Mini System

FW-C28/21M/22/34

Service
Service
Service

Service Manual

COMPACT disc DIGITAL AUDIO

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CLASS 1
LASER PRODUCT

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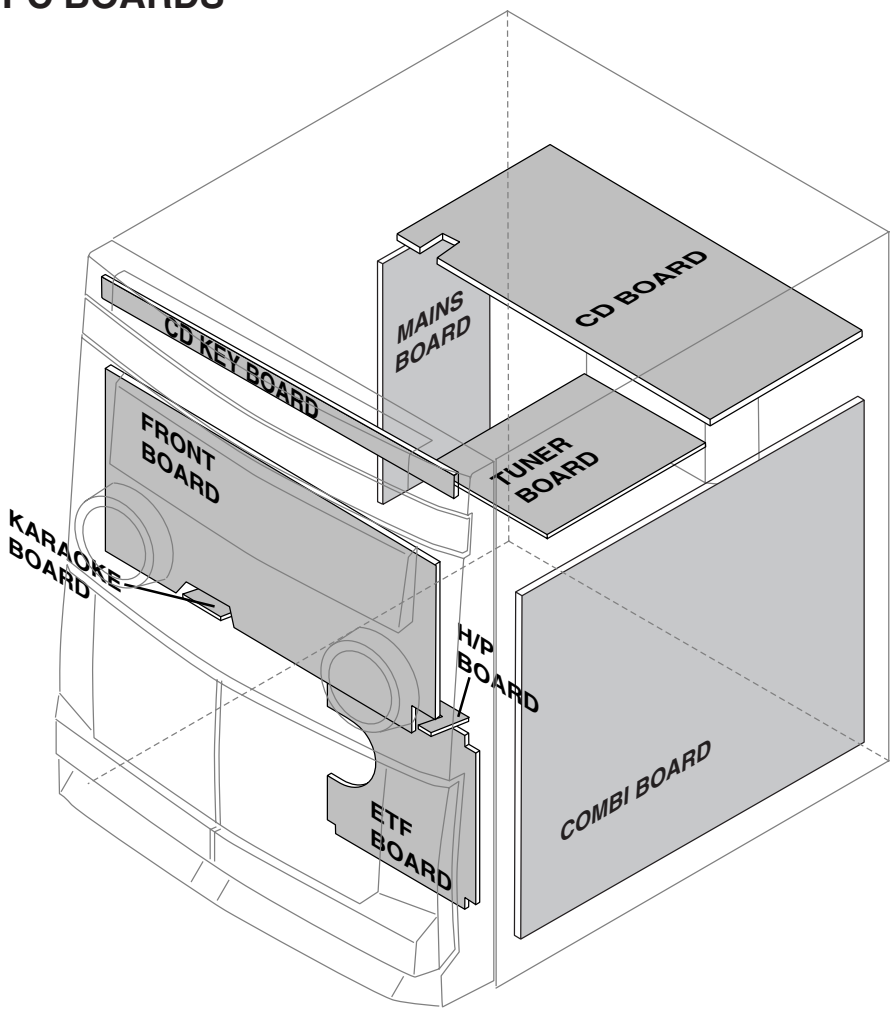
GB 3139 785 22140

PCS 103 446

PHILIPS

LOCATION OF PC BOARDS



VERSION VARIATIONS:

Type /Versions: / Features & Board in used:	FW-C28							
	/21M *	/22	/33	/34				
Dolby B								
Incredible Surround								
Karaoke			x					
News		x		x				
RDS		x		x				
Rotary Encoder (volume control)	x	x	x	x				
Jog Shuttle								
Voltage Selector	x							
Aux Input	x	x	x	x				
Digital Output								
Headphone Socket	x	x	x	x				
Line Output								
Subwoofer Output								
Surround Output								
Matrix Surround Loudspeakers								
Tuner board - ECO5 Sys	x		x	x				
Tuner board - Tuner 95		x						
Standby with clock display	x	x	x	x				

* For India only

SPECIFICATIONS

GENERAL:

Mains voltage : 110-127V/220-240V Switchable for /21/21M
120V for /37
220V for /33
220-230V for /22/34
230V for /25
230-240V for /30
Mains frequency : 50/60Hz
Power consumption : < 15W at Standby (Demo mode off)
: 35W when Active
Clock accuracy : < 4 seconds per day
Dimension centre unit : 265 x 310 x 320mm

TUNER:

FM

Tuning range : 87.5-108MHz
65.81-74MHz for /34 [1)]
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 : > 30dB
Image rejection : > 25dB [> 60dB]
Distortion at RF=1mV, dev. 75kHz : < 3%
-3dB Limiting point : < 8µV
Crosstalk at RF=1mV, dev. 40kHz : > 18dB

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 : > 40dB
Image rejection : > 28dB
Distortion at RF=50mV, m=80% : < 5%

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 : [> 30dB]
IF rejection : [> 25dB]
Image rejection : [> 35dB]
Distortion at RF=50mV, m=80% : [< 5%]

AMPLIFIER:

Output power : 2 x 15W RMS [2)] @ 6 ohm
Frequency response within ±3dB : 50Hz-15kHz
Dynamic Bass Boost : DBB ON, DBB Off [3)]
Digital Sound Control : Jazz, Techno, Optimal, Rock [3)]
Input sensitivity
Aux-in : 700mV ± 3dB at 600ohm
Mic : {3.5mV ± 3dB} at 600ohm
Output sensitivity
Headphone : 18mW at 32ohm

CASSETTE RECORDER:

Number of track : 2 x 2 stereo
Tape speed : 4.76 cm/sec ± 2%
Wow and flutter : < 0.4% DIN
Fast-wind/rewind time C60 : 130 sec
Bias system : 75kHz ± 10kHz
Rec/Pb frequency response within 8dB : 80Hz - 12.5kHz
Signal to noise ratio Type I : > 48dBA
Type II : > 52dBA

COMPACT DISC:

Measurement done at output conn. of the CDC module.
Frequency response within ± 1.5dB : 20Hz - 20kHz
Output level (in Vrms) : 550mV ± 2dB unloaded
Signal/Noise ratio (A-weighted) : > 80dBA
Distortion at 1kHz : < 0.003%
Channel difference at 1kHz : < ± 1dB
Channel separation at 1kHz : > 60dB
De-emphasis : 0 or 15/50 µS (Switched by subcode on the disc)

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

{....} Values indicated are for Karaoke version only

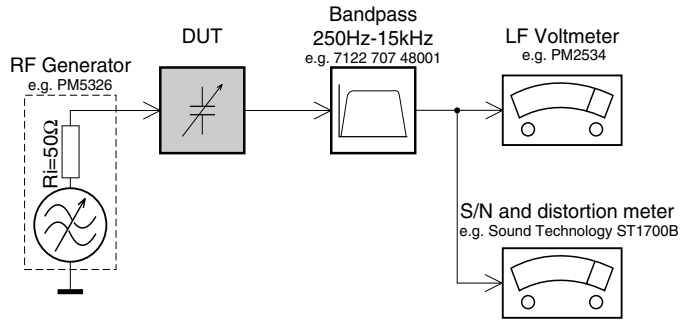
1) Default setting is OFF, to switch on please refer to page 3-4

2) ±1dB, 1kHz, 10% THD

3) Frequency response in each setting is software controlled.

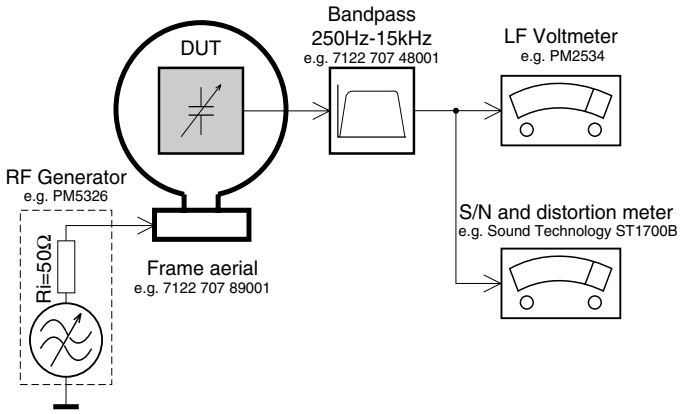
MEASUREMENT SETUP

Tuner FM



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

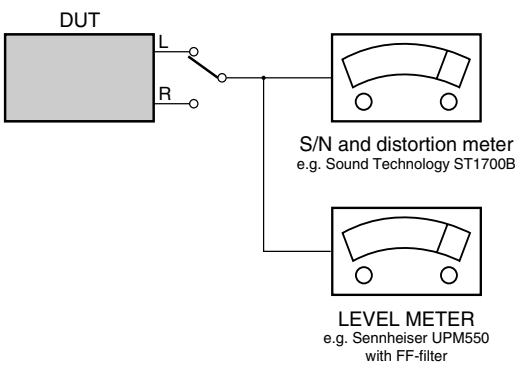
Tuner AM (MW,LW)



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).

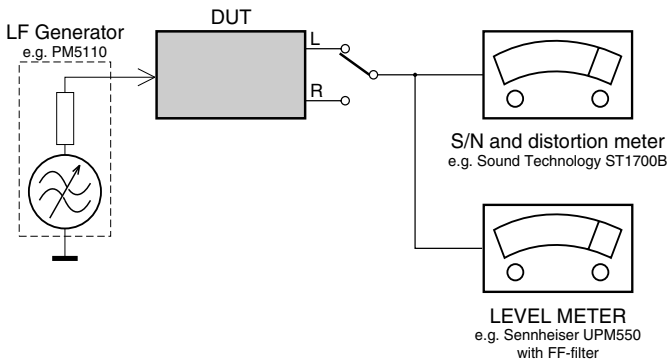
CD

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

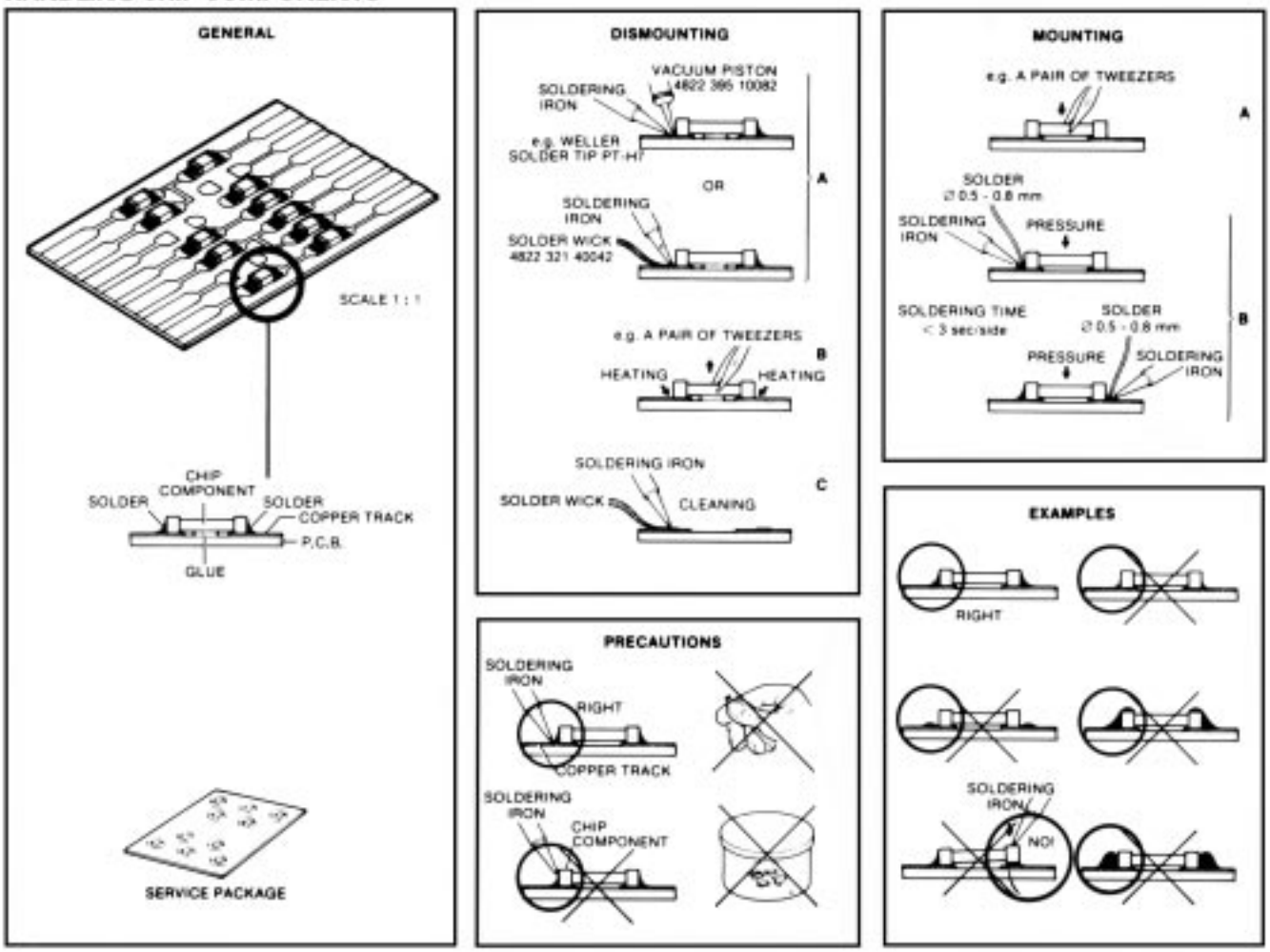
Compact Disc:

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



ESD

GB WARNING

All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD).
Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wrist wrap with resistance.
Keep components and tools also at this potential.

F ATTENTION

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

D WARNUNG

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kan die Lebensdauer drastisch reduzieren.
Veranlassen Sie, dass Sie im Reparaturfall über ein Pulsarmband mit Widerstand verbunden sind mit dem gleichen Potential wie die Masse des Gerätes.
Bauteile und Hilfsmittel auch auf dieses gleiche Potential halten.

NL WAARSCHUWING

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

I AVVERTIMENTO

Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione.
Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

GB

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

NL

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

F

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

D

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

I

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

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

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

GB Warning !

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

S Varning !

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

SF Varoitus !

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

DK Advarse !

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

CONTENTS

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 has been omitted. We have tried to make the packaging easy to separate into three materials: cardboard (box), polystyrene foam (buffer) and polyethylene (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 (two AA size) for remote control
– AM loop antenna
– FM wire antenna
– AC power cord

SAFETY INFORMATION

Safety Information

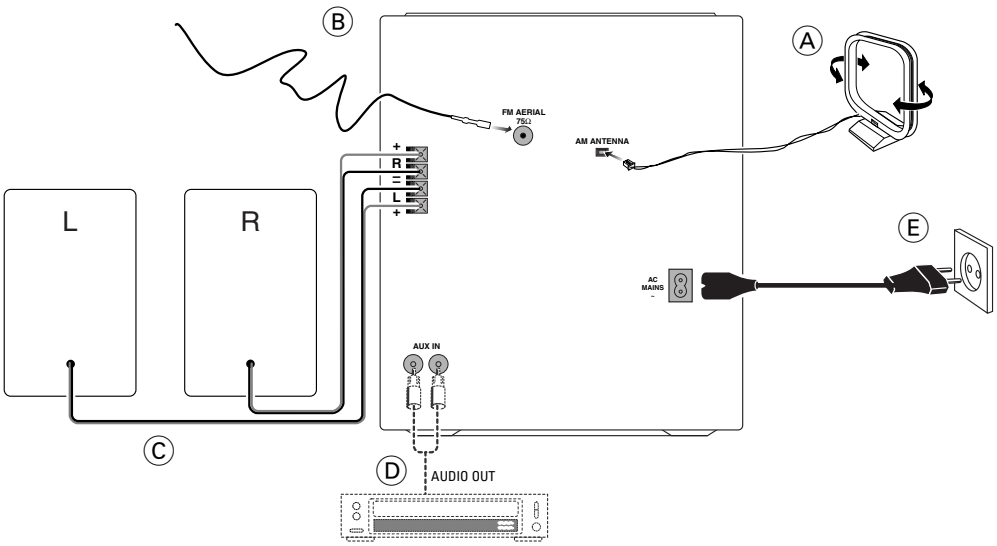
- Before operating the system, check that the operating voltage indicated on the typeplate (or the voltage indication beside the voltage selector) of your system is identical with the voltage of your local power supply. If not, please consult your dealer. The typeplate is located at the rear of your 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. Allow at least 10cm clearance from the rear and the top of the unit and 5cm from the each side.
- 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.**

English

PREPARATION

English

Rear Connections



Ⓐ AM Loop Antenna Connection

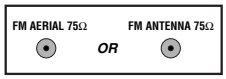
Connect the supplied loop antenna to the AM ANTENNA terminal. Place the AM loop antenna far away from the system and adjust its position for the best reception.

Ⓑ FM Wire Antenna Connection

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

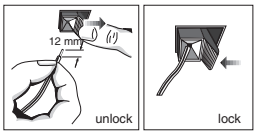
Outdoor Antenna

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



Ⓒ Speakers Connection

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



Ⓓ Connecting other equipment to your system

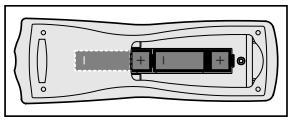
You can connect the audio left and right OUT terminals of a TV, VCR, Laser Disc player, DVD player or CD Recorder to the AUX IN terminals at the rear of the system.

Ⓔ AC Power Supply

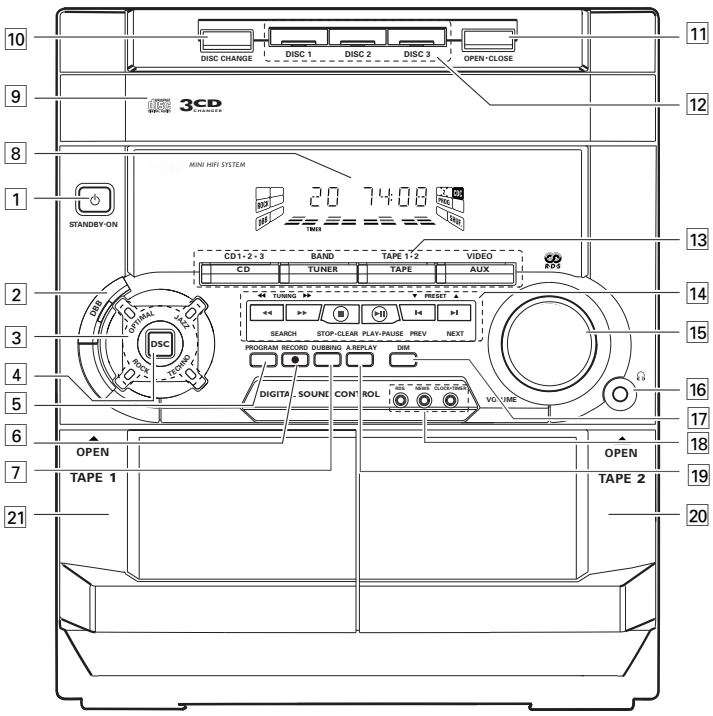
After all other connections have been made, connect the AC power cord to the system and to the wall outlet.

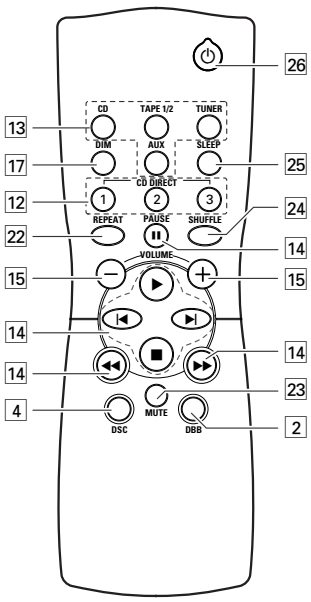
Inserting batteries into the Remote Control

- Insert the batteries (Type R06 or AA) 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 R06 or AA batteries.





CONTROLS

English

Controls on the system and remote control

1 STANDBY ON
– to switch the system on or to standby mode.
– to use for EASY SET.

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

3 DIGITAL SOUND CONTROL PANEL
– to view the desired DSC display.

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

5 PROGRAM
for CD ..... to program CD tracks.
for TUNER ..... to program preset radio stations.
for CLOCK ..... to select 12 or 24 hour in clock setting mode.

6 RECORD
– to start recording on tape deck 2.

7 DUBBING
– to dub a tape in normal speed.

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

9 CD CAROUSEL TRAY

10 DISC CHANGE
– to change CD(s).

11 OPEN•CLOSE
– to open or close the CD carousel tray.

12 DISC 1 / DISC 2 / DISC 3 (CD DIRECT PLAY)
– to select a CD tray for playback.

13 SOURCE – to select the following:
CD / (CD 1•2•3)
– to select CD mode. When CD playback is stopped, press to select disc tray 1, 2 or 3.
TUNER / (BAND)
– to select Tuner mode. When in tuner mode, press to select the waveband: FM, MW or LW.
TAPE / (TAPE 1• 2)
– to select Tape mode. When tape playback is stopped, press to select either tape deck 1 or 2.
AUX / (VIDEO)
– to select sound from an external source (e.g. TV, VCR, Laser Disc player, DVD player or CD Recorder).

14 MODE SELECTION
SEARCH ◀◀ ▶▶ (TUNING ◀◀ ▶▶)
for CD ..... to search backward/ forward.
for TUNER ..... to tune to a lower or higher radio frequency.
for TAPE ..... to rewind or fast forward a tape.
for CLOCK ..... to set the hour *(on the system only).*
STOP•CLEAR ■
for CD ..... to stop CD playback or to clear a program.
for TUNER ..... to stop programming.
for TAPE ..... to stop playback or recording
for DEMO ..... *(on the system only)* to start or stop demonstration mode.
PLAY ▶ / PAUSE ▮▮
for CD ..... to start or interrupt playback.
for TAPE ..... to start playback.
PREV ⏮ / NEXT ⏭(PRESET ▼▲)
for CD ..... to skip to the beginning of the current, previous, or next track.
for TUNER ..... to select a preset station in memory.
for CLOCK ..... to set the minute *(on the system only).*

15 VOLUME
– to increase or decrease the volume.

16 🎧
– to connect headphones.

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

18 CLOCK•TIMER
– to view the clock, set the clock or set the timer.
RDS
– to select RDS data in the following order: station name, program type and radio text.
NEWS
– to hear news automatically

19 AUTO REPLAY
– to select playback mode either in continuous AUTO PLAY or ONCE only.

20 TAPE DECK 2

21 TAPE DECK 1

22 REPEAT
– to repeat a CD track, a disc, or all available discs.

23 MUTE
– to switch off the sound temporarily.

24 SHUFFLE
– to play all the available discs and their tracks in random order.

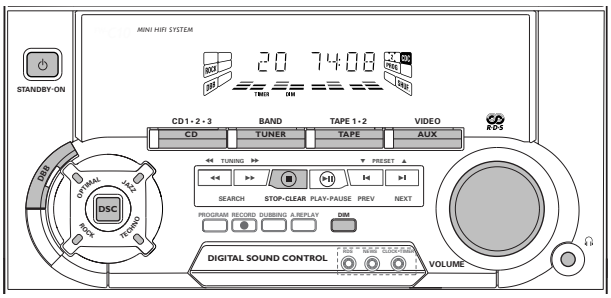
25 SLEEP
– to switch the system to standby mode at a selected time.

26 ⏻
– to switch the system to standby mode.

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

OPERATING THE SYSTEM

English



Important:
Before you operate the system, complete the preparation procedures.

Demonstration mode

The system has a demonstration mode that shows the various features offered by the system. ***When the system is switched on for the first time, the demonstration mode will start automatically.***

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

To stop the demonstration mode
- Press and hold ■ *(on the system only)* for ***5 seconds*** when the system is in demonstration mode.
  → The demonstration will stop.
  → "DEMO OFF" is displayed.
  → The system will switch to standby mode.

Note:
– Even though the AC power cord is removed from and reconnected to the wall socket, the demonstration will remain off until it is switched on again.

To start the demonstration mode
- Press and hold ■ *(on the system only)* for ***5 seconds*** when the system is in standby mode.
  → The demonstration will begin.

Easy Set

EASY SET allows you to store all available radio stations and RDS stations automatically.

1 Press and hold **STANDBY ON** *(on the system only)* for ***5 seconds***; when the system is in standby or demonstration mode.
→ "EASY SET" will be displayed, and followed by "TUNER" and then "AUTO".
→ EASY SET will start searching for all RDS radio stations with sufficient signal strength and then followed by radio stations on FM, MW and LW band respectively. Weak RDS radio stations may be stored in later presets.
→ All available RDS and radio stations with sufficient signal strength will be stored. Up to 40 presets may be stored.

2 The system will proceed to set the RDS time automatically with the stored RDS preset station.
- If no RDS station is available in the first preset station, the program will exit automatically.
  → After a radio 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 will be displayed for 2 seconds and stored automatically.

Notes:
– EASY SET will start with the RDS station, if there are still presets available, it will continue to store the FM, MW and LW bands respectively.
– When EASY SET is used, all previously stored radio stations will be replaced.
– The last preset radio station or the first available RDS station 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".

Switching the system ON

- Press **CD**, **TUNER**, **TAPE** or **AUX**.

You can also switch on the system by pressing any one of the CD DIRECT PLAY buttons.

OPERATING THE SYSTEM

English

Switching the system to standby mode

- Press **STANDBY ON** or ⏻ on the remote control.
  → 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.

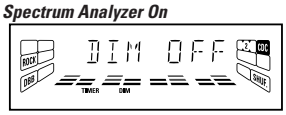
Note:
– *For an external source, make sure you have connected the audio left and right OUT terminals of the external equipment (TV, VCR, Laser Disc player, DVD player or CD Recorder) to the AUX IN terminals.*

DIM mode

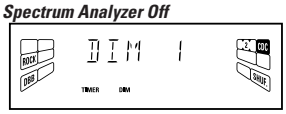
You can select the desired brightness for the display.

- Press **DIM** to select DIM 1, DIM 2, DIM 3 or DIM OFF display mode.
  → The **DIM** display lights up.
  → "DIM 1", "DIM 2", "DIM 3" or "DIM OFF" will be displayed depending on the mode selected.

DIM OFF - normal brightness with Spectrum Analyzer On

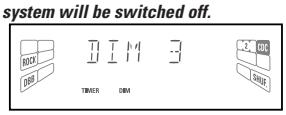


DIM 1 - normal brightness with Spectrum Analyzer Off



DIM 2 - half brightness with Spectrum Analyzer On

DIM 3 - half brightness with Spectrum Analyzer Off and all LEDs on the system will be switched off.



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 **DSC** to select OPTIMAL, JAZZ, ROCK or TECHNO.
  → The Digital Sound Control display panel will light up respectively.
  → "OPTIMAL, JAZZ, ROCK or TECHNO" and the respective flag will be displayed.

Note:
– *When "OPTIMAL" sound is selected, DBB will be switched on automatically.*

DYNAMIC BASS BOOST (DBB)

The DBB mode enhances the bass response.

- Press **DBB** to switch on bass response.
  → The DBB button lights up.
  → "DBB ON" and the **DBB** flag will be displayed.

To switch off DBB

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

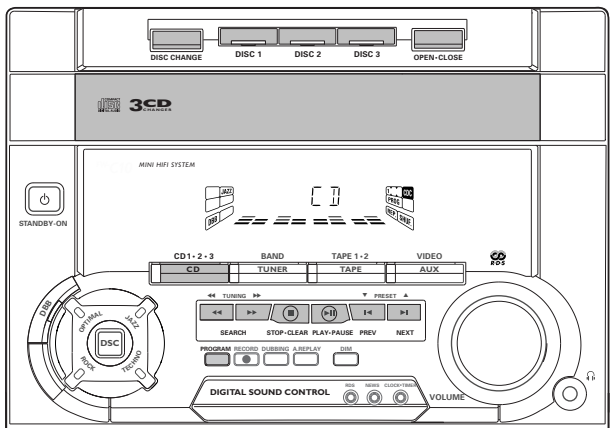
Note:
– *Some CDs or tapes might be recorded in high modulation, which causes a distortion at high volume. If this occurs, switch off DBB or reduce the volume.*

***MUTE** (only on remote control)*
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" and the **MUTE** flag will be displayed.
- Press **MUTE** again on the remote control or increase the **VOLUME** to switch on the sound.

CD

English



Warning!

1) This system is designed for conventional CDs. Do not use any accessories such as disc stabilizer rings or CD treatment sheets, etc., which may damage the CD mechanism.
2) Do not load more than one disc into each tray.
3) When the CD changer is loaded with CDs, do not turn over or shake the system. This may jam the changer.

You may load three discs in the CD changer for continuous playback without interruption.

Discs for playback

This system can play all digital audio CD, finalized digital audio CD-Recordable and finalized digital audio CD-Rewritable format discs.

COMPACT disc DIGITAL AUDIO
COMPACT disc DIGITAL AUDIO Recordable
COMPACT disc DIGITAL AUDIO ReWritable

Loading the CD Changer

1 Press **CD** to select CD mode.
2 Press **OPEN•CLOSE**.
  → The CD carousel tray slides out.
3 Load a CD with the printed side up in the right tray.
- You can load another disc in the left tray.
- To load the third disc, press the **DISC CHANGE** button.
  → The CD carousel tray will rotate until the empty tray is ready for loading.

4 Press **OPEN•CLOSE** to close the CD carousel tray.
  → The total number of tracks and the playing time of the selected disc appear on the display.

Note:
– *To ensure good system performance, wait until the CD changer completely reads the disc(s) before proceeding.*

CD Direct Play

- You can play a CD directly by pressing the **DISC 1**, **DISC 2** or **DISC 3** button. The CD player will stop at the end of playback of the selected disc.
  → A lit button indicates that a disc is loaded in the disc tray.
  → A flashing button indicates that a disc is playing.

Playing a CD

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

2 To stop playback, press ■.

Note:
– *All the available discs will play once, then stop.*

Disc Change

You can change the outer two discs while the third inner disc is stopped or is playing.

1 Press **DISC CHANGE**.
  → The CD carousel tray slides out.
2 Replace the discs in the left and right disc trays.
- If you press **DISC CHANGE** again during playback, the CD will stop playing.

→ The CD carousel tray will rotate until the inner tray is rotated out and is ready for changing.

3 Press **OPEN•CLOSE** to close the CD carousel tray.

Selecting a desired track

Selecting a desired track when playback is stopped

1 Press ⏮ or ⏭ until the desired track appears on the display.

2 Press ▶ to start playback.
→ The selected track number and elapsed playing time appear on the display.

Selecting a desired track during playback

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

Note:

– *Pressing ⏮ during shuffling can only skip to the beginning of the current track.*

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 when playback is stopped. The display will indicate the total tracks stored in the program. Up to 40 tracks can be stored in the memory in any order. When 40 tracks are stored and you attempt to store another track, the display will show "PROGRAM FULL".

1 Load the desired discs in the disc trays.

2 Press **PROGRAM** to start programming.
→ The **PROG** flag starts flashing.
→ It will cancel any previously selected repeat mode.

3 Press the **CD** (CD 1•2•3) or **DISC 1/2/3** button to select the disc.

4 Press ⏮ or ⏭ to select the desired track.

5 Press **PROGRAM** to store the track.

- Repeat steps ***3*** to ***5*** to store other discs and tracks.

6 Press ■ once to end programming.
→ 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 on the display instead of the total playing time.*

– *If the system is reading the discs, programming is not possible, "READING" will be displayed and followed by "DISC x". "x" is the current read disc number.*

– *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*

Reviewing the program

Reviewing of the program is possible only when playback is stopped.

- Press ⏮ or ⏭ repeatedly to review the programmed tracks.
- Press ■ to exit review mode.

Playing the program

1 Press ▶ to start program playback.
→ "PLAY PROGRAM" will be displayed.
→ 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 or all programmed tracks will be played repeatedly.
  → "TRACK" or "PROGRAM" will be displayed.
  → The **REP** and **PROG** flags appear on the display.

2 Press ■ to stop program playback.

Notes:

– *If you press any of the CD DIRECT PLAY buttons, the system will play the selected disc or track and the stored program will be ignored temporarily. The **PROG** display also will disappear temporarily from the display. It will reappear when playback of the selected disc ends.*

– *REPEAT DISC mode will be cancelled when program playback begins.*

Erasing the program *(when playback is stopped)*

- Press ■ .
  → "PROGRAM CLEARED" will be displayed.

Note:

– *The program will be erased when the system is disconnected from the power supply or when the CD carousel tray is opened.*

Shuffle *(only on remote control)*

In shuffle mode, the system plays all the available discs and their tracks in random order. Shuffle may be used also when tracks are programmed.

To shuffle all the discs and tracks

1 Press **SHUFFLE**.
→ "SHUFFLE" will be displayed.
→ The **SHUF** flag, the disc and the track selected at random appear on the display.

- The discs and the tracks will be played in random order until you press ■ .
- If you press **REPEAT** during shuffling, the current track or all available discs will be played repeatedly.
  → "TRACK" or "ALL DISC" will be displayed.
  → The **REP** and **SHUF** flags appear on the display.

2 Press **SHUFFLE** again to resume normal playback.
→ The **SHUF** flag disappears from the display.

Note:

– *REPEAT DISC mode will be cancelled when shuffle is selected.*

Repeat *(only on remote control)*

You can play the current track, a disc or all available discs repeatedly.

1 Press **REPEAT** on the remote control to select the various repeat modes.
→ "TRACK", "DISC", "ALL DISC" or "OFF" will be displayed.
→ The **REP** flag appears on the display.

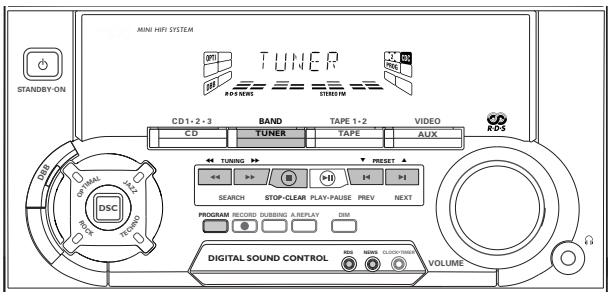
- The selected track, selected disc or all available discs will now be played repeatedly until you press ■ .

2 Press **REPEAT** until the "OFF" mode is displayed to resume normal playback.
→ The **REP** flag disappears from the display.

Notes:

– *REPEAT DISC mode is not available during program play or shuffle mode.*

– *You can also repeat shuffling a program.*
→ "TRACK" or "PROGRAM" will be displayed.
→ *The **REP**, **PROG**, and **SHUF** flags appear on the display.*



Note:

– *For 'EASY SET' feature, please refer to page 10.*

Tuning to radio stations

1 Press **TUNER** (BAND) to select TUNER mode.
→ "TUNER" will be displayed.
A few seconds later, the current radio frequency will be displayed.

2 Press **TUNER** (BAND) again to select the desired waveband : FM, MW or LW.

3 Press ◀◀ 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 ◀◀ or ▶▶ repeatedly 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** (BAND).

2 Press **PROGRAM** for more than one second.
→ The PROG flag starts flashing and "AUTO" will be displayed.
→ The system will start searching for all radio stations with RDS and then followed by radio stations on FM, MW and LW band respectively.
→ All available stations 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.

Notes:
– *You can cancel the automatic programming by pressing PROGRAM or ■ (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, only the preset numbers 10 to 40 will be programmed.*

Manual programming

1 Press **TUNER** (BAND).

2 Press **TUNER** (BAND) to select the desired waveband : FM, MW or LW.

3 Press **PROGRAM** for less than one second.
→ The PROG flag starts flashing.
→ The next available preset number will be displayed for selection.

4 Press ◀◀ or ▶▶ to tune to the desired frequency.

• If you wish to store the radio station to another preset number, press ▼ or ▲ to select the desired preset number.

5 Press **PROGRAM** again.
→ The PROG flag disappears and the radio station will be stored.

• Repeat ***steps 3 – 5*** 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 3 – 5.*
– *You can cancel manual programming by pressing ■ (on the system only).*
– *During programming, if no button is pressed within 20 seconds, the system will exit program mode automatically.*

Tuning to Preset Radio Stations

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

Receiving RDS Radio Station

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 radio station name 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 ( ) and the radio 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 → PROGRAM TYPE → RADIO TEXT → TUNED FREQUENCY → STATION NAME ...

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 Clock

Some RDS station may be transmitting a real clock time 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 current station is not receiving any RDS information, "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.
→ If within 90 seconds, the RDS time is not detected, "NO RDS TIME" will be displayed.

Note:
– *Some RDS station may be transmitting a real time clock at a minute interval. The accuracy of the transmitted time depends on the transmitting RDS station.*

News *(only available in Radio Station with RDS)*

You can activate NEWS function in Standby or any source mode except Tuner mode. Once the News PTY (program type) is detected in a RDS station, it will switch to TUNER mode automatically.

To start NEWS function

1 Press **NEWS**.

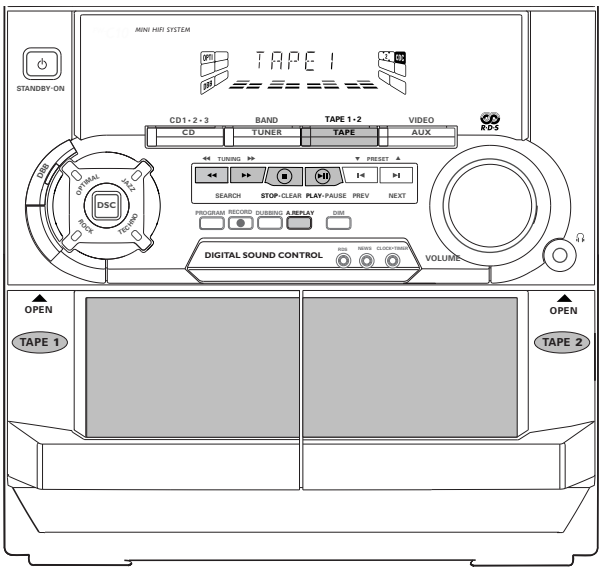
• The **NEWS** and "NEWS" will be displayed.
• It will scan stations stored in the first 5 preset and wait for the News Program Type data to be available in any of these RDS stations. During the search :
→ The current source activity will remain uninterrupted.
→ If no RDS station is found in the first 5 presets, the NEWS function will be switched off. The display will show "NO RDS NEWS" and **NEWS** will disappear from the display.
• When NEWS transmission is detected, the system will switch to Tuner mode.
→ The **NEWS** starts flashing.

To cancel NEWS function

• Press **NEWS** again.
→ The **NEWS** disappears and "NEWS OFF" will be displayed.

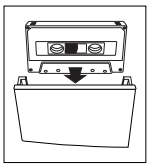
Notes:
– *If you are listening to a non RDS TUNER radio station and should you decide to hear NEWS, first select other source (e.g. CD, TAPE or AUX), then press NEWS.*
– *Before using the NEWS feature, ensure that the first 5 presets are RDS stations.*
– *The NEWS works only once for each activation.*
– *During News bulletin, you can press any available source or Tuner function keys to cancel NEWS function and execute the relevant source mode.*
– *If set is switched to Tuner source, the NEWS function will be cancelled, "NEWS OFF" will be displayed immediately after the "TUNER" message.*

TAPE



Loading a tape

1 Press **OPEN**.
2 The tape deck door opens.
3 Load the tape with the open side downward and the full spool to the left.



4 Close the tape deck door.

Auto Replay

- Press **A. REPLAY** to select either continuous AUTO REPLAY or ONCE during tape playback.
  → "AUTO REPLAY "(⇄) or "ONCE "(→) will be displayed.

Notes:
– *This feature is available during tape playback only.*
– *When "AUTO REPLAY" is selected, the tape will rewind automatically at the end of playback for the selected side. Then it will start playing again. It will replay up to a maximum of 20 times until you press ■.*
– *When "ONCE" is selected, the tape will play the selected side once and then stop.*

Tape Playback

1 Press **TAPE** (TAPE 1•2) to select TAPE mode.
  → "TAPE 1" or "TAPE 2" will be displayed and followed by "T 1 >>>" or "T2 >>>".
2 Load the tape into the selected tape deck.
3 Press ▶ to start playback.
  → "T 1" or "T2" with ">" scrolling right will be displayed.
- Press **A.REPLAY** to select the different type of playback mode (see Auto Replay)
4 Press ■ to end playback.
  → "T 1" or "T2" with ">>>" will be displayed.

Rewind/Fast Forward

When playback is stopped

1 You can rewind or fast forward the tape by pressing ◀◀ or ▶▶ respectively.
  → If rewinding, "T 1 <" or "T2 <" with "<" scrolling left will be displayed.
  → If fast forwarding, "T 1 >" or "T2 >" with ">" scrolling right will be displayed
  → The tape will stop automatically at the end of rewinding or fast forwarding.
2 Press ■ to stop rewinding or fast forwarding.

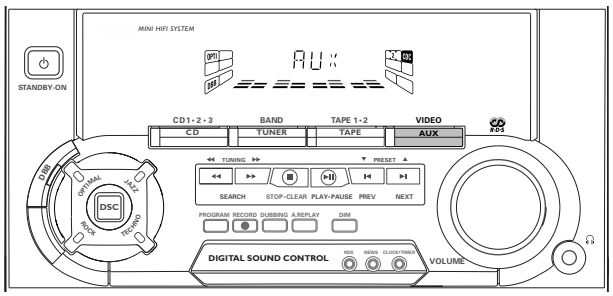
TAPE

During playback

- Press and hold ◀◀ or ▶▶ until the desired passage is located.
  → "T 1 or T2" with "<< or >>"" scrolling left or right will be displayed depending on which button is pressed.
  → During searching, the sound is reduced to a low volume.
  → When you release ◀◀ or ▶▶, the tape continues playing.

Notes:
– *During rewinding or fast forwarding of a tape, it is also possible to select another source (e.g. CD, TUNER, or AUX).*
– *Before playing a tape, check and tighten slack tape 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 speaker).*

AUX



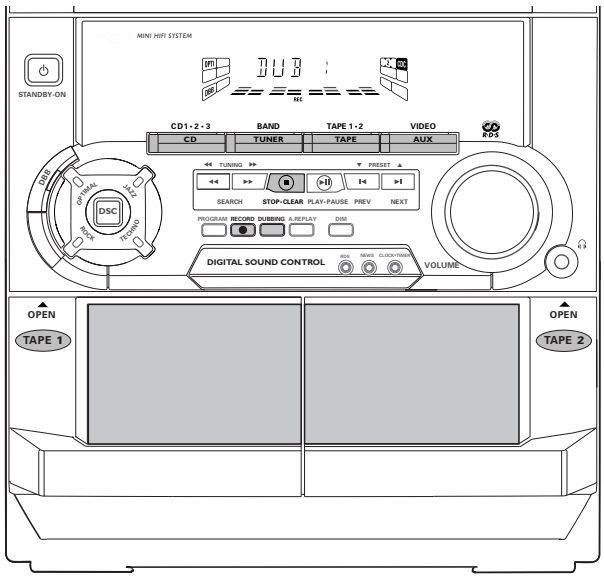
Selecting External Equipment

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

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

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

RECORDING



Notes:
- *For recording, use only tape of IEC type I (normal tape) or IEC type II (CrO_2).*
- *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 DSC.*
- *To prevent accidental recording, break out the tab on the left shoulder of the tape side that you want to protect.*
- *If "CHECK TAPE" is displayed, the protection tab has been broken. Put a piece of clear adhesive tape over the opening. Do not cover the CrO_2 tape detection hole when covering the tab opening.*

One Touch Recording

- For One Touch Recording, as soon as you press RECORD, the current source (CD, TUNER or AUX) will be recorded on tape deck 2.

1 Load a blank tape in tape deck 2.
2 Press **RECORD** to start recording.
→ The **REC** starts flashing.
3 Press ■ to stop recording.

Note:
- *When you press RECORD while in TAPE mode, "SELECT SOURCE" will be displayed. One Touch Recording is not possible in TAPE mode.*

CD Synchro Start Recording

1 Load a blank tape into tape deck 2 and a disc into a disc tray.
2 Press **CD** to select CD mode.
- You can program the tracks in the order you want them to be recorded (see Programming Tracks). If not, select the disc by pressing **CD** (CD 1•2•3) and the tracks are recorded according to the order on the selected disc.

3 Press **RECORD** to start recording.
→ The **REC** starts flashing.
- CD will start playback automatically.

4 Press ■ to stop recording.

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

1 Press **TAPE** (TAPE 1•2) to select tape deck 2.
2 Load the prerecorded tape into tape deck 1 and a blank tape into tape deck 2 with full spool to the left.
3 Press **DUBBING**
→ "DUB" with ">" scrolling right will be displayed.
- Dubbing will start immediately.
→ The **REC** starts flashing.

4 Press ■ to stop dubbing.

RECORDING

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 1 to tape deck 2.*
- *To ensure good dubbing, use tapes of the same length.*
- *You can switch to other source while dubbing.*

Recording from other sources

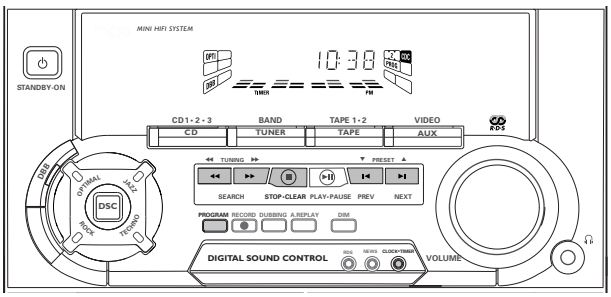
(only on tape deck 2)

1 Press **TAPE** (TAPE 1•2) to select tape deck 2.
2 Load a blank tape into tape deck 2 with the open side downward.
3 Press **CD**, **TUNER** or **AUX**.
- Start playback of the selected source.

4 Press **RECORD** to start recording.
→ The **REC** starts flashing.
5 Press ■ to stop recording.

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

CLOCK



View Clock

You can view the clock (if it is set) if the system is in Standby mode or when any sound source is selected (CD, TUNER, etc.). The clock will be displayed for about seven seconds.

- Press **CLOCK•TIMER** briefly.
→ " 10:38 **PM** or 22:38" (the current time) will be displayed depending on whether you have selected 12- or 24-hour mode.
→ "--:--" will be displayed if the clock is not set.

Clock Setting

The clock can be set in either 12- or 24-hour mode, e.g. " 12:00 **AM**" or "00:00". Before setting the clock, you must be in the View Clock mode.

1 Press **CLOCK•TIMER** to select clock mode.
2 Press **PROGRAM** to select 12- and 24-hour mode.
→ If 12-hour mode is selected, " 12:00" starts flashing and the **AM** lights up.
→ If 24-hour mode is selected, "00:00" starts flashing.
3 Set the hour with ◀◀ or ▶▶ on the system.
4 Set the minute with ⏮ or ⏭ on the system.

TIMER

5 Press **CLOCK•TIMER** again to store the setting.
→ The clock starts.

• To exit without storing the setting, press ■ on the system.

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.

Timer Setting

• The system can switch on to CD, TUNER, or TAPE 2 mode automatically at a preset time. It can serve as an alarm to wake you up.
• Before setting the timer, make sure the clock is set correctly.
• The timer will always be switched on once it is set.
• **The volume of the timer will increase from the minimum level until the volume level before the set is switched to standby mode.**

1 Press and hold **CLOCK•TIMER** for more than ***2 seconds*** to select timer mode.
→ "12:00 AM" or "00:00" or the last timer setting starts flashing depending on whether you have selected 12- or 24-hour mode.
→ The TIMER starts flashing.
→ The selected source is lit while other available sources are flashing.
2 Press **CD**, **TUNER** or **TAPE** to select the desired source.
• Before selecting CD or TAPE, make sure a CD or tape is loaded in the CD tray or tape deck 2.
3 Press ◀◀ or ▶▶ on the system to set the hour for the timer to start.
4 Press ⏮ or ⏭ on the system 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 remains on the display.
• At the preset time, the timer will be activated.
→ The selected source will be played.

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, playback will begin with the first track of the selected disc or program. If the CD trays are empty, the TUNER will be selected instead.*
– *The timer will not activate if a recording is in progress.*

To switch off the TIMER
1 Press and hold **CLOCK•TIMER** for more than ***2 seconds***.
2 Press ■ on the system to cancel the timer.
→ The timer is now switched off.
→ The display will show "CANCEL" and the TIMER disappears.

To start the TIMER again *(for the same preset time and source)*
1 Press and hold **CLOCK•TIMER** for more than ***2 seconds***.
2 Press **CLOCK•TIMER** again to store the start time.
→ The timer is now on.
→ The TIMER appears on the display.

SLEEP TIMER

English

Sleep Timer *(only on remote control)*

This feature allows you to select a length of time after which the system will switch to the standby mode automatically.

1 Press **SLEEP** on the remote control repeatedly to select a period of time.
→ The selections are as follows (time in minutes):
60 → 45 → 30 → 15 → OFF → 60 …
→ "SLEEP xx" or "OFF" will be displayed. "xx" is the time in minutes.
2 When you reach the desired length of time, stop pressing the **SLEEP** button.
→ After this amount of time passes, the system will switch to the standby mode.

To switch off the Sleep Timer
• Press **SLEEP** repeatedly until "OFF" is displayed, or press the **STANDBY ON** button.

MAINTENANCE

Maintenance

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

Cleaning Discs
• When a disc becomes dirty, clean it with a cleaning cloth. Wipe the disc from the center out.
• Do not use solvents such as benzine, thinner, commercially available cleaners, or antistatic spray intended for analog records.

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

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

Demagnetizing the heads
• Use a demagnetizing tape available at your dealer.

TROUBLESHOOTING

English

Warning! Under no circumstances should you try to repair the set yourself as this will invalidate the guarantee. Do not open the set as there is a risk of electric shock.

