Mini System

FW-V320/21M

Service
Service
Service

Service Manual

COMPACT disc DIGITAL VIDEO

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CLASS 1
LASER PRODUCT

Published by KC 0114 Service Audio Printed in The Netherlands Subject to modification

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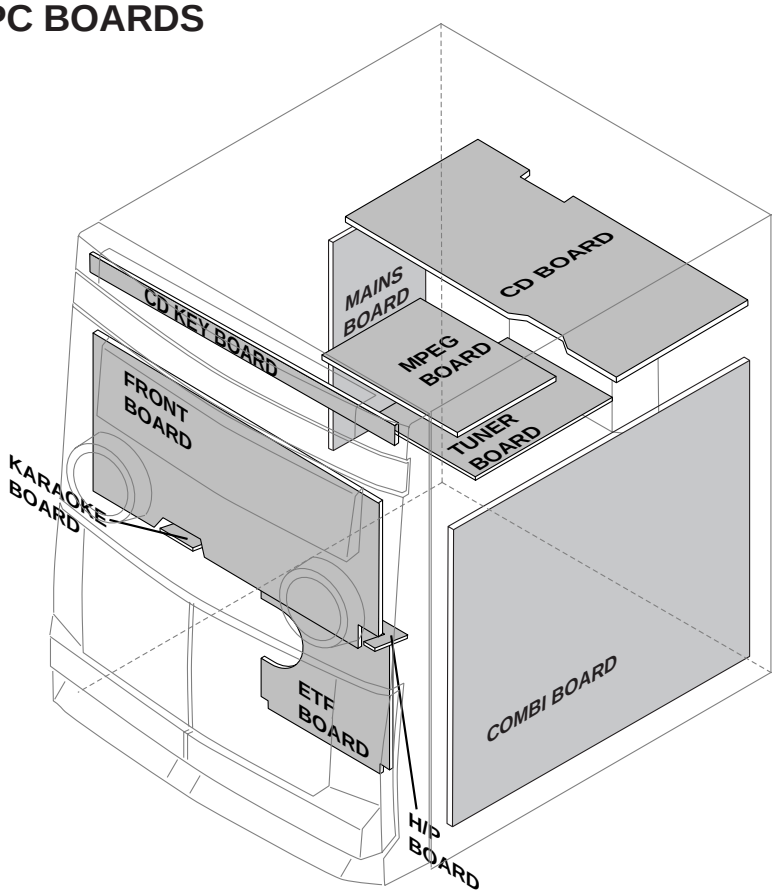
PHILIPS

LOCATION OF PC BOARDS



VERSION VARIATIONS:

Type /Versions: / Features & Board in used:	FW-V320							
	/21M							
Incredible Surround	x							
Karaoke	x							
News								
RDS								
Rotary Encoder (volume control)	x							
Jog Shuttle	x							
Voltage Selector	x							
Aux Input	x							
Digital Output								
Headphone Socket	x							
Line Output								
Subwoofer Output								
Surround Output								
Matrix Surround Loudspeakers	x							
Standby - Clock Display	x							
Standby - Dark								
Tuner board - ECO5 Sys	x							
Tuner board - Tuner 95								
Combi board 12W version								
Combi board 18W version								
Combi board 25W version	x							
ETF7 ND/DD/FR Chrome/Ferro								
ETF7 ND/DD/FF Chrome/Ferro	x							
ETF7 ND/DD/FF Ferro								

SPECIFICATIONS

GENERAL:

Mains voltage : 110-127V/220-240V Switchable
Mains frequency : 50/60Hz
Power consumption : < 25W at Standby
< 75W Active
Clock accuracy : < 4 seconds per day
Dimension centre unit : 265 x 310 x 340mm

TUNER:

FM

Tuning range : 87.5-108MHz
Grid : 50kHz
IF frequency : 10.7MHz ± 25kHz
Aerial input : 75Ω coaxial
Sensitivity at 26dB S/N : < 7µV
Selectivity at 600kHz bandwidth : > 30dB
Image rejection : > 25dB
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
Grid : 9kHz / 10kHz
IF frequency : 450kHz ± 1kHz
Aerial input : Frame aerial
Sensitivity at 26dB S/N : < 4.0mV/M
Selectivity at 18kHz bandwidth : > 18dB
IF rejection : > 45dB
Image rejection : > 28dB
Distortion at RF=50mV, m=80% : < 5%

AMPLIFIER:

Output power (6Ω, 1 kHz, 10% THD) : 2 x 35W RMS ± 1dB
Frequency response within -3dB : 50Hz-15kHz
Dynamic Bass Boost : DBB ON, DBB Off [1)]
Incredible Surround : IS, IS Off [1)]
Digital Sound Control : Jazz, Techno, Optimal, Rock [1)]
VEC Control : Hall, Cinema, Concert [1)]
Headphone output at 32Ω : 16mW
Input sensitivity
Aux-in : 700mV ± 2dB at 600Ω
Mic : 3.5mV

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

VIDEO CD

Audio Performance:

Measurement done at output conn. of the CDC module.
Frequency response within ± 1.5dB : 20Hz - 20kHz
Output level (in Vrms) : 500mV, Z_{out} = 100Ω
Signal/Noise ratio (A-weighted) : > 80dBA
Distortion at 1kHz : < 0.003%
Channel unbalance at 1kHz : ±1dB
Channel separation at 1kHz : > 60dB
De-emphasis : 0 or 15/50 mS (Switched by subcode on the disc)
MP3-CD bit rate : 32 - 256kbps
Sampling Frequency : 32kHz, 44.1kHz & 48kHz

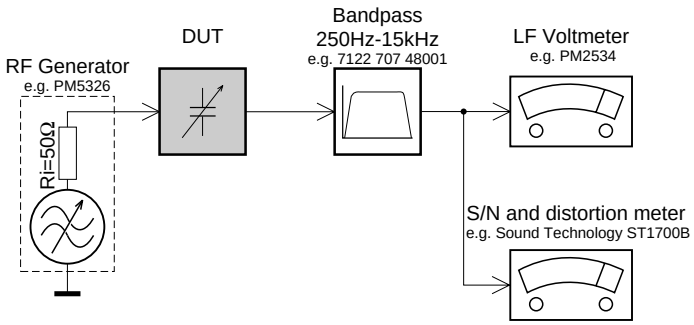
Video Performance:

Video output level : 1.0 ± 0.2V_{p-p}
Luminance non-linear distortion : < 0 ± 5%
Luminance S/N ratio : > 50dB

[1)] Frequency response in each setting is software controlled.

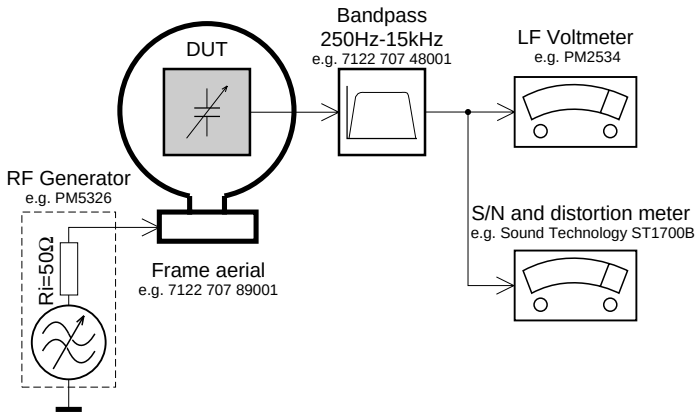
MEASUREMENT SETUP

Tuner FM



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

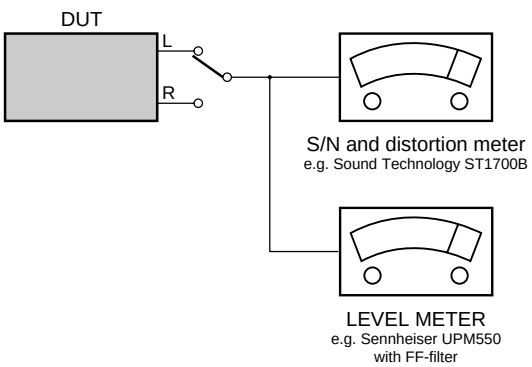
Tuner AM (MW,LW)



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

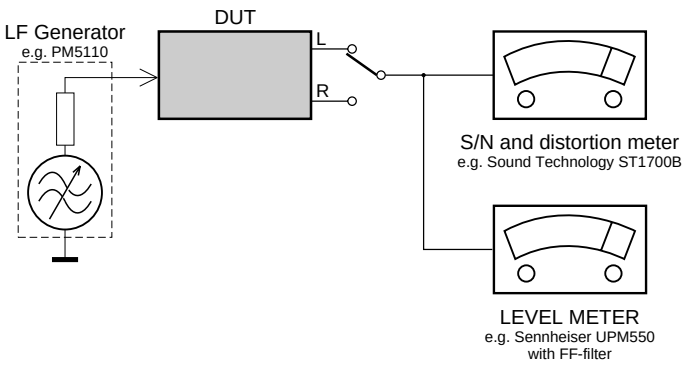
CD

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



Recorder

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



SERVICE AIDS

Service Tools:

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

Cassette:

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

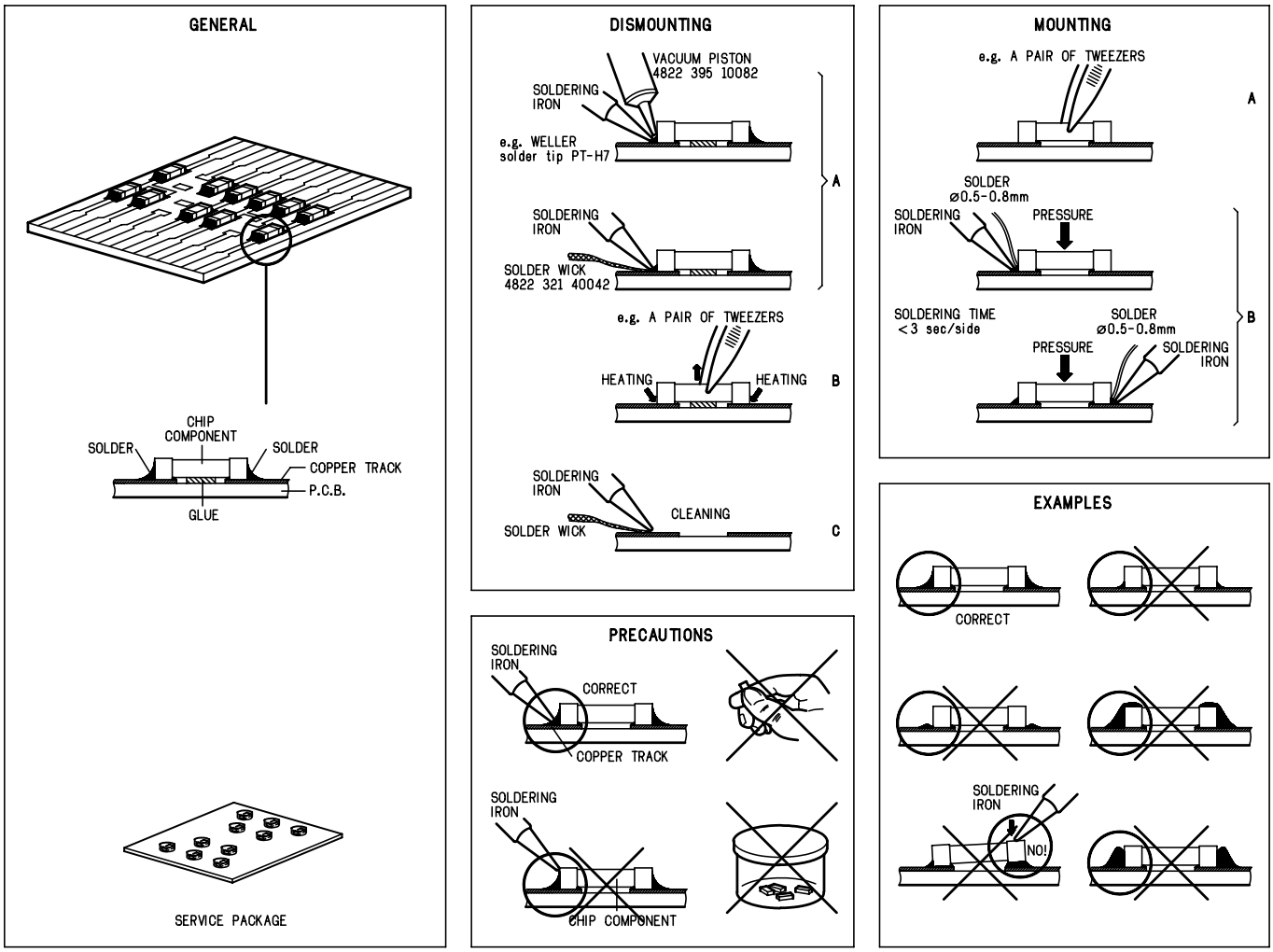
Compact Disc:

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

ESD Equipment:

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

HANDLING CHIP COMPONENTS



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 !

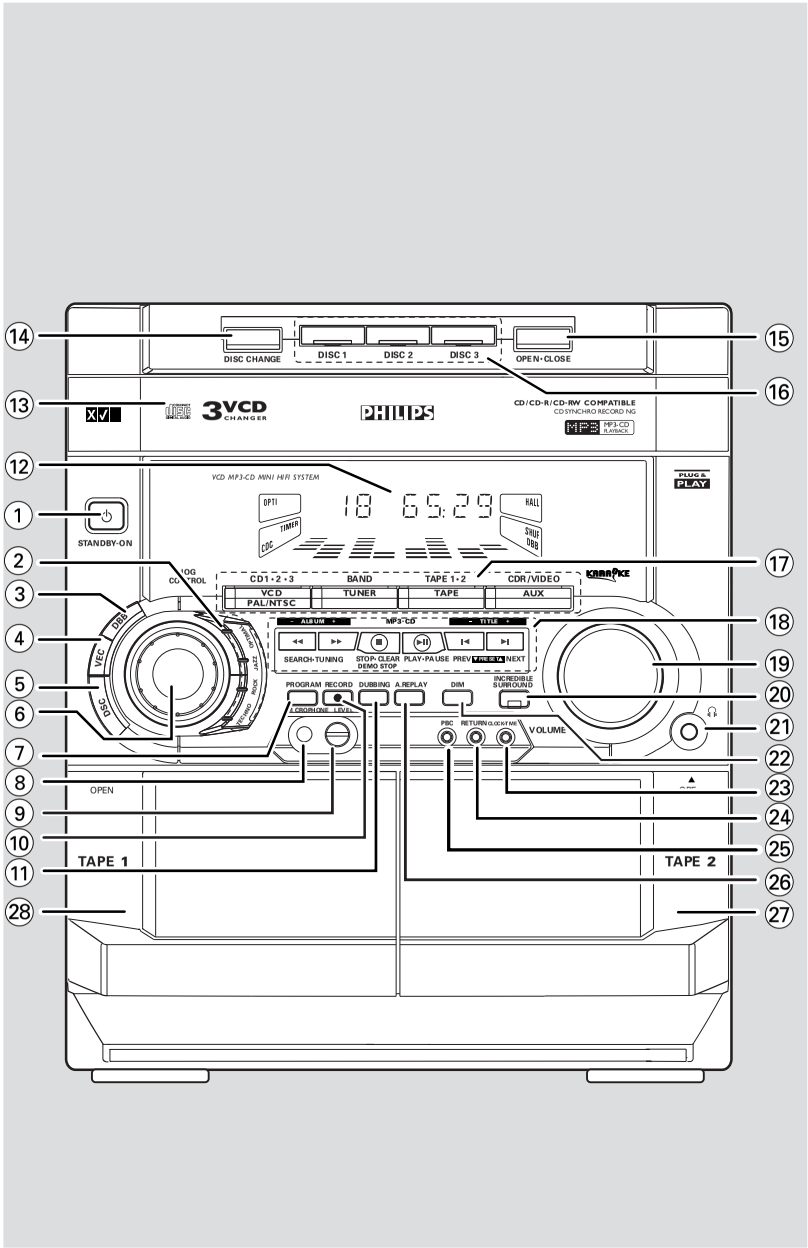
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

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.



English

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IMPORTANT:
PLEASE NOTE THAT THE VOLTAGE SELECTOR LOCATED AT THE REAR OF THIS SYSTEM IS PRESET AT 220V FROM THE FACTORY.
FOR COUNTRIES THAT OPERATE AT 110-127V, PLEASE ADJUST TO 110-127V BEFORE YOU SWITCH ON THE SYSTEM.

- ***The type plate (which contains the serial number) is located at the rear of the player.***
- ***Recording is permissible if copyright or other rights of th rd parties are not infringed.***

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).

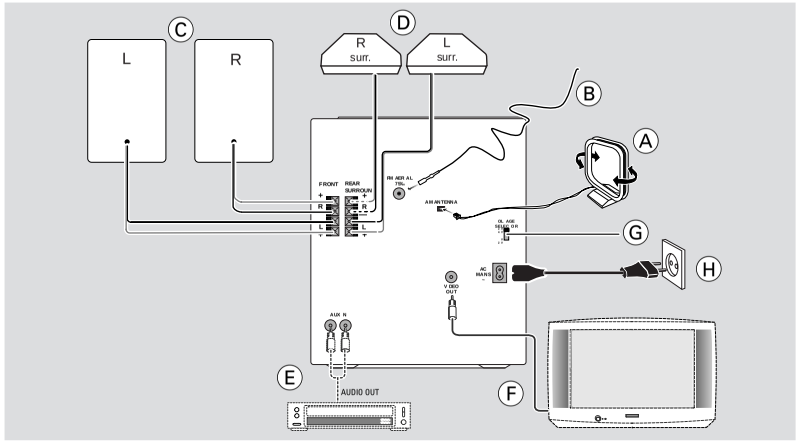
Your system consists of materials which can be recycled and reused if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packaging materials, exhausted batteries and old equipment.

Supplied Accessories

– Remote control
– Batteries (two AA size) for remote control
– AM loop antenna
– FM wire antenna
– AC power cord
– One Video cinch cable

Safety Information

- Before operating the player, check that the operating voltage indicated on the typeplate (or the voltage indication beside the voltage selector) of your player 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 player.
- When the player is switched on, do not move it around.
- Place the player on a solid base (e.g. a cabinet).
- Place the player in a location with adequate ventilation to prevent internal heat build-up in your player. Allow at least 10 cm (4 inches) clearance from the rear and the top of the unit and 5 cm (2 inches) from the each side.
- Do not expose the player to excessive moisture, rain, sand or heat sources.
- Under no circumstances should you repair the player yourself, as this will invalidate the warranty!
- If the player 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 disc unit inside the player. Should this occur, the CD player will not operate normally. Leave the power on for about one hour with no disc in the player 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 player from the power supply completely, remove the AC power plug from the wall socket.**



Rear Connections

Ⓐ AM Loop Antenna Connection

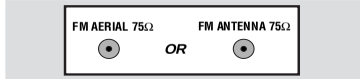
Connect the supplied loop antenna to the AM ANTENNA terminal. Place the AM loop antenna far away from the system and adjust its position for the best reception.

Ⓑ 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.

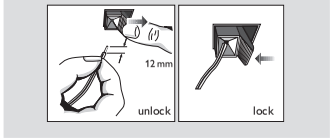
Outdoor Antenna

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.



CAUTION:
– For optimal sound performance, it is recommended to use the supplied speakers.
– Do not connect more than one speaker to any one pair of + / − speaker terminal.
– Do not connect speakers with impedance lower than the speakers supplied. Please refer to SPECIFICATION section of this manual.

Ⓓ Rear Surround Speakers Connection

Connect the optional Rear Surround Speakers to the REAR SURROUND terminals. Be sure to follow the instructions supplied with the Rear Surround Speakers.

Ⓔ Connecting other equipment to your player

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.

Ⓕ Video Out Connection

Connect the VIDEO OUT terminal at the rear of the system to the TV or VCR VIDEO IN for viewing or recording.

Ⓖ Adjusting the Operating Voltage

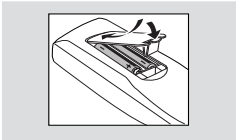
Before connecting the AC power cord to the wall outlet, make sure that the voltage selector at the rear of the system is set to the local power line voltage. If not, reset the selector before connecting to the wall outlet.

Ⓗ 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.



CAUTION

– Remove batteries if they are exhausted or not to be used for a long t me.

– Do not use old and new or different types of batteries in combination.

– Batteries contain chemical substances, so they should be disposed off properly.

Controls *(main system's illustration on page 3)*

Controls on the player and remote control

① **STANDBY-ON** ⏻
– switches the system to standby/on.

② **DIGITAL SOUND CONTROL DISPLAY PANEL**
– to view the desired DSC display.

③ **DBB (DYNAMIC BASS BOOST)**
– to switch on bass boost, to enhance bass response or to switch off bass boost.

④ **VEC (VIRTUAL ENVIRONMENT CONTROL)**
– to select the desired Virtual Environment Control effect : HALL, CINEMA or CONCERT.

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

⑥ **JOG CONTROL**
– to select the desired DSC setting. You must select the DSC feature first.
– to select the desired VEC setting. You must select the VEC feature first.

⑦ **PROGRAM (PROG)**
for VCD/CD/MP3-CD…to programme disc tracks.
for TUNER ..... to programme preset radio stations.
for CLOCK ..... to select 12- or 24- hour in clock setting mode *(on the system only)*.

⑧ **MICROPHONE**
– to connect microphone jack.

⑨ **MIC LEVEL**
– to adjust the mixing level for karaoke or microphone recording.

⑩ **RECORD**
– to start recording on tape deck 2.

⑪ **DUBBING**
– to dub a tape in normal speed.

⑫ **DISPLAY SCREEN**
– to view the current setting of the system.

⑬ **CD CHANGER TRAY**

⑭ **DISC CHANGE**
– to change disc(s).

⑮ **OPEN•CLOSE**
– to open or close the CD changer tray.

⑯ **DISC 1 / DISC 2 / DISC 3 (DISC DIRECT PLAY)**
– to select a disc tray for playback.

⑰ **SOURCE** – to select the following:
VCD / (CD 1•2•3)
– to select VCD/CD mode *(this system can playback MP3-CD format disc also)*. When VCD/CD playback is stopped, press to select the disc tray 1, 2 or 3.
PAL / NTSC
– to select corresponding PAL or NTSC system of your TV set (exception Multi-system TV).
TUNER / (BAND)
– to select Tuner mode. When in tuner mode, press to select the waveband: FM or MW.
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).

⑱ **MODE SELECTION**
SEARCH ◀◀ ▶▶ (TUNING ◀◀▶▶) (ALBUM −/+)
for MP3-CD only…to select previous/next Album
for VCD only…to move the zoomed picture to the left or right.
for VCD/CD…to search backward/forward during playback.
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 VCD/CD/MP3-CD…to stop disc playback or to clear a programme.
for TUNER ..... to stop programming *(on the system only)*.
for TAPE ..... to stop playback or recording.
for DEMO ..... to start or stop demonstration mode *(on the system only)*.
for CLOCK ..... to exit clock setting or cancel timer *(on the system only)*.
for PLUG & PLAY…to exit plug & play mode and return to standby mode *(on the system only)*.
PLAY•PAUSE ▶II
for VCD/CD/MP3-CD…to start or interrupt playback.
for VCD only…to watch a still picture.
for TAPE ..... to start playback.
for PLUG & PLAY…to initiate and start plug & play from standby/demo mode *(on the system only)*.
PREV ⏮ / NEXT ⏭(PRESET ▼▲) (TITLE −/+)
for MP3-CD only…to select previous/next Title.
for VCD only…to move the zoomed picture down or up.
for VCD with PBC on .... to select next or previous MENU or VCD track during playback.
for VCD/CD ..... to skip to the previous, or next track.
for TUNER ..... to select a preset station in memory.
for CLOCK ..... to set the minute *(on the system only)*.

⑲ **VOLUME**
– to increase or decrease the volume.

⑳ **INCREDIBLE SURROUND**
– to switch on or off the surround sound effect.

㉑ 🎧
– to connect headphones.

㉒ **DIM**
– to select different brightness for the display screen : DIM 1, DIM 2, DIM 3 or DIM OFF.

㉓ **CLOCK•TIMER**
– to view the clock, set the clock or set the timer.

㉔ **RETURN**
– for VCD with PBC on to return to the previous MENU level during playback *(for VCD version 2.0 only)*.

㉕ **PBC (PLAYBACK CONTROL)**
– to switch on or off PBC mode *(for VCD version 2.0 only)*.

㉖ **A. REPLAY (AUTO REPLAY)**
– to select playback mode either in continuous AUTO REPLAY or ONCE only.

㉗ **TAPE DECK 2**

㉘ **TAPE DECK 1**

㉙ **OSD (ON SCREEN DISPLAY)**
– to switch on or off the on screen display on the TV screen.

㉚ **ZOOM**
– to enlarge a still picture on the TV screen *(for VCD operation only)*.

㉛ **VOCAL**
– to fade out the vocal of the original song during VCD playback or to switch between mono or stereo mode during audio disc playback *(for VCD/CD/MP3 operation only)*.

㉜ **KEY CONTROL (♭ ♮ ♯)**
– to change the key to suit your vocal range *(for VCD operation only)*.
♭ ..... to decrease vocal key level.
♮ ..... to restore vocal key to original setting.
♯ ..... to increase vocal key level.

㉝ **ECHO −/+**
– to adjust the echo level for karaoke *(for VCD operation only)*.

㉞ **RESUME**
– to continue playback again from where you have stopped. Only when PBC mode is switched off *(for VCD operation only)*.

㉟ **SLOW**
– to watch a VCD at a slower speed. There are 3 modes of selection *(for VCD operation only)*.

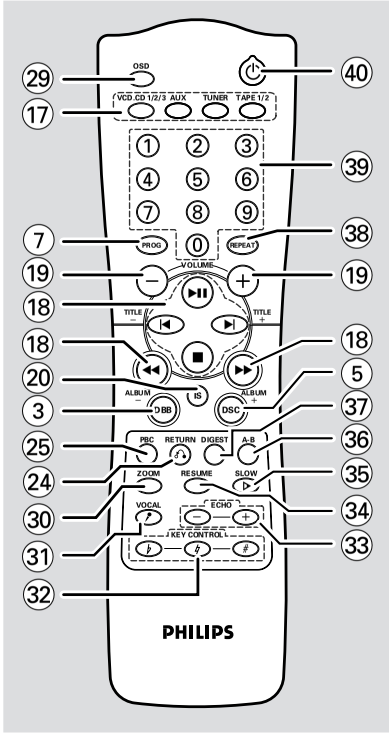
㊱ **A - B**
– to playback a certain scene or passage of a VCD/CD repeatedly.

㊲ **DIGEST**
– to scan through a VCD or a particular track. There are 4 modes of selection *(for VCD operation only)*.

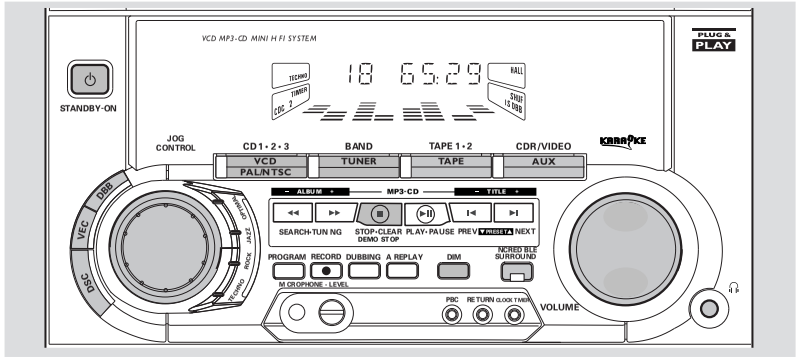
㊳ **REPEAT**
– to repeat a disc track or the current disc.

㊴ **DIGIT 0 – 9**
(numbers consisting more than two figures must be keyed in within 2 seconds.)
for VCD with PBC on…to select an entry level.
for VCD/CD/MP3-CD…to key in a disc track to start playback or
..... to select another track during playback or
..... to select a track for programming.

㊵ ⏻
– 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. VCD , TUNER, etc.).
– Then select the desired function (▶ , ⏮, ⏭, etc.).



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

Plug and Play

The system provides PLUG and PLAY feature that allows you to store all available radio stations automatically upon power up.

If the PLUG and PLAY has not been installed

1 Upon power up, "AUTO INSTALL - PRESS PLAY" will be displayed.

2 Press **PLAY** *(on the system only)* to start installation.
➜ "INSTALL" will be displayed and followed by "TUNER" and then "AUTO".
➜ The **PROG** starts flashing.
➜ PLUG and PLAY will start searching for all radio stations on FM band and then followed by radio stations on MW band.
➜ All available radio stations with sufficient signal strength will be stored. Up to 40 presets may be stored.
➜ The last preset radio station will appear on the display when PLUG and PLAY is completed.

To reinstall the PLUG & PLAY

1 In Standby or Demostration mode, press and hold **PLAY** for five seconds *(on the system only)* "AUTO INSTALL - PRESS PLAY" will be displayed.

2 Press **PLAY** *(on the system only)* again to start installation.

● To exit without storing the PLUG and PLAY, press ■ button *(on the system only)*.

Notes:
– PLUG and PLAY will be reinitiated again during the next power up if :
i) PLUG and PLAY installation was not completed.
ii) No stereo frequency being detected during PLUG and PLAY, "CHECK ANTENNA" will be displayed.
– You can store any radio stations manually or automatically after PLUG and PLAY.
– When PLUG and PLAY is used, all previously stored radio stations will be replaced.
– During PLUG and PLAY, if no button is pressed within 15 seconds, the system will go to demonstration mode (if demonstration mode is enable)

English

Demonstration mode

The system has a demonstration mode that shows the various features offered by the system.

To disable the demonstration mode

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

To enable the demonstration mode

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

Notes:
– If the demonstration mode has not been disabled, it will resume 5 seconds later after the system switches to standby mode.
– When the system is switched on from the main power outlet, the VCD changer tray may open and close again to initialize the set.
– 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.

Switching the system ON

- Press **VCD**, **TUNER**, **TAPE** or **AUX**.
- Press **STANDBY-ON** in demo.

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

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: **VCD**, **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 Analyser On

DIM 1 - normal brightness w th Spectrum Analyser Off

DIM 2 - half brightness with Spectrum Analyser On

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

English

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.

1. Press to select the **DSC** feature.
   ➜ DSC led lights up.
2. Adjust **JOG CONTROL** 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.
  ➜ The **DBB** flag disappear from the display.

Note:
– Some discs 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.

VIRTUAL ENVIRONMENT CONTROL (VEC)

The VEC feature enables you to adjust the system to select a type of environment.

1. Press to select the **VEC** feature.
   ➜ VEC led lights up.
2. Adjust the **JOG CONTROL** to select the desired Virtual Environment Control setting : HALL, CINEMA or CONCERT.
   ➜ "HALL, CINEMA or CONCERT" and the respective flag will be displayed.

VEC Selection	DBB	IS
HALL	On	On
CONCERT	Off	On
CINEMA	Off	On

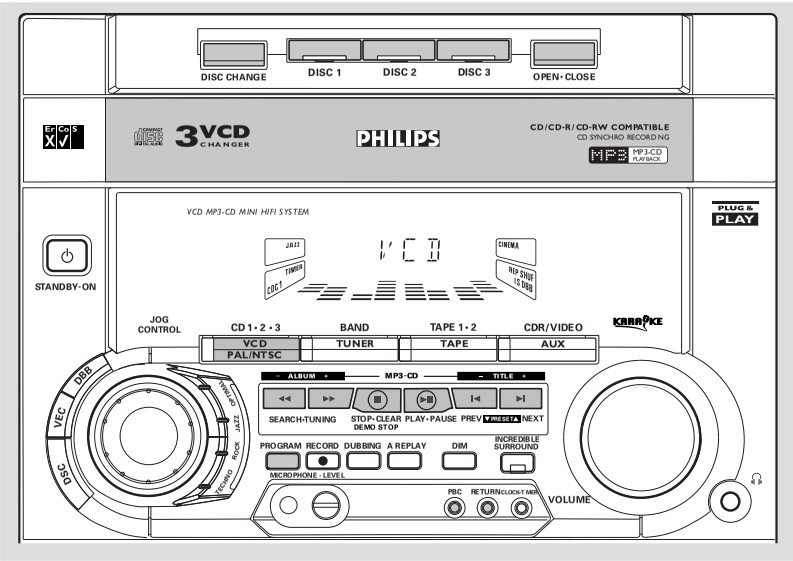
INCREDIBLE SURROUND

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

- Press INCREDIBLE SURROUND to switch on.
  ➜ The INCREDIBLE SURROUND button lights up.
  ➜ "INCR SURROUND" and the **IS** flag will be displayed.

To switch off Incredible Surround

- Press INCREDIBLE SURROUND again.
  ➜ The INCREDIBLE SURROUND button light is switched off.
  ➜ "IS OFF" will be displayed.
  ➜ The **IS** flag disappear from the display.



Warning!

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

You may load three discs in the VCD changer for continuous playback without interruption.
Before viewing the Video CD, ensure that the set is switched to corresponding PAL or NTSC system of your TV set (exception Multi-system TV).

Discs for playback

This system can play all digital audio disc, finalised digital audio CD-Recordable, finalised digital audio CD-Rewritable and MP3-CD format discs.

Support follow ng MP3-CD formats (ISO9660 format):

- Max. 30 characters
- Max. nested directory is 8 levels
- The max. ALB number is 32
- The max. MP3 programme track number is 99
- Supported VBR bit-rate
- Supported sampling frequencies for MP3 disc are: 32 kHz, 44.1 kHz, 48 kHz
- Supported Bit-rates of MP3 disc are: 32, 64, 96, 128, 192, 256 (kbps)

Follow ng formats can't be supported

- The files like *.WMA, *AAC, *.DLF, *.M3U, *.PLS
- Chinese filename
- The non-session closed discs
- The discs recorded under UDF format

Note:
– For mixed mode discs, only one mode will be selected for playback depending on the recording format.

Loading a Disc

1 Press **VCD** to select VCD/CD mode.
2 Press **OPEN•CLOSE**.
➜ The disc changer tray slides out.
3 Load a disc 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 disc changer tray will rotate until the empty tray is ready for loading.

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

For MP3-CD only:
➜ The first Album and the first Title information appear on the display.

Note:
– To ensure good system performance, wait until the disc changer completely reads the disc(s) before proceeding.
– For MP3-CD, the disc reading time may exceed 10 seconds due to the large number of songs compiled into one disc.

Disc Direct Play

- You can play a disc directly by pressing the **DISC 1, DISC 2** or **DISC 3** button. The disc 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 normal disc

For normal VCD:
Ensure that the system is switched to the corresponding PAL or NTSC system of your TV set (except multi-system TV).

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

For MP3-CD only:
➜ **TITLE** will appear on the display.
2 To stop playback, press ■.

Note:
– During Disc Reading mode, if you press any button, "PLEASE WAIT" will be displayed.

Disc Change

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

1 Press **DISC CHANGE**.
➜ The disc changer tray slides out.
2 Replace the discs in the left and right disc trays.
- If you wish to change the inner disc during playback, press **DISC CHANGE** again.
➜ "DISC CHANGE" will be displayed.
➜ The disc will stop playing.
➜ The disc changer tray will close to retrieve the inner disc and then open again with the inner disc accessible.

3 Press **OPEN•CLOSE** to close the disc changer tray.

Selecting a desired track

Selecting a desired track when playback is stopped

- Press **digit 0 – 9** on the remote control to select the desired track.
➜ Playback will start immediately for the selected track.
➜ The selected track number and elapsed playing time appear on the display.

Note:
– Maximum track selection from digital keys on remote control is 199 for MP3-CD and 99 for VCD/CD.

English

Selecting a desired track during playback

- Press ⏮ or ⏭ *(or **digit 0-9** on the remote control)* 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.

For MP3-CD only

1 Press **ALBUM** −/+ *(⏪ or ⏩)* until the desired Album appears on the display.
2 Press **TITLE** −/+ *(⏮ or ⏭)* until the desired Title appears on the display.
  ➜ The selected track number and elapsed playing time appear on the display.
3 Press **PLAY** ▶II to start playback.

Searching for a particular passage during playback

- Press ⏪ or ⏩ to select 4 different search speed.
  ➜ "**FRX1**" ; "**FRX2**" ; "**FRX3**" or "**FRX4**" is displayed on the TV screen when you select a fast rewind search.
  ➜ "**FFX1**" ; "**FFX2**" ; "**FFX3**" or "**FFX4**" is displayed on the TV screen when you select a fast forward search.
  ➜ Normal playback will begin at the end of the fast rewinding or forwarding of the selected track.
- Play returns to normal when **PLAY** ▶II is pressed or when a new track is selected.

Programming Tracks

Programming tracks of a loaded disc is possible when playback is stopped. The display will indicate the total tracks stored in the programme. Up to 99 tracks can be stored in the memory in any order. When 99 tracks are stored and you attempt to store another track, the display will show "PROGRAM FULL".

Note:
– Programme cannot be used for VCDs when PBC is switched on. Switch off PBC before storing tracks from such a VCD.

1 Load the desired discs in the disc trays.
2 Press the **VCD** (CD 1•2•3) button to select the disc tray.
  ➜ Programming can only be done on the selected disc.
3 Press **PROGRAM** to start programming.
  ➜ The **PROG** flag starts flashing.
4 Press ⏮ or ⏭ *(or **digit 0-9** on the remote control)* to select the desired track.
- For MP3-CD, press **ALBUM** −/+ and **TITLE** −/+ to select the desired Album and Title for programming.

5 Press **PROGRAM** to store the track.
- Repeat steps ***4*** 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:
– For MP3-CD, total playing time will not be shown.
– If the total playing time is more than "99:59" then "--:--" appears on the display instead of the total playing time.
– During programming, if no button is pressed within 20 seconds, the system will exit programme mode automatically.

Reviewing the programme

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

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

Playing the programme

1 Press **PLAY** ▶II to start programme 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 programme playback, the current track or all programmed tracks will be played repeatedly.
  ➜ "REPEAT TRACK", "REPEAT PROGRAM" or "REPEAT OFF" will be displayed.
  ➜ The **REP** and **PROG** flags appear on the display.

2 Press ■ to stop programme playback.

English

Note:
– If you press any other DISC DIRECT PLAY buttons, the system will play the selected disc and the stored programme will be cleared.

Erasing the programme *(when playback is stopped)*

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

Note:
– The programme will be erased when the system is disconnected from the power supply or switched to standby mode or other sources or when you change the programme disc.

Repeat *(only on remote control)*

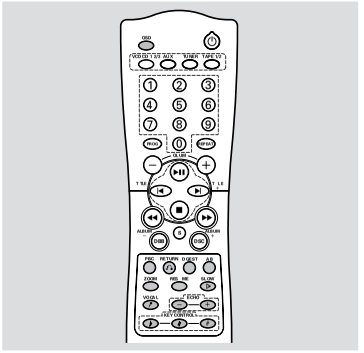
You can play the current track or a disc repeatedly.

1 Press **REPEAT** on the remote control to select the various repeat modes.
  ➜ "REPEAT TRACK", "REPEAT DISC" or "REPEAT OFF" will be displayed.
  ➜ The **REP** flag appears on the display.
- The current track or disc will now be played repeatedly until you press ■.

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

Notes:
– REPEAT DISC mode is not available during programme play mode.

VIDEO CD



Adjusting the TV System

Before viewing the Video CD, ensure that the set is switched to corresponding PAL or NTSC system of your TV set (exception Multi – system TV).

- Press and hold **PAL/NTSC** for more than ***2 seconds*** to switch between PAL or NTSC TV system.
  ➜ After TV system is selected, the set will automatically switch to the last TV system setting every time the VCD source is selected.

Note:
– Before adjusting the TV system, make sure that there is no MP3-CD in disc tray 1 during power up.

OSD – On Screen Display

If you insert VCD/CD, your TV screen will serve as an additional display for messages (e.g. PLAY, STOP), and information stored on the VCD/CD.

- Press **OSD** on the remote control repeatedly to switch ON or OFF.

  When OSD is switched ON; you can see the following display on the TV screen.

  Below is an example of the OSD message.

SINGLE ELAPSED
PLAY XX/TT MM:SS

Notes:
– *"XX" is the current track.*
– *"TT" is the total tracks.*
– *"MM" is in minutes.*
– *"SS" is in seconds.*

When OSD is switched off, there is no information indicated on the TV screen.

Playing a Video CD with PBC

VCD with PBC (Playback Control) will be indicated on the display of the set and on your TV screen as soon as they are inserted. PBC is a predefined play sequence stored on the VCD.

1 Switch on the TV, insert a VCD with PBC and press **PLAY ▶II** to start playback.
2 MENU appears on the TV screen.

If the menu consists of a list of titles, you can select a sequence directly

1 Select your choice with the **digit keys 0 - 9** on the remote control. The VCD starts playing of the selected sequence automatically.
➜ The VCD starts playing of the selected sequence automatically.
2 Press **RETURN** on the remote control to go back to the previous menu.

Note:
– *If a menu consists of more than one page, press I◀ / ▶I to go through the pages.*

Switching off PBC

● In stop mode, press **PBC**.
➜ On TV screen, "**PBC OFF**" will be displayed.

Notes:
– *Programme mode is not available whenever PBC mode is switched on.*
– *The menu structure depends on the programme stored on the VCD. Please refer to the information supplied with the disc.*

Pause

1 Press **PAUSE ▶II** to have a still picture on the TV screen.
➜ On TV screen, "**PAUSE**" will be displayed.
2 Press **PLAY ▶II** again to continue playback.

Note:
– *Audio is muted during Pause.*

Slow

1 Press **SLOW** on the remote control to watch a VCD at a slower speed. There are 3 types of slow modes to select.
➜ On TV screen, "**SLOW 1**", "**SLOW 2**" or "**SLOW 3**" will be displayed.
2 Press **PLAY ▶II** again to resume playback at normal speed.

Note:
– *Audio is muted in Slow mode.*

Resume

This feature is also applicable to audio CD *(except for MP3-CD)*.

1 Press ■ to stop playback.
2 Press **RESUME** on the remote control to start playback again from where you have stopped.
➜ "RESUME" appears on the display.

Note:
– *Resume information is lost if you select another disc or the set is disconnected from the mains, the system is switched to standby mode or when you change source.*
– *Resume is not available when PBC mode is switched on.*

Zoom

This feature enables you to view a still picture frame in an enlarge mode.

After you have pressed **PAUSE ▶II** to have a still picture on the TV screen.

1 Press **ZOOM** once to enlarge the still picture by 2 times.
➜ "ZOOM" appears on the TV screen.
● You can move the zoom picture left or right by pressing ◀◀ or ▶▶ respectively.
● You can move the zoom picture down or up by pressing I◀ or ▶I respectively.
2 Press **ZOOM** once more to return to normal still frame.
3 Press **PLAY ▶II** again on the remote control to continue playback.

A-B Repeat

This feature is also applicable to audio CD *(except for MP3-CD)*. To play a certain scene or passage of the disc repeatedly.

1 Press **A-B** on the remote control during playback to mark the start of the chosen scene or passage.
➜ "SET A" appears on the display.
2 Press **A-B** again to mark the end of the chosen scene or passage.
➜ "SET B" appears on the display.
➜ The selected scene or passage is played repeatedly.
➜ "PLAY AB" appears on the display.
3 Press **A-B** once more to return to normal playback.
➜ "CLEAR AB" appears on the display.

Notes:
– *You can also cancel A-B Repeat by pressing I◀ or ▶I.*
– *You can only repeat a maximum of one track. Once it cross from one track to the next, the A-B marking is reset.*

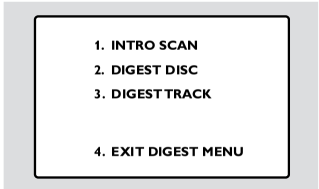
Return ↩

● Press **RETURN** to return to the previous VCD disc MENU level. It is functional only for Video CD when PBC is switched on.

Digest

This feature allows you to scan through a VCD for a quick review. PBC mode must be switched off. There are four digest mode for selection.

1 Press **DIGEST**.
➜ "DIGEST" appears on the display.
➜ "1.INTRO SCAN" , "2.DIGEST DISC" , "3.DIGEST TRACK" and "4.EXIT DIGEST MENU" appear on the TV screen.



● Press **digit 1** on the remote control to select "INTRO SCAN".
➜ The first 10 seconds of each track are played.
● Press **digit 2** on the remote control to select "DIGEST DISC".
➜ The first frame of each track appears on the TV screen.
➜ Press digit 0 – 9 on the remote control to playback the desired tracks.
➜ Press I◀ or ▶I to view the previous or next page for additional information.
● Press **digit 3** on the remote control to select "DIGEST TRACK".
➜ The first track of the selected disc will be divided into 9 parts and displayed on the TV screen.
➜ Press **digit 0 – 9** on the remote control to playback the desired parts.
➜ Press I◀ or ▶I to digest the next track.
● Press **digit 4** on the remote control to select "EXIT DIGEST MENU".
➜ Digest mode will be exited.

English

Vocal

This feature allows you to fade out the original vocal from a karaoke VCD. This feature is used together with Echo mode. You can also use it to select the different audio modes.

- **STEREO** – same effect as the original recorded disc.
- **STEREO VOCAL LEFT/RIGHT** – fade out the original vocal for special recorded Karaoke disc only *(with the ECHO mode switched on)*.
- **MONO LEFT/RIGHT** – select the language on a bilingual VCD.

Ensure that Echo mode is switched on when press **VOCAL** to fade out the original vocal during STEREO VOCAL LEFT/RIGHT mode.

- Pressing **VOCAL** repeatedly allows you to select the following modes.
  ➜ STEREO → STEREO VOCAL LEFT → STEREO VOCAL RIGHT → MONO LEFT → MONO RIGHT → STEREO ...

Echo

This feature allows you to add echo while singing or talking through a microphone.

- Press **ECHO** −/+ to decrease or increase the echo effect.
  ➜ "ECHO +x" or "ECHO OFF" appears on the display.

Notes:
– "x" denotes the echo level.
– You are advised to put echo to the minimum level when you are not using the feature.
– Echo mode is switched off when echo is at the minimum level.

Key Control (♭ ♮ #)

This feature allows you to change the key of your vocal range.

- Press ♭ or # to increase or decrease vocal key level.
  ➜ "KEY -x" or "KEY +x" appears on the display.
- Press ♮ to restore vocal key to original setting.
  ➜ "KEY FLAT" appears on the display.

Notes:
– "x" denotes the key level.

MP3 Disc

Album

This feature allows you to view and select the next or previous MP3-CD Album.

- Press **ALBUM** −/+ *(◀◀ or ▶▶)* to scroll through the previous or next Album name until the desired Album appears on the display.
  ➜ **ALB** will starts flashing.
  ➜ The selected Album will appear on the display and follow by "Axx Txxx".

Title

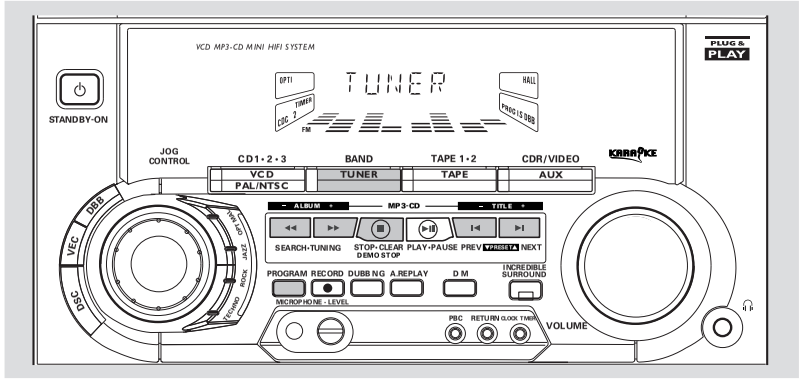
This feature allows you to view and select the next or previous MP3-CD Title.

- Press **TITLE** −/+ *(I◀, ▶I or **digit 0-9** on the remote control)* to scroll through the previous or next Title name until the desired Title appears on the display.
  ➜ **TITLE** will starts flashing.
  ➜ The selected Title will appear on the display and followed by "Axx Txxx".

Note:
– "A" represents ALBUM and "T" represents TITLE, "xx" or "xxx" is the current selected Album or Title number.

English

Tuner



Note:
– For 'PLUG & PLAY' feature, please refer to page 12.

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 or MW.
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 search for every available station in the FM waveband first, then search the MW waveband.
   ➜ 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.

English

Manual programming

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

Changing the MW tuning grid *(for specific version only)*

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.

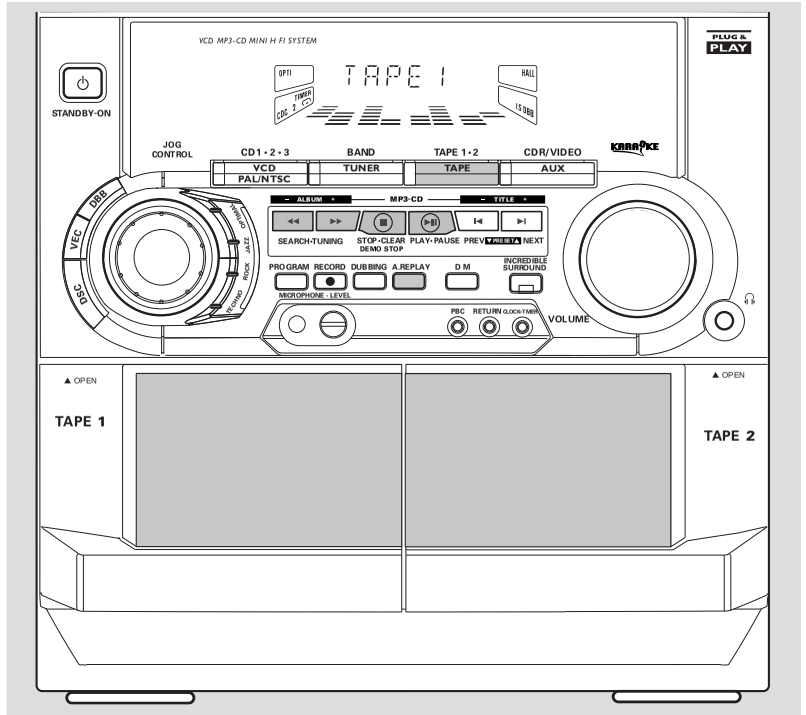
For MW Band
To change from 9 kHz to 10 kHz or vice versa

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".

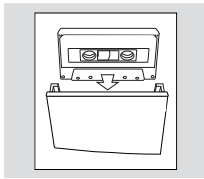
Notes:
– GRID 9 indicates that the tuning grid is in step of 9 kHz in MW band. GRID 10 indicates that the tuning grid is in step of 10 kHz in MW band.
– FM tuning grid will also be changed from 50 kHz to 100 kHz or vice versa.

English



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

English

Tape Playback

1 Press **TAPE** (TAPE 1•2) to select TAPE mode.
➜ "TAPE 1" or "TAPE 2" will be displayed and followed by "T1 >>>" or "T2 >>>".
2 Load the tape into the selected tape deck.
3 Press **PLAY ▶II** to start playback.
➜ "T1" 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.
➜ "T1" or "T2" with ">>>" will be displayed.

Rewind/Fast Forward

When playback is stopped

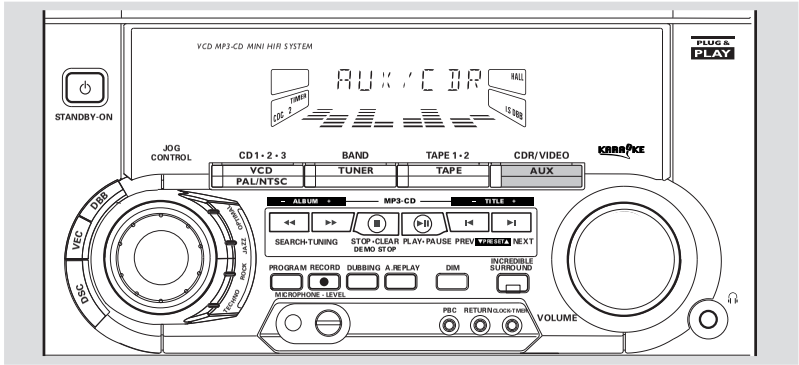
1 You can rewind or fast forward the tape by pressing ◀◀ or ▶▶ respectively.
➜ If rewinding, "T1 <" or "T2 <" with "<" scrolling left will be displayed.
➜ If fast forwarding, "T1 >" or "T2 >" with ">" scrolling right will be displayed.
➜ The tape will stop automatically at the end of rewinding or fast forwarding.
2 Press ■ to stop rewinding or fast forwarding.

During playback

● Press and hold ◀◀ or ▶▶ until the desired passage is located.
➜ "T1 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

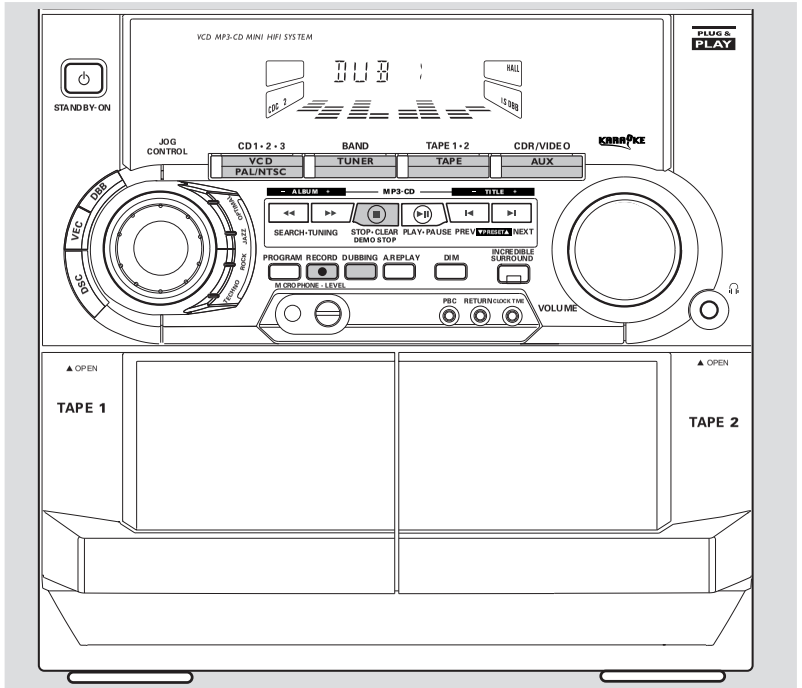
If you have connected the audio out terminals of the external equipment (TV, VCR, Laser Disc player, DVD player or CD Recorder) to the AUX IN terminals, you can hear the enhanced sound from the system.

● Press **AUX** (CDR/VIDEO) to select the external equipment.
➜ "AUX / CDR" will be displayed.

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

Recording

English



Notes:
– If you do not intend to record via the microphone, unplug the microphone to avoid accidental mixing with other recording source.
– For recording, use only tape of IEC type I (normal tape).
– The tape is secured at both ends with leader tape. At the beginning and end of tape, nothing will be recorded for six to seven seconds.
– The recording level is set automatically, regardless of the position of VOLUME, Incredible Surround, DSC or VEC.
– 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.

Recording the mixed sound / One Touch Recording

● During microphone mixing, you can record the mixed sound on a tape in tape deck 2 except dubbing mode.
● For One Touch Recording, as soon as you press **RECORD**, the current source (VCD, 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.

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.

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 Load a blank tape into tape deck 2 with the open side downward.
2 Press **VCD**, **TUNER** or **AUX**.
● Start playback of the selected source.
3 Press **RECORD** to start recording.
➜ The **REC** starts flashing.
4 Press ■ to stop recording.

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

VCD/CD Synchro Start Recording

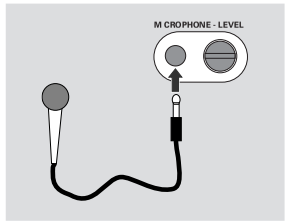
1 Load a blank tape into tape deck 2 and a disc into a disc tray.
2 Press **VCD** to select VCD/CD mode.
● You can programme the tracks in the order you want them to be recorded (see Programming Tracks). If not, select the disc by pressing **VCD** (CD 1•2•3) and the tracks are recorded according to the order on the selected disc.
3 Press **RECORD** to start recording.
➜ The **REC** flag starts flashing.
● Disc will start playback automatically.
4 Press ■ to stop recording.

