

Service
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Service Manual



Table of Contents

Technical specification 1-2
 Measurement setup 1-3
 Warnings & Safety 1-4
 Service Hints 2-1
 Location of printed circuit boards 2-2
 Brief Operating Instructions
 Dismantling Instructions 3-1
 Service Testprogram 3-4
 Wiring Diagram 4-1
 Blockdiagram 5-1
Front Display Board 6
Tuner Board 7
Front Control Board 8
 STANDBY (POWER) PART 8-1
 KEY CONTROL (KEYB. 1) & LIGHTWASH PARTS 8-2
 HEADPHONE, JOG (VOLUME) AND CDC KEY PARTS 8-3

Electronic Tape Function ETF8 9
3 Disc Tray Changer Module 10
Power Module 11
 Exploded view of set 12
 Partslist of set 12

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PHILIPS

Technical Specification

General:

Mains voltage	: 120 / 240V switchable (for /21)
	: 230V (for /22)
	: 120V (for /37)
Mains frequency	: 50 ~ 60Hz
Power consumption	: 43W at 1/8 P _{RATED}
	: 185W at max output
	: ≤10W at Stand by
	: ≤1W at ECO Stand by
Clock accuracy	: ≤4 seconds per day

Tuner:

FM

Tuning range	: 87.5MHz - 108MHz
Grid	: 50 kHz, 100kHz for /37
IF	: 10.7MHz
Aerial input	: 75Ω coaxial
	: 300Ω click fit for /37
Sensitivity Mono (26dB S/N)	: < 22dBf (typ. 16dBf)
d (RF=1mV, Δf=75kHz)	: < 3% (typ. 1%)
IF rejection	: > 60dB
Image rejection	: > 25dB
-3dB Limiting Point	: < 23.5dBf (typ. 15dBf)

MW

Tuning range	: 531kHz - 1062kHz
Grid	: 9kHz, 10kHz for /37
IF	: 450kHz ±1kHz
Sensitivity at 26dB S/N	: < 4400μV/m
d (RF=50mV, m=80%)	: < 5% - typ. 3%
IF rejection	: > 45dB
Image rejection	: > 28dB

LW

Tuning range	: 153kHz - 279kHz
Grid	: 3kHz
IF	: 450kHz ±1kHz
Sensitivity at 26dB S/N	: < 7000μV/m
d (RF=50mV, m=80%)	: < 5% - typ. 3%
IF rejection	: > 35dB
Image rejection	: > 30dB

Amplifier:

Output power	: 2 x 75W at 6Ω (2x70W FTC)
Headphone	: 2,5V at 100kΩ
Frequency response	: 20Hz - 20kHz (-3dB) Limit
Equalizer	: Digital Sound Control

Input sensitivity

Aux/Line	: 500mV ±2dB
Microphone	: 2.5mV ±2dB at 1kHz

CD unit:

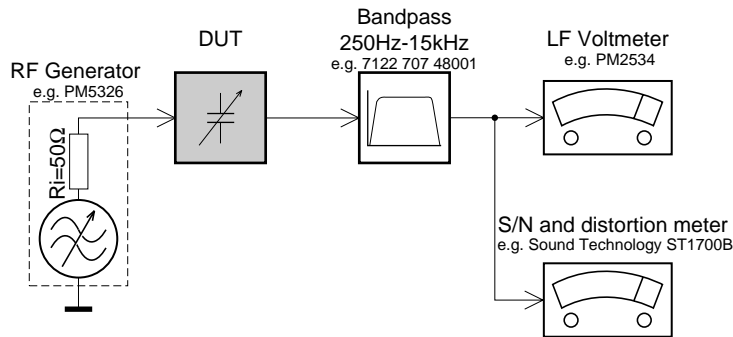
Measured at the output of the 3DTC Module.	
Frequency response within	: 20Hz - 20kHz at ±1dB
Signal/Noise ratio	: > 80dB (A-weighted)
Distortion at 1kHz, 0dB	: < 0.02%
Channel unbalance	: < 1dB
Channel crosstalk at 1kHz	: -60dB
De-emphasis	: 0 or 15/50 μS
Laser	
Output power	: ≤500μW
Wave length	: 780nm ±20nm

Cassette recorder:

Tape speed	: 4.76cm/s
Wow and flutter	: < 0.4%
Wind/rewind (C60)	: < 130s
Tape	: IEC I, IEC II
Bias system	: AC, 78kHz ±10kHz
Erase attenuation	: > 60dB at IEC I
Frequency response	: 80Hz - 12500Hz within 8dB
Signal/Noise ratio	: > 48dB (A-weighted)
Distortion at 1kHz, 250nW/m	: < 5%
Channel unbalance	: < 4dB
Channel crosstalk at 1kHz	: -18dB
ALC attack time	: < 25ms
ALC recovery time	: > 40s

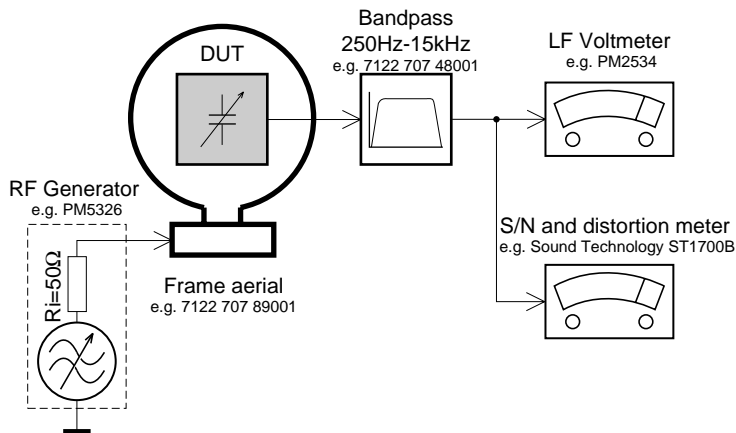
Measurement Setup

Tuner FM



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

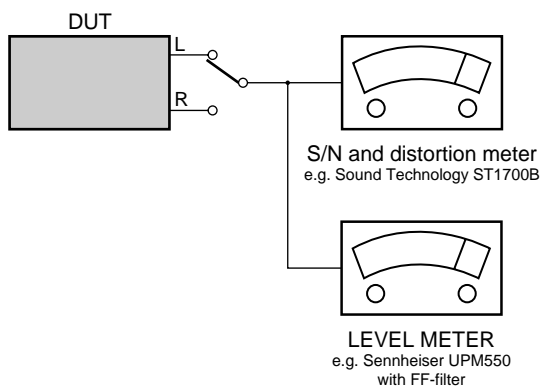
Tuner AM (MW,LW)



To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday's cage.

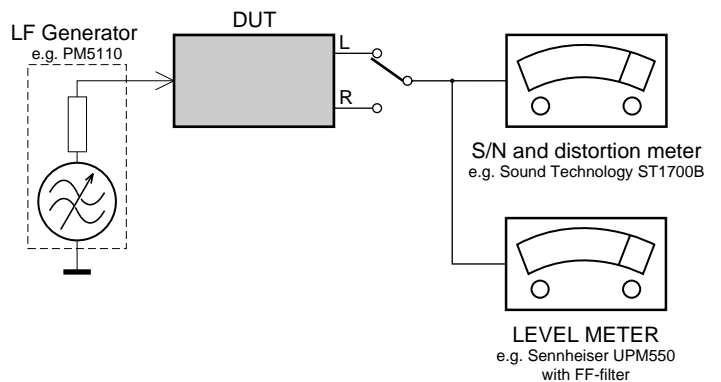
CD

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



Warnings & Safety

Ⓒ WARNING

All ICs and many other semiconductors 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 wristband with resistance. Keep components and tools at this potential.

Ⓕ ATTENTION

Tous les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévité pourrait être considérablement écourtée par le fait qu'aucune précaution n'est prise à leur manipulation.

Lors de réparations, s'assurer de bien être relié au même potentiel que la masse de l'appareil et enfilez le bracelet serti d'une résistance de sécurité.

Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.

Ⓓ WARNING

Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostativen Entladungen (ESD). Unvorsichtige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.

Sorgen Sie dafür, daß Sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.

Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

ESD



Ⓖ 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.

Ⓘ AVVERTIMENTO

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

La loro longevità potrebbe essere fortemente ridotta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparazioni occorre quindi essere collegato allo stesso potenziale che quello della massa dell'apparecchio tramite un braccialetto a resistenza.

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

Ⓒ AVAILABLE ESD PROTECTION EQUIPMENT :

anti-static table mat large 1200x650x1.25mm
small 600x650x1.25mm

anti-static wristband

connection box (3 press stud connections, 1MΩ)

extendible cable (2m, 2MΩ, to connect wristband to connection box)

connecting cable (3m, 2MΩ, to connect table mat to connection box)

earth cable (1MΩ, to connect any product to mat or to connection box)

KIT ESD3 (combining all 6 prior products - small table mat)

wristband tester

4822 466 10953

4822 466 10958

4822 395 10223

4822 320 11307

4822 320 11305

4822 320 11306

4822 320 11308

4822 310 10671

4822 344 13999

Ⓒ

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

Safety components are marked by the symbol

Ⓕ

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

Les composants de sécurité sont marqués

Ⓓ

Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.

Sicherheitsbauteile sind durch das Symbol markiert.

SAFETY



Ⓖ

Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast. De Veiligheidsonderdelen zijn aangeduid met het symbool

Ⓘ

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

Componenti di sicurezza sono marcati con

Ⓒ

DANGER: Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM.

**CLASS 1
LASER PRODUCT**

Ⓔ Varning !

Osynlig laserstrålning när apparaten är öppnad och spärrar är ukopplad. Betrakta ej strålen.

ⒹK Advarsel !

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

ⒻI Varoitus !

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

Ⓒ

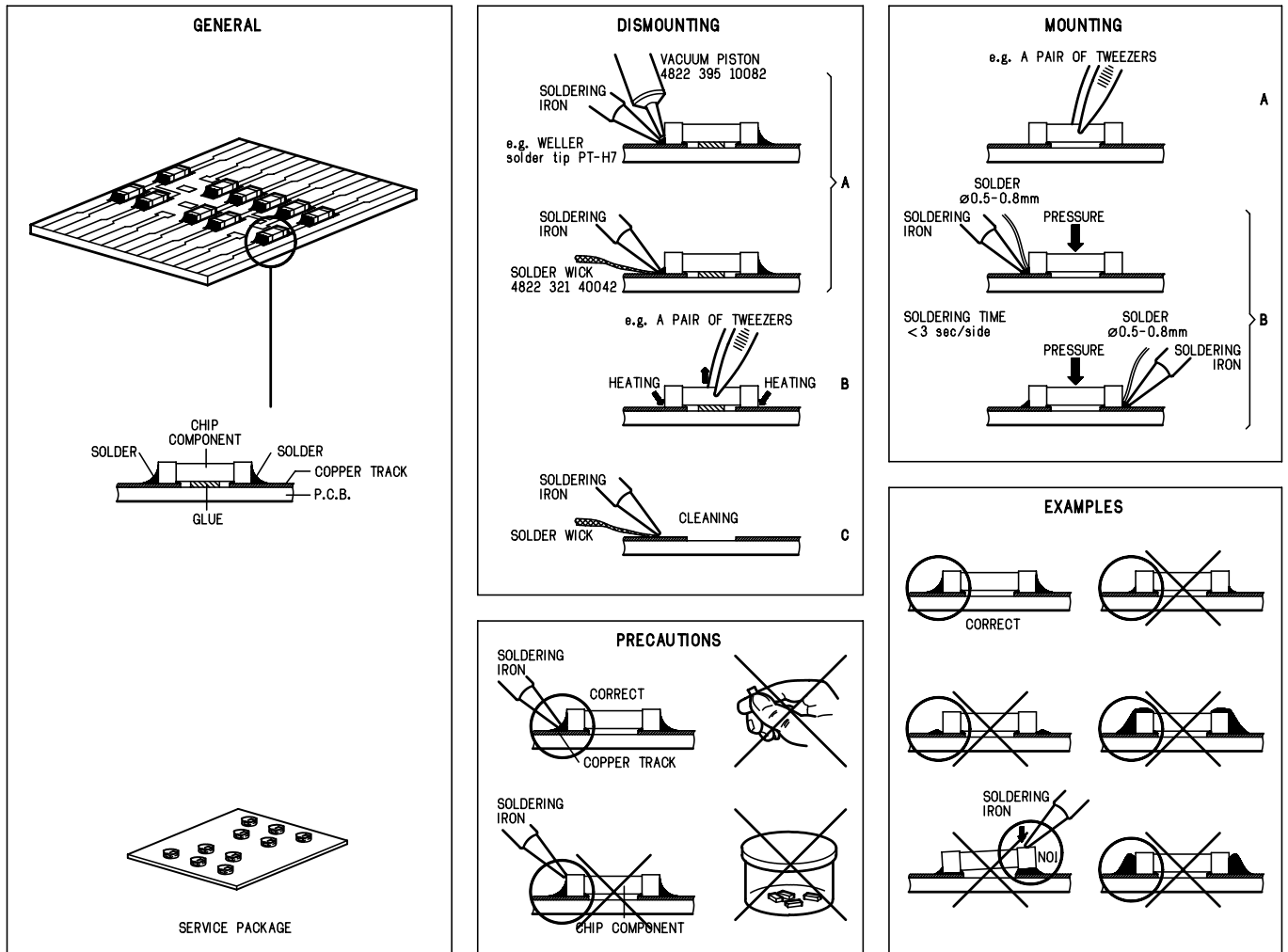
After servicing and before returning the set to customer perform a leakage current measurement test from all exposed metal parts to earth ground, to assure no shock hazard exists.

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".

Handling chip components



Service Tools

- TORX T10 screwdriver with shaftlength 150mm4822 395 50423
- TORX screwdriver set SBC 1634822 295 50145

- Audio signal disc SBC 429.....4822 397 30184
- Playability test disc SBC4444822 397 30245
- Test disc 5 (disc without errors) +
- Test disc 5A (disc with dropout errors, black spots and fingerprints)
- SBC 426/426A4822 397 30096
- Burn in test disc (65 min. 1kHz signal at -30dB level without "pause")...4822 397 30155

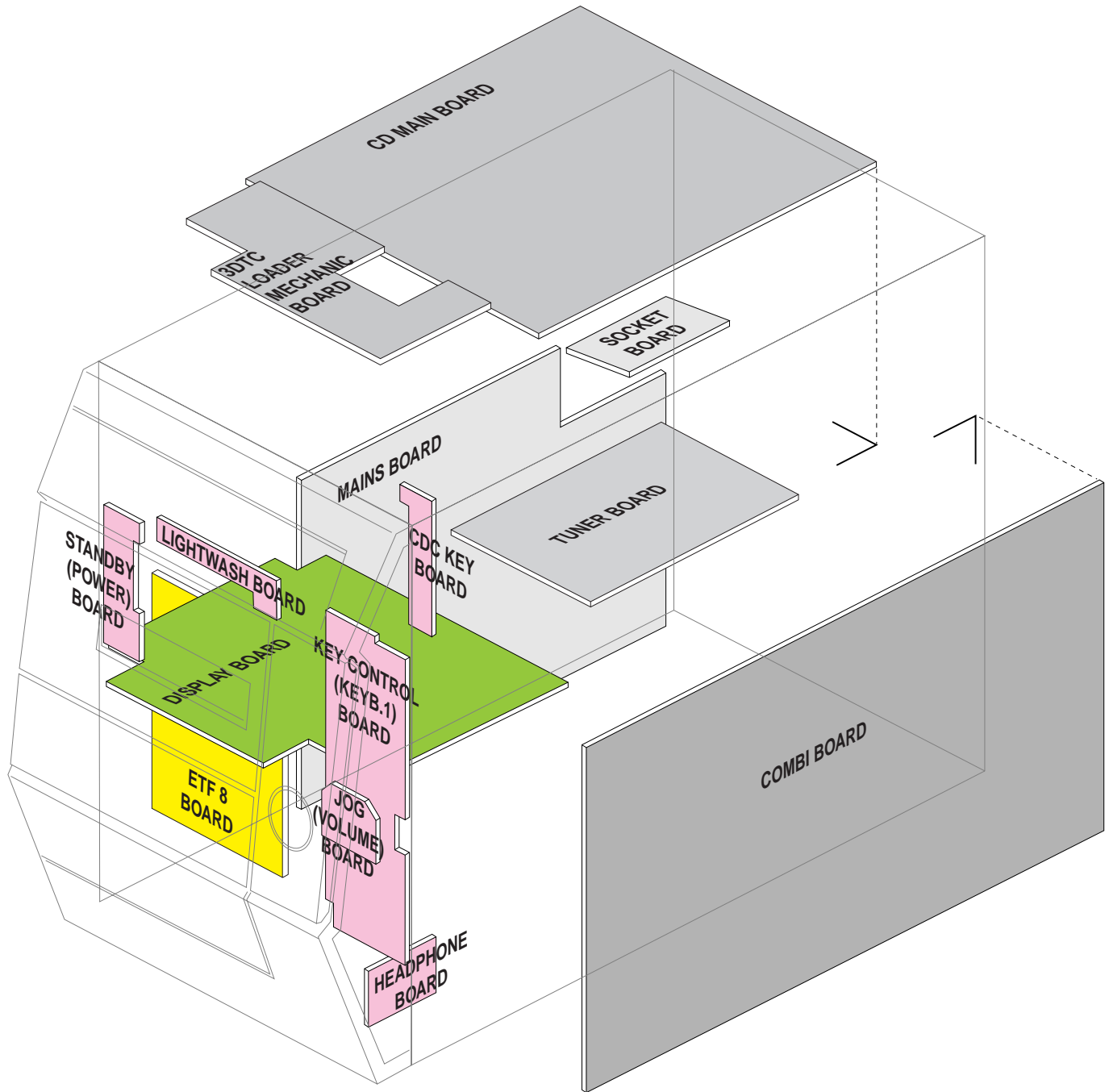
- SBC420 Test cassette Fe.....4822 397 30071
- SBC419 Test cassette CrO₂.....4822 397 30069

Escape from „Demo Mode“

The demo mode displays various features of the set and will start automatically. Press and hold DEMO STOP on the system until "DEMO OFF OFF" is displayed. The system will switch to Standby mode.

Note: Even if you remove the AC power cord and reconnect it to the wall socket, the demonstration will remain off until you activate it again.

Location of Printed Circuit Boards

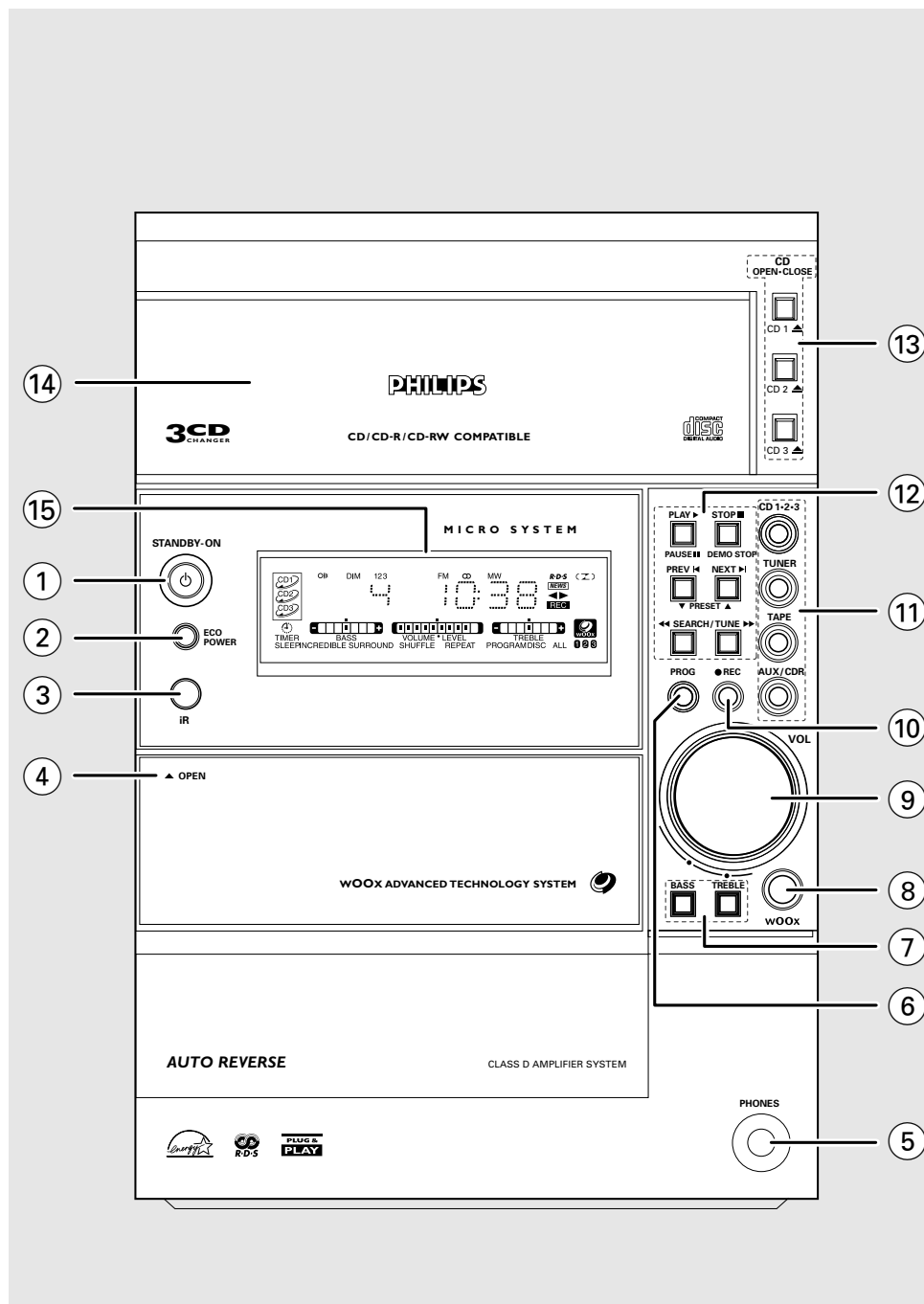


Attention:

Lightwash, CDC-key board, standby board and headphone board are part of the **Front Control Board**.
For details see chapter 8

Brief Operating Instruction

The following excerpt of the Owners Manual serves as a very short introduction to the set. The complete Owners Manual can be downloaded in several languages from the Internet site of Philips Customer Care Center: www.p4c.philips.com



Controls (main system's illustration on page 3)

Controls on the system and remote control

- 1 **STANDBY ON** \odot
 - to switch the system on or to Standby mode.
- 2 **ECO POWER**
 - to switch the system on or to Eco Power Standby mode.
- 3 **IR**
 - infrared sensor for remote control.
- 4 **OPEN**
 - to open the tape deck door.
- 5 **PHONES**
 - to connect headphones.
- 6 **PROG (PROGRAM)**
 - for CD to programme disc tracks.
 - for TUNER to programme preset radio stations.
 - for CLOCK to select 12- or 24-hour clock mode.
- 7 **BASS/TREBLE**
 - to select BASS or TREBLE sound feature.
 - **BASS/TREBLE + / -** (on the remote control) to increase or decrease the low or high tone level for the respective BASS or TREBLE sound feature selected.
- 8 **WOOX**
 - (on the system only) to select the next wOOx level or switch off wOOx sound effect.
 - (on the remote control only) to switch on or off the wOOx sound effect.
- WOOX LEVEL**
 - (on the remote control only) to select a desired wOOx level: WOOX 1, WOOX 2 or WOOX 3.
- 9 **VOL (VOLUME + / -)**
 - to increase or decrease the volume.
 - (on the system only) to increase or decrease the low or high tone level for the respective BASS or TREBLE sound feature selected.
- 10 **REC**
 - to start recording on a tape.

- 11 **SOURCE** --- to select the following: CD 1-2-3 (CD 123)
- to select disc tray 1, 2 or 3.

TUNER

- to select waveband: FM, MW or LW.

TAPE

- to select tape mode.

AUX / CDR

- to select a connected external source: CDR or AUX (auxiliary) mode.

Mode Selection

- 12 **PLAY PAUSE** $\blacktriangleright \text{II}$
 - for CD to start or interrupt playback.
 - for TAPE to start playback.
 - for PLUG & PLAY .. (on the system only) to initiate and start plug & play mode.

STOP/DEMO STOP

- for CD to stop playback or to clear a programme.

for TUNER

- to stop programming.
- (on the system only) to delete the preset radio station.

for TAPE

- to stop playback or recording.

for DEMO

- (on the system only) to activate/deactivate the demonstration.

for CLOCK

- to exit clock setting or cancel timer.

for PLUG & PLAY

- (on the system only) to exit plug & play mode.

PREV / NEXT

- \blacktriangleleft \blacktriangleright (PRESET \blacktriangledown \blacktriangleup)

for CD

- to skip to the beginning of the current, previous, or next track.

for TUNER

- to select a preset radio station.

for TAPE

- to select tape side (back or front).

for CLOCK

- to set the minute.

SEARCH / TUNE

- \blacktriangleleft \blacktriangleright to search backward/forward.

for CD

- to tune to a lower or higher radio frequency.

for TUNER

- to tune to a lower or higher radio frequency.

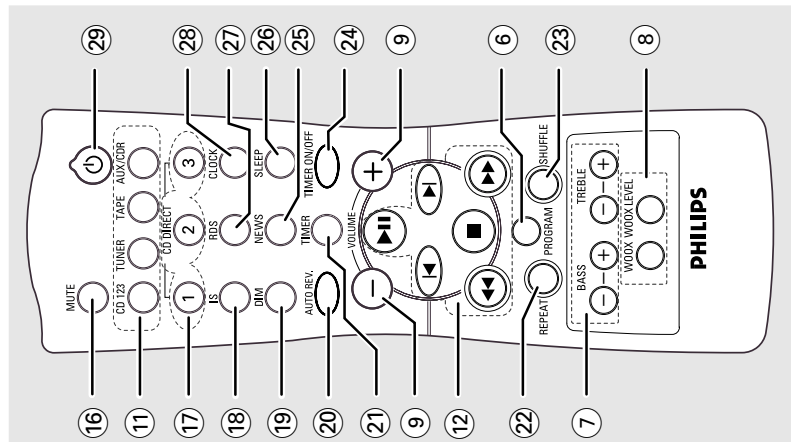
for TAPE

- to rewind or fast forward.

for CLOCK

- to set the hour.

Controls



Notes for remote control:

- First, select the source you wish to control by pressing one of the source select buttons on the remote control (CD 123 or TUNER, for example).
- Then select the desired function (\blacktriangleleft , \blacktriangleright , \blacktriangleup , \blacktriangledown , for example).

- 13 **CD OPEN/CLOSE (CD 1/CD 2/CD 3)** \blacktriangleup
 - to open or close the individual disc tray: CD 1, CD 2 or CD 3

14 Disc trays

- to view the current status of the system.

15 Display screen

- to interrupt or resume sound reproduction.

16 MUTE

- to interrupt or resume sound reproduction.

17 CD DIRECT 1/2/3

- to select a disc tray for playback.

18 IS (INCREDIBLE SURROUND)

- to activate or deactivate the surround sound effect.

19 DIM

- to select various dim mode: DIM 1, DIM 2, DIM 3 or DIM OFF.

20 AUTO REV. (AUTO REVERSE)

- to select the desired tape playback modes.

21 TIMER

- to display timer or set the timer.

22 REPEAT

- to playback track(s)/disc(s)/programme repeatedly.

23 SHUFFLE

- to playback all available discs and their tracks/programme in random order.

24 TIMER ON/OFF

- to activate or deactivate the timer function.

25 NEWS

- to hear News automatically.

26 SLEEP

- to activate, deactivate or set the sleep timer function.

27 RDS

- to select RDS information.

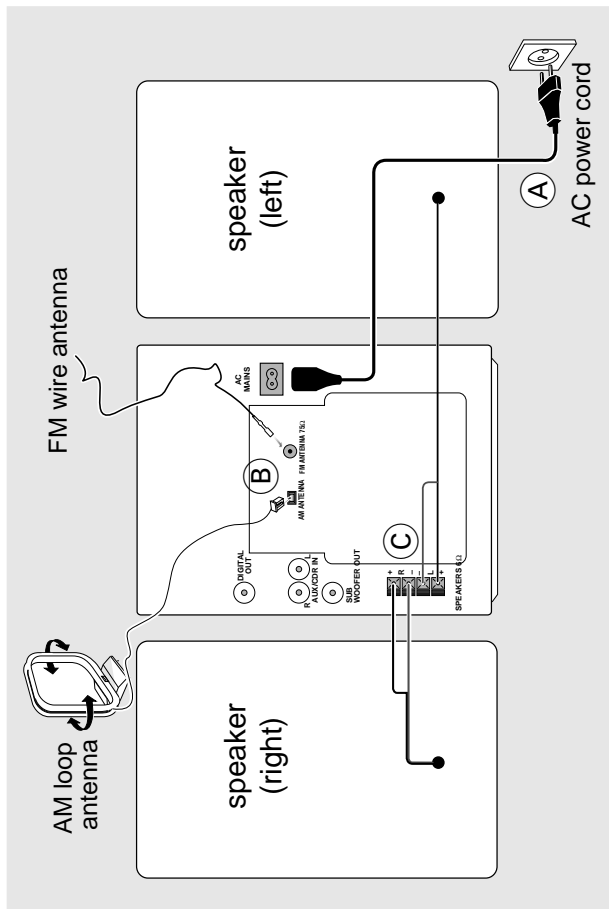
28 CLOCK

- to display clock or set the clock.

29 \odot

- to switch the system to Eco Power Standby mode.

Preparations



Preparations

FM Antenna

- For better FM stereo reception, connect an outdoor FM antenna to the FM ANTENNA terminal.

Speakers Connection

Front Speakers

Connect the speaker wires to the SPEAKERS (FRONT) terminals, right speaker to "R" and left speaker to "L", coloured (marked) wire to "+" and black (unmarked) wire to "-".

Digital Out connection

Connect this digital output when recording on any audio equipment with digital input (CD Recorder, Digital Audio Tape [DAT] deck, Digital to Analogue Converter and Digital Signal Processor, for example). Use a cinch cable to connect the **DIGITAL OUT** terminal to the digital input terminal of the equipment.

Connecting other equipment to your system

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

Note:

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

Rear connections

The type plate is located at the rear of the system.
For users in the U.K.: please follow the instructions on page 2.

A Power

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

WARNING!

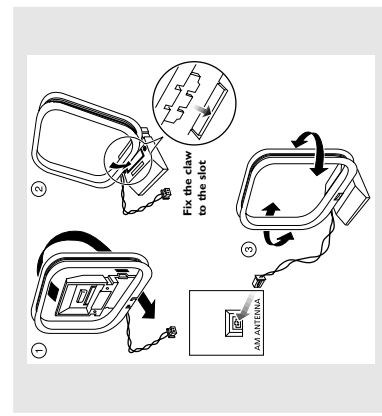
- For optimal performance, use only the original power cable.
- Never make or change connections with the power switched on.

To avoid overheating of the system, a safety circuit has been built in. Therefore, your system may switch to Standby mode automatically under extreme conditions. If this happens, let the system cool down before reusing it.

B Antennas Connection

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

AM Antenna



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

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

Notes:

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

Optional connections

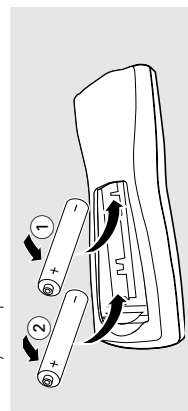
The optional equipment and connecting cords are not supplied. Refer to the operating instructions of the connected equipment for details.

Subwoofer Out connection

Connect the subwoofer to the **SUBWOOFER OUT** terminal. The subwoofer reproduces just the low bass sound effect (explosions or the rumble of spaceships, for example).

Inserting batteries into the remote control

Insert two batteries (Type R06 or AA) into the remote control with the correct polarity as indicated by the + and - symbols inside the battery compartment.



CAUTION!

- Remove batteries if they are exhausted or will not be used for a long time.
- Do not use old and new or different types of batteries in combination.
- Batteries contain chemical substances, so they should be disposed off properly.

Technical Remarks

DISMANTLING INSTRUCTIONS

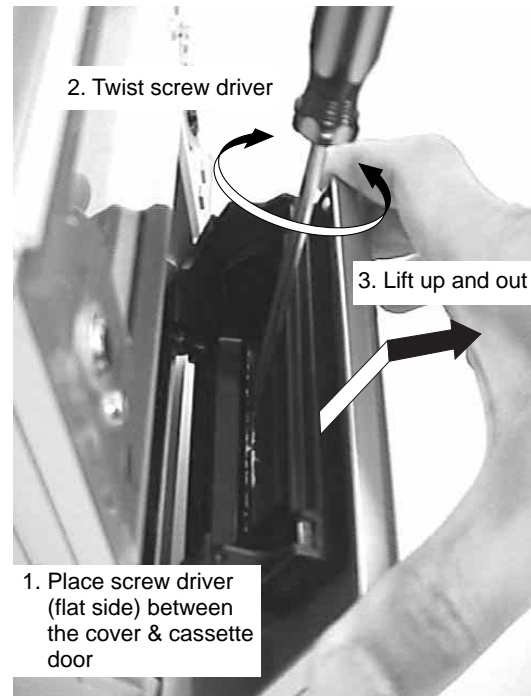
Dismantling of the Cassette Cover

Figure 1 Remove Cassette Cover

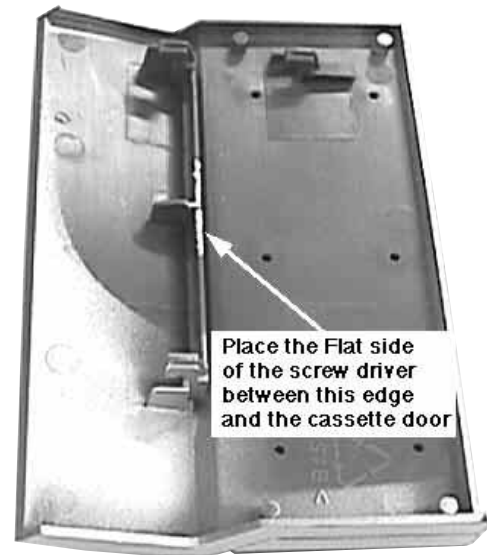


Figure 2 Cassette Cover

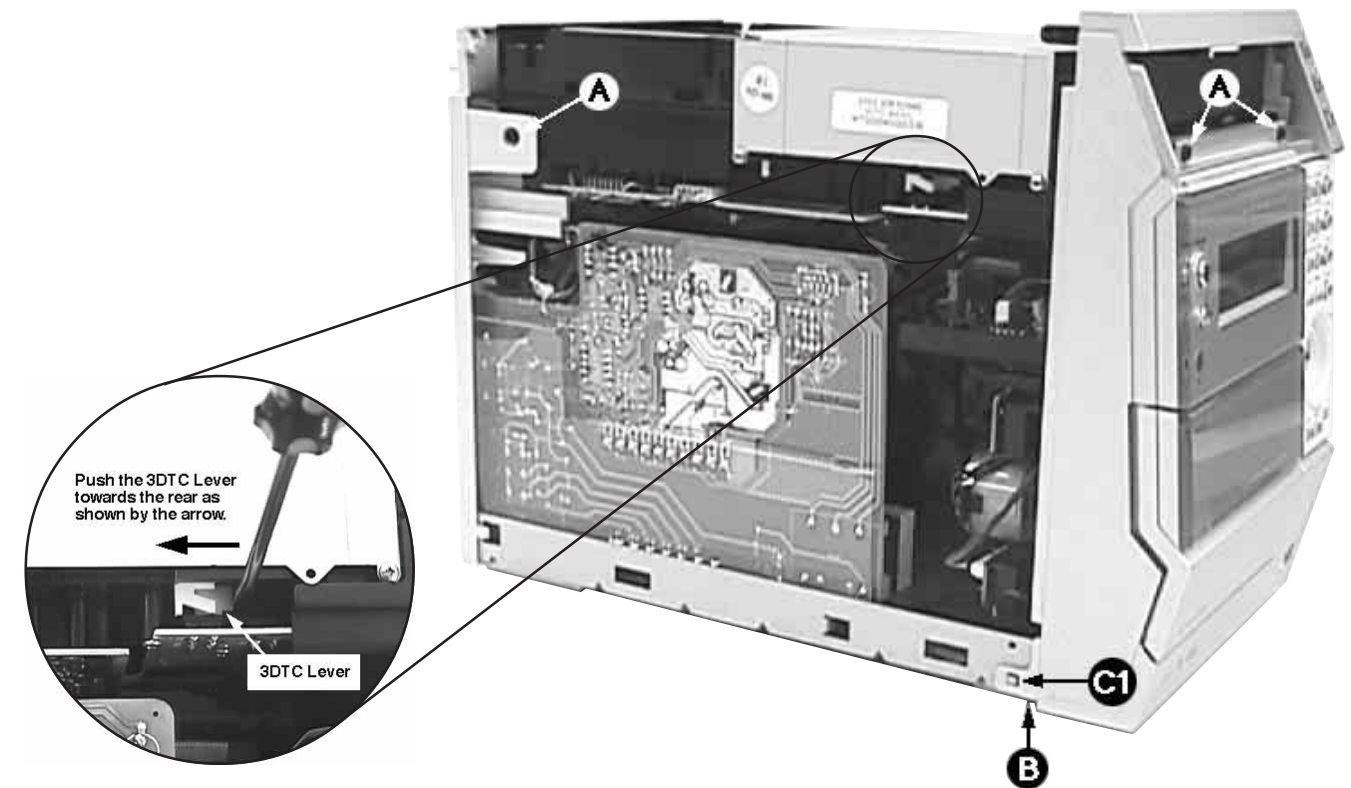


Figure 4

Dismantling of the 3DTC Module and Tuner Board

- 1) Loosen 4 screws and remove the Cover Top (pos 255) by sliding it out towards the rear before lifting up.
 - 2 screws on the rear
 - 1 screw each on the left & right side
- 2) Loosen 2 screws each to remove the Panel Left and Right (pos 253 & 254). The Panels are removed by sliding it towards the rear and outwards.
 - 1 screw on the side
 - 1 screw on the rear
- 3) Open the 3DTC Tray by sliding the lever (pos 36) as shown in figure 4 with the help of a flat head screw driver.
- 4) Remove the Cover Tray (pos 106) as shown in figure 3.
- 5) Loosen 4 screws A (see figure 4) to remove the 3DTC Module.
 - 2 screws on the front
 - 1 screw each on the left & right side
- 6) Loosen 3 screws E (see figure 8) on the Panel Rear (pos 256) & uncatch 2 catches C3 to remove the Tuner Board.



Figure 3

Detaching the Front Panel assembly from the Bottom/Rear assembly

- 1) Remove 2 screws B (see figure 4) from the bottom of the Cabinet Front (pos 101).
- 2) Release the fixation of the Combi Board to Bracket Combi (pos 252) by releasing 2 catches C2 and pulling the board outwards as shown in figure 5.
- 3) Uncatch 2 catches C1 (see figure 4) on the left & right sides of Cabinet Front (pos 101) and slide the Front Panel assembly out towards the front.

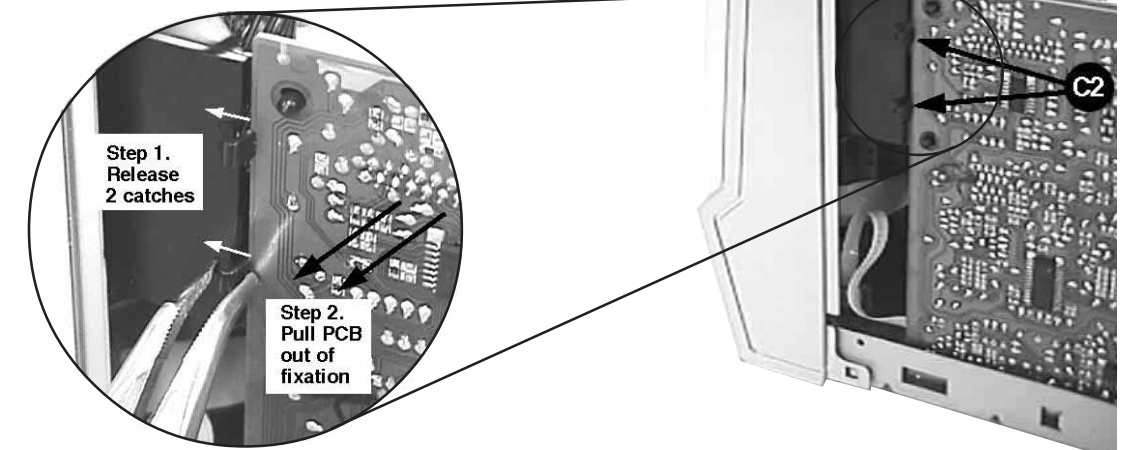


Figure 5

Dismantling of the Front Panel assembly

- 1) Loosen 4 screws C in figure 7 to remove the ETF8 Module.
- 2) Insert a strong string into the slot between the Jog knob (pos 136) and Cover control (pos 137), looped it until it engage into both the U-slot of the Jog knob and pulled it out as shown in figure 6.
- 3) Loosen 4 screws D to remove the Display Board assembly.

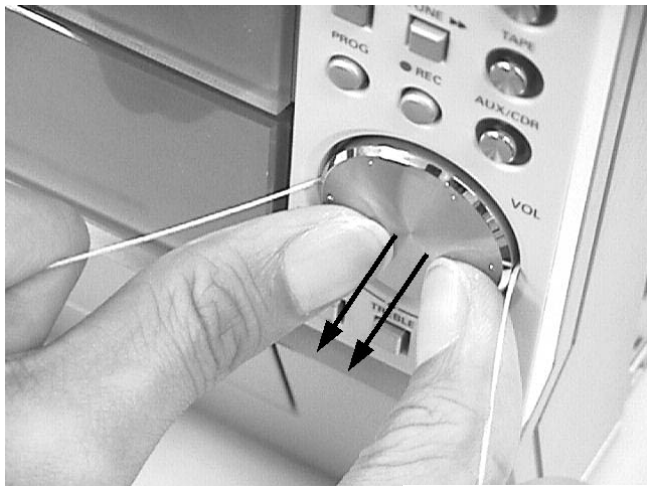
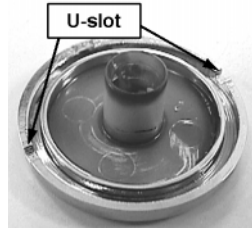


figure 6



U-slot

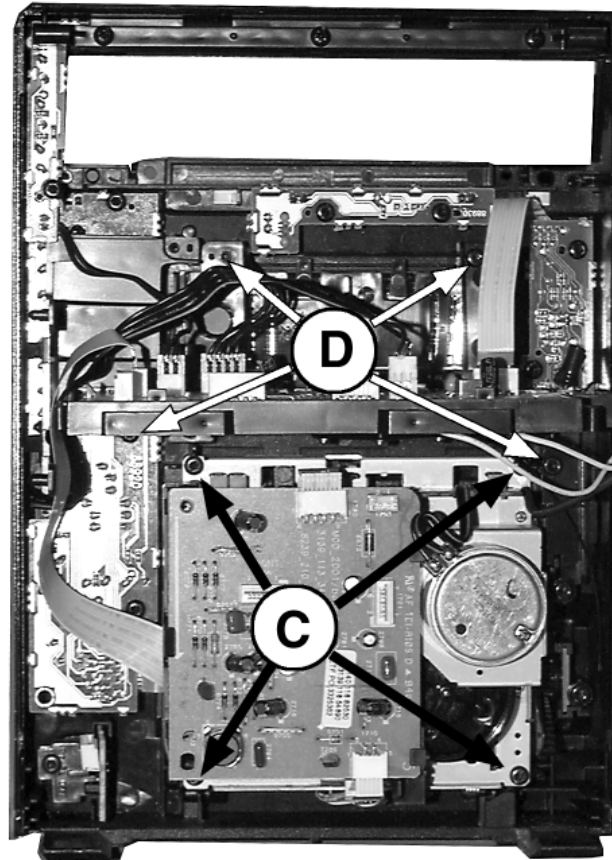


figure 7

Dismantling of Rear Panel

- 1) Loosen 3 screws E and 2 catches C3 to remove the Tuner Board assembly.
Note: Tuner Board assembly can also be remove together with the Panel Rear.
- 2) Loosen 1 screw F and the 2 catches C4 to free the Mains socket board from the Panel Rear (pos 256).
- 3) Loosen 5 screws G and 2 catches C5 to remove the Panel Rear (pos 256) by sliding it out towards the rear.

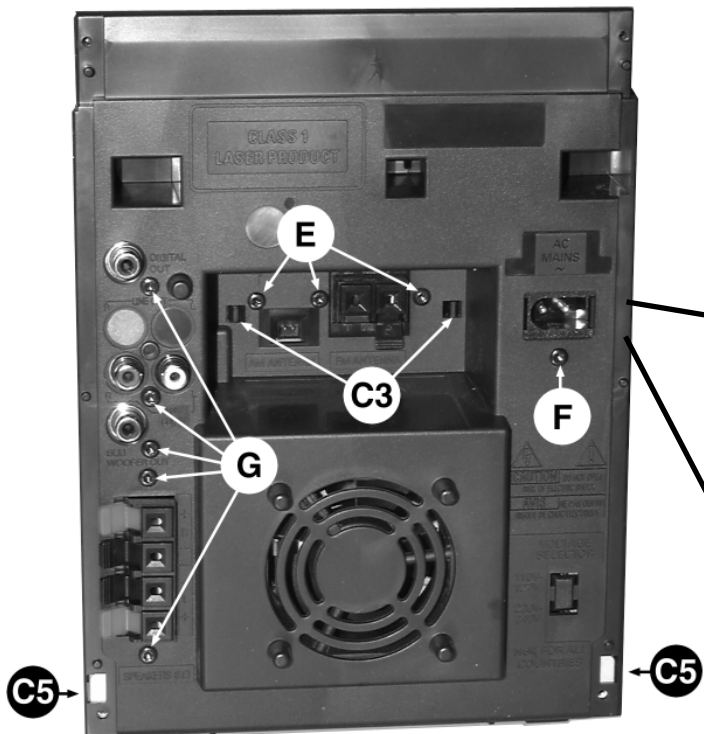
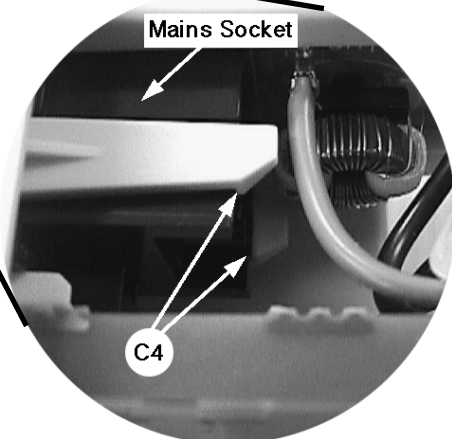


figure 8



Mains Socket

C4

Dismantling of the Bottom assembly

- 1) Loosen 1 screw H as shown in figure 9 to remove the Combi board assembly.
- 2) Loosen 1 screw J and uncatch Shield Transformer (pos 269) from the Bottom plate (pos 265) as shown in figure 11 to remove it.
- 3) Loosen 4 screws K mounting the Mains Transformer (pos 5001) to remove the Mains Board & Transformer assembly.
- 4) Loosen 4 screws L to remove the Fan (pos 267).

Note: During Fan replacement care should be taken to ensure that the following are correct:
 - fan blades direction
 - fan wire position

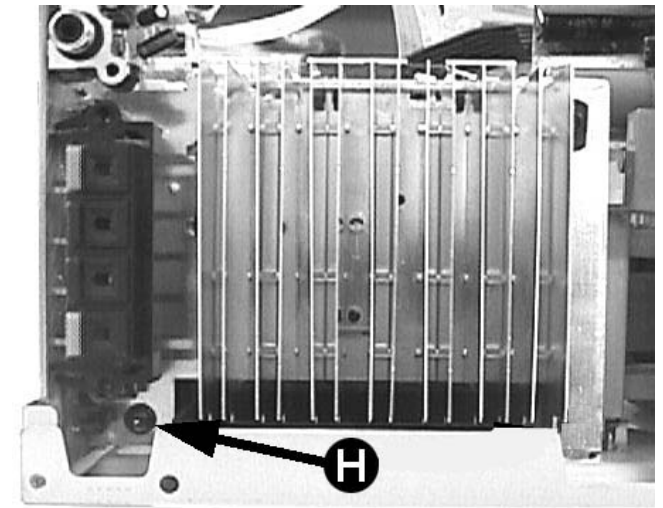


figure 9

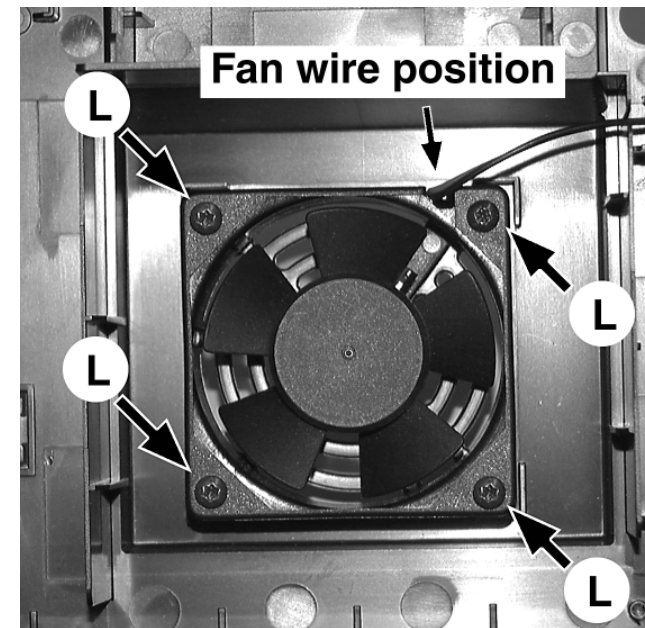
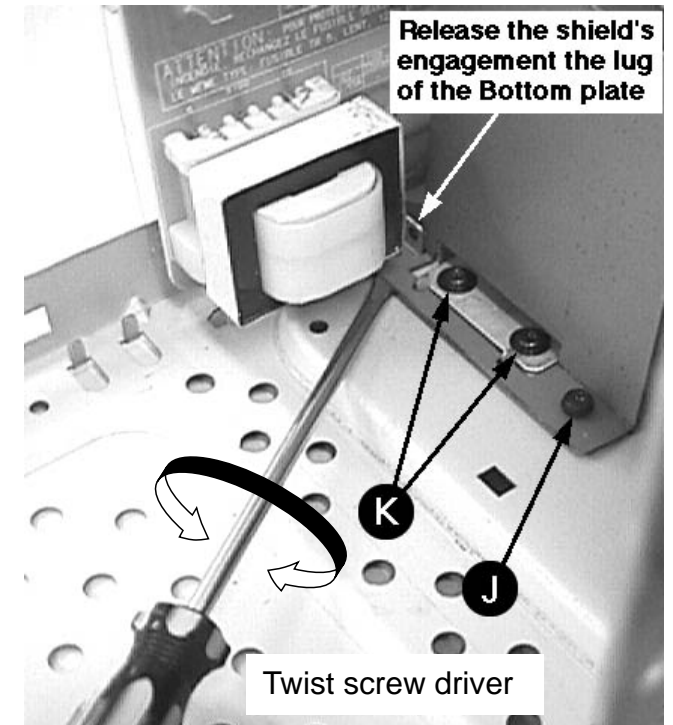


figure 10



Release the shield's engagement the lug of the Bottom plate

Twist screw driver

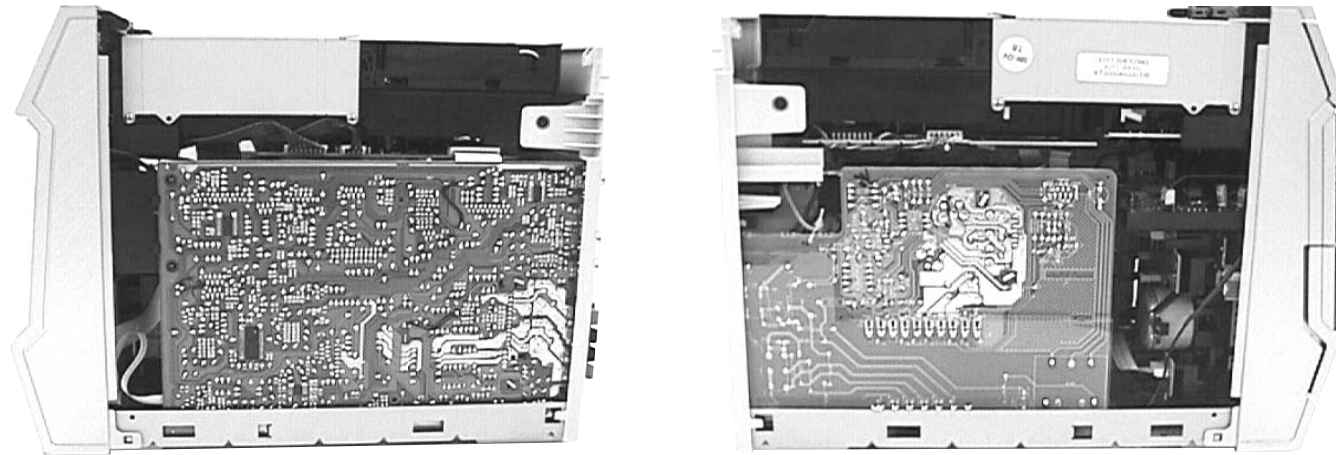
figure 11

SERVICE POSITIONS & REPAIR HINTS

- 1) During repair it is possible to disconnect the ECO6 Tuner board, ETF8 Tape Module and/or 3DTC Module completely unless the fault is suspected to be in that area. This will not affect the performance of the rest of the set.
- 2) Use Service position A for repairs on Combi or Mains Board.
- 3) Use Service position B for repairs on Tuner or 3DTC electronic.

- 4) Use Service position C for repairs on the ETF8 Tape module.
Note: The flex cables are very fragile, care should be taken not to damage them during repair. After repair, be very sure that the flex cables are inserted properly into the flex sockets before encasing, otherwise faults may occur.