• 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 at the lens.
→ *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.*
• The CD lens is dirty or dusty.
→ *See section under Maintenance (page 23).*

"DISC NOT FINALIZED" is displayed.
• The CD-RW or CD-R disc is not properly recorded for use with a standard CD player.
→ *Read the instruction booklet of your CD-Rewritable or CD-Recorder on how to finalize a recording.*
• The CD is badly scratched or dirty.
→ *Replace or clean CD.*

Radio Reception

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

"NO RDS TEXT" is displayed.
• RDS text message is not available.
→ *Select another RDS station.*

TROUBLESHOOTING

English

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 (page 23).*
- Magnetic build-up in the record/ playback head.
→ *Use demagnetizing tape.*

Tape deck door cannot open.
- Power failure or AC power plug disconnect from the wall outlet during tape playback.
→ *Reconnect the AC power plug and switch on the system again.*

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 the power plug 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 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, colored/black wires to colored/black terminals.*

Remote control has no effect on the system.
- Wrong source is selected.
→ *Select the source (CD, TUNER, etc.) before pressing the function button, (▶, ⏮, ⏭, etc.).*
- 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.*

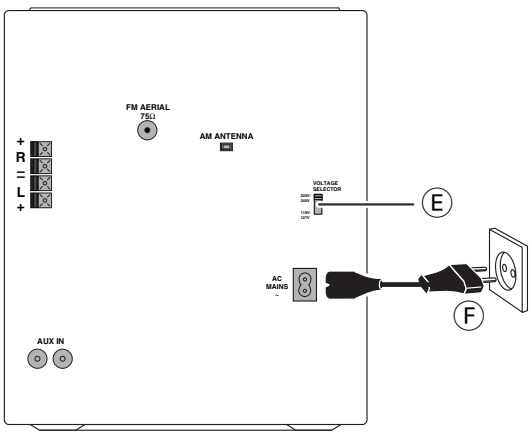
Timer is not working.
- Clock is not set.
→ *Set the clock.*
- Timer is not switched on.
→ *Press CLOCK•TIMER to switch on the timer.*
- Recording is in progress.
→ *Stop recording.*

Clock setting is erased.
- There was a power failure.
→ *Reset the clock.*

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

All lighted buttons are not lit.
- Display is switch on in DIM 3 mode.
→ *Press DIM until DIM OFF display mode is shown.*

ADDITIONAL FEATURES FOR /21



Ⓔ Adjusting the Operating Voltage (Only for /21)

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.

Ⓕ AC Power Supply

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

Changing the MW tuning grid

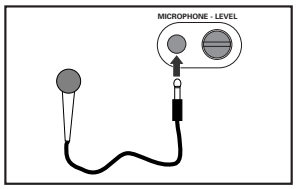
The frequency step can be changed if necessary. In North and South America, the frequency step between adjacent channels in the MW band is 10 kHz. In other parts of the world, it is 9 kHz. The frequency step preset in the factory is 9 KHz.

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.*



English

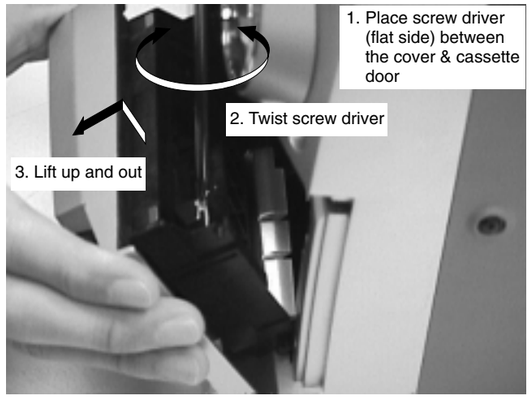
Microphone Mixing

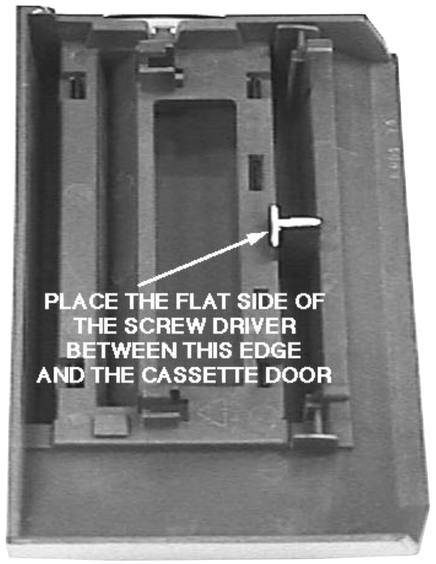
1 Set the **MIC LEVEL** control to the minimum level to prevent acoustic feedback (e.g. a loud howling sound) before you connect the microphone.
2 Connect a microphone to the **MIC** socket.
3 Press **CD**, **TUNER**, **TAPE** or **AUX**.
4 Play the selected source.
5 Adjust the volume level with **VOLUME**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

Note:
– *Keep the mic away from the speakers to prevent howling*

DISMANTLING INSTRUCTIONS

Dismantling of the Cassette Cover

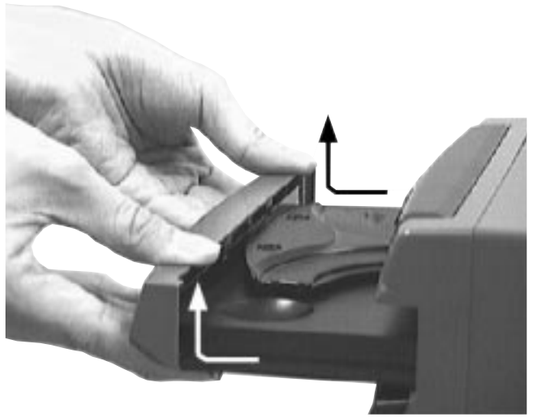




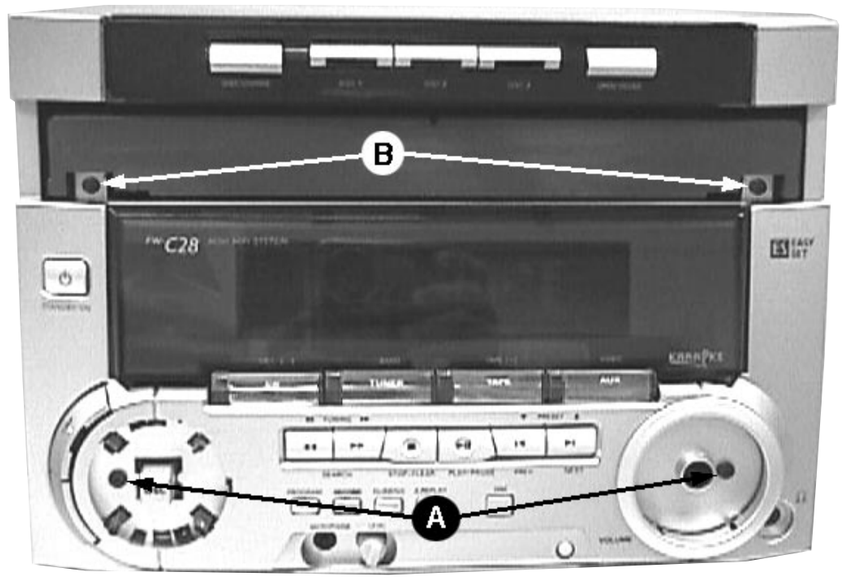
Cassette Cover

Dismantling of the Front Panel

1) Slide out the tray an remove the Cover Tray CDC (pos 107) as indicated.
2) Loosen the 8 screws to separate the Front Panel from the rear portion.
   - 2 screws B on the front
   - 2 screws each on the left & right side
   - 2 screws at the bottom



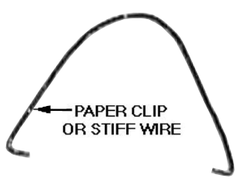
3-1

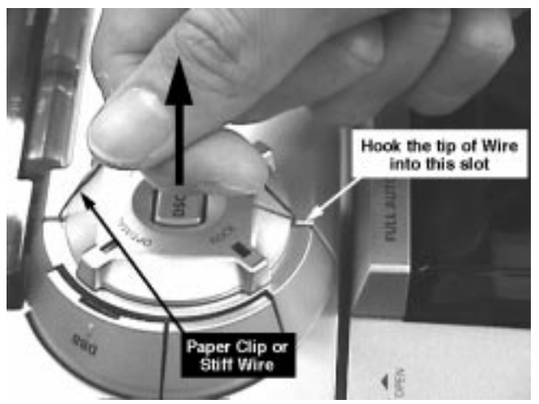


Dismantling of the Cover Control on the Front (see Notes)

1) Insert a strong string into the slot between the Volume knob (pos 146) and Cover Ring Volume (pos 144), looped it 1,5 turns securely around the Volume knob and pulled it out as shown.
2) Use a 0.5mm thick paper clip or stiff wire and bend into the shape as shown. Hook the 2 ends of the clip or wire into the slots.
3) Hold the clip or wire in position and pulled out the Cover Ring DSC (pos 143).
4) Remove the 2 hidden screws A to take out the Cover Control (pos 153).

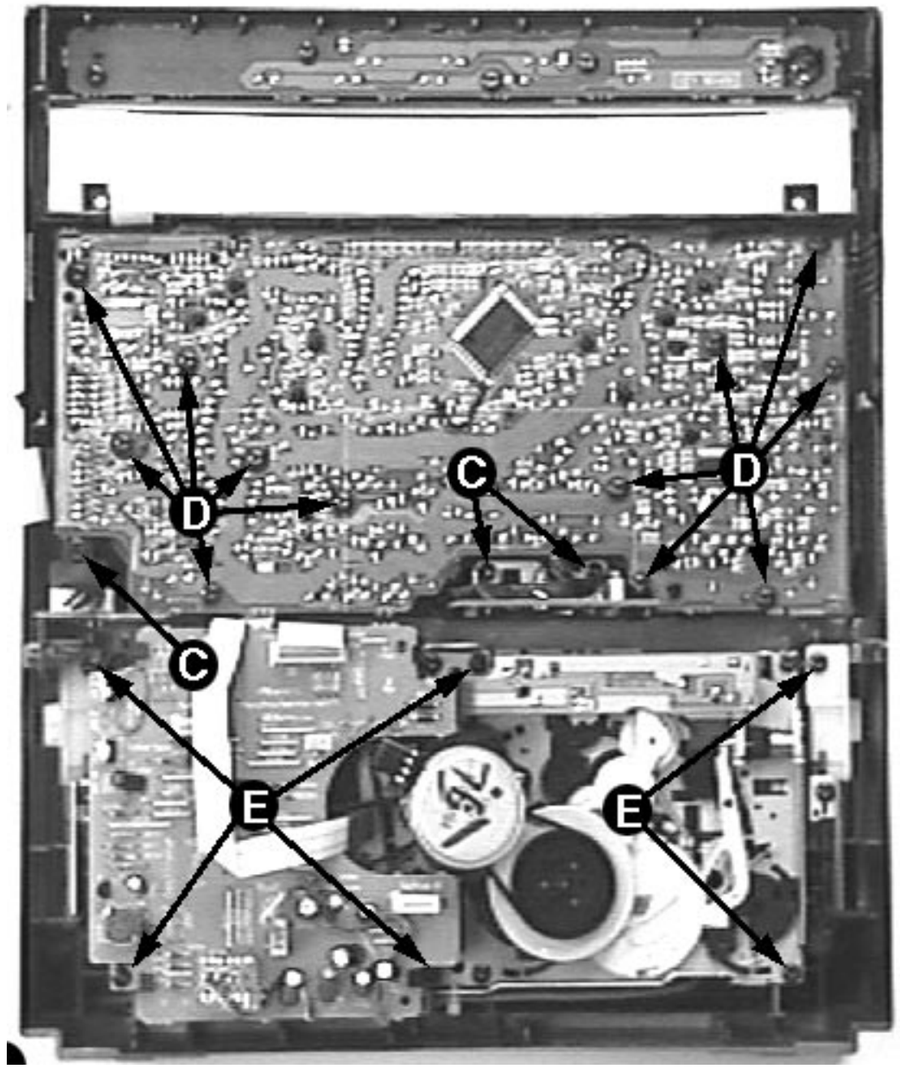
***Note**: Only the Lightguide DSC (pos 127) is sandwiched between the Front Cabinet (pos 101) & Cover Control (pos 153).*
Removal of Cover Ring DSC is not recommended unless any of the parts (pos 101, 127, 143 & 153) are need to be replaced and may cause some damage to the existing parts!





Dismantling of Assemblies on the Front Panel

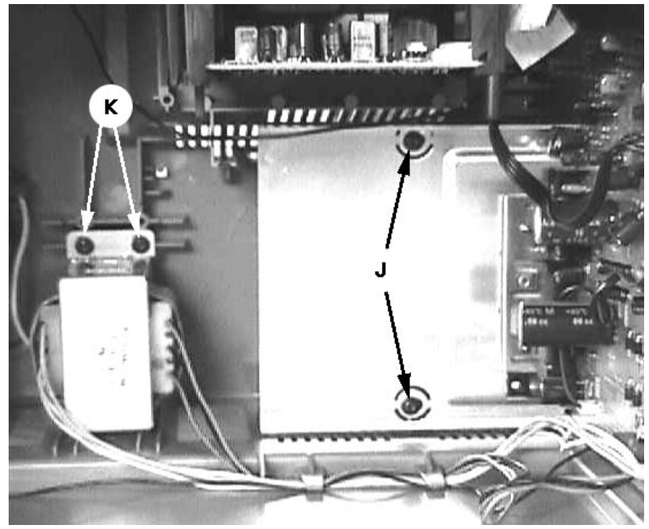
1) Remove the Volume knobs (pos 146) as per step 1 of ***Dismantling of the Cover Control on the Front***.
2) Remove 3 screws C to loosen the Headphone board (1x) and the Karaoke borad (2x).
   Note: Karaoke board is for some version only.
3) Remove 12 screws D as indicated to loosen the Front board.
4) Remove 6 screws E to loosen the ETF7 Module.



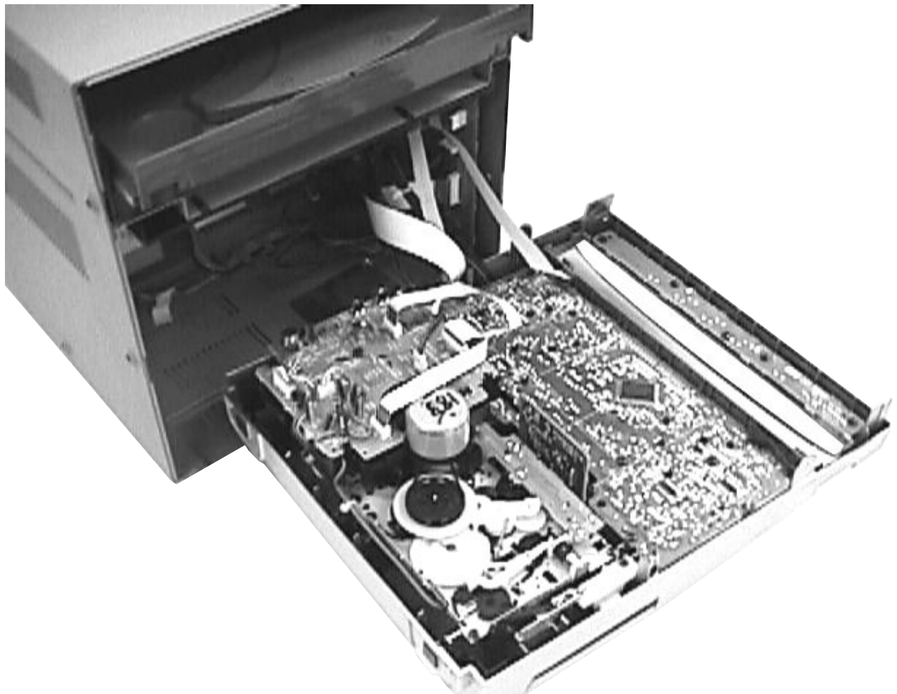
3-2

Dismantling of Rear Portion

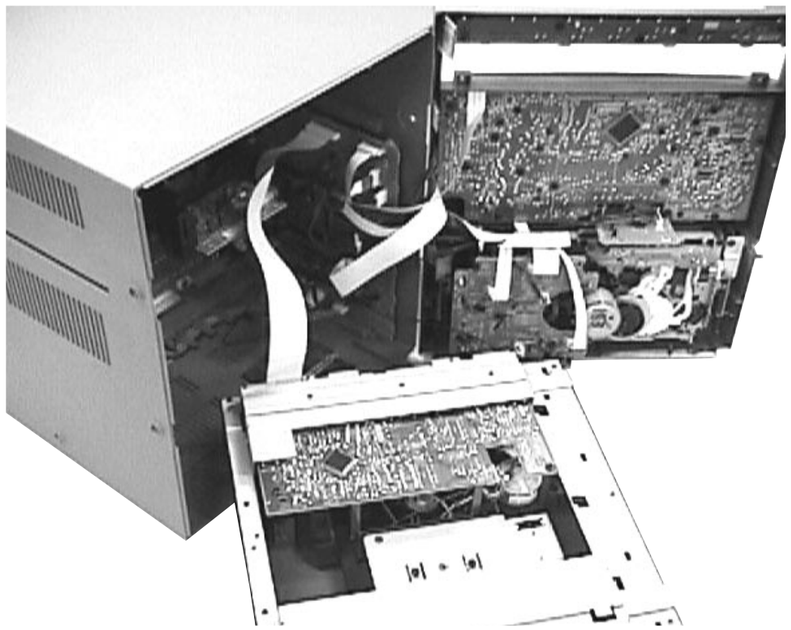
1) Remove 1 screw H & uncatch C1 to loosen the Mains socket board.
2) Remove 2 screws F, 2 screws G and uncatch C2 to loosen the Tuner board assembly.
3) Remove 5 screws J (3x on the rear and 2x on the heatsink) to loosen the Combi board (Main part).
4) Remove 2 screws K to loosen the Mains Transformer.



Service pos A



Service pos B



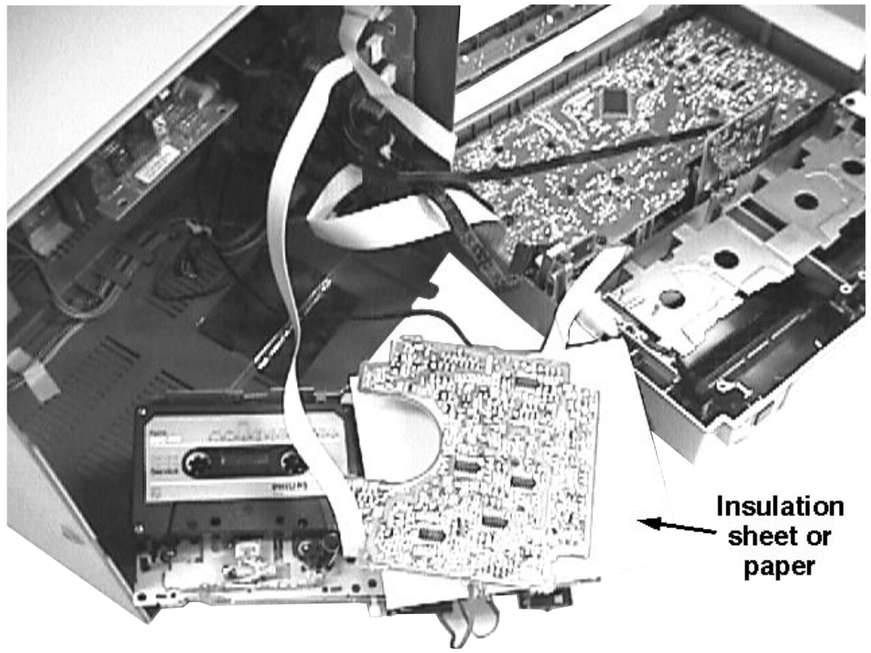
Notes:

1. During repair it is possible to disconnect the following assemblies or modules while repairing other areas:
   - Tuner Board
   - CDC Module

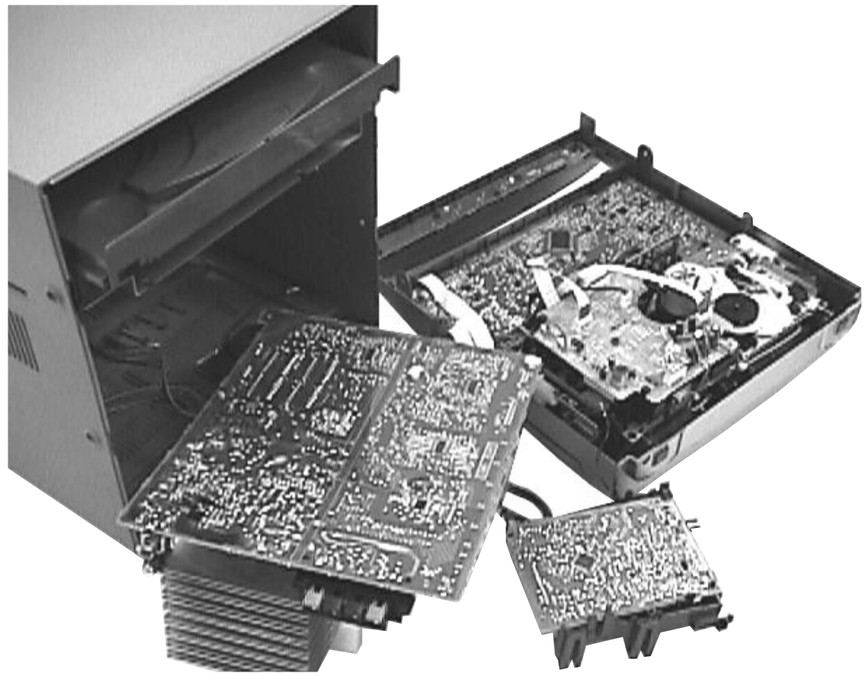
2. The flex cables are very fragile, care should be taken not to damage them during repair. After repair, be very sure that the flex cables are inserted properly into the flex sockets before encasing, otherwise faults may occurs.

3-3

Service pos C

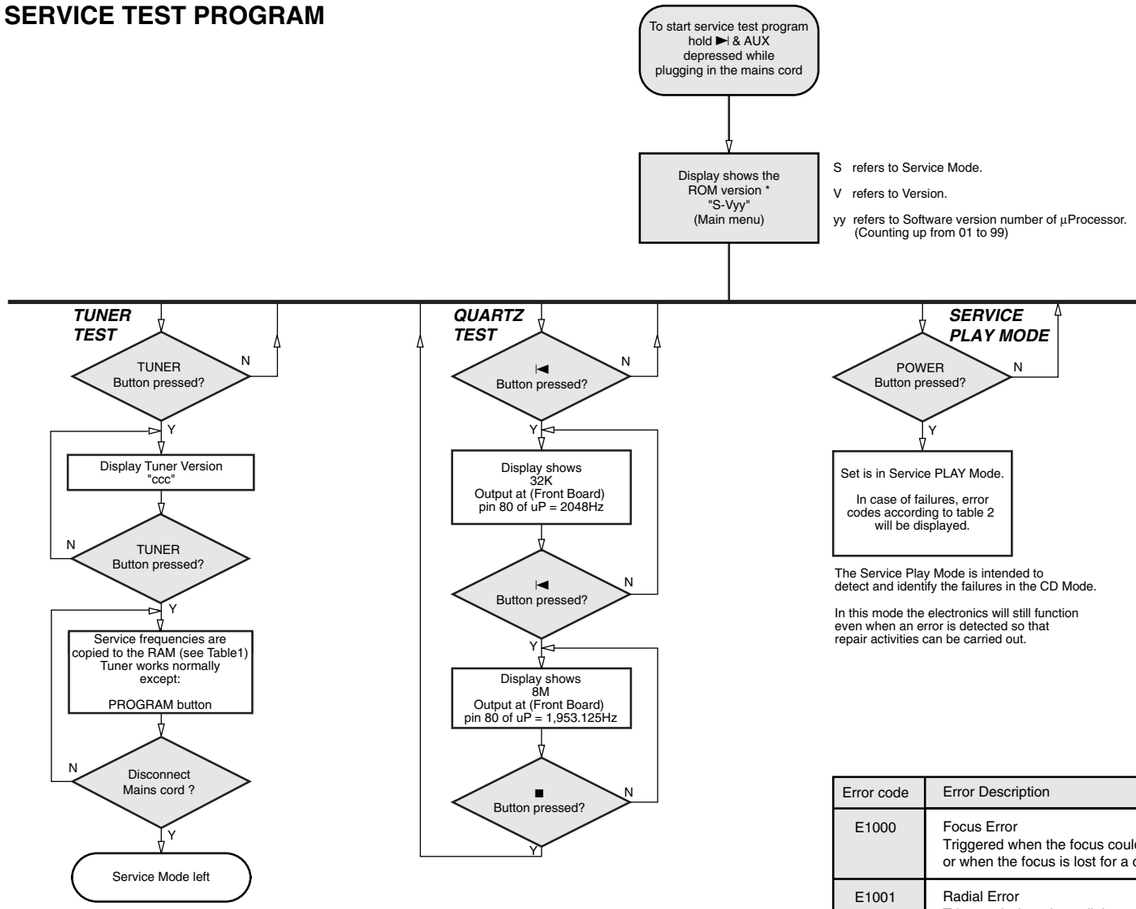


Service pos D



3-4

SERVICE TEST PROGRAM



PRESET	Europe "EUR"	East Eur. "EAS"	East Eur. Extended-band "EAS"	USA "USA"	Oversea "OSE"
1	87.5MHz	87.5MHz	65.81MHz	87.5MHz	87.5MHz
2	108MHz	108MHz	108MHz	108MHz	108MHz
3	531kHz	531kHz	74MHz	530kHz	531/530kHz*
4	1602kHz	1602kHz	87.5MHz	1700kHz	1602/1700kHz*
5	558kHz	558kHz	531kHz	560kHz	558/560kHz*
6	1494kHz	1494kHz	1602kHz	1500kHz	1494/1500kHz*
7	153kHz	87.5MHz	558kHz	98MHz	87.5/98MHz*
8	279kHz	87.5MHz	1494kHz	87.5MHz	87.5MHz
9	198kHz	87.5MHz	98MHz	87.5MHz	87.5MHz
10	98MHz	87.5MHz	70.01MHz	87.5MHz	87.5MHz
11	87.5MHz	98MHz	65.81MHz	87.5MHz	98/87.5MHz*

Table 1

Note: * Depending on the selected grid frequency (9 or 10kHz)
By holding the TUNER and ►► buttons depressed while switching on the Mains supply, one of the undermentioned features will be activated:
- the tuning grid frequency is toggled between 9kHz and 10kHz for the Oversea (/21) version.
- the extended FM1 (65.81MHz - 74MHz) is toggled on and off for East Eur. (/34) version.

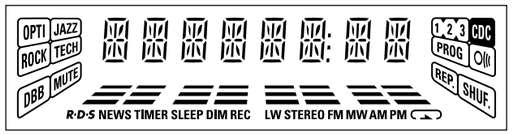
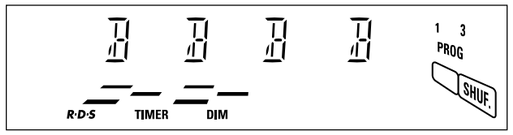


Figure 1



note ♪: DISC1, DISC3, TUNER, JAZZ and TECHNO

Figure 2

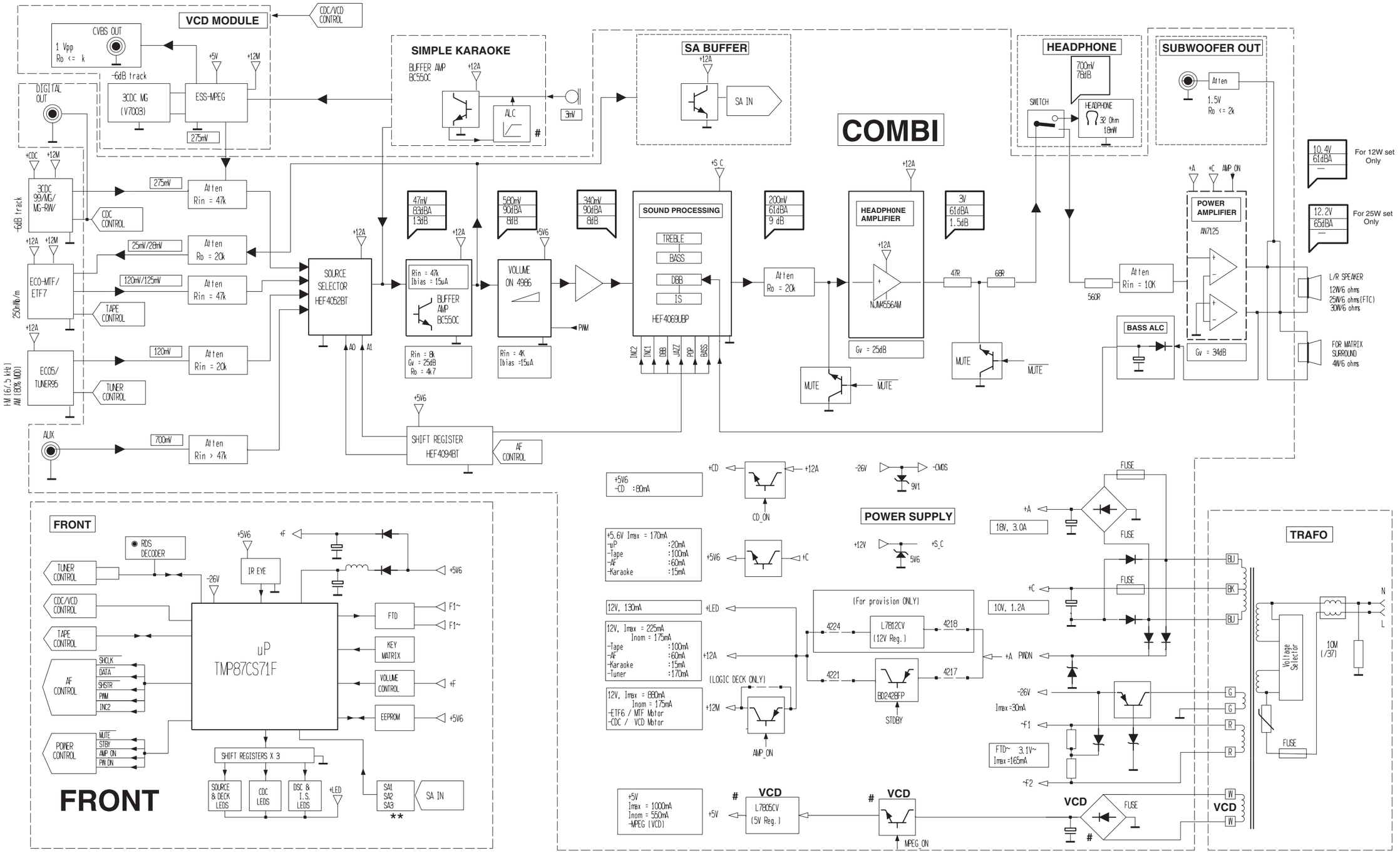
Error code	Error Description
E1000	Focus Error Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play.
E1001	Radial Error Triggered when the radial servo is off-track for a certain time during play.
E1002	Sledge In Error The sledge did not reach its inner position (inner-switch is still close) before approximately 6 Sec. have passed by. Inner-switch or sledge motor problem.
E1003	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	Jump-offtrack error Triggered in normal play when the jump destination could not be found within a certain time. When this error occurred, software will try to recover by initiating the jump command again. If it is recoverable, the disc will continue to play.
E1006	Subcode Error Triggered when a new subcode was missing for a certain time during play.
E1007	PLL Error The Phase Lock Loop could not lock within a certain time.
E1008	Turntable Motor Error Generated when the CD could not reached 75% of speed during startup within a certain time. Discmotor problem.
E1020	Focus Search Error The focus point has not been found within a certain time.
E1070	The carousel switch is not open within certain 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	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	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.

Table 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 "ERROR" will be displayed.
EEPROM FORMAT	◄◄	Load default data. Display shows "NEW" for 1 second. ***Caution!*** ***All presets from the customer will be lost!!***
ENCODER TEST	Volume Knob or Jog Shuttle knob	Display shows value for 2 seconds. Values increases or decreases in steps of 1 until 0 (Min.) or 40 (Max.) is reached.
LEAVE SERVICE TESTPROGRAM	Disconnect mains cord	

4-1

SET BLOCK DIAGRAM



NOTE :

MAIN SIGNAL PATH

MEASUREMENTS ARE IN AUX MODE

XX mV	LEVELS AT MAX VOL
YY dBA	S/N AT 500mW
ZZ dB	HEADROOM (1% thd) WRT TO LEVEL AT MAX VOL.

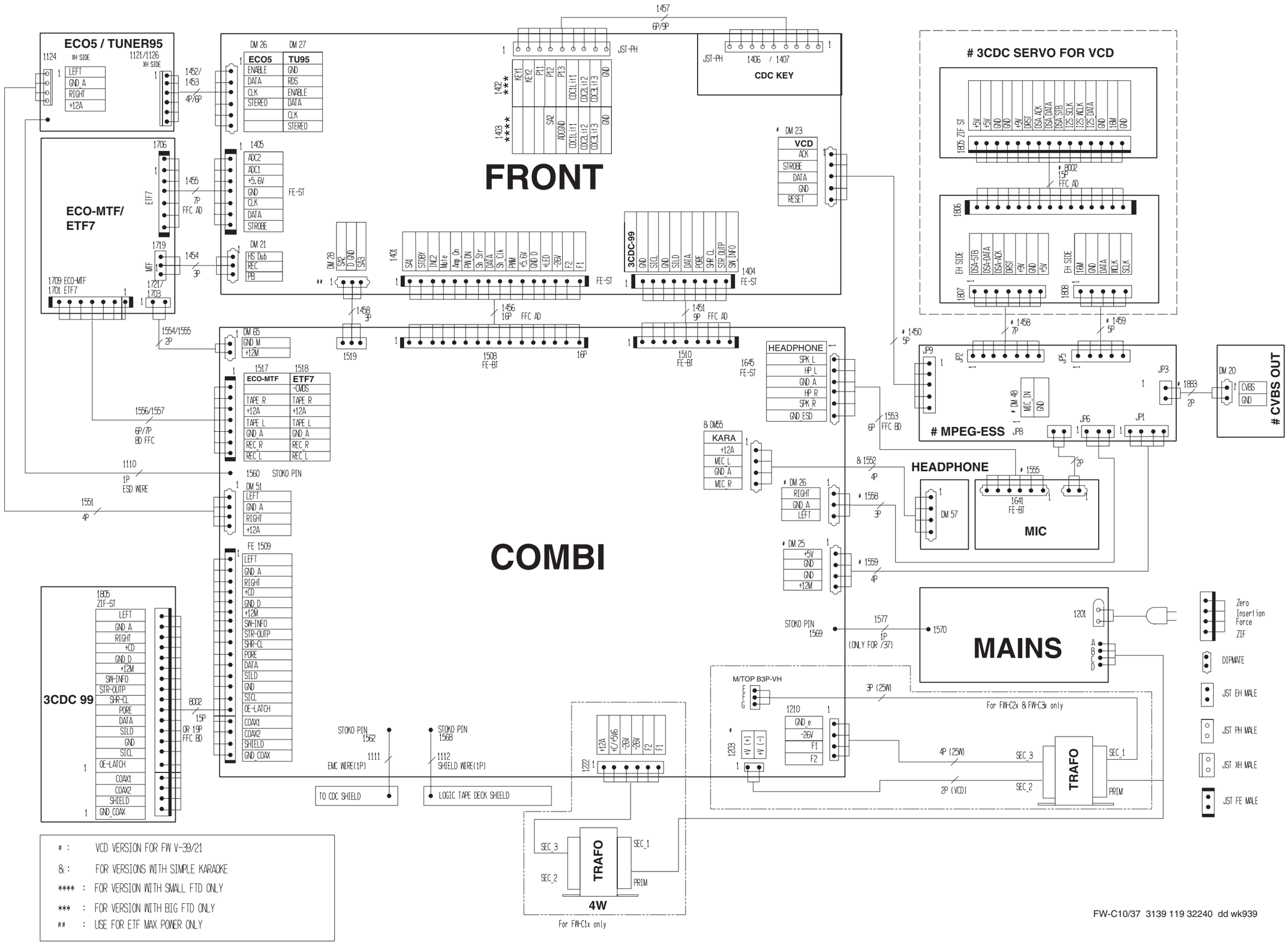
** For version with small FTD, only SA3 is use.

Provision for VCD

Updated on 10-06-99

5-1

SET WIRING DIAGRAM



FW-C10/37 3139 119 32240 dd wk939

FRONT BOARD

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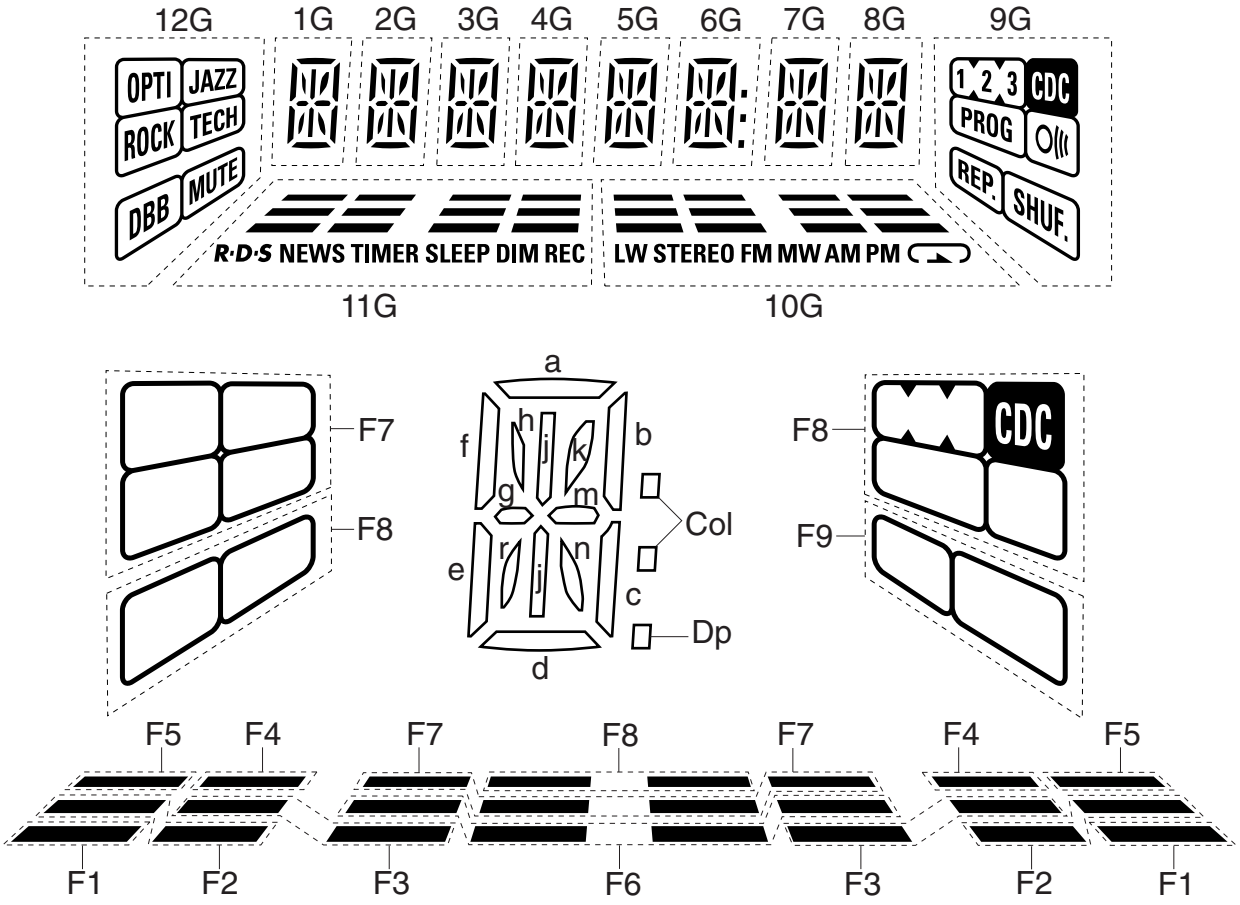
FTD DISPLAY PIN CONNECTIONS



	1G - 5G	6G	7G - 8G	9G	10G	11G	12G
P1	a	a	a	1	F1	F1	OPTI
P2	h	h	h	2	F2	F2	JAZZ
P3	j	j	j	3	F3	F3	TECH
P4	k	k	k		F4	F4	MUTE
P5	b	b	b	SHUF.	F5	F5	DBB
P6	f	f	f	REP.	F6	F6	ROCK
P7	m	m	m	PROG	F7	F7	F7
P8	g	g	g	F8	F8	F8	F8
P9	c	c	c	F9	LW	R·D·S	-
P10	e	e	e	-	STEREO	NEWS	-
P11	r	r	r	-	FM	TIMER	-
P12	n	n	n	-	MW	SLEEP	-
P13	d	d	d	-	AM	DIM	-
P14	-	Col	-	-	PM	REC	-
P15	-	Dp	-	-		-	-
P16	-	-	-	-		-	-

Front Board application

A5272	FW-C1/37, FW-C10/22/34/37
A5273	FW-C3/37, FW-C30/30/37, FW-C35/37
A5274	FW-C38/21/21M, FW-C39/21/21M/33
A5275	FW-C28/33
A5276	FW-C38/22/34
A5277	FW-C28/22/34
A5307	FW-C30/21/21M
A5308	FW-C38/37, FW-C39/30
A5344	FW-V39/21M/21K
A5348	FW-C10/21
A5350	FW-V28/21M
A5365	FW-C28/21M

FEATURES:	A5272	A5273	A5274	A5275	A5276	A5277	A5307	A5308	A5344	A5348	A5350	A5365
RDS	-	-	-	-	x	x	-	-	-	-	-	-
Rotary Volume	-	x	x	x	x	x	x	x	x	-	x	x
Jog Control	-	x	x	-	x	-	x	x	x	-	-	-
Spectrum Analyzer	-	-	x	-	x	-	-	x	x	-	-	-
Biplaner LED	-	x	x	x	x	x	x	x	x	-	x	x
Small FTD	x	x	-	x	-	x	x	-	-	x	x	x
Large FTD	-	-	x	-	x	-	-	x	x	-	-	-

Variations table for Front Board

ITEM NO.	A5272	A5273	A5274	A5275	A5276	A5277	A5307	A5308	A5344	A5348	A5350	A5365
DM21	x	x	-	-	-	-	x	-	-	x	-	-
DM23	-	-	-	-	-	-	-	-	x	-	x	-
DM26	x	x	x	x	-	-	x	x	x	x	x	x
DM27	-	-	-	-	x	x	-	-	-	-	-	-
1402	-	-	x	-	x	-	-	x	x	-	-	-
1403	x	x	-	x	-	x	x	-	-	x	x	x
1404	x	x	x	x	x	x	x	x	-	x	-	x
1405	-	-	x	x	x	x	-	x	x	-	x	x
1418	-	-	x	-	x	-	-	x	x	-	-	-
1419	-	-	x	-	x	-	-	x	x	-	-	-
1420	-	-	x	-	x	-	-	x	x	-	-	-
1421	-	-	x	x	x	x	-	x	x	-	x	x
1423	-	-	x	x	x	x	-	x	x	-	x	x
1425	-	-	-	x	x	x	-	-	x	-	x	-
1426	-	-	x	x	x	x	-	x	x	-	x	x
1427	-	-	-	-	x	x	-	-	x	-	x	-
1428	x	-	-	-	-	-	-	-	-	x	-	-
1429	x	-	-	-	-	-	-	-	-	x	-	-
1430	x	-	-	x	-	x	-	-	-	x	x	x
2417	-	220µF	220µF	220µF	220µF	220µF	220µF	220µF	220µF	-	220µF	220µF
2421	2,2µF	22µF	22µF	22µF	22µF	22µF	22µF	22µF	22µF	2,2µF	22µF	22µF
2432	-	-	-	-	100pF	100pF	-	-	-	-	-	-
2433	-	-	-	-	47pF	47pF	-	-	-	-	-	-
2462	-	220nF	220nF	220nF	220nF	220nF	220nF	220nF	220nF	-	220nF	220nF

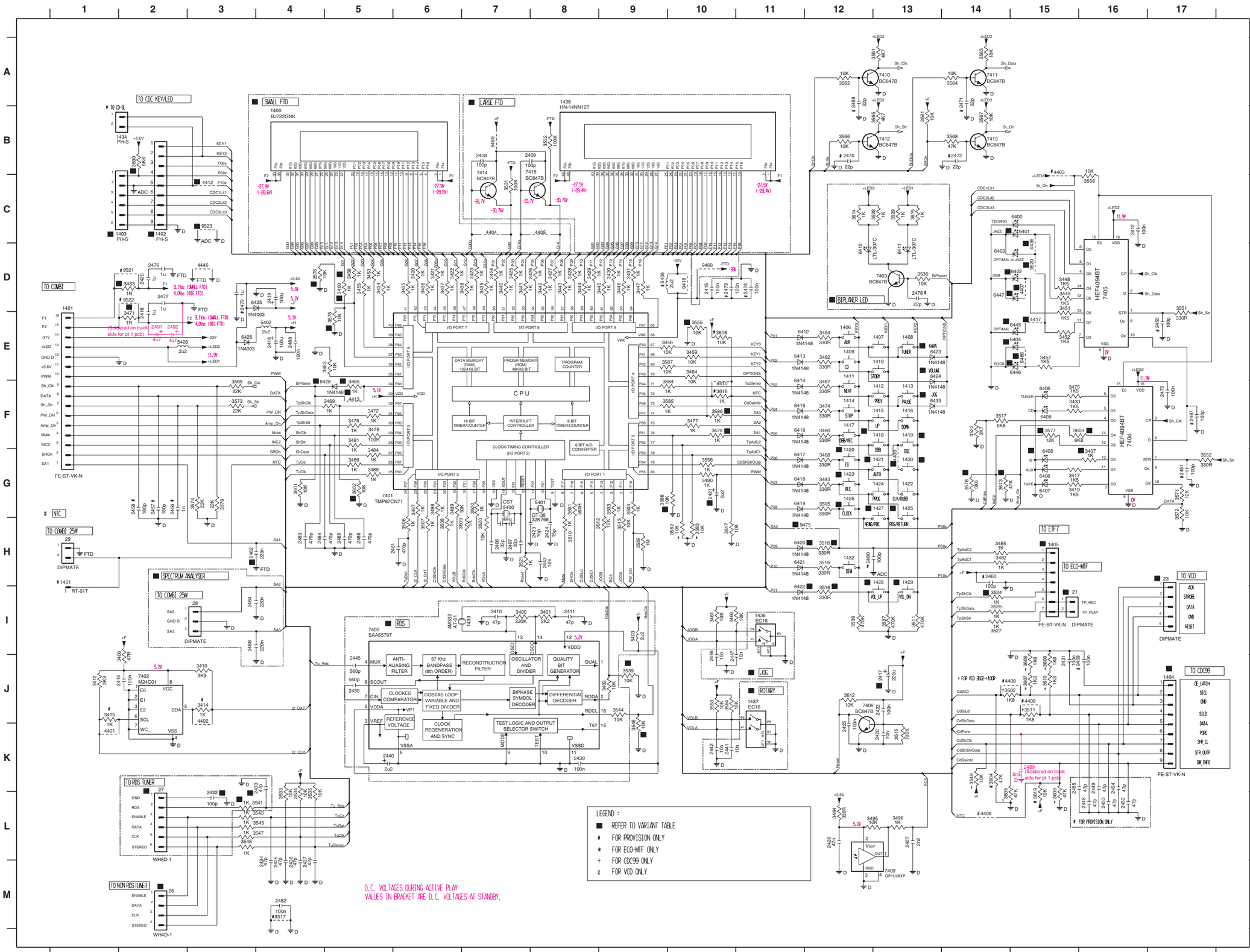
6-3

ITEM NO.	A5272	A5273	A5274	A5275	A5276	A5277	A5307	A5308	A5344	A5348	A5350	A5365
3407	-	-	1k	-	1k	-	-	1k	1k	-	-	-
3458	-	-	1k	-	1k	-	-	1k	1k	-	-	-
3460	-	-	1k	-	1k	-	-	1k	1k	-	-	-
3465	-	1k	1k	1k	1k	1k	1k	1k	1k	-	1k	1k
3471	4R7	4R7	1R	4R7	1R	4R7	4R7	1R	1R	4R7	4R7	4R7
3479	-	1k	1k	1k	1k	1k	1k	1k	1k	-	1k	1k
3483	4R7	4R7	1R	4R7	1R	4R7	4R7	1R	1R	4R7	4R7	4R7
3516	330R	-	-	-	-	-	-	-	-	330R	-	-
3518	-	-	330R	-	330R	-	-	330R	330R	-	-	-
3524	-	-	1k	1k	1k	1k	-	1k	1k	-	1k	1k
3539	10k	10k	10k	10k	-	-	10k	10k	10k	10k	10k	10k
3541	-	-	-	-	1k	1k	-	-	-	-	-	-
3546	10k	10k	10k	10k	-	-	10k	10k	10k	10k	10k	10k
3555	10k	10k	-	10k	-	10k	10k	-	-	10k	10k	10k
3575	10k	10k	-	10k	-	10k	10k	-	-	10k	10k	10k
3576	10k	10k	-	10k	-	10k	10k	-	-	10k	10k	10k
3577	-	-	12k	-	12k	-	-	12k	12k	-	-	-
3578	-	-	5k6	-	5k6	-	-	5k6	5k6	-	-	-
3586	-	-	1k	-	1k	-	-	1k	1k	-	-	-
3588	10k	-	-	-	-	-	-	-	-	10k	-	-
3600	5k6	5k6	-	5k6	-	5k6	5k6	-	-	5k6	5k6	5k6
3602	10k	10k	-	-	-	-	10k	-	-	10k	-	-
3603	6k8	10k	10k	10k	10k	10k	10k	10k	10k	6k8	10k	10k
3613	47k	12k	12k	12k	12k	12k	12k	12k	12k	47k	12k	12k
4400	x	-	-	x	-	x	-	-	-	x	x	x
4407	x	x	-	x	-	x	x	-	-	x	x	x
4412	-	-	x	-	x	-	-	x	x	-	-	-
4413	x	-	-	-	-	-	-	-	-	x	-	-
4417	x	-	-	x	-	x	-	-	-	x	x	x
4436	x	-	-	x	-	x	-	-	-	x	x	x
6401	-	x	x	-	x	-	x	x	x	-	-	-
6402	-	-	x	-	x	-	-	x	x	-	-	-
6404	-	x	x	-	x	-	x	x	x	-	-	-
6405	-	-	x	-	x	-	-	x	x	-	-	-
6420	-	-	x	-	x	-	-	x	x		-	
6422	x	-	-	-	-	-	-	-	-	x	-	-
6423	-	-	x	x	-	-	x	-	x	x	-	-
6424	-	x	-	-	-	-	x	-	-	-	-	-
6428	-	x	x	x	x	x	x	x	x	-	x	x
6433	-	x	-	-	-	-	x	-	-	-	-	-
6445	x	-	-	x	-	x	-	-	-	x	x	x
6446	x	-	-	x	-	x	-	-	-	x	x	x
6447	x	x	-	x	-	x	x	-	-	x	x	x
9475	x	x	-	x	-	x	x	-	-	x	x	x
9488	-	x	x	-	x	-	x	x	x	-	-	-
9520	-	x	x	-	x	-	x	x	x	-	-	-
9523	x	x	-	x	-	x	x	-	-	x	x	x

x = Item in use.

