
SERVO-DRIVER
MOTOR-DRIVER
TDA7073A
SAA7378
MICROPROCESSOR INTERFACE
CONTROL PART
PRE-PROC.
FUNCTION CONTROL
ADC
VERSATILE PINS
SERIAL DATA INTERFACE
AUDIO PROCESSOR
KILL
ERROR CORRECTION
FLAGS
EBU INT.
EFM DEMOD.
SRAM
RAM ADDR.
DIGITAL PLL
MOTOR CONTROL
FRONT END
TIMING
OUTPUT STAGES
PEAK DETECT
SUBCODE PROCESSOR
TRANSFER OF AUDIO SAMPLES VIA SERIAL INTERF
CC Version (non bitstream)
during speed up
during play
during brake
During Focus search:
Service step "Focus search"
TRACK
FOCUS
SLIDE
TURNTABLE
SLEDGE
DISC
INNERSWITCH
Track
Focus
BCLK
WCLK
SDA

10-7



1801	G2	3846	P9
1802	G33	3848	M13
1803	N26	3849	M10
1804	M33	3850	N13
1806	O2	3851	N10
1810	L31	3852	N9
2761	H29	3853	N9
2765	D29	3855	I14
2766	D29	3856	J14
2769	D28	3859	E16
2770	C28	3860	K17
2802	B9	3861	L15
2803	D3	3863	E17
2804	D3	3864	F21
2805	D3	3865	E18
2806	E4	3866	J28
2807	C6	3867	J28
2808	C7	3868	J29
2820	I7	3869	J29
2821	I6	3870S	N29
2822	I5	3871	E16
2823	I6	3872	L31
2824	I6	3873S	K30
2825	I7	3874S	K30
2826	I8	3875	L19
2827	I8	3876	H29
2828	I9	3877	D28
2829	I9	3878	D29
2830	I9	3879	H28
2836	L10	3880	K33
2837	L9	3884	D31
2838	E20	3885	D31
2839	M10	3887	E32
2840	M9	3890	O23
2842	E17	3891	O23
2843	O9	3892	N23
2844	F14	3893	N22
2845	E19	3895	N23
2847	K9	5802	N25
2849	M9	5804	G28
2850	N14	5810	G30
2851	N9	5860	L16
2853	N10	6888	P22
2856	K14	6889	I4
2857	L15	7800	C6
2858	K14	7800	D5
2860	L15	7800	D7
2863	E17	7800	D7
2864	E27	7800	D8
2865	O26	7800	D10
2866	E27	7820	F11
2867	E25	7851	K8
2868S	N30	7852	M8
2869	K19	7855	N24
2898	J3	7860	F15
3751	E19	7871	C26
3752	E18	7872	D27
3753	E18	7877	G29
3762	G22	7878S	L30
3763	F22	7895	D32
3764	G22	9801	D15
3767	C27	9892	E33
3770	D27		
3801	B8		
3802	D4		
3803	C5		
3804	D6		
3805	D7		
3806	B6		
3807	B8		
3808	C5		
3809	D8		
3810	C8		
3811	D8		
3812	D9		
3813	D10		
3814	C10		
3815	D12		
3816	E27		
3818	F13		
3819	D15		
3820	I4		
3821	H4		
3822	H4		
3824	H4		
3825	I7		
3826	H7		
3827	H8		
3828	G8		
3829	G9		
3830	G9		
3832	E14		
3833	K16		
3835	K10		
3836	L9		
3837	K9		
3838	M10		
3839	M9		
3840	M9		
3841S	K10		
3842	E15		
3843	O10		
3844	P9		
3845	O10		

WARNING

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CDM-ELECTRONICS WHEN CONNECTING A NEW CDM MECHANISM. THAT'S WHY, BESIDES THE SAFETY MEASURES LIKE
• SWITCH OFF POWER SUPPLY
• ESD PROTECTION
ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.

The following steps have to be done when replacing the CDM mechanism:

1. Disconnect old CDM flexfoil from printed board
2. Connect paperclip to CDM flexfoil to short-circuit flexfoil (fig.1)
3. Short-circuit printed board with **brass-sheet (4822 321 11197)** plugged into the flexfoil connector (fig.2)
4. Remove old CDM mechanism
5. Position new CDM mechanism in its studs
6. Remove short-circuit from printed board connector
7. Remove short-circuit from flexfoil of new CDM
8. Connect new flexfoil to print connector (fig.3)

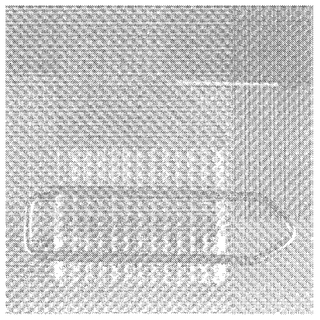


fig.1

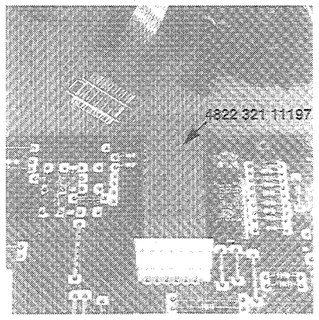


fig.2

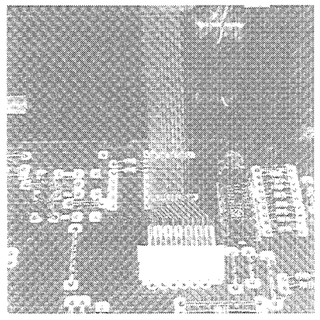
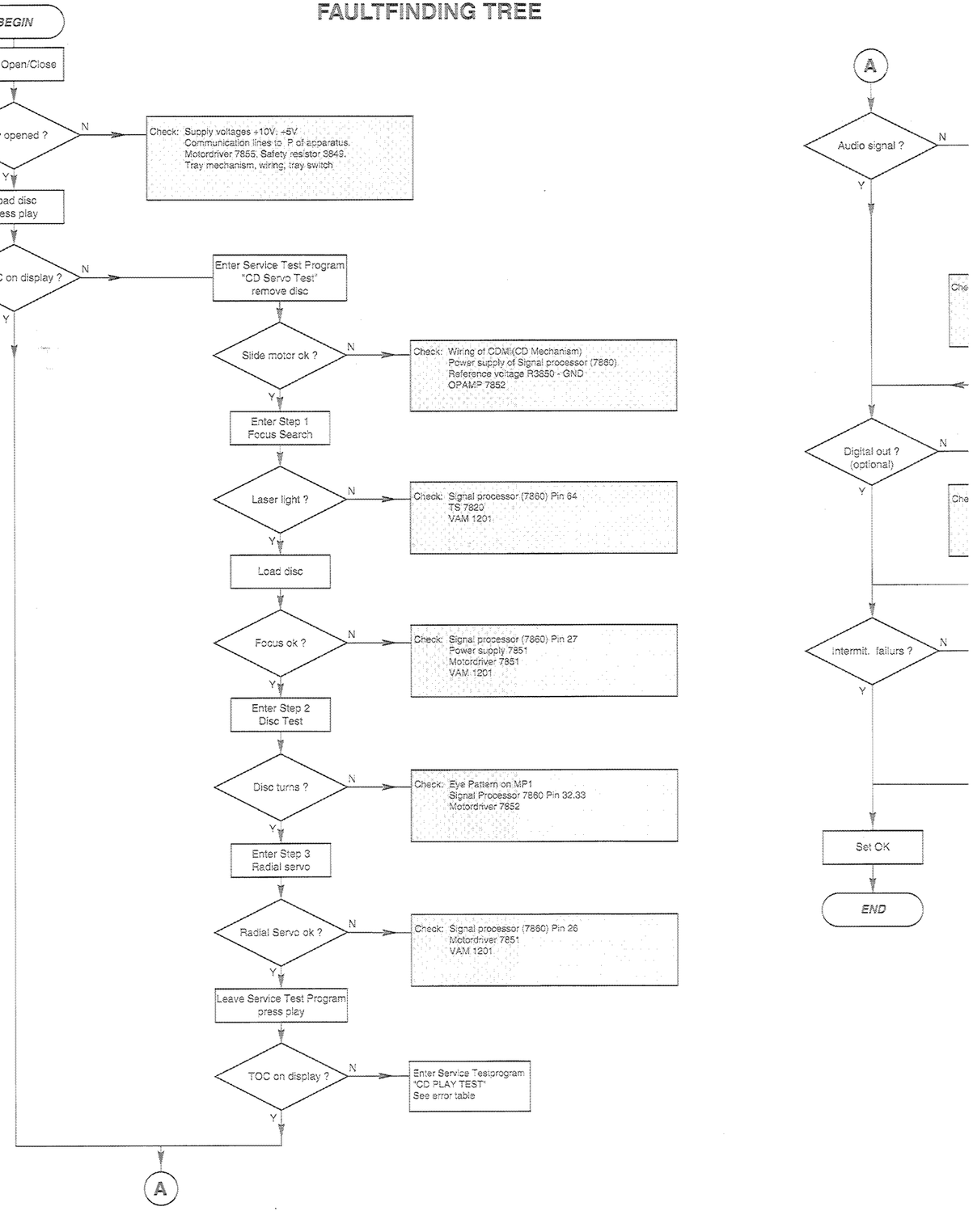