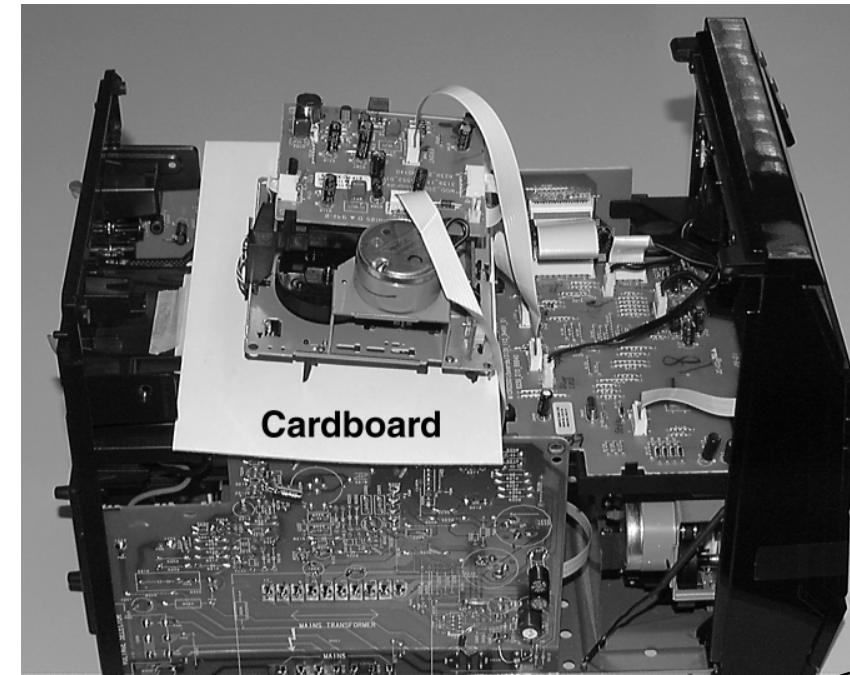
Service position A



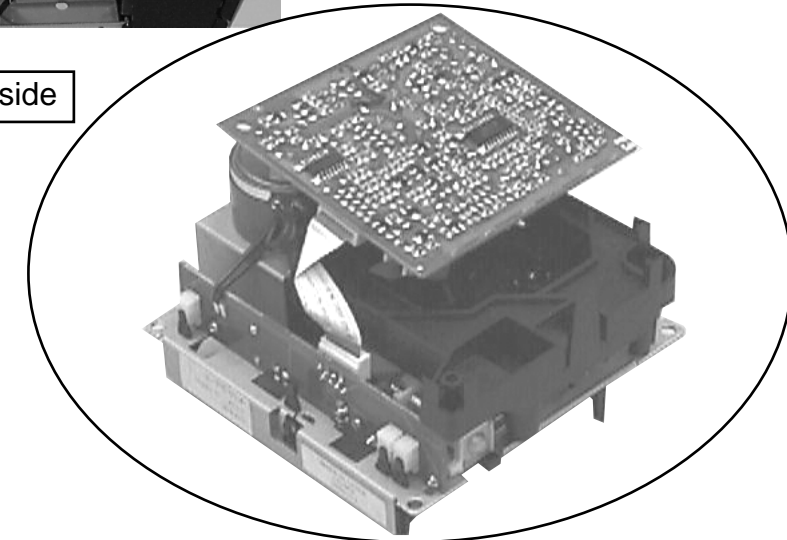
Service position B



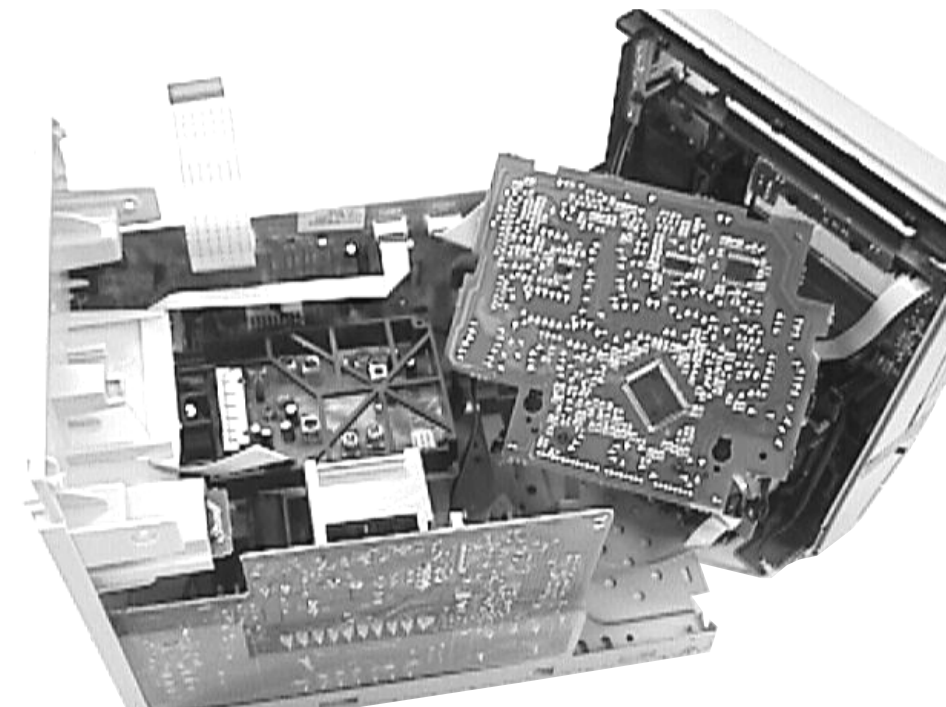
Service position C



Access to copperside



Service position D



SERVICE TEST PROGRAM

To start service test program hold TUNER & AUX depressed while plugging in the mains cord

Display shows the ROM version "S-Vyy" (Main menu)

S refers to Service Mode.
V refers to Version.
yy refers to Software version number of μProcessor. (Counting up from 01 to 99)

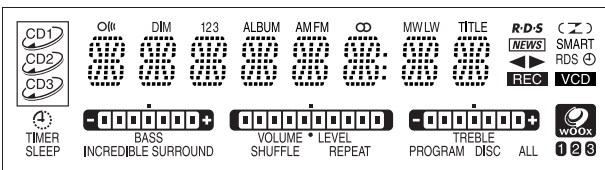
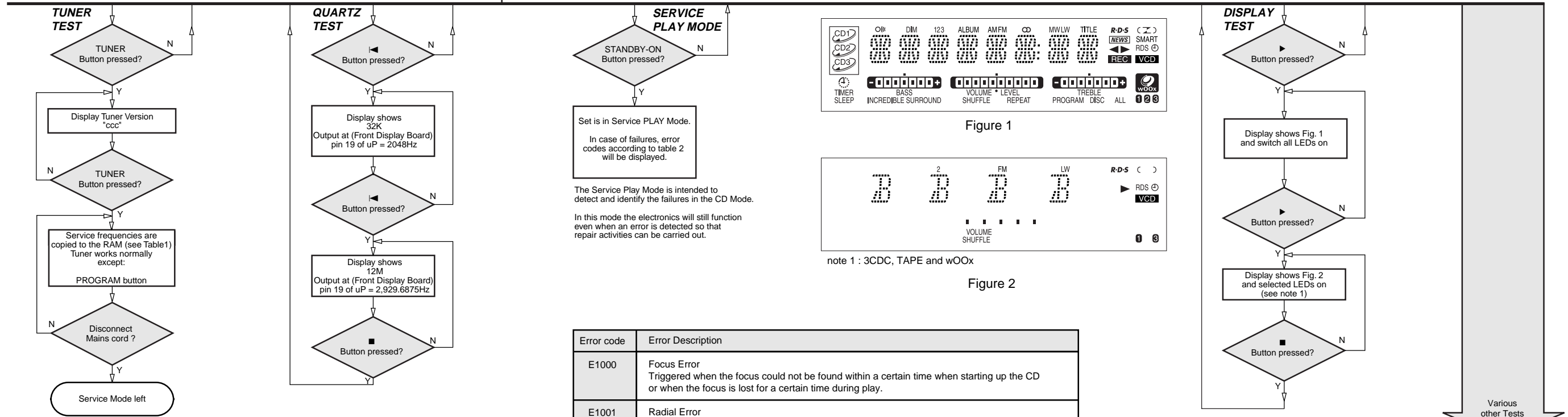


Figure 1

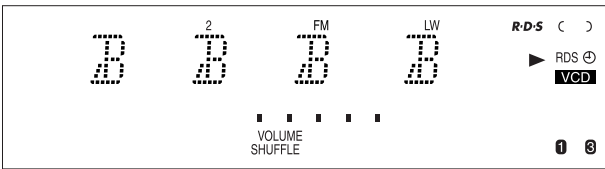


Figure 2

note 1 : 3CDC, TAPE and wOOx

Error code	Error Description
E1000	Focus Error Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play.
E1001	Radial Error Triggered when the radial servo is off-track for a certain time during play.
E1002	Sledge In Error The sledge did not reach its inner position (inner-switch is still close) before approximately 6 Sec. have passed by. Inner-switch or sledge motor problem.
E1003	Sledge Out Error The sledge did not come out of its inner position (inner-switch is still open) before approximately 250 mSec. have passed by. Inner-switch or sledge motor problem.
E1005	Jump-offtrack error Triggered in normal play when the jump destination could not be found within a certain time.
E1006	Subcode Error Triggered when a new subcode was missing for a certain time during play.
E1007	PLL Error The Phase Lock Loop could not lock within a certain time.
E1008	Turntable Motor Error Generated when the CD could not reached 75% of speed during startup within a certain time. Disc motor problem.
E1020	Focus Search Error The focus point has not been found within a certain time.
E1031	The active lower carriage does not come to the end position within a certain time. This can happen when the switches are defective, or when the carriage is blocked in between two end positions (example: 2 disc in one carriage). The time-out is approximately 5 seconds.
E1061	The drawer could not enter the inside position and is opening again. This can happen if the drawer is blocked such that it cannot go fully inside, or if the drawer switch is defective and never closes.
E1071	The active upper carriage does not come to the end position within a certain time. This happen when the switches are defective, or when the carriage is blocked in between two end positions (example: 2 disc in one carriage)/ The time-out is approximately 5 Sec.
E1079	The drawer could not enter the outside position and is stopped at its blocked position. This can happen if the drawer is blocked such that it cannot go fully outside, or if the drawer switch is defective and never opens.

Table 2

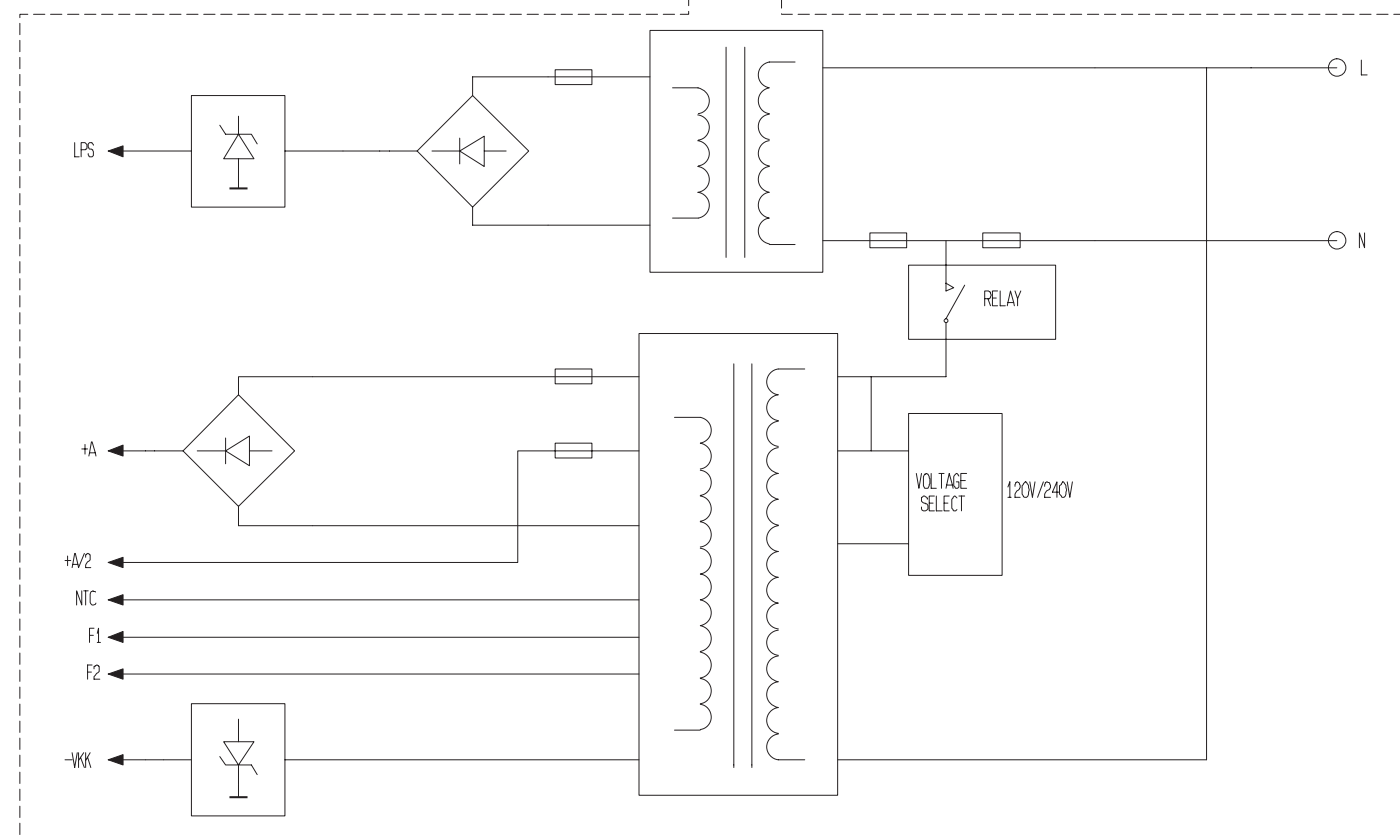
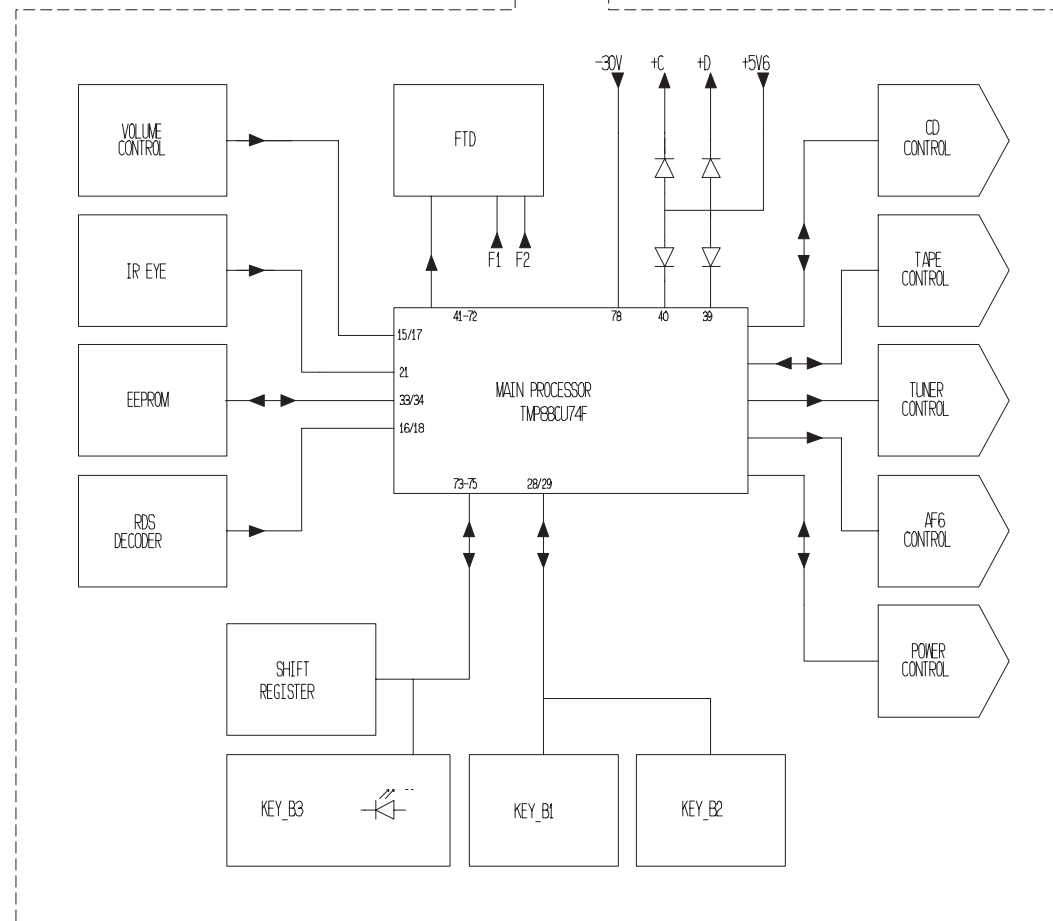
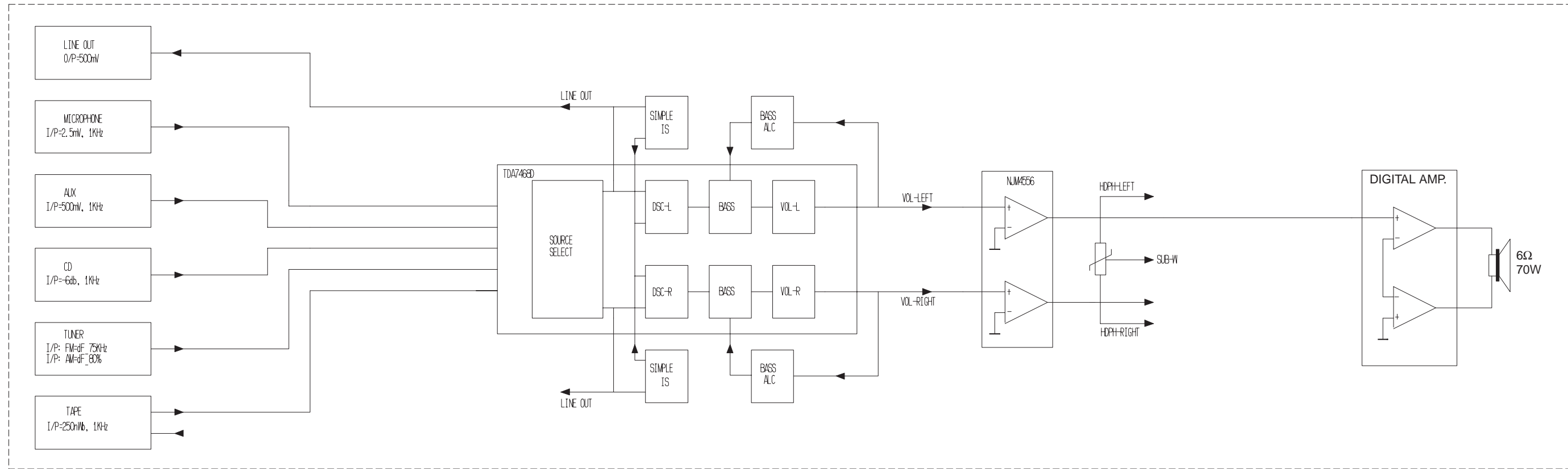
PRESET	Europe "EUR"	USA "USA"	Oversea "OSE"
1	87.5MHz	87.5MHz	87.5MHz
2	108MHz	108MHz	108MHz
3	531kHz	530kHz	531/530kHz*
4	1602kHz	1700kHz	1602/1700kHz*
5	558kHz	560kHz	558/560kHz*
6	1494kHz	1500kHz	1494/1500kHz*
7	153kHz	98MHz	98MHz
8	279kHz	87.5MHz	87.5MHz
9	198kHz	87.5MHz	87.5MHz
10	98MHz	87.5MHz	87.5MHz
11	87.5MHz	87.5MHz	87.5MHz

Table 1

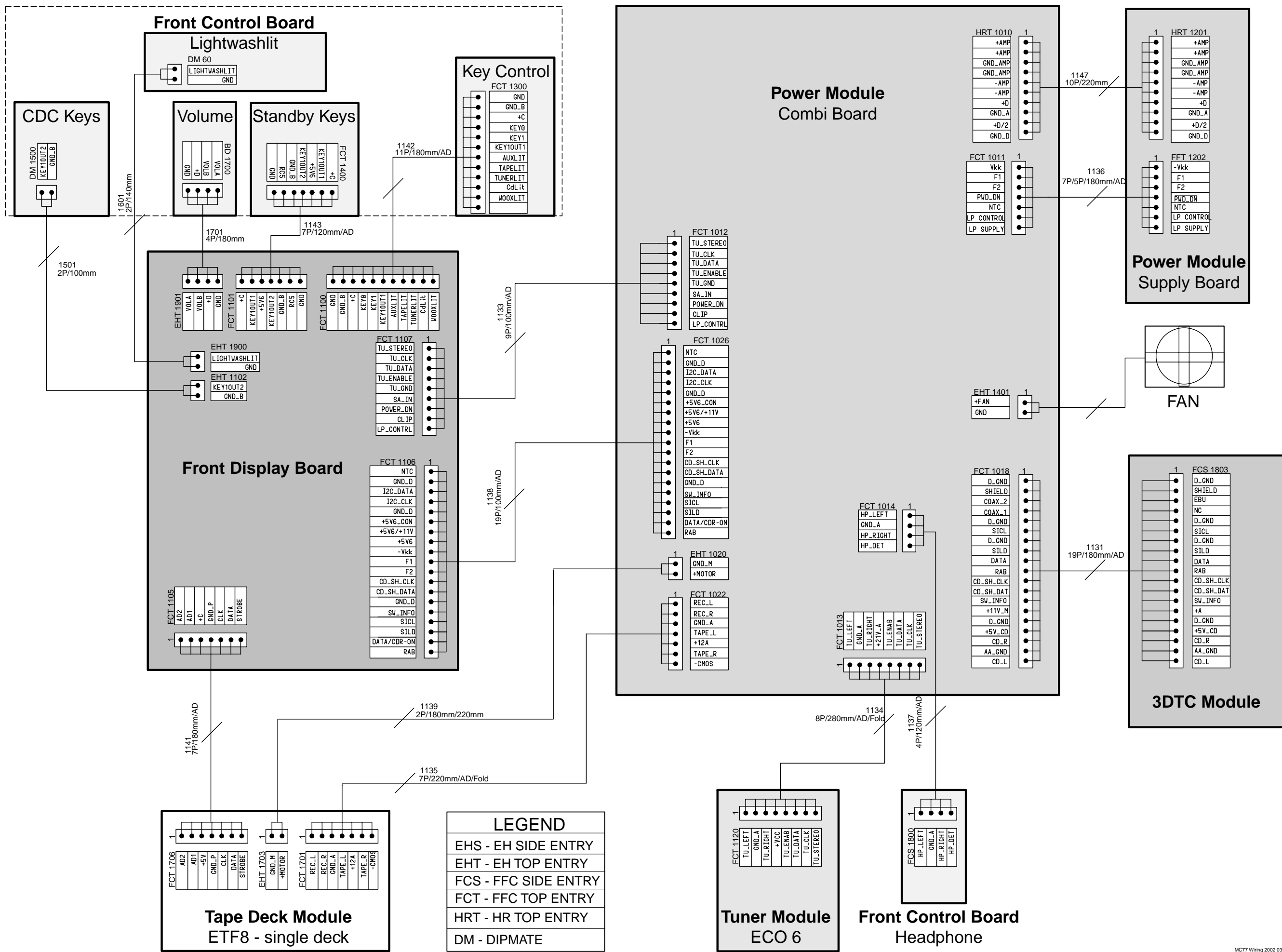
Note: * Depending on the selected grid frequency (9 or 10kHz)
By holding the TUNER and ►► buttons depressed while switching on the Mains supply, one of the undermentioned features will be activated:
- the tuning grid frequency is toggled between 9kHz and 10kHz for the Oversea (/21) version.

TEST	Activated with	ACTION
EEPROM TEST	►► ■ to Exit	8 test patterns will be sent to the EEPROM. "PASS" is displayed if the uProcessor read back the test patterns 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	Display shows value for 2 seconds. Values increases or decreases in steps of 1 dB until VOL MUTE (Min.) or 0dB (Max.) is reached.
DEMO MODE	Treble	Pressing this button will toggle between DEMO ON and DEMO OFF. The DEMO status will scroll once on the Display.
LEAVE SERVICE TESTPROGRAM	Disconnect mains cord	

SET BLOCK DIAGRAM



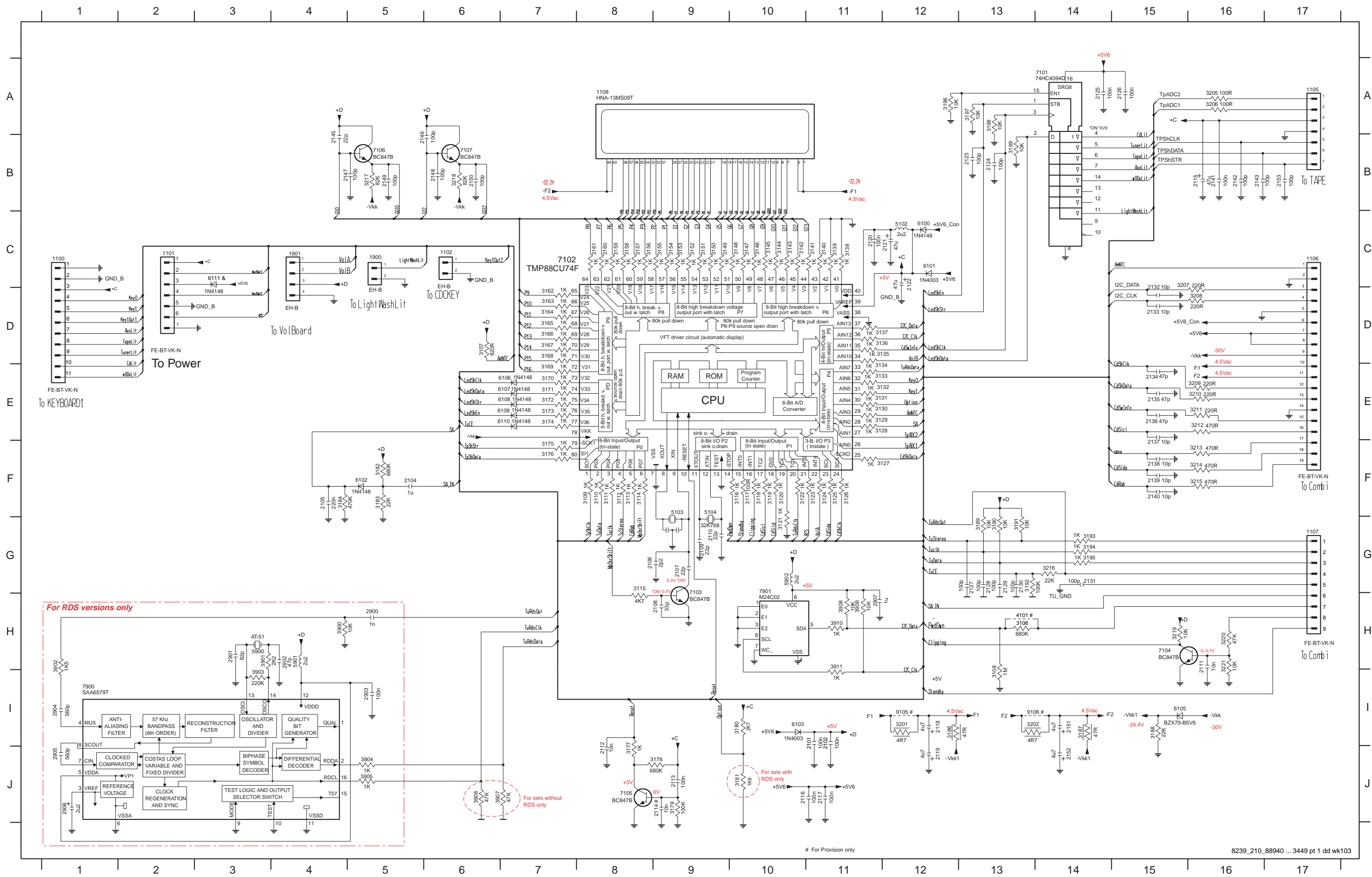
WIRING DIAGRAM



LEGEND

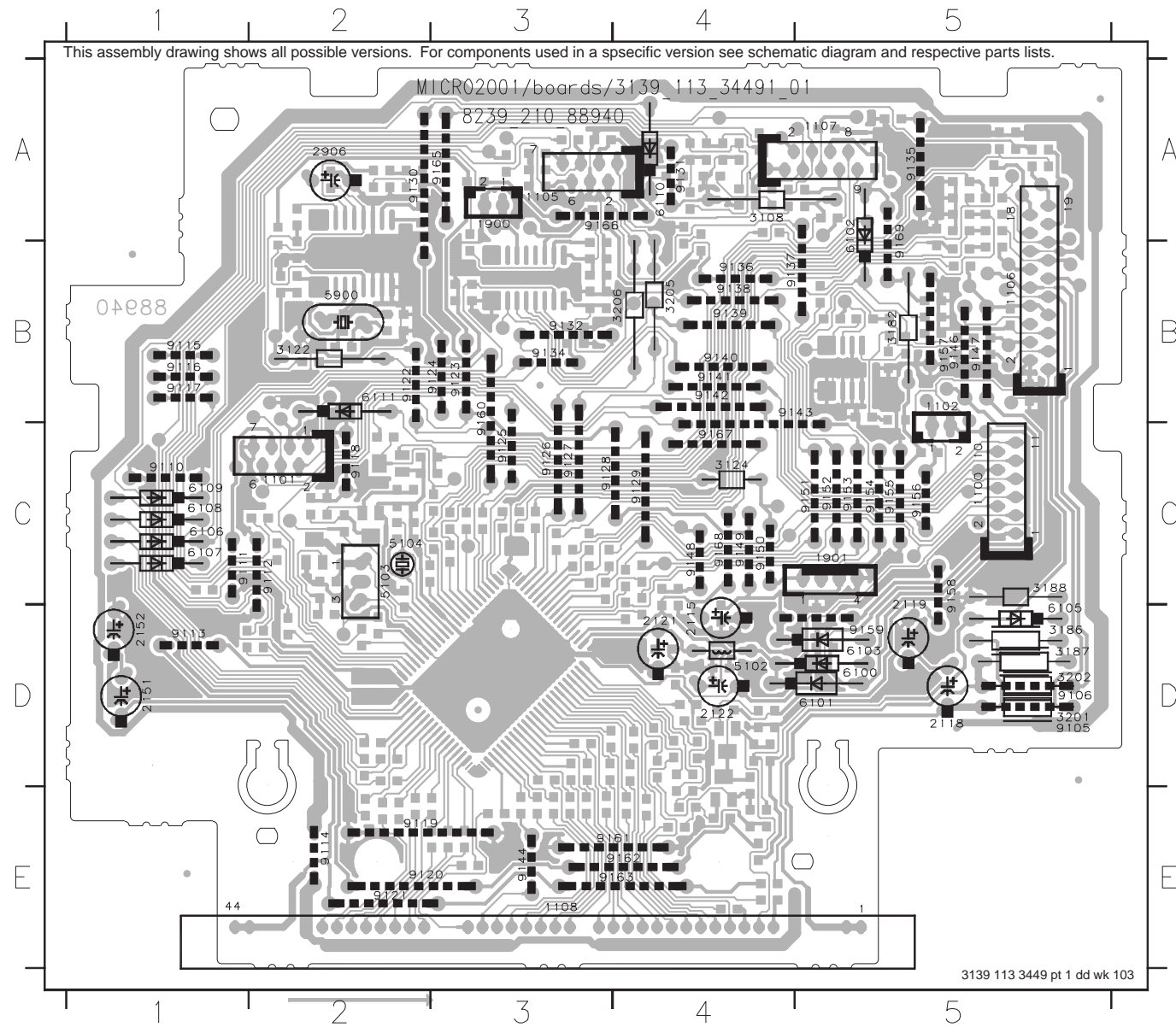
EHS - EH SIDE ENTRY
EHT - EH TOP ENTRY
FCS - FFC SIDE ENTRY
FCT - FFC TOP ENTRY
HRT - HR TOP ENTRY
DM - DIPMATE

1100 C1	2102 I11	2113 J9	2123 B13	2133 D15	2143 B17	2900 H5	3108 I13	3118 F10	3128 E11	3138 C11	3148 C10	3158 C8	3168 D7	3178 J9	3189 G13	3199 B13	3212 E16	3900 H4	3910 H11	6101 C12	7101 A14	9106 I13
1101 C2	2104 F5	2114 J9	2124 B13	2134 E15	2145 B4	2901 H3	3109 F8	3119 F10	3129 E11	3139 C11	3149 C9	3159 C8	3169 E7	3179 J9	3190 G13	3201 I12	3213 F16	3901 H3	3911 H11	6102 F5	7102 C7	
1102 C6	2105 F4	2115 B16	2125 A14	2135 E15	2146 B6	2902 H4	3110 F8	3120 F10	3130 E11	3140 C11	3150 C9	3160 C8	3170 E7	3180 I10	3191 G13	3202 I13	3214 F16	3902 H1	3911 H11	6103 I10	7103 H9	
1105 A18	2106 G8	2116 J10	2126 A15	2136 E15	2147 B5	2903 I5	3111 F8	3121 F10	3131 E11	3141 C11	3151 C9	3161 C8	3171 E7	3181 J10	3192 G13	3205 A17	3215 F16	3903 I3	3910 H11	6105 I15	7104 H15	
1106 C17	2107 G9	2117 J11	2127 G13	2137 F15	2148 B6	2904 I1	3112 F8	3122 F10	3132 E12	3142 C10	3152 C9	3162 D7	3172 E7	3182 F5	3193 G14	3206 A17	3216 G14	3904 J5	3910 H11	6106 E7	7105 J8	
1107 G17	2108 H9	2118 I12	2128 G13	2138 F15	2149 B5	2905 J1	3113 F8	3123 F11	3133 E11	3143 C10	3153 C9	3163 D7	3173 E7	3183 F5	3194 G14	3207 C15	3217 B5	3905 J5	3910 H11	6107 E7	7106 B5	
1108 A8	2109 G9	2119 J12	2129 G13	2139 F15	2150 B6	2906 J1	3114 F8	3124 F11	3134 E11	3144 C10	3154 C9	3164 D7	3174 E7	3184 F4	3195 G14	3208 D16	3218 B6	3906 J6	3911 H11	6108 E7	7107 B6	
1900 C5	2110 G9	2120 C11	2130 G13	2140 F15	2151 I14	2907 H11	3115 G8	3125 F11	3135 D12	3145 C10	3155 C9	3165 D7	3175 E7	3185 I2	3196 A12	3209 E16	3219 H15	3907 J6	3911 H11	6109 E7	7900 H1	
1901 C4	2111 H16	2121 C12	2131 G14	2141 B17	2152 J14	3106 H13	3116 F10	3126 F11	3136 D11	3146 C10	3156 C8	3166 D7	3176 F7	3187 I4	3197 A13	3210 E16	3220 H16	3908 H11	3911 H11	6110 E7	7901 G10	
2101 I11	2112 J8	2122 C12	2132 D15	2142 B17	2153 B17	3107 D6	3117 F10	3127 F12	3137 D11	3147 C10	3157 C8	3167 D7	3177 J8	3188 I5	3198 A13	3211 E16	3221 H16	3909 H11	3911 H11	6111 C3	9105 I12	



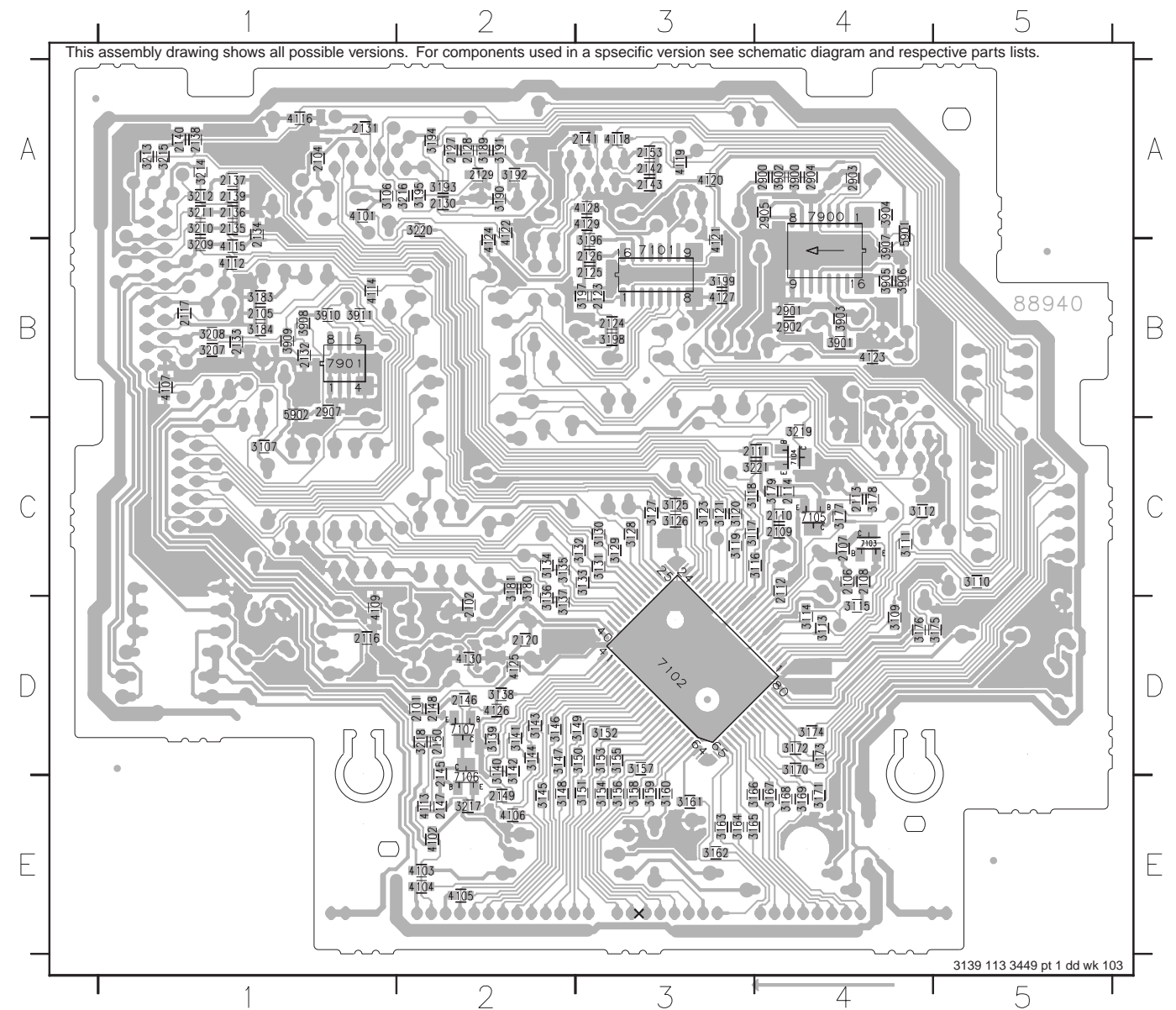
Component Layout

1100 C5	1900 A3	2151 D1	3186 D5	5102 D4	6103 D5	6111 B2	9114 E2	9121 E2	9128 C3	9136 B4	9143 B5	9151 C5	9158 C5	9166 A3
1101 C2	1901 C5	2152 D1	3187 D5	5103 C2	6105 D5	9105 D5	9115 B1	9122 B2	9129 C4	9137 B4	9144 E3	9152 C5	9159 D5	9167 C4
1102 B5	2115 D4	2906 A2	3188 C5	5104 C2	6106 C1	9106 D5	9116 B1	9123 B3	9130 A2	9138 B4	9146 B5	9153 C5	9160 B3	9168 C4
1105 A3	2118 D5	3108 A4	3201 D5	5900 B2	6107 C1	9110 C1	9117 B1	9124 B3	9131 A4	9139 B4	9147 B5	9154 C5	9161 E4	9169 B5
1106 B5	2119 C5	3122 B2	3202 D5	6100 D5	6108 C1	9111 C1	9118 C2	9125 C3	9132 B3	9140 B4	9148 C4	9155 C5	9162 E4	
1107 A5	2121 D4	3124 C4	3205 B4	6101 D5	6109 C1	9112 C2	9119 E2	9126 C3	9134 B3	9141 B4	9149 C4	9156 C5	9163 E4	
1108 E3	2122 D4	3182 B5	3206 B4	6102 A5	6110 A4	9113 D1	9120 E2	9127 C3	9135 A5	9142 B4	9150 C4	9157 B5	9165 A3	



Chip Layout

2101 D2	2117 B1	2135 A1	2150 D2	3112 C4	3128 C3	3142 D2	3156 E3	3170 D4	3189 A2	3210 A1	3902 A4	4105 E2	4123 B4	7105 C4
2102 D2	2120 D2	2136 A1	2153 A3	3113 D4	3129 C3	3143 D2	3157 D3	3171 E4	3190 A2	3211 A1	3903 B4	4106 E2	4124 B2	7106 E2
2104 A1	2123 B3	2137 A1	2900 A4	3114 D4	3130 C3	3144 D2	3158 E3	3172 D4	3191 A2	3212 A1	3904 A4	4107 B1	4125 D2	7107 D2
2105 B1	2124 B3	2138 A1	2901 B4	3115 D4	3131 C3	3145 E2	3159 E3	3173 D4	3192 A2	3213 A1	3905 B4	4109 D1	4126 D2	7900 A4
2106 C4	2125 B3	2139 A1	2902 B4	3116 C4	3132 C3	3146 D2	3160 E3	3174 D4	3193 A2	3214 A1	3906 B4	4112 B1	4127 B3	7901 B1
2107 C4	2126 B3	2140 A1	2903 A4	3117 C3	3133 C3	3147 D2	3161 E3	3175 D5	3194 A2	3215 A1	3907 B4	4113 E2	4128 A3	
2108 C4	2127 A2	2141 A3	2904 A4	3118 C3	3134 C2	3148 E2	3162 E3	3176 D4	3195 A2	3216 A2	3908 B1	4114 B1	4129 A3	
2109 C4	2128 A2	2142 A3	2905 A4	3119 C3	3135 C2	3149 D3	3163 E3	3177 C4	3196 B3	3217 E2	3909 B1	4115 B1	4130 D2	
2110 C4	2129 A2	2143 A3	2907 B1	3120 C3	3136 D2	3150 D3	3164 E3	3178 C4	3197 B3	3218 D2	3910 B1	4116 A1	5901 A4	
2111 C4	2130 A2	2145 D2	3106 A1	3121 C3	3137 D2	3151 E3	3165 E3	3179 C4	3198 B3	3219 C4	3911 B1	4118 A3	5902 B1	
2112 C4	2131 A1	2146 D2	3107 C1	3123 C3	3138 D2	3152 D3	3166 E3	3180 C2	3199 B3	3220 A2	4101 A1	4119 A3	7101 B3	
2113 C4	2132 B1	2147 E2	3109 D4	3125 C3	3139 D2	3153 D3	3167 E4	3181 C2	3207 B1	3221 C4	4102 E2	4120 A3	7102 D3	
2114 C4	2133 B1	2148 D2	3110 C5	3126 C3	3140 D2	3154 E3	3168 E4	3183 B1	3208 B1	3900 A4	4103 E2	4121 B3	7103 C4	
2116 D1	2134 A1	2149 E2	3111 C4	3127 C3	3141 D2	3155 D3	3169 E4	3184 B1	3209 B1	3901 B4	4104 E2	4122 A2	7104 C4	



ELECTRICAL PARTSLIST Front Display Board**MISCELLANEOUS**

1100	4822 267 11039	FFC-CONNECTOR, 11P, TOP ENTRY			
1101	4822 267 10953	FFC-CONNECTOR, 7P, TOP ENTRY			
1105	4822 267 10953	FFC-CONNECTOR, 7P, TOP ENTRY			
1106	4822 265 11553	FFC-CONNECTOR, 19P, TOP ENTRY			
1107	2422 025 14518	FFC-CONNECTOR, 9P, TOP ENTRY			

1108	3139 110 52680	FTD Display MC-77			
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CAPACITORS

2101	2238 586 59812	100nF	10%	50V
2102	2238 586 59812	100nF	10%	50V
2104	3198 017 41050	1μF	20%	10V
2105	4822 126 13879	220nF	20%	16V
2106	4822 126 14223	2.2pF	10%	50V

2107	4822 122 33761	22pF	5%	50V
2108	2222 867 15339	33pF	5%	50V
2109	4822 122 33761	22pF	5%	50V
2110	4822 122 33761	22pF	5%	50V
2111	5322 126 11583	10nF	10%	63V

2112	5322 126 11583	10nF	10%	63V
2113	2238 586 59812	100nF	10%	50V
2115	4822 124 40433	47μF	20%	25V
2116	2238 586 59812	100nF	10%	50V
2117	2238 586 59812	100nF	10%	50V

2118	4822 124 40769	4.7μF	20%	100V
2119	4822 124 40769	4.7μF	20%	100V
2120	2238 586 59812	100nF	10%	50V
2121	4822 124 40433	47μF	20%	25V
2122	4822 124 40433	47μF	20%	25V

2123	2020 552 94427	100pF	5%	50V
2124	2020 552 94427	100pF	5%	50V
2125	2238 586 59812	100nF	10%	50V
2126	2238 586 59812	100nF	10%	50V
2127	2020 552 94427	100pF	5%	50V

2128	2020 552 94427	100pF	5%	50V
2129	2020 552 94427	100pF	5%	50V
2130	2020 552 94427	100pF	5%	50V
2131	2020 552 94427	100pF	5%	50V
2132	4822 122 33741	10pF	10%	50V

2133	4822 122 33741	10pF	10%	50V
2134	4822 122 33777	47pF	5%	63V
2135	4822 122 33777	47pF	5%	63V
2136	4822 122 33777	47pF	5%	63V
2137	4822 122 33741	10pF	10%	50V

2138	4822 122 33741	10pF	10%	50V
2139	4822 122 33741	10pF	10%	50V
2140	4822 122 33741	10pF	10%	50V
2141	2238 586 59812	100nF	10%	50V
2142	2020 552 94427	100pF	5%	50V

2143	2020 552 94427	100pF	5%	50V
2145	4822 122 33761	22pF	5%	50V
2146	2020 552 94427	100pF	5%	50V
2147	2020 552 94427	100pF	5%	50V
2148	2020 552 94427	100pF	5%	50V

2149	2020 552 94427	100pF	5%	50V
2150	2020 552 94427	100pF	5%	50V
2151	4822 124 40769	4.7μF	20%	100V
2152	4822 124 40769	4.7μF	20%	100V
2153	2020 552 94427	100pF	5%	50V

2900	3198 016 31020	1nF	5%	25V
2901	4822 126 14226	82pF	5%	50V
2902	4822 122 33777	47pF	5%	63V
2903	2238 586 59812	100nF	10%	50V
2904	4822 126 14249	560pF	10%	50V

CAPACITORS

2905	4822 126 14249	560pF	10%	50V
2906	4822 124 22652	2.2μF	20%	50V
2907	3198 017 41050	1μF	20%	10V

RESISTORS

3106	4822 051 30684	680kΩ	5%	0,06W
3107	4822 117 12968	820Ω	5%	0,06W
3108	4822 116 83866	1MΩ	5%	0,5W
3109	4822 051 30102	1kΩ	5%	0,06W
3110	4822 051 30102	1kΩ	5%	0,06W

3111	4822 051 30102	1kΩ	5%	0,06W
3112	4822 051 30102	1kΩ	5%	0,06W
3113	4822 051 30102	1kΩ	5%	0,06W
3114	4822 051 30102	1kΩ	5%	0,06W
3115	4822 051 30472	4,7kΩ	5%	0,06W

3116	4822 051 30102	1kΩ	5%	0,06W
3117	4822 051 30101	100Ω	5%	0,06W
3118	4822 051 30102	1kΩ	5%	0,06W
3119	4822 051 30102	1kΩ	5%	0,06W
3120	4822 051 30102	1kΩ	5%	0,06W

3121	4822 051 30102	1kΩ	5%	0,06W
3122	4822 050 11002	1kΩ	5%	0,2W
3123	4822 051 30102	1kΩ	5%	0,06W
3124	4822 050 11002	1kΩ	5%	0,2W
3125	4822 051 30102	1kΩ	5%	0,06W

3126	4822 051 30102	1kΩ	5%	0,06W
3127	4822 051 30102	1kΩ	5%	0,06W
3128	4822 051 30102	1kΩ	5%	0,06W
3129	4822 051 30102	1kΩ	5%	0,06W
3130	4822 051 30102	1kΩ	5%	0,06W

3131	4822 051 30102	1kΩ	5%	0,06W
3132	4822 051 30102	1kΩ	5%	0,06W
3133	4822 051 30102	1kΩ	5%	0,06W
3134	4822 051 30102	1kΩ	5%	0,06W
3135	4822 051 30102	1kΩ	5%	0,06W

3136	4822 051 30102	1kΩ	5%	0,06W
3137	4822 051 30102	1kΩ	5%	0,06W
3138	4822 051 30102	1kΩ	5%	0,06W
3139	4822 051 30102	1kΩ	5%	0,06W
3140	4822 051 30102	1kΩ	5%	0,06W

3141	4822 051 30102	1kΩ	5%	0,06W
3142	4822 051 30102	1kΩ	5%	0,06W
3143	4822 051 30102	1kΩ	5%	0,06W
3144	4822 051 30102	1kΩ	5%	0,06W
3145	4822 051 30102	1kΩ	5%	0,06W

3146	4822 051 30102	1kΩ	5%	0,06W
3147	4822 051 30102	1kΩ	5%	0,06W
3148	4822 051 30102	1kΩ	5%	0,06W
3149	4822 051 30102	1kΩ	5%	0,06W
3150	4822 051 30102	1kΩ	5%	0,06W

3151	4822 051 30102	1kΩ	5%	0,06W
3152	4822 051 30102	1kΩ	5%	0,06W
3153	4822 051 30102	1kΩ	5%	0,06W
3154	4822 051 30102	1kΩ	5%	0,06W
3155	4822 051 30102	1kΩ	5%	0,06W

3156	4822 051 30102	1kΩ	5%	0,06W
3157	4822 051 30102	1kΩ	5%	0,06W
3158	4822 051 30102	1kΩ	5%	0,06W
3159	4822 051 30102	1kΩ	5%	0,06W
3160	4822 051 30102	1kΩ	5%	0,06W

3161	4822 051 30102	1kΩ	5%	0,06W
3162	4822 051 30102	1kΩ	5%	0,06W
3163	4822 051 30102	1kΩ	5%	0,06W
3164	4822 051 30102	1kΩ	5%	0,06W

ELECTRICAL PARTSLIST Front Display Board**RESISTORS**

3165	4822 051 30102	1kΩ	5%	0,06W
3166	4822 051 30102	1kΩ	5%	0,06W
3167	4822 051 30102	1kΩ	5%	0,06W
3168	4822 051 30102	1kΩ	5%	0,06W
3169	4822 051 30102	1kΩ	5%	0,06W

3170	4822 051 30102	1kΩ	5%	0,06W
3171	4822 051 30102	1kΩ	5%	0,06W
3172	4822 051 30102	1kΩ	5%	0,06W
3173	4822 051 30102	1kΩ	5%	0,06W
3174	4822 051 30102	1kΩ	5%	0,06W

3175	4822 051 30102	1kΩ	5%	0,06W
3176	4822 051 30102	1kΩ	5%	0,06W
3177	4822 051 30102	1kΩ	5%	0,06W
3178	4822 051 30684	680kΩ	5%	0,06W
3179	4822 051 30105	1MΩ	5%	0,06W

3180	4822 051 30272	2,7kΩ	5%	0,06W
3181	4822 117 12902	8,2kΩ	1%	0,06W
3182	4822 116 52298	680kΩ	5%	0,5W
3183	4822 051 30223	22kΩ	5%	0,06W
3184	4822 051 30474	470kΩ	5%	0,06W

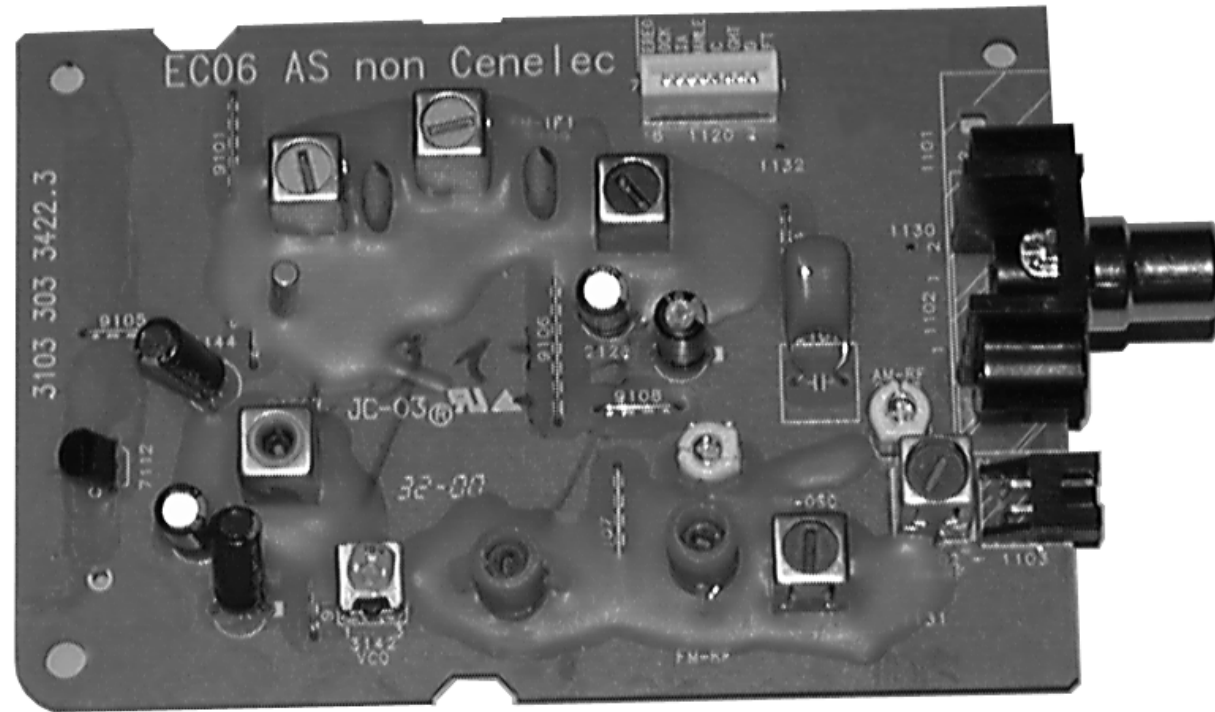
3186	4822 052 10479	47Ω	5%	0,3W
3187	4822 052 10479	47Ω	5%	0,3W
3188	4822 116 52257	22kΩ	5%	0,5W
3189	4822 051 30103	10kΩ	5%	0,06W
3190	4822 051 30103	10kΩ	5%	0,06W

3191	4822 051 30103	10kΩ	5%	0,06W
3192	4822 117 13632	100kΩ	1%	0,06W
3193	4822 051 30102	1kΩ	5%	0,06W
3194	4822 051 30102	1kΩ	5%	0,06W
3195	4822 051 30102	1kΩ	5%	0,06W