6-4

CIRCUIT DIAGRAM



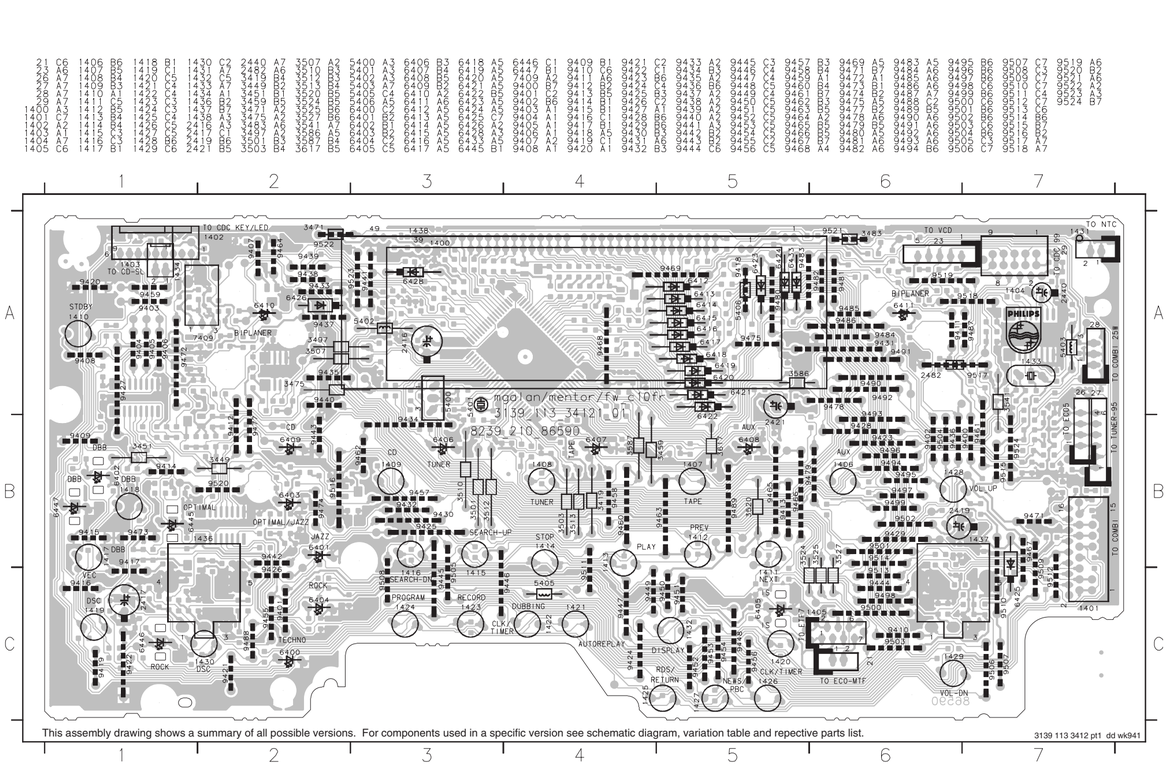
21 I15	3452 E15	5405 E2
23 H17	3453 D5	5406 D9
26 M2	3454 E12	6400 C15
27 K2	3455 D5	6401 C15
28 I3	3456 E10	6402 D15
29 H1	3457 E15	6403 D14
1400 B4	3458 D5	6404 E15
1401 D1	3459 E10	6405 G15
1402 C2	3460 D5	6406 F15
1403 C1	3461 I10	6407 G15
1404 J17	3462 E12	6408 G15
1405 H15	3463 E5	6409 F15
1406 E12	3464 E10	6410 D12
1407 E13	3465 F5	6411 D13
1408 E13	3466 I10	6412 E11
1409 E12	3467 F12	6413 E11
1410 E13	3469 F5	6414 F11
1411 E12	3471 E2	6415 F11
1412 F13	3472 F5	6416 F11
1413 F13	3474 F12	6417 G11
1414 F12	3475 F15	6418 G11
1415 F13	3476 F5	6419 G11
1416 F13	3477 F10	6420 H11
1417 F12	3478 F5	6421 H11
1418 F13	3479 F10	6422 I11
1419 F13	3480 F12	6423 E13
1420 G12	3481 F5	6424 E13
1421 G13	3482 H14	6425 D4
1422 G13	3483 D2	6426 E3
1423 G12	3484 G5	7428 F5
1424 G13	3485 H14	6433 F13
1425 G13	3486 G5	6445 E15
1426 G13	3488 G12	6446 E15
1427 G13	3489 G5	6447 D14
1428 H13	3490 G10	7400 I5
1429 H13	3493 G12	7401 G5
1430 G13	3494 L12	7402 J2
1431 H1	3495 L12	7403 D13
1432 H12	3496 L13	7404 F16
1433 I7	3497 G6	7405 D16
1434 B1	3498 G6	7408 J13
1436 I11	3499 G6	7409 M13
1437 J11	3500 G7	7410 A13
1438 A8	3501 G8	7411 A14
2406 H7	3502 J15	7412 B13
2407 H7	3503 G9	7413 B14
2408 B7	3504 G9	7414 B7
2409 B8	3505 G12	7415 B7
2410 I7	3506 H6	9418 D10
2411 I8	3507 H6	9468 D10
2412 C16	3508 H6	9469 B7
2414 J2	3509 H6	9475 H12
2415 D10	3510 H8	9488 E15
2416 E4	3511 J15	9517 M4
2417 J13	3512 H8	9520 D15
2418 E2	3513 H9	9521 D2
2419 D4	3515 K13	9522 D2
2420 D2	3516 I12	9523 C3
2421 G10	3517 F14	
2422 J13	3518 H12	
2423 H8	3519 H12	
2424 H8	3520 H7	
2425 K12	3521 H7	
2426 L12	3522 F14	
2427 L13	3524 I14	
2428 K13	3525 I14	
2430 J5	3527 I14	
2431 J15	3528 C13	
2432 L3	3529 C13	
2433 K3	3530 D13	
2434 M4	3531 C7	
2435 M4	3532 B8	
2436 M4	3533 L4	
2437 M4	3534 L4	
2439 K6	3535 L4	
2440 K5	3536 I12	
2441 K10	3537 I13	
2442 K10	3539 J9	
2443 H8	3541 L4	
2445 J5	3543 L4	
2446 J10	3544 J9	
2447 J10	3545 L4	
2448 L16	3546 K9	
2449 K16	3547 L4	
2450 E17	3548 L3	
2451 G17	3549 K14	
2452 L16	3551 D17	
2453 L16	3552 G17	
2454 K16	3553 J10	
2455 K15	3554 J10	
2456 G2	3555 E10	
2457 G2	3556 G10	
2458 G2	3558 C16	
2459 J15	3559 H9	
2460 H14	3561 A13	
2462 H3	3562 A12	
2464 I3	3563 A14	
2468 I3	3564 A14	
2469 A12	3565 B13	
2470 B12	3566 B12	
2471 A14	3567 B14	
2472 B14	3568 B14	
2473 D10	3569 F3	
2474 D11	3570 G3	
2475 F17	3571 G17	
2476 D2	3572 G17	
2477 D2	3573 F3	
2478 D13	3574 G3	
2479 D3	3575 E5	
2480 H12	3576 D4	
2481 H6	3577 F15	
2482 M4	3578 G14	
2483 H4	3581 B13	
2484 H4	3582 H10	
2485 H5	3583 H10	
2486 H5	3584 F10	
2487 F17	3585 F10	
2488 E4	3586 F10	
2489 K15	3587 E10	
3400 I7	3588 G9	
3401 I8	3600 B2	
3402 J9	3601 G4	
3406 J2	3602 G5	
3407 G16	3603 F16	
3410 J3	3604 K14	
3412 J1	3605 L14	
3414 J3	3606 L15	
3415 J1	3607 J15	
3417 G15	3608 J15	
3419 G15	3609 J15	
3420 D6	3610 J15	
3421 D6	3611 I13	
3422 D6	3612 J12	
3423 D7	3613 G14	
3424 D7	3614 C12	
3425 D7	3615 C13	
3426 D8	3616 F10	
3427 D8	3617 H10	
3428 D8	3618 E10	
3429 D8	3619 L15	
3430 D9	4400 G13	
3431 D9	4401 K1	
3433 F15	4402 J3	
3434 D5	4403 B15	
3435 D6	4404 C7	
3436 D6	4405 C8	
3437 D6	4406 L14	
3438 D7	4407 D15	
3439 D7	4408 J15	
3440 D7	4409 J15	
3441 D7	4410 F10	
3442 D8	4412 C3	
3443 D8	4413 F5	
3444 D8	4417 E15	
3445 D9	4436 D15	
3446 D9	4446 D3	
3447 D9	5400 G7	
3448 D15	5401 G8	
3449 D15	5402 E4	
3451 D15	5403 I9	

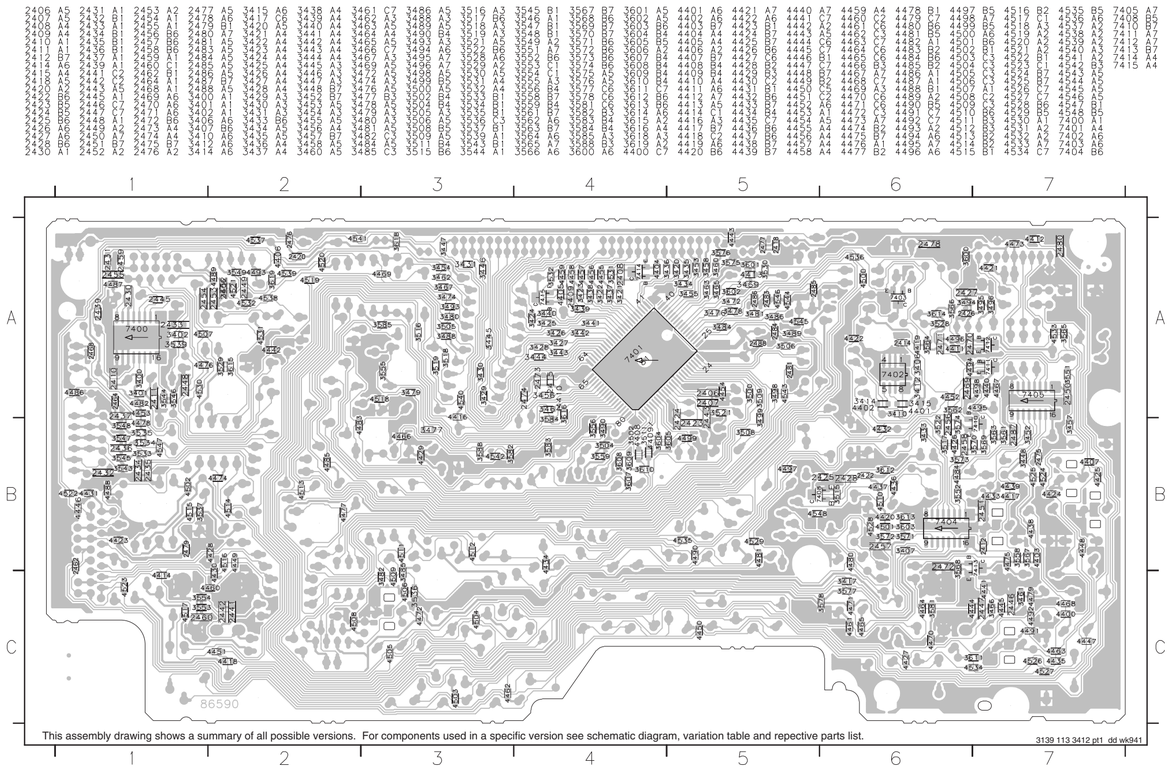
COMPONENT LAYOUT

6-5

CHIP LAYOUT

6-5





ELECTRICAL PARTS LIST - FRONT BOARD

MISCELLANEOUS

1400	313911052070	FTD Display BJ722GNK
1401	242202514546	Flex Socket 16 pin Hort.
1404	482226511531	Flex Socket 9 pin Hort.
1405	482226710953	Flex Socket 7 pin Vert.
1406	482227613775	Tact Switch
1407	482227613775	Tact Switch
1408	482227613775	Tact Switch
1409	482227613775	Tact Switch
1410	482227613775	Tact Switch
1411	482227613775	Tact Switch
1412	482227613775	Tact Switch
1413	482227613775	Tact Switch
1414	482227613775	Tact Switch
1415	482227613775	Tact Switch
1416	482227613775	Tact Switch
1417	482227613775	Tact Switch
1421	482227613775	Tact Switch
1422	482227613775	Tact Switch
1423	482227613775	Tact Switch
1424	482227613775	Tact Switch
1425	482227613775	Tact Switch
1426	482227613775	Tact Switch
1427	482227613775	Tact Switch
1430	482227613775	Tact Switch
1432	482227613775	Tact Switch
1433	482224272195	Quartz 4,332MHz
1437	482227310365	Rotary Encoder 24pin

CAPACITORS

2406	532212232659	33pF 5% 50V
2407	532212232659	33pF 5% 50V
2410	482212613692	47pF 1% 63V
2411	482212613692	47pF 1% 63V
2412	482212614585	100nF 10% 50V
2414	482212613838	100nF +80/-20% 50V
2415	482212614585	100nF 10% 50V
2416	482212423432	100µF 20% 10V
2417	482212412245	220µF 20% 10V
2418	482212614043	1µF +80/-20% 16V
2419	482212441584	100µF 20% 10V
2420	482212614043	1µF +80/-20% 16V
2421	482212481151	22µF 20% 50V
2422	482212614585	100nF 10% 50V
2423	482212613486	15pF 2% 63V
2424	482212613486	15pF 2% 63V
2425	482212613838	100nF +80/-20% 50V
2426	482212613751	47nF 10% 63V
2427	482212233127	2,2nF 10% 63V
2428	482212233177	10nF 20% 50V
2430	532211680853	560pF 5% 63V
2431	482212614585	100nF 10% 50V
2432	532212232531	100pF 5% 50V
2433	482212613692	47pF 1% 63V
2434	482212613692	47pF 1% 63V
2435	482212613692	47pF 1% 63V
2436	482212613692	47pF 1% 63V
2437	482212613692	47pF 1% 63V
2439	482212614585	100nF 10% 50V
2440	482212422652	2,2µF 20% 50V
2441	482212233177	10nF 20% 50V
2442	482212233177	10nF 20% 50V
2443	482212233177	10nF 20% 50V
2445	532211680853	560pF 5% 63V
2462	482212614076	220nF +80/-20% 25V
2475	482212614585	100nF 10% 50V
2476	482212614043	1µF +80/-20% 16V
2477	482212614043	1µF +80/-20% 16V
2481	532212232268	470pF 10% 50V
2482	482212612882	100nF +80/-20% 50V
2483	532212232268	470pF 10% 50V
2484	532212232268	470pF 10% 50V
2485	532212232268	470pF 10% 50V
2486	532212232268	470pF 10% 50V
2488	482212614585	100nF 10% 50V
2489	482212210577	3,3nF 10% 16V
2491	482212440769	4,7µF 20% 50V
2492	482212440769	4,7µF 20% 50V

RESISTORS

3400	482211713579	220k 1% 0,1W
3401	482211711449	2k2 1% 0,1W
3402	482211710833	10k 1% 0,1W
3406	482205120479	47R 5% 0,1W
3410	482205120392	3k9 5% 0,1W
3412	482205120392	3k9 5% 0,1W
3417	482211711139	1k5 1% 0,1W
3419	482211652243	1k5 5% 0,5W
3420	482205110102	1k 2% 0,25W
3421	482205110102	1k 2% 0,25W
3422	482205110102	1k 2% 0,25W
3423	482205110102	1k 2% 0,25W
3424	482205110102	1k 2% 0,25W
3425	482205110102	1k 2% 0,25W
3426	482205110102	1k 2% 0,25W
3427	482205110102	1k 2% 0,25W
3428	482205110102	1k 2% 0,25W
3429	482205110102	1k 2% 0,25W
3430	482205110102	1k 2% 0,25W
3431	482205110102	1k 2% 0,25W
3433	482211711139	1k5 1% 0,1W
3434	482205110102	1k 2% 0,25W
3435	482205110102	1k 2% 0,25W
3436	482205110102	1k 2% 0,25W
3437	482205110102	1k 2% 0,25W
3438	482205110102	1k 2% 0,25W
3439	482205110102	1k 2% 0,25W
3440	482205110102	1k 2% 0,25W
3441	482205110102	1k 2% 0,25W
3442	482205110102	1k 2% 0,25W
3443	482205110102	1k 2% 0,25W
3444	482205110102	1k 2% 0,25W
3445	482205110102	1k 2% 0,25W
3446	482205110102	1k 2% 0,25W
3447	482205110102	1k 2% 0,25W
3448	482211711139	1k5 1% 0,1W
3449	482211652243	1k5 5% 0,5W
3451	482211652243	1k5 5% 0,5W
3452	482211711139	1k5 1% 0,1W
3453	482205110102	1k 2% 0,25W
3454	482211713577	330R 1% 1,25W
3455	482205110102	1k 2% 0,25W
3456	482211710833	10k 1% 0,1W
3457	482211711139	1k5 1% 0,1W
3459	482205021003	10k 1% 0,6W
3461	482211710833	10k 1% 0,1W
3462	482211713577	330R 1% 1,25W
3463	482211710833	10k 1% 0,1W
3464	482211710833	10k 1% 0,1W
3465	482205110102	1k 2% 0,25W
3466	482211710833	10k 1% 0,1W
3467	482211713577	330R 1% 1,25W
3469	482205110102	1k 2% 0,25W
3471	482205024708	4R7 1% 0,6W
3472	482205110102	1k 2% 0,25W
3474	482211713577	330R 1% 1,25W
3475	482211652243	1k5 5% 0,5W
3476	482205110102	1k 2% 0,25W
3477	482205110102	1k 2% 0,25W
3478	482205120101	100R 5% 0,1W
3479	482205110102	1k 2% 0,25W
3480	482211713577	330R 1% 1,25W
3481	482205110102	1k 2% 0,25W
3482	482205110102	1k 2% 0,25W
3483	482205024708	4R7 1% 0,6W
3484	482205110102	1k 2% 0,25W
3485	482205110102	1k 2% 0,25W
3486	482205110102	1k 2% 0,25W
3488	482211713577	330R 1% 1,25W
3489	482205110102	1k 2% 0,25W
3490	482205110102	1k 2% 0,25W
3493	482211713577	330R 1% 1,25W
3494	482211713577	330R 1% 1,25W
3495	482211710833	10k 1% 0,1W
3496	482205110102	1k 2% 0,25W
3497	482205011002	1k 1% 0,4W
3498	482205110102	1k 2% 0,25W
3499	482211710833	10k 1% 0,1W
3500	482205110102	1k 2% 0,25W
3501	482211652226	560R 5% 0,5W
3502	482205120182	1k8 5% 0,1W
3503	482205011002	1k 1% 0,4W
3504	482205110102	1k 2% 0,25W
3505	482211713577	330R 1% 1,25W
3506	482205110102	1k 2% 0,25W
3507	482205011002	1k 1% 0,4W
3508	482205110102	1k 2% 0,25W
3509	482205110102	1k 2% 0,25W
3510	482205011002	1k 1% 0,4W
3511	482205120182	1k8 5% 0,1W
3512	482205021003	10k 1% 0,6W
3513	482205021003	10k 1% 0,6W
3515	482211710837	100k 1% 0,1W
3517	482211711507	6k8 1% 0,1W
3519	482211713577	330R 1% 1,25W
3520	482205021003	10k 1% 0,6W
3521	482205110102	1k 2% 0,25W
3522	482211712955	2k7 1% 0,1W
3524	482205011002	1k 1% 0,4W
3525	482205011002	1k 1% 0,4W
3527	482205011002	1k 1% 0,4W
3528	482205110102	1k 2% 0,25W
3529	482205110102	1k 2% 0,25W
3530	482211710833	10k 1% 0,1W
3533	482211710833	10k 1% 0,1W
3534	482211710833	10k 1% 0,1W
3535	482211710833	10k 1% 0,1W
3536	482205120474	470k 5% 0,1W
3537	482205120474	470k 5% 0,1W
3539	482211710833	10k 1% 0,1W
3541	482205011002	1k 1% 0,4W
3543	482205110102	1k 2% 0,25W
3544	482211710833	10k 1% 0,1W
3545	482205110102	1k 2% 0,25W
3546	482211710833	10k 1% 0,1W
3547	482205110102	1k 2% 0,25W
3548	482205110102	1k 2% 0,25W
3549	482211710833	10k 1% 0,1W
3551	482211713577	330R 1% 1,25W
3552	482211713577	330R 1% 1,25W
3553	482211710833	10k 1% 0,1W
3554	482211710833	10k 1% 0,1W
3555	482211710833	10k 1% 0,1W
3556	482205110102	1k 2% 0,25W
3558	482211710833	10k 1% 0,1W
3559	482205120105	1M 5% 0,1W
3561	482205120472	4k7 5% 0,1W
3562	482211710833	10k 1% 0,1W
3563	482211710833	10k 1% 0,1W
3564	482211710833	10k 1% 0,1W
3565	482205120472	4k7 5% 0,1W
3566	482211710833	10k 1% 0,1W
3567	482211710833	10k 1% 0,1W
3568	482211710834	47k 1% 0,1W
3569	482205120223	22k 5% 0,1W
3570	482205120223	22k 5% 0,1W
3571	482211711383	12k 1% 0,1W
3572	482211710833	10k 1% 0,1W
3573	482205120223	22k 5% 0,1W
3574	482205120223	22k 5% 0,1W
3575	482211710833	10k 1% 0,1W
3576	482211710833	10k 1% 0,1W
3581	482211710833	10k 1% 0,1W
3584	482205110102	1k 2% 0,25W
3585	482205110102	1k 2% 0,25W
3587	482205021003	10k 1% 0,6W
3600	482205120562	5k6 5% 0,1W
3601	482211710833	10k 1% 0,1W
3603	482211710833	10k 1% 0,1W
3607	482205120182	1k8 5% 0,1W
3608	482205120182	1k8 5% 0,1W
3609	482205120182	1k8 5% 0,1W
3610	482205120182	1k8 5% 0,1W
3611	482205120474	470k 5% 0,1W
3612	482211710833	10k 1% 0,1W
3613	482211711383	12k 1% 0,1W
3614	482205110102	1k 2% 0,25W
3615	482205110102	1k 2% 0,25W
3617	482205021003	10k 1% 0,6W
4400	482205120008	0R Jumper 0805
4401	482205120008	0R Jumper 0805
4402	482205120008	0R Jumper 0805
4404	482205120008	0R Jumper 0805
4405	482205120008	0R Jumper 0805
4407	482205120008	0R Jumper 0805
4410	482205120008	0R Jumper 0805
4411	482205120008	0R Jumper 0805
4414	482205120008	0R Jumper 0805
4416	482205120008	0R Jumper 0805
4417	482205120008	0R Jumper 0805
4418	482205120008	0R Jumper 0805
4419	482205120008	0R Jumper 0805
4420	482205120008	0R Jumper 0805
4421	482205120008	0R Jumper 0805
4422	482205120008	0R Jumper 0805
4423	482205120008	0R Jumper 0805
4424	482205120008	0R Jumper 0805
4425	482205120008	0R Jumper 0805
4426	482205120008	0R Jumper 0805
4427	482205120008	0R Jumper 0805
4428	482205120008	0R Jumper 0805
4429	482205120008	0R Jumper 0805
4430	482205120008	0R Jumper 0805
4431	482205120008	0R Jumper 0805
4432	482205120008	0R Jumper 0805
4433	482205120008	0R Jumper 0805
4434	482205120008	0R Jumper 0805
4435	482205120008	0R Jumper 0805
4436	482205120008	0R Jumper 0805
4437	482205120008	0R Jumper 0805
4438	482205120008	0R Jumper 0805
4439	482205120008	0R Jumper 0805
4440	482205120008	0R Jumper 0805
4441	482205120008	0R Jumper 0805
4442	482205120008	0R Jumper 0805
4443	482205120008	0R Jumper 0805
4444	482205120008	0R Jumper 0805
4445	482205120008	0R Jumper 0805
4446	482205120008	0R Jumper 0805
4447	482205120008	0R Jumper 0805
4448	482205120008	0R Jumper 0805
4449	482205120008	0R Jumper 0805
4450	482205120008	0R Jumper 0805
4451	482205120008	0R Jumper 0805
4452	482205120008	0R Jumper 0805
4453	482205120008	0R Jumper 0805
4454	482205120008	0R Jumper 0805
4455	482205120008	0R Jumper 0805
4456	482205120008	0R Jumper 0805
4457	482205120008	0R Jumper 0805
4458	482205120008	0R Jumper 0805
4459	482205120008	0R Jumper 0805
4460	482205120008	0R Jumper 0805
4461	482205120008	0R Jumper 0805
4462	482205120008	0R Jumper 0805
4463	482205120008	0R Jumper 0805
4464	482205120008	0R Jumper 0805
4465	482205120008	0R Jumper 0805
4466	482205120008	0R Jumper 0805
4467	482205120008	0R Jumper 0805
4468	482205120008	0R Jumper 0805
4469	482205120008	0R Jumper 0805
4470	482205120008	0R Jumper 0805
4471	482205120008	0R Jumper 0805
4472	482205120008	0R Jumper 0805
4473	482205120008	0R Jumper 0805
4474	482205120008	0R Jumper 0805
4475	482205120008	0R Jumper 0805
4476	482205120008	0R Jumper 0805
4477	482205120008	0R Jumper 0805
4478	482205120008	0R Jumper 0805
4479	482205120008	0R Jumper 0805
4480	482205120008	0R Jumper 0805

ELECTRICAL PARTS LIST - FRONT BOARD

RESISTORS

4481	482205120008	0R Jumper 0805
4482	482205120008	0R Jumper 0805
4483	482205120008	0R Jumper 0805
4484	482205120008	0R Jumper 0805
4485	482205120008	0R Jumper 0805
4486	482205120008	0R Jumper 0805
4487	482205120008	0R Jumper 0805
4488	482205120008	0R Jumper 0805
4489	482205120008	0R Jumper 0805
4490	482205120008	0R Jumper 0805
4491	482205120008	0R Jumper 0805
4492	482205120008	0R Jumper 0805
4493	482205120008	0R Jumper 0805
4494	482205120008	0R Jumper 0805
4495	482205120008	0R Jumper 0805
4496	482205120008	0R Jumper 0805
4497	482205120008	0R Jumper 0805
4498	482205120008	0R Jumper 0805
4499	482205120008	0R Jumper 0805
4500	482205120008	0R Jumper 0805
4501	482205120008	0R Jumper 0805
4502	482205120008	0R Jumper 0805
4503	482205120008	0R Jumper 0805
4504	482205120008	0R Jumper 0805
4505	482205120008	0R Jumper 0805
4506	482205120008	0R Jumper 0805
4507	482205120008	0R Jumper 0805
4508	482205120008	0R Jumper 0805
4509	482205120008	0R Jumper 0805
4510	482205120008	0R Jumper 0805
4511	482205120008	0R Jumper 0805
4512	482205120008	0R Jumper 0805
4513	482205120008	0R Jumper 0805
4514	482205120008	0R Jumper 0805
4515	482205120008	0R Jumper 0805
4516	482205120008	0R Jumper 0805
4517	482205120008	0R Jumper 0805
4518	482205120008	0R Jumper 0805
4519	482205120008	0R Jumper 0805
4520	482205120008	0R Jumper 0805
4521	482205120008	0R Jumper 0805
4522	482205120008	0R Jumper 0805
4523	482205120008	0R Jumper 0805
4524	482205120008	0R Jumper 0805
4525	482205120008	0R Jumper 0805
4526	482205120008	0R Jumper 0805
4527	482205120008	0R Jumper 0805
4528	482205120008	0R Jumper 0805
4529	482205120008	0R Jumper 0805
4530	482205120008	0R Jumper 0805
4531	482205120008	0R Jumper 0805
4532	482205120008	0R Jumper 0805
4533	482205120008	0R Jumper 0805
4534	482205120008	0R Jumper 0805
4535	482205120008	0R Jumper 0805
4536	482205120008	0R Jumper 0805
4537	482205120008	0R Jumper 0805
4538	482205120008	0R Jumper 0805
4539	482205120008	0R Jumper 0805
4540	482205120008	0R Jumper 0805
4541	482205120008	0R Jumper 0805
4542	482205120008	0R Jumper 0805
4543	482205120008	0R Jumper 0805
4544	482205120008	0R Jumper 0805
4545	482205120008	0R Jumper 0805
4546	482205120008	0R Jumper 0805
4547	482205120008	0R Jumper 0805
4548	482205120008	0R Jumper 0805

COILS & FILTERS

5400	482224272066	Ceram Resonator 8MHz
5401	242254301069	X'tal Resonator 32,768kHz
5402	482215762552	Coil 2,2µH 5%
5403	482215762552	Coil 2,2µH 5%
5405	482215762552	Coil 2,2µH 5%

DIODES

6400	823921052460	LTL-4222N-071A
6403	823921052460	LTL-4222N-071A
6406	482213082978	LTL-1CHPE
6407	482213082978	LTL-1CHPE
6408	482213082978	LTL-1CHPE
6409	482213082978	LTL-1CHPE
6410	823921052490	LTL-2N3URK-071A
6411	823921052490	LTL-2N3URK-071A
6412	482213030621	1N4148
6413	482213030621	1N4148
6414	482213030621	1N4148
6415	482213030621	1N4148
6416	482213030621	1N4148
6417	482213030621	1N4148
6418	482213030621	1N4148
6419	482213030621	1N4148
6421	482213030621	1N4148
6425	482213031878	1N4003G
6426	482213031878	1N4003G
6428	482213030621	1N4148
6445	823921052460	LTL-4222N-071A
6446	482213082978	LTL-1CHPE
6447	482213082978	LTL-1CHPE

TRANSISTORS & INTEGRATED CIRCUITS

7400	482220931981	SAA6579T
7401	313911052110	TMP87CS71F "C28S52111"

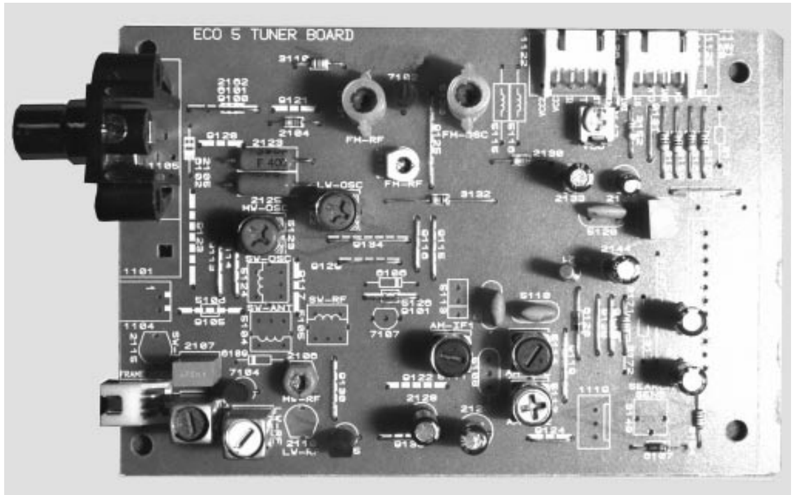
ELECTRICAL PARTS LIST - FRONT BOARD

TRANSISTORS & INTEGRATED CIRCUITS

7402	932213104668	M24C01-WMN6
7403	482213060511	BC847B
7404	532220911306	HEF4094BT
7405	532220911306	HEF4094BT
7408	482213060511	BC847B
7409	482213010165	GP1U28XP
7410	482213060511	BC847B
7411	482213060511	BC847B
7412	482213060511	BC847B
7413	482213060511	BC847B

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

7B-1
7B-1



TUNER BOARD ECO5

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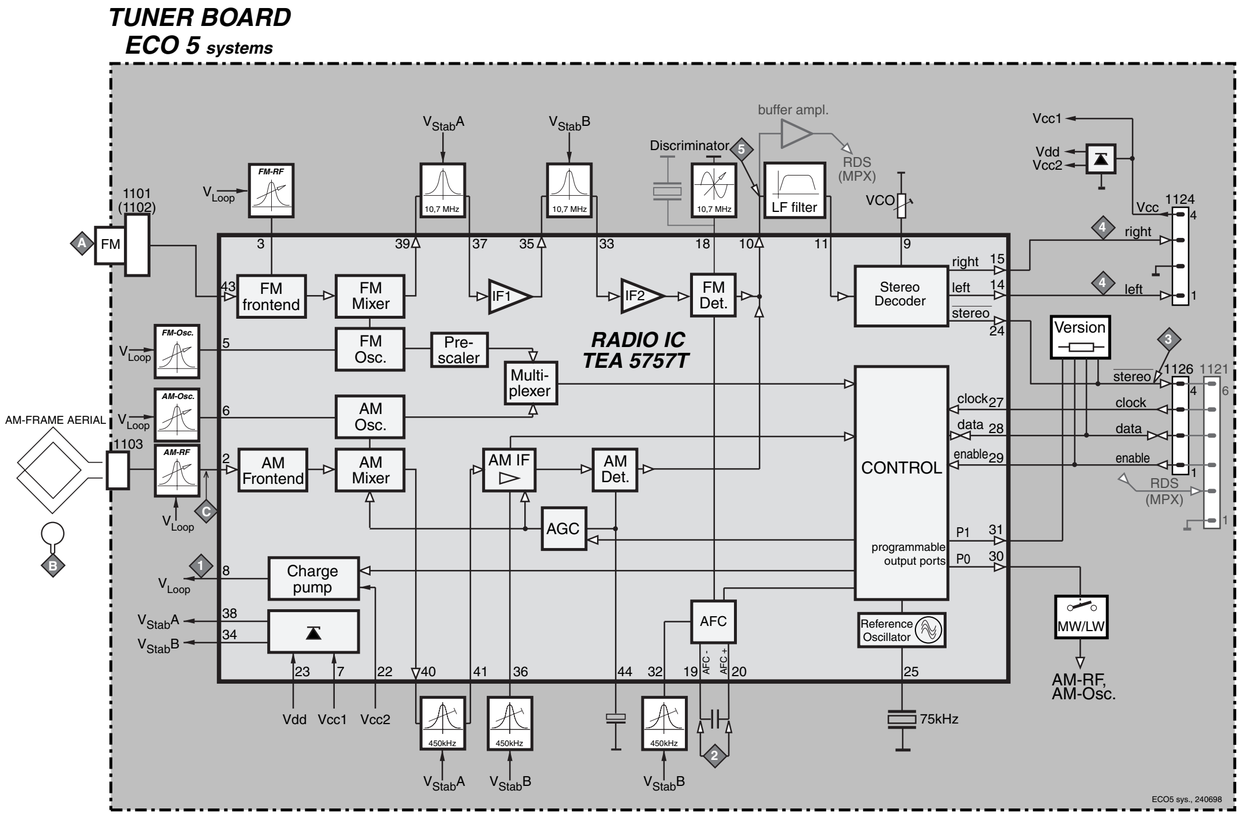
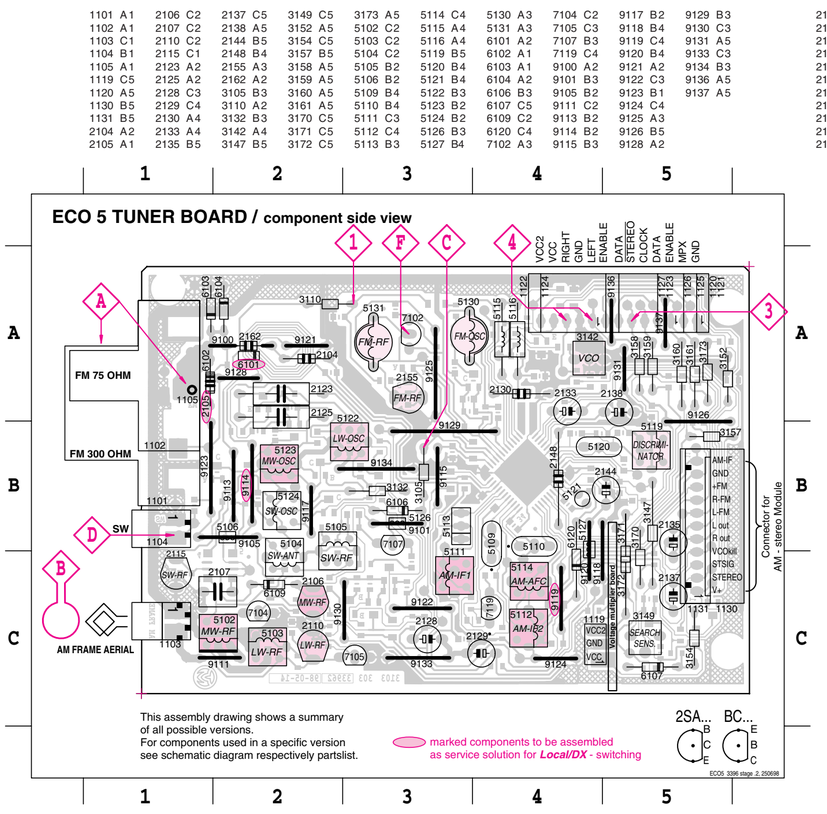
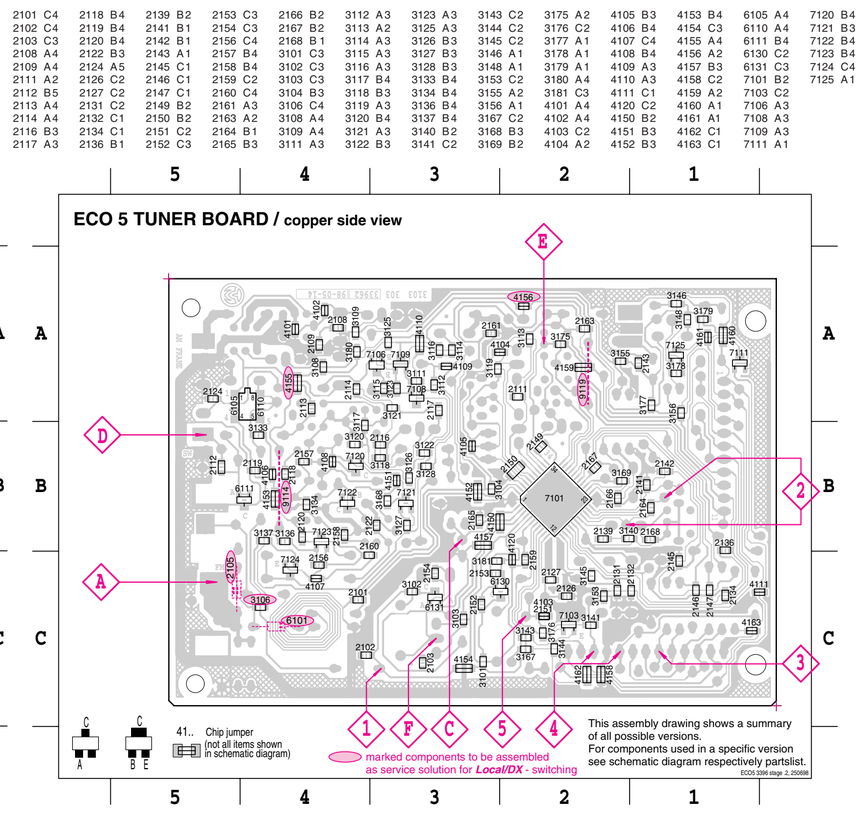
BLOCKDIAGRAM



7B-2

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		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	1	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	IC 7101 36 220R 100nF	5111	4	max. f_o symmetric
		Δf=±15kHz V_{RF} = 3mV	IC 7101 40 see remark [2] 220R 100nF	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	1494kHz	2106	4	max. f_o symmetric
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz	Δf = ±30kHz V_{RF} as low as possible	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

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TUNER BOARD ECO5 / Systems

VERSION PROGRAMMING COMPONENTS					
	6120	3156	3157	3170	remark
/00 FM/MW/LW	x	-	-	-	7111 not mounted
/00 FM/MW/LW/SW-Eu	-	-	-	-	
/01 FM/MW-Stereo	-	-	x	-	SW
/01 FM/MW	-	x	-	x	
/01 FM/MW/SW-Ov	-	x	-	-	
/06 FM-Japan/MW-stereo	-	-	-	x	
/13 FM/MW-Stereo	-	-	x	-	SW
/14 FM-OIRT/MW/LW	x	-	x	x	
/14 FM-OIRT/MW	x	-	x	-	
/17 FM/AM-Stereo	-	-	x	-	SW
/17 FM/AM	x	-	-	x	
/.. FM/MW/2xSW	-	-	x	x	
/15 FM/MW/SW-Eu	-	x	x	x	

x = component mounted
SW = Software initialisation

r....for RDS version only
s...for East European version (/14/34) only
t....for Japanese version (/06/26) only
u...for 2-band (FM/AM) version only
v...for SW-version 3.9-12.1MHz only
w...for LW only
x....not for all versions
y....for USA version (/17/37) only
z....for AM-STEREO (/06/13/26/33) versions only

Signal path: FM; AM; MPX (Audio Frequency); AF - left/right

Vdc FM mode stereo; Vdc MW mode; Vdc LW mode

Voltages measured while set is tuned to a strong transmitter

ECO5 systems, discr.coil, 030998

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ELECTRICAL PARTS LIST - ECO5 TUNER BOARD

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 20223	22k 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	
3176	4822 051 10102	1k 2% 0,25W	for RDS version
3180	4822 051 20223	22k 5% 0,1W	for LW 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	

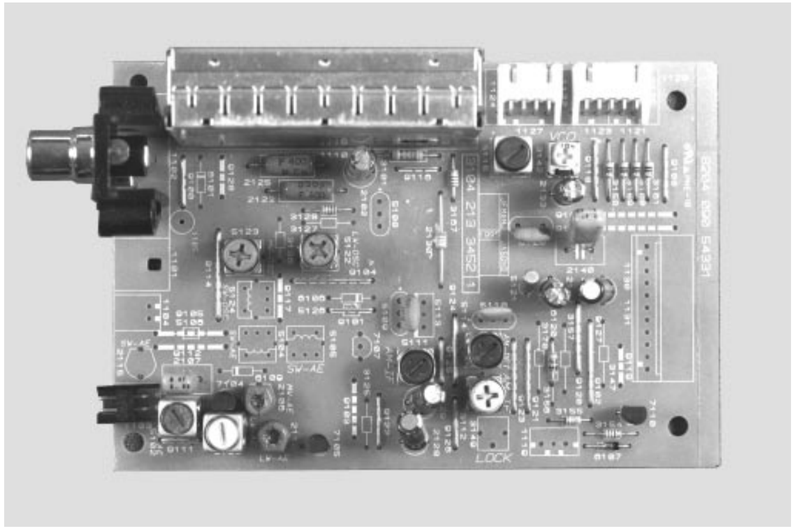
DIODES

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

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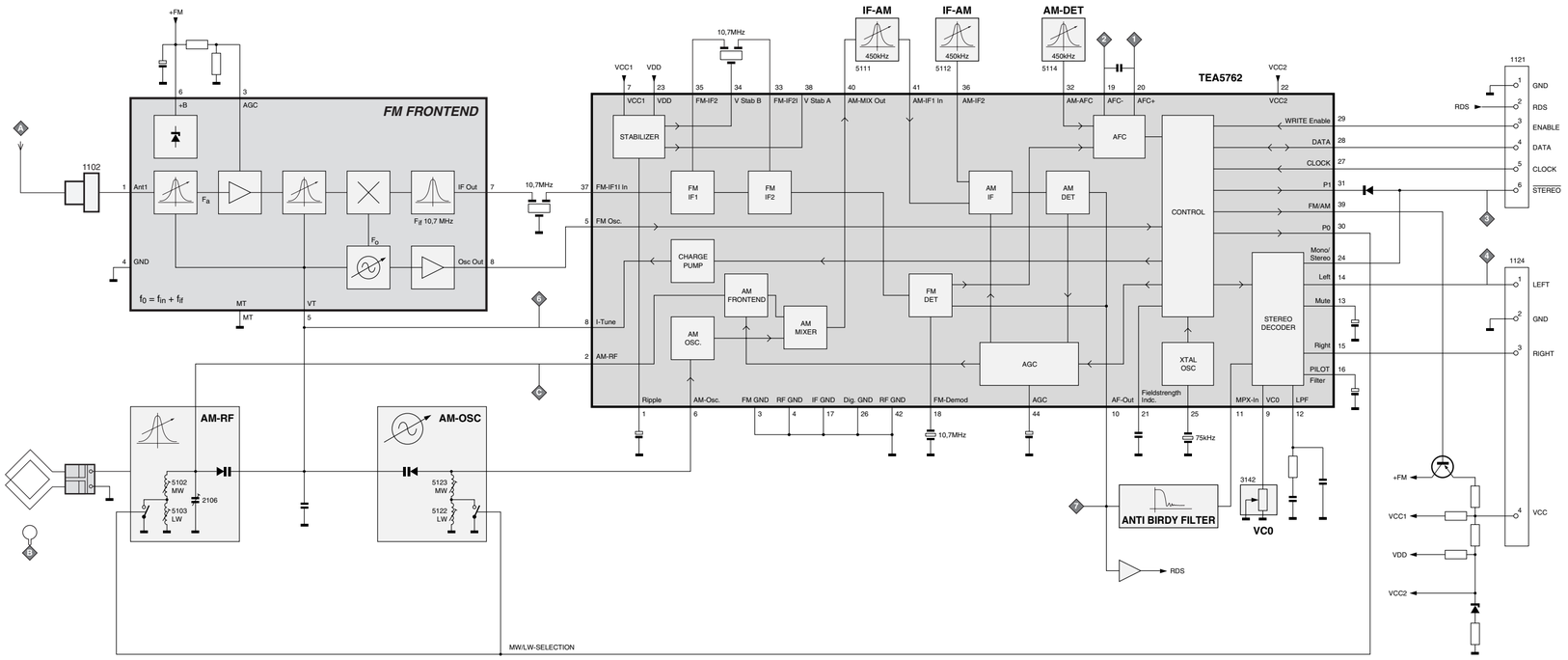
BLOCKDIAGRAM



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 50E	MW	5111	◇7	symmetrical and max. height
				5112		
	450kHz continuous wave	◇C		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

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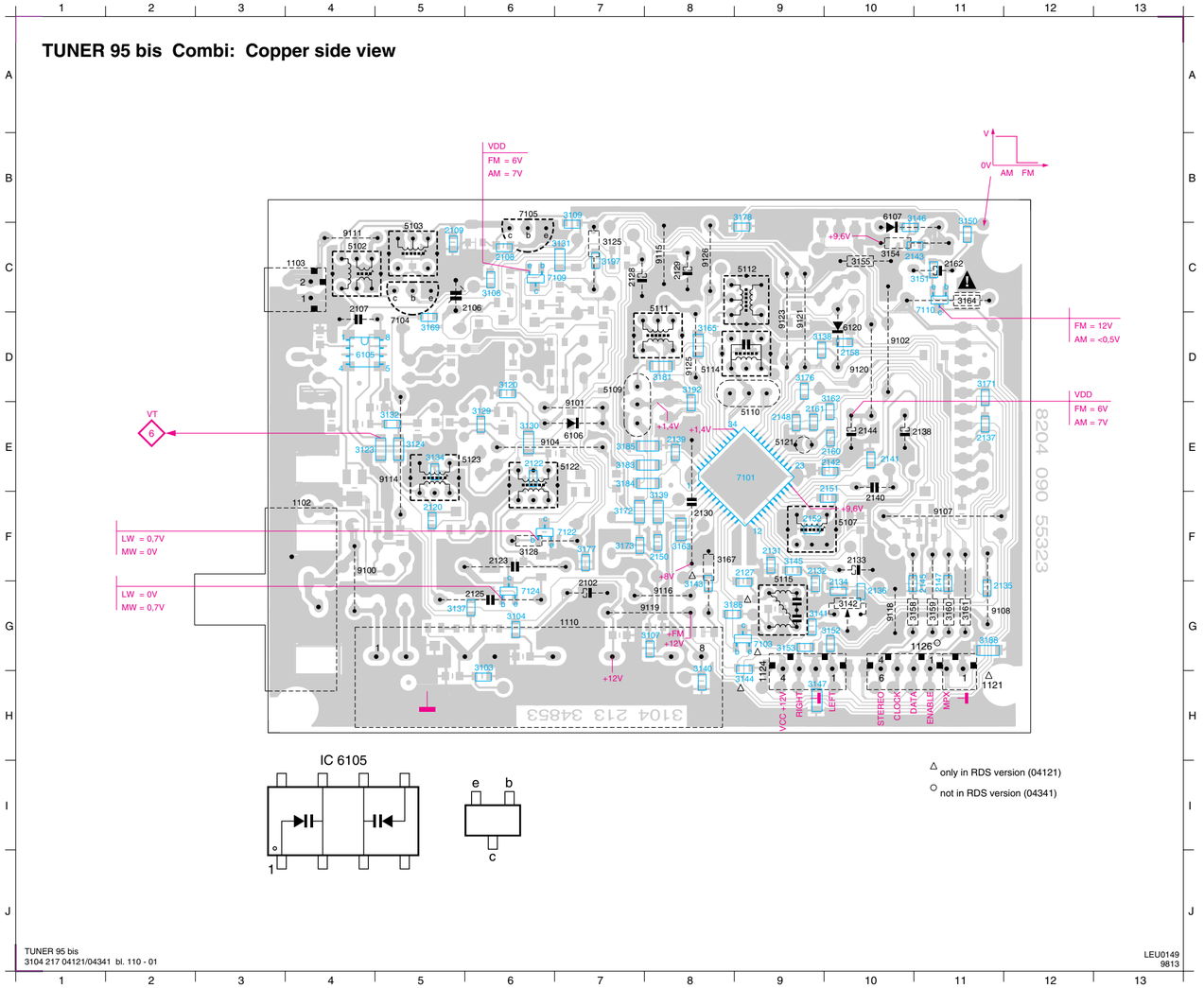
1102	F4	2107	C4	2128	C7	2136	G10	2144	E10	2160	E9	3120	D6	3132	E5	3143	G8	3153	G9	3163	F8	3176	D9	3188	G11	5111	C8	6106	E7	7110	D11	9108	G11	9121	D9
1103	C4	2108	C6	2129	C8	2137	E11	2145	G11	2161	E9	3123	E4	3134	E5	3144	H9	3154	C10	3164	C11	3177	F7	3192	D8	5112	C9	6107	B10	7122	F7	9111	C4	9123	D9
1110	G7	2109	C5	2130	F8	2138	E10	2147	G11	2162	C11	3124	E5	3137	G5	3145	F9	3155	C10	3165	D8	3178	B8	3197	C7	5114	D8	6120	D10	7124	G6	9114	E5	9125	D8
1121	H11	2120	F5	2131	F9	2139	E8	2148	E9	3103	H6	3125	C7	3138	D9	3146	B10	3158	G11	3167	F8	3181	D8	5102	C4	5115	G9	7101	E9	9100	F4	9115	C8	9126	C8
1124	H9	2122	E6	2132	F9	2140	F10	2150	F8	3104	G6	3128	F6	3139	F8	3147	H9	3159	G11	3169	D5	3183	E7	5103	C5	5121	E9	7103	G9	9101	E7	9116	G8		
1126	G10	2123	F6	2133	F10	2141	E10	2151	F9	3107	G7	3129	E6	3140	H8	3150	C11	3160	G11	3171	D11	3184	E7	5107	F10	5122	E7	7104	D5	9102	D10	9118	G10		
2102	G7	2125	G6	2134	G10	2142	E9	2152	F9	3108	C6	3130	E6	3141	G9	3151	C10	3161	G11	3172	F7	3185	E7	5109	D7	5123	E5	7105	B6	9104	E6	9119	G7		
2106	C5	2127	F9	2135	G11	2143	C10	2158	D10	3109	B7	3131	C6	3142	G10	3152	G9	3162	D9	3173	F7	3186	G8	5110	E9	6105	D4	7109	C6	9107	F11	9120	D10		



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
2139	I7
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
3120	H5
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
3147	N20
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
3178	N20
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
6106	H5
6107	K20
6120	E17
7101	C15
7103	K17
7104	J2
7105	K2
7109	L10
7110	I19
7122	L9
7124	L6

TUNER 95 bis

LEU0150
9813

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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% 50V
2123	4822 121 10766	390pF 1% 630V
2125	4822 121 10578	560pF 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
2139	4822 126 10002	100nF 20% 25V
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	15pF 5% 50V
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
3120	4822 051 20008	0R Jumper 0805
3123	4822 051 10008	0R Jumper 1206
3124	4822 051 10008	0R Jumper 1206
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 Jumper 1206
3131	4822 051 10008	0R Jumper 1206
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 Jumper 1206
3140	4822 051 20331	330R 5% 0,1W
3141	4822 117 11148	56k 1% 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
3147	4822 051 10008	0R Jumper 1206
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 117 13579	220k 1% 0,1W
3163	4822 051 10008	0R Jumper 1206
3164	4822 052 10478 ⚠	4R7 5% 0,33W
3165	4822 051 10008	0R Jumper 1206
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 Jumper 1206
3173	4822 051 20008	0R Jumper 0805
3176	4822 051 20008	0R Jumper 0805
3177	4822 051 20223	22k 5% 0,1W
3178	4822 051 10008	0R Jumper 1206
3181	4822 051 10008	0R Jumper 1206
3183	4822 051 10008	0R Jumper 1206
3184	4822 051 10008	0R Jumper 1206
3185	4822 051 10008	0R Jumper 1206
3186	4822 051 10102	1k 2% 0,25W
3188	4822 051 10008	0R Jumper 1206
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
6106	4822 130 30621	1N4148
6107	4822 130 34488	BZX79-C11
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.