fig.3

Remarks

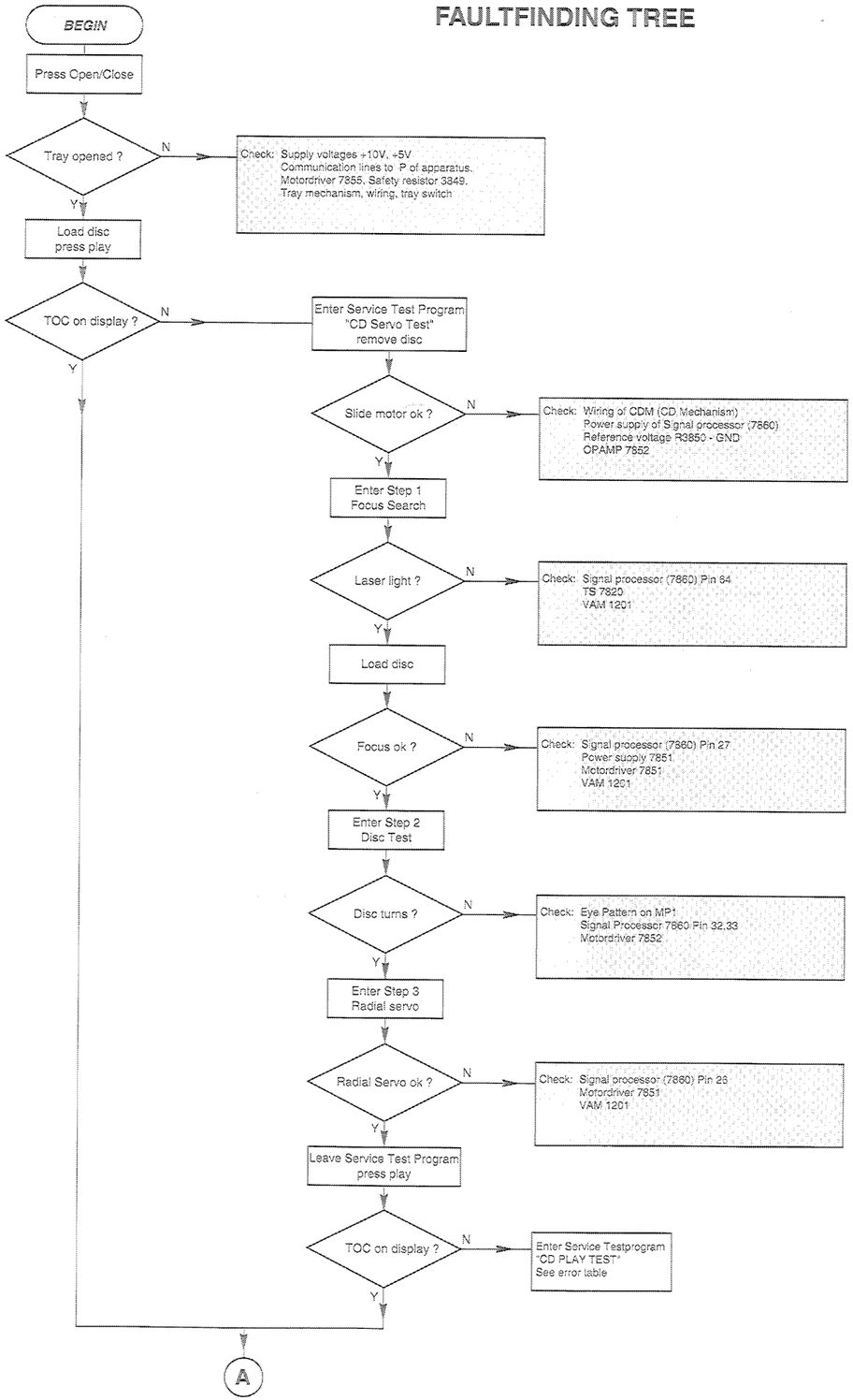
FAULTFINDING TREE

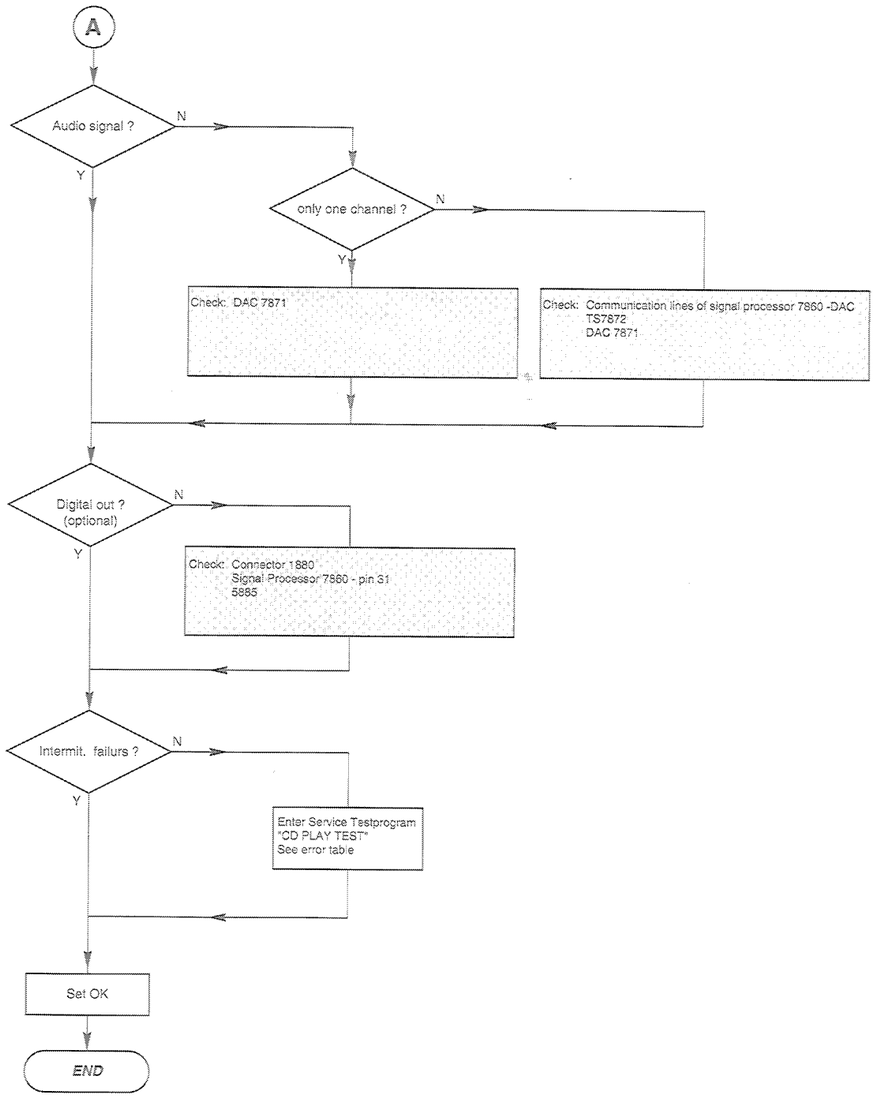


FAULTFINDING TREE

WHEN
LIKE

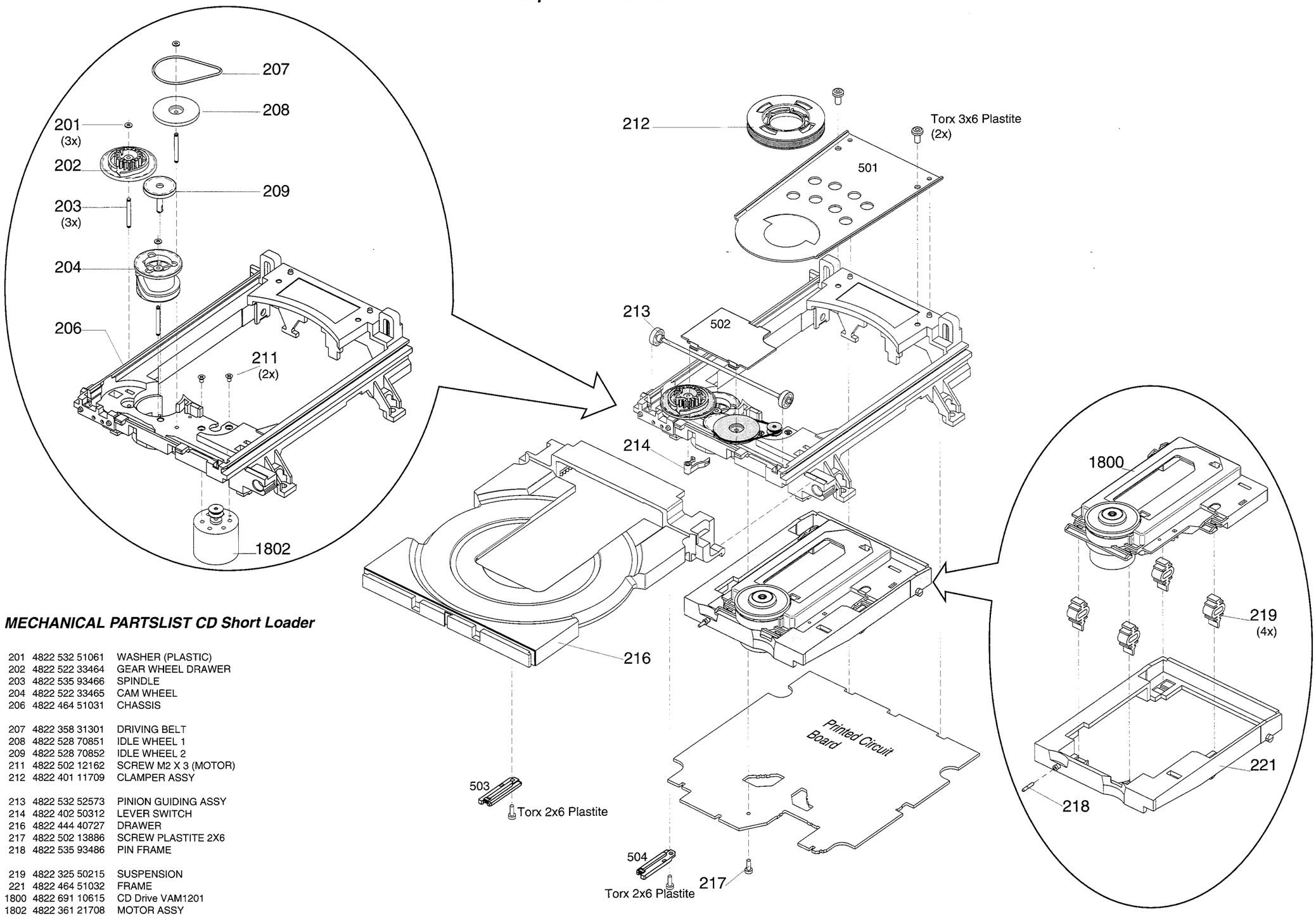
(fig.2)





10-9

Exploded view CD Short Loader



MECHANICAL PARTSLIST CD Short Loader

201	4822 532 51061	WASHER (PLASTIC)
202	4822 522 33464	GEAR WHEEL DRAWER
203	4822 535 93466	SPINDLE
204	4822 522 33465	CAM WHEEL
206	4822 464 51031	CHASSIS
207	4822 358 31301	DRIVING BELT
208	4822 528 70851	IDLE WHEEL 1
209	4822 528 70852	IDLE WHEEL 2
211	4822 502 12162	SCREW M2 X 3 (MOTOR)
212	4822 401 11709	CLAMPER ASSY
213	4822 532 52573	PINION GUIDING ASSY
214	4822 402 50312	LEVER SWITCH
216	4822 444 40727	DRAWER
217	4822 502 13886	SCREW PLASTITE 2X6
218	4822 535 93486	PIN FRAME
219	4822 325 50215	SUSPENSION
221	4822 464 51032	FRAME
1800	4822 691 10615	CD Drive VAM1201
1802	4822 361 21708	MOTOR ASSY
	4822 502 30735	SCREW 3 X 6 PLASTITE

MISCELLANEOUS

1801	4822 267 51453	FLEX FOIL CONNECTOR 12PIN
1804	5322 265 40945	CONNECTOR 9PIN
1810	4822 276 13503	TRAY SWITCH

CAPACITORS

2761	4822 121 51387	10nF	20%	16V
2765	4822 126 12878	1,5nF	10%	16V
2766	4822 126 12878	1,5nF	10%	16V
2769	4822 124 41969	1µF	20%	50V
2770	4822 124 23401	4,7µF	20%	25V
2802	4822 126 12882	100nF	20%	50V
2803	4822 122 10319	82pF	5%	50V
2804	4822 122 10319	82pF	5%	50V
2805	4822 122 33849	150pF	10%	50V
2806	4822 122 33192	27pF	5%	50V
2807	4822 122 33848	47pF	5%	50V
2808	4822 122 33848	47pF	5%	50V
2809	4822 122 33848	47pF	5%	50V
2810	4822 122 10462	15pF	5%	50V
2811	4822 122 33849	150pF	10%	50V
2814	4822 126 12339	2,2nF	10%	16V
2818	4822 126 12882	100nF	20%	50V
2819	4822 126 12882	100nF	20%	50V
2820	4822 122 10459	560pF	10%	50V
2821	4822 126 10053	180pF	10%	50V
2822	4822 126 12787	330pF	10%	50V
2823	4822 126 12878	1,5nF	10%	16V
2824	4822 126 10053	180pF	10%	50V
2825	4822 122 10466	220pF	10%	50V
2826	4822 122 10466	220pF	10%	50V
2827	4822 122 10466	220pF	10%	50V
2828	4822 122 10466	220pF	10%	50V
2829	4822 122 10466	220pF	10%	50V
2830	4822 122 10466	220pF	10%	50V
2836	4822 126 13098	5,6nF	20%	16V
2837	4822 122 10459	560pF	10%	50V
2838	4822 126 12882	100nF	20%	50V
2839	4822 121 51387	10nF	20%	16V
2840	4822 122 10576	1,8nF	10%	16V
2842	4822 121 51387	10nF	20%	16V
2843	5322 124 41948	0,47µF	20%	50V
2844	4822 124 23401	4,7µF	20%	25V
2845	4822 122 33848	47pF	5%	50V
2847	4822 124 40433	47µF	20%	25V
2849	4822 124 40433	47µF	20%	25V
2850	4822 124 23178	47µF	20%	16V
2851	4822 121 51387	10nF	20%	16V
2853	4822 126 12882	100nF	20%	50V
2856	4822 121 43526	47nF	5%	100V
2857	4822 126 11585	22nF	20%	50V
2858	4822 122 33848	47pF	5%	50V
2860	4822 124 23401	4,7µF	20%	25V
2863	4822 124 23178	47µF	20%	16V
2864	4822 124 23401	4,7µF	20%	25V
2866	4822 124 23264	100µF	20%	6,3V
2867	4822 121 51387	10nF	20%	16V
2869	4822 126 12882	100nF	20%	50V
2898	4822 126 12882	100nF	20%	50V

RESISTORS

3751	4822 116 83872	220Ω	5%	0,5W
3752	4822 116 83872	220Ω	5%	0,5W
3753	4822 116 83872	220Ω	5%	0,5W
3762	4822 050 11002	1kΩ	5%	0,2W
3763	4822 050 11002	1kΩ	5%	0,2W
3764	4822 050 11002	1kΩ	5%	0,2W
3767	4822 116 52224	470Ω	5%	0,5W
3770	4822 116 52224	470Ω	5%	0,5W
3801	4822 116 52226	560Ω	5%	0,5W
3802	4822 050 11002	1kΩ	5%	0,2W
3803	4822 116 52272	330kΩ	5%	0,5W
3804	4822 116 83961	6,8kΩ	5%	0,16W
3805	4822 116 52257	22kΩ	5%	0,5W
3806	4822 116 83864	10kΩ	5%	0,5W
3807	4822 116 83864	10kΩ	5%	0,5W
3808	4822 116 52284	47kΩ	5%	0,5W
3809	4822 116 52269	3,3kΩ	5%	0,5W
3810	4822 116 52269	3,3kΩ	5%	0,5W
3811	4822 116 52257	22kΩ	5%	0,5W
3812	4822 116 52269	3,3kΩ	5%	0,5W
3813	4822 116 52269	3,3kΩ	5%	0,5W
3814	4822 116 52269	3,3kΩ	5%	0,5W
3815	4822 050 11002	1kΩ	5%	0,2W
3816	4822 116 52283	4,7kΩ	5%	0,5W
3818	4822 116 52283	4,7kΩ	5%	0,5W
3819	4822 116 83868	150Ω	5%	0,5W
3820	4822 050 11002	1kΩ	5%	0,2W
3821	4822 116 52239	120kΩ	5%	0,5W
3822	4822 116 52291	56kΩ	5%	0,5W
3824	4822 116 52239	120kΩ	5%	0,5W
3825	4822 116 83864	10kΩ	5%	0,5W
3826	4822 116 83864	10kΩ	5%	0,5W
3827	4822 116 83864	10kΩ	5%	0,5W
3828	4822 116 83864	10kΩ	5%	0,5W
3829	4822 116 83864	10kΩ	5%	0,5W
3830	4822 116 83864	10kΩ	5%	0,5W
3832	4822 116 52191	33Ω	5%	0,5W
3833	4822 050 11002	1kΩ	5%	0,2W
3835	4822 116 52264	27kΩ	5%	0,5W
3836	4822 116 52207	1,2kΩ	5%	0,5W
3837	4822 116 83961	6,8kΩ	5%	0,16W
3838	4822 116 52257	22kΩ	5%	0,5W
3839	4822 116 52207	1,2kΩ	5%	0,5W
3840	4822 116 83961	6,8kΩ	5%	0,16W
3841	4822 052 10338 ⚠	3,3Ω		NFR25
3842	4822 116 83864	10kΩ	5%	0,5W
3843	4822 116 83882	39kΩ	5%	0,5W
3844	4822 050 11002	1kΩ	5%	0,2W
3845	4822 116 83882	39kΩ	5%	0,5W
3846	4822 050 11002	1kΩ	5%	0,2W
3848	4822 050 11002	1kΩ	5%	0,2W
3849	4822 052 10338 ⚠	3,3Ω		NFR25
3850	4822 050 11002	1kΩ	5%	0,2W
3851	4822 116 52264	27kΩ	5%	0,5W
3852	4822 050 11002	1kΩ	5%	0,2W
3853	4822 116 83961	6,8kΩ	5%	0,16W
3855	4822 116 52278	390kΩ	5%	0,5W
3856	4822 116 52257	22kΩ	5%	0,5W
3859	4822 116 83872	220Ω	5%	0,5W
3860	4822 116 52175	100Ω	5%	0,5W

10-10

ELECTRICAL PARTSLIST CD BOARD

RESISTORS

3861	4822 116 52175	100Ω	5%	0,5W
3862	4822 116 52235	1MΩ	5%	0,5W
3863	4822 116 83872	220Ω	5%	0,5W
3864	4822 116 52175	100Ω	5%	0,5W
3865	4822 116 83872	220Ω	5%	0,5W
3866	4822 116 83864	10kΩ	5%	0,5W
3867	4822 116 83864	10kΩ	5%	0,5W
3868	4822 116 83864	10kΩ	5%	0,5W
3869	4822 116 83864	10kΩ	5%	0,5W
3870	4822 116 83864	10kΩ	5%	0,5W
3871	4822 116 52176	10Ω	5%	0,5W
3872	4822 116 52175	100Ω	5%	0,5W
3873	4822 116 83864	10kΩ	5%	0,5W
3874	4822 116 83864	10kΩ	5%	0,5W
3875	4822 116 52175	100Ω	5%	0,5W
3876	4822 116 52213	180Ω	5%	0,5W
3877	4822 116 52284	47kΩ	5%	0,5W
3878	4822 116 52284	47kΩ	5%	0,5W
3879	4822 116 52226	560Ω	5%	0,5W
3890	4822 050 11002	1kΩ	5%	0,2W
3891	4822 050 11002	1kΩ	5%	0,2W
3892	4822 116 52271	33kΩ	5%	0,16W
3893	4822 116 52249	1,8kΩ	5%	0,16W
3895	4822 116 52271	33kΩ	5%	0,16W

COILS

5804	4822 157 53302	1µH
5810	4822 152 20677	10µH
5860	4822 242 73557	CERAMIC RES. 8,46MHz

DIODES

6888	4822 130 80655	BZX79-F2V4
6889	4822 130 34167	BZX79-B6V2

TRANSISTORS

7820	5322 130 44779	BC338-40
7872	4822 130 44196	BC548C
7877	4822 130 40937	BC548B
7878	4822 130 44196	BC548C

INTEGRATED CIRCUITS

7800 ©	5322 209 11517	PC74HCU04T
7851	4822 209 32852	TDA7073A/N2
7852	4822 209 32852	TDA7073A/N2
7855 ©	4822 209 31519	TDA7072A
7860 ©	4822 209 12752	SAA7378GP
7871	4822 209 32421	TDA1311A/N2

COMBI BOARD

TABLE OF CONTENTS

11-1

Brief introduction of the Combi Board

NOTES:

A. TRANSFORMER PRIMARY PART
Transformer Primary Circuit provide connection for AC mains supply and primary wires of transformer.

B. POWER SUPPLY PART
Power Supply Circuit consists of rectifiers, capacitive filters and voltage regulators. Regulated voltage include +5V6, +12A, +12M, -26V, PWDN. The +C supply to the power amplifier is not regulated. F1-F2 is the ac supply voltage to the FTD Display filament.

C. SOURCE SELECT & AMPLIFIER PART

a) SHIFT REGISTER (AF CONTROL)
This shift register deliver commands from the µP to control the AF functions which include source selection (A0 & A1 control lines), DSC modes , DBB, IS and CD_ON. Other control lines such as MUTE, AMPON, STBY and PWM are coming directly from the µP on the Front board.

b) SOURCE SELECTION
One of the 4 sources, namely AUX, TAPE, TUNER, CD, can be selected via A0 & A1 lines which control the IC 7501 (HEF4052BT). Karaoke mic. mixing is connected to th e selected source before the signal is amplified with a buffer amplifier (Tr 7503 & 7504). The source signal is then split into recording path (for recording on tape) and main signal path (to the PWM volume control).

c) PWM VOLUME CONTROL
The discrete volume control makes use of 4 Transistors 7505, 7506, 7507 & 7508 (BC557B or ON4986) and PWM control signal from µP. For good performance transistors for the left and right channels should be paired for gain characteristics.

d) SOUND FEATURES
Sound Features include the DBB, IS and 4 DSC modes. The sound features are realised with a hex-inverter IC 7530 (HEF4069BT) as analog buffer/amplifier and transistors as electronic switches controlled by the shift registers (AF control).

e) POWER AMPLIFIER
IC 7391 (AN7125) is used as power amplifier.

f) CD ON CONTROL
This circuit switches on the supply +CD supply (derived from +12A) to CD servo control, HF circuit and the laser light pen on the CD Module during the CD mode only.

g) MATRIX SURROUND OUTPUT
The matrix surround feature is provided on board. This feature is only optional on certain type version.

D. KARAOKE & HEADPHONE PART

a) SIMPLE KARAOKE
This is a 1-mic. mono amplifier using discrete components. It has a level control using a rotary potmeter. This feature is available for some version only.

g) HEADPHONE OUTPUT
The headphone output is derived from the power amplifier output after the attenuation resistors which are tailored to deliver 18mW output power into a 32 ohm headphone.

11-1

Brief introduction of the Combi Board

A. TRANSFORMER PRIMARY PART

Transformer Primary Circuit provide connection for AC mains supply and primary wires of transformer.

B. POWER SUPPLY PART

Power Supply Circuit consists of rectifiers, capacitive filters and voltage regulators. Regulated voltage include +5V6, +12A, +12M, -26V, PWDN. The +C supply to the power amplifier is not regulated. F1-F2 is the ac supply voltage to the FTD Display filament.

C. SOURCE SELECT & AMPLIFIER PART

a) SHIFT REGISTER (AF CONTROL)

This shift register deliver commands from the µP to control the AF functions which include source selection (A0 & A1 control lines), DSC modes , DBB, IS and CD_ON. Other control lines such as MUTE, AMPON, STBY and PWM are coming directly from the µP on the Front board.

b) SOURCE SELECTION

One of the 4 sources, namely AUX, TAPE, TUNER, CD, can be selected via A0 & A1 lines which control the IC 7501 (HEF4052BT). Karaoke mic. mixing is connected to th e selected source before the signal is amplified with a buffer amplifier (Tr 7503 & 7504). The source signal is then split into recording path (for recording on tape) and main signal path (to the PWM volume control).

c) PWM VOLUME CONTROL

The discrete volume control makes use of 4 Transistors 7505, 7506, 7507 & 7508 (BC557B or ON4986) and PWM control signal from µP. For good performance transistors for the left and right channels should be paired for gain characteristics.

d) SOUND FEATURES

Sound Features include the DBB, IS and 4 DSC modes. The sound features are realised with a hex-inverter IC 7530 (HEF4069BT) as analog buffer/amplifier and transistors as electronic switches controlled by the shift registers (AF control).

e) POWER AMPLIFIER

IC 7391 (AN7125) is used as power amplifier.

f) CD ON CONTROL

This circuit switches on the supply +CD supply (derived from +12A) to CD servo control, HF circuit and the laser light pen on the CD Module during the CD mode only.

g) MATRIX SURROUND OUTPUT

The matrix surround feature is provided on board. This feature is only optional on certain type version.