Karaoke

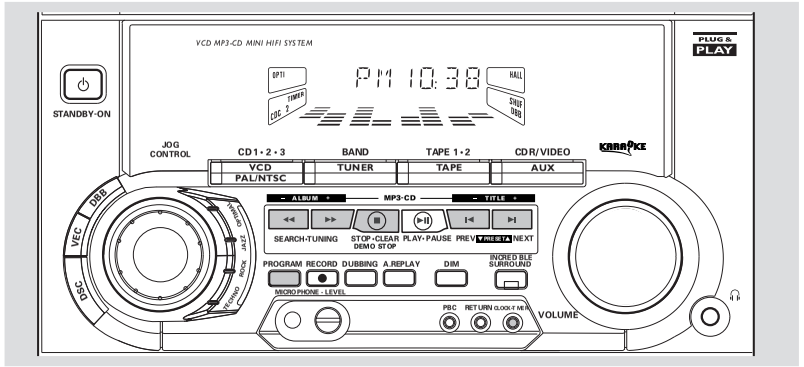
Microphone Mixing

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 **MICROPHONE** socket.
3 Press **VCD**, **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



Clock/Timer



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 (VCD, TUNER, etc.). The clock will be displayed for about seven seconds.

● Press **CLOCK•TIMER** briefly *(on the system only)*.
➜ "PM 10:38 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. "AM 12:00" 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, "AM 12:00" starts flashing.
➜ 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.
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.

Timer Setting

● The system can switch on to VCD , 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 to the most recently selected volume level.**

1 Press and hold **CLOCK•TIMER** for more than ***two seconds*** to select timer mode.
➜ "AM 12:00" 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 **VCD** , **TUNER** or **TAPE** to select the desired source.
● Before selecting VCD or TAPE, make sure a disc or tape is loaded in the disc tray or tape deck 2.

Clock/Timer

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 VCD, playback will begin with the first track of the last selected disc or other trays if disc is empty. If all the disc 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 ***two seconds***.
2 Press ■ on the system to cancel the timer.
➜ The timer is now switched off.
➜ The display will show "OFF" 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 ***two seconds***.
2 Press **CLOCK•TIMER** again to store the start time.
➜ The timer is now on.
➜ The **TIMER** appears on the display.

Maintenance

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

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

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

Cleaning the Heads and the Tape Paths
● To ensure good recording and playback quality, clean the heads, 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

WARNING
Do not open the player as there is a risk of electric shock! Under no circumstances should you try to repair the player yourself, as this will invalidate the warranty

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

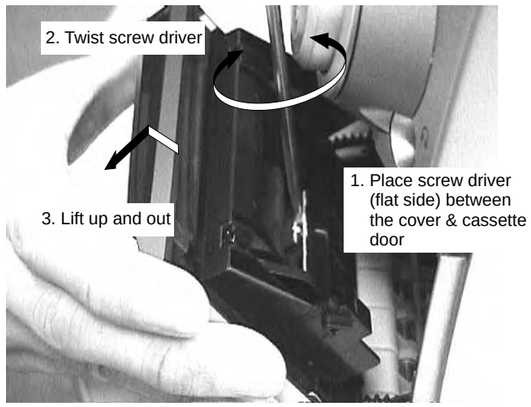
Symptom	Remedy
DISC PLAYER OPERATION	
"UNREADABLE DISC" **is displayed.**	– If the disc is inserted upside down. – Moisture condensation at the lens. – The disc is dirty, badly scratched or warped. – The disc lens is dirty or dusty, refer to section under Maintenance. – An incorrect MP3-CD format disc is inserted
"NO DISC" **is displayed.**	– There is no disc in the disc tray.
No picture on TV screen.	– Connect the cable betwen the system and TV.
No colour on TV.	– Change the system to the respective PAL or NTSC setting.
Cannot adjust the TV system to PAL or NTSC.	– Remove the MP-3 CD from disc tray 1 or press DISC CHANGE to select a non MP3 disc tray before adjusting the TV system.
RADIO RECEPTION	
Poor radio reception.	– The signal is too weak, adjust the antenna or connect an external antenna for better reception. – The TV or VCR is too close to the stereo system.
Cannot tune to station	– Wrong tuning grid.
TAPE DECK OPERATION	
Recording or playback cannot be made or there is a decrease in audio level.	– Dirty tape heads, capstans or pressure rollers, refer to section under Maintenance. – Magnetic build-up in the record/playback head, use demagnetizing tape.
Tape deck door cannot open.	– Reconnect the AC power plug and switch on the system again.

Troubleshooting

GENERAL	
System does not react when any button is pressed.	– 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.	– Adjust the volume. – Disconnect the headphones. – Check that the speakers are connected correctly. – Check if the stripped speaker wire is clamped. – Make sure the MP3-CD was recorded within 32-256 kbps bit rate with sampling frequencies at 48 kHz, 44.1 kHz or 32 kHz.
Reversed left and right sound.	– Check the speaker connections and location.
Lack of bass sound or apparently imprecise physical location of musical instruments.	– Check the speaker connection for proper phasing, colored/black wires to colored/ black terminals.
Remote control has no effect on the system.	– Select the source (VCD, TUNER, etc.) before pressing the function button (▶ , ⏮, ⏭, etc.). – Reduce the distance to the system. – Insert the batteries with their polarities (+ / – signs) as indicated. – Replace the batteries.
Timer is not working.	– Set the clock. – Press CLOCK•TIMER to switch on the timer. – If recording is in progress, stop recording.
Clock setting is erased.	– Reset the clock.
System displays features automatically;buttons flash continuously.	– Press and hold ■ (on the system) for five seconds to switch off the demonstration.
All lighted buttons are not lit.	– Press DIM until DIM OFF display mode is shown.

DISMANTLING INSTRUCTIONS

Dismantling of the Cassette Cover

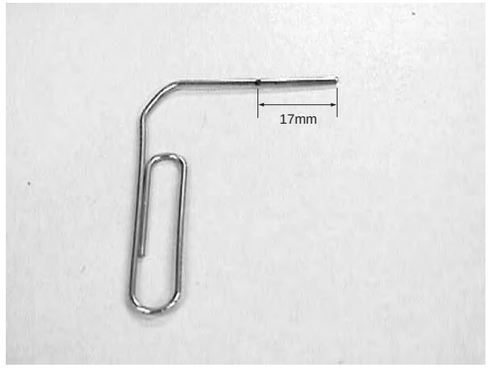


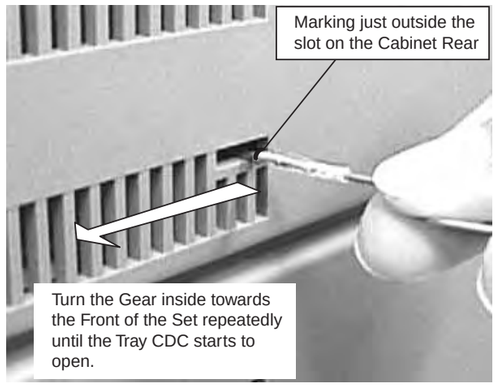
Cassette door

Opening the CDC Tray manually

1) Take a paper clip or any stiff wire diameter of 1mm -1.5mm and make a marking about 17mm from the tip.
2) Place the set in an upright position and insert the paper clip into the slot on the right side of the Cabinet Rear (pos 251).
3) With the marking just outside the Cabinet Rear, you should be able to engage the gear on the side of the 3CDC-LC Module. Because of the distance between the gear and the Cabinet Rear the chance of the paper clip slipping above or below the gear is high, therefore you have to feel and adjust slightly to engage the gear correctly.
4) Push the gear slowly towards the front as shown until the Tray CDC starts to move out of the Front Cabinet (pos 101). The Tray CDC is now disengage and can be pulled out completely

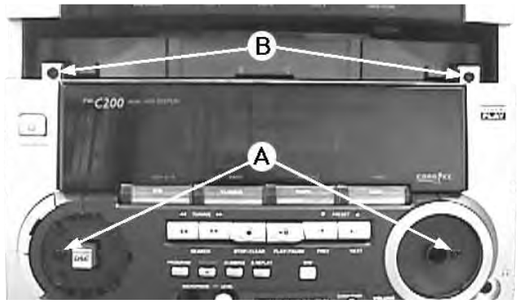
Note: ***If the Cabinet Rear has to be replaced, it has to be replaced by one that has a similar slot on the right side of the Cabinet otherwise there is no possibility to disassemble the same set in the future.***

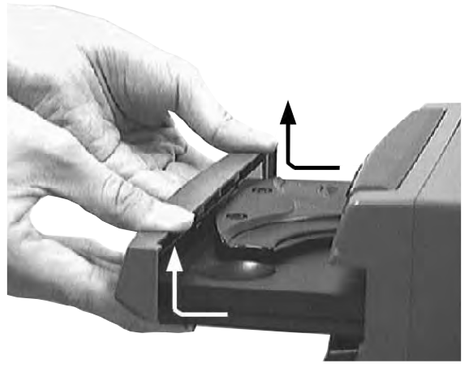




Dismantling of the Front Panel

1) With the CDC tray opened 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





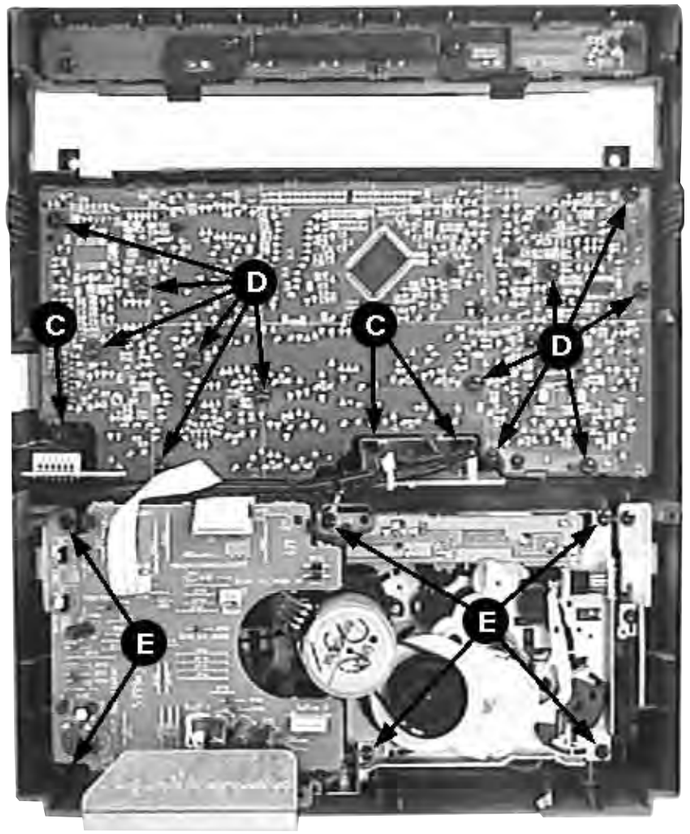
Dismantling of the Cover Control on the Front (see Notes)

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) Do likewise for the Jog Rotary knob (pos 145).
3) Remove the 2 hidden screws A to take out the Cover Control assembly (pos 153 + 143 + 144).

Note*: Only the Lightguide DSC (pos 127) is sandwiched between the Front Cabinet (pos 101) & Cover Control (pos 153).*

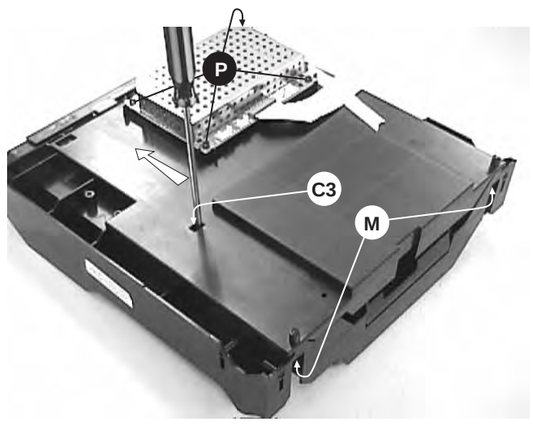
Dismantling of Assemblies on the Front Panel

1) Remove 3 screw C to loosen the Headphone board (1x) and the Karaoke board (2x).
   Note: Karaoke board is for some version only.
2) Remove 12 screws D as indicated to loosen the Front board.
3) Remove 6 screws E to loosen the ETF7 Module



Separating the MPEG and the 3CDC-LC Module

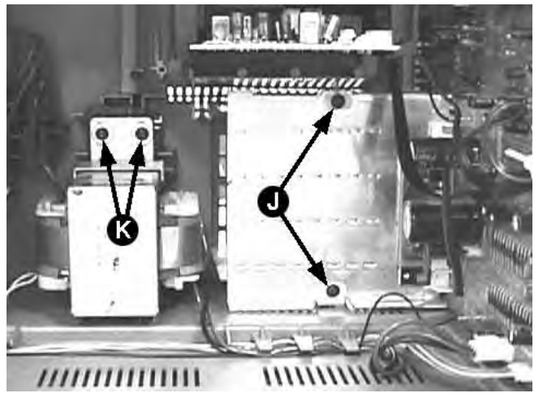
1) Remove 4 screws P to remove the MPEG shield & MPEG Board
2) Remove 2 screws M and uncatch C3 with a flat screw-driver in the direction as shown to loosen the Plate Insulator.



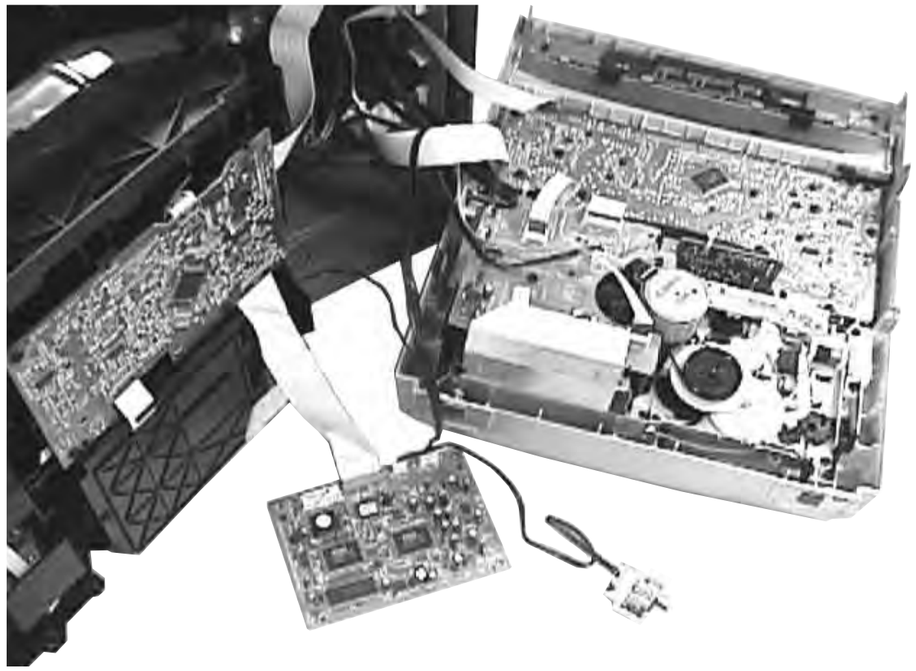
3-2

Dismantling of Rear Portion

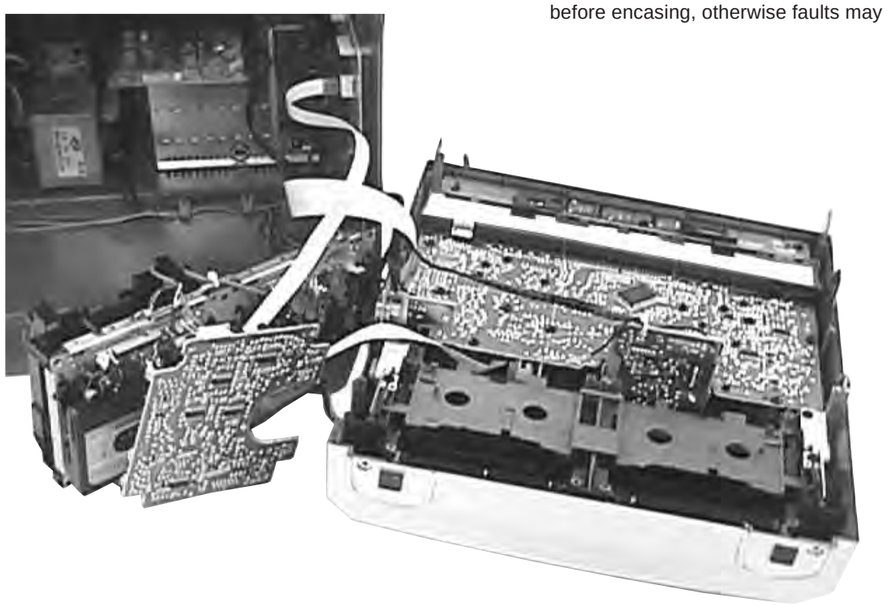
1) Remove 1 screw H & uncatch C1 to loosen the Mains socket board.
2) Remove 2 screws F, 2 screws G and uncatch C2 to loosen the Tuner board assembly.
3) Remove 5 screws J (3x on the rear and 2x on the heatsink) and uncatch C4 to loosen the Combi board (Main part).
4) Remove 2 screws K to loosen the Mains Transformer.
5) Remove 1 screw L to remove the Video out part.



Service pos A



Service pos B

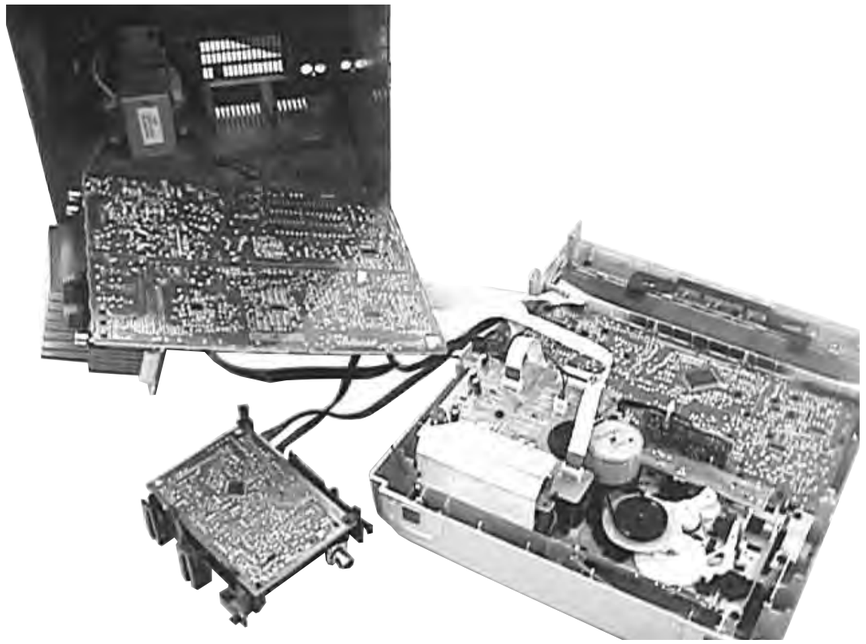


Note:

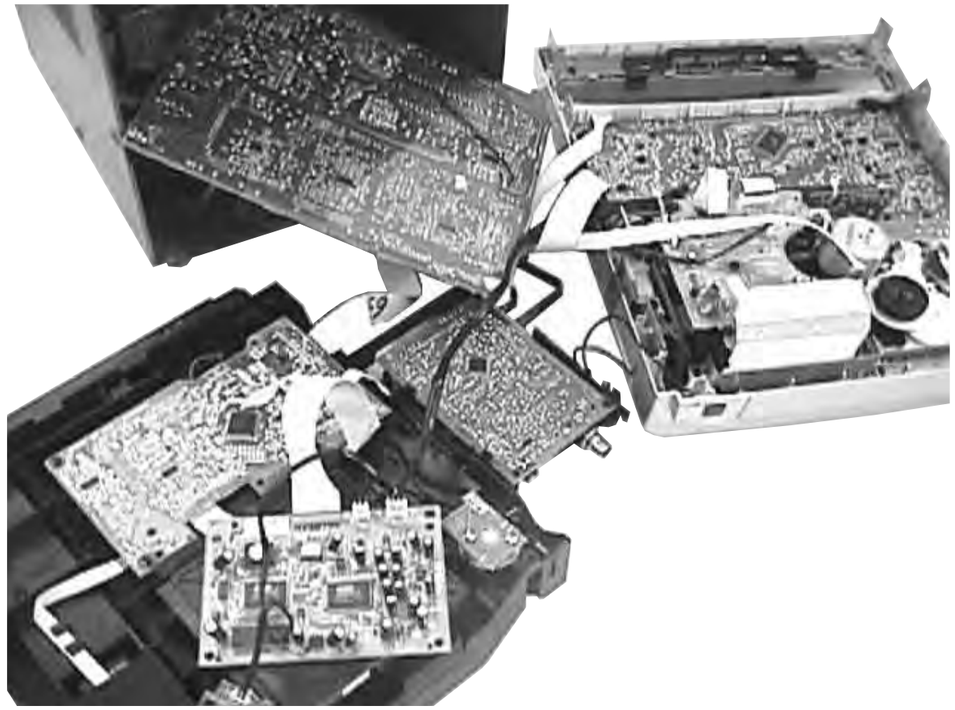
1 During repair it is possible to disconnect the following assemblies or modules while working on other areas:
   - Tuner Board (pos 1103)
   - 3CDC-LC + MPEG Module (1105)
2 Flex cables are very fragile, care should be taken not to damage them during repair. After repair, be very sure that the flex cables are inserted properly into the flex sockets before encasing, otherwise faults may occurs.

3-3

Service pos C

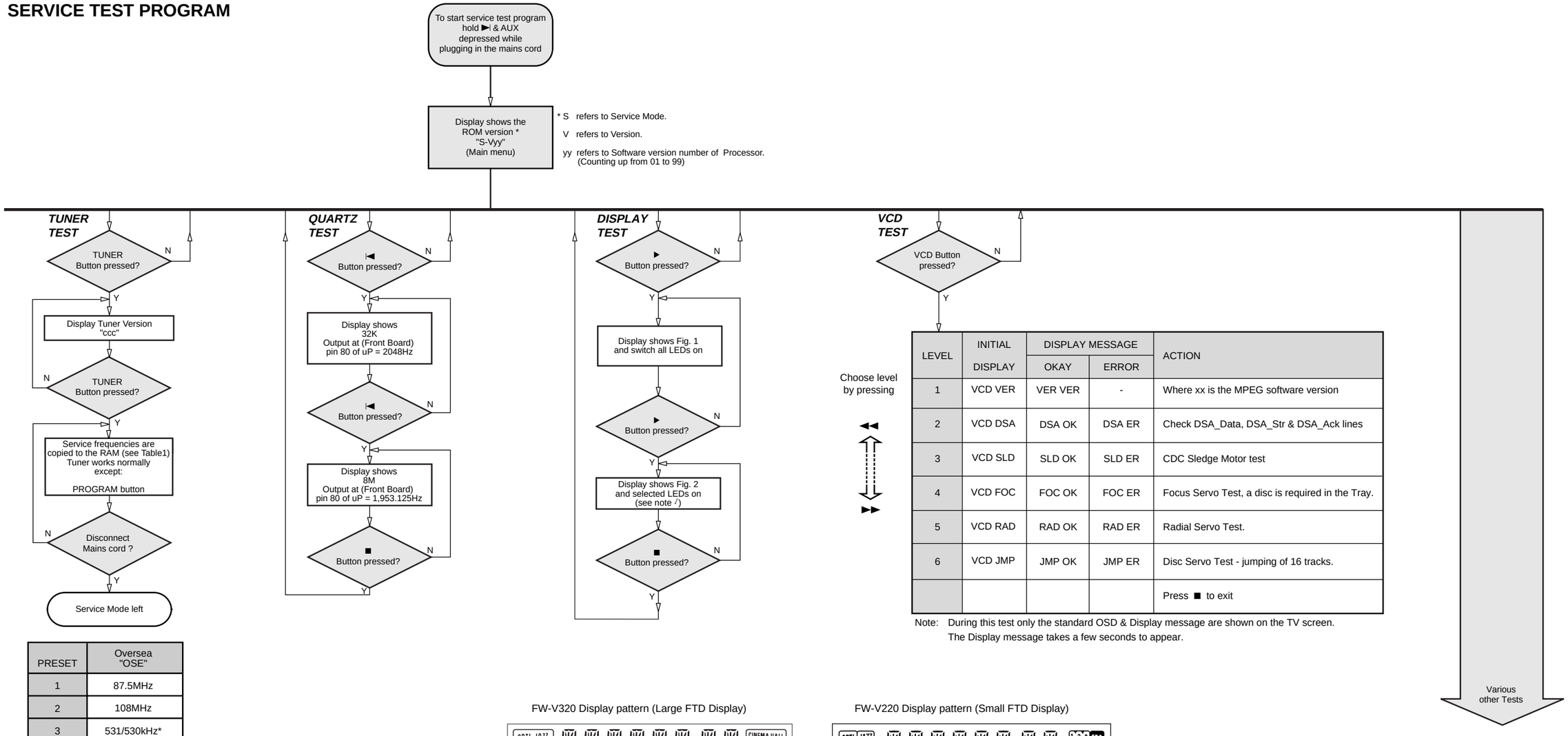


Service pos D



3-4

SERVICE TEST PROGRAM



LEVEL	INITIAL DISPLAY	DISPLAY MESSAGE OKAY	DISPLAY MESSAGE ERROR	ACTION
1	VCD VER	VER VER	-	Where xx is the MPEG software version
2	VCD DSA	DSA OK	DSA ER	Check DSA_Data, DSA_Str & DSA_Ack lines
3	VCD SLD	SLD OK	SLD ER	CDC Sledge Motor test
4	VCD FOC	FOC OK	FOC ER	Focus Servo Test, a disc is required in the Tray.
5	VCD RAD	RAD OK	RAD ER	Radial Servo Test.
6	VCD JMP	JMP OK	JMP ER	Disc Servo Test - jumping of 16 tracks.
				Press ■ to exit

Note: During this test only the standard OSD & Display message are shown on the TV screen.
The Display message takes a few seconds to appear.

PRESET	Oversea "OSE"
1	87.5MHz
2	108MHz
3	531/530kHz*
4	1602/1700kHz*
5	558/560kHz*
6	1494/1500kHz*
7	87.5/98MHz*
8	87.5MHz
9	87.5MHz
10	87.5MHz
11	98/87.5MHz*

Table 1

* Depending on the selected grid frequency (9 or 10kHz)

Note:
a) By holding the TUNER and ►► buttons depressed while switching on the Mains supply, the tuning grid frequency is toggled between 9kHz and 10kHz for the Oversea (/21) version.
b) This Tuner information is also applicable for /12 and /28 versions.

FW-V320 Display pattern (Large FTD Display)

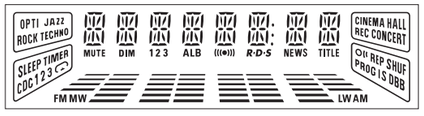
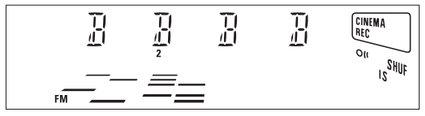


Figure 1



note ♪ : DISC1, DISC3, TUNER, JAZZ, TECHNO and Biplanar (if applicable)

Figure 2

FW-V220 Display pattern (Small FTD Display)

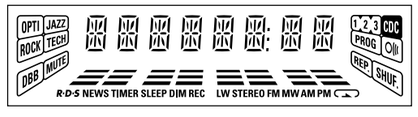
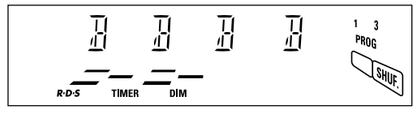


Figure 1



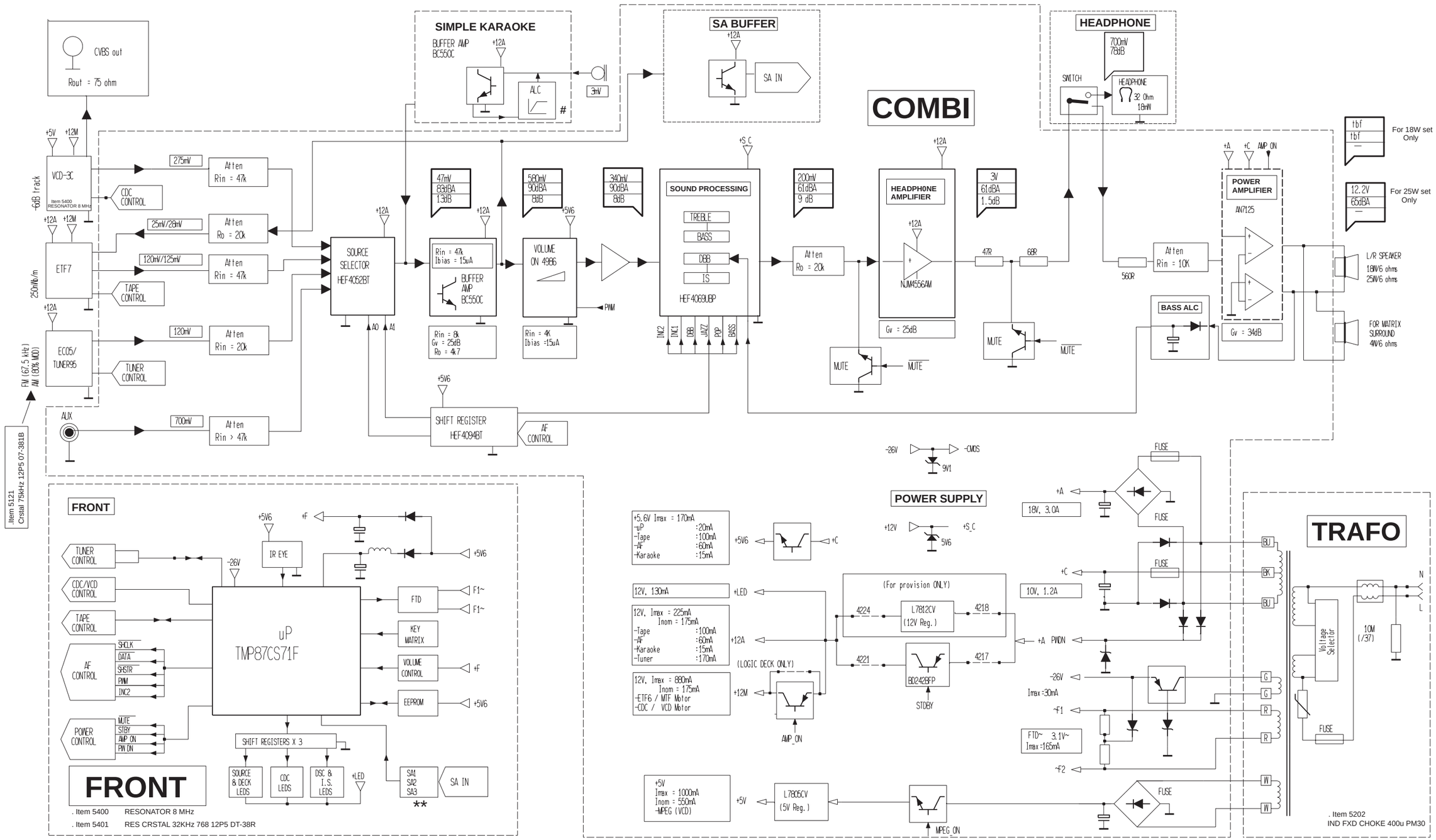
note ♪ : DISC1, DISC3, TUNER, JAZZ, TECHNO and Biplanar (if applicable)

Figure 2

TEST	*Activated with*	*ACTION*
EEPROM TEST	►► ■ to Exit	A test pattern will be sent to the EEPROM. "PASS" is displayed if the uProcessor read back the test pattern correctly, otherwise "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.
DEMO MODE	DSC button	Pressing this button will toggle between DEMO ON and DEMO OFF. The DEMO status will scroll once across the Display.
LEAVE SERVICE TESTPROGRAM	Disconnect mains cord	

4-1

SET BLOCK DIAGRAM



NOTE :

→ MAIN SIGNAL PATH

MEASUREMENTS ARE IN AUX MODE

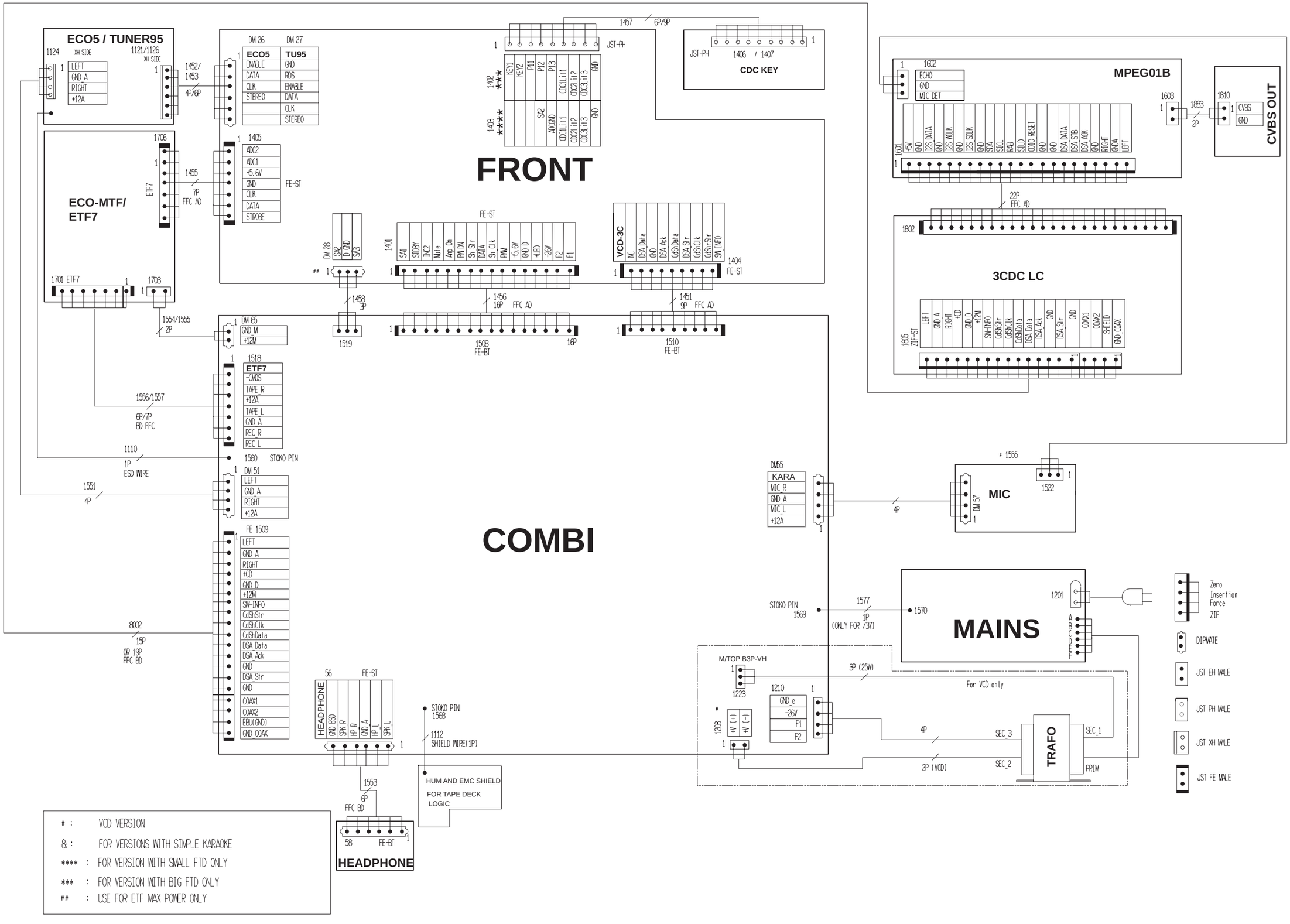
XX mV	LEVELS AT MAX VOL
YY dBA	S/N AT 500mW
ZZ dB	HEADROOM (1% thd) WRT TO LEVEL AT MAX VOL.

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

Updated on 25-09-2000

5-1

SET WIRING DIAGRAM



: VCD VERSION

& : FOR VERSIONS WITH SIMPLE KARAOKE

**** : FOR VERSION WITH SMALL FTD ONLY

*** : FOR VERSION WITH BIG FTD ONLY

: USE FOR ETF MAX POWER ONLY

FRONT BOARD

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Chip layout 6-5
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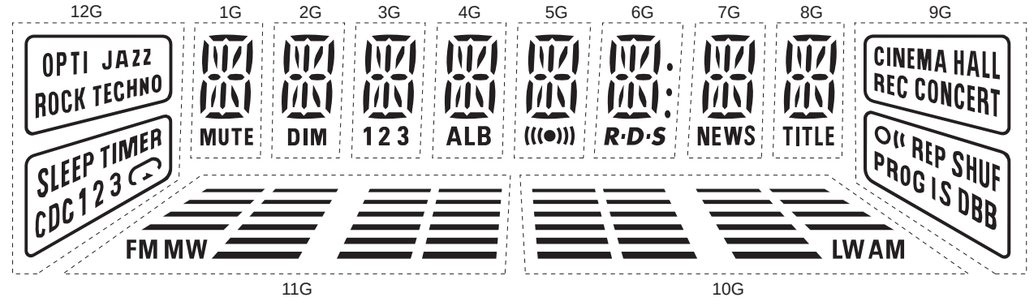
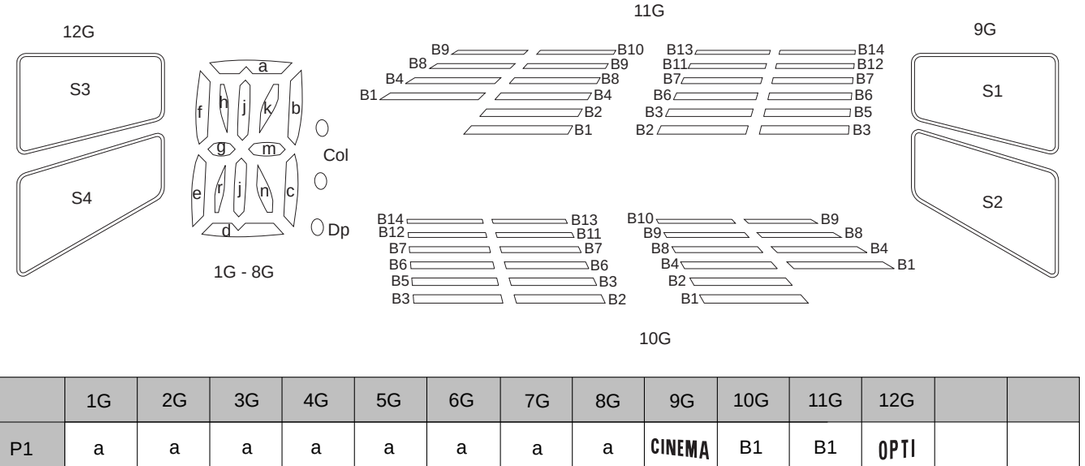
FTD DISPLAY PIN CONNECTIONS





	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G		
P1	a	a	a	a	a	a	a	a	CINEMA	B1	B1	OPTI		
P2	h	h	h	h	h	h	h	h	HALL	B2	B2	JAZZ		
P3	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p	REC	B3	B3	ROCK		
P4	k	k	k	k	k	k	k	k	CONCERT	B4	B4	TECHNO		
P5	b	b	b	b	b	b	b	b	O((	B5	B5	SLEEP		
P6	f	f	f	f	f	f	f	f	REP	B6	B6	TIMER		
P7	m	m	m	m	m	m	m	m	SHUF	B7	B7	CDC		
P8	g	g	g	g	g	g	g	g	PROG	B8	B8	1		
P9	c	c	c	c	c	c	c	c	IS	B9	B9	2		
P10	e	e	e	e	e	e	e	e	DBB	B10	B10	3		
P11	r	r	r	r	r	r	r	r	S1	B11	B11	)		
P12	n	n	n	n	n	n	n	n	S2	B12	B12	▸		
P13	d	d	d	d	d	d	d	d	-	B13	B13	S3		
P14	MUTE	DIM	1	ALB	((●))	R·D·S	NEWS	TITLE	-	B14	B14	S4		
P15	-	-	2	-	-	Col	-	-	-	LW	FM	-		
P16	-	-	3	-	-	Dp	-	-	-	AM	MW	-		

Front Board application

A54690	FW-V220/21M
A54700	FW-V320/21K/21M

FEATURES:	A54690	A54700							
RDS	-	-							
Rotary Volume Encoder	x	x							
Jog Encoder	-	x							
Spectrum Analyzer	-	x							
Biplaner LED	-	x							
Small FTD	x	-							
Large FTD	-	x							
NTC	-	-							
LED Control	x	x							

Variations table for Front Board

ITEM NO.	A54690	A54700								
DM21	-	-								
DM26	x	x								
DM27	-	-								
DM29	-	-								
1402	-	x								
1403	x	-								
1404	x	x								
1405	x	x								
1418	-	x								
1419	-	x								
1420	-	x								
1421	x	x								
1423	x	x								
1425	x	x								
1426	x	x								
1427	x	x								
1428	-	-								
1429	-	-								
1430	x	-								
2417	220µF	220µF								
2421	22µF	22µF								
2432	-	-								
2433	-	-								
2462	220nF	220nF								
3407	-	1k								
3458	-	1k								
3460	-	1k								
3465	-	1k								
3479	1k	1k								

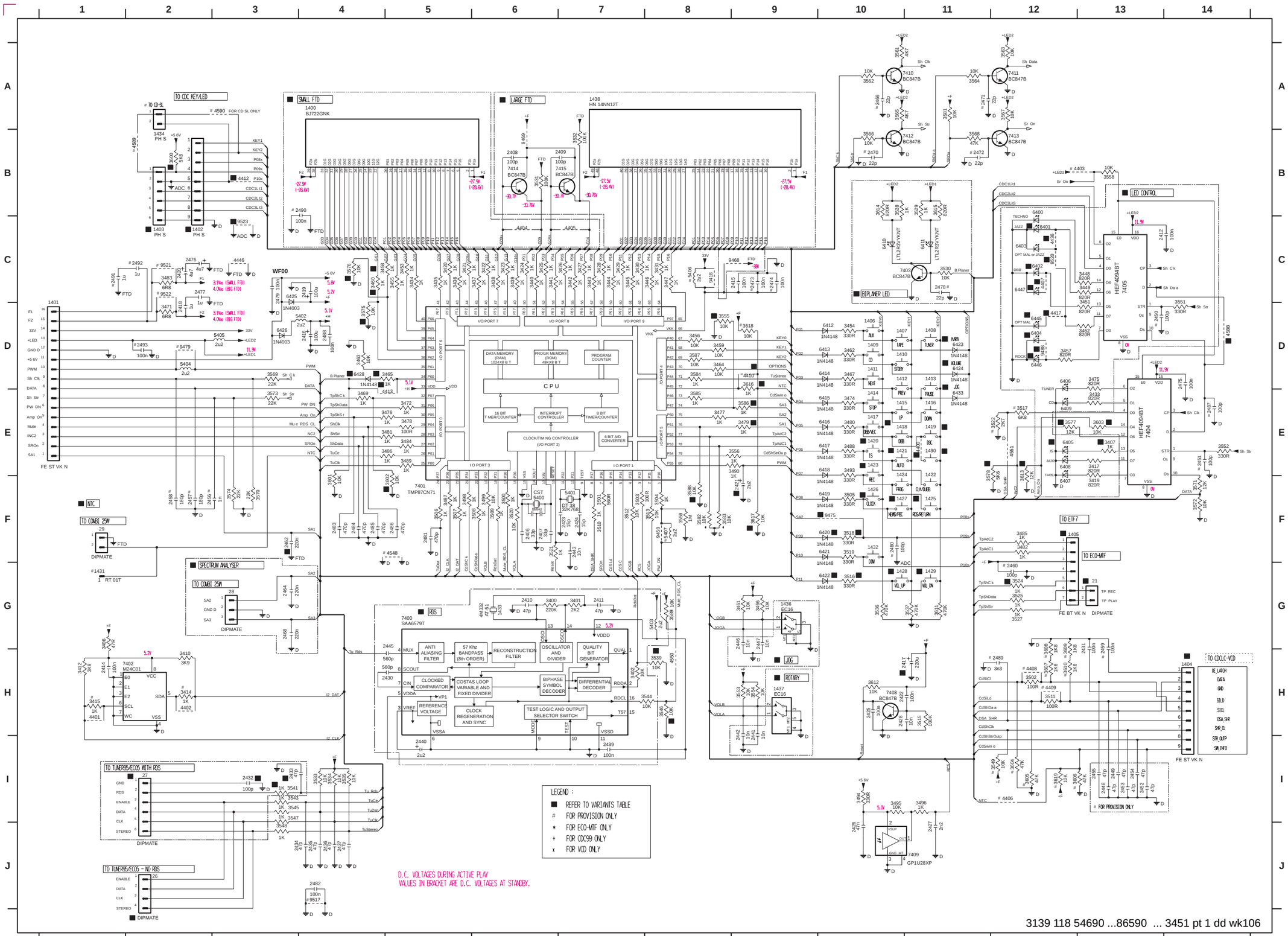
6-2

ITEM NO.	A54690	A54700								
3516	-	-								
3518	-	330R								
3524	1k	1k								
3539	10k	10k								
3541	-	-								
3546	10k	10k								
3555	10k	-								
3575	10k	-								
3576	10k	-								
3577	-	12k								
3578	-	5k6								
3586	-	1k								
3588	10k	10k								
3600	5k6	-								
3602	-	-								
3603	10k	10k								
3613	12k	12k								
3616	-	-								
3617	10k	10k								
4400	x	-								
4407	x	-								
4410	x	x								
4412	-	x								
4413	x	-								
4417	x	-								
4436	x	-								
4588	-	-								
6401	-	x								
6402	-	x								
6404	-	x								
6405	-	x								
6420	-	x								
6422	-	-								
6423	-	-								
6424	-	-								
6428	-	x								
6433	-	-								
6445	x	-								
6446	x	-								
6447	x	-								
9475	x	-								
9488	-	x								
9520	-	x								
9523	x	-								

x = Item in use.

6-3

CIRCUIT DIAGRAM

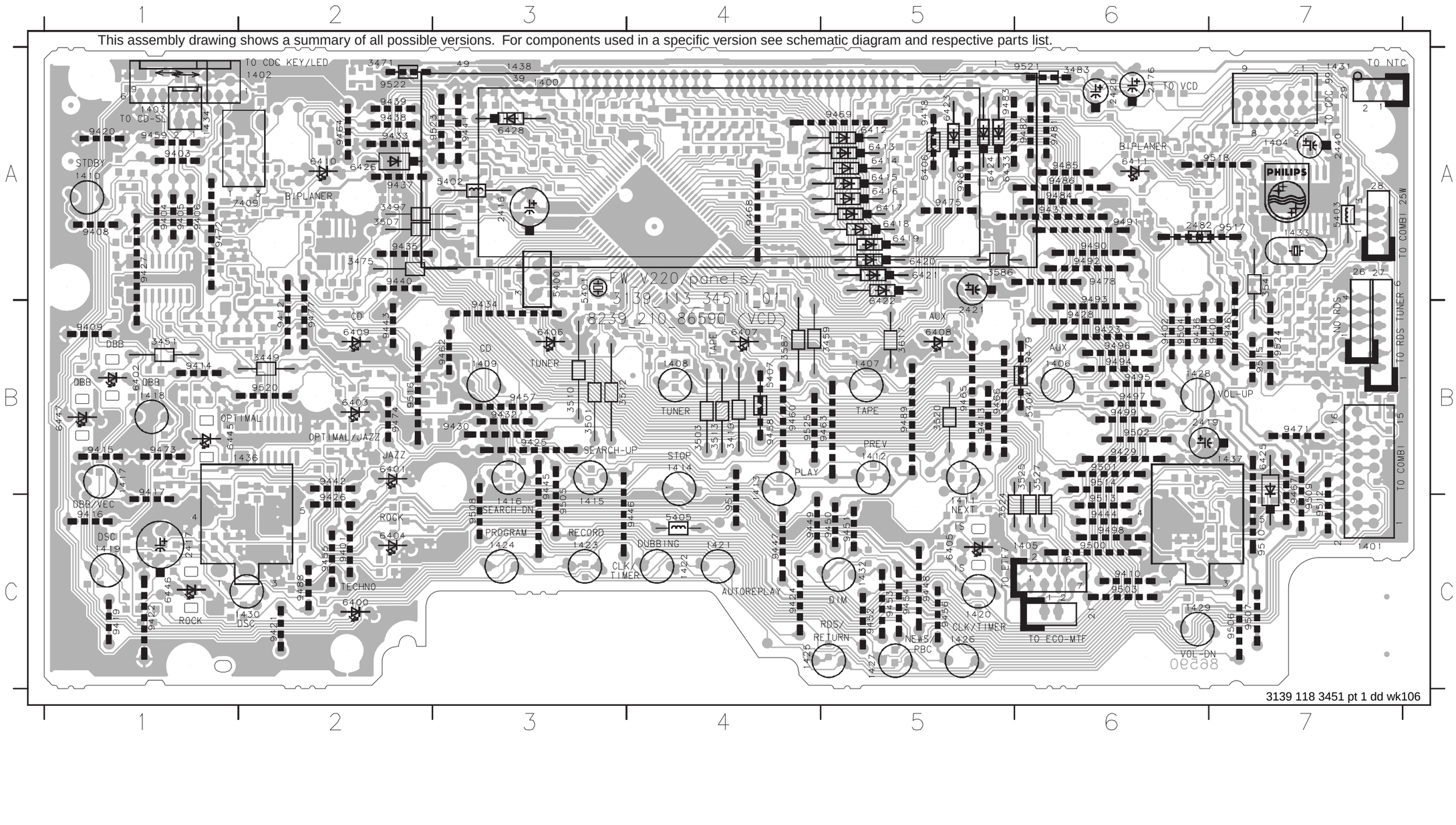


21 G13	3448 C13	4548 F5
26 J2	3449 C13	4550 H8
27 I2	3451 D13	4551 E12
28 G3	3452 D13	4588 D14
29 F1	3453 C5	4589 B2
1400 A4	3454 D10	4590 A3
1401 C1	3455 C5	5400 F6
1402 C2	3456 D8	5401 F7
1403 C2	3457 D12	5402 D4
1404 H14	3458 C4	5403 G8
1405 F12	3459 D8	5404 D2
1406 D10	3460 C4	5405 D3
1407 D10	3461 G9	5406 C8
1408 D11	3462 D10	5407 F8
1409 D10	3463 D4	6400 B12
1410 D10	3464 D8	6401 C12
1411 D10	3465 D5	6402 C12
1412 D10	3466 G9	6403 C12
1413 D11	3467 D10	6404 D12
1414 E10	3469 E4	6405 E12
1415 E10	3471 D2	6406 D12
1416 E11	3472 E5	6407 F12
1417 E10	3474 E10	6408 E12
1418 E10	3475 D13	6409 E12
1419 E11	3476 E5	6410 C10
1420 E10	3477 E8	6411 C11
1421 E10	3478 E5	6412 D10
1422 F11	3479 E9	6413 D10
1423 E10	3480 E10	6414 D10
1424 F10	3481 E5	6415 E10
1425 F11	3482 F12	6416 E10
1426 F10	3483 C2	6417 E10
1427 F10	3484 E5	6418 E10
1428 G10	3485 F12	6419 F10
1429 G11	3486 E5	6420 F10
1430 E11	3488 E10	6421 F10
1431 G1	3489 E5	6422 G10
1432 F10	3490 E9	6423 D11
1433 G6	3493 E10	6424 D11
1434 B2	3494 I10	6425 C3
1436 G9	3495 I10	6426 D3
1437 H9	3496 I11	6428 D4
1438 A7	3497 F5	6433 E11
2406 F6	3498 F5	6445 D12
2407 F6	3499 F6	6446 D12
2408 B6	3500 F6	6447 C12
2409 B7	3501 F7	7400 G5
2411 G7	3502 H12	7402 H1
2412 C13	3503 F7	7403 C11
2414 H1	3504 F8	7404 E13
2415 C9	3505 F10	7405 C13
2416 D4	3506 F5	7408 H10
2417 H11	3507 F5	7409 J11
2418 D2	3508 F6	7410 A10
2419 C4	3509 F6	7411 A12
2420 C2	3510 F7	7412 B10
2421 F9	3511 H12	7413 B12
2422 H10	3512 F7	7414 B6
2423 F7	3513 F8	7415 B6
2424 F7	3515 H11	9418 C8
2425 H10	3516 G10	9458 F8
2426 J10	3517 E12	9468 C9
2427 J11	3518 F10	9469 B6
2428 H10	3519 F10	9475 F10
2430 H5	3520 F6	9479 D2
2431 G13	3521 F6	9488 D12
2432 I3	3522 E12	9517 J4
2433 I3	3524 G12	9520 C12
2434 J3	3525 G12	9521 C2
2435 J4	3527 G12	9522 C2
2436 J4	3528 B10	9523 C3
2437 J4	3529 B11	
2439 I7	3530 C11	
2440 I5	3531 B6	
2441 H9	3532 B7	
2442 H9	3533 I4	
2443 F7	3534 I4	
2445 G5	3535 I4	
2446 G9	3536 G10	
2448 I13	3537 G11	
2449 I13	3541 I3	
2450 D13	3543 I3	
2451 E14	3544 H8	
2452 I13	3545 I3	
2453 I13	3546 H8	
2454 I13	3547 I3	
2455 I13	3548 J3	
2456 F2	3549 I12	
2457 F2	3551 D14	
2458 F2	3552 E14	
2459 G13	3553 H9	
2460 G12	3554 H9	
2462 F3	3555 D8	
2464 G3	3556 E9	
2468 G3	3558 B13	
2469 A10	3559 F8	
2470 B10	3561 A10	
2471 A11	3562 A10	
2472 B11	3563 A12	
2473 C9	3564 A11	
2474 C9	3565 A10	
2475 D14	3566 B10	
2476 C2	3567 A12	
2477 C2	3568 B11	
2478 C11	3569 D3	
2479 C3	3570 F3	
2480 F10	3571 F14	
2481 F5	3572 F14	
2482 J4	3573 E3	
2483 F4	3574 F3	
2484 F4	3575 D4	
2485 F4	3576 C4	
2486 F5	3577 E12	
2487 E14	3578 E11	
2488 D4	3581 A11	
2489 H12	3582 F8	
2490 B4	3583 F8	
2491 C1	3584 D8	
2492 C2	3585 E8	
2493 D2	3586 E9	
3400 G6	3587 D8	
3401 G7	3588 F8	
3402 H7	3589 G8	
3406 G1	3600 B2	
3407 E13	3601 F4	
3410 H2	3602 F5	
3412 H1	3603 E13	
3414 H2	3604 I12	
3415 H1	3605 I12	
3417 E13	3606 I12	
3419 F13	3607 H12	
3420 C5	3608 G12	
3421 C5	3609 G12	
3422 C6	3610 H12	
3423 C6	3611 G11	
3424 C6	3612 H10	
3425 C6	3613 E12	
3426 C7	3614 B10	
3427 C7	3615 B11	
3428 C7	3616 D9	
3429 C7	3617 F9	
3430 C7	3618 D9	
3431 C8	3619 I12	
3433 E13	4400 E11	
3434 C5	4401 H1	
3435 C5	4402 H2	
3436 C5	4403 B13	
3437 C6	4404 C6	
3438 C6	4405 C7	
3439 C6	4406 I12	
3440 C6	4407 C12	
3441 C6	4408 H12	
3442 C7	4409 H12	
3443 C7	4410 D9	
3444 C7	4412 B3	
3445 C7	4413 E5	
3446 C8	4417 D12	
3447 C8	4436 C12	
	4446 C3	