ETF7 TAPE MODULE

(Non-Dolby Version)

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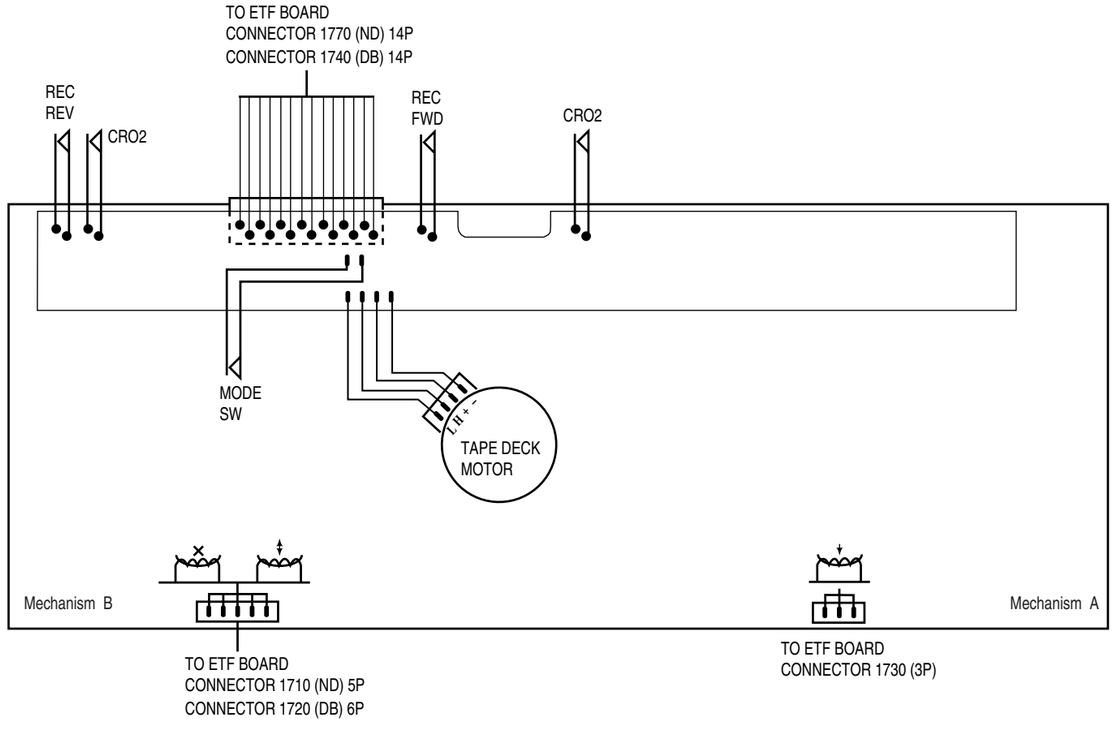
Tapedeck wiring (Double deck)



OPTIONS / VARIANTS TABLE

MODULE	**ETF7**		
VARIANT	**1**	**2**	**3**
FEATURES	**DB/DD/FR**	**ND/DD/FR**	**ND/DD/FF**
Deck configuration	double	double	double
Deck type (Tokyo Pigeon)	CWE	CWE	CWE
Autoreverse	yes (B)	yes (B)	no
Auto Replay	no	no	yes (A+B)
Motor configuration	single	single	single
Auto tape type selection	yes	yes	yes
Dolby type B Noise Reduction	yes	no	no
19 kHz pilot suppression	yes	no	no
Normal / High speed dubbing	yes	yes	no
Cue/Review & Fwd/Rewind	yes	yes	yes

DB = Dolby B NR
DD = Double Deck
FF = Non-Autoreverse
FR = Autoreverse Deck B
ND = Non-Dolby
SD = Single Deck

Variations table for Analog Circuit

	Autoreverse	Non-autoreverse
	ND/DD/FR	ND/DD/FF
2701 , 2702	150pF	270pF
2703 , 2704	100pF	220pF
2717 , 2718	10nF	15nF
2727 , 2728	470pF	1nF
3616	10k	1k
3618	6k8	-
3620	10k trimmer	-
3622	-	10k trimmer
3672	4k7	-
3676	47k	-
3688	680R	-
3723 , 3724	15k	18k
3727 , 3728	5k6	6k8
3729 , 3730	3k3	4k7
3743 , 3744	1k5	2k2
3745 , 3746	3k3	5k6
3754 , 3755	1M	47R
3769	12k	8k2
3772	6k8	5k6
3774	15k	8k2
6614	1N4148	-
7616	BC857B	-
7622	BC847B	-

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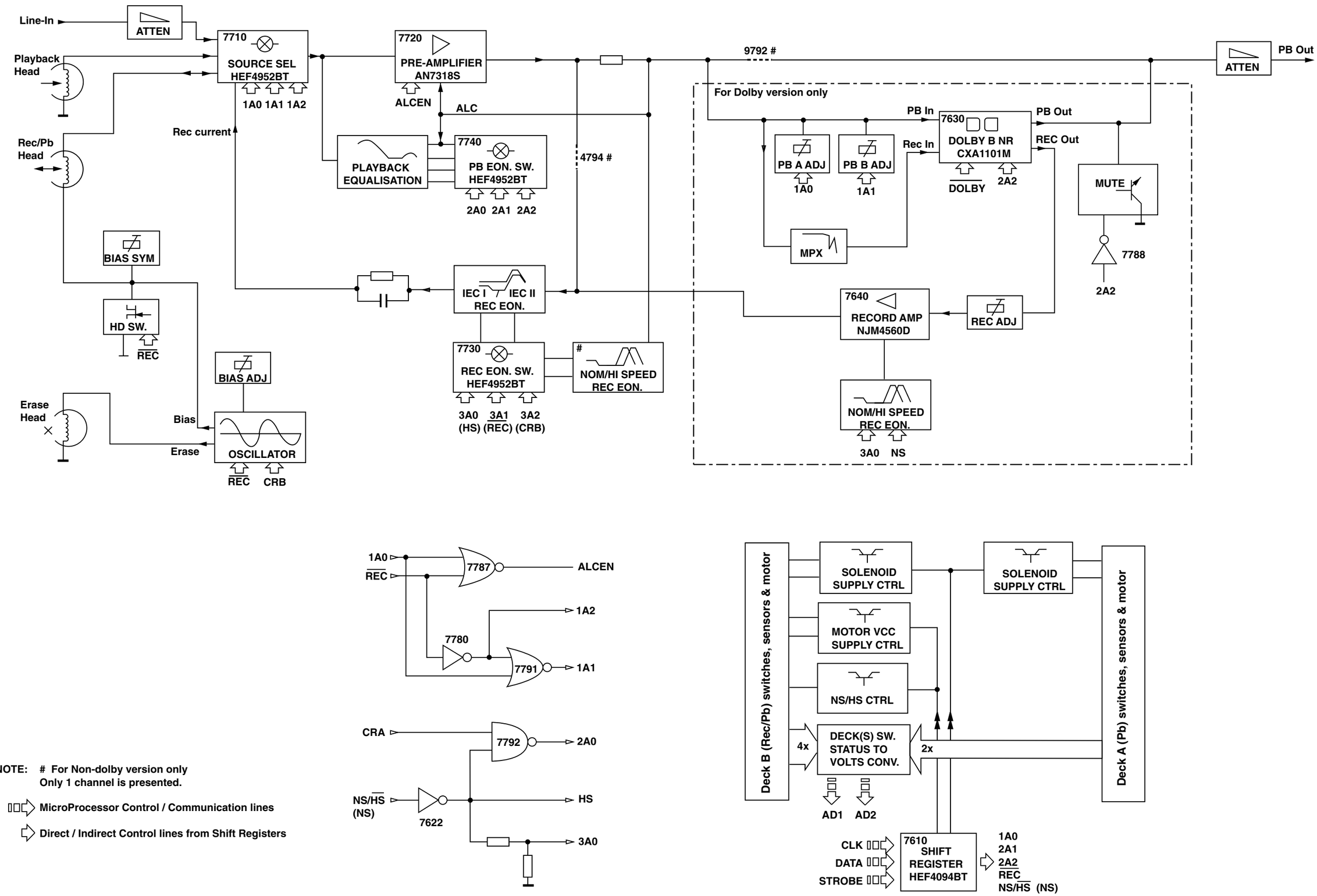
BLOCK DIAGRAM



NOTE: # For Non-dolby version only
Only 1 channel is presented.

MicroProcessor Control / Communication lines

Direct / Indirect Control lines from Shift Registers

9-3

Brief introduction

General

1. Playback Mode
   Signal from the playback head Deck A or Deck B is selected and fed through by the Mode Selector IC7710 (HEF4952BT). The signal is amplified by amplifier IC7720 (AN7323S) before feeding to the IC7740 (HEF4952BT) and out to the AF Board via connector 1701.

2. Recording Mode
   Recording Signal is selected and fed through by the Mode Selector IC7710 (HEF4952BT) which is then amplified by the amplifier IC7720 (AN7323S). The amplified output signal will pass through IC7730 (HEF4952BT) for record equalization and back to IC7710 (HEF4952BT) before registered into the Rec/PB Head of Deck B.

3. Dubbing Mode
   In Dubbing mode, signal from the playback head Deck A is selected and fed through by the Mode Selector IC7710 (HEF4952BT) which is then equalised for playback mode by the amplifier IC7720 (AN7323S) so that a flat response is obtained after the pre-amp. The equalised signal will then follow the same path as in the Recording mode.

4. Mode Selector
   The Mode Selector IC7710 (HEF4952BT) caters for 4 inputs signal, namely Playback Signal from Deck A, Playback Signal from Deck B, Recording Signal and Dubbing Signal.

5. Amplifier PB/REC
   Amplifier IC7720 (AN7323S) is for the purpose of amplifying the Playback and Recording signal from the Mode Selector.

6. Automatic Level Control (ALC)
   ALC circuit consists of resistors (3760, 3765, 3766, 3767), capacitors (2762 , 2763) and control by transistor 7787 (BC847B). ALC limits the amplifier output to a constant value when input signal becomes too large, thus limiting recording current to below saturation level, to prevent recording distortion.

7. Muting Circuit (For Non-Dolby version only)
   Switch S4 of the IC7740 (HEF4952BT) is for the purpose of muting the output during Recording mode. During Recording mode, S4 is closed and shorted to the ground.

8. IC7740 (HEF4952BT)
   The function of the IC7740 (HEF4952BT) is to change time constant between 120us Ferro (IEC I) and 70us Chrome (IEC II) during playback mode. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II). This IC will switch to Flat Gain during the Recording mode.

9. IC7730 (HEF4952BT)
   The function of the IC7730 (HEF4952BT) is to change gain and time constant according to tape type and recording speed to boost recording current at higher frequency during recording to compensate for head loss. It will automatically determined whether the tape type is 120us Ferro (IEC I) or 70us Chrome (IEC II).

10. Bias Level
    Bias Level making use of the Variable resistor (3773) for adjusting the optimal level of the bias current for Ferro or Chrome.

11. Bias Symm (For Dolby B NR version only)
    Bias Symm making use of the Variable resistor (3785) to adjust the bias current for the left and the right channel to be equal.

12. PB Switch
    Playback Switch which consists of the FETs 7785 (For Dolby B NR version only) & 7786 (J111) is for the purpose of providing a virtual ground for the Rec/PB Head (Deck B) during Playback mode. During the Playback mode, the FETs are turn on and shorted pin 2 and 4 of connector 1720 to the ground. During Recording mode, the FETs are turn off to allow the oscillator signal to be superposition onto the Recording signal for recording.

13. Motor Speed (For FR versions only)
    During High speed dubbing, a feedback signal from the uP through pin 03 of the IC7610 (HEF4094BT) will trigger the transistors 7622 (BC847B) and 7616 (BC857B) to cause a change in the voltage level between High and Low, thus changing the speed of the motor.

14. IC7610 (HEF4094BT)
    IC7610 (HEF4094BT) is a Shift Register use for issues the logic for cmos switch ICs (HEF4952BT) via 1A0, 2A1 and 2A2. It also issues logic to On/Off SOL_A, SOL_B and MOT. Recording speed is controlled via NS/HS.

Dolby Circuit (For sets with Dolby B NR version only)

15. IC7630 (CXA1551M)
    IC7630 (CXA1551M) in the Dolby circuit is a Dolby Noise Reduction Type B IC for the Playback and Recording signal. Noise Reduction ON/OFF are controlled by $\overline{\text{DOLBY}}$, which is from CLK, direct from uP. After clocking in DATA, CLK is set to HIGH/ LOW for NR OFF/ON.

16. 19kHz Filter
    The 19kHz filters 5631 & 5632 (LXD-210) in the Dolby circuit is for the purpose of filtering the 19kHz Pilot Tone (for Tuner signal only) of the Recording signal.

17. Level Adjust
    The Variable resistor 3635, 3636,3641 and 3642 in the Dolby circuit is for adjusting the playback level of the Dolby reference (400Hz , 200nWb/m). Transistor 7631, 7632 are ON to enable adjustment of 3641, 3642 during Playback Deck A. Transistor 7633, 7634 and 3635, 3636 are active for Playback Deck B.

18. Amplifier IC7640 (NJM4560M)
    The Amplifiers 7640A & 7640B (NJM4560M) in the Dolby circuit is for the purpose of amplified the Recording signal.

19. Muting Circuit
    The muting circuit which consists of transistors 7788, 7789 and 7790 (BC847B) is for the purpose of muting the output during Recording mode.

NOTATIONS & ABBREVIATIONS USED IN THIS DOCUMENT

CR	Chrome (IEC type II)
DB	Dolby NR type B
DD	Double Deck
DM	Double Motor
FE	Ferro (IEC type I)
FF	Non-Autoreverse
FR	Autoreverse Deck B
Gnd x	Ground x
HSD	High speed dubbing
ND	Non Dolby
NR	Noise Reduction
NSD	Normal speed dubbing
PB	Playback
REC	Record
S/A	Sub-assy
SD	Single Deck
SM	Single Motor

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CONNECTORS ASSIGNMENTS:

CONNECTOR 1701 — INTERCONNECTION TO AF BOARD

1	REC-L	Record input left
2	REC-R	Record input right
3	GND A	AF Ground
4	TAPE-L	Playback output left
5	+12V	D.C. supply (+12V) for AF electronics
6	TAPE-R	Playback output right
7	-CMOS	Negative d.c. supply (-9V) for CMOS ICs

CONNECTOR 1703 — INTERCONNECTION TO AF BOARD

1	GND M	Motor Ground
2	+MOTOR	D.C. supply (+12V) for tape deck motor & solenoid

CONNECTOR 1706 — INTERCONNECTION TO FRONT BOARD

1	AD2	Deck sensing switches output voltage / Deck A EOT
2	AD1	Deck sensing switches output voltage / Deck B EOT
3	+5V	DC supply +5V for ADC network
4	GND P	Control & Oscillator Ground
5	CLK	HEF4094BT shift register Clock line
6	DATA	HEF4094BT shift register Data line
7	STROBE	HEF4094BT shift register Strobe line

CONNECTOR 1710 — DECK B HEADS CONNECTON ***(For Non-Dolby version only)***

1	B R/P HD L+	R/P Head left channel positive
2	GND A	R/P Head return ground
3	B R/P HD R+	R/P Head right channel positive
4	ERASE HEAD	Erase Head
5	GND A	Erase Head ground

CONNECTOR 1720 — DECK B HEADS CONNECTON ***(For Dolby B NR version only)***

1	B R/P HD L+	R/P Head left channel positive
2	B R/P HD L-	R/P Head left channel negative
3	B R/P HD R+	R/P Head right channel positive
4	B R/P HD R-	R/P Head right channel negative
5	ERASE HEAD	Erase Head
6	GND A	Erase Head ground

CONNECTOR 1730 — DECK A HEAD CONNECTIONS ***(For Double Deck versions only)***

1	A PB HD L+	Pb Head left channel positive
2	GND A	Pb Head return ground shield
3	A PB HD R+	Pb Head right channel positive

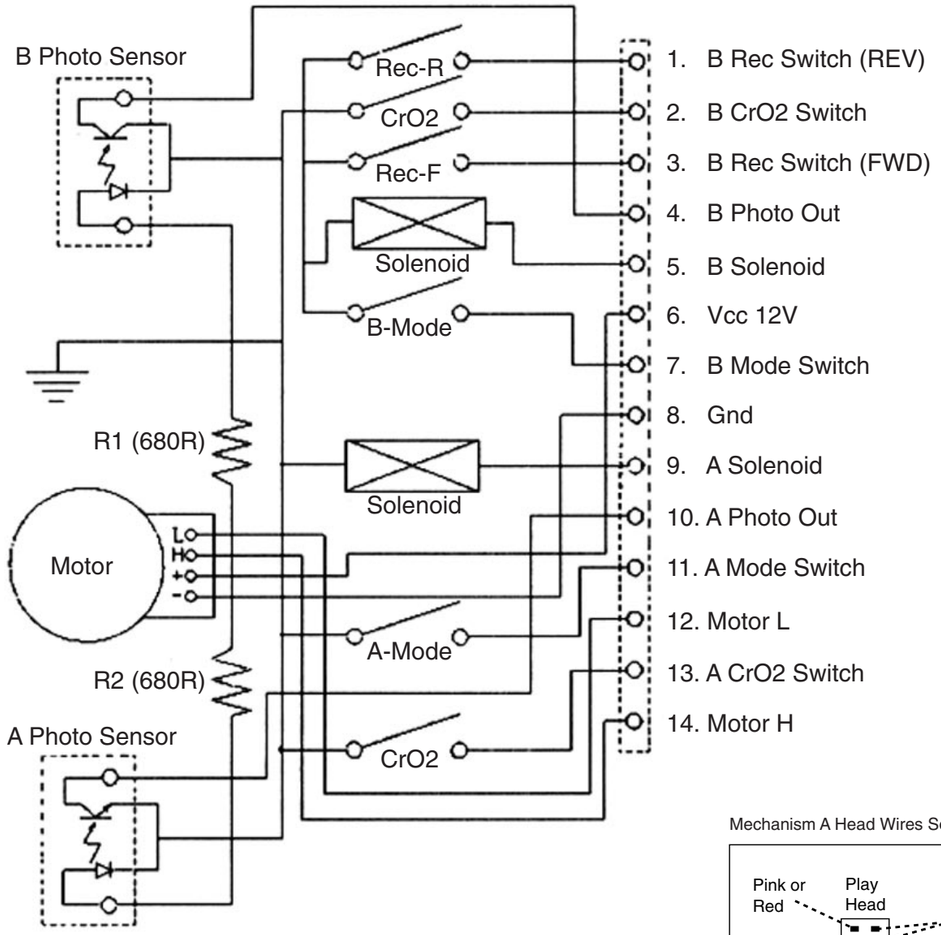
CONNECTOR 1740 — DECK A & B CONTROL INTERFACE ***(For Dolby B NR version only)***

1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
2	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
3	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
4	PHOTO B	Photo sensor output (tape movement indication)	
5	SOL B	Solenoid supply for deck B	
6	Vcc	Deck / Motor supply	
7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
8	GND M	Deck / Motor ground	
9	SOL A	Solenoid supply for deck A	
10	PHOTO A	Photo sensor output (tape movement indication)	
11	MODE A	Mode switch (head engagement)	[open=off: close=engaged]
12	L	L pin for motor	
13	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
14	H	H pin for motor	

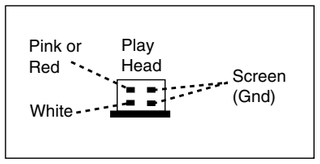
CONNECTOR 1770 — DECK A & B CONTROL INTERFACE ***(For Non-Dolby version only)***

1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
2	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
3	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
4	PHOTO B	Photo sensor output (tape movement indication)	
5	SOL B	Solenoid supply for deck B	
6	Vcc	Deck / Motor supply	
7	MODE B	Mode switch (head engagement)	[open=off: close=engaged]
8	GND M	Deck / Motor ground	
9	SOL A	Solenoid supply for deck A	
10	PHOTO A	Photo sensor output (tape movement indication)	
11	MODE A	Mode switch (head engagement)	[open=off: close=engaged]
12	L	L pin for motor	
13	CrO2 A	Chrome tape detection switch deck A	[open=Cr: close=Fe]
14	H	H pin for motor	

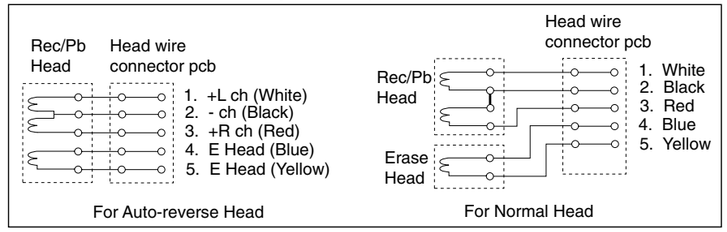
TAPE MECHANISM ELECTRONICS



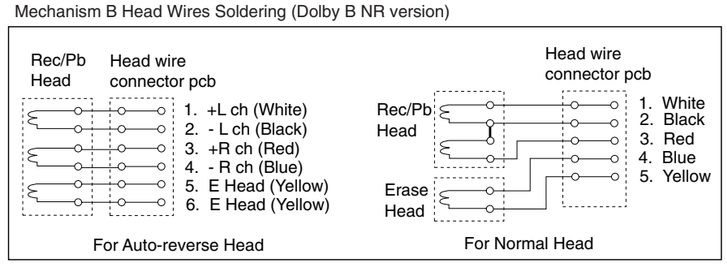
Mechanism A Head Wires Soldering



Mechanism B Head Wires Soldering (Non-Dolby version)



Mechanism B Head Wires Soldering (Dolby B NR version)



9-5

TAPE ADJUSTMENT & CHECK TABLE

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST with	ADJUST to
ADJUST MOTOR SPEED						
NORMAL SPEED	SBC420 3150Hz	PLAY B	◇1 or ◇2 LEFT RIGHT	frequency counter	3620	3150Hz ± 0.5%
		PLAY A			check	3150Hz -0.8/+1.8%
CHECK WOW & FLUTTER						
DECK A & B	SBC420 3150Hz	PLAY	◇1 or ◇2 LEFT RIGHT	W&F-meter	check	≤0.4 % DIN
ADJUST AZIMUTH						
DECK A & B	SBC420 10kHz	PLAY FWD	◇1 or ◇2 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
		PLAY REV #			right hand screw	
CHECK PLAYBACK FREQUENCY RESPONSE						
DECK A & B	SBC420	PLAY	◇1 or ◇2 LEFT RIGHT	mV-meter	check	limits see fig.1
ADJUST BIAS CURRENT						
DECK B	SBC419A	RECORD	◇5 or ◇6 LEFT RIGHT	mV-meter	3773	995mV
	SBC420				check	750mV ± 1.5dB
CHECK OVERALL FREQUENCY RESPONSE AND DISTORTION						
Inject 3mV signals 100Hz, 250Hz, 1kHz, 10kHz, 12.5kHz via ◇3 or ◇4	SBC419A or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	◇1 or ◇2 LEFT RIGHT	mV-meter	check	limits see fig. 2 *
Inject 1kHz 8.85mV via ◇3 or ◇4	SBC419A or SBC420	RECORD B				
	RECORDED CASSETTE	PLAY B	◇1 or ◇2 LEFT RIGHT	THD-meter	check	≤3% *

SBC419A : 4822 397 30069
SBC420 : 4822 397 30071

\# For Auto-reverse version only
* If high frequencies are not within limits, decrease bias and re-measure. If distortion is too high, increase bias and re-meaure

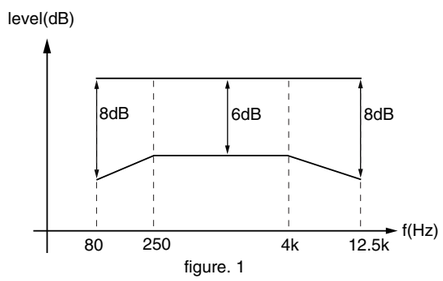


figure. 1

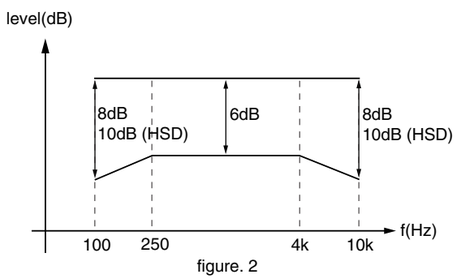
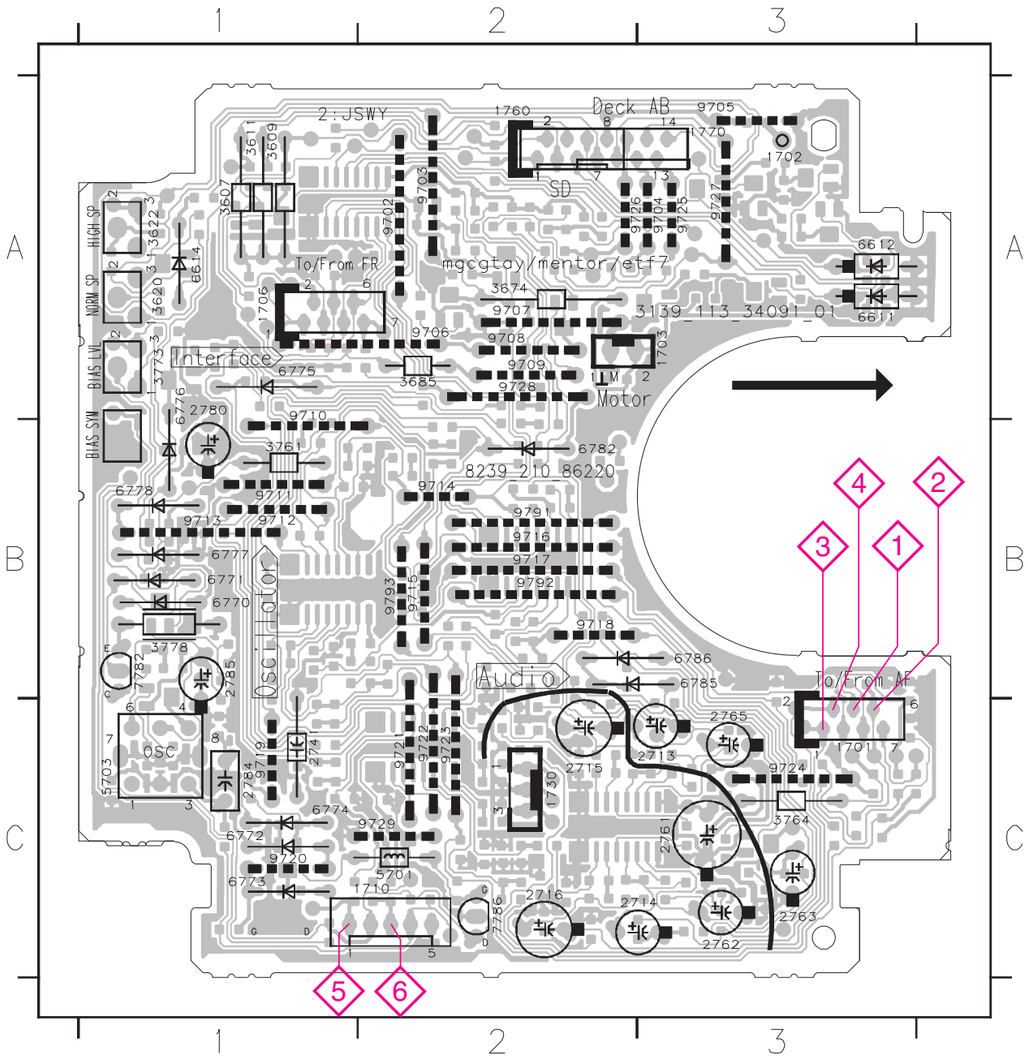


figure. 2

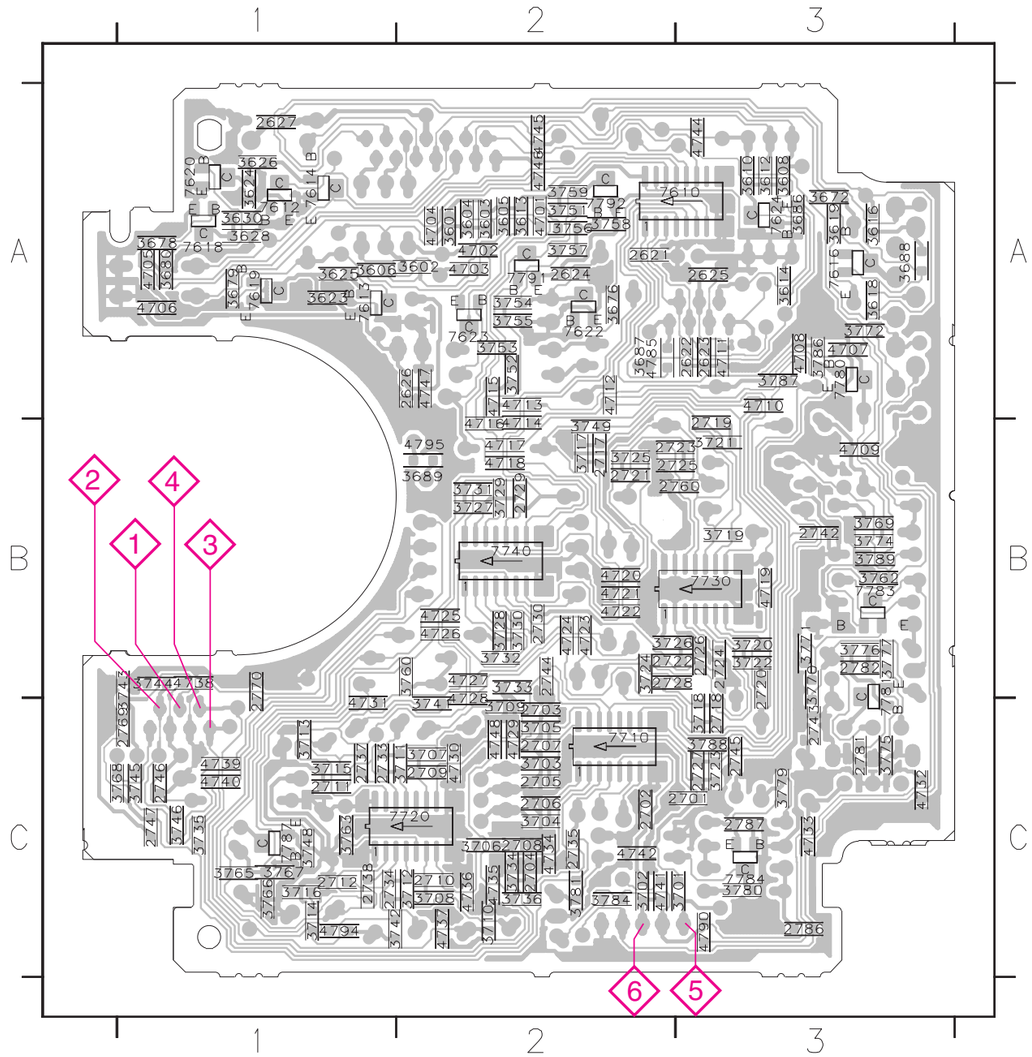
COMPONENT LAYOUT

1701 C3	2715 C2	3607 A1	3778 B1	6774 C1	9702 A2	9712 B1	9722 C2	9793 B2
1702 A3	2716 C2	3609 A1	5701 C2	6775 A1	9703 A2	9713 B1	9723 C2	
1703 A3	2741 C1	3611 A1	5703 C1	6776 A1	9704 A3	9714 B2	9724 C3	
1706 A1	2761 C3	3620 A1	6611 A3	6777 B1	9705 A3	9715 B2	9725 A3	
1710 C2	2762 C3	3622 A1	6612 A3	6778 B1	9706 A2	9716 B2	9726 A2	
1730 C2	2763 C3	3674 A2	6614 A1	6782 B2	9707 A2	9717 B2	9727 A3	
1760 A2	2765 C3	3685 A2	6770 B1	6785 B3	9708 A2	9718 B2	9728 A2	
1770 A3	2780 A1	3761 B1	6771 B1	6786 B3	9709 A2	9719 C1	9729 C2	
2713 C3	2784 C1	3764 C3	6772 C1	7782 B1	9710 A1	9720 C1	9791 B2	
2714 C3	2785 B1	3773 A1	6773 C1	7786 C2	9711 B1	9721 C2	9792 B2	



CHIP LAYOUT

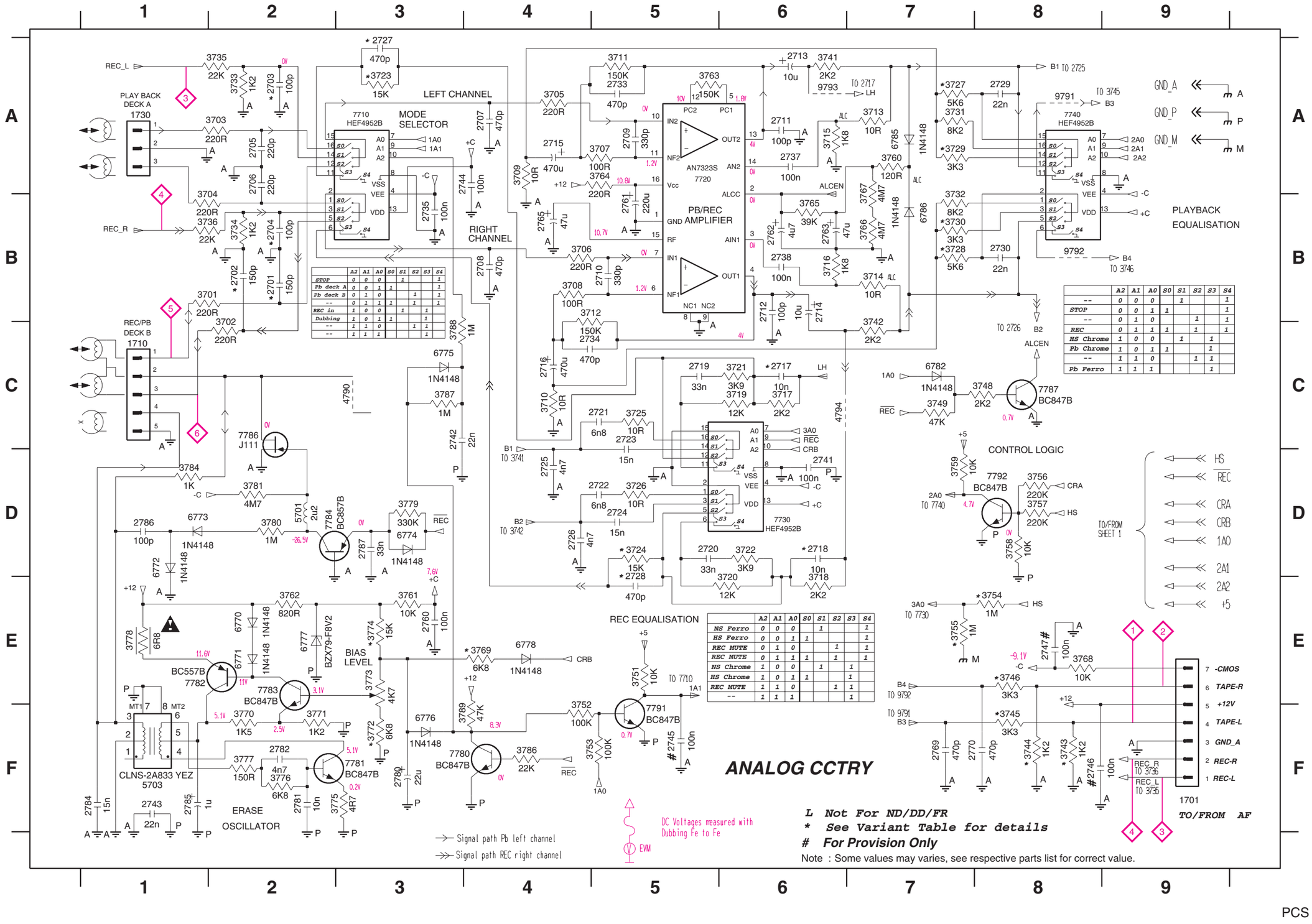
2621 A2	2724 B3	3602 A2	3688 A3	3725 B2	3757 A2	4701 A2	4727 B2	7612 A1
2622 A3	2725 B3	3603 A2	3689 B2	3726 B2	3758 A2	4702 A2	4728 C2	7613 A1
2623 A3	2726 B3	3604 A2	3701 C3	3727 B2	3759 A2	4703 A2	4729 C2	7614 A1
2624 A2	2727 C3	3605 A2	3702 C2	3728 B2	3760 B2	4704 A2	4730 C2	7616 A3
2625 A3	2728 B2	3606 A1	3703 C2	3729 B2	3762 B3	4705 A1	4731 C1	7618 A1
2626 A2	2729 B2	3608 A3	3704 C2	3730 B2	3763 C1	4706 A1	4732 C3	7619 A1
2627 A1	2730 B2	3610 A3	3705 C2	3731 B2	3765 C1	4707 A3	4733 C3	7620 A1
2701 C3	2733 C1	3612 A3	3706 C2	3732 B2	3766 C1	4708 A3	4734 C2	7622 A2
2702 C2	2734 C1	3613 A2	3707 C2	3733 B2	3767 C1	4709 B3	4735 C2	7623 A2
2703 C2	2735 C2	3614 A3	3708 C2	3734 C2	3768 C1	4710 A3	4736 C2	7624 A3
2704 C2	2737 C1	3616 A3	3709 C2	3735 C1	3769 B3	4711 A3	4737 C2	7710 C2
2705 C2	2738 C1	3618 A3	3710 C2	3736 C2	3770 B3	4712 A2	4738 B1	7720 C2
2706 C2	2742 B3	3619 A3	3711 C2	3741 C2	3771 B3	4713 A2	4739 C1	7730 B3
2707 C2	2743 C3	3623 A1	3712 C2	3742 C1	3772 A3	4714 B2	4740 C1	7740 B2
2708 C2	2744 B2	3624 A1	3713 C1	3743 B1	3774 B3	4715 A2	4741 C2	7780 A3
2709 C2	2745 C3	3625 A1	3714 C1	3744 B1	3775 C3	4716 B2	4742 C2	7781 B3
2710 C2	2746 C1	3626 A1	3715 C1	3745 C1	3776 B3	4717 B2	4744 A3	7783 B3
2711 C1	2747 C1	3628 A1	3716 C1	3746 C1	3777 B3	4718 B2	4745 A2	7784 C3
2712 C1	2760 B3	3630 A1	3717 B2	3748 C1	3779 C3	4719 B3	4746 A2	7787 C1
2717 B2	2769 C1	3672 A3	3718 C3	3749 B2	3780 C3	4720 B2	4747 A2	7791 A2
2718 C3	2770 B1	3676 A2	3719 B3	3751 A2	3781 C2	4721 B2	4748 C2	7792 A2
2719 B3	2781 C3	3678 A1	3720 B3	3752 A2	3784 C2	4722 B2	4785 A2	
2720 B3	2782 B3	3679 A1	3721 B3	3753 A2	3786 A3	4723 B2	4790 C3	
2721 B2	2786 C3	3680 A1	3722 B3	3754 A2	3787 A3	4724 B2	4794 C1	
2722 B2	2787 C3	3686 A3	3723 C3	3755 A2	3788 C3	4725 B2	4795 B2	
2723 B2	3601 A2	3687 A2	3724 B2	3756 A2	3789 B3	4726 B2	7610 A3	



9-7

ANALOG CIRCUIT

1701 F9 2705 A2 2712 B6 2719 C5 2726 D4 2735 B3 2745 F5 2765 B4 2785 F1 3705 A4 3712 B4 3719 C6 3726 D5 3733 A2 3744 F8 3753 F5 3760 A7 3767 A7 3774 E3 3781 D2 4794 C6 6774 D3 6786 B7 7782 E1 9791 A8
1710 C1 2706 A2 2713 A6 2720 D5 2727 A3 2737 A6 2746 F8 2769 F7 2786 D1 3706 B4 3713 A7 3720 E6 3727 A7 3734 B2 3745 F8 3754 E8 3761 E3 3768 E8 3775 F3 3784 D1 5701 D2 6775 C3 6787 A3 7783 E2 9792 B8
1730 A1 2707 A4 2714 B6 2721 C5 2728 E5 2738 B6 2747 E8 2770 F8 2787 D3 3707 A5 3714 B7 3721 C6 3728 B7 3735 A2 3746 E8 3755 E7 3762 E2 3769 E4 3776 F2 3786 F4 5703 F1 6776 F3 7720 A5 7784 D2 9793 A6
2701 B2 2708 B4 2715 A4 2722 D5 2729 A8 2741 D6 2760 E3 2780 F3 3701 B1 3708 B4 3715 A6 3722 D6 3729 A7 3736 B1 3748 C8 3756 D8 3763 A5 3770 F2 3777 F2 3787 C3 6770 E2 6777 E2 7730 D6 7786 C2
2702 B2 2709 A5 2716 C4 2723 C5 2730 B8 2742 C3 2761 B5 2781 F2 3702 C2 3709 A4 3716 B6 3723 A3 3730 B7 3741 A6 3749 C7 3757 D8 3764 A5 3771 F2 3778 E1 3788 C3 6771 E2 6778 E4 7740 A8 7787 C8
2703 A2 2710 B5 2717 C6 2724 D5 2733 A5 2743 F1 2762 B6 2782 F2 3703 A2 3710 C4 3717 C6 3724 D5 3731 A7 3742 C7 3751 E5 3758 D8 3765 B6 3772 F3 3779 D3 3789 F4 6772 D1 6782 C7 7780 F4 7791 F5
2704 B2 2711 A6 2718 D6 2725 D4 2734 C4 2744 A4 2763 B6 2784 F1 3704 B1 3711 A5 3718 E6 3725 C5 3732 B7 3743 F8 3752 F4 3759 D7 3766 B7 3773 E3 3780 D2 4790 C3 6773 D1 6785 A7 7781 F3 7792 D8



	A2	A1	A0	S0	S1	S2	S3	S4
STOP	0	0	0		1			1
Pb deck A	0	0	1	1				1
Pb deck B	0	1	0			1		1
--	0	1	1	1		1		1
REC in	1	0	0		1		1	
Dubbing	1	0	1	1			1	
--	1	1	0			1	1	
--	1	1	1				1	

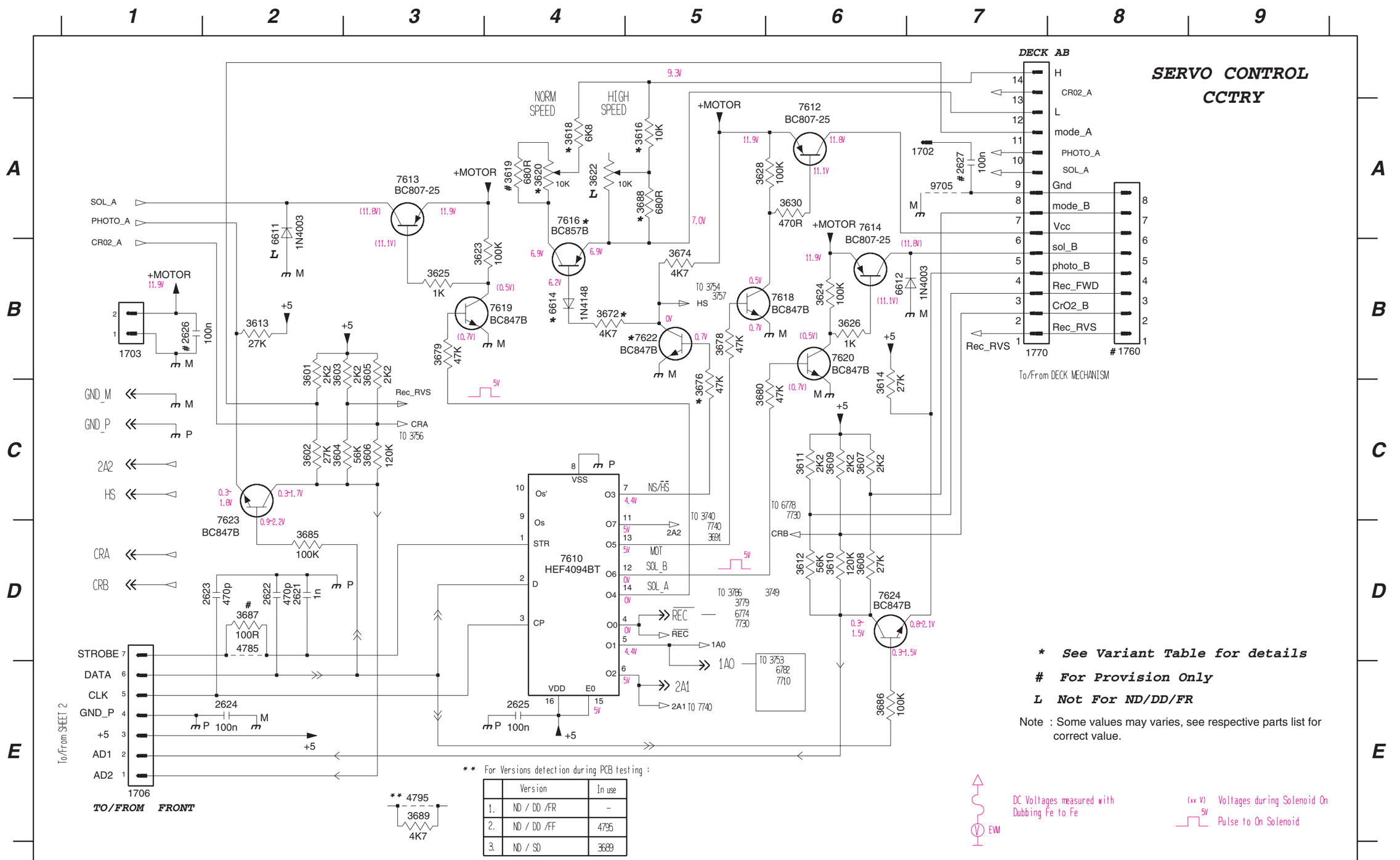
	A2	A1	A0	S0	S1	S2	S3	S4
--	0	0	0		1			1
STOP	0	0	1	1				1
--	0	1	0			1		1
REC	0	1	1	1		1		1
HS Chrome	1	0	0		1		1	
Pb Chrome	1	0	1	1			1	
--	1	1	0			1	1	
Pb Ferro	1	1	1				1	