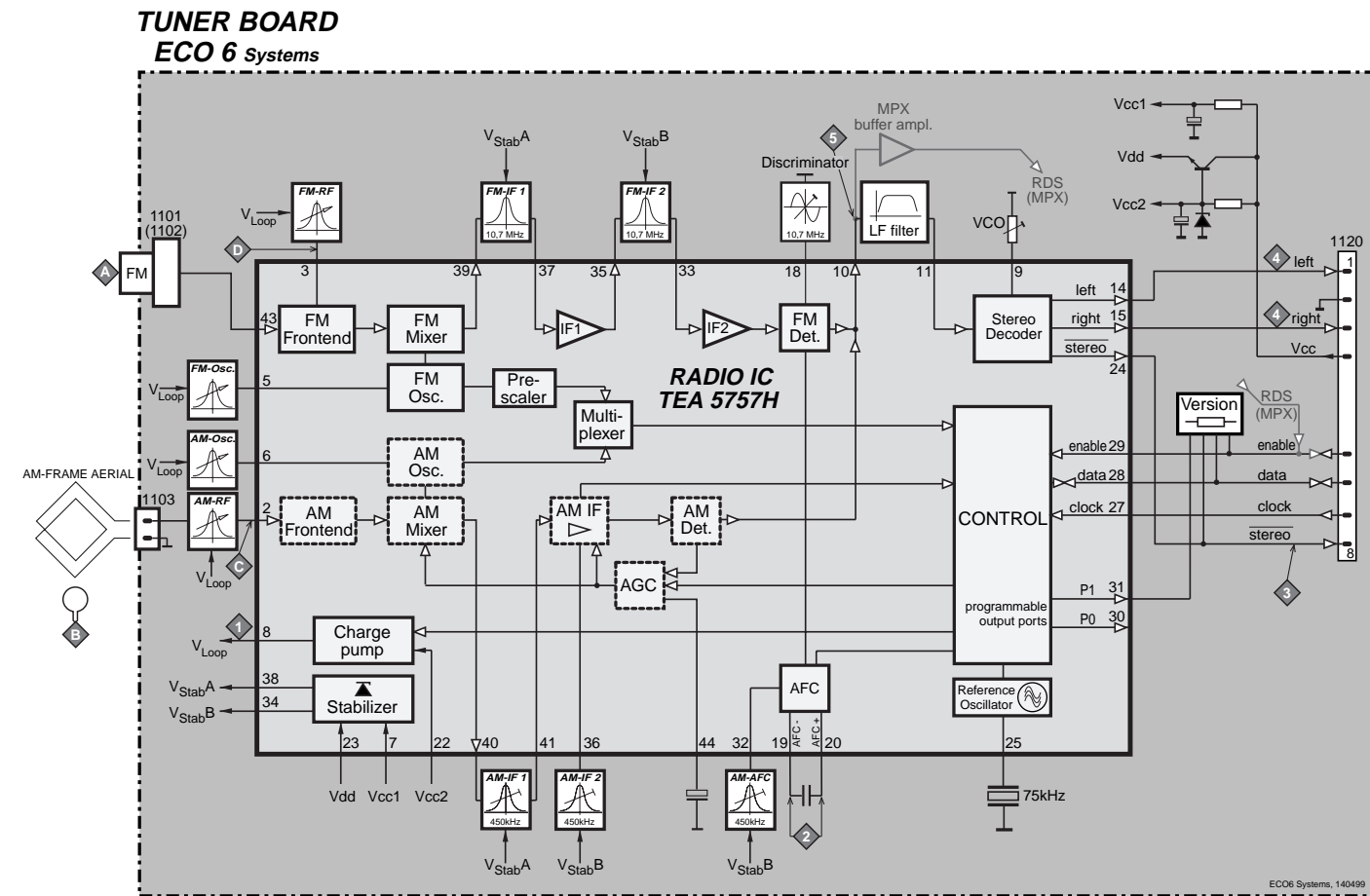
3196	4822 051 30103	10kΩ	5%	0,06W
3197	4822 051 30103	10kΩ	5%	0,06W
3198	4822 051 30103	10kΩ	5%	0,06W
3199	4822 051 30103	10kΩ	5%	0,06W
3201	4822 052 10228	2,2Ω	5%	0,33W

3202	4822 052 10228	2,2Ω	5%	0,33W
3205	4822 116 52175	100Ω	5%	0,5W
3206	4822 116 52175	100Ω	5%	0,5W
3207	4822 051 30221	220Ω	5%	0,06W
3208	4822 051 30221	220Ω	5%	0,06W

3209	4822 051 30221	220Ω	5%	0,06W
3210	4822 051 30221	220Ω	5%	0,06W
3211	4822 051 30221	220Ω	5%	0,06W
3212	4822 051 30471	470Ω	5%	0,06W
3213	4822 051 30471	470Ω	5%	0,06W



BLOCK DIAGRAM

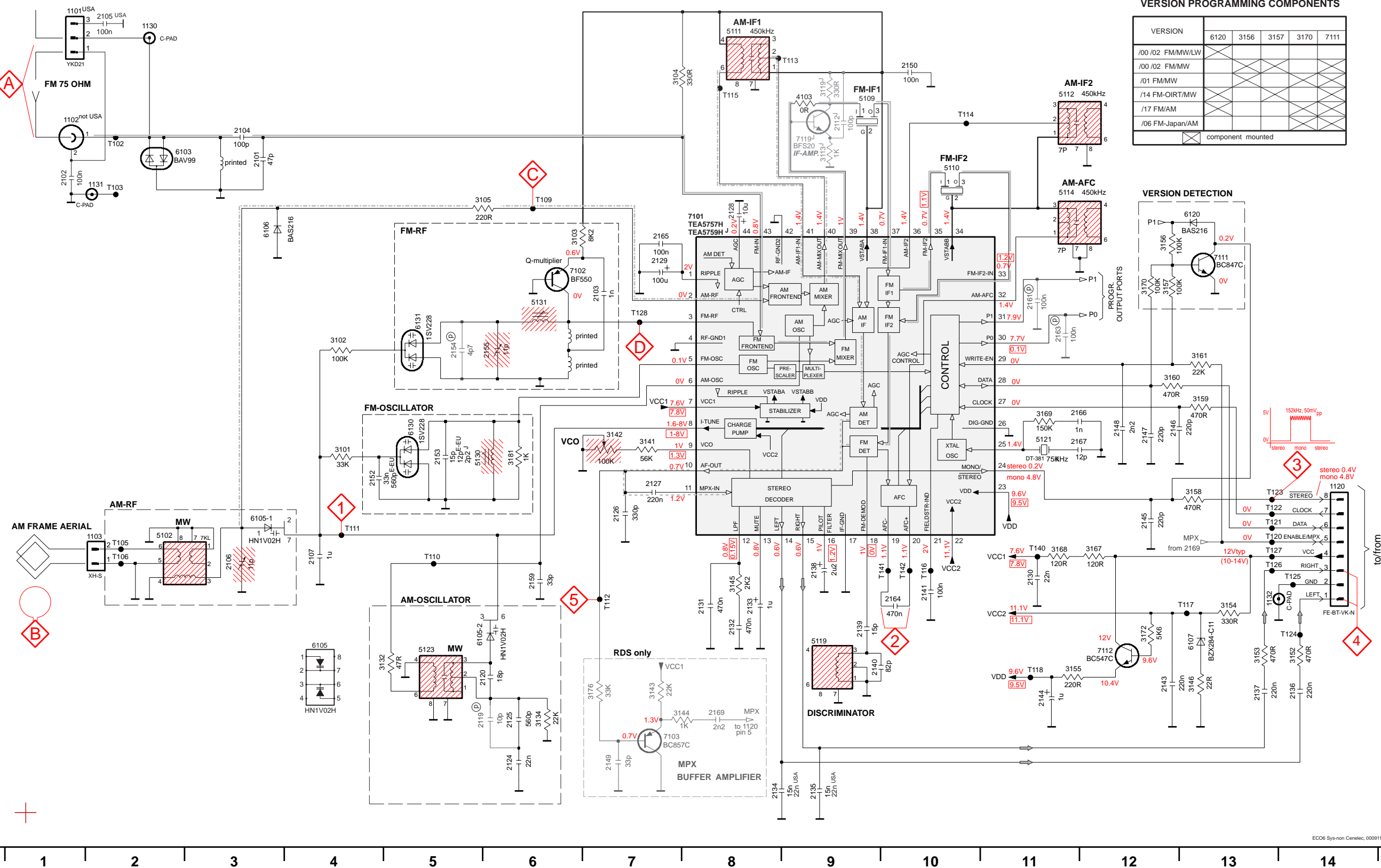


ECO6 Tuner Board
version: **SYSTEMS non-CENELEC**

TABLE OF CONTENTS

Blockdiagram7A-1
 Schematic Diagram7A-2
 Component Layout.....7A-3
 Adjustment table7A-3
 Electrical Partslist.....7A-4

TUNER BOARD ECO6 / SYSTEMS NON CENELEC

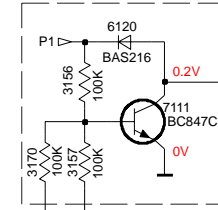


VERSION PROGRAMMING COMPONENTS

VERSION	6120	3156	3157	3170	7111
/00 /02 FM/MW/LW					
/00 /02 FM/MW					
/01 FM/MW					
/14 FM-OIRT/MW					
/17 FM/AM					
/06 FM-Japan/AM					

component mounted

VERSION DETECTION



LEGEND

- (P)...for provision only
- USA ... for USA version only
- E-EU ... for East European version only
- J ... for Japanese version only

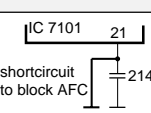
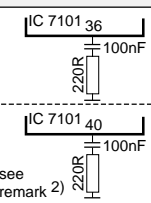
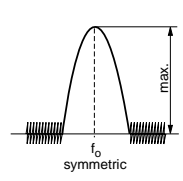
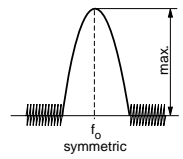
- ...V FM mode stereo
- ...V MW mode
- ...V LW mode
- voltages measured while set is tuned to a strong transmitter
- EVM

- Signal path
- FM
- - - AM
- · - · MPX (Audio Frequency)
- ⇒ AF - left/right

- 1101 A1
- 1102 B1
- 1103 F2
- 1120 E14
- 1130 A2
- 1131 B2
- 1132 G13
- 2101 B3
- 2102 B1
- 2103 C7
- 2104 B3
- 2105 A2
- 2106 F3
- 2107 F4
- 2119 H6
- 2120 G6
- 2124 H6
- 2125 H6
- 2126 F7
- 2127 E7
- 2128 C8
- 2129 C7
- 2130 F11
- 2131 G8
- 2132 G8
- 2133 G8
- 2134 H8
- 2135 H9
- 2136 G14
- 2137 G13
- 2138 F9
- 2139 G9
- 2140 G9
- 2141 F10
- 2143 G12
- 2144 G11
- 2145 F12
- 2146 E12
- 2147 E12
- 2148 H7
- 2149 H7
- 2150 A10
- 2152 E4
- 2153 E5
- 2154 D5
- 2155 D5
- 2159 F6
- 2161 C11
- 2163 D11
- 2164 F10
- 2165 C7
- 2166 E11
- 2167 H11
- 2169 H8
- 3101 E4
- 3102 D4
- 3103 C6
- 3104 A7
- 3105 B6
- 3132 G5
- 3134 H6
- 3141 E7
- 3142 E7
- 3143 G7
- 3144 H7
- 3145 F8
- 3146 G13
- 3152 G14
- 3153 G13
- 3154 G13
- 3155 G11
- 3156 C12
- 3157 C12
- 3158 E13
- 3159 D13
- 3160 D12
- 3161 D13
- 3167 F12
- 3168 F11
- 3169 E11
- 3170 C12
- 3172 G12
- 3176 G7
- 3181 E6
- 5102 F2
- 5109 B9
- 5110 B10
- 5111 A8
- 5112 A11
- 5114 A11
- 5119 B9
- 5121 E11
- 5123 G5
- 5130 E5
- 5131 C6
- 5132 G5
- 5133 F3
- 5134 D5
- 5135 G5
- 5136 C3
- 5137 G5
- 5138 E5
- 5139 E5
- 5140 F5
- 5141 F4
- 5142 F7
- 5143 A8
- 5144 B10
- 5145 A8
- 5146 F10
- 5147 G13
- 5148 F13
- 5149 F13
- 5150 F13
- 5151 F13
- 5152 F13
- 5153 F13
- 5154 F13
- 5155 F13
- 5156 F13
- 5157 F13
- 5158 F13
- 5159 F13
- 5160 F13
- 5161 F13
- 5162 F13
- 5163 F13
- 5164 F13
- 5165 F13
- 5166 F13
- 5167 F13
- 5168 F13
- 5169 F13
- 5170 F13
- 5171 F13
- 5172 F13
- 5173 F13
- 5174 F13
- 5175 F13
- 5176 F13
- 5177 F13
- 5178 F13
- 5179 F13
- 5180 F13
- 5181 F13
- 5182 F13
- 5183 F13
- 5184 F13
- 5185 F13
- 5186 F13
- 5187 F13
- 5188 F13
- 5189 F13
- 5190 F13
- 5191 F13
- 5192 F13
- 5193 F13
- 5194 F13
- 5195 F13
- 5196 F13
- 5197 F13
- 5198 F13
- 5199 F13
- 5200 F13

1101 A6 1120 A4 1132 A5 2128 C4 2138 C2 3142 D2 5110 B3 5114 A2 5123 D5 7112 C1 9104 B5 9107 D4
 1102 B6 1130 B5 2106 C5 2129 B4 2144 B2 5102 D6 5111 B4 5119 C2 5130 D3 9101 A2 9105 B1 9108 C4
 1103 D6 1131 D5 2107 B5 2133 D2 2155 C4 5109 A3 5112 A3 5121 B2 5131 D4 9103 B2 9106 B3 9109 D2

TUNER ADJUSTMENT TABLE (ECO6 FM/MW- and FM/MW/LW - versions with AM-frame aerial)

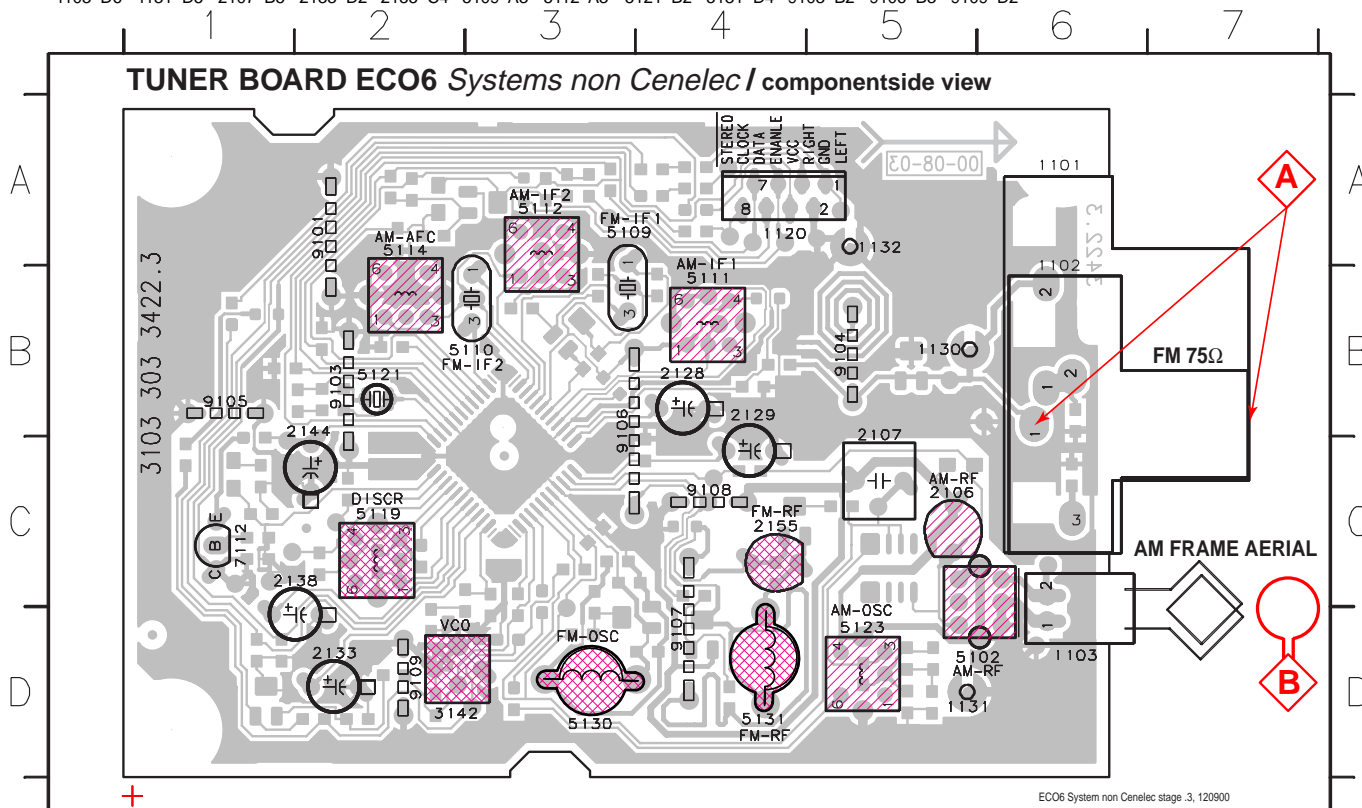
Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
<i>VARICAP ALIGNMENT</i>						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)			108MHz	5130		8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V ⁵⁾ (1.2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123	1	6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
<i>FM IF</i>						
FM	10.7MHz, 45mV continuous wave	D		5119	2	0 ± 3 mV DC
<i>FM RF</i>						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	A	108MHz	2155	4	MAX
	87.5MHz (65.81MHz)	mod=1kHz Δf=±22.5kHz	87.5MHz (65.81MHz)	5131		
<i>VCO</i>						
FM	98MHz, 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz ¹⁾
<i>AM IF</i>						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc	C		5111	5	
		C	IC 7101 40 see remark 2)	5112		
AM AFC MW		C	continuous wave V _{RF} = 2mV	5114	2	0 ± 2 mV DC
<i>AM RF³⁾</i>						
MW ⁴⁾ FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	B	1494kHz	2106	5	
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz	B	1500kHz	2106	5	
	560kHz		560kHz	5102		

Use Service Testprogram. By selecting the TUNER TEST test frequencies will be stored as preset frequencies automatically.

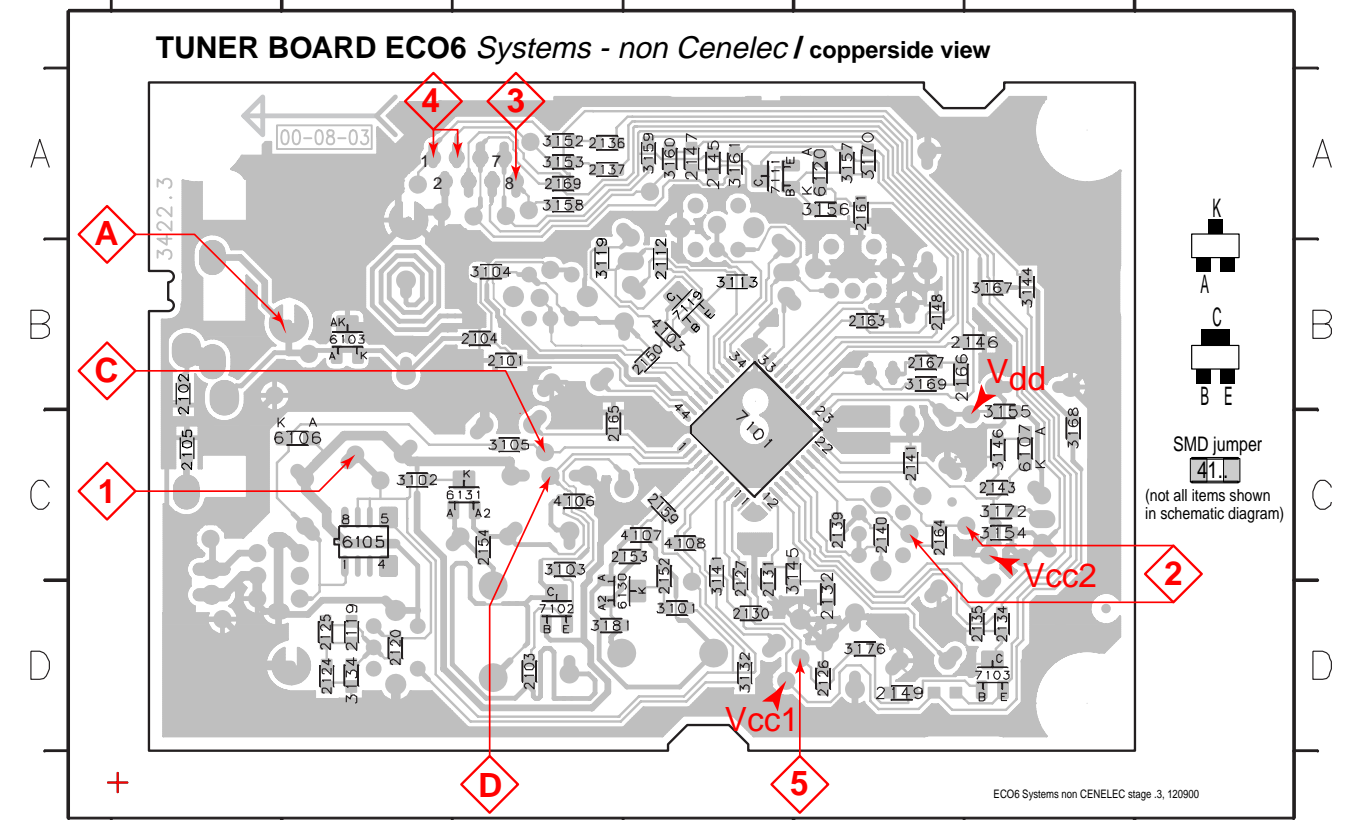
- 1) If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)
- 2) RC network serves for damping the IF-filter while adjusting the other one.
- 3) For AM RF adjustments the original frame antenna has to be used !
- 4) MW has to be aligned before LW.
- 5) 1.7V ±0.5V when alternative varicap. BB804 is used on nos. 6130 6131

↑ Repeat

ECO6, Sys + PA with frame aerial, 170501



2101 B4 2119 D3 2130 D5 2137 A4 2146 B7 2153 C5 2165 C4 3103 C4 3134 D3 3152 A4 3158 A4 3169 B6 4106 C4 6107 C7 7103 D7
 2102 B1 2120 D3 2131 C5 2139 C6 2147 A5 2154 C4 2166 B6 3104 B4 3141 C5 3153 A4 3159 A5 3170 A6 4107 C5 6120 A6 7111 A5
 2103 D4 2124 D3 2132 D6 2140 C6 2148 B6 2159 C5 2167 B6 3105 C4 3143 D6 3154 C7 3160 A5 3172 C7 4108 C5 6130 D4 7119 B5
 2104 B4 2125 D3 2134 D7 2141 C6 2149 D6 2161 A6 2169 A4 3113 B5 3144 B7 3155 C7 3161 A5 3176 D6 6103 B3 6131 C4
 2105 C1 2126 D6 2135 D7 2143 C7 2150 B5 2163 B6 3101 D5 3119 B5 3145 C5 3156 A6 3167 B7 3181 D4 6105 C3 7101 C5
 2112 B5 2127 C5 2136 A4 2145 A5 2152 C5 3102 C3 3132 D5 3146 C7 3157 A6 3168 C7 4103 B5 6106 C3 7102 D4



These assembly drawings show a summary of all possible versions.
 For components used in a specific version see schematic diagram respectively partlist.

MISCELLANEOUS

1101	2422 015 19376	SOCKET 2P CLICKFIT	USA only
1102	4822 267 10283	SOCKET COAX, IEC 75Ω	not USA
1103	4822 265 31184	JST CONNECTOR 2 POLE	
1120	4822 265 11515	FFC SOCKET, 8P	

CAPACITORS

2101	4822 126 13692	47pF	1%	63V	
2102	4822 126 13838	100nF	10%	50V	not USA
2103	5322 122 31647	1nF	10%	63V	
2104	5322 122 32531	100pF	5%	50V	
2105	4822 126 13838	100nF	10%	50V	USA only
2106	2020 800 00191	3-11pF TRIMCAP.,N450			
2107	4822 121 51319	1μF	20%	50V	
2120	4822 126 13689	18pF	1%	63V	
2124	5322 122 32654	22nF	10%	63V	
2125	2020 552 96199	560pF	1%	50V	
2126	5322 122 31863	330pF	5%	50V	
2127	4822 126 14076	220nF	20%	25V	
2128	4822 124 40248	10μF	20%	63V	
2129	4822 124 41584	100μF	20%	10V	
2130	5322 122 32654	22nF	10%	63V	
2131	4822 126 13482	470nF	20%	16V	
2132	4822 126 13482	470nF	20%	16V	
2133	4822 124 21913	1μF	20%	63V	
2134	4822 126 13188	15nF	5%	63V	not USA
2134	5322 122 32654	22nF	10%	63V	USA only
2135	4822 126 13188	15nF	5%	63V	not USA
2135	5322 122 32654	22nF	10%	63V	USA only
2136	4822 126 14076	220nF	20%	25V	
2137	4822 126 14076	220nF	20%	25V	
2138	4822 124 22652	2,2μF	20%	50V	
2139	4822 126 14236	15pF	5%	50V	
2140	4822 126 13695	82pF	1%	63V	
2141	4822 126 13838	100nF	10%	50V	
2143	4822 126 14076	220nF	20%	25V	
2144	4822 124 21913	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 122 33127	2,2nF	10%	63V	
2149	5322 122 32659	33pF	5%	50V	RDS only
2150	4822 126 13838	100nF	10%	50V	
2152	4822 126 12105	33nF	5%	63V	not for East Europe
2152	5322 116 80853	560pF	5%	63V	for East Europe only
2153	4822 126 13486	15pF	2%	63V	not for East Europe
2153	4822 122 33926	12pF	2%	50V	for East Europe only
2155	2020 800 00191	3-11pF TRIMCAP.,N450			
2159	5322 122 32659	33pF	5%	50V	
2164	4822 126 13482	470nF	20%	16V	
2165	4822 126 13838	100nF	10%	50V	
2166	5322 122 31647	1nF	10%	63V	
2167	4822 122 33926	12pF	5%	50V	
2169	4822 122 33127	2,2nF	10%	63V	RDS only

RESISTORS

3101	4822 051 20333	33kΩ	5%	0,1W
3102	4822 117 10837	100kΩ	1%	0,1W
3103	4822 051 20822	8,2kΩ	5%	0,1W
3104	4822 117 13577	330Ω	1%	0,1W
3105	4822 117 11503	220Ω	5%	0,1W
3132	4822 051 20479	47Ω	5%	0,1W
3134	4822 051 20223	22kΩ	5%	0,1W
3141	4822 117 11148	56kΩ	1%	0,1W
3142	4822 100 12159	TRIMPOT. 100kΩ		

RESISTORS

3143	4822 051 20223	22kΩ	5%	0,1W	RDS only
3144	4822 051 10102	1kΩ	2%	0,25W	RDS only
3145	4822 117 11449	2,2kΩ	1%	0,1W	
3146	4822 051 20229	22Ω	5%	0,1W	
3152	4822 051 20471	470Ω	5%	0,1W	
3153	4822 051 20471	470Ω	5%	0,1W	
3154	4822 117 13577	330Ω	1%	0,1W	
3155	4822 117 11503	220Ω	5%	0,1W	
3156	4822 117 10837	100kΩ	1%	0,1W	
3157	4822 117 10837	100kΩ	1%	0,1W	
3158	4822 051 20471	470Ω	5%	0,1W	
3159	4822 051 20471	470Ω	5%	0,1W	
3160	4822 051 20471	470Ω	5%	0,1W	
3161	4822 051 20223	22kΩ	5%	0,1W	
3167	4822 051 20121	120Ω	5%	0,1W	
3168	4822 051 20121	120Ω	5%	0,1W	
3169	4822 051 20154	150kΩ	5%	0,1W	
3170	4822 117 10837	100kΩ	1%	0,1W	
3172	4822 051 20562	5,6kΩ	5%	0,1W	
3176	4822 051 20333	33kΩ	5%	0,1W	RDS only
3181	4822 051 10102	1kΩ	2%	0,25W	
4103	4822 051 20008	CHIP JUMPER 0805			
4106	4822 051 20008	CHIP JUMPER 0805			
4107	4822 051 20008	CHIP JUMPER 0805			
4108	4822 051 20008	CHIP JUMPER 0805			

COILS

5102	4822 157 71634	RF-COIL MW
5109	4822 242 70665	FM-IF FILTER 10,7MHz
5110	4822 242 70665	FM-IF FILTER 10,7MHz
5111	2422 549 44023	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 COIL
5121	4822 242 10261	QUARTZ 75kHz
5123	2422 549 44108	RF-COIL, AM-OSCILLATOR
5130	4822 157 11843	RF COIL 1,5 TURNS
5131	4822 157 11843	RF COIL 1,5 TURNS

DIODES

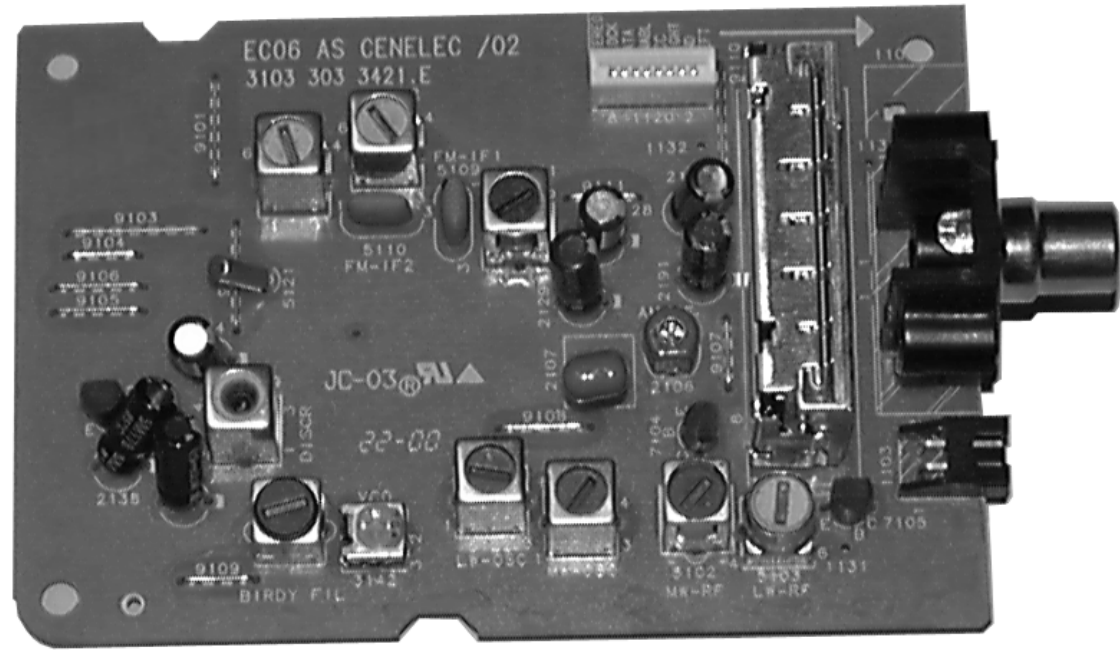
6103	5322 130 34337	BAV99
6105	4822 130 83075	HN1V02H
6106	4822 130 83757	BAS216
6107	9340 386 90115	BZX284-C11
6120	4822 130 83757	BAS216
6130	4822 130 82833	1SV228
6131	4822 130 82833	1SV228

TRANSISTORS

7102	4822 130 42131	BF550
7103	5322 130 42756	BC857C
7111	5322 130 42755	BC847C
7112	4822 130 44503	BC547C

INTEGRATED CIRCUITS

7101	9351 740 80557	TEA5757H/V1, RADIO IC
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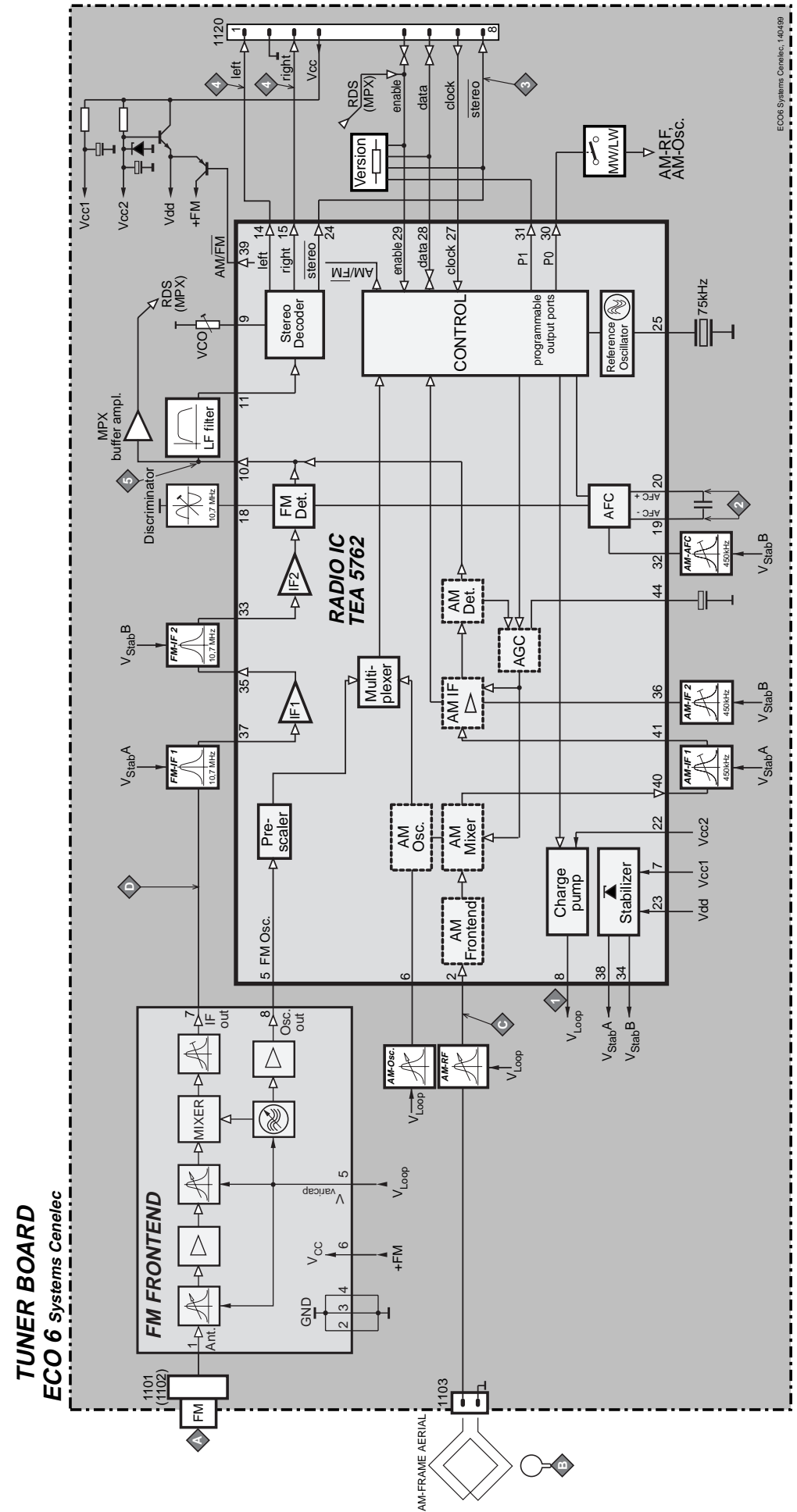
ECO6 Tuner Board

version: **SYSTEMS CENELEC**

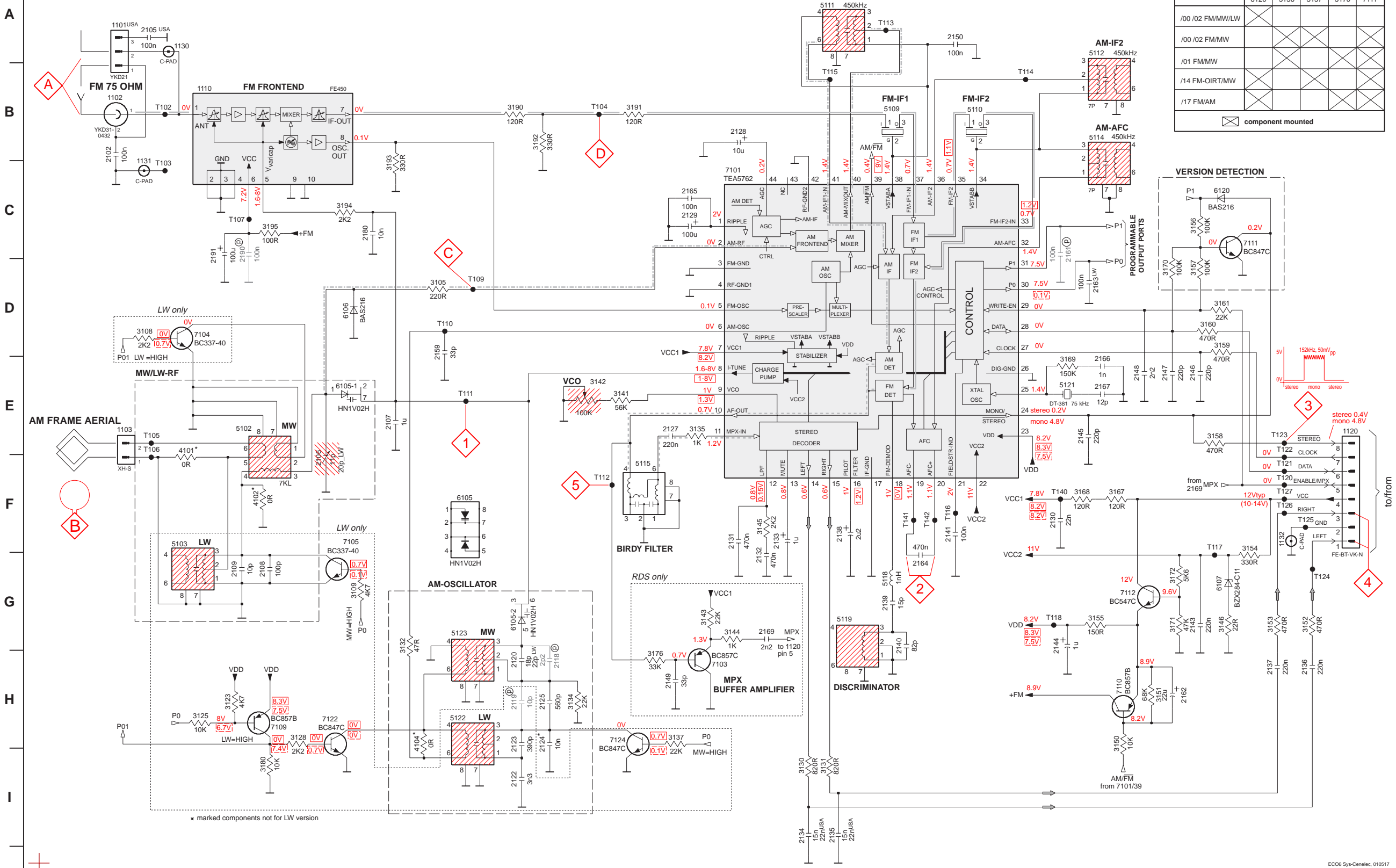
TABLE OF CONTENTS

- Blockdiagram7B-1
- Schematic Diagram7B-2
- Component Layout7B-3
- Adjustment table7B-3
- Electrical Partslist7B-4

BLOCK DIAGRAM



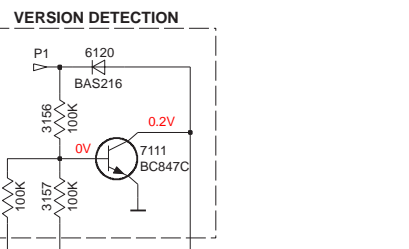
TUNER BOARD ECO6 / SYSTEMS-CENELEC



VERSION PROGRAMMING COMPONENTS

VERSION	6120	3156	3157	3170	7111
/00 /02 FM/MW/LW					
/00 /02 FM/MW					
/01 FM/MW					
/14 FM-OIRT/MW					
/17 FM/AM					

☒ component mounted

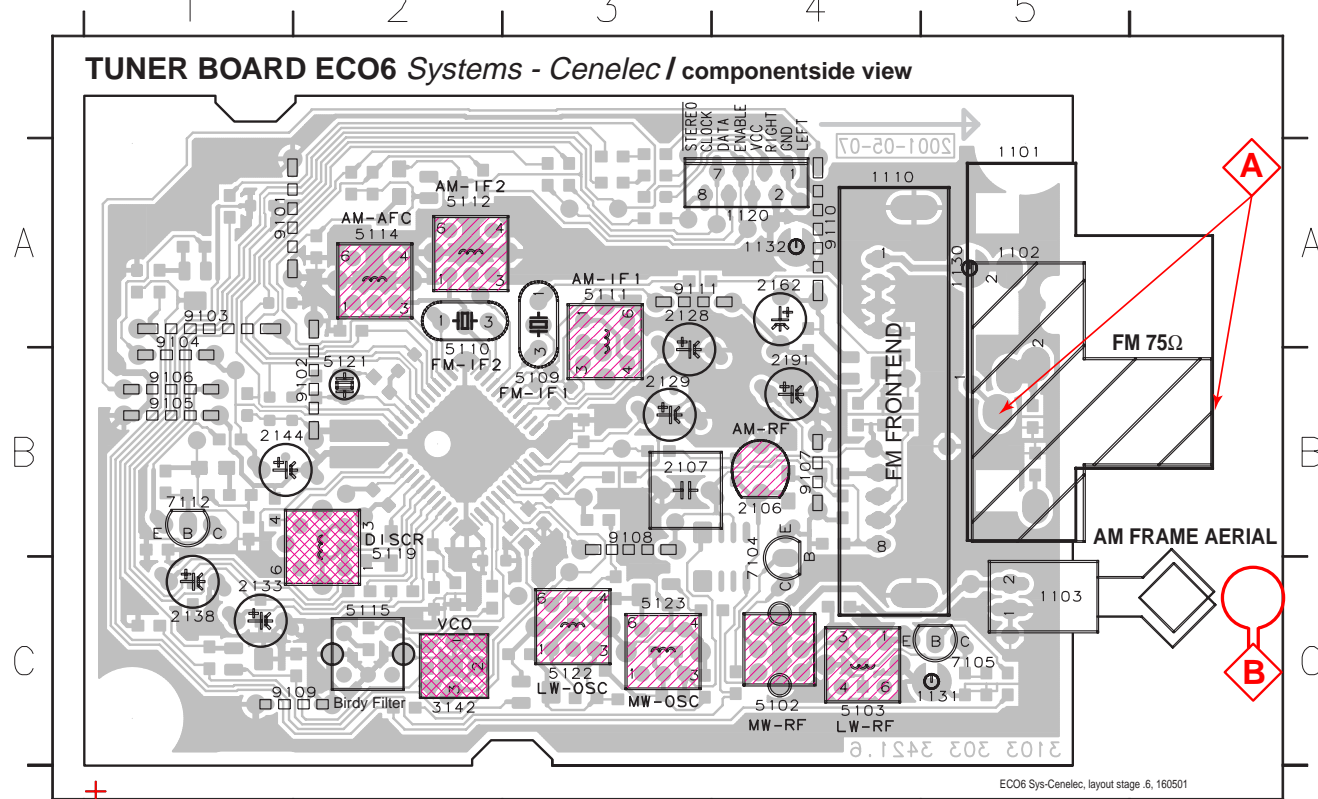


- 1101 A2
- 1102 B1
- 1103 E2
- 1110 B2
- 1120 E14
- 1130 A2
- 1131 C2
- 1132 F13
- 2102 B1
- 2105 A2
- 2106 E3
- 2107 E4
- 2108 G3
- 2109 C3
- 2118 H6
- 2119 H6
- 2120 H6
- 2122 I6
- 2123 H6
- 2124 H6
- 2125 H6
- 2127 E7
- 2128 B8
- 2129 C7
- 2130 F11
- 2131 F8
- 2132 F8
- 2133 F8
- 2134 I8
- 2135 I9
- 2136 H14
- 2137 H13
- 2138 F9
- 2139 G9
- 2140 G9
- 2141 F10
- 2143 G12
- 2144 G11
- 2145 E11
- 2146 E12
- 2147 E12
- 2148 E12
- 2149 H7
- 2150 A10
- 2159 D5
- 2161 C11
- 2162 H12
- 2163 D11
- 2164 G10
- 2165 C7
- 2166 E11
- 2167 H11
- 2169 G8
- 2180 C4
- 2190 C3
- 2191 C3
- 3105 D5
- 3108 D2
- 3109 S4
- 3123 H3
- 3128 H3
- 3130 I9
- 3131 I9
- 3132 G4
- 3134 H6
- 3135 E7
- 3137 H7
- 3141 E7
- 3142 E6
- 3143 G7
- 3144 G8
- 3145 F8
- 3146 G13
- 3150 H12
- 3151 H12
- 3152 G14
- 3153 G13
- 3154 F13
- 3155 G12
- 3156 C12
- 3157 D12
- 3158 I3
- 3159 D13
- 3160 D13
- 3161 D13
- 3167 F12
- 3168 F11
- 3169 E11
- 3170 D12
- 3171 G12
- 3172 H7
- 3180 I3
- 3190 B6
- 3191 B7
- 3192 B6
- 3193 B4
- 3194 C4
- 3195 C3
- 4101 E2
- 4102 F3
- 4104 H5
- 5102 E3
- 5103 F2
- 5109 B9
- 5110 B10
- 5111 A9
- 5112 A11
- 5114 B11
- 5115 E7
- 5118 G9
- 5119 G9

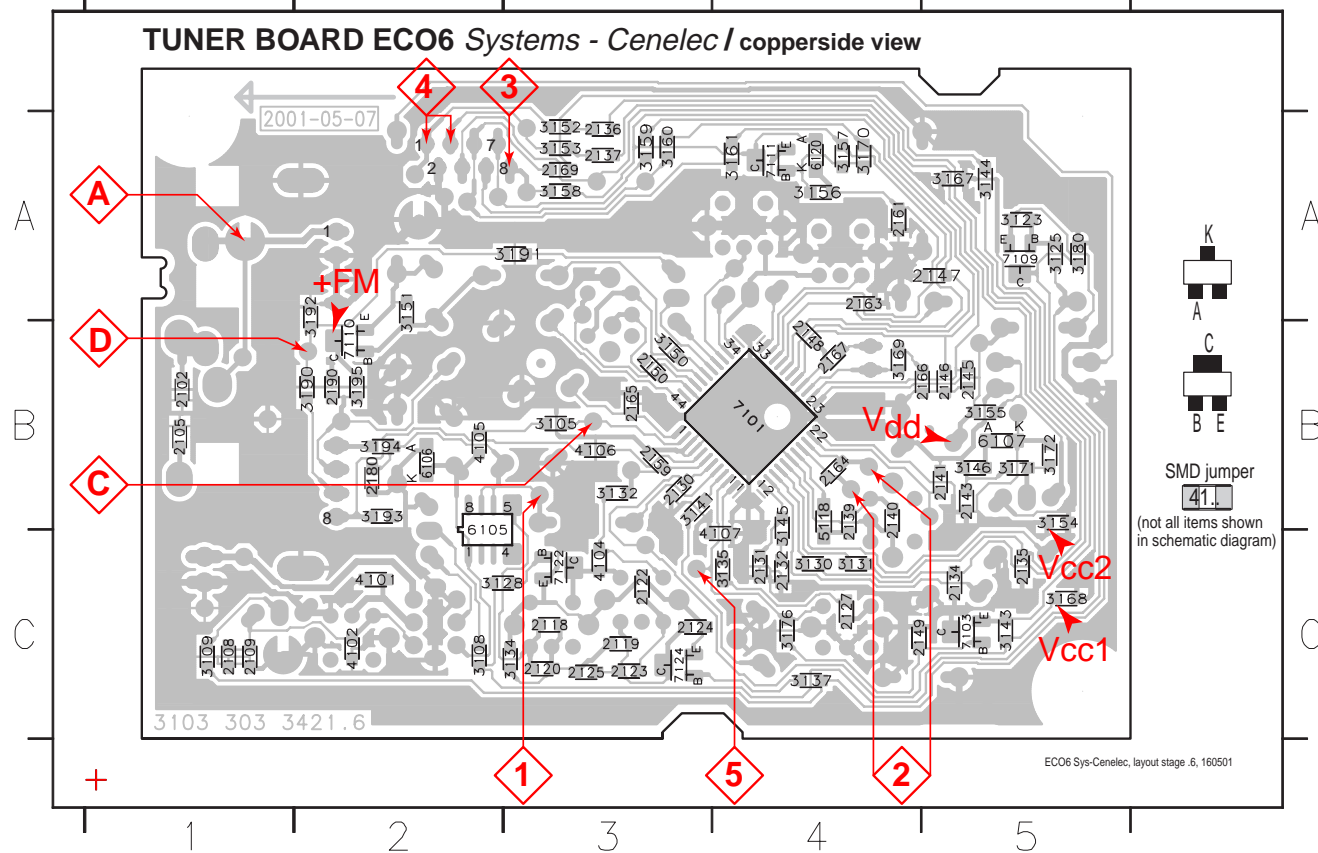
LEGEND

- * ... only assembled in FM/AM-version
- Ⓧ ... for provision only
- USA ... for USA version only
- LW ... for LW version only
- SMD jumper
- Ⓧ EVM
- ...V FM mode stereo
- ...V MW mode
- ...V LW mode
- voltages measured while set is tuned to a strong transmitter
- Signal path
- FM
- - - AM
- MPX (Audio Frequency)
- ⇒ AF - left/right

1101 B5 1110 B4 1131 C5 2107 B3 2133 C1 2162 A4 5102 C4 5110 A2 5114 A2 5121 B2 7104 C4 9101 A2 9104 B1 9107 B4 9110 A4
 1102 B5 1120 A4 1132 A4 2128 A3 2138 B1 2191 B4 5103 C4 5111 A3 5115 C2 5122 C3 7105 C5 9102 B2 9105 B1 9108 B3 9111 A3
 1103 C5 1130 A5 2106 B4 2129 B3 2144 B1 3142 C2 5109 B3 5112 A2 5119 B2 5123 C3 7112 B1 9103 A1 9106 B1 9109 C2

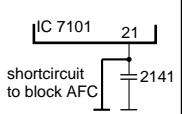
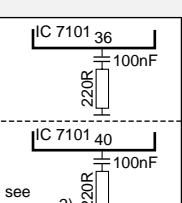
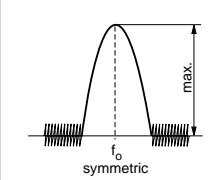

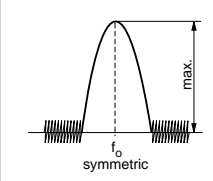


2102 B1 2120 C3 2130 B3 2137 A3 2146 B5 2161 A4 2169 A3 3123 A5 3134 C3 3145 C4 3154 B5 3160 A3 3171 B5 3192 A2 4104 C3 6106 B2 7110 B2
 2105 B1 2122 C3 2131 C4 2139 B4 2147 A5 2163 A4 2180 B2 3125 A5 3135 C4 3146 B5 3155 B5 3161 A4 3172 B5 3193 B2 4105 B2 6107 B5 7111 A4
 2108 C1 2123 C3 2132 C4 2140 B4 2148 B4 2164 B4 2190 B2 3128 C2 3137 C4 3150 B3 3156 A4 3167 A5 3176 C4 3194 B2 4106 B3 6120 A4 7122 C3
 2109 C1 2124 C3 2134 C5 2141 B5 2149 C4 2165 B3 3105 B3 3130 C4 3141 B3 3151 A2 3157 A4 3168 C5 3180 A5 3195 B2 4107 C4 7101 B4 7124 C3
 2118 C3 2125 C3 2135 C5 2143 B5 2150 B3 2166 B5 3108 C2 3131 C4 3143 C5 3152 A3 3158 A3 3169 B4 3190 B2 4101 C2 5118 C4 7103 C5
 2119 C3 2127 C4 2136 A3 2145 B5 2159 B3 2167 B4 3109 C1 3132 B3 3144 A5 3153 A3 3159 A3 3170 A4 3191 A3 4102 C2 6105 B2 7109 A5



These assembly drawings show a summary of all possible versions.
 For components used in a specific version see schematic diagram respectively partslist.

TUNER ADJUSTMENT TABLE (ECO6 Cenelec FM/MW - and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
<i>VARICAP ALIGNMENT</i>						
FM 87.5 - 108MHz (50kHz grid)			108MHz	check		8V ±1.2V
			87.5MHz	check		1.6V ±0.5V
MW 531 - 1602kHz (9kHz grid)			1602kHz	5123	1	8V ±0.2V 3-band 6.9V ±0.2V 2-band
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz (3kHz grid)			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
<i>FM - IF</i>						
FM	10.7MHz, 45mV continuous wave	D		5119	2	0mV ±3mV
<i>FM - VCO</i>						
FM	98MHz, 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz ¹⁾
<i>FM RF (channel separation)</i> Note: The FM-frontend unit has already been adjusted by the factory and needs therefore no further adjustments for service purposes.						
FM	98MHz, 1mV 90% Left + 9% pilot mod=1kHz	A	98MHz	IF coil inside FM frontend 1110	4	right channel min.
<i>AM IF</i>						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc	C $\Delta f = \pm 10\text{kHz}$ $V_{RF} = 0.5\text{mV}$ (as low as possible)		5111	5	
				5112		
AM AFC MW		C continuous wave $V_{RF} = 2\text{mV}$		5114	2	0mV ±2mV
<i>AM RF ³⁾</i>						
MW	1494kHz	B 	1494kHz	2106	5	
	558kHz		558kHz	5102		
LW	198kHz	$\Delta f = \pm 30\text{kHz}$ V_{RF} as low as possible	198kHz	5103		

Use Service Testprogram. 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!
 MW has to be aligned before LW.