6-4

COMPONENT LAYOUT

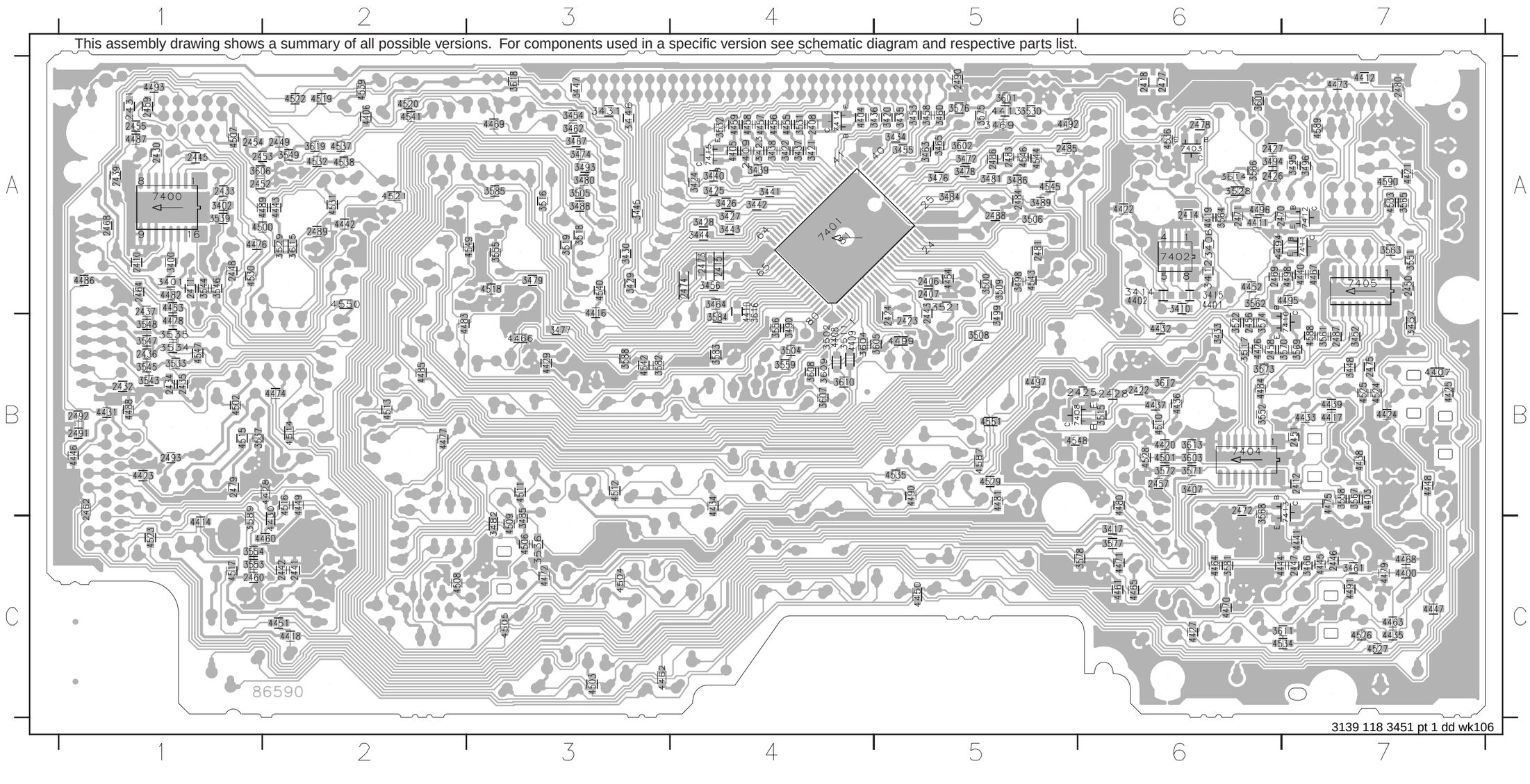
21	C6	1407	B5	1419	C1	1431	A7	2440	A7	3503	B4	3617	B5	6403	B2	6415	A5	6428	A3	9406	A1	9420	A1	9432	B3	9444	C6	9456	C5	9468	A4	9482	A6	9495	B6	9507	C7	9520	B2
26	A7	1408	B4	1420	C5	1432	C5	2476	A6	3507	A2	5400	A3	6404	C2	6416	A5	6433	A5	9408	A1	9421	C2	9433	A2	9445	B3	9457	B3	9469	A5	9483	A5	9496	B6	9508	C3	9521	A6
27	A7	1409	B3	1421	C4	1433	A7	2482	A6	3510	B3	5401	A3	6405	C5	6417	A5	6445	B1	9409	B1	9422	C1	9434	B3	9446	C4	9458	B4	9471	B7	9484	A6	9497	B6	9509	C7	9522	A2
28	A7	1410	A1	1422	C4	1434	A1	3419	B4	3512	B3	5402	A3	6406	B3	6418	A5	6446	C1	9410	C6	9423	B6	9435	A2	9447	C4	9459	A1	9472	A1	9485	A6	9498	C6	9510	C7	9523	A3
29	A7	1411	C5	1423	C3	1436	B2	3449	B2	3513	B4	5403	A7	6407	B4	6419	A5	6447	B1	9412	B2	9424	C4	9436	B6	9448	C5	9460	B4	9473	B1	9486	A6	9499	B6	9511	C4	9524	B7
1400	A3	1412	B5	1424	C3	1437	B7	3451	B1	3520	B5	5404	B6	6408	B5	6420	A5	7409	A2	9413	B5	9425	B3	9437	A2	9449	C4	9461	B7	9474	B2	9488	C2	9500	C6	9512	C7	9525	B4
1401	C7	1413	B4	1425	C4	1438	A3	3459	B5	3524	C5	5405	C4	6409	B2	6421	A5	9400	B7	9414	B1	9426	C2	9438	A2	9450	C5	9462	B3	9475	A5	9489	B5	9501	B6	9513	C6		
1402	A2	1414	B4	1426	C5	2416	A3	3471	A2	3525	B6	5406	A5	6410	A2	6422	B5	9401	C2	9415	B1	9427	A1	9439	A2	9451	C5	9463	B5	9477	B2	9490	A6	9502	B6	9514	B6		
1403	A1	1415	C3	1427	C5	2417	C1	3475	A2	3527	B6	5407	B4	6411	A6	6423	A5	9402	B6	9416	C1	9428	B6	9440	A2	9452	C5	9464	A2	9478	A6	9491	A6	9503	C6	9515	B7		
1404	A7	1416	C3	1428	B6	2419	B6	3483	A6	3541	A7	6400	C2	6412	A5	6424	A5	9403	A1	9417	B1	9429	B6	9441	A3	9453	C5	9465	B5	9479	B6	9492	A6	9504	B6	9516	B2		
1405	C6	1417	B1	1429	C6	2420	A6	3497	A2	3586	A5	6401	B2	6413	A5	6425	B7	9404	A1	9418	A5	9430	B3	9442	B2	9454	C5	9466	B5	9480	A5	9493	A6	9505	C3	9517	A7		
1406	B6	1418	B1	1430	C2	2421	B5	3501	B3	3587	B4	6402	B1	6414	A5	6426	A2	9405	A1	9419	C1	9431	A6	9443	B2	9455	C2	9467	B7	9481	A6	9494	B6	9506	C7	9518	A7		



6-5

CHIP LAYOUT

2406	A5	2432	B1	2454	A1	2479	B1	3410	A6	3435	A5	3457	B7	3482	C3	3509	A5	3539	A1	3564	A6	3585	A3	3616	A4	4417	B7	4436	B6	4455	A4	4474	B2	4493	A1	4512	B3	4531	A2	4550	A2
2407	A5	2433	A1	2455	A1	2480	A7	3412	A6	3436	A4	3458	A5	3484	A5	3511	B4	3543	B1	3565	A7	3588	B3	3618	A3	4418	C2	4437	B6	4456	A4	4475	B7	4494	A6	4513	B2	4532	A2	4551	B5
2408	A4	2434	B1	2456	B6	2481	A5	3414	A6	3437	A4	3460	A5	3485	C3	3515	B6	3544	A1	3566	A6	3589	C1	3619	A2	4419	A6	4438	B7	4457	A4	4476	A1	4495	A7	4514	B2	4533	A7	4587	B5
2409	A4	2435	B1	2457	B6	2483	A5	3415	A6	3438	A4	3461	C7	3486	A5	3516	A3	3545	B1	3567	B7	3600	A6	4400	C7	4420	B6	4439	B7	4458	A4	4477	B2	4496	A6	4515	B1	4534	C7	4588	B7
2410	A1	2436	B1	2458	B6	2484	A5	3417	C6	3439	A4	3462	A3	3488	A3	3517	B6	3546	A1	3568	B6	3601	A5	4401	A6	4421	A7	4440	A7	4459	A4	4478	B1	4497	B5	4516	B2	4535	B5	4589	A7
2411	A1	2437	A1	2459	A1	2485	A5	3420	A5	3440	A4	3463	A5	3489	A5	3518	A3	3547	B1	3569	B7	3602	A5	4402	A6	4422	A6	4441	C7	4460	C2	4479	C7	4498	A7	4517	C1	4536	A6	4590	A7
2412	B7	2439	A1	2460	C1	2486	A5	3421	A4	3441	A4	3464	A4	3490	B4	3519	A3	3548	B1	3570	B7	3603	B6	4403	B7	4423	B1	4442	A2	4461	C6	4480	B6	4499	B5	4518	A3	4537	A2	7400	A1
2414	A6	2441	C2	2462	B1	2487	B7	3422	A4	3442	A4	3465	A5	3493	A3	3521	A5	3549	A2	3571	B6	3604	B4	4404	A4	4424	B7	4443	A2	4462	C3	4481	B5	4500	A1	4519	A2	4538	A2	7401	A4
2415	A4	2442	C2	2464	A1	2488	A5	3423	A4	3443	A4	3466	C7	3494	A6	3522	B6	3551	A7	3572	B6	3605	B5	4405	A4	4425	B7	4444	C6	4463	C7	4482	A1	4501	B6	4520	A2	4539	A2	7402	A6
2418	A6	2443	A5	2468	A1	2489	A2	3424	A4	3444	A4	3467	A3	3495	A7	3528	A6	3552	B6	3573	B6	3606	A1	4406	A2	4426	B6	4445	C7	4464	C6	4483	B2	4502	B1	4521	A2	4540	A3	7403	A6
2422	B6	2445	A1	2469	A6	2490	A5	3425	A4	3445	A3	3469	A5	3496	A7	3529	A2	3553	C1	3574	B6	3607	B4	4407	B7	4427	C6	4446	B1	4465	C6	4484	B6	4503	C3	4522	A2	4541	A2	7404	B6
2423	B5	2446	C7	2470	A6	2491	B1	3426	A4	3446	A3	3472	A5	3498	A5	3530	A5	3554	C1	3575	A5	3608	B4	4408	B4	4428	B2	4447	C7	4466	B3	4485	B2	4504	C3	4523	C1	4542	B3	7405	A7
2424	B5	2447	C7	2471	A6	2492	B1	3427	A4	3447	A3	3474	A3	3499	B5	3531	A4	3555	A3	3576	A5	3609	B4	4409	B4	4429	B3	4448	B7	4467	A7	4486	A1	4505	C3	4524	B7	4543	A5	7408	B5
2425	B6	2448	A1	2472	B6	2493	B1	3428	A4	3448	B7	3476	A5	3500	A5	3532	A4	3556	B4	3577	C6	3610	B4	4410	A4	4430	C2	4449	B2	4468	C7	4487	A1	4506	C3	4525	B7	4544	A5	7410	B7
2426	A6	2449	A2	2473	A4	3400	A1	3429	A3	3452	B7	3477	B3	3502	B4	3533	B1	3558	B7	3578	C6	3611	C7	4411	A6	4431	B1	4450	C5	4469	A3	4488	B1	4507	A1	4526	C7	4545	A5	7411	A7
2427	A6	2450	A7	2474	A4	3401	A1	3430	A3	3453	A5	3478	A5	3504	B4	3534	B1	3559	B4	3581	C6	3612	B6	4412	A7	4432	B6	4451	C2	4470	C6	4489	A1	4508	C2	4527	C7	4546	A5	7412	A7
2428	B6	2451	B7	2475	B7	3402	A1	3431	A3	3454	A3	3479	A3	3505	A3	3535	B1	3561	B7	3582	B3	3613	B6	4413	A5	4433	B7	4452	A6	4471	C6	4490	B5	4509	C3	4528	B6	4547	B1	7413	B7
2430	A1	2452	A1	2477	A6	3406	A6	3433	B6	3455	A5	3480	A3	3506	A5	3536	C3	3562	A6	3583	B4	3614	A6	4414	C1	4434	B4	4453	A1	4472	C3	4491	C7	4510	B6	4529	B5	4548	B5	7414	A4
2431	A1	2453	A1	2478	A6	3407	B6	3434	A5	3456	A4	3481	A5	3508	B5	3537	B1	3563	A7	3584	B4	3615	A2	4416	A3	4435	C7	4454	A5	4473	A7	4492	A5	4511	B3	4530	A1	4549	A3	7415	A4



6-6

ELECTRICAL PARTS LIST - FRONT BOARD

ELECTRICAL PARTS LIST - FRONT BOARD

MISCELLANEOUS

1401	2422 025 14546	Flex Socket 16pin Hort.
1404	4822 265 11531	Flex Socket 9pin Hort.
1405	4822 267 10953	Flex Socket 7pin Vert.
1406	2422 128 02917	Tact Switch
1407	2422 128 02917	Tact Switch
1408	2422 128 02917	Tact Switch
1409	2422 128 02917	Tact Switch
1410	2422 128 02917	Tact Switch
1411	2422 128 02917	Tact Switch
1412	2422 128 02917	Tact Switch
1413	2422 128 02917	Tact Switch
1414	2422 128 02917	Tact Switch
1415	2422 128 02917	Tact Switch
1416	2422 128 02917	Tact Switch
1417	2422 128 02917	Tact Switch
1418	2422 128 02917	Tact Switch
1419	2422 128 02917	Tact Switch
1420	2422 128 02917	Tact Switch
1421	2422 128 02917	Tact Switch
1422	2422 128 02917	Tact Switch
1423	2422 128 02917	Tact Switch
1424	2422 128 02917	Tact Switch
1425	2422 128 02917	Tact Switch
1426	2422 128 02917	Tact Switch
1427	2422 128 02917	Tact Switch
1432	2422 128 02917	Tact Switch
1436	4822 273 10366	Rotary Encoder 24P
1437	4822 273 10365	Rotary Encoder 24P
1438	3139 110 52640	FTD Display

CAPACITORS

2406	5322 122 32659	33pF 5% 50V
2407	5322 122 32659	33pF 5% 50V
2408	5322 122 32531	100pF 5% 50V
2409	5322 122 32531	100pF 5% 50V
2412	4822 126 14585	100nF 10% 50V
2414	4822 126 13838	100nF +80/-20% 25V
2415	4822 126 14585	100nF 10% 50V
2416	4822 124 23432	100µF 20% 10V
2417	4822 124 12245	220µF 20% 10V
2418	4822 126 14043	1µF +80/-20% 16V
2419	4822 124 41584	100µF 20% 10V
2420	4822 124 12032	4,7µF 20% 50V
2421	4822 124 81151	22µF 20% 50V
2422	4822 126 14585	100nF 10% 50V
2423	4822 126 13486	15pF 2% 63V
2424	4822 126 13486	15pF 2% 63V
2425	4822 126 13838	100nF +80/-20% 25V
2426	4822 126 13751	47nF 10% 63V
2427	4822 122 33127	2,2nF 10% 63V
2428	4822 122 33177	10nF 20% 50V
2431	4822 126 14585	100nF 10% 50V
2434	4822 126 13692	47pF 1% 63V
2435	4822 126 13692	47pF 1% 63V
2436	4822 126 13692	47pF 1% 63V
2437	4822 126 13692	47pF 1% 63V
2441	4822 122 33177	10nF 20% 50V
2442	4822 122 33177	10nF 20% 50V
2443	4822 122 33177	10nF 20% 50V
2446	4822 122 33177	10nF 20% 50V
2447	4822 122 33177	10nF 20% 50V
2462	4822 126 14076	220nF +80/-20% 25V
2464	4822 126 14076	220nF +80/-20% 25V
2468	4822 126 14076	220nF +80/-20% 25V
2475	4822 126 14585	100nF 10% 50V
2476	4822 124 12032	4,7µF 20% 50V
2477	4822 126 14043	1µF +80/-20% 16V
2479	4822 126 14585	100nF 10% 50V
2481	5322 122 32268	470pF 5% 63V
2482	2020 561 90365	100nF +80/-20% 50V
2483	5322 122 32268	470pF 5% 63V
2484	5322 122 32268	470pF 5% 63V
2485	5322 122 32268	470pF 5% 63V
2486	5322 122 32268	470pF 5% 63V
2488	4822 126 14585	100nF 10% 50V
2489	4822 122 33891	3,3nF 10% 63V
2493	4822 126 14585	100nF 10% 50V

RESISTORS

3406	4822 051 20479	47R 5% 0,1W
3407	4822 051 10102	1k 2% 0,25W
3410	4822 051 20392	3k9 5% 0,1W
3412	4822 051 20392	3k9 5% 0,1W
3417	4822 117 11454	820R 1% 0,1W
3419	4822 116 52231	820R 5% 0,5W
3420	4822 051 10102	1k 2% 0,25W
3421	4822 051 10102	1k 2% 0,25W
3422	4822 051 10102	1k 2% 0,25W
3423	4822 051 10102	1k 2% 0,25W
3424	4822 051 10102	1k 2% 0,25W
3425	4822 051 10102	1k 2% 0,25W
3426	4822 051 10102	1k 2% 0,25W
3427	4822 051 10102	1k 2% 0,25W
3428	4822 051 10102	1k 2% 0,25W
3429	4822 051 10102	1k 2% 0,25W
3430	4822 051 10102	1k 2% 0,25W
3431	4822 051 10102	1k 2% 0,25W
3433	4822 117 11454	820R 1% 0,1W
3434	4822 051 10102	1k 2% 0,25W
3435	4822 051 10102	1k 2% 0,25W
3436	4822 051 10102	1k 2% 0,25W
3437	4822 051 10102	1k 2% 0,25W
3438	4822 051 10102	1k 2% 0,25W
3439	4822 051 10102	1k 2% 0,25W
3440	4822 051 10102	1k 2% 0,25W
3441	4822 051 10102	1k 2% 0,25W
3442	4822 051 10102	1k 2% 0,25W
3443	4822 051 10102	1k 2% 0,25W
3444	4822 051 10102	1k 2% 0,25W
3445	4822 051 10102	1k 2% 0,25W
3446	4822 051 10102	1k 2% 0,25W
3447	4822 051 10102	1k 2% 0,25W
3448	4822 117 11454	820R 1% 0,1W
3449	4822 116 52231	820R 5% 0,5W
3451	4822 116 52231	820R 5% 0,5W
3452	4822 117 11454	820R 1% 0,1W
3453	4822 051 10102	1k 2% 0,25W
3454	4822 117 13577	330R 1% 0,25W
3455	4822 051 10102	1k 2% 0,25W
3456	4822 117 10833	10k 1% 0,1W
3457	4822 117 11454	820R 1% 0,1W
3458	4822 051 10102	1k 2% 0,25W
3459	4822 050 21003	10k 1% 0,6W
3460	4822 051 10102	1k 2% 0,25W
3461	4822 117 10833	10k 1% 0,1W
3462	4822 117 13577	330R 1% 0,25W
3463	4822 117 10833	10k 1% 0,1W
3464	4822 117 10833	10k 1% 0,1W
3465	4822 051 10102	1k 2% 0,25W
3466	4822 117 10833	10k 1% 0,1W
3467	4822 117 13577	330R 1% 0,25W
3469	4822 051 10102	1k 2% 0,25W
3471	4822 050 26808	6R8 1% 0,6W
3472	4822 051 10102	1k 2% 0,25W
3474	4822 117 13577	330R 1% 0,25W
3475	4822 116 52231	820R 5% 0,5W
3476	4822 051 10102	1k 2% 0,25W
3477	4822 051 10102	1k 2% 0,25W
3478	4822 117 11373	100R 1% 0,25W
3479	4822 051 10102	1k 2% 0,25W
3480	4822 117 13577	330R 1% 0,25W
3481	4822 051 10102	1k 2% 0,25W
3482	4822 051 10102	1k 2% 0,25W
3483	4822 050 26808	6R8 1% 0,6W
3484	4822 051 10102	1k 2% 0,25W
3485	4822 051 10102	1k 2% 0,25W
3486	4822 051 10102	1k 2% 0,25W
3488	4822 117 13577	330R 1% 0,25W
3489	4822 051 10102	1k 2% 0,25W
3490	4822 051 10102	1k 2% 0,25W
3493	4822 117 13577	330R 1% 0,25W
3494	4822 117 13577	330R 1% 0,25W
3495	4822 117 10833	10k 1% 0,1W
3496	4822 051 10102	1k 2% 0,25W
3497	4822 050 11002	1k 1% 0,4W
3498	4822 051 10102	1k 2% 0,25W
3499	4822 117 10833	10k 1% 0,1W
3500	4822 051 10102	1k 2% 0,25W
3501	4822 116 52226	560R 5% 0,5W
3502	4822 117 11373	100R 1% 0,25W
3503	4822 116 52175	100R 5% 0,5W
3504	4822 051 10102	1k 2% 0,25W
3505	4822 117 13577	330R 1% 0,25W
3506	4822 051 10102	1k 2% 0,25W
3507	4822 050 11002	1k 1% 0,4W
3508	4822 051 10102	1k 2% 0,25W
3509	4822 051 10102	1k 2% 0,25W
3510	4822 116 52175	100R 5% 0,5W
3511	4822 117 11373	100R 1% 0,25W
3512	4822 050 21003	10k 1% 0,6W
3513	4822 050 21003	10k 1% 0,6W
3515	4822 117 10837	100k 1% 0.1W
3518	4822 117 13577	330R 1% 0,25W
3519	4822 117 13577	330R 1% 0,25W
3520	4822 050 21003	10k 1% 0,6W
3521	4822 051 10102	1k 2% 0,25W
3524	4822 050 11002	1k 1% 0,4W
3525	4822 050 11002	1k 1% 0,4W
3527	4822 050 11002	1k 1% 0,4W
3528	4822 051 10102	1k 2% 0,25W
3529	4822 051 10102	1k 2% 0,25W
3530	4822 117 10833	10k 1% 0,1W
3531	4822 117 10837	100k 1% 0.1W
3532	4822 117 10837	100k 1% 0.1W
3533	4822 117 10833	10k 1% 0,1W
3534	4822 117 10833	10k 1% 0,1W
3535	4822 117 10833	10k 1% 0,1W
3536	4822 051 20474	470k 5% 0,1W
3537	4822 051 20474	470k 5% 0,1W
3539	4822 117 10833	10k 1% 0,1W
3543	4822 051 10102	1k 2% 0,25W
3545	4822 051 10102	1k 2% 0,25W
3546	4822 117 10833	10k 1% 0,1W
3547	4822 051 10102	1k 2% 0,25W
3548	4822 051 10102	1k 2% 0,25W
3551	4822 117 13577	330R 1% 0,25W
3552	4822 117 13577	330R 1% 0,25W
3553	4822 117 10833	10k 1% 0,1W
3554	4822 117 10833	10k 1% 0,1W
3556	4822 051 10102	1k 2% 0,25W
3558	4822 117 10833	10k 1% 0,1W
3559	4822 051 20105	1M 5% 0,1W
3561	4822 051 20472	4k7 5% 0,1W
3562	4822 117 10833	10k 1% 0,1W
3563	4822 117 10833	10k 1% 0,1W
3564	4822 117 10833	10k 1% 0,1W
3565	4822 051 20472	4k7 5% 0,1W
3566	4822 117 10833	10k 1% 0,1W

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ELECTRICAL PARTS LIST - FRONT BOARD

ELECTRICAL PARTS LIST - FRONT BOARD

RESISTORS

3567	4822 117 10833	10k 1% 0,1W
3568	4822 117 10834	47k 1% 0,1W
3569	4822 051 20223	22k 5% 0,1W
3570	4822 051 20223	22k 5% 0,1W
3571	4822 117 11383	12k 1% 0,1W
3572	4822 117 10833	10k 1% 0,1W
3573	4822 051 20223	22k 5% 0,1W
3574	4822 051 20223	22k 5% 0,1W
3577	4822 117 11383	12k 1% 0,1W
3578	4822 051 20562	5k6 5% 0,1W
3581	4822 117 10833	10k 1% 0,1W
3584	4822 051 10102	1k 2% 0,25W
3585	4822 051 10102	1k 2% 0,25W
3586	4822 050 11002	1k 1% 0,4W
3587	4822 050 21003	10k 1% 0,6W
3589	4822 117 10833	10k 1% 0,1W
3601	4822 117 10833	10k 1% 0,1W
3603	4822 117 10833	10k 1% 0,1W
3611	4822 051 20474	470k 5% 0,1W
3612	4822 117 10833	10k 1% 0,1W
3613	4822 117 11383	12k 1% 0,1W
3614	4822 117 11454	820R 1% 0,1W
3615	4822 117 11454	820R 1% 0,1W
3617	4822 050 21003	10k 1% 0,6W
4401	4822 051 20008	0R Jumper 0805
4402	4822 051 20008	0R Jumper 0805
4410	4822 051 20008	0R Jumper 0805
4411	4822 051 20008	0R Jumper 0805
4412	4822 051 20008	0R Jumper 0805
4414	4822 051 20008	0R Jumper 0805
4416	4822 051 20008	0R Jumper 0805
4418	4822 051 20008	0R Jumper 0805
4419	4822 051 20008	0R Jumper 0805
4420	4822 051 20008	0R Jumper 0805
4421	4822 051 20008	0R Jumper 0805
4422	4822 051 20008	0R Jumper 0805
4423	4822 051 20008	0R Jumper 0805
4424	4822 051 20008	0R Jumper 0805
4425	4822 051 20008	0R Jumper 0805
4426	4822 051 20008	0R Jumper 0805
4427	4822 051 20008	0R Jumper 0805
4428	4822 051 20008	0R Jumper 0805
4429	4822 051 20008	0R Jumper 0805
4430	4822 051 20008	0R Jumper 0805
4431	4822 051 20008	0R Jumper 0805
4432	4822 051 20008	0R Jumper 0805
4433	4822 051 20008	0R Jumper 0805
4434	4822 051 20008	0R Jumper 0805
4435	4822 051 20008	0R Jumper 0805
4437	4822 051 20008	0R Jumper 0805
4438	4822 051 20008	0R Jumper 0805
4439	4822 051 20008	0R Jumper 0805
4440	4822 051 20008	0R Jumper 0805
4441	4822 051 20008	0R Jumper 0805
4442	4822 051 20008	0R Jumper 0805
4443	4822 051 20008	0R Jumper 0805
4444	4822 051 20008	0R Jumper 0805
4445	4822 051 20008	0R Jumper 0805
4446	4822 051 20008	0R Jumper 0805
4447	4822 051 20008	0R Jumper 0805
4448	4822 051 20008	0R Jumper 0805
4449	4822 051 20008	0R Jumper 0805
4450	4822 051 20008	0R Jumper 0805
4451	4822 051 20008	0R Jumper 0805
4452	4822 051 20008	0R Jumper 0805
4453	4822 051 20008	0R Jumper 0805
4454	4822 051 20008	0R Jumper 0805
4455	4822 051 20008	0R Jumper 0805
4456	4822 051 20008	0R Jumper 0805
4457	4822 051 20008	0R Jumper 0805
4458	4822 051 20008	0R Jumper 0805
4459	4822 051 20008	0R Jumper 0805
4460	4822 051 20008	0R Jumper 0805
4461	4822 051 20008	0R Jumper 0805
4462	4822 051 20008	0R Jumper 0805
4463	4822 051 20008	0R Jumper 0805
4464	4822 051 20008	0R Jumper 0805
4465	4822 051 20008	0R Jumper 0805
4466	4822 051 20008	0R Jumper 0805
4467	4822 051 20008	0R Jumper 0805
4468	4822 051 20008	0R Jumper 0805
4469	4822 051 20008	0R Jumper 0805
4470	4822 051 20008	0R Jumper 0805
4471	4822 051 20008	0R Jumper 0805
4472	4822 051 20008	0R Jumper 0805
4473	4822 051 20008	0R Jumper 0805
4474	4822 051 20008	0R Jumper 0805
4475	4822 051 20008	0R Jumper 0805
4476	4822 051 20008	0R Jumper 0805
4477	4822 051 20008	0R Jumper 0805
4478	4822 051 20008	0R Jumper 0805
4479	4822 051 20008	0R Jumper 0805
4480	4822 051 20008	0R Jumper 0805
4481	4822 051 20008	0R Jumper 0805
4482	4822 051 20008	0R Jumper 0805
4483	4822 051 20008	0R Jumper 0805
4484	4822 051 20008	0R Jumper 0805
4485	4822 051 20008	0R Jumper 0805
4486	4822 051 20008	0R Jumper 0805
4487	4822 051 20008	0R Jumper 0805
4488	4822 051 20008	0R Jumper 0805
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4492	4822 051 20008	0R Jumper 0805
4493	4822 051 20008	0R Jumper 0805
4494	4822 051 20008	0R Jumper 0805
4495	4822 051 20008	0R Jumper 0805
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4499	4822 051 20008	0R Jumper 0805
4500	4822 051 20008	0R Jumper 0805
4501	4822 051 20008	0R Jumper 0805
4502	4822 051 20008	0R Jumper 0805
4503	4822 051 20008	0R Jumper 0805
4504	4822 051 20008	0R Jumper 0805
4505	4822 051 20008	0R Jumper 0805
4506	4822 051 20008	0R Jumper 0805
4507	4822 051 20008	0R Jumper 0805
4508	4822 051 20008	0R Jumper 0805
4509	4822 051 20008	0R Jumper 0805
4510	4822 051 20008	0R Jumper 0805
4511	4822 051 20008	0R Jumper 0805
4512	4822 051 20008	0R Jumper 0805
4513	4822 051 20008	0R Jumper 0805
4514	4822 051 20008	0R Jumper 0805
4515	4822 051 20008	0R Jumper 0805
4516	4822 051 20008	0R Jumper 0805
4517	4822 051 20008	0R Jumper 0805
4518	4822 051 20008	0R Jumper 0805
4519	4822 051 20008	0R Jumper 0805
4520	4822 051 20008	0R Jumper 0805
4521	4822 051 20008	0R Jumper 0805
4522	4822 051 20008	0R Jumper 0805
4523	4822 051 20008	0R Jumper 0805
4524	4822 051 20008	0R Jumper 0805
4525	4822 051 20008	0R Jumper 0805
4526	4822 051 20008	0R Jumper 0805
4527	4822 051 20008	0R Jumper 0805
4528	4822 051 20008	0R Jumper 0805
4529	4822 051 20008	0R Jumper 0805
4530	4822 051 20008	0R Jumper 0805
4531	4822 051 20008	0R Jumper 0805
4532	4822 051 20008	0R Jumper 0805
4533	4822 051 20008	0R Jumper 0805
4534	4822 051 20008	0R Jumper 0805
4535	4822 051 20008	0R Jumper 0805
4536	4822 051 20008	0R Jumper 0805
4537	4822 051 20008	0R Jumper 0805
4538	4822 051 20008	0R Jumper 0805
4539	4822 051 20008	0R Jumper 0805
4540	4822 051 20008	0R Jumper 0805
4541	4822 051 20008	0R Jumper 0805
4542	4822 051 20008	0R Jumper 0805
4543	4822 051 20008	0R Jumper 0805
4544	4822 051 20008	0R Jumper 0805
4545	4822 051 20008	0R Jumper 0805
4546	4822 051 20008	0R Jumper 0805
4547	4822 051 20008	0R Jumper 0805
4549	4822 051 20008	0R Jumper 0805
4587	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5400	4822 242 72066	Ceram Resonator 8MHz
5401	2422 543 01069	X'tal Resonator 32,768kHz
5402	4822 157 62552	Coil 2,2µH 5%
5404	4822 157 62552	Coil 2,2µH 5%
5405	4822 157 62552	Coil 2,2µH 5%

DIODES

6400	4822 130 11589	LTL-1CHAE
6401	4822 130 11589	LTL-1CHAE
6402	4822 130 11589	LTL-1CHAE
6403	4822 130 11589	LTL-1CHAE
6404	4822 130 11589	LTL-1CHAE
6405	4822 130 10791	LTL-1CHGE
6406	4822 130 11589	LTL-1CHAE
6407	4822 130 11589	LTL-1CHAE
6408	4822 130 11589	LTL-1CHAE
6409	4822 130 11589	LTL-1CHAE
6410	9322 161 99676	LTL-2R3VYKNT
6411	9322 161 99676	LTL-2R3VYKNT
6412	4822 130 30621	1N4148
6413	4822 130 30621	1N4148
6414	4822 130 30621	1N4148
6415	4822 130 30621	1N4148
6416	4822 130 30621	1N4148
6417	4822 130 30621	1N4148
6418	4822 130 30621	1N4148
6419	4822 130 30621	1N4148
6420	4822 130 30621	1N4148
6421	4822 130 30621	1N4148
6425	4822 130 31878	1N4003G
6426	4822 130 31878	1N4003G
6428	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7401	3139 110 52770	TMP87CS71F "V320S52771"
7402	9322 131 04668	M24C01-WMN6
7403	4822 130 60511	BC847B
7404	5322 209 11306	HEF4094BT
7405	5322 209 11306	HEF4094BT
7408	4822 130 60511	BC847B
7409	4822 130 10165	GP1U28XP
7410	4822 130 60511	BC847B
7411	4822 130 60511	BC847B
7412	4822 130 60511	BC847B

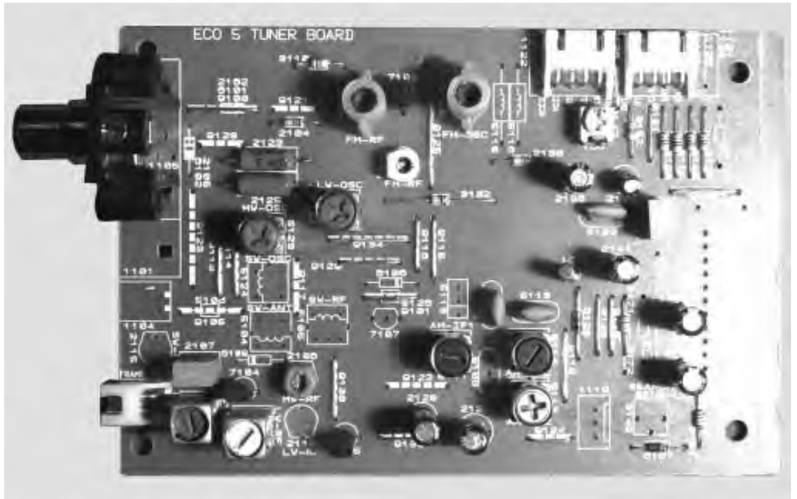
6-8

ELECTRICAL PARTS LIST - FRONT BOARD

TRANSISTORS & INTEGRATED CIRCUITS

7413	4822 130 60511	BC847B
7414	4822 130 60511	BC847B
7415	4822 130 60511	BC847B

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



TUNER BOARD ECO5

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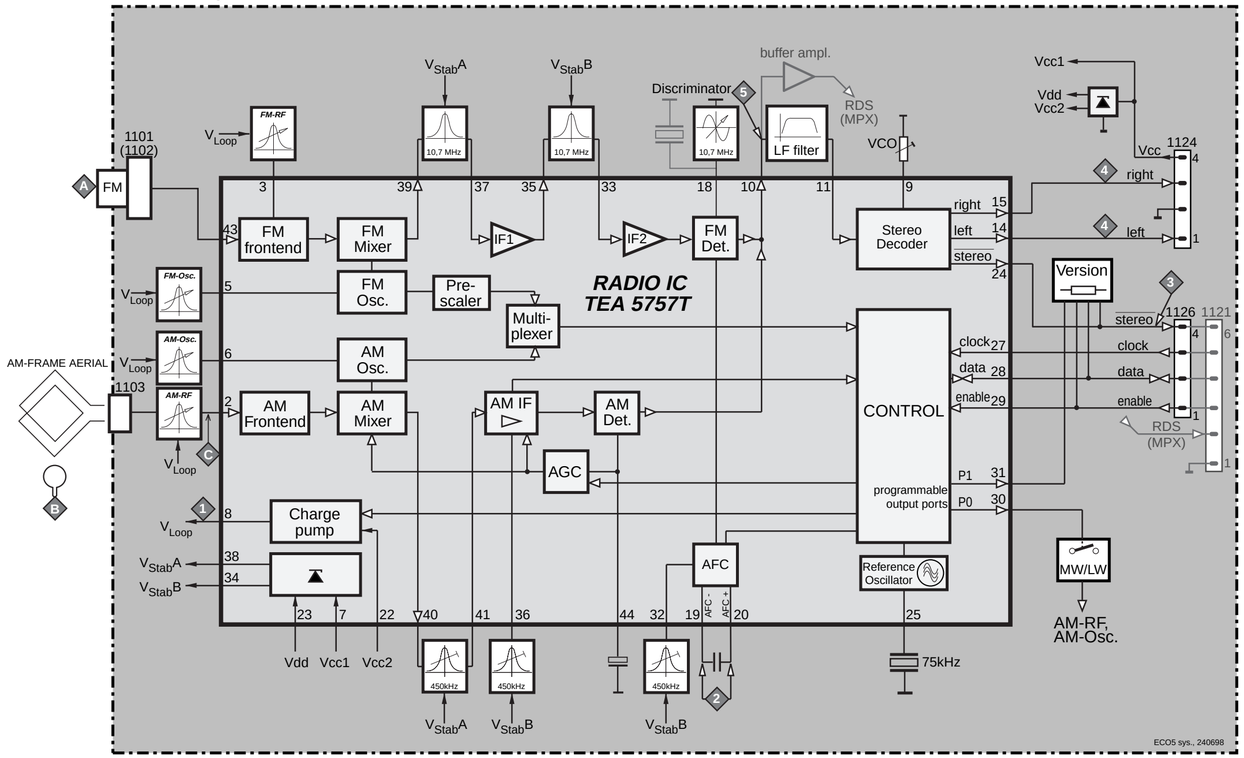
7B-1

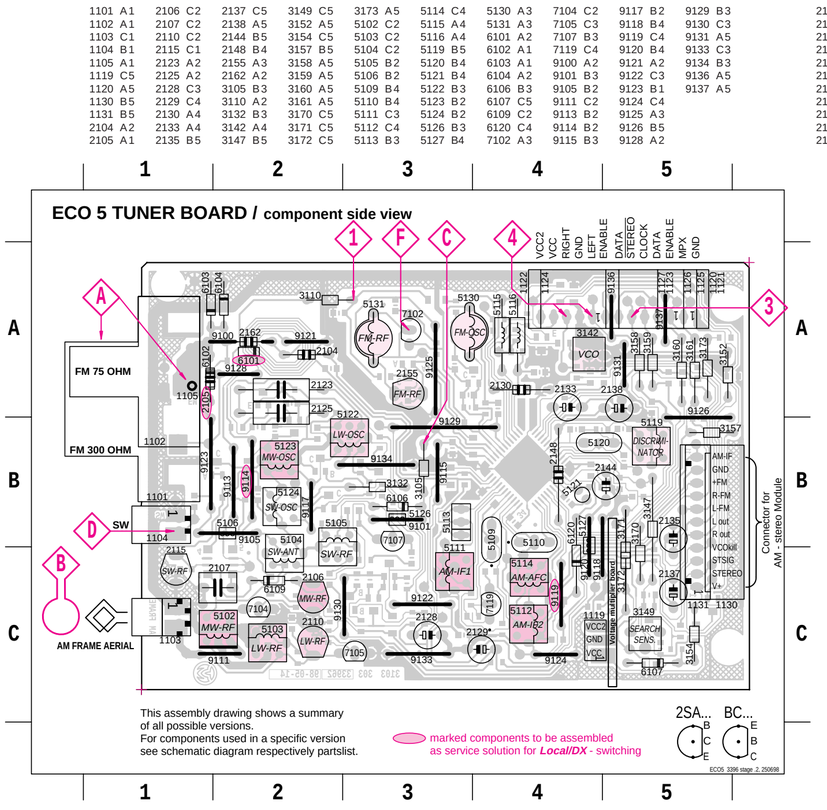
BLOCKDIAGRAM

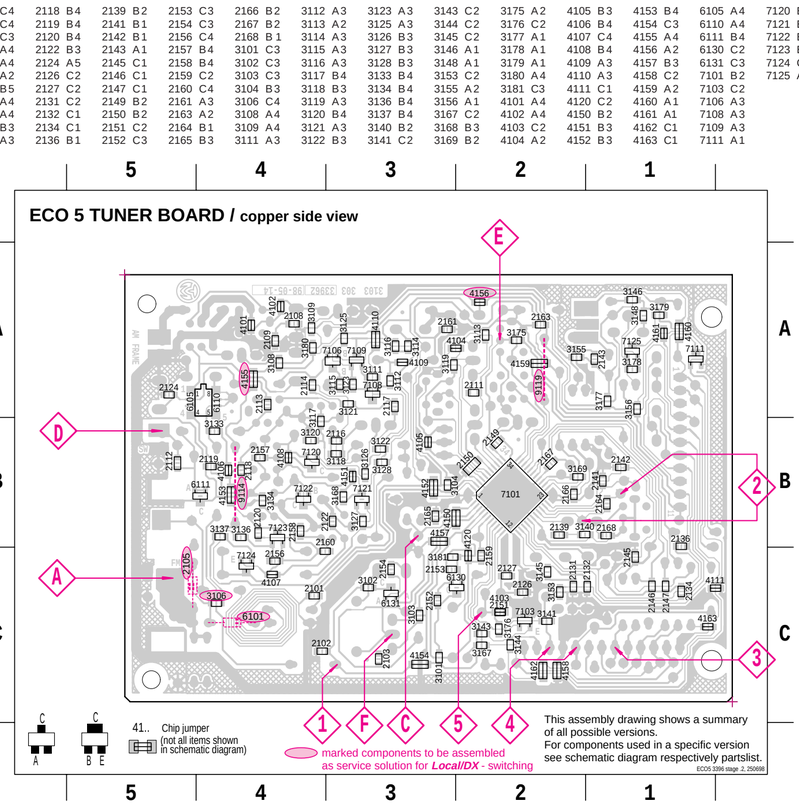
TUNER BOARD
ECO 5 systems



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

ECO5, discr coil, 090797

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

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

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

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

4) MW has to be aligned before LW.

Repeat

7B-3

TUNER BOARD ECO5 / Systems

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

2140 exchanged by 2164 (SMD type 0805) from layout stage 3317.9 onwards respectively 3103 303 3380.1 and 3103 308 3396.1

3140 and 5120 provisional as alternative

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 wh le set is tuned to a strong transm tter

ECO5 systems discr coil 030998

7B-4

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.

VCD - MPEG-01B MODULE

This chapter shows the MPEG-01B Board, for 3CDC-LC-VCD mechanism & electronics please refer to Chapter 10

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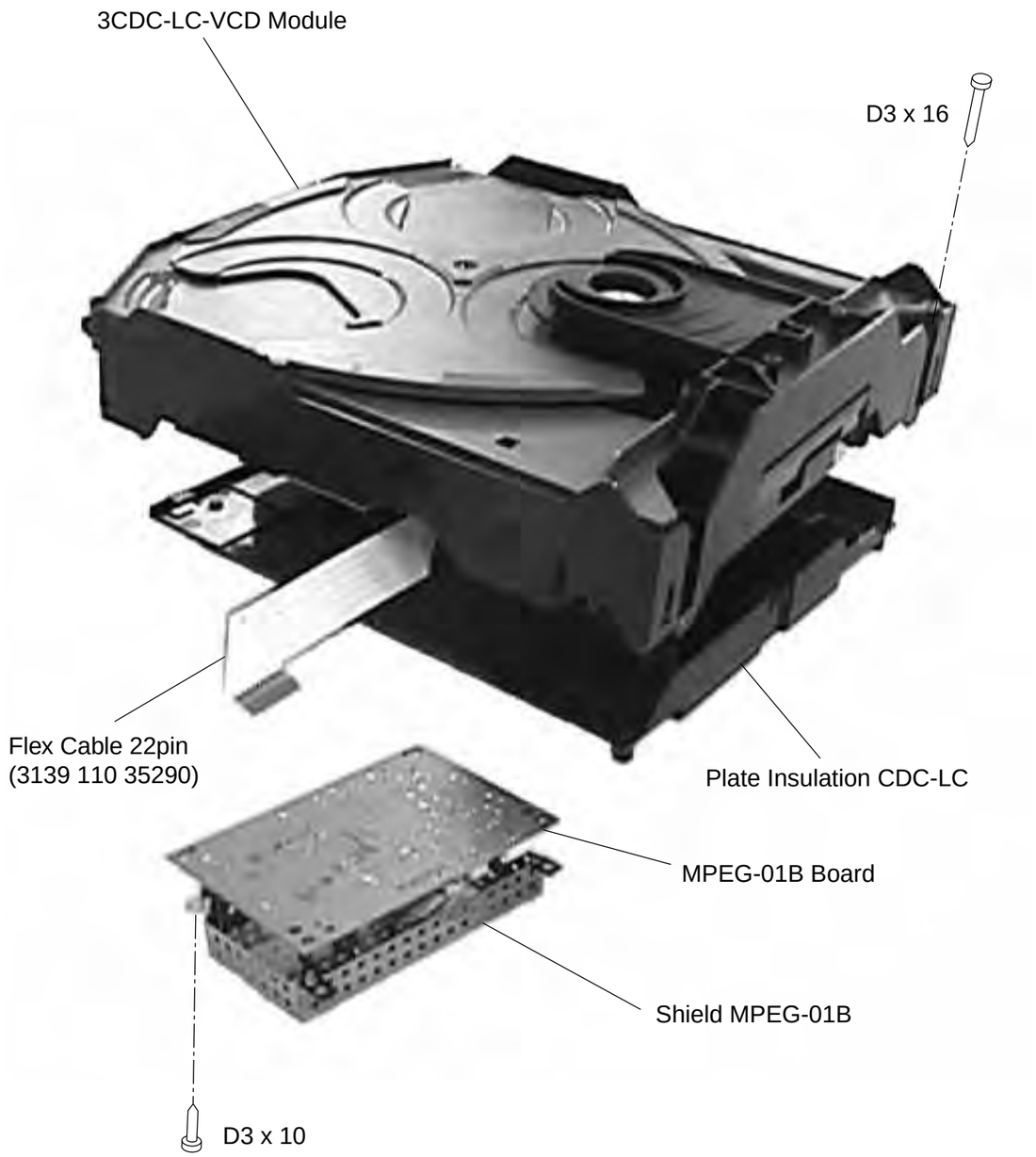
8-1

EXPLODED VIEW OF MODULE



Brief Introduction on the MPEG

1. When VCD source is selected the MPEG_RESET line will go positive triggering the following:
   - DRST pulse to reset 8-bit microcontroller IC 7212 P83C528EBB
   - RSTOUT# pulse to reset IC 7201 ESS3880
   - IC7212 sends CD10_RST to reset Signal Processor IC 7802 on the in the VCD electronics.

2. Communication will establish as follows:
   - DSA_ACK, DSA_STB and DSA_DAT between µProcessor IC 7401 on the Front Board and IC 7201 ESS3880.
   - DSA_STB to IC7204 ESS3883 to select between NTSC (Lo) or PALS (Hi)
   - DSA_A, DSA_D and DSA_S between IC 7201 ESS3880 and microcontroller IC7212
   - SILD, SICL, RAB and SDA between microcontroller IC7212 P83C528EBB and Signal Processor IC7802 SAA7327H/M2B on the CD Board.

3. Other activities between IC7201 ESS3880 and Eprom IC7202, Dram IC7203 and IC7204 ESS3883 will follows resulting in the OSD display on the TV set connected to the Video out socket.

4. When play button is activated the I^2S signal (IIS_SCLK, IIS_WCLK and IIS_DATA) from the CD Board will enter IC7201 ESS3880 which will work closely with the Eprom IC7202 and Dram IC7203. Inverter IC7205 74HC04D serves to reconstruct the Digital signal & level required by IC7201 ESS3880.

5. Digital Audio information (AUDIOCLK, AUDATA and BCLK) will be send to DAC (Digital to Analog Converter) of IC7204 ESS3883.

6. Analog output (AOL+, AOL-, AOR+ and AOR-) is amplified by the differential Op. Amplifier IC7207 NJM4560M.

7. Digital Video information YUV(0….7) will be send to the Video processing part of IC7204 ESS3883 and out to the Video out socket.

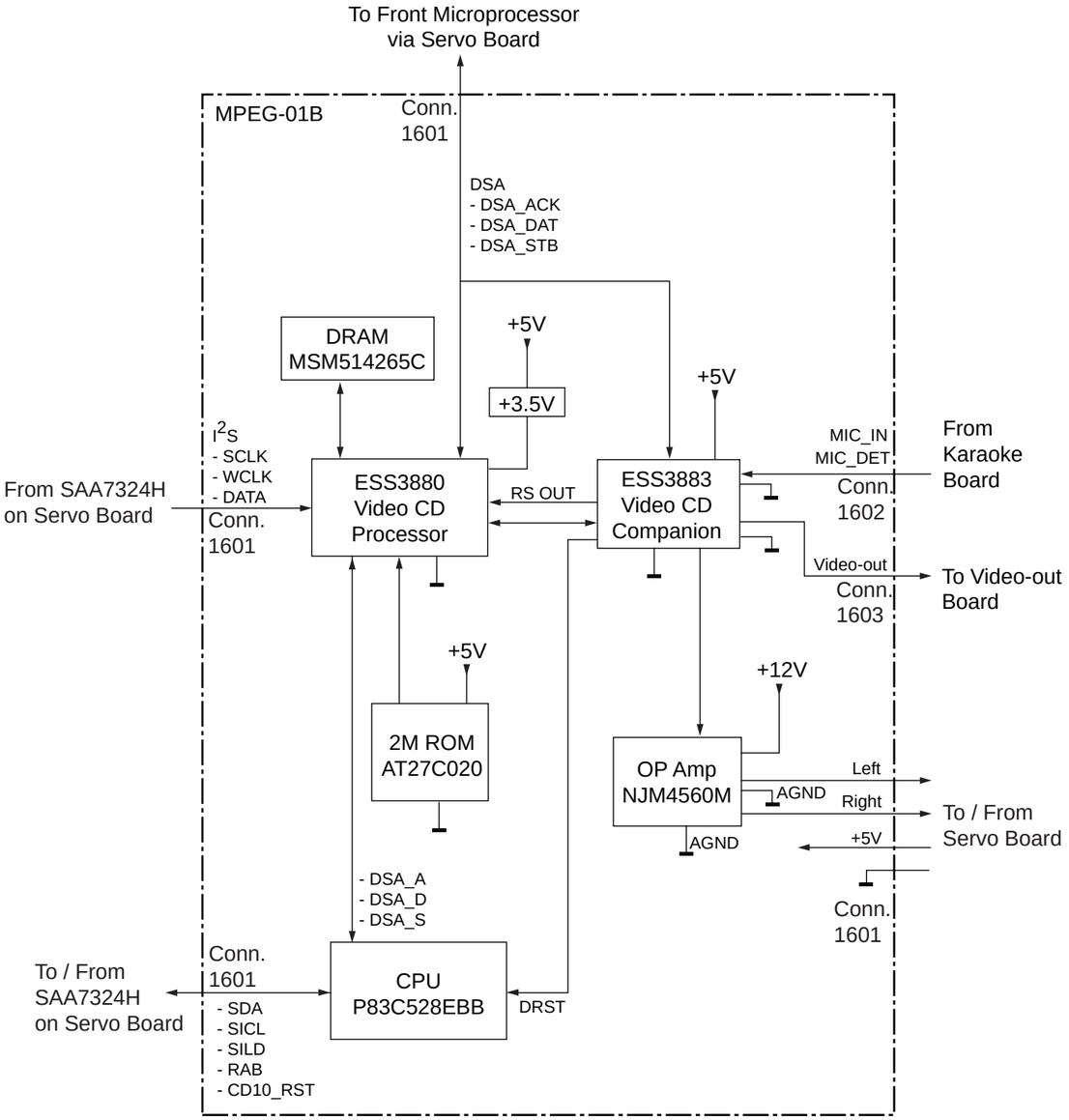
8. The HSYNC & VSYNC from IC7204 ESS3883 to IC7201 ESS3880 are to synchronize the Digital Video Information.

9. Mic Echo Input into IC7204 ESS3883 is converted to digital signal (ARCLK, AIN and ARFS) for IC7201 ESS3880 to combine into the Digital Audio Information.

