CDR Mini System

MC-77/21/21M/22/37

Service
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Service Manual

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CLASS 1
LASER PRODUCT

Published by HB 0218 Service Audio Printed in The Netherlands Subject to modification

GB 3103 785 25160

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

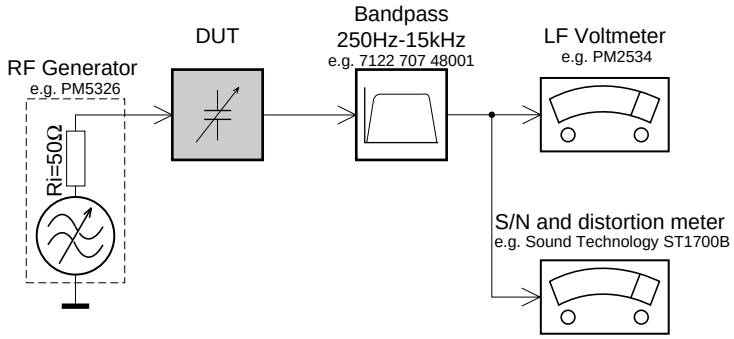
Output power	: ≤500µW
Wave length	: 780nm ±20nm

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 recovey time	: >40s

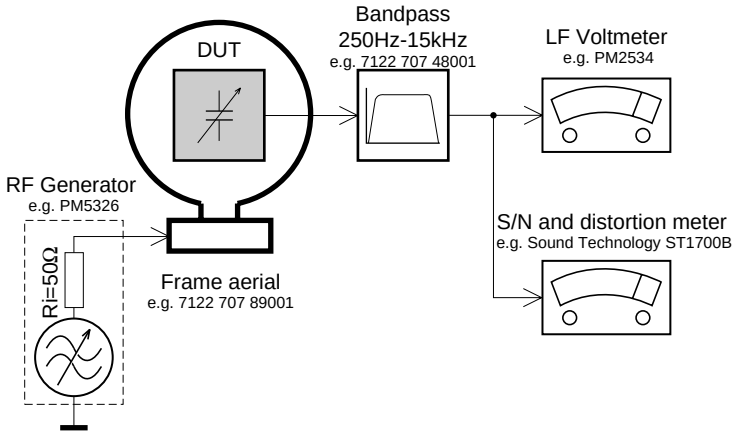
Measurement Setup

Tuner FM



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

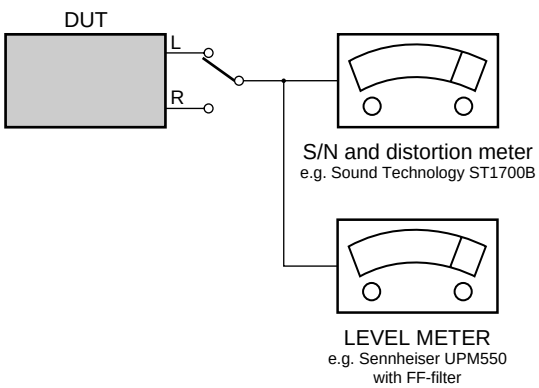
Tuner AM (MW,LW)



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

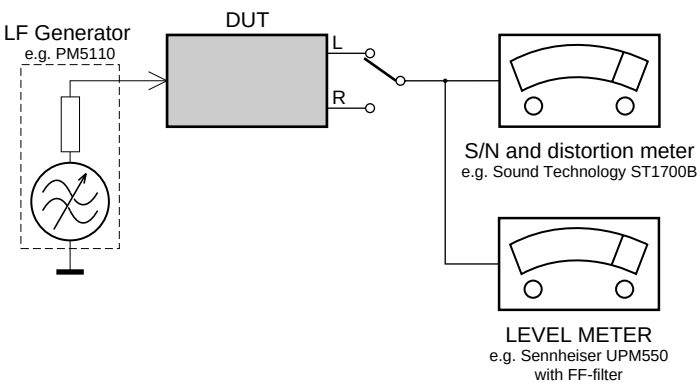
CD

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



RECORDER

Use Universal Test Cassette **CrO_2** SBC419 4822 397 30069
or Universal Test Cassette **Fe** SBC420 4822 397 30071



Warnings & Safety

ESD

(GB) 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.

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

(D) WARNUNG
Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß Sie im Reparaturfall über ein Puls-armband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

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

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

(GB) AVAILABLE ESD PROTECTION EQUIPMENT :

anti-static table mat	large 1200x650x1.25mm	4822 466 10953
	small 600x650x1.25mm	4822 466 10958
anti-static wristband		4822 395 10223
connection box (3 press stud connections, 1MΩ)		4822 320 11307
extendible cable (2m, 2MΩ, to connect wristband to connection box)		4822 320 11305
connecting cable (3m, 2MΩ, to connect table mat to connection box)		4822 320 11306
earth cable (1MΩ, to connect any product to mat or to connection box)		4822 320 11308
KIT ESD3 (combining all 6 prior products - small table mat)		4822 310 10671
wristband tester		4822 344 13999

SAFETY

(GB)
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 ⚠

(F)
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 ⚠

(D)
Bei jeder Reparatur sind die geltenden Sicherheitsvor-schriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Original-ersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

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

(I)
Le norme di sicurezza estigono che l´apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

(GB) **DANGER**: Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM.

CLASS 1
LASER PRODUCT

(S) Varning !
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

(DK) Advarsel !
Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

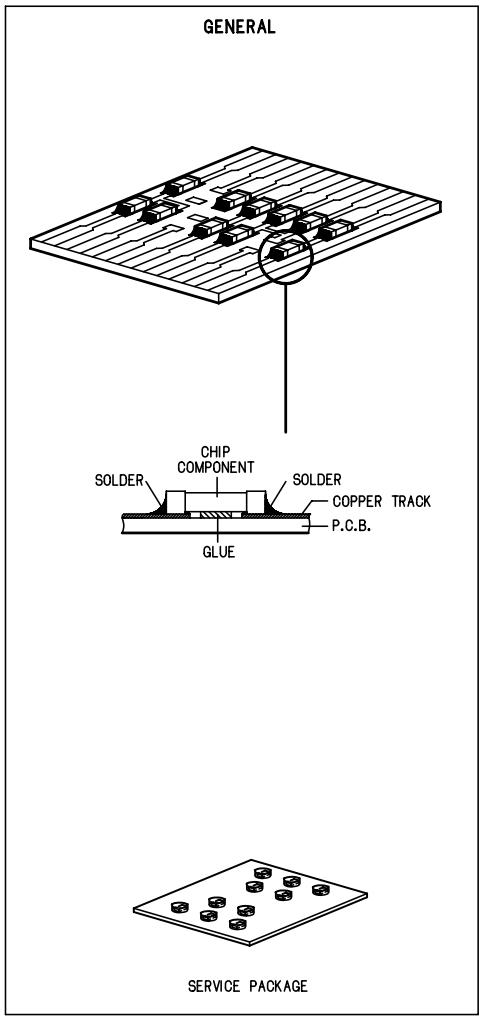
(FIN) Varoitus !
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

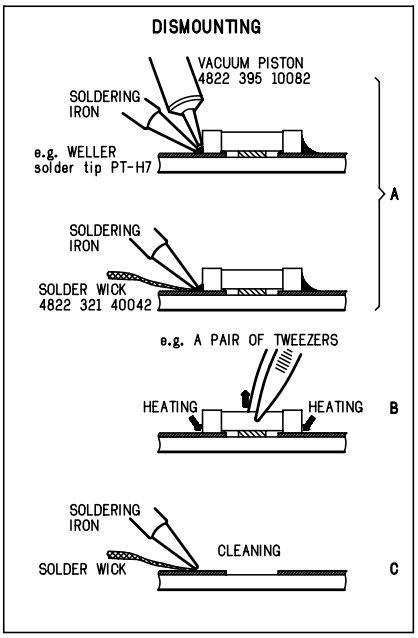
(GB)
After servicing and before returning the set to customer perform a leakage current measurement test from all exposed metal parts to earth ground, to assure no shock hazard exists.
The leakage current must not exceed 0.5mA.

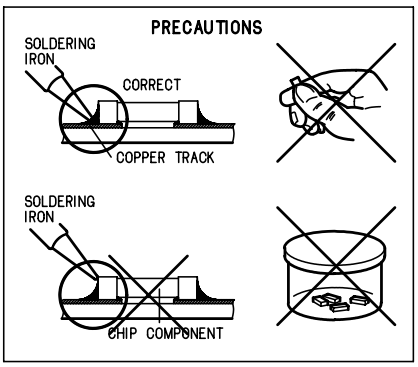
(F)
"Pour votre sécurite, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

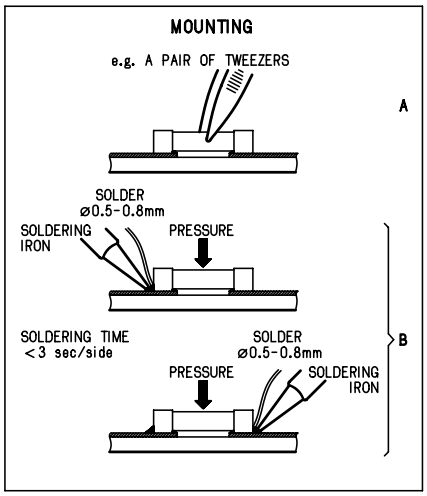
Service hints

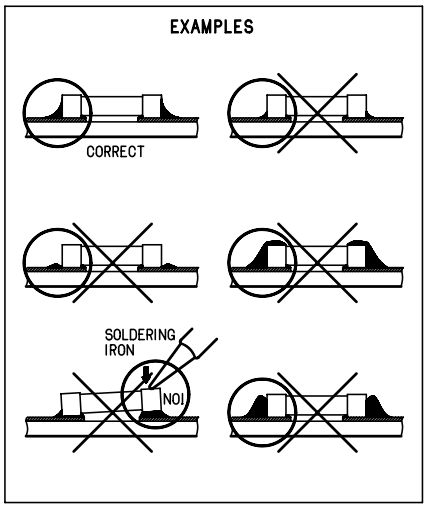
Handling chip components











Service Tools

TORX T10 screwdriver with shaftlength 150mm 4822 395 50423
TORX screwdriver set SBC 163 .....4822 295 50145

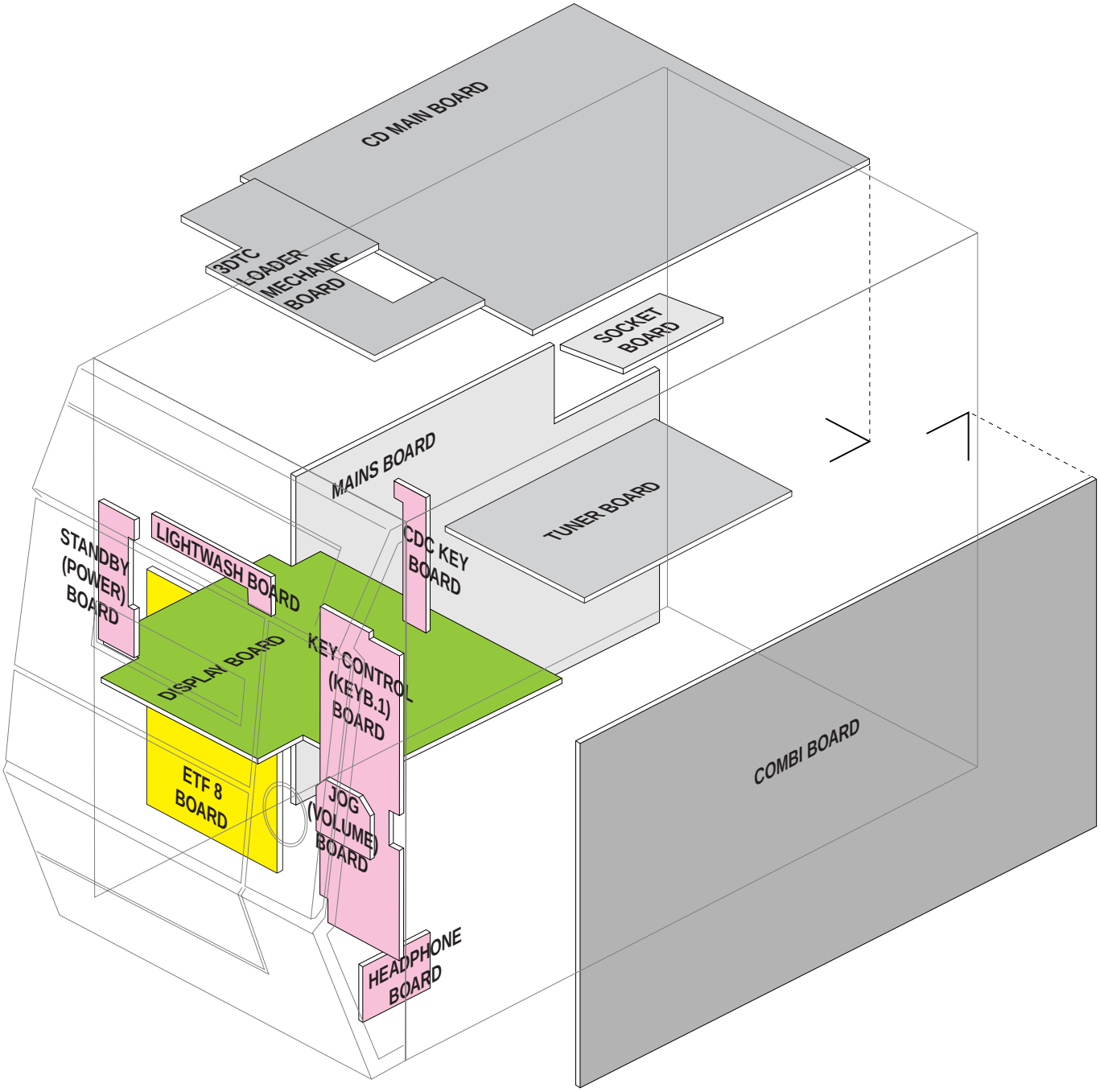
Audio signal disc SBC 429.....4822 397 30184
Playability test disc SBC444 .....4822 397 30245
Test disc 5 (disc without errors) +
Test disc 5A (disc with dropout errors, black spots and fingerprints)
SBC 426/426A 4822 397 30096
Burn in test disc (65 min. 1kHz signal at -30dB level without "pause") ...4822 397 30155

SBC420 Test cassette Fe.....4822 397 30071
SBC419 Test cassette CrO_2.....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.

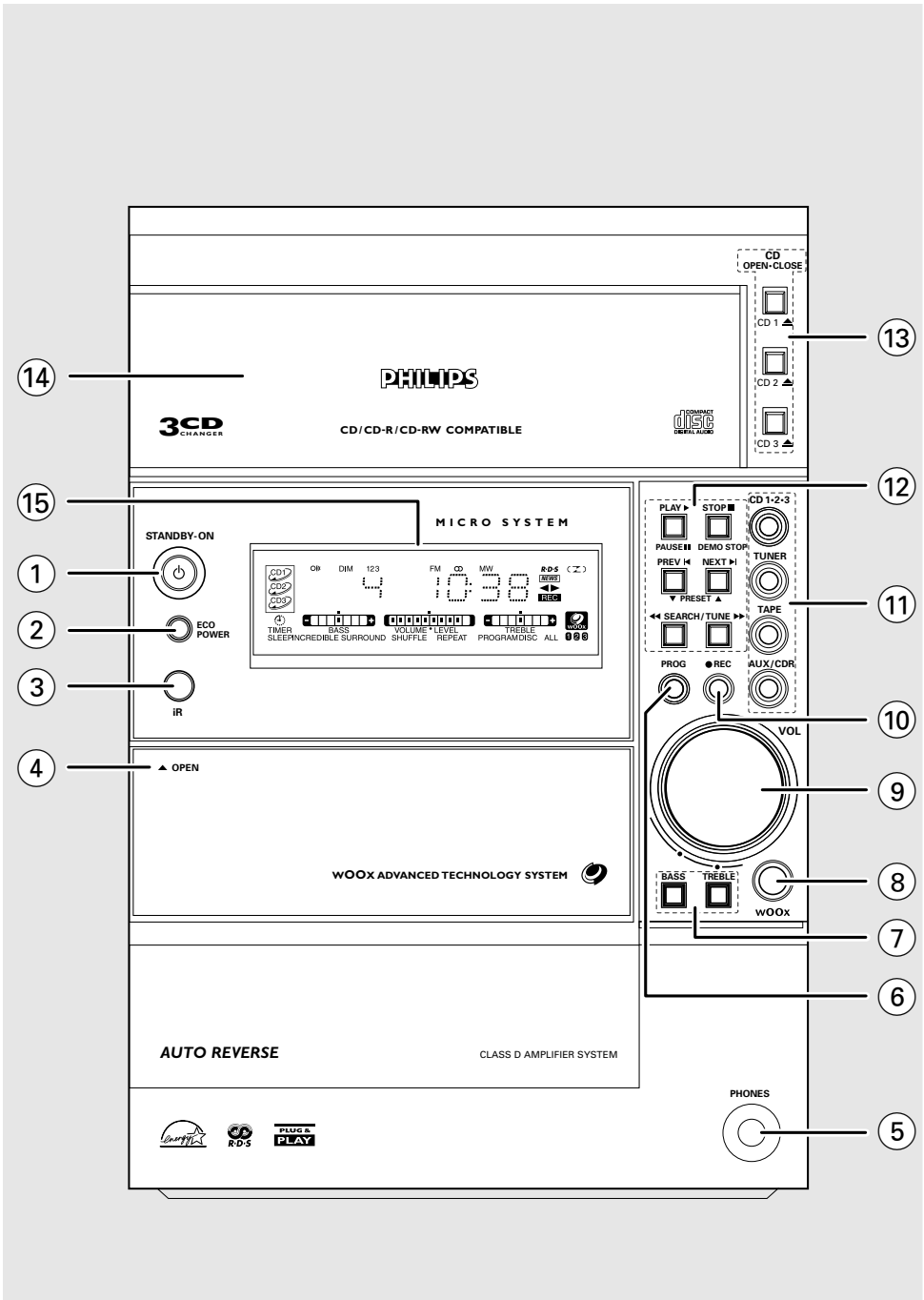
Location of Printed Circuit Boards



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 on the system and remote control

① **STANDBY ON** ⏻
– 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.

⑫ **Mode Selection**
PLAY PAUSE ▶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 ⏮ ⏭ (PRESET ▼▲)
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 ◀◀ ▶▶
for CD ..... to search backward/forward.
for TUNER ..... to tune to a lower or higher radio frequency.
for TAPE ..... to rewind or fast forward.
for CLOCK ..... to set the hour.

⑬ **CD OPEN•CLOSE (CD 1/CD 2/CD 3)** ⏏
– to open or close the individual disc tray : CD 1, CD 2 or CD 3

⑭ **Disc trays**

⑮ **Display screen**
– to view the current status of the system.

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.

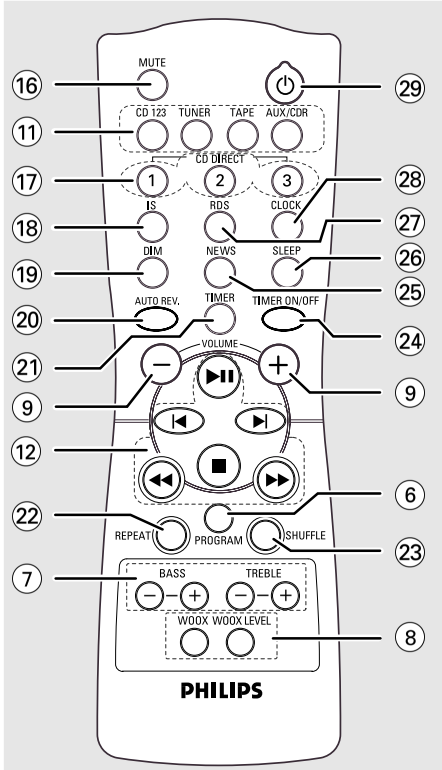
㉕ **NEWS**
– to hear News automatically.

㉖ **SLEEP**
– to activate, deactivate or set the sleep timer function.

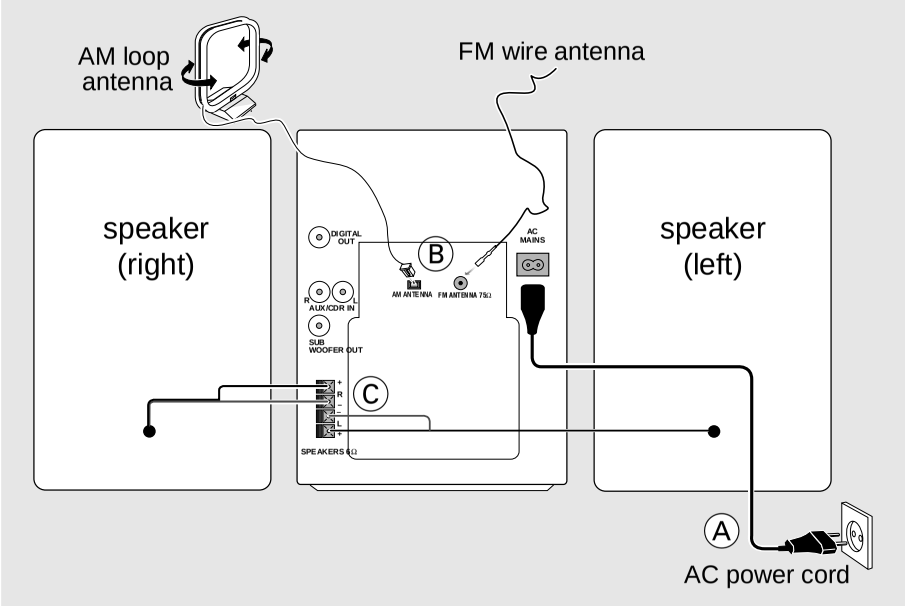
㉗ **RDS**
– to select RDS information.

㉘ **CLOCK**
– to display clock or set the clock.

㉙ ⏻
– to switch the system to Eco Power Standby mode.



Notes for remote control:
– First, select the source you wish to control by pressing one of the source select keys on the remote control (CD 123 or TUNER, for example).
– Then select the desired function (▶, ⏮, ⏭, for example).



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.

Ⓐ Power

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

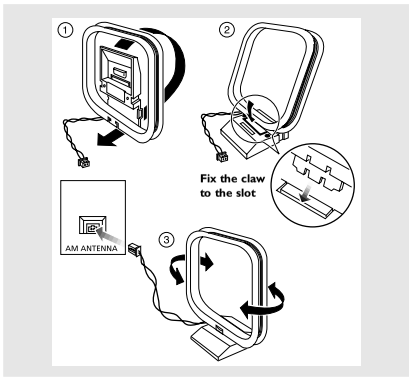
WARNING!
– For optimal performance, use only the original power cable.
– Never make or change connections with the power switched on.

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.

Ⓑ Antennas Connection

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

AM Antenna



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

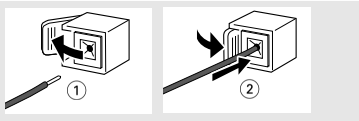
FM Antenna

- For better FM stereo reception, connect an outdoor FM antenna to the FM 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 "**–**".



- 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).

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/CDR IN** terminals.

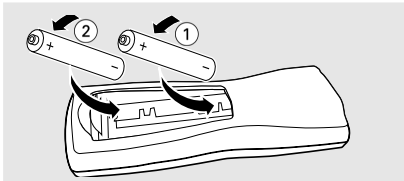
Note:
– If you are connecting equipment with a monaural output (a single audio out terminal), connect it to the AUX/CDR IN left terminal. Alternatively, you can use a "single to double" cinch cable (still be monaural sound).

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.