↑ Repeat

MISCELLANEOUS

1101	2422 015 19376	SOCKET CLICKFIT 2P	USA only
1102	4822 267 10283	SOCKET COAX, IEC 75Ω	not USA
1103	4822 265 31184	JST CONNECTOR, 2 POLE	
1110	2422 542 90071	FM FRONTEND	
1120	4822 265 11515	FFC SOCKET, 8P	

CAPACITORS

2102	4822 126 13838	100nF	10%	50V	not USA
2105	4822 126 13838	100nF	10%	50V	USA only
2106	2020 800 00204	TRIMCAP. 4.2 - 20pF, N750			LW only
2106	2020 800 00191	TRIMCAP. 3 - 11pF, N450			FM/AM only
2107	4822 121 51319	1μF	20%	50V	
2108	5322 122 32531	100pF	5%	50V	LW only
2109	5322 122 32448	10pF	5%	50V	LW only
2120	4822 126 13689	18pF	1%	63V	FM/AM only
2120	5322 122 32658	22pF	5%	50V	LW only
2122	4822 122 33891	3,3nF	10%	63V	LW only

2123	2020 552 93494	390pF	1%	50V	LW only
2124	4822 122 33177	10nF	20%	50V	FM/AM only
2125	2020 552 96199	560pF	1%	50V	
2127	4822 126 14076	220nF	20%	25V	
2128	4822 124 40248	10μF	20%	63V	

2129	4822 124 41584	100μF	20%	10V	
2130	5322 122 32654	22nF	10%	63V	
2131	4822 126 13482	470nF	20%	16V	
2132	4822 126 13482	470nF	20%	16V	
2133	4822 124 21913	1μF	20%	63V	

2134	3198 017 31530	15nF	10%	50V	not USA
2134	5322 122 32654	22nF	10%	63V	USA only
2135	3198 017 31530	15nF	10%	50V	not USA
2135	3198 017 32230	22nF	10%	25V	USA only
2136	4822 126 14076	220nF	20%	25V	

2137	4822 126 14076	220nF	20%	25V	
2138	4822 124 22652	2,2μF	20%	50V	
2139	4822 126 14236	15pF	5%	50V	
2140	4822 126 13695	82pF	1%	63V	
2141	4822 126 13838	100nF	10%	50V	

2143	4822 126 14076	220nF	20%	25V	
2144	4822 124 21913	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 122 33127	2,2nF	10%	63V	
2149	5322 122 32659	33pF	5%	50V	RDS only
2150	4822 126 13838	100nF	10%	50V	
2159	5322 122 31151	22μF	20%	50V	

2163	4822 126 13838	100nF	10%	50V	LW only
2164	4822 126 13482	470nF	20%	16V	
2165	4822 126 13838	100nF	10%	50V	
2166	5322 122 31647	1nF	10%	63V	
2167	4822 122 33926	12pF	5%	50V	

2169	4822 122 33127	2,2nF	10%	63V	RDS only
2180	3198 017 31030	10nF	10%	50V	
2190	4822 126 13838	100nF	10%	50V	
2191	4822 124 40178	100μF	20%	10V	

RESISTORS

3105	4822 117 11503	220Ω	5%	0,1W	
3108	4822 117 11449	2,2kΩ	1%	0,1W	LW only
3109	4822 051 20472	4,7kΩ	5%	0,1W	LW only
3123	4822 051 20472	4,7kΩ	5%	0,1W	LW only
3125	4822 117 10833	10kΩ	1%	0,1W	LW only

RESISTORS

3128	4822 117 11449	2,2kΩ	1%	0,1W	LW only
3130	3198 021 38210	820Ω	5%	0,06W	
3131	3198 021 38210	820Ω	5%	0,06W	
3132	4822 051 20479	47Ω	5%	0,1W	
3134	4822 051 20223	22kΩ	5%	0,1W	

3135	3198 021 31020	1kΩ	5%	0,06W	
3137	4822 051 20223	22kΩ	5%	0,1W	LW only
3141	4822 117 11148	56kΩ	1%	0,1W	
3142	4822 100 12159	TRIMPOT. 100kΩ			
3143	4822 051 20223	22kΩ	5%	0,1W	RDS only

3144	4822 051 10102	1kΩ	2%	0,25W	RDS only
3145	4822 117 11449	2,2kΩ	1%	0,1W	
3146	4822 051 20229	22Ω	5%	0,1W	
3150	4822 117 10833	10kΩ	1%	0,1W	
3151	4822 051 20683	68kΩ	5%	0,1W	

3152	4822 051 20471	470Ω	5%	0,1W	
3153	4822 051 20471	470Ω	5%	0,1W	
3154	4822 117 13577	330Ω	1%	0,1W	
3155	4822 117 10353	150Ω	5%	0,1W	
3156	4822 117 10837	100kΩ	1%	0,1W	

3157	4822 117 10837	100kΩ	1%	0,1W	
3158	4822 051 20471	470Ω	5%	0,1W	
3159	4822 051 20471	470Ω	5%	0,1W	
3160	4822 051 20471	470Ω	5%	0,1W	
3161	4822 051 20223	22kΩ	5%	0,1W	

3167	4822 051 20121	120Ω	5%	0,1W	
3168	4822 051 20121	120Ω	5%	0,1W	
3169	4822 051 20154	150kΩ	5%	0,1W	
3170	4822 117 10837	100kΩ	1%	0,1W	
3171	4822 117 10834	47kΩ	1%	0,1W	

3172	4822 051 20562	5,6kΩ	5%	0,1W	
3176	4822 051 20333	33kΩ	5%	0,1W	RDS only
3180	4822 117 10833	10kΩ	1%	0,1W	LW only
3190	4822 051 20121	120Ω	5%	0,1W	
3191	4822 051 20121	120Ω	5%	0,1W	

3192	4822 117 13577	330Ω	1%	0,1W	
3193	4822 117 13577	330Ω	1%	0,1W	
3194	4822 117 11449	2,2kΩ	1%	0,1W	
3195	4822 051 20101	100Ω	5%	0,1W	
4101	4822 051 20008	CHIP JUMPER 0805			FM/AM only

4102	4822 051 20008	CHIP JUMPER 0805			FM/AM only
4104	4822 051 20008	CHIP JUMPER 0805			FM/AM only
4105	4822 051 20008	CHIP JUMPER 0805			
4106	4822 051 20008	CHIP JUMPER 0805			
4107	4822 051 20008	CHIP JUMPER 0805			

COILS

5102	4822 157 71634	RF-COIL MW			
5103	2422 549 44107	RF-COIL LW			LW only
5109	4822 157 71639	FM-IF FILTER 10,7MHz			
5110	4822 242 70665	FM-IF FILTER 10,7MHz			
5111	2422 549 44023	AM-IF FILTER 450kHz			

5112	4822 157 70302	AM-IF FILTER 450kHz			
5114	4822 157 70302	AM-IF FILTER 450kHz			
5115	4822 157 71636	ANTI BIRDY FILTER			
5118	2422 535 95881	100nH			
5119	4822 157 11443	DISCRIMINATOR COIL			

5121	4822 242 10261	QUARTZ 75kHz			
5122	2422 549 44108	RF-COIL, LW-OSCILLATOR			LW only
5123	2422 549 44108	RF-COIL, MW-OSCILLATOR			

DIODES

6105	4822 130 83075	HN1V02H			
6106	4822 130 83757	BAS216			
6107	9340 386 90115	BZX284-C11			
6120	4822 130 83757	BAS216			

TRANSISTORS

7103	5322 130 42756	BC857C			RDS only
7104	9322 003 64676	TBC337-40			LW only
7105	9322 003 64676	TBC337-40			LW only
7109	4822 130 60373	BC856B			LW only
7110	4822 130 60373	BC856B			

7111	5322 130 42755	BC847C			
7112	4822 130 44503	BC547C			
7122	5322 130 42755	BC847C			LW only
7124	5322 130 42755	BC847C			LW only

INTEGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1, RADIO IC			
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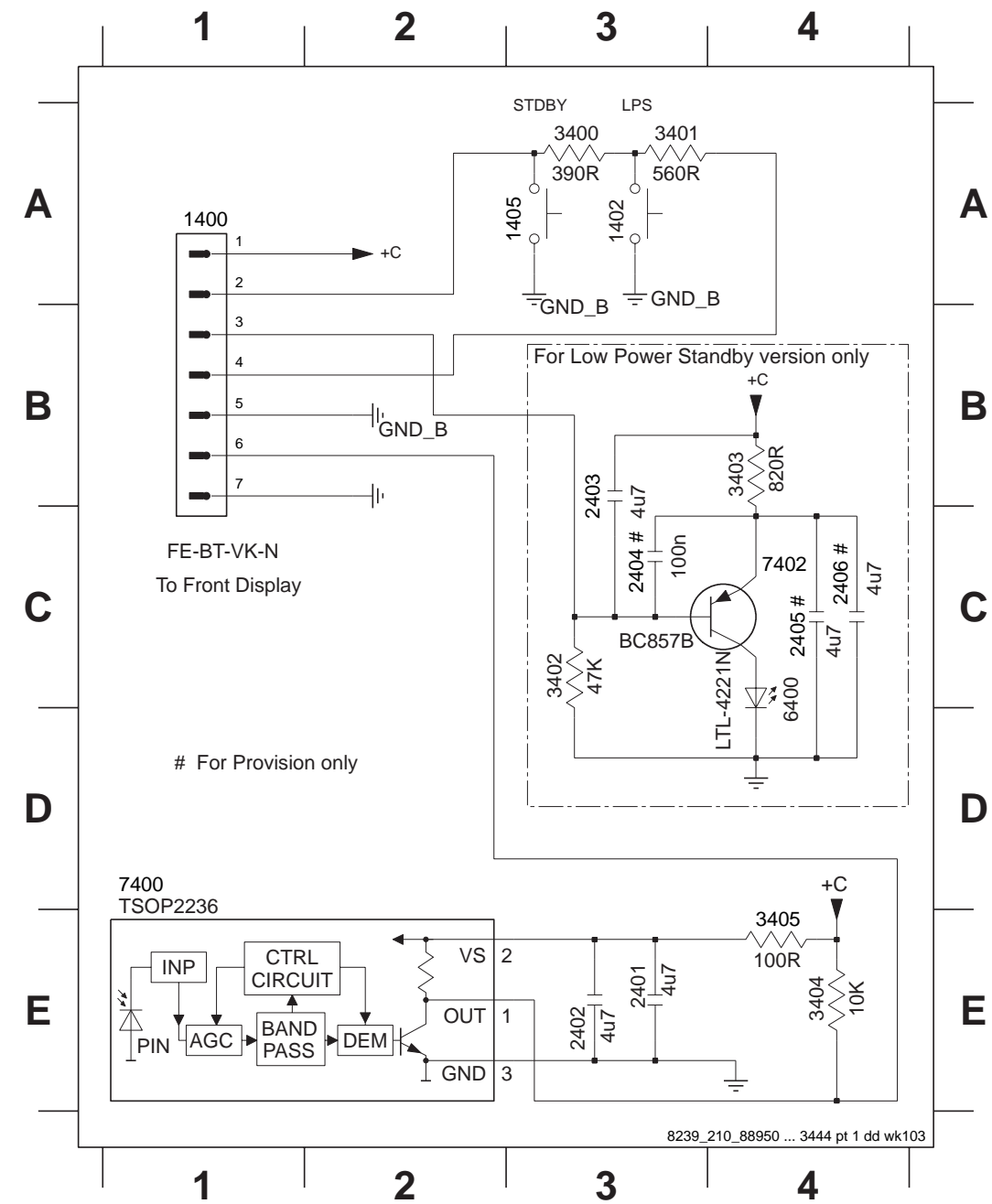
STANDBY (POWER) PART - CIRCUIT & LAYOUTS

1400 A1	2401 E3	2404 C3	3400 A3	3403 B4	6400 C4
1402 A3	2402 E3	2405 C4	3401 A3	3404 E4	7400 D1
1405 A2	2403 B3	2406 C4	3402 C3	3405 E4	7402 C4

FRONT CONTROL BOARD

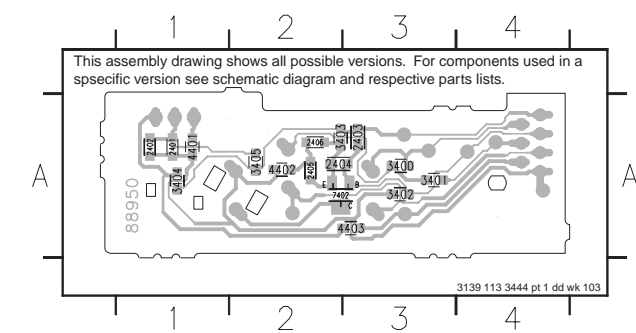
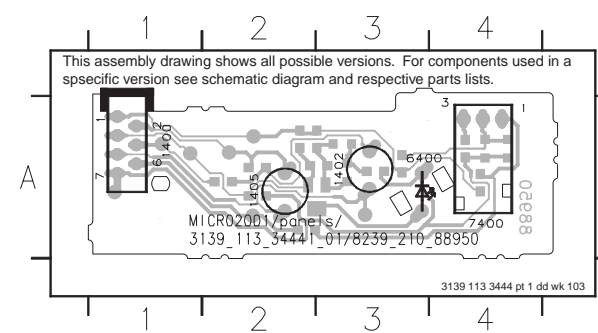
TABLE OF CONTENTS

Standby (Power) part 8-1
 Key Control (KEYB. 1) & Lightwash parts 8-2
 Headphone, Jog (Volume) and CDC Key parts 8-3
 Electrical parts list 8-4



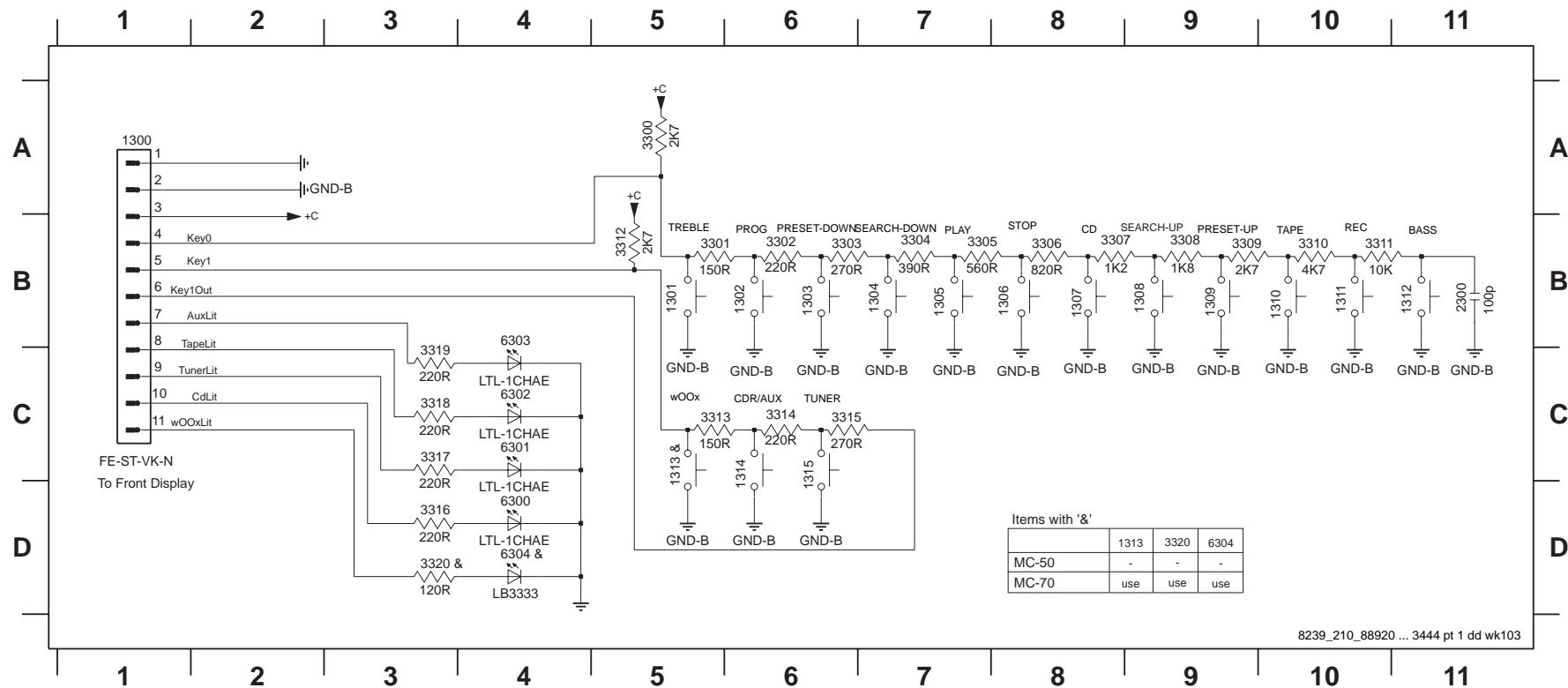
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2401 A1	2405 A2	3402 A3	4401 A1
2402 A1	2406 A2	3403 A2	4402 A2
2403 A3	3400 A3	3404 A1	4403 A3
2404 A2	3401 A3	3405 A2	7402 A2

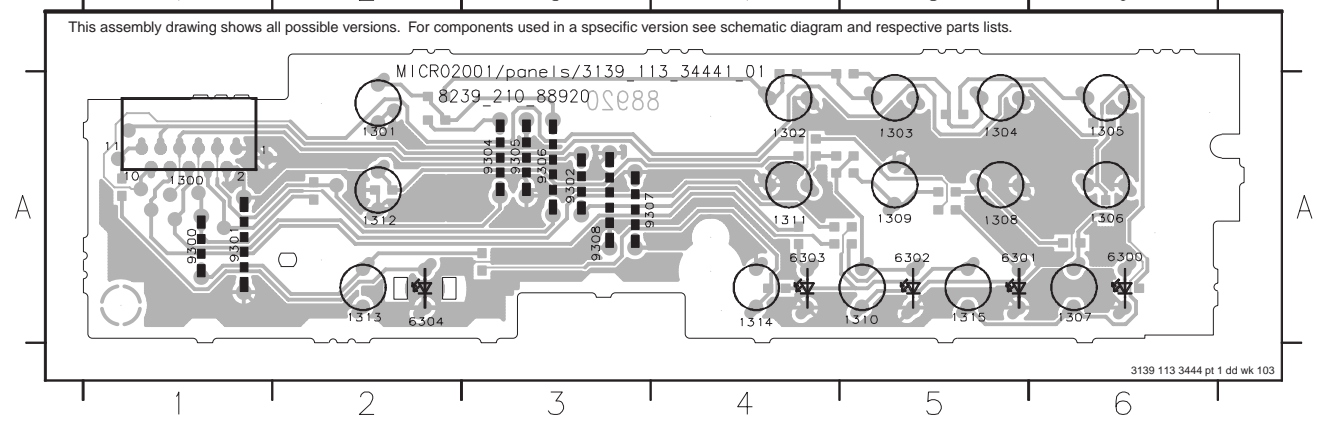


KEY CONTROL (KEYB. 1) PART - CIRCUIT & LAYOUT DIAGRAMS

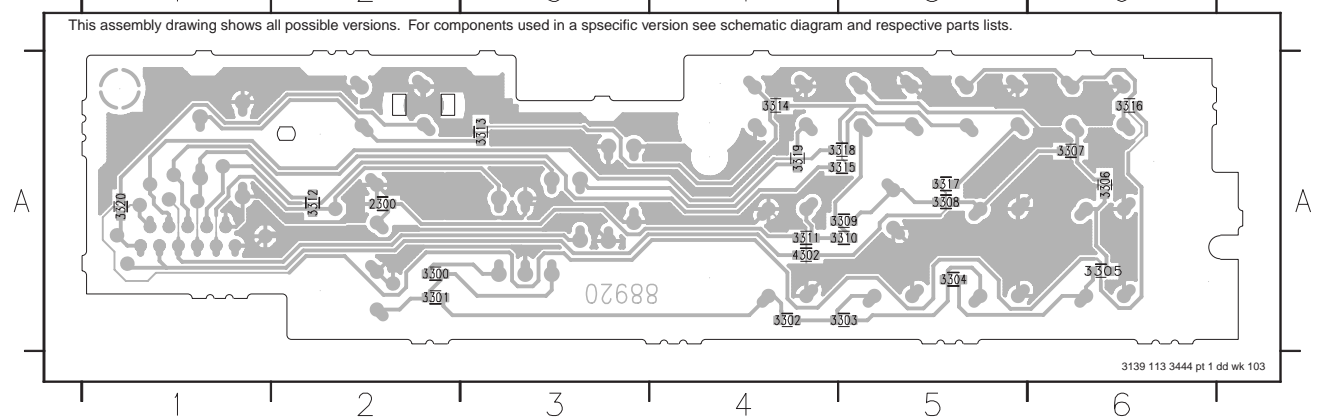
- 1300 A1 1303 B6 1306 B8 1309 B9 1312 B11 1315 D6 3301 B5 3304 B7 3307 B8 3310 B10 3313 C5 3316 D3 3319 C3 6301 C4 6304 D4
- 1301 B5 1304 B7 1307 B8 1310 B10 1313 C5 2300 B11 3302 B6 3305 B7 3308 B9 3311 B10 3314 C6 3317 C3 3320 D3 6302 C4
- 1302 B6 1305 B7 1308 B9 1311 B10 1314 D6 3300 A5 3303 B6 3306 B8 3309 B9 3312 B5 3315 C6 3318 C3 6300 D4 6303 B4



- 1300 A1 1302 A4 1304 A5 1306 A6 1308 A5 1310 A5 1312 A2 1314 A4 6300 A6 6302 A5 6304 A2 9301 A1 9304 A3 9306 A3 9308 A3
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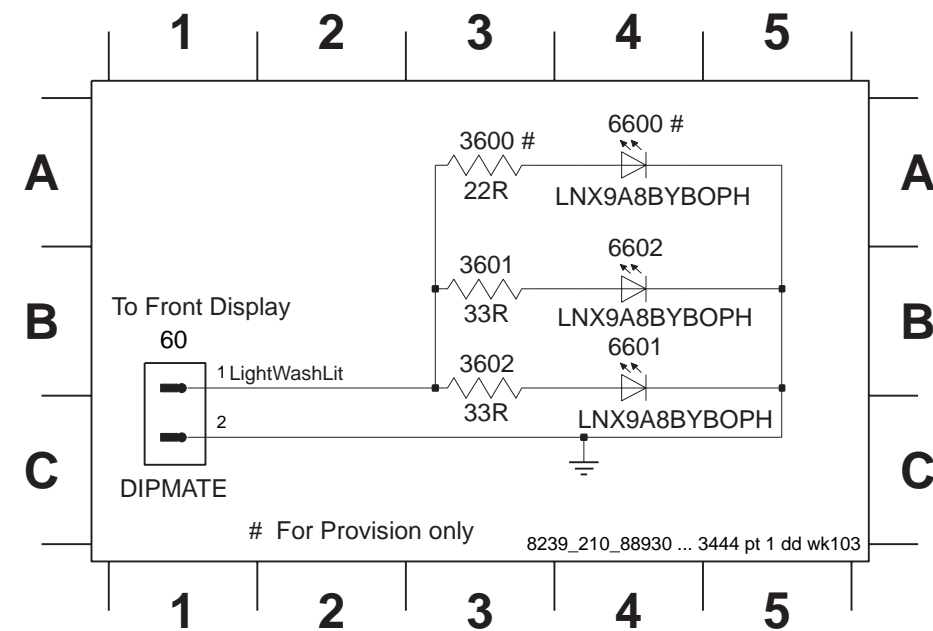


- 2300 A2 3301 A2 3303 A5 3305 A6 3307 A6 3309 A5 3311 A4 3313 A3 3315 A5 3317 A5 3319 A4 4302 A4
- 3300 A2 3302 A4 3304 A5 3306 A6 3308 A5 3310 A5 3312 A2 3314 A4 3316 A6 3318 A5 3320 A1

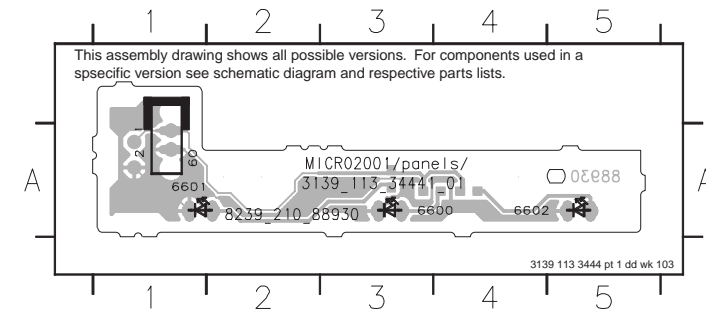


LIGHTWASH PART - CIRCUIT & LAYOUT DIAGRAMS

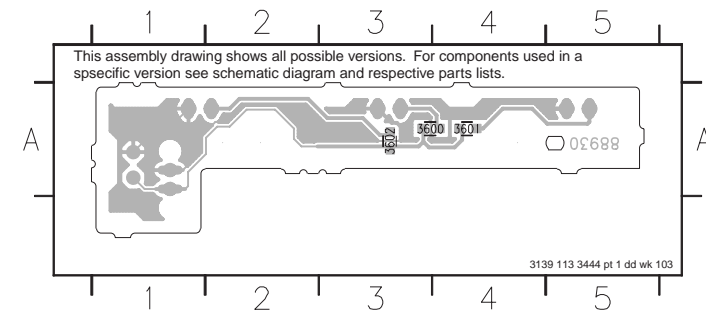
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- 3600 A3 3602 B3 6601 B4



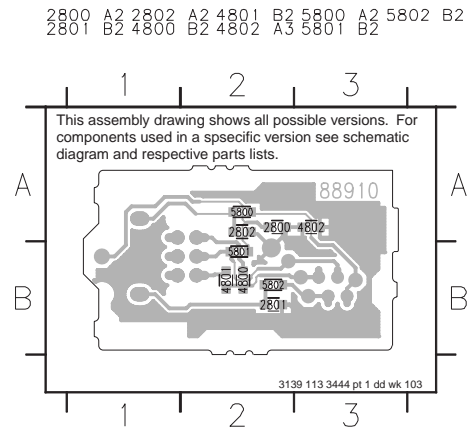
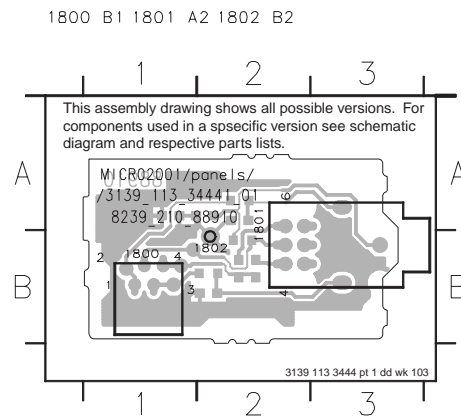
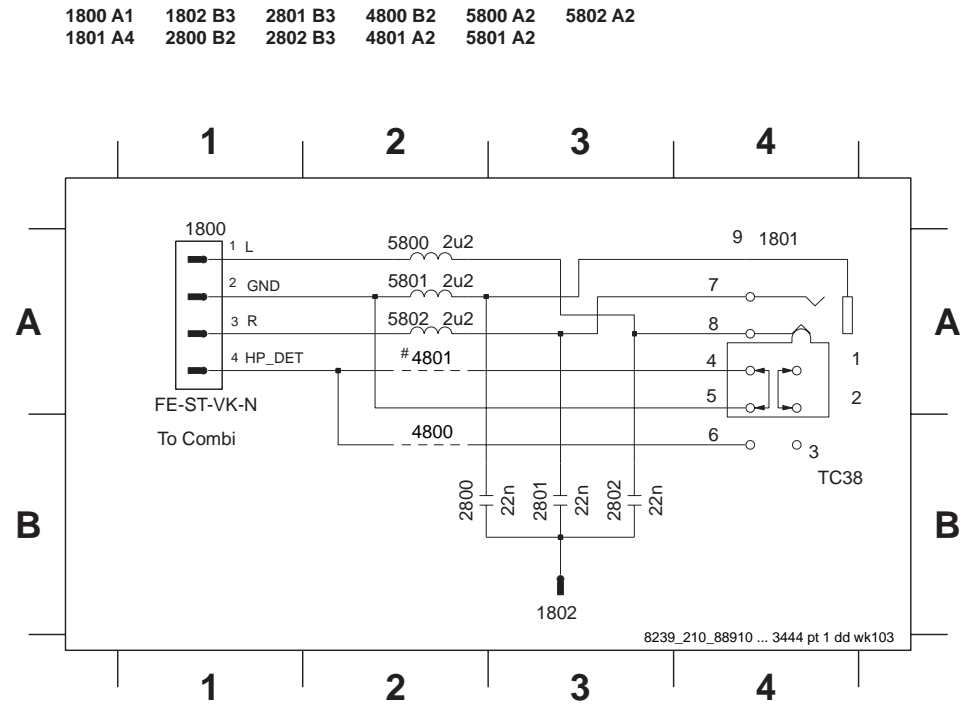
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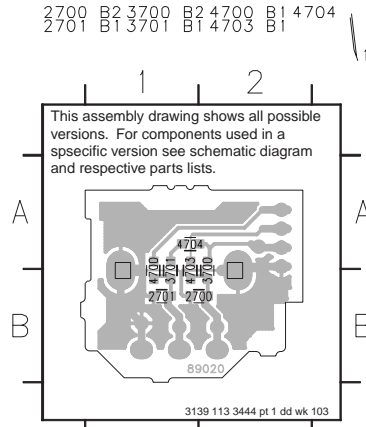
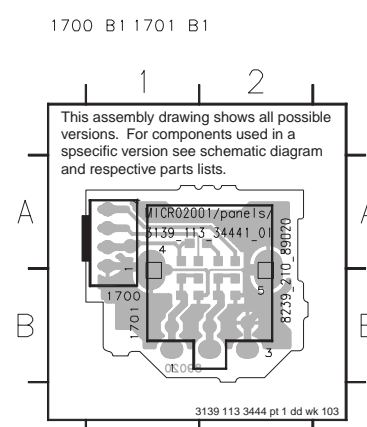
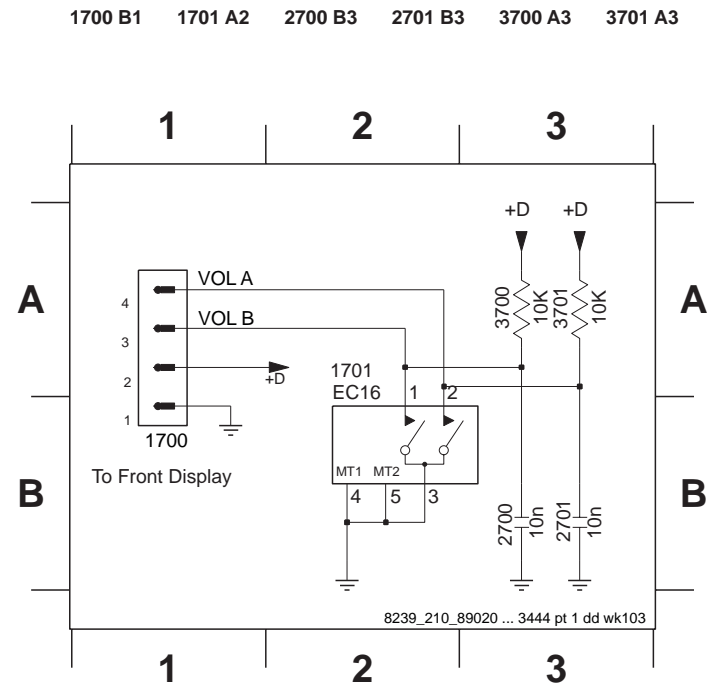
- 3600 A3 3601 A4 3602 A3



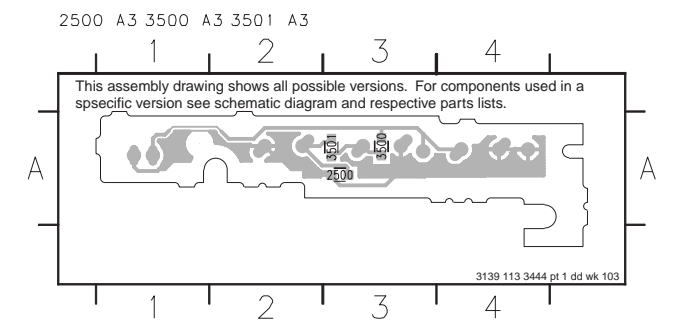
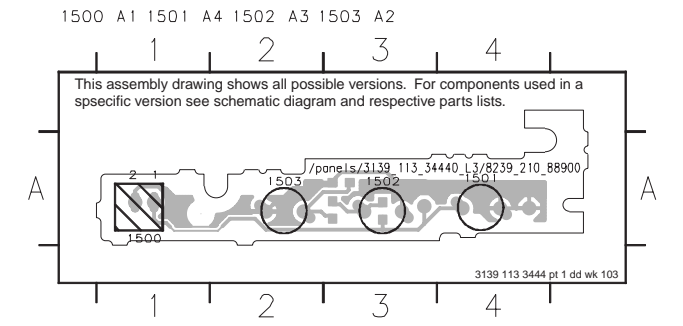
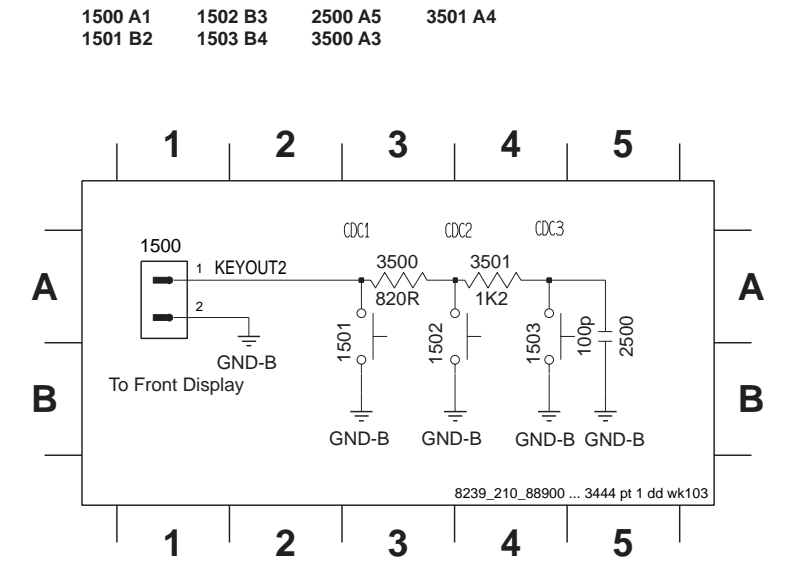
HEADPHONE PART - CIRCUIT & LAYOUT DIAGRAMS



JOG (VOLUME) PART - CIRCUIT & LAYOUT DIAGRAMS



CDC KEY PART - CIRCUIT & LAYOUT DIAGRAMS



ELECTRICAL PARTS LIST - FRONT CONTROL BOARD**MISCELLANEOUS**

1300	2422 025 14541	Flex Socket 11pin Hort.
1301	4822 276 13775	Tact Switch
1302	4822 276 13775	Tact Switch
1303	4822 276 13775	Tact Switch
1304	4822 276 13775	Tact Switch
1305	4822 276 13775	Tact Switch
1306	4822 276 13775	Tact Switch
1307	4822 276 13775	Tact Switch
1308	4822 276 13775	Tact Switch
1309	4822 276 13775	Tact Switch
1310	4822 276 13775	Tact Switch
1311	4822 276 13775	Tact Switch
1312	4822 276 13775	Tact Switch
1313	4822 276 13775	Tact Switch
1314	4822 276 13775	Tact Switch
1315	4822 276 13775	Tact Switch
1400	4822 267 10953	Flex Socket 7pin Vert.
1402	4822 276 13775	Tact Switch
1405	4822 276 13775	Tact Switch
1501	4822 276 13775	Tact Switch
1502	4822 276 13775	Tact Switch
1503	4822 276 13775	Tact Switch
1701	2422 129 16501	Rotary Encoder 12P
1800	4822 265 11183	Flex Socket 4pin Hort.
1801	4822 265 11529	Headphone Socket

CAPACITORS

2300	4822 122 31765	100pF 2% 63V
2401	2020 552 96305	4,7μF +80/-20% 10V
2402	2020 552 96305	4,7μF +80/-20% 10V
2403	2020 552 96305	4,7μF +80/-20% 10V
2500	4822 122 31765	100pF 2% 63V
2700	5322 126 11583	10nF 10% 50V
2701	5322 126 11583	10nF 10% 50V
2800	4822 126 14494	22nF 10% 25V
2801	4822 126 14494	22nF 10% 25V
2802	4822 126 14494	22nF 10% 25V

RESISTORS

3300	4822 051 30272	2k7 5% 0,062W
3301	4822 051 30151	150R 5% 0,062W
3302	4822 051 30221	220R 5% 0,062W
3303	4822 051 30271	270R 5% 0,062W
3304	4822 051 30391	390R 5% 0,062W
3305	4822 051 30561	560R 5% 0,062W
3306	4822 117 12968	820R 5% 0,62W
3307	4822 117 11817	1k2 1% 1/16W
3308	4822 117 12903	1k8 1% 0.063W
3309	4822 051 30272	2k7 5% 0,062W
3310	4822 051 30472	4k7 5% 0,062W
3311	4822 051 30103	10k 5% 0,062W
3312	4822 051 30272	2k7 5% 0,062W

3313	4822 051 30151	150R 5% 0,062W
3314	4822 051 30221	220R 5% 0,062W
3315	4822 051 30271	270R 5% 0,062W
3316	4822 051 30221	220R 5% 0,062W
3317	4822 051 30221	220R 5% 0,062W
3318	4822 051 30221	220R 5% 0,062W
3319	4822 051 30221	220R 5% 0,062W
3320	4822 051 30121	120R 5% 0,062W
3400	4822 051 30391	390R 5% 0,062W
3401	4822 051 30561	560R 5% 0,062W
3402	4822 117 12925	47k 1% 0.063W
3403	4822 117 12968	820R 5% 0,62W
3404	4822 051 30103	10k 5% 0,062W
3405	4822 051 30101	100R 5% 0,062W
3500	4822 117 12968	820R 5% 0,62W
3501	4822 117 11817	1k2 1% 1/16W
3601	4822 051 30339	33R 5% 0,062W
3602	4822 051 30339	33R 5% 0,062W
3700	4822 051 30103	10k 5% 0,062W
3701	4822 051 30103	10k 5% 0,062W
4302	4822 051 30008	0R Jumper 0603
4401	4822 051 30008	0R Jumper 0603
4402	4822 051 30008	0R Jumper 0603
4403	4822 051 30008	0R Jumper 0603
4700	4822 051 30008	0R Jumper 0603
4703	4822 051 30008	0R Jumper 0603
4704	4822 051 30008	0R Jumper 0603
4800	4822 051 30008	0R Jumper 0603
4802	4822 051 30008	0R Jumper 0603

COILS & FILTERS

5800	4822 157 10586	2,2μH 10% 0805
5801	4822 157 10586	2,2μH 10% 0805
5802	4822 157 10586	2,2μH 10% 0805

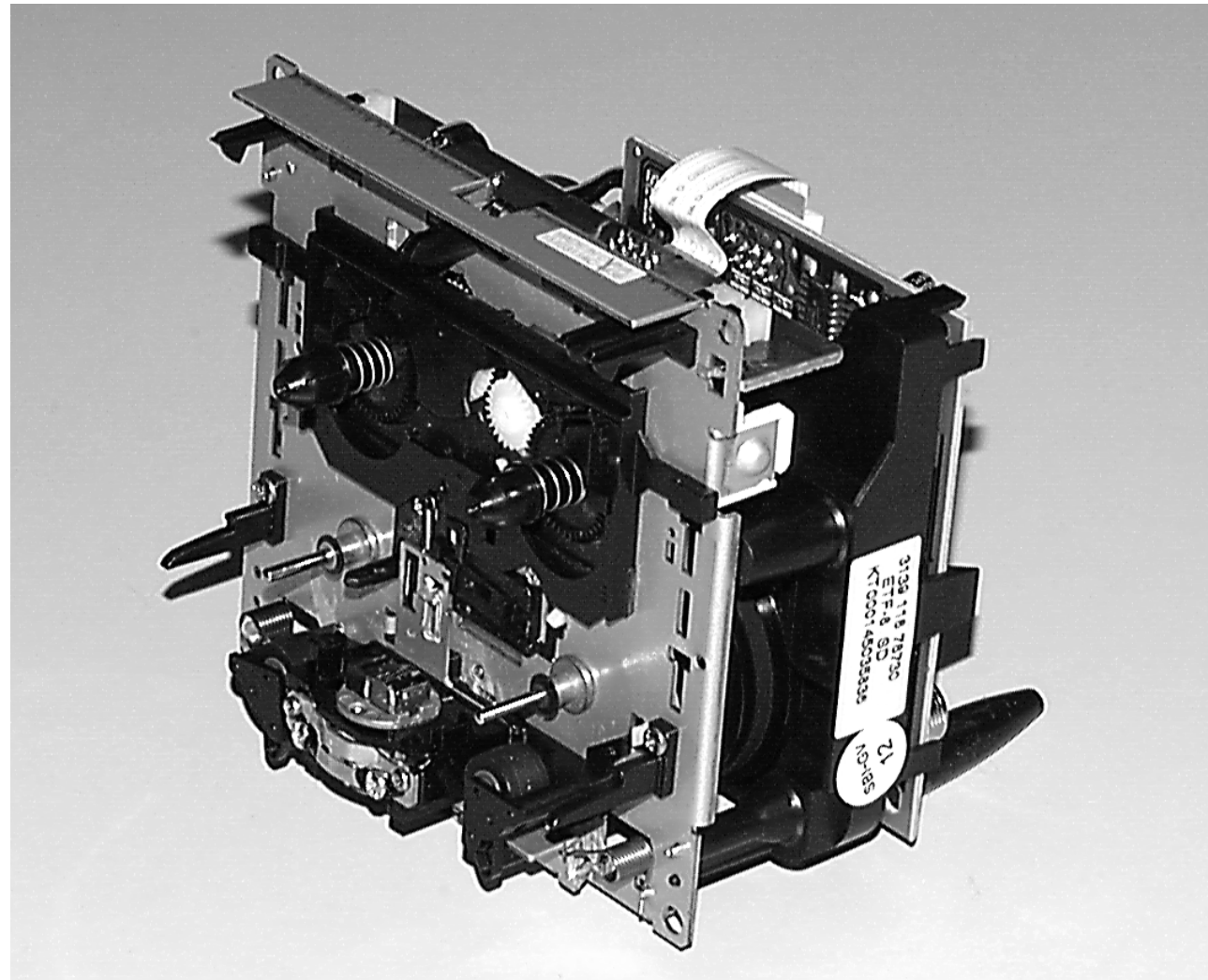
DIODES

6300	4822 130 11589	LTL-1CHAE
6301	4822 130 11589	LTL-1CHAE
6302	4822 130 11589	LTL-1CHAE
6303	4822 130 11589	LTL-1CHAE
6304	9322 153 37676	LB3333RT-E7898
6400	9322 160 65676	LTL-4221NLC-VA
6601	9322 147 33676	LNx9A8BYB0PH
6602	9322 147 33676	LNx9A8BYB0PH

TRANSISTORS & INTEGRATED CIRCUITS

7400	9322 164 67667	IR Receiver TSOP2236QJ1
7402	4822 130 60373	BC857B

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



ETF-8 Module

(Electronic Tape Function)

stage .2

TABLE OF CONTENTS

Connector assignment	9-1
Tape Module Wiring	9-2
Tape Mechanism electronics	9-2
Tape adjustment / Check Table	9-3
HEF4094BT Functional Block & Application Logic Table	9-3
ETF8 Board layouts - Components & Chips	9-4
ETF8 Circuit diagram	9-5
Exploded Views & mechanical parts list	9-6
Electrical parts list	9-8

CONNECTORS ASSIGNMENTS:

CONNECTOR 1701

○	1	REC-L
○	2	REC-R
○	3	GND A
○	4	TAPE-L
○	5	+12V
○	6	TAPE-R
○	7	-CMOS

INTERCONNECTION TO AF BOARD

Record input left
Record input right
AF Ground
Playback output left
D.C. supply (+12V) for AF electronics
Playback output right
Negative d.c. supply (-9V) for controlling JFET J111

CONNECTOR 1703

○	1	GND M
○	2	+MOTOR

INTERCONNECTION TO AF BOARD

Motor Ground
D.C. supply (+12V) for tape deck motor & solenoid

CONNECTOR 1706

○	1	CR_IN
○	2	AD1
○	3	+5V
○	4	GND_P
○	5	CLK
○	6	DATA
○	7	STROBE

INTERCONNECTION TO FRONT BOARD

Deck sensing Chrome Tape
Deck sensing switches output voltage / Deck EOT
DC supply (+5V) for deck status ADC network (ref to microprocessor's supply)
Control & Oscillator Ground
HEF4094BT shift register Clock line
HEF4094BT shift register Data line
HEF4094BT shift register Strobe line

CONNECTOR 1710

○	1	GND A
○	2	ERASE HEAD
○	3	R/P HD Rch
○	4	Common
○	5	R/P HD Lch

TAPE HEAD CONNECTIONS

Erase Head ground
Erase Head
R/P Head right channel positive
Pb Head return ground shield
R/P Head left channel positive

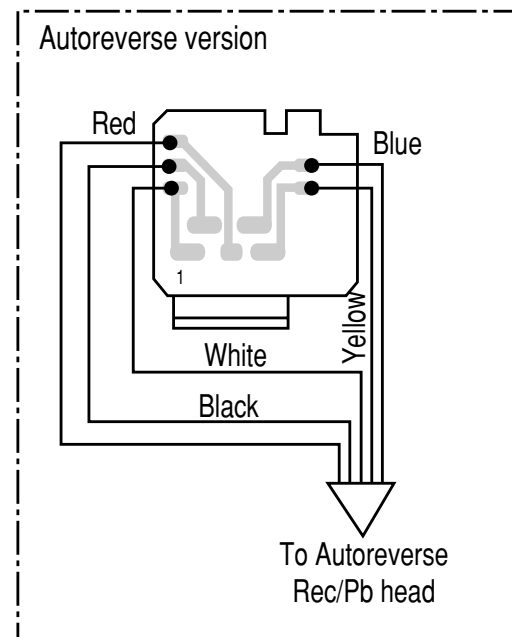
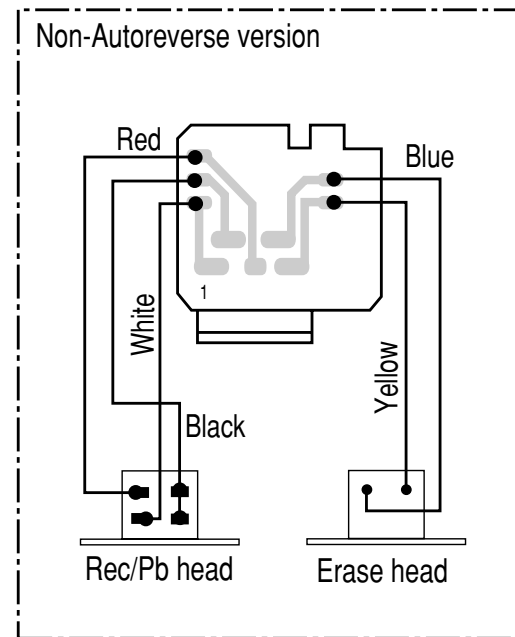
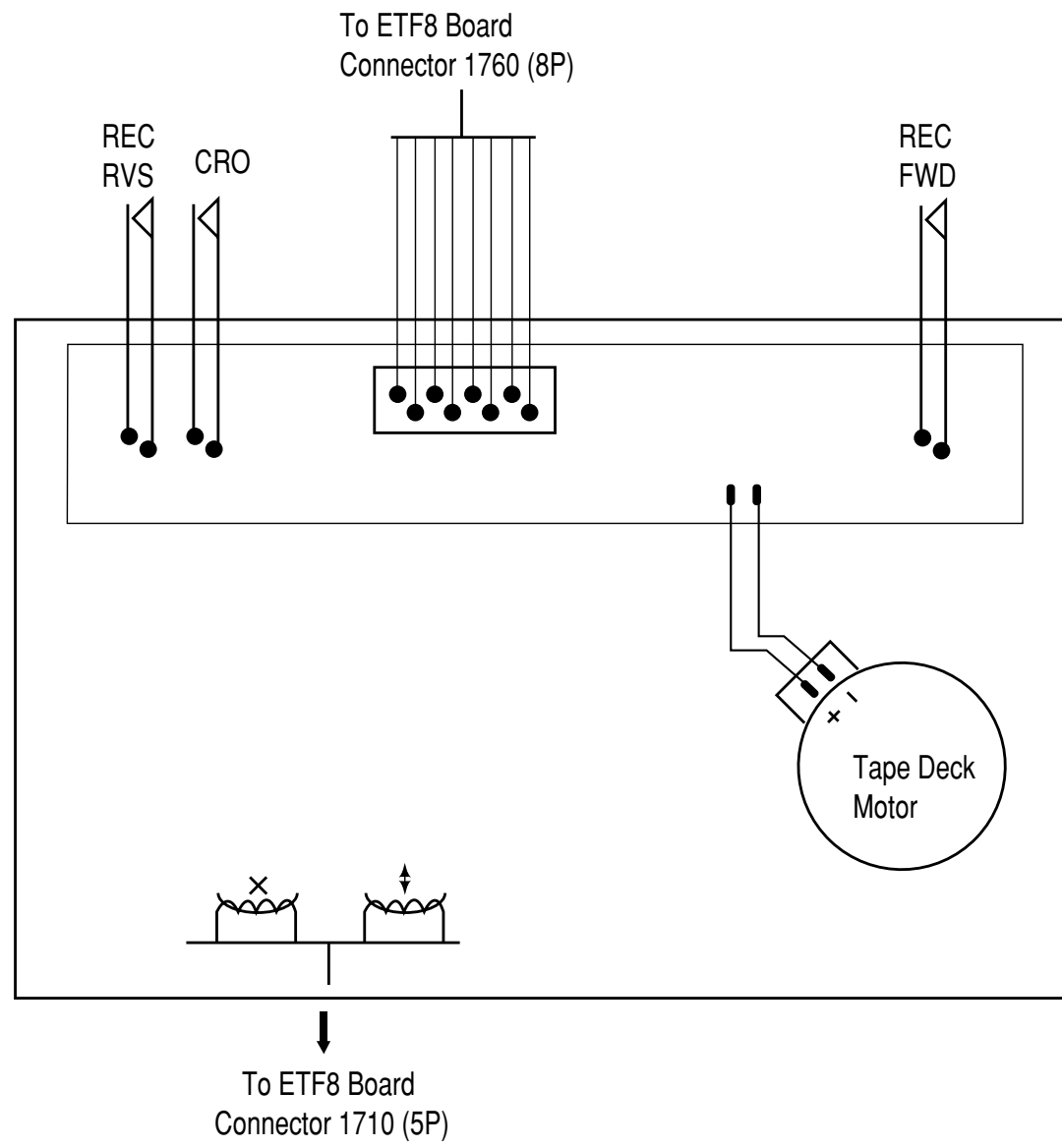
CONNECTOR 1760

○	1	Vcc 12V
○	2	PHOTO
○	3	GND_M
○	4	MODE
○	5	SoI_supply
○	6	CR_IN
○	7	REC FWD
○	8	REC REW

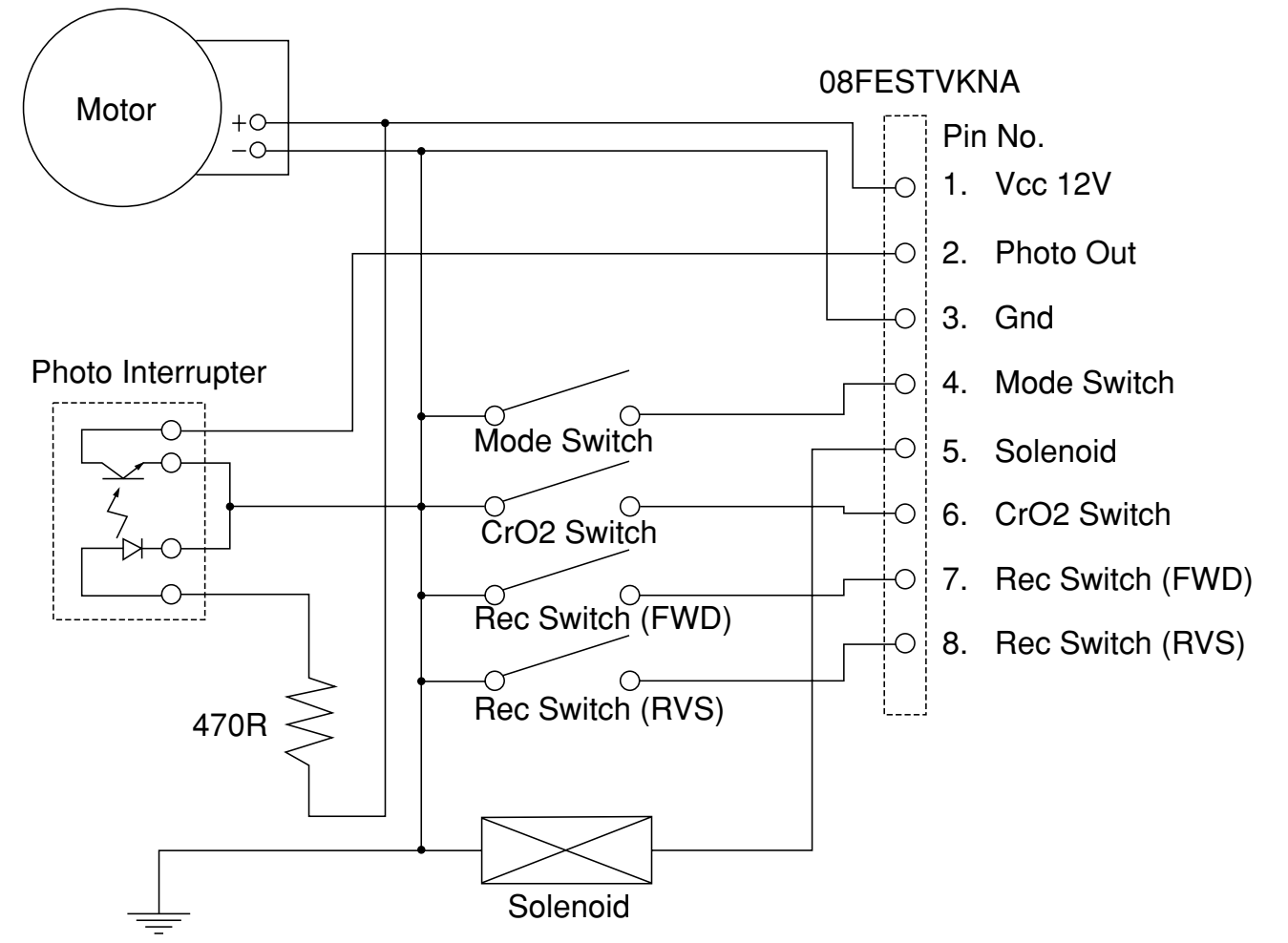
DECK CONTROL INTERFACE

Deck / Motor supply
Photo sensor output (tape movement indication)
Deck / Motor ground
Mode switch (head engagement)
Solenoid supply
Chrome tape detection switch
Record tab protection status switch (forward)
Record tab protection status switch (reverse)

TAPE DECK WIRING



TAPE MECHANISM ELECTRONICS



TAPE ADJUSTMENT & CHECK TABLE

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST	
					with	to
MOTOR SPEED	SBC420 3150Hz	PLAY		frequency counter	check	3150Hz +/- 2%
WOW & FLUTTER	SBC420 3150Hz	PLAY		W&F-meter	check	< 0.4 % DIN
ADJUST AZIMUTH	SBC420 10kHz	PLAY FWD	1 or 2 LEFT RIGHT	mV-meter	left hand screw	max. output level & left=right
		PLAY REV ^			right hand screw	
PLAYBACK FREQ. RESPONSE	SBC420	PLAY		mV-meter	check	limits see fig. 1 *
CHECK RECORD/PLAYBACK FREQUENCY AND DISTORTION						
Inject 8.85mV signals 100Hz, 250Hz, 1kHz, 10kHz, 12.5kHz via 3 or 4	SBC419A or SBC420	RECORD				
	RECORDED CASSETTE	PLAY	1 or 2 LEFT RIGHT	mV-meter	check	limits see fig. 2 *
Inject 1kHz 28mV via 3 or 4	SBC419A or SBC420	RECORD				
	RECORDED CASSETTE	PLAY	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-measure