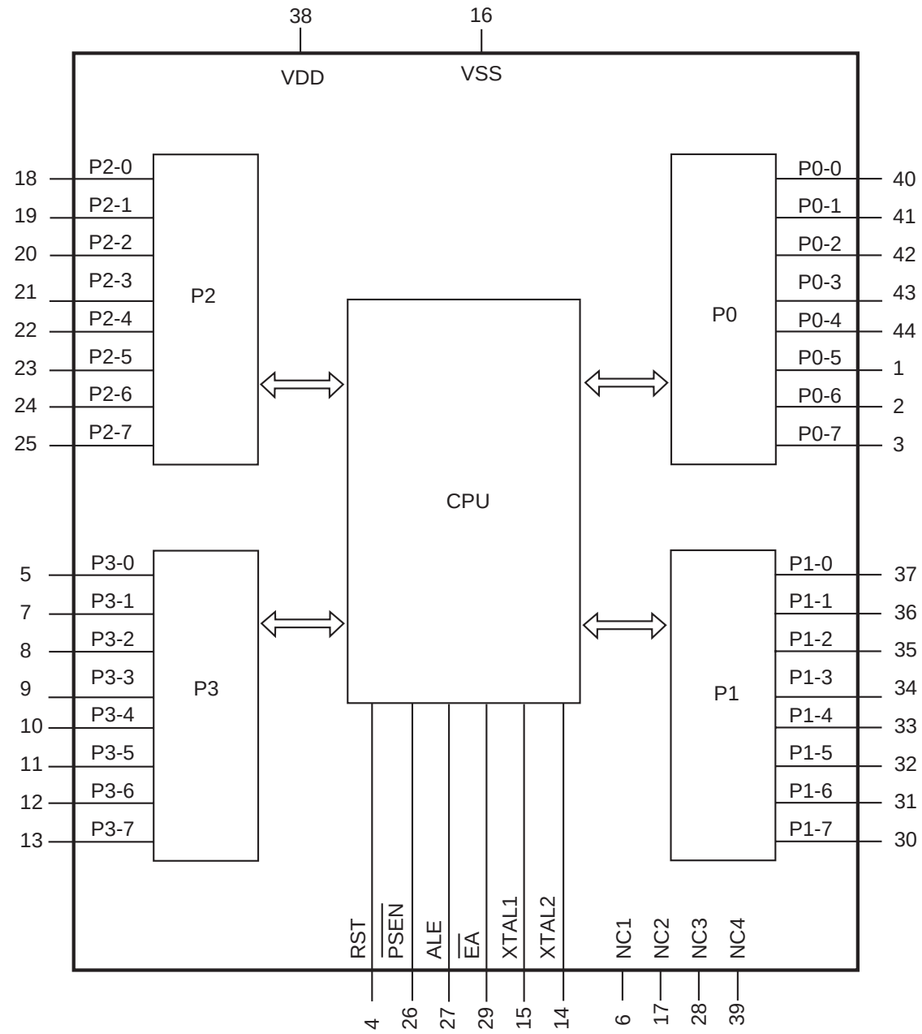
8-2

NOTES:

MPEG-01B BLOCK DIAGRAM

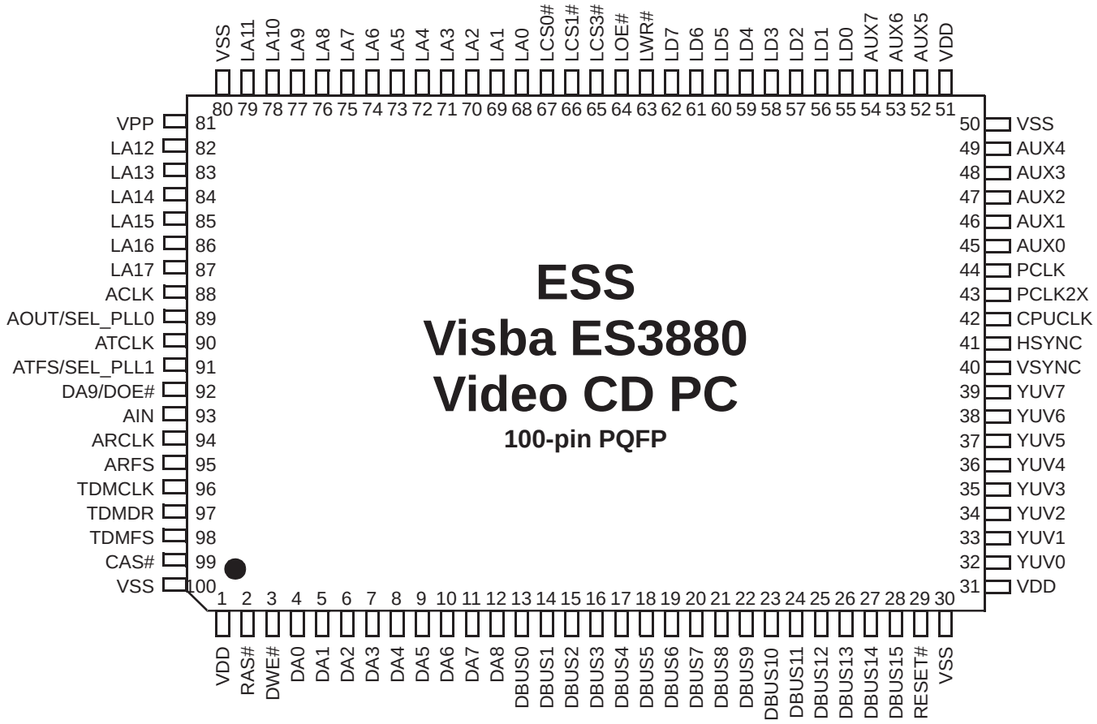


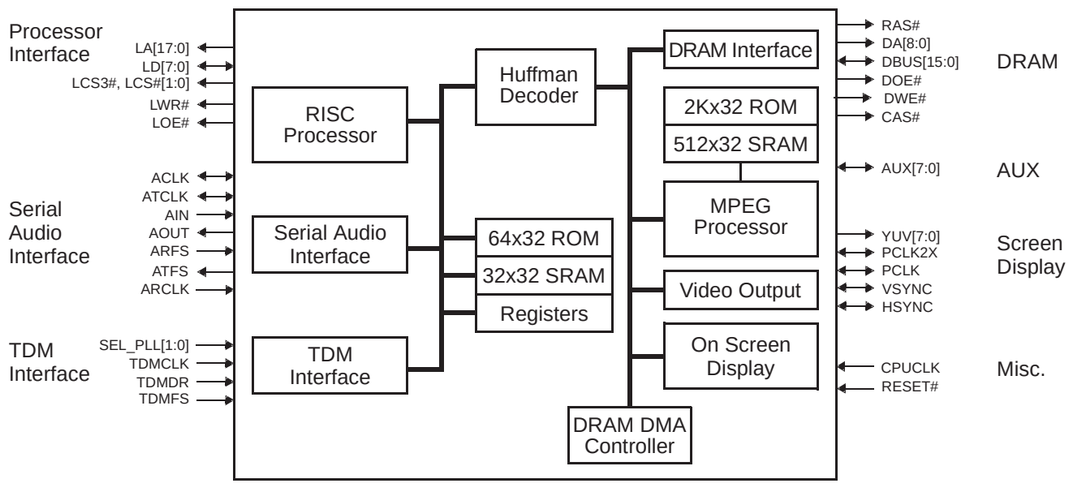
P83C528EBB INTERNAL BLOCK



8-4

ES3880 VIDEO CD PROCESSOR CHIP





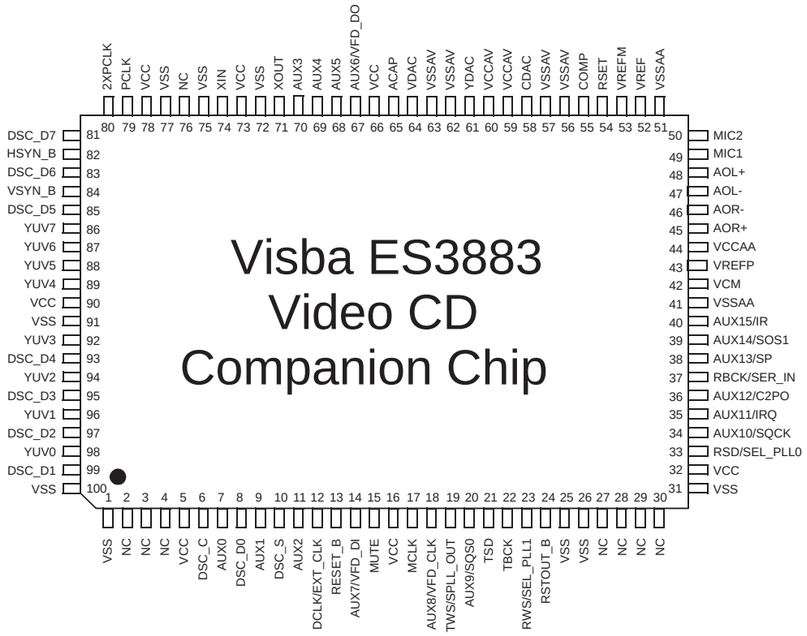
Visba Video CD PC Block Diagram

VISBA VIDEO PC PROCESSOR CHIP PIN DESCRIPTION

Name	Number	I/O	Definition
VDD	1, 31, 51	I	Voltage supply for 3.3 V.
RAS#	2	O	DRAM row address strobe (active low).
DWE#	3	O	DRAM write enable (active low).
DA[8:0]	12:4	O	DRAM multiplexed row and column address bus.
DBUS[15:0]	28:13	I/O	DRAM data bus.
RESET#	29	I	System reset (active low).
VSS	30, 50, 80, 100	I	Ground.
YUV[7:0]	39:32	O	Y is luminance, UV are chrominance data bus for screen video interface. YUV[7:0] for 8-bit YUV mode.
VSYNC	40	I/O	Vertical sync for screen video interface, programmable for rising or falling edge.
HSYNC	41	I/O	Horizontal sync for screen video interface, programmable for rising or falling edge.
CPUCLK	42	I	RISC and system clock input. CPUCLK is used only if SEL_PLL[1:0] = 00.
PCLK2X	43	I/O	Pixel clock; two times the actual pixel clock for screen video interface.
PCLK	44	I/O	Pixel clock qualifier in for screen video interface.
AUX[7:0]	54, 52, 53, 49:45	I/O	Auxiliary control pins (AUX0 and AUX1 are open collectors).
LD[7:0]	62:55	I/O	RISC interface data bus.
LWR#	63	O	RISC interface write enable (active low).
LOE#	64	O	RISC interface output enable (active low).
LCS[3,1,0]#	65,66,67	O	RISC interface chip select (active low).
LA[17:0]	87:82, 79:68	O	RISC interface address bus.
VPP	81	I	Digital supply voltage for 5 V.
ACLK	88	I/O	Master clock for external audio DAC (8.192 MHz, 11.2896 MHz, 12.288 MHz, 16.9344 MHz, and 18.432 MHz).
AOUT/ SEL_PLL0	89	O	Dual-purpose pin. AOUT is the audio interface serial data output
		I	Pins SEL_PLL[1:0] select phase-lock loop (PLL) clock frequency CPUCLK for the Visba: 00 = bypass PLL. 01 = 54 MHz PLL. 10 = 67.5 MHz PLL. 11 = 81 MHz PLL.
ATCLK	90	I/O	Audio transmit bit clock.
ATFS/ SEL_PLL1	91	O	Dual-purpose pin. ATFS is the audio interface transmit frame sync.
		I	Pins SEL_PLL[1:0] select phase-lock loop (PLL) clock frequency CPUCLK for the Visba. See the SEL_PLL0 pin above for the settings.
DA9/DOE#	92	O	Dual purpose pin: DRAM output enable (active low)/DRAM multiplexed row and column address bus.
AIN	93	I	Audio interface serial data input.
ARCLK	94	I	Audio receive bit clock.
ARFS	95	I	Audio interface receive frame sync.
TDMCLK	96	I	TDM interface serial clock.
TDMDR	97	I	TDM interface serial data receive.
TDMFS	98	I	TDM interface frame sync.
CAS#	99	O	DRAM column address strobe bank 0 (active low).

8-5

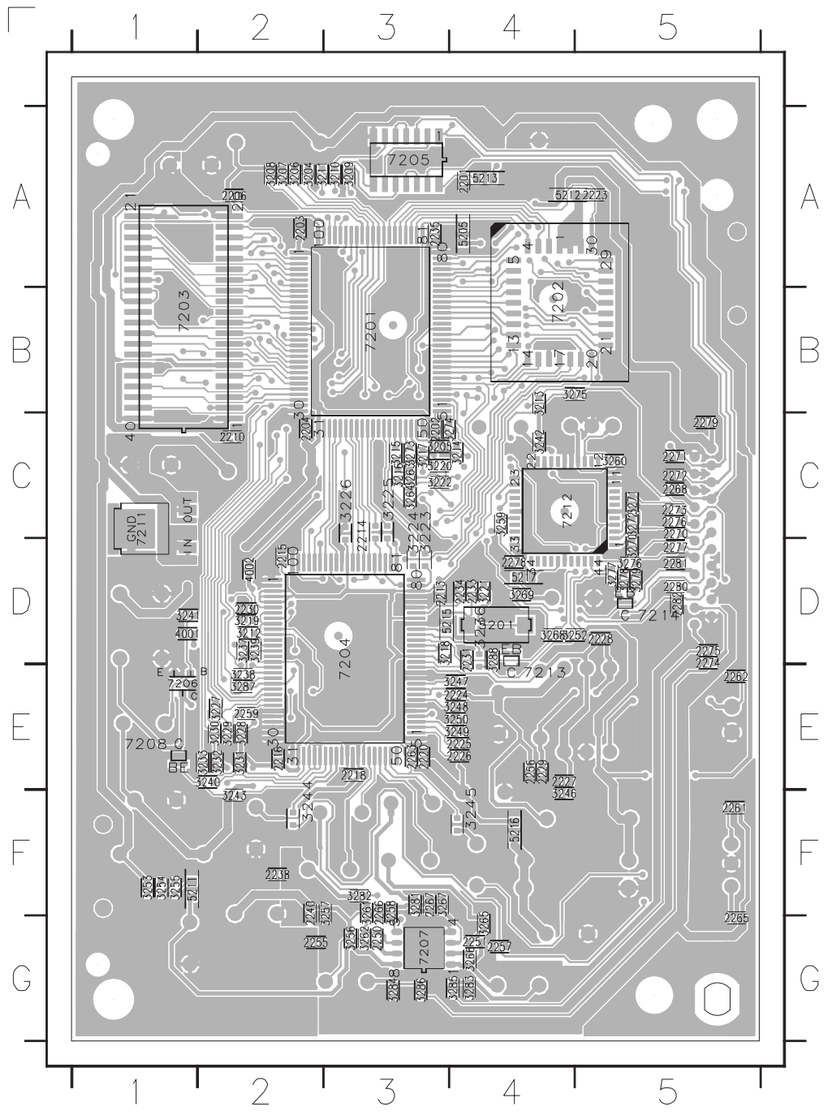
ES3883 VIDEO CD COMPANION CHIP



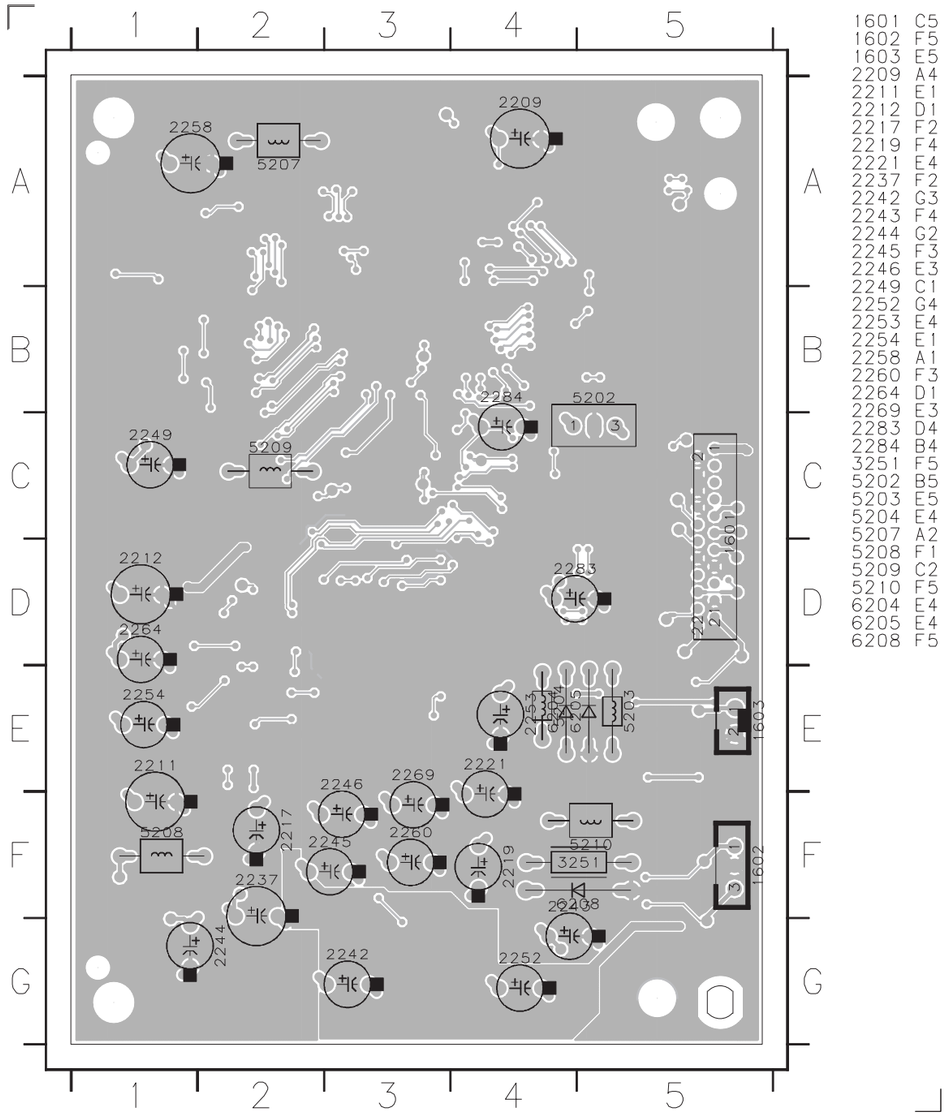
PIN DESCRIPTION

Name	Number	I/O	Definition
VSS	1,25:26,31,72,75,77,91,100	I	Ground.
VCC	5,16,32,66,73,78,90	I	Voltage supply, 5 V.
DSC_C	6	I	Clock for programming to access internal registers.
AUX0	7	I/O	Servo Forward or Control Pin.
AUX1	9	I/O	Servo Reverse or Control Pin.
AUX2	11	I/O	Servo LDON or Control Pin.
AUX3	70	I/O	Servo CW/Limit or Control Pin.
AUX4	69	I/O	Servo CCW/Close or Control Pin.
AUX5	68	I/O	Servo Data or Control Pin.
AUX6	67	I/O	Servo XLAT or Control Pin/VFD_DO.
AUX7	14	I/O	Servo BRKM/Sense or Control Pin/VFD_DI.
AUX8	18	I/O	Servo Mute/Open or Control Pin/VFD_CLK.
AUX9	20	I/O	Servo SQS0 or Control Pin.
AUX10	34	I/O	Servo SQCK or Control Pin.
AUX11	35	I/O	3880 IRQ or Interrupt Output or Control Pin.
AUX12	36	I/O	CD C2PO or Interrupt Input or Control Pin.
AUX13	38	I/O	Serial Interrupt/CD-Mute or Control Pin.
AUX14	39	I/O	Servo SCOR (S0S1) or Interrupt Input or Control Pin.
AUX15	40	I/O	Interrupt Input or Control Pin.
DSC_D[7:0]	81,83,85,93,95,97,99,8	I/O	Data for programming to access internal registers.
DSC_S	10	I	Strobe for programming to access internal registers.
DCLK	12	O	Dual-purpose pin DCLK is the MPEG decoder clock.
EXT_CLK		I	EXT_CLK is the external clock EXT_CLK is an input during bypass PLL mode.
RESET_B	13	I	Video reset (active-low).
MUTE	15	O	Audio mute.
MCLK	17	I	Audio master clock.
TWS	19	I	Dual-purpose pin TWS is the transmit audio frame sync.
SPLL_OUT		O	SPLL_OUT is the select PLL output.
RWS	23	O	Dual-purpose pin RWS is the receive audio frame sync.
SEL_PLL1		I	Pins SEL_PLL[1:0] select the PLL clock frequency for the DCLK output. SEL_PLL1 SEL_PLL0 DCLK 0 0 Bypass PLL (input mode) 0 1 27 MHz (output mode) 1 0 32.4 MHz (output mode) 1 1 40.5 MHz (output mode)
RSTOUT_B	24	O	Reset output (active-low).
NC	2:4,27:30,76		No connect. Do not connect to these pins.
RSD	33	O	Dual-purpose pin. RSD is the receive audio data input.
SEL_PLL0		I	SEL_PLL0 along with SEL_PLL1 select the PLL clock frequency for the DCLK output. See the table for pin number 23.
RBCK	37	O	Dual-purpose pin. RBCK is the receive audio bit clock.
SER_IN		I	SER_IN is the serial input DSC mode. 0 - Parallel DSC mode. 1 - Serial DSC mode.
VSSAA	41,51	I	Audio Analog Ground.
VCM	42	I	ADC Common Mode Reference (CMR) buffer output. CMR is approximately 2.25 V. Bypass to analog ground with 47 mF electrolytic in parallel with 0.1 mF.
VREFP	43	I	DAC and ADC maximum reference. Bypass to VCMR with 10 mF in parallel with 0.1 mF.
VCCAA	44	I	Analog VCC, 5 V.
AOR+, AOR-	45:46	O	Right channel output.
AOL-, AOL+	47:48	O	Left channel output.
MIC1	49	I	Microphone input 1.
MIC2	50	I	Microphone input 2.
VREF	52	I	Internal resistor divider generates Common Mode Reference (CMR) voltage. Bypass to analog ground with 0.1 mF.
VREFM	53	I	DAC and ADC minimum reference. Bypass to VCMR with 10 mF in parallel with 0.1 mF.
RSET	54	I	Full scale DAC current adjustment.
COMP	55	I	Compensation pin.
VSSAV	56:57,62:63	I	Video Analog Ground
CDAC	58	O	Modulated chrominance output.
VCCAV	59,60	I	Video VCC, 5 V
YDAC	61	O	Y luminance data bus for screen video port.
VDAC	64	O	Composite video output.
ACAP	65	I	Audio CAP
XOUT	71	O	Crystal output.
XIN	74	I	27 MHz crystal input.
PCLK	79	I/O	13.5 MHz pixel clock.
2XPCLK	80	I/O	27 MHz (2 times pixel clock).
HSYN_B	82	O	Horizontal sync (active-low).
VSYN_B	84	O	Vertical sync (active-low).
YUV[7:0]	86:89,92,94,96,98	I	YUV data bus for screen video port.

MPEG-01B BOARD LAYOUT



2201 A4
2202 C3
2203 A2
2204 C2
2206 A2
2210 C2
2213 D3
2214 C3
2215 D2
2216 E2
2218 E3
2220 E3
2223 A5
2224 E4
2225 E4
2226 E4
2227 E4
2228 D5
2229 E4
2230 D2
2231 D4
2233 D4
2234 D4
2235 A3
2238 F2
2240 F2
2250 G3
2251 G4
2255 G2
2256 E4
2257 G4
2259 E2
2261 F5
2262 E5
2263 E3
2265 G5
2266 F3
2267 F3
2268 C5
2270 C5
2271 C5
2272 C5
2273 C5
2274 D5
2275 D5
2276 C5
2277 D5
2278 D4
2279 C5
2280 D5
2281 D5
2282 D5
3204 A2
3205 C3
3206 A2
3207 A2
3208 A2
3209 A3
3210 A3
3211 A2
3212 D2
3213 B4
3214 C4
3215 C3
3216 C3
3217 C3
3218 D3
3219 D2
3220 C3
3221 D4
3222 C3
3223 D3
3224 D3
3225 C3
3226 C3
3227 E2
3228 E2
3229 E2
3230 E2
3231 E2
3232 E2
3233 E2
3236 D4
3237 D2
3238 E2
3239 D2
3240 E2
3241 D1
3242 C4
3243 F2
3244 F2
3245 F4
3246 F4
3247 E4
3248 E4
3249 E4
3250 E4
3252 D4
3253 F1
3254 F1
3255 F1
3256 G3
3257 F3
3258 F3
3259 C4
3260 C5
3261 F3
3262 G3
3263 C3
3264 C3
3265 G4
3266 G4
3267 F3
3268 D4
3269 D4
3270 D5
3271 C5
3272 C5
3273 C3
3274 C3
3275 B4
3276 D5
3277 D5
3278 D5
3279 D5
3281 F3
3282 F3
3283 G4
3284 G3
3285 G4
3286 G3
3287 E2
3288 D4
4001 D1
4002 D2
5201 D4
5205 A4
5211 F1
5212 A4
5213 A4
5215 D3
5216 F4
5217 D4
7201 B3
7202 B4
7203 B1
7204 D3
7205 A3
7206 E1
7207 G3
7208 E1
7211 C1
7212 C4
7213 E4
7214 D5

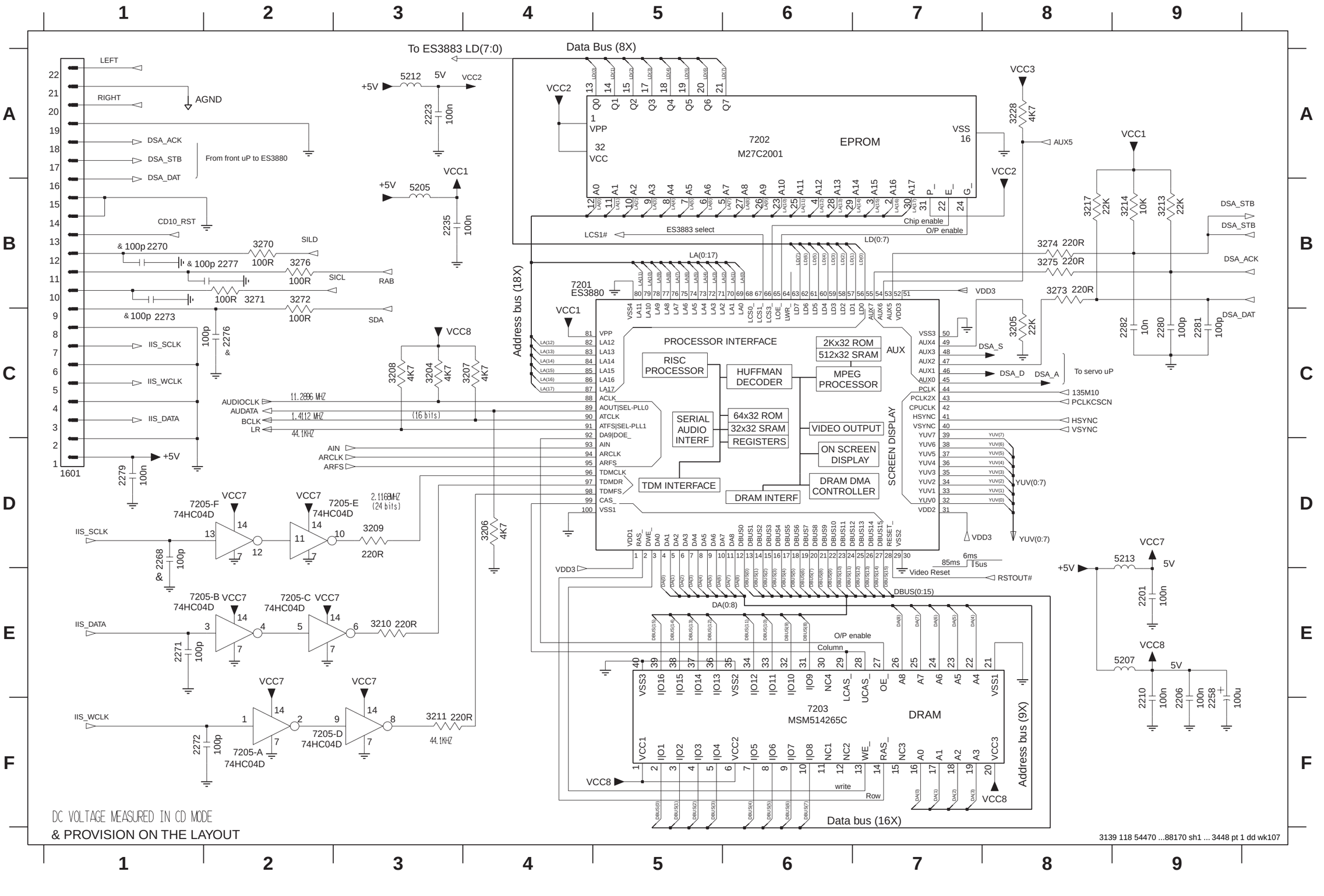


1601 C5
1602 F5
1603 E5
2209 A4
2211 E1
2212 D1
2217 F2
2219 F4
2221 E4
2237 F2
2242 G3
2243 F4
2244 G2
2245 F3
2246 E3
2249 C1
2252 G4
2253 E4
2254 E1
2258 A1
2260 F3
2264 D1
2269 E3
2283 D4
2284 B4
3251 F5
5202 B5
5203 E5
5204 E4
5207 A2
5208 F1
5209 C2
5210 F5
6204 E4
6205 E4
6208 F5

8-7

ES3880 CIRCUIT

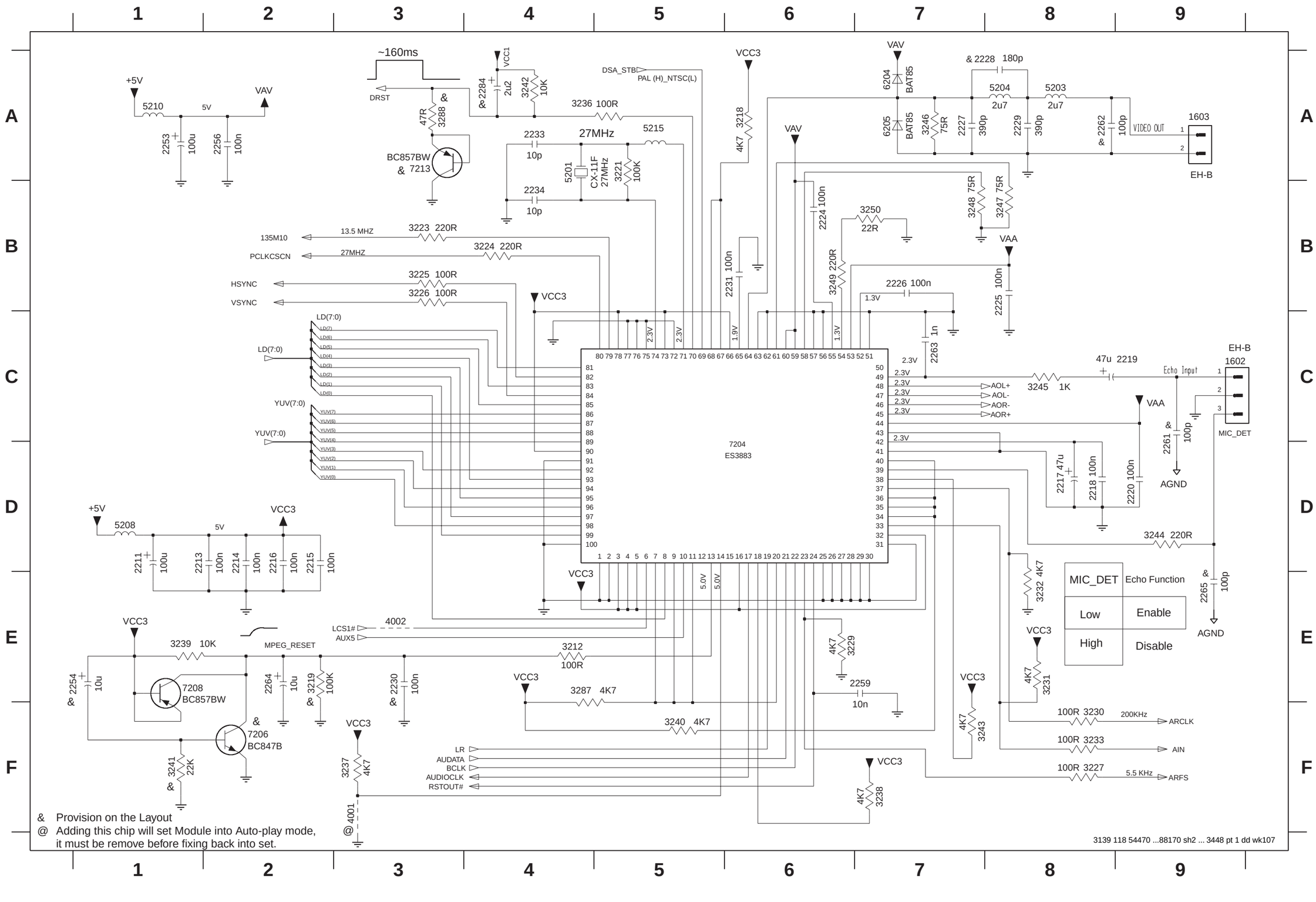
1601 D1	2210 F9	2258 F9	2271 E1	2276 C2	2280 C9	3204 C3	3207 C4	3210 E3	3214 B9	3270 B2	3273 B8	3276 B2	5212 A3	7202 A6	7205-B E1	7205-E D2
2201 E9	2223 A3	2268 D1	2272 F1	2277 B2	2281 C9	3205 C8	3208 C3	3211 F3	3217 B8	3271 B2	3274 B8	5205 B3	5213 D9	7203 F6	7205-C E2	7205-F D1
2206 F9	2235 B3	2270 B1	2273 C1	2279 D1	2282 C9	3206 D4	3209 D3	3213 B9	3228 A8	3272 B2	3275 B8	5207 E9	7201 B4	7205-A F2	7205-D F2	



8-8

ES3883 CIRCUIT

1602 C9	2213 D1	2216 D2	2219 C9	2225 B8	2228 A7	2231 B6	2253 A1	2259 E7	2263 C7	2284 A4	3219 E2	3224 B4	3227 F8	3231 E8	3236 A4	3239 E1	3242 A4	3245 C8	3248 B7	3287 E4	4002 E3	5204 A8	5215 A5	7204 D6	7213 A3
1603 A9	2214 D2	2217 D8	2220 D9	2226 B7	2229 A8	2233 A4	2254 E1	2261 D9	2264 E2	3212 E4	3221 A5	3225 B3	3229 E6	3232 E8	3237 F3	3240 F5	3243 F7	3246 A7	3249 B6	3288 A3	5201 A4	5208 D1	6204 A7	7206 F2	
2211 D1	2215 D2	2218 D8	2224 B6	2227 A7	2230 E3	2234 B4	2256 A2	2262 A8	2265 E9	3218 A6	3223 B3	3226 B3	3230 F8	3233 F8	3238 F7	3241 F1	3244 D9	3247 B8	3250 B7	4001 F3	5203 A8	5210 A1	6205 A7	7208 E1	

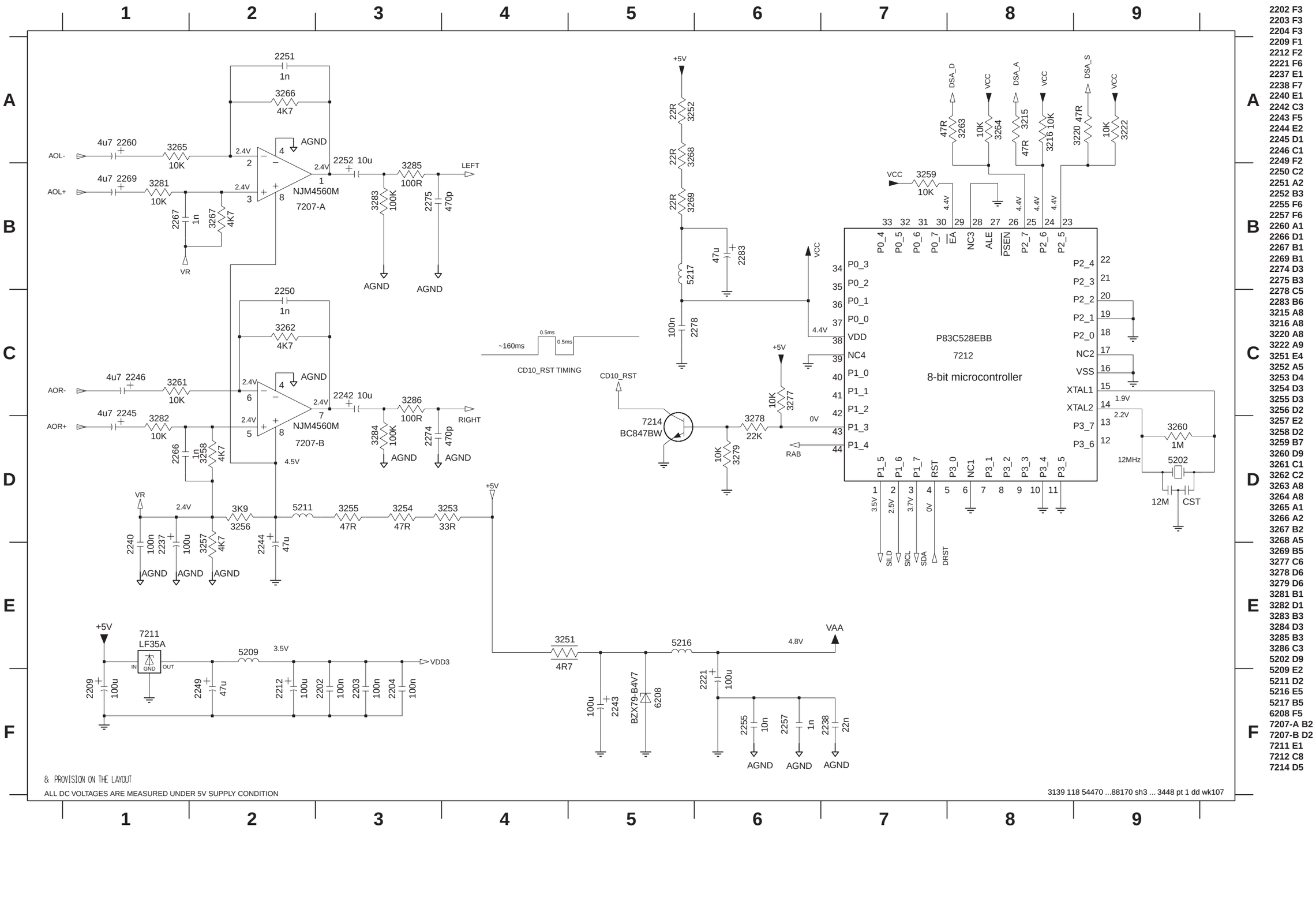


& Provision on the Layout

@ Adding this chip will set Module into Auto-play mode, it must be remove before fixing back into set.

8-9

AUDIO CIRCUIT



& PROVISION ON THE LAYOUT

ALL DC VOLTAGES ARE MEASURED UNDER 5V SUPPLY CONDITION

3139 118 54470 ...88170 sh3 ... 3448 pt 1 dd wk107

2202 F3
2203 F3
2204 F3
2209 F1
2212 F2
2221 F6
2237 E1
2238 F7
2240 E1
2242 C3
2243 F5
2244 E2
2245 D1
2246 C1
2249 F2
2250 C2
2251 A2
2252 B3
2255 F6
2257 F6
2260 A1
2266 D1
2267 B1
2269 B1
2274 D3
2275 B3
2278 C5
2283 B6
3215 A8
3216 A8
3220 A8
3222 A9
3251 E4
3252 A5
3253 D4
3254 D3
3255 D3
3256 D2
3257 E2
3258 D2
3259 B7
3260 D9
3261 C1
3262 C2
3263 A8
3264 A8
3265 A1
3266 A2
3267 B2
3268 A5
3269 B5
3277 C6
3278 D6
3279 D6
3281 B1
3282 D1
3283 B3
3284 D3
3285 B3
3286 C3
5202 D9
5209 E2
5211 D2
5216 E5
5217 B5
6208 F5
7207-A B2
7207-B D2
7211 E1
7212 C8
7214 D5

8-10

ELECTRICAL PARTS LIST - MPEG-01B BOARD

ELECTRICAL PARTS LIST - MPEG-01B BOARD

MISCELLANEOUS

1601	2422 025 16837	Flex Socket 22pin Hort.

CAPACITORS

2201	4822 126 14305	100nF 10% 16V
2202	4822 126 14305	100nF 10% 16V
2203	4822 126 14305	100nF 10% 16V
2204	4822 126 14305	100nF 10% 16V
2206	4822 126 14305	100nF 10% 16V
2209	4822 124 40207	100µF 20% 25V
2210	4822 126 14305	100nF 10% 16V
2211	4822 124 40207	100µF 20% 25V
2212	4822 124 40207	100µF 20% 25V
2213	4822 126 14305	100nF 10% 16V
2214	4822 126 14305	100nF 10% 16V
2215	4822 126 14305	100nF 10% 16V
2216	4822 126 14305	100nF 10% 16V
2217	4822 124 40433	47µF 20% 25V
2218	4822 126 14305	100nF 10% 16V
2219	4822 124 40433	47µF 20% 25V
2220	4822 126 14305	100nF 10% 16V
2221	4822 124 41584	100µF 20% 10V
2223	4822 126 14305	100nF 10% 16V
2224	4822 126 14305	100nF 10% 16V
2225	4822 126 14305	100nF 10% 16V
2226	4822 126 14305	100nF 10% 16V
2227	4822 126 14315	390pF 5% 50V
2229	4822 126 14315	390pF 5% 50V
2231	4822 126 14305	100nF 10% 16V
2233	4822 122 33741	10pF 10% 50V
2234	4822 122 33741	10pF 10% 50V
2235	4822 126 14305	100nF 10% 16V
2237	4822 124 40207	100µF 20% 25V
2238	4822 126 14494	22nF 10% 25V
2240	4822 126 14305	100nF 10% 16V
2242	4822 124 40248	10µF 20% 63V
2243	4822 124 41584	100µF 20% 10V
2244	4822 124 40433	47µF 20% 25V
2245	4822 124 40769	4,7µF 20% 100V
2246	4822 124 40769	4,7µF 20% 100V
2249	4822 124 40433	47µF 20% 25V
2250	3198 016 31020	1nF 5% 25V
2251	3198 016 31020	1nF 5% 25V
2252	4822 124 40248	10µF 20% 63V
2253	4822 124 41584	100µF 20% 10V
2255	5322 126 11583	10nF 10% 50V
2256	4822 126 14305	100nF 10% 16V
2257	3198 016 31020	1nF 5% 25V
2258	4822 124 40207	100µF 20% 25V
2259	5322 126 11583	10nF 10% 50V
2260	4822 124 40769	4,7µF 20% 100V
2263	3198 016 31020	1nF 5% 25V
2264	4822 124 40248	10µF 20% 63V
2266	3198 016 31020	1nF 5% 25V
2267	3198 016 31020	1nF 5% 25V
2269	4822 124 40769	4,7µF 20% 100V
2271	4822 122 31765	100pF 2% 63V
2272	4822 122 31765	100pF 2% 63V
2274	4822 126 13881	470pF 5% 50V
2275	4822 126 13881	470pF 5% 50V
2278	4822 126 14305	100nF 10% 16V
2279	4822 126 14305	100nF 10% 16V
2280	4822 122 31765	100pF 2% 63V
2281	4822 122 31765	100pF 2% 63V
2282	5322 126 11583	10nF 10% 50V
2283	4822 124 40433	47µF 20% 25V

RESISTORS

3204	4822 051 30472	4k7 5% 0,062W
3205	4822 051 30223	22k 5% 0,062W
3206	4822 051 30472	4k7 5% 0,062W
3207	4822 051 30472	4k7 5% 0,062W
3208	4822 051 30472	4k7 5% 0,062W
3209	4822 051 30221	220R 5% 0,062W
3210	4822 051 30221	220R 5% 0,062W
3211	4822 051 30221	220R 5% 0,062W
3212	4822 051 30101	100R 5% 0,062W
3213	4822 051 30223	22k 5% 0,062W
3214	4822 051 30103	10k 5% 0,062W
3215	4822 051 30479	47R 5% 0,062W
3216	4822 051 30103	10k 5% 0,062W
3217	4822 051 30223	22k 5% 0,062W
3218	4822 051 30472	4k7 5% 0,062W
3220	4822 051 30479	47R 5% 0,062W
3221	4822 117 13632	100k 1% 0,062W
3222	4822 051 30103	10k 5% 0,062W
3223	4822 051 30221	220R 5% 0,062W
3224	4822 051 30221	220R 5% 0,062W
3225	4822 051 30101	100R 5% 0,062W
3226	4822 051 30101	100R 5% 0,062W
3227	4822 051 30101	100R 5% 0,062W
3228	4822 051 30472	4k7 5% 0,062W
3229	4822 051 30472	4k7 5% 0,062W
3230	4822 051 30101	100R 5% 0,062W
3231	4822 051 30472	4k7 5% 0,062W
3232	4822 051 30472	4k7 5% 0,062W
3233	4822 051 30101	100R 5% 0,062W
3236	4822 051 30101	100R 5% 0,062W
3237	4822 051 30472	4k7 5% 0,062W
3238	4822 051 30472	4k7 5% 0,062W
3239	4822 051 30103	10k 5% 0,062W
3240	4822 051 30472	4k7 5% 0,062W
3242	4822 051 30103	10k 5% 0,062W
3243	4822 051 30472	4k7 5% 0,062W
3244	4822 051 30221	220R 5% 0,062W
3245	4822 051 30102	1k 5% 0,062W
3246	4822 051 30759	75R 5% 0,062W
3247	4822 051 30759	75R 5% 0,062W
3248	4822 051 30759	75R 5% 0,062W
3249	4822 051 30221	220R 5% 0,062W
3250	4822 117 12139	22R 5% 0,062W
3251	4822 052 10478	4R7 5% 0,33W
3252	4822 117 12139	22R 5% 0,062W
3253	4822 051 30339	33R 5% 0,062W
3254	4822 051 30479	47R 5% 0,062W
3255	4822 051 30479	47R 5% 0,062W
3256	4822 051 30392	3k9 5% 0,062W
3257	4822 051 30472	4k7 5% 0,062W
3258	4822 051 30472	4k7 5% 0,062W
3259	4822 051 30103	10k 5% 0,062W
3260	4822 051 30105	1M 5% 0,062W
3261	4822 051 30103	10k 5% 0,062W
3262	4822 051 30472	4k7 5% 0,062W
3263	4822 051 30479	47R 5% 0,062W
3264	4822 051 30103	10k 5% 0,062W
3265	4822 051 30103	10k 5% 0,062W
3266	4822 051 30472	4k7 5% 0,062W
3267	4822 051 30472	4k7 5% 0,062W
3268	4822 117 12139	22R 5% 0,062W
3269	4822 117 12139	22R 5% 0,062W
3270	4822 051 30101	100R 5% 0,062W
3271	4822 051 30101	100R 5% 0,062W
3272	4822 051 30101	100R 5% 0,062W
3273	4822 051 30221	220R 5% 0,062W
3274	4822 051 30221	220R 5% 0,062W
3275	4822 051 30221	220R 5% 0,062W
3276	4822 051 30101	100R 5% 0,062W
3277	4822 051 30103	10k 5% 0,062W
3278	4822 051 30223	22k 5% 0,062W
3279	4822 051 30103	10k 5% 0,062W
3281	4822 051 30103	10k 5% 0,062W
3282	4822 051 30103	10k 5% 0,062W
3283	4822 117 13632	100k 1% 0,062W
3284	4822 117 13632	100k 1% 0,062W
3285	4822 051 30101	100R 5% 0,062W
3286	4822 051 30101	100R 5% 0,062W
3287	4822 051 30472	4k7 5% 0,062W
4002	4822 051 30008	0R Jumper 0603

COILS & FILTERS

5201	2422 543 01137	X'tal Resonator 27MHz
5202	5322 242 73686	Ceram Resonator 12MHz
5203	4822 157 11868	Coil 2,7µH 5%
5204	4822 157 11868	Coil 2,7µH 5%
5205	4822 157 11506	Chip Ind. 120R 100MHz
5207	4822 526 10704	FE Bead 100MHz
5208	4822 526 10704	FE Bead 100MHz
5209	4822 526 10704	FE Bead 100MHz
5210	4822 526 10704	FE Bead 100MHz
5211	4822 157 11506	Chip Ind. 120R 100MHz
5212	4822 157 11506	Chip Ind. 120R 100MHz
5213	4822 157 11506	Chip Ind. 120R 100MHz
5215	4822 157 11506	Chip Ind. 120R 100MHz
5216	4822 157 11506	Chip Ind. 120R 100MHz
5217	4822 157 11506	Chip Ind. 120R 100MHz

DIODES

6204	4822 130 31983	BAT85
6205	4822 130 31983	BAT85
6208	4822 130 34174	BZX79-B4V7

TRANSISTORS & INTEGRATED CIRCUITS

7201	9322 139 79671	ES3880
7202	9965 000 08683	AT27C020-70JC
7203	9322 164 13668	MSM514265E-60JS
7204	9322 138 97671	ES3883
7205	9337 142 60653	74HC04D
7207	4822 209 83357	NJM4560M
7208	3198 010 42310	BC847BW
7211	9322 154 82668	LF35ABDT
7212	9352 691 27518	P83C528EBBB/301
7214	3198 010 42310	BC847BW

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

ETF7 TAPE MODULE

(Non-Dolby Version)

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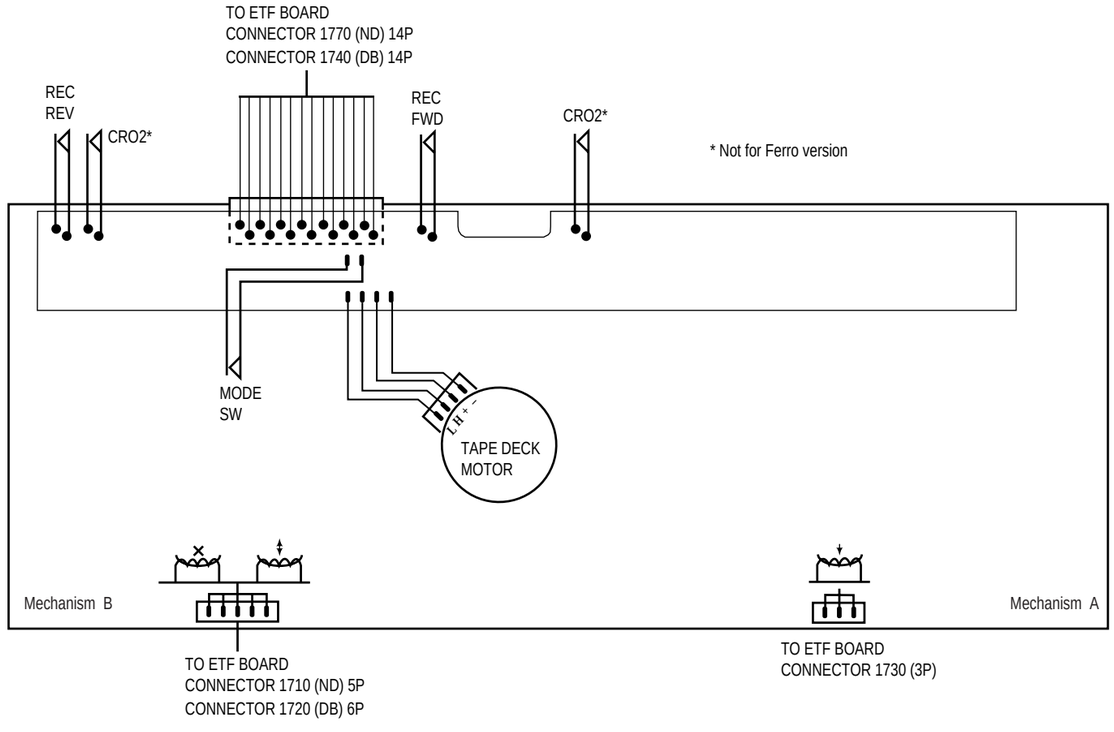
Tapedeck wiring (Double deck)



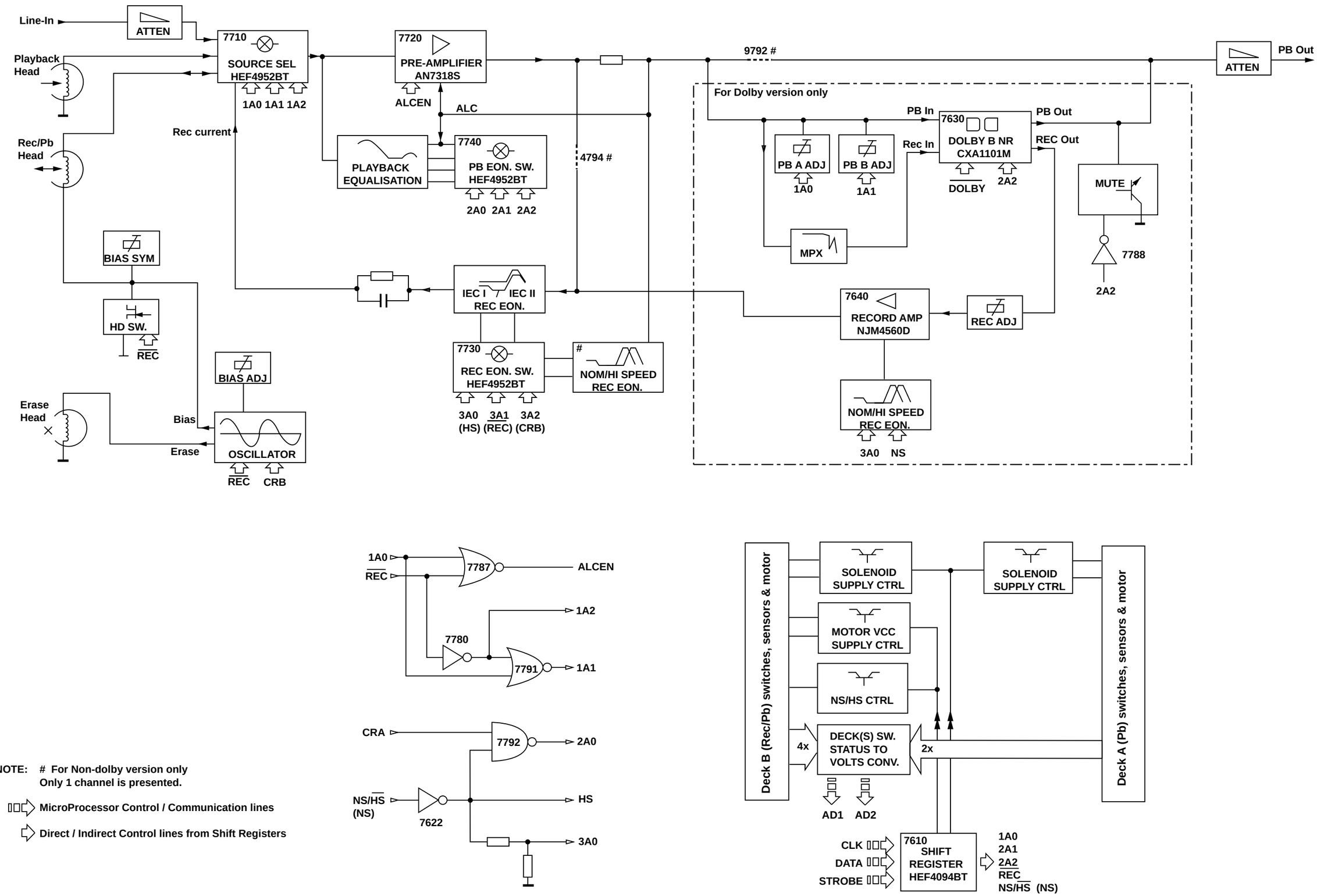
Variations table for Analog Circuit

	Autoreverse ND/DD/FR	Non-autoreverse ND/DD/FF	
	Chrome/Ferro	Chrome/Ferro	Ferro
2624	-	-	100nF
2701 , 2702	150pF	270pF	270pF
2703 , 2704	100pF	220pF	220pF
2717 , 2718	10nF	15nF	15nF
2721 , 2722	6,8nF	6,8nF	-
2727 , 2728	470pF	1nF	1nF
3616	10k	1k	1k
3618	6k8	-	-
3620	10k trimmer	-	-
3622	-	10k trimmer	10k trimmer
3672	4k7	-	-
3676	47k	-	-
3687	220R	220R	-
3688	680R	-	-
3723 , 3724	15k	18k	18k
3725 , 3726	10R	10R	-
3727 , 3728	5k6	6k8	6k8
3729 , 3730	3k3	4k7	4k7
3743 , 3744	1k5	2k2	2k2
3745 , 3746	3k3	5k6	5k6
3754 , 3755	1M	47R	47R

	Autoreverse ND/DD/FR	Non-autoreverse ND/DD/FF	
	Chrome/Ferro	Chrome/Ferro	Ferro
3769	12k	8k2	8k2
3772	6k8	5k6	5k6
4785	-	-	0R jumper
3774	15k	8k2	8k2
6614	1N4148	-	-
7616	BC857B	-	-
7622	BC847B	-	-

9-2

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

9-4

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

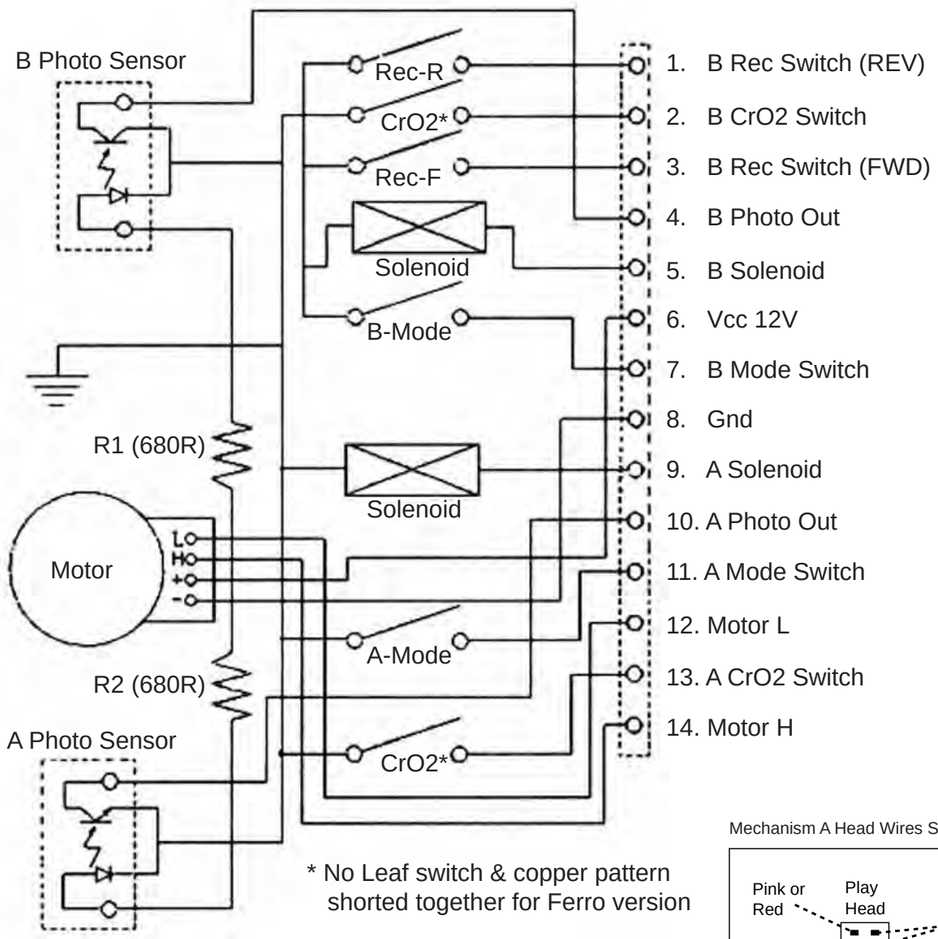
CONNECTOR 1740 — DECK A & B CONTROL INTERFACE ***(For Dolby B NR version only)***