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

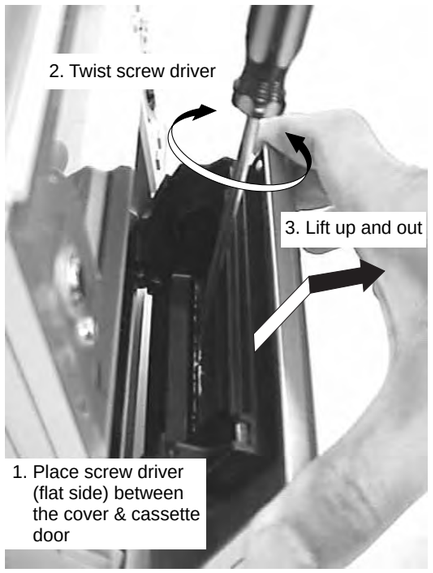


Figure 1 Remove Cassette Cover

Figure 2 Cassette Cover

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 remove 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

3-1

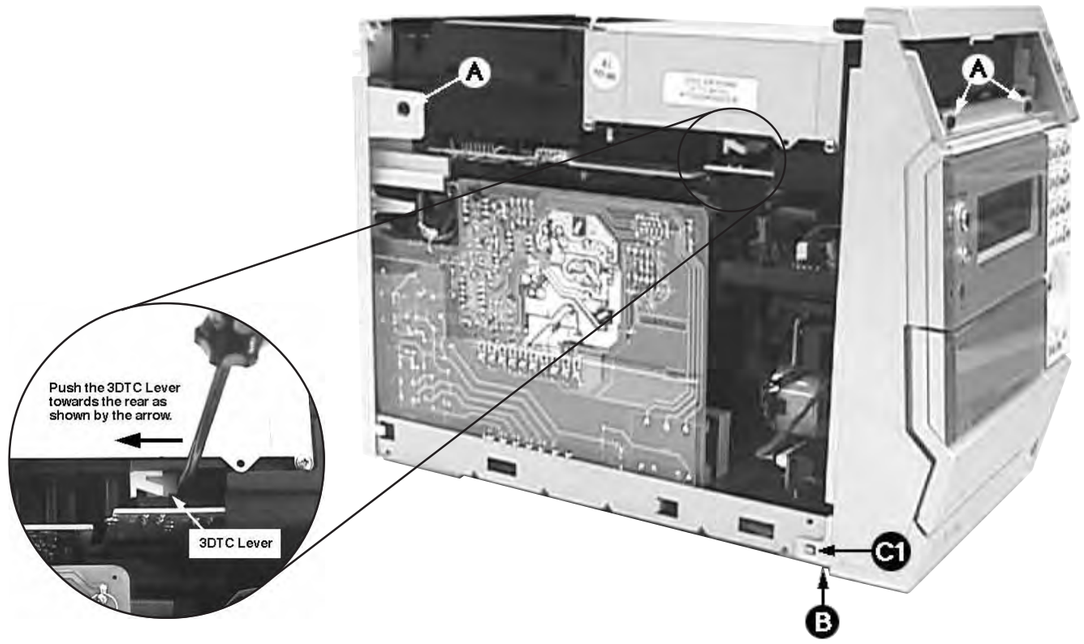


Figure 4

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 slides the Front Panel assembly out towards the front.

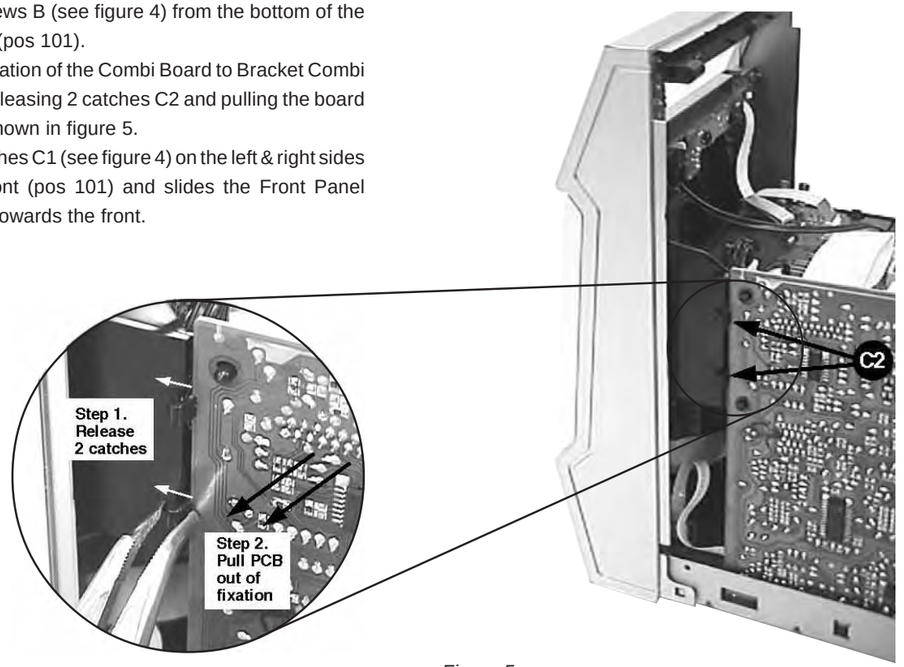


Figure 5

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

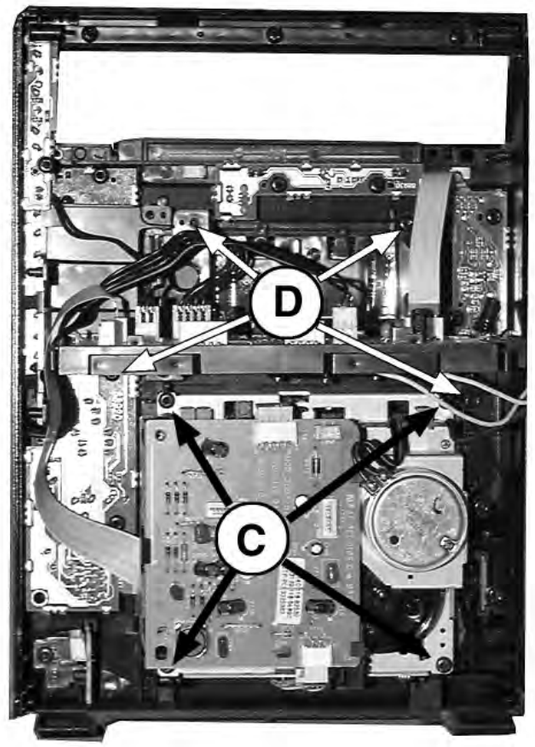


figure 7

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.

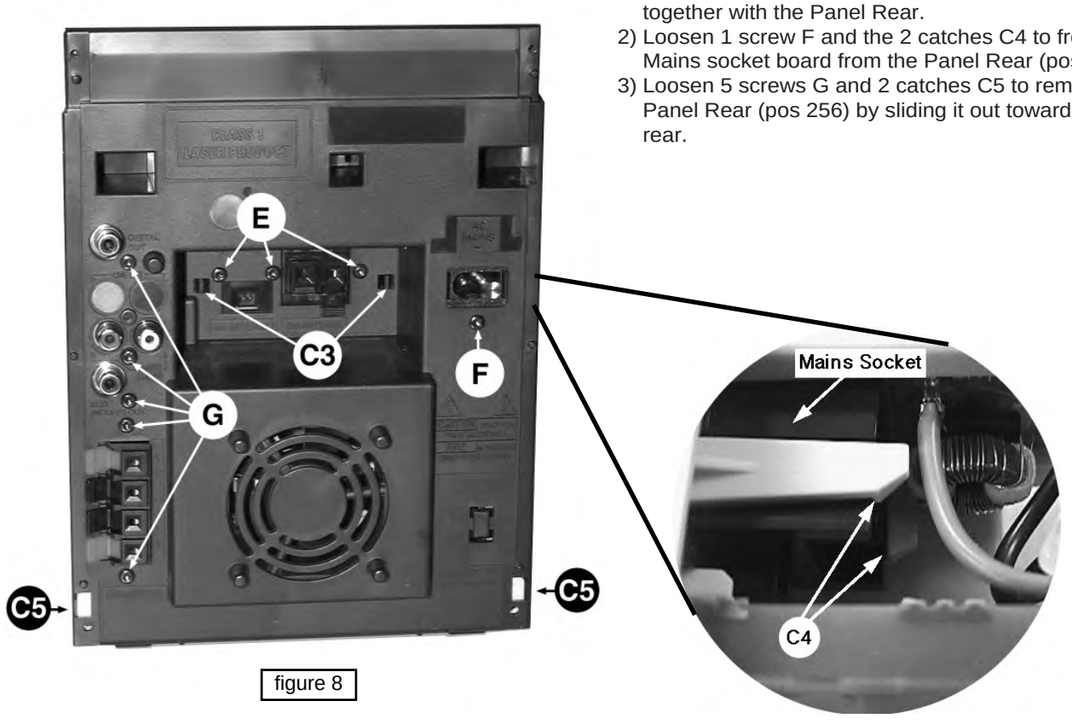


figure 8

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

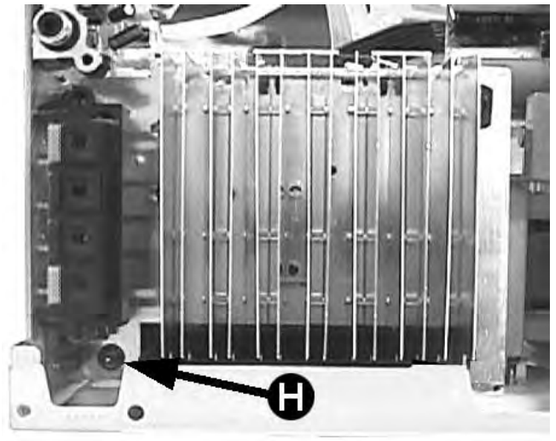


figure 9

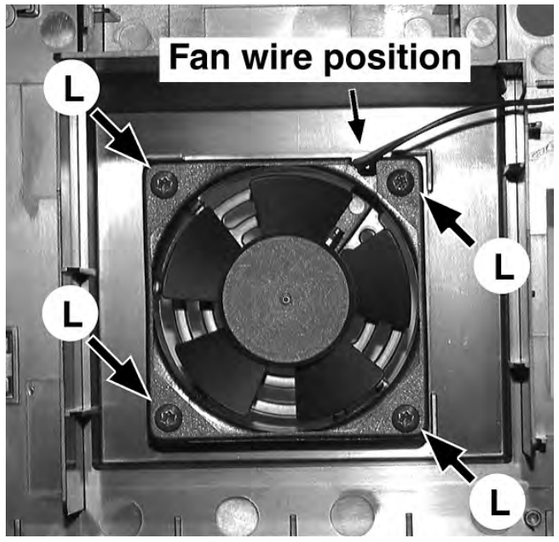


figure 10

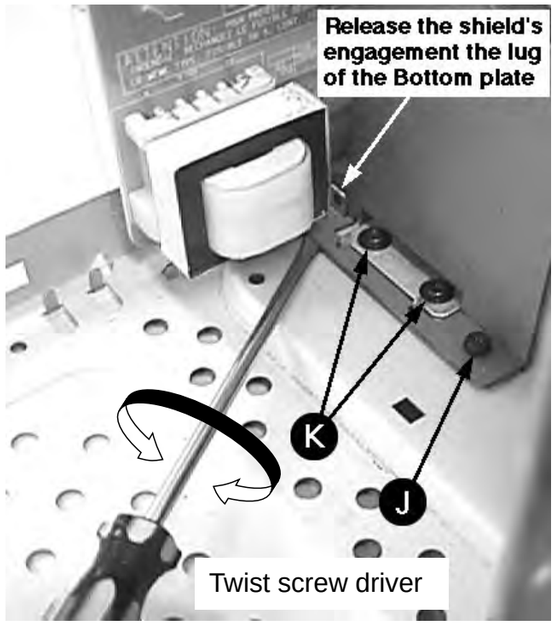


figure 11

3-3

SERVICE POSITIONS & REPAIR HINTS

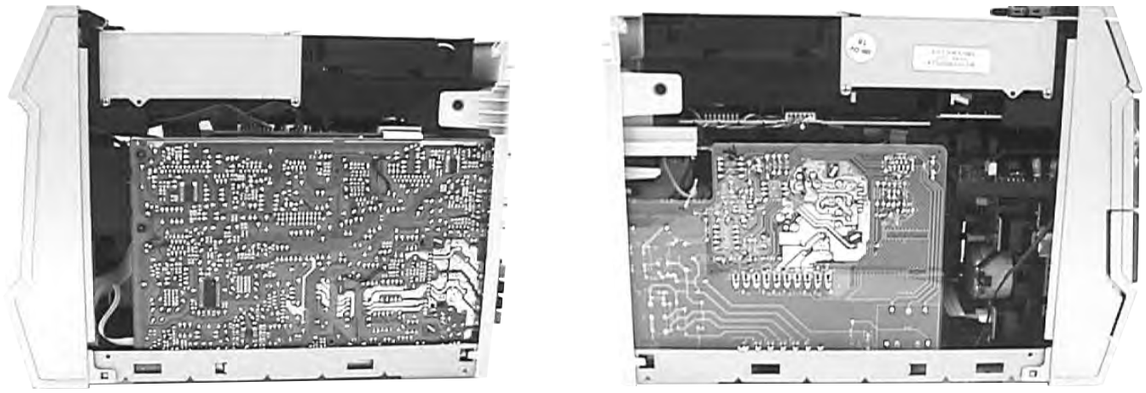
1) During repair it is possible to disconnect the ECO6 Tuner board, ETF8 Tape Module and/or 3DTC Module completely unless the fault is suspected to be in that area.
   This will not affect the performance of the rest of the set.

2) Use Service position A for repairs on Combi or Mains Board.

3) Use Service position B for repairs on Tuner or 3DTC electronic.

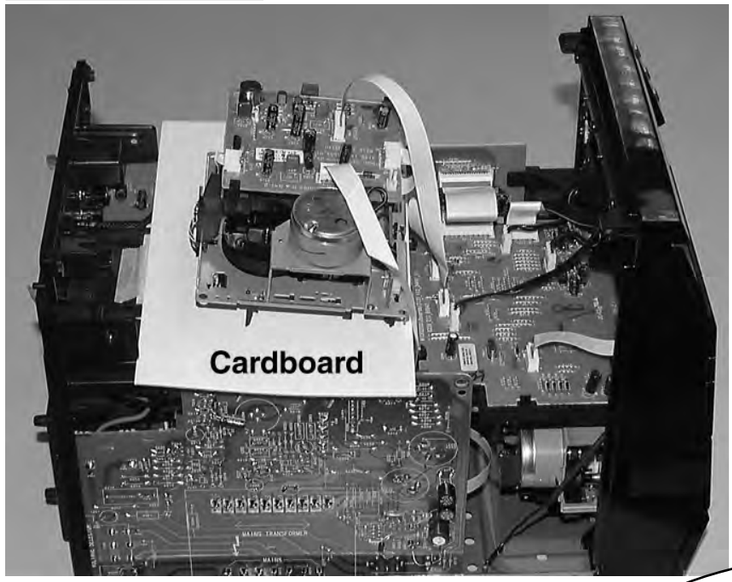
4) Use Service position C for repairs on the ETF8 Tape module.
   Note: The flex cables are very fragile, care should be taken not to damage them during repair. After repair, be very sure that the flex cables are inserted properly into the flex sockets before encasing, otherwise faults may occur.

Service position A

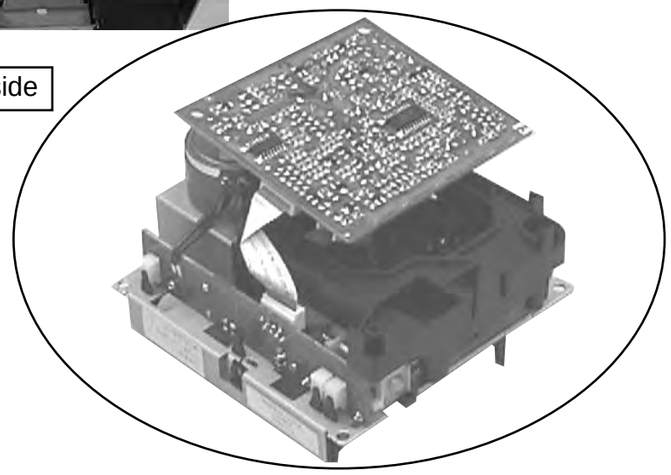


Service position B

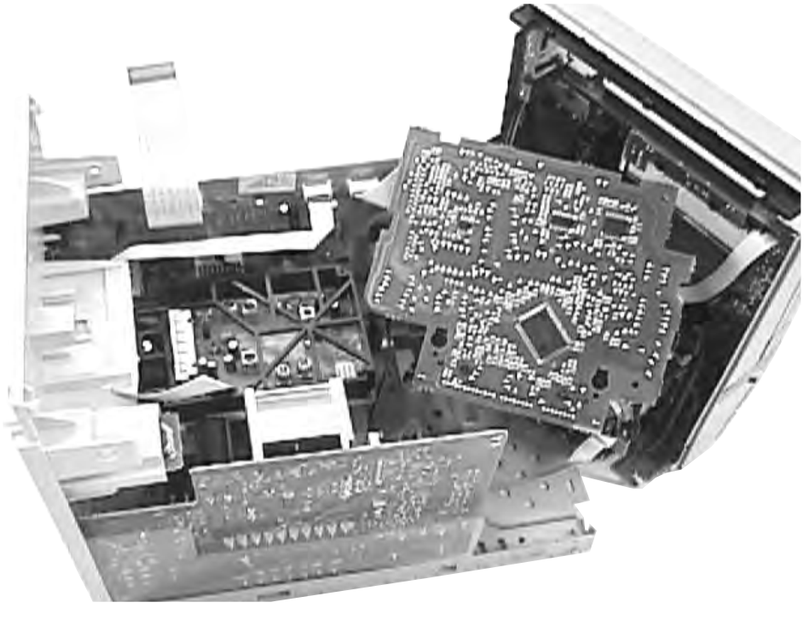
Service position C



Access to copperside

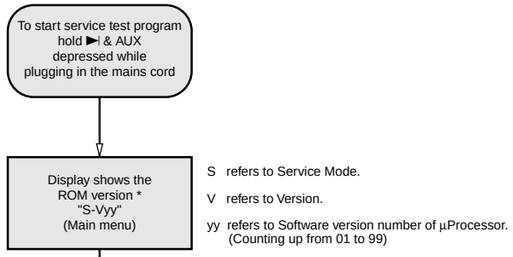


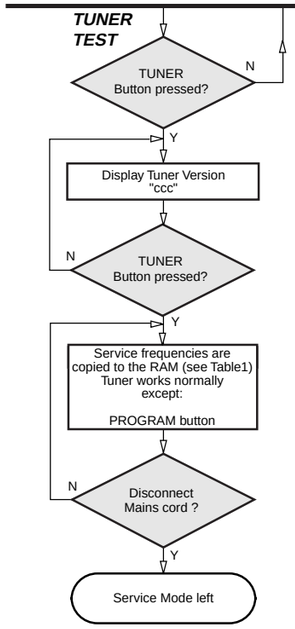
Service position D

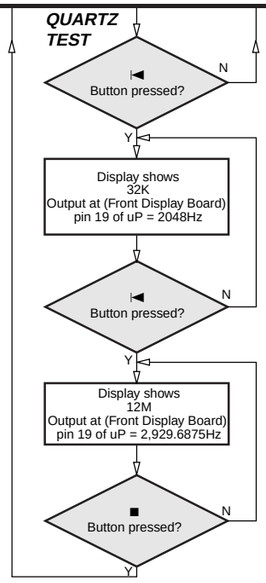


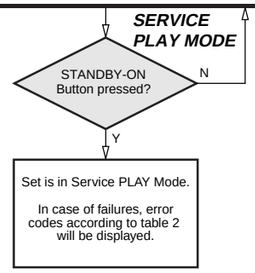
3-4

SERVICE TEST PROGRAM









The Service Play Mode is intended to detect and identify the failures in the CD Mode.

In this mode the electronics will still function even when an error is detected so that repair activities can be carried out.

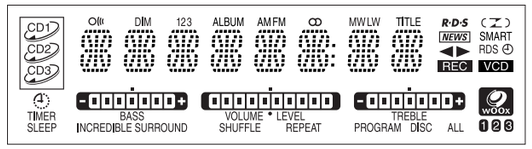
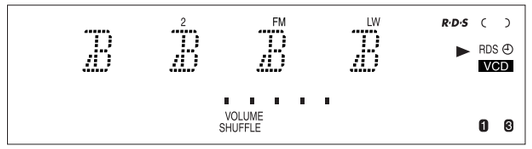


Figure 1

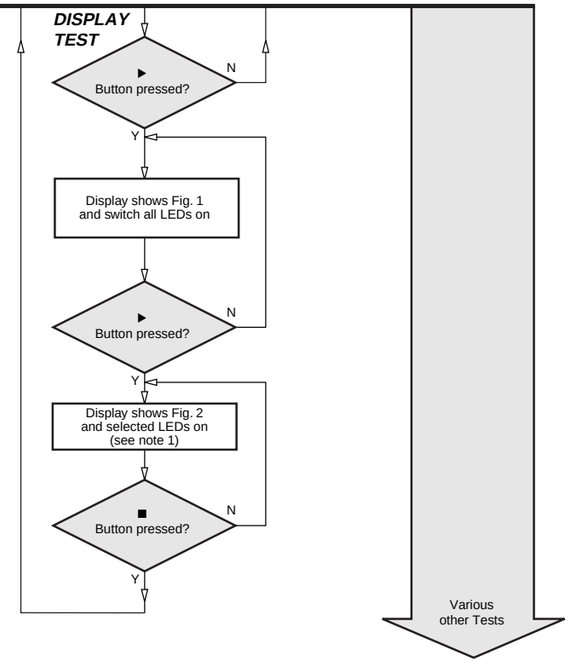


note 1 : 3CDC, TAPE and wOOx

Figure 2

Error code	Error Description
E1000	Focus Error Triggered when the focus could not be found within a certain time when starting up the CD or when the focus is lost for a certain time during play.
E1001	Radial Error Triggered when the radial servo is off-track for a certain time during play.
E1002	Sledge In Error The sledge did not reach its inner position (inner-switch is still close) before approximately 6 Sec. have passed by. Inner-switch or sledge motor problem.
E1003	Sledge Out Error The sledge did not come out of its inner position (inner-switch is still open) before approximately 250 mSec. have passed by. Inner-switch or sledge motor problem.
E1005	Jump-offtrack error Triggered in normal play when the jump destination could not be found within a certain time.
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



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	

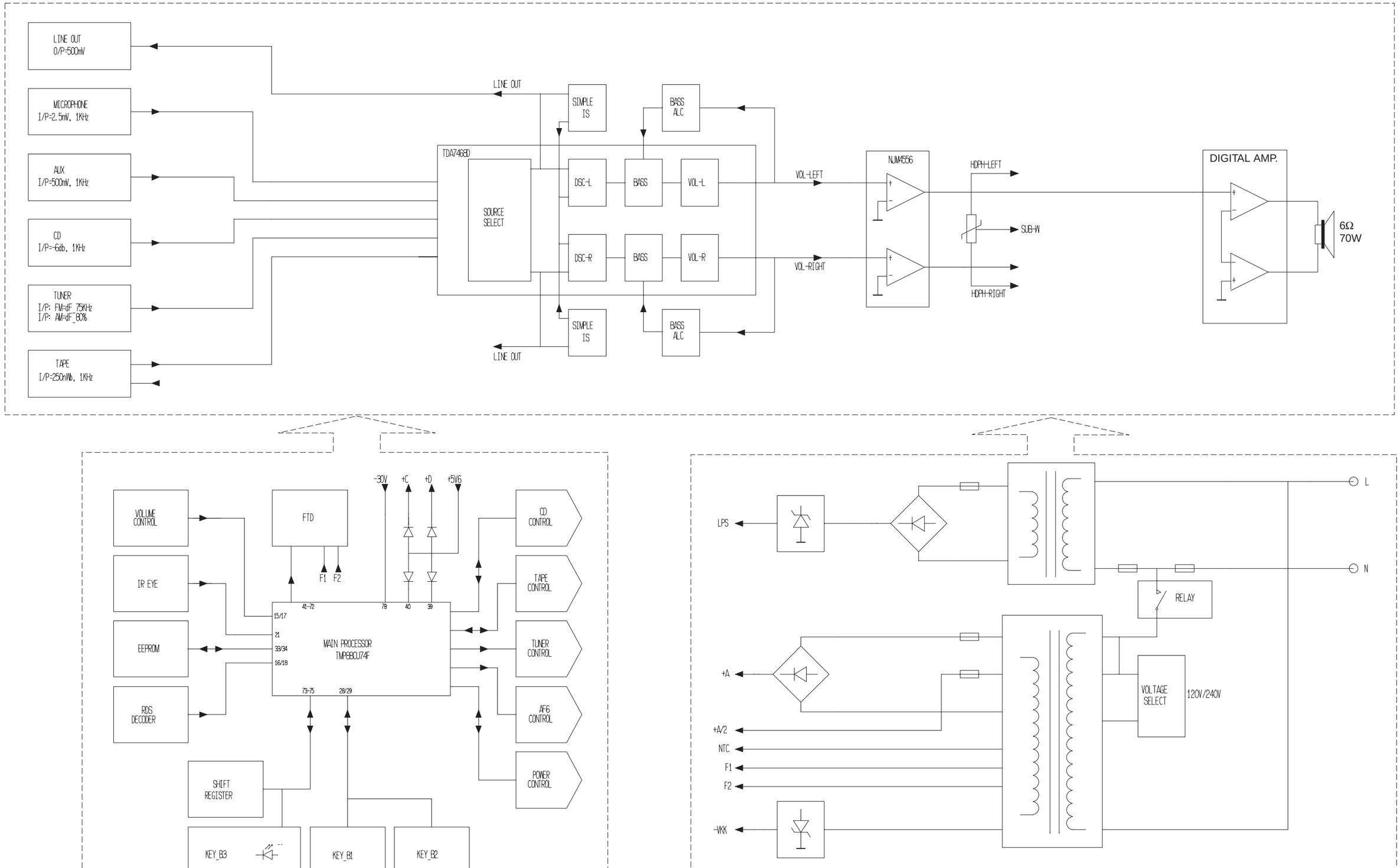
PRESET	Europe "EUR"	USA "USA"	Oversea "OSE"
1	87.5MHz	87.5MHz	87.5MHz
2	108MHz	108MHz	108MHz
3	531kHz	530kHz	531/530kHz*
4	1602kHz	1700kHz	1602/1700kHz*
5	558kHz	560kHz	558/560kHz*
6	1494kHz	1500kHz	1494/1500kHz*
7	153kHz	98MHz	98MHz
8	279kHz	87.5MHz	87.5MHz
9	198kHz	87.5MHz	87.5MHz
10	98MHz	87.5MHz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