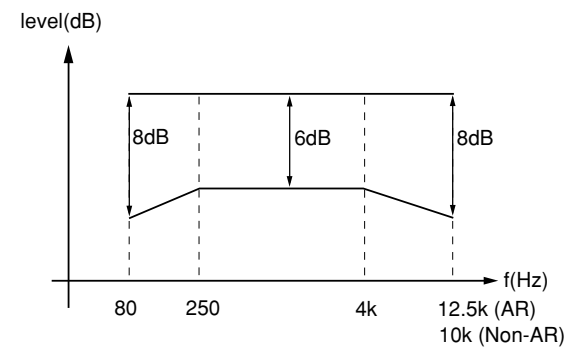


figure. 1

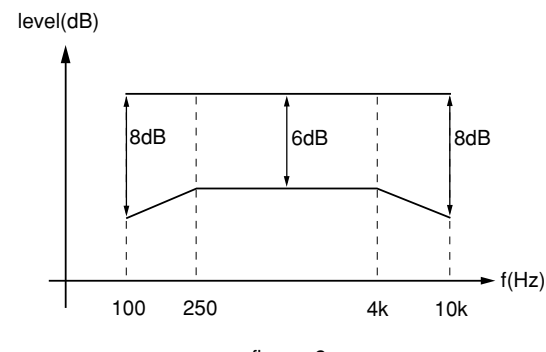
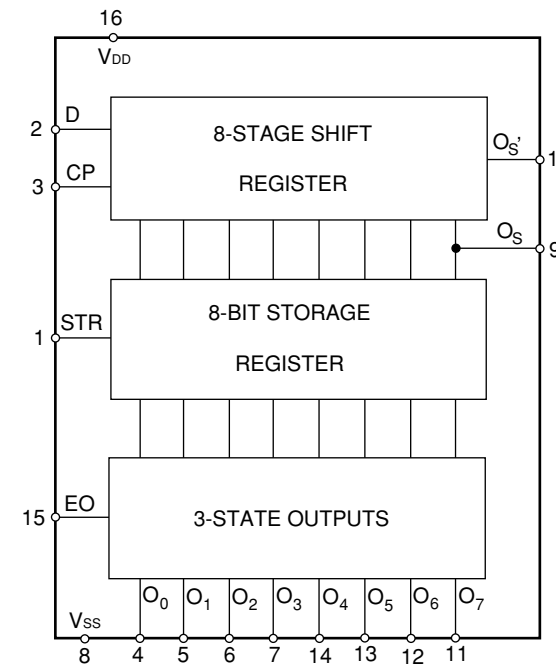


figure. 2

HEF4094BT FUNCTIONAL BLOCK DIAGRAM



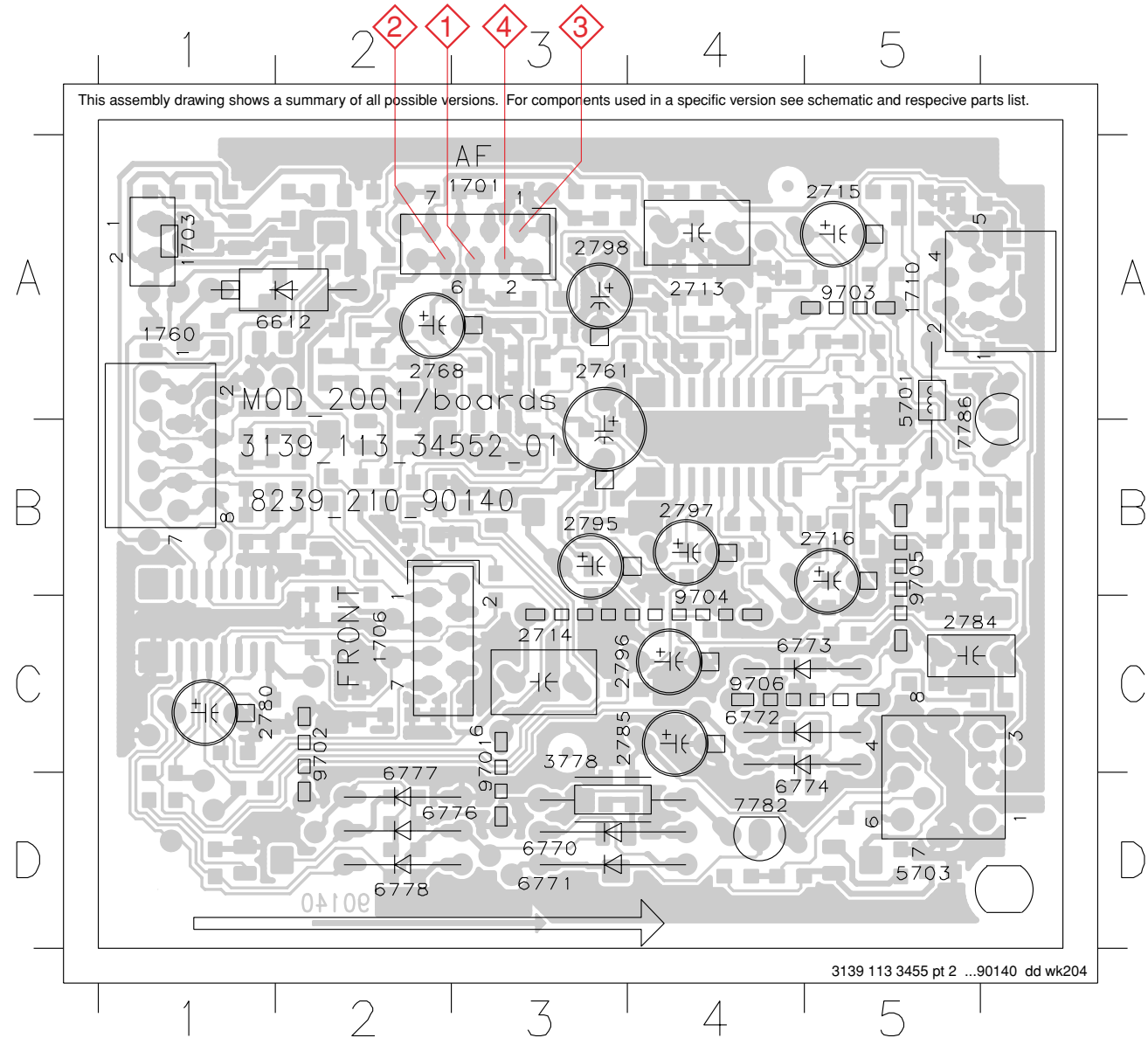
AF Control Logic State Table

State of Module	Control lines from HEF4094BT							
	O ₀	O ₁	O ₂	O ₃	O ₄	O ₅	O ₆	O ₇
	CR_SEL	REC	BIAS_OFF	CR_BIAS		SOL	MUTE_OFF	MOT
Stop	0	0	1	X	Not in used	Deck Mechanism Timing	0	0
Playback (Ferro)	0	0	1	0			1	1
Playback (Chrome)	1	0	1	1			1	1
Record (Ferro)	0	1	0	0			0	1
Record (Chrome)	1	1	0	1			0	1
FWD	0	0	1	X			0	1
REW	0	0	1	X			0	1

Note: 0 = Logic Low
1 = Logic High
X = Not applicable

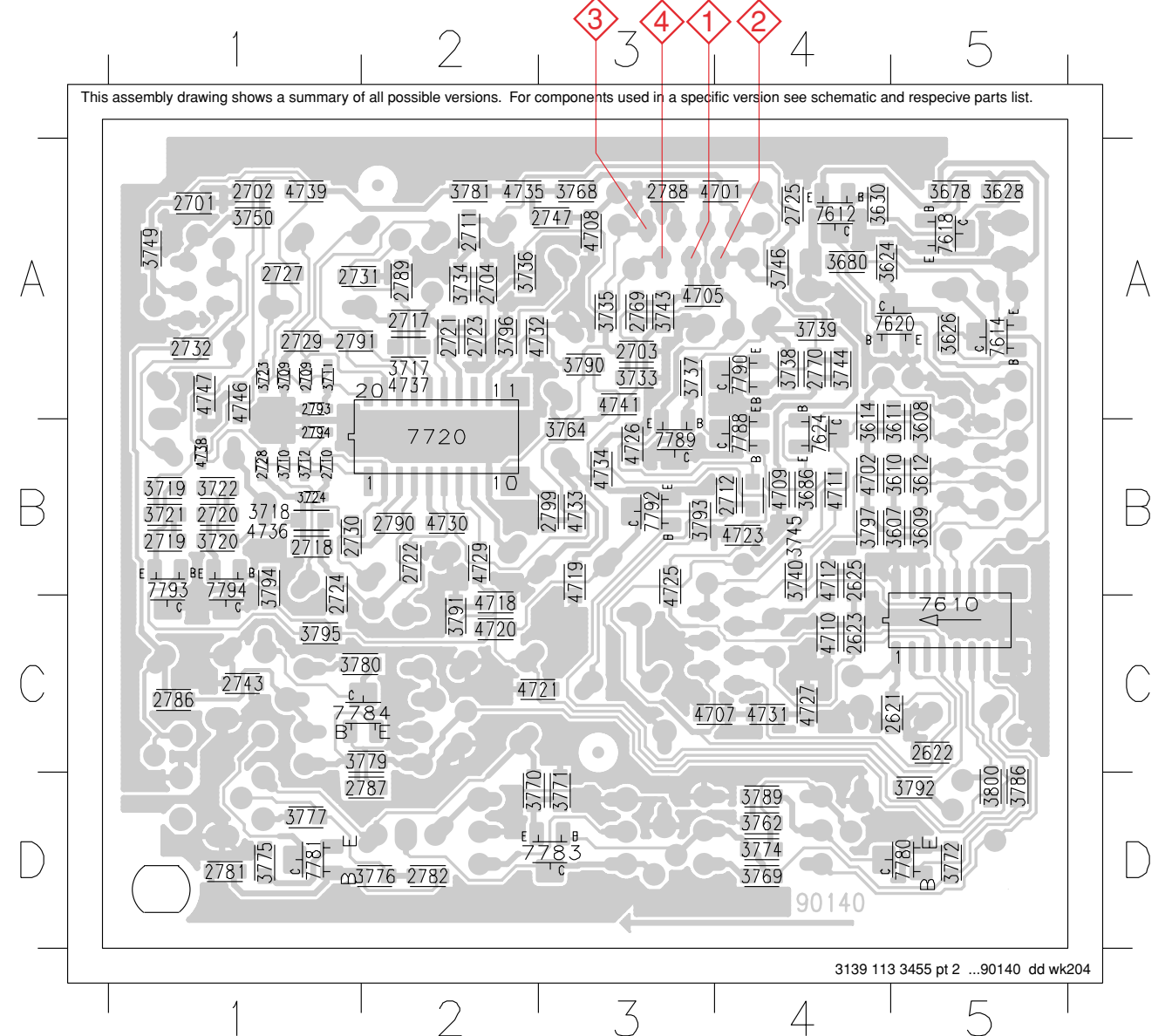
COMPONENT LAYOUT

1701 A3	2715 A5	2795 B3	6612 A2	6777 D2	9704 C4
1703 A1	2716 B5	2796 C3	6770 D3	6778 D2	9705 B5
1706 C2	2761 A3	2797 B4	6771 D3	7782 D4	9706 C4
1710 A5	2768 A2	2798 A3	6772 C4	7786 B5	
1760 A1	2780 C1	3778 C3	6773 C4	9701 C3	
2713 A4	2784 C5	5701 A5	6774 D4	9702 C2	
2714 C3	2785 C3	5703 D5	6776 D2	9703 A5	



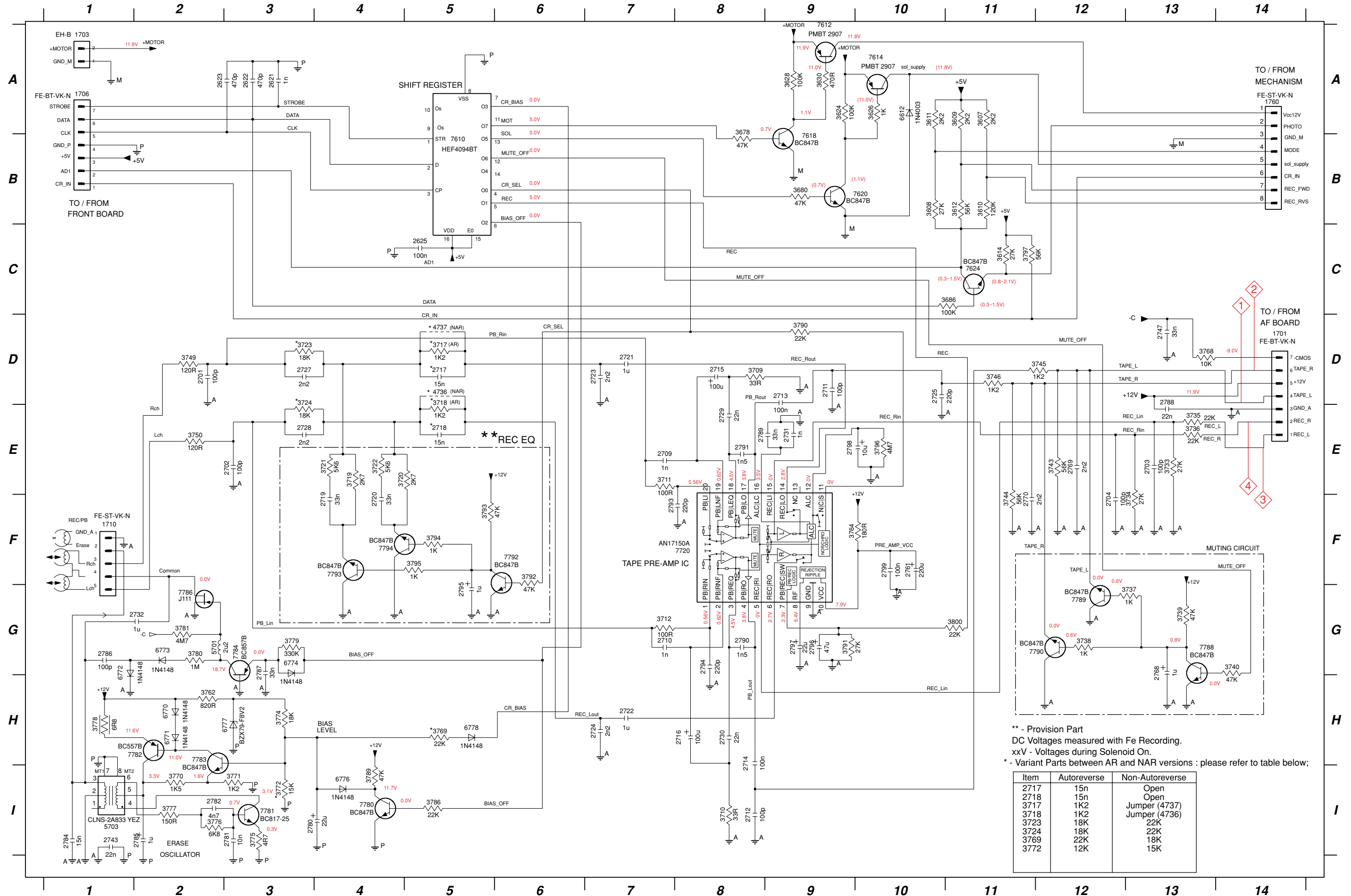
CHIP LAYOUT

2621 C5	2732 A1	3630 A4	3745 B4	3796 A2	4735 A2
2622 C5	2743 C1	3678 A5	3746 A4	3797 B4	4736 B1
2623 C4	2747 A3	3680 A4	3749 A1	3800 D5	4737 A2
2625 B4	2769 A3	3686 B4	3750 A1	4701 A4	4738 B1
2701 A1	2770 A4	3709 A1	3762 D4	4702 B4	4739 A1
2702 A1	2781 D1	3710 B1	3764 B3	4705 A3	4741 A3
2703 A3	2782 D2	3711 A1	3768 A3	4707 C3	4746 A1
2704 A2	2786 C1	3712 B1	3769 D4	4708 A3	4747 A1
2709 A1	2787 D2	3717 A2	3770 D2	4709 B4	7610 C5
2710 B1	2788 A3	3718 B1	3771 D3	4710 C4	7612 A4
2711 A2	2789 A2	3719 B1	3772 D5	4711 B4	7614 A5
2712 B4	2790 B2	3720 B1	3774 D4	4712 B4	7618 A5
2717 A2	2791 A1	3721 B1	3775 D1	4718 C2	7620 A5
2718 B1	2793 A1	3722 B1	3776 D2	4719 B3	7624 B4
2719 B1	2794 B1	3723 A1	3777 D1	4720 C2	7720 B2
2720 B1	2799 B3	3724 B1	3779 C2	4721 C2	7780 D5
2721 A2	3607 B5	3733 A3	3780 C1	4723 B4	7781 D1
2722 B2	3608 B5	3734 A2	3781 A2	4725 B3	7783 D3
2723 A2	3609 B5	3735 A3	3786 D5	4726 B3	7784 C1
2724 B1	3610 B5	3736 A2	3789 D4	4727 C4	7788 B4
2725 A4	3611 B5	3737 A3	3790 A3	4729 B2	7789 B3
2727 A1	3612 B5	3738 A4	3791 C2	4730 B2	7790 A4
2728 B1	3614 B4	3739 A4	3792 D5	4731 C4	7792 B3
2729 A1	3624 A4	3740 B4	3793 B3	4732 A2	7793 B1
2730 B1	3626 A5	3743 A3	3794 B1	4733 B3	7794 B1
2731 A1	3628 A5	3744 A4	3795 C1	4734 B3	



CIRCUIT DIAGRAM

1701 D14	2621 A3	2702 E3	2711 D9	2716 H8	2721 D7	2727 D3	2732 G2	2769 E12	2784 I1	2789 E8	2795 G5	3607 A11	3612 B11	3630 A9	3710 I8	3719 E4	3724 E3	3737 G13	3744 F11	3762 H2	3771 I3	3777 I2	3786 I5	3793 F5	3800 G11	6612 A10	6774 G3	7612 A9	7720 F8	7784 G3	7792 F6
1703 A1	2622 A3	2703 E13	2712 I8	2717 D5	2722 H7	2728 E3	2743 I1	2770 F11	2785 I2	2790 G8	2796 G9	3608 B10	3614 C11	3678 B8	3711 E7	3720 E4	3733 E3	3738 G12	3764 F9	3772 I3	3778 H1	3789 I4	3794 F5	4736 D5	6612 A10	6770 H4	7614 A10	7780 I4	7786 G2	7793 F4	
1706 A1	2623 A2	2704 F12	2713 D9	2718 E5	2723 D7	2729 E8	2747 D13	2780 I3	2786 G1	2791 E8	2797 G9	3609 A11	3624 A9	3680 B9	3712 G7	3721 E4	3734 F13	3739 G13	3746 D11	3768 D13	3774 H3	3779 G3	3790 D9	3795 F5	4737 D5	6771 H2	6777 H3	7618 B9	7781 I3	7788 G13	7794 F4
1710 F1	2625 C5	2709 E7	2714 H8	2719 F4	2724 H7	2730 H8	2761 F10	2781 I3	2787 G3	2793 F7	2798 E9	3610 B11	3626 A10	3686 C11	3717 D5	3722 E4	3735 E13	3740 G14	3749 D2	3769 H5	3775 I3	3780 G2	3791 G9	3796 E10	5701 G2	6772 G1	6778 H5	7620 B9	7782 H2	7789 G12	
1760 A14	2701 D2	2710 G7	2715 D8	2720 F4	2725 D10	2731 E9	2768 G13	2782 I2	2788 D13	2794 G8	2799 F10	3611 A10	3628 A9	3709 D8	3718 E5	3723 D3	3736 E13	3743 E12	3750 E2	3770 I2	3776 I2	3781 G2	3792 F6	3797 C11	5703 I1	6773 G2	7610 B5	7624 C11	7783 H2	7790 G12	



** - Provision Part
 DC Voltages measured with Fe Recording.
 xxV - Voltages during Solenoid On.
 * - Variant Parts between AR and NAR versions : please refer to table below;

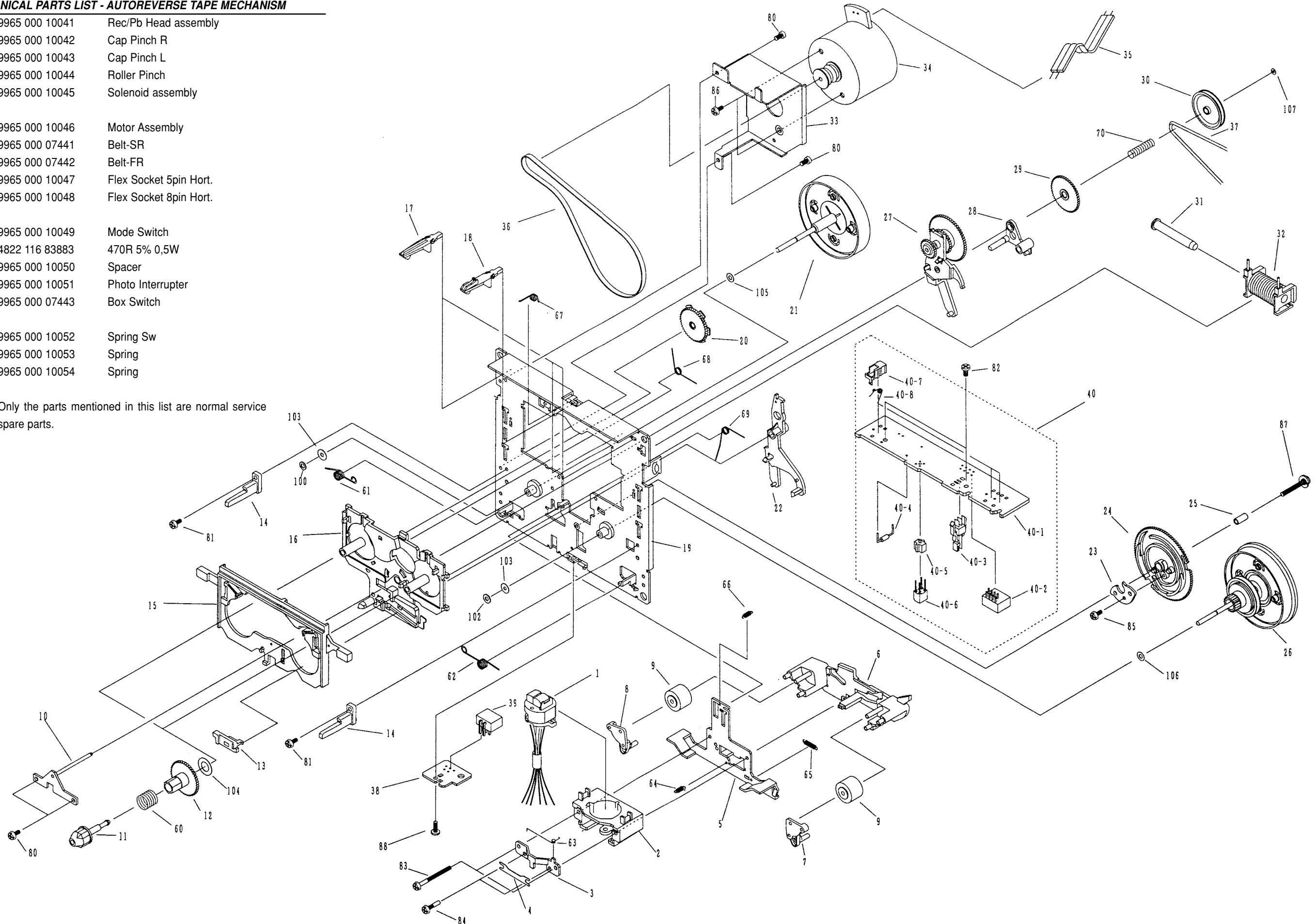
Item	Autoreverse	Non-Autoreverse
2717	15n	Open
2718	15n	Open
3717	1K2	Jumper (4737)
3718	1K2	Jumper (4736)
3723	18K	22K
3724	18K	22K
3769	22K	18K
3772	12K	15K

AUTOREVERSE (AR) TAPE MECHANISM

MECHANICAL PARTS LIST - AUTOREVERSE TAPE MECHANISM

1	9965 000 10041	Rec/Pb Head assembly
7	9965 000 10042	Cap Pinch R
8	9965 000 10043	Cap Pinch L
9	9965 000 10044	Roller Pinch
32	9965 000 10045	Solenoid assembly
34	9965 000 10046	Motor Assembly
36	9965 000 07441	Belt-SR
37	9965 000 07442	Belt-FR
39	9965 000 10047	Flex Socket 5pin Hort.
40-2	9965 000 10048	Flex Socket 8pin Hort.
40-3	9965 000 10049	Mode Switch
40-4	4822 116 83883	470R 5% 0,5W
40-5	9965 000 10050	Spacer
40-6	9965 000 10051	Photo Interrupter
40-7	9965 000 07443	Box Switch
40-8	9965 000 10052	Spring Sw
61	9965 000 10053	Spring
62	9965 000 10054	Spring

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

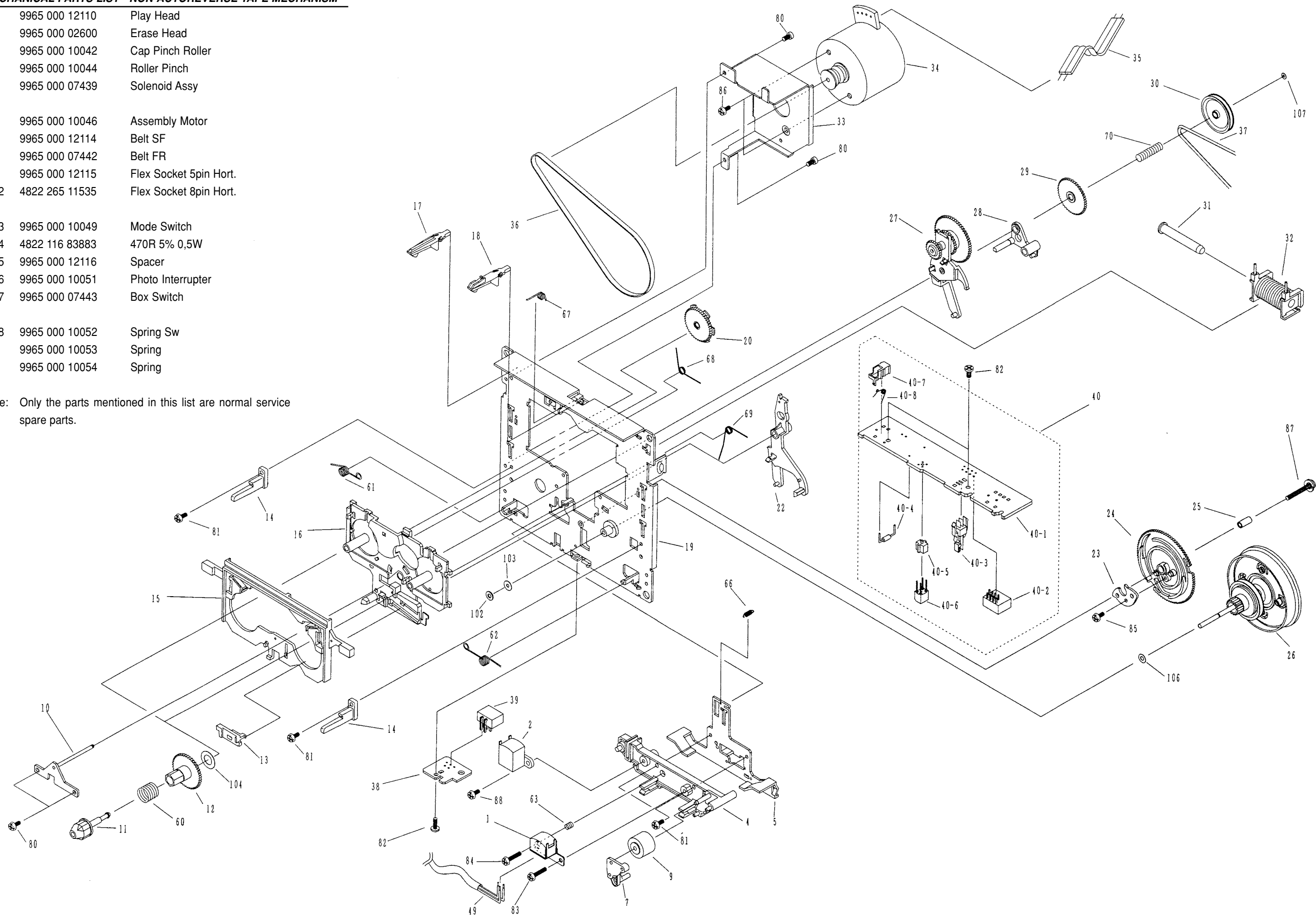


NON-AUTOREVERSE (NAR) TAPE MECHANISM

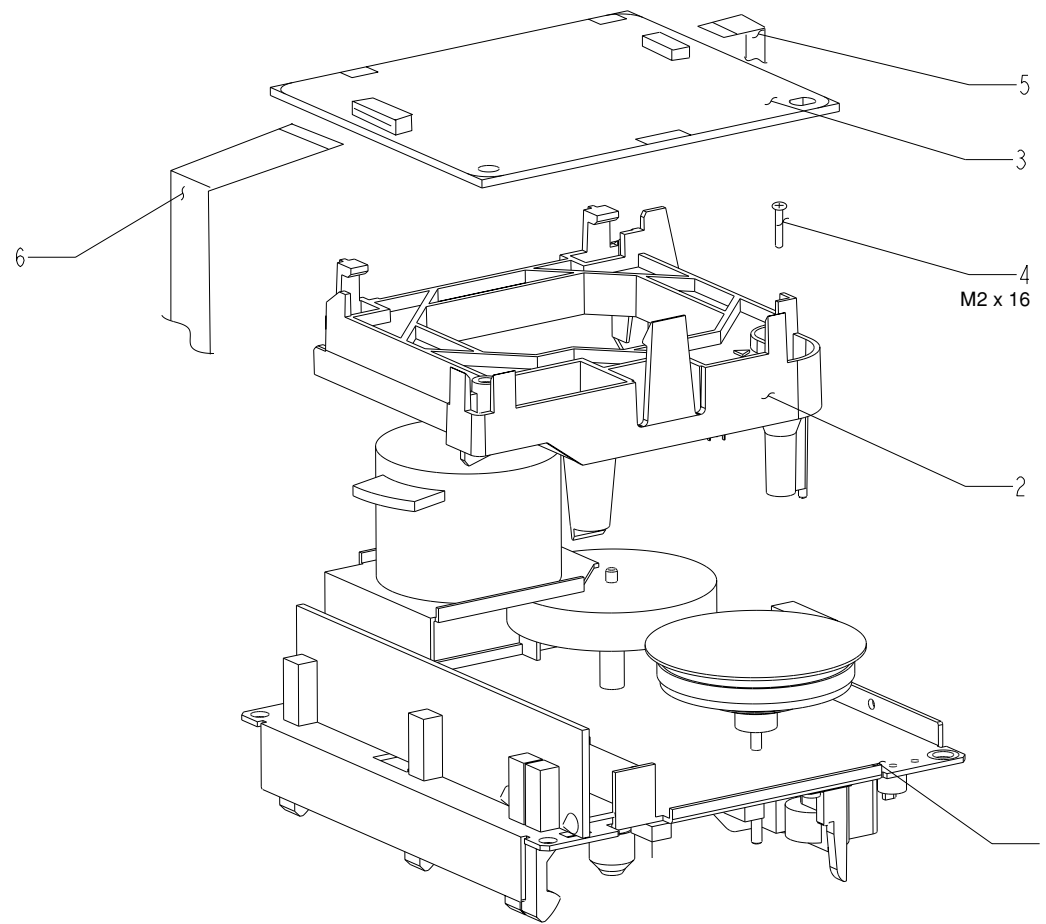
MECHANICAL PARTS LIST - NON-AUTOREVERSE TAPE MECHANISM

1	9965 000 12110	Play Head
2	9965 000 02600	Erase Head
7	9965 000 10042	Cap Pinch Roller
9	9965 000 10044	Roller Pinch
32	9965 000 07439	Solenoid Assy
34	9965 000 10046	Assembly Motor
36	9965 000 12114	Belt SF
37	9965 000 07442	Belt FR
39	9965 000 12115	Flex Socket 5pin Hort.
40-2	4822 265 11535	Flex Socket 8pin Hort.
40-3	9965 000 10049	Mode Switch
40-4	4822 116 83883	470R 5% 0,5W
40-5	9965 000 12116	Spacer
40-6	9965 000 10051	Photo Interrupter
40-7	9965 000 07443	Box Switch
40-8	9965 000 10052	Spring Sw
61	9965 000 10053	Spring
62	9965 000 10054	Spring

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



TAPE MODULE EXPLODED VIEW



ETF8 SD Exploded view78730 dd wk204

MECHANICAL PARTS LIST - TAPE MODULE

1	3139 118 78740	AR Tape Mech. CRL4438
1	3139 118 79220	Non-AR Tape Mech. CFL4217
5	3139 110 35580	Flex Cable 5pin 40mm AD
6	3139 110 35590	Flex Cable 8pin 48mm AD

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

ELECTRICAL PARTS LIST - ETF8 BOARD

MISCELLANEOUS

1701	4822 267 10953	Flex Socket 7pin Vert.
1706	4822 267 10953	Flex Socket 7pin Vert.
1710	4822 267 10958	Flex Socket 5pin Hort.
1760	4822 265 11535	Flex Socket 8pin Hort.

CAPACITORS

2621	5322 126 11578	1nF 10% 50V
2622	4822 126 13881	470pF 5% 50V
2623	4822 126 13881	470pF 5% 50V
2625	4822 126 14305	100nF 10% 16V
2701	4822 122 31765	100pF 2% 63V
2702	4822 122 31765	100pF 2% 63V
2703	4822 122 31765	100pF 2% 63V
2704	4822 122 31765	100pF 2% 63V
2709	5322 126 11578	1nF 10% 50V
2710	5322 126 11578	1nF 10% 50V
2711	4822 122 31765	100pF 2% 63V
2712	4822 122 31765	100pF 2% 63V
2713	5322 121 42386	100nF 5% 63V
2714	5322 121 42386	100nF 5% 63V
2715	4822 124 41584	100uF 20% 10V
2716	4822 124 41584	100uF 20% 10V
2717	3198 017 31530	15nF 50V
2718	3198 017 31530	15nF 50V
2721	3198 017 41050	1uF 10V
2722	3198 017 41050	1uF 10V
2723	4822 126 14238	2,2nF 50V
2724	4822 126 14238	2,2nF 50V
2725	4822 126 13883	220pF 5% 50V
2727	4822 126 14238	2,2nF 50V
2728	4822 126 14238	2,2nF 50V
2729	4822 126 14494	22nF 10% 25V
2730	4822 126 14494	22nF 10% 25V
2731	5322 126 11578	1nF 10% 50V
2732	3198 017 41050	1uF 10V
2743	4822 126 14494	22nF 10% 25V
2747	4822 126 14549	33nF 16V
2761	4822 124 40196	220uF 20% 16V
2768	4822 124 40756	1uF 20% 100V
2769	4822 126 14238	2,2nF 50V
2770	4822 126 14238	2,2nF 50V
2780	4822 124 81151	22uF 50V
2781	5322 126 11583	10nF 10% 50V
2782	4822 126 13193	4,7nF 10% 63V
2784	4822 121 51305	15nF 10% 50V
2785	4822 124 21913	1uF 20% 63V
2786	4822 122 31765	100pF 2% 63V
2787	4822 126 14549	33nF 16V
2788	4822 126 14494	22nF 10% 25V
2789	4822 126 14549	33nF 16V
2790	4822 126 14247	1,5nF 50V
2791	4822 126 14247	1,5nF 50V

2793	4822 126 13883	220pF 5% 50V
2794	4822 126 13883	220pF 5% 50V
2796	4822 124 40433	47uF 20% 25V
2797	4822 124 81151	22uF 50V
2798	4822 124 21732	10uF 20% 25V
2799	4822 126 14305	100nF 10% 16V

RESISTORS

3607	4822 051 30222	2k2 5% 0,062W
3608	4822 051 30273	27k 5% 0,062W
3609	4822 051 30222	2k2 5% 0,062W
3610	4822 051 20124	120k 5% 0,1W
3611	4822 051 30222	2k2 5% 0,062W
3612	4822 051 30563	56k 5% 0,062W
3614	4822 051 30273	27k 5% 0,062W
3624	4822 117 13632	100k 1% 0,062W
3626	4822 051 30102	1k 5% 0,062W
3628	4822 117 13632	100k 1% 0,062W
3630	4822 051 30471	470R 5% 0,062W
3678	4822 117 12925	47k 1% 0,063W
3680	4822 117 12925	47k 1% 0,063W
3686	4822 117 13632	100k 1% 0,062W
3709	4822 051 30339	33R 5% 0,062W
3710	4822 051 30339	33R 5% 0,062W
3711	4822 051 30101	100R 5% 0,062W
3712	4822 051 30101	100R 5% 0,062W
3717	4822 117 11817	1k2 1% 1/16W
3718	4822 117 11817	1k2 1% 1/16W
3723	4822 051 30183	18k 5% 0,062W
3723	4822 051 30223	22k 5% 0,062W
3724	4822 051 30183	18k 5% 0,062W
3724	4822 051 30223	22k 5% 0,062W
3733	4822 051 30273	27k 5% 0,062W
3734	4822 051 30273	27k 5% 0,062W
3735	4822 051 30223	22k 5% 0,062W
3736	4822 051 30223	22k 5% 0,062W
3737	4822 051 30102	1k 5% 0,062W
3738	4822 051 30102	1k 5% 0,062W
3739	4822 117 12925	47k 1% 0,063W
3740	4822 117 12925	47k 1% 0,063W
3743	4822 051 30563	56k 5% 0,062W
3744	4822 051 30563	56k 5% 0,062W
3745	4822 117 11817	1k2 1% 1/16W
3746	4822 117 11817	1k2 1% 1/16W
3749	4822 051 30121	120R 5% 0,062W
3750	4822 051 30121	120R 5% 0,062W
3762	4822 117 12968	820R 5% 0,62W
3764	4822 051 30181	180R 5% 0,062W
3768	4822 051 30103	10k 5% 0,062W
3769	4822 051 30223	22k 5% 0,062W
3769	4822 051 30183	18k 5% 0,062W
3770	4822 051 30152	1k5 5% 0,062W

AR
AR

AR
AR
AR
Non-AR
AR
Non-AR
AR
Non-AR
AR
Non-AR

ELECTRICAL PARTS LIST - ETF8 BOARD**RESISTORS**

3771	4822 117 11817	1k2 1% 1/16W	
3772	4822 051 30153	15k 5% 0,062W	AR
3772	4822 051 30123	12k 5% 0,062W	Non-AR
3774	4822 051 30183	18k 5% 0,062W	
3775	4822 117 13608	4,7R 5% 0,063W	
3776	4822 051 30682	6k8 5% 0,062W	
3777	4822 051 30151	150R 5% 0,062W	
3778	4822 052 10688	6R8 5% 0,33W	
3779	4822 051 30334	330k 5% 0,062W	
3780	4822 051 30105	1M 5% 0,062W	
3781	4822 051 30475	4M7 5% 0,062W	
3786	4822 051 30223	22k 5% 0,062W	
3789	4822 117 12925	47k 1% 0,063W	
3790	4822 051 30223	22k 5% 0,062W	
3791	4822 051 30273	27k 5% 0,062W	
3796	4822 051 30475	4M7 5% 0,062W	
3797	4822 051 30563	56k 5% 0,062W	
3800	4822 051 30223	22k 5% 0,062W	
4701	4822 051 30008	0R Jumper 0603	
4702	4822 051 30008	0R Jumper 0603	
4705	4822 051 30008	0R Jumper 0603	
4707	4822 051 30008	0R Jumper 0603	
4708	4822 051 30008	0R Jumper 0603	
4709	4822 051 30008	0R Jumper 0603	
4710	4822 051 30008	0R Jumper 0603	
4711	4822 051 30008	0R Jumper 0603	
4712	4822 051 30008	0R Jumper 0603	
4718	4822 051 30008	0R Jumper 0603	
4719	4822 051 30008	0R Jumper 0603	
4720	4822 051 30008	0R Jumper 0603	
4721	4822 051 30008	0R Jumper 0603	
4723	4822 051 30008	0R Jumper 0603	
4725	4822 051 30008	0R Jumper 0603	
4726	4822 051 30008	0R Jumper 0603	
4727	4822 051 30008	0R Jumper 0603	
4729	4822 051 30008	0R Jumper 0603	
4730	4822 051 30008	0R Jumper 0603	
4731	4822 051 30008	0R Jumper 0603	
4732	4822 051 30008	0R Jumper 0603	
4733	4822 051 30008	0R Jumper 0603	
4734	4822 051 30008	0R Jumper 0603	
4735	4822 051 30008	0R Jumper 0603	
4736	4822 051 30008	0R Jumper 0603	Non-AR
4737	4822 051 30008	0R Jumper 0603	Non-AR
4738	4822 051 30008	0R Jumper 0603	
4739	4822 051 30008	0R Jumper 0603	
4741	4822 051 30008	0R Jumper 0603	
4746	4822 051 30008	0R Jumper 0603	
4747	4822 051 30008	0R Jumper 0603	

COILS & FILTERS

5701	4822 157 62552	Coil 2,2uH 5%
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5703	4822 156 20946	Osc Coil 100kHz
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DIODES

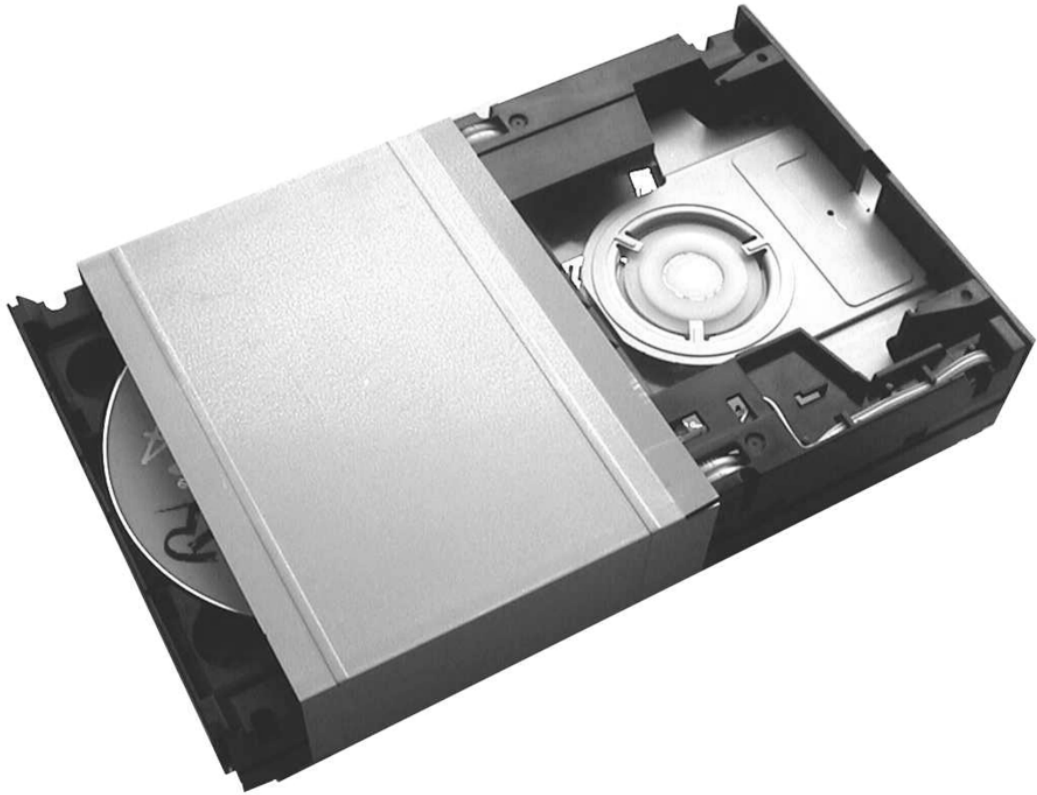
6612	4822 130 31878	1N4003G
6770	4822 130 30621	1N4148
6771	4822 130 30621	1N4148
6772	4822 130 30621	1N4148
6773	4822 130 30621	1N4148
6774	4822 130 30621	1N4148
6776	4822 130 30621	1N4148
6777	3198 010 58280	BZX79-B8V2
6778	4822 130 30621	1N4148

TRANSISTORS & INTEGRATED CIRCUIT

7610	5322 209 11306	HEF4094BT
7612	4822 130 11201	PMBT2907
7614	4822 130 11201	PMBT2907
7618	4822 130 60511	BC847B
7620	4822 130 60511	BC847B
7624	4822 130 60511	BC847B
7720	9322 167 09668	AN17150ATA
7780	4822 130 60511	BC847B
7781	4822 130 42804	BC817-25
7782	4822 130 44568	BC557B
7783	4822 130 60511	BC847B
7784	4822 130 60373	BC857B
7786	4822 130 63494	J111
7788	4822 130 60511	BC847B
7789	4822 130 60511	BC847B
7790	4822 130 60511	BC847B

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

Technical Remarks



3DTC Module

(Basic version)

Layout stage .5

TABLE OF CONTENTS

Service hints	10-2
Wiring	10-3
Location of switches	10-4
Blockdiagram	10-5
Component Layout Main Board	10-6
Circuit Diagram part1	10-7
Component Layout Main Board	10-8
Circuit Diagram part2	10-9
Circuit Diagram part3	10-10
Exploded View	10-11
Mechanical Partslist	10-11
Electrical Partslist	10-12

See also separate Training Manual 3DTC **3103 785 25140**

WARNING

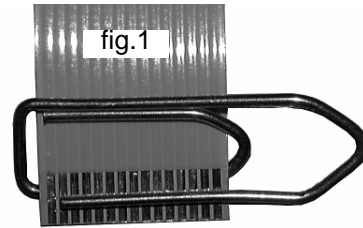
CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE ELECTRONICS WHEN CONNECTING A NEW CDM MECHANISM. THAT'S WHY, BESIDES THE SAFETY MEASURES LIKE

- **SWITCH OFF POWER SUPPLY**
- **ESD PROTECTION**

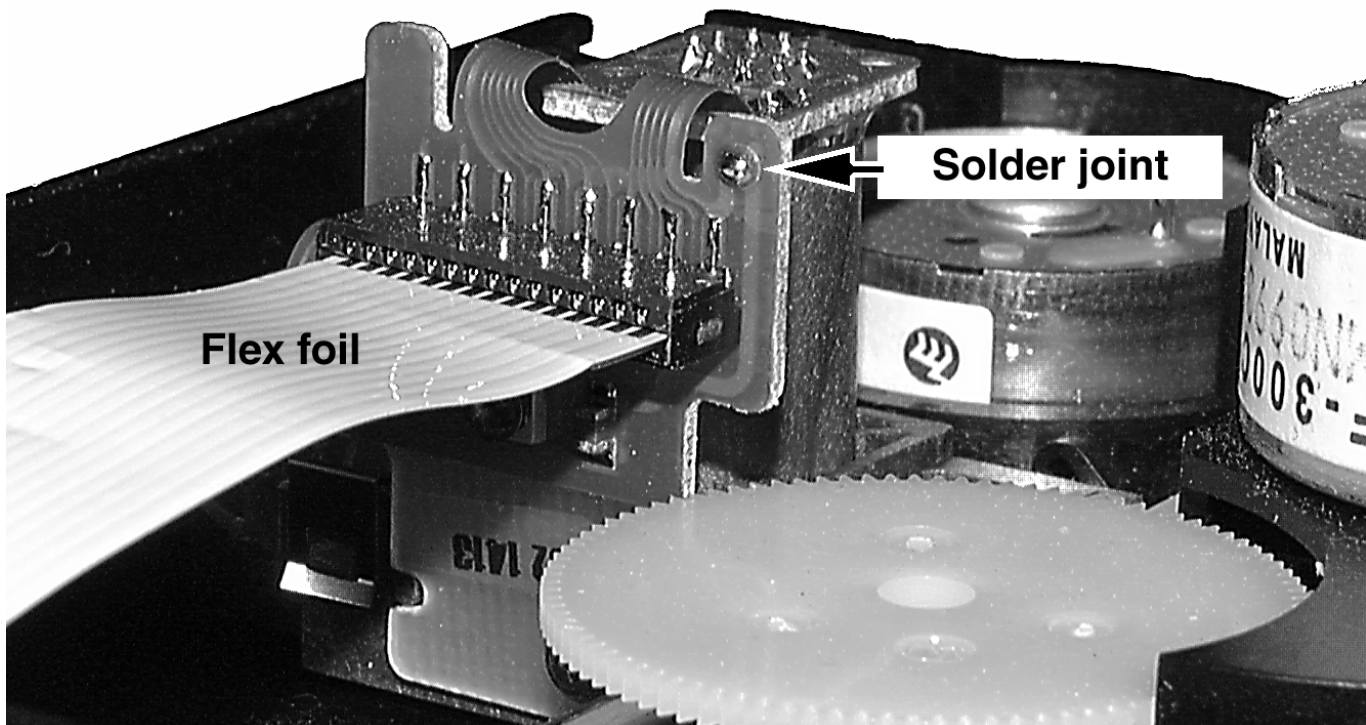
ADDITIONAL ACTIONS MUST BE TAKEN BY THE REPAIR TECHNICIAN.

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

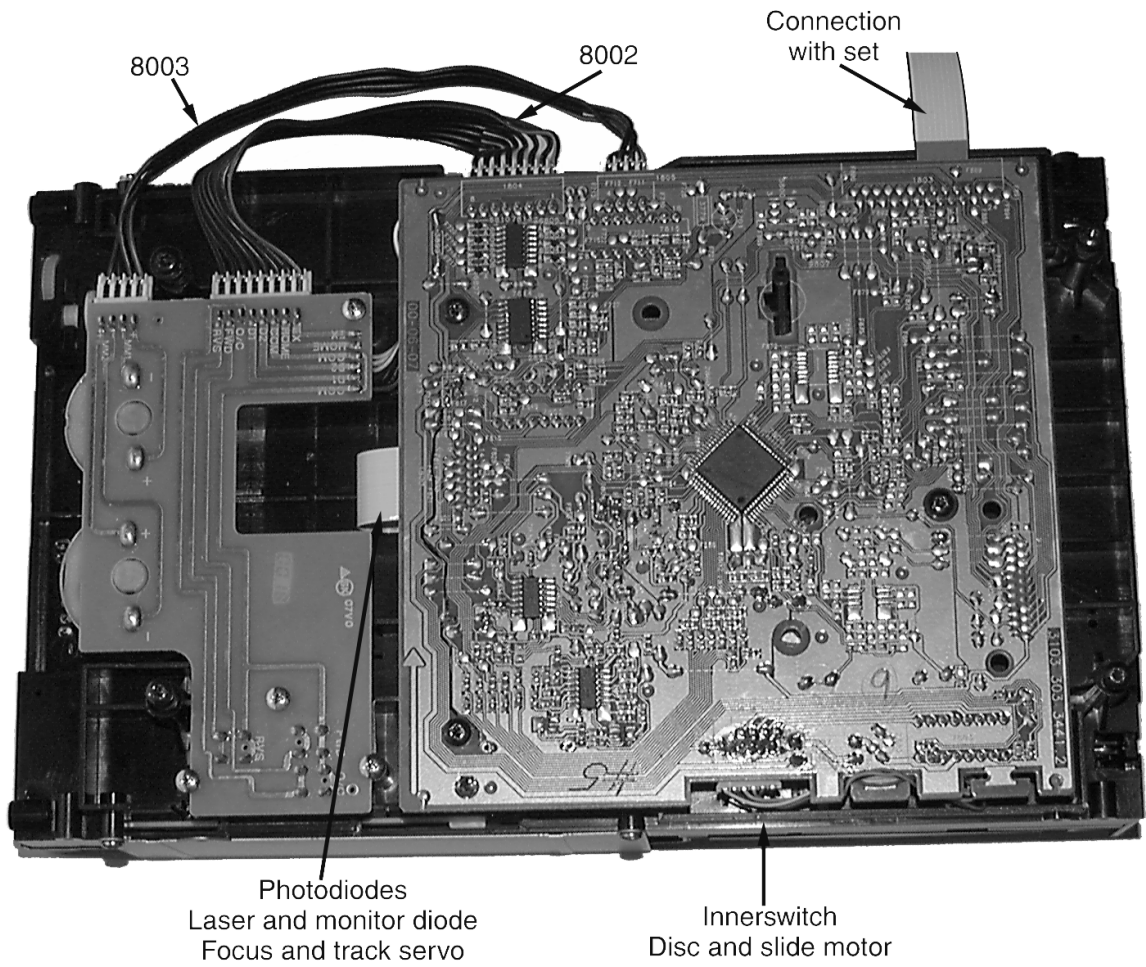
1. Disconnect flexfoil from old CD drive
2. Put a paperclip over contacts of flexfoil to short-circuit the contacts (fig.1)
3. Remove old CD drive
4. Remove paperclip from flexfoil
5. Connect flexfoil to new CD drive
6. Remove ESD-protection (solder joint) from laserunit (see below)
7. Position new CD drive in its studs



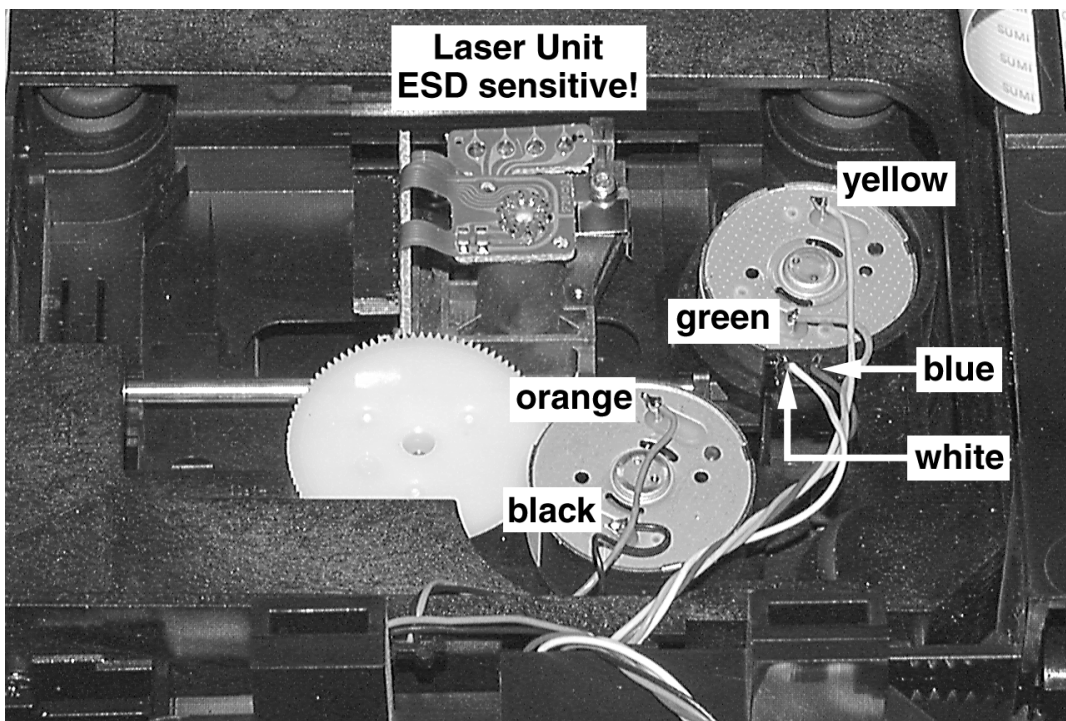
Attention: The laser diode of this CD drive is protected against ESD by a solder joint which shortcircuits the laserdiode to ground.
For proper functionality of the CD drive this solder joint must be removed **after** connection the drive to the set.