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)***

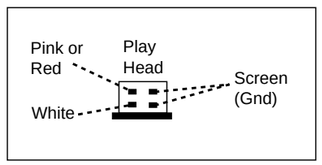
1	REC REW	Record tab protection status switch (reverse)	[open=on: close=off]
2	CrO2 B	Chrome tape detection switch deck B	[open=Cr: close=Fe]
3	REC FWD	Record tab protection status switch (forward)	[open=on: close=off]
4	PHOTO B	Photo sensor output (tape movement indication)	
5	SOL B	Solenoid supply 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

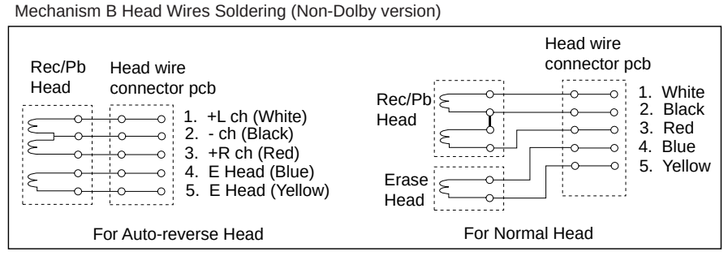


* No Leaf switch & copper pattern shorted together for Ferro version

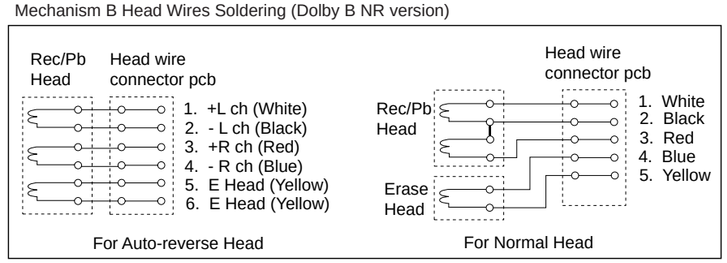
Mechanism A Head Wires Soldering



Mechanism B Head Wires Soldering (Non-Dolby version)



Mechanism B Head Wires Soldering (Dolby B NR version)



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
^ Not applicable for Ferro version

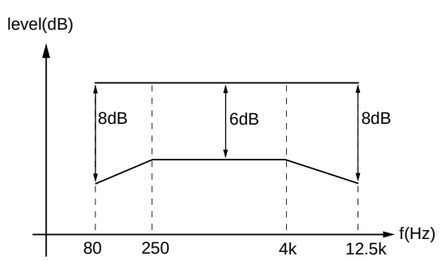


figure. 1

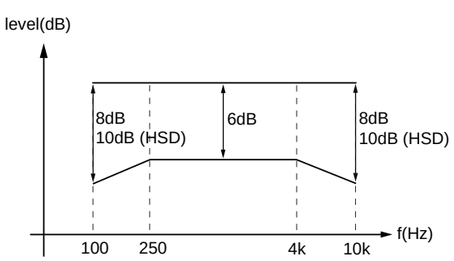
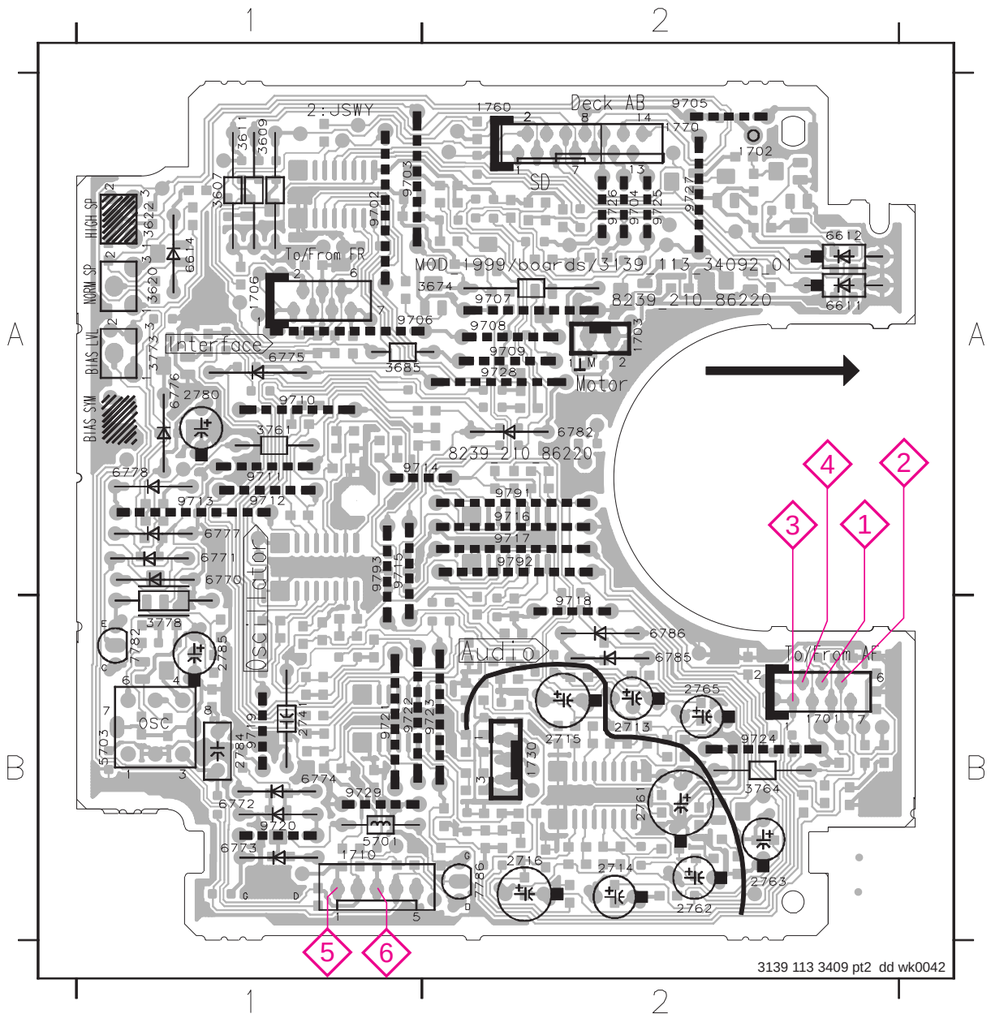


figure. 2

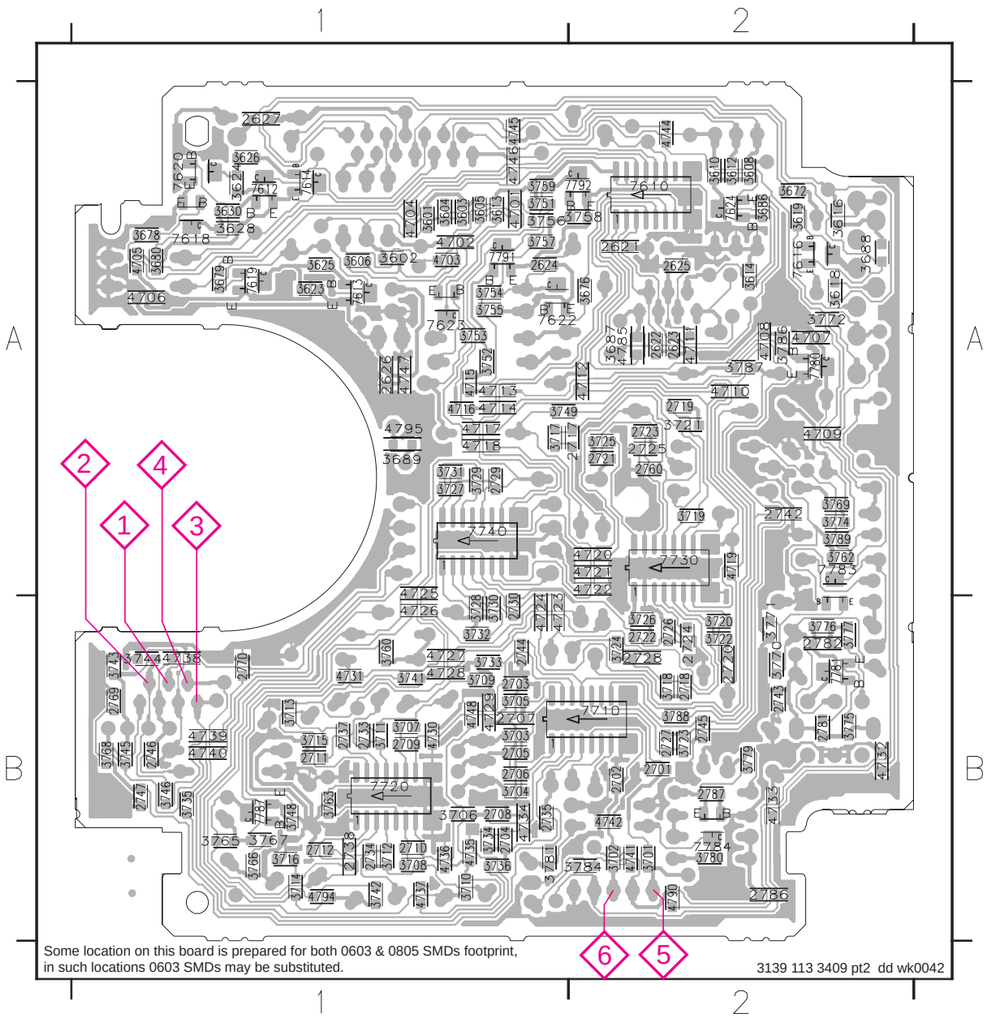
COMPONENT LAYOUT

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



CHIP LAYOUT

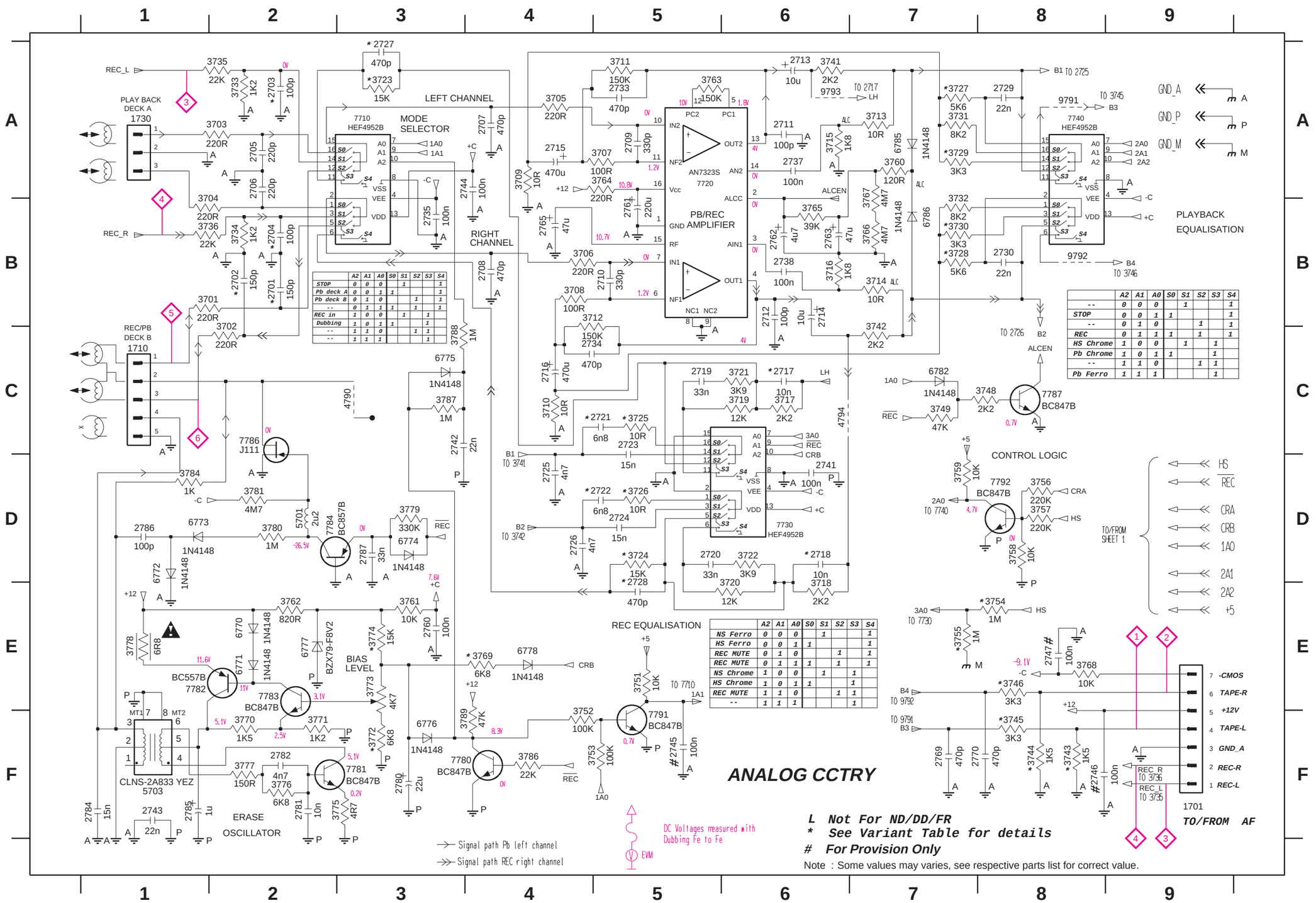
2621 A2	2724 B2	3602 A1	3688 A2	3725 A2	3757 A1	4701 A1	4727 B1	7612 A1
2622 A2	2725 A2	3603 A1	3689 A1	3726 B2	3758 A2	4702 A1	4728 B1	7613 A1
2623 A2	2726 B2	3604 A1	3701 B2	3727 A1	3759 A1	4703 A1	4729 B1	7614 A1
2624 A1	2727 B2	3605 A1	3702 B2	3728 B1	3760 B1	4704 A1	4730 B1	7616 A2
2625 A2	2728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



9-7

ANALOG CIRCUIT

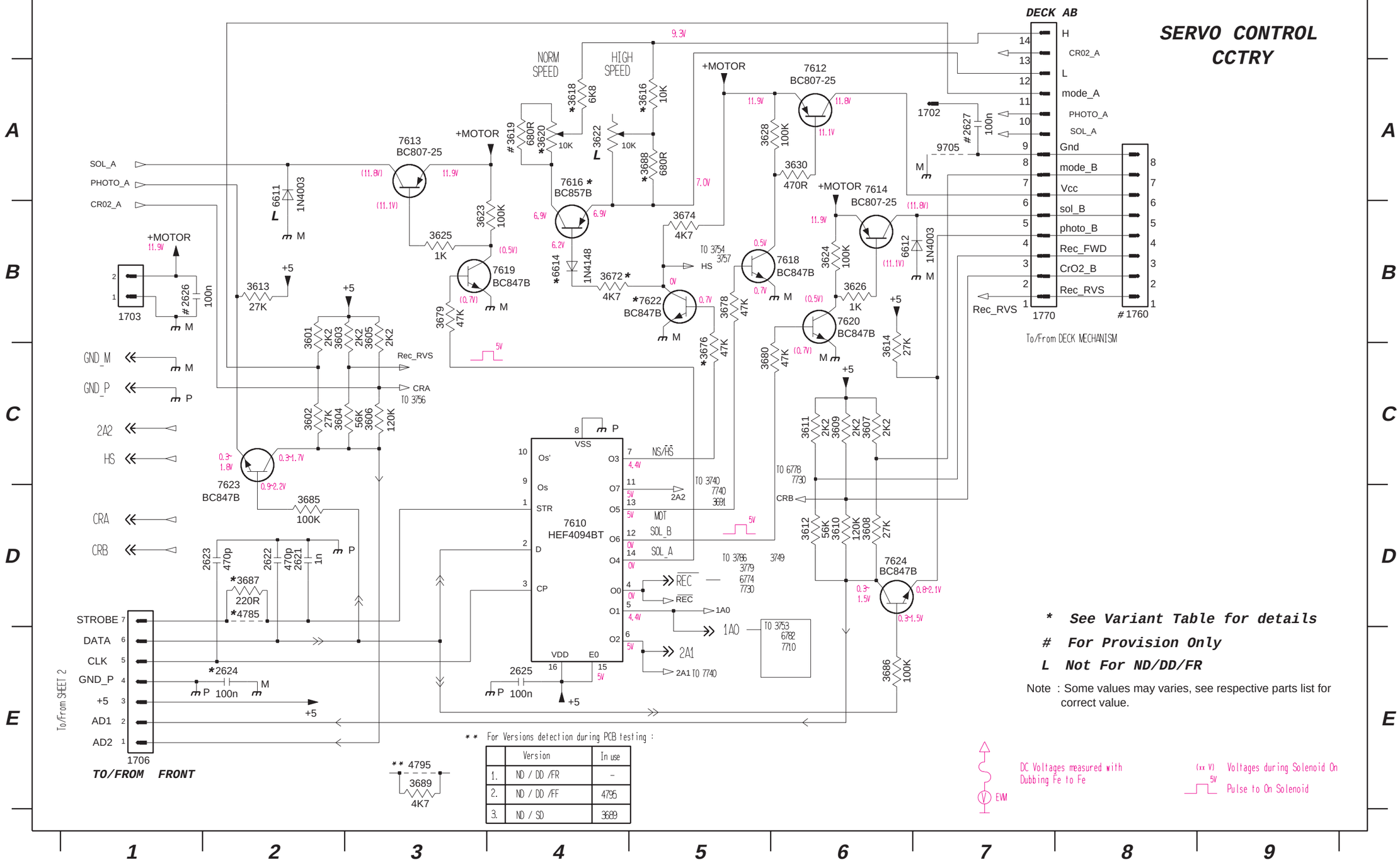
1701 F9	2705 A2	2712 B6	2719 C5	2726 D4	2735 B3	2745 F5	2765 B4	2785 F1	3705 A4	3712 B4	3719 C6	3726 D5	3733 A2	3744 F8	3753 F5	3760 A7	3767 A7	3774 E3	3781 D2	4794 C6	6774 D3	6786 B7	7782 E1	9791 A8
1710 C1	2706 A2	2713 A6	2720 D5	2727 A3	2737 A6	2746 F8	2769 F7	2786 D1	3706 B4	3713 A7	3720 E6	3727 A7	3734 B2	3745 F8	3754 E8	3761 E3	3768 E8	3775 F3	3784 D1	5701 D2	6775 C3	7710 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	

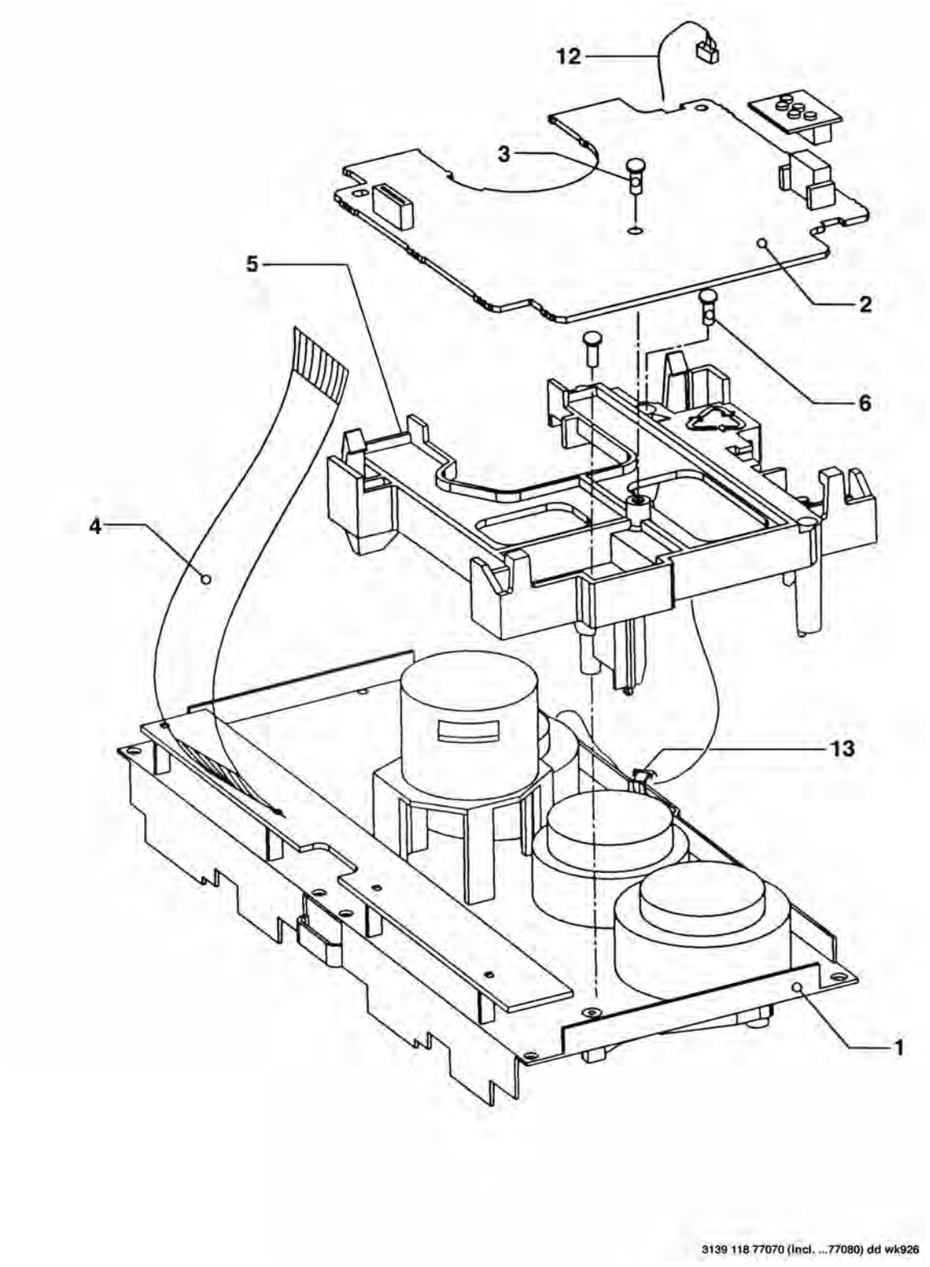


9-8

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 2627 A7 3602 C2 3605 B3 3608 D6 3611 C6 3614 C6 3616 A5 3619 A4 3623 B3 3626 B6 3628 A5 3672 B4 3674 B5 3678 B5 3679 B3 3685 E6 3688 E5 3689 E3 4795 E3 6611 A2 6614 B4 7610 D4 7613 A6 7618 A4 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 6610 D4 6614 A6 7619 A4 7623 B2 7624 B6



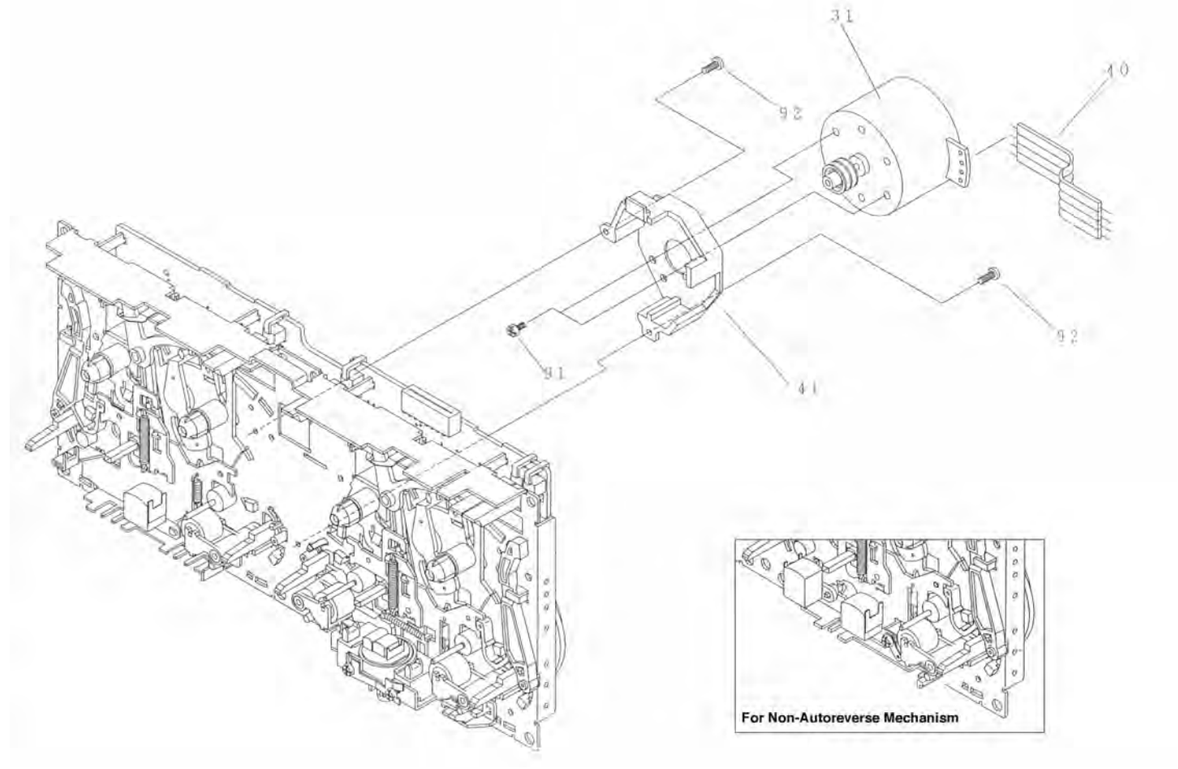


TAPE MODULE EXPLODED VIEW

1	3139 118 77130	Autoreverse Mech. CWE44FR01
1	3139 118 77140	Non-Autoreverse Mech. CWE44FF02 Chrome/Ferro
1	3139 118 77950	Non-Autoreverse Mech. CWE44FF05 Ferro
3	-	Screw D3 x 10
6	-	Screw M2 x 16
7	3139 110 34080	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.

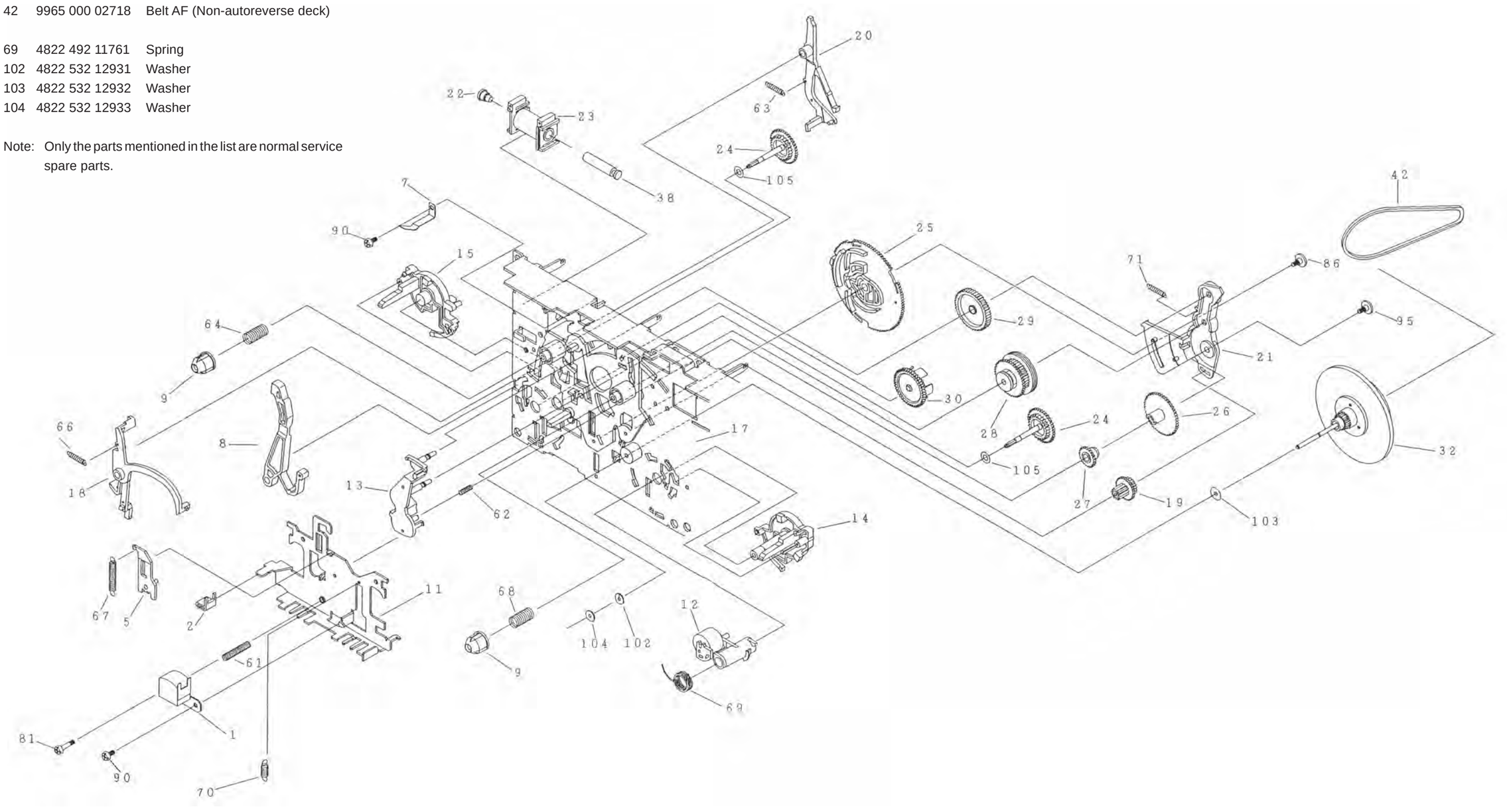
9-10

TAPE MECHANISM A - PLAY

MECHANICAL PARTS - PLAY MECHANISM

1	9965 000 02313	Play Head (Non-Autoreverse deck)
1	9965 000 02321	Play Head (Autoreverse deck)
12	4822 402 10972	Pinch Arm Assembly R
23	9965 000 02314	Coil Assembly
25	9965 000 06443	Cam Gear
32	4822 528 11209	Flywheel Assembly RV
42	9965 000 02315	Belt AF (Autoreverse deck)
42	9965 000 02718	Belt AF (Non-autoreverse deck)
69	4822 492 11761	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

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



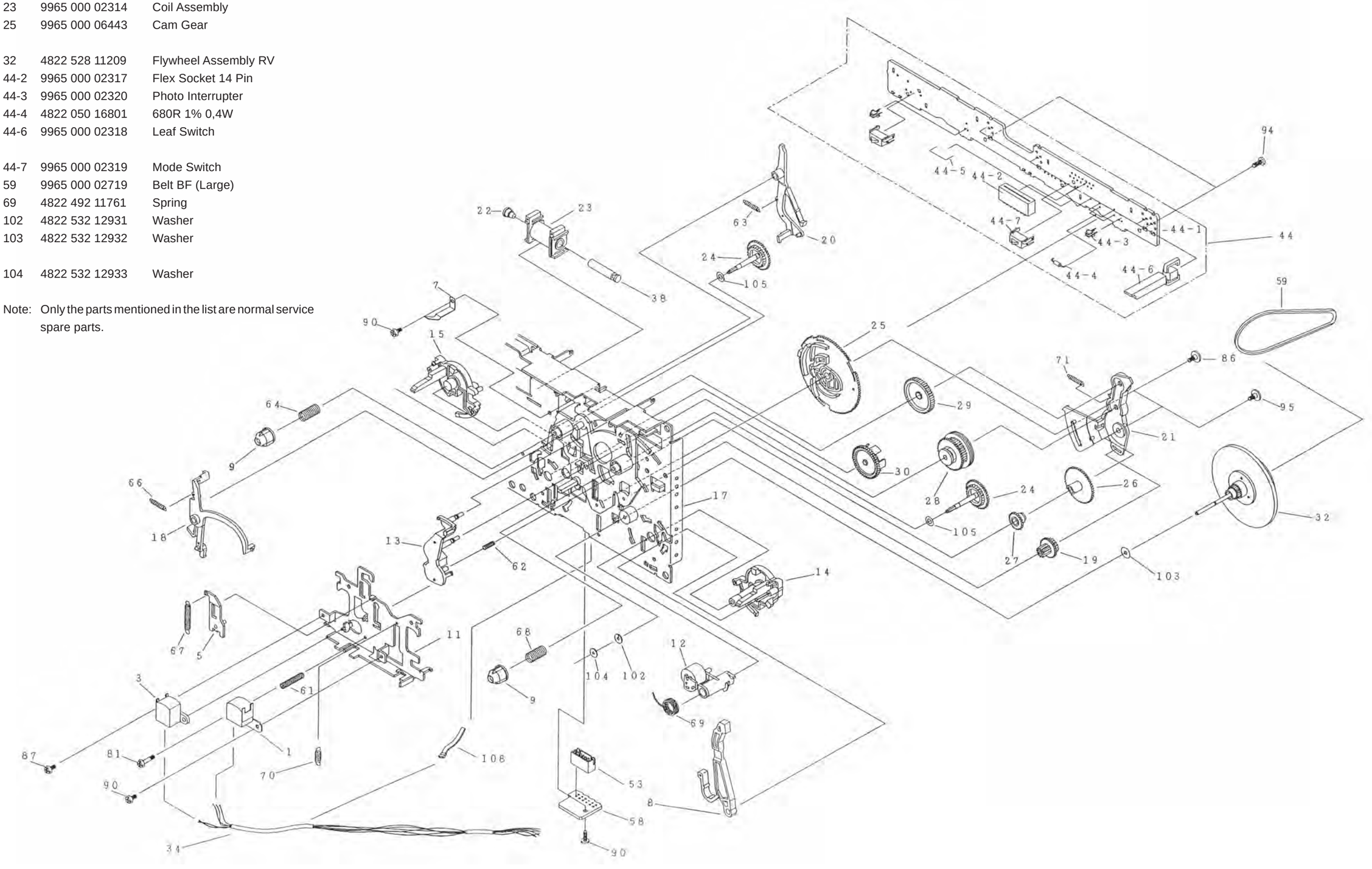
9-11

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

MECHANICAL PARTS - REC/PB MECHANISM

1	9965 000 02313	Play Head
3	9965 000 02600	Head, Erase
12	4822 402 10972	Pinch Arm Assembly R
23	9965 000 02314	Coil Assembly
25	9965 000 06443	Cam Gear
32	4822 528 11209	Flywheel Assembly RV
44-2	9965 000 02317	Flex Socket 14 Pin
44-3	9965 000 02320	Photo Interrupter
44-4	4822 050 16801	680R 1% 0,4W
44-6	9965 000 02318	Leaf Switch
44-7	9965 000 02319	Mode Switch
59	9965 000 02719	Belt BF (Large)
69	4822 492 11761	Spring
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer

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



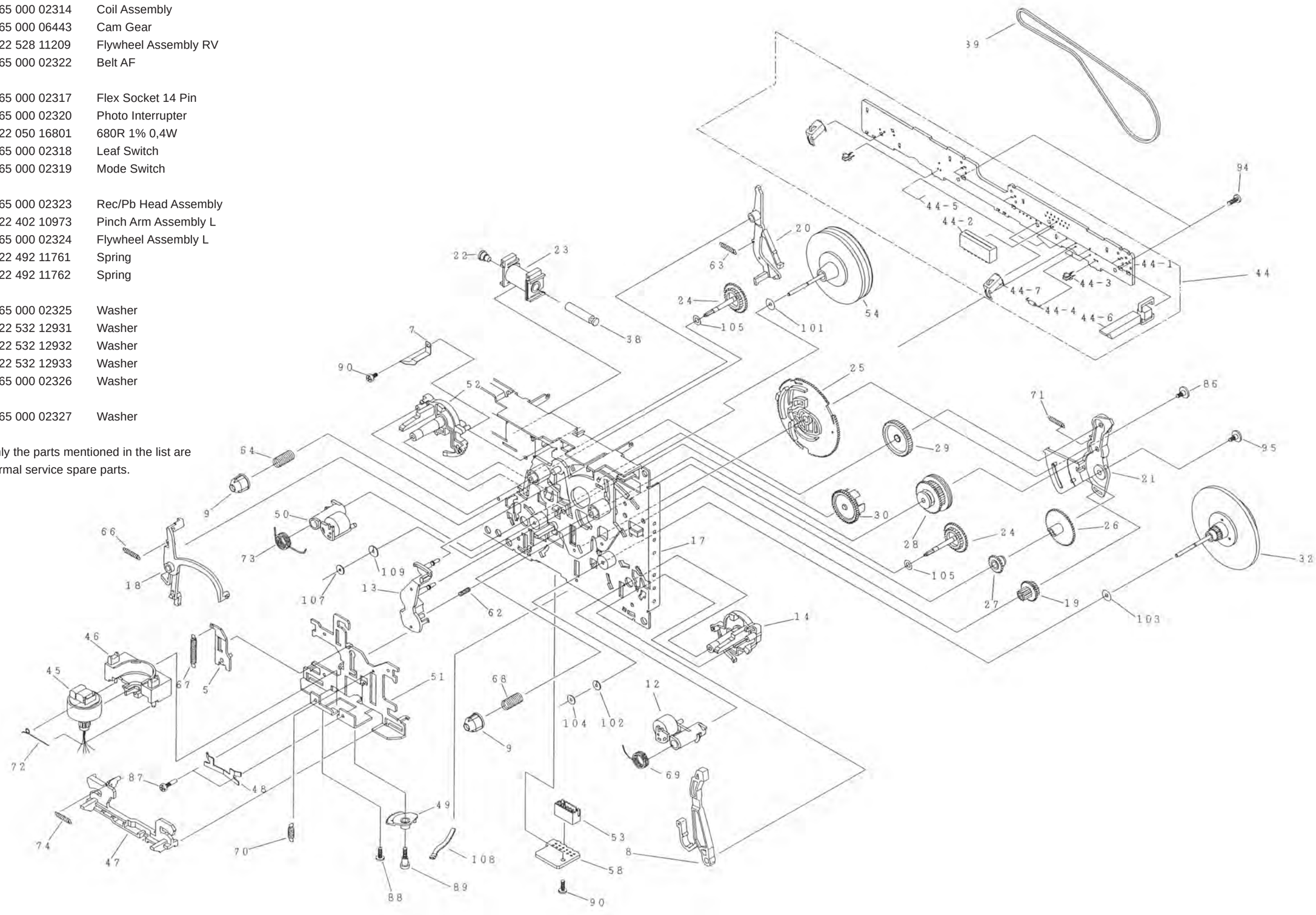
9-12

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

MECHANICAL PARTS - REC/PB MECHANISM

12	4822 402 10972	Pinch Arm Assembly R
23	9965 000 02314	Coil Assembly
25	9965 000 06443	Cam Gear
32	4822 528 11209	Flywheel Assembly RV
39	9965 000 02322	Belt AF
44-2	9965 000 02317	Flex Socket 14 Pin
44-3	9965 000 02320	Photo Interrupter
44-4	4822 050 16801	680R 1% 0,4W
44-6	9965 000 02318	Leaf Switch
44-7	9965 000 02319	Mode Switch
45	9965 000 02323	Rec/Pb Head Assembly
50	4822 402 10973	Pinch Arm Assembly L
54	9965 000 02324	Flywheel Assembly L
69	4822 492 11761	Spring
73	4822 492 11762	Spring
101	9965 000 02325	Washer
102	4822 532 12931	Washer
103	4822 532 12932	Washer
104	4822 532 12933	Washer
107	9965 000 02326	Washer
109	9965 000 02327	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	only for Ferro
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	not for Ferro
2722	532212231866	6,8nF 10% 63V	not for Ferro
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	Trim. 10k 30%	Autoreverse
3622	482210011141	Trim. 10k 30%	Non-autoreverse
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	
3687	482211711503	220R 1% 0,1W	not for Ferro
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	not for Ferro
3726	482205120109	10R 5% 0,1W	not for Ferro
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	

9-14

ELECTRICAL PARTS LIST - ETF7 NON-DOLBY BOARD

RESISTORS

4706	482205120008	0R Jumper 0805	
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	only for Ferro
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

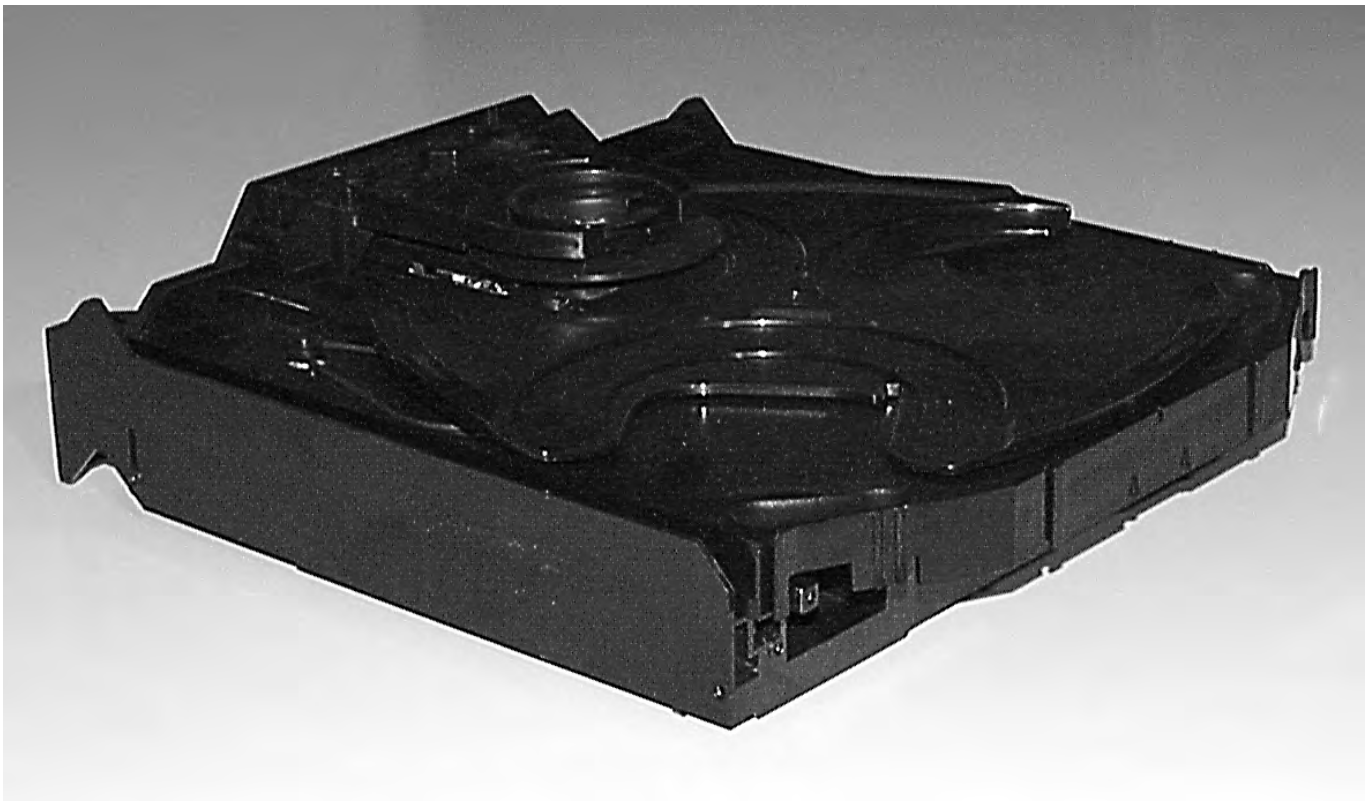
DIODES

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-LC-VCD

(3 Disc Carousel Changer)

Layout stage .1

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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 of CD drive
5. Connect flexfoil to new CD drive
6. Position new CD drive in its studs
7. Remove short-circuit from Laserunit

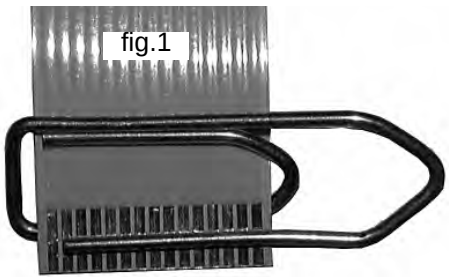
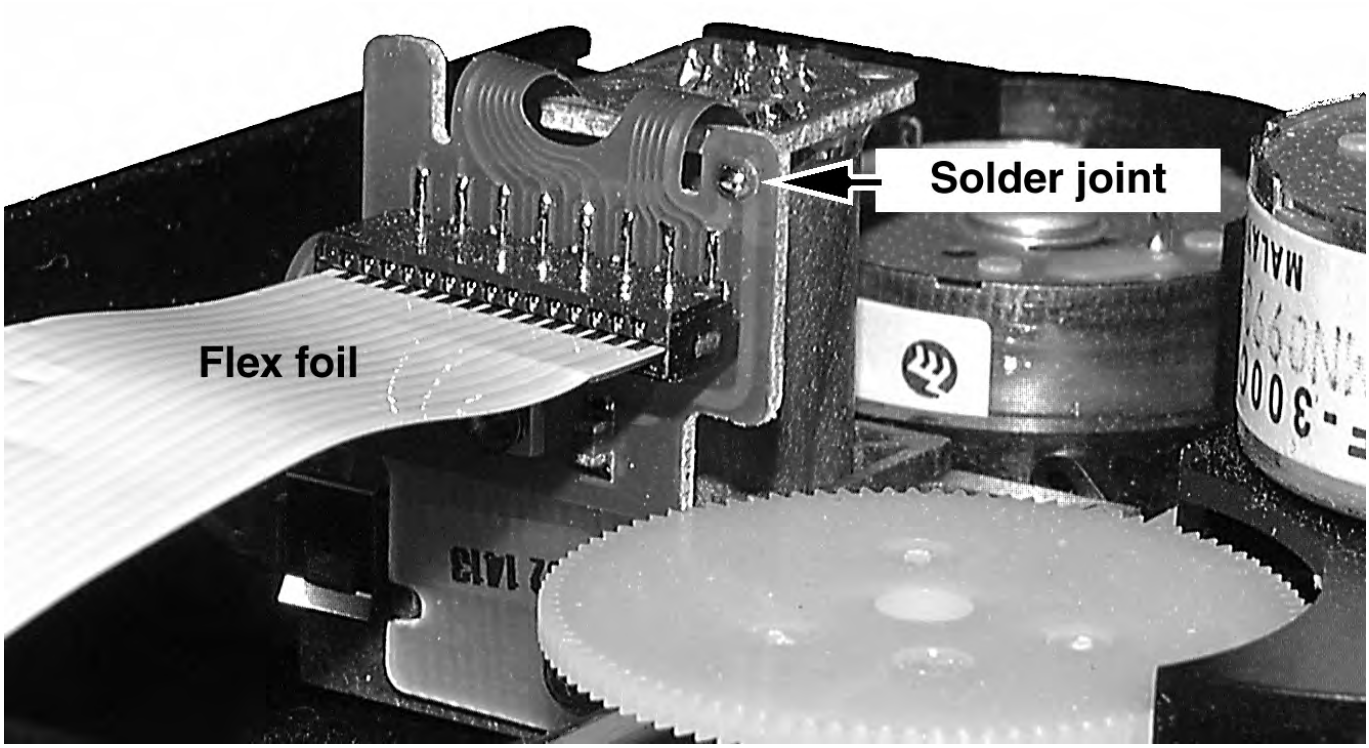
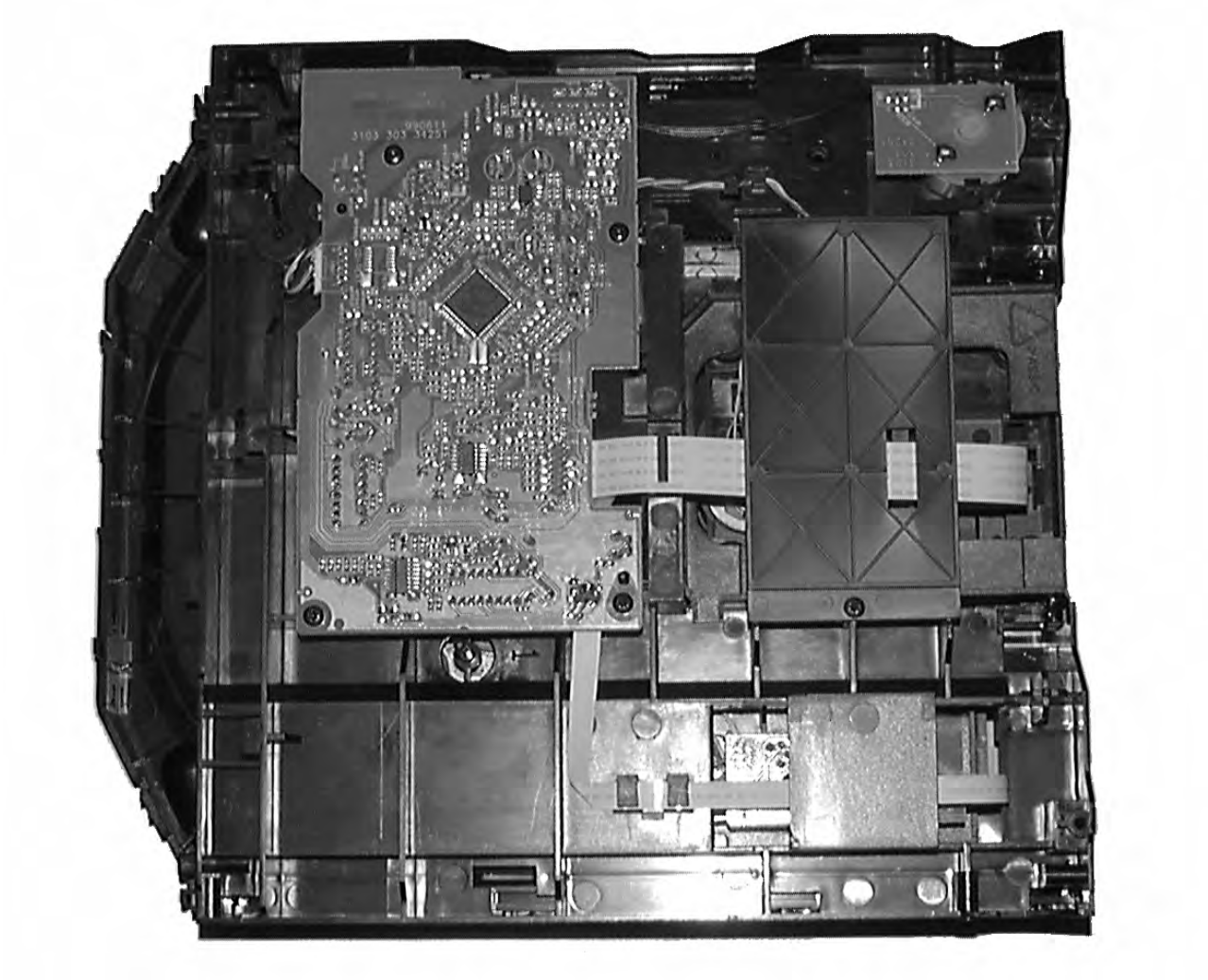


fig.1

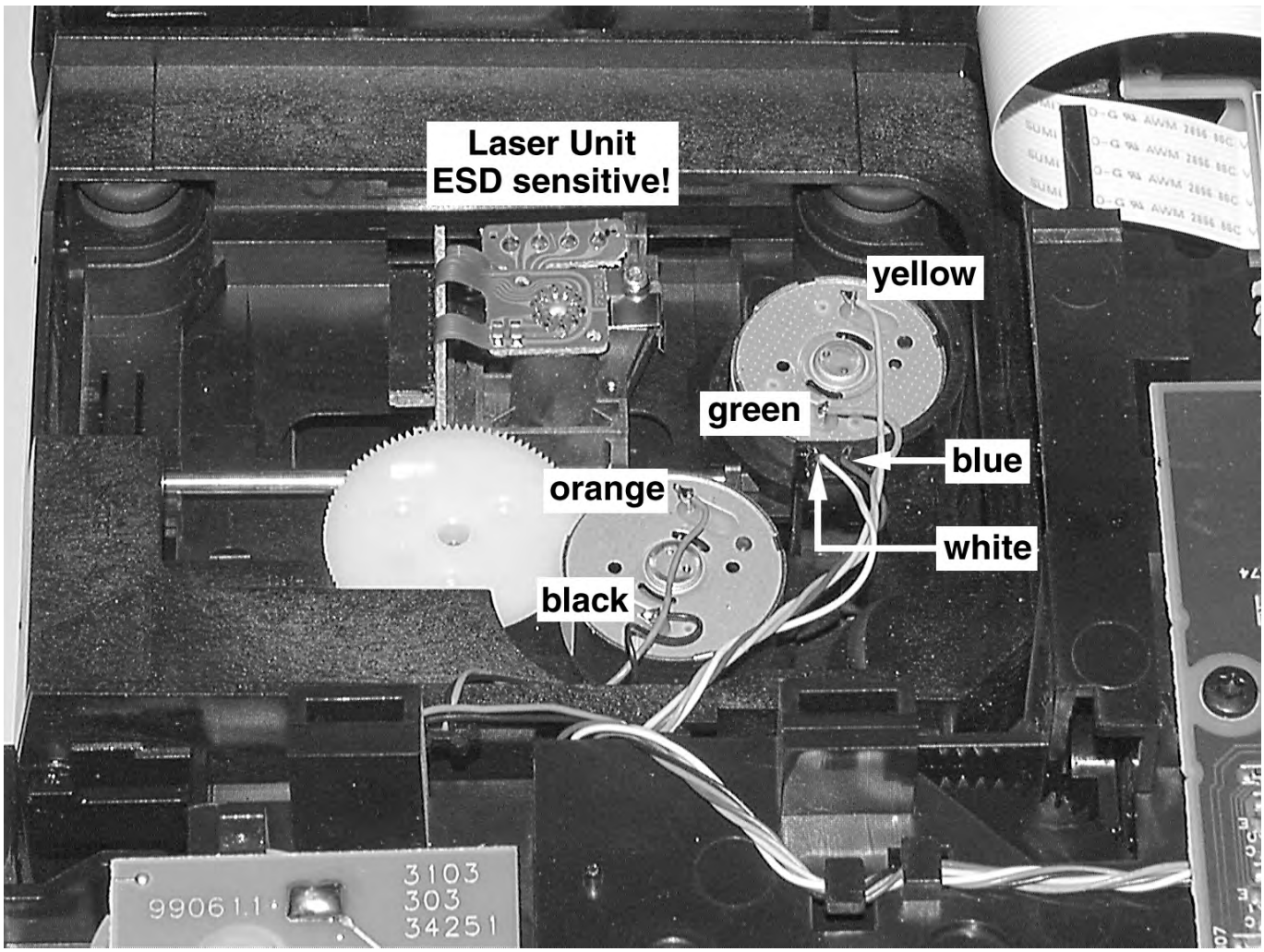
Attention: The laser diode of this CD drive is protected against ESD by a solder joint which shortcircuits the laserdiode to ground.
For proper functionality of the CD drive this solder joint must be removed **after** connection the drive to the set.