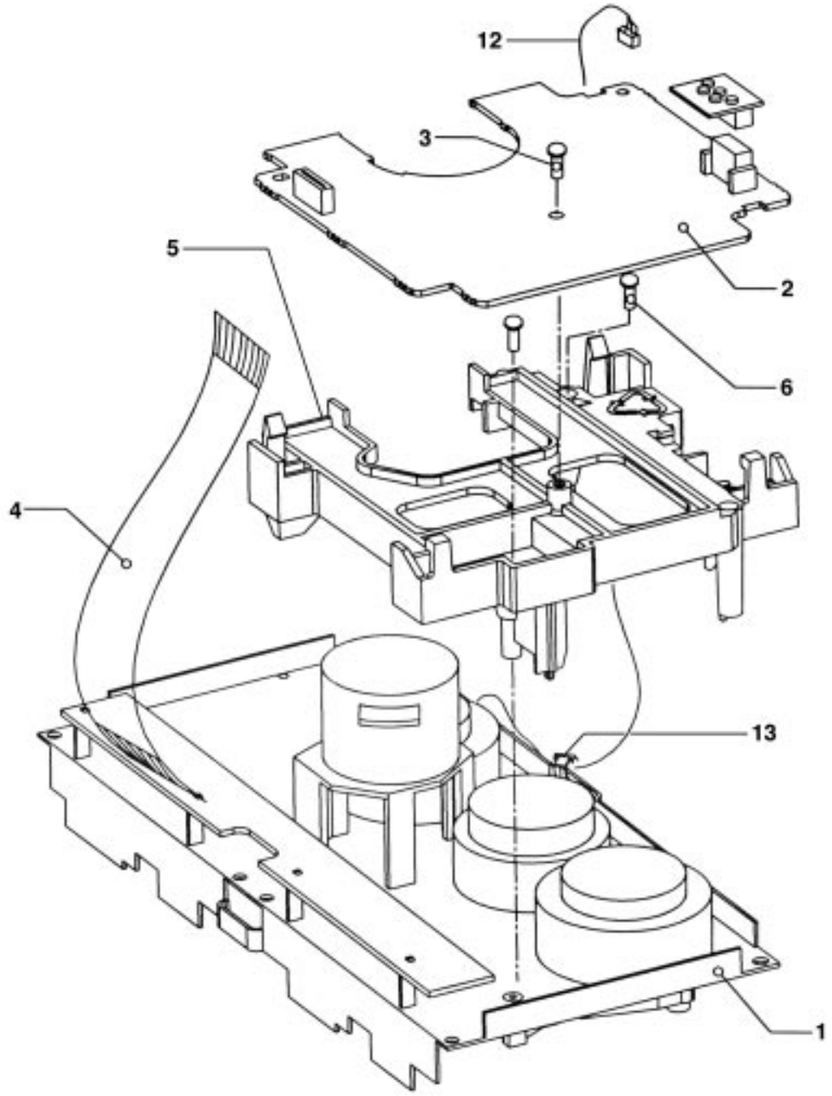
	A2	A1	A0	S0	S1	S2	S3	S4
NS Ferro	0	0	0		1			1
HS Ferro	0	0	1	1				1
REC MUTE	0	1	0			1		1
REC MUTE	0	1	1	1		1		1
NS Chrome	1	0	0		1		1	
HS Chrome	1	0	1	1			1	
REC MUTE	1	1	0			1	1	
--	1	1	1				1	

9-8

SERVO CONTROL CIRCUIT

1702 A7 1760 B8 2622 D2 2625 E4 3601 B2 3604 C2 3607 C6 3610 D6 3613 B2 3618 A4 3622 A4 3625 B3 3630 A6 3676 C5 3680 C5 3687 D2 4785 D2 6612 B6 7612 A6 7616 A4 7620 B6 7624 D6
1703 B1 1770 B7 2623 D2 2626 B1 3602 C2 3605 B3 3608 D6 3611 C6 3614 C6 3619 A4 3623 B3 3626 B6 3672 B4 3678 B5 3685 D2 3688 A5 4795 E3 6614 B4 7610 D4 7613 A3 7618 B6 7622 B5 9705 A7
1706 E1 2621 D2 2624 E2 2627 A7 3603 B2 3606 C3 3609 C6 3612 D6 3616 A5 3620 A4 3624 B6 3628 A5 3674 B5 3679 B3 3686 E6 3689 E3 6611 A2 6710 D4 7614 A6 7619 B4 7623 D2





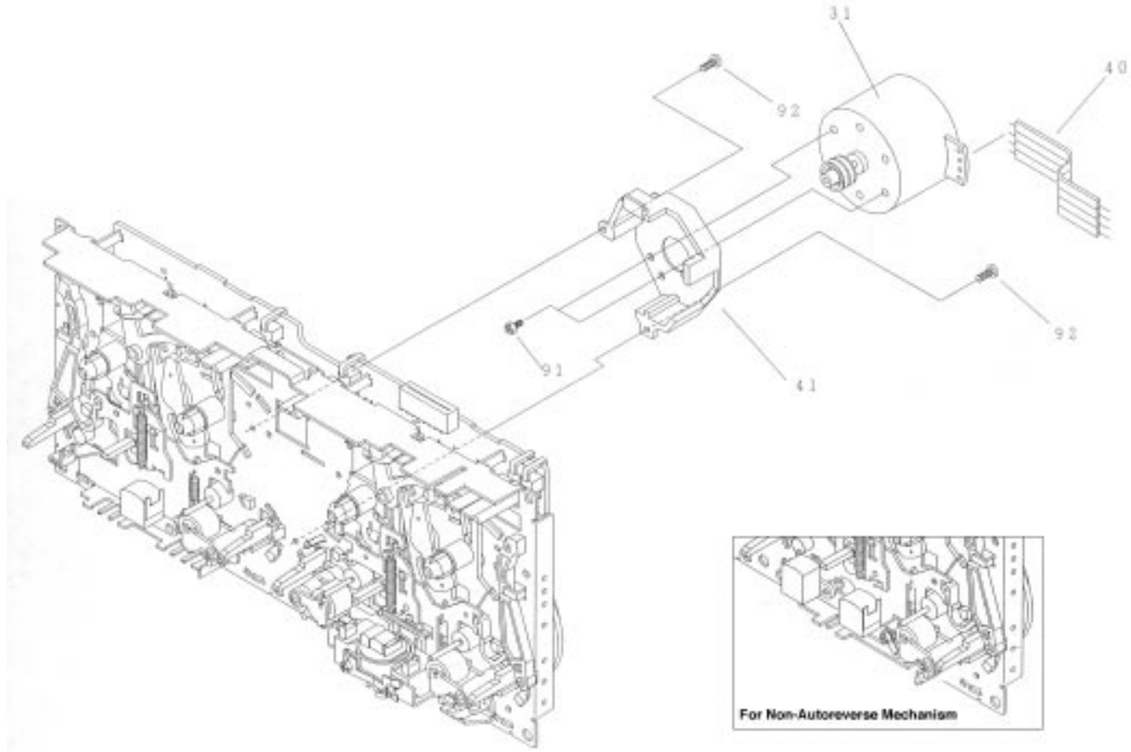
3139 118 77070 (Incl. ...77080) dd wk926

TAPE MODULE EXPLODED VIEW

1	313911877130	Autoreverse Mech. CWE44FR01
1	313911877140	Non-Autoreverse Mech. CWE44FF02
3	-	Screw D3 x 10
6	-	Screw M2 x 16
7	313911034080	Flex Cable 14 pin 7,5 cm

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

9-9



TAPE MECHANISM - MOTOR EXPLODED VIEW

31	4822 361 11055	Motor Assembly
91	-	Screw M2,6 x 5
92	-	Screw M2 x 5

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

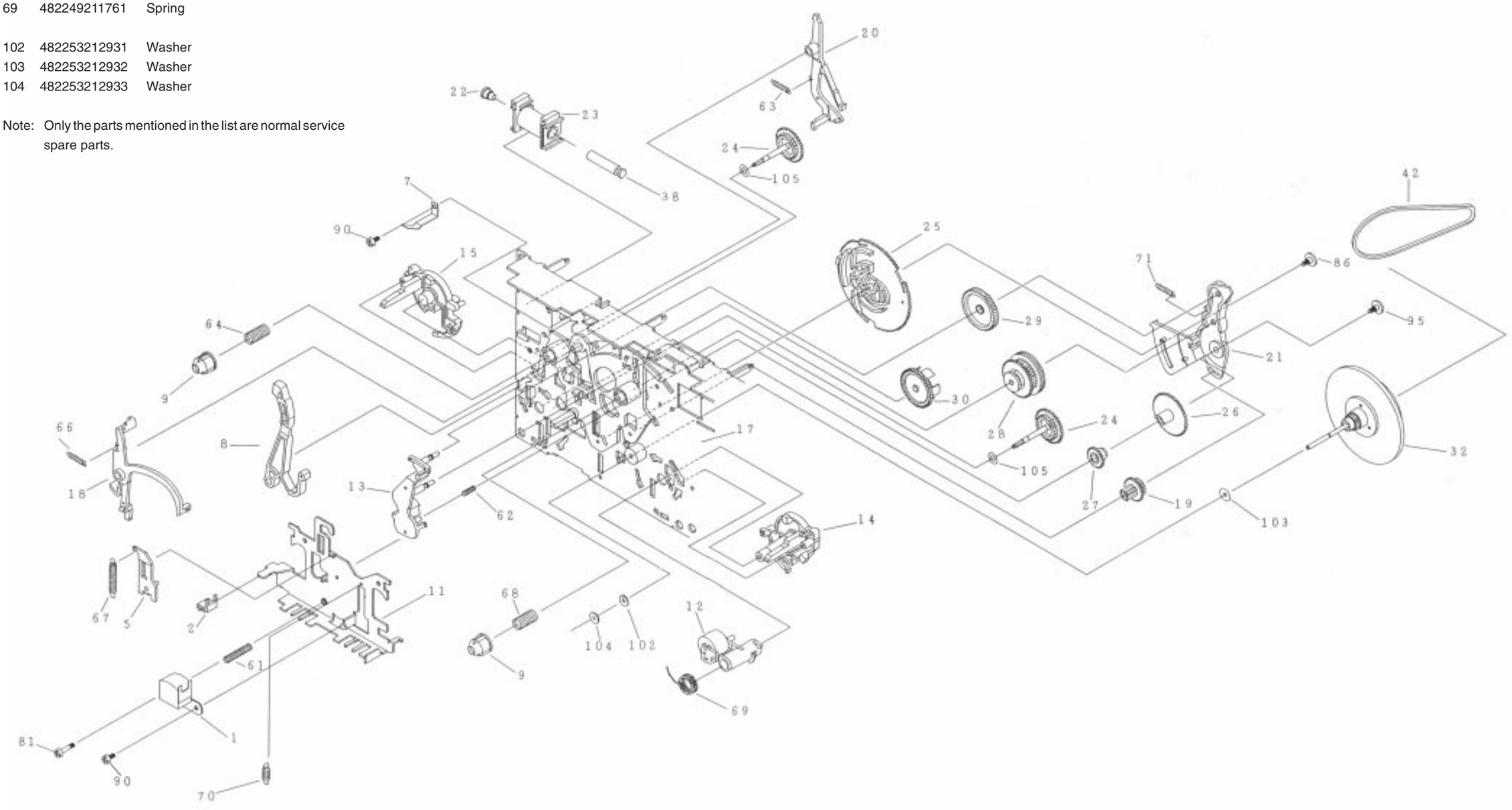
9-10

TAPE MECHANISM A - PLAY

MECHANICAL PARTS - PLAY MECHANISM

1	996500002313	Play Head (Non-Autoreverse deck)
1	996500002321	Play Head (Autoreverse deck)
12	482240210972	Pinch Arm Assembly R
23	996500002314	Coil Assembly
32	482252811209	Flywheel Assembly RV
42	996500002315	Belt AF (Autoreverse deck)
42	996500002718	Belt AF (Non-autoreverse deck)
69	482249211761	Spring
102	482253212931	Washer
103	482253212932	Washer
104	482253212933	Washer

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



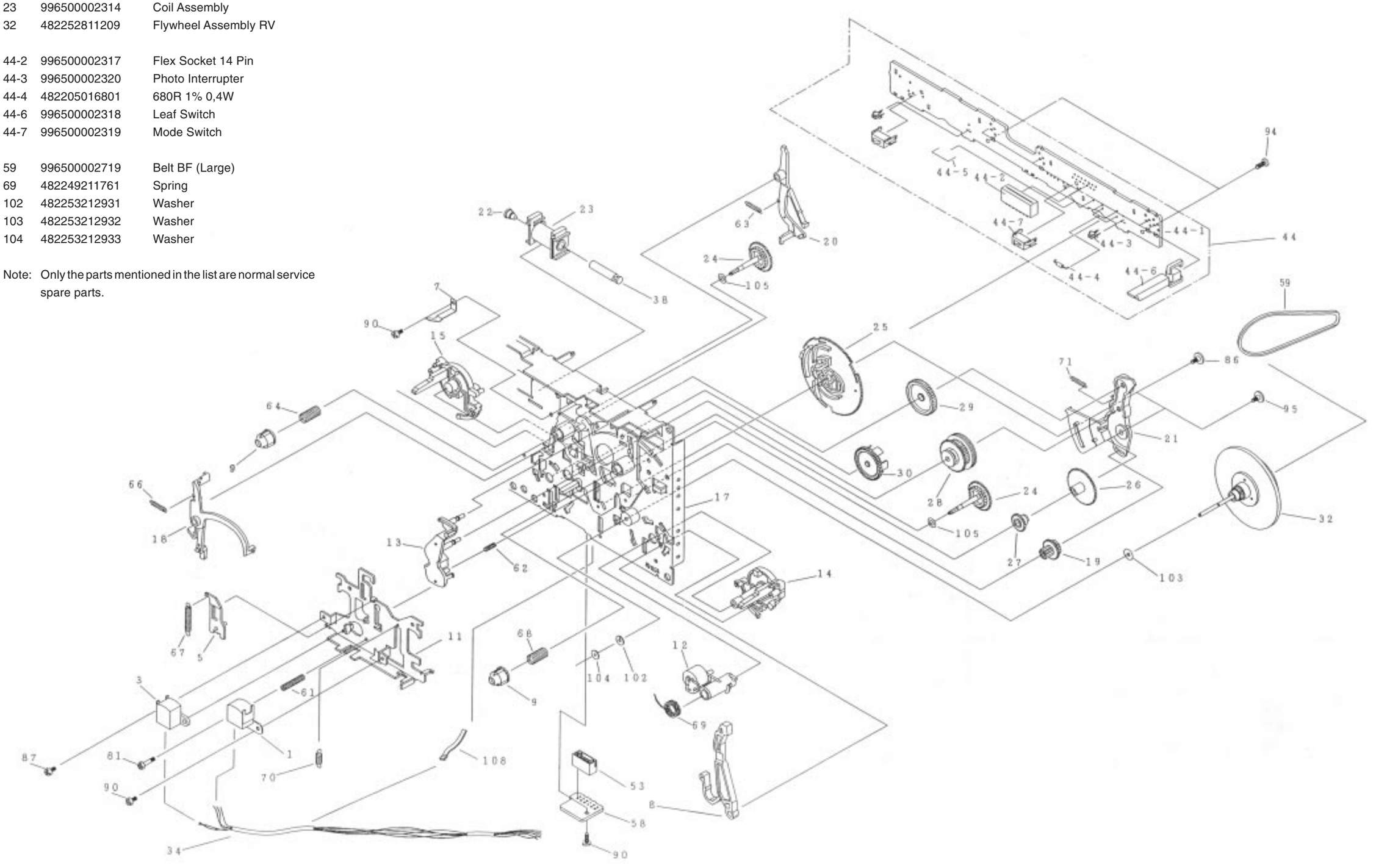
9-11

TAPE MECHANISM B - RECORD/PLAYBACK *(Non-Autoreverse version)*

MECHANICAL PARTS - REC/PB MECHANISM

1	996500002313	Play Head
3	996500002600	Head, Erase
12	482240210972	Pinch Arm Assembly R
23	996500002314	Coil Assembly
32	482252811209	Flywheel Assembly RV
44-2	996500002317	Flex Socket 14 Pin
44-3	996500002320	Photo Interrupter
44-4	482205016801	680R 1% 0,4W
44-6	996500002318	Leaf Switch
44-7	996500002319	Mode Switch
59	996500002719	Belt BF (Large)
69	482249211761	Spring
102	482253212931	Washer
103	482253212932	Washer
104	482253212933	Washer

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



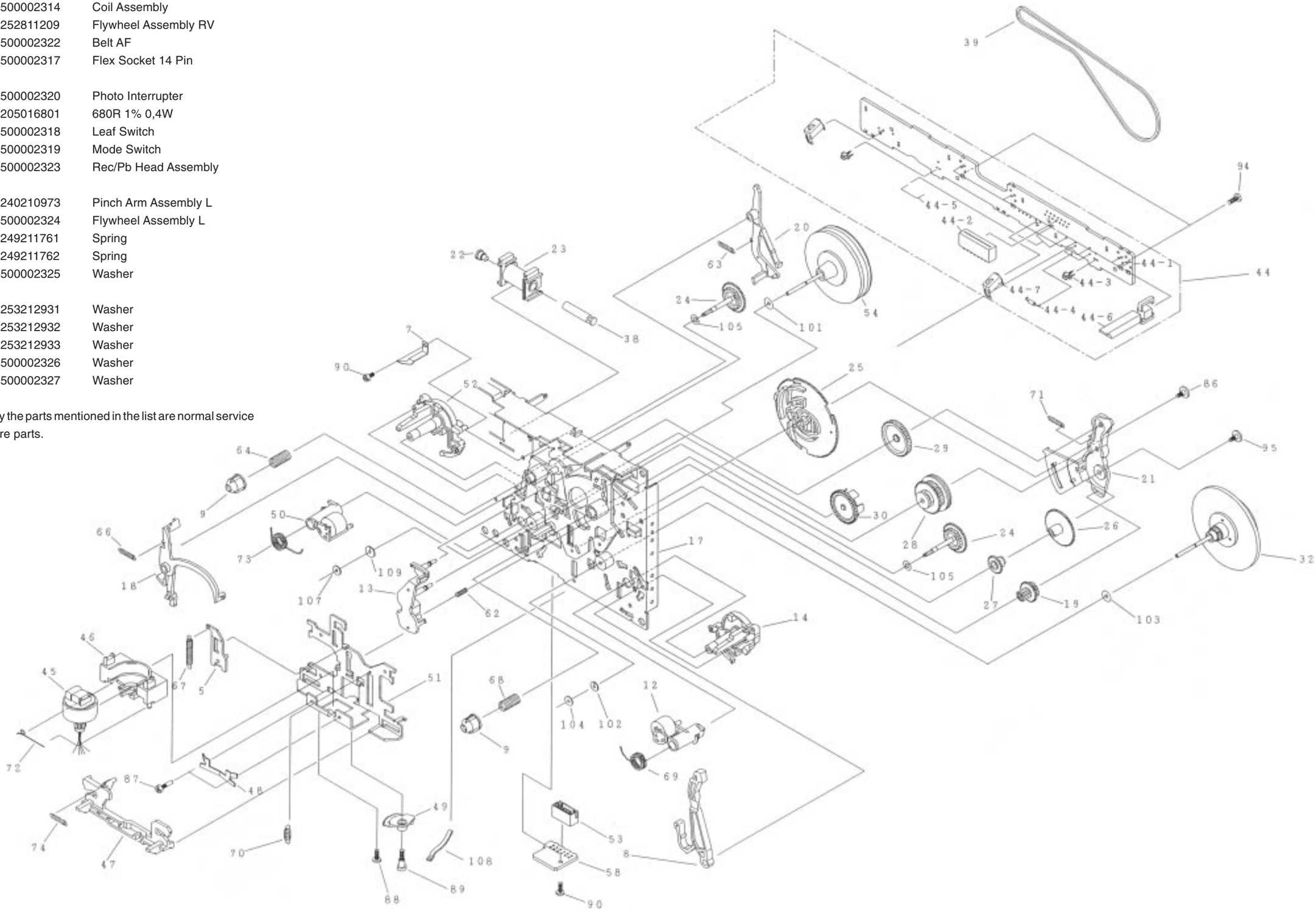
9-12

TAPE MECHANISM B - RECORD/PLAYBACK *(Autoreverse version)*

MECHANICAL PARTS - REC/PB MECHANISM

12	482240210972	Pinch Arm Assembly R
23	996500002314	Coil Assembly
32	482252811209	Flywheel Assembly RV
39	996500002322	Belt AF
44-2	996500002317	Flex Socket 14 Pin
44-3	996500002320	Photo Interrupter
44-4	482205016801	680R 1% 0,4W
44-6	996500002318	Leaf Switch
44-7	996500002319	Mode Switch
45	996500002323	Rec/Pb Head Assembly
50	482240210973	Pinch Arm Assembly L
54	996500002324	Flywheel Assembly L
69	482249211761	Spring
73	482249211762	Spring
101	996500002325	Washer
102	482253212931	Washer
103	482253212932	Washer
104	482253212933	Washer
107	996500002326	Washer
109	996500002327	Washer

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



9-13

ELECTRICAL PARTS LIST - ETF7 NON-DOLBY BOARD

ELECTRICAL PARTS LIST - ETF7 NON-DOLBY BOARD

MISCELLANEOUS

1701	482226710953	Flex Socket 7pin Vert.
1706	482226710953	Flex Socket 7pin Vert.
1770	482226751255	Flex Socket 14pin Vert.

CAPACITORS

2621	532212231647	1nF 10% 63V	
2622	532212234099	470pF 10% 63V	
2623	532212234099	470pF 10% 63V	
2624	482212614585	100nF 10% 50V	
2625	482212614585	100nF 10% 50V	
2701	532212233538	150pF 2% 63V	Autoreverse
2701	482212233216	270pF 5% 63V	Non-autoreverse
2702	532212233538	150pF 2% 63V	Autoreverse
2702	482212233216	270pF 5% 63V	Non-autoreverse
2703	532212232531	100pF 5% 50V	Autoreverse
2703	482212233575	220pF 5% 63V	Non-autoreverse
2704	532212232531	100pF 5% 50V	Autoreverse
2704	482212233575	220pF 5% 63V	Non-autoreverse
2705	482212233575	220pF 5% 63V	
2706	482212233575	220pF 5% 63V	
2707	532212234099	470pF 10% 63V	
2708	532212234099	470pF 10% 63V	
2709	532212231863	330pF 5% 63V	
2710	532212231863	330pF 5% 63V	
2711	532212232531	100pF 5% 50V	
2712	532212232531	100pF 5% 50V	
2713	482212440248	10µF 20% 63V	
2714	482212440248	10µF 20% 63V	
2715	482212480195	470µF 20% 10V	
2716	482212480195	470µF 20% 10V	
2717	482212233177	10nF 20% 50V	Autoreverse
2717	482212613188	15nF 5% 63V	Non-autoreverse
2718	482212233177	10nF 20% 50V	Autoreverse
2718	482212613188	15nF 5% 63V	Non-autoreverse
2719	482212612105	33nF 5% 50V	
2720	482212612105	33nF 5% 50V	
2721	532212231866	6,8nF 10% 63V	
2722	532212231866	6,8nF 10% 63V	
2723	482212613188	15nF 5% 63V	
2724	482212613188	15nF 5% 63V	
2725	532212610223	4,7nF 10% 63V	
2726	532212610223	4,7nF 10% 63V	
2727	532212234099	470pF 10% 63V	Autoreverse
2727	532212231647	1nF 10% 63V	Non-autoreverse
2728	532212234099	470pF 10% 63V	Autoreverse
2728	532212231647	1nF 10% 63V	Non-autoreverse
2729	532212232654	22nF 10% 63V	
2730	532212232654	22nF 10% 63V	
2733	532212234099	470pF 10% 63V	
2734	532212234099	470pF 10% 63V	
2735	482212614585	100nF 10% 50V	
2737	482212614585	100nF 10% 50V	
2738	482212614585	100nF 10% 50V	
2741	482212611585	22nF +80/-20% 25V	
2742	532212232654	22nF 10% 63V	
2743	532212232654	22nF 10% 63V	
2744	482212614585	100nF 10% 50V	
2760	482212614585	100nF 10% 50V	
2761	482212480144	220µF 20% 25V	
2762	482212440769	4,7µF 20% 100V	
2763	482212440433	47µF 20% 25V	
2765	482212440433	47µF 20% 25V	
2769	532212234099	470pF 10% 63V	
2770	532212234099	470pF 10% 63V	
2780	482212481151	22µF 20% 50V	
2781	482212233177	10nF 20% 50V	
2782	532212610223	4,7nF 10% 63V	
2784	482212151305	15nF 10% 50V	
2785	482212421913	1µF 20% 63V	
2786	532212232531	100pF 5% 50V	
2787	482212612105	33nF 5% 50V	

RESISTORS

3601	482211711449	2k2 1% 0,1W	
3602	482205120273	27k 5% 0,1W	
3603	482211711449	2k2 1% 0,1W	
3604	482211711148	56k 1% 0,1W	
3605	482211711449	2k2 1% 0,1W	
3606	482205120124	120k 5% 0,1W	
3607	482211652256	2k2 5% 0,5W	
3608	482205120273	27k 5% 0,1W	
3609	482211652256	2k2 5% 0,5W	
3610	482205120124	120k 5% 0,1W	
3611	482211652256	2k2 5% 0,5W	
3612	482211711148	56k 1% 0,1W	
3613	482205120273	27k 5% 0,1W	
3614	482205120273	27k 5% 0,1W	
3616	482211710833	10k 1% 0,1W	Autoreverse
3616	482205110102	1k 2% 0,25W	Non-autoreverse
3618	482211711507	6k8 1% 0,1W	Autoreverse
3620	482210011141	Trimmer 10k 30% 0,1W	Autorev.
3622	482210011141	Trimmer 10k 30% 0,1W	Non-autorev.
3623	482211710837	100k 1% 0,1W	
3624	482211710837	100k 1% 0,1W	
3625	482205110102	1k 2% 0,25W	
3626	482205110102	1k 2% 0,25W	
3628	482211710837	100k 1% 0,1W	
3630	482205120471	470R 5% 0,1W	
3672	482205120472	4k7 5% 0,1W	Autoreverse
3674	482211652283	4k7 5% 0,5W	
3676	482211710834	47k 1% 0,1W	Autoreverse
3678	482211710834	47k 1% 0,1W	
3679	482211710834	47k 1% 0,1W	
3680	482211710834	47k 1% 0,1W	
3685	482211652234	100k 5% 0,5W	
3686	482211710837	100k 1% 0,1W	
3688	482211710361	680R 1% 0,1W	Autoreverse
3701	482211711503	220R 1% 0,1W	
3702	482211711503	220R 1% 0,1W	
3703	482211711503	220R 1% 0,1W	
3704	482211711503	220R 1% 0,1W	
3705	482211711503	220R 1% 0,1W	
3706	482211711503	220R 1% 0,1W	
3707	482205120101	100R 5% 0,1W	
3708	482205120101	100R 5% 0,1W	
3709	482205120109	10R 5% 0,1W	
3710	482205120109	10R 5% 0,1W	
3711	482205120154	150k 5% 0,1W	
3712	482205120154	150k 5% 0,1W	
3713	482205120109	10R 5% 0,1W	
3714	482205120109	10R 5% 0,1W	
3715	482205120182	1k8 5% 0,1W	
3716	482205120182	1k8 5% 0,1W	
3717	482211711449	2k2 1% 0,1W	
3718	482211711449	2k2 1% 0,1W	
3719	482211711383	12k 1% 0,1W	
3720	482211711383	12k 1% 0,1W	
3721	482205120392	3k9 5% 0,1W	
3722	482205120392	3k9 5% 0,1W	
3723	482211683933	15k 1% 0,1W	Autoreverse
3723	482211710965	18k 1% 0,1W	Non-autoreverse
3724	482211683933	15k 1% 0,1W	Autoreverse
3724	482211710965	18k 1% 0,1W	Non-autoreverse
3725	482205120109	10R 5% 0,1W	
3726	482205120109	10R 5% 0,1W	
3727	482205120562	5k6 5% 0,1W	Autoreverse
3727	482211711507	6k8 1% 0,1W	Non-autoreverse
3728	482205120562	5k6 5% 0,1W	Autoreverse
3728	482211711507	6k8 1% 0,1W	Non-autoreverse
3729	482205120332	3k3 5% 0,1W	Autoreverse
3729	482205120472	4k7 5% 0,1W	Non-autoreverse
3730	482205120332	3k3 5% 0,1W	Autoreverse
3730	482205120472	4k7 5% 0,1W	Non-autoreverse
3731	482205120822	8k2 5% 0,1W	
3732	482205120822	8k2 5% 0,1W	
3733	482205120122	1k2 5% 0,1W	
3734	482205120122	1k2 5% 0,1W	
3735	482205120223	22k 5% 0,1W	
3736	482205120223	22k 5% 0,1W	
3741	482211711449	2k2 1% 0,1W	
3742	482211711449	2k2 1% 0,1W	
3743	482211711139	1k5 1% 0,1W	Autoreverse
3743	482211711449	2k2 1% 0,1W	Non-autoreverse
3744	482211711139	1k5 1% 0,1W	Autoreverse
3744	482211711449	2k2 1% 0,1W	Non-autoreverse
3745	482205120332	3k3 5% 0,1W	Autoreverse
3745	482205120562	5k6 5% 0,1W	Non-autoreverse
3746	482205120332	3k3 5% 0,1W	Autoreverse
3746	482205120562	5k6 5% 0,1W	Non-autoreverse
3748	482211711449	2k2 1% 0,1W	
3749	482211710834	47k 1% 0,1W	
3751	482211710833	10k 1% 0,1W	
3752	482211710837	100k 1% 0,1W	
3753	482211710837	100k 1% 0,1W	
3754	482205120105	1M 5% 0,1W	Autoreverse
3754	482205120479	47R 5% 0,1W	Non-autoreverse
3755	482205120105	1M 5% 0,1W	Autoreverse
3755	482205120479	47R 5% 0,1W	Non-autoreverse
3756	482211713579	220k 1% 0,1W	
3757	482211713579	220k 1% 0,1W	
3758	482211710833	10k 1% 0,1W	
3759	482211710833	10k 1% 0,1W	
3760	482205120121	120R 5% 0,1W	
3761	482205021003	10k 1% 0,6W	
3762	482211711454	820R 1% 0,1W	
3763	482205120154	150k 5% 0,1W	
3764	482211683872	220R 5% 0,5W	
3765	482205120393	39k 5% 0,1W	
3766	482205120475	4M7 5% 0,1W	
3767	482205120475	4M7 5% 0,1W	
3768	482211710833	10k 1% 0,1W	
3769	482211711383	12k 1% 0,1W	Autoreverse
3769	482205120822	8k2 5% 0,1W	Non-autoreverse
3770	482211711139	1k5 1% 0,1W	
3771	482205120122	1k2 5% 0,1W	
3772	482211711507	6k8 1% 0,1W	Autoreverse
3772	482205120562	5k6 5% 0,1W	Non-autoreverse
3773	482210012227	Trimmer 4k7 30% 0,1W	
3774	482211683933	15k 1% 0,1W	Autoreverse
3774	482205120822	8k2 5% 0,1W	Non-autoreverse
3775	482205120478	4R7 5% 0,1W	
3776	482211711507	6k8 1% 0,1W	
3777	482211710353	150R 1% 0,1W	
3778	482205210688	⚠ 6R8 5% 0,33W	
3779	482205120334	330k 5% 0,1W	
3780	482205120105	1M 5% 0,1W	
3781	482205120475	4M7 5% 0,1W	
3784	482205110102	1k 2% 0,25W	
3786	482205120223	22k 5% 0,1W	
3787	482205120105	1M 5% 0,1W	
3788	482205120105	1M 5% 0,1W	
3789	482211710834	47k 1% 0,1W	
4701	482205120008	0R Jumper 0805	
4702	482205120008	0R Jumper 0805	
4703	482205120008	0R Jumper 0805	
4704	482205120008	0R Jumper 0805	
4705	482205120008	0R Jumper 0805	
4706	482205120008	0R Jumper 0805	

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ELECTRICAL PARTS LIST - ETF7 NON-DOLBY BOARD

RESISTORS

4707	482205120008	0R Jumper 0805	
4708	482205120008	0R Jumper 0805	
4709	482205120008	0R Jumper 0805	
4710	482205120008	0R Jumper 0805	
4711	482205120008	0R Jumper 0805	
4712	482205120008	0R Jumper 0805	
4713	482205120008	0R Jumper 0805	
4714	482205120008	0R Jumper 0805	
4715	482205120008	0R Jumper 0805	
4716	482205120008	0R Jumper 0805	
4717	482205120008	0R Jumper 0805	
4718	482205120008	0R Jumper 0805	
4719	482205120008	0R Jumper 0805	
4720	482205120008	0R Jumper 0805	
4721	482205120008	0R Jumper 0805	
4722	482205120008	0R Jumper 0805	
4723	482205120008	0R Jumper 0805	
4724	482205120008	0R Jumper 0805	
4725	482205120008	0R Jumper 0805	
4726	482205120008	0R Jumper 0805	
4727	482205120008	0R Jumper 0805	
4728	482205120008	0R Jumper 0805	
4729	482205120008	0R Jumper 0805	
4730	482205120008	0R Jumper 0805	
4731	482205120008	0R Jumper 0805	
4732	482205120008	0R Jumper 0805	
4733	482205120008	0R Jumper 0805	
4734	482205120008	0R Jumper 0805	
4735	482205120008	0R Jumper 0805	
4736	482205120008	0R Jumper 0805	
4737	482205120008	0R Jumper 0805	
4738	482205120008	0R Jumper 0805	
4739	482205120008	0R Jumper 0805	
4740	482205120008	0R Jumper 0805	
4741	482205120008	0R Jumper 0805	
4742	482205120008	0R Jumper 0805	
4744	482205120008	0R Jumper 0805	
4745	482205120008	0R Jumper 0805	
4746	482205120008	0R Jumper 0805	
4748	482205120008	0R Jumper 0805	
4785	482205120008	0R Jumper 0805	
4790	482205120008	0R Jumper 0805	
4794	482205120008	0R Jumper 0805	
4795	482205120008	0R Jumper 0805	

COILS & FILTERS

5701	482215711477	Coil 2,2µH 5%
5703	482215620946	Osc Coil 100kHz

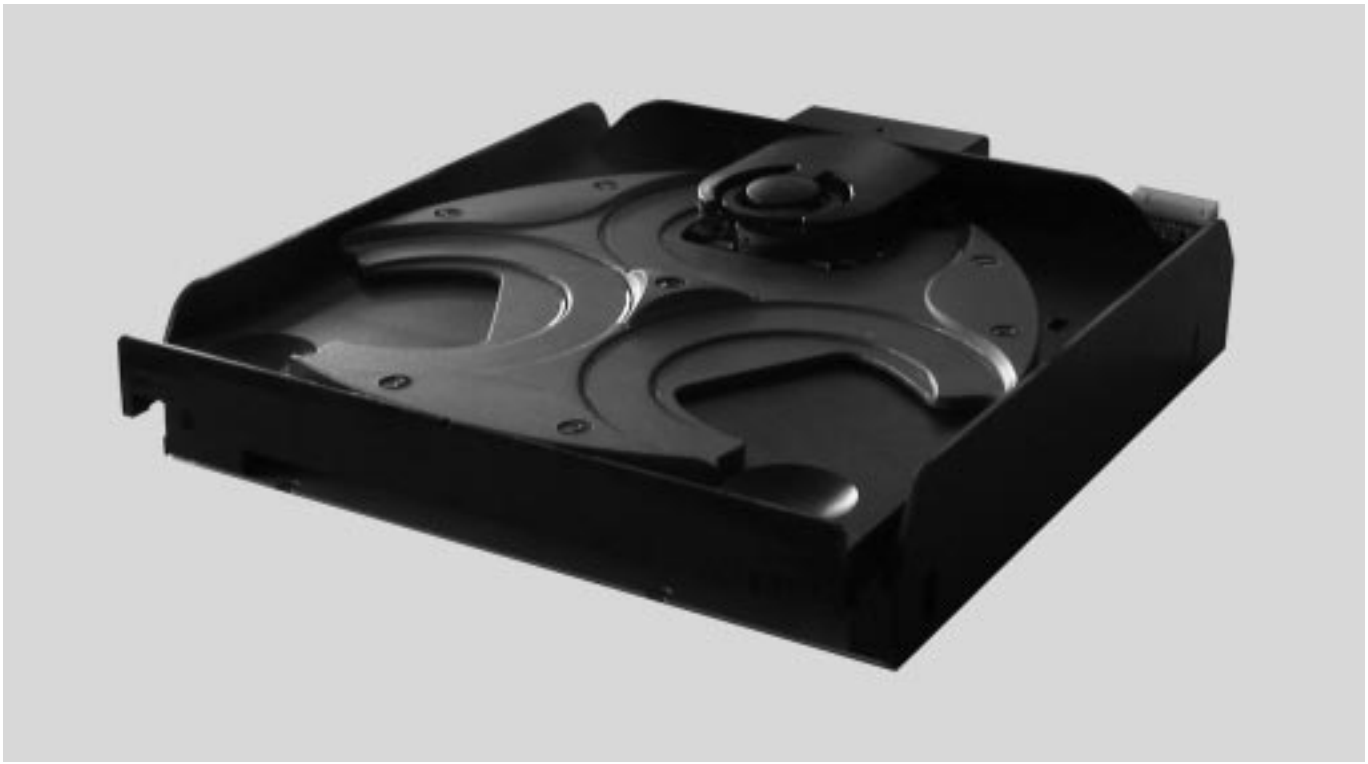
DIODES

6611	482213031878	1N4003G	
6612	482213031878	1N4003G	
6614	482213030621	1N4148	Autoreverse
6770	482213030621	1N4148	
6771	482213030621	1N4148	
6772	482213030621	1N4148	
6773	482213030621	1N4148	
6774	482213030621	1N4148	
6775	482213030621	1N4148	
6776	482213030621	1N4148	
6777	482213034382	BZX79-F8V2	
6778	482213030621	1N4148	
6782	482213030621	1N4148	
6785	482213030621	1N4148	
6786	482213030621	1N4148	

TRANSISTORS & INTEGRATED CIRCUITS

7610	532220911306	HEF4094BT	
7612	532213060845	BC807-25	
7613	532213060845	BC807-25	
7614	532213060845	BC807-25	
7616	482213060373	BC857B	Autoreverse
7618	482213060511	BC847B	
7619	482213060511	BC847B	
7620	482213060511	BC847B	
7622	482213060511	BC847B	Autoreverse
7623	482213060511	BC847B	
7624	482213060511	BC847B	
7710	482220932919	HEF4952BT	
7720	932214000668	AN7323S	
7730	482220932919	HEF4952BT	
7740	482220932919	HEF4952BT	
7780	482213060511	BC847B	
7781	482213042804	BC817-25	
7782	482213044568	BC557B	
7783	482213060511	BC847B	
7784	482213060373	BC857B	
7786	482213063494	J111	
7787	482213060511	BC847B	
7791	482213060511	BC847B	
7792	482213060511	BC847B	

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



3CDC 99 Module

(3 Disc Carrousel Changer)

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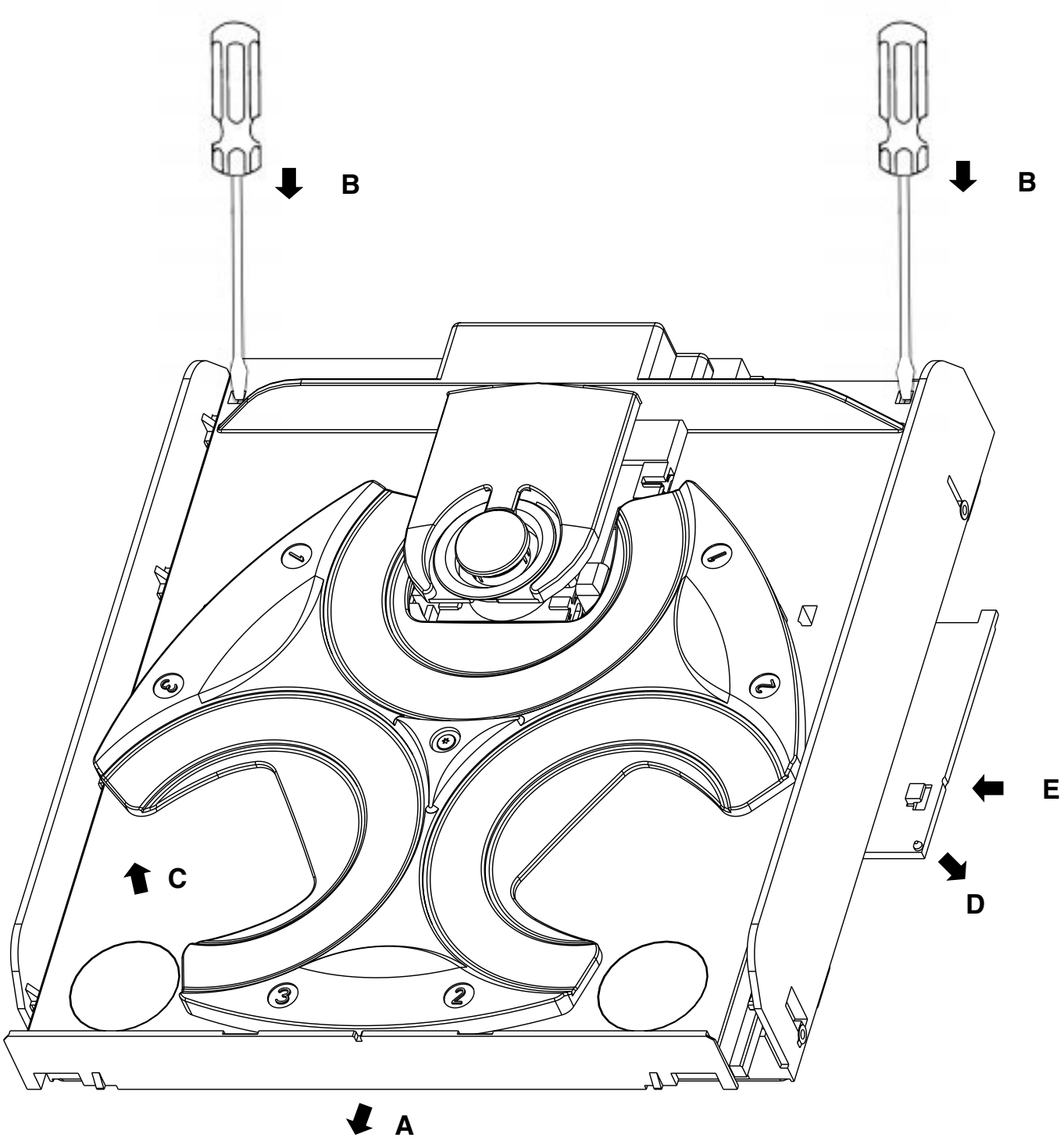
Demounting Hints



Demounting of Drawer

→ **A** Pull drawer outwards
→ **B** Unlock drawer with screwdriver
→ **C** Lift drawer to demount from chassis

Demounting of Flex Plate

→ **D** Lift plate to unlock pin from bottom plate
→ **E** Move plate inwards to demount from bottom plate

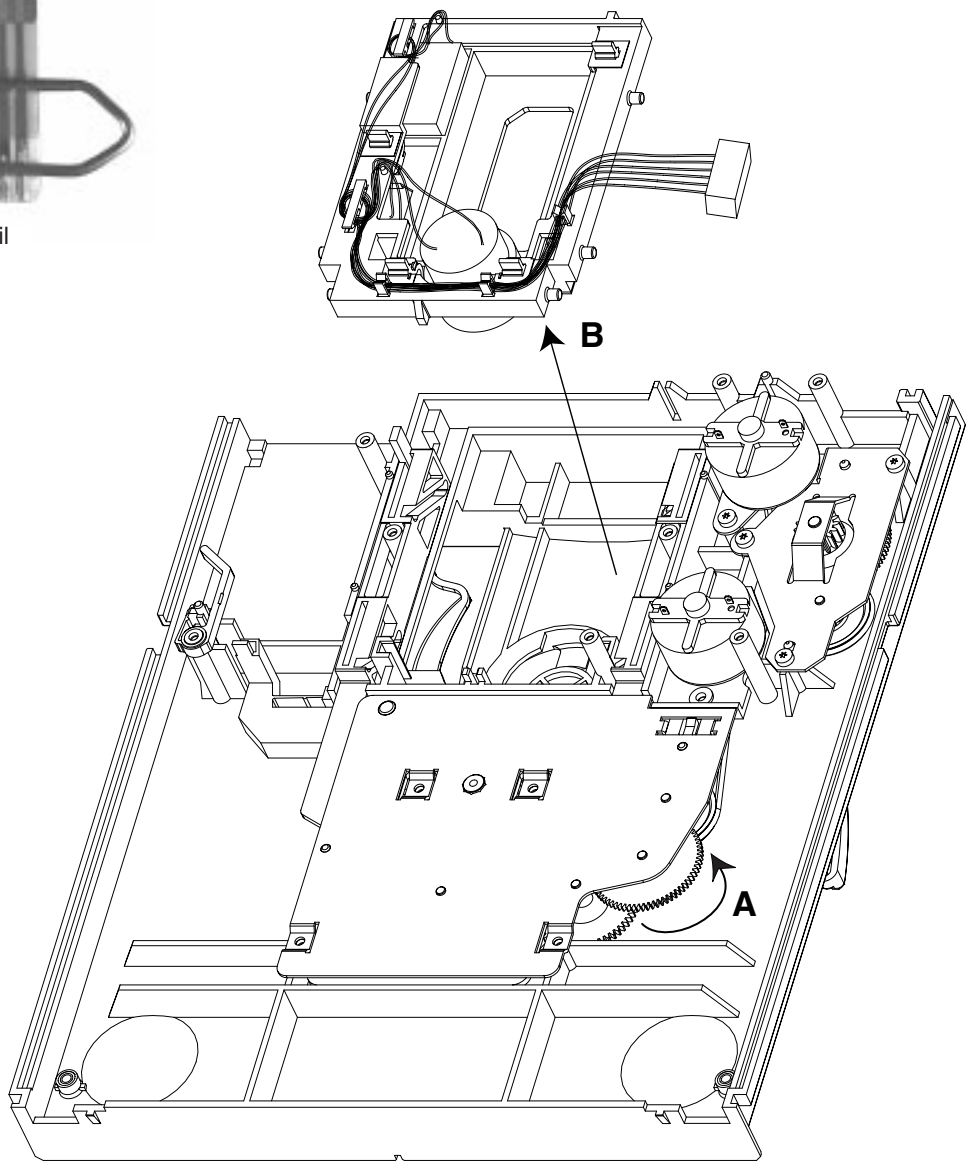
Servicing Hints

Replacement of CD Drive

See also exploded view of changer mechanism.

1. Demount printed circuit board: remove 5 screws.
2. Disconnect flexfoil and JST connector of CD drive from Printed circuit board. Shortcircuit the flexfoil with a paperclip to protect the laser against ESD.
3. Remove 2 screws (pos 107,108) and demount CD drive lockings (pos 105,106).
4. Turn gearwheel (pos 42) of disc change mechanism by finger to move CD drive support in upper position as shown in picture below Ⓐ.
5. Demount CD drive support (pos 95) Ⓑ.
6. Replace CD drive (pos 100). The wire tree of JST connector has to be desoldered and resoldered on the new CD drive again.