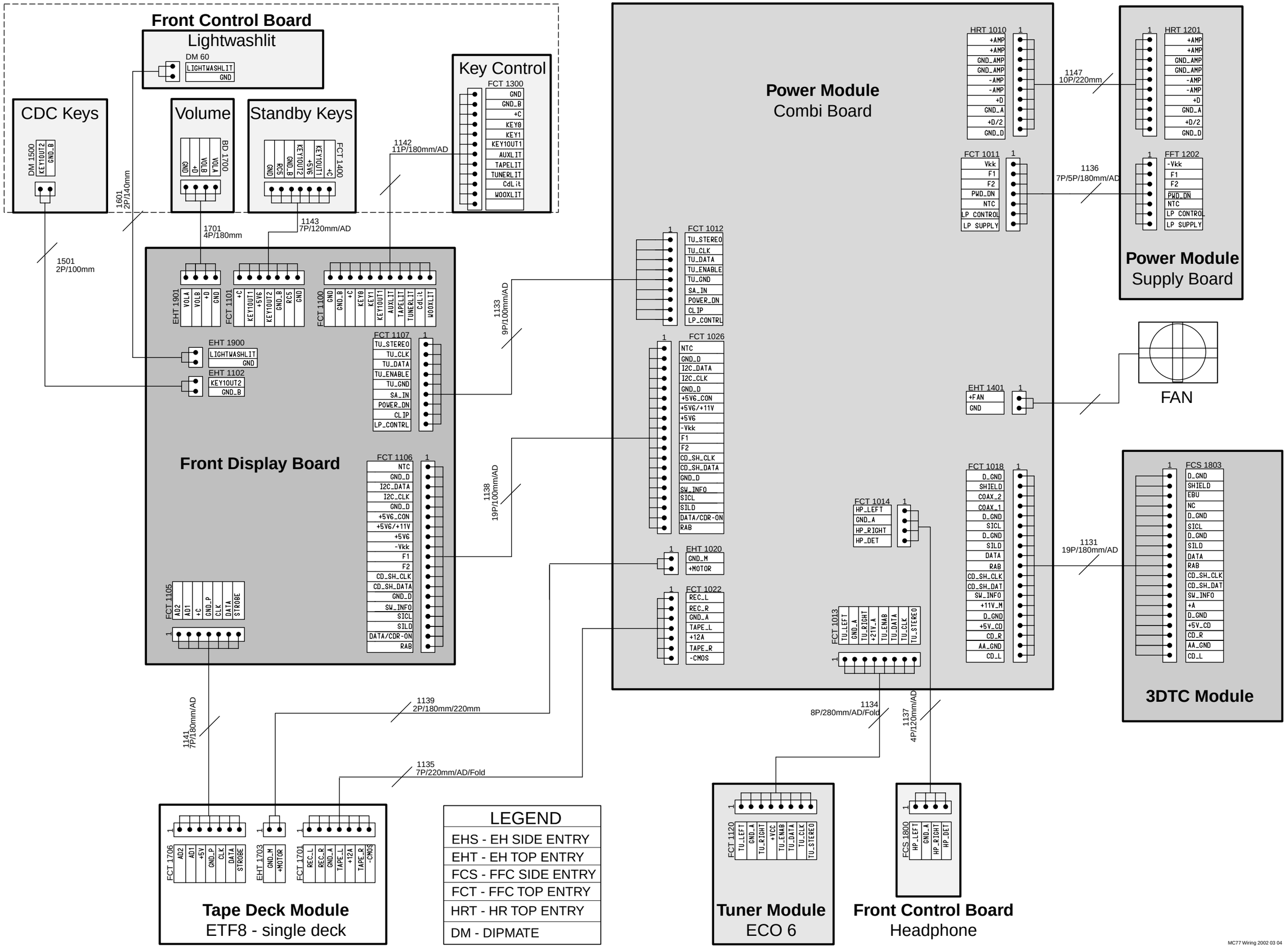
4-1

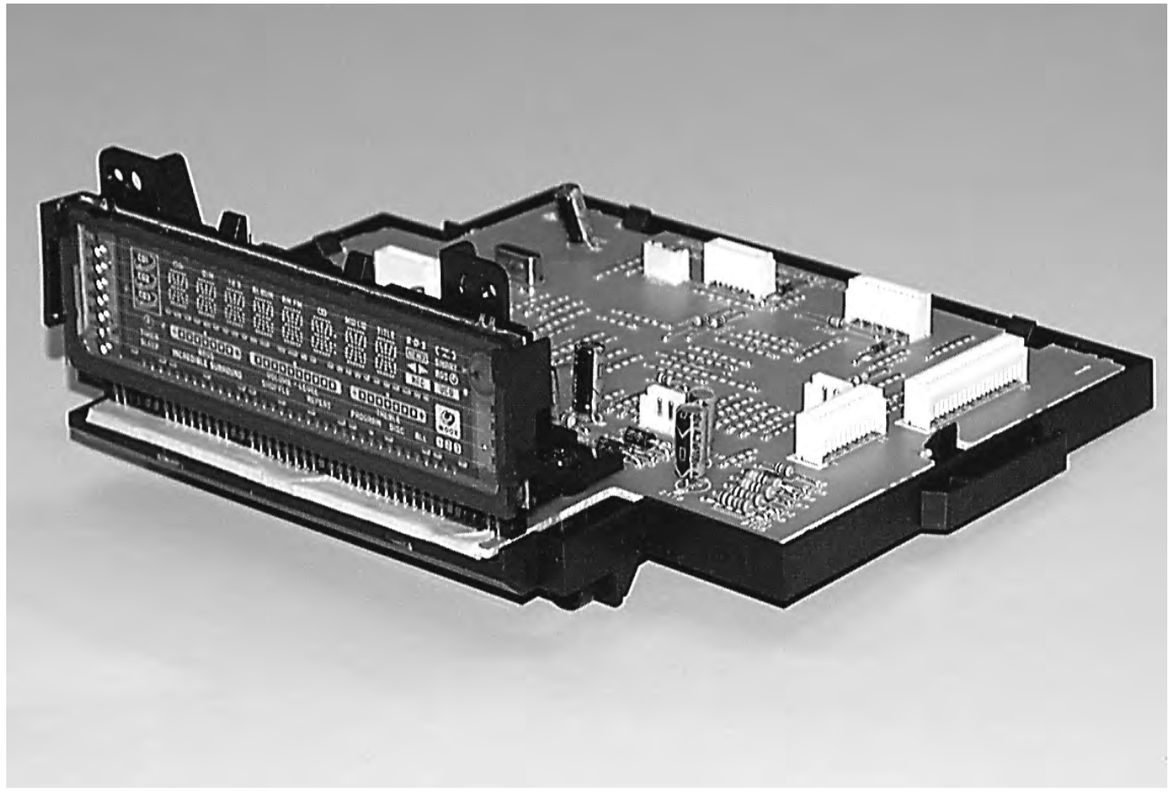
SET BLOCK DIAGRAM



5-1

WIRING DIAGRAM





Front Display Board

stage .1

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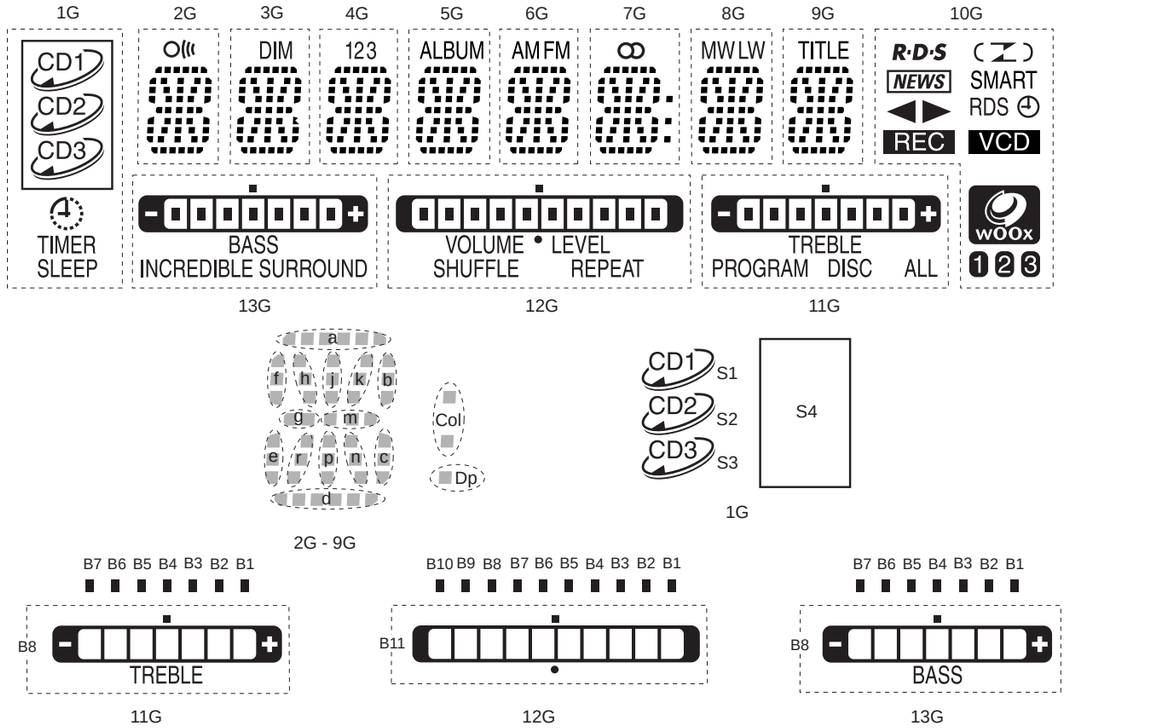

	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G
P1	-	a	a	a	a	a	a	a	a	R·D·S	ALL	B1	-
P2	-	h	h	h	h	h	h	h	h	NEWS	DISC	B2	-
P3	SLEEP	j , p	j , p	j , p	j , p	j , p	j , p	j , p	j , p	(	PROGRAM	B3	-
P4	CD1	k	k	k	k	k	k	k	k	Z	B1	B4	B1
P5	CD2	b	b	b	b	b	b	b	b	)	B2	B5	B2
P6	CD3	f	f	f	f	f	f	f	f	SMART	B3	B6	B3
P7	-	m	m	m	m	m	m	m	m	RDS	B4	B7	B4
P8	TIMER	g	g	g	g	g	g	g	g	◀	B5	B8	B5
P9	S1	c	c	c	c	c	c	c	c	▶	B6	B9	B6
P10	S2	e	e	e	e	e	e	e	e	REC	B7	B10	B7
P11	S3	r	r	r	r	r	r	r	r	VCD	-	-	INCREDIBLE SURROUND
P12	S4	n	n	n	n	n	n	n	n	wOOx	B8	B11	B8
P13	-	d	d	d	d	d	d	d	d	1	-	VOLUME	-
P14	-	O((	DIM	1	ALBUM	AM	∞	MW	TITLE	2	-	LEVEL	-
P15	-	-	-	2	-	FM	Col	LW	-	3	-	SHUFFLE	-
P16	-	-	-	3	-	-	Dp	-	-	-	-	REPEAT	-

PIN NO.	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
CONNECTION	F2	F2	-	-	-	-	P16	P15	P14	P13	P12	P11	P10	P9	-	-	P8	P7	P6	P5	P4	P3	P2	P1	-	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G	-	-	-	-	F1	F1

6-2

1100 C1
1101 C2
1102 C6
1105 A18
1106 C17
1107 G17
1108 A8
1900 C5
1901 C4
2101 I11
2102 I11
2104 F5
2105 F4
2106 G8
2107 G9
2108 H9
2109 G9
2110 G9
2111 H16
2112 J8
2113 J9
2114 J9
2115 B16
2116 J10
2117 J11
2118 I12
2119 J12
2120 C11
2121 C12
2122 C12
2123 B13
2124 B13
2125 A14
2126 A15
2127 G13
2128 G13
2129 G13
2130 G13
2131 G14
2132 D15
2133 D15
2134 E15
2135 E15
2136 E15
2137 F15
2138 F15
2139 F15
2140 F15
2141 B17
2142 B17
2143 B17
2145 B4
2146 B6
2147 B5
2148 B6
2149 B5
2150 B6
2151 I14
2152 J14
2153 B17
2900 H5
2901 H3
2902 H4
2903 I5
2904 I1
2905 J1
2906 J1
2907 H11
3106 H13
3107 D6
3108 I13
3109 F8
3110 F8
3111 F8
3112 F8
3113 F8
3114 F8
3115 G8
3116 F10
3117 F10
3118 F10
3119 F10
3120 F10
3121 G10
3122 F10
3123 F11
3124 F11
3125 F11
3126 F11
3127 F12
3128 E11
3129 E11
3130 E11
3131 E11
3132 E12
3133 E11
3134 E11
3135 D12
3136 D11
3137 D11
3138 C11
3139 C11
3140 C11
3141 C11
3142 C10
3143 C10
3144 C10
3145 C10
3146 C10
3147 C10
3148 C10
3149 C9
3150 C9
3151 C9
3152 C9
3153 C9
3154 C9
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3156 C8
3157 C8
3158 C8
3159 C8
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3162 C8
3163 D7
3164 D7
3165 D7
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3167 D7
3168 D7
3169 E7
3170 E7
3171 E7
3172 E7
3173 E7
3174 E7
3175 F7
3176 F7
3177 J8
3178 J9
3179 J9
3180 I10
3181 J10
3182 F5
3183 F5
3184 F4
3186 I12
3187 I14
3188 I15
3189 G13
3190 G13
3191 G13
3192 G13
3193 G14
3194 G14
3195 G14
3196 A12
3197 A13
3198 A13
3199 B13
3201 I12
3202 I13
3205 A17
3206 A17
3207 C15
3208 D16
3209 E16
3210 E16
3211 E16
3212 E16
3213 F16
3214 F16
3215 F16
3216 G14
3217 F5
3218 B6
3219 H15
3220 H16
3221 H16
3900 H4
3901 H3
3902 H1
3903 I3
3904 J5
3905 J5
3906 J6
3907 J6
3908 H11
3909 H11
3910 H11
4101 H13
5102 C12
5103 F9
5104 F9
5900 H3
5901 H4
5902 G10
6100 C12
6101 C12
6102 F5
6103 I10
6105 I15
6106 E7
6107 E7
6108 E7
6109 E7
6110 E7
6111 C3
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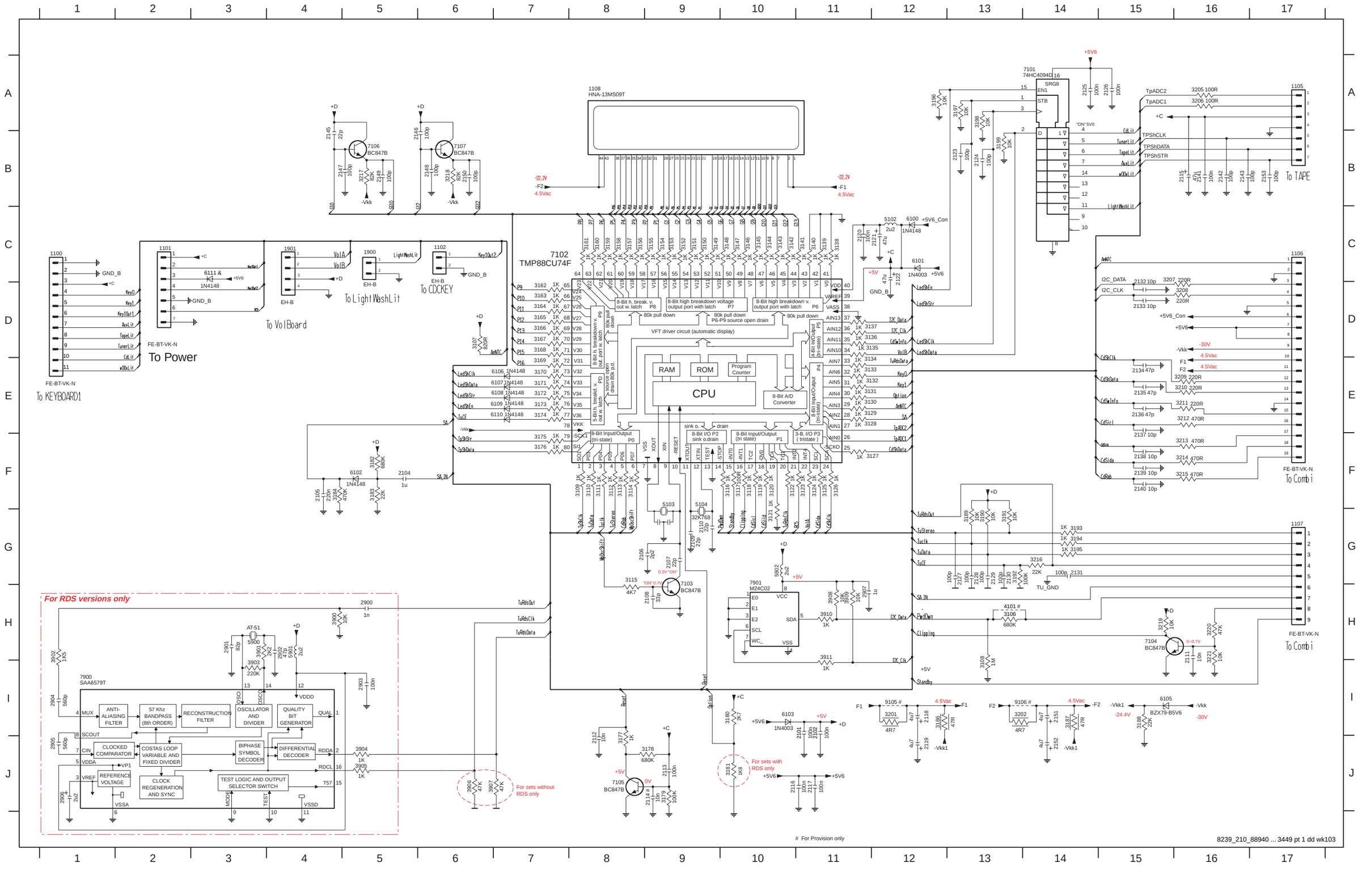
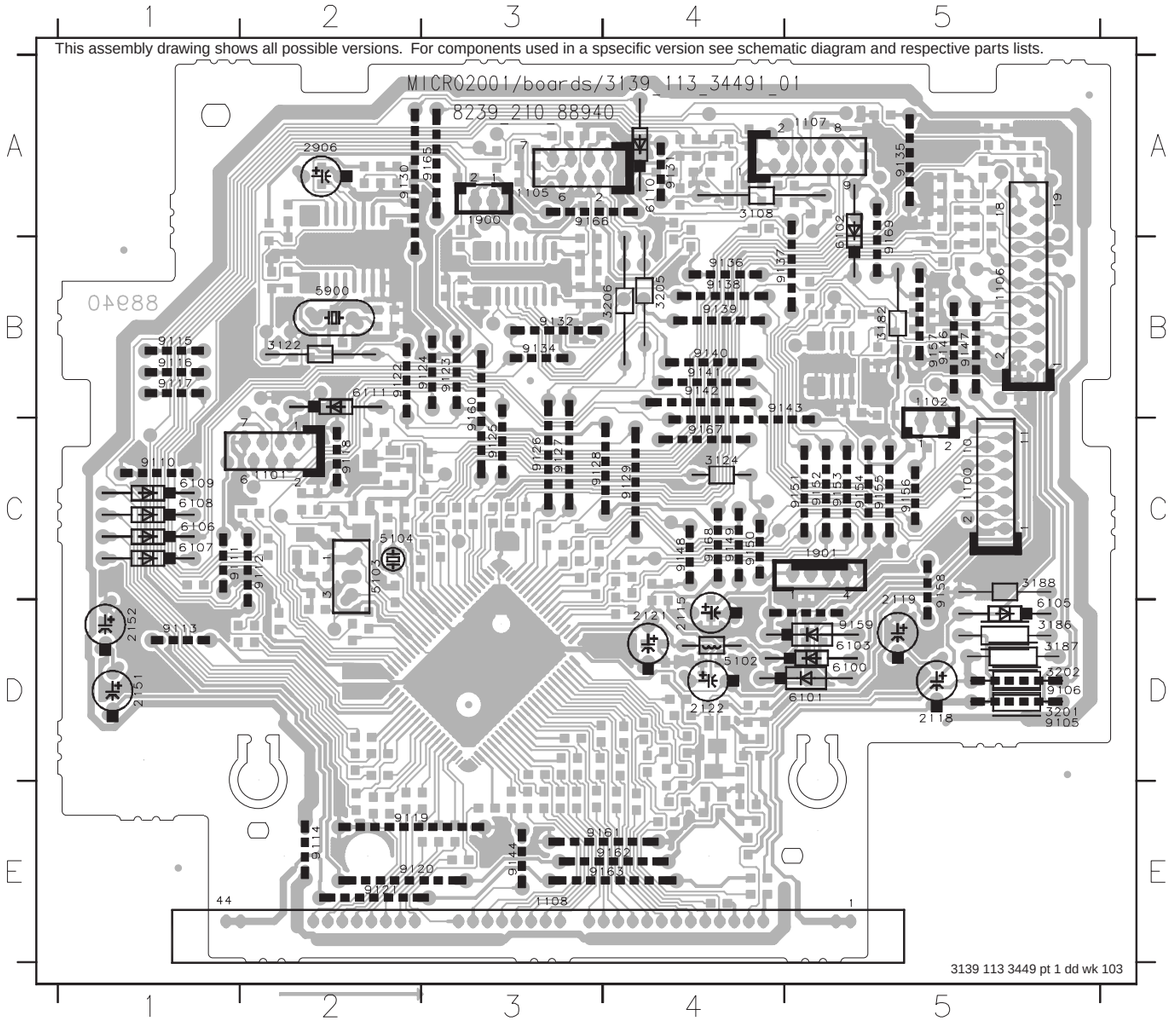