D. KARAOKE & HEADPHONE PART

a) SIMPLE KARAOKE

This is a 1-mic. mono amplifier using discrete components. It has a level control using a rotary potmeter. This feature is available for some version only.

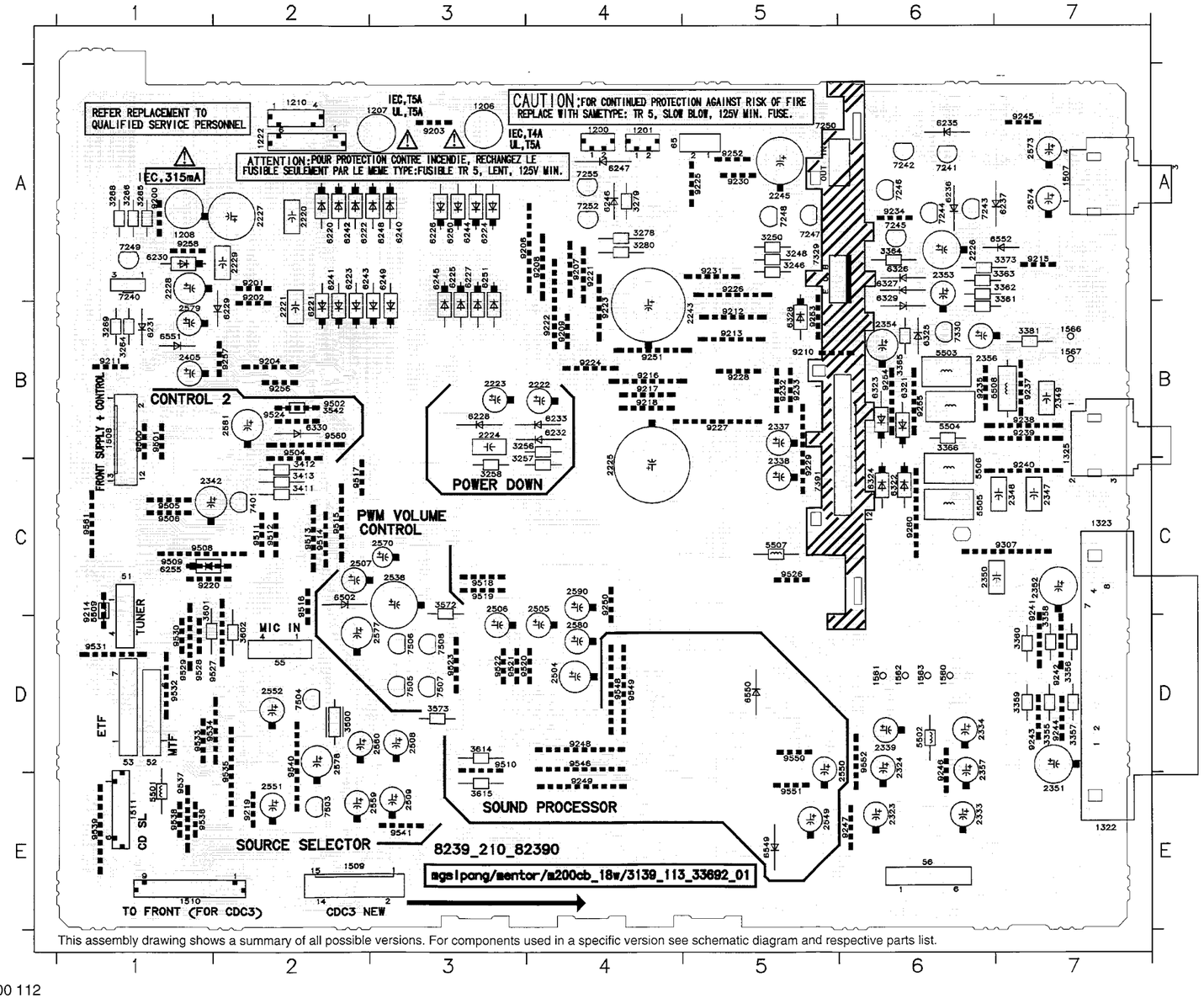
g) HEADPHONE OUTPUT

The headphone output is derived from the power amplifier output after the attenuation resistors which are tailored to deliver 18mW output power into a 32 ohm headphone.

NOTES:

COMPONENT LAYOUT - MAIN PART

51 C1	1508 B1	2227 A2	2351 E7	2552 D2	3258 C3	3363 A7	5501 E1	6228 B3	6248 A3	6550 D5	7330 B6	9209 B4	9226 A5	9244 D7	9500 B1	9519 C3	9537 E1
52 D1	1509 E2	2228 A1	2352 C7	2559 E3	3264 B1	3364 A6	5502 D6	6229 B2	6249 A3	6551 B1	7391 C5	9210 B5	9227 B5	9245 A7	9501 B1	9520 D3	9538 E1
53 D1	1510 E1	2229 A2	2353 A6	2560 D3	3265 A1	3365 B6	5503 B6	6230 A1	6250 A3	6552 A7	7401 C2	9211 B1	9228 B5	9246 D6	9502 B2	9521 D3	9539 E1
55 D2	1511 E1	2243 B5	2354 B6	2570 C3	3266 A1	3366 B6	5504 B6	6231 B1	6251 A3	7240 A1	7503 E2	9212 B5	9229 C5	9247 E6	9504 B2	9522 D3	9540 D2
56 E6	1560 D6	2245 A5	2356 B6	2573 A7	3268 A1	3373 A7	5505 C6	6232 B4	6255 C1	7241 A6	7504 D2	9213 B5	9230 A5	9248 D4	9505 C1	9523 D3	9541 E3
65 A4	1561 D6	2323 E6	2357 D6	2574 A7	3269 B1	3381 B7	5506 C6	6233 B4	6321 B6	7242 A6	7505 D3	9214 C1	9231 A5	9249 E4	9506 C1	9524 B2	9546 D4
1200 A4	1562 D6	2324 D6	2405 B1	2577 D3	3278 A4	3411 C2	5507 C5	6235 A6	6322 C6	7243 A6	7506 D3	9215 A7	9232 B5	9250 C4	9508 C1	9526 C5	9548 D4
1201 A4	1563 D6	2333 E6	2504 D4	2578 D2	3279 A4	3412 C2	5508 B6	6236 A6	6323 B6	7244 A6	7507 D3	9216 B4	9233 B5	9251 B4	9509 C1	9527 D1	9549 D4
1206 A3	1566 B7	2334 D6	2505 C4	2579 B1	3280 A4	3413 C2	5509 C1	6237 A7	6324 C6	7245 A6	7508 D3	9217 B4	9234 A6	9252 A5	9510 D3	9528 D1	9550 D5
1207 A3	1567 B7	2337 B5	2506 C3	2580 D4	3355 D7	3500 D2	6220 A2	6240 A3	6325 B6	7246 A6	9200 A1	9218 B4	9235 B6	9253 B5	9511 C2	9529 D1	9551 E5
1208 A1	2220 A2	2338 C5	2507 C2	2581 B2	3356 D7	3542 B2	6221 B2	6241 A2	6326 A6	7247 A5	9201 A2	9219 E2	9237 B7	9254 B6	9512 C2	9530 D1	9552 D6
1210 A2	2221 B2	2339 D6	2508 D3	2590 C4	3357 D7	3572 C3	6222 A2	6242 A2	6327 A6	7248 A5	9202 A2	9220 C1	9238 B7	9255 B6	9513 C2	9531 D1	9560 B2
1222 A2	2222 B4	2342 C1	2509 E3	3246 A5	3358 D7	3573 D3	6223 A2	6243 A2	6328 B5	7249 A1	9203 A3	9221 A4	9239 B7	9256 B5	9514 C2	9532 D1	9561 C1
1322 E7	2223 B3	2347 C7	2536 C3	3248 A5	3359 D7	3601 C1	6224 A3	6244 A3	6329 A6	7250 A5	9204 B2	9222 B4	9240 C7	9257 B2	9515 C2	9533 D1	
1323 C7	2224 B3	2348 C7	2549 E5	3250 A5	3360 D7	3602 D2	6225 A3	6245 A3	6330 B2	7252 A4	9206 A3	9223 B4	9241 C7	9258 A1	9516 C2	9534 D1	
1325 B7	2225 C4	2349 B7	2550 D6	3256 B3	3361 A7	3614 D3	6226 A3	6246 A4	6502 C2	7255 A4	9207 A4	9224 B4	9242 D7	9260 C6	9517 C2	9535 D2	
1507 A7	2226 A6	2350 C6	2551 E2	3257 B3	3362 A7	3615 E3	6227 A3	6247 A4	6549 E5	7329 A5	9208 A4	9225 A5	9243 D7	9307 C7	9518 C3	9536 E1	



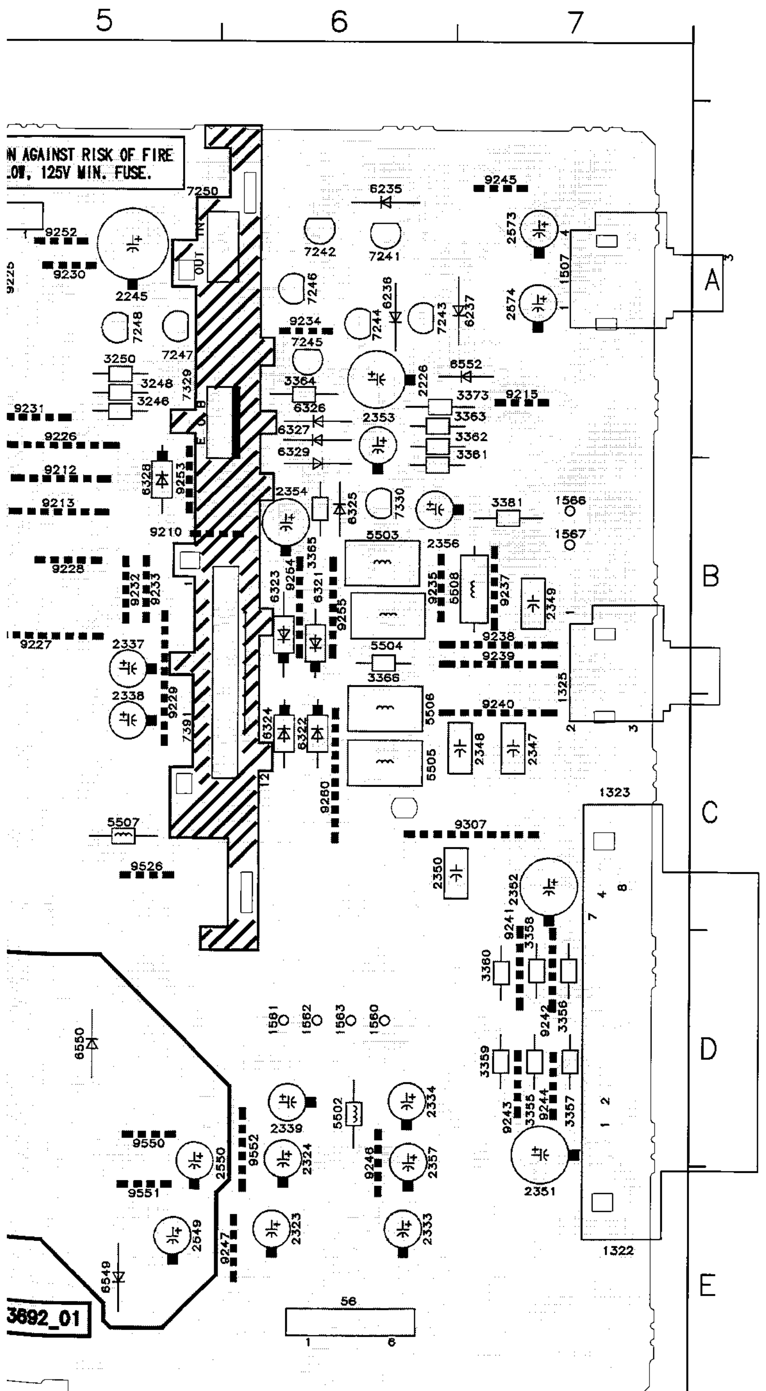
This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

CHIP LAYOUT - MAIN PART

2230 A2	2364 A1	2523 E4	2548 D3	2587 E3	3253 A2	3331 E2	3367 B2	3405 C7	35										
2321 E2	2365 A1	2524 D4	2553 D7	2588 E5	3254 A2	3332 E2	3368 B1	3406 C7	35										
2322 E2	2366 D3	2525 E4	2554 D7	2589 E5	3255 A2	3333 E2	3369 C2	3407 C7	35										
2327 E2	2367 E3	2526 D4	2555 C7	2591 D5	3259 A2	3334 D2	3370 B1	3409 B7	35										
2328 D2	2400 C6	2527 E4	2556 C7	2592 D5	3260 A2	3335 E2	3371 B1	3410 B7	35										
2329 E2	2401 C6	2528 D4	2557 E7	2594 D5	3261 A2	3336 D2	3372 D2	3501 D5	35										
2330 D2	2402 C6	2529 E4	2558 E7	2595 D6	3263 A2	3337 E2	3378 B7	3502 D5	35										
2331 E2	2403 B6	2530 D6	2561 E7	2596 D6	3271 A2	3338 D2	3379 D2	3503 E4	35										
2332 D2	2501 E6	2531 D5	2562 C5	2597 B1	3272 A2	3339 E2	3380 D2	3504 D4	35										
2335 E2	2502 D6	2532 D4	2563 E7	3209 A3	3273 A2	3340 E2	3382 B2	3505 E4	35										
2336 E2	2503 D3	2533 E4	2564 A1	3210 A3	3274 A4	3341 E2	3383 B1	3506 D4	35										
2340 B3	2510 D5	2534 D3	2565 A1	3211 A2	3275 A4	3342 E2	3384 B1	3507 E4	35										
2341 B3	2511 D5	2535 E3	2566 A1	3212 A2	3276 A4	3343 B3	3385 B1	3508 D4	35										
2343 B3	2512 D5	2537 E3	2567 D4	3213 A2	3277 A4	3344 C3	3386 B1	3509 E4	35										
2344 C3	2513 D5	2538 D3	2568 B7	3214 A3	3281 A4	3345 B3	3387 B6	3510 D4	35										
2345 B2	2514 D5	2539 E3	2569 B7	3215 A3	3282 A4	3346 C3	3388 B6	3511 E4	35										
2346 C2	2515 E5	2540 D3	2572 A1	3242 A3	3283 A4	3347 B2	3390 E6	3512 D4	35										
2355 B2	2516 D5	2541 E3	2575 E4	3243 A3	3321 E3	3348 C2	3391 E5	3513 E4	35										
2358 B2	2517 E5	2542 D3	2576 D4	3244 A2	3322 D3	3349 B2	3392 D5	3514 D4	35										
2359 C2	2518 D4	2543 E3	2582 D5	3245 A2	3325 E2	3350 C2	3400 C7	3515 E4	35										
2360 A3	2519 E4	2544 D3	2583 E5	3247 A3	3326 E2	3351 B2	3401 B7	3516 D4	35										
2361 D7	2520 D4	2545 E3	2584 D4	3249 A3	3328 D4	3352 C2	3402 B6	3517 D6	35										
2362 B6	2521 E4	2546 D3	2585 E4	3251 B7	3329 E2	3353 B2	3403 B7	3518 D4	35										
2363 B6	2522 D4	2547 E3	2586 D3	3252 A2	3330 D2	3354 C2	3404 B6	3519 E4	35										

This assembly drawing shows a summary of all possible versions. For components used in a specific

D5	7330 B6	9209 B4	9226 A5	9244 D7	9500 B1	9519 C3	9537 E1
B1	7391 C5	9210 B5	9227 B5	9245 A7	9501 B1	9520 D3	9538 E1
A7	7401 C2	9211 B1	9228 B5	9246 D6	9502 B2	9521 D3	9539 E1
A1	7503 E2	9212 B5	9229 C5	9247 E6	9504 B2	9522 D3	9540 D2
A6	7504 D2	9213 B5	9230 A5	9248 D4	9505 C1	9523 D3	9541 E3
A6	7505 D3	9214 C1	9231 A5	9249 E4	9506 C1	9524 B2	9546 D4
A6	7506 D3	9215 A7	9232 B5	9250 C4	9508 C1	9526 C5	9548 D4
A6	7507 D3	9216 B4	9233 B5	9251 B4	9509 C1	9527 D1	9549 D4
A6	7508 D3	9217 B4	9234 A6	9252 A5	9510 D3	9528 D1	9550 D5
A6	9200 A1	9218 B4	9235 B6	9253 B5	9511 C2	9529 D1	9551 E5
A5	9201 A2	9219 E2	9237 B7	9254 B6	9512 C2	9530 D1	9552 D6
A5	9202 A2	9220 C1	9238 B7	9255 B6	9513 C2	9531 D1	9560 B2
A1	9203 A3	9221 A4	9239 B7	9256 B2	9514 C2	9532 D1	9561 C1
A5	9204 B2	9222 B4	9240 C7	9257 B2	9515 C2	9533 D1	
A4	9206 A3	9223 B4	9241 C7	9258 A1	9516 C2	9534 D1	
A4	9207 A4	9224 B4	9242 D7	9260 C6	9517 C2	9535 D2	
A5	9208 A4	9225 A5	9243 D7	9307 C7	9518 C3	9536 E1	



chematic diagram and respective parts list.