Service Position

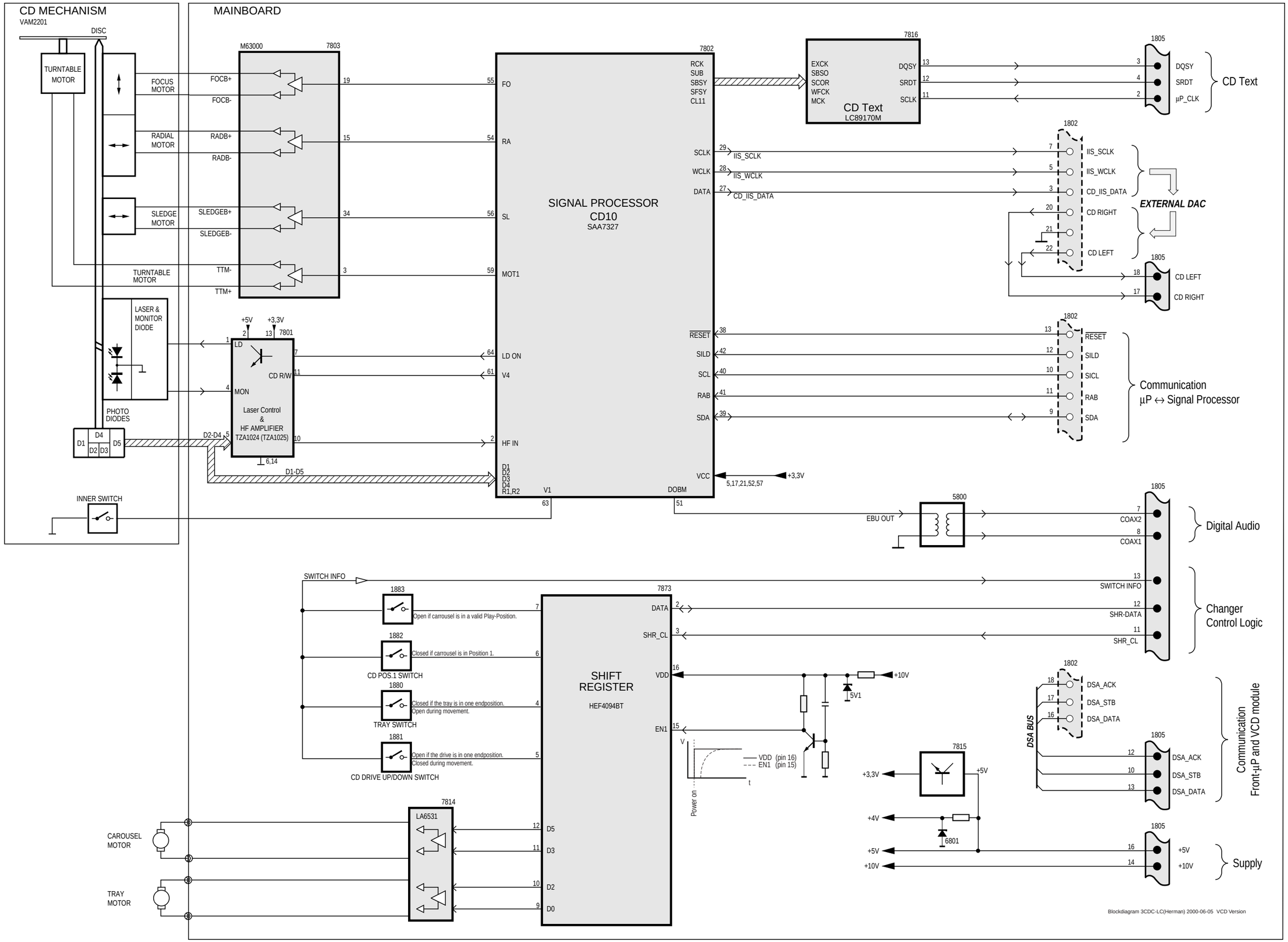


Wiring

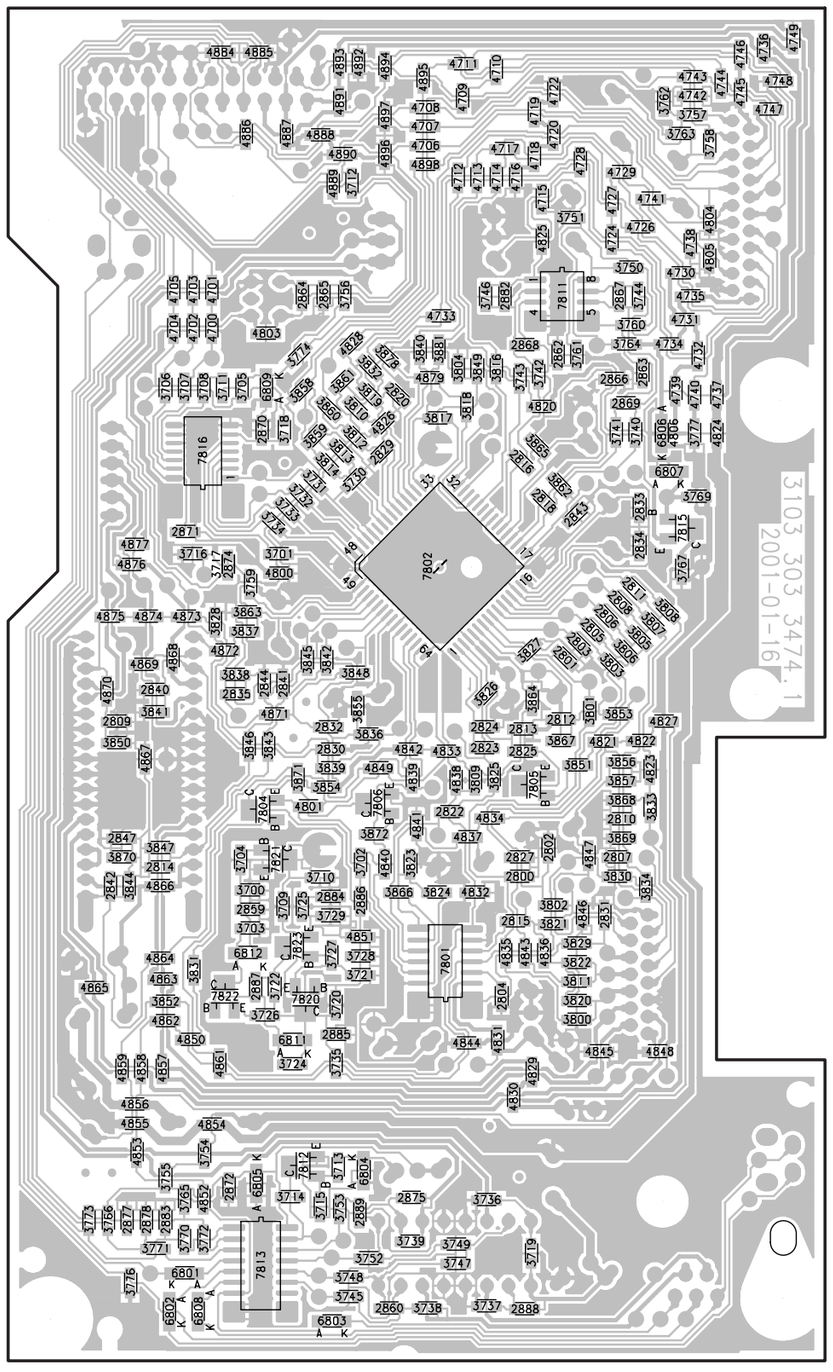

Laser Unit
ESD sensitive!
yellow
green
blue
orange
white
black
3103
303
34251

10-5

BLOCK DIAGRAM 3CDC-LC **VCD Version**



3CDC-LC (Herman) Copperside view



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

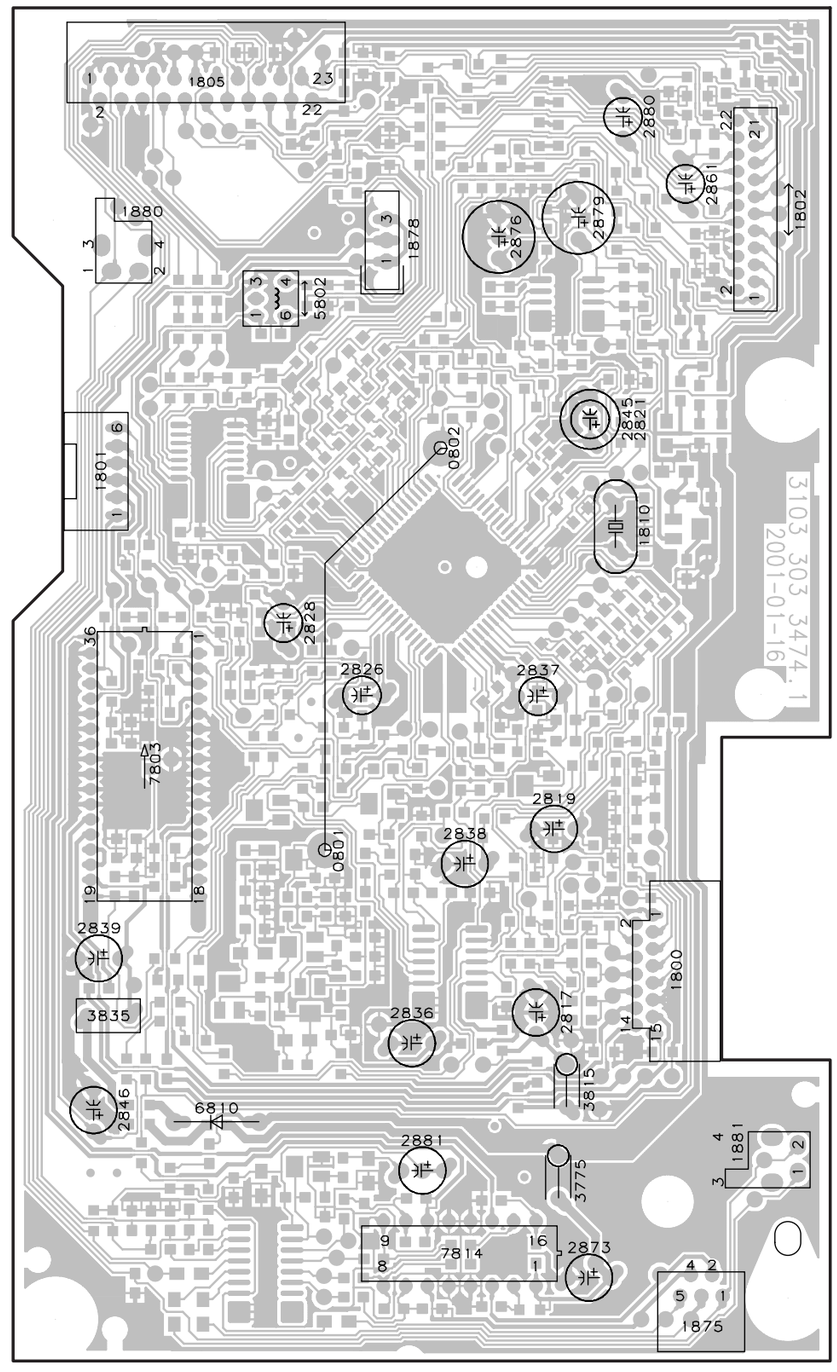
Mapping

Copperside

2800	F4	3729	F2	3845	D2	4827	E4	7823	F2	0801	E2
2801	D4	3730	C3	3846	E2	4828	C3			0802	C3
2802	E4	3731	C2	3847	E1	4829	G4			1800	F4
2803	D4	3732	C2	3848	D3	4830	G3			1801	C1
2804	F3	3733	C2	3849	C3	4831	G3			1802	B5
2805	D4	3734	D2	3850	E1	4832	F3			1805	A2
2806	D4	3735	G2	3851	E4	4833	E3			1810	D4
2807	F4	3736	H3	3852	F1	4834	E3			1875	H5
2808	D4	3737	H3	3853	E4	4835	F3			1878	B3
2809	E1	3738	H3	3854	E2	4836	F4			1880	B1
2810	E4	3739	H3	3855	E3	4837	E3			1881	G5
2811	D4	3740	C4	3856	E4	4838	E3			2817	F4
2812	E4	3741	C4	3857	E4	4839	E3			2819	E4
2813	E4	3742	C4	3858	C2	4840	F3			2821	C4
2814	F1	3743	C4	3859	C2	4841	E3			2826	D3
2815	F3	3744	B4	3860	C2	4842	E3			2828	D2
2816	C4	3745	H3	3861	C2	4843	F4			2836	F3
2818	C4	3746	B3	3862	C4	4844	G3			2837	D4
2820	C3	3747	H3	3863	D2	4845	G4			2838	E3
2822	E3	3748	H3	3864	E4	4846	F4			2839	F1
2823	E3	3749	H3	3865	C4	4847	F4			2845	C4
2824	E3	3750	B4	3866	F3	4848	G4			2846	G1
2825	E4	3751	B4	3867	E4	4849	E3			2861	B5
2827	F4	3752	H3	3868	E4	4850	G2			2873	H4
2829	C3	3753	H2	3869	E4	4851	F3			2876	B3
2830	E2	3754	G2	3870	F1	4852	H2			2879	B4
2831	F4	3755	G1	3871	E2	4853	G1			2880	A4
2832	E2	3756	B2	3872	E3	4854	G2			2881	G3
2833	C4	3757	A5	3878	C3	4855	G1			3775	G4
2834	D4	3758	A5	3881	C3	4856	G1			3815	G4
2835	E2	3759	D2	4700	B2	4857	G1			3835	F1
2840	E1	3760	B4	4701	B2	4858	G1			5802	B2
2841	E2	3761	C4	4702	B2	4859	G1			6810	G2
2842	F1	3762	A4	4703	B2	4861	G2			7803	E1
2843	D4	3763	A4	4704	B1	4862	F1			7814	H3
2844	E2	3764	C4	4705	B1	4863	F1				
2847	E1	3765	H2	4706	A3	4864	F1				
2859	F2	3766	H1	4707	A3	4865	F1				
2860	H3	3767	D4	4708	A3	4866	F1				
2862	C4	3769	C5	4709	A3	4867	E1				
2863	C4	3770	H2	4710	A3	4868	D1				
2864	B2	3771	H1	4711	A3	4869	D1				
2865	B2	3772	H2	4712	B3	4870	E1				
2866	C4	3773	H1	4713	B3	4871	E2				
2867	B4	3774	C2	4714	B3	4872	D2				
2868	C4	3776	H1	4715	B4	4873	D2				
2869	C4	3777	C5	4716	B3	4874	D1				
2870	C2	3800	F4	4717	A3	4875	D1				
2871	D2	3801	E4	4718	A4	4876	D1				
2872	G2	3802	F4	4719	A4	4877	D1				
2874	D2	3803	D4	4720	A4	4879	C3				
2875	H3	3804	C3	4722	A4	4884	A2				
2877	H1	3805	D4	4724	B4	4885	A2				
2878	H1	3806	D4	4726	B4	4886	A2				
2882	B3	3807	D4	4727	B4	4887	A2				
2883	H1	3808	D4	4728	A4	4888	A2				
2884	F2	3809	E3	4729	A4	4889	B2				
2885	G2	3810	C3	4730	B4	4890	A2				
2886	F3	3811	F4	4731	B4	4891	A2				
2887	F2	3812	C3	4732	C5	4892	A3				
2888	H4	3813	C2	4733	B3	4893	A2				
2889	H3	3814	C2	4734	C4	4894	A3				
3700	F2	3816	C3	4735	B5	4895	A3				
3701	D2	3817	C3	4736	A5	4896	A3				
3702	F3	3818	C3	4737	C5	4897	A3				
3703	F2	3819	C3	4738	B5	4898	A3				
3704	F2	3820	F4	4739	C4	6801	H2				
3705	C2	3821	F4	4740	C5	6802	H1				
3706	C1	3822	F4	4741	B4	6803	H2				
3707	C2	3823	F3	4742	A5	6804	G3				
3708	C2	3824	F3	4743	A5	6805	G2				
3709	F2	3825	E3	4744	A5	6806	C4				
3710	F2	3826	E3	4745	A5	6807	C4				
3711	C2	3827	D4	4746	A5	6808	H2				
3712	B3	3828	D2	4747	A5	6809	C2				
3713	G2	3829	F4	4748	A5	6811	G2				
3714	H2	3830	F4	4749	A5	6812	F2				
3715	H2	3831	F2	4800	D2	7801	F3				
3716	D2	3832	C3	4801	E2	7802	D3				
3717	D2	3833	E4	4803	B2	7804	E2				
3718	C2	3834	F4	4804	B5	7805	E4				
3719	H4	3836	E3	4805	B5	7806	E3				
3720	F2	3837	D2	4806	C4	7811	B4				
3721	F3	3838	D2	4820	C4	7812	G2				
3722	F2	3839	E2	4821	E4	7813	H2				
3724	G2	3840	C3	4822	E4	7815	D4				
3725	F2	3841	E1	4823	E4	7816	C2				
3726	F2	3842	D2	4824	C5	7820	F2				
3727	F2	3843	E2	4825	B4	7821	F2				
3728	F3	3844	F1	4826	C3	7822	F2				

10-6

3CDC-LC (Herman) Components seen from Copperside



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

3CDC LC VCD (Herman) Layout stage 1 2001 02 08

10-7

1800	C1	2803	B5	2808	A5	2815	D5	2830	H6	2839	G5	2848	H5	2885	C9	3703	D12	3721	D10	3727	C11	3801	B4	3807	A4	3821	C4	3833	A3	3838	I5
1801	G1	2804	D6	2809	I5	2817	E5	2831	E4	2840	H5	2852	B12	2886	C10	3704	C13	3722	C11	3728	D10	3802	B4	3808	A4	3822	C4	3834	A3	3839	H6
2800	C4	2805	B5	2810	A4	2819	C2	2832	I6	2841	F6	2859	D13	2887	C11	3709	C14	3724	C12	3729	D11	3803	B4	3811	B4	3824	D8	3835	G5	3841	H5
2801	C5	2806	A5	2811	A5	2827	B4	2835	I5	2842	F5	2860	A9	3700	D13	3710	D14	3725	D11	3735	B9	3805	A4	3815	E5	3829	E4	3836	H6	3842	F6
2802	B4	2807	A4	2814	G5	2828	A13	2836	E8	2844	G6	2884	D11	3702	C9	3720	C10	3726	C12	3800	B4	3806	B4	3820	D4	3830	D4	3837	I5	3843	F6

3844	F5	3850	I5	3863	A13	3876	B13	7801	D6	7823	C13																				
3845	G6	3852	H5	3866	D8	3886	A10	7803	E3																						
3846	G6	3854	E8	3868	A4	4801	E8	7820	C10																						
3847	G5	3856	C2	3869	A4	6811	C11	7821	C13																						
3848	I6	3857	C2	3872	A13	6812	C12	7822	C12																						

1 2 3 4 5 6 7 8 9 10 11 12 13 14

A B C D E F G H I

3CDC-LC
part 1

TO SERVOPOCESSOR 7800 on PART2

from part 2

HF-Detector

HF_DETECT to 7800/pin34 on part 2

HF to 7800 on part 2

HF-Amplifier & Laser power control

TZA1024/TZA1025

ESD sensitive line!

U >400mV ->Laser damaged !

Σ (D2-D4) = Audio signal

CD Drive VAM2201

FMZ ST

PH S

Servo Driver

Motor Driver

FROM SIGNALPOCESSOR 7800 on PART2

EYE-PATTERN

800mVpp

TB = 0.5µs/div

SINGLE = 3V
DOUBLE Speed = 0V
CD_RW = 3V / CD_DA = 0V

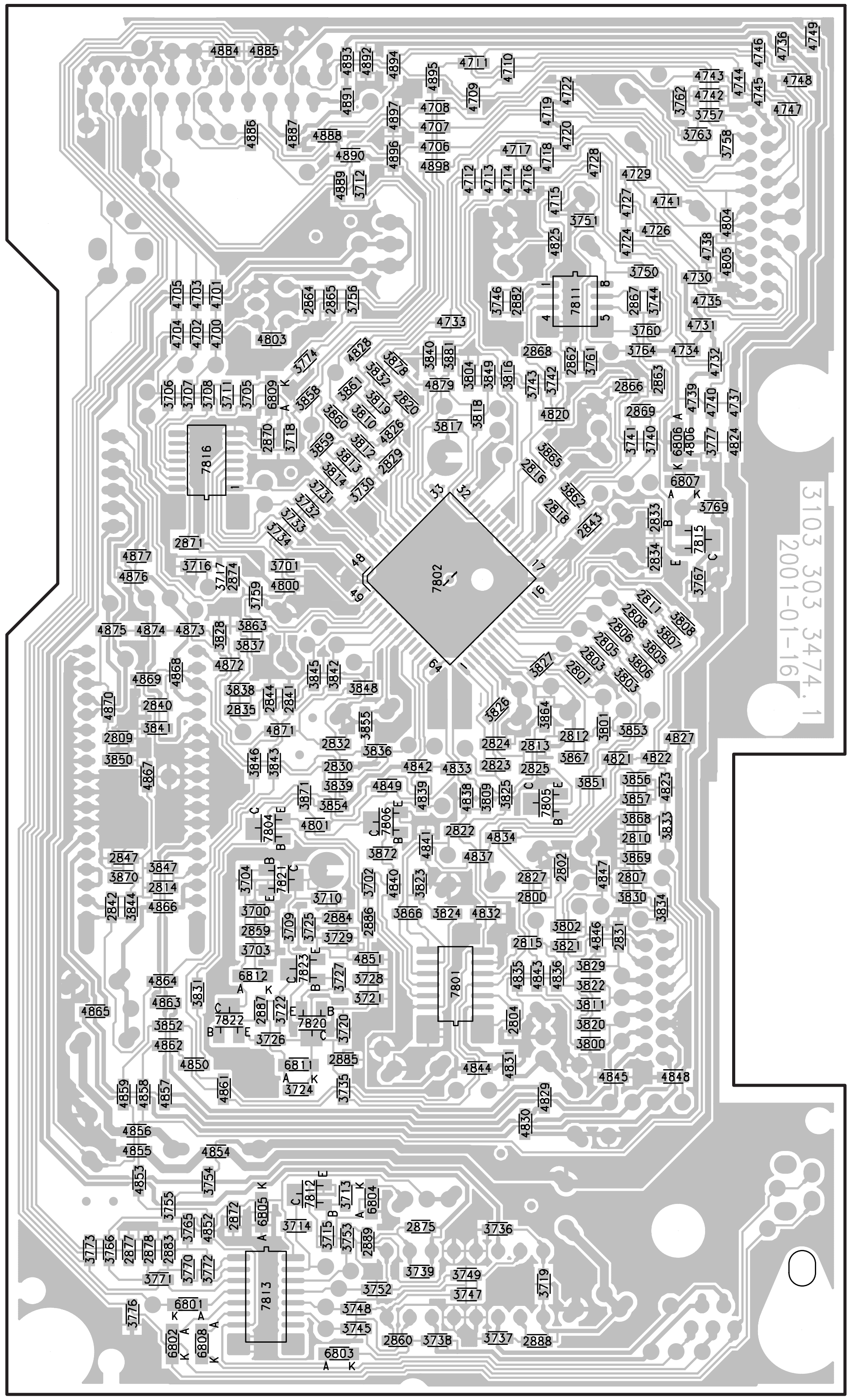
EQSEL from part2 7800/pin62

RW/DA from part2 7800/pin61

. . . V DC voltages measured in *PLAY MODE* with following conditions:
"+10V" = 10V
"+5V" = 5V

* marked components only forseen

3CDC-LC (Herman) Copperside view



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of all possible versions.
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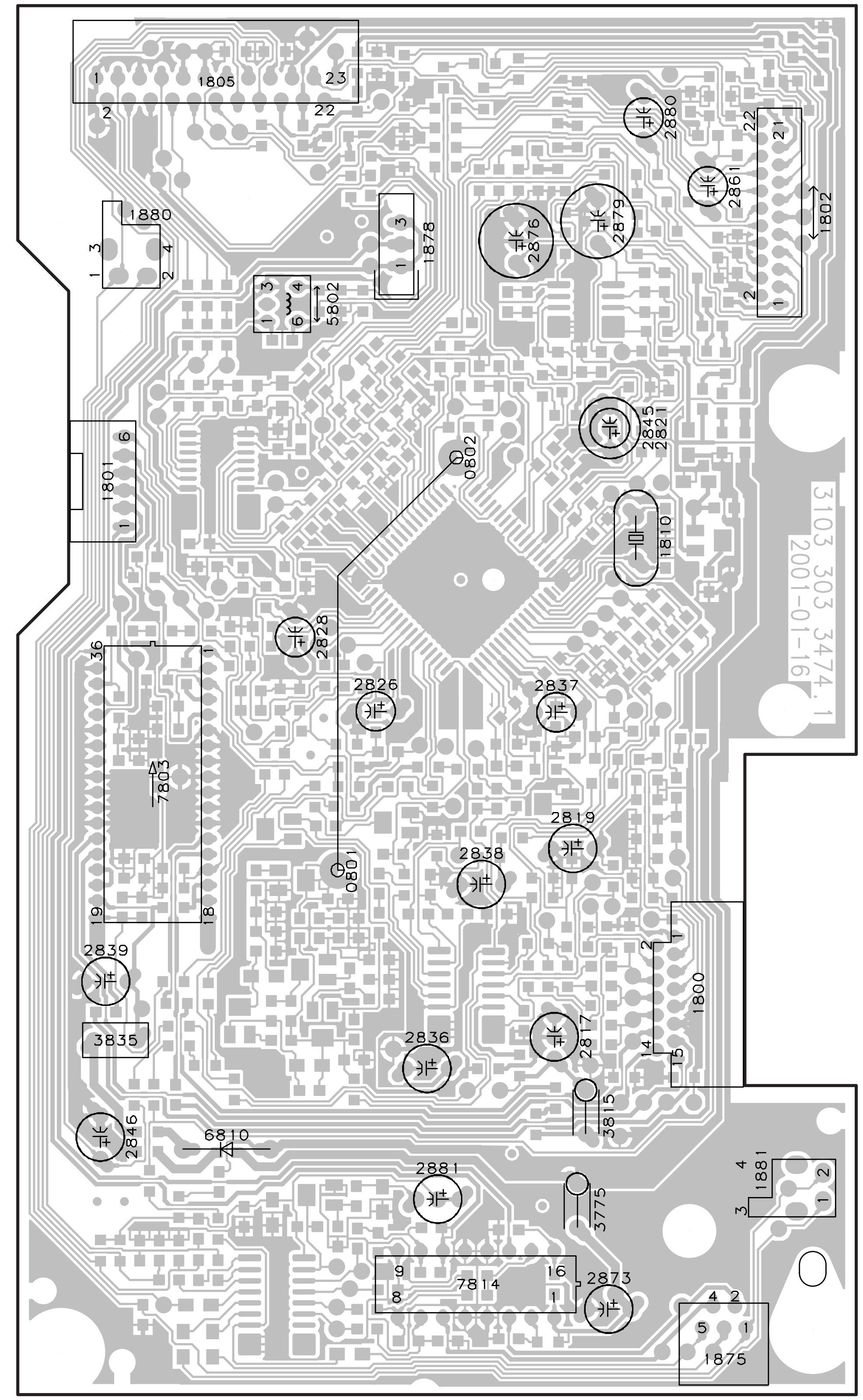
Mapping

Copperside										Componentside	
2800	F4	3729	F2	3845	D2	4827	E4	7823	F2	0801	E2
2801	D4	3730	C3	3846	E2	4828	C3			0802	C3
2802	E4	3731	C2	3847	E1	4829	G4			1800	F4
2803	D4	3732	C2	3848	D3	4830	G3			1801	C1
2804	F3	3733	C2	3849	C3	4831	G3			1802	B5
2805	D4	3734	D2	3850	E1	4832	F3			1805	A2
2806	D4	3735	G2	3851	E4	4833	E3			1810	D4
2807	F4	3736	H3	3852	F1	4834	E3			1875	H5
2808	D4	3737	H3	3853	E4	4835	F3			1878	B3
2809	E1	3738	H3	3854	E2	4836	F4			1880	B1
2810	E4	3739	H3	3855	E3	4837	E3			1881	G5
2811	D4	3740	C4	3856	E4	4838	E3			2817	F4
2812	E4	3741	C4	3857	E4	4839	E3			2819	E4
2813	E4	3742	C4	3858	C2	4840	F3			2821	C4
2814	F1	3743	C4	3859	C2	4841	E3			2826	D3
2815	F3	3744	B4	3860	C2	4842	E3			2828	D2
2816	C4	3745	H3	3861	C2	4843	F4			2836	F3
2818	C4	3746	B3	3862	C4	4844	G3			2837	D4
2820	C3	3747	H3	3863	D2	4845	G4			2838	E3
2822	E3	3748	H3	3864	E4	4846	F4			2839	F1
2823	E3	3749	H3	3865	C4	4847	F4			2845	C4
2824	E3	3750	B4	3866	F3	4848	G4			2846	G1
2825	E4	3751	B4	3867	E4	4849	E3			2861	B5
2827	F4	3752	H3	3868	E4	4850	G2			2873	H4
2829	C3	3753	H2	3869	E4	4851	F3			2876	B3
2830	E2	3754	G2	3870	F1	4852	H2			2879	B4
2831	F4	3755	G1	3871	E2	4853	G1			2880	A4
2832	E2	3756	B2	3872	E3	4854	G2			2881	G3
2833	C4	3757	A5	3878	C3	4855	G1			3775	G4
2834	D4	3758	A5	3881	C3	4856	G1			3815	G4
2835	E2	3759	D2	4700	B2	4857	G1			3835	F1
2840	E1	3760	B4	4701	B2	4858	G1			5802	B2
2841	E2	3761	C4	4702	B2	4859	G1			6810	G2
2842	F1	3762	A4	4703	B2	4861	G2			7803	E1
2843	D4	3763	A4	4704	B1	4862	F1			7814	H3
2844	E2	3764	C4	4705	B1	4863	F1				
2847	E1	3765	H2	4706	A3	4864	F1				
2859	F2	3766	H1	4707	A3	4865	F1				
2860	H3	3767	D4	4708	A3	4866	F1				
2862	C4	3769	C5	4709	A3	4867	E1				
2863	C4	3770	H2	4710	A3	4868	D1				
2864	B2	3771	H1	4711	A3	4869	D1				
2865	B2	3772	H2	4712	B3	4870	E1				
2866	C4	3773	H1	4713	B3	4871	E2				
2867	B4	3774	C2	4714	B3	4872	D2				
2868	C4	3776	H1	4715	B4	4873	D2				
2869	C4	3777	C5	4716	B3	4874	D1				
2870	C2	3800	F4	4717	A3	4875	D1				
2871	D2	3801	E4	4718	A4	4876	D1				
2872	G2	3802	F4	4719	A4	4877	D1				
2874	D2	3803	D4	4720	A4	4879	C3				
2875	H3	3804	C3	4722	A4	4884	A2				
2877	H1	3805	D4	4724	B4	4885	A2				
2878	H1	3806	D4	4726	B4	4886	A2				
2882	B3	3807	D4	4727	B4	4887	A2				
2883	H1	3808	D4	4728	A4	4888	A2				
2884	F2	3809	E3	4729	A4	4889	B2				
2885	G2	3810	C3	4730	B4	4890	A2				
2886	F3	3811	F4	4731	B4	4891	A2				
2887	F2	3812	C3	4732	C5	4892	A3				
2888	H4	3813	C2	4733	B3	4893	A2				
2889	H3	3814	C2	4734	C4	4894	A3				
3700	F2	3816	C3	4735	B5	4895	A3				
3701	D2	3817	C3	4736	A5	4896	A3				
3702	F3	3818	C3	4737	C5	4897	A3				
3703	F2	3819	C3	4738	B5	4898	A3				
3704	F2	3820	F4	4739	C4	6801	H2				
3705	C2	3821	F4	4740	C5	6802	H1				
3706	C1	3822	F4	4741	B4	6803	H2				
3707	C2	3823	F3	4742	A5	6804	G3				
3708	C2	3824	F3	4743	A5	6805	G2				
3709	F2	3825	E3	4744	A5	6806	C4				
3710	F2	3826	E3	4745	A5	6807	C4				
3711	C2	3827	D4	4746	A5	6808	H2				
3712	B3	3828	D2	4747	A5	6809	C2				
3713	G2	3829	F4	4748	A5	6811	G2				
3714	H2	3830	F4	4749	A5	6812	F2				
3715	H2	3831	F2	4800	D2	7801	F3				
3716	D2	3832	C3	4801	E2	7802	D3				
3717	D2	3833	E4	4803	B2	7804	E2				
3718	C2	3834	F4	4804	B5	7805	E4				
3719	H4	3836	E3	4805	B5	7806	E3				
3720	F2	3837	D2	4806	C4	7811	B4				
3721	F3	3838	D2	4820	C4	7812	G2				
3722	F2	3839	E2	4821	E4	7813	H2				
3724	G2	3840	C3	4822	E4	7815	D4				
3725	F2	3841	E1	4823	E4	7816	C2				
3726	F2	3842	D2	4824	C5	7820	F2				
3727	F2	3843	E2	4825	B4	7821	F2				
3728	F3	3844	F1	4826	C3	7822	F2				

10-8

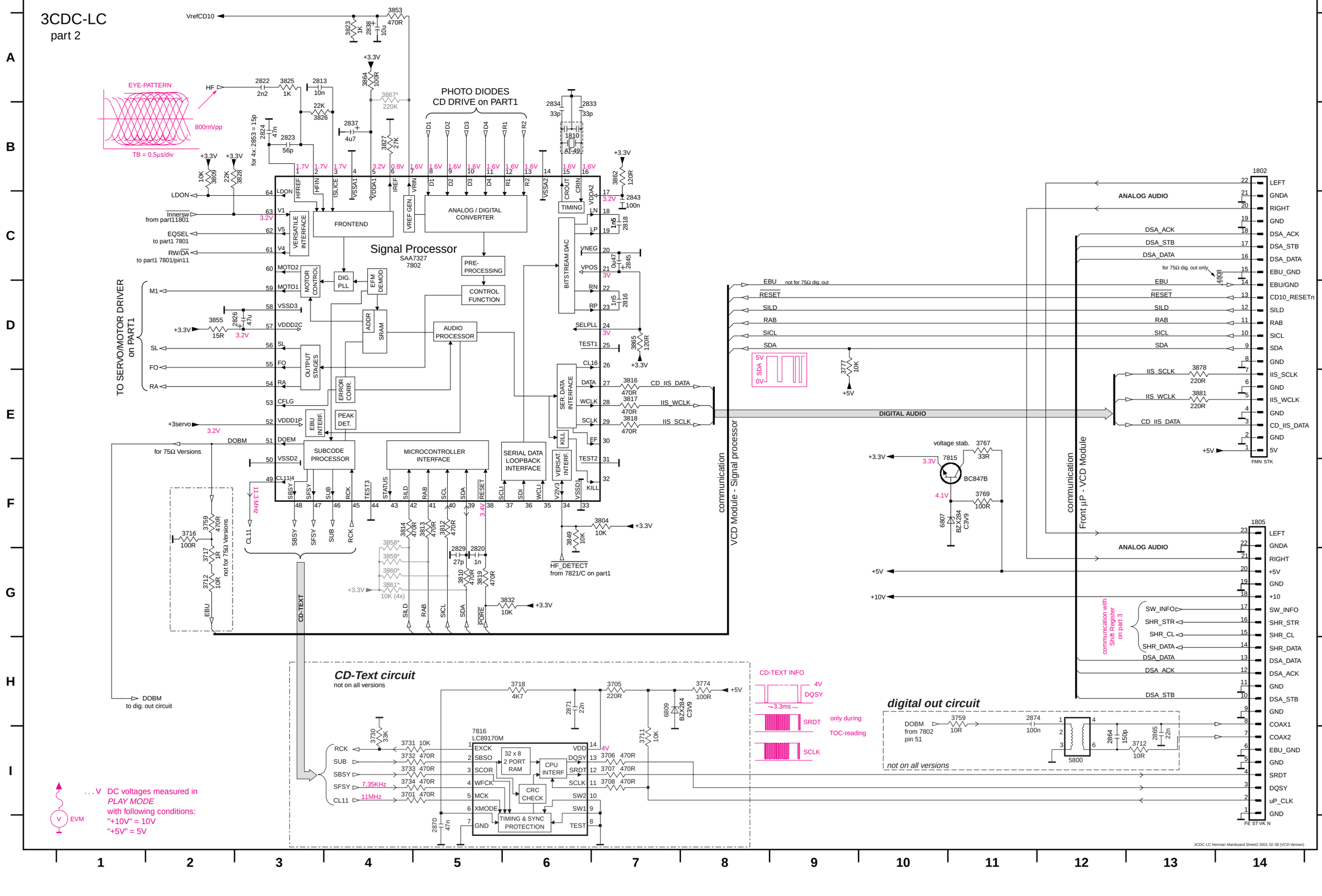
3CDC-LC (Herman) Components seen from Copperside



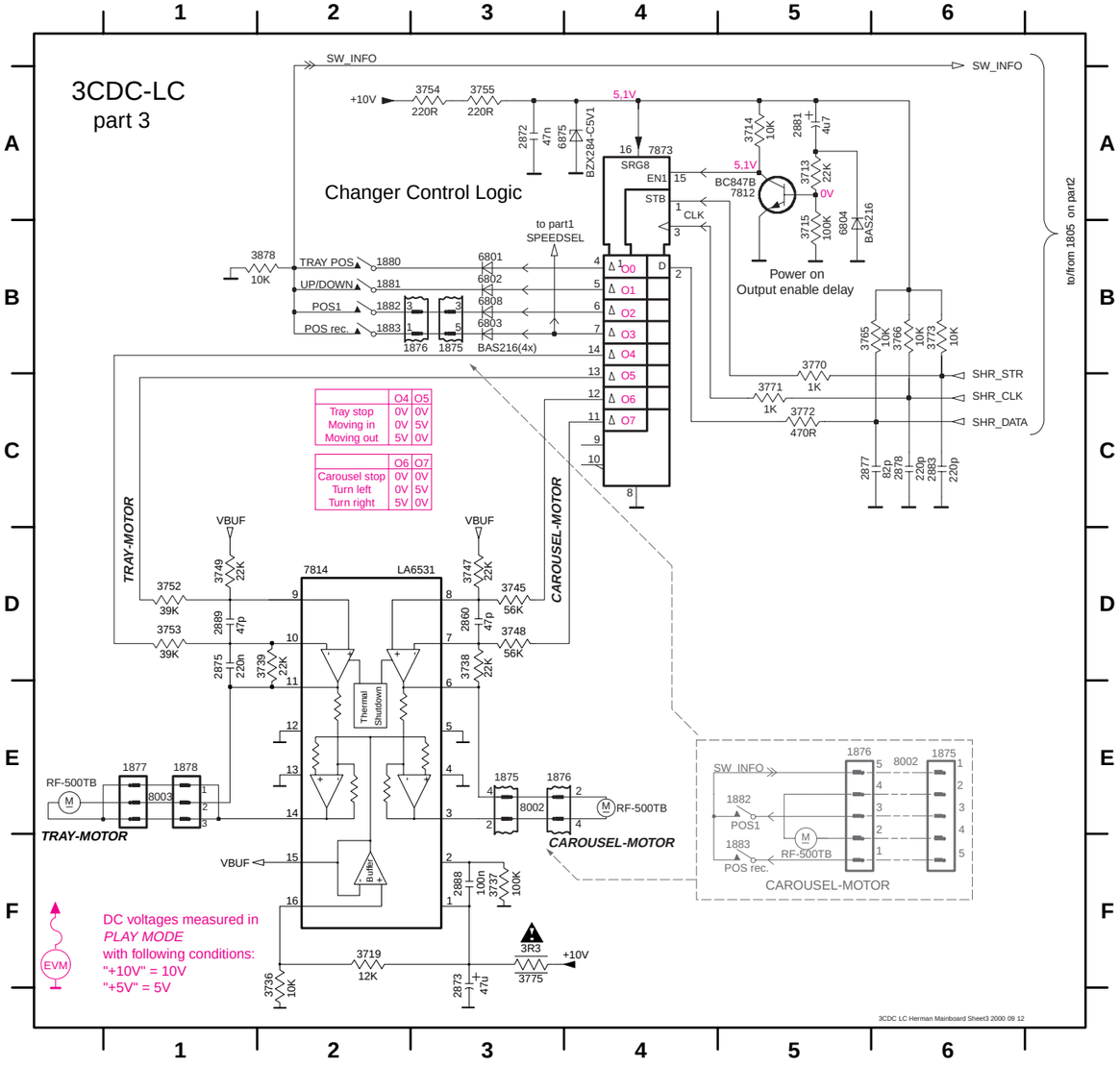
This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

10-9

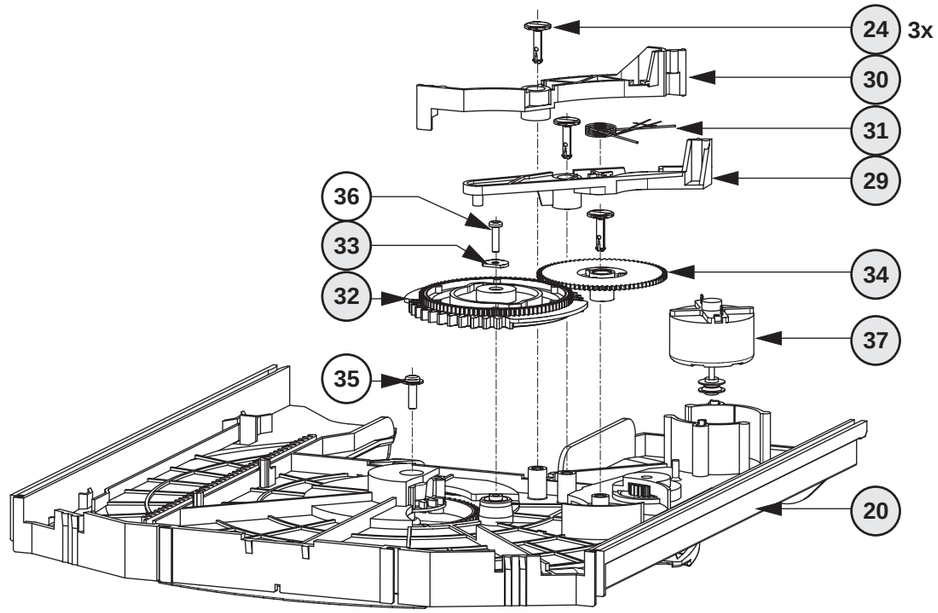
1802	B14	2816	D7	2823	B3	2833	B6	2843	C7	2870	I5	3701	I5	3711	I7	3717	G2	3732	I5	3759	H10	3777	D9	3810	G5	3816	E7	3823	A4	3828	B3	3855	D2	3861	G4	3878	E13	6807	F11
1805	F14	2818	C7	2824	B3	2834	B6	2845	C7	2871	H6	3705	H7	3712	G2	3718	H6	3733	I5	3767	E11	3804	F7	3812	F5	3817	E7	3825	A3	3832	G6	3858	G4	3862	B7	3881	E13	6809	H7
1810	B6	2820	G5	2826	D3	2837	B4	2854	I12	2874	H11	3706	I7	3712	I13	3730	I4	3734	I5	3769	F11	3808	I7	3813	F5	3818	E7	3826	B3	3849	F6	3859	G4	3864	A4	4808	C14	7802	C5
2813	A3	2822	A3	2829	G5	2838	A4	2865	I13	3367	A4	3707	I7	3716	F2	3731	I5	3759	F2	3774	H8	3809	B2	3814	F4	3819	G5	3827	B4	3853	A4	3860	G4	3865	D7	5800	I12	7815	F11



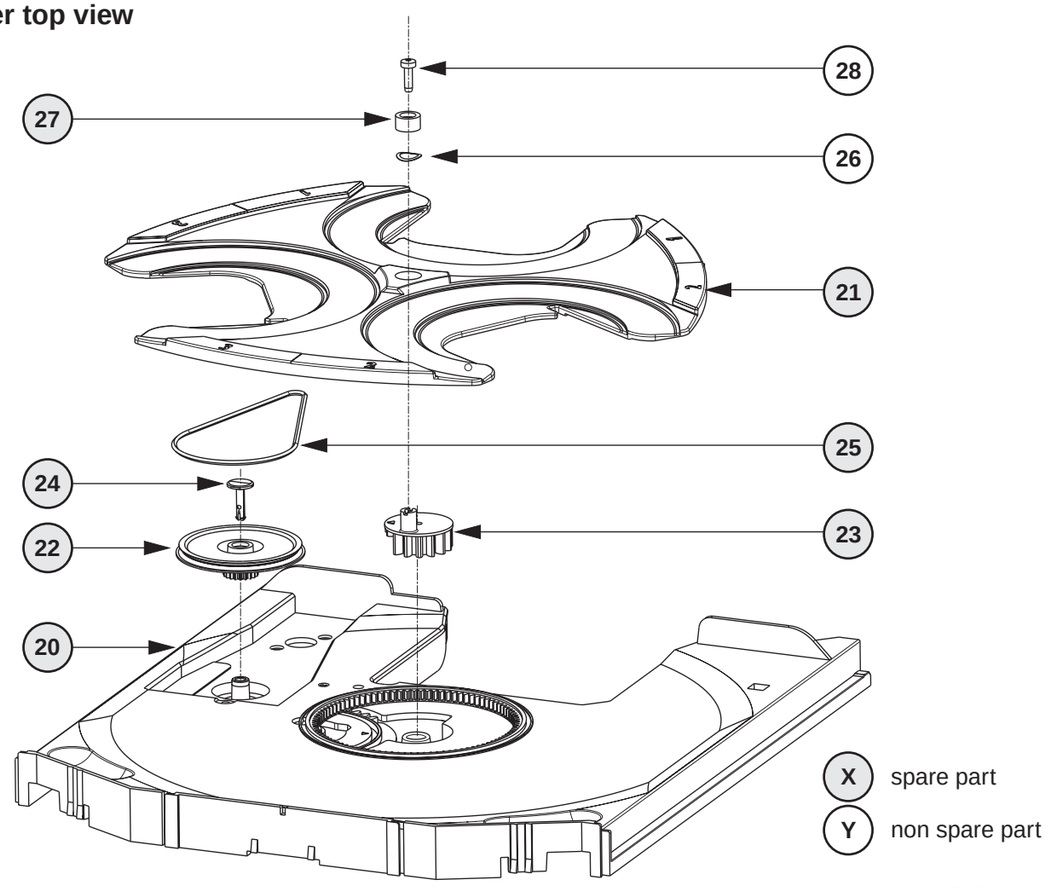
1875	B3	1876	E3	1880	B2	1883	B2	2873	F3	2881	A5	3713	A5	3736	F2	3745	D3	3752	D1
1875	E3	1876	E5	1881	B2	1883	F5	2875	D1	2883	C6	3714	A5	3737	F3	3747	D3	3753	D1
1875	E6	1877	D1	1882	B2	2860	D3	2877	C6	2888	F3	3715	B5	3738	D3	3748	D3	3754	A3
1876	B3	1878	E1	1882	E5	2872	A3	2878	C6	2889	D1	3719	F2	3739	D2	3749	D1	3755	A3



Drawer bottom view



Drawer top view



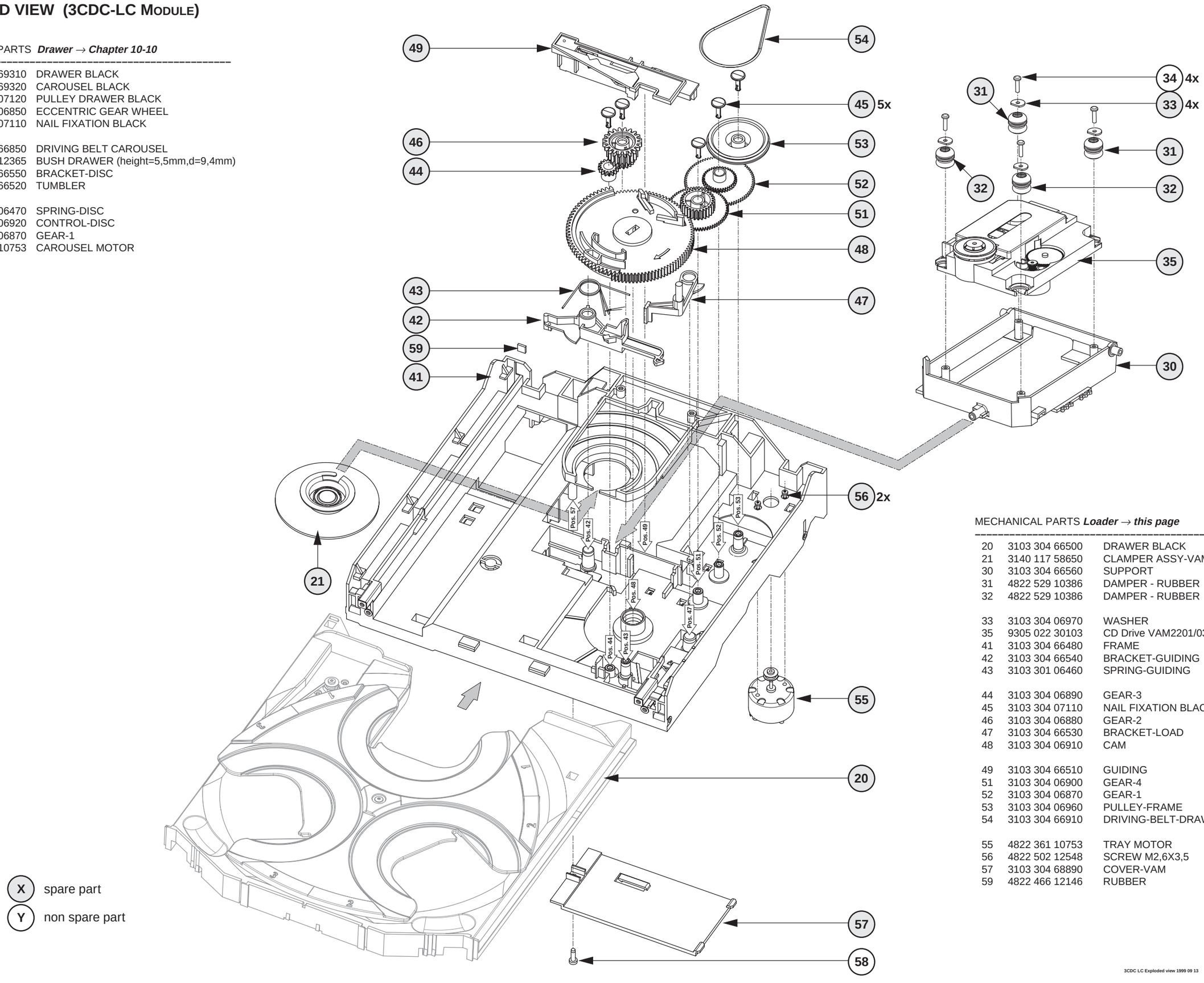
3CDC LC Drawer assy 1999 09 13

10-11

EXPLODED VIEW (3CDC-LC MODULE)

MECHANICAL PARTS ***Drawer → Chapter 10-10***

20	3103 304 69310	DRAWER BLACK
21	3103 304 69320	CAROUSEL BLACK
22	3103 304 07120	PULLEY DRAWER BLACK
23	3103 304 06850	ECCENTRIC GEAR WHEEL
24	3103 304 07110	NAIL FIXATION BLACK
25	3103 304 66850	DRIVING BELT CAROUSEL
27	4822 532 12365	BUSH DRAWER (height=5,5mm,d=9,4mm)
29	3103 304 66550	BRACKET-DISC
30	3103 304 66520	TUMBLER
31	3103 301 06470	SPRING-DISC
32	3103 304 06920	CONTROL-DISC
34	3103 304 06870	GEAR-1
37	4822 361 10753	CAROUSEL MOTOR



X spare part

Y non spare part

MECHANICAL PARTS ***Loader → this page***

20	3103 304 66500	DRAWER BLACK
21	3140 117 58650	CLAMPER ASSY-VAM
30	3103 304 66560	SUPPORT
31	4822 529 10386	DAMPER - RUBBER
32	4822 529 10386	DAMPER - RUBBER
33	3103 304 06970	WASHER
35	9305 022 30103	CD Drive VAM2201/03
41	3103 304 66480	FRAME
42	3103 304 66540	BRACKET-GUIDING
43	3103 301 06460	SPRING-GUIDING
44	3103 304 06890	GEAR-3
45	3103 304 07110	NAIL FIXATION BLACK
46	3103 304 06880	GEAR-2
47	3103 304 66530	BRACKET-LOAD
48	3103 304 06910	CAM
49	3103 304 66510	GUIDING
51	3103 304 06900	GEAR-4
52	3103 304 06870	GEAR-1
53	3103 304 06960	PULLEY-FRAME
54	3103 304 66910	DRIVING-BELT-DRAWER
55	4822 361 10753	TRAY MOTOR
56	4822 502 12548	SCREW M2,6X3,5
57	3103 304 68890	COVER-VAM
59	4822 466 12146	RUBBER

10-12

ELECTRICAL PARTSLIST 3CDC-LC MODULE

MISCELLANEOUS

35	9305 022 30103	CD Drive VAM2201/03				
37	4822 361 10753	CAROUSEL MOTOR				
55	4822 361 10753	TRAY MOTOR				
1800	4822 265 10925	FLEX FOIL CONNECTOR, 15P				
1802	2422 025 16837	FLEX FOIL CONNECTOR, 22P				
1805	4822 265 10979	FLEX FOIL CONNECTOR, 15P				
1875	4822 267 10958	FLEX FOIL CONNECTOR, 5P				
1876	2422 025 08332	FLEX FOIL CONNECTOR 5P				
1880	4822 276 13503	SWITCH, Tray position				
1881	4822 276 13503	SWITCH, Drive up/down				
1882	4822 276 13503	SWITCH, Position 1 recognized				
1883	4822 276 13503	SWITCH, Position recognized				
8002	3103 308 91990	FLEX FOIL CABLE 5P, 200mm				
8005	3103 308 91980	FLEX FOIL CABLE 15P, 170mm				

CAPACITORS

2800 ©	4822 126 10326	180pF	5%			
2801 ©	4822 126 13883	220pF	5%	50V		
2802 ©	4822 126 14508	180pF	5%	50V		
2803 ©	4822 126 13883	220pF	5%	50V		
2804 ©	4822 126 13193	4,7nF	10%	63V		
2805 ©	4822 126 13883	220pF	5%	50V		
2806 ©	4822 126 13883	220pF	5%	50V		
2807 ©	5322 122 31863	330pF	5%	50V		
2808 ©	4822 126 13883	220pF	5%	50V		
2809 ©	4822 126 13879	220nF	20%	16V		
2810 ©	4822 126 10326	180pF	5%			
2811 ©	4822 126 13883	220pF	5%	50V		
2812 ©	3198 017 34730	47nF	10%	16V		X7R
2813 ©	4822 122 33177	10nF	20%	50V		
2814 ©	4822 122 33216	270pF	5%	50V		
2815 ©	4822 126 14076	220nF	20%	25V		
2816 ©	4822 126 13344	1,5nF	5%	63V		
2817	4822 124 40769	4,7µF	20%	100V		
2818 ©	4822 126 13344	1,5nF	5%	63V		
2819	4822 124 40769	4,7µF	20%	100V		
2820 ©	5322 126 11578	1nF	10%	63V		
2822 ©	2238 786 11554	2,2nF	5%	16V		
2823 ©	4822 122 33777	47pF	5%	63V		
2824 ©	4822 126 13751	47nF	10%	50V		
2826	4822 124 12362	47µF	20%	4V		
2827 ©	5322 122 34099	470pF	10%	63V		
2828	4822 124 12362	47µF	20%	4V		
2829 ©	4822 126 11669	27pF	10%	50V		
2831 ©	4822 126 13751	47nF	10%	50V		
2833 ©	4822 126 11671	33pF	5%	50V		
2834 ©	4822 126 11671	33pF	5%	50V		
2835 ©	3198 017 34730	47nF	10%	16V		X7R
2836	4822 124 40769	4,7µF	20%	100V		
2837	4822 124 22726	4,7µF	20%	35V		
2839	4822 124 40433	47µF	20%	25V		
2840 ©	4822 126 13751	47nF	10%	50V		
2841 ©	4822 122 33575	220pF	5%	50V		
2842 ©	4822 126 13883	220pF	5%	50V		
2843 ©	4822 126 14585	100nF	10%	50V		
2844 ©	5322 126 10794	220pF	10%			
2845	5322 124 41948	0,47µF	20%	50V		
2860 ©	4822 122 33777	47pF	5%	63V		
2866 ©	4822 126 13751	47nF	10%	50V		
2872 ©	3198 017 34730	47nF	10%	16V		X7R
2873	4822 124 80231	47µF	20%	16V		
2875 ©	4822 126 13879	220nF	20%	16V		
2877 ©	4822 126 14226	82pF		50V		
2878 ©	4822 126 13883	220pF	5%	50V		
2881	4822 124 40769	4,7µF	20%	100V		
2883 ©	4822 126 13883	220pF	5%	50V		