Component Layout

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 D5 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
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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
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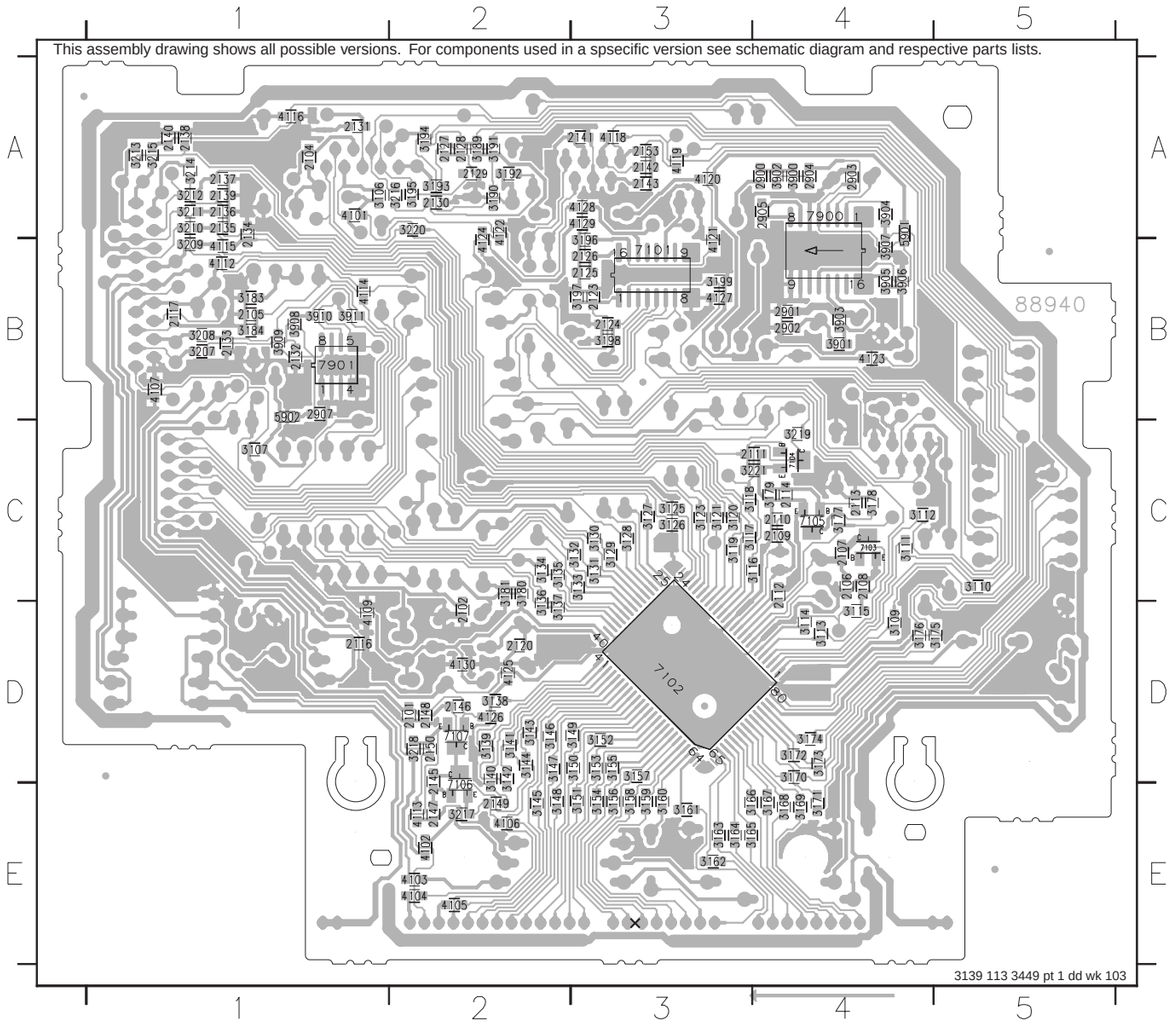


6-4

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	

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		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	

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	
3214 ©	4822 051 30471	470Ω	5%	0,06W	
3215 ©	4822 051 30471	470Ω	5%	0,06W	
3216 ©	4822 051 30223	22kΩ	5%	0,06W	
3217 ©	4822 117 12864	82kΩ	5%	0,06W	
3218 ©	4822 117 12864	82kΩ	5%	0,06W	
3219 ©	4822 051 30103	10kΩ	5%	0,06W	
3220 ©	4822 117 12925	47kΩ	1%	0,06W	
3221 ©	4822 051 30103	10kΩ	5%	0,06W	
3900 ©	4822 051 30103	10kΩ	5%	0,06W	
3901 ©	4822 051 30222	2,2kΩ	5%	0,06W	
3902 ©	4822 051 30152	1,5kΩ	5%	0,06W	
3903 ©	4822 117 12891	220kΩ	1%	0,06W	
3904 ©	4822 051 30102	1kΩ	5%	0,06W	
3905 ©	4822 051 30102	1kΩ	5%	0,06W	
3908 ©	4822 051 30103	10kΩ	5%	0,06W	
3909 ©	4822 051 30103	10kΩ	5%	0,06W	
3910 ©	4822 051 30102	1kΩ	5%	0,06W	
3911 ©	4822 051 30102	1kΩ	5%	0,06W	
4102 ©	4822 051 30008	CHIP JUMPER 0603			

RESISTORS

4103 ©	4822 051 30008	CHIP JUMPER 0603
4104 ©	4822 051 30008	CHIP JUMPER 0603
4105 ©	4822 051 30008	CHIP JUMPER 0603
4106 ©	4822 051 30008	CHIP JUMPER 0603
4107 ©	4822 051 30008	CHIP JUMPER 0603
4109 ©	4822 051 30008	CHIP JUMPER 0603
4112 ©	4822 051 30008	CHIP JUMPER 0603
4113 ©	4822 051 30008	CHIP JUMPER 0603
4114 ©	4822 051 30008	CHIP JUMPER 0603
4115 ©	4822 051 30008	CHIP JUMPER 0603
4116 ©	4822 051 30008	CHIP JUMPER 0603
4118 ©	4822 051 30008	CHIP JUMPER 0603
4119 ©	4822 051 30008	CHIP JUMPER 0603
4120 ©	4822 051 30008	CHIP JUMPER 0603
4121 ©	4822 051 30008	CHIP JUMPER 0603
4122 ©	4822 051 30008	CHIP JUMPER 0603
4123 ©	4822 051 30008	CHIP JUMPER 0603
4124 ©	4822 051 30109	10Ω 5% 0,06W
4125 ©	4822 051 30008	CHIP JUMPER 0603
4126 ©	4822 051 30008	CHIP JUMPER 0603
4127 ©	4822 051 30008	CHIP JUMPER 0603
4128 ©	4822 051 30008	CHIP JUMPER 0603
4129 ©	4822 051 30008	CHIP JUMPER 0603
4130 ©	4822 051 30008	CHIP JUMPER 0603

COILS

5102	4822 157 62552	2,2µH
5103	5322 242 73686	CERAMIC RESONATOR, 12MHZ
5104	4822 242 70938	CRYSTAL 32,768kHz
5900	4822 242 11033	RESONATOR 4,332MHz
5901 ©	4822 157 10586	2,2µH
5902 ©	4822 157 10586	2,2µH

DIODES

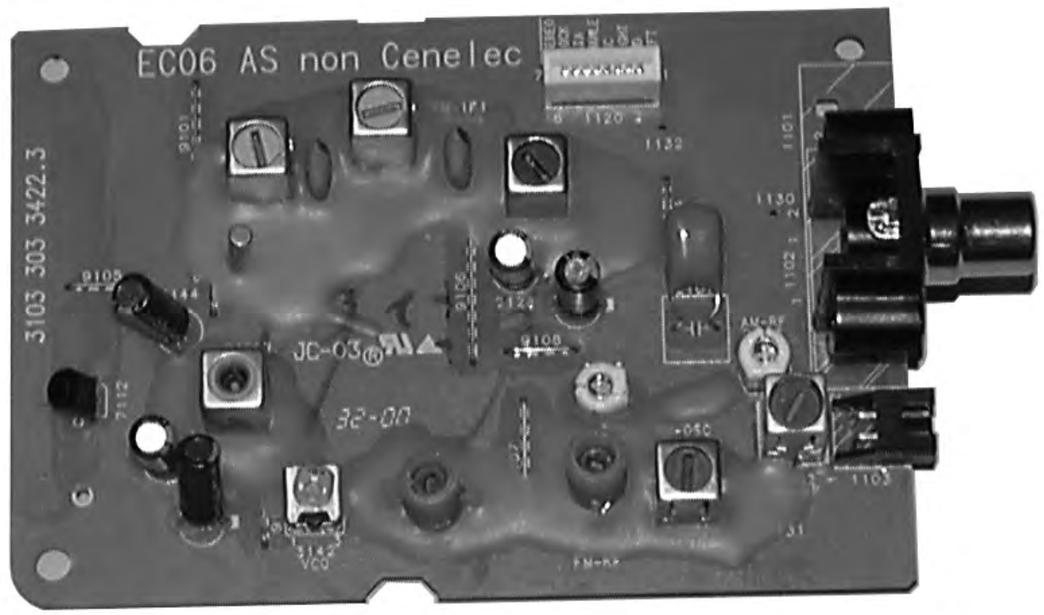
6100	4822 130 30621	1N4148
6101	4822 130 31878	1N4003G
6102	4822 130 30621	1N4148
6103	4822 130 31878	1N4003G
6105	4822 130 34173	BZX79-B5V6
6106	4822 130 30621	1N4148
6107	4822 130 30621	1N4148
6108	4822 130 30621	1N4148
6109	4822 130 30621	1N4148
6110	4822 130 30621	1N4148
6111	4822 130 30621	1N4148

TRANSISTORS

7103 ©	4822 130 60511	BC847B
7104 ©	4822 130 60511	BC847B
7105 ©	4822 130 60511	BC847B
7106 ©	4822 130 60511	BC847B
7107 ©	4822 130 60511	BC847B

INTEGRATED CIRCUITS

7101 ©	4822 209 15449	74HC4094D, SHIFT REGISTER
7102 ©	3103 308 84440	TMP88CU74YF M1 MC77 (µP)
7900 ©	9352 679 67118	SAA6579T/V1/M4 (RDS Decoder)
7901 ©	9322 145 26668	M24C02-WMN6, EEPROM



ECO6 Tuner Board

version: ***SYSTEMS non-CENELEC***

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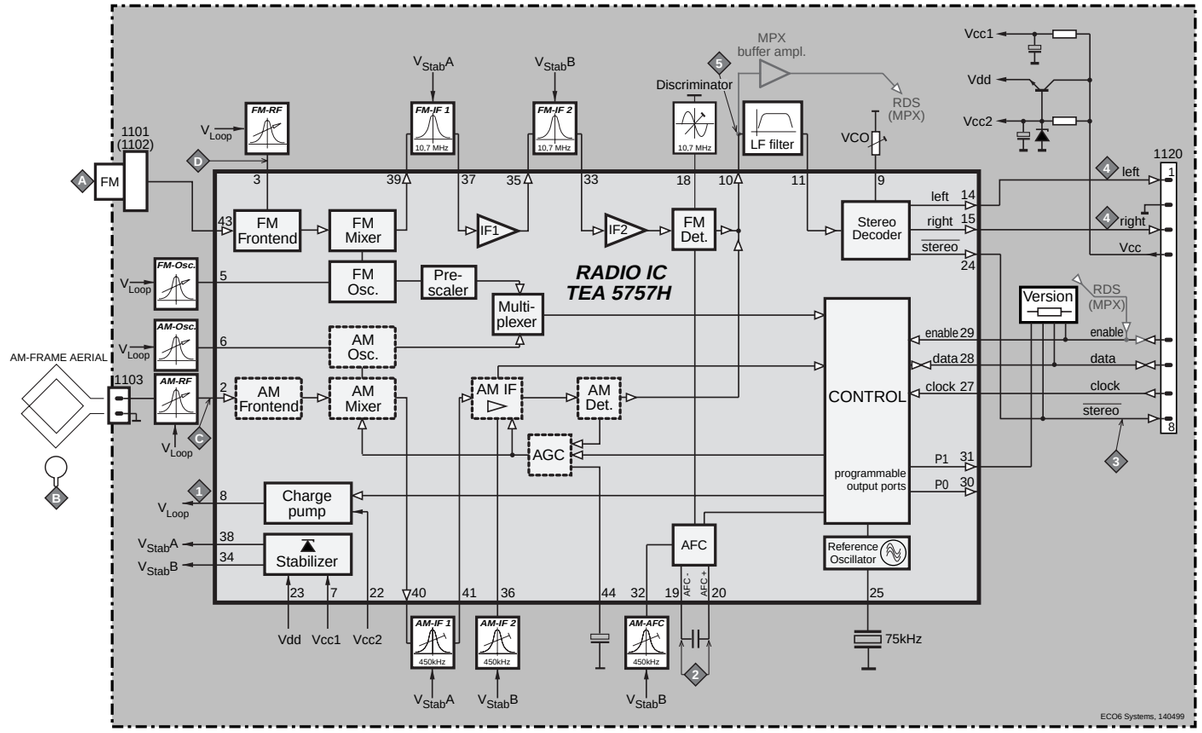
BLOCK DIAGRAM

TUNER BOARD
ECO 6 Systems



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TUNER BOARD ECO6 / SYSTEMS NON CENELEC

VERSION PROGRAMMING COMPONENTS

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

X component mounted

VERSION DETECTION

LEGEND

ⓟ...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
EVM
voltages measured while set is tuned to a strong transmitter

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

ECO6 Sys-non Cenelec, 000911

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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 FM/MW- and FM/MW/LW - versions with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)			108MHz	5130	◇1	8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V [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		6.9V ±0.2V
			531kHz	check		1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM IF						
FM	10.7MHz, 45mV continuous wave	◇D	IC 7101 21 shortcircuit to block AFC 2141	5119	◇2	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65.81 - 74, 87.5 - 108MHz)	108MHz	◇A mod=1kHz Δf=±22.5kHz	108MHz	2155	◇4	MAX
	87.5MHz (65.81MHz)		87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	◇A	98MHz	3142	◇3	152kHz ±1kHz [1]
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc	◇C Δf=±10kHz V_{RF} = 0.5mV (as low as possible)	IC 7101 36 220R 100nF	5111	◇5	max. f_o symmetric
			IC 7101 40 220R 100nF see remark [2]	5112		
AM AFC **MW**		◇C continuous wave V_{RF} = 2mV		5114	◇2	0 ± 2 mV DC
AM RF [3]						
MW [4] FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	◇B Δf = ±30kHz V_{RF} as low as possible	1494kHz	2106	◇5	max. f_o symmetric
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz		1500kHz	2106		
	560kHz		560kHz	5102		

ECO6, Sys + PA with frame aerial, 170501

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.

↕ Repeat

[5] 1.7V ±0.5V when alternative varicap. BB804 is used on pos. 6130, 6131.

Electrical Partslist *ECO6* *SYSTEMS NON-CENELEC*

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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

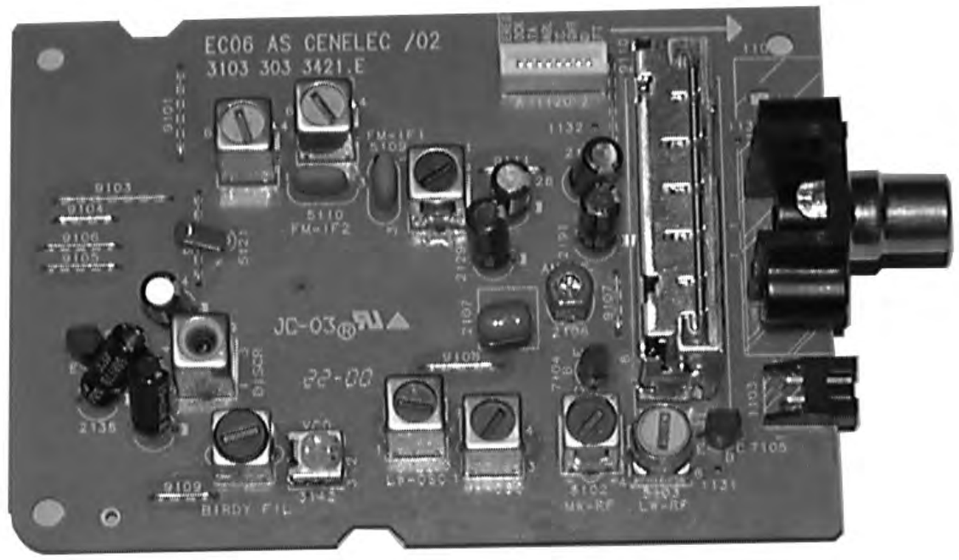
6103 ©	5322 130 34337	BAV99	
6105 ©	4822 130 83075	HN1V02H	
6106 ©	4822 130 83757	BAS216	
6107 ©	9340 386 90115	BZX284-C11	
6120 ©	4822 130 83757	BAS216	
6130 ©	4822 130 82833	1SV228	
6131 ©	4822 130 82833	1SV228	

TRANSISTORS

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

INTEGRATED CIRCUITS

7101 ©	9351 740 80557	TEA5757H/V1, RADIO IC



ECO6 Tuner Board

version: ***SYSTEMS CENELEC***

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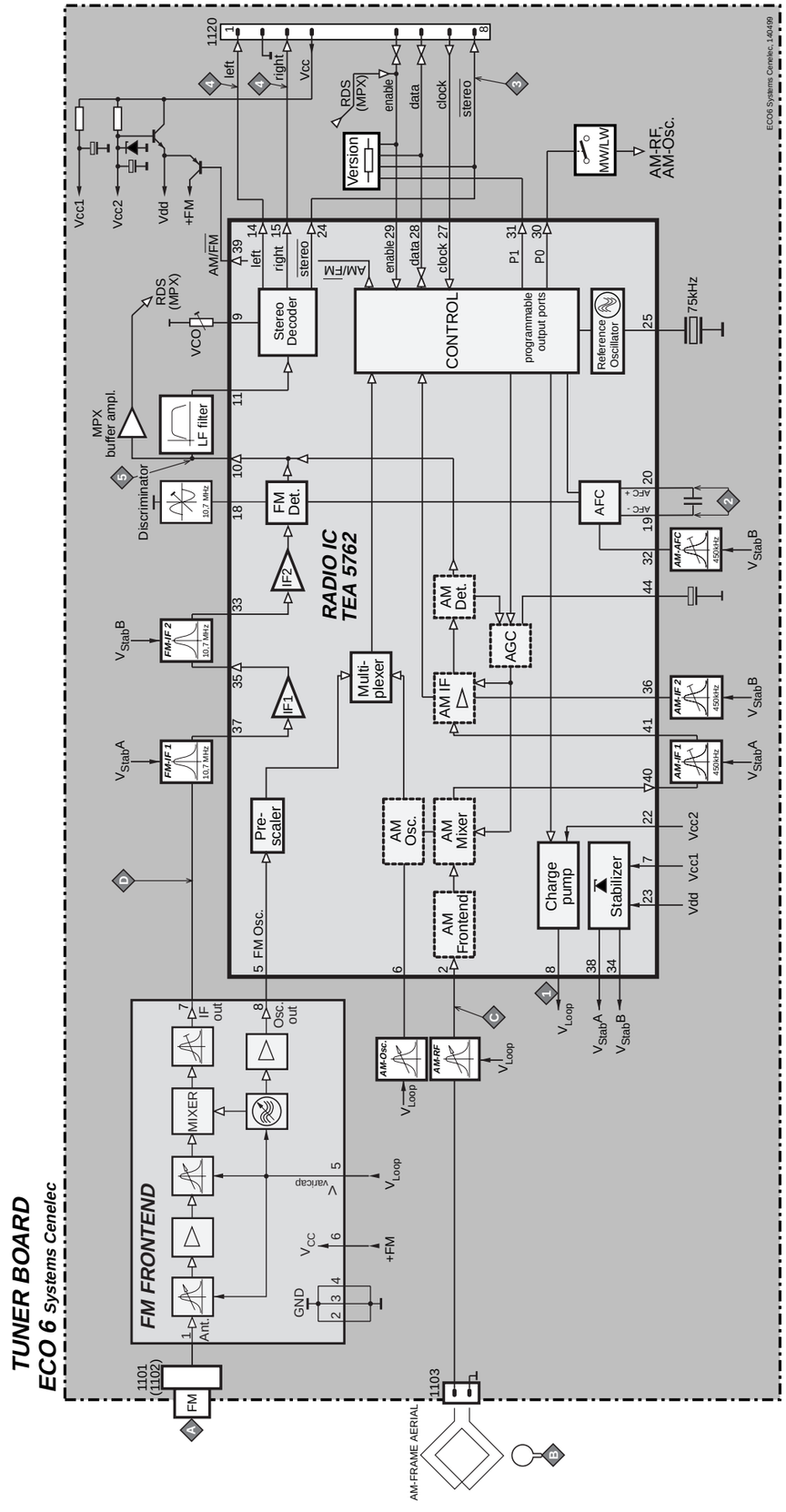
BLOCK DIAGRAM



7B-2

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

LEGEND

* ... only assembled in FM/AM-version
(p)...for provision only
USA ... for USA version only
LW ... for LW version only

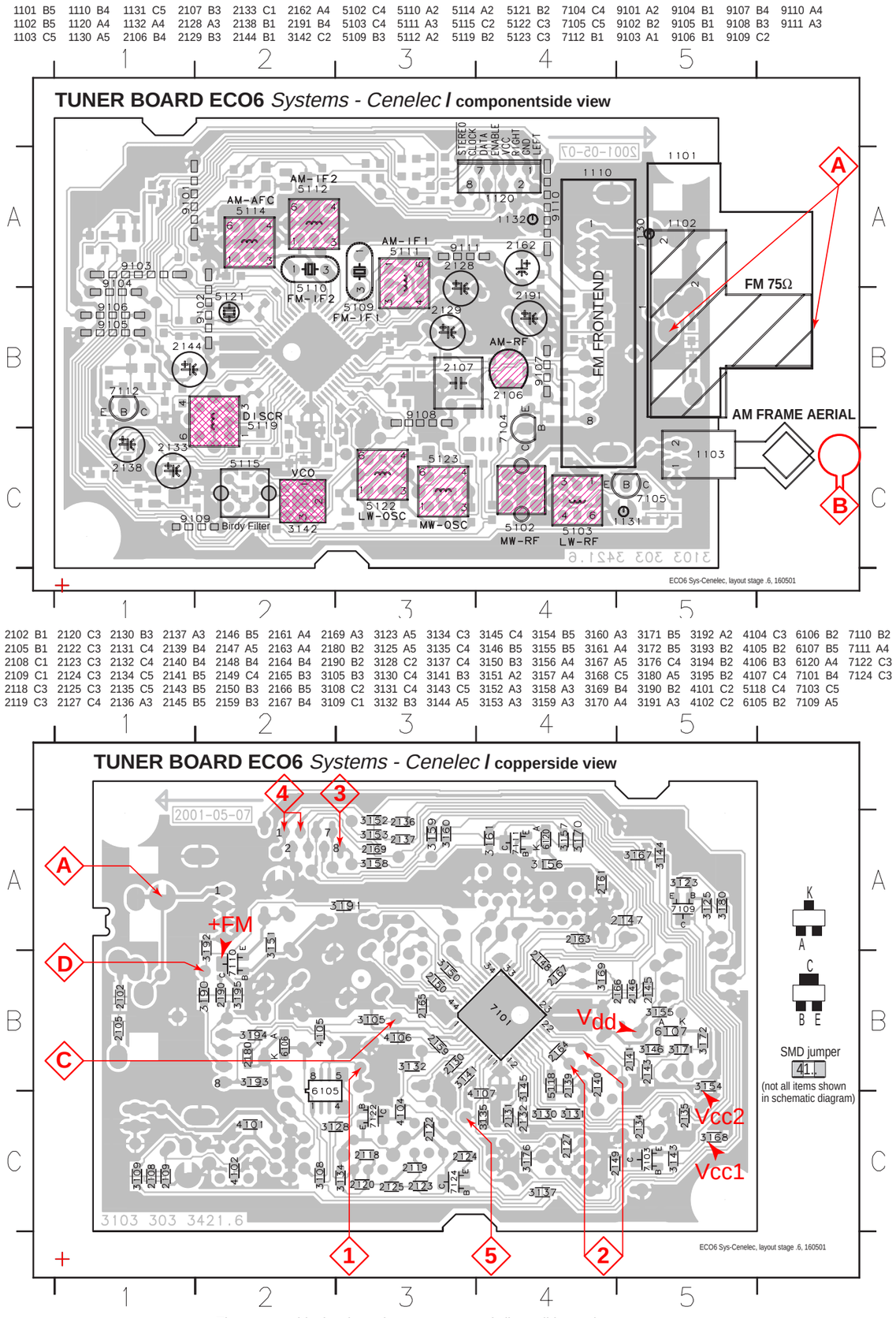
SMD jumper 41xx 0R

...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

* marked components not for LW version

ECO6 Sys-Cenelec, 010517



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

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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
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (50kHz grid)			108MHz	check	1	8V ±1.2V
			87.5MHz	check		1.6V ±0.5V
MW 531 - 1602kHz (9kHz grid)			1602kHz	5123		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
FM - IF						
FM	10.7MHz, 45mV continuous wave	D	IC 7101 21 shortcircuit to block AFC 2141	5119	2	0mV ±3mV
FM - VCO						
FM	98MHz, 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz 1)
FM RF (channel separation)	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.
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with 3.3kΩ to Vcc	C Δf = ±10kHz V_{RF} = 0.5mV (as low as possible)	IC 7101 36 220R 100nF	5111	5	max. f_o symmetric
			IC 7101 40 220R 100nF see remark 2)	5112		
AM AFC **MW**		C continuous wave V_{RF} = 2mV		5114	2	0mV ±2mV
AM RF 3)						
MW	1494kHz	B Δf = ±30kHz V_{RF} as low as possible	1494kHz	2106	5	max. f_o symmetric
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		