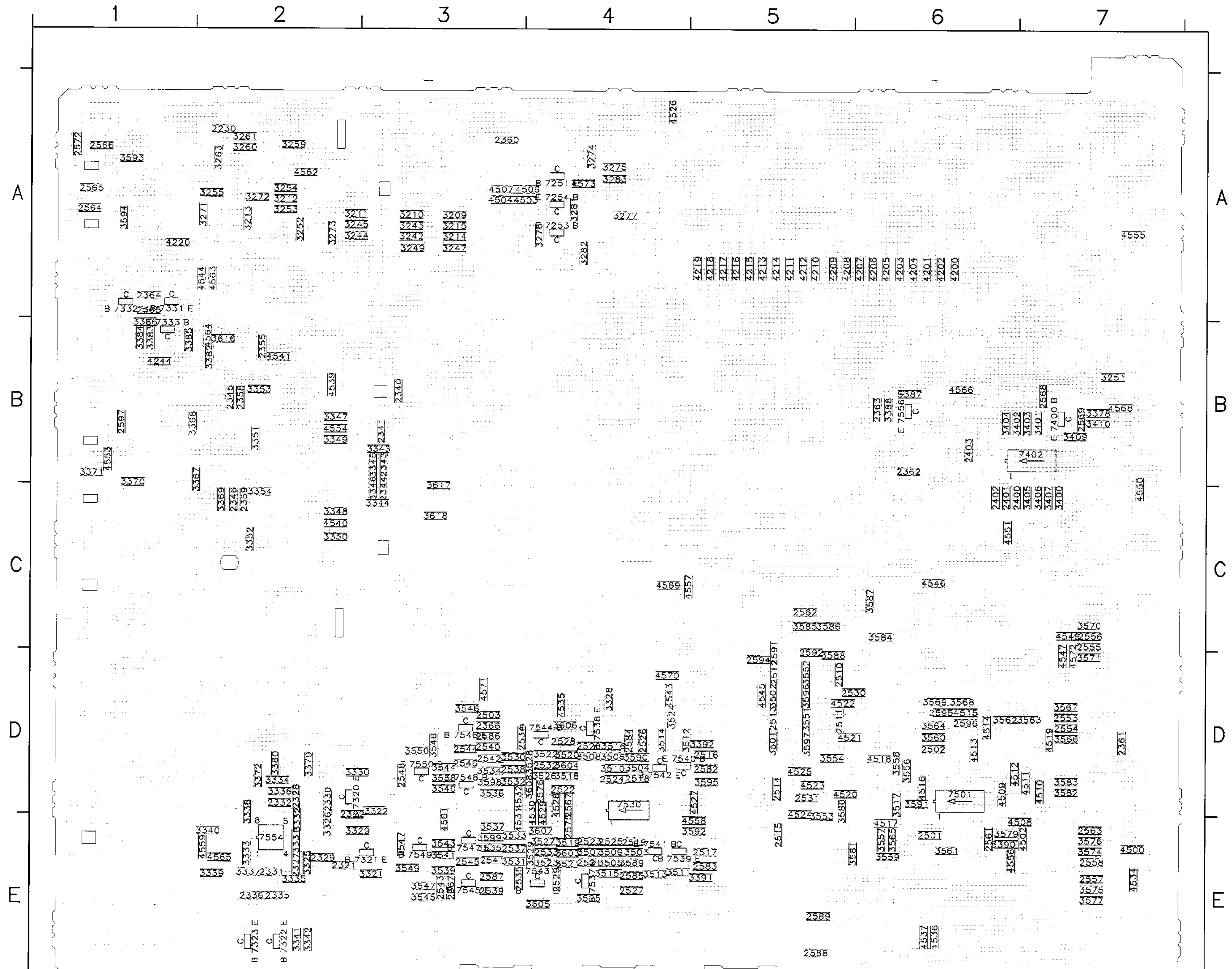
11-2

CHIP LAYOUT - MAIN PART

2230 A2	2364 A1	2523 E4	2548 D3	2587 E3	3253 A2
2321 E2	2365 A1	2524 D4	2553 D7	2588 E5	3254 A2
2322 E2	2366 D3	2525 E4	2554 D7	2589 E5	3255 A2
2327 E2	2367 E3	2526 D4	2555 C7	2591 D5	3259 A2
2328 D2	2400 C6	2527 E4	2556 C7	2592 D5	3260 A2
2329 E2	2401 C6	2528 D4	2557 E7	2594 D5	3261 A2
2330 D2	2402 C6	2529 E4	2558 E7	2595 D6	3263 A2
2331 E2	2403 B6	2530 D6	2561 E6	2596 D6	3271 A2
2332 D2	2501 E6	2531 D5	2562 C5	2597 B1	3272 A2
2335 E2	2502 D6	2532 D4	2563 E7	3209 A3	3273 A2
2336 E2	2503 D3	2533 E4	2564 A1	3210 A3	3274 A4
2340 B3	2510 D5	2534 D3	2565 A1	3211 A2	3275 A4
2341 B3	2511 D5	2535 E3	2566 A1	3212 A2	3276 A4
2343 B3	2512 D5	2537 E3	2567 D4	3213 A2	3277 A4
2344 C3	2513 D5	2538 D3	2568 B7	3214 A3	3281 A4
2345 B2	2514 D5	2539 E3	2569 B7	3215 A3	3282 A4
2346 C2	2515 E5	2540 D3	2572 A1	3242 A3	3283 A4
2355 B2	2516 D5	2541 E3	2575 E4	3243 A3	3321 E3
2358 B2	2517 E5	2542 D3	2576 D4	3244 A2	3322 D3
2359 C2	2518 D4	2543 E3	2582 D5	3245 A2	3325 E2
2360 A3	2519 E4	2544 D3	2583 E5	3247 A3	3326 E2
2361 D7	2520 D4	2545 E3	2584 D4	3249 A3	3328 D4
2362 B6	2521 E4	2546 D3	2585 E4	3251 B7	3329 E2
2363 B6	2522 D4	2547 E3	2586 D3	3252 A2	3330 D2

3331 E2	3367 B2	3405 C7	3520 D4	3545 E3	3570 C7
3332 E2	3368 B1	3406 C7	3521 E4	3546 D3	3571 D7
3333 E2	3369 C2	3407 C7	3522 D4	3547 E3	3574 E7
3334 D2	3370 B1	3409 B7	3523 E4	3548 D3	3575 E7
3335 E2	3371 B1	3410 B7	3524 D4	3549 E3	3576 E7
3336 D2	3372 D2	3501 D5	3525 E4	3550 D3	3577 E7
3337 E2	3378 B7	3502 D5	3526 D4	3551 D5	3579 E6
3338 D2	3379 D2	3503 E4	3527 E4	3552 D5	3580 D5
3339 E2	3380 D2	3504 D4	3528 D4	3553 E5	3581 E6
3340 E2	3382 B2	3505 E4	3529 E4	3554 D5	3582 D7
3341 E2	3383 B1	3506 D4	3530 D3	3556 D6	3583 D7
3342 E2	3384 B1	3507 E4	3531 E3	3557 E6	3584 C6
3343 B3	3385 B1	3508 D4	3532 D3	3558 D6	3585 C5
3344 C3	3386 B1	3509 E4	3533 E3	3559 E6	3586 C5
3345 B3	3387 B6	3510 D4	3534 D3	3560 D6	3587 C6
3346 C3	3388 B6	3511 E4	3535 E3	3561 E6	3588 D5
3347 B2	3390 E6	3512 D4	3536 D3	3562 D6	3589 E4
3348 C2	3391 E5	3513 E4	3537 E3	3563 D7	3590 D4
3349 B2	3392 D5	3514 D4	3538 D3	3564 D6	3591 D6
3350 C2	3400 C7	3515 E4	3539 E3	3565 E6	3592 E5
3351 B2	3401 B7	3516 D4	3540 D3	3566 D7	3593 A1
3352 C2	3402 B6	3517 D6	3541 E3	3567 D7	3594 A1
3353 B2	3403 B7	3518 D4	3543 E3	3568 D6	3595 D5
3354 C2	3404 B6	3519 E4	3544 D3	3569 D6	3596 D5

3597 D5	4212 A5	4516 D6	4543 D4	4571 D3	7544 D4
3598 D3	4213 A5	4517 E6	4544 A2	4572 D7	7545 E3
3599 E3	4214 A5	4518 D6	4545 D5	4573 A4	7546 D3
3603 E4	4215 A5	4519 D7	4546 C6	7251 A4	7547 E3
3604 D4	4216 A5	4520 D5	4547 D7	7253 A4	7548 D3
3605 E4	4217 A5	4521 D5	4549 C7	7254 A4	7549 E3
3606 D4	4218 A5	4522 D5	4550 C7	7320 D2	7550 D3
3607 E4	4219 A5	4523 D5	4551 C6	7321 E3	7554 E2
3608 D4	4220 A1	4524 D5	4553 B1	7322 E2	7556 B6
3616 B2	4244 B1	4525 D5	4554 B2	7323 E2	
3617 C3	4500 E7	4526 A4	4555 A7	7331 A1	
3618 C3	4502 E7	4527 D5	4556 E6	7332 A1	
4200 A6	4503 A4	4528 D4	4557 C5	7333 B1	
4201 A6	4504 A3	4529 D4	4558 E5	7400 B7	
4202 A6	4506 A4	4530 D4	4559 E2	7402 B7	
4203 A6	4507 A3	4531 E3	4561 E3	7501 D6	
4204 A6	4508 E7	4532 D3	4562 A2	7530 D4	
4205 A6	4509 D6	4534 E7	4563 A2	7537 E4	
4206 A6	4510 D7	4535 D4	4564 B2	7538 D4	
4207 A6	4511 D7	4536 E6	4565 E2	7539 E4	
4208 A5	4512 D6	4537 E6	4566 B6	7540 D4	
4209 A5	4513 D6	4539 B2	4568 B7	7541 E4	
4210 A5	4514 D6	4540 C2	4569 C4	7542 D4	
4211 A5	4515 D6	4541 B2	4570 D4	7543 E4	



This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

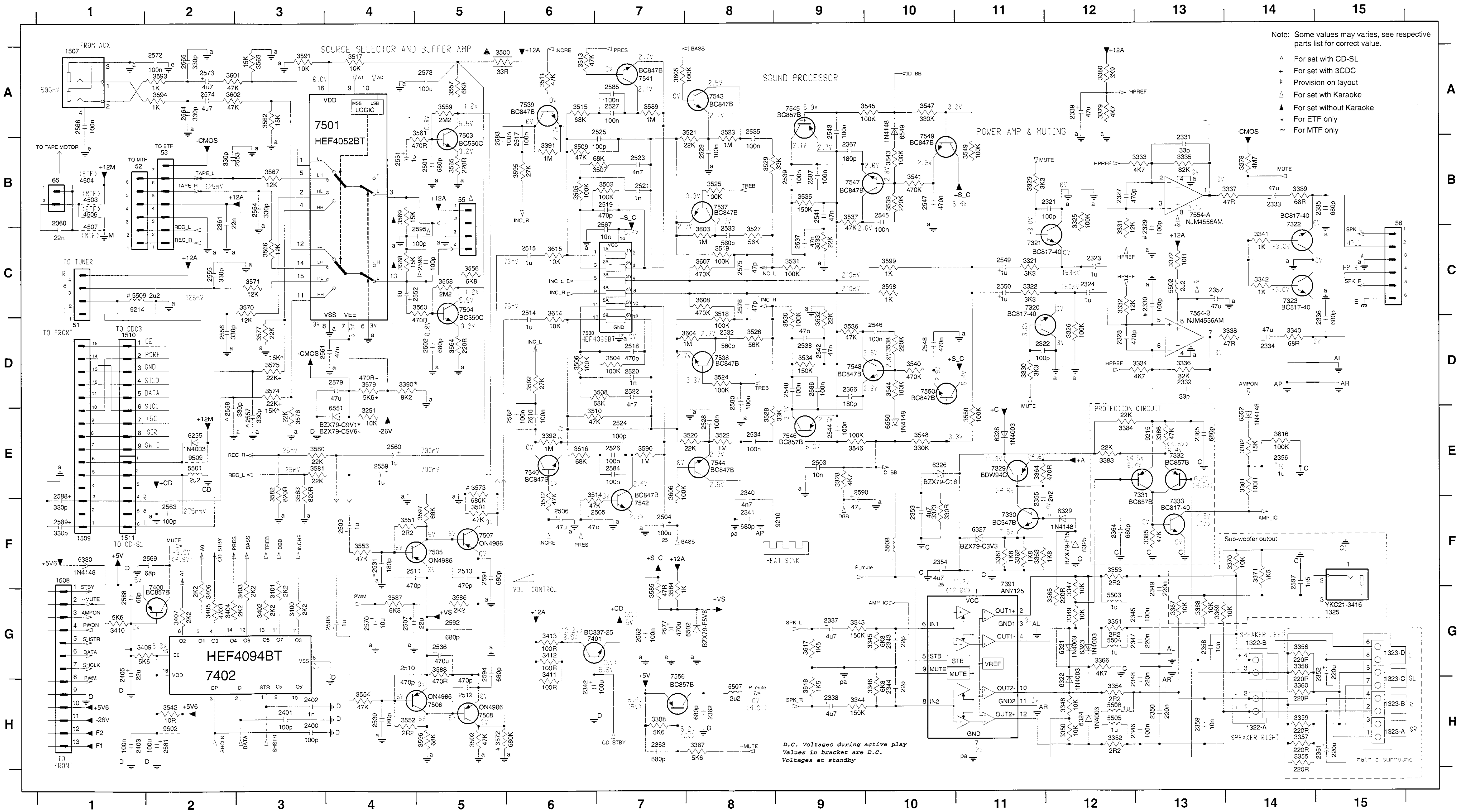
11-3

CIRCUIT DIAGRAM - SOURCE SELECT & AMPLIFIER PART

51 D1	1509 F1	2335 B15	2350 H13	2365 E13	2508 G4	2523 B7	2538 D9	2553 B2	2568 G1
52 B1	1510 D1	2336 D15	2351 H15	2366 D9	2509 F4	2524 E7	2539 B9	2554 B3	2569 F2
53 B2	1511 F1	2337 G9	2352 G15	2367 B9	2510 G4	2525 A7	2540 D9	2555 C2	2570 G4
55 B5	2321 B12	2338 H9	2353 F10	2400 H3	2511 F4	2526 E7	2541 B9	2556 D2	2572 A2
56 C15	2322 D11	2339 A12	2354 F10	2401 H3	2512 H5	2527 A7	2542 D9	2557 E3	2573 A2
65 B1	2323 C12	2340 E8	2355 F11	2402 H3	2513 F5	2528 E8	2543 A9	2558 E2	2574 A2
1322-A H14	2324 C12	2341 F8	2356 E14	2403 H1	2514 C6	2529 B8	2544 E9	2559 E4	2575 C8
1322-B G14	2327 B12	2342 H6	2357 C13	2405 G1	2515 C6	2530 H4	2545 B10	2560 E4	2576 C8
1323-A H15	2328 D12	2343 G10	2358 G13	2501 B5	2516 E6	2531 F4	2546 D10	2561 D3	2577 G7
1323-B H15	2329 C13	2344 H10	2359 H13	2502 D5	2517 B6	2532 D8	2547 B10	2562 G7	2578 A5
1323-C G15	2330 C13	2345 G12	2360 B1	2503 E9	2518 D7	2533 C8	2548 D10	2563 F2	2579 D4
1323-D G15	2331 B13	2346 H12	2361 B2	2504 F7	2519 B7	2534 E8	2549 C11	2564 A2	2580 D8
1325 G15	2332 D13	2347 G12	2362 H8	2505 F7	2520 D7	2535 A8	2550 C11	2565 A2	2581 H2
1507 A1	2333 B14	2348 H12	2363 H7	2506 F6	2521 B7	2536 G5	2551 B4	2566 A1	2582 E6
1508 F1	2334 D14	2349 G13	2364 F12	2507 G4	2522 D7	2537 C9	2552 C4	2567 B7	2583 B5