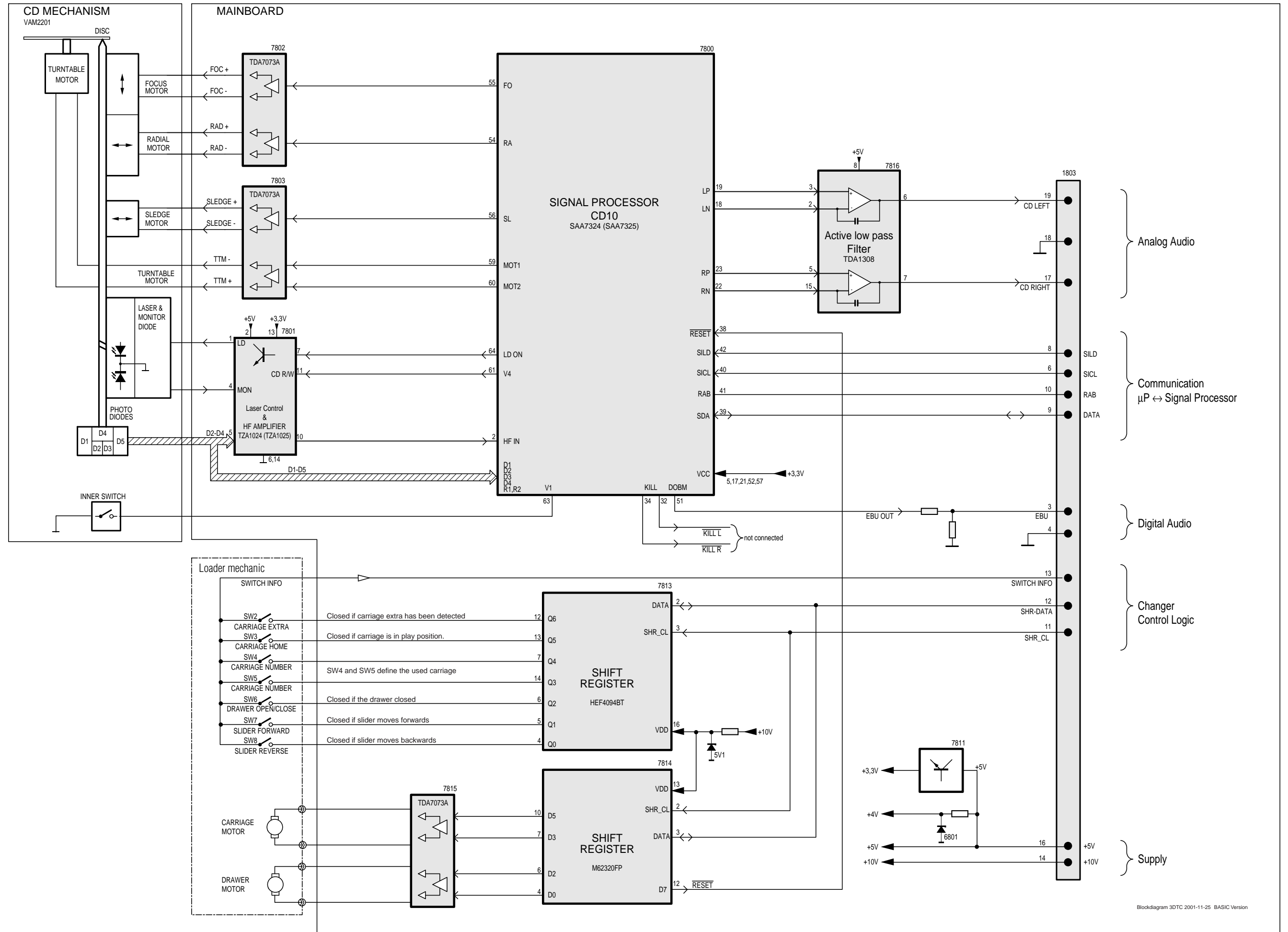
WIRING Module



WIRING CD Drive



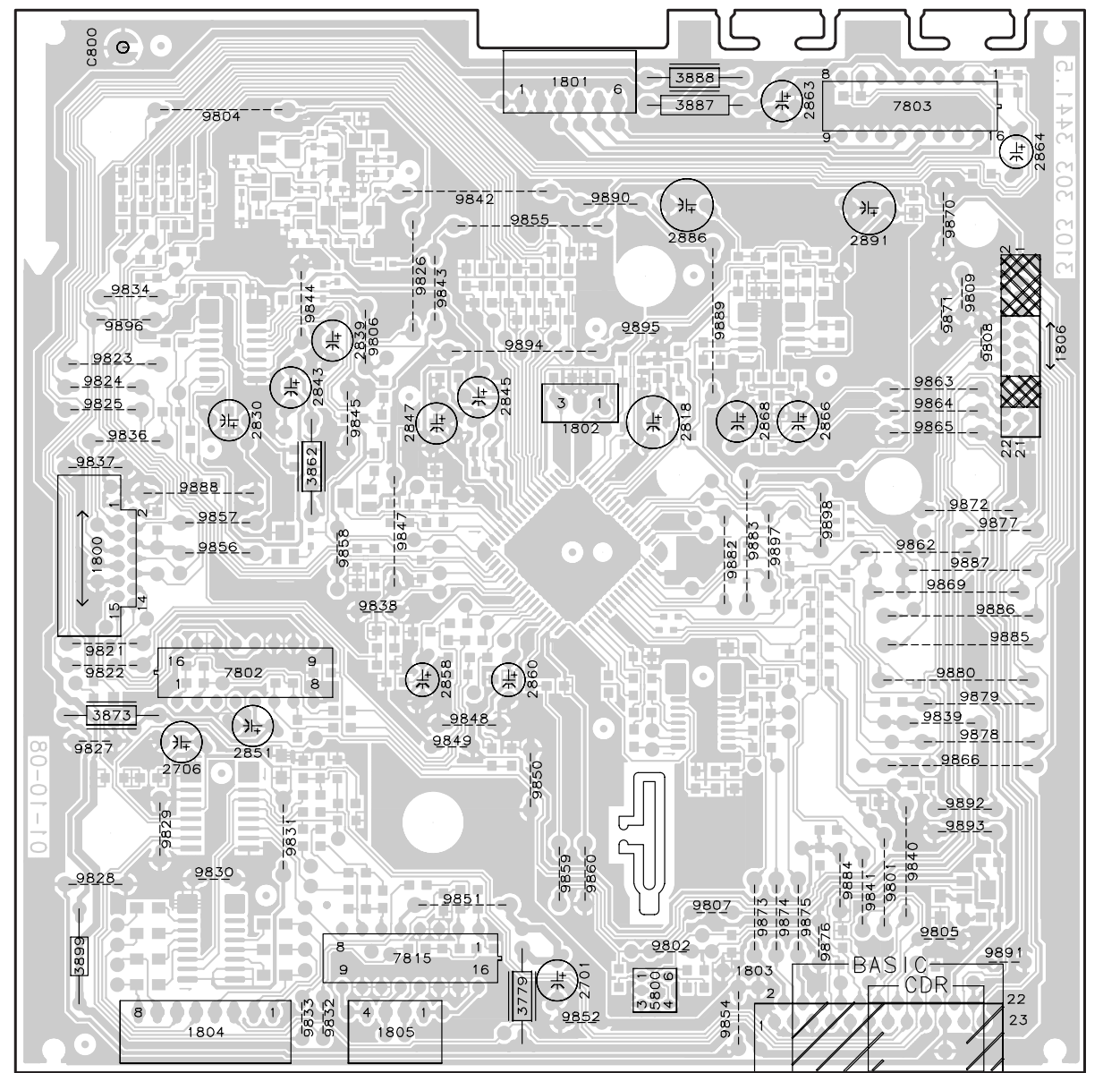
BLOCK DIAGRAM 3DTC



1800 D1	2818 C5	2863 A6	3887 A5	9804 A2	9824 C1	9833 G2	9843 B3	9854 G5	9864 C7	9875 F6	9885 E7	9894 C4
1801 A4	2830 C2	2864 A7	3888 A5	9805 G7	9825 C1	9834 B1	9844 B2	9855 B4	9865 C7	9876 G6	9886 D7	9895 C5
1802 C4	2839 C3	2866 C6	3899 G1	9806 C3	9826 B3	9836 C1	9845 C3	9856 D2	9866 E7	9877 D7	9887 D7	9896 C1
1803 G5	2843 C2	2868 C5	5800 G5	9807 F5	9827 E1	9837 C1	9847 D3	9857 D2	9869 D7	9878 E7	9888 D2	9897 D6
1804 G2	2845 C4	2886 B5	7802 E2	9808 C7	9828 F1	9838 D3	9848 E3	9858 D3	9870 B7	9879 E7	9889 C5	9898 D6
1805 G3	2847 C3	2891 B6	7803 A6	9809 B7	9829 F1	9839 E7	9849 E3	9859 F4	9871 B7	9880 E7	9890 B4	C800 A1
1806 C7	2851 E2	3779 G4	7815 G3	9821 E1	9830 F2	9840 F6	9850 F4	9860 F4	9872 D7	9882 D5	9891 G7	
2701 G4	2858 E3	3862 D2	9801 F6	9822 E1	9831 F2	9841 F6	9851 F3	9862 D6	9873 F5	9883 D5	9892 F7	
2706 E2	2860 E4	3873 E1	9802 G5	9823 C1	9832 G3	9842 B4	9852 G4	9863 C7	9874 F6	9884 F6	9893 F7	

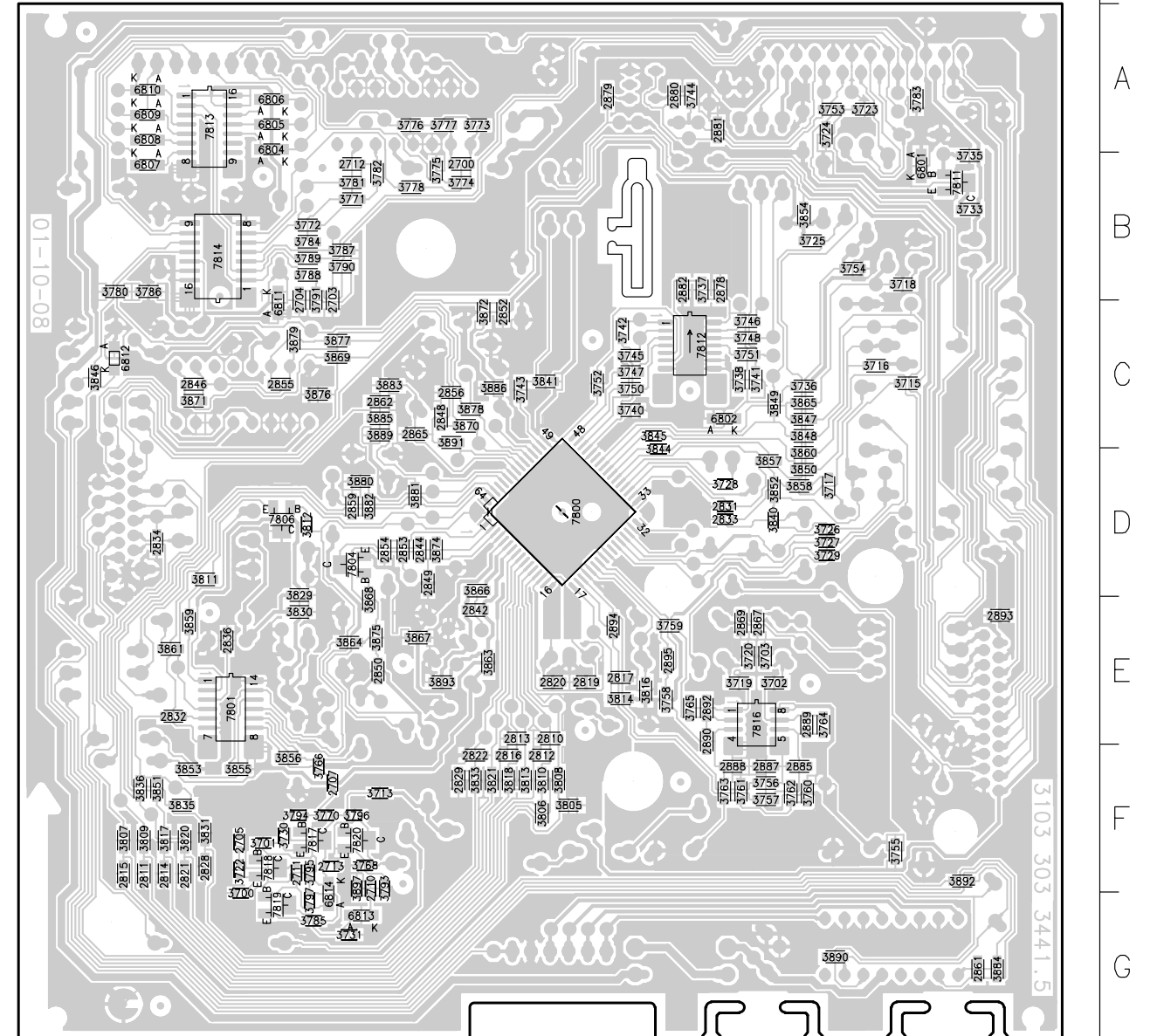
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2703 B3	2817 E5	2848 C3	2879 A4	3702 E6	3728 D5	3746 C5	3762 F6	3780 B1	3796 F3	3820 F2	3849 C6	3865 C6	3881 D3	6805 A2	7812 C5
2704 B2	2819 E4	2849 D3	2880 A5	3703 E6	3729 D6	3747 C5	3763 F5	3781 B3	3797 G2	3821 F4	3850 D6	3866 D4	3882 D3	6806 A2	7813 A2
2705 F2	2820 E4	2850 E3	2881 A5	3713 F3	3730 F2	3748 C5	3764 E6	3782 B3	3805 F4	3829 D2	3851 F1	3867 E3	3883 C3	6807 B1	7814 B2
2707 F3	2821 F2	2852 C4	2882 B5	3715 C6	3731 G3	3750 C5	3765 E5	3783 A7	3806 F4	3830 E2	3852 D6	3868 E3	3884 G7	6808 A1	7816 E5
2710 F3	2822 F4	2853 D3	2885 F6	3716 C6	3733 B7	3751 C5	3766 F3	3784 B2	3807 F1	3831 F2	3853 F2	3869 C3	3885 C3	6809 A1	7817 F2
2711 F2	2828 F2	2854 D3	2887 F6	3717 D6	3735 B7	3752 C4	3768 F3	3785 G2	3808 F4	3833 F4	3854 B6	3870 C4	3886 C4	6810 A1	7818 F2
2712 B3	2829 F3	2855 C2	2888 F5	3718 B6	3736 C6	3753 A6	3770 F3	3786 B1	3809 F1	3835 F2	3855 F2	3871 C2	3889 C3	6811 C2	7819 G2
2713 F3	2831 D5	2856 C3	2889 E6	3719 E5	3737 B5	3754 B6	3771 B3	3787 B3	3810 F4	3836 F1	3856 F2	3872 C4	3890 G6	6812 C1	7820 F3
2810 E4	2832 E2	2859 D3	2890 E5	3720 E5	3738 C5	3755 F6	3772 B2	3788 B2	3811 D2	3840 D6	3857 D6	3874 D3	3891 C3	6813 G3	
2811 F1	2833 D5	2861 G7	2892 E5	3722 F2	3740 C5	3756 F6	3773 A4	3789 B2	3812 D2	3841 C4	3858 D6	3875 E3	3892 F7	6814 G3	
2812 F4	2834 D1	2862 C3	2893 E7	3723 A6	3741 C5	3757 F6	3774 B3	3790 B3	3813 F4	3844 D5	3859 E2	3876 C3	3893 E3	7800 D4	
2813 E4	2836 E2	2865 C3	2894 E5	3724 A6	3742 C5	3758 E5	3775 B3	3791 B3	3814 E5	3845 C5	3860 D6	3877 C3	3897 F3	7801 E2	
2814 F1	2842 E4	2867 E5	2895 E5	3725 B6	3743 C4	3759 E5	3776 A3	3793 F3	3816 E5	3846 C1	3861 E2	3878 C4	6801 B7	7804 D3	
2815 F1	2844 D3	2869 E5	3700 G2	3726 D6	3744 A5	3760 F6	3777 A3	3794 F2	3817 F1	3847 C6	3863 E4	3879 C2	6802 C5	7806 D2	

Mainboard Componentside view



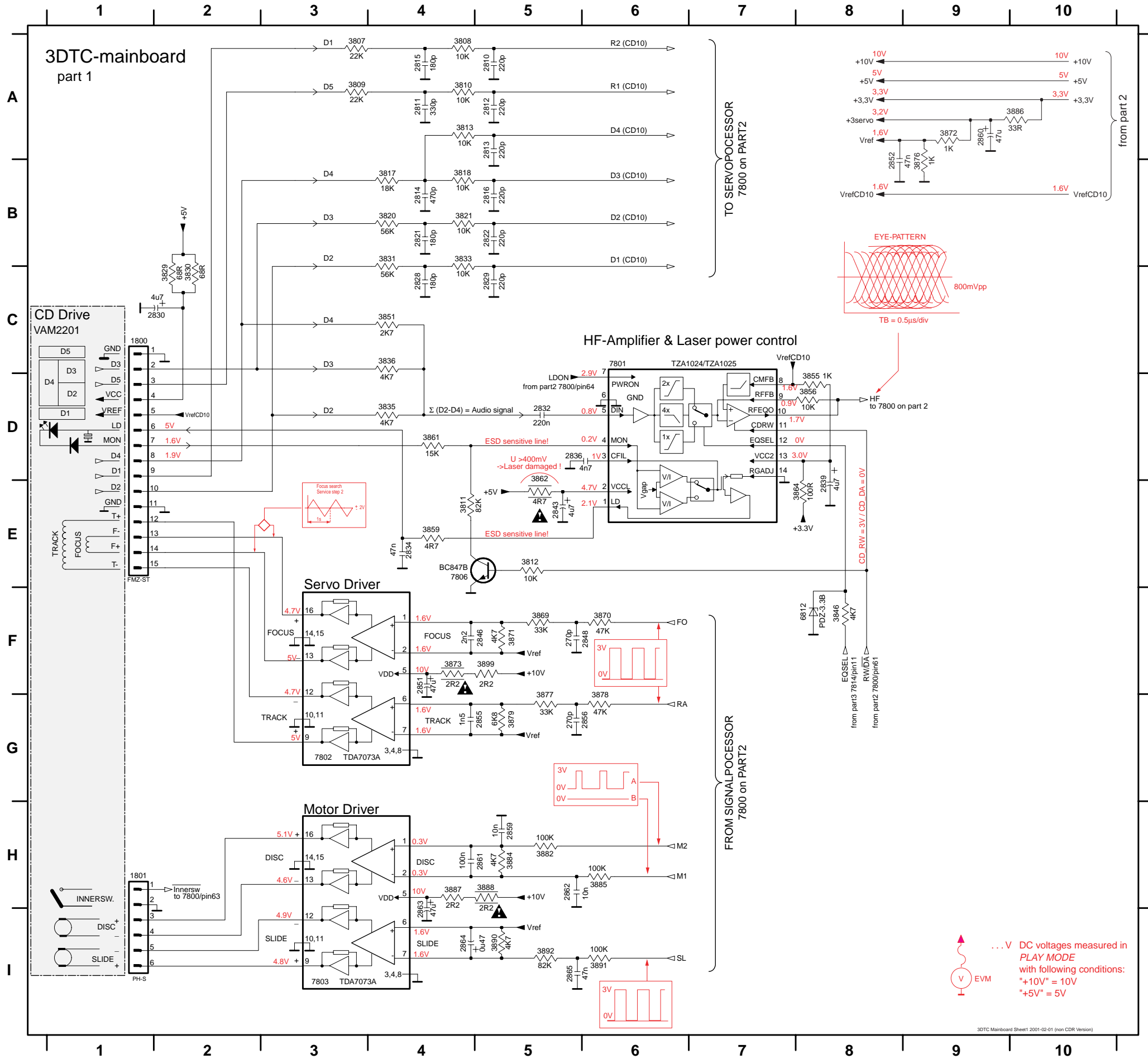
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

Mainboard Copperside view



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

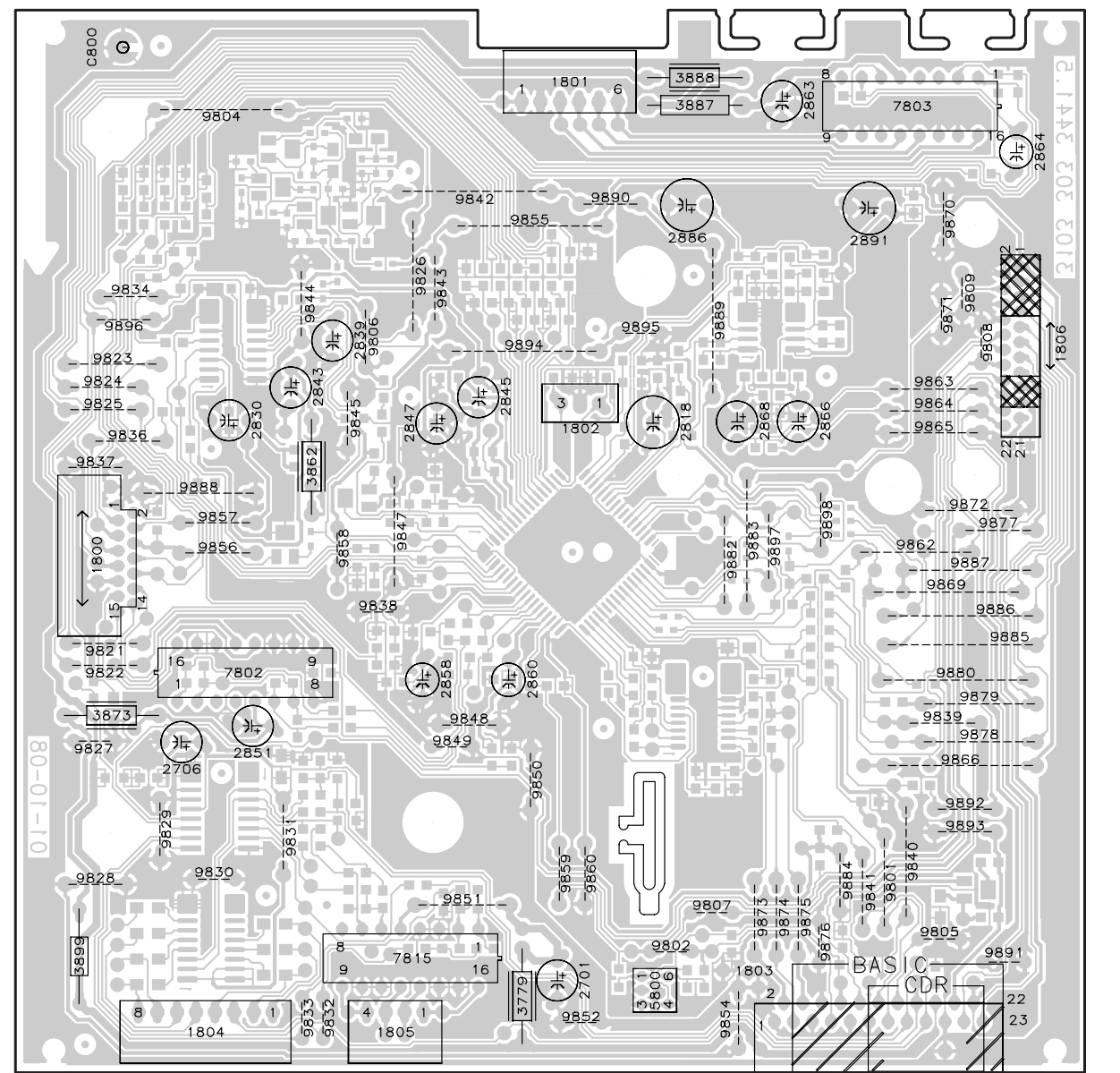
1800	C1	2813	A5	2822	B5	2834	E4	2848	F5	2859	H5	2864	I4	3810	A4	3821	B4	3835	D4	3856	D8	3869	F5	3876	B9	3884	H5	3890	I5	7801	D6
1801	I1	2814	B4	2828	C4	2836	D6	2851	F4	2860	B9	2865	I5	3813	A4	3829	C2	3836	C4	3859	E4	3870	F6	3877	G5	3885	H6	3891	I6	7802	G3
2810	A5	2815	A4	2829	C5	2839	E8	2852	B8	2861	H4	3807	A3	3817	B4	3830	C2	3846	F8	3861	D4	3871	F5	3878	G6	3886	A10	3892	I5	7803	I3
2811	A4	2816	B5	2830	C2	2843	E5	2855	G4	2862	H5	3808	A4	3818	B4	3831	B4	3851	C4	3862	E5	3872	B9	3879	G5	3887	H4	3899	F5		
2812	A4	2821	B4	2832	D5	2846	F4	2856	G5	2863	H4	3809	A3	3820	B4	3833	B4	3855	D8	3864	E8	3873	F4	3882	H5	3888	H5	6812	F8		



1800 D1	2818 C5	2863 A6	3887 A5	9804 A2	9824 C1	9833 G2	9843 B3	9854 G5	9864 C7	9875 F6	9885 E7	9894 C4
1801 A4	2830 C2	2864 A7	3888 A5	9805 G7	9825 C1	9834 B1	9844 B2	9855 B4	9865 C7	9876 G6	9886 D7	9895 C5
1802 C4	2839 C3	2866 C6	3899 G1	9806 C3	9826 B3	9836 C1	9845 C3	9856 D2	9866 E7	9877 D7	9887 D7	9896 C1
1803 G5	2843 C2	2868 C5	5800 G5	9807 F5	9827 E1	9837 C1	9847 D3	9857 D2	9869 D7	9878 E7	9888 D2	9897 D6
1804 G2	2845 C4	2886 B5	7802 E2	9808 C7	9828 F1	9838 D3	9848 E3	9858 D3	9870 B7	9879 E7	9889 C5	9898 D6
1805 G3	2847 C3	2891 B6	7803 A6	9809 B7	9829 F1	9839 E7	9849 E3	9859 F4	9871 B7	9880 E7	9890 B4	C800 A1
1806 C7	2851 E2	3779 G4	7815 G3	9821 E1	9830 F2	9840 F6	9850 F4	9860 F4	9872 D7	9882 D5	9891 G7	
2701 G4	2858 E3	3862 D2	9801 F6	9822 E1	9831 F2	9841 F6	9851 F3	9862 D6	9873 F5	9883 D5	9892 F7	
2706 E2	2860 E4	3873 E1	9802 G5	9823 C1	9832 G3	9842 B4	9852 G4	9863 C7	9874 F6	9884 F6	9893 F7	

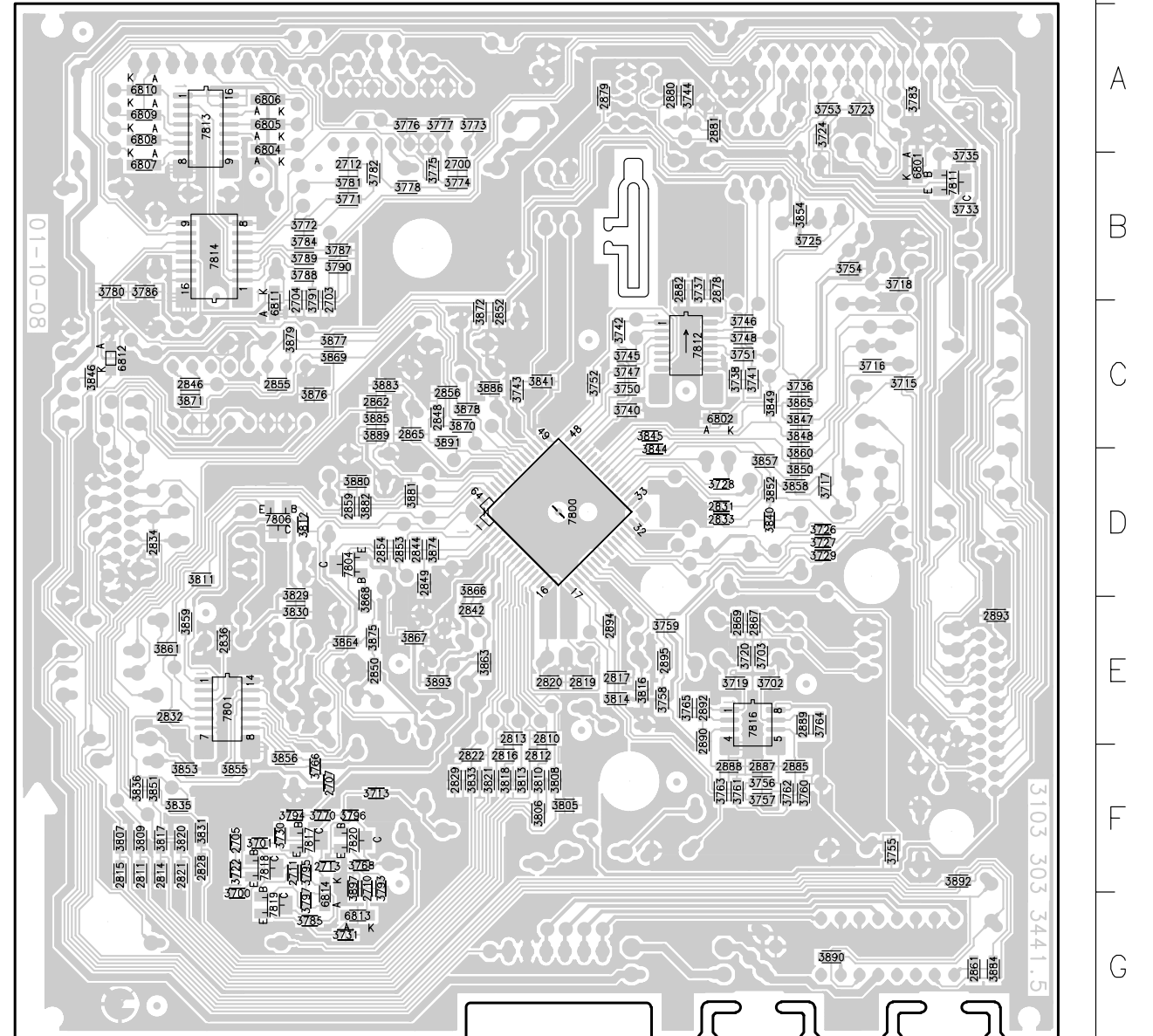
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2703 B3	2817 E5	2848 C3	2879 A4	3702 E6	3728 D5	3746 C5	3762 F6	3780 B1	3796 F3	3820 F2	3849 C6	3865 C6	3881 D3	6805 A2	7812 C5
2704 B2	2819 E4	2849 D3	2880 A5	3703 E6	3729 D6	3747 C5	3763 F5	3781 B3	3797 G2	3821 F4	3850 D6	3866 D4	3882 D3	6806 A2	7813 A2
2705 F2	2820 E4	2850 E3	2881 A5	3713 F3	3730 F2	3748 C5	3764 E6	3782 B3	3805 F4	3829 D2	3851 F1	3867 E3	3883 C3	6807 B1	7814 B2
2707 F3	2821 F2	2852 C4	2882 B5	3715 C6	3731 G3	3750 C5	3765 E5	3783 A7	3806 F4	3830 E2	3852 D6	3868 E3	3884 G7	6808 A1	7816 E5
2710 F3	2822 F4	2853 D3	2885 F6	3716 C6	3733 B7	3751 C5	3766 F3	3784 B2	3807 F1	3831 F2	3853 F2	3869 C3	3885 C3	6809 A1	7817 F2
2711 F2	2828 F2	2854 D3	2887 F6	3717 D6	3735 B7	3752 C4	3768 F3	3785 G2	3808 F4	3833 F4	3854 B6	3870 C4	3886 C4	6810 A1	7818 F2
2712 B3	2829 F3	2855 C2	2888 F5	3718 B6	3736 C6	3753 A6	3770 F3	3786 B1	3809 F1	3835 F2	3855 F2	3871 C2	3889 C3	6811 C2	7819 G2
2713 F3	2831 D5	2856 C3	2889 E6	3719 E5	3737 B5	3754 B6	3771 B3	3787 B3	3810 F4	3836 F1	3856 F2	3872 C4	3890 G6	6812 C1	7820 F3
2810 E4	2832 E2	2859 D3	2890 E5	3720 E5	3738 C5	3755 F6	3772 B2	3788 B2	3811 D2	3840 D6	3857 D6	3874 D3	3891 C3	6813 G3	
2811 F1	2833 D5	2861 G7	2892 E5	3722 F2	3740 C5	3756 F6	3773 A4	3789 B2	3812 D2	3841 C4	3858 D6	3875 E3	3892 F7	6814 G3	
2812 F4	2834 D1	2862 C3	2893 E7	3723 A6	3741 C5	3757 F6	3774 B3	3790 B3	3813 F4	3844 D5	3859 E2	3876 C3	3893 E3	7800 D4	
2813 E4	2836 E2	2865 C3	2894 E5	3724 A6	3742 C5	3758 E5	3775 B3	3791 B3	3814 E5	3845 C5	3860 D6	3877 C3	3897 F3	7801 E2	
2814 F1	2842 E4	2867 E5	2895 E5	3725 B6	3743 C4	3759 E5	3776 A3	3793 F3	3816 E5	3846 C1	3861 E2	3878 C4	6801 B7	7804 D3	
2815 F1	2844 D3	2869 E5	3700 G2	3726 D6	3744 A5	3760 F6	3777 A3	3794 F2	3817 F1	3847 C6	3863 E4	3879 C2	6802 C5	7806 D2	

Mainboard Componentside view



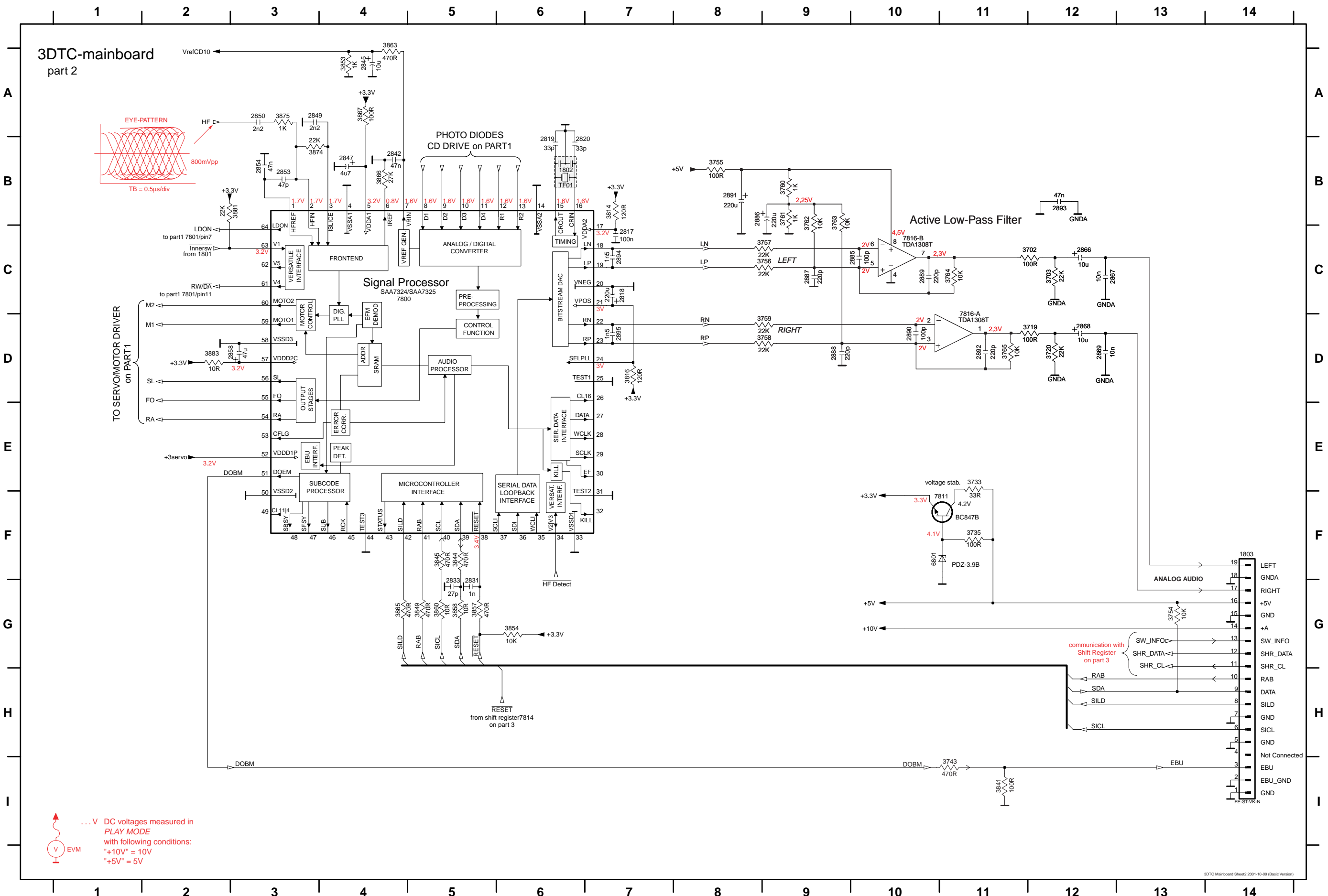
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partlist.

Mainboard Copperside view



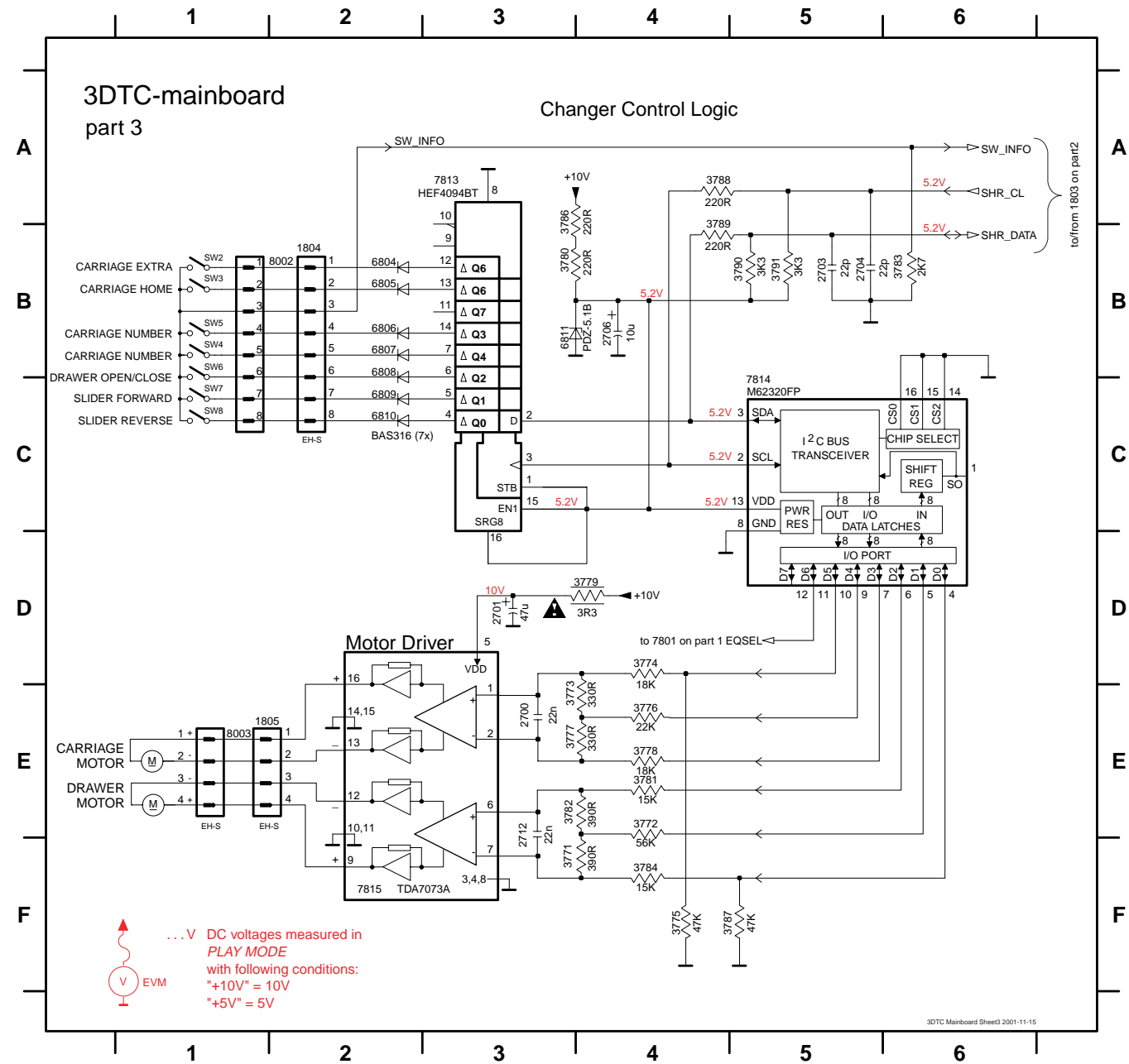
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partlist.

1802	B6	2819	B6	2842	B4	2850	A3	2866	C12	2885	C10	2889	C10	2893	B12	3703	C12	3735	F11	3756	C9	3760	B9	3764	C11	3841	I11	3853	A4	3860	G5	3867	A4	3883	D2	7816-A	D11
1803	F14	2820	B6	2845	A4	2853	B3	2867	C12	2886	B9	2890	D10	2894	C7	3719	D12	3743	I11	3757	C9	3761	B9	3765	D11	3844	F5	3854	G6	3863	A4	3874	B3	6801	F10	7816-B	C10
2817	C7	2831	G5	2847	B4	2854	B3	2868	D12	2887	C9	2891	B8	2895	D7	3720	D12	3754	G13	3758	D9	3762	B9	3814	B7	3845	F5	3857	G5	3865	G4	3875	A3	7800	C4		
2818	C7	2833	G5	2849	A3	2858	D3	2869	D12	2888	D9	2892	D11	3702	C12	3733	F11	3755	B8	3759	D9	3763	B9	3816	D7	3849	G5	3858	G5	3866	B4	3881	B3	7811	F10		

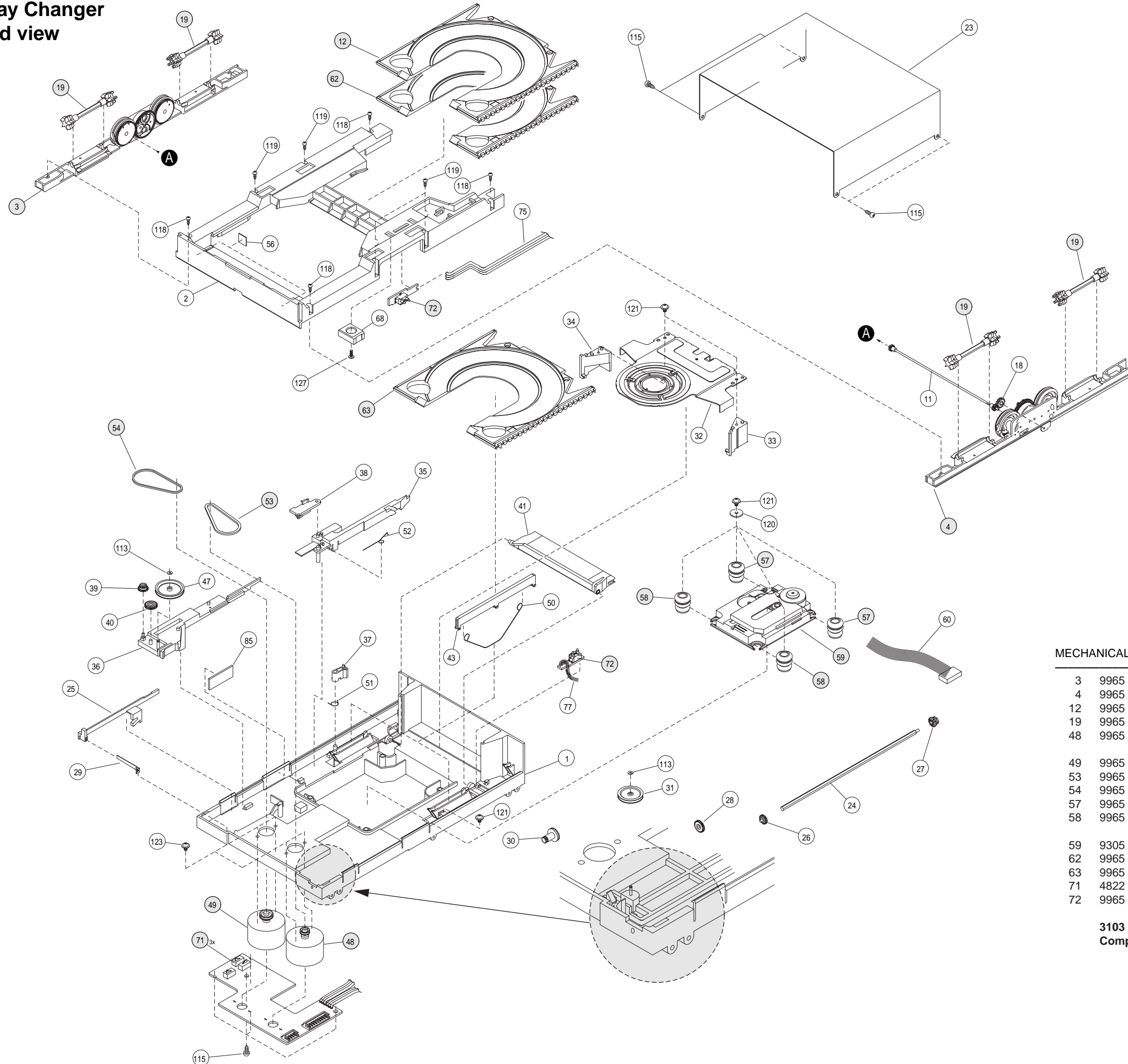


Technical remarks

1804	B2	2703	B5	3771	F4	3775	F4	3779	D4	3783	B6	3788	A4	6804	B2	6808	B2	7813	A3
1805	E1	2704	B5	3772	E4	3776	E4	3780	B3	3784	F4	3789	B4	6805	B2	6809	C2	7814	C5
2700	E3	2706	B4	3773	E4	3777	E4	3781	E4	3786	B3	3790	B5	6806	B2	6810	C2	7815	F2
2701	D3	2712	E3	3774	D4	3778	E4	3782	E4	3787	F5	3791	B5	6807	B2	6811	B3		



3Disc Tray Changer Exploded view



MECHANICAL PARTS

3	9965 000 06538	ASSY HOLDER LEFT
4	9965 000 06539	ASSY HOLDER RIGHT
12	9965 000 06540	ASSY CARRIAGE 1 (TOP)
19	9965 000 06541	ASSY GEAR STAR
48	9965 000 06542	ASSY MOTOR CARRIAGE
49	9965 000 06543	ASSY MOTOR DRAWER
53	9965 000 06544	BELT DRAWER
54	9965 000 06545	BELT CARRIAGE
57	9965 000 06546	DAMPER RUBBER REAR
58	9965 000 06547	DAMPER RUBBER FRONT
59	9305 022 30103	CD DRIVE VAM2201/03
62	9965 000 06548	ASSY CARRIAGE 2 (MIDDLE)
63	9965 000 06549	ASSY CARRIAGE 3 (BOTTOM)
71	4822 277 11652	SWITCH (SW6-SW8)
72	9965 000 06550	SWITCH (SW2-SW5)

**3103 309 05250 3DTC CMCJ-01-13 (1xSPEED)
Complete Mechanic - CD Drive already included**

ELECTRICAL PARTSLIST 3DTC MODULE Basic Version**MISCELLANEOUS**

1800	4822 265 10925	FLEX FOIL CONNECTOR, 15PIN
1803	4822 265 11545	FLEX FOIL CONNECTOR, 19PIN
8003	3103 308 92560	FLEX FOIL CABLE 15P, 80mm
59	9305 022 30103	CD DRIVE VAM2201/03

CAPACITORS

2700	4822 126 14494	22nF	10%	25V
2701	4822 124 40433	47μF	20%	25V
2703	5322 122 32658	22pF	5%	50V
2704	4822 122 33761	22pF	5%	50V
2706	4822 124 22833	10μF	20%	50V

2712	4822 126 14494	22nF	10%	25V
2810	4822 126 13883	220pF	5%	50V
2811	4822 126 14241	330pF		50V
2812	4822 126 13883	220pF	5%	50V
2813	4822 126 13883	220pF	5%	50V

2814	4822 126 13881	470pF	5%	50V
2815	4822 126 14508	180pF	5%	50V
2816	4822 126 13883	220pF	5%	50V
2817	4822 126 14585	100nF	10%	50V
2818	4822 124 42383	220μF	20%	4V

2819	5322 122 32659	33pF	5%	50V
2820	5322 122 32659	33pF	5%	50V
2821	4822 126 14508	180pF	5%	50V
2822	4822 126 13883	220pF	5%	50V
2828	4822 126 14508	180pF	5%	50V

2829	4822 126 13883	220pF	5%	50V
2830	4822 124 40769	4,7μF	20%	100V
2831	5322 126 11578	1nF	10%	63V
2832	4822 126 13879	220nF	20%	16V
2833	4822 126 11669	27pF	10%	50V

2834	4822 126 13751	47nF	10%	50V
2836	4822 126 13193	4,7nF	10%	63V
2839	4822 124 40769	4,7μF	20%	100V
2842	4822 126 13751	47nF	10%	50V
2843	4822 124 40769	4,7μF	20%	100V

2845	4822 124 40248	10μF	20%	63V
2846	4822 126 14238	2,2nF	10%	50V
2847	4822 124 40769	4,7μF	20%	100V
2848	4822 126 14506	270pF	5%	50V
2849	4822 122 33177	10nF	20%	50V

2850	4822 126 14238	2,2nF	10%	50V
2851	4822 124 40433	47μF	20%	25V
2852	3198 024 44730	47nF	5%	50V
2853	4822 126 13694	68pF	1%	63V
2854	4822 126 13751	47nF	10%	50V

2855	4822 126 14247	1,5nF	10%	50V
2856	4822 122 33216	270pF	5%	50V
2858	4822 124 12362	47μF	20%	4V
2859	4822 122 33177	10nF	20%	50V
2860	4822 124 12362	47μF	20%	4V

2861	4822 126 14585	100nF	10%	50V
2862	5322 126 11583	10nF	10%	63V
2863	4822 124 40433	47μF	20%	25V
2864	5322 124 41948	0,47μF	20%	50V
2865	3198 024 44730	47nF	5%	50V

2866	3198 028 41090	10μF	20%	35V
2867	4822 122 33177	10nF	20%	50V
2868	3198 028 41090	10μF	20%	35V
2869	4822 122 33177	10nF	20%	50V
2885	4822 122 31765	100pF	5%	50V

2886	4822 124 42383	220μF	20%	4V
2887	4822 126 13883	220pF	5%	50V
2888	4822 126 13883	220pF	5%	50V
2889	4822 126 13883	220pF	5%	50V
2890	4822 122 31765	100pF	5%	50V

CAPACITORS

2891	4822 124 42383	220μF	20%	4V
2892	4822 126 13883	220pF	5%	50V
2893	4822 126 13751	47nF	10%	50V
2894	4822 126 13344	1,5nF	5%	63V
2895	4822 126 13344	1,5nF	5%	63V

RESISTORS

3702	4822 051 30101	100Ω	5%	0,06W
3703	4822 051 30223	22kΩ	5%	0,06W
3719	4822 051 30101	100Ω	5%	0,06W
3720	4822 051 30223	22kΩ	5%	0,06W
3733	4822 051 30339	33Ω	5%	0,06W

3735	4822 051 30101	100Ω	5%	0,06W
3743	4822 051 30471	470Ω	5%	0,06W
3754	4822 051 30103	10kΩ	5%	0,06W
3755	4822 051 30101	100Ω	5%	0,06W
3756	4822 051 30223	22kΩ	5%	0,06W

3757	4822 051 30223	22kΩ	5%	0,06W
3758	4822 051 30223	22kΩ	5%	0,06W
3759	4822 051 20223	22kΩ	5%	0,1W
3760	4822 051 10102	1kΩ	2%	0,25W
3761	4822 051 10102	1kΩ	2%	0,25W

3762	4822 117 10833	10kΩ	1%	0,1W
3763	4822 117 10833	10kΩ	1%	0,1W
3764	4822 051 30103	10kΩ	5%	0,06W
3765	4822 051 30103	10kΩ	5%	0,06W
3771	4822 051 30391	390Ω	5%	0,06W

3772	4822 051 30563	56kΩ	5%	0,06W
3773	4822 051 30331	330Ω	5%	0,06W
3774	4822 051 30183	18kΩ	5%	0,06W
3775	4822 117 12925	47kΩ	1%	0,06W
3776	4822 051 30223	22kΩ	5%	0,06W

3777	4822 051 30331	330Ω	5%	0,06W
3778	4822 051 30183	18kΩ	5%	0,06W
3779	4822 052 10338	3,3Ω		NFR25
3780	4822 117 11503	220Ω	5%	0,1W
3781	4822 051 30153	15kΩ	5%	0,06W

3782	4822 051 30391	390Ω	5%	0,06W
3783	4822 051 30272	2,7kΩ	5%	0,06W
3784	4822 051 30153	15kΩ	5%	0,06W
3786	4822 051 30221	220Ω	5%	0,06W
3787	4822 117 10834	47kΩ	1%	0,1W

3788	4822 051 30221	220Ω	5%	0,06W
3789	4822 051 30221	220Ω	5%	0,06W
3790	4822 051 20332	3,3kΩ	5%	0,06W
3791	4822 051 20332	3,3kΩ	5%	0,06W
3807	4822 051 30223	22kΩ	5%	0,06W

3808	4822 051 30103	10kΩ	5%	0,06W
3809	4822 051 30223	22kΩ	5%	0,06W
3810	4822 051 30103	10kΩ	5%	0,06W
3811	4822 117 12864	82kΩ	5%	0,6W
3812	4822 117 10833	10kΩ	1%	0,1W

3813	4822 051 30103	10kΩ	5%	0,06W
3814	4822 051 20121	120Ω	5%	0,1W
3816	4822 051 30121	120Ω	5%	0,06W
3817	4822 051 20273	27kΩ	5%	0,1W
3818	4822 051 30103	10kΩ	5%	0,06W

3820	4822 117 11148	56kΩ	1%	0,1W
3821	4822 051 30103	10kΩ	5%	0,06W
3822	4822 051 30103	10kΩ	5%	0,06W
3823	4822 051 30103	10kΩ	5%	0,06W
3829	4822 051 30689	68Ω	5%	0,06W

3830	4822 051 30689	68Ω	5%	0,06W
3831	4822 051 30563	56kΩ	5%	0,06W

ELECTRICAL PARTSLIST 3DTC MODULE Basic Version**RESISTORS**

3833	4822 051 30103	10kΩ	5%	0,06W
3835	4822 051 30472	4,7kΩ	5%	0,06W
3836	4822 051 20472	4,7kΩ	5%	0,1W
3841	4822 051 30101	100Ω	5%	0,06W
3844	4822 051 30471	470Ω	5%	0,06W

3845	4822 051 30471	470Ω	5%	0,06W
3846	4822 051 30472	4,7kΩ	5%	0,06W
3849	4822 051 20471	470Ω	5%	0,1W
3851	4822 117 12955	2,7kΩ	1%	0,1W
3853	4822 051 30102	1kΩ	5%	0,06W

3854	4822 051 30103	10kΩ	5%	0,06W
3855	4822 051 10102	1kΩ	2%	0,25W
3856	4822 051 30103	10kΩ	5%	0,06W
3857	4822 051 30471	470Ω	5%	0,06W
3858	4822 051 30109	10Ω	5%	0,06W

3859	4822 117 13608	4,7Ω	5%	0,06W
3860	4822 051 20109	10Ω	5%	0,1W
3861	4822 051 30153	15kΩ	5%	0,06W
3862	4822 052 10478	4,7Ω	5%	NFR
3863	4822 051 20471	470Ω	5%	0,1W

3864	4822 117 11373	100R	1%	0,1W
3865	4822 051 20471	470Ω	5%	0,1W
3866	4822 051 20273	27kΩ	5%	0,1W
3867	4822 117 11373	100R	1%	0,1W
3869	4822 051 30333	33kΩ	5%	0,06W

3870	4822 117 12925	47kΩ	1%	0,06W
3871	4822 051 30472	4,7kΩ	5%	0,06W
3872	4822 051 30102	1kΩ	5%	0,06W
3873	4822 052 10228	2,2Ω	5%	0,33W
3874	4822 051 30223	22kΩ	5%	0,06W

3875	4822 051 30102	1kΩ	5%	0,06W
3876	4822 051 30102	1kΩ	5%	0,06W
3877	4822 051 30333	33kΩ	5%	0,06W
3878	4822 117 12925	47kΩ	1%	0,06W
3879	4822 051 30682	6,8kΩ	5%	0,06W

3881	4822 051 20223	22kΩ	5%	0,1W
3882	4822 117 10837	100kΩ	1%	0,1W
3883	4822 051 30109	10Ω	5%	0,06W
3884	4822 051 30472	4,7kΩ	5%	0,06W
3885	4822 117 13632	100kΩ	1%	0,06W

3886	4822 051 30339	33Ω	5%	0,06W
3887	4822 053 10228	2,2Ω	5%	1W
3888	4822 052 10228	2,2Ω	5%	0,33W
3890	4822 051 30472	4,7kΩ	5%	0,06W
3891	4822 117 13632	100kΩ	1%	0,06W

3892	4822 117 11149	82kΩ	1%	0,1W
3893	4822 117 13579	220kΩ	1%	0,1W
3899	4822 116 81154	2,2Ω	5%	0,5W

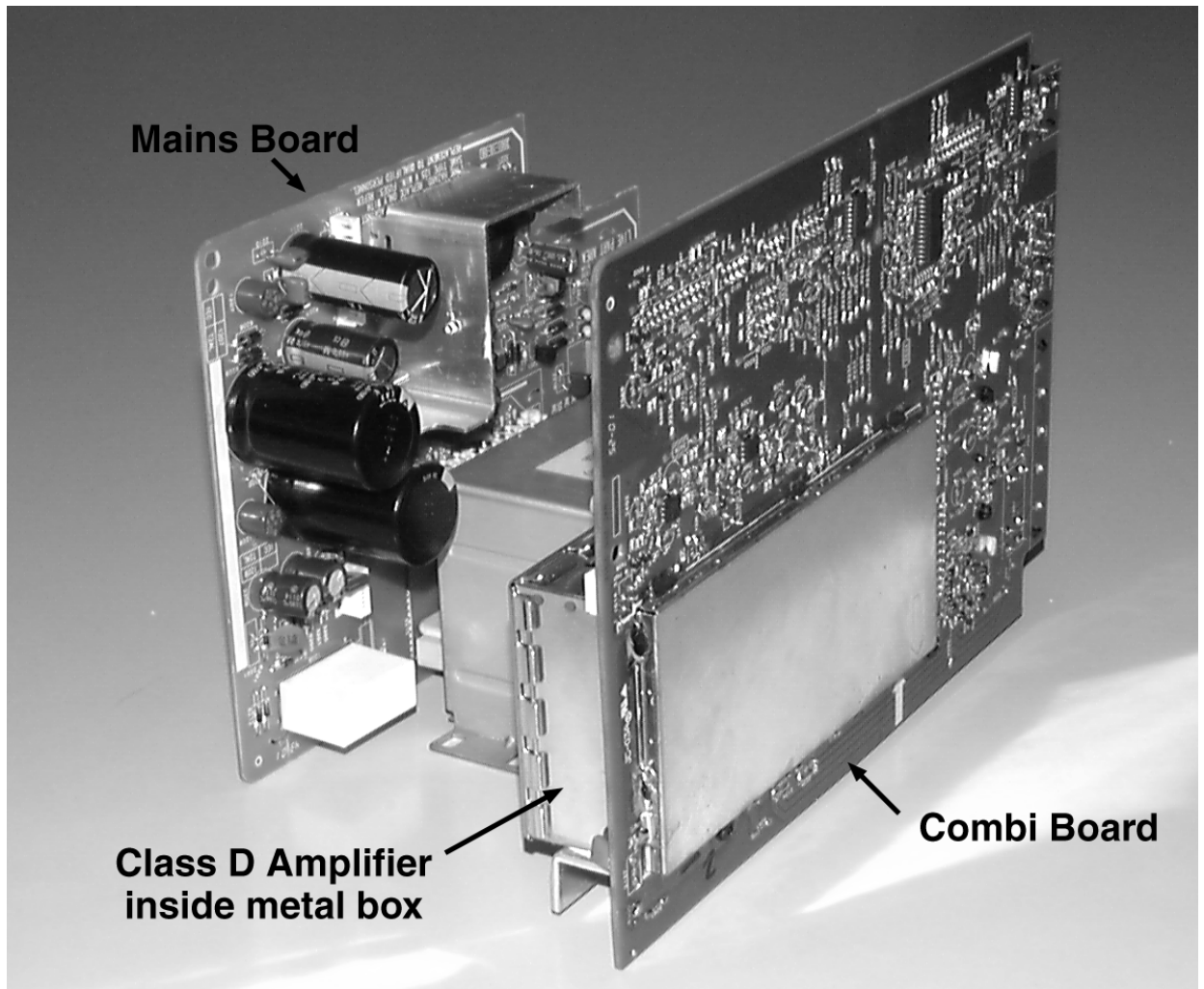
COILS

1802	2422 543 01068	RESONATOR 8MHZ
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DIODES

6801	9322 129 34685	BZX284-C3V9
6804	4822 130 11397	BAS316
6805	4822 130 11397	BAS316
6806	4822 130 11397	BAS316
6807	4822 130 11397	BAS316

6808	4822 130 11397	BAS316
6809	4822 130 11397	BAS316
6810	4822 130 11397	BAS316
6811	9340 548 52115	BZX284-C5V1



Power 2002 Module

(70W Class D)

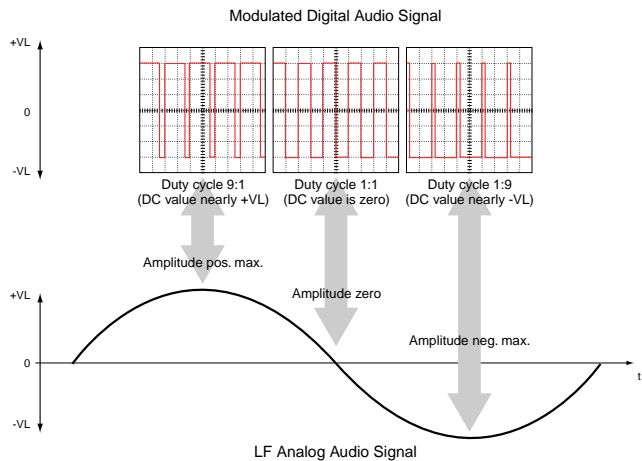
stage M.4/C.7

TABLE OF CONTENTS

Brief Circuit Description	11-2
Service Hints	11-4
COMBI BOARD	
Circuit Diagram	
Overview	11-7
Source Selector part	11-8
Audio Frequency & Logic part.....	11-9
Oscillator & Pre-Amplifier part.....	11-10
Amplifier part Left Channel	11-11
Amplifier part Right Channel	11-12
Component Layout	
Copperside view	11-13
Componentside view.....	11-14
MAINS BOARD	
Component Layout	11-15
Circuit Diagram	11-16
Partslist	11-17

Class-D Circuit Description (BASED ON POWER 2002 MODULE - 70W CLASS D)

Basically Class-D works by transforming the LF audio input to a square wave signal with a fixed frequency and a variable duty cycle. See simplified drawing below.