ECO6 Sys Cenelec, 190599

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

Electrical Partslist *ECO6* SYSTEMS-CENELEC

7B-4

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

FRONT CONTROL BOARD

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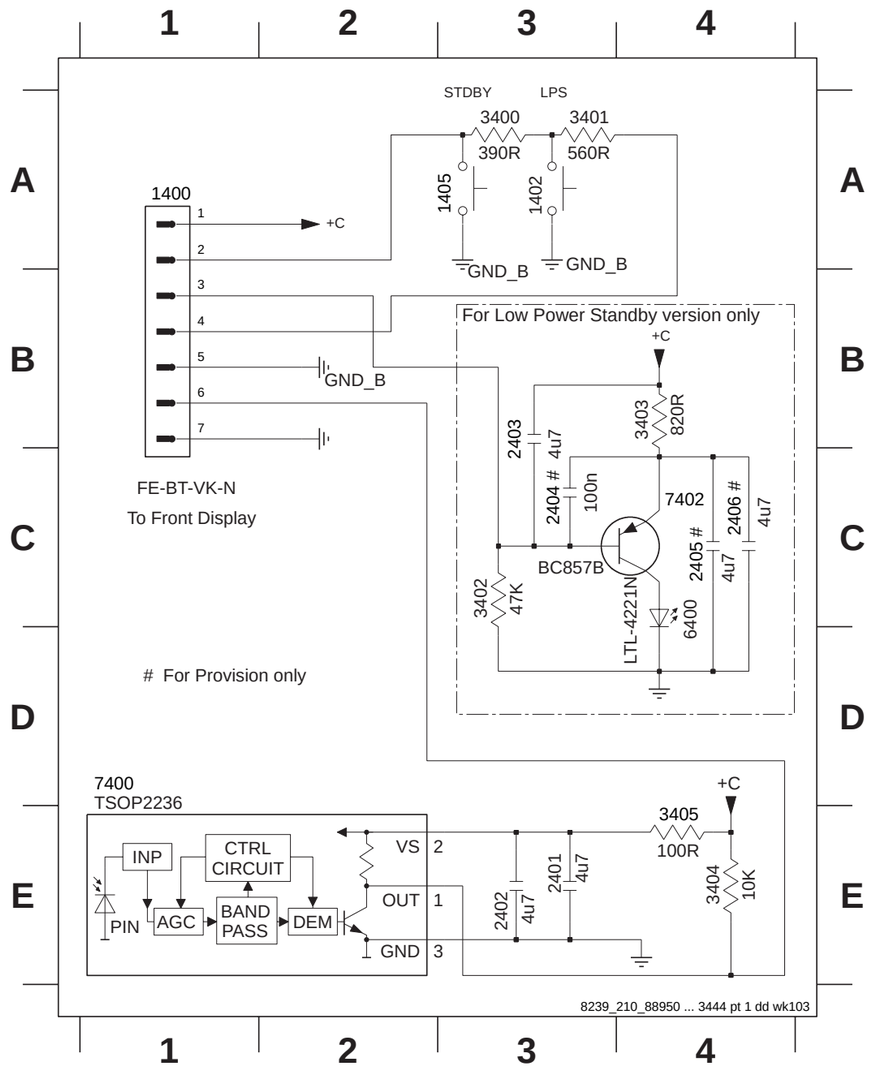
STANDBY (POWER) PART - CIRCUIT & LAYOUTS

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



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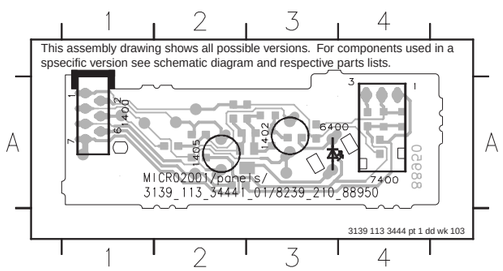

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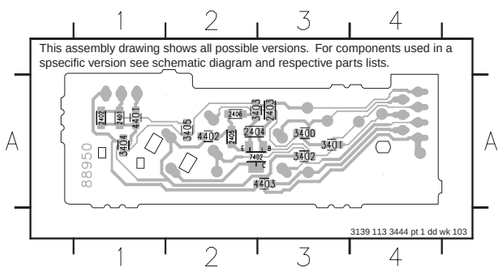
2405 A2 2406 A2 3400 A3 3401 A3
3402 A3 3403 A2 3404 A1 3405 A2
4401 A1 4402 A2 4403 A3 7402 A2



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

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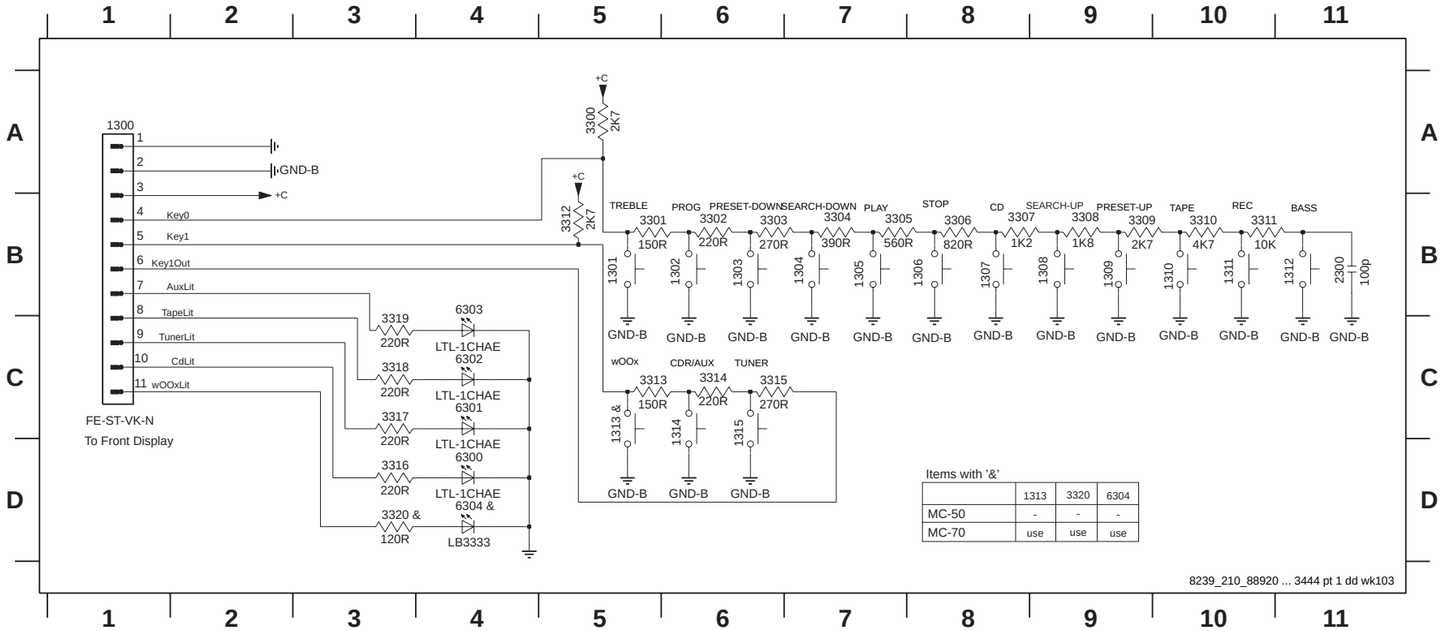
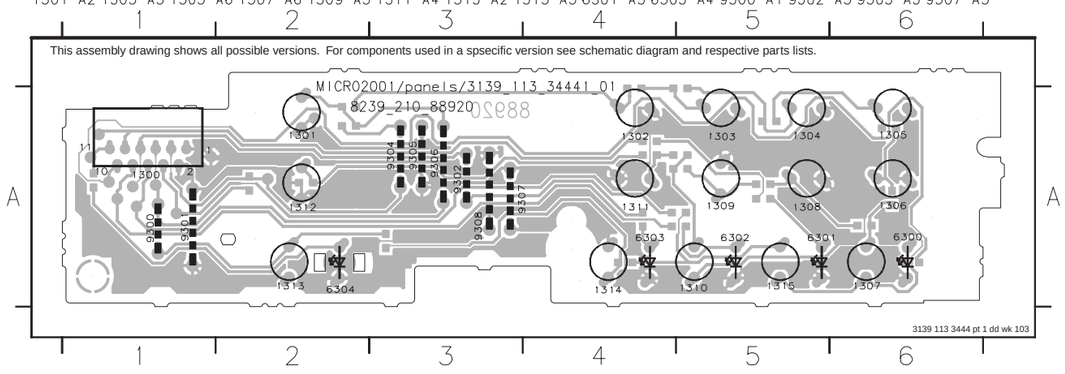
1301 B5	1304 B7	1307 B8	1310 B10	1313 C5	2300 B11	3302 B6	3305 B7	3308 B9	3311 B10	3314 C6	3317 C3	3320 D3	6302 C4		
1302 B6	1305 B7	1308 B9	1311 B10	1314 D6	3300 A5	3303 B6	3306 B8	3309 B9	3312 B5	3315 C6	3318 C3	6300 D4	6303 B4		



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
1301 A2 1303 A5 1305 A6 1307 A6 1309 A5 1311 A4 1313 A2 1315 A5 6301 A5 6303 A4 9300 A1 9302 A3 9305 A3 9307 A3



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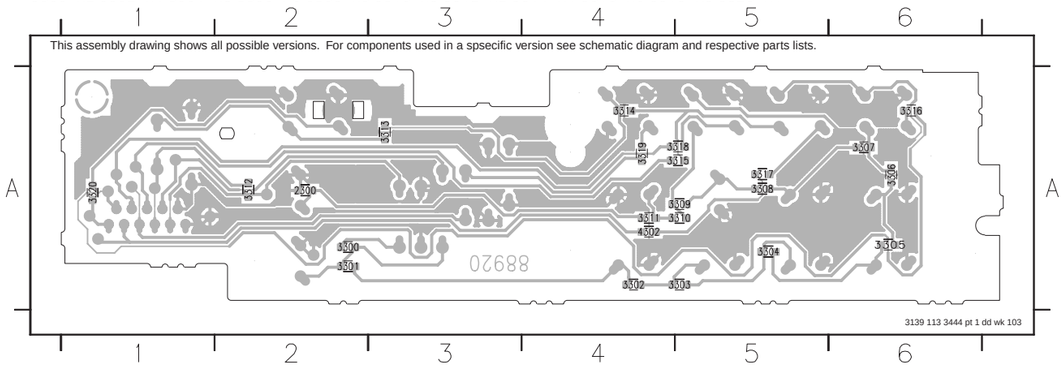
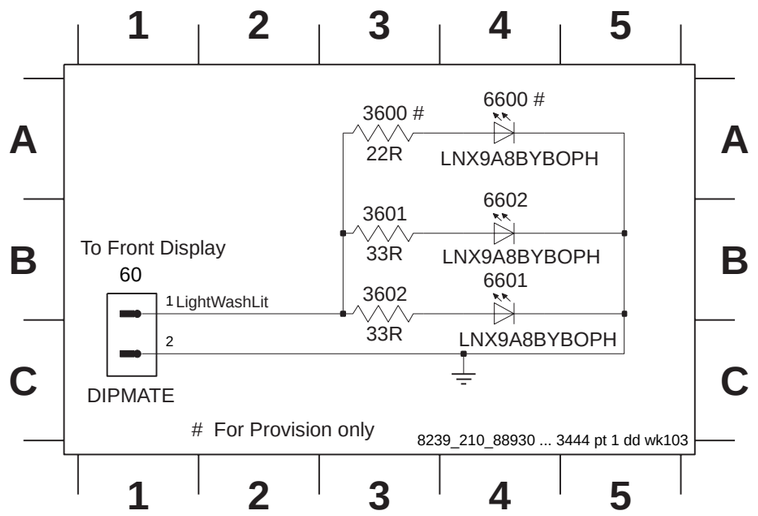
3300 A2 3302 A4 3304 A5 3306 A6 3308 A5 3310 A5 3312 A2 3314 A4 3316 A6 3318 A5 3320 A1

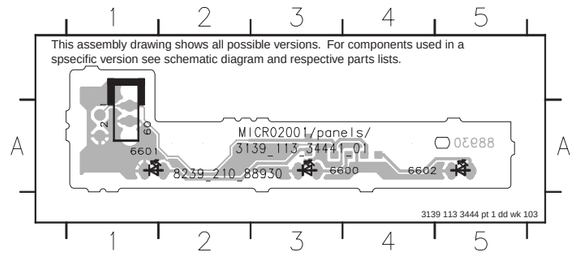


LIGHTWASH PART - CIRCUIT & LAYOUT DIAGRAMS

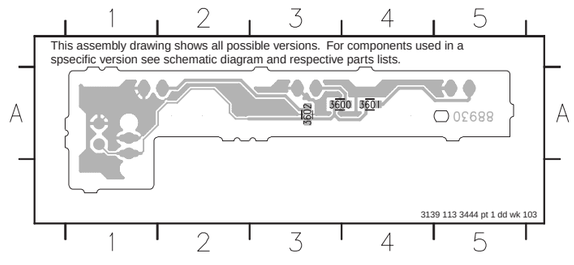
60 B1	3601 B3	6600 A4	6602 B4
3600 A3	3602 B3	6601 B4	



60 A1 6600 A4 6601 A1 6602 A4

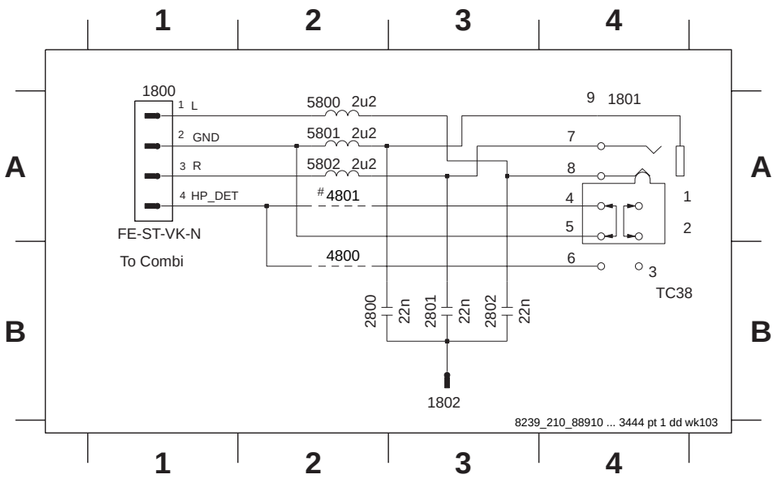


3600 A3 3601 A4 3602 A3



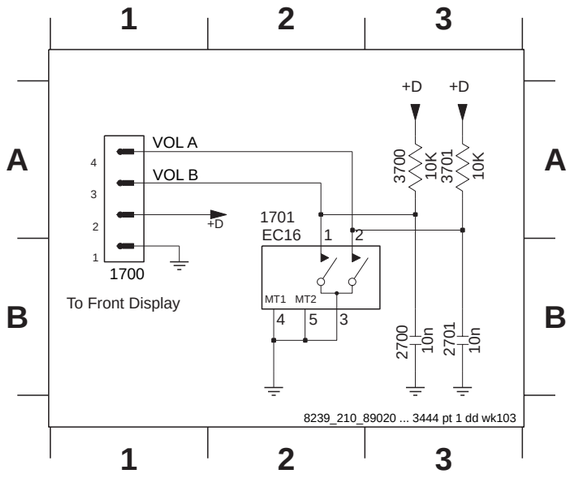
HEADPHONE PART - CIRCUIT & LAYOUT DIAGRAMS

1800 A1 1802 B3 2801 B3 4800 B2 5800 A2 5802 A2
1801 A4 2800 B2 2802 B3 4801 A2 5801 A2



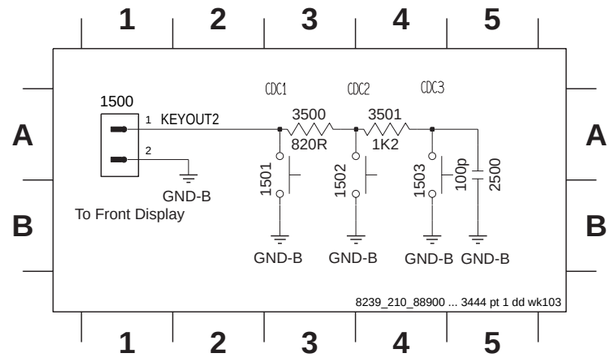
JOG (VOLUME) PART - CIRCUIT & LAYOUT DIAGRAMS

1700 B1 1701 A2 2700 B3 2701 B3 3700 A3 3701 A3

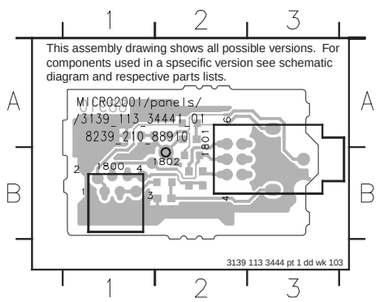


CDC KEY PART - CIRCUIT & LAYOUT DIAGRAMS

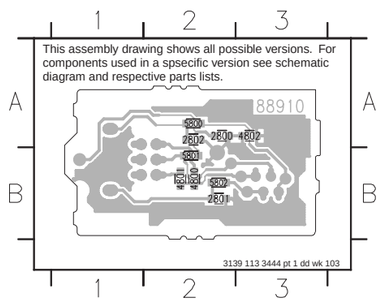
1500 A1 1502 B3 2500 A5 3501 A4
1501 B2 1503 B4 3500 A3



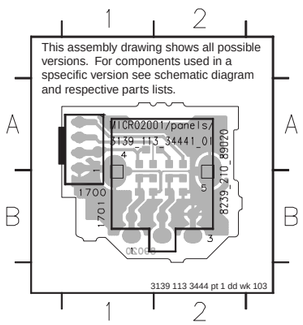
1800 B1 1801 A2 1802 B2



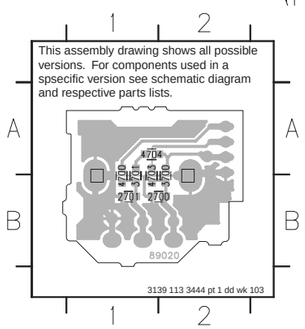
2800 A2 2802 A2 4801 B2 5800 A2 5802 B2
2801 B2 4800 B2 4802 A3 5801 B2



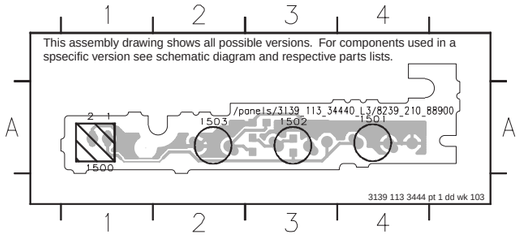
1700 B1 1701 B1



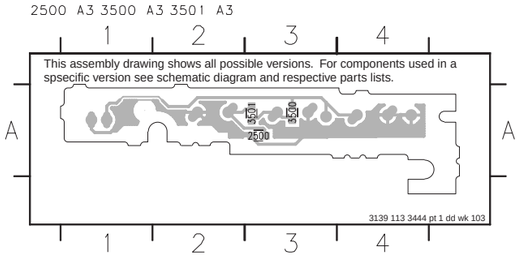
2700 B2 3700 B2 4700 B1 4704
2701 B1 3701 B1 4703 B1



1500 A1 1501 A4 1502 A3 1503 A2



2500 A3 3500 A3 3501 A3



8-4

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

*(**E**lectronic **T**ape **F**unction)* **stage .2**

TABLE OF CONTENTS

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CONNECTORS ASSIGNMENTS:

CONNECTOR 1701			INTERCONNECTION TO AF BOARD
○	1	REC-L	Record input left
○	2	REC-R	Record input right
○	3	GND A	AF Ground
○	4	TAPE-L	Playback output left
○	5	+12V	D.C. supply (+12V) for AF electronics
○	6	TAPE-R	Playback output right
○	7	-CMOS	Negative d.c. supply (-9V) for controlling JFET J111

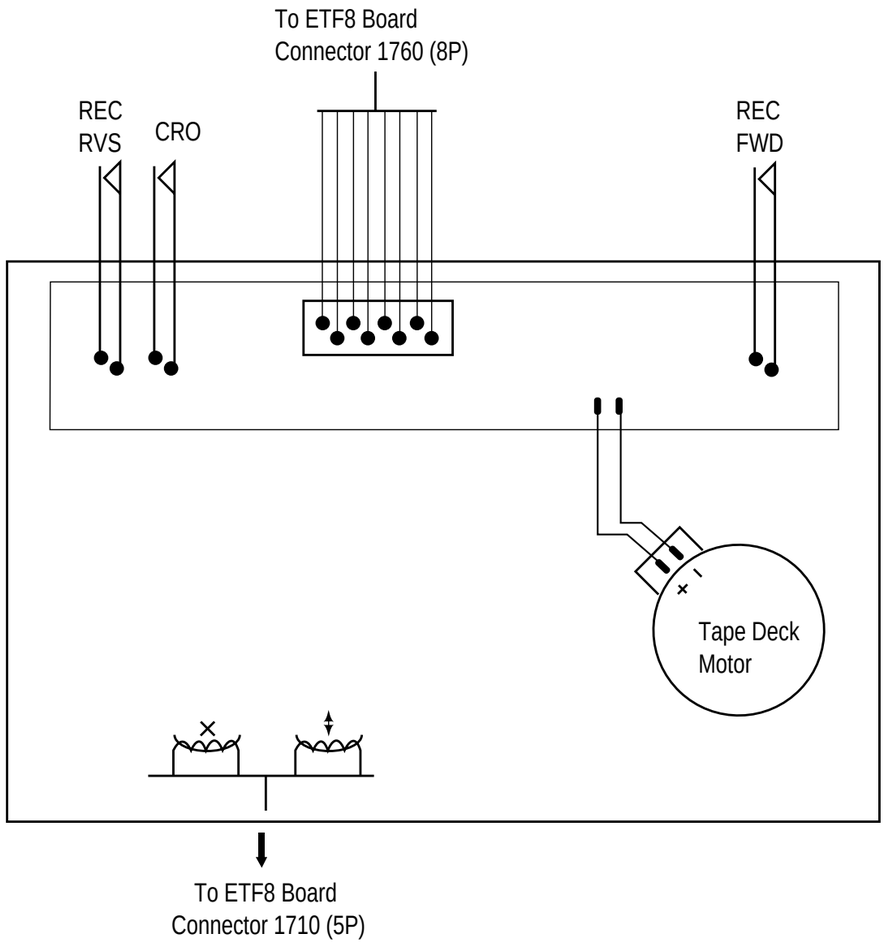
CONNECTOR 1703			INTERCONNECTION TO AF BOARD
○	1	GND M	Motor Ground
○	2	+MOTOR	D.C. supply (+12V) for tape deck motor & solenoid