2584 E7	3322 C11	3340 D14	3355 H14	3370 F14	3390 D4	3413 G6	3514 E6	3529 B8	3544 D10
2585 A7	3325 B12	3341 C14	3356 G14	3371 F14	3391 B6	3500 A5	3515 A6	3530 D9	3545 A10
2586 D9	3326 D12	3342 C14	3357 H14	3372 C13	3392 E6	3501 F5	3516 E6	3531 C9	3546 E9
2587 B9	3328 E9	3343 G9	3358 G14	3373 F10	3400 G3	3502 H5	3517 A4	3532 D9	3547 A10
2588 E1	3329 B11	3344 H9	3359 H14	3378 B14	3401 G3	3503 B7	3518 C8	3533 C9	3548 E10
2589 F1	3330 D11	3345 G10	3360 H14	3379 A12	3402 G3	3504 D7	3519 C8	3534 D9	3549 B11
2590 E9	3331 C12	3346 H10	3361 F11	3380 A12	3403 G3	3505 B6	3520 E8	3535 B9	3550 E11
2591 F5	3332 C12	3347 G12	3362 F11	3381 E14	3404 G2	3506 D6	3521 A8	3536 D9	3551 F4
2592 G5	3333 B13	3348 H12	3363 F11	3382 E14	3405 G2	3507 B7	3522 E8	3537 B9	3552 H4
2594 G5	3334 D13	3349 G12	3364 E11	3383 E12	3406 G2	3508 D7	3523 A8	3538 D10	3553 F4
2595 C5	3335 B13	3350 H12	3365 G12	3384 E12	3407 G2	3509 B6	3524 D8	3539 B10	3554 H4
2596 C5	3336 D13	3351 G12	3366 G12	3385 F13	3409 G1	3510 E6	3525 B8	3540 D10	3556 C5
2597 F14	3337 B14	3352 H12	3367 G13	3386 E13	3410 G1	3511 A6	3526 D8	3541 B10	3557 A5
3251 E4	3338 D14	3353 F12	3368 G13	3387 H8	3411 G6	3512 F6	3527 C8	3542 H2	3558 C5
3321 C11	3339 B14	3354 H12	3369 G13	3388 H7	3412 G6	3513 A6	3528 E8	3543 B10	3559 A5

3560 C5	3575 D3	3591 A3	3607 C8	5505 H12	6330 F1	7391 F11	7540 E6	9214 C1
3561 A5	3576 E3	3592 D6	3608 C8	5506 H12	6502 G8	7400 F1	7541 A7	9215 E13
3562 A3	3577 D3	3593 A2	3614 C6	5507 H8	6549 A10	7401 G6	7542 F7	9502 H2
3563 A3	3579 D4	3594 A2	3615 C6	5508 F10	6550 E10	7402 H2	7543 A8	9509 E2
3564 D5	3580 E3	3595 B6	3616 E14	5509 C1	6551 E4	7501 A3	7544 E8	
3565 B5	3581 E3	3596 H5	3617 G9	6255 E2	6552 E14	7503 B5	7545 A9	
3566 C3	3582 E3	3597 F5	3618 H9	6321 G12	7320 C11	7504 C5	7546 E9	
3567 B3	3583 E3	3598 C10	4503 B1	6322 H12	7321 C11	7505 F5	7547 B9	
3568 C4	3584 G7	3599 C10	4504 B1	6323 G12	7322 B14	7506 H5	7548 D9	
3569 B4	3585 G7	3601 A2	4506 B1	6324 H12	7323 C14	7507 F5	7549 A10	
3570 C3	3586 G5	3602 A2	4507 C1	6325 F12	7329 E11	7508 H5	7550 D10	
3571 C3	3587 G4	3603 C8	5501 E2	6326 E10	7330 F11	7530 C7	7554-A B13	
3572 H5	3588 G5	3604 D8	5502 C13	6327 F11	7331 E12	7537 B8	7554-B C13	
3573 E5	3589 A7	3605 A7	5503 G12	6328 E11	7332 E13	7538 D8	7556 G7	
3574 D3	3590 E7	3606 E7	5504 G12	6329 F12	7333 F13	7539 A6	9210 F9	

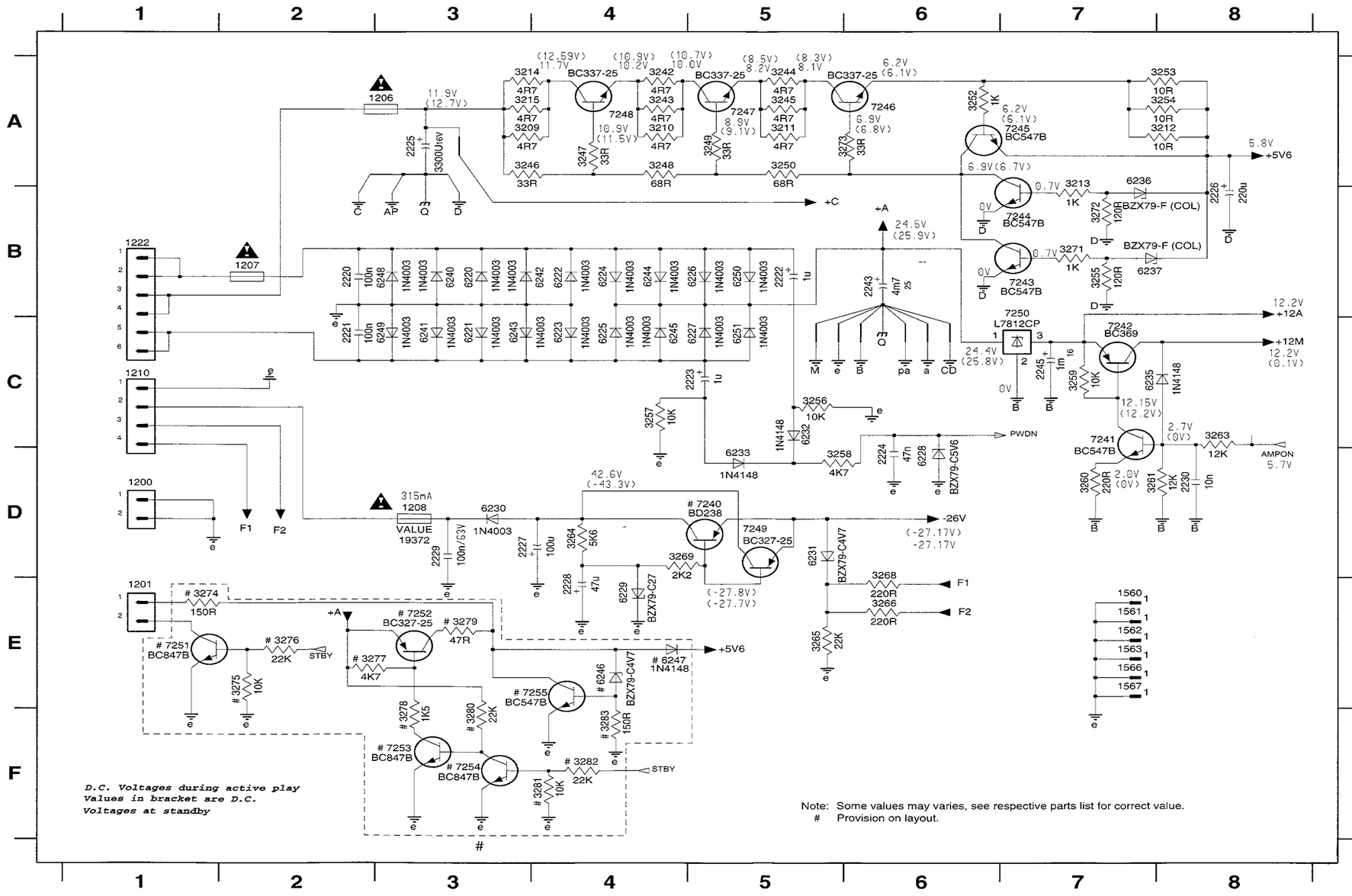


Note: Some values may varies, see respective parts list for correct value.

- ^ For set with CD-SL
- \+ For set with 3CDC
- \# Provision on layout
- △ For set wth Karaoke
- ▲ For set without Karaoke
- • For ETF only
- ~ For MTF only

11-4

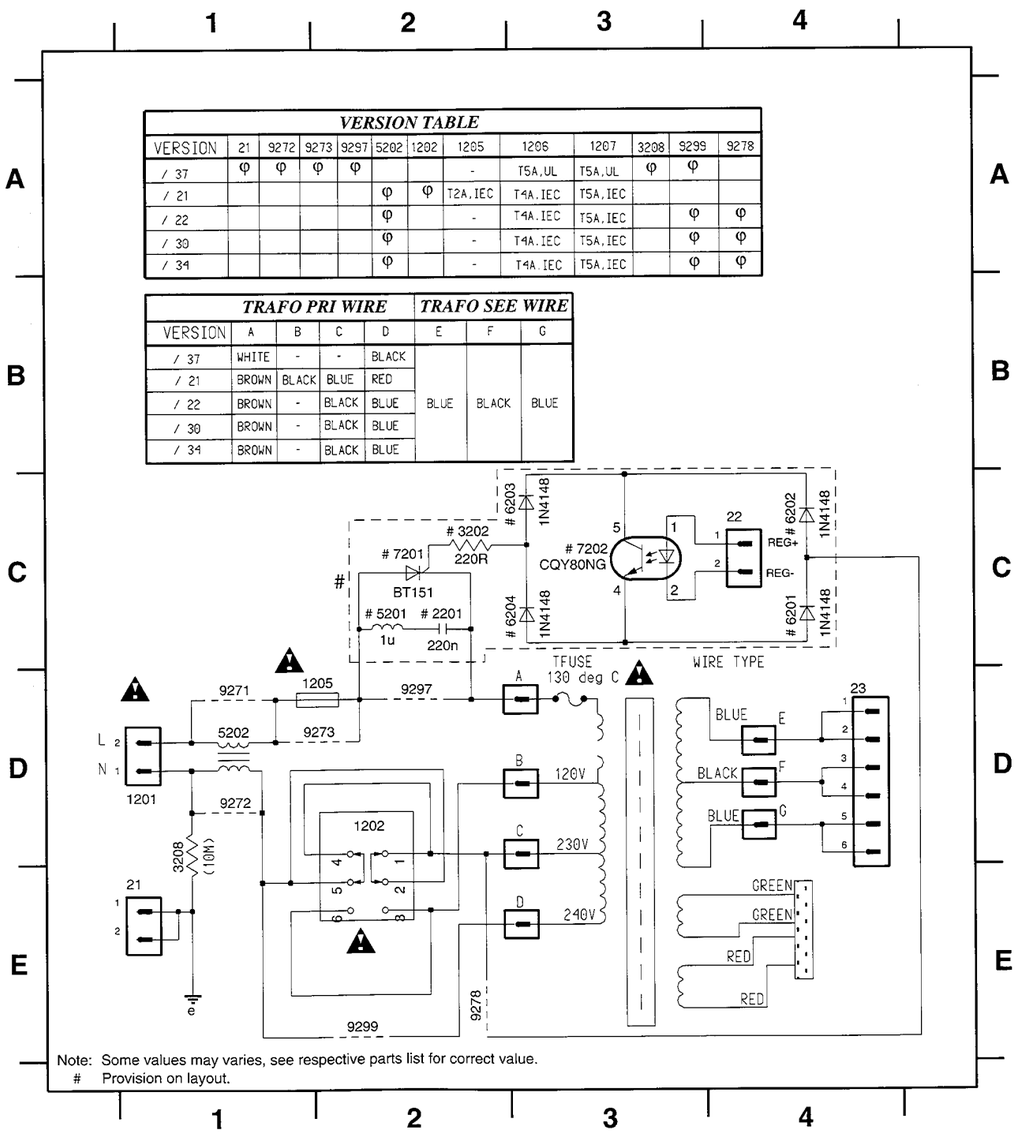
CIRCUIT DIAGRAM - POWER SUPPLY PART



1200	D1	6222	B4
1201	E1	6223	C4
1206	A3	6224	B4
1207	B2	6225	C4
1208	D3	6226	B5
1210	C1	6227	C5
1222	B1	6228	D6
1560	E7	6229	E4
1561	E7	6230	D3
1562	E7	6231	D5
1563	E7	6232	C5
1566	E7	6233	D5
1567	E7	6235	C7
2220	B2	6236	A7
2221	C2	6237	B7
2222	B5	6240	B3
2223	C5	6241	C3
2224	D6	6242	B4
2225	A3	6243	C3
2226	B8	6244	B4
2227	D3	6245	C4
2228	E4	6246	E4
2229	D3	6247	E4
2230	D8	6248	B3
2243	B6	6249	C3
2245	C7	6250	B5
3209	A3	6251	C5
3210	A4	7240	D4
3211	A5	7241	C7
3212	A8	7242	C7
3213	A7	7243	B7
3214	A3	7244	B7
3215	A3	7245	A7
3242	A4	7246	A6
3243	A4	7247	A5
3244	A5	7248	A4
3245	A5	7249	D5
3246	A3	7250	B7
3247	A4	7251	E1
3248	A4	7252	E3
3249	A5	7253	F3
3250	A5	7254	F3
3252	A6	7255	E4
3253	A8		
3254	A8		
3255	B7		
3256	C5		
3257	C4		
3258	D5		
3259	C7		
3260	D7		
3261	D7		
3263	C8		
3264	D4		
3265	E5		
3266	E6		
3268	E6		
3269	D4		
3271	B7		
3272	B7		
3273	A6		
3274	E1		
3275	E2		
3276	E2		
3277	E2		
3278	F3		
3279	E3		
3280	F3		
3281	F4		
3282	F4		
3283	F4		
6220	B3		
6221	C3		

CIRCUIT DIAGRAM - TRANSFORMER PRIMARY PART

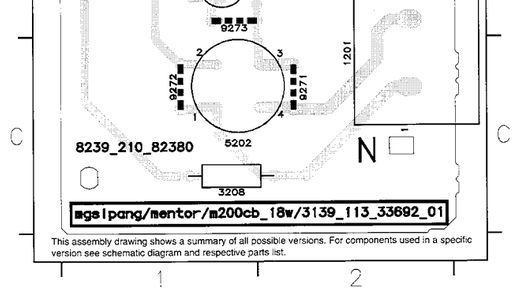
21 E1 22 C4 | 23 D4 1201 D1 | 1202 D2 1205 D2 | 2201 C2 3202 C2 | 3208 D1 5201 C2 | 5202 D1 6201 C4 | 6202 C4 6203 C3 | 6204 C3 7201 C2 | 7202 C3 9271 D1 | 9272 D1 9273 D2 | 9278 E2 9297 D2 | 9299 E2



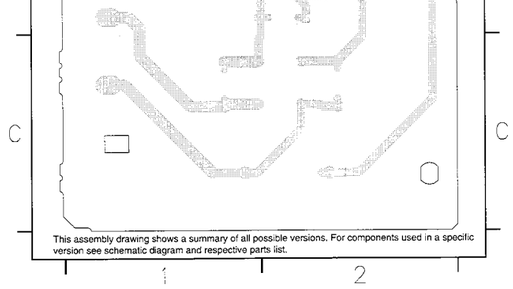
Note: Some values may varies, see respective parts list for correct value.
Provision on layout.

COMPONENT & CHIP LAYOUT - TRANSFORMER PRIMARY

21 B1 22 A1 23 A1 1201 C2 1202 A2 | 1205 B1 3208 C1 5000 B2 5002 B2 5003 A2 | 5004 A2 5005 A1 5006 A1 5007 A1 5201 A1 | 5202 C1 6201 A2 6202 A2 6203 A2 6204 A2 | 7201 A1 7202 A1 9271 C2 9272 C1 9273 B1 | 9275 A1 9276 A1 9278 A2 9297 B1 9299 A1