CAPACITORS

2884 ©	5322 126 11578	1nF	10%	63V		
2885 ©	4822 126 14585	100nF	10%	50V		
2886 ©	4822 126 14585	100nF	10%	50V		
2887 ©	5322 126 11578	1nF	10%	63V		
2888 ©	4822 126 14585	100nF	10%	50V		
2889 ©	4822 122 33777	47pF	5%	63V		

RESISTORS

3700 ©	4822 117 10837	100kΩ	1%	0,1W		
3702 ©	4822 117 10833	10kΩ	1%	0,1W		
3703 ©	4822 051 10102	1kΩ	2%	0,25W		
3704 ©	4822 117 10837	100kΩ	1%	0,1W		
3709 ©	4822 051 20472	4,7kΩ	5%	0,1W		
3710 ©	4822 117 10833	10kΩ	1%	0,1W		
3713 ©	4822 051 30223	22kΩ	5%	0,06W		
3714 ©	4822 051 30103	10kΩ	5%	0,06W		
3715 ©	4822 117 13632	100kΩ	1%	0,06W		
3719 ©	4822 051 30123	12kΩ	5%	0,06W		
3720 ©	4822 051 20154	150kΩ	5%	0,1W		
3721 ©	4822 117 11449	2,2kΩ	1%	0,1W		
3722 ©	4822 117 11449	2,2kΩ	1%	0,1W		
3724 ©	4822 117 10837	100kΩ	1%	0,1W		
3725 ©	4822 051 20471	470Ω	5%	0,1W		
3726 ©	4822 117 11373	100R	1%	0,1W		
3727 ©	4822 117 11449	2,2kΩ	1%	0,1W		
3728 ©	4822 117 10837	100kΩ	1%	0,1W		
3729 ©	4822 051 10102	1kΩ	2%	0,25W		
3730 ©	4822 051 20333	33kΩ	5%	0,1W		
3735 ©	4822 117 11373	100R	1%	0,1W		
3736 ©	4822 051 30103	10kΩ	5%	0,06W		
3737 ©	4822 117 13632	100kΩ	1%	0,06W		
3738 ©	4822 051 30223	22kΩ	5%	0,06W		
3739 ©	4822 051 30223	22kΩ	5%	0,06W		
3745 ©	4822 051 30563	56kΩ	5%	0,06W		
3747 ©	4822 051 30223	22kΩ	5%	0,06W		
3748 ©	4822 051 30563	56kΩ	5%	0,06W		
3749 ©	4822 051 30223	22kΩ	5%	0,06W		
3752 ©	4822 051 30393	39kΩ	5%	0,06W		
3753 ©	4822 051 30393	39kΩ	5%	0,06W		
3754 ©	4822 117 11503	220Ω	5%	0,1W		
3755 ©	4822 117 11503	220Ω	5%	0,1W		
3765 ©	4822 051 30103	10kΩ	5%	0,06W		
3766 ©	4822 117 10833	10kΩ	1%	0,1W		
3767 ©	4822 051 30339	33Ω	5%	0,06W		
3769 ©	4822 051 30101	100Ω	5%	0,06W		
3770 ©	4822 051 30102	1kΩ	5%	0,06W		
3771 ©	4822 051 30102	1kΩ	5%	0,06W		
3772 ©	4822 051 30471	470Ω	5%	0,06W		
3773 ©	4822 117 10833	10kΩ	1%	0,1W		
3775	4822 052 10338	3,3Ω		NFR25		
3776 ©	4822 051 30103	10kΩ	5%	0,06W		
3777 ©	4822 051 30103	10kΩ	5%	0,06W		
3800 ©	4822 051 30563	56kΩ	5%	0,06W		
3801 ©	4822 051 30103	10kΩ	5%	0,06W		
3802 ©	4822 117 11148	56kΩ	1%	0,1W		
3803 ©	4822 117 10833	10kΩ	1%	0,1W		
3805 ©	4822 051 30103	10kΩ	5%	0,06W		
3806 ©	4822 051 30103	10kΩ	5%	0,06W		
3807 ©	4822 051 30103	10kΩ	5%	0,06W		
3808 ©	4822 051 30103	10kΩ	5%	0,06W		
3809 ©	4822 051 30103	10kΩ	5%	0,06W		
3810 ©	4822 051 30471	470Ω	5%	0,06W		
3811 ©	4822 051 20273	27kΩ	5%	0,1W		
3812 ©	4822 051 20471	470Ω	5%	0,1W		
3813 ©	4822 051 20471	470Ω	5%	0,1W		

RESISTORS

3814 ©	4822 051 20471	470Ω	5%	0,1W		
3815 ⚠	4822 052 10478	4,7Ω	5%	NFR		
3816 ©	4822 051 20471	470Ω	5%	0,1W		
3817 ©	4822 051 30471	470Ω	5%	0,06W		
3818 ©	4822 117 11503	220Ω	5%	0,1W		
3819 ©	4822 051 20471	470Ω	5%	0,1W		
3820 ©	4822 051 30472	4,7kΩ	5%	0,06W		
3821 ©	4822 051 20472	4,7kΩ	5%	0,1W		
3822 ©	4822 051 30272	2,7kΩ	5%	0,06W		
3823 ©	4822 051 30102	1kΩ	5%	0,06W		
3824 ©	4822 051 30102	1kΩ	5%	0,06W		
3825 ©	4822 051 10102	1kΩ	2%	0,25W		
3826 ©	4822 051 20223	22kΩ	5%	0,1W		
3827 ©	4822 051 20273	27kΩ	5%	0,1W		
3828 ©	4822 051 30223	22kΩ	5%	0,06W		
3829 ©	4822 117 13608	4,7Ω	5%	0,06W		
3830 ©	4822 116 83933	15kΩ	1%	0,1W		
3832 ©	4822 117 10833	10kΩ	1%	0,1W		
3833 ©	4822 051 30223	22kΩ	5%	0,06W		
3834 ©	4822 051 20223	22kΩ	5%	0,1W		
3837 ©	4822 117 10833	10kΩ	1%	0,1W		
3838 ©	4822 051 30103	10kΩ	5%	0,06W		
3839 ©	4822 051 20273	27kΩ	5%	0,1W		
3841 ©	4822 051 20273	27kΩ	5%	0,1W		
3842 ©	4822 117 10834	47kΩ	1%	0,1W		
3843 ©	4822 117 10834	47kΩ	1%	0,1W		
3844 ©	4822 117 12864	82kΩ	5%	0,6W		
3845 ©	4822 117 10834	47kΩ	1%	0,1W		
3846 ©	4822 117 10834	47kΩ	1%	0,1W		
3847 ©	4822 117 11148	56kΩ	1%	0,1W		
3848 ©	4822 117 10837	100kΩ	1%	0,1W		
3849 ©	4822 051 30103	10kΩ	5%	0,06W		
3850 ©	4822 051 30183	18kΩ	5%	0,06W		
3852 ©	4822 051 10102	1kΩ	2%	0,25W		
3853 ©	4822 051 20471	470Ω	5%	0,1W		
3854 ©	4822 051 30101	100Ω	5%	0,06W		
3855 ©	4822 117 12971	15Ω	5%	0,06W		
3856 ©	4822 117 12521	68Ω	1%	0,1W		
3857 ©	4822 117 12521	68Ω	1%	0,1W		
3860 ©	4822 117 10833	10kΩ	1%	0,1W		
3862 ©	4822 051 20121	120Ω	5%	0,1W		
3863 ©	4822 051 30339	33Ω	5%	0,06W		
3864 ©	4822 051 30101	100Ω	5%	0,06W		
3865 ©	4822 051 30121	120Ω	5%	0,06W		
3866 ©	4822 051 30103	10kΩ	5%	0,06W		
3871 ©	4822 117 11149	82kΩ	1%	0,1W		
3872 ©	4822 117 10833	10kΩ	1%	0,1W		
3878 ©	4822 051 20008	CHIP JUMPER 0805				
3881 ©	4822 117 11503	220Ω	5%	0,1W		
4707 ©	4822 051 20008	CHIP JUMPER 0805				
4708 ©	4822 051 20008	CHIP JUMPER 0805				
4709 ©	4822 051 20008	CHIP JUMPER 0805				
4710 ©	4822 051 20008	CHIP JUMPER 0805				
4711 ©	4822 051 20008	CHIP JUMPER 0805				
4713 ©	4822 051 20008	CHIP JUMPER 0805				
4714 ©	4822 051 20008	CHIP JUMPER 0805				
4717 ©	4822 051 30008	CHIP JUMPER 0603				
4724 ©	4822 051 20008	CHIP JUMPER 0805				
4726 ©	4822 051 20008	CHIP JUMPER 0805				
4727 ©	4822 051 20008	CHIP JUMPER 0805				
4728 ©	4822 051 20008	CHIP JUMPER 0805				
4729 ©	4822 051 20008	CHIP JUMPER 0805				
4730 ©	4822 051 20008	CHIP JUMPER 0805				
4731 ©	4822 051 30008	CHIP JUMPER 0603				
4732 ©	4822 051 20008	CHIP JUMPER 0805				

RESISTORS

4733 ©	4822 051 30008	CHIP JUMPER 0603				
4734 ©	4822 051 20008	CHIP JUMPER 0805				
4735 ©	4822 051 20008	CHIP JUMPER 0805				
4736 ©	4822 051 30008	CHIP JUMPER 0603				
4737 ©	4822 051 30008	CHIP JUMPER 0603				
4738 ©	4822 051 30008	CHIP JUMPER 0603				
4739 ©	4822 051 30008	CHIP JUMPER 0603				
4740 ©	4822 051 30008	CHIP JUMPER 0603				
4743 ©	4822 051 20008	CHIP JUMPER 0805				
4744 ©	4822 051 30008	CHIP JUMPER 0603				
4745 ©	4822 051 20008	CHIP JUMPER 0805				
4746 ©	4822 051 20008	CHIP JUMPER 0805				
4747 ©	4822 051 20008	CHIP JUMPER 0805				
4748 ©	4822 051 20008	CHIP JUMPER 0805				
4749 ©	4822 051 30008	CHIP JUMPER 0603				
4800 ©	4822 051 30008	CHIP JUMPER 0603				
4801 ©	4822 051 30008	CHIP JUMPER 0603				
4802 ©	4822 051 30008	CHIP JUMPER 0603				
4804 ©	4822 051 20008	CHIP JUMPER 0805				
4805 ©	4822 051 30008	CHIP JUMPER 0603				
4806 ©	4822 051 20008	CHIP JUMPER 0805				
4820 ©	4822 051 20008	CHIP JUMPER 0805				
4823 ©	4822 051 30008	CHIP JUMPER 0603				
4824 ©	4822 051 30008	CHIP JUMPER 0603				
4826 ©	4822 051 20008	CHIP JUMPER 0805				
4828 ©	4822 051 30008	CHIP JUMPER 0603				
4832 ©	4822 051 30008	CHIP JUMPER 0603				
4833 ©	4822 051 20008	CHIP JUMPER 0805				
4834 ©	4822 051 20008	CHIP JUMPER 0805				
4835 ©	4822 051 20008	CHIP JUMPER 0805				
4836 ©	4822 051 20008	CHIP JUMPER 0805				
4837 ©	4822 051 20008	CHIP JUMPER 0805				
4838 ©	4822 051 30008	CHIP JUMPER 0603				
4839 ©	4822 051 20008	CHIP JUMPER 0805				
4840 ©	4822 051 20008	CHIP JUMPER 0805				
4841 ©	4822 051 20008	CHIP JUMPER 0805				
4842 ©	4822 051 20008	CHIP JUMPER 0805				
4843 ©	4822 051 20008	CHIP JUMPER 0805				
4844 ©	4822 051 20008	CHIP JUMPER 0805				
4845 ©	4822 051 20008	CHIP JUMPER 0805				
4846 ©	4822 051 20008	CHIP JUMPER 0805				
4847 ©	4822 051 20008	CHIP JUMPER 0805				
4848 ©	4822 051 20008	CHIP JUMPER 0805				
4849 ©	4822 051 30008	CHIP JUMPER 0603				
4850 ©	4822 051 20008	CHIP JUMPER 0805				
4851 ©	4822 051 20008	CHIP JUMPER 0805				
4854 ©	4822 051 30008	CHIP JUMPER 0603				
4855 ©	4822 051 20008	CHIP JUMPER 0805				
4856 ©	4822 051 20008	CHIP JUMPER 0805				
4857 ©	4822 051 30008	CHIP JUMPER 0603				
4859 ©	4822 051 20008	CHIP JUMPER 0805				
4861 ©	4822 051 20008	CHIP JUMPER 0805				
4863 ©	4822 051 20008	CHIP JUMPER 0805				
4864 ©	4822 051 20008	CHIP JUMPER 0805				
4865 ©	4822 051 30008	CHIP JUMPER 0603				
4866 ©	4822 051 20008	CHIP JUMPER 0805				
4867 ©	4822 051 30008	CHIP JUMPER 0603				
4868 ©	4822 051 20008	CHIP JUMPER 0805				
4869 ©	4822 051 20008	CHIP JUMPER 0805				
4870 ©	4822 051 20008	CHIP JUMPER 0805				
4871 ©	4822 051 20008	CHIP JUMPER 0805				
4872 ©	4822 051 20008	CHIP JUMPER 0805				
4873 ©	4822 051 20008	CHIP JUMPER 0805				
4874 ©	4822 051 20008	CHIP JUMPER 0805				
4875 ©	4822 051 20008	CHIP JUMPER 0805				

ELECTRICAL PARTSLIST 3CDC-LC MODULE

RESISTORS

4876 ©	4822 051 20008	CHIP JUMPER 0805
4877 ©	4822 051 30008	CHIP JUMPER 0603
4879 ©	4822 051 20008	CHIP JUMPER 0805
4884 ©	4822 051 20008	CHIP JUMPER 0805
4885 ©	4822 051 20008	CHIP JUMPER 0805
4886 ©	4822 051 20008	CHIP JUMPER 0805
4887 ©	4822 051 30008	CHIP JUMPER 0603
4888 ©	4822 051 20008	CHIP JUMPER 0805
4889 ©	4822 051 20008	CHIP JUMPER 0805
4890 ©	4822 051 20008	CHIP JUMPER 0805
4891 ©	4822 051 30008	CHIP JUMPER 0603
4892 ©	4822 051 20008	CHIP JUMPER 0805
4893 ©	4822 051 20008	CHIP JUMPER 0805
4894 ©	4822 051 20008	CHIP JUMPER 0805
4895 ©	4822 051 20008	CHIP JUMPER 0805
4896 ©	4822 051 20008	CHIP JUMPER 0805
4897 ©	4822 051 20008	CHIP JUMPER 0805
4898 ©	4822 051 20008	CHIP JUMPER 0805

COILS

1810	4822 242 10849	CRYSTAL 8,46MHz

DIODES

6801 ©	4822 130 83757	BAS216
6802 ©	4822 130 83757	BAS216
6803 ©	4822 130 83757	BAS216
6804 ©	4822 130 83757	BAS216
6805	4822 130 11383	BZX284-C5V1
6807	4822 130 11366	BZX284-C3V9
6808 ©	4822 130 83757	BAS216
6811 ©	4822 130 83757	BAS216
6812 ©	4822 130 83757	BAS216

TRANSISTORS

7806 ©	4822 130 60511	BC847B
7812 ©	4822 130 60511	BC847B
7815 ©	4822 130 60511	BC847B
7820 ©	4822 130 60511	BC847B
7821 ©	4822 130 60511	BC847B
7822	4822 130 42131	BF550
7823 ©	4822 130 60511	BC847B

INTEGRATED CIRCUITS

7801 ©	9352 622 36118	TZA1025T/V2 HF-Amplifier
7802 ©	9352 641 81557	SAA7327M2B Signal processor
7803 ©	9322 158 56682	M63000SP MOTOR DRIVER
7813	5322 209 11306	HEF4094BT
7814	4822 209 32636	LA6531 MOTOR DRIVER

Technical remarks

COMBI BOARD

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11-1

Brief introduction of the Combi Board

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

B. POWER SUPPLY PART
Power Supply Circuit consists of rectifiers, capacitive filters and voltage regulators. Regulated voltage include +5V6, +LED, +12A, +12M, -32V, 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

A54710	FW-V220/21M
A54720	FW-V320/21K/21M

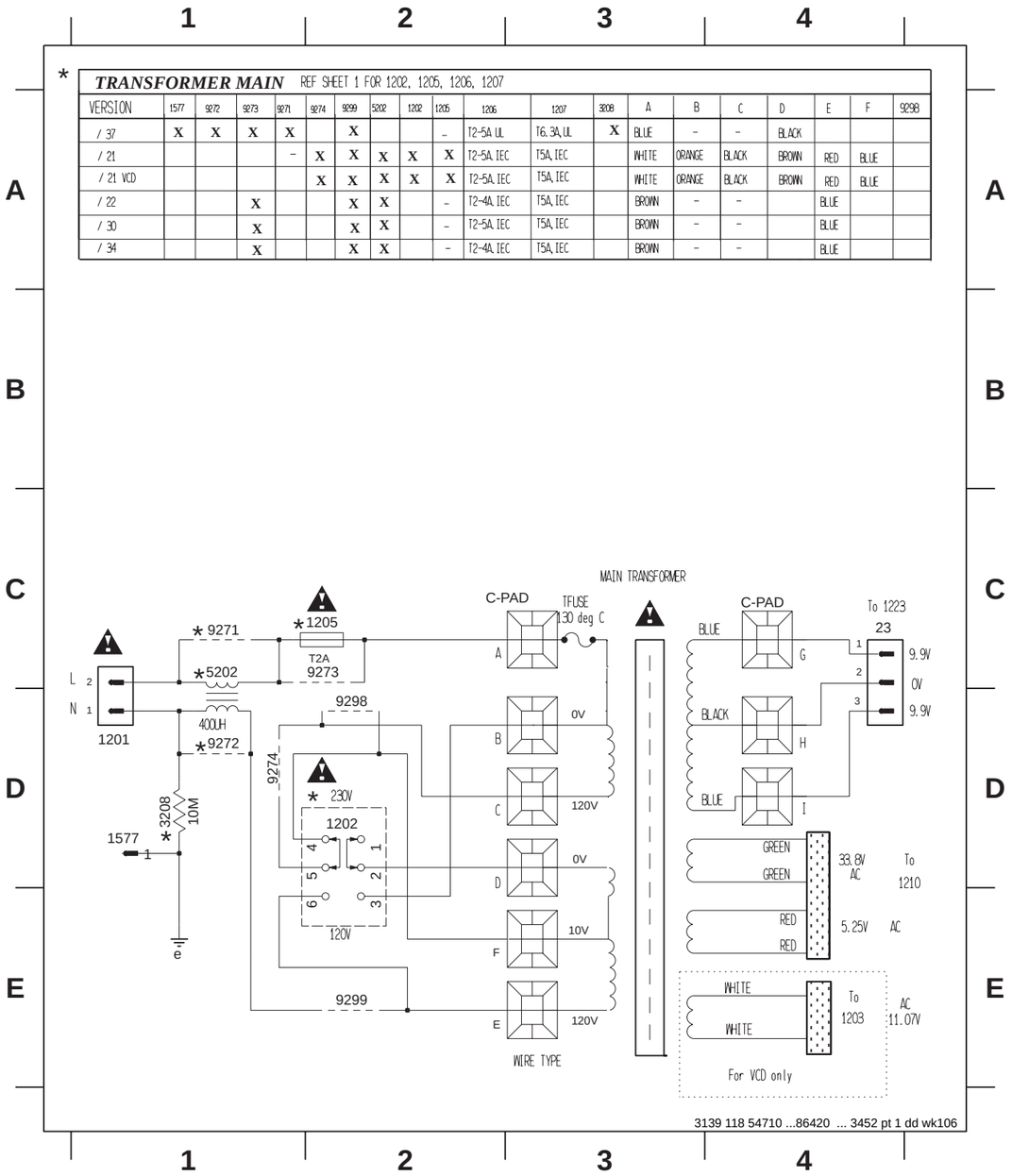
Features/Configuration:	A54710	A54720							
Aux in	x	x							
Sub-woofer Out	-	-							
Digital Out	-	-							
I. S.	-	x							
Voltage Selector	x	x							
Karaoke	x	x							
DBB	x	x							
DSC	x	x							
Matrix Sound	-	x							
1-band Spectrum Analyser	x	-							
3-band Spectrum Analyser	-	x							
18W	x	-							
25W	-	x							
VCD	x	x							
NTC	-	-							
ECO-MTF	-	-							
ETF7	x	x							

11-2

NOTES

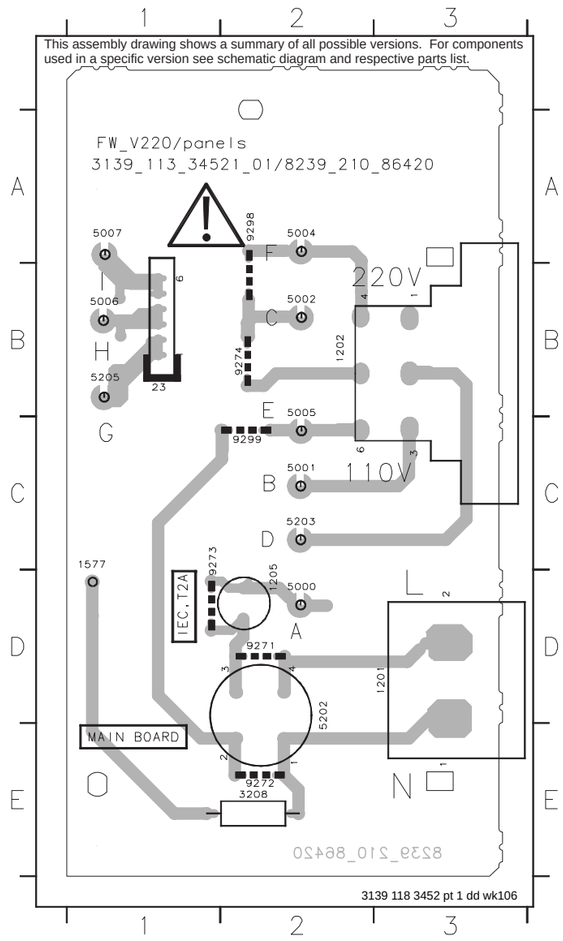
CIRCUIT DIAGRAM - TRANSFORMER PRIMARY PART

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

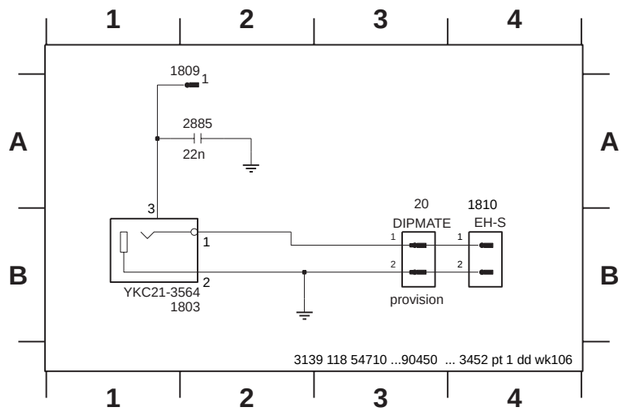


COMPONENT LAYOUT - TRANSFORMER PRIMARY

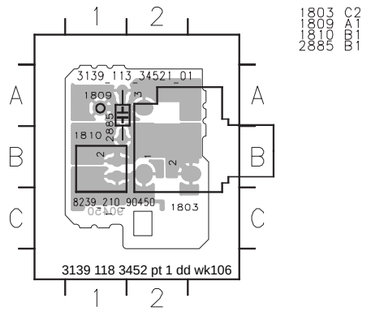
23 B1 1201 D3 1202 B2 1205 D2 1577 C1 3208 F2 5000 D2 5001 C2 5002 B2 5004 A2 5005 B2 5006 B1 5007 A1 5202 D2 5203 C2 5205 B1 9271 D2 9272 F2 9273 C1 9274 B2 9298 A2 9299 C2



VIDEO OUT PART - CIRCUIT & LAYOUT



20 A3
1803 B2
1809 A2
1810 B4
2885 A2

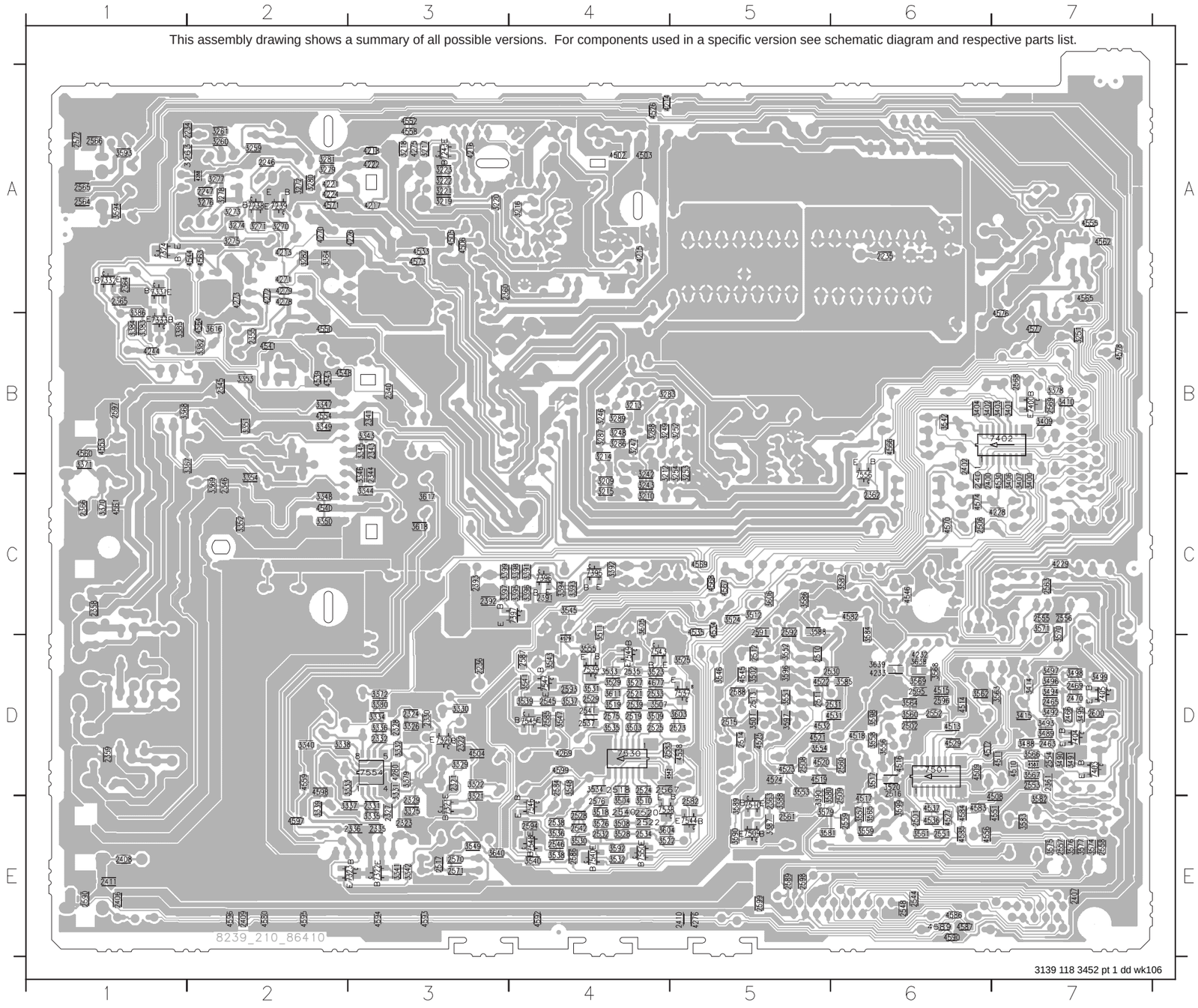


1803 C2
1809 A1
1810 B1
2885 B1

11-4

CHIP LAYOUT - MAIN PART

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



3139 118 3452 pt 1 dd wk106

2234	A2	2587	D4	3400	C7	3639	D6	4677	D4						
2235	A6	2588	D5	3401	B7	3640	E3	7238	A2						
2236	D3	2589	D5	3402	B6	4213	A2	7239	A2						
2246	A2	2590	E1	3403	B7	4214	A4	7243	A3						
2247	A2	2591	C5	3404	B6	4215	A4	7320	D3						
2321	D3	2592	C5	3406	C7	4216	A3	7321	E3						
2322	D3	2593	D4	3407	C7	4217	A3	7322	E3						
2323	D3	2594	D4	3409	B7	4218	A3	7323	E3						
2324	D3	2595	D6	3410	B7	4221	A2	7324	A1						
2327	E3	2596	D6	3414	D7	4222	A3	7331	A1						
2328	D3	2597	B1	3415	D7	4224	A2	7332	A1						
2329	E3	2598	E5	3488	D7	4226	A3	7335	B1						
2330	E3	2599	E5	3489	D7	4228	C7	7395	C4						
2331	E3	2600	D7	3490	D7	4229	C7	7396	C4						
2332	D3	3209	C4	3491	D7	4232	D6	7397	C4						
2335	E3	3210	C4	3492	D7	4233	D6	7400	B7						
2336	E3	3212	B4	3493	D7	4244	B1	7402	B7						
2340	D3	3213	B4	3494	D7	4269	D4	7403	D7						
2341	B3	3214	B4	3495	D7	4270	A2	7404	D7						
2343	B3	3215	C4	3496	D7	4271	A2	7405	D7						
2344	D3	3216	A4	3497	D7	4272	A2	7501	D6						
2345	B3	3217	A3	3498	D7	4273	A2	7509	E5						
2346	D2	3218	A3	3499	D7	4275	A3	7510	E5						
2355	B2	3219	A3	3501	D5	4276	E5	7530	D4						
2358	C1	3220	A3	3502	D5	4278	A2	7537	D5						
2359	D1	3221	A3	3503	D4	4279	A2	7538	E4						
2360	A3	3222	A3	3504	D4	4280	D3	7539	D4						
2361	D7	3223	A3	3507	D4	4288	A2	7540	E4						
2362	C6	3242	C4	3508	E4	4502	A4	7543	D4						
2363	E5	3243	C4	3509	D4	4503	A4	7544	E5						
2364	A1	3246	B4	3510	C4	4504	D3	7545	D4						
2365	A1	3247	B4	3511	C4	4505	A3	7546	E4						
2366	C1	3248	B4	3512	C5	4506	A3	7547	D4						
2391	C4	3249	B4	3517	D6	4508	E7	7548	E4						
2392	C3	3251	B7	3518	E4	4509	D6	7549	D4						
2393	C3	3252	B5	3519	D4	4510	D7	7550	E4						
2400	C6	3253	B5	3520	D6	4511	D7	7554	E3						
2401	C6	3254	B5	3522	E4	4512	D6	7556	C6						
2402	B6	3259	A2	3523	D4	4513	D6								
2406	E7	3260	A2	3524	C5	4514	D6								
2407	E7	3261	A2	3525	E4	4515	D6								
2408	E1	3263	A2	3526	E4	4516	D6								
2409	E2	3270	A2	3527	D4	4517	E6								
2410	E5	3271	A2	3528	E4	4518	D6								
2411	E7	3272	A2	3529	D4	4519	D5								
2463	D7	3273	A2	3530	D4	4520	D5								
2465	D7	3274	A2	3531	D4	4521	D5								
2466	D7	3275	A2	3532	E4	4522	D5								
2469	D7	3276	A2	3533	D4	4523	D5								
2470	D7	3277	A2	3534	D4	4524	D5								
2501	E6	3278	A2	3535	D4	4525	D5								
2502	D6	3279	A2	3536	E4	4526	A4								
2506	C6	3280	A2	3537	D4	4527	E6								
2508	D5	3281	A2	3538	E4	4529	D6								
2509	D5	3282	A2	3539	E4	4530	C7								
2510	D5	3283	B4	3540	E4	4531	C6								
2511	D5	3286	B4	3541	D4	4532	D5								
2512	D5	3287	B4	3542	B6	4533	A3								
2513	D5	3288	B4	3543	D4	4534	C5								
2514	D5	3289	B4	3545	D4	4535	C5								
2515	D5	3321	E3	3546	D5	4536	E6								
2516	D6	3322	D3	3547	D4	4537	E6								
2517	E3	3325	E3	3548	D4	4538	D5								
2518	D4	3326	D3	3549	E3	4539	B2								
2519	D4	3329	D3	3551	D4	4540	C2								
2520	D4	3330	D3	3552	D5	4541	B2								
2521	D4	3331	D3	3553	D5	4542	D4								
2522	E4	3332	D3	3554	D5	4543	B2								
2523	D5	3333	D2	3555	D4	4544	A2								
2524	D4	3334	D3	3556	D6	4545	D5								
2525	D4	3335	D3	3557	D6	4546	C6								
2528	E4	3336	D3	3558	D6	4548	B2								
2529	D4	3337	E3	3559	E6	4550	B2								
2530	D6	3338	D2	3560	D6	4551	E7								
2531	E4	3339	D2	3561	D6	4552	A3								
2532	E4	3340	D2	3562	D6	4553	B1								
2533	D4	3341	E3	3563	D7	4554	B2								
2534	E4	3342	E3	3564	D6	4555	A7								
2535	D4	3343	E3	3565	D6	4556	E6								
2537	D4	3344	E3	3566	D7	4558	A3								
2538	E4	3345	B3	3567	D7	4559	D2								
2539	D4	3346	C3	3568	D6	4560	B1								
2540	C4	3347	B2	3569	D6	4561	C1								
2541	D4	3348	B2	3570	C7	4562	A7								
2542	E4	3349	B2	3571	C7	4563	A2								
2544	E6	3350	C2	3574	E7	4564	B2								
2545	D4	3351	B2	3575	E7	4565	A7								
2546	E4	3352	C2	3576	E7	4566	B6								
2548	E6	3353	C2	3577	E7	4567	C5								
2551	E6	3354	C2	3579	E5	4568	C5								
2552	D6	3364	A2	3580	E5	4569	C5								
2553	D7	3367	B2	3581	E5	4570	C6								
2554	D7	3368	B1	3582	E7	4571	A2								
2555	E7	3369	C2	3583	E7	4573	A3								
2556	C7	3370	C1	3584	D6	4574	C6								
2557	E7	3371	B1	3585	D6	4576	B7								
2558	E7	3372	D3	3586	C5	4577	B7								
2559	D6	3376	D2	3587	C6	4578	B7								
2560	E5	3378	D3	3588	C6	4579	D4								
2561	E5	3380	D3	3589	E5	4580	E2								
2563	C7	3382	B2	3590	E5	4581	D7								
2564	A1	3383	B1	3592	E4	4582	C6								
2565	A1	3384	B1	3593	A1	4583	E6								
2566	A1	3385	B1	3594	E7	4584	E6								
2567	D4	3386	A1	3596	D5	4585	E6								
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2569	B7	3388	E5	3598	D6	4587	E6								
2570	B7	3390	E5	3599	E5	4589	E6								
2571	E3	3391	C4	3603	D5	4590	E6								
2572	A1	3392	C4	3604	E4	4592	E4								
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2584	D4	3397	C3	3617	C3	4597	E2								
2585	D4	3398	C4	3618	C3	4598	D2								
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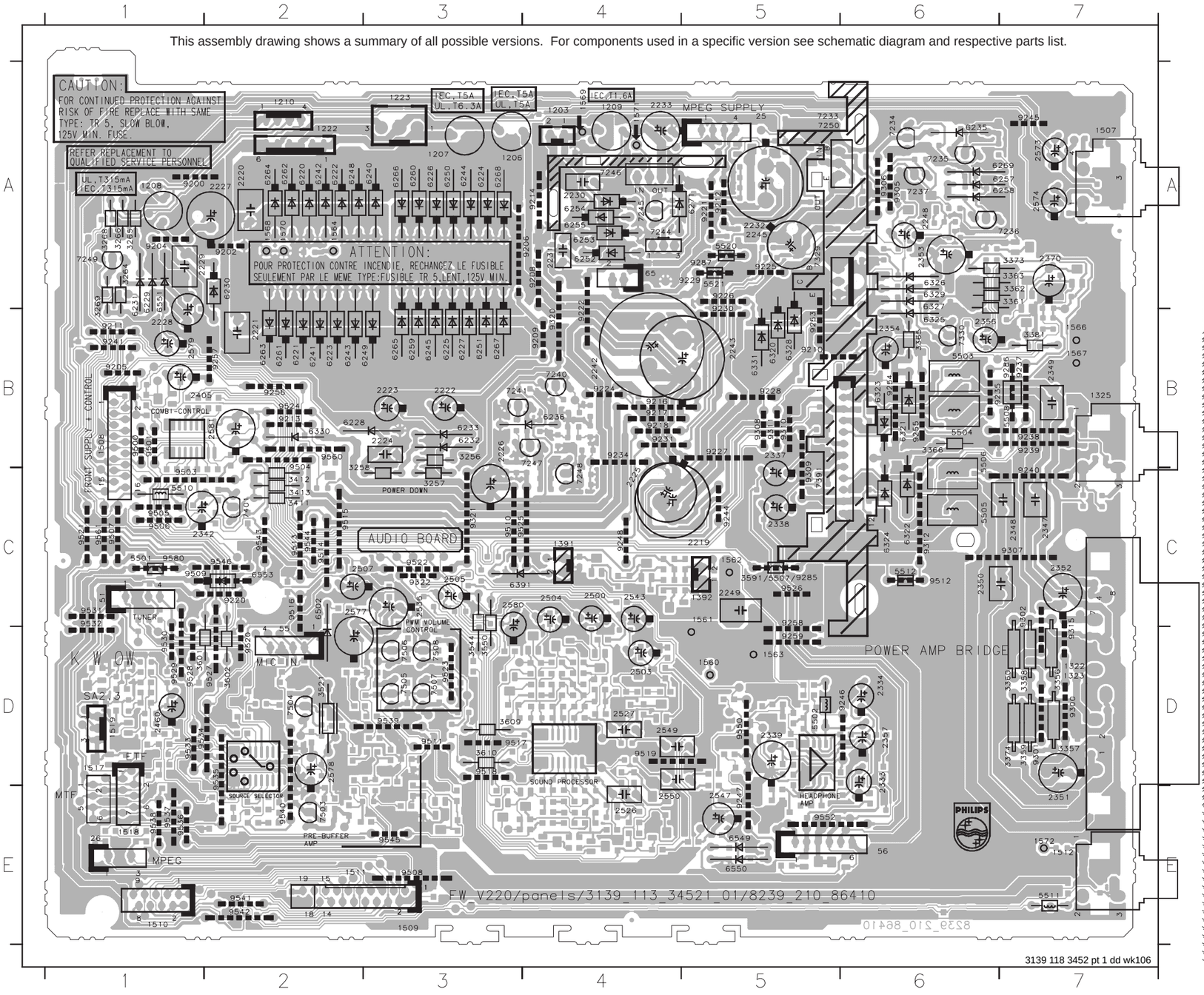
11-5

COMPONENT LAYOUT - MAIN PART



25	A5	3374	D7	9208	A4		
26	E1	3381	B7	9209	B4		
51	C1	3411	C2	9210	B5		
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56	E6	3413	C2	9212	A5		
65	A4	3521	D2	9213	B2		
1203	A4	3544	D3	9214	A4		
1206	A3	3550	D3	9216	B4		
1207	A3	3591	C5	9217	B4		
1208	A1	3601	D1	9218	B4		
1209	A4	3602	D2	9220	C2		
1210	A2	3609	D3	9221	A5		
1222	A2	3610	D3	9222	B4		
1223	A3	5501	C1	9224	B4		
1322	D7	5502	D5	9225	A5		
1323	D7	5503	B6	9226	A5		
1325	B7	5504	B6	9227	B5		
1391	C4	5505	C6	9228	B5		
1392	C5	5506	B6	9229	A5		
1507	A7	5507	C5	9230	A5		
1508	B1	5508	B7	9231	B4		
1509	E3	5510	C1	9234	B4		
1510	E1	5511	E7	9235	B6		
1511	E2	5512	C6	9237	B7		
1517	D1	5521	A5	9239	B7		
1518	E1	6220	A2	9240	C7		
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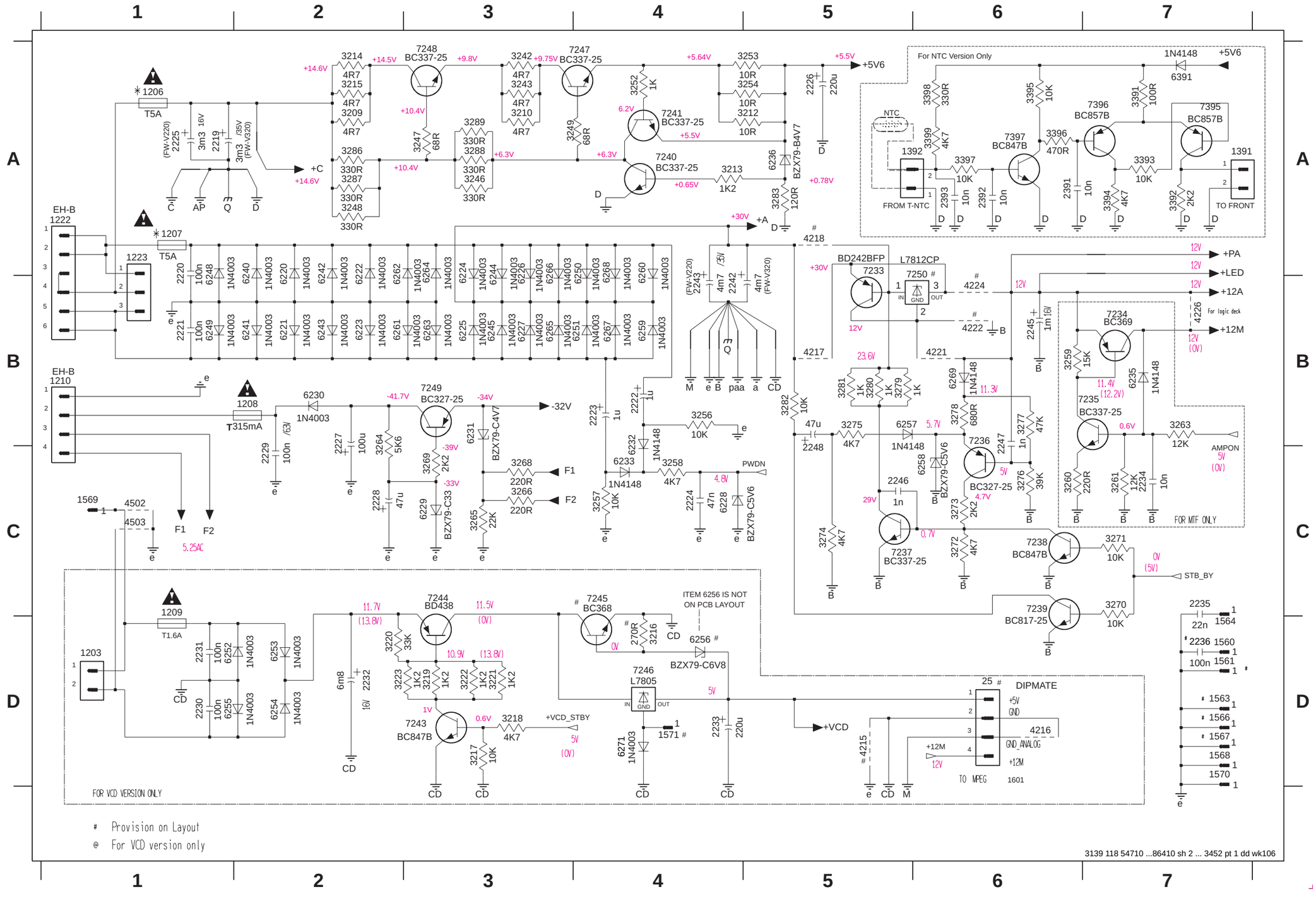
1560	C5	6223	B2	9244	C5		
1561	C5	6224	A3	9245	A7		
1562	C5	6225	B3	9246	D6		
1563	D5	6226	A3	9247	E5		
1564	A2	6227	B3	9248	C4		
1566	B7	6228	B2	9253	C5		
1567	B7	6229	A1	9254	B6		
1568	A2	6230	A2	9255	B6		
1569	A4	6231	A1	9256	B2		
1570	A2	6232	B3	9257	B5		
1571	A4	6235	B3	9258	C5		
1572	E7	6235	A6	9259	D5		
2219	C5	6236	B4	9285	C5		
2220	A2	6240	A3	9286	B7		
2221	B2	6241	B3	9287	A5		
2223	B3	6242	A2	9301	D7		
2224	B3	6243	B2	9302	C7		
2225	C4	6244	A3	9305	A6		
2226	B2	6245	B3	9306	A6		
2227	A2	6248	A2	9307	C6		
2228	B1	6249	B3	9308	B5		
2229	A1	6250	A3	9309	C5		
2230	A4	6251	B3	9310	B5		
2231	A4	6252	A4	9311	C6		
2232	A5	6253	A4	9312	C6		
2233	A4	6254	A4	9315	D7		
2242	B4	6255	A4	9320	B4		
2245	B5	6257	A7	9321	C3		
2245	C6	6258	A7	9322	C3		
2248	A6	6259	B3	9500	B1		
2249	C5	6260	A3	9501	B1		
2333	D6	6261	B2	9503	C1		
2334	D6	6262	A2	9504	B2		
2337	B5	6263	B2	9505	C1		
2338	C5	6264	A2	9506	C1		
2339	C5	6265	B3	9507	C1		
2342	C1	6266	A3	9508	E3		
2347	C7	6267	B3	9509	C1		
2348	C7	6268	A3	9510	C3		
2349	B7	6269	A7	9511	D3		
2350	C6	6271	A7	9512	C6		
2351	E7	6320	B5	9513	C2		
2352	C7	6321	B6	9514	C2		
2353	A6	6322	C6	9515	C2		
2354	B6	6323	B6	9516	C3		
2356	B6	6324	C6	9517	C3		
2357	D6	6325	B6	9518	D3		
2370	A7	6326	A6	9519	D4		
2405	B1	6327	A6	9520	D2		
2500	D4	6328	B6	9521	C1		
2500	D4	6329	B6	9522	C3		
2503	D4	6330	B2	9523	D3		
2504	C4	6331	B5	9524	B2		
2505	C3	6391	C3	9525	C3		
2507	C2	6502	C5	9526	C3		
2526	E4	6549	E5	9527	D2		
2527	D4	6550	E5	9528	D1		
2536	C3	6551	A1	9529	D1		
2543	C4	6553	C2	9530	D1		
2547	E5	7233	A2	9531	C1		
2549	D4	7234	A6	9532	C1		
2550	E4	7235	A6	9533	D1		
2573	A7	7236	A7	9534	D1		
2574	A7	7237	A6	9535	D2		
2577	C2	7240	B4	9536	D2		
2578	D2	7241	B3	9537	E1		
2579	B1	7244	A4	9538	E1		
2580	C3	7245	A4	9539	D3		
2581	B2	7246	A4	9540	E2		
2356	B6	7247	B4	9541	E2		
3557	C3	7248	C4	9542	E2		
3258	B2	7249	A1	9543	C2		
3264	A1	7250	A5	9544	C3		
3265	A1	7329	A5	9545	C3		
3266	A1	7330	B6	9546	C2		
3268	A1	7391	C5	9550	D5		
3269	A1	7401	C2	9552	E5		
3356	D7	7503	E2	9560	B2		
3357	D7	7504	D3	9561	C1		
3358	D7	7505	D3	9580	C1		
3359	D7	7506	D3				
3360	D7	7507	D3				
3361	A7	7508	D3				
3362	A7	9200	A1				
3363	A7	9202	A2				
3365	B6	9204	A1				
3366	B6	9205	B1				
3373	A7	9206	A4				

11-6

CIRCUIT DIAGRAM - POWER SUPPLY PART

25 D6	1223 A1	1567 D7	2222 B4	2230 D1	2243 B4	3209 A2	3218 D3	3246 A3	3257 C4	3266 C3	3275 B5	3283 A5	3394 A7	4217 B5	6220 A2	6228 C4	6240 A2	6250 A4	6258 C6	6266 A3	7235 B7	7244 C3	7396 A7
1203 D1	1391 A7	1568 D7	2223 B4	2231 D1	2245 B6	3210 A3	3219 D3	3247 A3	3258 C4	3268 C3	3276 C6	3286 A2	3395 A6	4218 A5	6221 B2	6229 C3	6241 B2	6251 B4	6259 B4	6267 B4	7236 B6	7245 C4	7397 A6
1206 A1	1392 A6	1569 C1	2224 C4	2232 D2	2246 C5	3212 A5	3220 D2	3248 A2	3259 B6	3269 C3	3277 B6	3287 A2	3396 A6	4221 B6	6222 A2	6230 B2	6242 A2	6252 D1	6260 A4	6268 A4	7237 C5	7246 D4	
1207 A1	1560 D7	1570 D7	2225 A1	2233 D4	2247 B6	3213 A4	3221 D3	3249 A4	3260 C6	3270 C7	3278 B6	3288 A3	3397 A6	4222 B6	6223 B2	6231 B3	6243 B2	6253 D2	6261 B2	6269 B6	7238 C6	7247 A3	
1208 B2	1561 D7	1571 D4	2226 A5	2234 C7	2248 B5	3214 A2	3222 D3	3252 A4	3261 C7	3271 C7	3279 B5	3289 A3	3398 A6	4224 B6	6224 A3	6232 B4	6244 A3	6254 D2	6262 A2	6271 D4	7239 C6	7248 A3	
1209 C1	1563 D7	2219 A1	2227 B2	2235 C7	2391 A6	3215 A2	3223 D2	3253 A5	3263 B7	3272 C6	3280 B5	3391 A7	3399 A6	4226 B7	6225 B3	6233 C4	6245 B3	6255 D1	6263 B3	6391 A7	7240 A4	7249 B3	
1210 B1	1564 D7	2220 A1	2228 C2	2236 D7	2392 A6	3216 D4	3242 A3	3254 A5	3264 B2	3273 C6	3281 B5	3392 A7	4215 D5	4502 C1	6226 A3	6235 B7	6248 A1	6256 D4	6264 A3	7233 A5	7241 A4	7250 B6	
1222 A1	1566 D7	2221 B1	2229 C2	2242 B4	2393 A6	3217 D3	3243 A3	3256 B4	3265 C3	3274 C5	3282 B5	3393 A7	4216 D6	4503 C1	6227 B3	6236 A5	6249 B1	6257 B5	6265 B3	7234 B7	7243 D3	7395 A7		



11-7

CIRCUIT DIAGRAM - SOURCE SELECT & AMPLIFIER PART

	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

	A0	A1
AUX	1	1
TUNER	0	1
TAPE	1	0
VCD	0	0

% VALUE FOR ONE BAND SOPECTRUM ANALYZER

ITEM #	3497	3498	3499	2469
VALUE	150K	56K	220K	100nF

★ VALUE FOR 18W & 25W VERSIONS

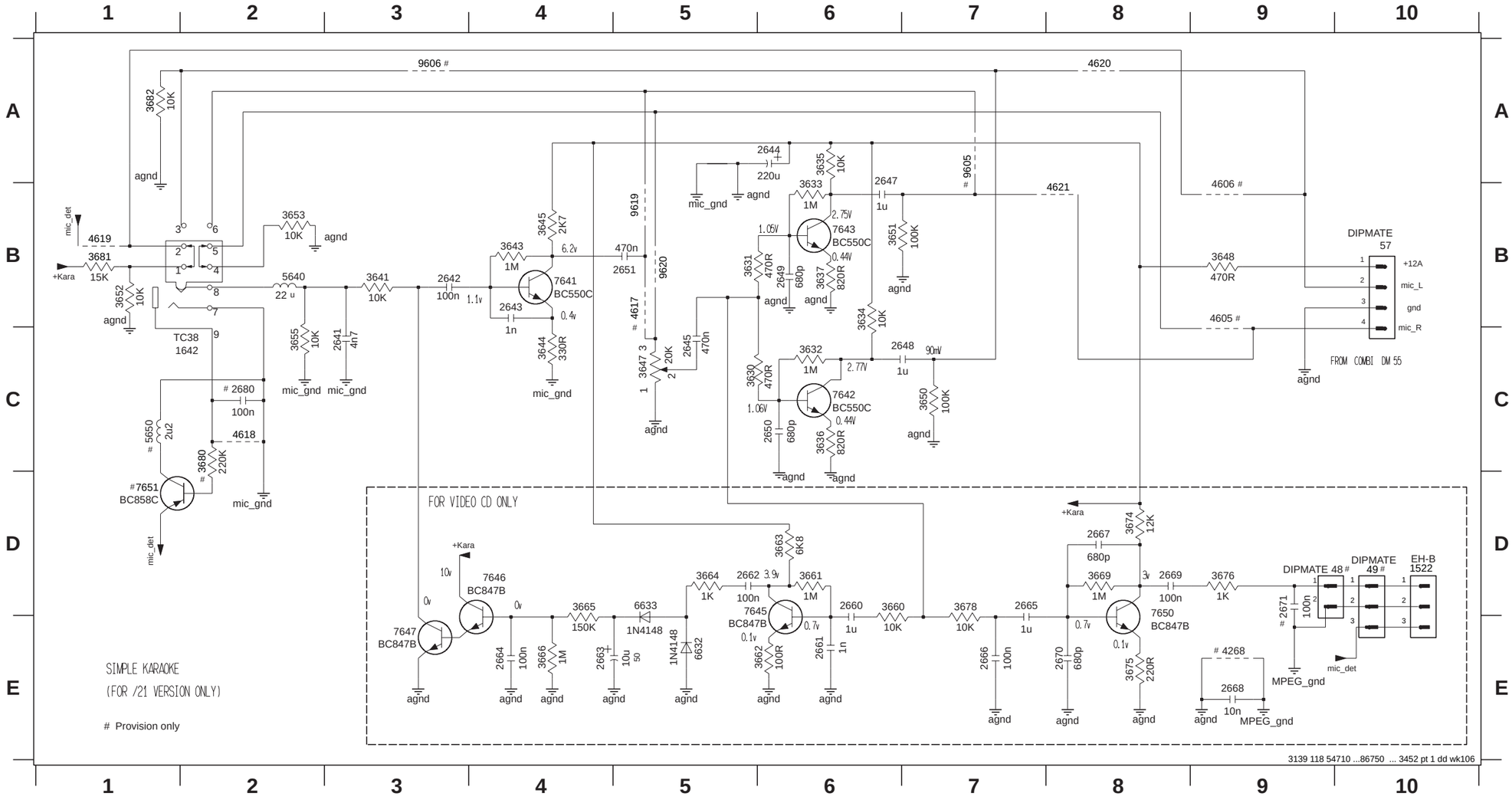
VERSION	3345	3346	6325	6326	6327
18W	10K	10K	BZX79 B18	BZX79 C22	BZX79 B4V7
25W	12K	12K	BZX79 B18	BZX79 C22	BZX79 B4V7

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

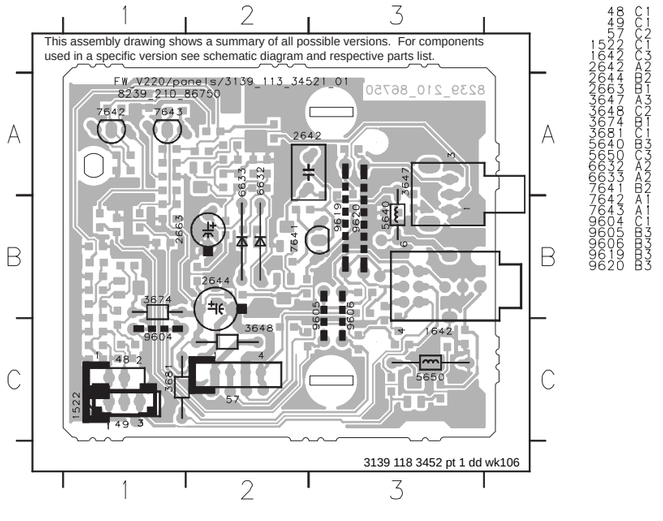
Remark : +A AND +C SUPPLY SWITCH AT VOL 32