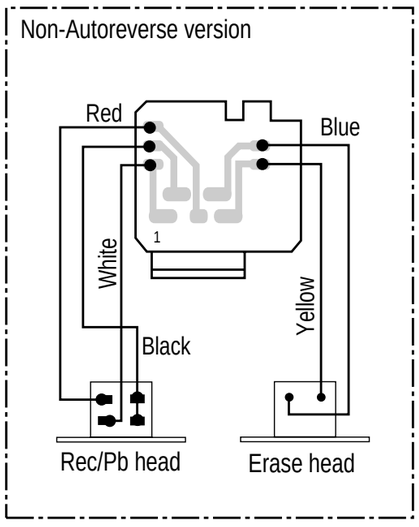
CONNECTOR 1706			INTERCONNECTION TO FRONT BOARD
○	1	CR_IN	Deck sensing Chrome Tape
○	2	AD1	Deck sensing switches output voltage / Deck EOT
○	3	+5V	DC supply (+5V) for deck status ADC network (ref to microprocessor's supply)
○	4	GND _P	Control & Oscillator Ground
○	5	CLK	HEF4094BT shift register Clock line
○	6	DATA	HEF4094BT shift register Data line
○	7	STROBE	HEF4094BT shift register Strobe line

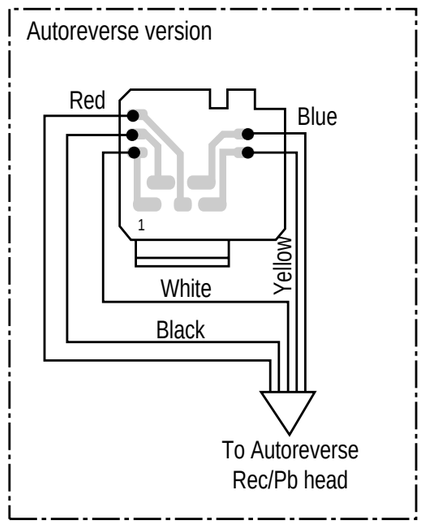
CONNECTOR 1710			TAPE HEAD CONNECTIONS
○	1	GND A	Erase Head ground
○	2	ERASE HEAD	Erase Head
○	3	R/P HD Rch	R/P Head right channel positive
○	4	Common	Pb Head return ground shield
○	5	R/P HD Lch	R/P Head left channel positive

CONNECTOR 1760			DECK CONTROL INTERFACE
○	1	Vcc 12V	Deck / Motor supply
○	2	PHOTO	Photo sensor output (tape movement indication)
○	3	GND_M	Deck / Motor ground
○	4	MODE	Mode switch (head engagement)
○	5	Sol_supply	Solenoid supply
○	6	CR_IN	Chrome tape detection switch
○	7	REC FWD	Record tab protection status switch (forward)
○	8	REC REW	Record tab protection status switch (reverse)

TAPE DECK WIRING

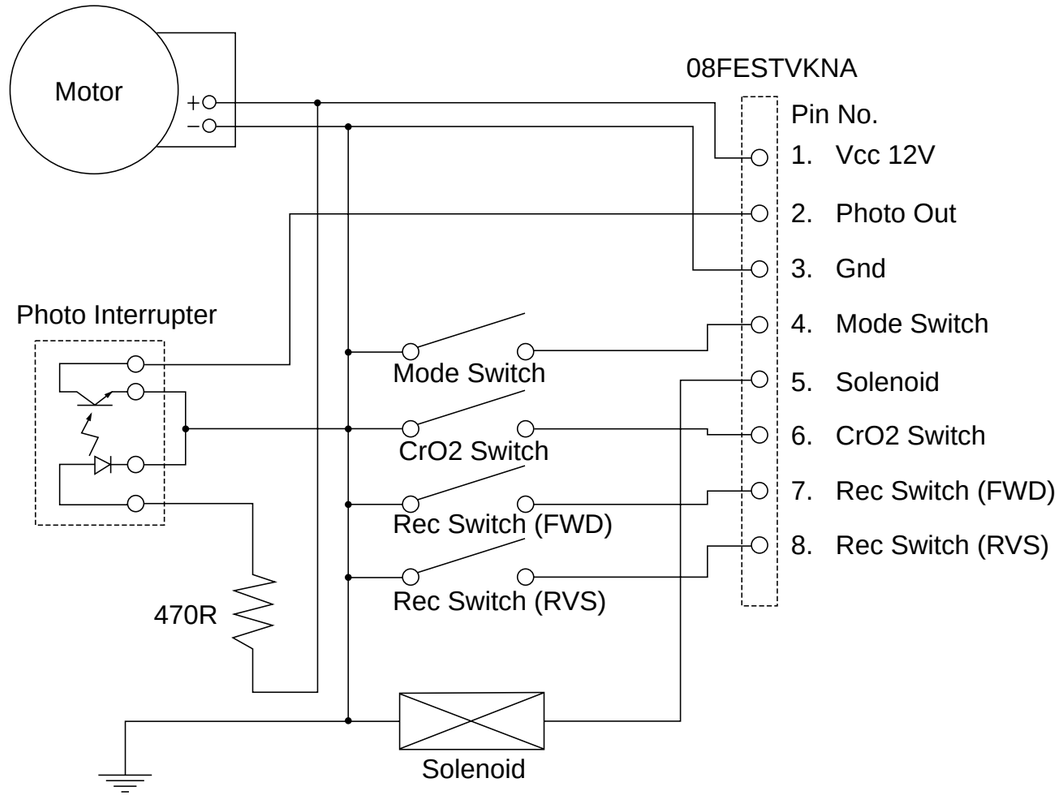






9-2

TAPE MECHANISM ELECTRONICS



9-3

TAPE ADJUSTMENT & CHECK TABLE

	TEST CASSETTE	RECORDER MODE	MEASURE ON	READ ON	ADJUST with	ADJUST to
MOTOR SPEED	SBC420 3150Hz	PLAY	1 or 2 LEFT RIGHT	frequency counter	check	3150Hz +/- 2%
WOW & FLUTTER	SBC420 3150Hz	PLAY		W&F-meter	check	< 0.4 % DIN
ADJUST AZIMUTH	SBC420 10kHz	PLAY FWD		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-meaure

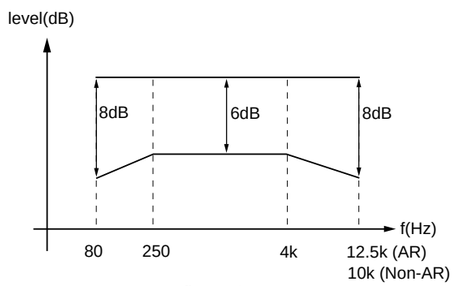


figure. 1

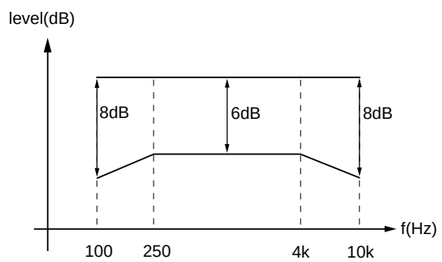
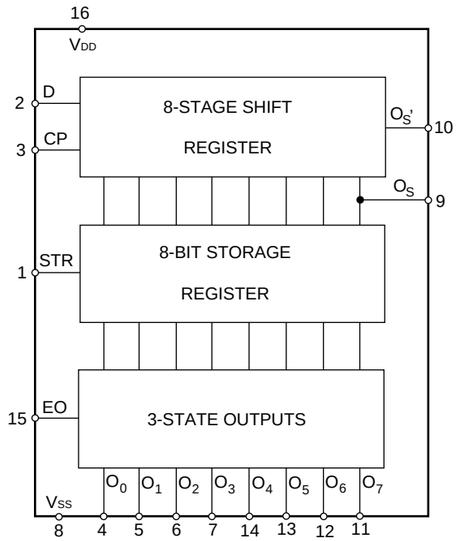


figure. 2

HEF4094BT FUNCTIONAL BLOCK DIAGRAM



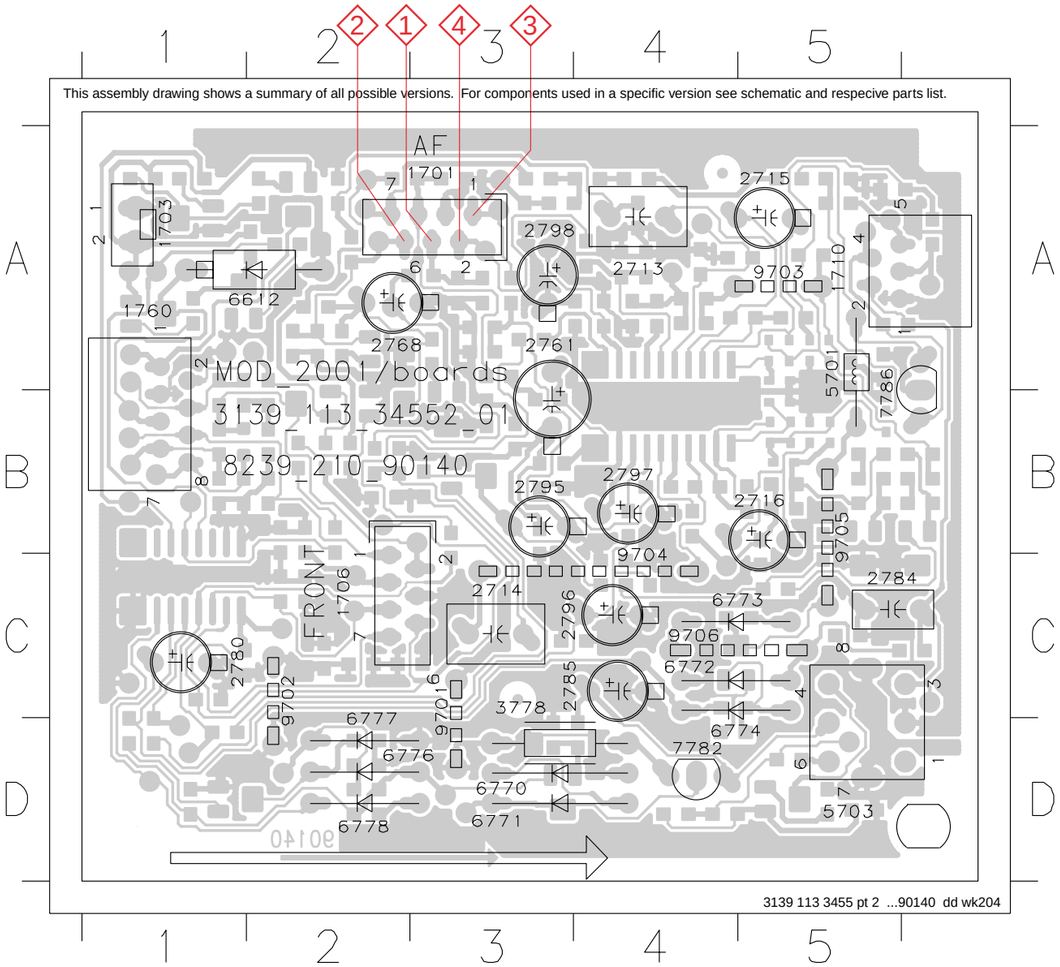
AF Control Logic State Table

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	



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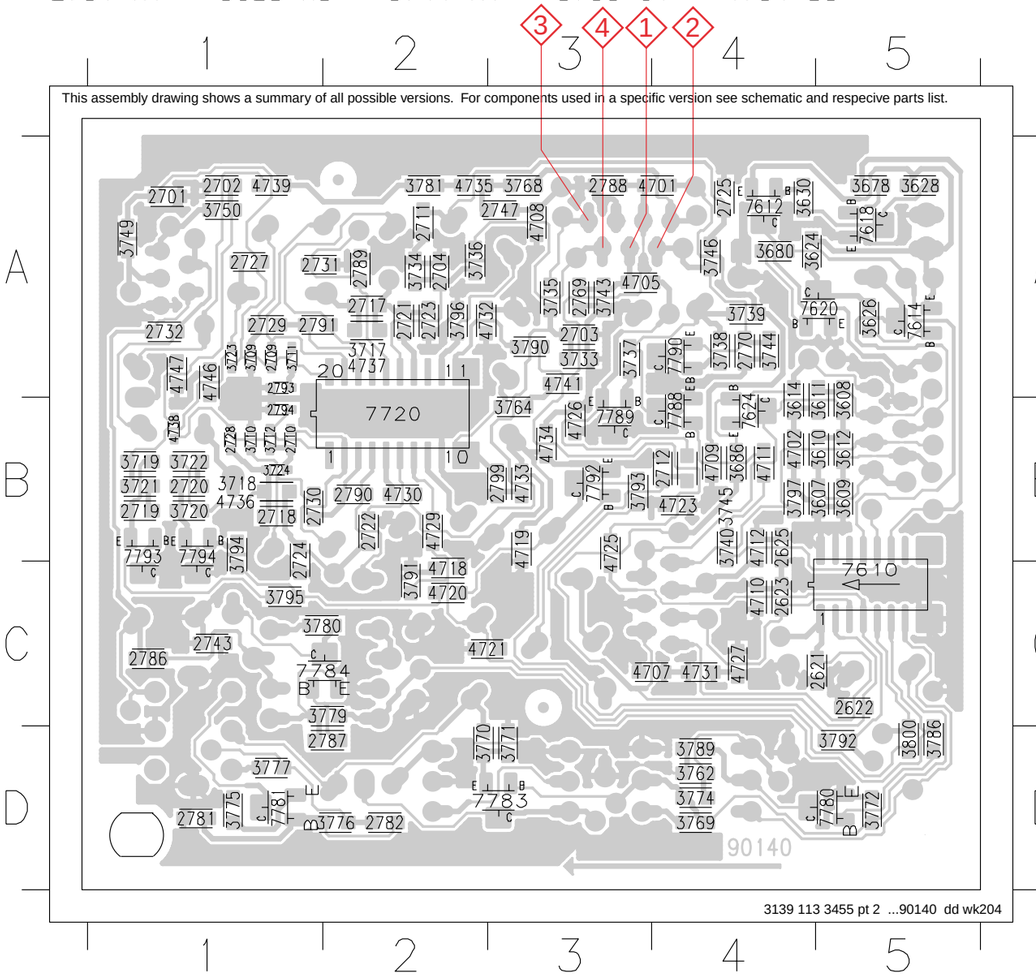
CHIP LAYOUT

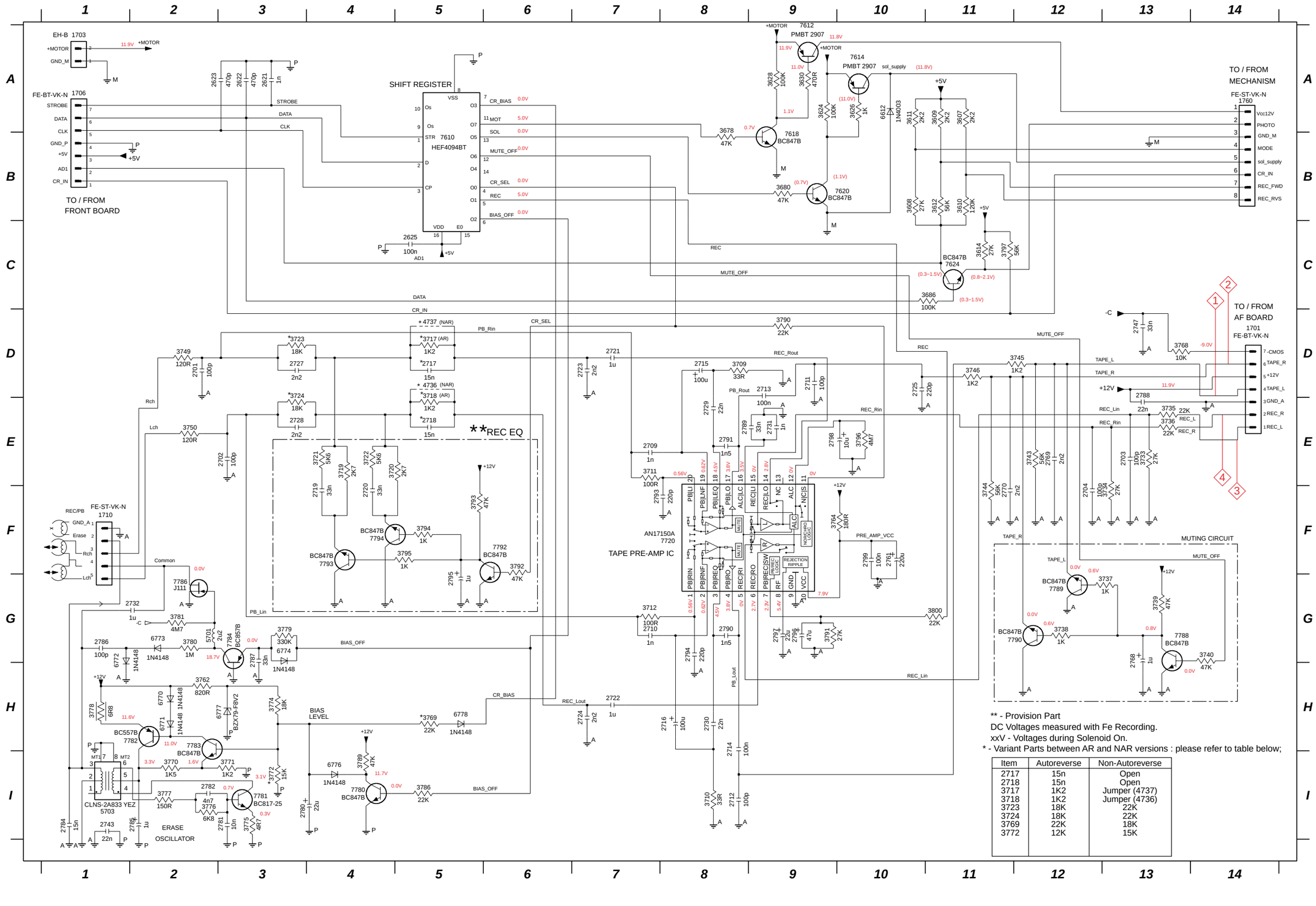
2621 C5	2732 A1	3630 A4	3745 B4	3796 A2	4735 A2
2622 C5	2743 C1	3678 A5	3746 A4	3797 B4	4736 B1
2623 C4	2747 A3	3680 A4	3749 A1	3800 D5	4737 A2
2625 B4	2769 A3	3686 B4	3750 A1	4701 A4	4738 B1
2701 A1	2770 A4	3709 A1	3762 D4	4702 B4	4739 A1
2702 A1	2781 D1	3710 B1	3764 B3	4705 A3	4741 A3
2703 A3	2782 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	



9-5

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 E13	3738 G12	3745 D12	3764 F9	3772 I3	3778 H1	3789 I4	3794 F5	4736 D5	6770 H2	6776 I4	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	



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

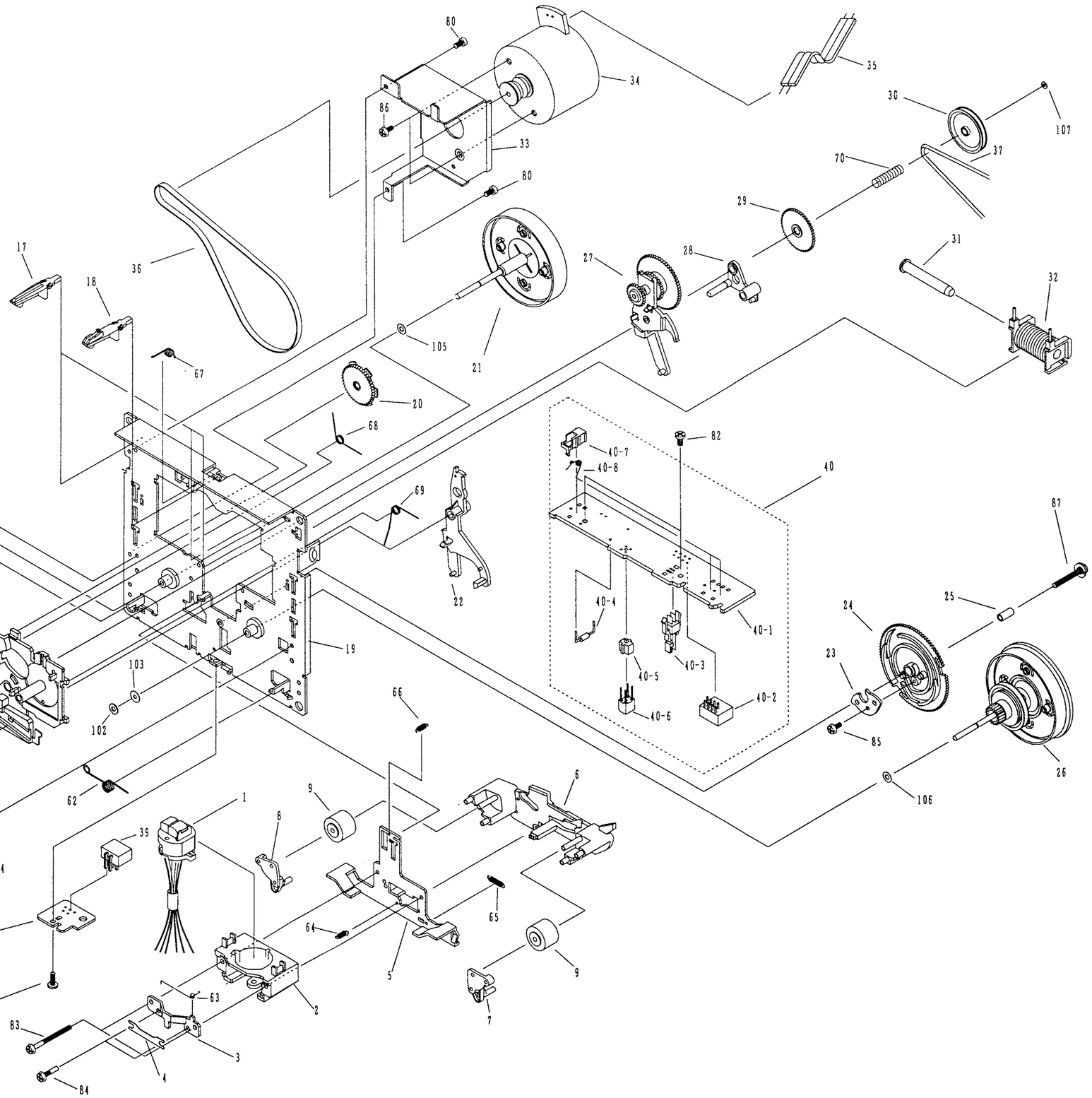
9-6

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.