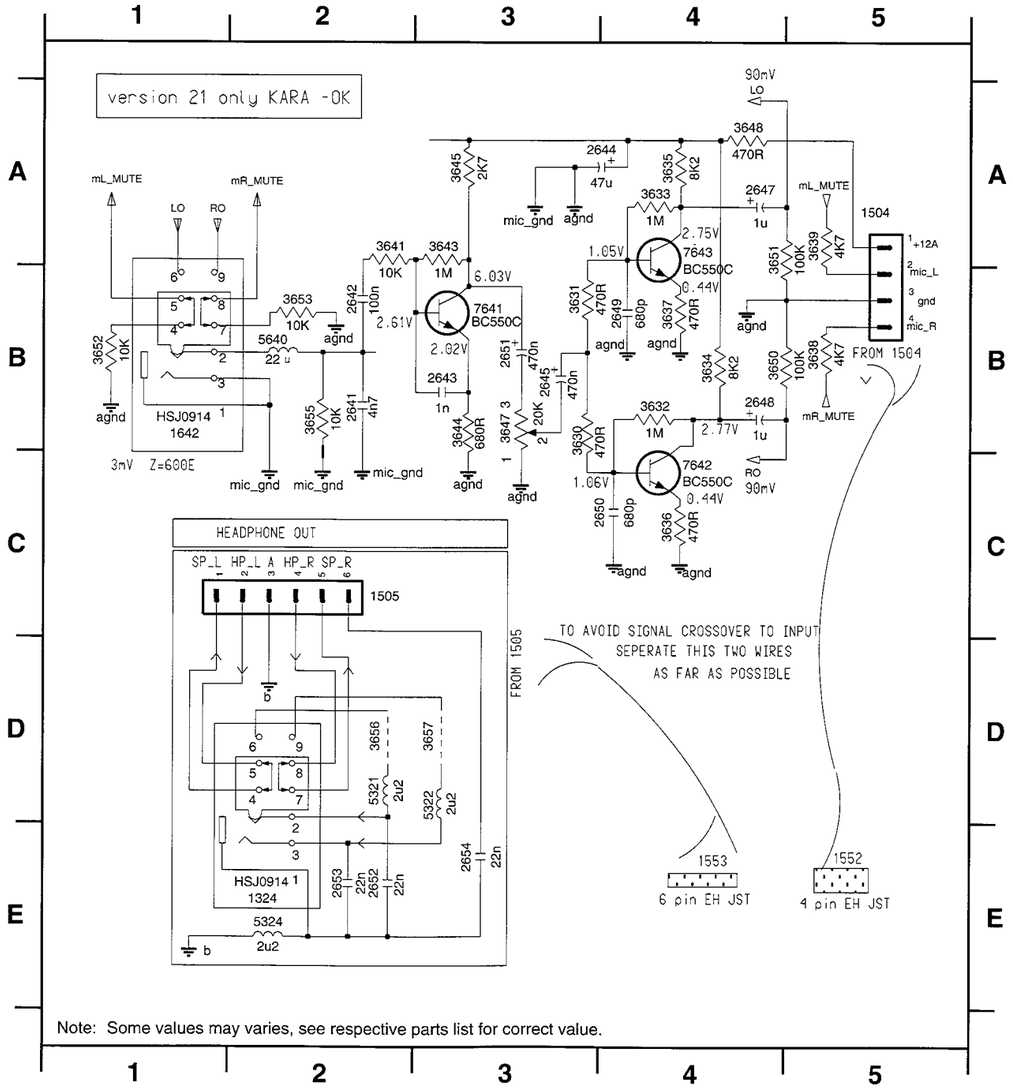


2201 A2 3202 A2



KARAOKE & HEADPHONE PART - CIRCUIT DIAGRAM

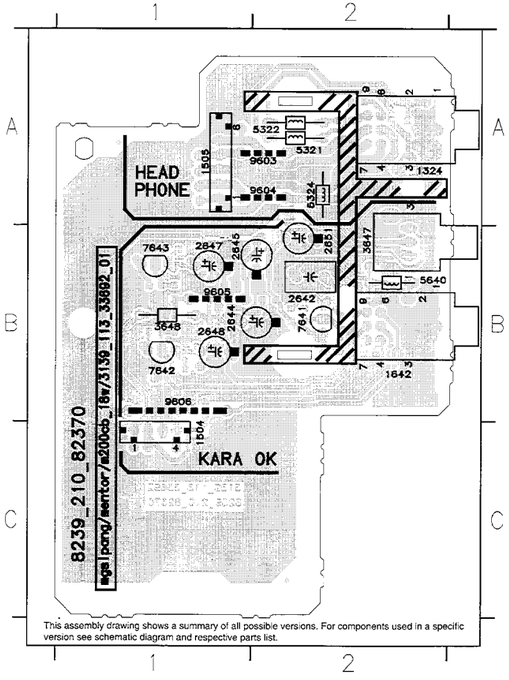
1324 E2	2641 B2	2645 B3	2650 C4	2654 E3	3633 A4	3637 B4	3643 A3	3648 A4	3653 B2	5321 D2	7641 B3
1504 A5	2642 B2	2647 A4	2651 B3	3630 B3	3634 B4	3638 B5	3644 B3	3650 B4	3655 B2	5322 D3	7642 C4
1505 C2	2643 B3	2648 B4	2652 E2	3631 B3	3635 A4	3639 A5	3645 A3	3651 A4	3656 D2	5324 E2	7643 A4
1642 B1	2644 A4	2649 B4	2653 E2	3632 B4	3636 C4	3641 A2	3647 B3	3652 B1	3657 D3	5640 B2	



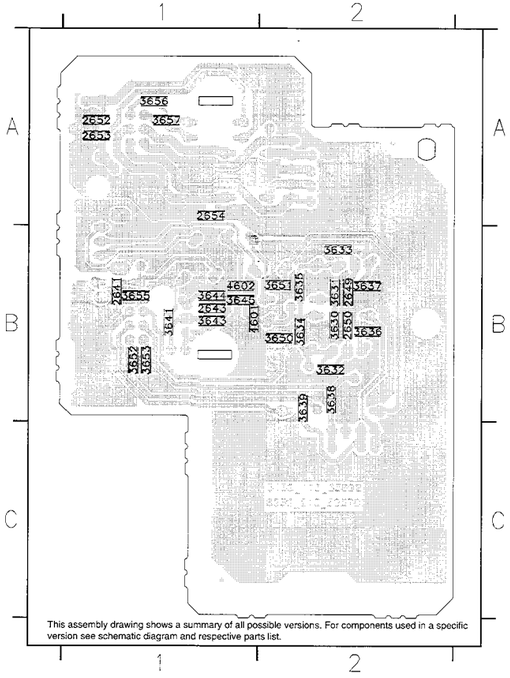
Note: Some values may varies, see respective parts list for correct value.

KARAOKE & HEADPHONE PART - COMPONENT & CHIP LAYOUT

1324 A2	2642 B2	2648 B1	5321 A2	7641 B2	9604 A2	
1504 C1	2644 B1	2651 B2	5322 A2	7642 B1	9605 B1	
1505 A1	2645 B1	3647 B2	5324 A2	7643 B1	9606 B1	
1642 B2	2647 B1	3648 B1	5640 B2	9603 A2		



2641 B1	2653 A1	3633 B2	3638 B2	3645 B1	3655 B1	
2643 B1	2654 A1	3634 B2	3639 B2	3650 B2	3656 A1	
2649 B2	3630 B2	3635 B2	3641 B1	3651 B2	3657 A1	
2650 B2	3631 B2	3636 B2	3643 B1	3652 B1	4601 B1	
2652 A1	3632 B2	3637 B2	3644 B1	3653 B1	4602 B1	

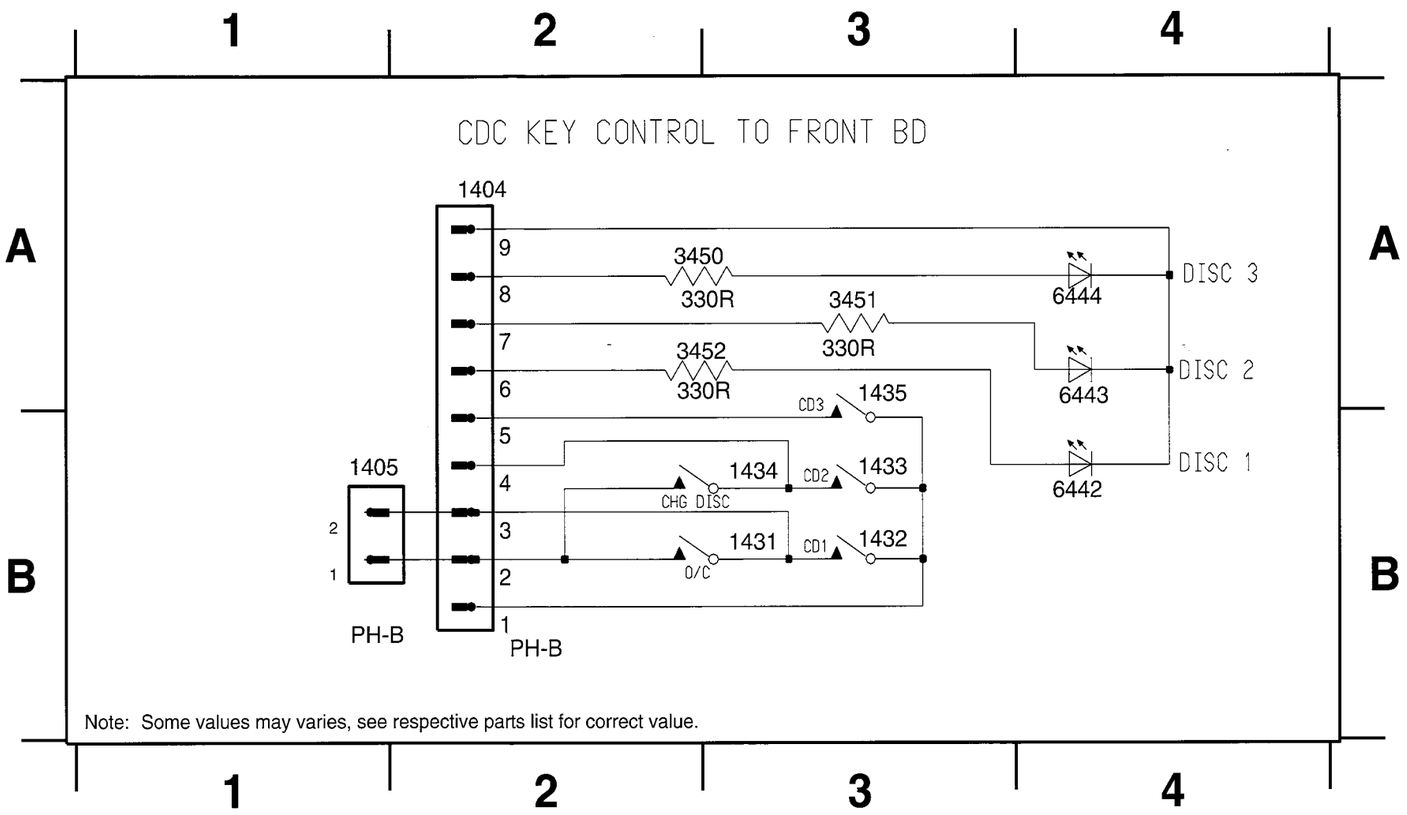


11-7

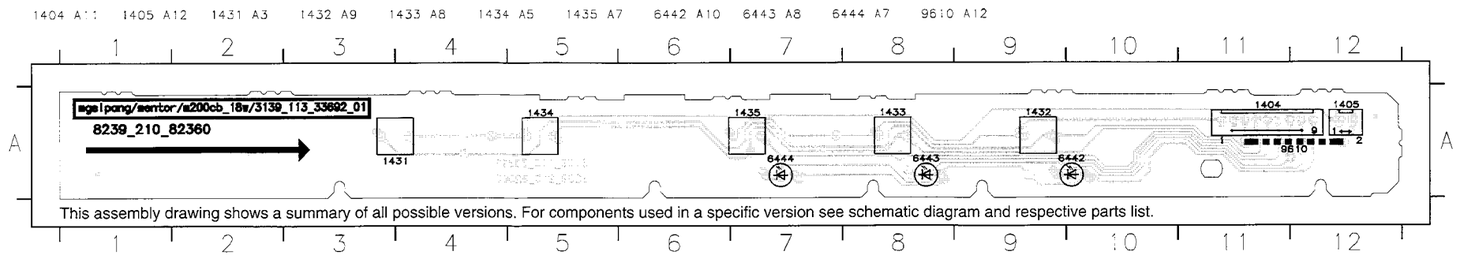
CDC KEY PART

1404 A2 1431 B3 1433 B3 1435 A3 3451 A3 6442 B4 6444 A4
1405 B1 1432 B3 1434 B3 3450 A2 3452 A2 6443 A4

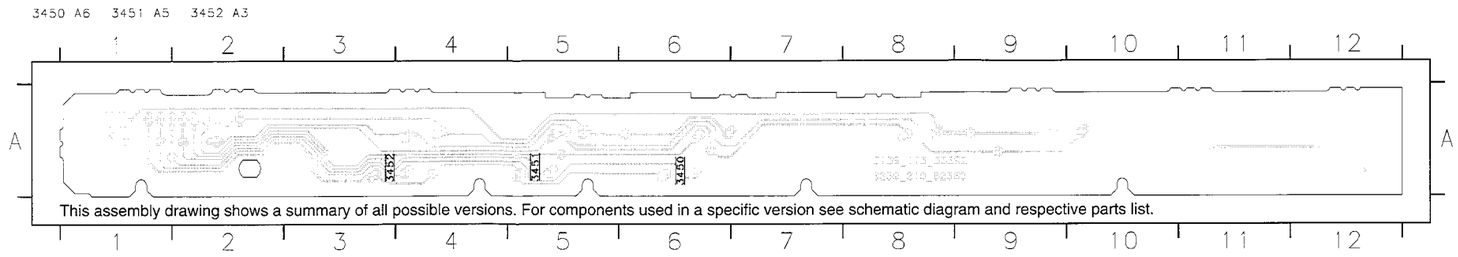
CIRCUIT DIAGRAM - CDC KEY PART



COMPONENT LAYOUT - CDC KEY



CHIP LAYOUT - CDC KEY



11-8

ELECTRICAL PARTS LIST - COMBI BOARD

ELECTRICAL PARTS LIST - COMBI BOARD

MISCELLANEOUS

1201	4822 265 31015	⚠	Mains Socket
1202	4822 272 10269	⚠	Voltage Selector /21/21M
1205	4822 071 52002	⚠	Fuse T2A 250V /21/21M
1206	4822 071 54002	⚠	Fuse T4A 250V
1207	4822 071 55002	⚠	Fuse T5A 250V
1208	4822 071 53151	⚠	Fuse T315mA 250V
1322	4822 267 31176		Loudspeaker Socket
1324	4822 267 40898		Headphone Socket
1431	4822 276 13114		Tact Switch
1507	4822 265 20553		Aux Socket
1508	4822 267 10738		Flex Socket 13 pins
1642	4822 267 40898		Mic-in Socket

CAPACITORS

2220	5322 121 42386	100nF 5% 63V
2221	5322 121 42386	100nF 5% 63V
2222	4822 124 40242	1µF 20% 63V
2223	4822 124 40242	1µF 20% 63V
2224	4822 121 43526	47nF 5% 250V
2225	4822 124 40784	3300µF 20% 16V
2226	4822 124 22263	220µF 20% 25V
2227	4822 124 40255	100µF 20% 63V
2228	4822 124 41751	47µF 20% 50V
2229	5322 121 42386	100nF 5% 63V
2230	4822 122 33177	10nF 20% 50V
2243	4822 124 80563	4700µF 20% 35V
2245	4822 123 14024	1000µF 20% 16V
2321	5322 122 32531	100pF 5% 50V
2322	5322 122 32531	100pF 5% 50V
2323	4822 124 40242	1µF 20% 63V
2324	4822 124 40242	1µF 20% 63V
2327	5322 122 34099	470pF 10% 63V
2328	5322 122 34099	470pF 10% 63V
2331	5322 122 32659	33pF 5% 50V
2332	5322 122 32659	33pF 5% 50V
2333	4822 124 40433	47µF 20% 25V
2334	4822 124 40433	47µF 20% 25V
2335	4822 122 32535	680pF 10% 63V
2336	4822 122 32535	680pF 10% 63V
2337	4822 124 40246	4,7µF 20% 63V
2338	4822 124 40246	4,7µF 20% 63V
2339	4822 124 40433	47µF 20% 25V
2340	5322 126 10223	4,7nF 10% 63V
2341	4822 122 32535	680pF 10% 63V
2342	4822 124 81029	100µF 20% 25V
2343	5322 122 32658	22pF 5% 50V
2344	5322 122 32658	22pF 5% 50V
2345	4822 126 14118	100nF +80/-20% 50V
2346	4822 126 14118	100nF +80/-20% 50V
2347	4822 121 42408	220nF 5% 63V
2348	4822 121 42408	220nF 5% 63V
2349	4822 121 42408	220nF 5% 63V
2350	4822 121 42408	220nF 5% 63V
2353	4822 124 40246	4,7µF 20% 63V
2354	4822 124 40246	4,7µF 20% 63V
2355	4822 122 33175	2,2nF 20% 50V
2356	4822 124 40242	1µF 20% 63V
2357	4822 124 40433	47µF 20% 25V
2358	4822 122 33177	10nF 20% 50V
2359	4822 122 33177	10nF 20% 50V
2360	5322 122 32654	22nF 10% 63V
2361	5322 122 32654	22nF 10% 63V
2362	4822 122 32535	680pF 10% 63V
2363	4822 122 32535	680pF 10% 63V
2364	4822 122 32535	680pF 10% 63V
2365	4822 122 32535	680pF 10% 63V
2366	4822 126 10326	180pF 5% 63V
2367	4822 126 10326	180pF 5% 63V
2400	5322 122 32531	100pF 5% 50V
2401	5322 122 32531	100pF 5% 50V
2402	5322 122 34123	1nF 10% 50V
2403	4822 126 14118	100nF +80/-20% 50V
2405	4822 124 81151	22µF 50V
2501	4822 122 32535	680pF 10% 63V
2502	4822 122 32535	680pF 10% 63V
2503	4822 122 33177	10nF 20% 50V
2504	4822 124 41584	100µF 20% 10V
2505	4822 124 40433	47µF 20% 25V
2506	4822 124 40433	47µF 20% 25V
2507	4822 124 81151	22µF 50V
2508	4822 124 40242	1µF 20% 63V
2509	4822 124 40242	1µF 20% 63V
2510	5322 122 34099	470pF 10% 63V
2511	5322 122 34099	470pF 10% 63V
2512	5322 122 34099	470pF 10% 63V
2513	5322 122 34099	470pF 10% 63V
2514	4822 126 13836	1µF 16V
2515	4822 126 13836	1µF 16V
2516	4822 126 13296	100nF 10% 16V
2517	4822 126 13296	100nF 10% 16V
2518	5322 122 34099	470pF 10% 63V
2519	5322 122 34099	470pF 10% 63V
2520	5322 122 34123	1nF 10% 50V
2521	5322 122 34123	1nF 10% 50V
2522	5322 126 10223	4,7nF 10% 63V
2523	5322 126 10223	4,7nF 10% 63V
2524	5322 122 32531	100pF 5% 50V
2525	5322 122 32531	100pF 5% 50V
2526	4822 126 13296	100nF 10% 16V
2527	4822 126 13296	100nF 10% 16V
2528	4822 126 13296	100nF 10% 16V
2529	4822 126 13296	100nF 10% 16V
2530	4822 126 10326	180pF 5% 63V
2531	4822 126 10326	180pF 5% 63V
2532	5322 116 80853	560pF 5% 63V
2533	5322 116 80853	560pF 5% 63V
2534	4822 126 13296	100nF 10% 16V
2535	4822 126 13296	100nF 10% 16V
2536	4822 124 80195	470µF 20% 10V
2537	4822 126 13751	47nF 10% 63V
2538	4822 126 13751	47nF 10% 63V
2539	4822 126 13296	100nF 10% 16V
2540	4822 126 13296	100nF 10% 16V
2541	4822 126 13751	47nF 10% 63V
2542	4822 126 13751	47nF 10% 63V
2543	4822 126 13296	100nF 10% 16V
2544	4822 126 13296	100nF 10% 16V
2545	4822 126 13296	100nF 10% 16V
2546	4822 126 13296	100nF 10% 16V
2547	4822 126 13869	470nF +80/-20% 16V
2548	4822 126 13869	470nF +80/-20% 16V
2549	4822 124 40242	1µF 20% 63V
2550	4822 124 40242	1µF 20% 63V
2551	4822 124 40242	1µF 20% 63V
2552	4822 124 40242	1µF 20% 63V
2553	4822 122 33805	330pF 10% 63V
2554	4822 122 33805	330pF 10% 63V
2555	4822 122 33805	330pF 10% 63V
2556	4822 122 33805	330pF 10% 63V
2557	4822 122 33805	330pF 10% 63V
2558	4822 122 33805	330pF 10% 63V
2559	4822 124 40242	1µF 20% 63V
2560	4822 124 40242	1µF 20% 63V
2561	4822 126 13751	47nF 10% 63V
2562	4822 126 14118	100nF +80/-20% 50V
2563	5322 122 32531	100pF 5% 50V
2564	4822 122 33805	330pF 10% 63V
2565	4822 122 33805	330pF 10% 63V
2566	4822 126 10002	100nF 20% 25V
2567	4822 122 33177	10nF 20% 50V
2568	4822 126 13694	68pF 1% 63V
2569	4822 126 13694	68pF 1% 63V
2570	4822 124 41579	10µF 20% 50V
2572	4822 126 10002	100nF 20% 25V
2573	4822 124 40246	4,7µF 20% 63V
2574	4822 124 40246	4,7µF 20% 63V
2575	4822 126 13692	47pF 1% 63V
2576	4822 126 13692	47pF 1% 63V
2577	4822 124 80195	470µF 20% 10V
2578	4822 124 81029	100µF 20% 25V
2579	4822 124 40433	47µF 20% 25V
2580	4822 124 41584	100µF 20% 10V
2581	4822 124 41584	100µF 20% 10V
2582	4822 126 13296	100nF 10% 16V
2583	4822 126 13296	100nF 10% 16V
2584	4822 126 13296	100nF 10% 16V
2585	4822 126 13296	100nF 10% 16V
2586	4822 126 13296	100nF 10% 16V
2587	4822 126 13296	100nF 10% 16V
2590	4822 124 40433	47µF 20% 25V
2591	4822 122 32535	680pF 10% 63V
2592	4822 122 32535	680pF 10% 63V
2594	4822 122 32535	680pF 10% 63V
2595	5322 122 32531	100pF 5% 50V
2596	5322 122 32531	100pF 5% 50V
2641	5322 126 10223	4,7nF 10% 63V
2642	5322 121 42386	100nF 5% 63V
2643	5322 122 34123	1nF 10% 50V
2644	4822 124 40433	47µF 20% 25V
2645	4822 124 41407	0,47µF 20% 63V
2647	4822 124 40242	1µF 20% 63V
2648	4822 124 40242	1µF 20% 63V
2649	4822 122 32535	680pF 10% 63V
2650	4822 122 32535	680pF 10% 63V
2651	4822 124 41407	0,47µF 20% 63V
2652	5322 122 32654	22nF 10% 63V
2653	5322 122 32654	22nF 10% 63V
2654	5322 122 32654	22nF 10% 63V