11-8

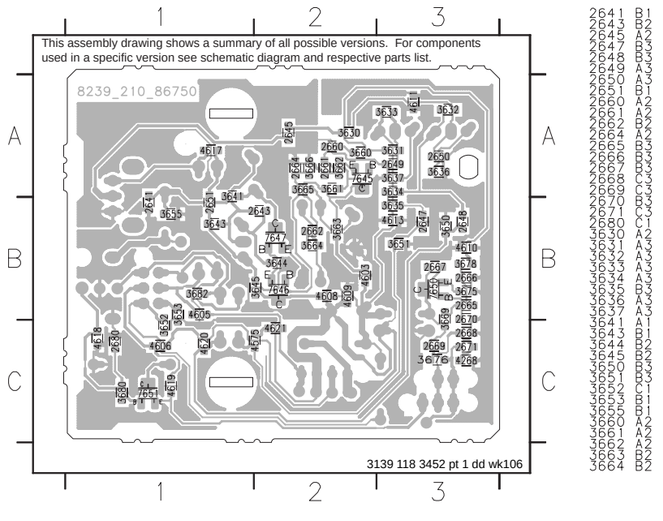
KARAOKE PART - CIRCUIT & COMPONENT LAYOUT



48 D9
49 D10
57 B10
1522 D10
1642 C2
2641 C3
2642 B3
2643 B4
2644 A6
2645 C5
2647 B6
2648 C7
2649 B6
2650 C6
2651 B5
2660 D6
2661 E6
2662 D5
2663 E4
2664 E4
2665 D7
2666 E7
2667 D8
2668 E9
2669 D8
2670 E8
2671 D9
2680 C2
3630 C5
3631 B5
3632 C6
3633 B6
3634 B6
3635 A6
3636 C6
3637 B6
3641 B3
3643 B4
3644 C4
3645 B4
3647 C5
3648 B9
3650 C7
3651 B6
3652 B1
3653 B2
3655 C2
3660 D6
3661 D6
3662 E6
3663 D6
3664 D5
3665 D4
3666 E4
3669 D8
3674 D8
3675 E8
3676 D9
3678 D7
3680 C2
3681 B1
3682 A1
4268 E9
4605 B9
4606 B9
4617 B5
4618 C2
4619 B1
4620 A8
4621 B8
5640 B2
5650 C1
6632 E5
6633 D5
7641 B4
7642 C6
7643 B6
7645 D6
7646 D4
7647 E3
7650 E8
7651 D1
9605 A7
9606 A3
9619 B5
9620 B5



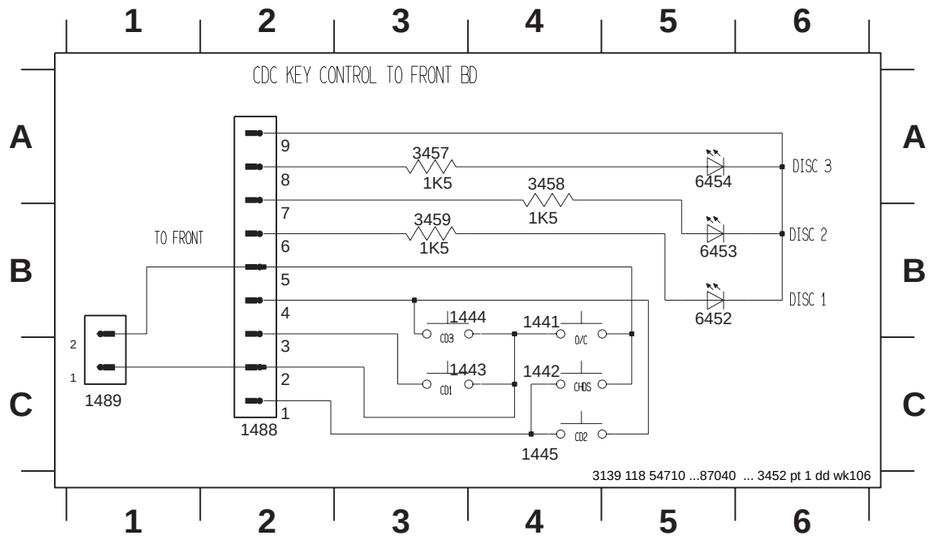
48 C1
49 C1
57 C2
1522 C1
1642 C3
2642 A2
2644 B2
2663 B1
3647 A3
3648 C2
3674 B1
3681 C1
5640 B3
5650 C3
6632 A2
6633 A2
7641 B2
7642 A1
7643 A1
9604 C1
9605 B3
9606 B3
9619 B3
9620 B3



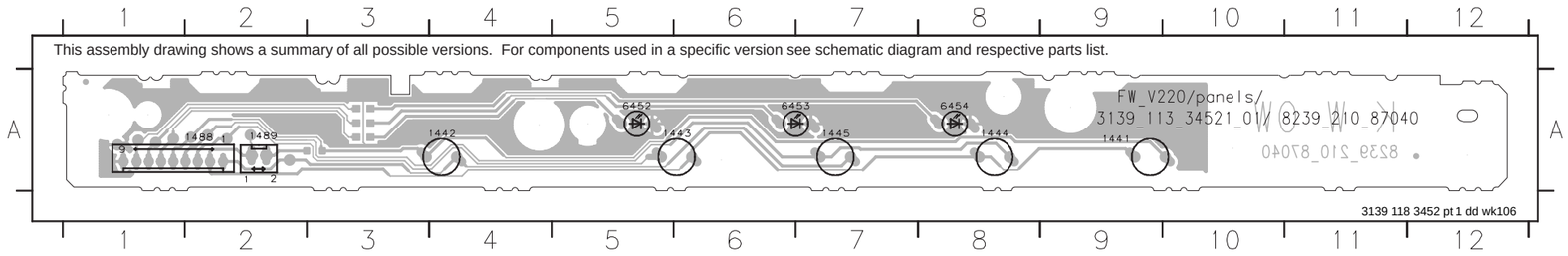
2641 B1
2643 B2
2645 A2
2647 B3
2648 B3
2649 A3
2650 A3
2651 B1
2660 A2
2661 A2
2662 B2
2664 A2
2665 B3
2666 B3
2667 B3
2668 C3
2669 C3
2670 B3
2671 C3
2680 C1
3630 A2
3631 A3
3632 A3
3633 A3
3634 A3
3635 B3
3636 A3
3637 A3
3641 A1
3643 B1
3644 B2
3645 B2
3647 B3
3648 B3
3651 B3
3652 C1
3653 B1
3655 B1
3660 A2
3661 A2
3662 A2
3663 B2
3664 B2
3665 A2
3666 A2
3669 B3
3675 B3
3676 C3
3678 B3
3680 C1
3682 B1
4268 C3
4575 C2
4603 B2
4605 B1
4606 C1
4608 B2
4609 B2
4610 B3
4611 A3
4613 B3
4617 A1
4618 C1
4619 C1
4620 C1
4621 C2
7645 A2
7646 B2
7647 B2
7650 B3
7651 C1

CDC KEY PART - CIRCUIT & COMPONENT LAYOUT

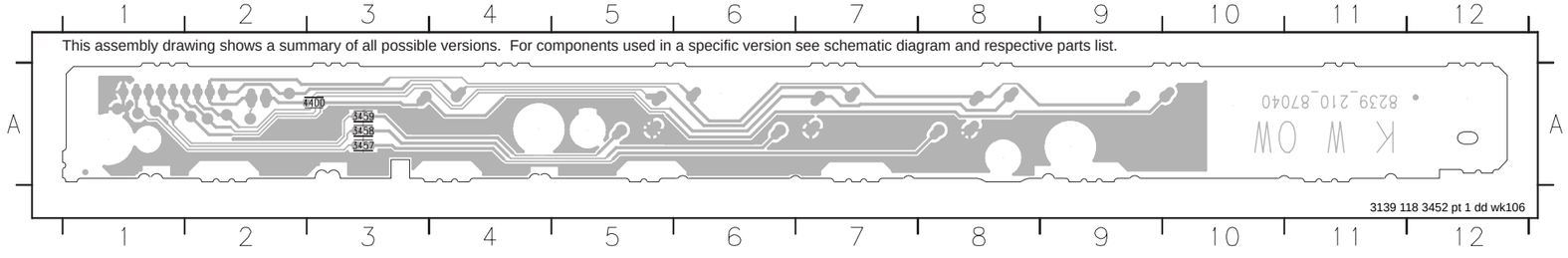
1441 B4 1443 C3 1445 C4 1489 C1 3458 A4 6452 B5 6454 A5
1442 C4 1444 B3 1488 C2 3457 A3 3459 B3 6453 B5



1441 A9 1442 A4 1443 A6 1444 A8 1445 A7 1488 A2 1489 A2 6452 A5 6453 A6 6454 A8

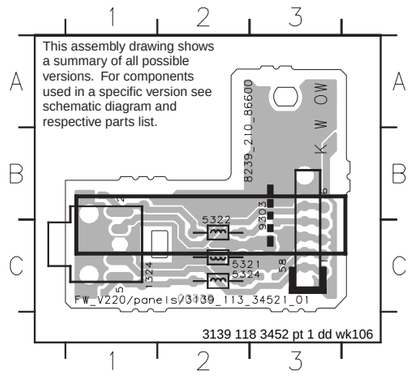


3457 A3 3458 A3 3459 A3 4400 A3

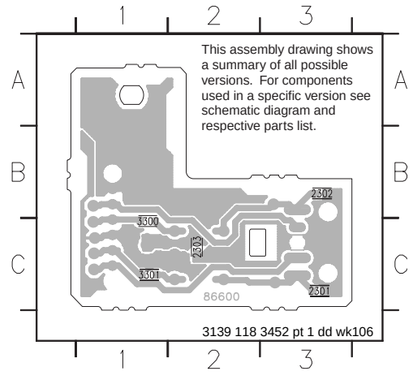


HEADPHONE PART - CIRCUIT & COMPONENT LAYOUT

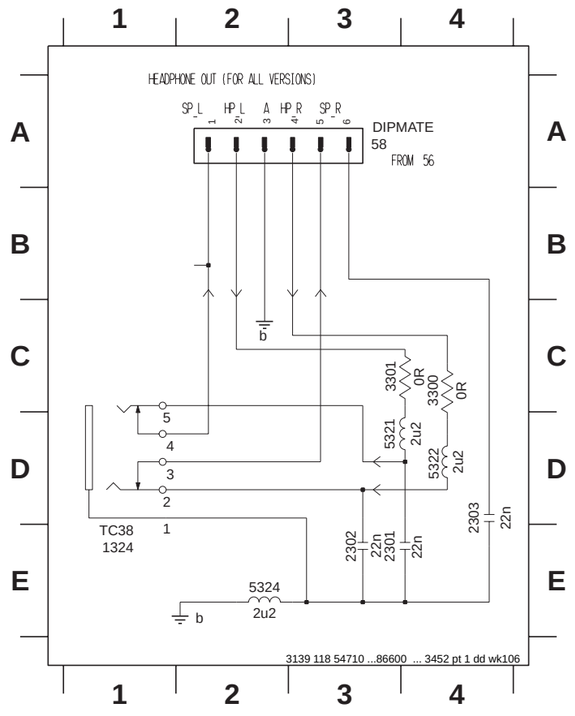
58 C3 5321 C2 5324 C2
1324 C1 5322 B2 9303 B3



2301 C3 2303 C2 3301 C1
2302 B3 3300 C1



58 A3 2301 E3 2303 D4 3301 C3 5322 D4
1324 E1 2302 E3 3300 C4 5321 D3 5324 E2



11-10

ELECTRICAL PARTS LIST - COMBI BOARD

MISCELLANEOUS

0306	4822 492 63051		Spring Clip
1201	4822 265 31015	⚠	Mains Socket
1202	4822 272 10269	⚠	Voltage Selector
1205	4822 071 52002	⚠	Fuse T2A 250V
1206	4822 071 55002	⚠	Fuse T5A 250V
1207	4822 071 55002	⚠	Fuse T5A 250V
1208	4822 071 53151	⚠	Fuse T315mA 250V
1209	4822 071 51602	⚠	Fuse T1.6A 250V
1323	4822 265 10463		Loudspeaker Socket 8P
1324	4822 265 11547		Headphone Socket
1441	2422 128 02917		Tact Switch
1442	2422 128 02917		Tact Switch
1443	2422 128 02917		Tact Switch
1444	2422 128 02917		Tact Switch
1445	2422 128 02917		Tact Switch
1507	4822 265 20553		Aux-in Socket
1508	2422 025 14526		Flex Socket 16pin Vert.
1509	4822 265 10981		Flex Socket 15pin Vert.
1510	2422 025 14518		Flex Socket 9pin Vert.
1518	4822 267 10953		Flex Socket 7pin Vert.
1642	4822 265 11529		Mic Socket
1803	4822 267 31996		Video-out Socket

CAPACITORS

2219	4822 124 42367	3300µF 20% 35V
2220	5322 121 42386	100nF 5% 63V
2221	5322 121 42386	100nF 5% 63V
2222	4822 124 21913	1µF 20% 63V
2223	4822 124 21913	1µF 20% 63V
2224	4822 121 43526	47nF 5% 250V
2226	4822 124 80144	220µF 20% 25V
2227	4822 124 40255	100µF 20% 63V
2228	4822 124 41751	47µF 20% 50V
2229	5322 121 42386	100nF 5% 63V
2230	5322 121 42386	100nF 5% 63V
2231	5322 121 42386	100nF 5% 63V
2232	4822 124 12328	6800µF 16V
2233	4822 124 80144	220µF 20% 25V
2235	5322 122 32654	22nF 10% 63V
2242	4822 124 80415	4700µF 20% 50V
2245	4822 124 81144	1000µF 20% 16V
2246	5322 122 31647	1nF 10% 63V
2247	5322 122 31647	1nF 10% 63V
2248	4822 124 40433	47µF 20% 25V
2249	4822 121 43526	47nF 5% 250V
2301	5322 122 32654	22nF 10% 63V
2302	5322 122 32654	22nF 10% 63V
2303	5322 122 32654	22nF 10% 63V
2321	5322 122 32531	100pF 5% 50V
2322	5322 122 32531	100pF 5% 50V
2323	4822 126 14043	1µF +80/-20% 16V
2324	4822 126 14043	1µF +80/-20% 16V
2327	5322 122 34099	470pF 10% 63V
2328	5322 122 34099	470pF 10% 63V
2331	4822 122 33575	220pF 5% 63V
2332	4822 122 33575	220pF 5% 63V
2333	4822 124 40433	47µF 20% 25V
2334	4822 124 40433	47µF 20% 25V
2335	4822 122 32535	680pF 10% 63V
2336	4822 122 32535	680pF 10% 63V
2337	4822 124 40769	4,7µF 20% 100V
2338	4822 124 40769	4,7µF 20% 100V
2339	4822 124 80144	220µF 20% 25V
2340	5322 126 10223	4,7nF 10% 63V
2341	4822 122 32535	680pF 10% 63V
2343	5322 122 32658	22pF 5% 50V
2344	5322 122 32658	22pF 5% 50V
2345	4822 126 14585	100nF 10% 50V
2346	4822 126 14585	100nF 10% 50V
2347	4822 121 42408	220nF 5% 63V
2348	4822 121 42408	220nF 5% 63V
2349	4822 121 42408	220nF 5% 63V
2350	4822 121 42408	220nF 5% 63V
2351	4822 124 80144	220µF 20% 25V
2352	4822 124 80144	220µF 20% 25V
2353	4822 124 80144	220µF 20% 25V
2354	4822 124 40769	4,7µF 20% 100V
2355	4822 122 33127	2,2nF 10% 63V
2356	4822 124 21913	1µF 20% 63V
2357	4822 124 40433	47µF 20% 25V
2358	4822 122 33177	10nF 20% 50V
2359	4822 122 33177	10nF 20% 50V
2360	5322 122 32654	22nF 10% 63V
2361	5322 122 32654	22nF 10% 63V
2362	4822 122 32535	680pF 10% 63V
2363	4822 126 13692	47pF 1% 63V
2364	4822 122 32535	680pF 10% 63V
2365	4822 122 32535	680pF 10% 63V
2370	4822 124 81151	22µF 20% 50V
2400	5322 122 32448	10pF 5% 63V
2401	5322 122 32448	10pF 5% 63V
2402	4822 122 33173	560pF 10% 50V
2405	4822 124 40433	47µF 20% 25V
2407	4822 126 13751	47nF 10% 63V
2460	4822 124 40207	100µF 20% 25V
2463	4822 122 33806	820pF 10% 63V
2465	5322 122 31866	6,8nF 10% 63V
2466	4822 126 13838	100nF +80/-20% 25V
2469	4822 126 13751	47nF 10% 63V
2470	4822 126 14043	1µF +80/-20% 16V
2500	4822 124 80195	470µF 20% 10V
2501	5322 122 32268	470pF 5% 63V
2502	5322 122 32268	470pF 5% 63V
2503	4822 124 40433	47µF 20% 25V
2504	4822 124 40433	47µF 20% 25V
2505	4822 124 40433	47µF 20% 25V
2506	4822 122 33891	3,3nF 10% 63V
2507	4822 124 81151	22µF 50V
2508	4822 126 14043	1µF +80/-20% 16V
2509	4822 126 14043	1µF +80/-20% 16V
2510	5322 122 34099	470pF 10% 63V
2511	5322 122 34099	470pF 10% 63V
2512	5322 122 34099	470pF 10% 63V
2513	5322 122 34099	470pF 10% 63V
2514	4822 126 14585	100nF 10% 50V
2515	4822 126 14585	100nF 10% 50V
2517	5322 122 32658	22pF 5% 50V
2518	5322 122 34099	470pF 10% 63V
2519	5322 122 34099	470pF 10% 63V
2520	5322 122 31647	1nF 10% 63V
2521	5322 122 31647	1nF 10% 63V
2522	5322 122 31866	6,8nF 10% 63V
2523	5322 122 31866	6,8nF 10% 63V
2524	5322 122 32659	33pF 5% 50V
2525	5322 122 32659	33pF 5% 50V
2526	4822 121 41856	22nF 5% 250V
2527	4822 121 41856	22nF 5% 250V
2528	4822 126 13751	47nF 10% 63V
2529	4822 126 13751	47nF 10% 63V
2530	4822 126 13691	27pF 1% 63V
2531	4822 126 13691	27pF 1% 63V
2532	4822 126 10326	180pF 5% 63V
2533	4822 126 10326	180pF 5% 63V
2534	4822 126 13344	1,5nF 5% 63V
2535	4822 126 13344	1,5nF 5% 63V
2536	4822 124 80195	470µF 20% 10V
2537	4822 126 13838	100nF +80/-20% 25V
2538	4822 126 13838	100nF +80/-20% 25V
2539	4822 126 14043	1µF +80/-20% 16V
2540	4822 126 14043	1µF +80/-20% 16V
2541	4822 126 14585	100nF 10% 50V
2542	4822 126 14585	100nF 10% 50V
2543	4822 124 40433	47µF 20% 25V
2545	4822 126 13838	100nF +80/-20% 25V
2546	4822 126 13838	100nF +80/-20% 25V
2547	4822 124 40207	100µF 20% 25V
2549	4822 121 41854	150nF 5% 63V
2550	4822 121 41854	150nF 5% 63V
2551	4822 126 14043	1µF +80/-20% 16V
2552	4822 126 14043	1µF +80/-20% 16V
2553	5322 122 31863	330pF 5% 63V
2554	5322 122 31863	330pF 5% 63V
2555	5322 122 31863	330pF 5% 63V
2556	5322 122 31863	330pF 5% 63V
2557	5322 122 31863	330pF 5% 63V
2558	5322 122 31863	330pF 5% 63V
2559	4822 126 14043	1µF +80/-20% 16V
2560	4822 126 14043	1µF +80/-20% 16V
2561	4822 126 14585	100nF 10% 50V
2563	5322 122 32654	22nF 10% 63V
2564	5322 122 31863	330pF 5% 63V
2565	5322 122 31863	330pF 5% 63V
2566	4822 126 13838	100nF +80/-20% 25V
2567	5322 122 32654	22nF 10% 63V
2568	4822 126 13694	68pF 1% 63V
2569	4822 122 33127	2,2nF 10% 63V
2570	4822 122 32535	680pF 10% 63V
2571	4822 122 32535	680pF 10% 63V
2572	4822 126 13838	100nF +80/-20% 25V
2573	4822 124 40769	4,7µF 20% 100V
2574	4822 124 40769	4,7µF 20% 100V
2575	4822 126 13689	18pF 1% 63V
2576	4822 126 13689	18pF 1% 63V
2577	4822 124 80195	470µF 20% 10V
2578	4822 124 40207	100µF 20% 25V
2579	4822 124 40433	47µF 20% 25V
2580	4822 124 40433	47µF 20% 25V
2581	4822 124 80791	470µF 20% 16V
2582	2238 780 15654	220nF 10% 16V
2583	2238 780 15654	220nF 10% 16V
2584	4822 126 13692	47pF 1% 63V
2585	4822 126 13692	47pF 1% 63V
2586	4822 126 13838	100nF +80/-20% 25V
2587	4822 126 13838	100nF +80/-20% 25V
2588	4822 122 32535	680pF 10% 63V
2591	4822 122 32535	680pF 10% 63V
2592	4822 122 32535	680pF 10% 63V
2593	4822 126 13692	47pF 1% 63V
2594	4822 126 13692	47pF 1% 63V
2599	5322 122 32654	22nF 10% 63V
2600	4822 126 13691	27pF 1% 63V
2641	5322 126 10223	4,7nF 10% 63V
2642	5322 121 42386	100nF 5% 63V
2643	5322 122 31647	1nF 10% 63V
2644	4822 124 80144	220µF 20% 25V
2645	4822 126 13482	470nF 80/20% 16V
2647	4822 126 14043	1µF +80/-20% 16V
2648	4822 126 14043	1µF +80/-20% 16V
2649	4822 122 32535	680pF 10% 63V
2650	4822 122 32535	680pF 10% 63V
2651	4822 126 13482	470nF 80/20% 16V
2660	4822 126 14043	1µF +80/-20% 16V
2661	5322 126 10511	1nF 5% 50V
2662	4822 126 13838	100nF +80/-20% 25V
2663	4822 124 40248	10µF 20% 63V
2664	4822 126 13838	100nF +80/-20% 25V
2665	4822 126 14043	1µF +80/-20% 16V
2666	4822 126 13838	100nF +80/-20% 25V

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ELECTRICAL PARTS LIST - COMBI BOARD

ELECTRICAL PARTS LIST - COMBI BOARD

CAPACITORS

2667	4822 122 32535	680pF 10% 63V
2668	4822 122 33177	10nF 20% 50V
2669	4822 126 13838	100nF +80/-20% 25V
2670	4822 122 32535	680pF 10% 63V
2885	4822 126 11585	22nF +80/-20% 25V

RESISTORS

3209	4822 051 20478	4R7 5% 0,1W
3210	4822 051 20478	4R7 5% 0,1W
3212	4822 051 20109	10R 5% 0,1W
3213	4822 051 20122	1k2 5% 0,1W
3214	4822 051 20478	4R7 5% 0,1W
3215	4822 051 20478	4R7 5% 0,1W
3217	4822 117 10833	10k 1% 0,1W
3218	4822 051 20472	4k7 5% 0,1W
3219	4822 051 20122	1k2 5% 0,1W
3220	4822 051 20333	33k 5% 0,1W
3221	4822 051 20122	1k2 5% 0,1W
3222	4822 051 20122	1k2 5% 0,1W
3223	4822 051 20122	1k2 5% 0,1W
3242	4822 051 20478	4R7 5% 0,1W
3243	4822 051 20478	4R7 5% 0,1W
3246	4822 117 13577	330R 1% 0,25W
3247	4822 117 12521	68R 1% 0,1W
3248	4822 117 13577	330R 1% 0,25W
3249	4822 117 12521	68R 1% 0,1W
3251	4822 117 10833	10k 1% 0,1W
3252	4822 051 10102	1k 2% 0,25W
3253	4822 051 20109	10R 5% 0,1W
3254	4822 051 20109	10R 5% 0,1W
3256	4822 050 21003	10k 1% 0,6W
3257	4822 050 21003	10k 1% 0,6W
3258	4822 116 52283	4k7 5% 0,5W
3264	4822 116 52289	5k6 5% 0,5W
3265	4822 116 52257	22k 5% 0,5W
3266	4822 116 83872	220R 5% 0,5W
3268	4822 116 83872	220R 5% 0,5W
3269	4822 116 52256	2k2 5% 0,5W
3270	4822 117 10833	10k 1% 0,1W
3271	4822 117 10833	10k 1% 0,1W
3272	4822 051 20472	4k7 5% 0,1W
3273	4822 117 11449	2k2 5% 0,1W
3274	4822 051 20472	4k7 5% 0,1W
3275	4822 051 20472	4k7 5% 0,1W
3276	4822 051 20393	39k 5% 0,1W
3277	4822 117 10834	47k 1% 0,1W
3278	4822 117 10361	680R 1% 0,1W
3279	4822 051 10102	1k 2% 0,25W
3280	4822 051 10102	1k 2% 0,25W
3281	4822 051 10102	1k 2% 0,25W
3282	4822 117 10833	10k 1% 0,1W
3283	4822 051 20121	120R 5% 0,1W
3286	4822 117 13577	330R 1% 0,25W
3287	4822 117 13577	330R 1% 0,25W
3288	4822 117 13577	330R 1% 0,25W
3289	4822 117 13577	330R 1% 0,25W
3300	4822 051 20008	0R Jumper 0805
3301	4822 051 20008	0R Jumper 0805
3321	4822 051 20392	3k9 5% 0,1W
3322	4822 051 20392	3k9 5% 0,1W
3325	4822 117 10837	100k 1% 0.1W
3326	4822 117 10837	100k 1% 0.1W
3329	4822 051 20472	4k7 5% 0,1W
3330	4822 051 20472	4k7 5% 0,1W
3331	4822 117 11383	12k 1% 0,1W
3332	4822 117 11383	12k 1% 0,1W
3333	4822 117 11449	2k2 5% 0,1W
3334	4822 117 11449	2k2 5% 0,1W
3335	4822 051 20273	27k 5% 0,1W
3336	4822 051 20273	27k 5% 0,1W
3337	4822 051 20479	47R 5% 0,1W
3338	4822 051 20479	47R 5% 0,1W
3339	4822 051 20479	47R 5% 0,1W
3340	4822 051 20479	47R 5% 0,1W
3341	4822 051 10102	1k 2% 0,25W
3342	4822 051 10102	1k 2% 0,25W
3343	4822 051 20154	150k 5% 0,1W
3344	4822 051 20154	150k 5% 0,1W
3345	4822 117 11383	12k 1% 0,1W
3346	4822 117 11383	12k 1% 0,1W
3347	4822 117 10833	10k 1% 0,1W
3348	4822 117 10833	10k 1% 0,1W
3349	4822 117 10833	10k 1% 0,1W
3350	4822 117 10833	10k 1% 0,1W
3351	4822 051 20228	2R2 5% 0,1W
3352	4822 051 20228	2R2 5% 0,1W
3353	4822 051 20228	2R2 5% 0,1W
3354	4822 051 20228	2R2 5% 0,1W
3356	4822 053 10331 ⚠	330R 5% 1W
3357	4822 053 10331 ⚠	330R 5% 1W
3358	4822 053 10331 ⚠	330R 5% 1W
3359	4822 053 10331 ⚠	330R 5% 1W
3360	4822 053 10331 ⚠	330R 5% 1W
3361	4822 116 52249	1k8 5% 0,5W
3362	4822 116 52249	1k8 5% 0,5W
3363	4822 116 52249	1k8 5% 0,5W
3364	4822 051 20471	470R 5% 0,1W
3365	4822 116 83872	220R 5% 0,5W
3366	4822 116 52283	4k7 5% 0,5W
3372	4822 051 20109	10R 5% 0,1W
3373	4822 116 52219	330R 5% 0,5W
3374	4822 053 10331 ⚠	330R 5% 1W
3379	4822 051 20472	4k7 5% 0,1W
3380	4822 051 20392	3k9 5% 0,1W
3381	4822 116 52175	100R 5% 0,5W
3382	4822 116 83933	15k 1% 0,1W
3383	4822 051 20223	22k 5% 0,1W
3384	4822 051 20223	22k 5% 0,1W
3385	4822 117 10834	47k 1% 0,1W
3386	4822 117 10834	47k 1% 0,1W
3387	4822 117 11149	82k 1% 0,1W
3388	4822 051 20334	330k 5% 0,1W
3390	4822 051 20154	150k 5% 0,1W
3400	4822 117 11449	2k2 5% 0,1W
3401	4822 117 11449	2k2 5% 0,1W
3402	4822 117 11449	2k2 5% 0,1W
3403	4822 117 11449	2k2 5% 0,1W
3404	4822 117 11449	2k2 5% 0,1W
3406	4822 117 11449	2k2 5% 0,1W
3407	4822 117 11449	2k2 5% 0,1W
3409	4822 051 20562	5k6 5% 0,1W
3410	4822 051 20562	5k6 5% 0,1W
3414	4822 117 11507	6k8 1% 0,1W
3415	4822 117 11507	6k8 1% 0,1W
3457	4822 117 11139	1k5 1% 0,1W
3458	4822 117 11139	1k5 1% 0,1W
3459	4822 117 11139	1k5 1% 0,1W
3488	4822 117 11139	1k5 1% 0,1W
3489	4822 051 20684	680k 5% 0,1W
3490	4822 117 11149	82k 1% 0,1W
3491	4822 051 20474	470k 5% 0,1W
3492	4822 117 11139	1k5 1% 0,1W
3493	4822 051 20684	680k 5% 0,1W
3494	4822 117 11149	82k 1% 0,1W
3495	4822 051 20474	470k 5% 0,1W
3496	4822 117 11139	1k5 1% 0,1W
3497	4822 051 20684	680k 5% 0,1W
3498	4822 117 11149	82k 1% 0,1W
3499	4822 051 20474	470k 5% 0,1W
3501	4822 051 20683	68k 5% 0,1W
3502	4822 051 20683	68k 5% 0,1W
3503	4822 117 10837	100k 1% 0.1W
3504	4822 117 10837	100k 1% 0.1W
3507	4822 117 10834	47k 1% 0,1W
3508	4822 117 10834	47k 1% 0,1W
3509	4822 117 11149	82k 1% 0,1W
3510	4822 117 11149	82k 1% 0,1W
3511	4822 051 20184	180k 5% 0,1W
3512	4822 051 20184	180k 5% 0,1W
3517	4822 117 10833	10k 1% 0,1W
3518	4822 051 20333	33k 5% 0,1W
3519	4822 051 20333	33k 5% 0,1W
3520	4822 116 83933	15k 1% 0,1W
3521	4822 052 10339 ⚠	33R 5% 0,33W
3522	4822 051 20105	1M 5% 0,1W
3523	4822 051 20105	1M 5% 0,1W
3524	4822 051 20683	68k 5% 0,1W
3525	4822 051 20683	68k 5% 0,1W
3526	4822 051 20273	27k 5% 0,1W
3527	4822 051 20273	27k 5% 0,1W
3528	4822 117 10833	10k 1% 0,1W
3529	4822 117 10833	10k 1% 0,1W
3530	4822 051 20333	33k 5% 0,1W
3531	4822 051 20333	33k 5% 0,1W
3532	4822 051 20393	39k 5% 0,1W
3533	4822 051 20393	39k 5% 0,1W
3534	4822 117 10837	100k 1% 0.1W
3535	4822 117 10837	100k 1% 0.1W
3536	4822 051 20332	3k3 5% 0,1W
3537	4822 051 20332	3k3 5% 0,1W
3538	4822 117 11149	82k 1% 0,1W
3539	4822 117 11149	82k 1% 0,1W
3540	4822 051 20472	4k7 5% 0,1W
3541	4822 051 20472	4k7 5% 0,1W
3542	4822 051 20109	10R 5% 0,1W
3543	4822 051 20683	68k 5% 0,1W
3544	4822 116 52297	68k 5% 0,5W
3545	4822 117 10834	47k 1% 0,1W
3546	4822 117 10834	47k 1% 0,1W
3547	4822 051 20471	470R 5% 0,1W
3548	4822 051 20471	470R 5% 0,1W
3549	4822 051 20472	4k7 5% 0,1W
3550	4822 116 52304	82k 5% 0,5W
3551	4822 051 20228	2R2 5% 0,1W
3552	4822 051 20228	2R2 5% 0,1W
3553	4822 051 20393	39k 5% 0,1W
3554	4822 051 20393	39k 5% 0,1W
3555	4822 117 11149	82k 1% 0,1W
3556	4822 051 20332	3k3 5% 0,1W
3557	4822 051 20332	3k3 5% 0,1W
3558	4822 051 20184	180k 5% 0,1W
3559	4822 051 20184	180k 5% 0,1W
3560	4822 051 20471	470R 5% 0,1W
3561	4822 051 20471	470R 5% 0,1W
3562	4822 051 20822	8k2 5% 0,1W
3563	4822 051 20822	8k2 5% 0,1W
3564	4822 117 11448	180R 1% 0,1W
3565	4822 117 11448	180R 1% 0,1W
3566	4822 117 10833	10k 1% 0,1W
3567	4822 117 10833	10k 1% 0,1W
3570	4822 117 10833	10k 1% 0,1W
3571	4822 117 10833	10k 1% 0,1W
3574	4822 051 20273	27k 5% 0,1W
3575	4822 051 20273	27k 5% 0,1W
3576	4822 051 20273	27k 5% 0,1W
3577	4822 051 20273	27k 5% 0,1W
3579	4822 051 20154	150k 5% 0,1W
3580	4822 051 20223	22k 5% 0,1W

RESISTORS

3581	4822 051 20223	22k 5% 0,1W
3582	4822 051 20122	1k2 5% 0,1W
3583	4822 051 20122	1k2 5% 0,1W
3584	4822 117 10361	680R 1% 0,1W
3585	4822 051 20228	2R2 5% 0,1W
3586	4822 117 11449	2k2 5% 0,1W
3587	4822 117 11507	6k8 1% 0,1W
3588	4822 051 20471	470R 5% 0,1W
3589	4822 051 20391	390R 5% 0,1W
3590	4822 117 11449	2k2 5% 0,1W
3591	4822 116 83872	220R 5% 0,5W
3592	4822 051 20333	33k 5% 0,1W
3593	4822 051 10102	1k 2% 0,25W
3594	4822 051 10102	1k 2% 0,25W
3596	4822 051 20683	68k 5% 0,1W
3597	4822 051 20683	68k 5% 0,1W
3598	4822 117 10837	100k 1% 0.1W
3599	4822 117 10837	100k 1% 0.1W
3601	4822 116 83884	47k 5% 0,5W
3602	4822 116 83884	47k 5% 0,5W
3603	4822 051 20105	1M 5% 0,1W
3604	4822 051 20105	1M 5% 0,1W
3605	4822 117 10834	47k 1% 0,1W
3606	4822 117 10834	47k 1% 0,1W
3609	4822 116 83883	470R 5% 0,5W
3610	4822 116 83883	470R 5% 0,5W
3611	4822 051 20333	33k 5% 0,1W
3616	4822 117 10837	100k 1% 0.1W
3617	4822 051 20182	1k8 5% 0,1W
3618	4822 051 20182	1k8 5% 0,1W
3630	4822 051 20471	470R 5% 0,1W
3631	4822 051 20471	470R 5% 0,1W
3632	4822 051 20105	1M 5% 0,1W
3633	4822 051 20105	1M 5% 0,1W
3634	4822 117 10833	10k 1% 0,1W
3635	4822 117 10833	10k 1% 0,1W
3636	4822 117 11454	820R 1% 0,1W
3637	4822 117 11454	820R 1% 0,1W
3638	4822 117 11449	2k2 5% 0,1W
3639	4822 117 11449	2k2 5% 0,1W
3640	4822 117 10833	10k 1% 0,1W
3641	4822 117 10833	10k 1% 0,1W
3643	4822 051 20105	1M 5% 0,1W
3644	4822 117 13577	330R 1% 0,25W
3645	4822 117 12955	2k7 1% 0,1W
3647	4822 101 21204	Potm Rotary 20KA
3648	4822 116 83883	470R 5% 0,5W
3650	4822 117 10837	100k 1% 0.1W
3651	4822 117 10837	100k 1% 0.1W
3652	4822 117 10833	10k 1% 0,1W
3653	4822 117 10833	10k 1% 0,1W
3655	4822 117 10833	10k 1% 0,1W
3660	4822 117 10833	10k 1% 0,1W
3661	4822 051 20105	1M 5% 0,1W
3662	4822 117 11373	100R 1% 0,25W
3663	4822 117 11507	6k8 1% 0,1W
3664	4822 051 10102	1k 2% 0,25W
3665	4822 051 20154	150k 5% 0,1W
3666	4822 051 20105	1M 5% 0,1W
3669	4822 051 20105	1M 5% 0,1W
3674	4822 116 52238	12k 5% 0,5W
3675	4822 117 11503	220R 1% 0.1W
3676	4822 051 10102	1k 2% 0,25W
3678	4822 117 10833	10k 1% 0,1W
3681	4822 116 52244	15k 5% 0,5W
3682	4822 051 30103	10k 5% 0,062W
4213	4822 051 20008	0R Jumper 0805
4214	4822 051 20008	0R Jumper 0805
4216	4822 051 20008	0R Jumper 0805
4217	4822 051 20008	0R Jumper 0805
4221	4822 051 20008	0R Jumper 0805
4226	4822 051 20008	0R Jumper 0805
4228	4822 051 20008	0R Jumper 0805
4244	4822 051 20008	0R Jumper 0805
4269	4822 051 20008	0R Jumper 0805
4270	4822 051 20008	0R Jumper 0805
4271	4822 051 20008	0R Jumper 0805
4272	4822 051 20008	0R Jumper 0805
4273	4822 051 20008	0R Jumper 0805
4275	4822 051 20008	0R Jumper 0805
4276	4822 051 20008	0R Jumper 0805
4278	4822 051 20008	0R Jumper 0805
4279	4822 051 20008	0R Jumper 0805
4280	4822 051 20008	0R Jumper 0805
4288	4822 051 20008	0R Jumper 0805
4504	4822 051 20008	0R Jumper 0805
4505	4822 051 20008	0R Jumper 0805
4506	4822 051 20008	0R Jumper 0805
4508	4822 051 20008	0R Jumper 0805
4509	4822 051 20008	0R Jumper 0805
4510	4822 051 20008	0R Jumper 0805
4511	4822 051 20008	0R Jumper 0805
4512	4822 051 20008	0R Jumper 0805
4513	4822 051 20008	0R Jumper 0805
4514	4822 051 20008	0R Jumper 0805
4515	4822 051 20008	0R Jumper 0805
4516	4822 051 20008	0R Jumper 0805
4517	4822 051 20008	0R Jumper 0805
4518	4822 051 20008	0R Jumper 0805
4519	4822 051 20008	0R Jumper 0805
4520	4822 051 20008	0R Jumper 0805
4521	4822 051 20008	0R Jumper 0805
4522	4822 051 20008	0R Jumper 0805
4523	4822 051 20008	0R Jumper 0805

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ELECTRICAL PARTS LIST - COMBI BOARD

4524	4822 051 20008	0R Jumper 0805
4525	4822 051 20008	0R Jumper 0805
4526	4822 051 20008	0R Jumper 0805
4527	4822 051 20008	0R Jumper 0805
4529	4822 051 20008	0R Jumper 0805
4530	4822 051 20008	0R Jumper 0805
4531	4822 051 20008	0R Jumper 0805
4532	4822 051 20008	0R Jumper 0805
4533	4822 051 20008	0R Jumper 0805
4534	4822 051 20008	0R Jumper 0805
4535	4822 051 20008	0R Jumper 0805
4536	4822 051 20008	0R Jumper 0805
4537	4822 051 20008	0R Jumper 0805
4538	4822 051 20008	0R Jumper 0805
4539	4822 051 20008	0R Jumper 0805
4540	4822 051 20008	0R Jumper 0805
4541	4822 051 20008	0R Jumper 0805
4542	4822 051 20008	0R Jumper 0805
4543	4822 051 20008	0R Jumper 0805
4544	4822 051 20008	0R Jumper 0805
4545	4822 051 20008	0R Jumper 0805
4546	4822 051 20008	0R Jumper 0805
4548	4822 051 20008	0R Jumper 0805
4550	4822 051 20008	0R Jumper 0805
4551	4822 051 20008	0R Jumper 0805
4552	4822 051 20008	0R Jumper 0805
4553	4822 051 20008	0R Jumper 0805
4554	4822 051 20008	0R Jumper 0805
4555	4822 051 20008	0R Jumper 0805
4556	4822 051 20008	0R Jumper 0805
4558	4822 051 20008	0R Jumper 0805
4559	4822 051 20008	0R Jumper 0805
4560	4822 051 20008	0R Jumper 0805
4561	4822 051 20008	0R Jumper 0805
4562	4822 051 20008	0R Jumper 0805
4563	4822 051 20008	0R Jumper 0805
4564	4822 051 20008	0R Jumper 0805
4565	4822 051 20008	0R Jumper 0805
4566	4822 051 20008	0R Jumper 0805
4567	4822 051 20008	0R Jumper 0805
4568	4822 051 20008	0R Jumper 0805
4569	4822 051 20008	0R Jumper 0805
4570	4822 051 20008	0R Jumper 0805
4571	4822 051 20008	0R Jumper 0805
4573	4822 051 20008	0R Jumper 0805
4574	4822 051 20008	0R Jumper 0805
4575	4822 051 20008	0R Jumper 0805
4576	4822 051 20008	0R Jumper 0805
4577	4822 051 20008	0R Jumper 0805
4578	4822 051 20008	0R Jumper 0805
4579	4822 051 20008	0R Jumper 0805
4580	4822 051 20008	0R Jumper 0805
4581	4822 051 20008	0R Jumper 0805
4582	4822 051 20008	0R Jumper 0805
4583	4822 051 20008	0R Jumper 0805
4584	4822 051 20008	0R Jumper 0805
4585	4822 051 20008	0R Jumper 0805
4586	4822 051 20008	0R Jumper 0805
4587	4822 051 20008	0R Jumper 0805
4589	4822 051 20008	0R Jumper 0805
4590	4822 051 20008	0R Jumper 0805
4592	4822 051 20008	0R Jumper 0805
4593	4822 051 20008	0R Jumper 0805
4594	4822 051 20008	0R Jumper 0805
4595	4822 051 20008	0R Jumper 0805
4596	4822 051 20008	0R Jumper 0805
4597	4822 051 20008	0R Jumper 0805
4598	4822 051 20008	0R Jumper 0805
4599	4822 051 20008	0R Jumper 0805
4603	4822 051 20008	0R Jumper 0805
4608	4822 051 20008	0R Jumper 0805
4609	4822 051 20008	0R Jumper 0805
4610	4822 051 20008	0R Jumper 0805
4611	4822 051 20008	0R Jumper 0805
4613	4822 051 20008	0R Jumper 0805
4618	4822 051 20008	0R Jumper 0805
4619	4822 051 20008	0R Jumper 0805
4620	4822 051 20008	0R Jumper 0805
4621	4822 051 20008	0R Jumper 0805
4677	4822 051 20008	0R Jumper 0805

COILS & FILTERS

5202	4822 157 11832	Mains Filter 400µH 3A
5321	4822 157 62552	Coil 2,2µH 5%
5322	4822 157 62552	Coil 2,2µH 5%
5324	4822 157 62552	Coil 2,2µH 5%
5502	4822 157 62552	Coil 2,2µH 5%
5503	4822 157 62255	Coil 18,5 Turns
5504	4822 157 62255	Coil 18,5 Turns
5505	4822 157 62255	Coil 18,5 Turns
5506	4822 157 62255	Coil 18,5 Turns
5508	4822 526 10704	FE Bead 100MHz
5510	4822 157 62552	Coil 2,2µH 5%
5512	4822 157 62552	Coil 2,2µH 5%
5521	4822 157 62552	Coil 2,2µH 5%
5640	4822 157 11235	Coil 22µH 5%

DIODES

6220	4822 130 31878	1N4003G
6221	4822 130 31878	1N4003G
6222	4822 130 31878	1N4003G
6223	4822 130 31878	1N4003G
6224	4822 130 31878	1N4003G
6225	4822 130 31878	1N4003G

ELECTRICAL PARTS LIST - COMBI BOARD

DIODES

6226	4822 130 31878	1N4003G
6227	4822 130 31878	1N4003G
6228	4822 130 34173	BZX79-B5V6
6229	4822 130 34142	BZX79-B33
6230	4822 130 31878	1N4003G
6231	4822 130 34174	BZX79-B4V7
6232	4822 130 30621	1N4148
6233	4822 130 30621	1N4148
6236	4822 130 34174	BZX79-B4V7
6240	4822 130 31878	1N4003G
6241	4822 130 31878	1N4003G
6242	4822 130 31878	1N4003G
6243	4822 130 31878	1N4003G
6244	4822 130 31878	1N4003G
6245	4822 130 31878	1N4003G
6248	4822 130 31878	1N4003G
6249	4822 130 31878	1N4003G
6250	4822 130 31878	1N4003G
6251	4822 130 31878	1N4003G
6252	4822 130 31878	1N4003G
6253	4822 130 31878	1N4003G
6254	4822 130 31878	1N4003G
6255	4822 130 31878	1N4003G
6257	4822 130 30621	1N4148
6258	4822 130 34173	BZX79-B5V6
6259	4822 130 31878	1N4003G
6260	4822 130 31878	1N4003G
6261	4822 130 31878	1N4003G
6262	4822 130 31878	1N4003G
6263	4822 130 31878	1N4003G
6264	4822 130 31878	1N4003G
6265	4822 130 31878	1N4003G
6266	4822 130 31878	1N4003G
6267	4822 130 31878	1N4003G
6268	4822 130 31878	1N4003G
6269	4822 130 30621	1N4148
6271	4822 130 31878	1N4003G
6320	4822 130 31878	1N4003G
6321	4822 130 31878	1N4003G
6322	4822 130 31878	1N4003G
6323	4822 130 31878	1N4003G
6324	4822 130 31878	1N4003G
6325	4822 130 31024	BZX79-B18
6326	4822 130 34441	BZX79-B22
6327	4822 130 34174	BZX79-B4V7
6328	4822 130 31878	1N4003G
6329	4822 130 30621	1N4148
6330	4822 130 30621	1N4148
6331	4822 130 31878	1N4003G
6452	4822 130 11589	LTL-1CHAE
6453	4822 130 11589	LTL-1CHAE
6454	4822 130 11589	LTL-1CHAE
6502	4822 130 34173	BZX79-B5V6
6549	4822 130 30621	1N4148
6550	4822 130 30621	1N4148
6551	4822 130 30862	BZX79-B9V1
6553	4822 130 31878	1N4003G
6632	4822 130 30621	1N4148
6633	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUITS

7233	9322 139 22687	BD242BFP
7236	4822 130 41246	BC327-25
7237	4822 130 40981	BC337-25
7238	4822 130 60511	BC847B
7239	4822 130 42804	BC817-25
7240	4822 130 40981	BC337-25
7241	4822 130 40981	BC337-25
7243	4822 130 60511	BC847B
7244	4822 130 40995	BD438
7246	4822 209 80817	L7805CV
7247	4822 130 40981	BC337-25
7248	4822 130 40981	BC337-25
7249	4822 130 41246	BC327-25
7320	4822 130 42804	BC817-25
7321	4822 130 42804	BC817-25
7322	4822 130 42804	BC817-25
7323	4822 130 42804	BC817-25
7324	4822 130 60373	BC857B
7329	4822 130 10847	BDW94C
7330	4822 130 40981	BC337-25
7331	4822 130 60373	BC857B
7332	4822 130 60373	BC857B
7333	4822 130 42804	BC817-25
7391	9322 133 18682	AN7125P
7400	4822 130 60373	BC857B
7402	5322 209 11306	HEF4094BT
7403	4822 130 60373	BC857B
7404	4822 130 60373	BC857B
7405	4822 130 60373	BC857B
7501	5322 209 11102	HEF4052BT
7503	4822 130 41096	BC550C
7504	4822 130 41096	BC550C
7505	4822 130 44568	ON4986
7506	4822 130 44568	ON4986
7507	4822 130 44568	ON4986
7508	4822 130 44568	ON4986
7509	4822 130 60511	BC847B
7510	4822 130 60373	BC857B
7530	5322 209 14482	HEF4069UBT
7537	4822 130 60511	BC847B
7538	4822 130 60511	BC847B
7539	4822 130 60511	BC847B
7540	4822 130 60511	BC847B

ELECTRICAL PARTS LIST - COMBI BOARD

TRANSISTORS & INTEGRATED CIRCUITS

7543	4822 130 60511	BC847B
7544	4822 130 60511	BC847B
7545	4822 130 60511	BC847B
7546	4822 130 60511	BC847B
7547	4822 130 60511	BC847B
7548	4822 130 60511	BC847B
7549	4822 130 60511	BC847B
7550	4822 130 60511	BC847B
7554	4822 209 31378	NJM4556MB
7556	3198 010 44010	PDTA114ET
7641	4822 130 41096	BC550C
7642	4822 130 41096	BC550C
7643	4822 130 41096	BC550C
7645	4822 130 60511	BC847B
7646	4822 130 60511	BC847B
7647	4822 130 60511	BC847B
7650	4822 130 60511	BC847B

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

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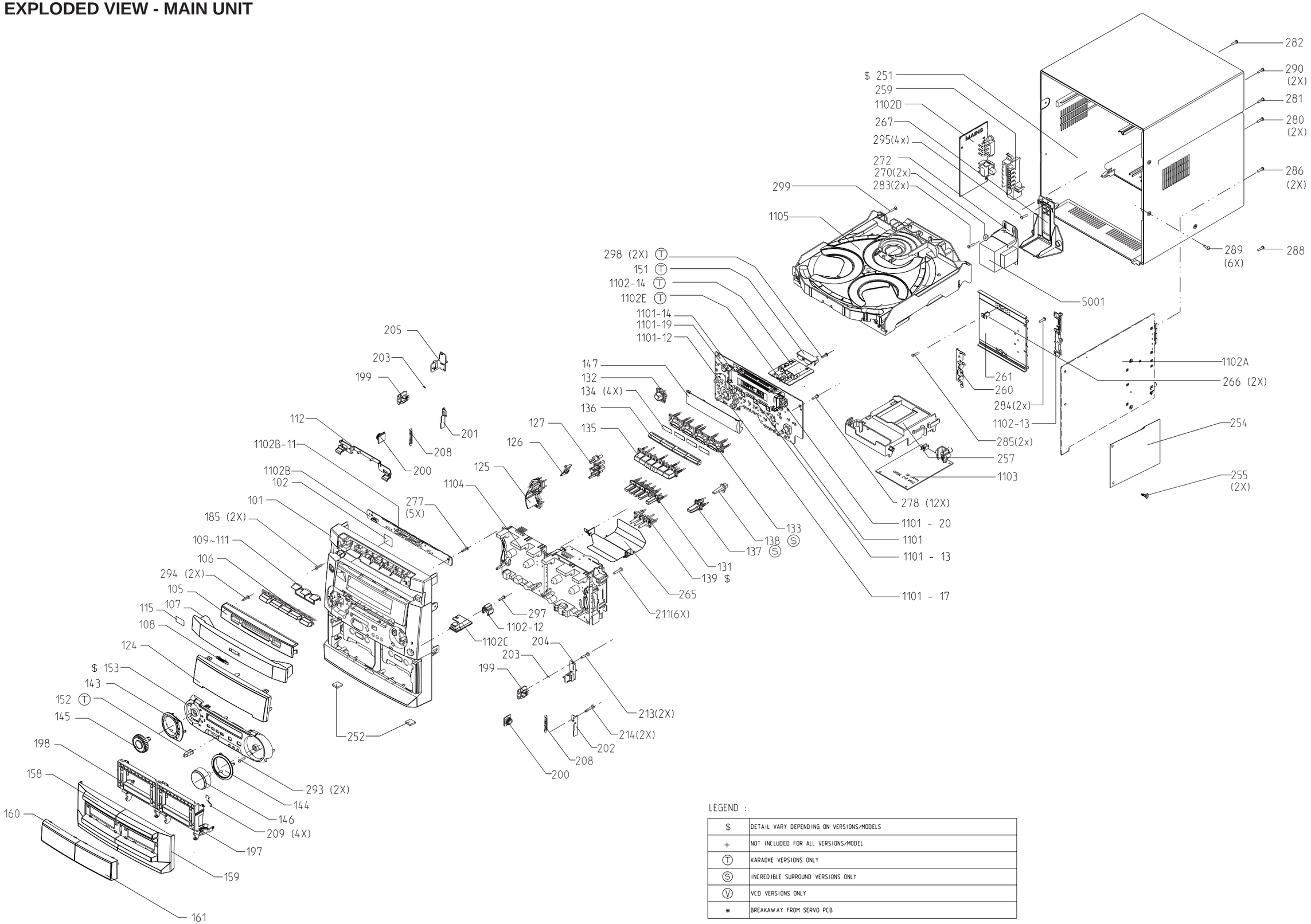
EXPLODED VIEW - MAIN UNIT



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

MECHANICAL & ACCESSORIES PARTS LIST - MAIN UNIT

101	3139 118 13630	Cabinet Front
105	3139 118 13700	Window CDC Control
106	3139 118 13710	Button Set CDC Select
107	3139 118 15290	Cover Tray CDC-LC
108	4822 454 13408	Badge Philips
115	3139 110 00150	Badge Super Error Correction
124	3139 118 15530	Window Display
125	3139 118 13980	Button Set DBB/VEC/DSC
127	3139 114 68340	Lightguide DSC
131	3139 118 13460	Button Set Program
132	3139 118 13550	Button Power On/Off
133	3139 114 69720	Button Set Source Select Blue
135	3139 118 13560	Button Set Controls
136	3139 118 12330	Lightcap Source Select
137	3139 118 13990	Button Incredible Sound
139	3139 114 73120	Button Set RDS/News/CLK
143	3139 118 10620	Cover Ring Jog
144	3139 118 10330	Cover Ring Volume
145	3139 118 14000	Knob Jog Rotary
146	3139 118 13760	Knob Volume Rotary
152	3139 114 72010	Knob Karaoke
153	3139 118 15540	Cover Control
158	3139 118 13500	Cover Cassette Left
159	3139 118 13510	Cover Cassette Right
160	3139 114 71840	Lens Cassette Left
161	3139 114 71850	Lens Cassette Right
197	4822 443 10488	Door Cassette Right
198	4822 443 10487	Door Cassette Left
199	4822 402 10621	Push-Catch
200	4822 529 10322	Damper Assembly
203	4822 492 11344	Spring Compression
204	4822 402 11246	Bracket Right
205	4822 402 11245	Bracket Left
208	4822 492 11345	Spring Tension
209	4822 492 42787	Spring Cassette
251	3139 114 73500	Cabinet Rear
252	4822 462 40683	Foot Rubber (SQ)
255	4822 466 93148	Spacer 5mm
260	4822 492 11734	Spring IC
266	3139 114 68040	Spacer Heatsink
350	3139 118 78400	Loudspeaker Box
351	4822 303 50063	FM Aerial
356	3139 228 85100	Remote Control RC2517/01
384	4822 303 50082	AM Frame Antenna
385	2422 070 98151	Mains Cord
387	3139 115 20850	Instruction For Use
395	4822 263 21206	Cinch Cable 1.7m
1450	3139 110 34770	Flex Cable 15pin 22cm BD
1451	4822 320 12604	Flex Cable 9pin 22cm AD
1455	4822 320 12752	Flex Cable 7pin 18cm AD
1456	3139 110 34180	Flex Cable 16pin 22cm AD
1557	4822 320 12663	Flex Cable 7pin 34cm BD
5001	3139 118 32140	Mains Transformer

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

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SCREW LISTS - MAIN UNIT

185	D3 x 25
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
295	D3 x 16
297	D3 x 12
298	D3 x 12
299	D3 x 12