CD drive flex foil

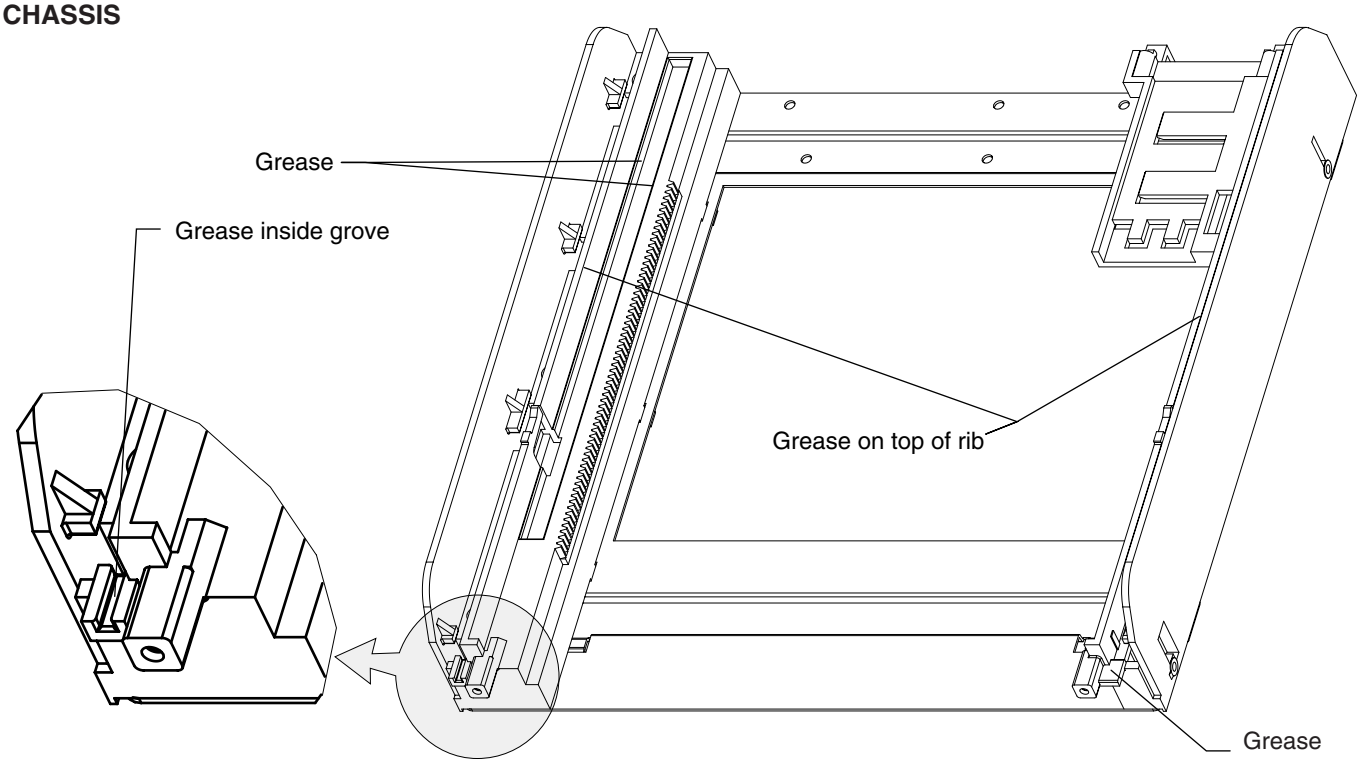


Mounting of Carrousel

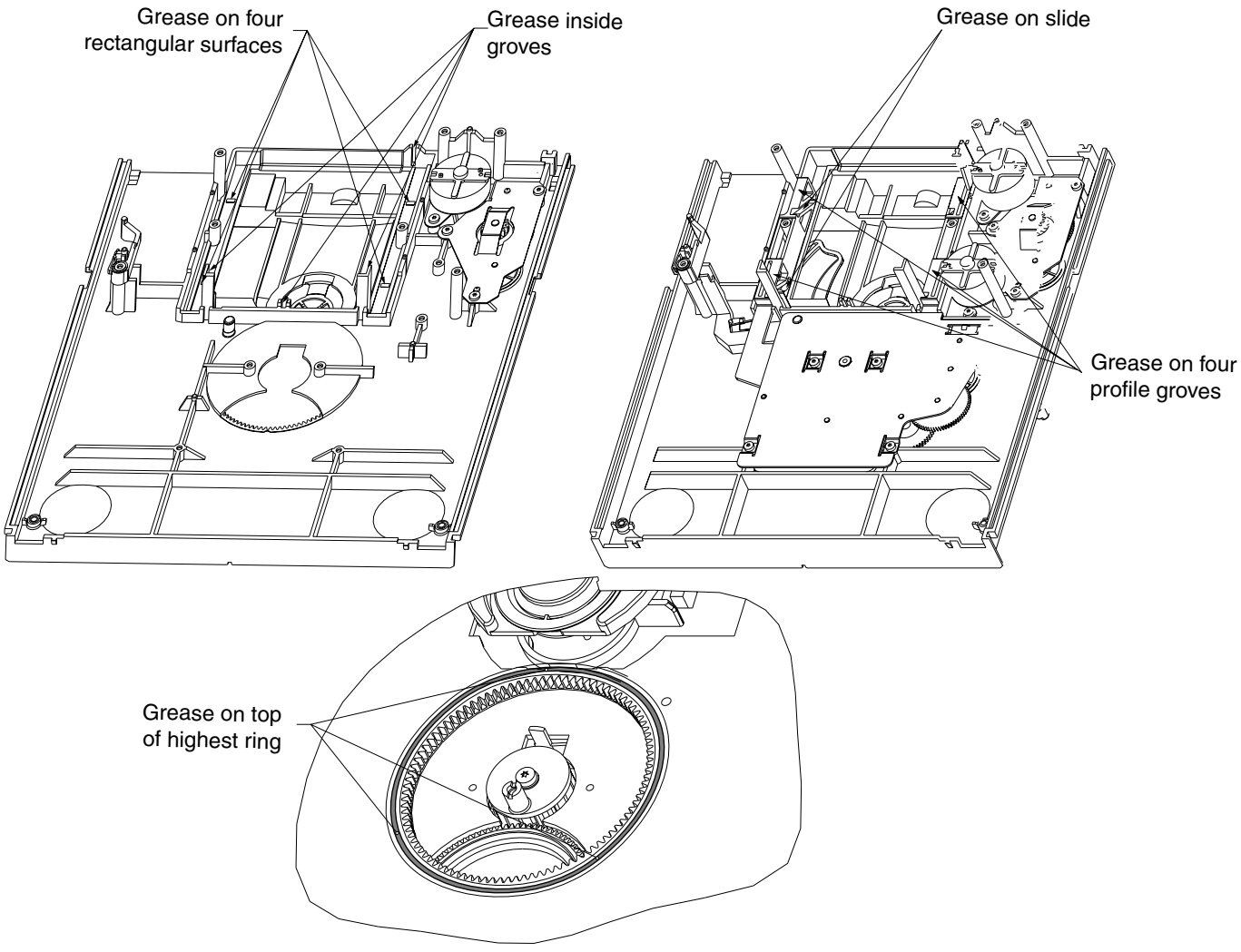
1. Turn gearwheel (pos 42) of disc change mechanism by finger until CD drive is in play position.
2. Mount carrousel (pos 115) so that disc is positioned right on turntable. Carrousel position number doesn´t matter.

Lubrication Instructions

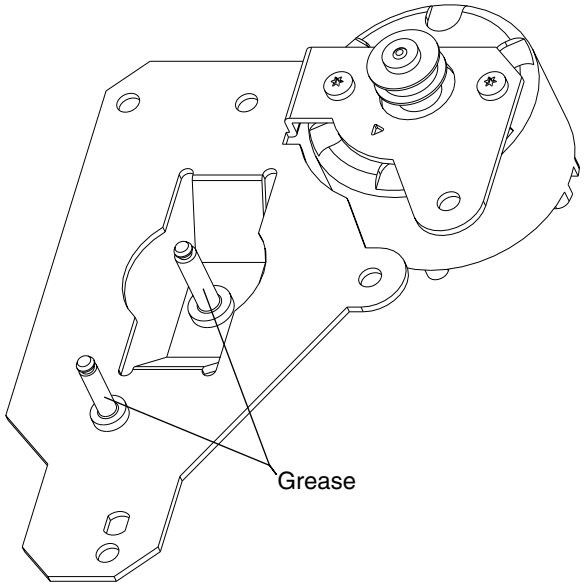
CHASSIS



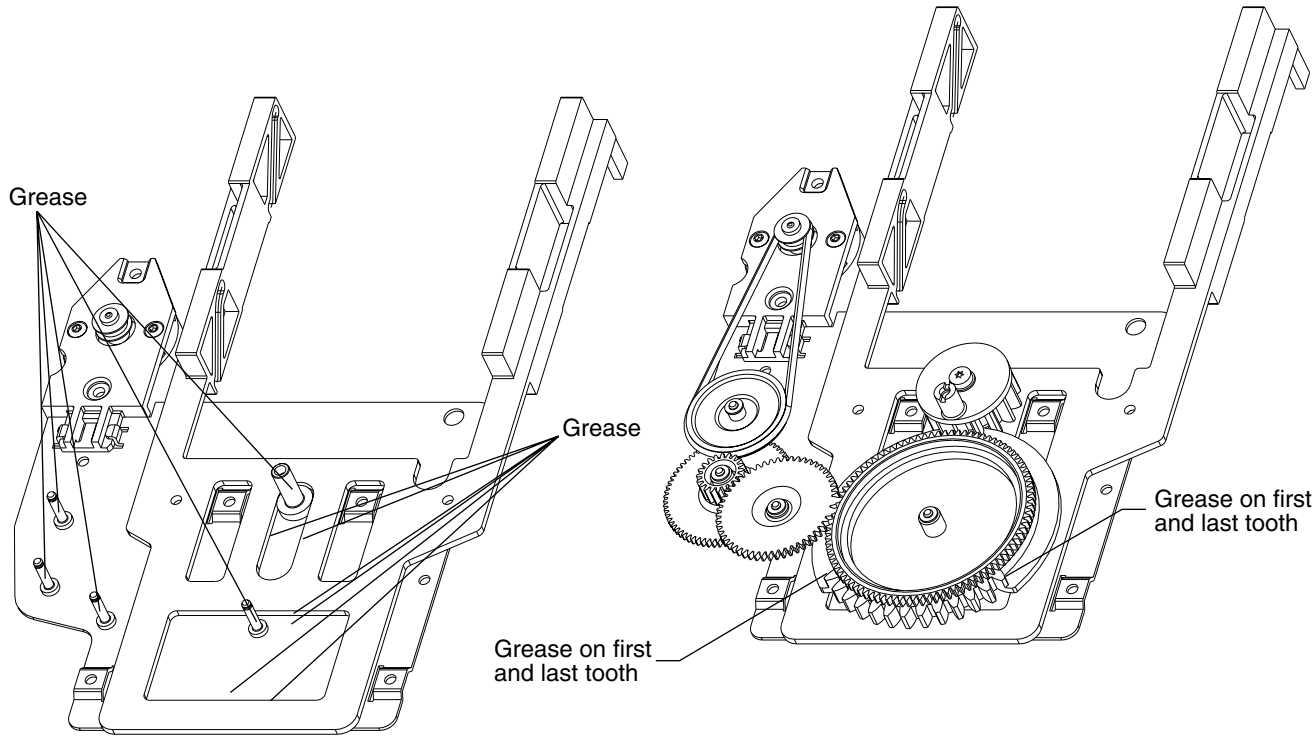
DRAWER



DRAWER MECHANISM



DISC CHANGE MECHANISM



Use only grease **Polylub GLY 801** service codenumber 4822 390 10136

WARNING

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE 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 CD mechanism:

1. Disconnect CD drive flexfoil from old CD drive
2. Connect paperclip to CD drive flexfoil to short-circuit flexfoil (fig.1)
3. Remove old CD drive
4. Remove short-circuit from flexfoil
5. Connect flexfoil to new CD drive
6. Position new CD drive in its studs
7. Remove short-circuit from Laserunit

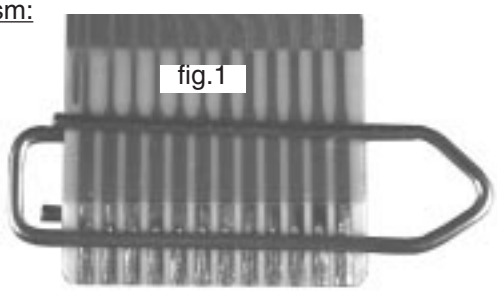
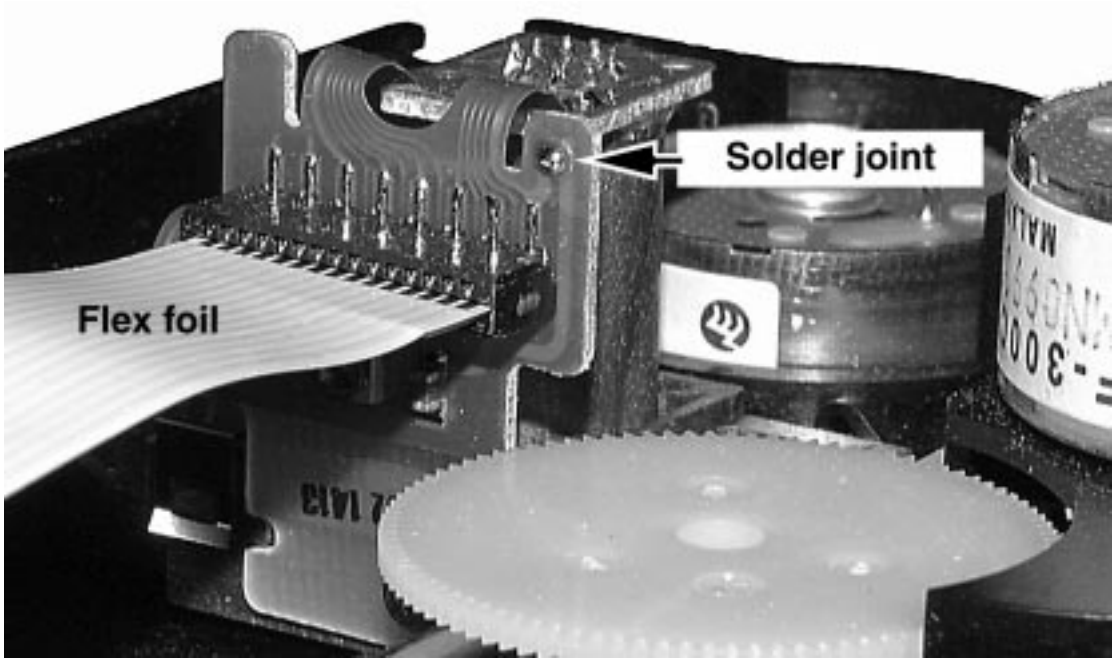
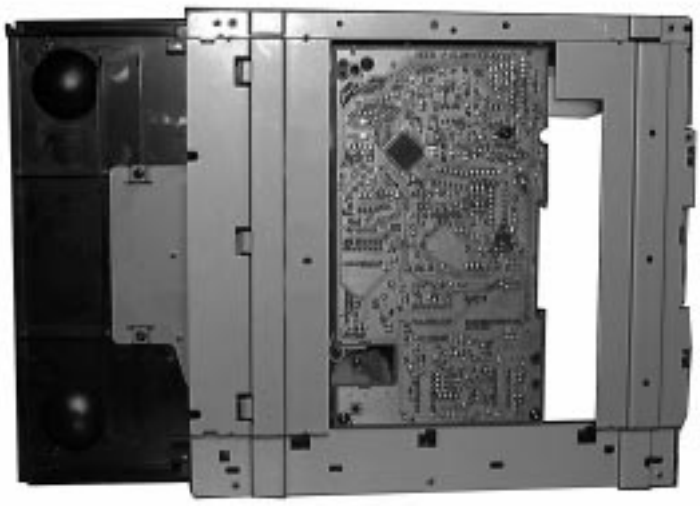


fig.1

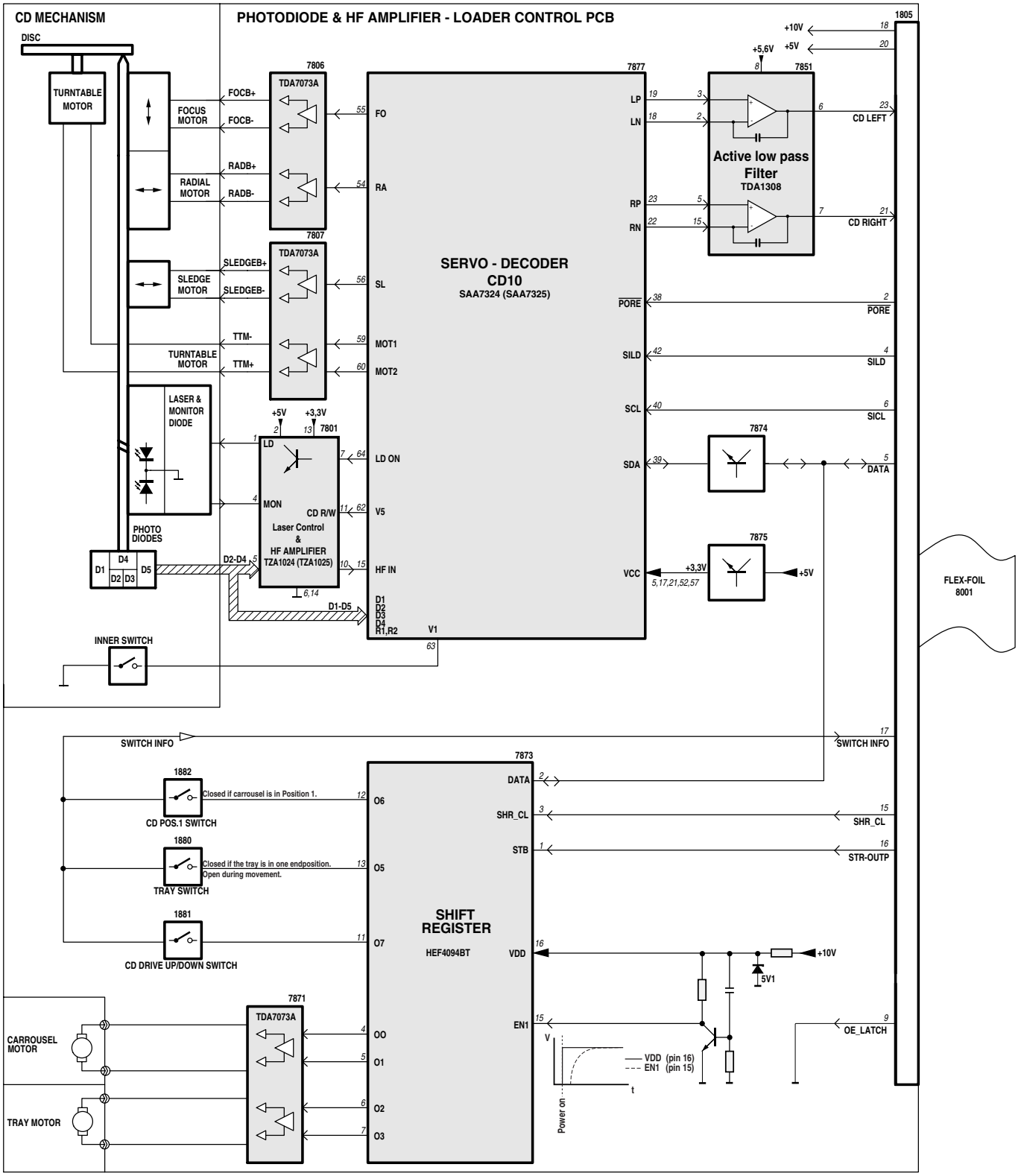
Attention: The laser diode of this CD drive is protected against ESD by a solder joint which shortcircuits the laser diode to ground.
For proper functionality of the CD drive this solder joint must be removed **after** connection the drive to the set.



Service Position

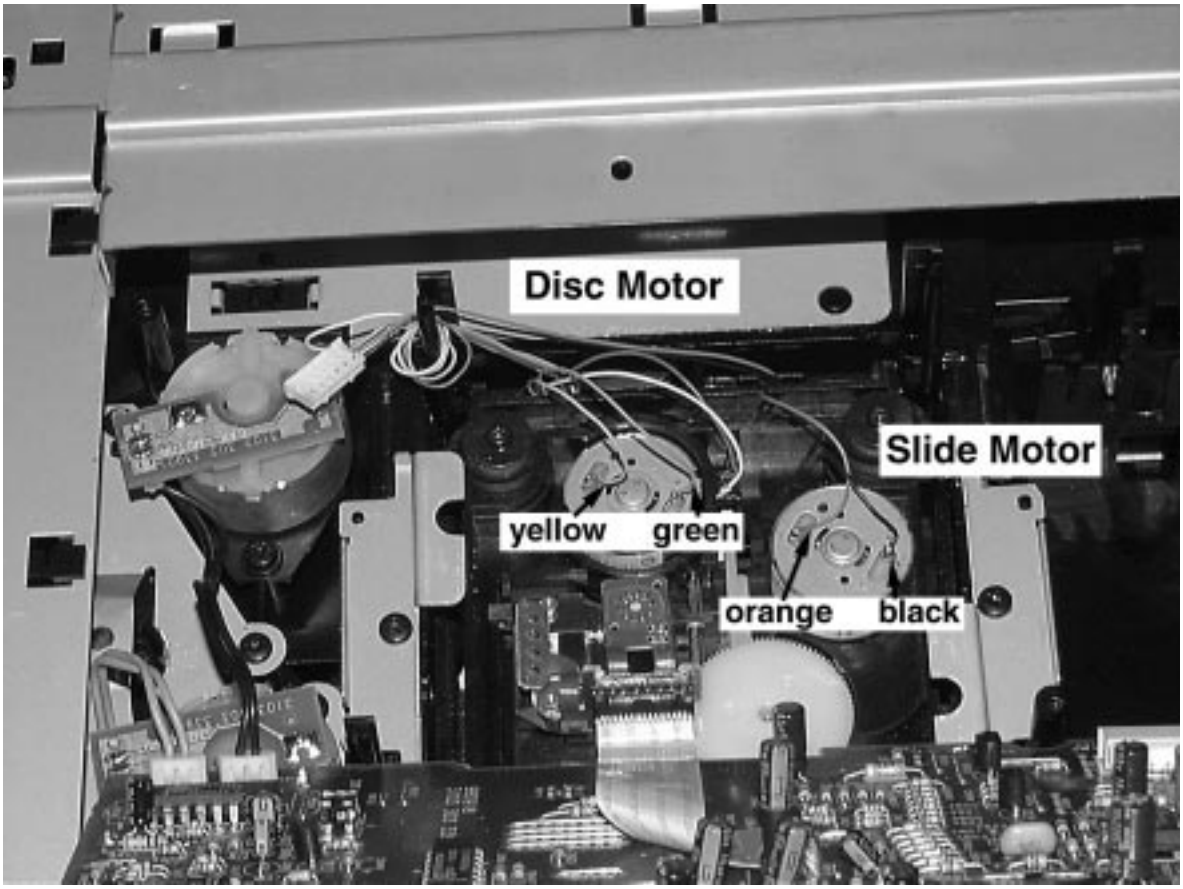


Blockdiagram

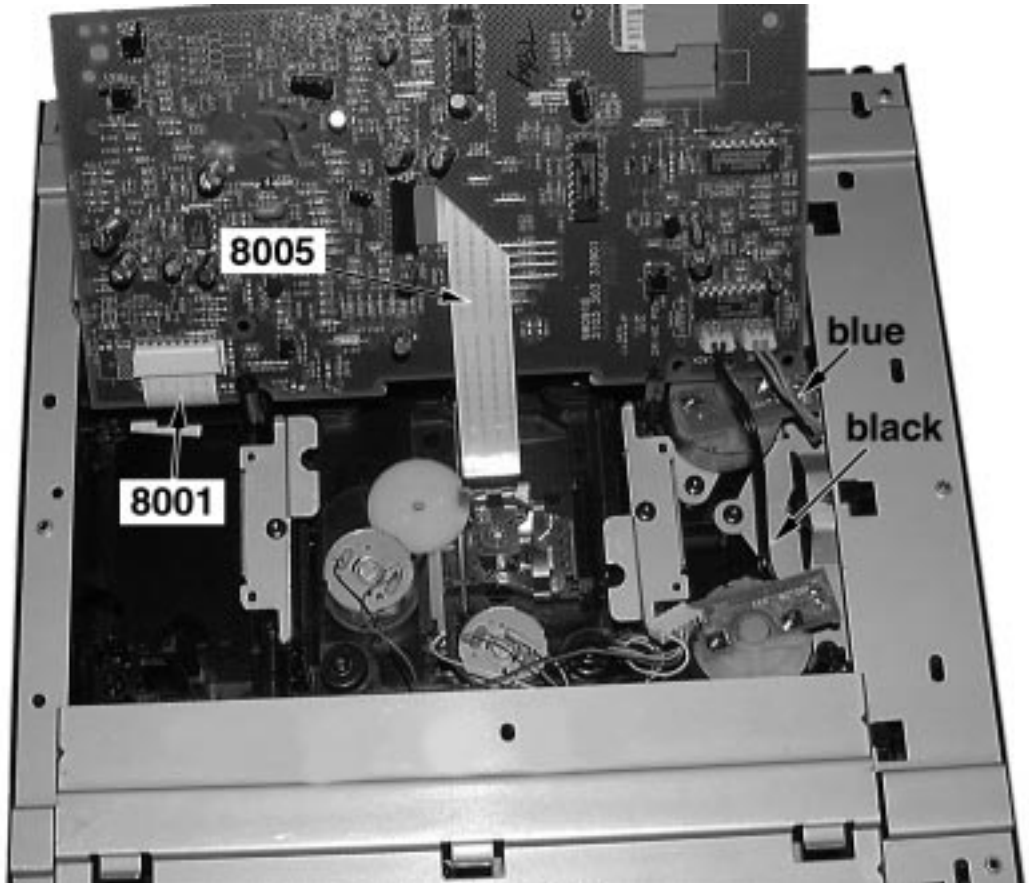


Blockdiagram 3CDC99 19981202

Wiring of CD Drive



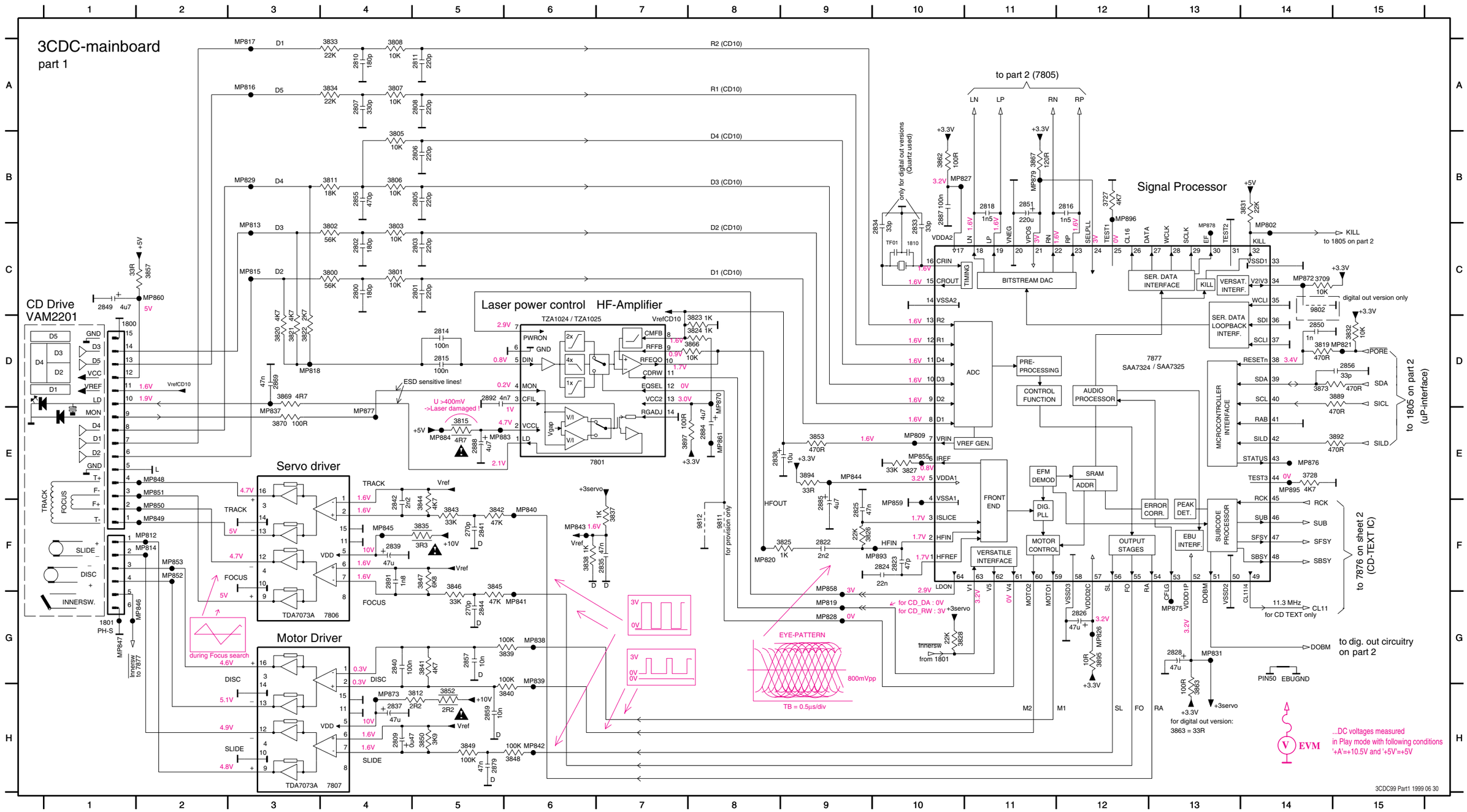
Pict. 1



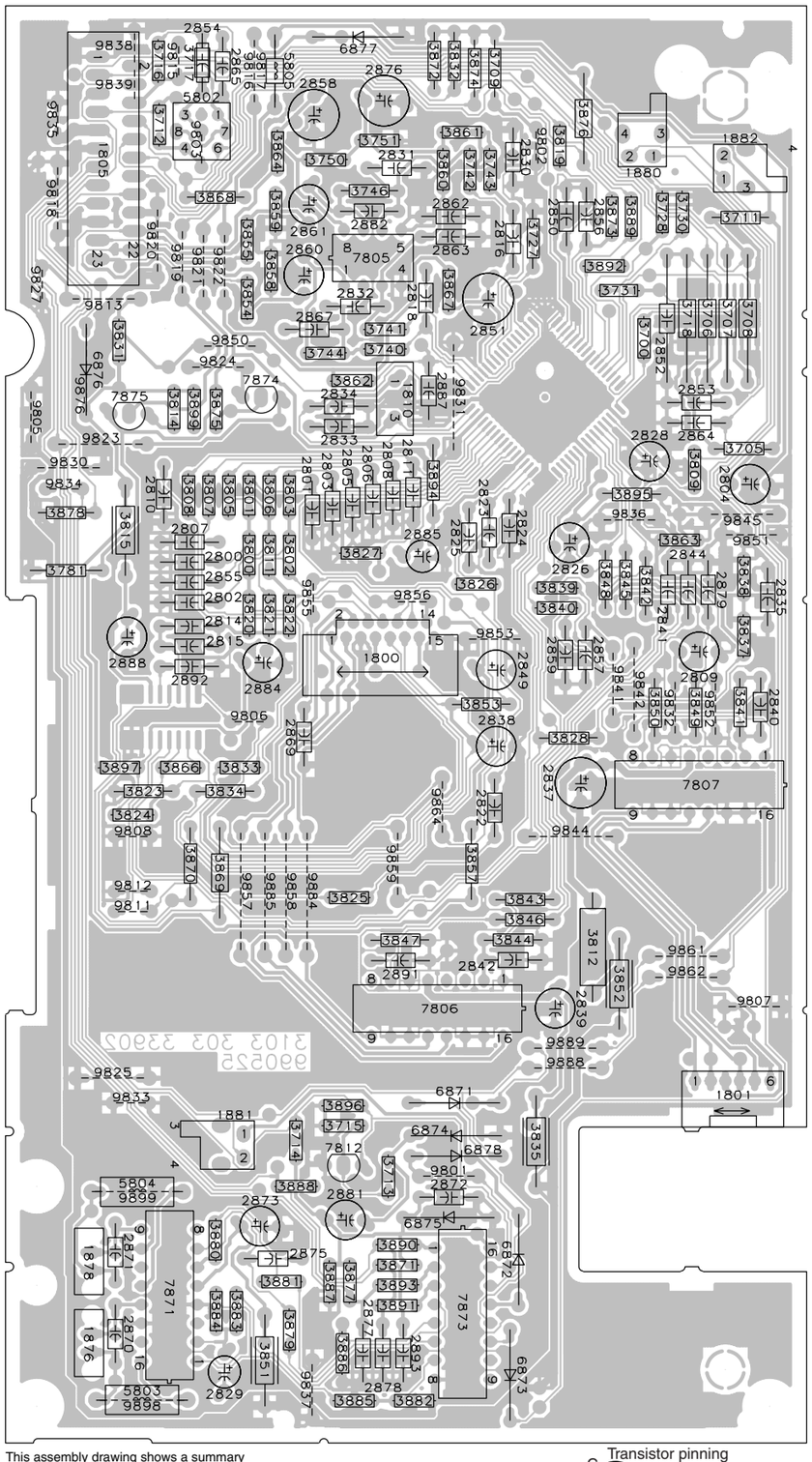
Pict. 2

10-9

1800 D2	2805 B5	2814 D5	2825 F9	2838 E8	2850 D14	2879 H5	2892 D5	3803 C4	3815 E5	3825 F9	3834 A4	3842 F5	3849 H5	3866 D8	3894 E9	9802 C14
1801 G1	2806 B5	2815 D5	2826 G12	2839 F4	2851 B11	2880 D8	3709 C14	3805 B4	3819 D14	3826 F9	3835 F5	3843 F5	3850 H5	3867 B11	3895 G12	9811 F8
1810 C10	2807 A4	2816 B12	2828 G13	2840 G4	2855 B4	2884 E8	3727 B12	3806 B4	3820 D3	3827 E10	3837 F7	3844 F5	3852 H5	3869 D3	3897 E7	9812 F8
2800 C4	2808 A5	2818 B11	2833 C10	2841 F5	2856 D15	2885 F9	3728 E14	3807 A4	3821 D3	3828 G10	3838 F6	3845 F5	3853 E9	3870 E3	7801 E7	
2801 C5	2809 H4	2822 F9	2834 C10	2842 F4	2857 G5	2887 B10	3800 C4	3808 A4	3822 D3	3831 B14	3839 G6	3846 F5	3857 C2	3873 D14	7806 G4	
2802 C4	2810 A4	2823 F10	2835 F7	2844 G5	2859 H5	2888 E5	3801 C4	3811 B4	3823 D8	3832 D15	3840 H6	3847 F5	3862 B10	3889 D15	7807 H4	
2803 C5	2811 A5	2824 F10	2837 H4	2849 C1	2869 D3	2891 F4	3802 C4	3812 H5	3824 D8	3833 A4	3841 G5	3848 H6	3863 H13	3892 E15	7877 D12	



3CDC99 Board Componentside view



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

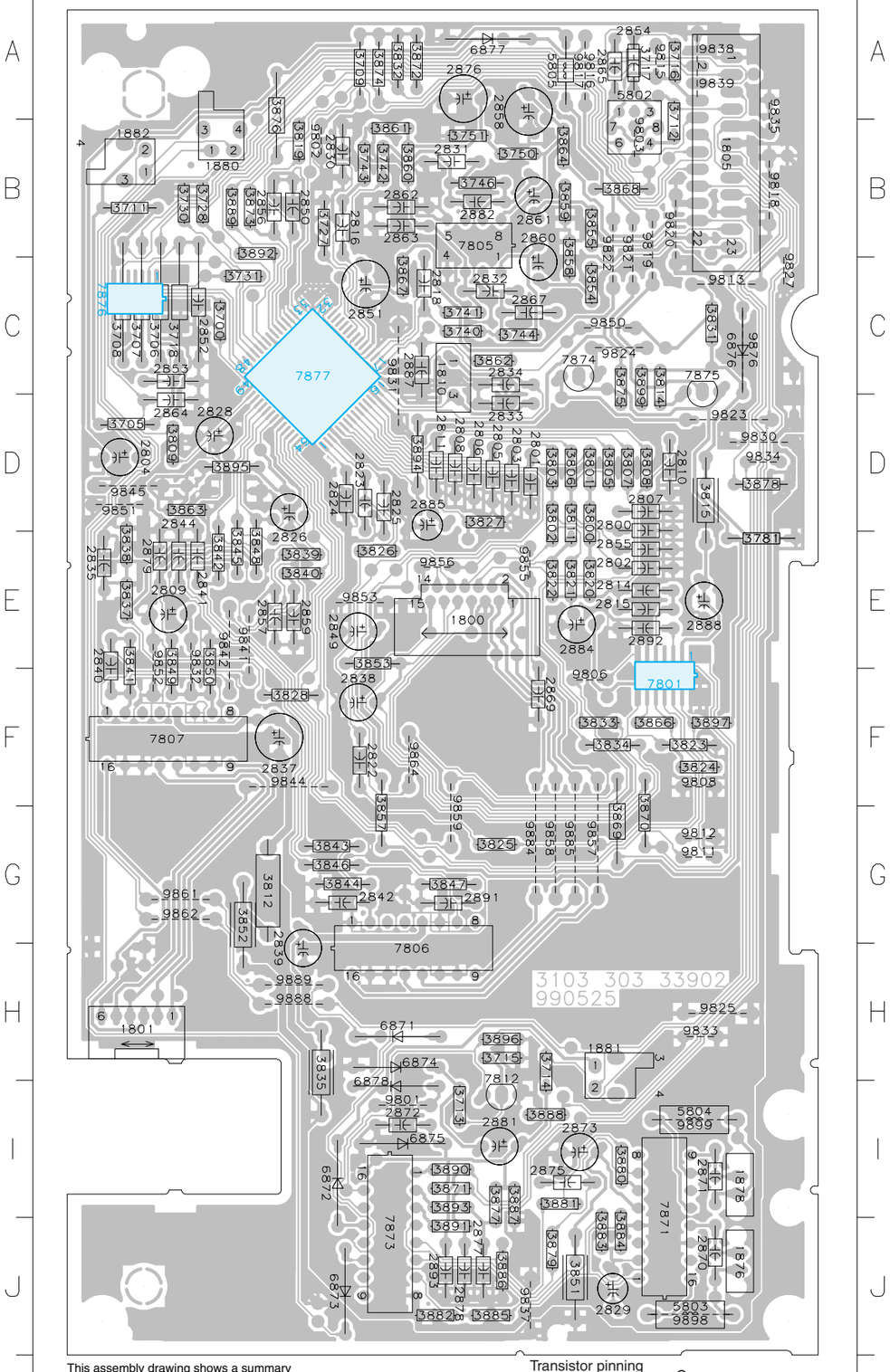
Transistor pinning

3CDC99 Layout stage .2 990701

Mapping

1800 E3	3716 A2	3888 I3
1801 H5	3717 A2	3889 B5
1805 B1	3718 C5	3890 I3
1810 C3	3727 B4	3891 J3
1876 J1	3728 B5	3892 B5
1878 I1	3730 B5	3893 I3
1880 B5	3731 C5	3894 D3
1881 H2	3740 C3	3895 D5
1882 B5	3741 C3	3896 H3
2800 D2	3742 B4	3897 F1
2801 D3	3743 B4	3899 C2
2802 E2	3744 C3	5802 A2
2803 D3	3746 B3	5803 J1
2804 D5	3750 B3	5804 I1
2805 D3	3751 B3	5805 A2
2806 D3	3781 E1	6871 H4
2807 D2	3800 D2	6872 I4
2808 D3	3801 D2	6873 J4
2809 E5	3802 D2	6874 H3
2810 D2	3803 D2	6875 I3
2811 D3	3805 D2	6876 C1
2814 E2	3806 D2	6877 A3
2815 E2	3807 D2	6878 H4
2816 B4	3808 D2	7801 F1
2818 C3	3809 D5	7805 B3
2822 F4	3811 D2	7806 H3
2823 D4	3812 G5	7807 F5
2824 D4	3814 C2	7812 H3
2825 D4	3815 D1	7871 J2
2826 E4	3819 B4	7873 J4
2828 D5	3820 E2	7874 C2
2829 J2	3821 E2	7875 C1
2830 B4	3822 E2	7876 C5
2831 B3	3823 F1	7877 C4
2832 C3	3824 F1	9801 I4
2833 D3	3825 G3	9802 B4
2834 C3	3826 E4	9803 B2
2835 E5	3827 D3	9805 D1
2837 F4	3828 F4	9806 F2
2838 F4	3831 C1	9807 G5
2839 H4	3832 A4	9808 F1
2840 E5	3833 F2	9811 G1
2841 E5	3834 F2	9812 G1
2842 G4	3835 H4	9813 C1
2844 D5	3837 E5	9815 A2
2849 E4	3838 E5	9816 A2
2850 B4	3839 E4	9817 A2
2851 C4	3840 E4	9818 B1
2852 C5	3841 E5	9819 B2
2853 C5	3842 E5	9820 B2
2854 A2	3843 G4	9821 B2
2855 E2	3844 G4	9822 B2
2856 B5	3845 E5	9823 D1
2857 E5	3846 G4	9824 C2
2858 A3	3847 G3	9825 H1
2859 E4	3848 E5	9827 C1
2860 B3	3849 E5	9830 D1
2861 B3	3850 E5	9831 C4
2862 B4	3851 J2	9832 E5
2863 B4	3852 G5	9833 H1
2864 D5	3853 E4	9834 D1
2865 A2	3854 C2	9835 A1
2867 C3	3855 B2	9836 D5
2869 F2	3857 G4	9837 J3
2870 J1	3858 C2	9838 A1
2871 I1	3859 B2	9839 A1
2872 I4	3860 B4	9841 E5
2873 I2	3861 B4	9842 E5
2875 I3	3862 C3	9844 F4
2876 A3	3863 D5	9845 D5
2877 J3	3864 B2	9850 C2
2878 J3	3866 F2	9851 D5
2879 E5	3867 C4	9852 E5
2881 I3	3868 B2	9853 E4
2882 B3	3869 G2	9855 E3
2884 E2	3870 G2	9856 E3
2885 D3	3871 I3	9857 G2
2887 C4	3872 A3	9858 G2
2888 E1	3873 B5	9859 G3
2891 G3	3874 A4	9861 G5
2892 E2	3875 C2	9862 G5
2893 J3	3876 A4	9864 F3
3700 C5	3877 I3	9876 C1
3705 D5	3878 D1	9884 G3
3706 C5	3879 J2	9885 G2
3707 C5	3880 I2	9888 H4
3708 C5	3881 I2	9889 H4
3709 A4	3882 J3	9898 J1
3711 B5	3883 J2	9899 I1
3712 B2	3884 J2	
3713 I3	3885 J3	
3714 H3	3886 J3	
3715 H3	3887 I3	

3CDC99 Board Copperside view



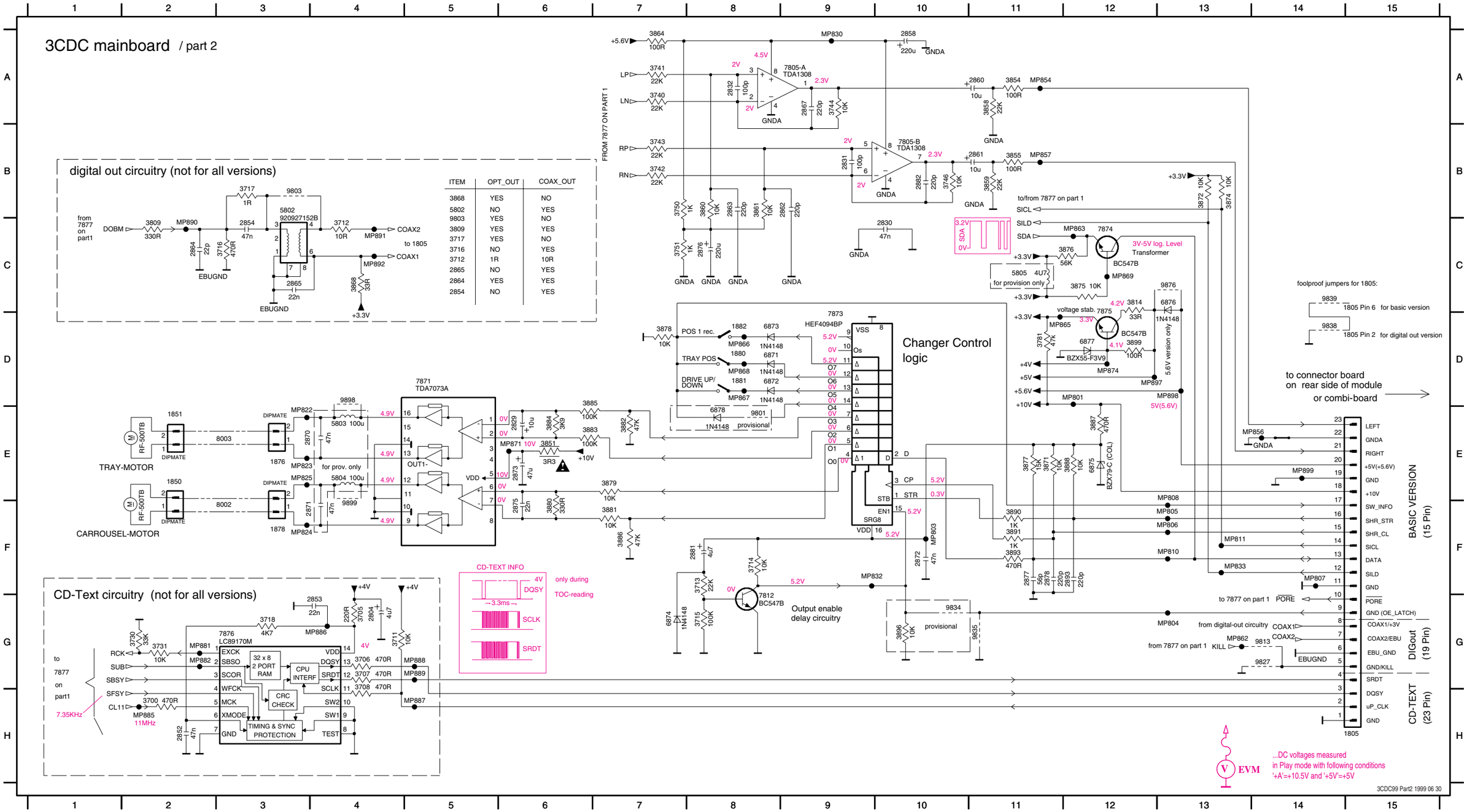
This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

Transistor pinning

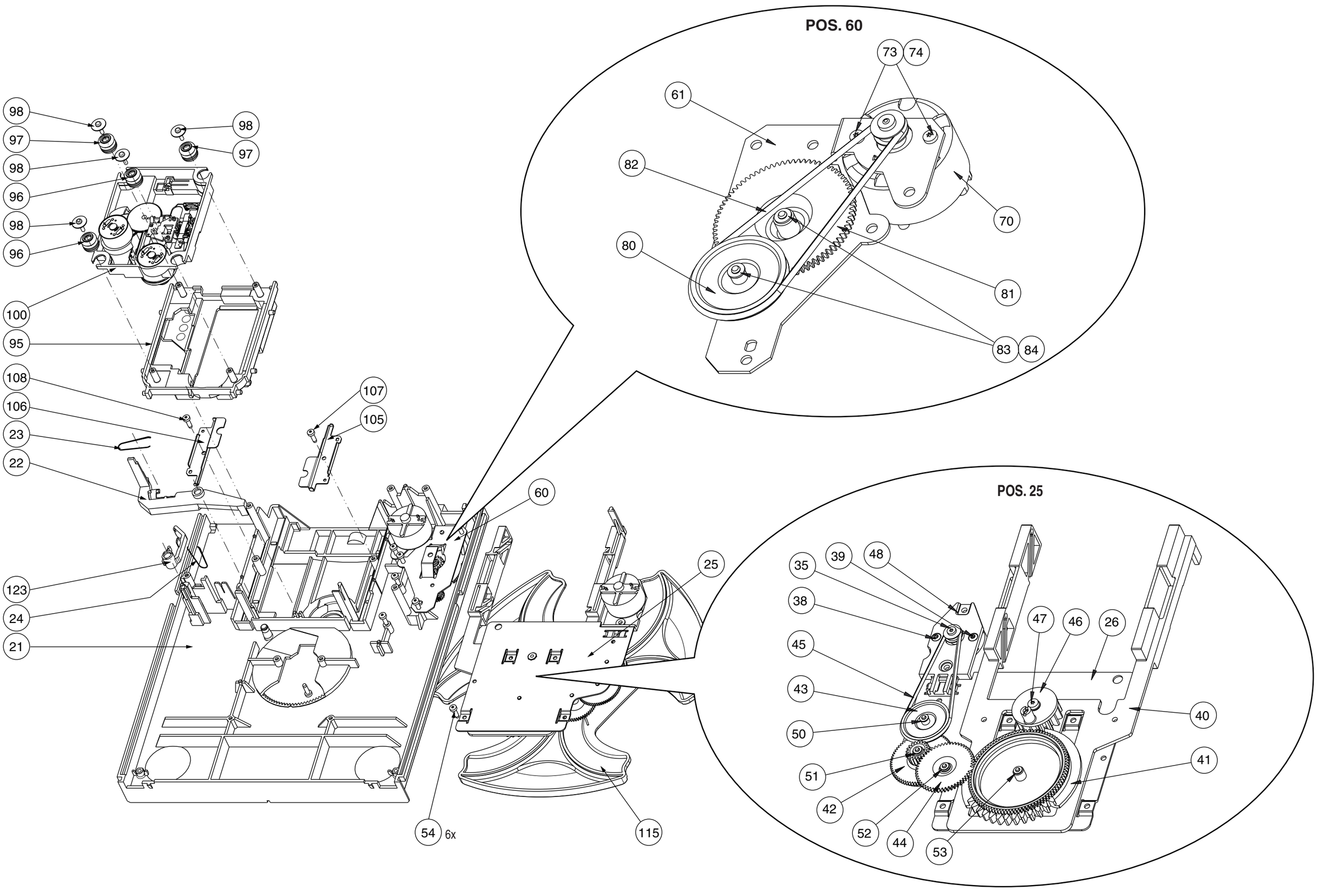
3CDC99 Layout stage .2 990701

10-11

1805 H14	2804 G4	2853 G4	2863 B8	2872 F10	2881 F8	3707 G4	3715 G8	3740 A7	3750 B7	3855 B11	3868 C4	3877 E11	3883 E6	3890 F11	5803 E4	6874 G7	7805-B B10	7876 G3	9835 G11
1876 E3	2829 E6	2854 C3	2858 A10	2873 E6	2882 B10	3708 H4	3716 C3	3741 A7	3751 C7	3858 A11	3871 E11	3878 D7	3884 E6	3891 F11	5804 E4	6875 E12	7812 G8	9801 E8	9838 D14
1878 F3	2830 C10	2858 A10	2865 C3	2875 F6	2893 F12	3711 G4	3717 B3	3742 B7	3781 D12	3859 B11	3872 B13	3879 E7	3885 D6	3893 F11	5805 C11	6876 C13	7871 D5	9803 B3	9839 C14
1880 D8	2831 B9	2860 A11	2867 A9	2876 C8	3700 H2	3712 C4	3718 G3	3743 B7	3809 C2	3860 B8	3874 B13	3880 F6	3886 F7	3896 G10	6871 D8	6877 D12	7873 D9	9813 G14	9876 C13
1881 D8	2832 A8	2861 B11	2870 E3	2877 F11	3705 G4	3713 F8	3730 G2	3744 A9	3814 C12	3861 B8	3875 C12	3881 F7	3887 E12	3899 D12	6872 D8	6878 E8	7874 C12	9827 G14	9898 D4
1882 D8	2852 H2	2862 B8	2871 F4	2878 F11	3706 G4	3714 F8	3731 G2	3746 B10	3851 E6 3854 A11	3864 A7	3876 C12	3882 E7	3888 E12	5802 B3	6873 D8	7805-A A9	7875 D12	9834 G10	9899 E4