RESISTORS

3209	4822 051 20478	4R7 5% 0,1W
3210	4822 051 20478	4R7 5% 0,1W
3211	4822 051 20478	4R7 5% 0,1W
3212	4822 051 20109	10R 5% 0,1W
3213	4822 051 10102	1k 2% 0,25W
3214	4822 051 20478	4R7 5% 0,1W
3215	4822 051 20478	4R7 5% 0,1W
3242	4822 051 20478	4R7 5% 0,1W
3243	4822 051 20478	4R7 5% 0,1W
3244	4822 051 20478	4R7 5% 0,1W
3245	4822 051 20478	4R7 5% 0,1W
3246	4822 116 52191	33R 5% 0,5W
3247	4822 051 20339	33R 5% 0,1W
3248	4822 116 52199	68R 5% 0,5W
3249	4822 051 20339	33R 5% 0,1W
3250	4822 116 52199	68R 5% 0,5W
3251	4822 117 10833	10k 1% 0,1W
3252	4822 051 10102	1k 2% 0,25W
3253	4822 051 20109	10R 5% 0,1W
3254	4822 051 20109	10R 5% 0,1W
3255	4822 051 20121	120R 5% 0,1W
3256	4822 116 83864	10k 5% 0,5W
3257	4822 116 83864	10k 5% 0,5W
3258	4822 116 52283	4k7 5% 0,5W
3259	4822 117 10833	10k 1% 0,1W
3260	4822 117 11503	220R 1% 0.1W
3261	4822 117 11383	12k 1% 0,1W
3263	4822 117 11383	12k 1% 0,1W

ELECTRICAL PARTS LIST - COMBI BOARD

RESISTORS

3264	4822 116 52289	5k6 5% 0,5W
3265	4822 116 52257	22k 5% 0,5W
3266	4822 116 83872	220R 5% 0,5W
3268	4822 116 83872	220R 5% 0,5W
3269	4822 116 52256	2k2 5% 0,5W
3271	4822 051 10102	1k 2% 0,25W
3272	4822 051 20121	120R 5% 0,1W
3273	4822 051 20339	33R 5% 0,1W
3321	4822 051 20332	3k3 5% 0,1W
3322	4822 051 20332	3k3 5% 0,1W
3325	4822 051 20104	100k 5% 0,1W
3326	4822 051 20104	100k 5% 0,1W
3328	4822 051 20472	4k7 5% 0,1W
3329	4822 051 20332	3k3 5% 0,1W
3330	4822 051 20332	3k3 5% 0,1W
3331	4822 117 11383	12k 1% 0,1W
3332	4822 117 11383	12k 1% 0,1W
3333	4822 051 20472	4k7 5% 0,1W
3334	4822 051 20472	4k7 5% 0,1W
3335	4822 117 11149	82k 1% 0,1W
3336	4822 117 11149	82k 1% 0,1W
3337	4822 051 20479	47R 5% 0,1W
3338	4822 051 20479	47R 5% 0,1W
3339	4822 051 20689	68R 5% 0,1W
3340	4822 051 20689	68R 5% 0,1W
3341	4822 051 10102	1k 2% 0,25W
3342	4822 051 10102	1k 2% 0,25W
3343	4822 051 20154	150k 5% 0,1W
3344	4822 051 20154	150k 5% 0,1W
3345	4822 117 11507	6k8 1% 0,1W
3346	4822 117 11507	6k8 1% 0,1W
3347	4822 117 10833	10k 1% 0,1W
3348	4822 117 10833	10k 1% 0,1W
3349	4822 117 10833	10k 1% 0,1W
3350	4822 117 10833	10k 1% 0,1W
3351	4822 051 20228	2R2 5% 0,1W
3352	4822 051 20228	2R2 5% 0,1W
3353	4822 051 20228	2R2 5% 0,1W
3354	4822 051 20228	2R2 5% 0,1W
3361	4822 116 52249	1k8 5% 0,5W
3362	4822 116 52249	1k8 5% 0,5W
3363	4822 116 52249	1k8 5% 0,5W
3364	4822 116 83883	470R 5% 0,5W
3365	4822 116 83872	220R 5% 0,5W
3366	4822 116 52283	4k7 5% 0,5W
3367	4822 117 10833	10k 1% 0,1W
3368	4822 117 10833	10k 1% 0,1W
3372	4822 051 20109	10R 5% 0,1W
3373	4822 116 52219	330R 5% 0,5W
3378	4822 051 20475	4M7 5% 0,1W
3379	4822 051 20472	4k7 5% 0,1W
3380	4822 051 20392	3k9 5% 0,1W
3381	4822 116 52175	100R 5% 0,5W
3382	4822 051 20153	15k 5% 0,1W
3383	4822 051 20223	22k 5% 0,1W
3384	4822 051 20223	22k 5% 0,1W
3385	4822 117 10834	47k 1% 0,1W
3386	4822 117 10834	47k 1% 0,1W
3387	4822 051 20562	5k6 5% 0,1W
3388	4822 051 20562	5k6 5% 0,1W
3391	4822 051 20105	1M 5% 0,1W
3392	4822 051 20105	1M 5% 0,1W
3400	4822 117 11449	2k2 1% 0,1W
3401	4822 117 11449	2k2 1% 0,1W
3402	4822 117 11449	2k2 1% 0,1W
3403	4822 117 11449	2k2 1% 0,1W
3404	4822 117 11449	2k2 1% 0,1W
3405	4822 051 20471	470R 5% 0,1W
3406	4822 117 11449	2k2 1% 0,1W
3407	4822 117 11449	2k2 1% 0,1W
3409	4822 051 20562	5k6 5% 0,1W
3410	4822 051 20562	5k6 5% 0,1W
3411	4822 116 52175	100R 5% 0,5W
3412	4822 116 52175	100R 5% 0,5W
3413	4822 116 52175	100R 5% 0,5W
3500	4822 052 10339	⚠ 33R 5% 0,33W
3501	4822 117 10834	47k 1% 0,1W
3502	4822 117 10834	47k 1% 0,1W
3503	4822 051 20104	100k 5% 0,1W
3504	4822 051 20104	100k 5% 0,1W
3505	4822 051 20104	100k 5% 0,1W
3506	4822 051 20104	100k 5% 0,1W
3507	4822 051 20683	68k 5% 0,1W
3508	4822 051 20683	68k 5% 0,1W
3509	4822 117 10834	47k 1% 0,1W
3510	4822 117 10834	47k 1% 0,1W
3511	4822 117 10834	47k 1% 0,1W
3512	4822 117 10834	47k 1% 0,1W
3513	4822 117 10834	47k 1% 0,1W
3514	4822 117 10834	47k 1% 0,1W
3515	4822 051 20683	68k 5% 0,1W
3516	4822 051 20683	68k 5% 0,1W
3517	4822 117 10833	10k 1% 0,1W
3518	4822 051 20104	100k 5% 0,1W
3519	4822 051 20104	100k 5% 0,1W
3520	4822 051 20223	22k 5% 0,1W
3521	4822 051 20223	22k 5% 0,1W
3522	4822 051 20105	1M 5% 0,1W
3523	4822 051 20105	1M 5% 0,1W
3524	4822 051 20104	100k 5% 0,1W
3525	4822 051 20104	100k 5% 0,1W
3526	4822 117 11148	56k 1% 0,1W
3527	4822 117 11148	56k 1% 0,1W
3528	4822 051 20333	33k 5% 0,1W

3529	4822 051 20333	33k 5% 0,1W
3530	4822 051 20104	100k 5% 0,1W
3531	4822 051 20104	100k 5% 0,1W
3532	4822 051 20223	22k 5% 0,1W
3533	4822 051 20223	22k 5% 0,1W
3534	4822 051 20154	150k 5% 0,1W
3535	4822 051 20154	150k 5% 0,1W
3536	4822 117 10834	47k 1% 0,1W
3537	4822 117 10834	47k 1% 0,1W
3538	4822 051 20224	220k 5% 0,1W
3539	4822 051 20224	220k 5% 0,1W
3540	4822 051 20474	470k 5% 0,1W
3541	4822 051 20474	470k 5% 0,1W
3542	4822 116 52176	10R 5% 0,5W
3543	4822 051 20104	100k 5% 0,1W
3544	4822 051 20104	100k 5% 0,1W
3545	4822 051 20104	100k 5% 0,1W
3546	4822 051 20104	100k 5% 0,1W
3547	4822 051 20334	330k 5% 0,1W
3548	4822 051 20334	330k 5% 0,1W
3549	4822 051 20104	100k 5% 0,1W
3550	4822 051 20104	100k 5% 0,1W
3551	4822 051 20228	2R2 5% 0,1W
3552	4822 051 20228	2R2 5% 0,1W
3553	4822 117 10834	47k 1% 0,1W
3554	4822 117 10834	47k 1% 0,1W
3556	4822 117 11507	6k8 1% 0,1W
3557	4822 117 11507	6k8 1% 0,1W
3558	4822 051 20225	2M2 5% 0,1W
3559	4822 051 20225	2M2 5% 0,1W
3560	4822 051 20471	470R 5% 0,1W
3561	4822 051 20471	470R 5% 0,1W
3562	4822 051 20153	15k 5% 0,1W
3563	4822 051 20153	15k 5% 0,1W
3564	4822 117 11503	220R 1% 0.1W
3565	4822 117 11503	220R 1% 0.1W
3566	4822 117 11383	12k 1% 0,1W
3567	4822 117 11383	12k 1% 0,1W
3568	4822 051 20153	15k 5% 0,1W
3569	4822 051 20153	15k 5% 0,1W
3570	4822 117 11383	12k 1% 0,1W
3571	4822 117 11383	12k 1% 0,1W
3574	4822 051 20153	15k 5% 0,1W
3575	4822 051 20153	15k 5% 0,1W
3576	4822 051 20223	22k 5% 0,1W
3577	4822 051 20223	22k 5% 0,1W
3579	4822 051 20471	470R 5% 0,1W
3580	4822 051 20223	22k 5% 0,1W
3581	4822 051 20223	22k 5% 0,1W
3582	4822 117 11454	820R 1% 0,1W
3583	4822 117 11454	820R 1% 0,1W
3584	4822 051 10102	1k 2% 0,25W
3585	4822 051 20479	47R 5% 0,1W
3586	4822 117 11449	2k2 1% 0,1W
3587	4822 117 11507	6k8 1% 0,1W
3588	4822 051 20471	470R 5% 0,1W
3589	4822 051 20105	1M 5% 0,1W
3590	4822 051 20105	1M 5% 0,1W
3591	4822 117 10833	10k 1% 0,1W
3592	4822 051 20273	27k 5% 0,1W
3593	4822 051 10102	1k 2% 0,25W
3594	4822 051 10102	1k 2% 0,25W
3595	4822 051 20273	27k 5% 0,1W
3596	4822 051 20683	68k 5% 0,1W
3597	4822 051 20683	68k 5% 0,1W
3598	4822 051 10102	1k 2% 0,25W
3599	4822 051 10102	1k 2% 0,25W
3601	4822 116 83884	47k 5% 0,5W
3602	4822 116 83884	47k 5% 0,5W
3603	4822 051 20105	1M 5% 0,1W
3604	4822 051 20105	1M 5% 0,1W
3605	4822 051 20104	100k 5% 0,1W
3606	4822 051 20104	100k 5% 0,1W
3607	4822 051 20474	470k 5% 0,1W
3608	4822 051 20474	470k 5% 0,1W
3614	4822 116 83864	10k 5% 0,5W
3615	4822 116 83864	10k 5% 0,5W
3616	4822 051 20104	100k 5% 0,1W
3617	4822 117 11139	1k5 1% 0,1W
3618	4822 117 11139	1k5 1% 0,1W
3630	4822 051 20471	470R 5% 0,1W
3631	4822 051 20471	470R 5% 0,1W
3632	4822 051 20105	1M 5% 0,1W
3633	4822 051 20105	1M 5% 0,1W
3634	4822 051 20822	8k2 5% 0,1W
3635	4822 051 20822	8k2 5% 0,1W
3636	4822 051 20471	470R 5% 0,1W
3637	4822 051 20471	470R 5% 0,1W
3638	4822 051 20472	4k7 5% 0,1W
3639	4822 051 20472	4k7 5% 0,1W
3641	4822 117 10833	10k 1% 0,1W
3643	4822 051 20105	1M 5% 0,1W
3644	4822 051 20681	680R 5% 0,1W
3645	4822 117 12955	2K7 1% 0,1W
3647	4822 101 21204	Potm Rotary 20KA
3648	4822 051 20471	470R 5% 0,1W
3650	4822 051 20104	100k 5% 0,1W
3651	4822 051 20104	100k 5% 0,1W
3652	4822 117 10833	10k 1% 0,1W
3653	4822 117 10833	10k 1% 0,1W
3655	4822 117 10833	10k 1% 0,1W
3656	4822 051 20008	0R Jumper 0805
3657	4822 051 20008	0R Jumper 0805
4200	4822 051 20008	0R Jumper 0805