The amplitude of the square wave signal is equal to the supply voltage of the amplifier. With the audio signal the square wave signal is pulse-width modulated.

Compared to a conventional power amplifier the benefits of the Class D amplifier are:

- higher efficiency
- lower power dissipation
- smaller cooling fin
- smaller mains transformer

Disadvantage of this concept is:

- 500kHz square wave signal with high current requires a shielding box to suppress radiation.

Required Circuitries:

• 500kHz square wave oscillator.

The oscillator frequency is created by 7312-C; it is a dual-frequency oscillator with ceramic resonators 5300 and 5302, which resonate at 500kHz and 425kHz respectively. The resonators are switched by transistors 7309 and 7316, controlled by the "OZ_SW" line from the port expander 7406.

The reason for 2 frequencies is to avoid tuner disturbances in the AM-band.

The oscillator signal is shaped to square wave with 7312-B, afterwards buffered and fed to the amplifier modulators (ROZ to the right channel, LOZ to the left).

• Modulator

The modulator forms the pulse width modulated signal. For each channel a separate modulation is required.

• Power FETs

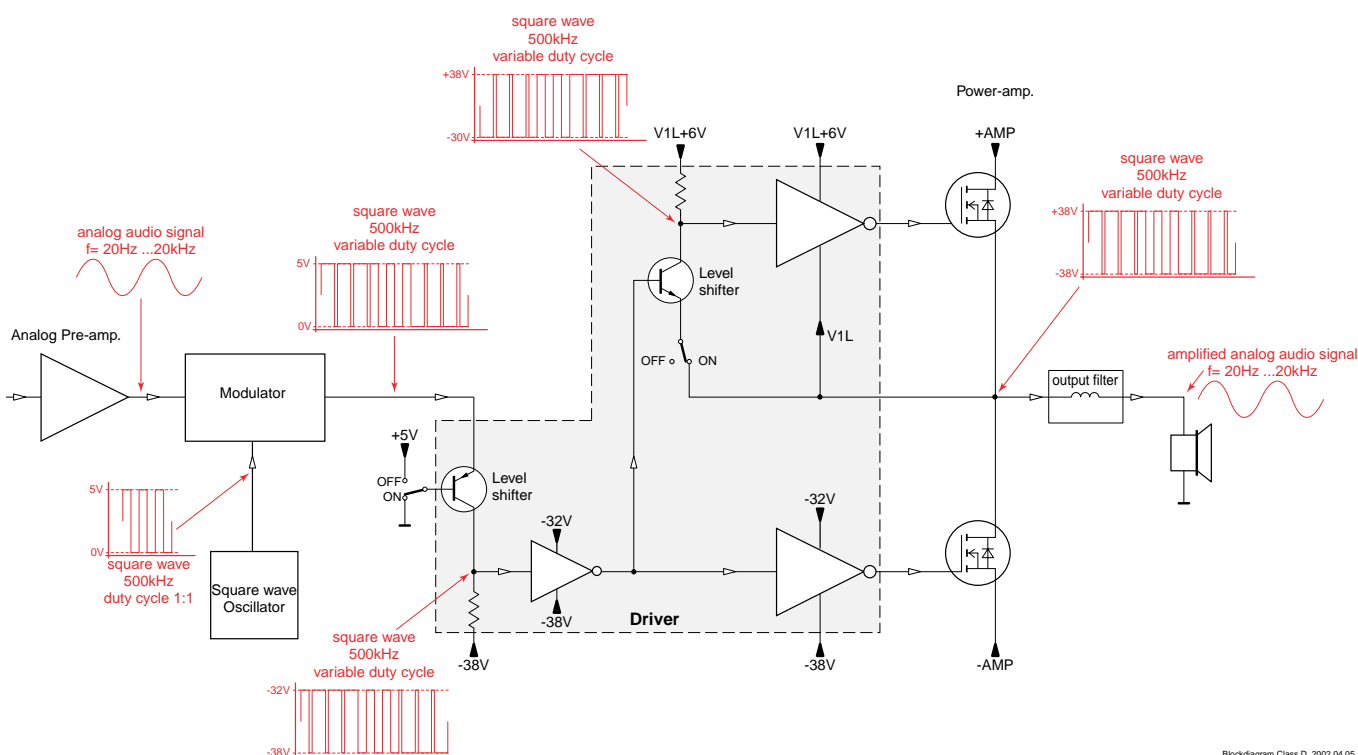
The FETs require drivers which supply the gates. One for the high-side-FET and one for the low-side-FET. Because of the different supply voltages also an additional level shifter is necessary per driver.

• Output filter

The output filter is necessary to block the 500kHz square wave signal from the speaker.

It consists of a series-mode coil 5101 and a capacity of approx. 500nF (2116, 2134), which forms a Chebycheff filter with 40kHz cut-off frequency at 6Ω load. For EMC reasons both, the speaker output and the return ground are fed through a common mode coil 5102, the filter is further improved by splitting the output capacity into 2116 before and 2134 after the common mode coil.

Blockdiagram Class D



All above mentioned circuitries are located inside the metal shielding box.

Class-D Circuit Description (BASED ON POWER 2002 MODULE - 70W CLASS D)

Functional Description:

Refers to the left channel in schematic diagrams.

The first stage of the modulator is an error integrator which compares the input to the (20 dB amplified) output signal of the power stage. The difference is leading to a current, which loads the integrator 7122-A. The second stage (7122-B) is again integrating, thus creating high gain at low frequency, which leads to high feedback and low distortion. The next stage is a comparator, which compares the integrated voltage to a triangle wave - thus creating a voltage controlled duty cycle. The comparator is realized by cascaded gates.

At pin 12 of IC7122 there is a square wave with the same frequency and duty cycle as the desired output.

The next task is to feed this information to the output FETs. Both FETs are n-channel types, so they are modulated by feeding the gate in respect to the source connection. We use inverters 74LV14 as drivers. The driver for the low-side FET (7121) is supplied by the negative supply -VL and a voltage +VL generated by 7115, which is 6.3V higher than -VL. The digital signal is level-shifted by 7128 to the negative supply reference. 3142, 6111 and 2126 together is a delay circuit for rising edges by approx. 50ns, this is to compensate the switch-off delay of the FETs and ensures that both FETs are not conducting at the same time.

The high-side FET (7109) is controlled by the inverted signal taken from pin 2 of 7118-A, which is level-shifted by transistor 7119. The driver for the high-side FET is supplied by a floating voltage between the amplifier output -V1L and +V1L, created by the charge pump 6107, 2114 regulated by 7114 to a 6.3V higher level. The pump is supplied by +5.6V to ensure supply at start-up (no signal). The necessary delay for the rising edge is generated by the level-shifter (mainly the pull-up 3117) and the input capacity of the driver (pin 13 of 7105-F).

The last stage in the gate driver consists of three gates in parallel for increased output current for the capacitive load, afterwards comes a 22R series resistor for soft rising edges and a transistor for very fast falling edges. This combination gives the best compromise of efficiency and radiation.

Protection Circuits:

The amplifier is protected against low load impedance (including short circuit). Current is sensed by shunts 3101, 3130 in both supplies. Overcurrent at the positive supply is then sensed by 7104, the negative supply overcurrent triggers 7117, which then also triggers 7104. The collector current then triggers the monoflop 7122-D and -E, giving a high pulse at pin 8. This shuts off level-shifter 7128 and triggers transistor 7129, which draws current into the emitter resistors (3134, 3127) of level-shifter 7119, which is therefore also shut off. So both FETs are shut off for approx. 0.2 sec, afterwards the amplifier tries to work again, but if the overload continues the on-time is only a few cycles.

The shut-off mechanism is also used to shut off the amplifier during headphone usage; this is done by pulling pin 11 of 7122-E high. The line "AMP_OFF" is controlled by the port expander 7406.

The loudspeakers are protected against DC voltages resulting e.g. from defective FETs, voltages greater than +-2V are detected by 7110+7112 and pull down the "DC_PROT" line, which disables the speaker relay 1201.

The gain of the class-D amplifier is 20dB, adjusted by the feedback resistors 3136, 3149 and the input resistors 3139, 3340. The input reference voltage for 7122-A is approx. half the supply, therefore 3144, 3148 are used for offset compensation. This compensation can be fine-tuned by the potentiometer 3306 to reach <1mV DC output.

Service Hints

The analog part of the Combi Board can be repaired without opening the metal shielding box. In case of a 'Class D' problem it is advised to disassemble the board first, desolder the metal bottom of the shielding box and assemble the board again. This takes a few minutes only.

Attention: Poor soldering of the metal shielding box results in disturbance of the tuner.

In most cases the FETs 7109 and/or 7121 for the left channel, respectively 7218 and/or 7231 for the right channel will be defective. This can be checked easily with an ordinary Ohm-meter.

LEFT CHANNEL:

In case **7109** is defect replace following parts: 7109, 7111, 7105, 7119, 7104 and 3101

In case **7121** is defect replace following parts: 7121, 7113, 7118, 7117 and 3130

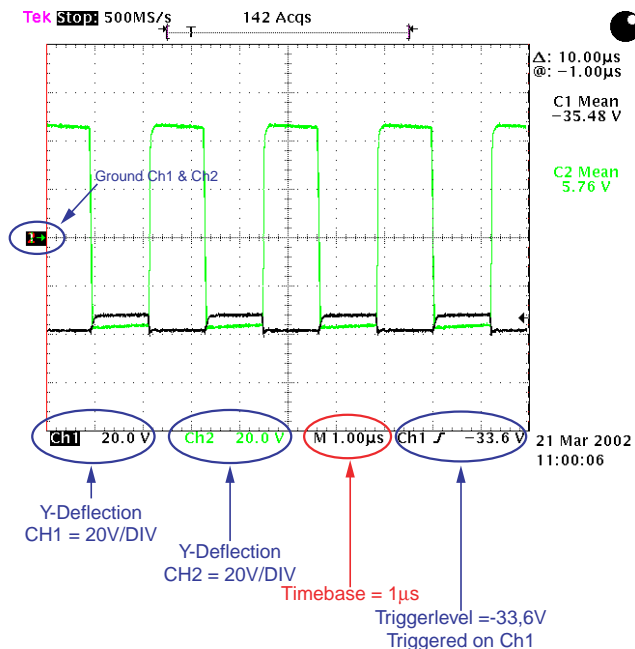
RIGHT CHANNEL:

In case **7218** is defect replace following parts: 7218, 7221, 7209, 7228, 7208 and 3205

In case **7231** is defect replace following parts: 7231, 7210, 7235, 7227 and 3243

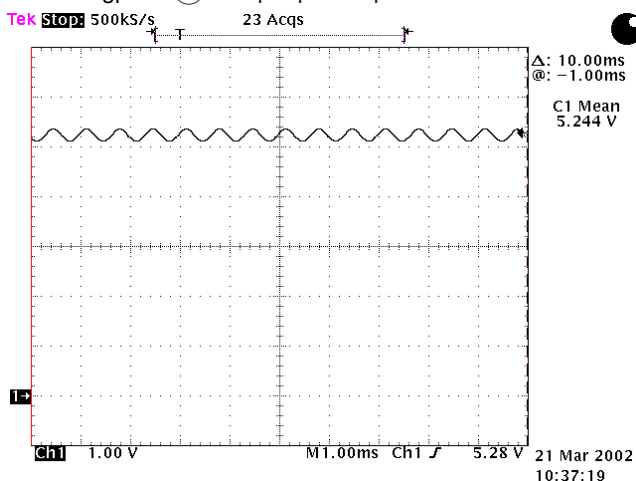
If none of the FETs is defective the fault is most probably located in the modulator. To check the operation - follow the given signals.

General description of Oscilloscope setup:



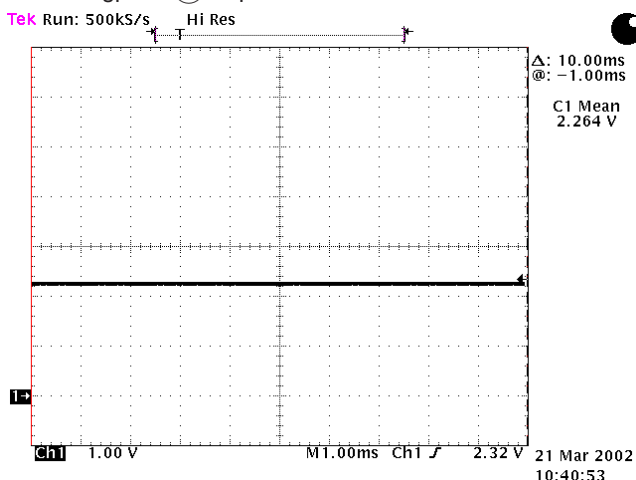
The following signals are measured at:
 AUX in = 500mV/1kHz, Volume = -28dB

Measuringpoint (A): Output pre-amplifier

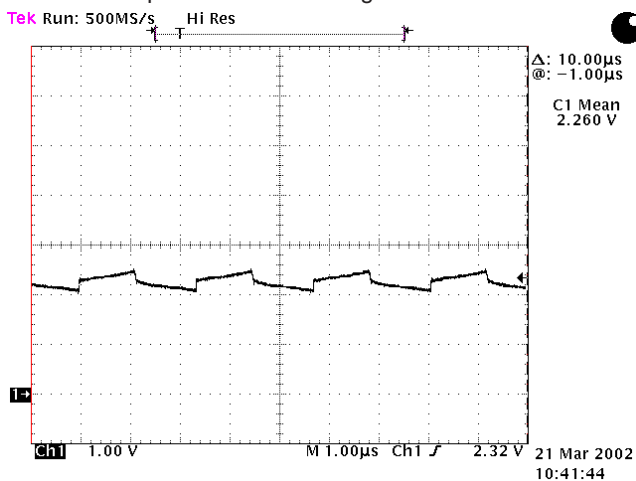


Normal analog signal measured (1kHz- Timebase 1µs). If this signal can't be measured - the fault is outside the shielding box.

Measuringpoint (B): Input Modulator

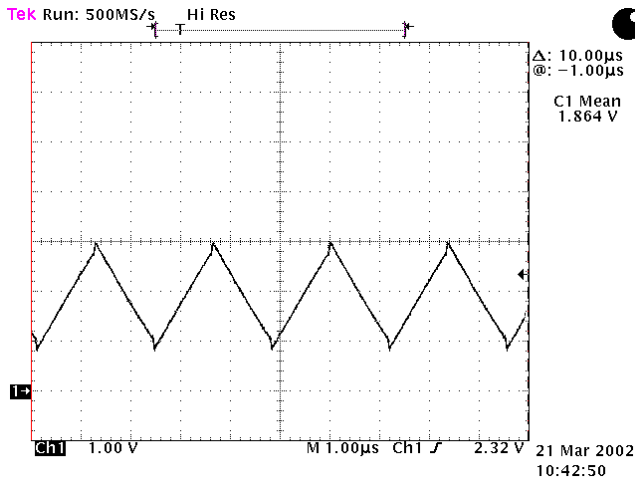


The 1kHz signal not visible anymore. Reducing the timebase to 1µs shows the oscillogram below.



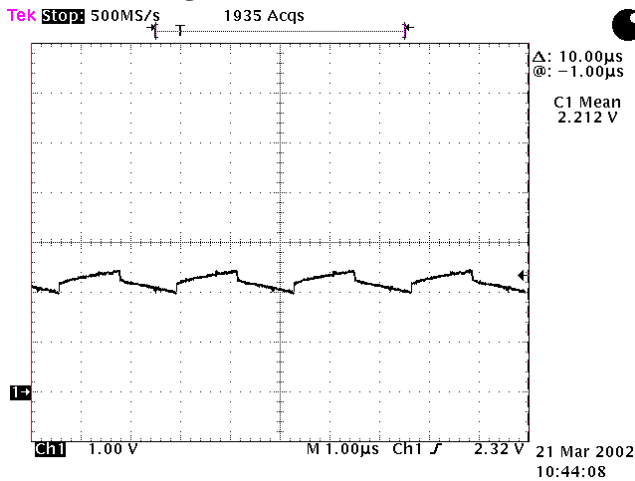
Service Hints

Measuringpoint (C):



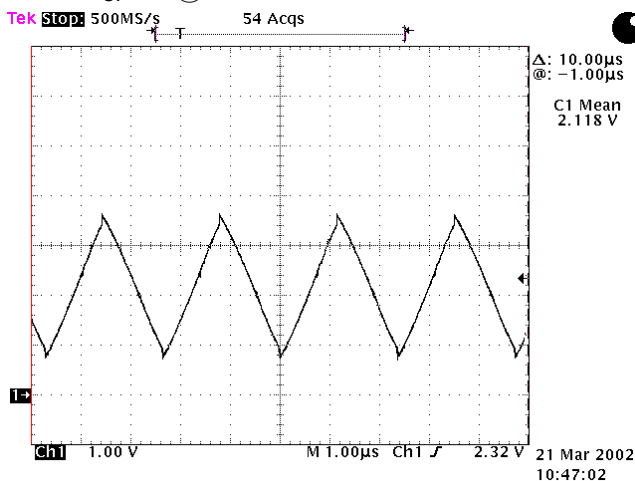
The first stage of the modulator is an integrator. An integrated rectangle results in a triangle.

Measuringpoint (D):



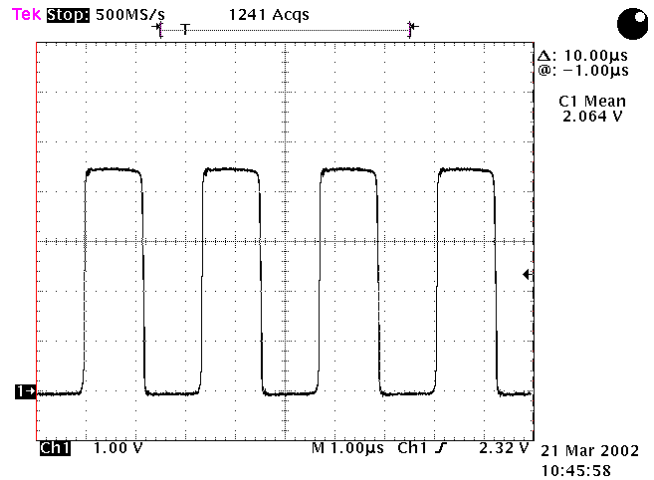
The oscillator signal (squarewave) is fed to the second integrator (7122-B).

Measuringpoint (E):



The integrated rectangle results in a triangle. 7122-C and 7122-F work as a comparator.

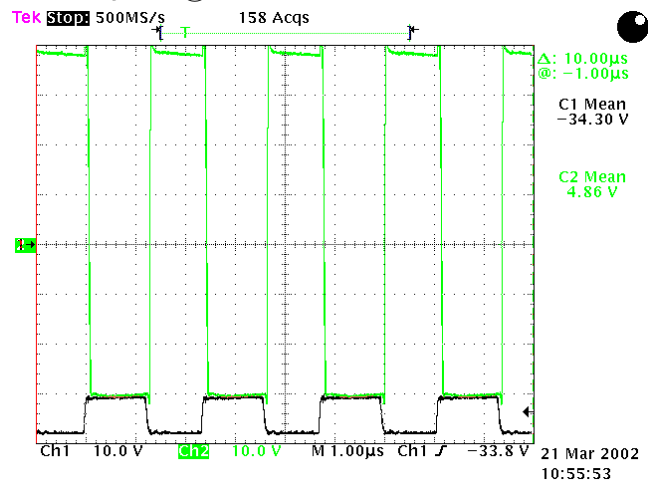
Measuringpoint (F): Output modulator



In this pulse width modulated square wave the analog Audio signal is included. Measurements with an analog scope will show a jitter on the falling edge.

The modulator frequency is still fixed to 500kHz. Similar to a frequency modulation - in this case the amplitude of the analog audio signal varies the pulse width, the frequency defines the speed.

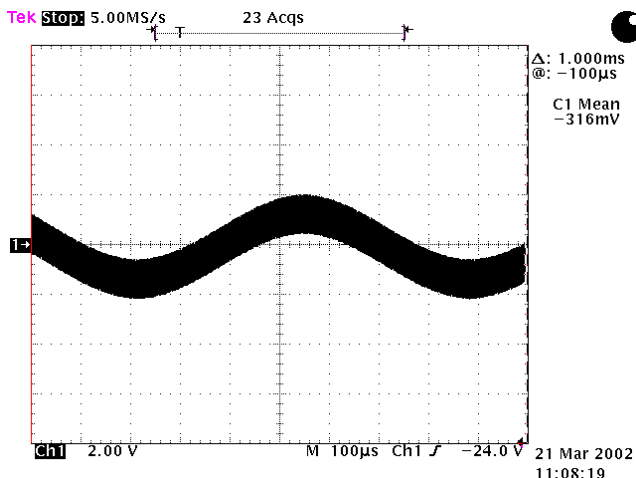
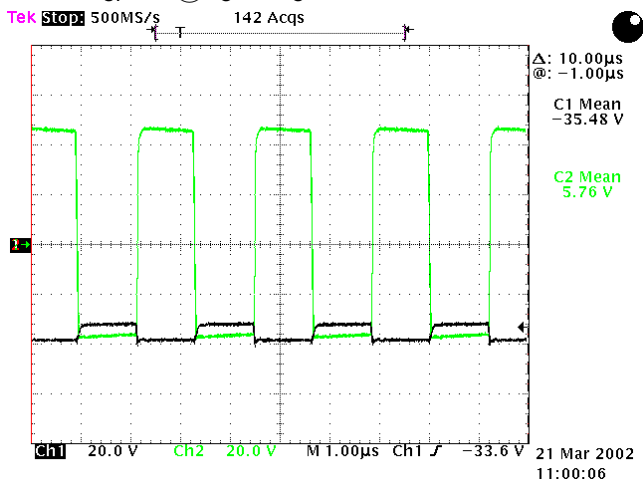
Measuringpoint (G):



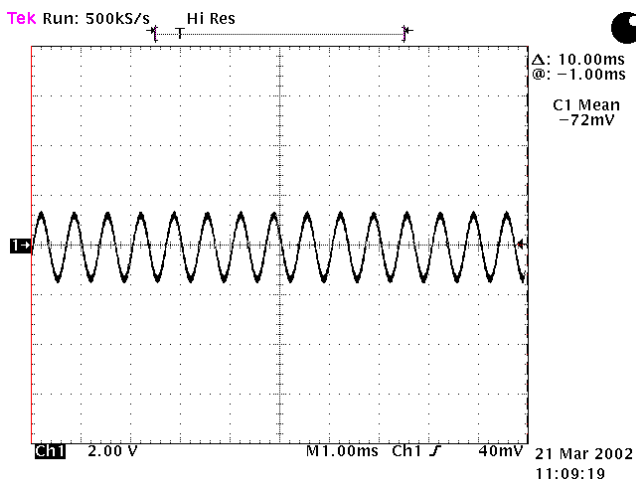
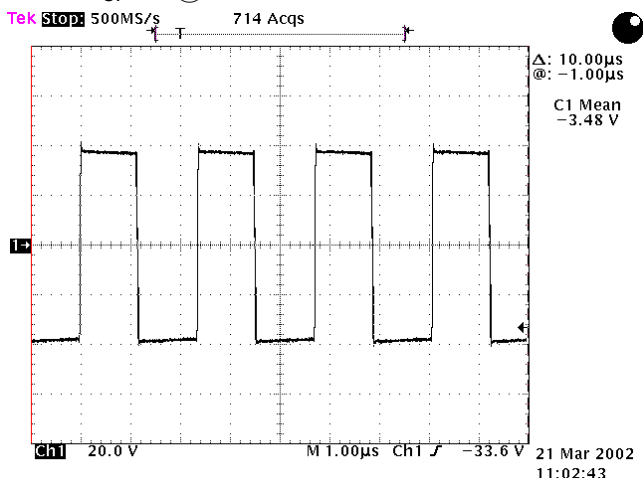
The low-side driver signal (Ch1) is the modulator output level-shifted by transistor 7128. The high-side driver signal (Ch2) is the inverted low-side driver signal level-shifted by transistor 7119.

Service Hints

Measuringpoint (H): gate-signal of the FETs



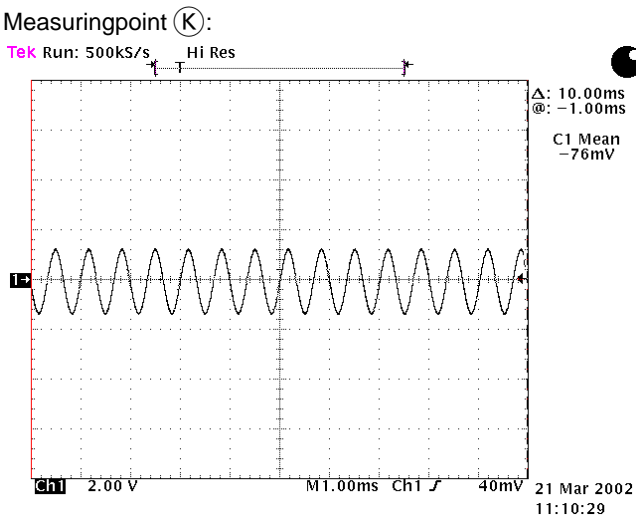
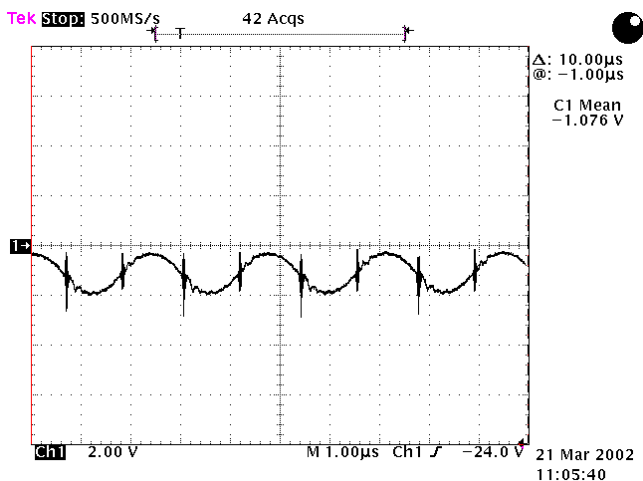
Measuringpoint (I):



Digital output signal.

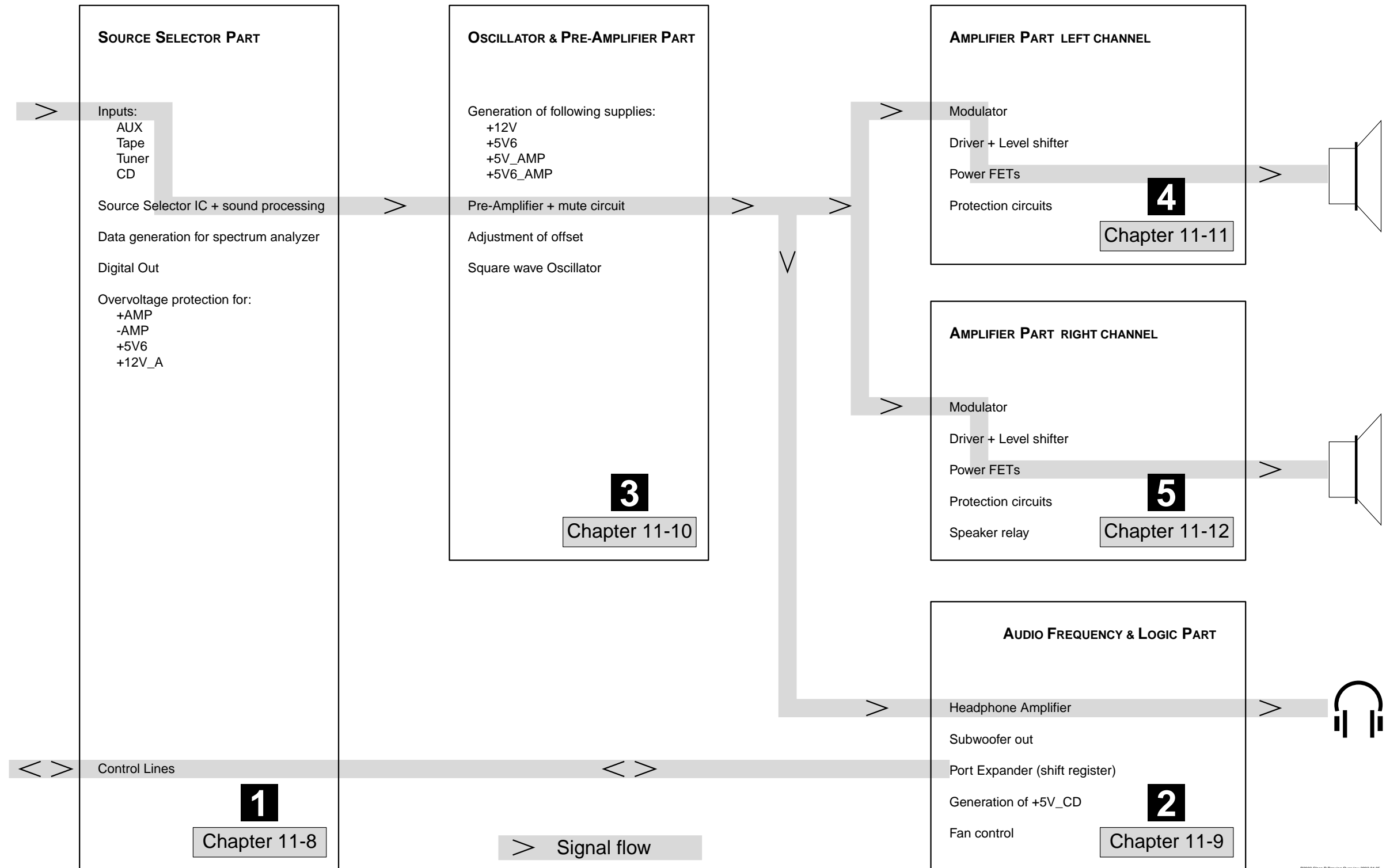
Measuringpoint (J):

The following three signals are measured after output filter 5101 with different timebases.

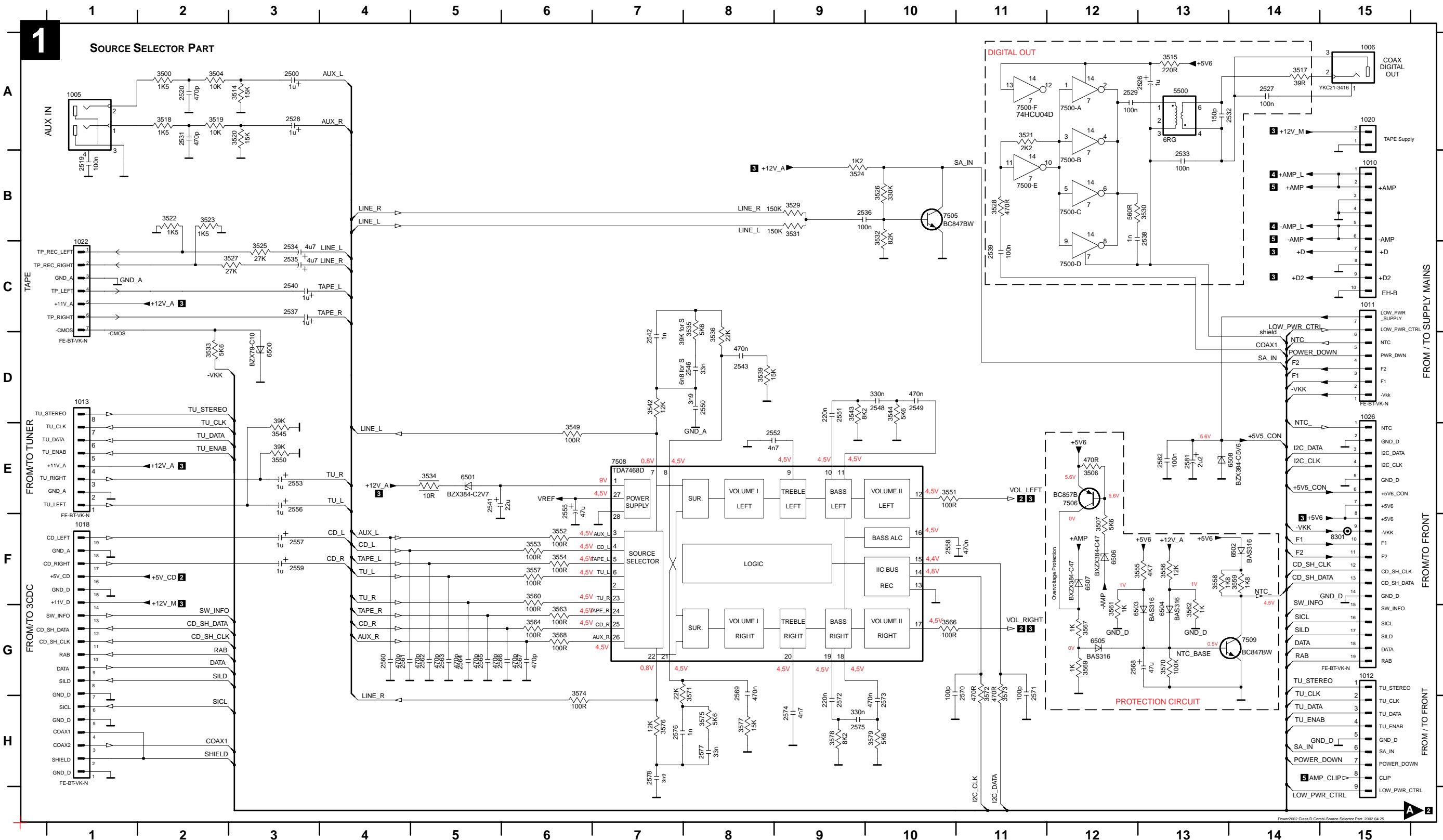


After common mode coil 5102 - the audio signal is restored.

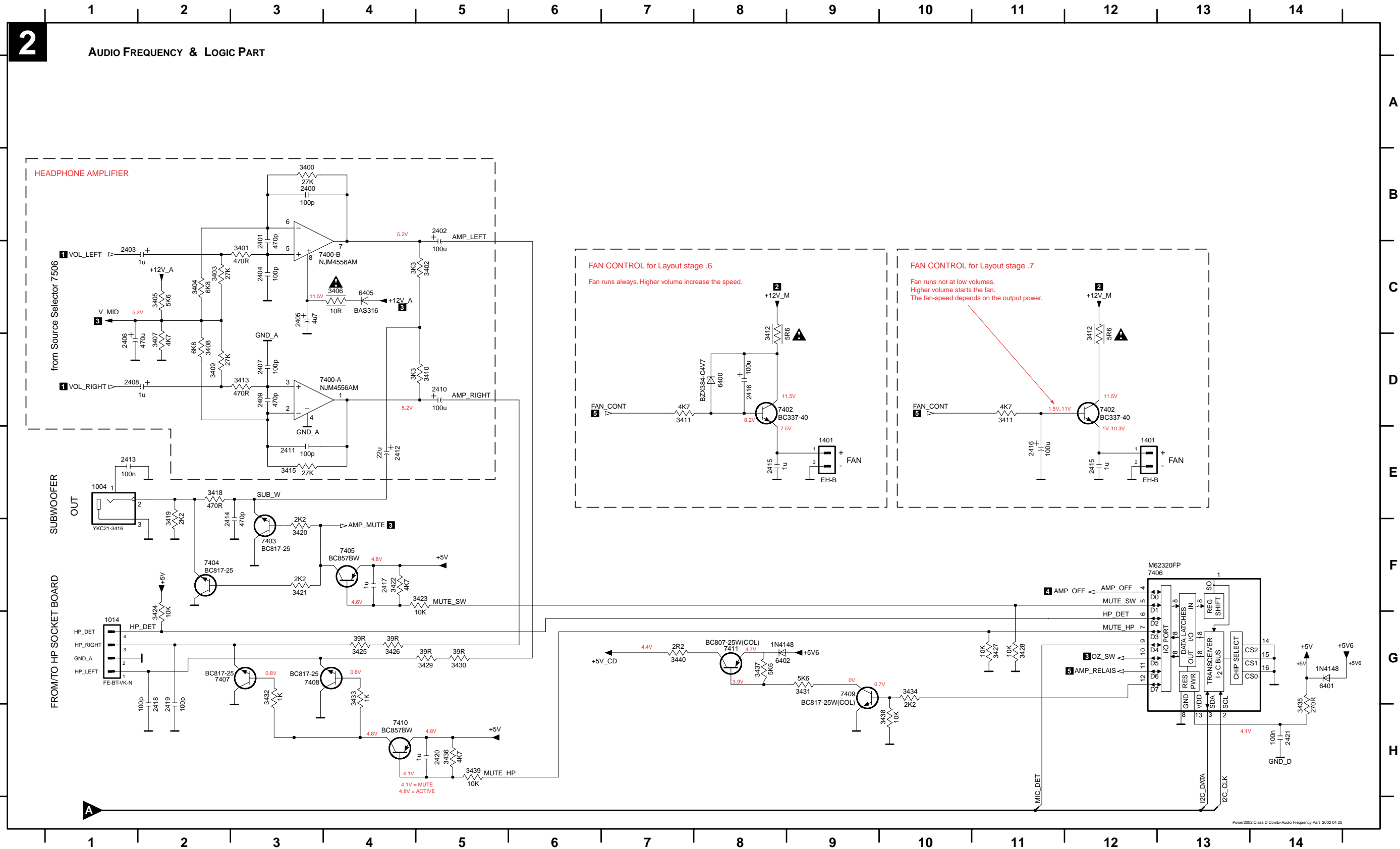
Power 2002 70W Class D Combi Board Circuit Diagram Overview



1005	A1	1022	B1	2528	A3	2537	B3	2548	D10	2556	E3	2564	G5	2572	H9	2582	D12	3518	A2	3526	B10	3534	C5	3549	E6	3557	F6	3566	G11	3574	H6	6500	C3	6508	D13	7505	B10
1006	A15	1026	D15	2529	A12	2538	B13	2549	D10	2557	F3	2565	G5	2573	H10	3500	A2	3519	A3	3527	B3	3535	C8	3550	E3	3558	F13	3567	G12	3575	H8	6501	C5	6510	E13	7506	E12
1010	B15	1311	C1	2531	A2	2539	C11	2550	D8	2558	F11	2566	G6	2574	H9	3504	A3	3520	A3	3528	B11	3536	D8	3551	E10	3559	F14	3568	G6	3576	H7	6502	F14	7500-A	A12	7508	E7
1011	C15	2500	A3	2532	A13	2540	C3	2551	D9	2559	F3	2567	G6	2575	H9	3506	E12	3521	A11	3529	B9	3537	D8	3552	F6	3560	F6	3569	G12	3577	H8	6503	G13	7500-B	B12	7509	G14
1012	G15	2519	A1	2533	B13	2541	D6	2552	E8	2560	G4	2568	G12	2576	H7	3507	F12	3522	A2	3530	B13	3542	D7	3553	F6	3561	G12	3570	G13	3578	H9	6504	G13	7500-C	B12	7510	E13
1013	D1	2520	A2	2534	B3	2542	D7	2553	E3	2561	G4	2569	G8	2577	H8	3514	A3	3523	B2	3531	B9	3543	D9	3554	F6	3562	G13	3571	G8	3579	H10	6505	G12	7500-D	C12	8301	F14
1018	F1	2526	A13	2535	B3	2543	D8	2554	E2	2562	G5	2570	G10	2578	H7	3515	A13	3524	B9	3532	B10	3544	D10	3555	F13	3563	G6	3572	G10	4501	D13	6506	F12	7500-E	B11		
1020	A15	2527	A14	2536	B9	2546	D8	2555	E6	2563	G5	2571	G11	2581	E13	3517	A14	3525	B3	3533	C2	3545	E3	3556	F13	3564	G6	3573	G11	5500	A13	6507	F12	7500-F	A11		

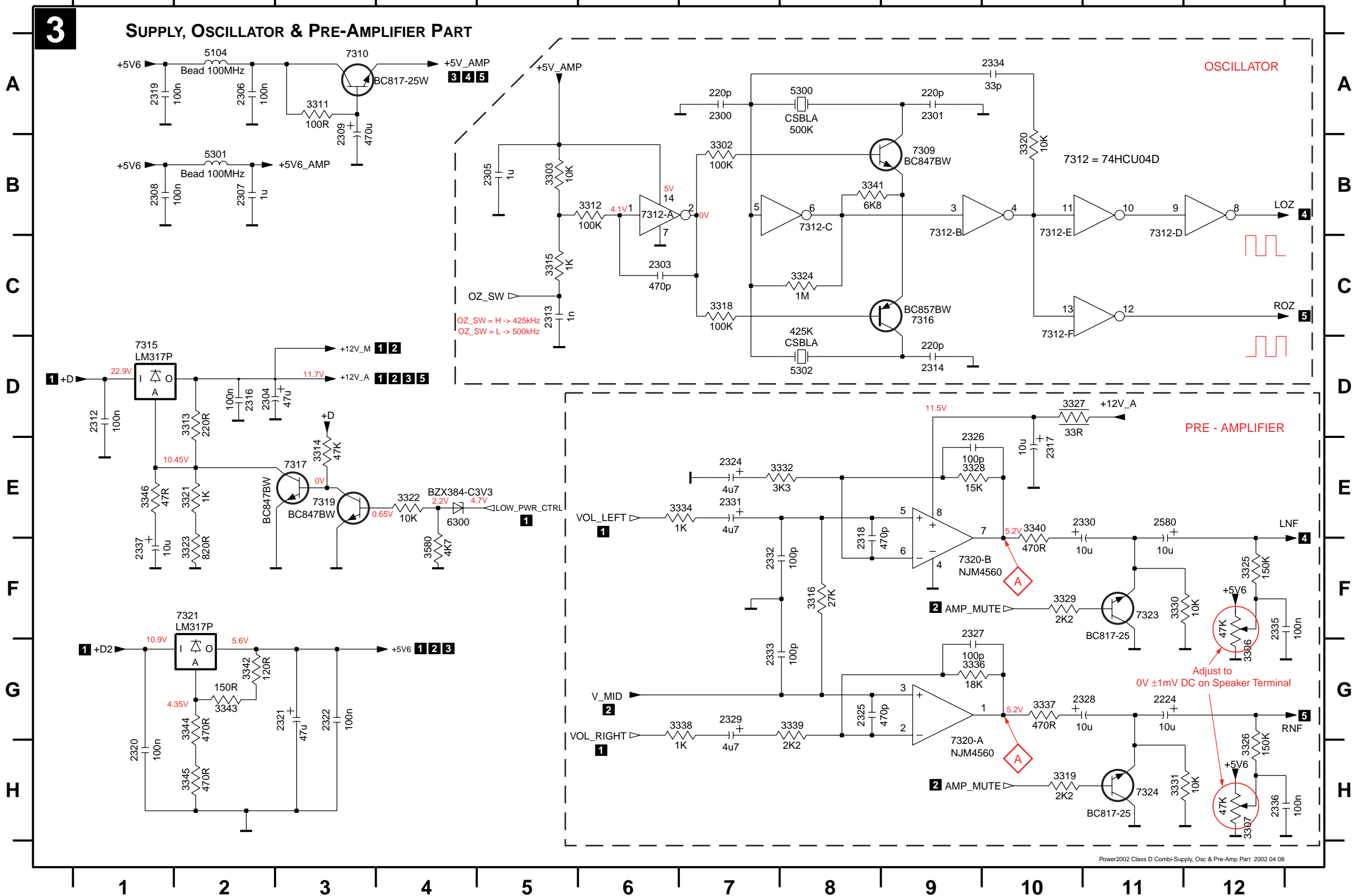


1004 E1	2400 B3	2404 C3	2408 D1	2412 E4	2416 D8	2420 H5	3402 C5	3406 C4	3410 D5	3415 E3	3421 F3	3425 G4	3429 G5	3433 G4	3437 H8	6400 D8	7400-B C3	7405 F4	7409 G9	9268 G8
1014 G1	2401 C3	2405 C4	2409 D3	2413 E1	2417 F4	2421 H14	3403 C2	3407 D2	3411 D7	3418 E2	3422 F4	3426 G4	3430 G5	3434 G10	3438 H10	6401 G14	7402 D8	7406 F12	7410 G4	
1400 D13	2402 B5	2406 D1	2410 D5	2414 F2	2418 H2	3400 B3	3404 C2	3408 D2	3412 D8	3419 F2	3423 F5	3427 G11	3431 G9	3435 H14	3439 H5	6402 H8	7403 F3	7407 G2	7411 H8	
1401 E9	2403 C1	2407 D3	2411 E3	2415 E8	2419 H2	3401 C3	3405 C2	3409 D2	3413 D3	3420 F3	3424 G2	3428 G11	3432 G3	3436 H5	3440 H7	7400-A D3	7404 F2	7408 G3	8302 E12	



3

SUPPLY, OSCILLATOR & PRE-AMPLIFIER PART

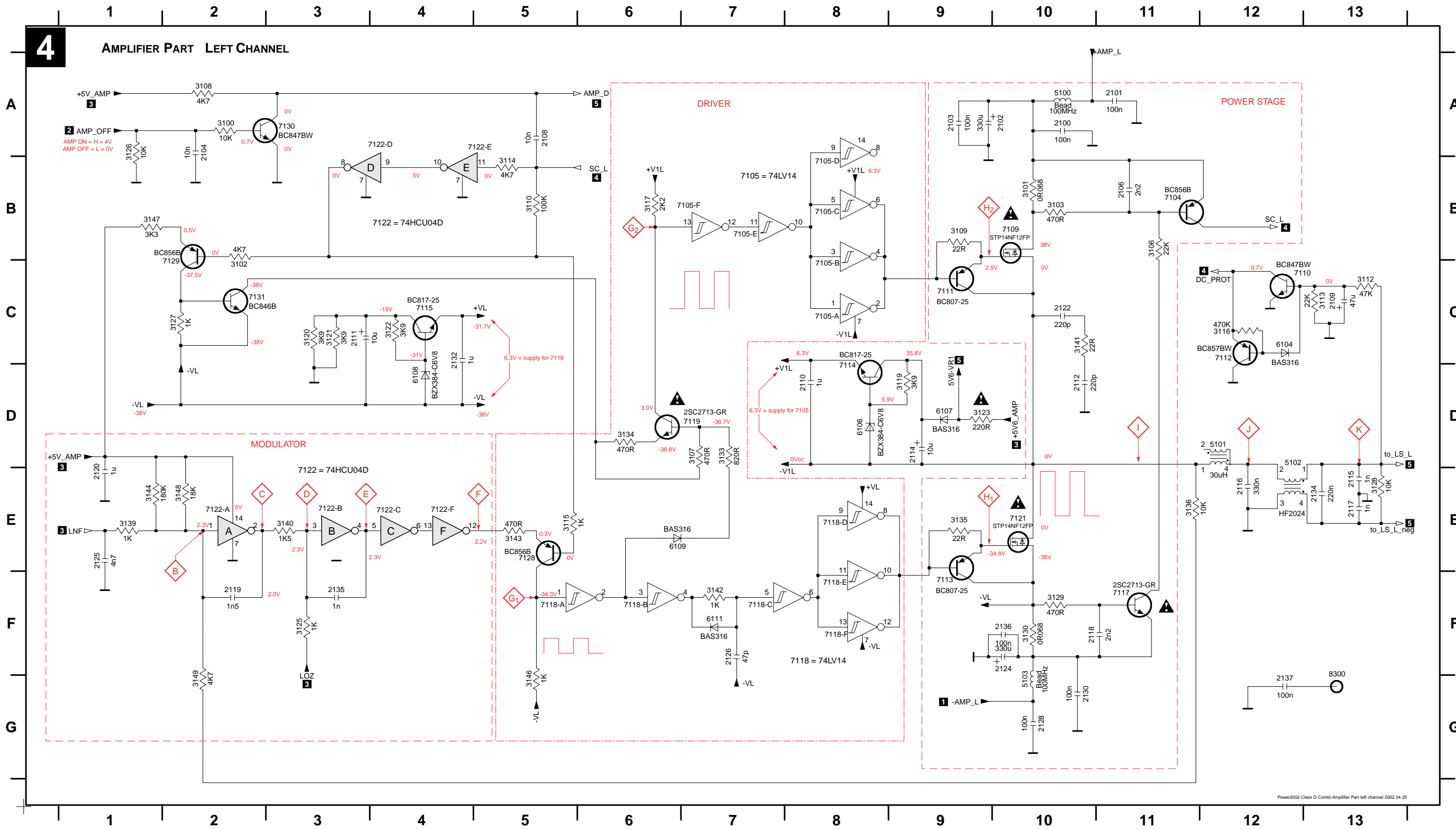


- 2224 G11
- 2300 A7
- 2301 A9
- 2303 B6
- 2304 D3
- 2305 B5
- 2306 A2
- 2307 B2
- 2308 B1
- 2309 B3
- 2312 E1
- 2313 C6
- 2314 D9
- 2316 D2
- 2317 E10
- 2318 F8
- 2319 A1
- 2320 H1
- 2321 G3
- 2322 G3
- 2324 E7
- 2325 G8
- 2326 E9
- 2327 F9
- 2328 G11
- 2329 G7
- 2330 E11
- 2331 E7
- 2332 F7
- 2333 G7
- 2334 A10
- 2335 F12
- 2336 H12
- 2337 F1
- 2580 E11
- 3302 B7
- 3303 B5
- 3306 G12
- 3307 H12
- 3311 A3
- 3312 B6
- 3313 D2
- 3314 E3
- 3315 C5
- 3316 F8
- 3318 C7
- 3319 H10
- 3320 B10
- 3321 E2
- 3322 E4
- 3323 F2
- 3324 C8
- 3325 F12
- 3326 G12
- 3327 D10
- 3328 E9
- 3329 F10
- 3330 F11
- 3331 H11
- 3332 E8
- 3334 E7
- 3336 G9
- 3337 G10
- 3338 G7
- 3339 G8
- 3340 E10
- 3341 B8
- 3342 G2
- 3343 G2
- 3344 G2
- 3345 H2
- 3346 E1
- 3347 G6
- 3580 F4
- 4301 A5
- 5104 A2
- 5300 A8
- 5301 B2
- 5302 D8
- 6300 E4
- 7309 B9
- 7310 A3
- 7312-A C6
- 7312-B C9
- 7312-C B8
- 7312-D C11
- 7312-E C10
- 7312-F D10
- 7315 D1
- 7316 C9
- 7317 E3
- 7319 E3
- 7320-A G9
- 7320-B F9
- 7321 F2
- 7323 F11
- 7324 H11
- 9284 H4
- 9288 G4

◇ for wave forms see chapter 11-4 Service Hints

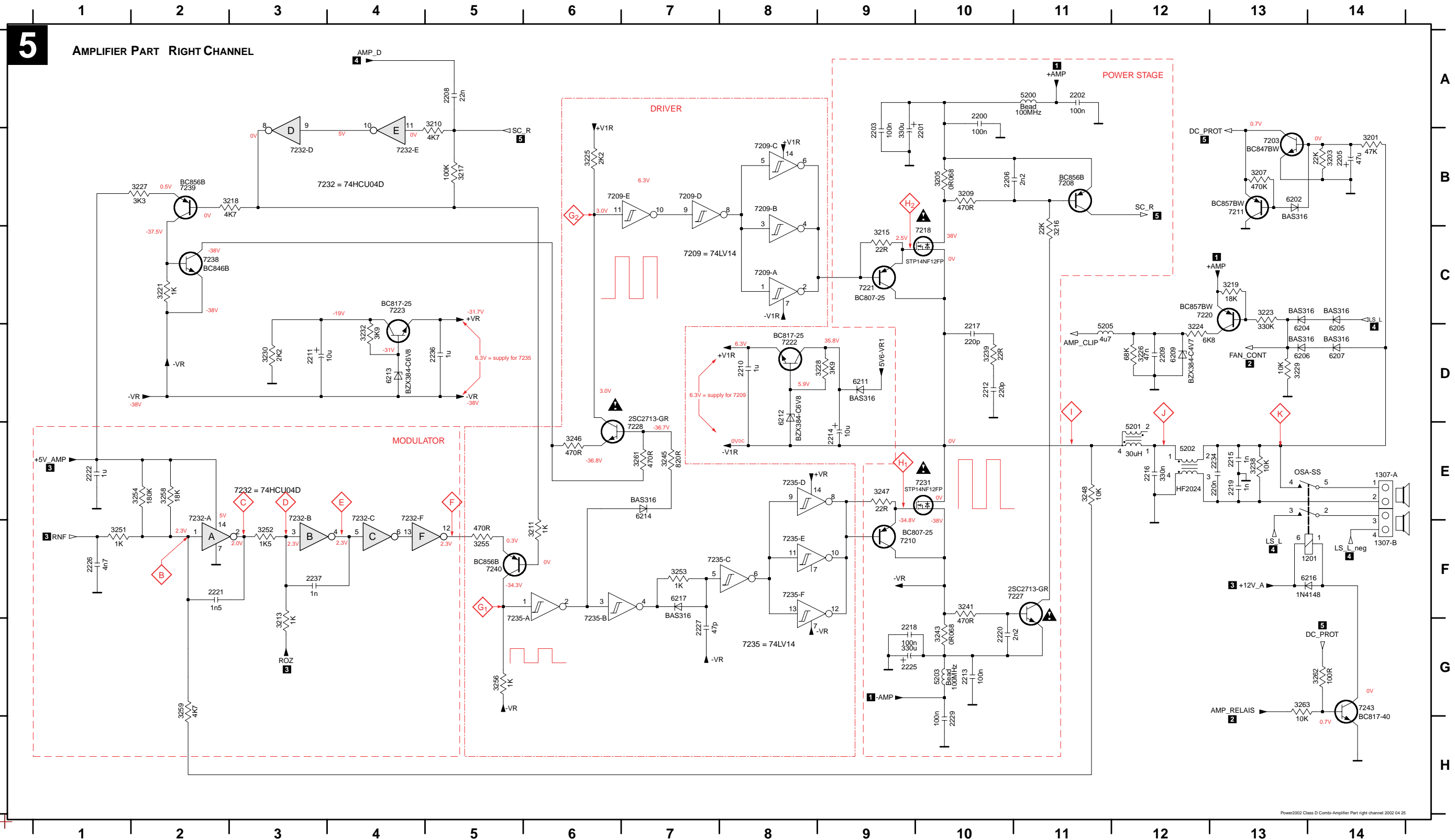
Attention:
 Adjustment to 0V ±1mV has to be done with 'cold' set.
 After operating a few minutes the value may increase up to 30mV.