10-12


POS. 60
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POS. 25
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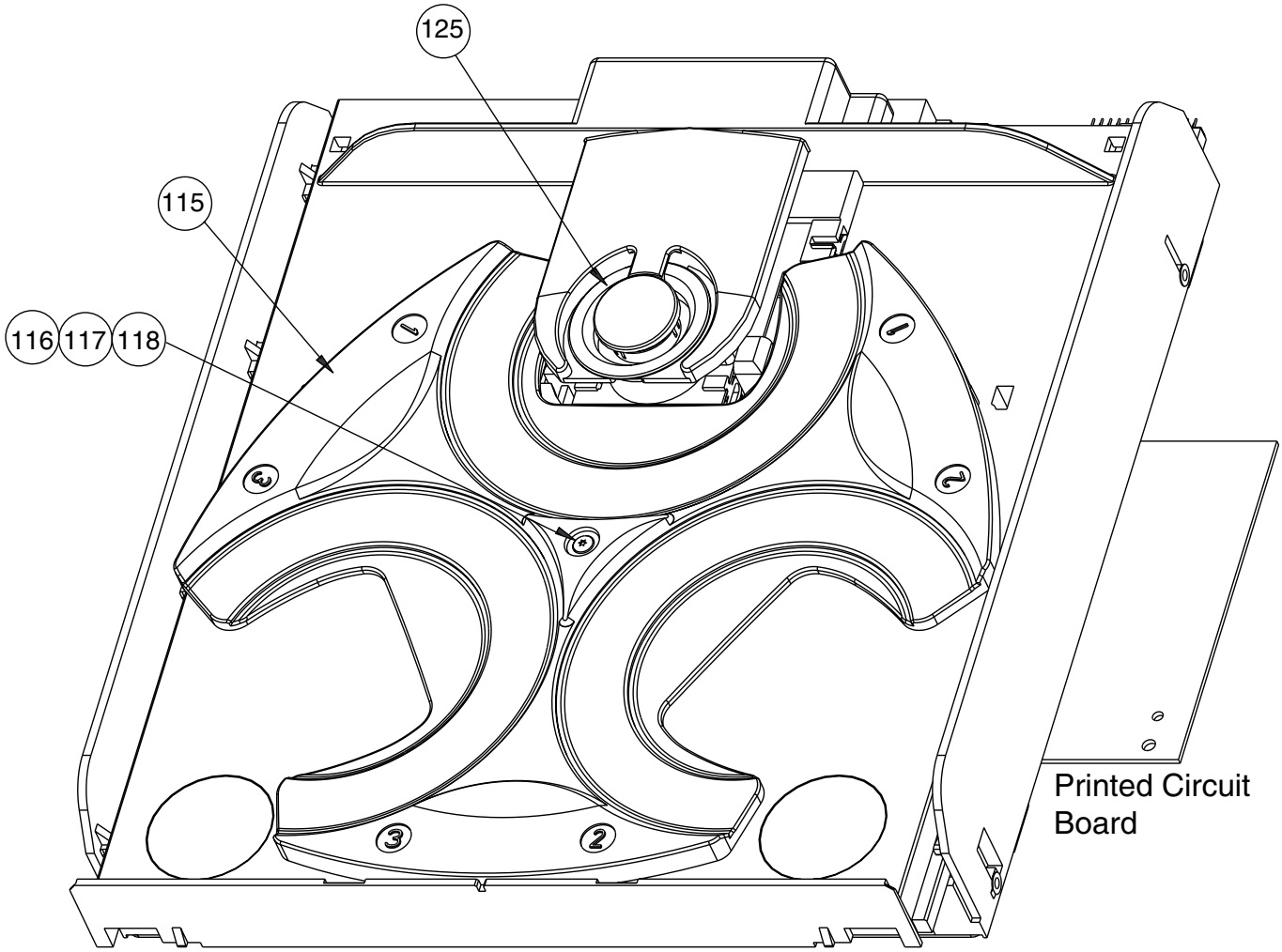
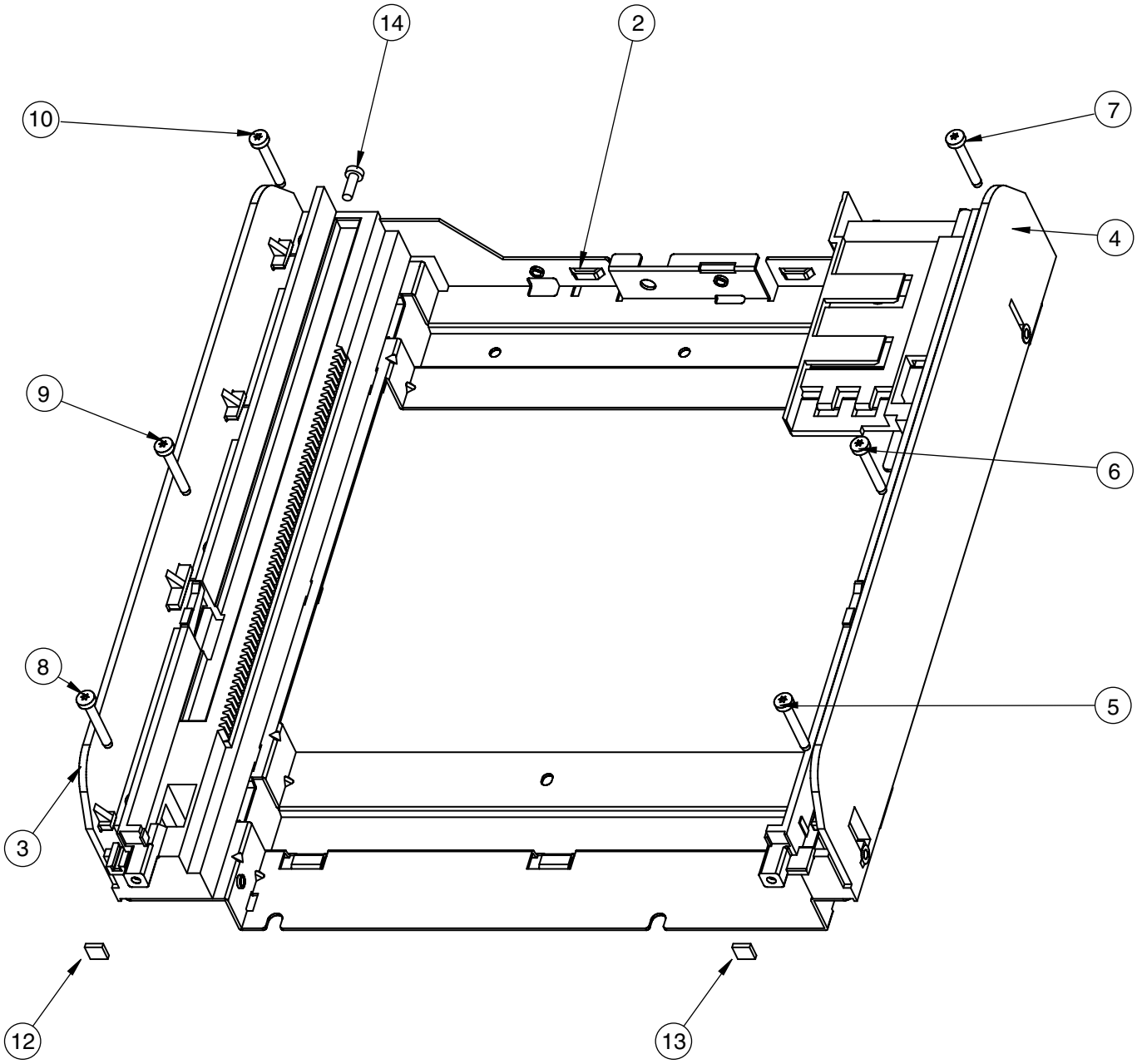


MECHANICAL PARTSLIST 3CDC-99 MODULE

	4822 390 10136	POLYLUB GLY801 (GREASE)
3	4822 463 11008	GUIDE LEFT
4	4822 463 11009	GUIDE RIGHT
21	4822 441 11615	DRAWER
22	4822 402 10088	BRACKET TUMBLER
38	4822 502 12548	SCREW M2,6X3,5
39	4822 502 12548	SCREW M2,6X3,5
40	4822 463 11011	SLIDE
41	4822 522 10509	CONTROL DISC
42	4822 522 10492	GEAR WHEEL
43	4822 528 10937	PULLEY
44	4822 522 10493	IDLER WHEEL
45	4822 358 10115	BELT
46	4822 466 10735	ECCENTRIC GEAR WHEEL
50	4822 532 12364	WASHER
51	4822 532 12364	WASHER
52	4822 532 12364	WASHER
53	4822 532 12364	WASHER
35	4822 361 10753	CARROUSEL MOTOR
70	4822 361 10753	CARROUSEL MOTOR

continued on next page



MECHANICAL PARTSLIST 3CDC-99 MODULE

73	4822 502 12548	SCREW M2,6X3,5
74	4822 502 12548	SCREW M2,6X3,5
80	4822 528 10937	PULLEY
81	4822 522 10494	GEAR DRAWER
82	4822 358 10115	BELT
83	4822 532 12364	WASHER
84	4822 532 12364	WASHER
95	4822 404 10895	SUPPORT
96	4822 529 10431	SUSPENSION
97	4822 529 10431	SUSPENSION
100	4822 691 10772	CD DRIVE VAM2201
115	4822 466 10736	CARROUSEL
117	4822 532 12365	BUSH DRAWER
123	4822 402 11237	SWITCH BRACKET
125	4822 401 11708	DISC CLAMP

ELECTRICAL PARTSLIST 3CDC-99 MODULE

MISCELLANEOUS

1800	4822 265 10925	FLEX FOIL CONNECTOR 15PIN
1805	4822 265 11533	FLEX FOIL CONNECTOR 23PIN
1805	2422 025 09768	FLEX FOIL CONNECTOR 19PIN
1805	4822 267 51322	FLEX FOIL CONNECTOR 15PIN
1880	4822 276 13503	SWITCH
1881	4822 276 13503	SWITCH
1882	4822 276 13503	SWITCH
8001	4822 320 12659	FLEX FOIL 23PIN 480MM *
8001	4822 320 12729	FLEX FOIL 23PIN 400MM
8001	4822 320 12658	FLEX FOIL 19PIN 480MM
8001	4822 320 12232	FLEX FOIL 15PIN 480MM
8005	3103 308 91820	FLEX FOIL 15PIN 95MM

* will be replaced by shorter length (400mm) when stock is out.

CAPACITORS

2800	4822 126 10053	180pF	10%	50V
2801	4822 122 10466	220pF	10%	50V
2802	4822 126 10053	180pF	10%	50V
2803	4822 122 10466	220pF	10%	50V
2804	4822 124 40246	4,7µF	20%	63V
2805	4822 122 10466	220pF	10%	50V
2806	4822 122 10466	220pF	10%	50V
2807	4822 126 12787	330pF	10%	50V
2808	4822 122 10466	220pF	10%	50V
2809	5322 124 41948	0,47µF	20%	50V
2810	4822 126 10053	180pF	10%	50V
2811	4822 122 10466	220pF	10%	50V
2814	4822 126 12882	100nF	20%	50V
2815	4822 126 12882	100nF	20%	50V
2816	4822 126 12878	1,5nF	10%	16V
2818	4822 126 12878	1,5nF	10%	16V
2822	4822 126 12339	2,2nF	10%	16V
2823	4822 122 33848	47pF	5%	50V
2824	4822 126 11585	22nF	20%	50V
2825	4822 126 12785	47nF	20%	50V
2826	4822 124 80231	47µF	20%	16V
2828	4822 124 40433	47µF	20%	25V
2829	4822 124 21732	10µF	20%	25V
2830	4822 126 12785	47nF	20%	50V
2831	4822 122 33195	100pF	10%	50V
2832	4822 122 33195	100pF	10%	50V
2833	4822 122 33069	33pF	5%	50V
2834	4822 122 33069	33pF	5%	50V
2835	4822 126 12785	47nF	20%	50V
2837	4822 124 40433	47µF	20%	25V
2838	4822 124 41579	10µF	20%	50V
2839	4822 124 40433	47µF	20%	25V
2840	4822 126 12882	100nF	20%	50V
2841	4822 126 12702	270pF	10%	50V
2842	4822 126 12339	2,2nF	10%	16V
2844	4822 126 12702	270pF	10%	50V
2849	4822 124 40246	4,7µF	20%	63V
2850	4822 122 33197	1nF	10%	50V
2851	4822 124 40196	220µF	20%	16V
2852	4822 126 12785	47nF	20%	50V
2853	4822 126 11585	22nF	20%	50V
2854	4822 126 12785	47nF	20%	50V
2855	4822 122 33519	470pF	10%	50V
2856	4822 122 33069	33pF	5%	50V
2857	4822 121 51387	10nF	20%	16V
2858	4822 124 40196	220µF	20%	16V
2859	4822 121 51387	10nF	20%	16V
2860	4822 124 41579	10µF	20%	50V
2861	4822 124 41579	10µF	20%	50V

CAPACITORS

2862	4822 122 10466	220pF	10%	50V
2863	4822 122 10466	220pF	10%	50V
2864	4822 122 33191	22pF	5%	50V
2865	4822 126 11585	22nF	20%	50V
2867	4822 122 10466	220pF	10%	50V
2869	4822 126 12785	47nF	20%	50V
2872	4822 126 12785	47nF	20%	50V
2873	4822 124 12233	47µF	20%	25V
2875	4822 126 11585	22nF	20%	50V
2876	4822 124 40196	220µF	20%	16V
2877	4822 122 10573	56pF	5%	50V
2878	4822 122 10466	220pF	10%	50V
2879	4822 126 12785	47nF	20%	50V
2881	4822 124 40769	4,7µF	20%	50V
2882	4822 122 10466	220pF	10%	50V
2884	4822 124 40246	4,7µF	20%	63V
2885	4822 124 40246	4,7µF	20%	63V
2887	4822 126 12882	100nF	20%	50V
2888	4822 124 40246	4,7µF	20%	63V
2891	4822 122 10576	1,8nF	10%	16V
2892	4822 126 11714	4,7nF	20%	16V
2893	4822 122 10466	220pF	10%	50V

RESISTORS

3700	4822 116 83883	470Ω	5%	0,16W
3705	4822 116 83872	220Ω	5%	0,5W
3706	4822 116 83883	470Ω	5%	0,16W
3707	4822 116 83883	470Ω	5%	0,16W
3708	4822 116 83883	470Ω	5%	0,16W
3709	4822 116 83864	10kΩ	5%	0,5W
3711	4822 116 83864	10kΩ	5%	0,5W
3712	4822 116 52176	10Ω	5%	0,5W
3713	4822 116 52257	22kΩ	5%	0,5W
3714	4822 116 83864	10kΩ	5%	0,5W
3715	4822 116 52234	100kΩ	5%	0,5W
3716	4822 116 83883	470Ω	5%	0,16W
3718	4822 116 52283	4,7kΩ	5%	0,5W
3727	4822 116 52283	4,7kΩ	5%	0,5W
3728	4822 116 52283	4,7kΩ	5%	0,5W
3730	4822 116 52271	33kΩ	5%	0,16W
3731	4822 116 83864	10kΩ	5%	0,5W
3740	4822 116 52257	22kΩ	5%	0,5W
3741	4822 116 52257	22kΩ	5%	0,5W
3742	4822 116 52257	22kΩ	5%	0,5W
3743	4822 116 52257	22kΩ	5%	0,5W
3744	4822 116 83864	10kΩ	5%	0,5W
3746	4822 116 83864	10kΩ	5%	0,5W
3750	4822 050 11002	1kΩ	5%	0,2W
3751	4822 050 11002	1kΩ	5%	0,2W
3781	4822 116 83884	47kΩ	5%	0,16W
3800	4822 116 52291	56kΩ	5%	0,5W
3801	4822 116 83864	10kΩ	5%	0,5W
3802	4822 116 52291	56kΩ	5%	0,5W
3803	4822 116 83864	10kΩ	5%	0,5W
3805	4822 116 83864	10kΩ	5%	0,5W
3806	4822 116 83864	10kΩ	5%	0,5W
3807	4822 116 83864	10kΩ	5%	0,5W
3808	4822 116 83864	10kΩ	5%	0,5W
3809	4822 116 52219	330Ω	5%	0.16W
3811	4822 116 52251	18kΩ	5%	0,5W
3812	4822 053 10228	2,2Ω	5%	1W
3814	4822 116 52191	33Ω	5%	0,5W
3815	4822 052 10478	4,7Ω	5%	NFR
3819	4822 116 83883	470Ω	5%	0,16W

ELECTRICAL PARTSLIST 3CDC-99 MODULE

RESISTORS

3820	4822 116 52283	4,7kΩ	5%	0,5W
3821	4822 116 52283	4,7kΩ	5%	0,5W
3822	4822 116 52263	2,7kΩ	5%	0,16W
3823	4822 050 11002	1kΩ	5%	0,2W
3824	4822 050 11002	1kΩ	5%	0,2W
3825	4822 050 11002	1kΩ	5%	0,2W
3826	4822 116 52257	22kΩ	5%	0,5W
3827	4822 116 52271	33kΩ	5%	0,16W
3828	4822 116 52257	22kΩ	5%	0,5W
3831	4822 116 52257	22kΩ	5%	0,5W
3832	4822 116 83864	10kΩ	5%	0,5W
3833	4822 116 52257	22kΩ	5%	0,5W
3834	4822 116 52257	22kΩ	5%	0,5W
3835	4822 052 10338	3,3Ω		NFR25
3837	4822 050 11002	1kΩ	5%	0,2W
3838	4822 050 11002	1kΩ	5%	0,2W
3839	4822 116 52234	100kΩ	5%	0,5W
3840	4822 116 52234	100kΩ	5%	0,5W
3841	4822 116 52283	4,7kΩ	5%	0,5W
3842	4822 116 83884	47kΩ	5%	0,16W
3843	4822 116 52271	33kΩ	5%	0,16W
3844	4822 116 52283	4,7kΩ	5%	0,5W
3845	4822 116 83884	47kΩ	5%	0,16W
3846	4822 116 52271	33kΩ	5%	0,16W
3847	4822 116 83961	6,8kΩ	5%	0,16W
3848	4822 116 52234	100kΩ	5%	0,5W
3849	4822 116 52234	100kΩ	5%	0,5W
3850	4822 116 52276	3,9kΩ	5%	0,5W
3851	4822 052 10338	3,3Ω		NFR25
3852	4822 052 10228	2,2Ω	5%	0,33W
3853	4822 116 83883	470Ω	5%	0,16W
3854	4822 116 52175	100Ω	5%	0,5W
3855	4822 116 52175	100Ω	5%	0,5W
3857	4822 116 52191	33Ω	5%	0,5W
3858	4822 116 52257	22kΩ	5%	0,5W
3859	4822 116 52257	22kΩ	5%	0,5W
3860	4822 116 83864	10kΩ	5%	0,5W
3861	4822 116 83864	10kΩ	5%	0,5W
3862	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52191	33Ω	5%	0,5W
3864	4822 116 52175	100Ω	5%	0,5W
3866	4822 116 83864	10kΩ	5%	0,5W
3867	4822 116 52206	120Ω	5%	0,16W
3869	4822 050 24708	4,7Ω	1%	0,6W
3870	4822 116 52175	100Ω	5%	0,5W
3871	4822 116 83864	10kΩ	5%	0,5W
3872	4822 116 83864	10kΩ	5%	0,5W
3873	4822 116 83883	470Ω	5%	0,16W
3874	4822 116 83864	10kΩ	5%	0,5W
3875	4822 116 83864	10kΩ	5%	0,5W
3876	4822 116 52291	56kΩ	5%	0,16W
3877	4822 116 83864	10kΩ	5%	0,5W
3878	4822 116 83864	10kΩ	5%	0,5W
3879	4822 116 83864	10kΩ	5%	0,5W
3880	4822 116 52219	330Ω	5%	0,5W
3881	4822 116 83864	10kΩ	5%	0,5W
3882	4822 116 83884	47kΩ	5%	0,16W
3883	4822 116 52234	100kΩ	5%	0,5W
3884	4822 116 52276	3,9kΩ	5%	0,5W
3885	4822 116 52234	100kΩ	5%	0,5W
3886	4822 116 83884	47kΩ	5%	0,16W
3887	4822 116 83883	470Ω	5%	0,16W
3888	4822 116 83864	10kΩ	5%	0,5W
3889	4822 116 83883	470Ω	5%	0,16W

RESISTORS

3890	4822 050 11002	1kΩ	5%	0,2W
3891	4822 050 11002	1kΩ	5%	0,2W
3892	4822 116 83883	470Ω	5%	0,16W
3893	4822 116 83883	470Ω	5%	0,16W
3894	4822 116 52191	33Ω	5%	0,5W
3895	4822 116 52176	10Ω	5%	0,5W
3897	4822 116 52175	100Ω	5%	0,5W
3899	4822 116 52175	100Ω	5%	0,5W

COILS

1810	4822 242 10849	QUARTZ 8,46MHz
1810	4822 242 73557	CERAMIC RES. 8,46MHz
5802	4822 156 31058	FILTER DIGITAL OUT

DIODES

6871	4822 130 30621	1N4148
6872	4822 130 30621	1N4148
6873	4822 130 30621	1N4148
6874	4822 130 30621	1N4148
6875	4822 130 34233	BZX79-B5V1
6877	4822 130 31981	BZX79-C3V9

TRANSISTORS

7812	4822 130 40959	BC547B
7874	4822 130 40959	BC547B
7875	4822 130 40959	BC547B

INTEGRATED CIRCUITS

7801 ©	4822 209 17286	TZA1024T/N1 HF-AMPLIFIER
7805	4822 209 17284	TDA1308 OPAMP
7806	4822 209 32852	TDA7073A/N2 SERVO DRIVER
7807	4822 209 32852	TDA7073A/N2 MOTOR DRIVER
7871	4822 209 32852	TDA7073A/N2 MOTOR DRIVER
7873	5322 209 10421	HEF4094BP SHIFT REGISTER
7876 ©	4822 209 16143	LC89170M CD TEXT
7877 ©	4822 209 17285	SAA7324H/M1 SIGNAL PROCESSOR

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

COMBI BOARD

TABLE OF CONTENTS

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, +LED, +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_STBY. 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 (ON4986 or selected BC557B) 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 (HEF4069UBT) 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_STBY CONTROL
This Transistor 7401 (BC337-25) 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 PART
This simple Karaoke consists of 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.

E. HEADPHONE PART
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.

F. CDC KEY PART
The CDC key buttons and LEDs are provided on this board.

Combi Board application

A262	FW-C3/37, FW-C35/37
A263	FW-C30/37
A264	FW-C30/21/21M
A265	FW-C30/30
A266	FW-C38/21/21M
A267	FW-C39/30
A268	FW-C39/33
A269	FW-C28/33
A270	FW-C38/22/34
A271	FW-C28/22/34
A278	FW-C38/37
A279	FW-C39/21/21M
A343	FW-V39/21K/21M
A347	FW-C28/21M
A351	FW-V28/21M

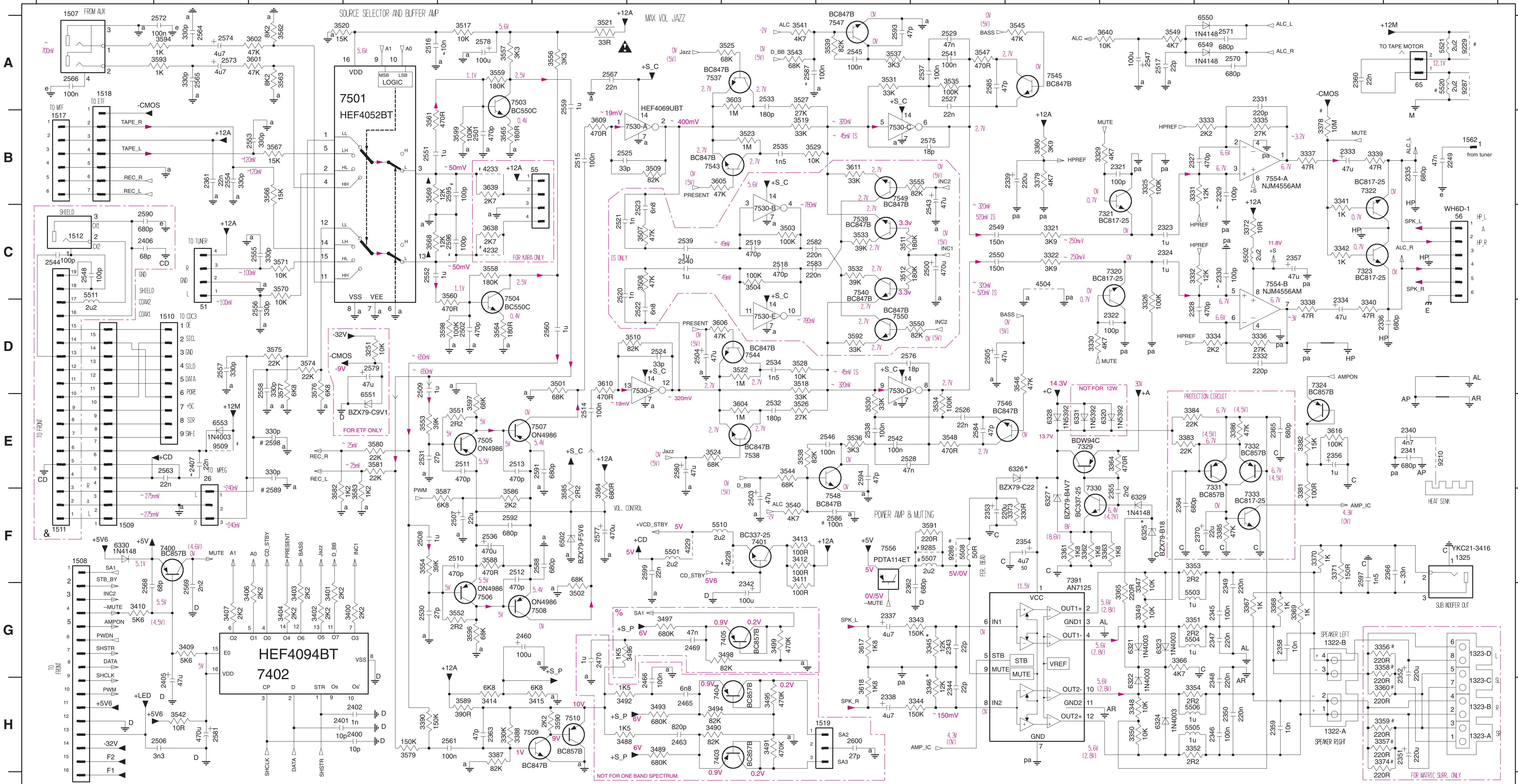
Features/Configuration:	A262	A263	A264	A265	A266	A267	A268	A269	A270	A271	A278	A279	A343	A347	A351
Aux In	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Sub-woofer Out	x	x	x	x	x	x	x	-	x	-	x	x	x	-	-
Digital Out	-	-	-	-	x	x	x	-	x	-	x	x	-	-	-
Video Output	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x
I.S.	-	-	-	-	x	x	x	-	x	-	x	x	x	-	-
Voltage Selector	-	-	x	-	x	-	-	-	-	-	-	x	x	x	x
Karaoke	-	-	x	-	x	-	x	x	-	-	-	-	x	-	x
DBB	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
DSC	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Matrix Surroud	-	x	-	-	x	x	x	-	-	-	x	x	x	-	-
1-band Spect. Analyser	x	x	x	x	-	-	-	x	-	x	-	-	-	x	x
3-band Spect. Analyser	-	-	-	-	x	x	x	-	x	-	x	x	x	-	-
12W	-	-	-	-	-	-	x	-	x	-	-	-	x	x	x
25W	x	x	x	x	x	x	x	-	x	-	x	x	x	-	-
VCD	-	-	-	-	-	-	-	-	-	-	-	-	x	-	x
NTC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECO-MTF	x	x	x	x	-	-	-	-	-	-	-	-	-	-	-
ETF7	-	-	-	-	x	x	x	x	x	x	x	x	x	x	x

MAIN PART - COMPONENT LAYOUT

MAIN PART - CHIP LAYOUT

CIRCUIT DIAGRAM - SOURCE SELECT & AMPLIFIER PART

26 E2	1511 F1	2332 D13	2348 H13	2364 F12	2500 C10	2516 A4	2532 E8	2548 C1	2565 A2	2581 H2	2597 F14	3336 D13	3352 H12	3369 G14	3388 H5	3488 H6	3507 C7	3527 A8	3543 A8	3559 A5	3577 D3	3594 A2	3618 H9	5508 F10	6331 E11	7391 F11	7530-A B6	7549 B9
51 D2	1512 C1	2333 B14	2349 G13	2365 E13	2501 B5	2517 A12	2533 A8	2549 C10	2566 A1	2582 C8	2598 E3	3337 B14	3353 F12	3370 F14	3390 H4	3489 H7	3508 C7	3528 D8	3544 E8	3560 C5	3579 H4	3596 G5	3638 C5	5510 F7	6502 F6	7400 F2	7530-B C8	7550 D9
55 B5	1517 B1	2334 D14	2350 H13	2366 F15	2502 D5	2518 C8	2534 D8	2550 C10	2567 A6	2583 C8	2599 F7	3338 D14	3354 H12	3371 F14	3400 G4	3490 H7	3509 B7	3529 B8	3545 A11	3561 B4	3580 E4	3597 E5	3639 B5	5511 C1	6549 A13	7401 F8	7530-C B9	7554-A B13
56 C15	1518 A1	2335 B15	2351 H15	2370 F13	2503 F8	2519 C8	2535 B8	2551 B4	2568 G1	2584 E10	2600 H9	3339 B14	3356 G14	3372 C13	3401 G3	3491 H8	3510 D7	3530 E9	3546 D11	3562 A3	3581 E4	3598 D5	3640 A12	5520 A15	6550 A13	7402 H3	7530-D D9	7554-B C13
65 A15	1519 H8	2336 D14	2352 G15	2400 H4	2504 D7	2520 C6	2536 F5	2552 C4	2569 G2	2585 A10	3251 D4	3340 D14	3357 H14	3373 F11	3402 G3	3492 H6	3511 C9	3531 A9	3547 A10	3563 A3	3582 F3	3599 B5	4228 F8	5521 A15	6551 E4	7403 H7	7530-E D8	7556 F9
1322-A H14	1562 B15	2337 G9	2353 F10	2401 H3	2505 D10	2521 C6	2537 A10	2553 B3	2570 A13	2586 F9	3321 C11	3341 B14	3358 G14	3374 H14	3403 G3	3493 H7	3512 C9	3532 C9	3548 E10	3564 D5	3583 F4	3601 A3	4229 F7	6320 E12	6553 E2	7404 H7	7530-F D7	9210 E15
1322-B G14	2249 B15	2338 H9	2354 F11	2402 H4	2506 H2	2522 D7	2538 E9	2554 B2	2571 A13	2587 A8	3322 C11	3342 C14	3359 H14	3378 B14	3404 G3	3494 H7	3517 A5	3533 C9	3549 A12	3565 B5	3584 F6	3602 A3	4232 C5	6321 G12	7320 C12	7405 G8	7537 A8	9229 A15
1323-A H15	2321 B12	2339 B11	2355 F12	2405 H2	2507 F5	2523 C7	2539 C7	2555 C3	2572 A2	2588 F6	3325 B12	3343 G10	3360 H14	3379 B11	3406 G3	3495 H8	3518 D8	3534 E10	3550 D10	3566 B3	3585 F6	3603 A8	4233 B5	6322 H12	7321 C11	7501 A3	7538 E8	9285 F10
1323-B H15	2322 D12	2340 E15	2356 E14	2406 C1	2508 F4	2524 D7	2540 C7	2556 D3	2573 A2	2589 E3	3326 D12	3344 H10	3361 F11	3380 B11	3407 G2	3496 G7	3519 B8	3535 A10	3551 E5	3567 B3	3586 F5	3604 E8	4504 C11	6323 G12	7322 B14	7503 A5	7539 C9	9286 F10
1323-C H15	2323 C12	2341 E15	2357 C14	2407 E2	2509 D4	2525 B6	2541 A10	2557 D2	2574 A2	2590 C1	3329 B12	3345 G10	3362 F11	3381 F14	3409 G2	3497 G7	3520 A3	3536 E9	3552 G5	3568 C4	3587 F5	3605 B7	5501 F7	6324 H12	7323 C14	7504 D5	7540 C9	9287 A15
1323-D G15	2324 C12	2342 G8	2358 G13	2460 G5	2510 F5	2526 E10	2542 E9	2558 D3	2575 B10	2591 E6	3330 D11	3346 H10	3363 F12	3382 E14	3410 G1	3498 G8	3521 A6	3537 A9	3553 E4	3569 B4	3588 F5	3606 D7	5502 C13	6325 F12	7324 D14	7505 E5	7543 B7	9509 E2
1325 F15	2327 B12	2343 G10	2359 H13	2463 H7	2511 E5	2527 A10	2543 C10	2559 A6	2576 D9	2592 F5	3331 B13	3347 G12	3364 E12	3383 E12	3411 F8	3499 G8	3522 D8	3538 E8	3554 F4	3570 C3	3589 H5	3609 B6	5503 G12	6326 E11	7329 E11	7506 G5	7544 D8	
1507 A1	2328 D12	2344 H10	2360 A14	2465 H7	2512 F5	2528 E9	2544 C1	2560 D6	2577 F6	2593 A9	3332 C13	3348 H12	3365 G12	3384 E12	3412 F8	3501 D6	3523 B8	3539 A9	3555 B10	3571 C3	3590 H6	3610 D6	5504 G12	6327 F11	7330 E11	7507 E5	7545 A11	
1508 F1	2329 B13	2345 G13	2361 B2	2466 H7	2513 E5	2529 A10	2545 A9	2561 H5	2578 A5	2594 E9	3333 B13	3349 G12	3366 G12	3385 F13	3413 F8	3502 G6	3524 E7	3540 F8	3556 A6	3574 D3	3591 F10	3611 B9	5505 H12	6328 E11	7331 E13	7508 G5	7546 E11	
1509 F1	2330 C13	2346 H13	2362 G10	2469 G7	2514 E6	2530 G4	2546 E9	2563 E2	2579 D4	2595 B5	3334 D13	3350 H12	3367 G13	3386 E13	3414 H5	3503 C8	3525 A8	3541 A8	3557 A5	3575 D3	3592 D9	3616 E14	5506 H12	6329 F12	7332 E13	7509 H6	7547 A9	
1510 D2	2331 A13	2347 G13	2363 H5	2470 G6	2515 B6	2531 E4	2547 A12	2564 A2	2580 E7	2596 C5	3335 B13	3351 G12	3368 G13	3387 H5	3415 H6	3504 C8	3526 E8	3542 H2	3558 C5	3576 D3	3593 A2	3617 G9	5507 F10	6330 F1	7333 F13	7510 H6	7548 F9	



	Inc1	Inc2	Jazz	Bass	Pre	DBB
Jazz	X	X	L	H	L	L
rock	X	X	H	H	H	H
Techno	X	X	L	H	L	H
Optimal	X	X	H	L	H	L / H
IS(vol<=24)	L	H	X	X	X	X
IS(vol>24)	H	L	X	X	X	X

Provision on layout
△ For set with Karaoke
▲ For set without Karaoke
& For set with Digital Out

	A0	A1
AUX	1	1
TUNER	0	1
TAPE	1	0
CD	0	0

% VALUE FOR ONE BAND SPECTRUM ANALYZER				
ITEM	2469	3497	3498	3499
VALUE	100n	150K	56K	220K

Remark : +A AND +C SUPPLY SWITCH AT VOL 32

* VALUE FOR 12W VERSION					
ITEM	3345	3346	6325	6326	6327
VALUE	6K8	6K8	BZX79-F15	BZX79-C18	BZX79-B3V3

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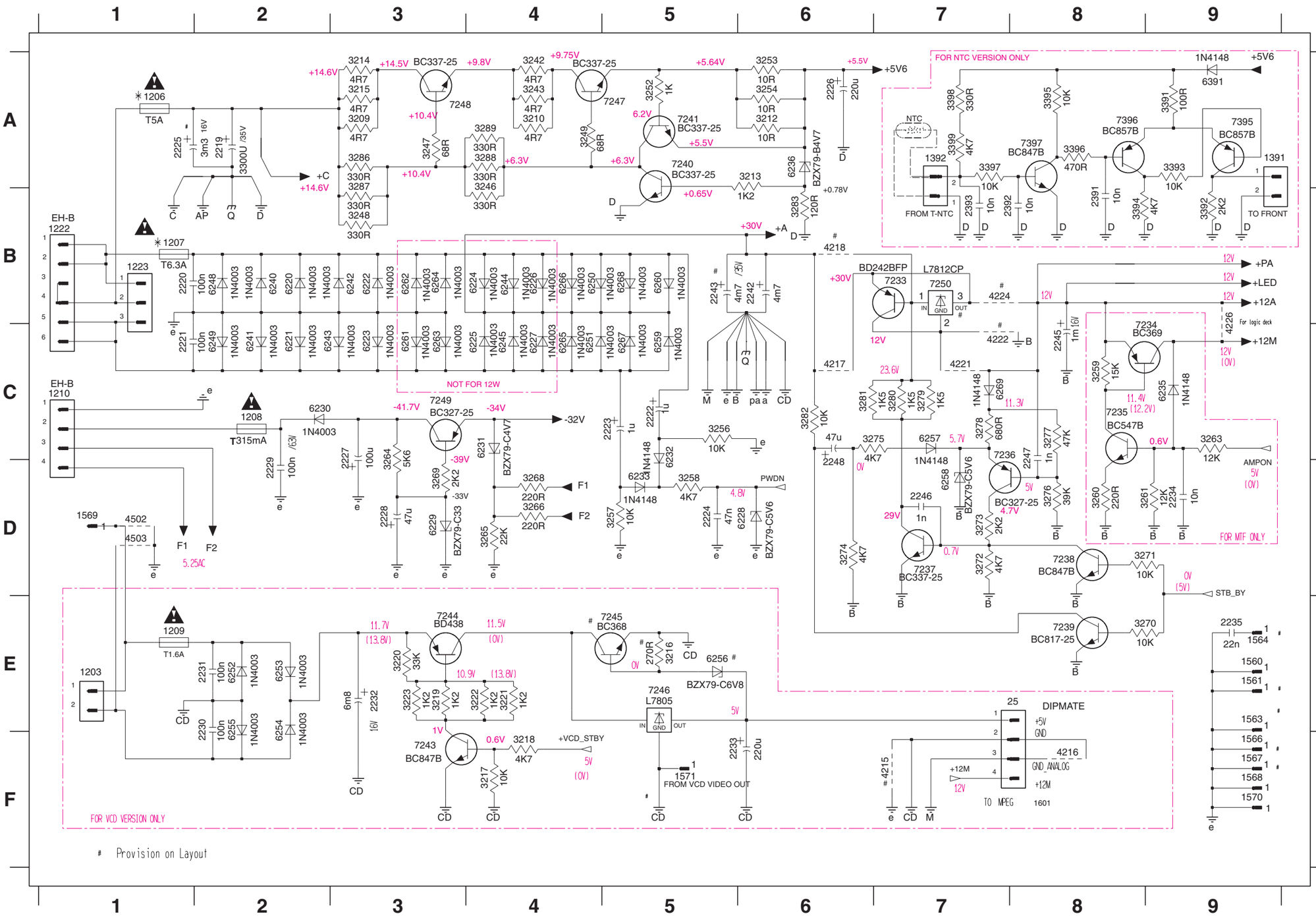
CIRCUIT DIAGRAM - POWER SUPPLY PART



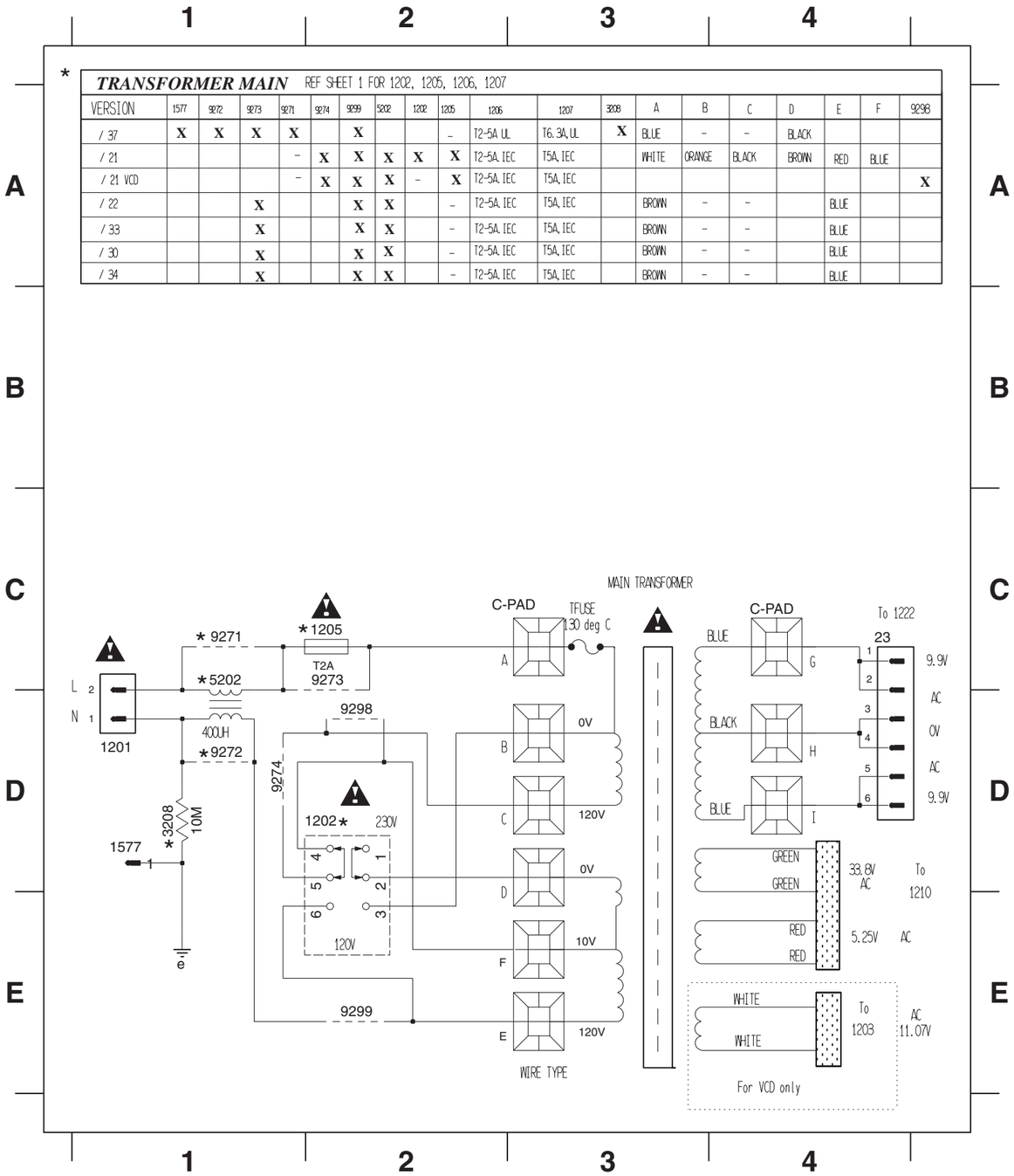
25 E7	3261 D9	6257 C7
1203 E1	3263 C9	6258 D7
1206 A1	3264 C3	6259 C5
1207 B1	3265 D4	6260 B5
1208 C2	3266 D4	6261 C3
1209 E1	3268 D4	6262 B3
1210 C1	3269 D3	6263 C3
1222 B1	3270 E8	6264 B3
1223 B1	3271 D8	6265 C4
1391 A9	3272 D7	6266 B4
1392 A7	3273 D7	6267 C5
1560 E9	3274 D6	6268 B5
1561 E9	3275 C6	6269 C7
1563 E9	3276 D8	6391 A9
1564 E9	3277 C8	7233 B7
1566 F9	3278 C7	7234 B8
1567 F9	3279 C7	7235 C8
1568 F9	3280 C7	7236 C7
1569 D1	3281 C6	7237 D7
1570 F9	3282 C6	7238 D8
1571 F5	3283 B6	7239 E8
2219 A2	3286 A3	7240 A5
2220 B1	3287 B3	7241 A5
2221 C1	3288 A4	7243 F3
2222 C5	3289 A4	7244 E3
2223 C5	3391 A9	7245 E4
2224 D5	3392 B9	7246 E5
2225 A1	3393 A9	7247 A5
2226 A6	3394 B8	7248 A3
2227 C3	3395 A8	7249 C3
2228 D3	3396 A8	7250 B7
2229 D2	3397 A7	7395 A9
2230 E2	3398 A7	7396 A8
2231 E2	3399 A7	7397 A8
2232 E3	4215 F7	
2233 F5	4216 F8	
2234 D9	4217 C6	
2235 E9	4218 B6	
2242 B6	4221 C7	
2243 B5	4222 C7	
2245 C8	4224 B7	
2246 D7	4226 B9	
2247 C8	4502 D1	
2248 C6	4503 D1	
2391 B8	6220 B2	
2392 B8	6221 C2	
2393 B7	6222 B3	
3209 A3	6223 C3	
3210 A4	6224 B4	
3212 A6	6225 C4	
3213 A6	6226 B4	
3214 A3	6227 C4	
3215 A3	6228 D5	
3216 E5	6229 D3	
3217 F4	6230 C2	
3218 F4	6231 C4	
3219 E3	6232 C5	
3220 E3	6233 D5	
3221 E4	6235 C9	
3222 E4	6236 A6	
3223 E3	6240 B2	
3242 A4	6241 C2	
3243 A4	6242 B3	
3246 B4	6243 C3	
3247 A3	6244 B4	
3248 B3	6245 C4	
3249 A4	6248 B2	
3252 A5	6249 C2	
3253 A6	6250 B4	
3254 A6	6251 C4	
3256 C5	6252 E2	
3257 D5	6253 E2	
3258 D5	6254 E2	
3259 C8	6255 E2	
3260 D8	6256 E5	

CIRCUIT DIAGRAM - TRANSFORMER PRIMARY PART

23 C4 1202 D1 1577 D1 5202 C1 9272 D1 9274 D1 9299 E2
1201 D1 1205 C2 3208 D1 9271 C1 9273 C2 9298 D2

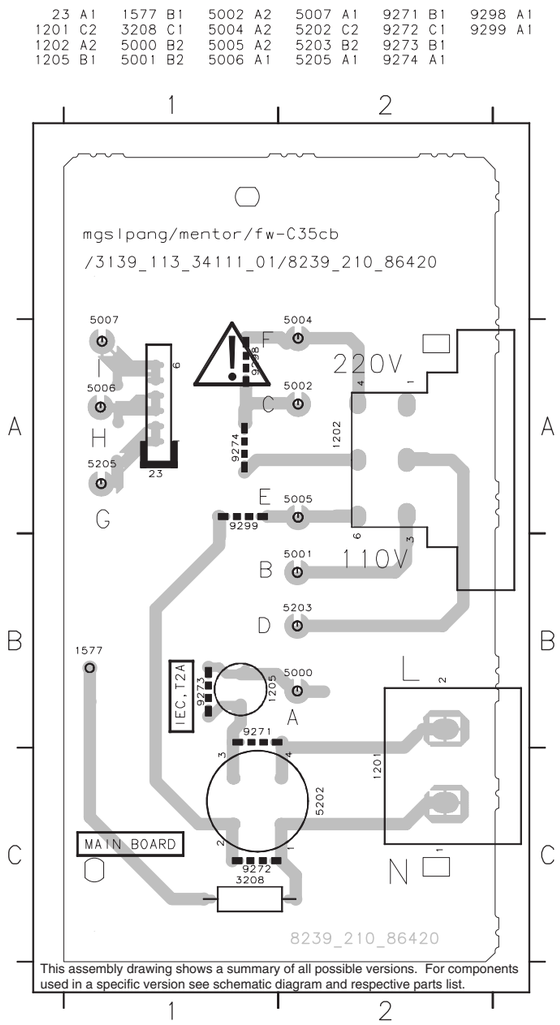
* ***TRANSFORMER MAIN*** REF SHEET 1 FOR 1202, 1205, 1206, 1207

VERSION	1577	9272	9273	9271	9274	9299	5202	1202	1205	1206	1207	3208	A	B	C	D	E	F	9298
/ 37	X	X	X	X		X			–	T2-5A UL	T6. 3A, UL	X	BLUE	–	–	BLACK			
/ 21				–	X	X	X	X	X	T2-5A. IEC	T5A, IEC		WHITE	ORANGE	BLACK	BROWN	RED	BLUE	
/ 21 VCD				–	X	X	X	–	X	T2-5A. IEC	T5A, IEC								X
/ 22			X			X	X		–	T2-5A. IEC	T5A, IEC		BROWN	–	–		BLUE		
/ 33			X			X	X		–	T2-5A. IEC	T5A, IEC		BROWN	–	–		BLUE		
/ 30			X			X	X		–	T2-5A. IEC	T5A, IEC		BROWN	–	–		BLUE		
/ 34			X			X	X		–	T2-5A. IEC	T5A, IEC		BROWN	–	–		BLUE		