RESISTORS

4201	4822 051 20008	0R Jumper 0805
4202	4822 051 20008	0R Jumper 0805
4203	4822 051 20008	0R Jumper 0805
4205	4822 051 20008	0R Jumper 0805
4206	4822 051 20008	0R Jumper 0805
4207	4822 051 20008	0R Jumper 0805
4208	4822 051 20008	0R Jumper 0805
4209	4822 051 20008	0R Jumper 0805
4210	4822 051 20008	0R Jumper 0805
4211	4822 051 20008	0R Jumper 0805
4212	4822 051 20008	0R Jumper 0805
4213	4822 051 20008	0R Jumper 0805
4214	4822 051 20008	0R Jumper 0805
4215	4822 051 20008	0R Jumper 0805
4216	4822 051 20008	0R Jumper 0805
4217	4822 051 20008	0R Jumper 0805
4218	4822 051 20008	0R Jumper 0805
4219	4822 051 20008	0R Jumper 0805
4220	4822 051 20008	0R Jumper 0805
4244	4822 051 20008	0R Jumper 0805
4500	4822 051 20008	0R Jumper 0805
4502	4822 051 20008	0R Jumper 0805
4503	4822 051 20008	0R Jumper 0805
4507	4822 051 20008	0R Jumper 0805
4508	4822 051 20008	0R Jumper 0805
4509	4822 051 20008	0R Jumper 0805
4510	4822 051 20008	0R Jumper 0805
4511	4822 051 20008	0R Jumper 0805
4512	4822 051 20008	0R Jumper 0805
4513	4822 051 20008	0R Jumper 0805
4514	4822 051 20008	0R Jumper 0805
4515	4822 051 20008	0R Jumper 0805
4516	4822 051 20008	0R Jumper 0805
4517	4822 051 20008	0R Jumper 0805
4518	4822 051 20008	0R Jumper 0805
4519	4822 051 20008	0R Jumper 0805
4520	4822 051 20008	0R Jumper 0805
4521	4822 051 20008	0R Jumper 0805
4522	4822 051 20008	0R Jumper 0805
4523	4822 051 20008	0R Jumper 0805
4524	4822 051 20008	0R Jumper 0805
4525	4822 051 20008	0R Jumper 0805
4526	4822 051 20008	0R Jumper 0805
4527	4822 051 20008	0R Jumper 0805
4528	4822 051 20008	0R Jumper 0805
4529	4822 051 20008	0R Jumper 0805
4530	4822 051 20008	0R Jumper 0805
4531	4822 051 20008	0R Jumper 0805
4532	4822 051 20008	0R Jumper 0805
4534	4822 051 20008	0R Jumper 0805
4535	4822 051 20008	0R Jumper 0805
4536	4822 051 20008	0R Jumper 0805
4537	4822 051 20008	0R Jumper 0805
4539	4822 051 20008	0R Jumper 0805
4540	4822 051 20008	0R Jumper 0805
4541	4822 051 20008	0R Jumper 0805
4543	4822 051 20008	0R Jumper 0805
4544	4822 051 20008	0R Jumper 0805
4545	4822 051 20008	0R Jumper 0805
4546	4822 051 20008	0R Jumper 0805
4547	4822 051 20008	0R Jumper 0805
4549	4822 051 20008	0R Jumper 0805
4550	4822 051 20008	0R Jumper 0805
4551	4822 051 20008	0R Jumper 0805
4554	4822 051 20008	0R Jumper 0805
4555	4822 051 20008	0R Jumper 0805
4556	4822 051 20008	0R Jumper 0805
4557	4822 051 20008	0R Jumper 0805
4558	4822 051 20008	0R Jumper 0805
4559	4822 051 20008	0R Jumper 0805
4561	4822 051 20008	0R Jumper 0805
4562	4822 051 20008	0R Jumper 0805
4563	4822 051 20008	0R Jumper 0805
4564	4822 051 20008	0R Jumper 0805
4565	4822 051 20008	0R Jumper 0805
4566	4822 051 20008	0R Jumper 0805
4568	4822 051 20008	0R Jumper 0805
4569	4822 051 20008	0R Jumper 0805
4570	4822 051 20008	0R Jumper 0805
4571	4822 051 20008	0R Jumper 0805
4572	4822 051 20008	0R Jumper 0805
4573	4822 051 20008	0R Jumper 0805
4601	4822 051 20008	0R Jumper 0805
4602	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5202	4822 157 71285	Choke Coil 400µH 30%
5321	4822 157 11477	Coil 2,2µH 5%
5322	4822 157 11477	Coil 2,2µH 5%
5324	4822 157 11477	Coil 2,2µH 5%
5501	4822 157 11477	Coil 2,2µH 5%
5502	4822 157 11477	Coil 2,2µH 5%
5503	4822 157 62255	Coil 18,5 Turns
5504	4822 157 62255	Coil 18,5 Turns
5505	4822 157 62255	Coil 18,5 Turns
5506	4822 157 62255	Coil 18,5 Turns
5507	4822 156 21721	Coil 2,2µH 10%
5508	4822 157 53447	Ind. Bead EMI 100MHz
5640	4822 157 11526	Coil 22µH 5%

DIODES

6220	4822 130 31878	1N4003G
6221	4822 130 31878	1N4003G
6222	4822 130 31878	1N4003G
6223	48	
6224	48	
6225	48	
6226	48	
6227	48	
6228	48	
6229	48	
6230	48	
6231	48	
6232	48	
6233	48	
6235	48	
6236	48	
6237	48	
6240	48	
6241	48	
6242	48	
6243	48	
6244	48	
6245	48	
6248	48	
6249	48	
6250	48	
6251	48	
6255	48	
6321	48	
6322	48	
6323	48	
6324	48	
6325	48	
6326	48	
6327	53	
6328	48	
6329	48	
6330	48	
6502	48	
6549	48	
6550	48	
6551	48	
6552	48	

TRANSIS

7241	48
7242	53
7243	48
7244	48
7245	48
7246	48
7247	48
7248	48
7249	48
7250	48

ELECTRICAL PARTS LIST - COMBI BOARD

6223	4822 130 31878	1N4003G
6224	4822 130 31878	1N4003G
6225	4822 130 31878	1N4003G
6226	4822 130 31878	1N4003G
6227	4822 130 31878	1N4003G
6228	4822 130 34173	BZX79-B5V6
6229	4822 130 34379	BZX79-B27
6230	4822 130 31878	1N4003G
6231	4822 130 34174	BZX79-B4V7
6232	4822 130 30621	1N4148
6233	4822 130 30621	1N4148
6235	4822 130 30621	1N4148
6236	4822 130 34233	BZX79-B5V1
6237	4822 130 34233	BZX79-B5V1
6240	4822 130 31878	1N4003G
6241	4822 130 31878	1N4003G
6242	4822 130 31878	1N4003G
6243	4822 130 31878	1N4003G
6244	4822 130 31878	1N4003G
6245	4822 130 31878	1N4003G
6248	4822 130 31878	1N4003G
6249	4822 130 31878	1N4003G
6250	4822 130 31878	1N4003G
6251	4822 130 31878	1N4003G
6255	4822 130 31878	1N4003G
6321	4822 130 31878	1N4003G
6322	4822 130 31878	1N4003G
6323	4822 130 31878	1N4003G
6324	4822 130 31878	1N4003G
6325	4822 130 34281	BZX79-B15
6326	4822 130 31024	BZX79-B18
6327	5322 130 31504	BZX79-B3V3
6328	4822 130 31878	1N4003G
6329	4822 130 30621	1N4148
6330	4822 130 30621	1N4148
6502	4822 130 34173	BZX79-B5V6
6549	4822 130 30621	1N4148
6550	4822 130 30621	1N4148
6551	4822 130 34173	BZX79-B5V6
6552	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

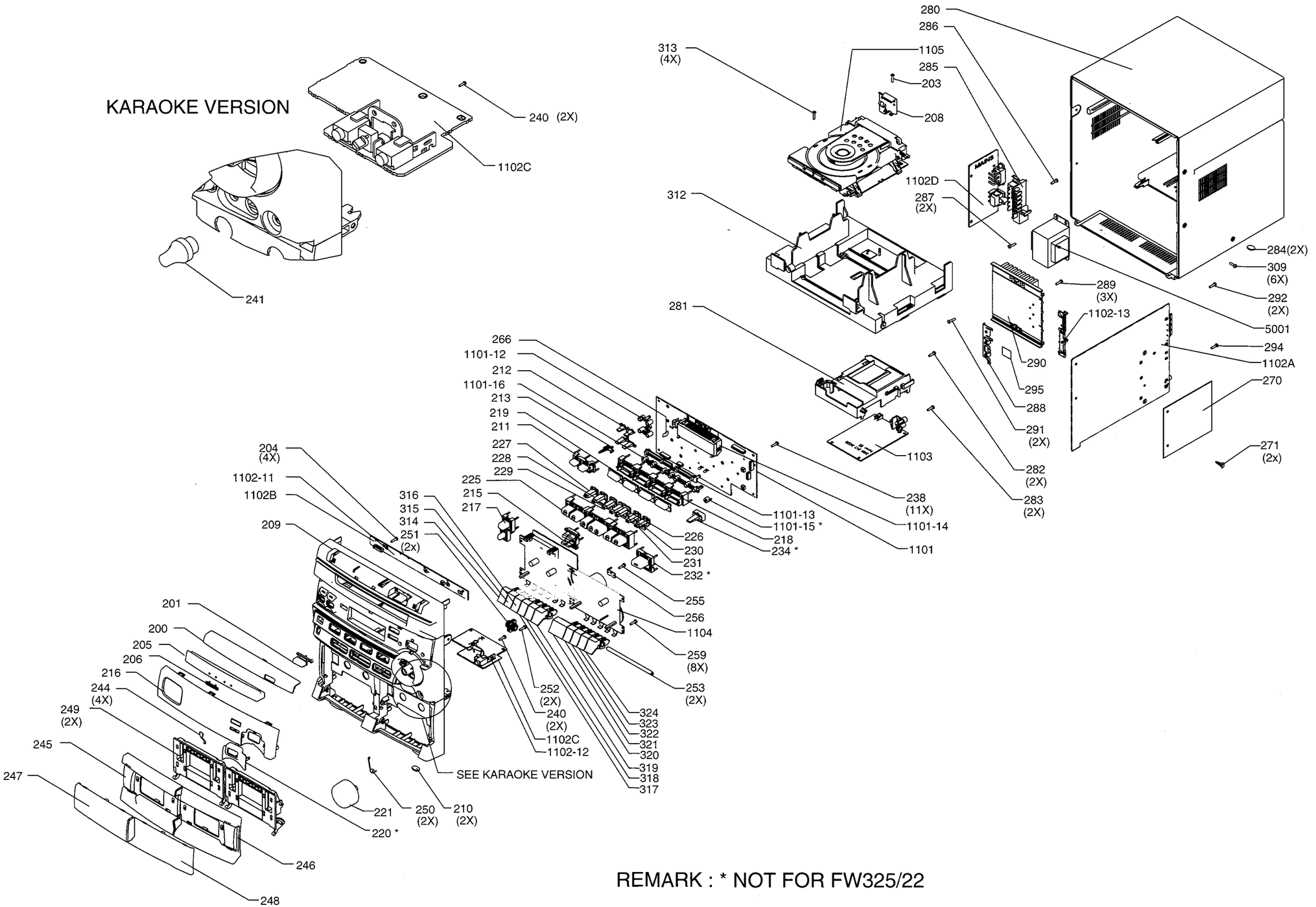
7241	4822 130 40959	BC547B
7242	5322 130 44593	BC369
7243	4822 130 40959	BC547B
7244	4822 130 40959	BC547B
7245	4822 130 40959	BC547B
7246	4822 130 40981	BC337-25
7247	4822 130 40981	BC337-25
7248	4822 130 40981	BC337-25
7249	4822 130 41246	BC327-25
7250	4822 209 33575	L7812CP
7320	4822 130 42615	BC817-40
7321	4822 130 42615	BC817-40
7322	4822 130 42615	BC817-40
7323	4822 130 42615	BC817-40
7329	4822 130 10847	BDW94C
7330	4822 130 40959	BC547B
7331	5322 130 60508	BC857B
7332	5322 130 60508	BC857B
7333	4822 130 42615	BC817-40
7391	4822 209 16224	AN7125
7400	5322 130 60508	BC857B
7401	4822 130 40981	BC337-25
7402	5322 209 11306	HEF4094BT
7501	5322 209 11102	HEF4052BT
7503	4822 130 41096	BC550C
7504	4822 130 41096	BC550C
7505	4822 130 44568	ON4986
7506	4822 130 44568	ON4986
7507	4822 130 44568	ON4986
7508	4822 130 44568	ON4986
7530	5322 209 14482	HEF4069UBT
7537	4822 130 60511	BC847B
7538	4822 130 60511	BC847B
7539	4822 130 60511	BC847B
7540	4822 130 60511	BC847B
7541	4822 130 60511	BC847B
7542	4822 130 60511	BC847B
7543	4822 130 60511	BC847B
7544	4822 130 60511	BC847B
7545	5322 130 60508	BC857B
7546	5322 130 60508	BC857B
7547	4822 130 60511	BC847B
7548	4822 130 60511	BC847B
7549	4822 130 60511	BC847B
7550	4822 130 60511	BC847B
7554	4822 209 31378	NJM4556MB
7556	5322 130 60508	BC857B
7641	4822 130 41096	BC550C
7642	4822 130 41096	BC550C
7643	4822 130 41096	BC550C

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

12-1

EXPLODED VIEW

KARAOKE VERSION



REMARK : * NOT FOR FW325/22

MECHANICAL & ACCESSORIES PARTS LIST - MAIN UNIT

200	4822 450 10499	Window SL Control
201	4822 410 11803	Button Open/Close
205	4822 442 01357	Cover Tray SL
206	4822 454 13035	Badge Philips
209	4822 459 04974	Cabinet Front FW326/21/21M
209	4822 459 04984	Cabinet Front FW326/22/34
209	4822 459 04983	Cabinet Front FW325/22
210	4822 462 40683	Plate (Foot)
211	4822 410 11636	Button Set DSC/DBB
215	4822 410 11657	Button Set CLK/RDS
216	4822 450 10501	Window Disp. FW326/21/21M
216	4822 450 10511	Window Disp. FW326/22/34
216	4822 450 10509	Window Disp. FW325/22
217	4822 410 11638	Button Set Power/HSD
218	4822 410 11643	Button Source Select
220	4822 442 01268	Cover Incredible Sound FW326
221	4822 410 11727	Knob Volume Rotary
225	4822 410 11729	Button Set Controls
232	4822 410 11705	Button Incredible Sound FW326
241	4822 410 11728	Knob Karaoke /21/21M
244	4822 492 70231	Spring Leaf
245	4822 442 01224	Cover Door Cassette Left
246	4822 442 01225	Cover Door Cassette Right
247	4822 381 11935	Lens Cassette Left
247	4822 450 10542	Lens Cassette Left /34
248	4822 381 11936	Lens Cassette Right
248	4822 450 10543	Lens Cassette Right /34
249	4822 443 10881	Door Cassette
250	4822 492 42709	Spring-Door
251	4822 529 10322	Damper Assembly
271	4822 466 93148	Spacer 5mm
280	4822 426 10598	Cabinet Rear /21
280	4822 426 10605	Cabinet Rear /21M/34
280	4822 426 10636	Cabinet Rear /22
284	4822 462 40683	Plate (Foot)
314	4822 410 11656	Button Record 1
315	4822 410 11658	Button Play 1
316	4822 410 11659	Button Rewind 1
317	4822 410 11661	Button F. Forward 1
318	4822 410 11662	Button Stop/Eject 1
319	4822 410 11663	Button Pause 1
320	4822 410 11664	Button Play 2
321	4822 410 11665	Button Rewind 2
322	4822 410 11666	Button F. Forward 2
323	4822 410 11667	Button Stop/Eject 2
324	4822 410 11668	Button Pause 2
350	4822 445 10747	Left Loudspeaker
350	4822 240 10286	Left Loudspeaker /22
350	4822 445 10748	Right Loudspeaker
350	4822 240 10287	Right Loudspeaker /22
351	4822 303 50063	FM Aerial
356	4822 219 10483	RC0797/01 for FW326
356	4822 219 10502	RC0798/01 for FW325
384	4822 303 50082	AM Frame Aerial
385	4822 321 10249 ⚠	Mains Cord
387	4822 736 16088	Instruction for Use /21/21M
387	4822 736 16114	Instruction For Use /22
387	4822 736 16229	Instruction For Use /34
1456	4822 320 12246	Flex Cable 13pin 22cm
5001	4822 146 10951 ⚠	Transformer Mains /21/21M
5001	4822 146 10949 ⚠	Transformer Mains /22/34

LOUDSPEAKER BOX BREAKDOWN

4822 240 10307	Woofer 6R 5,25"
4822 240 10306	Tweeter 6R 2,5"
4822 458 10643	Cloth Frame Right /21/21M/34
4822 458 10644	Cloth Frame Left /21/21M/34

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

12-2

SCREW LISTS - MAIN UNIT

203	D3 x 12
204	D3 x 12
238	D3 x 12
240	D3 x 12
252	D3 x 12
255	D3 x 12
259	D3 x 12
282	D3 x 12
283	D3 x 12
286	D3 x 12
287	D3 x 16
289	M3 x 15
291	D3 x 16
292	D3 x 12
294	D3 x 12
309	D3 x 12
313	D3 x 12