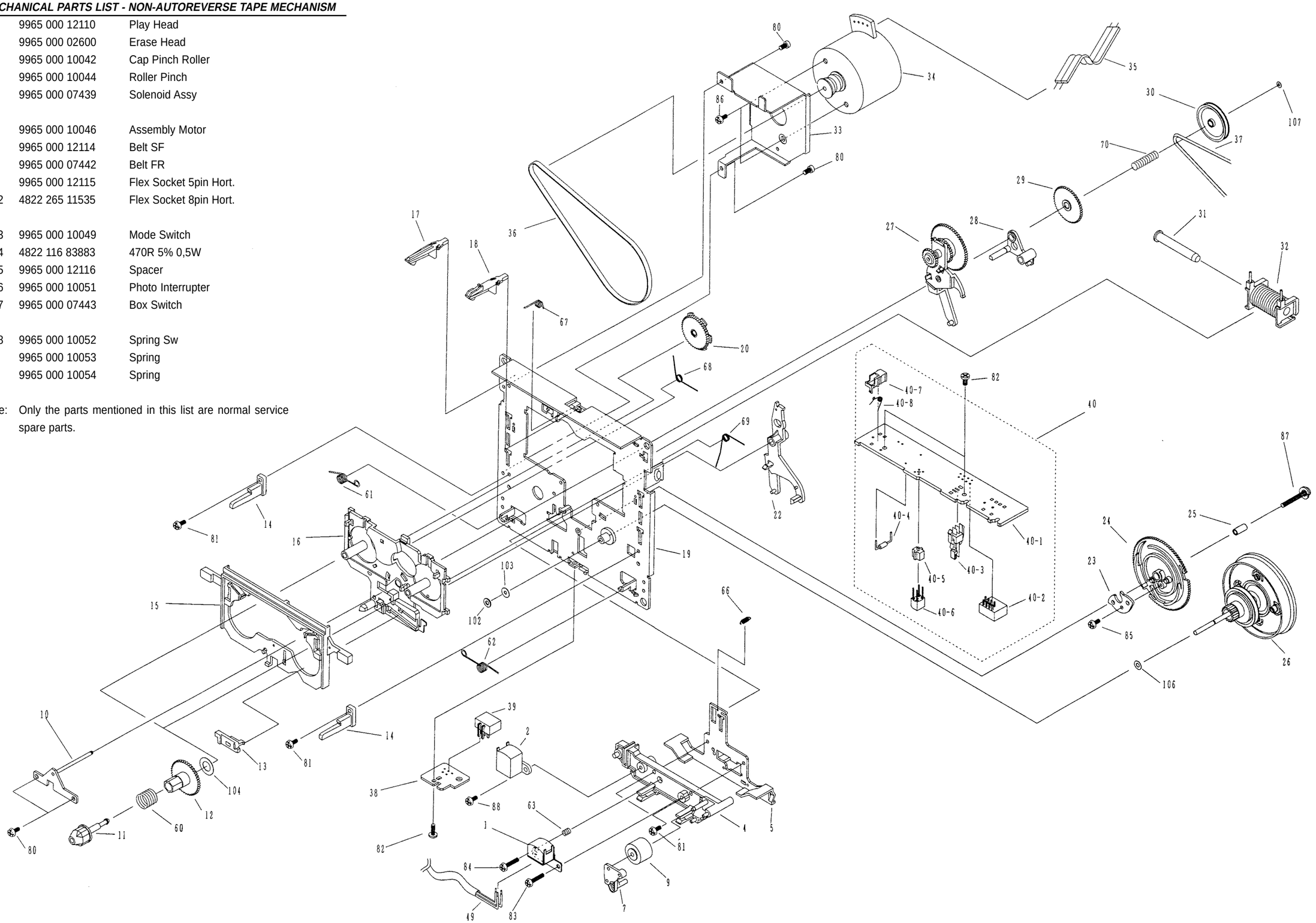


NON-AUTOREVERSE (NAR) TAPE MECHANISM

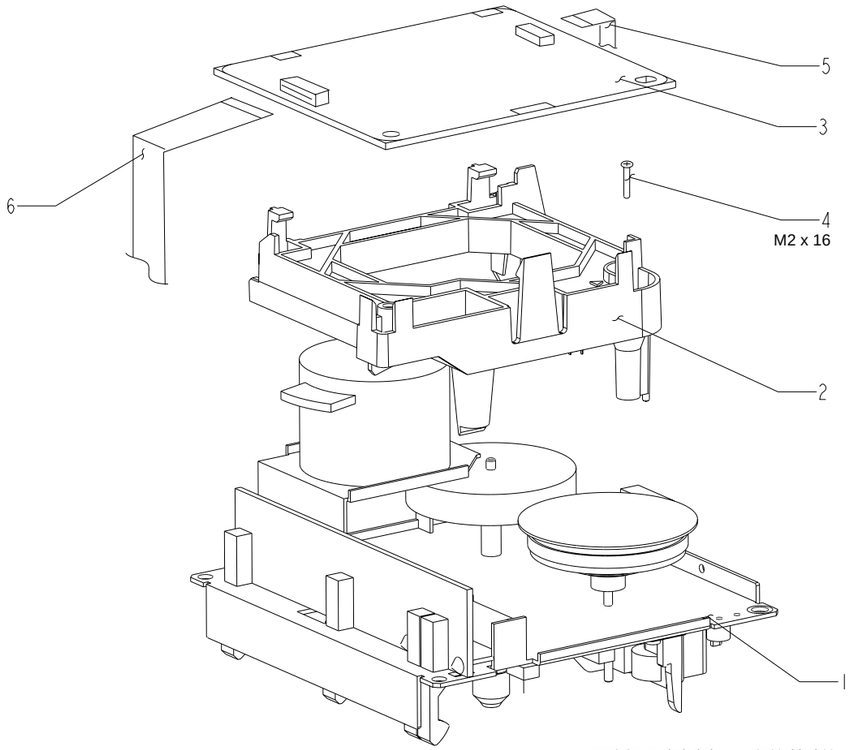
MECHANICAL PARTS LIST - NON-AUTOREVERSE TAPE MECHANISM

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 view ....78730 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.

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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	AR
2718	3198 017 31530	15nF 50V	AR
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	AR
3718	4822 117 11817	1k2 1% 1/16W	AR
3723	4822 051 30183	18k 5% 0,062W	AR
3723	4822 051 30223	22k 5% 0,062W	Non-AR
3724	4822 051 30183	18k 5% 0,062W	AR
3724	4822 051 30223	22k 5% 0,062W	Non-AR
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	AR
3769	4822 051 30183	18k 5% 0,062W	Non-AR
3770	4822 051 30152	1k5 5% 0,062W	

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%
5703	4822 156 20946	Osc Coil 100kHz

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

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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

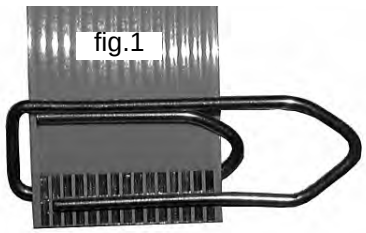
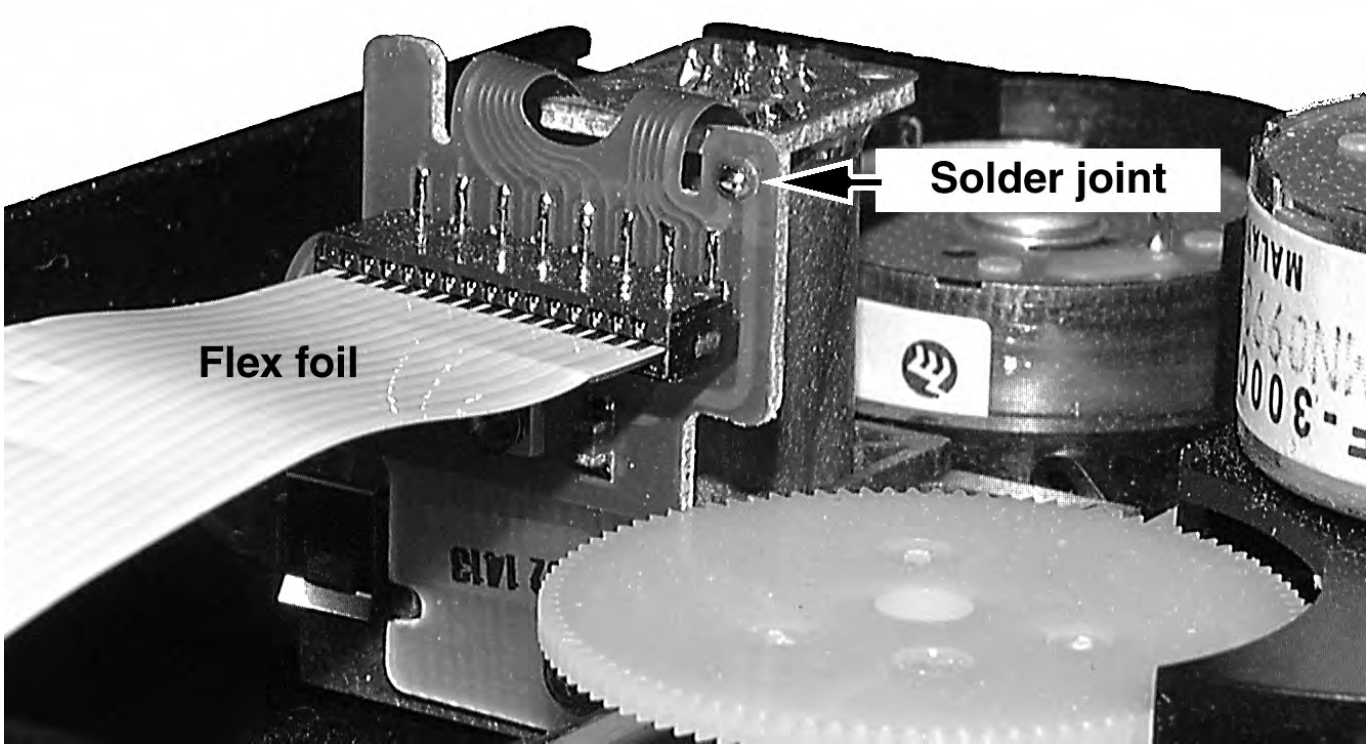


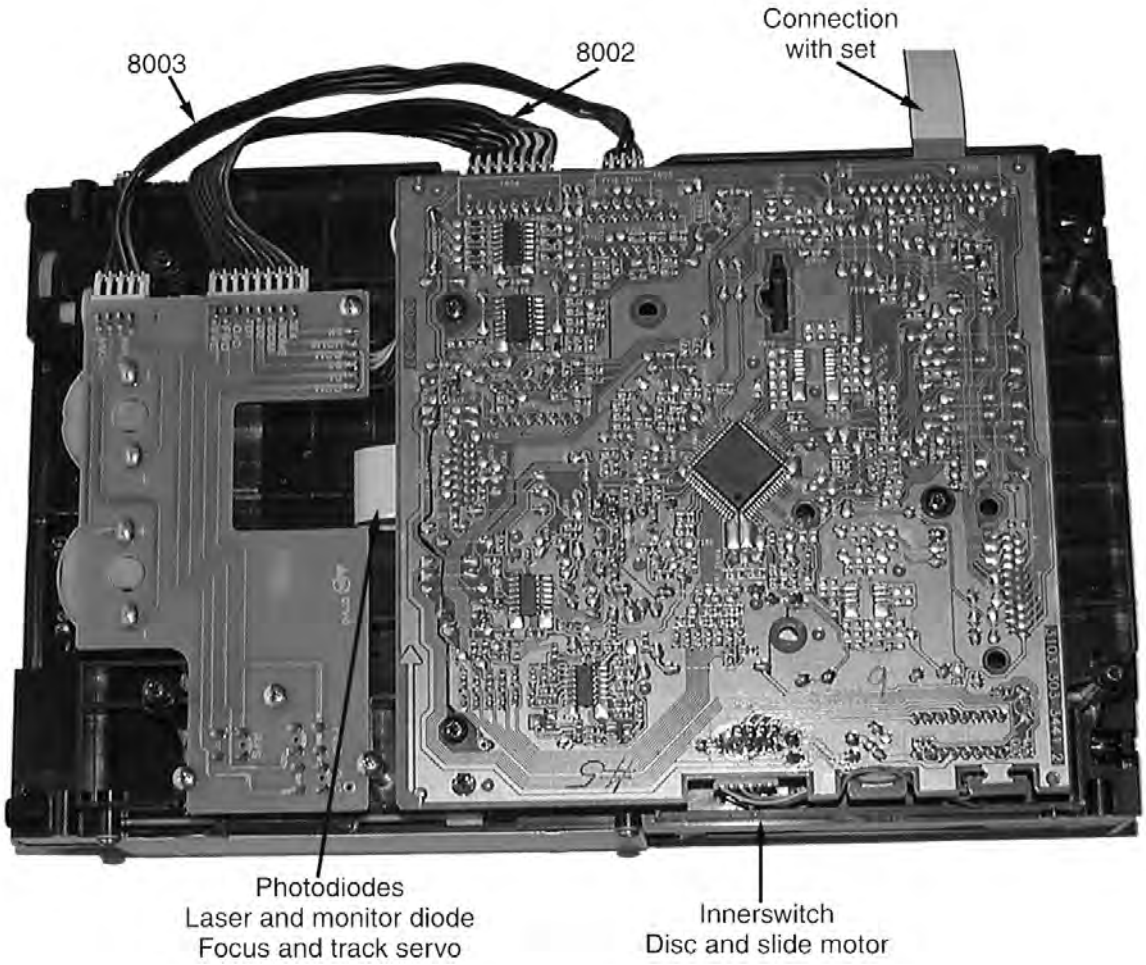
fig.1

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



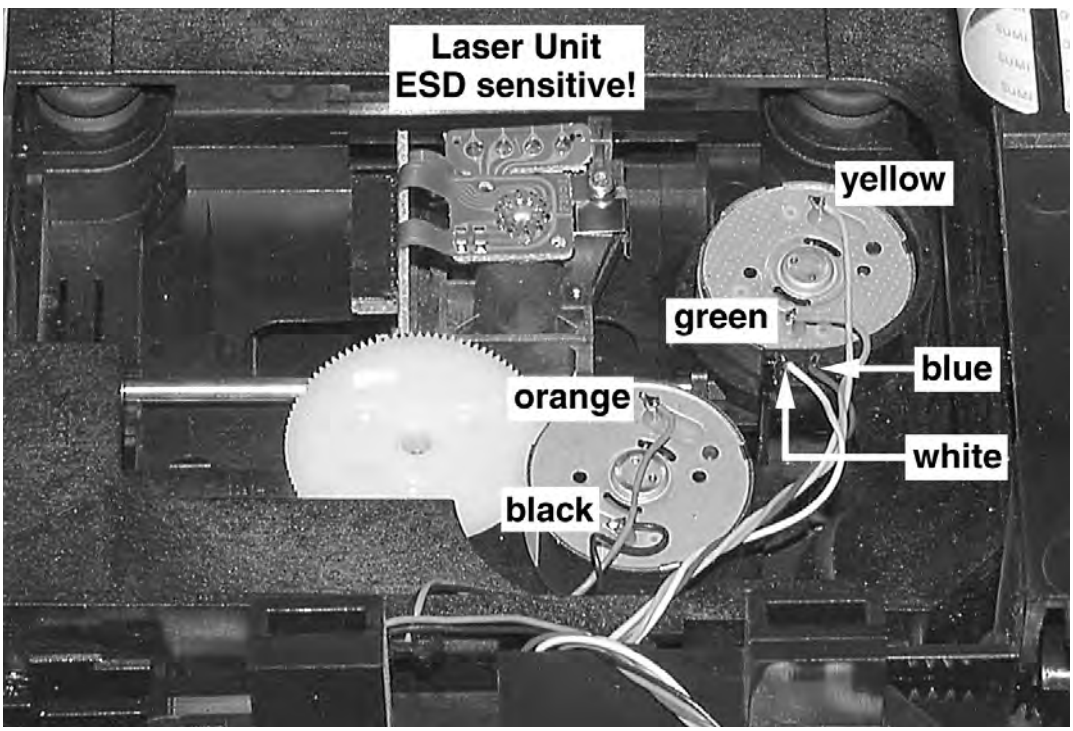
WIRING

Module

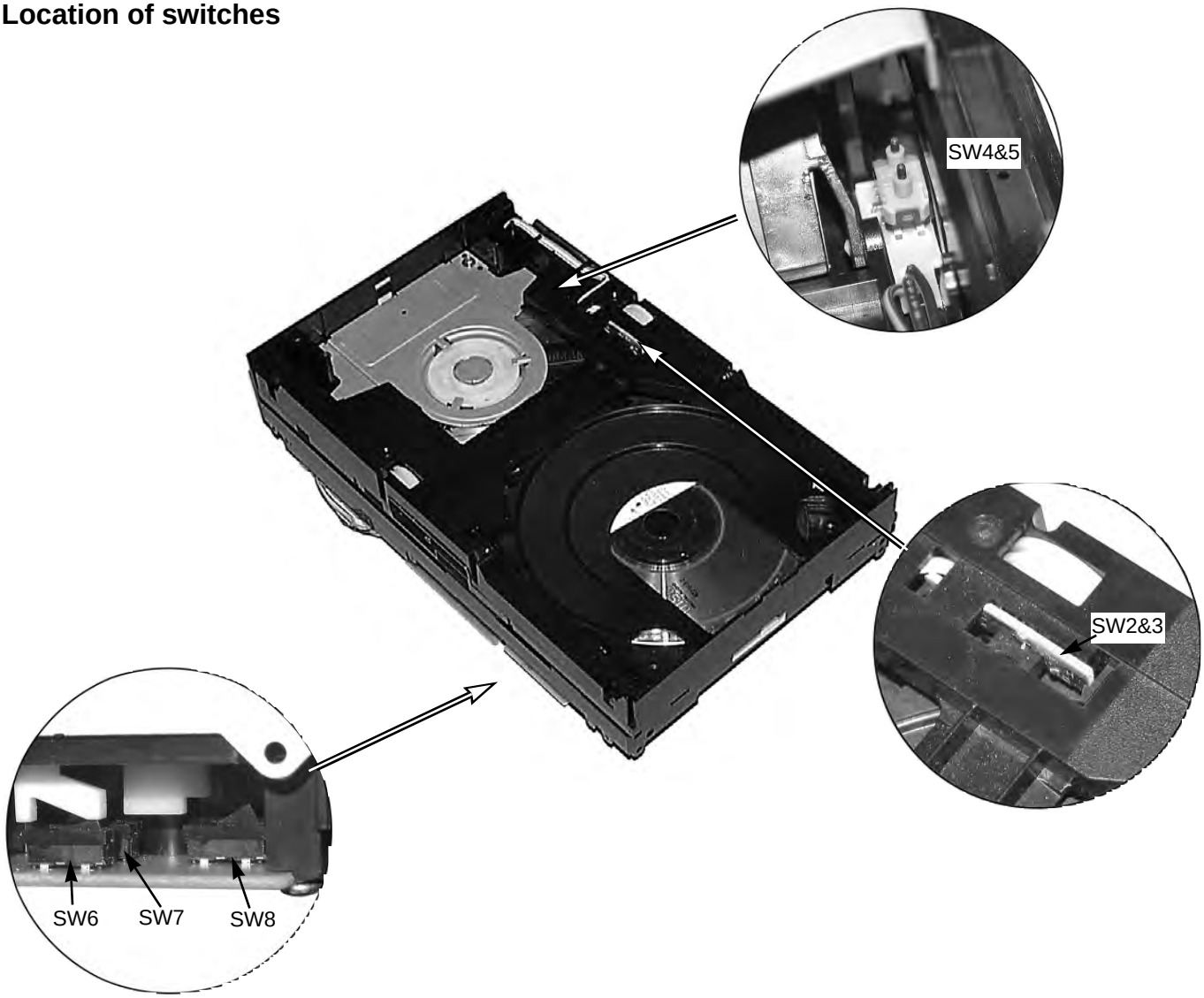


WIRING

CD Drive



Location of switches



Truth Table

Function	Register output / Switch							
	Q0	**Q1**	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**
	SW 8	**SW 7**	**SW 6**	**SW 5**	**SW 4**	**SW 3**	**SW 2**	**-**
Slider reverse recognition	1	0	0	0	0	0	0	X
Slider forward recognition	0	1	0	0	0	0	0	X
Drawer closed recognition	0	0	1	0	0	0	0	X
No carriage under clamper	0	0	0	0	0	0	0	X
Carriage #1 under clamper	0	0	0	0	1	0	0	X
Carriage #2 under clamper	0	0	0	1	0	0	0	X
Carriage #3 under clamper	0	0	0	1	1	0	0	X
Carriage home recognition	0	0	0	0	0	1	0	X
Carriage extra recognition	0	0	0	0	0	0	1	X

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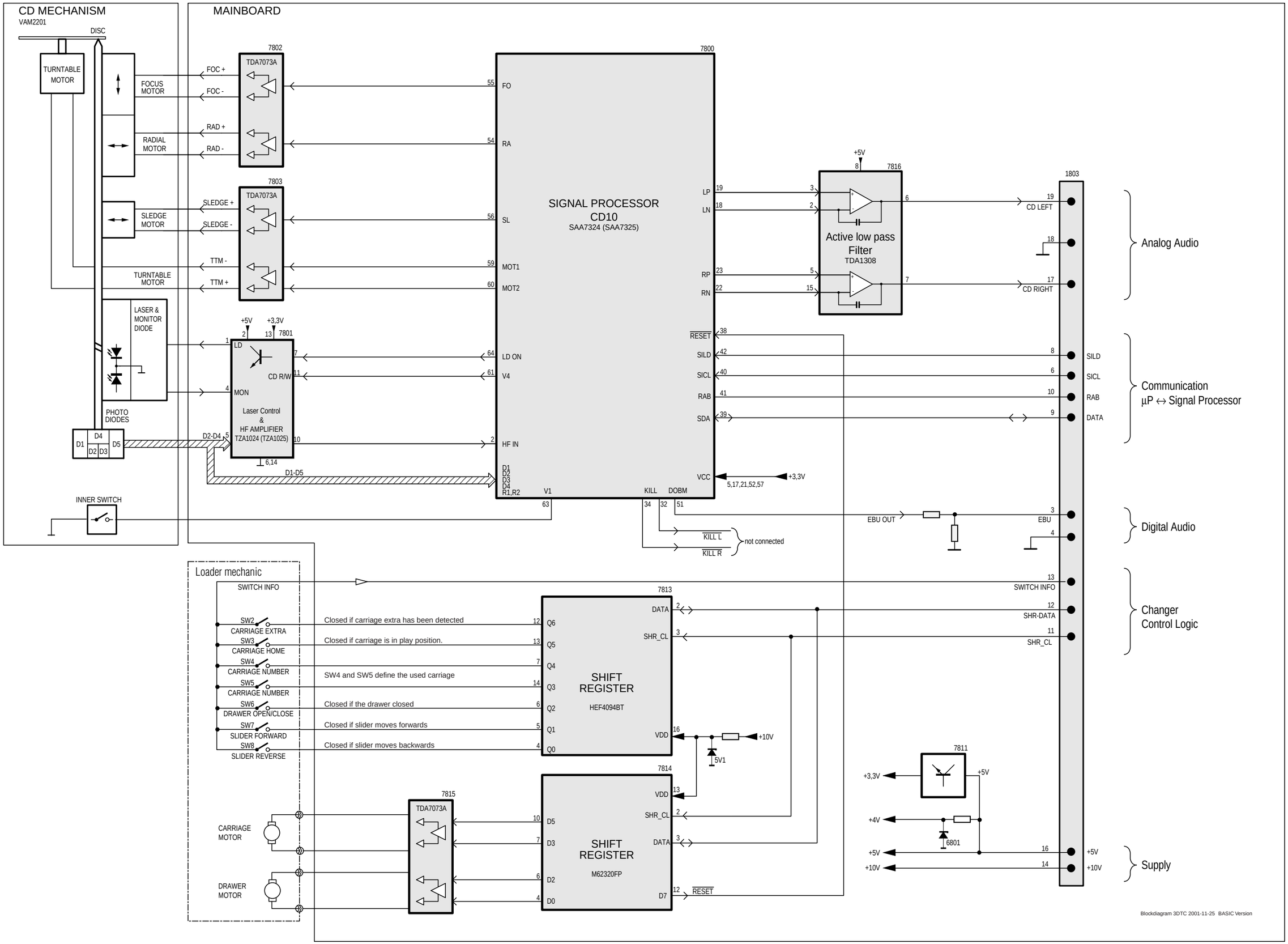
BLOCK DIAGRAM 3DTC

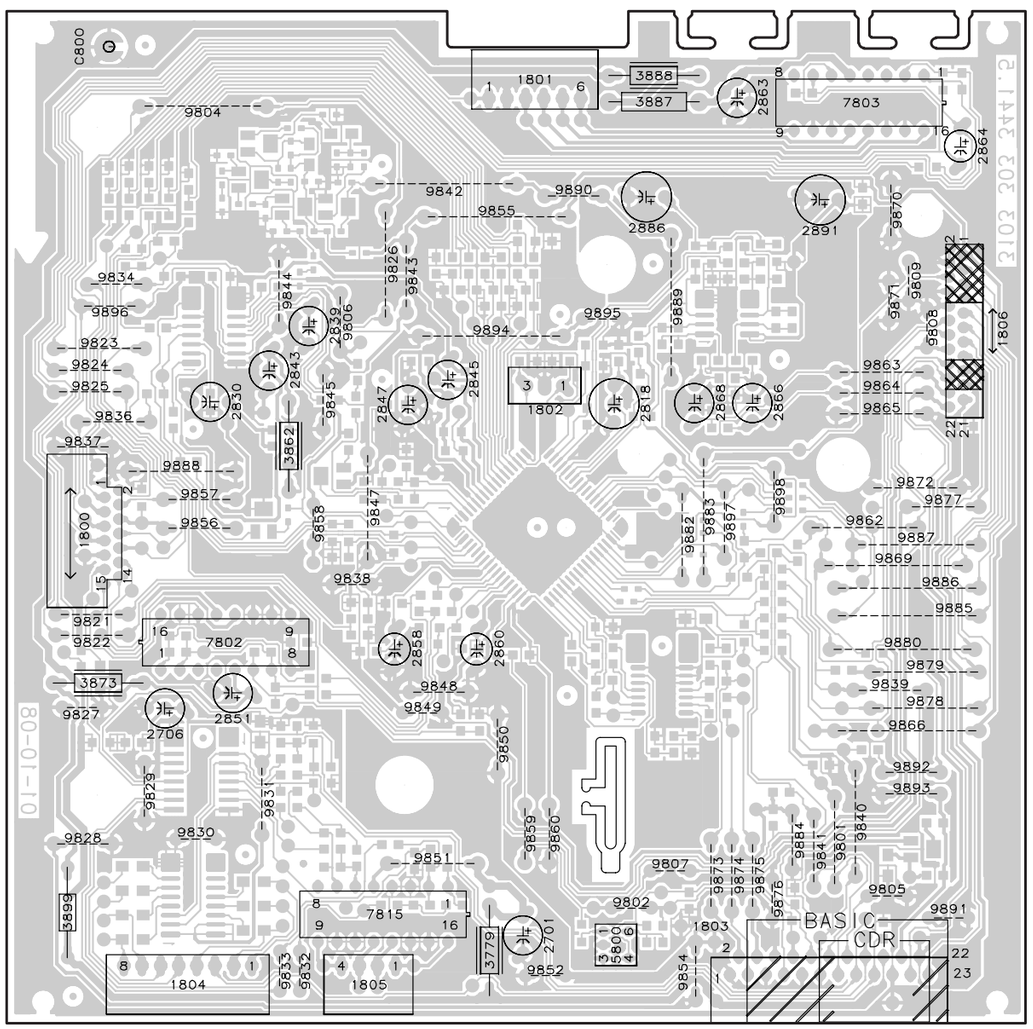


10-6

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

2700 B3 2816 F4 2846 C2 2878 B5 3701 F2 3727 D6 3745 C5 3761 F5 3778 B3 3795 F2 3818 F4 3848 C6 3864 E3 3880 D3 6804 A2 7811 B7
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