LAYOUT DIAGRAM - TRANSFORMER PRIMARY PART

23 A1 1577 B1 5002 A2 5007 A1 9271 B1 9298 A1
1201 C2 3208 C1 5004 A2 5202 C2 9272 C1 9299 A1
1202 A2 5000 B2 5005 A2 5203 B2 9273 B1
1205 B1 5001 B2 5006 A1 5205 A1 9274 A1



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

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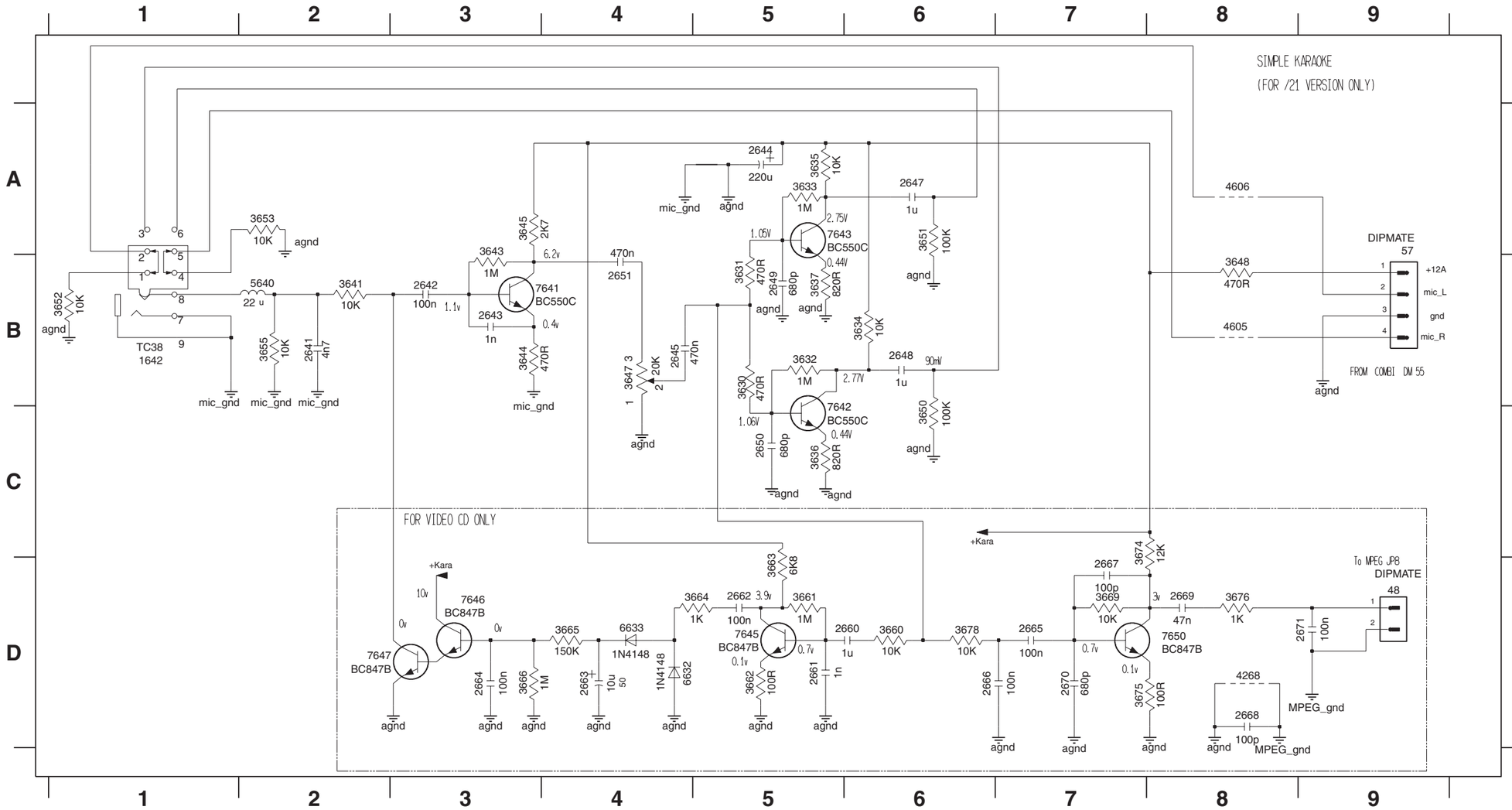
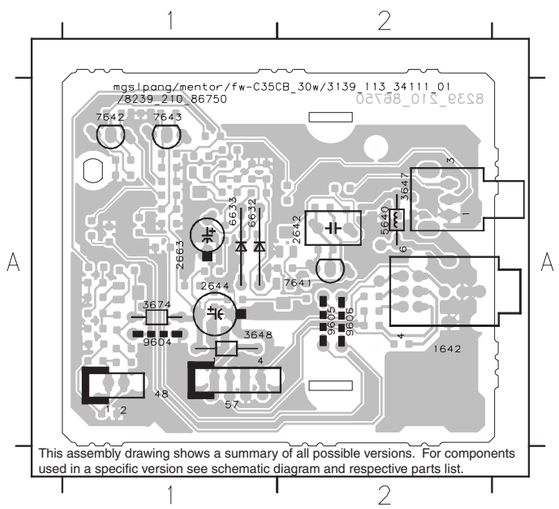
CIRCUIT & LAYOUT DIAGRAMS - KARAOKE PART

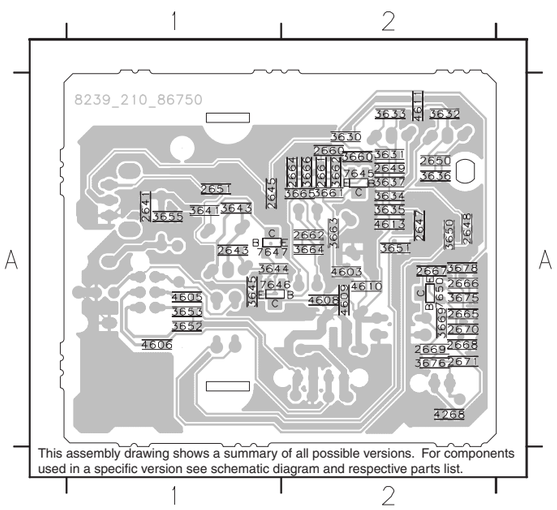


48 D9
57 A9
1642 B1
2641 B2
2642 B3
2643 B3
2644 A5
2645 B4
2647 A6
2648 B6
2649 B5
2650 C5
2651 B4
2660 D6
2661 D5
2662 D5
2663 D4
2664 D3
2665 D7
2666 D6
2667 D7
2668 D8
2669 D8
2670 D7
2671 D9
3630 B5
3631 B5
3632 B5
3633 A5
3634 B6
3635 A5
3636 C5
3637 B5
3641 B2
3643 B3
3644 B3
3645 A3
3647 B4
3648 B8
3650 C6
3651 A6
3652 B1
3653 A2
3655 B2
3660 D6
3661 D5
3662 D5
3663 D5
3664 D5
3665 D4
3666 D3
3669 D7
3674 C7
3675 D7
3676 D8
3678 D6
4268 D8
4605 B8
4606 A8
5640 B2
6632 D4
6633 D4
7641 B3
7642 C5
7643 A5
7645 D5
7646 D3
7647 D3
7650 D8



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

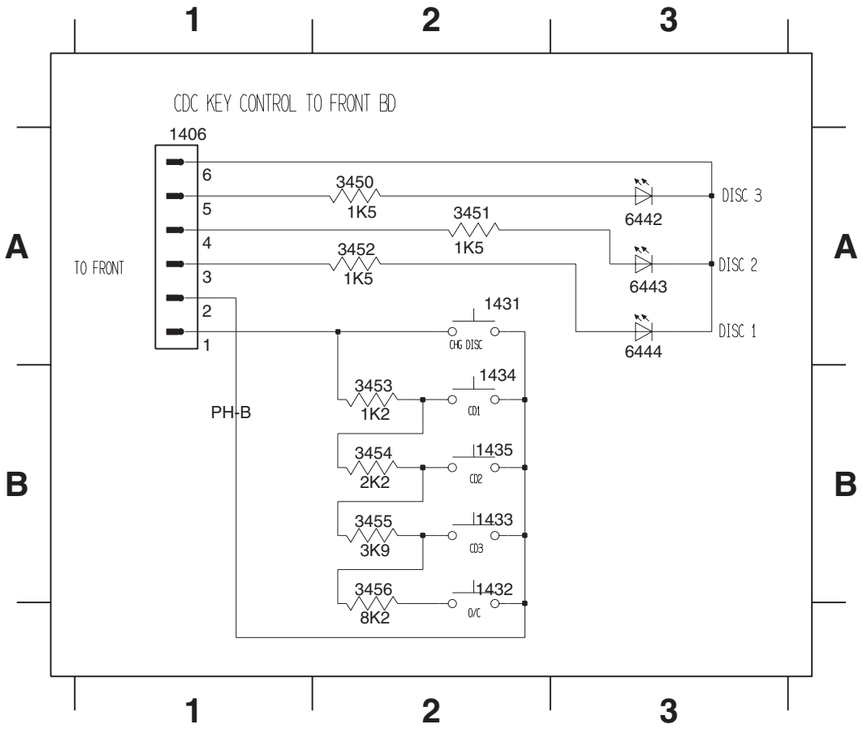
48 A1
57 A1
1642 A2
2642 A2
2644 A1
2663 A1
3647 A2
3648 A1
3674 A1
5640 A2
6632 A1
6633 A1
7641 A2
7642 A1
7643 A1
9604 A1
9605 A2
9606 A2



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

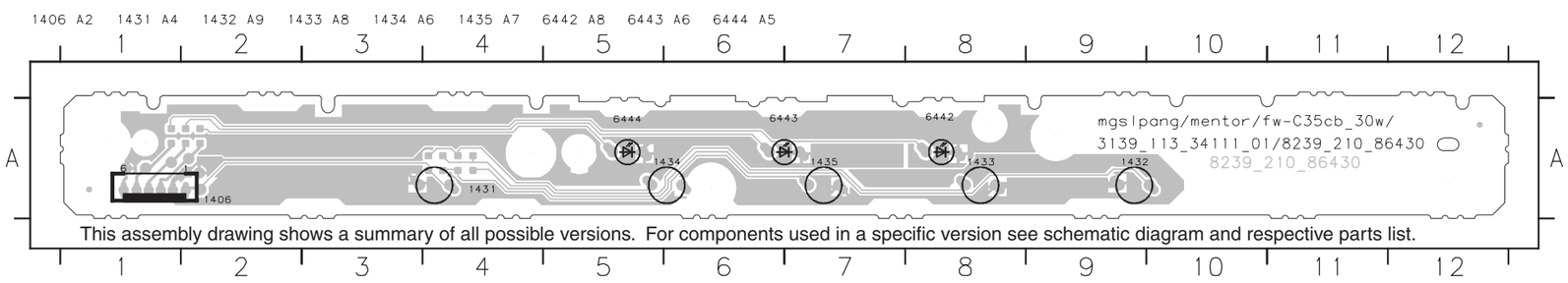
2641 A1
2643 A1
2645 A1
2647 A2
2648 A2
2649 A2
2650 A2
2651 A1
2660 A2
2661 A2
2662 A2
2664 A2
2665 A2
2666 A2
2667 A2
2668 A2
2669 A2
2670 A2
2671 A2
3630 A2
3631 A2
3632 A2
3633 A2
3634 A2
3635 A2
3636 A2
3637 A2
3641 A1
3643 A1
3644 A1
3645 A1
3650 A2
3651 A2
3652 A1
3653 A1
3655 A1
3660 A2
3661 A2
3662 A2
3663 A2
3664 A2
3665 A2
3666 A2
3669 A2
3675 A2
3676 A2
3678 A2
4268 A2
4603 A2
4605 A1
4606 A1
4608 A2
4609 A2
4610 A2
4611 A2
4613 A2
7645 A2
7646 A1
7647 A1
7650 A2

CIRCUIT & LAYOUT DIAGRAMS - CDC KEY PART



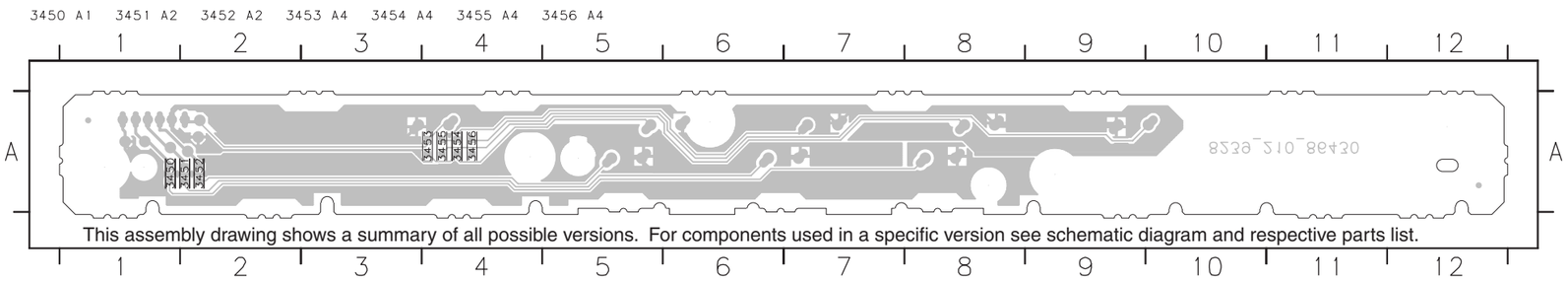
1406 A1
1431 A2
1432 B2
1433 B2
1434 B2
1435 B2
3450 A2
3451 A2
3452 A2
3453 B2
3454 B2
3455 B2
3456 B2
6442 A3
6443 A3
6444 A3

1406 A2 1431 A4 1432 A9 1433 A8 1434 A6 1435 A7 6442 A8 6443 A6 6444 A5



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

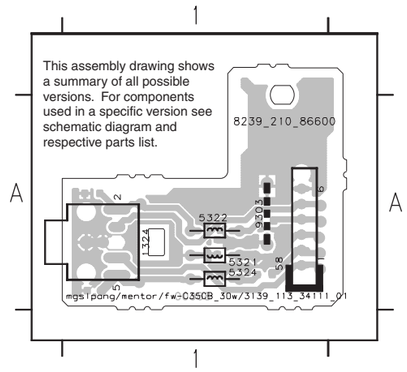
3450 A1 3451 A2 3452 A2 3453 A4 3454 A4 3455 A4 3456 A4



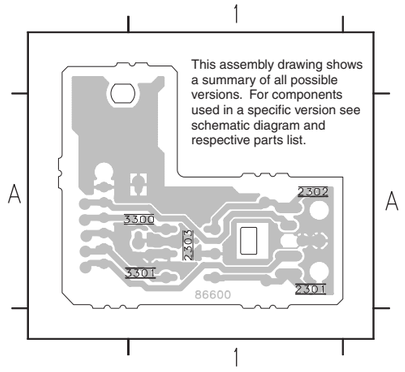
This assembly drawing shows a summary of all possible versions. For components used in a specific version see schematic diagram and respective parts list.

CIRCUIT & LAYOUT DIAGRAMS - HEADPHONE PART

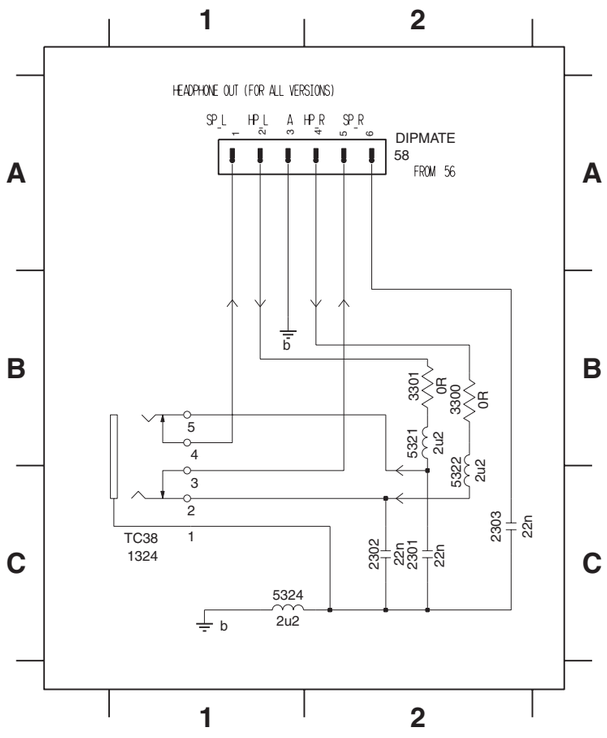
58 A1 5321 A1 5324 A1
1324 A1 5322 A1 9303 A1



2301 A1 2303 A1 3301 A1
2302 A1 3300 A1



58 A2 **2301 C2** **2303 C2** **3301 B2** **5322 C2**
1324 C1 **2302 C2** **3300 B2** **5321 B2** **5324 C1**



MISCELLANEOUS

1201	482226531015	⚠	Mains Socket
1202	482227210269	⚠	Voltage Selector /21M
1205	482207152002	⚠	Fuse T2A 250V /21M
1206	482207155002	⚠	Fuse T5A 250V
1207	482207155002	⚠	Fuse T5A 250V
1208	482207153151	⚠	Fuse T315mA 250V
1322	482226731176		Loudspeaker Socket L/R
1324	482226511547		Headphone Socket
1431	482227613775		Tact Switch
1432	482227613775		Tact Switch
1433	482227613775		Tact Switch
1434	482227613775		Tact Switch
1435	482227613775		Tact Switch
1507	482226520553		Aux-in Socket
1508	242202514526		Flex Socket 16pin Vert.
1509	482226510981		Flex Socket 15pin Vert.
1510	482226511532		Flex Socket 9pin Vert.
1518	482226710953		Flex Socket 7pin Vert.

CAPACITORS

2219	482212442367	3300µF 20% 35V
2220	532212142386	100nF 5% 63V
2221	532212142386	100nF 5% 63V
2222	482212421913	1µF 20% 63V
2223	482212421913	1µF 20% 63V
2224	482212143526	47nF 5% 250V
2226	482212480144	220µF 20% 25V
2227	482212440255	100µF 20% 63V
2228	482212441751	47µF 20% 50V
2229	532212142386	100nF 5% 63V
2235	532212232654	22nF 10% 63V
2242	482212480415	4700µF 20% 50V
2245	482212481144	1000µF 20% 16V
2246	532212231647	1nF 10% 63V
2247	532212231647	1nF 10% 63V
2248	482212440433	47µF 20% 25V
2249	482212143526	47nF 5% 250V
2301	532212232654	22nF 10% 63V
2302	532212232654	22nF 10% 63V
2303	532212232654	22nF 10% 63V
2321	532212232531	100pF 5% 50V
2322	532212232531	100pF 5% 50V
2323	482212614043	1µF +80/-20% 16V
2324	482212614043	1µF +80/-20% 16V
2327	532212234099	470pF 10% 63V
2328	532212234099	470pF 10% 63V
2331	482212233575	220pF 5% 63V
2332	482212233575	220pF 5% 63V
2333	482212440433	47µF 20% 25V
2334	482212440433	47µF 20% 25V
2335	482212232535	680pF 10% 63V
2336	482212232535	680pF 10% 63V
2337	482212440769	4,7µF 20% 100V
2338	482212440769	4,7µF 20% 100V
2339	482212480144	220µF 20% 25V
2340	532212610223	4,7nF 10% 63V
2341	482212232535	680pF 10% 63V
2342	482212440207	100µF 20% 25V
2343	532212232658	22pF 5% 50V
2344	532212232658	22pF 5% 50V
2345	482212614585	100nF 10% 50V
2346	482212614585	100nF 10% 50V
2347	482212142408	220nF 5% 63V
2348	482212142408	220nF 5% 63V
2349	482212142408	220nF 5% 63V
2350	482212142408	220nF 5% 63V
2353	482212480144	220µF 20% 25V
2354	482212440769	4,7µF 20% 100V
2355	482212233127	2,2nF 10% 63V
2356	482212421913	1µF 20% 63V
2357	482212440433	47µF 20% 25V
2358	482212233177	10nF 20% 50V
2359	482212233177	10nF 20% 50V
2360	532212232654	22nF 10% 63V
2361	532212232654	22nF 10% 63V
2362	482212232535	680pF 10% 63V
2363	482212613692	47pF 1% 63V
2364	482212232535	680pF 10% 63V
2365	482212232535	680pF 10% 63V
2370	482212481151	22µF 20% 50V
2400	532212232448	10pF 5% 63V
2401	532212232448	10pF 5% 63V
2402	532212231647	1nF 10% 63V
2405	482212440433	47µF 20% 25V
2460	482212440207	100µF 20% 25V
2469	482212614585	100nF 10% 50V
2501	532212232268	470pF 10% 50V
2502	532212232268	470pF 10% 50V
2503	482212440433	47µF 20% 25V
2504	482212440433	47µF 20% 25V
2505	482212440433	47µF 20% 25V
2506	482212233891	3,3nF 10% 63V
2507	482212481151	22µF 20% 50V
2508	482212614043	1µF +80/-20% 16V
2509	482212614043	1µF +80/-20% 16V
2510	532212234099	470pF 10% 63V
2511	532212234099	470pF 10% 63V
2512	532212234099	470pF 10% 63V
2513	532212234099	470pF 10% 63V
2514	482212614585	100nF 10% 50V
2515	482212614585	100nF 10% 50V
2517	532212232658	22pF 5% 50V
2524	532212232659	33pF 5% 50V
2525	532212232659	33pF 5% 50V

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ELECTRICAL PARTS LIST - COMBI BOARD

2526	482212141856	22nF 5% 250V
2527	482212141856	22nF 5% 250V
2528	482212613751	47nF 10% 63V
2529	482212613751	47nF 10% 63V
2530	482212613691	27pF 1% 63V
2531	482212613691	27pF 1% 63V
2532	482212610326	180pF 5% 63V
2533	482212610326	180pF 5% 63V
2534	532212231865	1,5nF 10% 63V
2535	532212231865	1,5nF 10% 63V
2536	482212480195	470µF 20% 10V
2537	482212613838	100nF +80/-20% 50V
2538	482212613838	100nF +80/-20% 50V
2541	482212613838	100nF +80/-20% 50V
2542	482212613838	100nF +80/-20% 50V
2545	482212613838	100nF +80/-20% 50V
2546	482212613838	100nF +80/-20% 50V
2547	482212440207	100µF 20% 25V
2549	482212141854	150nF 5% 63V
2550	482212141854	150nF 5% 63V
2551	482212421913	1µF 20% 63V
2552	482212421913	1µF 20% 63V
2553	532212231863	330pF 5% 63V
2554	532212231863	330pF 5% 63V
2555	532212231863	330pF 5% 63V
2556	532212231863	330pF 5% 63V
2557	532212231863	330pF 5% 63V
2558	532212231863	330pF 5% 63V
2559	482212614043	1µF +80/-20% 16V
2560	482212614043	1µF +80/-20% 16V
2561	482212614585	100nF 10% 50V
2563	532212232654	22nF 10% 63V
2564	532212231863	330pF 5% 63V
2565	532212231863	330pF 5% 63V
2566	482212613838	100nF +80/-20% 50V
2567	532212232654	22nF 10% 63V
2568	482212613694	68pF 1% 63V
2569	482212233127	2,2nF 10% 63V
2570	482212232535	680pF 10% 63V
2571	482212232535	680pF 10% 63V
2572	482212613838	100nF +80/-20% 50V
2573	482212440769	4,7µF 20% 100V
2574	482212440769	4,7µF 20% 100V
2575	482212613689	18pF 1% 63V
2576	482212613689	18pF 1% 63V
2577	482212480195	470µF 20% 10V
2578	482212440207	100µF 20% 25V
2579	482212440433	47µF 20% 25V
2580	482212440433	47µF 20% 25V
2581	482212480791	470µF 20% 16V
2584	482212613692	47pF 1% 63V
2585	482212613692	47pF 1% 63V
2588	482212232535	680pF 10% 63V
2591	482212232535	680pF 10% 63V
2592	482212232535	680pF 10% 63V
2593	482212613692	47pF 1% 63V
2594	482212613692	47pF 1% 63V
2599	532212232654	22nF 10% 63V

RESISTORS

3209	482205120478	4R7 5% 0,1W
3210	482205120478	4R7 5% 0,1W
3212	482205120109	10R 5% 0,1W
3213	482205120122	1k2 5% 0,1W
3214	482205120478	4R7 5% 0,1W
3215	482205120478	4R7 5% 0,1W
3242	482205120478	4R7 5% 0,1W
3243	482205120478	4R7 5% 0,1W
3246	482211713577	330R 1% 1,25W
3247	482211712521	68R 1% 0,1W
3248	482211713577	330R 1% 1,25W
3249	482211712521	68R 1% 0,1W
3251	482211710833	10k 1% 0,1W
3252	482205110102	1k 2% 0,25W
3253	482205120109	10R 5% 0,1W
3254	482205120109	10R 5% 0,1W
3256	482205021003	10k 1% 0,6W
3257	482205021003	10k 1% 0,6W
3258	482211652283	4k7 5% 0,5W
3264	482211652289	5k6 5% 0,5W
3265	482211652257	22k 5% 0,5W
3266	482211683872	220R 5% 0,5W
3268	482211683872	220R 5% 0,5W
3269	482211652256	2k2 5% 0,5W
3270	482211710833	10k 1% 0,1W
3271	482211710833	10k 1% 0,1W
3272	482205120472	4k7 5% 0,1W
3273	482211711449	2k2 1% 0,1W
3274	482205120472	4k7 5% 0,1W
3275	482205120472	4k7 5% 0,1W
3276	482205120393	39k 5% 0,1W
3277	482211710834	47k 1% 0,1W
3278	482211710361	680R 1% 0,1W
3279	482211711139	1k5 1% 0,1W
3280	482211711139	1k5 1% 0,1W
3281	482211711139	1k5 1% 0,1W
3282	482211710833	10k 1% 0,1W
3283	482205120121	120R 5% 0,1W
3286	482211713577	330R 1% 1,25W
3287	482211713577	330R 1% 1,25W
3288	482211713577	330R 1% 1,25W
3289	482211713577	330R 1% 1,25W
3300	482205120008	0R Jumper 0805
3301	482205120008	0R Jumper 0805

RESISTORS

3321	482205120392	3k9 5% 0,1W	3404	482211711449	2k2 1% 0,1W	3546	482211710834	47k 1% 0,1W	3606	482211710834	47k 1% 0,1W
3322	482205120392	3k9 5% 0,1W	3406	482211711449	2k2 1% 0,1W	3547	482205120471	470R 5% 0,1W	3609	482211683883	470R 5% 0,5W
3325	482211710837	100k 1% 0,1W	3407	482211711449	2k2 1% 0,1W	3548	482205120471	470R 5% 0,1W	3610	482211683883	470R 5% 0,5W
3326	482211710837	100k 1% 0,1W	3409	482205120562	5k6 5% 0,1W	3549	482205120472	4k7 5% 0,1W	3616	482211710837	100k 1% 0,1W
3329	482205120472	4k7 5% 0,1W	3410	482205120562	5k6 5% 0,1W	3551	482205120228	2R2 5% 0,1W	3617	482205120182	1k8 5% 0,1W
3330	482205120472	4k7 5% 0,1W	3411	482211652175	100R 5% 0,5W	3552	482205120228	2R2 5% 0,1W	3618	482205120182	1k8 5% 0,1W
3331	482211711383	12k 1% 0,1W	3412	482211652175	100R 5% 0,5W	3553	482205120393	39k 5% 0,1W	3640	482211710833	10k 1% 0,1W
3332	482211711383	12k 1% 0,1W	3413	482211652175	100R 5% 0,5W	3554	482205120393	39k 5% 0,1W	4213	482205120008	0R Jumper 0805
3333	482211711449	2k2 1% 0,1W	3414	482211711507	6k8 1% 0,1W	3556	482205120332	3k3 5% 0,1W	4214	482205120008	0R Jumper 0805
3334	482211711449	2k2 1% 0,1W	3415	482211711507	6k8 1% 0,1W	3557	482205120332	3k3 5% 0,1W	4217	482205120008	0R Jumper 0805
3335	482205120273	27k 5% 0,1W	3450	482211711139	1k5 1% 0,1W	3558	482205120184	180k 5% 0,1W	4221	482205120008	0R Jumper 0805
3336	482205120273	27k 5% 0,1W	3451	482211711139	1k5 1% 0,1W	3559	482205120184	180k 5% 0,1W	4226	482205120008	0R Jumper 0805
3337	482205120479	47R 5% 0,1W	3452	482211711139	1k5 1% 0,1W	3560	482205120471	470R 5% 0,1W	4229	482205120008	0R Jumper 0805
3338	482205120479	47R 5% 0,1W	3453	482205120122	1k2 5% 0,1W	3561	482205120471	470R 5% 0,1W	4244	482205120008	0R Jumper 0805
3339	482205120479	47R 5% 0,1W	3454	482211711449	2k2 1% 0,1W	3562	482205120822	8k2 5% 0,1W	4269	482205120008	0R Jumper 0805
3340	482205120479	47R 5% 0,1W	3455	482205120392	3k9 5% 0,1W	3563	482205120822	8k2 5% 0,1W	4270	482205120008	0R Jumper 0805
3341	482205110102	1k 2% 0,25W	3456	482205120822	8k2 5% 0,1W	3564	482211711448	180R 1% 0,1W	4271	482205120008	0R Jumper 0805
3342	482205110102	1k 2% 0,25W	3496	482211711139	1k5 1% 0,1W	3565	482211711448	180R 1% 0,1W	4272	482205120008	0R Jumper 0805
3343	482205120154	150k 5% 0,1W	3497	482205120154	150k 5% 0,1W	3566	482211683933	15k 1% 0,1W	4273	482205120008	0R Jumper 0805
3344	482205120154	150k 5% 0,1W	3498	482211711148	56k 1% 0,1W	3567	482211683933	15k 1% 0,1W	4275	482205120008	0R Jumper 0805
3345	482211711507	6k8 1% 0,1W	3499	482211713579	220k 1% 0,1W	3568	482211711383	12k 1% 0,1W	4276	482205120008	0R Jumper 0805
3346	482211711507	6k8 1% 0,1W	3501	482205120683	68k 5% 0,1W	3569	482211711383	12k 1% 0,1W	4278	482205120008	0R Jumper 0805
3347	482211710833	10k 1% 0,1W	3502	482205120683	68k 5% 0,1W	3570	482211710833	10k 1% 0,1W	4279	482205120008	0R Jumper 0805
3348	482211710833	10k 1% 0,1W	3509	482211711149	82k 1% 0,1W	3571	482211710833	10k 1% 0,1W	4280	482205120008	0R Jumper 0805
3349	482211710833	10k 1% 0,1W	3510	482211711149	82k 1% 0,1W	3574	482205120223	22k 5% 0,1W	4288	482205120008	0R Jumper 0805
3350	482211710833	10k 1% 0,1W	3517	482211710833	10k 1% 0,1W	3575	482205120223	22k 5% 0,1W	4502	482205120008	0R Jumper 0805
3351	482205120228	2R2 5% 0,1W	3518	482205120333	33k 5% 0,1W	3576	482211711507	6k8 1% 0,1W	4503	482205120008	0R Jumper 0805
3352	482205120228	2R2 5% 0,1W	3519	482205120333	33k 5% 0,1W	3577	482211711507	6k8 1% 0,1W	4504	482205120008	0R Jumper 0805
3353	482205120228	2R2 5% 0,1W	3520	482211683933	15k 1% 0,1W	3579	482205120154	150k 5% 0,1W	4505	482205120008	0R Jumper 0805
3354	482205120228	2R2 5% 0,1W	3521	482205210339	⚠ 33R 5% 0,33W	3580	482205120223	22k 5% 0,1W	4506	482205120008	0R Jumper 0805
3361	482211652249	1k8 5% 0,5W	3522	482205120105	1M 5% 0,1W	3581	482205120223	22k 5% 0,1W	4508	482205120008	0R Jumper 0805
3362	482211652249	1k8 5% 0,5W	3523	482205120105	1M 5% 0,1W	3582	482205120122	1k2 5% 0,1W	4509	482205120008	0R Jumper 0805
3363	482211652249	1k8 5% 0,5W	3524	482205120683	68k 5% 0,1W	3583	482205120122	1k2 5% 0,1W	4510	482205120008	0R Jumper 0805
3364	482205120471	470R 5% 0,1W	3525	482205120683	68k 5% 0,1W	3584	482211710361	680R 1% 0,1W	4511	482205120008	0R Jumper 0805
3365	482211683872	220R 5% 0,5W	3526	482205120273	27k 5% 0,1W	3585	482205120228	2R2 5% 0,1W	4512	482205120008	0R Jumper 0805
3366	482211652283	4k7 5% 0,5W	3527	482205120273	27k 5% 0,1W	3586	482211711449	2k2 1% 0,1W	4514	482205120008	0R Jumper 0805
3372	482205120109	10R 5% 0,1W	3528	482211710833	10k 1% 0,1W	3587	482211711507	6k8 1% 0,1W	4515	482205120008	0R Jumper 0805
3373	482211652219	330R 5% 0,5W	3529	482211710833	10k 1% 0,1W	3588	482205120471	470R 5% 0,1W	4516	482205120008	0R Jumper 0805
3379	482205120472	4k7 5% 0,1W	3530	482205120333	33k 5% 0,1W	3589	482205120391	390R 5% 0,1W	4517	482205120008	0R Jumper 0805
3380	482205120392	3k9 5% 0,1W	3531	482205120333	33k 5% 0,1W	3590	482211711449	2k2 1% 0,1W	4518	482205120008	0R Jumper 0805
3381	482211652175	100R 5% 0,5W	3534	482211710837	100k 1% 0,1W	3591	482211683872	220R 5% 0,5W	4519	482205120008	0R Jumper 0805
3382	482211683933	15k 1% 0,1W	3535	482211710837	100k 1% 0,1W	3593	482205110102	1k 2% 0,25W	4520	482205120008	0R Jumper 0805
3383	482205120223	22k 5% 0,1W	3536	482205120332	3k3 5% 0,1W	3594	482205110102	1k 2% 0,25W	4521	482205120008	0R Jumper 0805
3384	482205120223	22k 5% 0,1W	3537	482205120332	3k3 5% 0,1W	3596	482205120683	68k 5% 0,1W	4522	482205120008	0R Jumper 0805
3385	482211710834	47k 1% 0,1W	3538	482211711149	82k 1% 0,1W	3597	482205120683	68k 5% 0,1W	4523	482205120008	0R Jumper 0805
3386	482211710834	47k 1% 0,1W	3539	482211711149	82k 1% 0,1W	3598	482211710837	100k 1% 0,1W	4524	482205120008	0R Jumper 0805
3387	482211711149	82k 1% 0,1W	3540	482205120472	4k7 5% 0,1W	3599	482211710837	100k 1% 0,1W	4525	482205120008	0R Jumper 0805
3388	482205120334	330k 5% 0,1W	3541	482205120472	4k7 5% 0,1W	3601	482211683884	47k 5% 0,5W	4526	482205120008	0R Jumper 0805
3390	482205120154	150k 5% 0,1W	3542	482205120109	10R 5% 0,1W	3602	482211683884	47k 5% 0,5W	4527	482205120008	0R Jumper 0805
3401	482211711449	2k2 1% 0,1W	3543	482205120683	68k 5% 0,1W	3603	482205120105	1M 5% 0,1W	4528	482205120008	0R Jumper 0805
3402	482211711449	2k2 1% 0,1W	3544	482211652297	68k 5% 0,5W	3604	482205120105	1M 5% 0,1W	4529	482205120008	0R Jumper 0805
3403	482211711449	2k2 1% 0,1W	3545	482211710834	47k 1% 0,1W	3605	482211710834	47k 1% 0,1W	4530	482205120008	0R Jumper 0805

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ELECTRICAL PARTS LIST - COMBI BOARD

RESISTORS

4531	482205120008	0R Jumper 0805
4532	482205120008	0R Jumper 0805
4533	482205120008	0R Jumper 0805
4534	482205120008	0R Jumper 0805
4535	482205120008	0R Jumper 0805
4536	482205120008	0R Jumper 0805
4537	482205120008	0R Jumper 0805
4538	482205120008	0R Jumper 0805
4539	482205120008	0R Jumper 0805
4540	482205120008	0R Jumper 0805
4541	482205120008	0R Jumper 0805
4542	482205120008	0R Jumper 0805
4543	482205120008	0R Jumper 0805
4544	482205120008	0R Jumper 0805
4545	482205120008	0R Jumper 0805
4546	482205120008	0R Jumper 0805
4548	482205120008	0R Jumper 0805
4550	482205120008	0R Jumper 0805
4551	482205120008	0R Jumper 0805
4552	482205120008	0R Jumper 0805
4553	482205120008	0R Jumper 0805
4554	482205120008	0R Jumper 0805
4555	482205120008	0R Jumper 0805
4556	482205120008	0R Jumper 0805
4558	482205120008	0R Jumper 0805
4559	482205120008	0R Jumper 0805
4560	482205120008	0R Jumper 0805
4561	482205120008	0R Jumper 0805
4562	482205120008	0R Jumper 0805
4563	482205120008	0R Jumper 0805
4564	482205120008	0R Jumper 0805
4565	482205120008	0R Jumper 0805
4566	482205120008	0R Jumper 0805
4567	482205120008	0R Jumper 0805
4568	482205120008	0R Jumper 0805
4569	482205120008	0R Jumper 0805
4570	482205120008	0R Jumper 0805
4571	482205120008	0R Jumper 0805
4573	482205120008	0R Jumper 0805
4574	482205120008	0R Jumper 0805
4575	482205120008	0R Jumper 0805
4576	482205120008	0R Jumper 0805
4577	482205120008	0R Jumper 0805
4578	482205120008	0R Jumper 0805
4579	482205120008	0R Jumper 0805
4580	482205120008	0R Jumper 0805
4581	482205120008	0R Jumper 0805
4582	482205120008	0R Jumper 0805
4583	482205120008	0R Jumper 0805
4584	482205120008	0R Jumper 0805
4585	482205120008	0R Jumper 0805
4586	482205120008	0R Jumper 0805
4587	482205120008	0R Jumper 0805
4589	482205120008	0R Jumper 0805
4590	482205120008	0R Jumper 0805
4591	482205120008	0R Jumper 0805
4592	482205120008	0R Jumper 0805
4593	482205120008	0R Jumper 0805
4594	482205120008	0R Jumper 0805
4595	482205120008	0R Jumper 0805
4596	482205120008	0R Jumper 0805
4597	482205120008	0R Jumper 0805
4598	482205120008	0R Jumper 0805
4599	482205120008	0R Jumper 0805
4677	482205120008	0R Jumper 0805

COILS & FILTERS

5202	482215711832	Mains Filter 400µH
5321	482215762552	Coil 2,2µH 5%
5322	482215762552	Coil 2,2µH 5%
5324	482215762552	Coil 2,2µH 5%
5501	482215762552	Coil 2,2µH 5%
5502	482215762552	Coil 2,2µH 5%
5503	482215762255	Coil 18,5 Turns 1µH
5504	482215762255	Coil 18,5 Turns 1µH
5505	482215762255	Coil 18,5 Turns 1µH
5506	482215762255	Coil 18,5 Turns 1µH
5508	482252610704	Fe Bead 100MHz
5510	482215762552	Coil 2,2µH 5%
5521	482215762552	Coil 2,2µH 5%

DIODES

6220	482213031878	1N4003G
6221	482213031878	1N4003G
6222	482213031878	1N4003G
6223	482213031878	1N4003G
6228	482213034173	BZX79-B5V6
6229	482213034142	BZX79-B33
6230	482213031878	1N4003G
6231	482213034174	BZX79-B4V7
6232	482213030621	1N4148
6233	482213030621	1N4148
6236	482213034174	BZX79-B4V7
6240	482213031878	1N4003G
6241	482213031878	1N4003G
6242	482213031878	1N4003G
6243	482213031878	1N4003G
6248	482213031878	1N4003G
6249	482213031878	1N4003G
6250	482213031878	1N4003G
6251	482213031878	1N4003G
6257	482213030621	1N4148
6258	482213034173	BZX79-B5V6
6259	482213031878	1N4003G

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ELECTRICAL PARTS LIST - COMBI BOARD

6260	482213031878	1N4003G
6265	482213031878	1N4003G
6266	482213031878	1N4003G
6267	482213031878	1N4003G
6268	482213031878	1N4003G
6269	482213030621	1N4148
6321	482213031878	1N4003G
6322	482213031878	1N4003G
6323	482213031878	1N4003G
6324	482213031878	1N4003G
6325	482213034281	BZX79-F15
6326	482213031024	BZX79-B18
6327	532213031504	BZX79-B3V3
6328	532213080686	1N5392
6329	482213030621	1N4148
6330	482213030621	1N4148
6442	482213082978	LTL-1CHPE
6443	482213082978	LTL-1CHPE
6444	482213082978	LTL-1CHPE
6502	482213034173	BZX79-B5V6
6549	482213030621	1N4148
6550	482213030621	1N4148
6551	482213030862	BZX79-B9V1
6553	482213031878	1N4003G

TRANSISTORS & INTEGRATED CIRCUITS

7233	932213922687	BD242BFP
7236	482213041246	BC327-25
7237	482213040981	BC337-25
7238	482213060511	BC847B
7239	482213042804	BC817-25
7240	482213040981	BC337-25
7241	482213040981	BC337-25
7247	482213040981	BC337-25
7248	482213040981	BC337-25
7249	482213041246	BC327-25
7320	482213042804	BC817-25
7321	482213042804	BC817-25
7322	482213042804	BC817-25
7323	482213042804	BC817-25
7324	482213060373	BC857B
7329	482213010847	BDW94C
7330	482213040981	BC337-25
7331	482213060373	BC857B
7332	482213060373	BC857B
7333	482213042804	BC817-25
7391	482220916224	AN7125
7400	482213060373	BC857B
7401	482213040981	BC337-25
7402	532220911306	HEF4094BT
7501	532220911102	HEF4052BT
7503	482213041096	BC550C
7504	482213041096	BC550C
7505	482213044568	ON4986
7506	482213044568	ON4986
7507	482213044568	ON4986
7508	482213044568	ON4986
7509	482213060511	BC847B
7510	482213060373	BC857B
7530	532220914482	HEF4069UBT
7537	482213060511	BC847B
7538	482213060511	BC847B
7543	482213060511	BC847B
7544	482213060511	BC847B
7545	482213060511	BC847B
7546	482213060511	BC847B
7547	482213060511	BC847B
7548	482213060511	BC847B
7554	482220931378	NJM4556MB
7556	319801044010	PDTA114ET
7643	482213041096	BC550C

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

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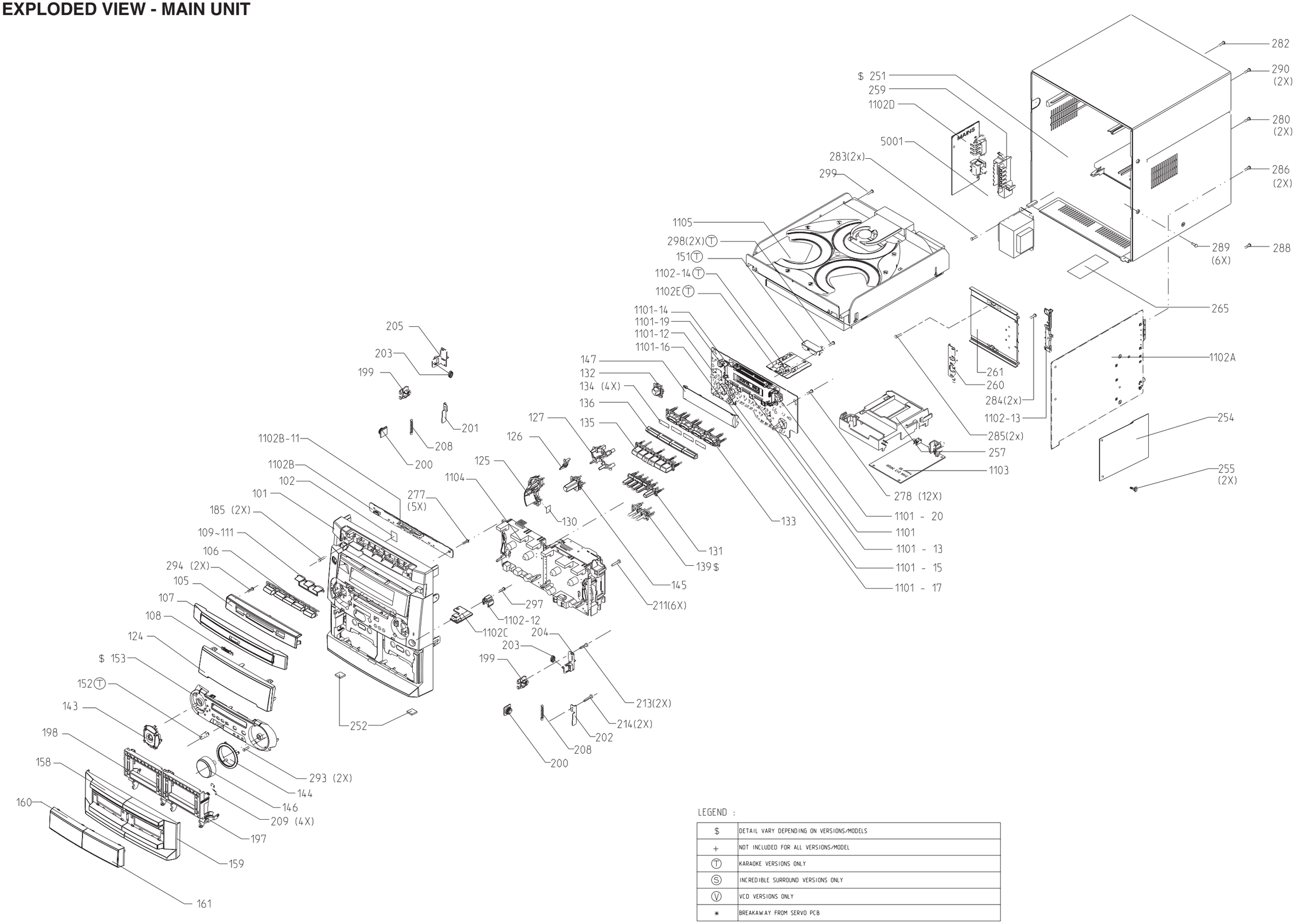
EXPLODED VIEW - MAIN UNIT



LEGEND :

$	DETAIL VARY DEPENDING ON VERSIONS/MODELS
+	NOT INCLUDED FOR ALL VERSIONS/MODEL
Ⓣ	KARAOKE VERSIONS ONLY
Ⓢ	INCREDIBLE SURROUND VERSIONS ONLY
Ⓥ	VCD VERSIONS ONLY
*	BREAKAWAY FROM SERVO PCB

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MECHANICAL & ACCESSORIES PARTS LIST - MAIN UNIT

0101	313911810640	Cabinet Front
0105	313911810440	Window CDC Control
0106	313911789360	Button Set CDC Select
0107	313911810990	Cover Tray CDC 2
0108	482245413408	Badge Philips
0124	313911812780	Window Display /21M
0124	313911811030	Window Display /22/34
0125	313911810690	Button DBB
0127	313911467670	Lightguide DSC C10
0131	313911810590	Button Set Prog
0132	313911789410	Button Power On/Off
0133	313911467730	Button Set Source Select
0135	313911810760	Button Set Controls
0136	313911810400	Lightcap Source Select
0139	313911469930	Button Clock/Timer /21M
0139	313911469930	Button RDS/News/Clk /22/34
0143	313911789440	Cover Ring DSC
0144	313911789450	Cover Ring Volume
0145	313911789460	Button DSC
0146	313911810930	Knob Volume Rotary
0153	313911812790	Cover Control 2 /21M
0153	313911810710	Cover Control 2 /22/34
0158	313911810660	Cover Cassette Left 2
0159	313911810670	Cover Cassette Right 2
0160	313911468520	Lens Cassette Left 2
0161	313911468530	Lens Cassette Right 2
0197	482244310488	Door Cassette Right
0198	482244310487	Door Cassette Left
0199	482240210621	Push-Catch
0200	482252910322	Damper Assembly
0203	482249211344	Spring Compression
0204	482240211246	Bracket Right
0205	482240211245	Bracket Left
0208	482249211345	Spring Tension
0209	482249242787	Spring Cassette
0251	313911469840	Cabinet Rear NMI /21M/34
0251	313911469820	Cabinet Rear MIH /22
0252	482246240683	Foot Rubber SQ
0255	482246693148	Spacer 5mm
0260	482249211734	Spring IC
0350	313911877280	Loudspeaker Box FB-C28
0351	482230350063	FM Aerial 75R
0356	313922883610	Remote Control RC282425/01
0384	482230350082	AM Frame Aerial
0385	482232110249 ⚠	Mains Cord
0387	313911520060	Instruction For Use /21M
0387	313911619330	Instruction For Use /22
0387	313911619340	Instruction For Use /34
1451	482232012604	Flex Cable 9pin 22cm
1455	482232012654	Flex Cable 7pin 22cm
1456	313911034180	Flex Cable 16pin 22cm
1557	482232012663	Flex Cable 7pin 34cm
5001	313911832230 ⚠	Mains Transformer /21M
5001	313911832130 ⚠	Mains Transformer /22/34

LEFT/RIGHT LOUDSPEAKER BOX BREAKDOWN

	482224810008	Piezo with Wire Assembly
	996500002117	Speaker 4" 6R 12W

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

SCREW LISTS - MAIN UNIT

185	D3 x 12
211	D3 x 12
213	D3 x 12
214	D3 x 12
277	D3 x 12
278	D3 x 12
280	D3 x 12
282	D3 x 12
283	D3 x 16
284	M3 x 15
285	D3 x 16
286	D3 x 12
288	D3 x 12
289	D3 x 12
290	D3 x 12
293	D3 x 12
294	D2 x 8
297	D3 x 12
298	D3 x 12
299	D3 x 12