2100 A10	2106 B11	2112 D10	2118 F10	2125 E1	2134 E13	3101 B10	3108 A2	3114 B5	3120 C3	3126 A1	3133 D7	3140 E3	3146 F5	5101 D12	6106 D8	7104 B11	7105-E B7	7112 C12	7118-A F5	7118-F F8	7122-C E3	7129 B2
2101 A11	2108 A5	2114 D9	2119 F2	2126 F7	2135 F3	3102 C2	3109 B9	3115 E5	3121 C3	3127 C2	3134 D6	3141 C10	3147 B1	5102 D12	6107 D9	7105-A C8	7105-F B6	7113 F9	7118-B F6	7119 D7	7122-D A4	7130 A3
2102 A10	2109 C13	2115 E13	2120 E1	2128 G10	2136 F10	3103 B10	3110 B5	3116 C12	3122 C4	3128 E13	3135 E9	3142 F7	3148 F2	5103 G10	6108 D4	7105-B C8	7109 B10	7114 C8	7118-C F7	7121 E10	7122-E A5	7131 C2
2103 A9	2110 D8	2116 E12	2122 C10	2130 G10	2137 G12	3106 B11	3112 C13	3117 B6	3123 D9	3129 F10	3136 E11	3143 E5	3149 G2	5105 A2	6109 E6	7105-C B8	7110 C13	7115 C4	7118-D E8	7122-A E2	7122-F E4	8300 G13
2104 A2	2111 C3	2117 E13	2124 F10	2132 C4	3100 A2	3107 D7	3113 C13	3119 D9	3125 F3	3130 F10	3139 E2	3144 F2	5100 A10	6104 C12	6111 F7	7105-D B8	7111 C9	7117 F11	7118-E F8	7122-B E3	7128 E5	



for wave forms see chapter 11-4 Service Hints

1201 F14	2203 B9	2211 D3	2217 D10	2225 G9	2237 F3	3210 A5	3218 B3	3226 D12	3238 E13	3247 E9	3255 F5	3263 G13	6202 B13	6211 D9	7203 B13	7209-E B6	7221 C9	7232-A F2	7235-A G5	7238 C2
1307-A E14	2205 B14	2212 D10	2218 G9	2226 F2	3201 B14	3211 F6	3219 C13	3227 B2	3239 D10	3248 E11	3256 G5	5200 A11	6204 D13	6212 D8	7208 B11	7209-F A8	7222 D8	7232-B F3	7235-B G6	7239 B2
1307-B F14	2206 B10	2213 G10	2219 E13	2227 G7	3203 B14	3213 G3	3221 C2	3228 D9	3241 F10	3251 F2	3258 G2	5201 E12	6205 D14	6213 D4	7209-A C8	7210 F9	7223 C4	7232-C F4	7235-C F7	7240 F5
2200 A10	2208 A5	2214 E9	2220 G10	2229 H10	3205 B10	3215 C9	3223 C13	3229 D13	3243 G10	3252 F3	3259 G2	5202 E12	6206 D13	6214 E7	7209-B B8	7211 B13	7227 F11	7232-D B3	7235-D E8	7243 G14
2201 B10	2209 D12	2215 E13	2221 F2	2234 E13	3207 B13	3216 C11	3224 D12	3230 D3	3245 E7	3253 F7	3261 E7	5203 G10	6207 D14	6216 F14	7209-C B8	7218 C10	7228 E7	7232-E B4	7235-E F8	
2202 A11	2210 D8	2216 E12	2222 E1	2236 D5	3209 B10	3217 B5	3225 B6	3232 D4	3246 E6	3254 G2	3262 G14	5205 D11	6209 D12	6217 F7	7209-D B7	7220 C13	7231 E10	7232-F F4	7235-F F8	



◇ for wave forms see chapter 11-4 Service Hints

ELECTRICAL PARTSLIST POWER 2002 70W Class-D Combi Board**MISCELLANEOUS**

1004	4822 267 31729	CINCH SOCKET, 1 POLE
1005	4822 265 20553	CINCH SOCKET, 2 POLE
1006	4822 267 31729	CINCH SOCKET, 1 POLE
1011	4822 267 10953	FFC-CONNECTOR, 7P, TOP ENTRY
1012	2422 025 14518	FFC-CONNECTOR, 9P, TOP ENTRY
1013	4822 265 11515	FFC-CONNECTOR, 8P, TOP ENTRY
1014	4822 267 10733	FFC-CONNECTOR, 4P
1018	4822 265 11553	FFC-CONNECTOR, 19P
1022	4822 267 10953	FFC-CONNECTOR, 7P, TOP ENTRY
1026	4822 265 11553	FFC-CONNECTOR, 19P
1201	2422 132 07517	RELAY 2P 12V
1307	4822 267 31176	SPEAKER TERMINAL

CAPACITORS

2100©	4822 122 33496	100nF	10%	63V
2101©	2222 580 15649	100nF	10%	50V
2102	2020 012 93762	330µF	20%	50V
2103©	4822 126 14585	100nF	10%	50V
2104©	5322 126 11583	10nF	10%	63V
2106©	2238 786 11554	2,2nF	5%	16V
2108©	5322 126 11583	10nF	10%	63V
2109	4822 124 81286	47µF	20%	16V
2110©	3198 017 41050	1µF	20%	10V
2111	4822 124 40248	10µF	20%	63V
2112©	4822 122 33575	220pF	5%	50V
2114	4822 124 40248	10µF	20%	63V
2115©	5322 126 11578	1nF	10%	63V
2116	5322 121 42661	330nF	5%	63V
2117©	5322 126 11578	1nF	10%	63V
2118©	2238 786 11554	2,2nF	5%	16V
2119©	4822 126 14247	1,5nF	10%	50V
2120©	3198 017 41050	1µF	20%	10V
2122©	4822 122 33575	220pF	5%	50V
2124	2020 012 93762	330µF	20%	50V
2125©	4822 126 13193	4,7nF	10%	63V
2126©	4822 122 33777	47pF	5%	63V
2128©	2222 580 15649	100nF	10%	50V
2130©	4822 126 14585	100nF	10%	50V
2132©	3198 017 41050	1µF	20%	10V
2134	4822 121 42408	220nF	5%	63V
2135©	3198 016 31020	1nF	5%	25V
2136©	4822 126 14585	100nF	10%	50V
2137	5322 121 42386	100nF	5%	63V
2200©	4822 126 14585	100nF	10%	50V
2201	2020 012 93762	330µF	20%	50V
2202©	2222 580 15649	100nF	10%	50V
2203©	4822 126 14585	100nF	10%	50V
2205	4822 124 81286	47µF	20%	16V
2206©	2238 786 11554	2,2nF	5%	16V
2208©	4822 126 14494	22nF	10%	25V
2209©	3198 024 44730	47nF	5%	50V
2210©	3198 017 41050	1µF	20%	10V
2211	4822 124 40248	10µF	20%	63V
2212©	4822 122 33575	220pF	5%	50V
2213©	4822 122 33496	100nF	10%	63V
2214	4822 124 40248	10µF	20%	63V
2215©	5322 126 11578	1nF	10%	63V
2216	5322 121 42661	330nF	5%	63V
2217©	4822 122 33575	220pF	5%	50V
2218©	4822 126 14585	100nF	10%	50V
2219©	5322 126 11578	1nF	10%	63V
2220©	2238 786 11554	2,2nF	5%	16V
2221©	4822 126 14247	1,5nF	10%	50V
2222©	3198 017 41050	1µF	20%	10V

CAPACITORS

2224	4822 124 11947	10µF	20%	16V
2225	2020 012 93762	330µF	20%	50V
2226©	4822 126 13193	4,7nF	10%	63V
2227©	4822 122 33777	47pF	5%	63V
2229©	2222 580 15649	100nF	10%	50V
2234	4822 121 42408	220nF	5%	63V
2236©	3198 017 41050	1µF	20%	10V
2237©	3198 016 31020	1nF	5%	25V
2300©	4822 126 13883	220pF	5%	50V
2301©	4822 126 13883	220pF	5%	50V
2303©	4822 126 13881	470pF	5%	50V
2304	4822 124 81286	47µF	20%	16V
2305©	3198 017 41050	1µF	20%	10V
2306©	4822 126 14585	100nF	10%	50V
2307©	3198 017 41050	1µF	20%	10V
2308©	2238 586 59812	100nF	10%	50V
2309	4822 124 80791	470µF	20%	16V
2312©	4822 126 14585	100nF	10%	50V
2313©	3198 016 31020	1nF	5%	25V
2314©	4822 126 13883	220pF	5%	50V
2316©	4822 126 14585	100nF	10%	50V
2317	4822 124 21732	10µF	20%	25V
2318©	4822 126 13881	470pF	5%	50V
2319©	4822 126 14585	100nF	10%	50V
2320©	4822 126 14585	100nF	10%	50V
2321	4822 124 81286	47µF	20%	16V
2322©	4822 126 14585	100nF	10%	50V
2324	4822 124 22726	4,7µF	20%	35V
2325©	4822 126 13881	470pF	5%	50V
2326©	2020 552 94427	100pF	5%	50V
2327©	2020 552 94427	100pF	5%	50V
2328	4822 124 21732	10µF	20%	25V
2329	4822 124 22726	4,7µF	20%	35V
2330	4822 124 21732	10µF	20%	25V
2331	4822 124 22726	4,7µF	20%	35V
2332©	2020 552 94427	100pF	5%	50V
2333©	2020 552 94427	100pF	5%	50V
2334©	2222 867 15339	33pF	5%	50V
2335©	2238 586 59812	100nF	10%	50V
2336©	2238 586 59812	100nF	10%	50V
2337	4822 124 21732	10µF	20%	25V
2400©	2020 552 94427	100pF	5%	50V
2401©	4822 126 13881	470pF	5%	50V
2402	4822 124 23052	100µF	20%	16V
2403	4822 124 22651	1µF	20%	50V
2404©	2020 552 94427	100pF	5%	50V
2405	4822 124 22726	4,7µF	20%	35V
2406	4822 124 80791	470µF	20%	16V
2407©	2020 552 94427	100pF	5%	50V
2408	4822 124 22651	1µF	20%	50V
2409©	4822 126 13881	470pF	5%	50V
2410	4822 124 23052	100µF	20%	16V
2411©	2020 552 94427	100pF	5%	50V
2412	4822 124 81151	22µF	20%	50V
2413©	2238 586 59812	100nF	10%	50V
2414©	4822 126 13881	470pF	5%	50V
2415©	3198 017 41050	1µF	20%	10V
2416	4822 124 23052	100µF	20%	16V
2417©	3198 017 41050	1µF	20%	10V
2418©	2020 552 94427	100pF	5%	50V
2419©	2020 552 94427	100pF	5%	50V
2420	4822 124 22651	1µF	20%	50V
2421©	2238 586 59812	100nF	10%	50V
2500	4822 124 21913	1µF	20%	63V
2519©	2238 586 59812	100nF	10%	50V

ELECTRICAL PARTSLIST POWER 2002 70W Class-D Combi Board

CAPACITORS

2520	4822 126 13881	470pF	5%	50V
2526	4822 124 21913	1µF	20%	63V
2527	2238 586 59812	100nF	10%	50V
2528	4822 124 21913	1µF	20%	63V
2529	2238 586 59812	100nF	10%	50V

2531	4822 126 13881	470pF	5%	50V
2532	4822 122 33753	150pF	5%	50V
2533	2238 586 59812	100nF	10%	50V
2534	4822 124 40769	4,7µF	20%	100V
2535	4822 124 40769	4,7µF	20%	100V

2536	2238 586 59812	100nF	10%	50V
2537	4822 124 22651	1µF	20%	50V
2538	3198 016 31020	1nF	5%	25V
2539	2238 586 59812	100nF	10%	50V
2540	4822 124 22651	1µF	20%	50V

2541	4822 124 81151	22µF	20%	50V
2542	3198 016 31020	1nF	5%	25V
2546	4822 126 14549	33nF	10%	16V
2548	2020 308 90121	330nF	5%	50V
2549	4822 121 43823	470nF	5%	50V

2550	5322 126 11579	3,3nF	10%	63V
2551	4822 126 13879	220nF	20%	16V
2552	4822 126 13193	4,7nF	10%	63V
2553	4822 124 22651	1µF	20%	50V
2554	5322 126 11583	10nF	10%	63V

2555	4822 124 81286	47µF	20%	16V
2556	4822 124 22651	1µF	20%	50V
2557	4822 124 21913	1µF	20%	63V
2559	4822 124 21913	1µF	20%	63V
2560	4822 126 13881	470pF	5%	50V

2561	4822 126 13881	470pF	5%	50V
2562	4822 126 13881	470pF	5%	50V
2563	4822 126 13881	470pF	5%	50V
2564	4822 126 13881	470pF	5%	50V
2565	4822 126 13881	470pF	5%	50V

2566	4822 126 13881	470pF	5%	50V
2567	4822 126 13881	470pF	5%	50V
2568	4822 124 12233	47µF	20%	25V
2570	2020 552 94427	100pF	5%	50V
2571	2020 552 94427	100pF	5%	50V

2572	4822 126 13879	220nF	20%	16V
2573	4822 121 43823	470nF	5%	50V
2574	4822 126 13193	4,7nF	10%	63V
2575	2020 308 90121	330nF	5%	50V
2576	3198 016 31020	1nF	5%	25V

2577	4822 126 14549	33nF	10%	16V
2578	5322 126 11579	3,3nF	10%	63V
2580	4822 124 21732	10µF	20%	25V
2581	4822 124 22652	2,2µF	20%	50V
2582	2238 586 59812	100nF	10%	50V

RESISTORS

3100	4822 050 21003	10kΩ	2%	0,25W
3101	2122 118 06192	68mΩ	1%	1W
3102	4822 051 30472	4,7kΩ	5%	0,06W
3103	4822 051 30471	470Ω	5%	0,06W
3106	4822 051 30223	22kΩ	5%	0,06W

3107	4822 051 30471	470Ω	5%	0,06W
3108	4822 051 30472	4,7kΩ	5%	0,06W
3109	4822 117 12139	22Ω	5%	0,06W
3110	4822 117 13632	100kΩ	1%	0,06W
3112	4822 117 12925	47kΩ	1%	0,06W

3113	4822 051 30223	22kΩ	5%	0,06W
3114	4822 051 30472	4,7kΩ	5%	0,06W
3115	4822 051 30102	1kΩ	5%	0,06W

RESISTORS

3116	4822 051 30474	470kΩ	5%	0,06W
3117	4822 051 30222	2,2kΩ	5%	0,06W
3119	4822 051 30392	3,9kΩ	5%	0,06W
3120	4822 051 30392	3,9kΩ	5%	0,06W
3121	4822 051 30392	3,9kΩ	5%	0,06W

3122	4822 051 30392	3,9kΩ	5%	0,06W
3123	4822 053 11221	220Ω	5%	2W
3125	4822 051 30102	1kΩ	5%	0,06W
3126	4822 051 30103	10kΩ	5%	0,06W
3127	4822 051 30102	1kΩ	5%	0,06W

3128	4822 051 30103	10kΩ	5%	0,06W
3129	4822 051 30471	470Ω	5%	0,06W
3130	2122 118 06192	68mΩ	1%	1W
3133	4822 117 12968	820Ω	5%	0,06W
3134	4822 051 30471	470Ω	5%	0,06W

3135	4822 117 12139	22Ω	5%	0,06W
3136	4822 051 30103	10kΩ	5%	0,06W
3139	4822 050 11002	1kΩ	5%	0,2W
3140	4822 051 30152	1,5kΩ	5%	0,06W
3141	4822 116 52186	22Ω	5%	0,5W

3142	4822 051 30102	1kΩ	5%	0,06W
3143	4822 051 30471	470Ω	5%	0,06W
3144	4822 051 30184	180kΩ	5%	0,06W
3146	4822 051 30102	1kΩ	5%	0,06W
3147	4822 051 30332	3,3kΩ	5%	0,06W

3148	4822 051 30183	18kΩ	5%	0,06W
3149	4822 051 30472	4,7kΩ	5%	0,06W
3201	4822 117 12925	47kΩ	1%	0,06W
3203	4822 051 30223	22kΩ	5%	0,06W
3205	2122 118 06192	68mΩ	1%	1W

3207	4822 051 30474	470kΩ	5%	0,06W
3209	4822 051 30471	470Ω	5%	0,06W
3210	4822 051 30472	4,7kΩ	5%	0,06W
3211	4822 051 30102	1kΩ	5%	0,06W
3213	4822 051 30102	1kΩ	5%	0,06W

3215	4822 117 12139	22Ω	5%	0,06W
3216	4822 051 30223	22kΩ	5%	0,06W
3217	4822 117 13632	100kΩ	1%	0,06W
3218	4822 051 30472	4,7kΩ	5%	0,06W
3219	4822 051 30183	18kΩ	5%	0,06W

3221	4822 051 30102	1kΩ	5%	0,06W
3223	4822 051 30334	330kΩ	5%	0,06W
3224	4822 051 30682	6,8kΩ	5%	0,06W
3225	4822 051 30222	2,2kΩ	5%	0,06W
3226	4822 051 30683	68kΩ	5%	0,06W

3227	4822 051 30332	3,3kΩ	5%	0,06W
3228	4822 051 30392	3,9kΩ	5%	0,06W
3229	4822 051 30103	10kΩ	5%	0,06W
3230	4822 116 52256	2,2kΩ	5%	0,16W
3232	4822 051 30392	3,9kΩ	5%	0,06W

3238	4822 051 30103	10kΩ	5%	0,06W
3239	4822 116 52186	22Ω	5%	0,5W
3241	4822 051 30471	470Ω	5%	0,06W
3243	2122 118 06192	68mΩ	1%	1W
3245	4822 117 12968	820Ω	5%	0,06W

3246	4822 051 30471	470Ω	5%	0,06W
3247	4822 117 12139	22Ω	5%	0,06W
3248	4822 051 30103	10kΩ	5%	0,06W
3251	4822 050 11002	1kΩ	5%	0,2W
3252	4822 051 30152	1,5kΩ	5%	0,06W

3253	4822 051 30102	1kΩ	5%	0,06W
3254	4822 051 30184	180kΩ	5%	0,06W
3255	4822 051 30471	470Ω	5%	0,06W
3256	4822 051 30102	1kΩ	5%	0,06W
3258	4822 051 30183	18kΩ	5%	0,06W

ELECTRICAL PARTSLIST POWER 2002 70W Class-D Combi Board

RESISTORS

3259©	4822 051 30472	4,7kΩ	5%	0,06W
3261©	4822 051 30471	470Ω	5%	0,06W
3262©	4822 051 30101	100Ω	5%	0,06W
3263©	4822 051 30103	10kΩ	5%	0,06W
3302©	4822 117 13632	100kΩ	1%	0,06W
3303©	4822 051 30103	10kΩ	5%	0,06W
3306	4822 101 11778	Potmeter 47kΩ		0,1W
3307	4822 101 11778	Potmeter 47kΩ		0,1W
3311©	4822 051 30101	100Ω	5%	0,06W
3312©	4822 117 13632	100kΩ	1%	0,06W
3313©	4822 051 30221	220Ω	5%	0,06W
3314©	4822 117 12925	47kΩ	1%	0,06W
3315	4822 050 11002	1kΩ	5%	0,2W
3316©	4822 051 30273	27kΩ	5%	0,06W
3318©	4822 117 13632	100kΩ	1%	0,06W
3319©	4822 051 30222	2,2kΩ	5%	0,06W
3320©	4822 051 30103	10kΩ	5%	0,06W
3321©	4822 051 30102	1kΩ	5%	0,06W
3322©	4822 051 30103	10kΩ	5%	0,06W
3323©	4822 117 12968	820Ω	5%	0,06W
3324©	4822 051 30105	1MΩ	5%	0,06W
3325©	4822 051 30154	150kΩ	5%	0,06W
3326©	4822 051 30154	150kΩ	5%	0,06W
3327	4822 052 10339	33Ω	5%	NFR
3328©	4822 051 30153	15kΩ	5%	0,06W
3329	4822 116 52256	2,2kΩ	5%	0,16W
3330©	4822 051 30103	10kΩ	5%	0,06W
3331©	4822 051 30103	10kΩ	5%	0,06W
3332©	4822 051 30332	3,3kΩ	5%	0,06W
3334©	4822 051 30102	1kΩ	5%	0,06W
3336©	4822 051 30183	18kΩ	5%	0,06W
3337©	4822 051 30471	470Ω	5%	0,06W
3338©	4822 051 30102	1kΩ	5%	0,06W
3339©	4822 051 30222	2,2kΩ	5%	0,06W
3340©	4822 051 30471	470Ω	5%	0,06W
3341©	4822 051 30682	6,8kΩ	5%	0,06W
3342©	4822 051 30121	120Ω	5%	0,06W
3343©	4822 051 30151	150Ω	5%	0,06W
3344©	4822 051 30471	470Ω	5%	0,06W
3345©	4822 051 30471	470Ω	5%	0,06W
3346©	4822 051 30479	47Ω	5%	0,06W
3347©	4822 117 12925	47kΩ	1%	0,06W
3400©	4822 051 30273	27kΩ	5%	0,06W
3401©	4822 051 30471	470Ω	5%	0,06W
3402©	4822 051 30332	3,3kΩ	5%	0,06W
3403©	4822 051 30273	27kΩ	5%	0,06W
3404©	4822 051 30682	6,8kΩ	5%	0,06W
3405©	4822 051 30472	4,7kΩ	5%	0,06W
3406	4822 052 10109	10Ω	5%	NFR
3407©	4822 051 30472	4,7kΩ	5%	0,06W
3408©	4822 051 30682	6,8kΩ	5%	0,06W
3409©	4822 051 30273	27kΩ	5%	0,06W
3410©	4822 051 30332	3,3kΩ	5%	0,06W
3411	4822 116 52283	4,7kΩ	5%	0,5W
3412	4822 052 10568	5,6Ω	5%	0,33W
3413©	4822 051 30471	470Ω	5%	0,06W
3415©	4822 051 30273	27kΩ	5%	0,06W
3418©	4822 051 30471	470Ω	5%	0,06W
3419©	4822 051 30222	2,2kΩ	5%	0,06W
3420©	4822 051 30222	2,2kΩ	5%	0,06W
3421©	4822 051 30222	2,2kΩ	5%	0,06W
3422©	4822 051 30472	4,7kΩ	5%	0,06W
3423©	4822 051 30103	10kΩ	5%	0,06W
3424©	4822 051 30103	10kΩ	5%	0,06W
3425©	2120 108 91909	39Ω	5%	

RESISTORS

3426©	2120 108 91909	39Ω	5%	
3427©	4822 051 30103	10kΩ	5%	0,06W
3428©	4822 051 30103	10kΩ	5%	0,06W
3429©	2120 108 91909	39Ω	5%	
3430©	2120 108 91909	39Ω	5%	
3431©	4822 051 30562	5,6kΩ	5%	0,06W
3432©	4822 051 30102	1kΩ	5%	0,06W
3433©	4822 051 30102	1kΩ	5%	0,06W
3434©	4822 051 30222	2,2kΩ	5%	0,06W
3435©	4822 051 30271	270Ω	5%	0,06W
3436©	4822 051 30472	4,7kΩ	5%	0,06W
3437©	4822 051 30562	5,6kΩ	5%	0,06W
3438©	4822 051 30103	10kΩ	5%	0,06W
3439©	4822 051 30103	10kΩ	5%	0,06W
3440	4822 116 81154	2,2Ω	5%	0,5W
3500©	4822 051 30152	1,5kΩ	5%	0,06W
3504©	4822 051 30103	10kΩ	5%	0,06W
3506©	4822 051 30471	470Ω	5%	0,06W
3507©	4822 051 30562	5,6kΩ	5%	0,06W
3514©	4822 051 30153	15kΩ	5%	0,06W
3515©	4822 051 30221	220Ω	5%	0,06W
3517©	4822 051 20399	39Ω	5%	0,1W
3518©	4822 051 30152	1,5kΩ	5%	0,06W
3519©	4822 051 30103	10kΩ	5%	0,06W
3520©	4822 051 30153	15kΩ	5%	0,06W
3521©	4822 051 30222	2,2kΩ	5%	0,06W
3522©	4822 051 30152	1,5kΩ	5%	0,06W
3523©	4822 051 30152	1,5kΩ	5%	0,06W
3524©	4822 117 11817	1,2kΩ	1%	0,06W
3525©	4822 051 30273	27kΩ	5%	0,06W
3526©	4822 051 30334	330kΩ	5%	0,06W
3527©	4822 051 30273	27kΩ	5%	0,06W
3528©	4822 051 30471	470Ω	5%	0,06W
3529©	4822 051 30154	150kΩ	5%	0,06W
3530©	4822 051 30561	560Ω	5%	0,06W
3531©	4822 051 30154	150kΩ	5%	0,06W
3532©	4822 117 12864	82kΩ	5%	0,06W
3533©	4822 051 30562	5,6kΩ	5%	0,06W
3534	4822 052 10109	10Ω	5%	NFR
3535©	4822 051 30562	5,6kΩ	5%	0,06W
3536©	4822 051 30223	22kΩ	5%	0,06W
3539©	4822 051 30153	15kΩ	5%	0,06W
3542©	4822 051 30123	12kΩ	5%	0,06W
3543©	4822 117 12902	8,2kΩ	1%	0,06W
3544©	4822 051 30562	5,6kΩ	5%	0,06W
3545©	4822 051 30393	39kΩ	5%	0,06W
3549©	4822 051 30101	100Ω	5%	0,06W
3550©	4822 051 30393	39kΩ	5%	0,06W
3551©	4822 051 30101	100Ω	5%	0,06W
3552©	4822 051 30101	100Ω	5%	0,06W
3553©	4822 051 30101	100Ω	5%	0,06W
3554©	4822 051 30101	100Ω	5%	0,06W
3555©	4822 051 30472	4,7kΩ	5%	0,06W
3556©	4822 051 30123	12kΩ	5%	0,06W
3557©	4822 051 30101	100Ω	5%	0,06W
3558©	4822 117 12903	1,8kΩ	1%	0,06W
3559©	4822 117 12903	1,8kΩ	1%	0,06W
3560©	4822 051 30101	100Ω	5%	0,06W
3561©	4822 051 30102	1kΩ	5%	0,06W
3562©	4822 051 30102	1kΩ	5%	0,06W
3563©	4822 051 30101	100Ω	5%	0,06W
3564©	4822 051 30101	100Ω	5%	0,06W
3566©	4822 051 30101	100Ω	5%	0,06W
3567©	4822 051 30102	1kΩ	5%	0,06W
3568©	4822 051 30101	100Ω	5%	0,06W

ELECTRICAL PARTSLIST POWER 2002 70W Class-D Combi Board**RESISTORS**

3569	4822 051 30102	1kΩ	5%	0,06W
3570	4822 117 13632	100kΩ	1%	0,06W
3571	4822 051 30223	22kΩ	5%	0,06W
3572	4822 116 83883	470Ω	5%	0,16W
3573	4822 116 83883	470Ω	5%	0,16W

3574	4822 051 30101	100Ω	5%	0,06W
3575	4822 051 30562	5,6kΩ	5%	0,06W
3576	4822 051 30123	12kΩ	5%	0,06W
3577	4822 051 30153	15kΩ	5%	0,06W
3578	4822 117 12902	8,2kΩ	1%	0,06W

3579	4822 051 30562	5,6kΩ	5%	0,06W
3580	4822 051 30472	4,7kΩ	5%	0,06W
4211	4822 051 20008	CHIP JUMPER 0805		
4212	4822 051 20008	CHIP JUMPER 0805		
4213	4822 051 30008	CHIP JUMPER 0603		

4214	4822 051 20008	CHIP JUMPER 0805		
4215	4822 051 30008	CHIP JUMPER 0603		
4216	4822 051 30008	CHIP JUMPER 0603		
4221	4822 051 30008	CHIP JUMPER 0603		
4223	4822 051 30008	CHIP JUMPER 0603		

4226	4822 051 30008	CHIP JUMPER 0603		
4230	4822 051 30008	CHIP JUMPER 0603		
4232	4822 051 30008	CHIP JUMPER 0603		
4233	4822 051 30008	CHIP JUMPER 0603		
4235	4822 051 30008	CHIP JUMPER 0603		

4240	4822 051 20008	CHIP JUMPER 0805		
4241	4822 051 20008	CHIP JUMPER 0805		
4242	4822 051 30008	CHIP JUMPER 0603		
4243	4822 051 30008	CHIP JUMPER 0603		
4245	4822 051 30008	CHIP JUMPER 0603		

4253	4822 051 30008	CHIP JUMPER 0603		
4260	4822 051 30008	CHIP JUMPER 0603		
4265	4822 051 30008	CHIP JUMPER 0603		
4272	4822 051 30008	CHIP JUMPER 0603		
4273	4822 051 30008	CHIP JUMPER 0603		

4274	4822 051 30008	CHIP JUMPER 0603		
4275	4822 051 30008	CHIP JUMPER 0603		
4276	4822 051 30008	CHIP JUMPER 0603		
4277	4822 051 30008	CHIP JUMPER 0603		
4279	4822 051 30008	CHIP JUMPER 0603		

4281	4822 051 30008	CHIP JUMPER 0603		
4301	4822 051 30008	CHIP JUMPER 0603		
4501	4822 051 30008	CHIP JUMPER 0603		

COILS

5100	4822 526 10494	FERRITE BEAD		
5101	3103 308 30850	Output Filter		
5102	2422 549 44944	Mains Filter 330μH 3A		
5103	4822 526 10494	FERRITE BEAD		
5104	4822 526 10494	FERRITE BEAD		
5105	4822 157 11835	4,7μH		
5201	3103 308 30850	Output Filter		
5202	2422 549 44944	Mains Filter 330μH 3A		
5203	4822 526 10494	FERRITE BEAD		
5205	4822 157 70649	4,7μH		
5300	2422 540 98542	Resonator 500kHz		
5301	4822 526 10494	FERRITE BEAD		
5302	2422 540 98561	Resonator 425kHz		
5500	4822 146 10663	TRANSFORMER 6RG (DC/DC)		

DIODES

6104	4822 130 11397	BAS316		
6106	4822 130 11416	PDZ6.8B		
6107	4822 130 11397	BAS316		
6108	4822 130 11416	PDZ6.8B		
6109	4822 130 11397	BAS316		

6111	4822 130 11397	BAS316		
6202	4822 130 11397	BAS316		
6204	4822 130 11397	BAS316		
6205	4822 130 11397	BAS316		
6206	4822 130 11397	BAS316		

6207	4822 130 11397	BAS316		
6209	4822 130 11148	UDZ-4,7B		
6211	4822 130 11397	BAS316		
6212	4822 130 11416	PDZ6.8B		
6213	4822 130 11416	PDZ6.8B		

6214	4822 130 11397	BAS316		
6216	4822 130 30621	1N4148		
6217	4822 130 11397	BAS316		
6300	4822 130 10838	UDZ3.3B		
6400	4822 130 11148	UDZ-4,7B		

6401	4822 130 30621	1N4148		
6402	4822 130 30621	1N4148		
6500	4822 130 61219	BZX79-C10		
6501	4822 130 82714	BZX79-B2V7		
6502	4822 130 11397	BAS316		

6503	4822 130 11397	BAS316		
6504	4822 130 11397	BAS316		
6505	4822 130 11397	BAS316		
6506	9322 150 18685	BZX384-C47		
6507	9322 150 18685	BZX384-C47		

6508	3198 020 55680	BZX384-C5V6		
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TRANSISTORS

7104	4822 130 60373	BC856B		
7109	9322 173 29687	STP14NF12FP Power FET		
7110	9340 217 70115	BC847BW		
7111	3198 010 44350	BC807-25W		
7112	9340 218 50115	BC857BW		

7113	3198 010 44350	BC807-25W		
7114	4822 130 42804	BC817-25		
7115	4822 130 42804	BC817-25		
7117	9322 170 06685	2SC2713-GR		
7119	9322 170 06685	2SC2713-GR		

7121	9322 173 29687	STP14NF12FP Power FET		
7128	4822 130 60373	BC856B		
7129	4822 130 60373	BC856B		
7130	5322 130 60159	BC846B		
7131	5322 130 60159	BC846B		

7203	9340 217 70115	BC847BW		
7208	4822 130 60373	BC856B		
7210	3198 010 44350	BC807-25W		
7211	9340 218 50115	BC857BW		
7218	9322 173 29687	STP14NF12FP Power FET		

7220	9340 218 50115	BC857BW		
7221	3198 010 44350	BC807-25W		
7222	4822 130 42804	BC817-25		
7223	4822 130 42804	BC817-25		
7227	9322 170 06685	2SC2713-GR		

7228	9322 170 06685	2SC2713-GR		
7231	9322 173 29687	STP14NF12FP Power FET		
7238	9340 217 70115	BC847BW		
7239	4822 130 60373	BC856B		
7240	4822 130 60373	BC856B		

ELECTRICAL PARTSLIST POWER 2002 70W Class-D Combi Board

TRANSISTORS

7243©	4822 130 42615	BC817-40
7309©	9340 217 70115	BC847BW
7310©	4822 130 42804	BC817-25
7316©	9340 218 50115	BC857BW
7317©	9340 217 70115	BC847BW

7319©	9340 217 70115	BC847BW
7323©	4822 130 42804	BC817-25
7324©	4822 130 42804	BC817-25
7402	4822 130 40855	BC337-40
7403©	4822 130 42804	BC817-25

7404©	4822 130 42804	BC817-25
7405©	9340 218 50115	BC857BW
7407©	4822 130 42804	BC817-25
7408©	4822 130 42804	BC817-25
7409©	4822 130 42804	BC817-25

7410©	9340 218 50115	BC857BW
7411©	3198 010 44350	BC807-25W
7505©	9340 217 70115	BC847BW
7506©	4822 130 60373	BC856B
7509©	9340 217 70115	BC847BW

INTEGRATED CIRCUITS

7105©	9350 694 90118	74LV14D
7118©	9350 694 90118	74LV14D
7122©	5322 209 11517	PC74HCU04T, HEX INVERTER IC
7209©	9350 694 90118	74LV14D
7232©	5322 209 11517	PC74HCU04T, HEX INVERTER IC

7235©	9350 694 90118	74LV14D
7312©	5322 209 11517	PC74HCU04T, HEX INVERTER IC
7315	4822 209 81351	LM317MPTB
7320©	4822 209 83357	NJM4560M
7321	4822 209 81351	LM317MPTB

7400©	4822 209 31378	NJM4556M, 2-FOLD OP-AMP.
7406©	4822 209 17345	M62320FP, I2C SHIFT REGISTER
7500©	4822 209 17235	74LVU04D, 6-FOLD INVERTER
7508©	9322 150 74668	TDA7468D, SOURCE SEL. & SOUND

ELECTRICAL PARTSLIST POWER 2002 70W Class-D Mains Board**MISCELLANEOUS**

1201 ▲	4822 071 51602	FUSE 1,6A
1201 ▲	4822 253 10126	FUSE T4A
1203 ▲	4822 071 55002	FUSE T5A
1204 ▲	2422 030 00328	MAINS SOCKET /37
1204 ▲	4822 265 31015	MAINS SOCKET, IEC
1205 ▲	4822 071 51602	FUSE 1,6A
1206 ▲	2422 129 16478	VOLTAGE SELECTOR
1207 ▲	9965 000 07788	FUSE RAD T2A
1208 ▲	2422 132 07519	RELAY 1P 12V 16A
1209 ▲	9965 000 07788	FUSE RAD T2A
1210	4822 267 10953	FFC-CONNECTOR, 7P, TOP ENTRY
1212 ▲	4822 071 55002	FUSE T5A
5001 ▲	3103 308 30870	Mains Transformer /37
5001 ▲	3103 308 30880	Mains Transformer /22
5001 ▲	3103 308 30890	Mains Transformer /21, /21M

5204 ▲ 2422 549 45157 TRAFO STANDBY

CAPACITORS

2200	4822 121 43696	100nF	10%	100V
2201	4822 122 31125	4,7nF	10%	63V
2203	4822 121 43696	100nF	10%	100V
2204	4822 121 43696	100nF	10%	100V
2205	5322 124 41948	0,47µF	20%	50V
2208	2020 012 93547	100µF	20%	63V
2209	5322 121 42386	100nF	5%	63V
2210	5322 121 42386	100nF	5%	63V
2211	4822 124 42367	3300µF	20%	35V
2212	4822 124 12328	6800µF	20%	16V
2213	4822 124 40255	100µF	20%	50V
2214 ▲	4822 121 10512	220nF	20%	275V
2215	2020 561 90365	100nF	20%	50V
2216	4822 124 21732	10µF	20%	25V
2217	4822 124 80144	220µF	20%	25V
2218	4822 121 41856	22nF	5%	250V
2219 ▲	4822 126 14088	2,2nF	20%	250V
2220	4822 121 43526	47nF	5%	100V
2222 ▲	4822 126 13589	470nF	10%	275V
2223	5322 121 42386	100nF	5%	63V
2224	4822 122 30043	10nF	80%	63V
2225	5322 121 42386	100nF	5%	63V
2226	5322 121 42386	100nF	5%	63V
2228 ©	4822 124 11946	22µF	20%	16V
2232	2022 020 00644	3300µF	20%	50V
2233	2022 020 00644	3300µF	20%	50V

RESISTORS

3200	4822 050 23303	33kΩ	1%	0,6W
3201 ▲	4822 052 10478	4,7Ω	5%	NFR25
3202	4822 050 23303	33kΩ	1%	0,6W
3203	4822 116 52276	3,9kΩ	5%	0,5W
3204 ▲	4822 053 21106	10MΩ	5%	0,5W
3205	4822 116 52228	680Ω	5%	0,5W
3206 ▲	4822 053 21106	10MΩ	5%	0,5W
3207	4822 116 52283	4,7kΩ	5%	0,5W
3211	4822 116 52219	330Ω	5%	0,5W
3212	4822 111 30893	4,7MΩ	5%	0,2W
3213	4822 116 83883	470Ω	5%	0,16W
3215	4822 116 52175	100Ω	5%	0,5W
3217	4822 116 52256	2,2kΩ	5%	0,16W
3218	4822 050 21003	10kΩ	2%	0,25W
3219	4822 116 52234	100kΩ	5%	0,5W
3220	4822 116 52219	330Ω	5%	0,5W
3221	4822 116 52219	330Ω	5%	0,5W
3222	4822 116 52228	680Ω	5%	0,5W
3223	4822 116 52283	4,7kΩ	5%	0,5W

COILS

5202	4822 157 53473	1000µH
5203	4822 157 53473	1000µH
5220 ▲	4822 157 11832	400µH Mains filter

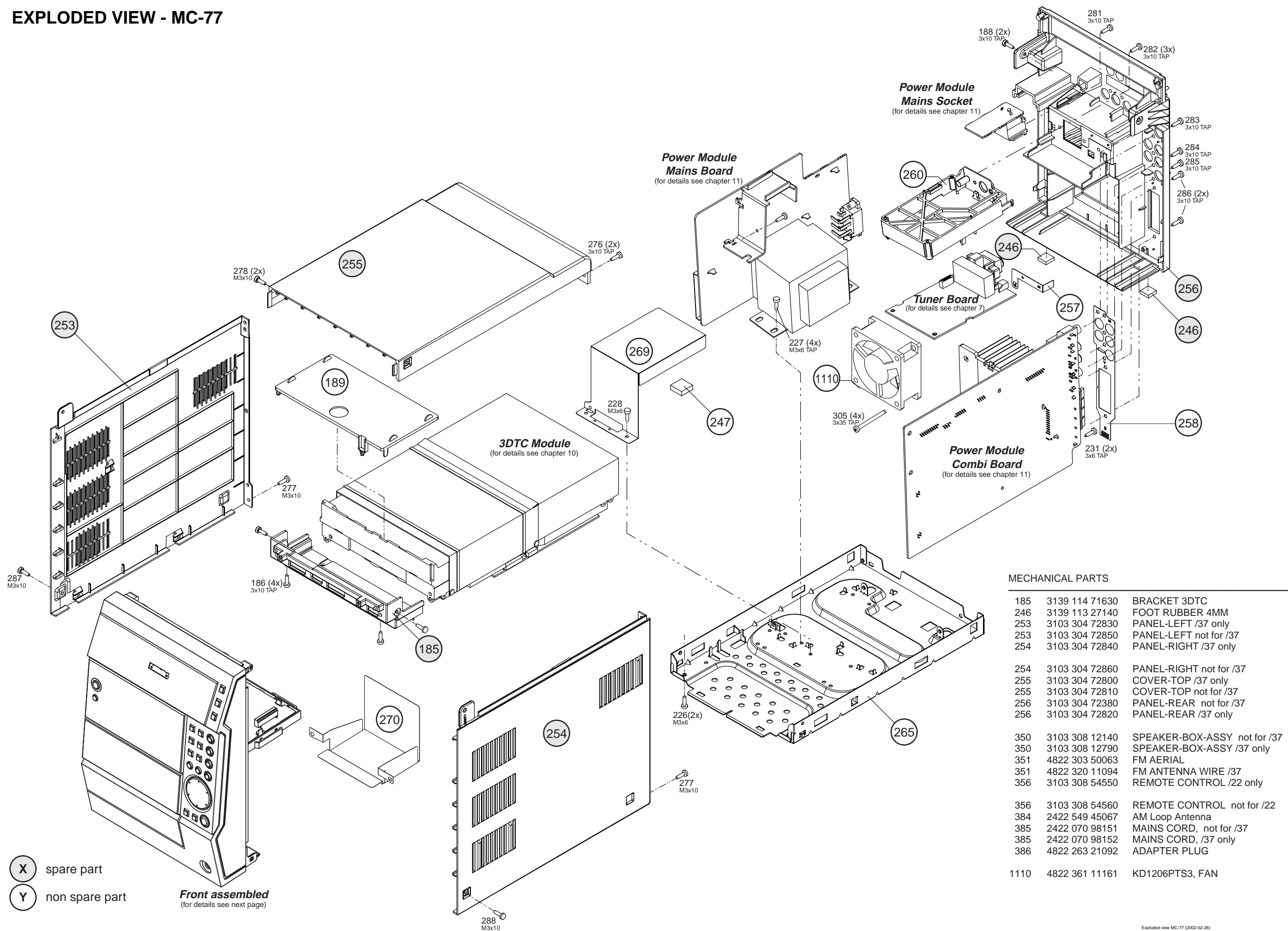
DIODES

6200	4822 130 30621	1N4148
6201	4822 130 34382	BZX79-B8V2
6202	4822 130 11139	GBU8D
6204	4822 130 34142	BZX79-B33
6206	4822 130 31878	1N4003G
6207	4822 130 31878	1N4003G
6209	4822 130 31878	1N4003G
6210	4822 130 31878	1N4003G
6211	4822 130 30621	1N4148
6212	4822 130 30621	1N4148
6213	4822 130 31878	1N4003G
6215	4822 130 30621	1N4148
6216	4822 130 30621	1N4148
6217	4822 130 31878	1N4003G
6219	4822 130 30621	1N4148
6220	4822 130 31983	BAT85
6221	4822 130 31983	BAT85
6223	4822 130 34145	BZX79-B39
6224	5322 130 34563	BZX79-C2V7
6225	4822 130 31878	1N4003G
6226	4822 130 31878	1N4003G
6227	4822 130 31878	1N4003G
6228	4822 130 30621	1N4148
6229	4822 130 30621	1N4148

TRANSISTORS

7200	4822 130 40995	BD438
7203	4822 130 40995	BD438
7204	4822 130 44568	BC557B
7205	4822 130 40855	BC337-40
7206	4822 130 40959	BC547B

EXPLODED VIEW - MC-77



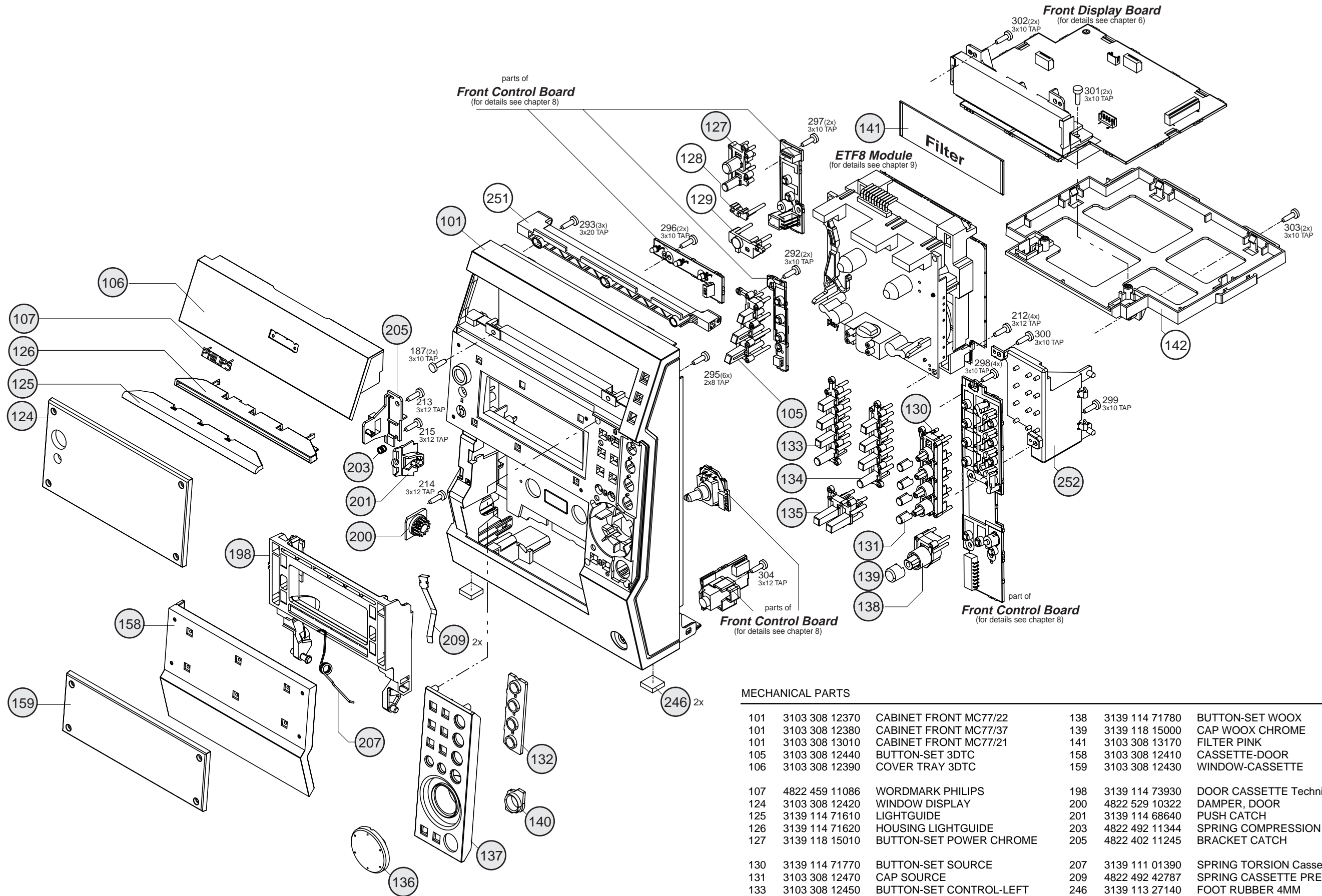
MECHANICAL PARTS

185	3139 114 71630	BRACKET 3DTC
246	3139 113 27140	FOOT RUBBER 4MM
253	3103 304 72830	PANEL-LEFT /37 only
253	3103 304 72850	PANEL-LEFT not for /37
254	3103 304 72840	PANEL-RIGHT /37 only
254	3103 304 72860	PANEL-RIGHT not for /37
255	3103 304 72800	COVER-TOP /37 only
255	3103 304 72810	COVER-TOP not for /37
256	3103 304 72380	PANEL-REAR not for /37
256	3103 304 72820	PANEL-REAR /37 only
350	3103 308 12140	SPEAKER-BOX-ASSY not for /37
350	3103 308 12790	SPEAKER-BOX-ASSY /37 only
351	4822 303 50063	FM AERIAL
351	4822 320 11094	FM ANTENNA WIRE /37
356	3103 308 54550	REMOTE CONTROL /22 only
356	3103 308 54560	REMOTE CONTROL not for /22
384	2422 549 45067	AM Loop Antenna
385	2422 070 98151	MAINS CORD, not for /37
385	2422 070 98152	MAINS CORD, /37 only
386	4822 263 21092	ADAPTER PLUG
1110	4822 361 11161	KD1206PTS3, FAN

- X** spare part
- Y** non spare part

Front assembled
(for details see next page)

EXPLODED VIEW - Front



MECHANICAL PARTS

101	3103 308 12370	CABINET FRONT MC77/22	138	3139 114 71780	BUTTON-SET WOOX
101	3103 308 12380	CABINET FRONT MC77/37	139	3139 118 15000	CAP WOOX CHROME
101	3103 308 13010	CABINET FRONT MC77/21	141	3103 308 13170	FILTER PINK
105	3103 308 12440	BUTTON-SET 3DTC	158	3103 308 12410	CASSETTE-DOOR
106	3103 308 12390	COVER TRAY 3DTC	159	3103 308 12430	WINDOW-CASSETTE
107	4822 459 11086	WORDMARK PHILIPS	198	3139 114 73930	DOOR CASSETTE Technical part
124	3103 308 12420	WINDOW DISPLAY	200	4822 529 10322	DAMPER, DOOR
125	3139 114 71610	LIGHTGUIDE	201	3139 114 68640	PUSH CATCH
126	3139 114 71620	HOUSING LIGHTGUIDE	203	4822 492 11344	SPRING COMPRESSION
127	3139 118 15010	BUTTON-SET POWER CHROME	205	4822 402 11245	BRACKET CATCH
130	3139 114 71770	BUTTON-SET SOURCE	207	3139 111 01390	SPRING TORSION Cassette door
131	3103 308 12470	CAP SOURCE	209	4822 492 42787	SPRING CASSETTE PRESSURE
133	3103 308 12450	BUTTON-SET CONTROL-LEFT	246	3139 113 27140	FOOT RUBBER 4MM
134	3103 308 12460	BUTTON-SET CONTROL-RIGHT	252	3139 114 71560	BRACKET CONTROL/COMBI
135	3103 308 12490	BUTTON-SET TREBLE/BASS			
136	3139 118 14950	KNOB JOG CHROME			
137	3103 308 12400	CONTROL-PANEL			

- X** spare part
- Y** non spare part

MISCELLANEOUS

350	3103 308 12140	SPEAKER-BOX-ASSY not for /37
350	3103 308 12790	SPEAKER-BOX-ASSY for /37 only
351	4822 303 50063	FM AERIAL
351	4822 320 11094	FW ANTENNA WIRE /37
356	3103 308 54550	REMOTE CONTROL not for /37
356	3103 308 54560	REMOTE CONTROL for /37 only
384	2422 549 45067	AM Loop Antenna
385	2422 070 98151	MAINS CORD not for /37
385	2422 070 98152	MAINS CORD for /37 only
386	4822 263 21092	ADAPTER PLUG
1110	4822 361 11161	KD1206PTS3, FAN
1131	3139 110 35560	FFC-CABLE 19P 180mm AD FOLDED
1133	3139 110 35570	FFC-CABLE 9P 100mm AD
1134	3139 110 35240	FFC-CABLE 8P 280mm AD FOLDED
1135	4822 320 12752	FFC-CABLE 7P 180mm
1137	3139 110 35250	FFC-CABLE 4P 120mm AD
1138	3139 110 35520	FFC-CABLE 19P 100mm AD
1141	4822 320 12752	FFC-CABLE 7P 180mm
1142	3139 110 34610	FFC-CABLE 11P 180mm AD
1143	3139 110 34950	FFC-CABLE 7P 120mm AD
5001	3103 308 30870	Mains Transformer /37
5001	3103 308 30880	Mains Transformer /22
5001	3103 308 30890	Mains Transformer /21, /21M