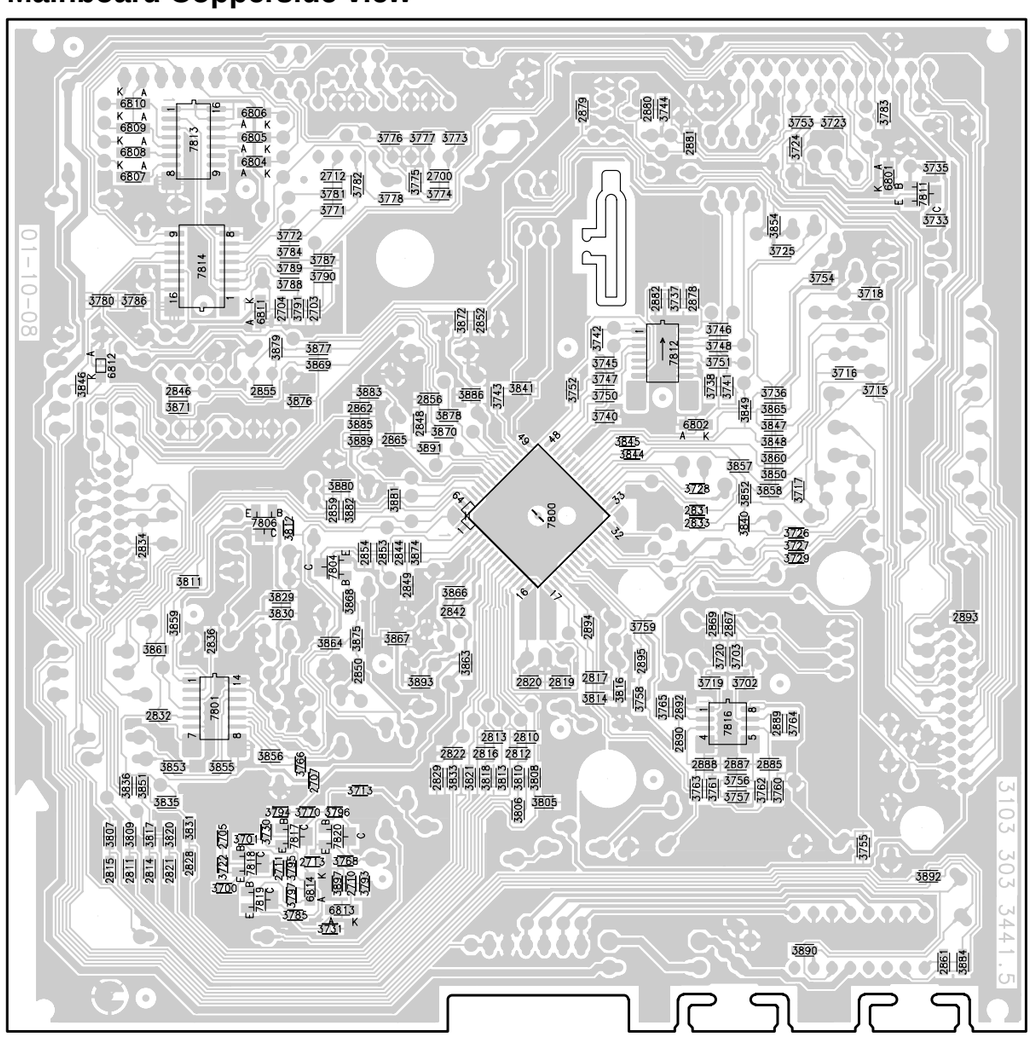
Mainboard Componentside view



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

3DTC, Mainboard Layout stage .5 2001-10-23

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.

3DTC, Mainboard Layout stage .5 2001-10-23

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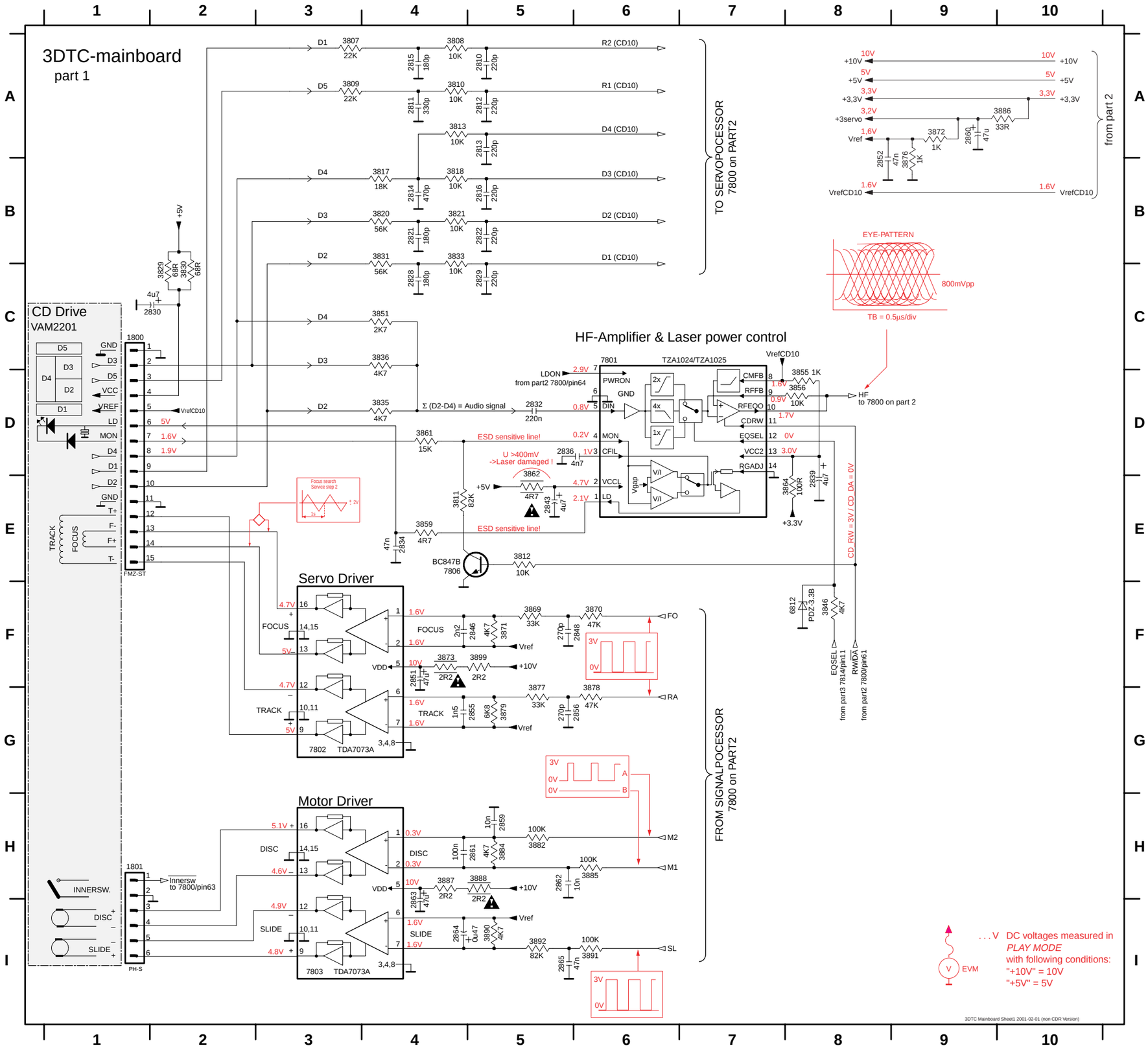
1800	C1	2813	A5	2822	B5	2834	E4	2848	F5	2859	H5	2864	I4	3810	A4	3821	B4	3835	D4	3856	D8	3869	F5	3876	B9	3884	H5	3890	I5	7801	D6
1801	I1	2814	B4	2828	C4	2836	D6	2851	F4	2860	B9	2865	I5	3813	A4	3829	C2	3836	C4	3859	E4	3870	F6	3877	G5	3885	H6	3891	I6	7802	G3
2810	A5	2815	A4	2829	C5	2839	E8	2852	B8	2861	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		

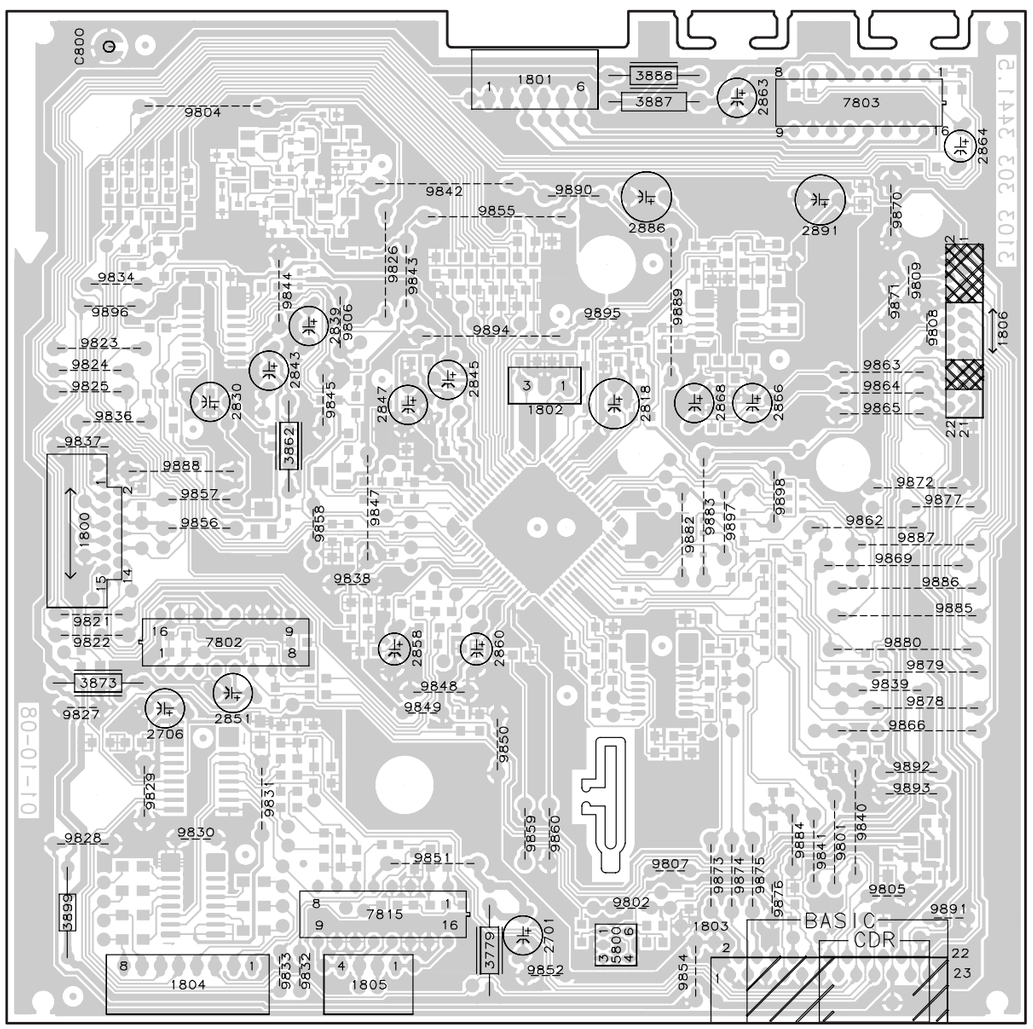


10-8

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

2700 B3 2816 F4 2846 C2 2878 B5 3701 F2 3727 D6 3745 C5 3761 F5 3778 B3 3795 F2 3818 F4 3848 C6 3864 E3 3880 D3 6804 A2 7811 B7
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

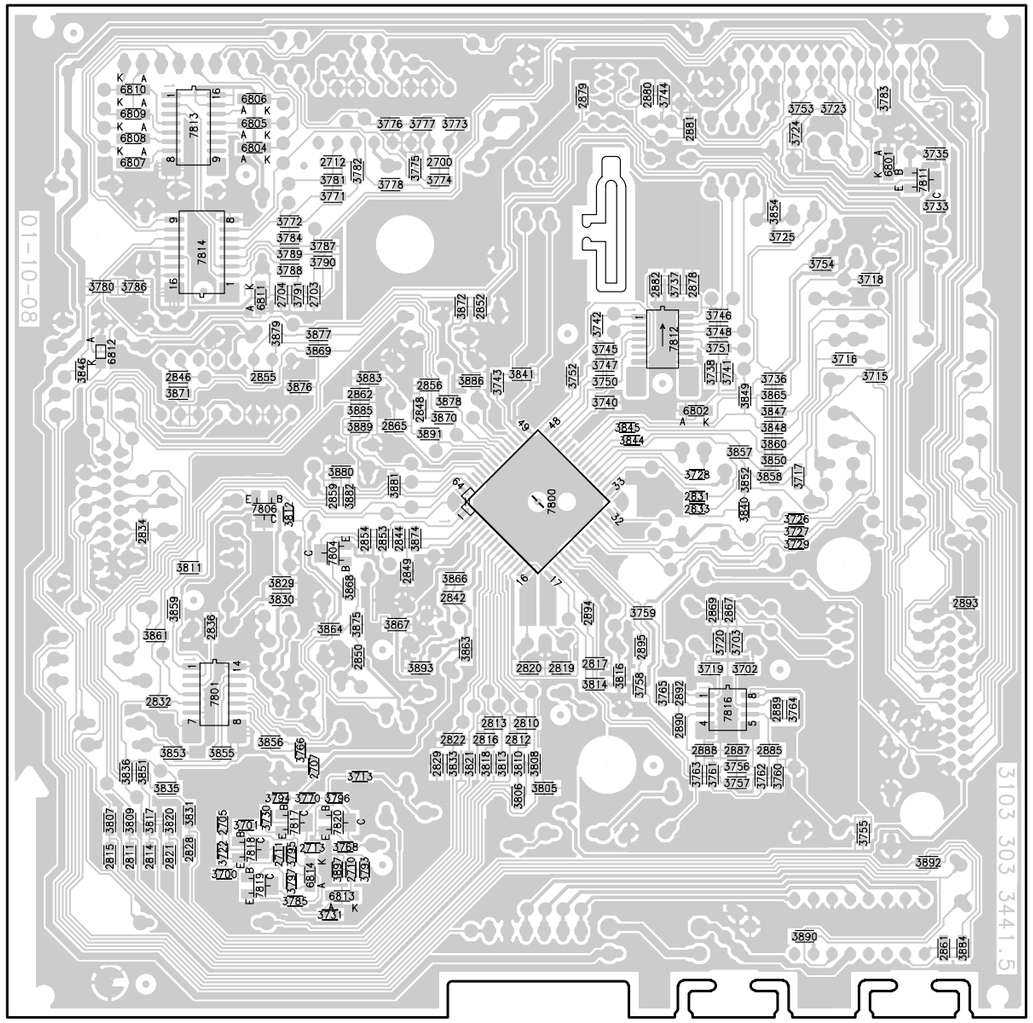
Mainboard Componentside view



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

3DTC, Mainboard Layout stage .5 2001-10-23

Mainboard Copperside view

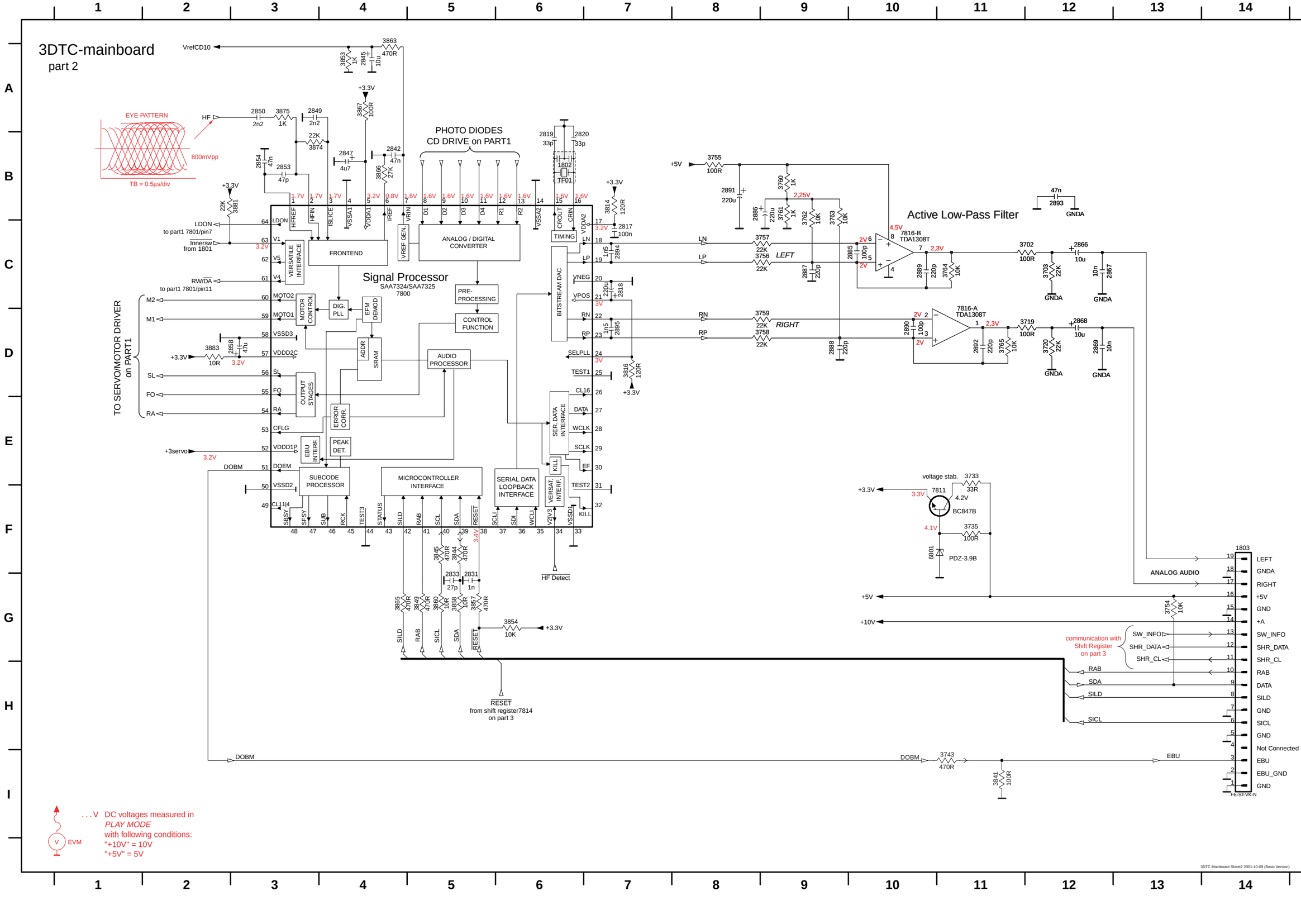


This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

3DTC, Mainboard Layout stage .5 2001-10-23

10-9

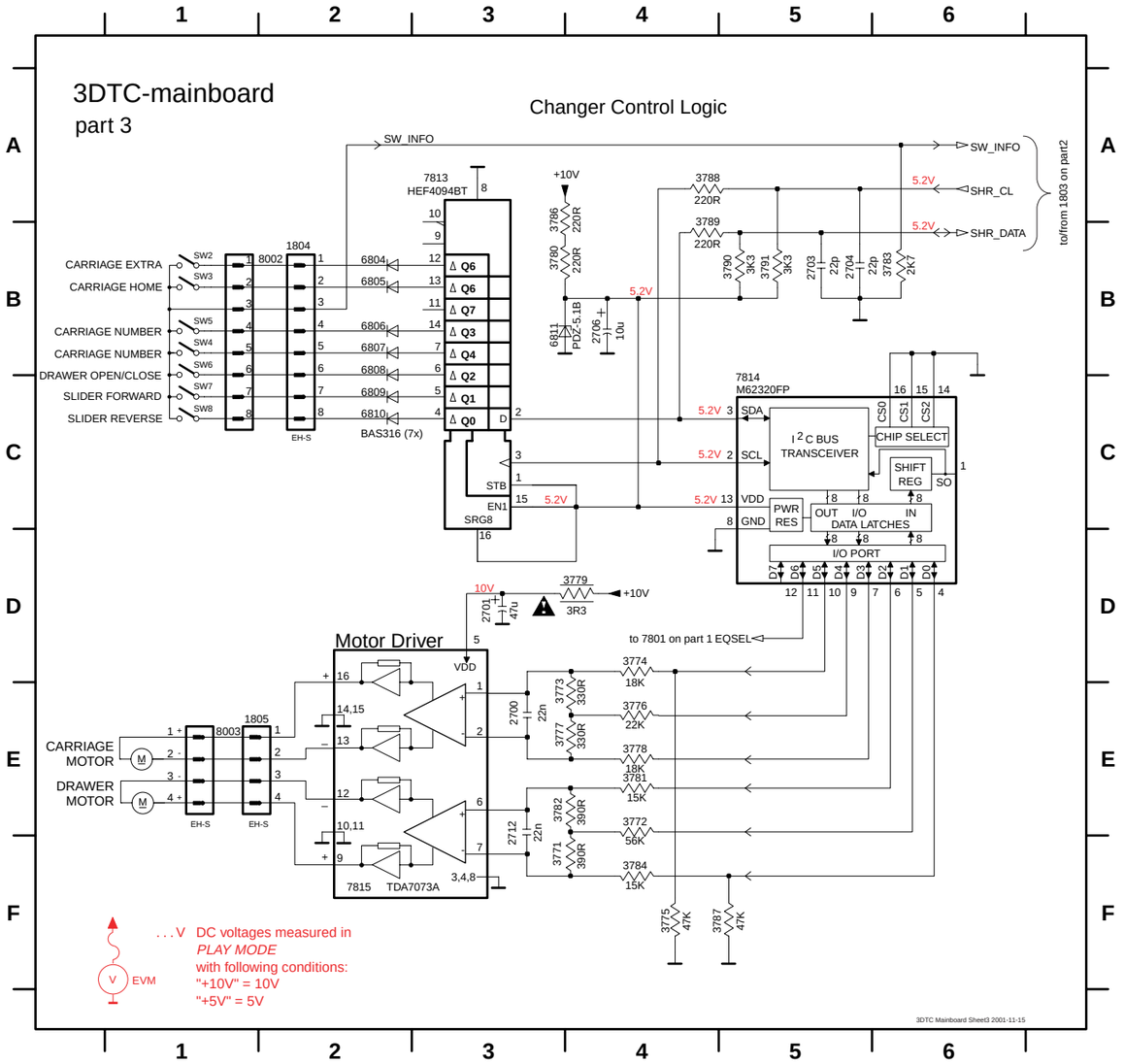
1802	B6	2819	B6	2842	B4	2850	A3	2866	C12	2885	C10	2889	C10	2893	B12	3703	C12	3735	F11	3756	C9	3760	B9	3764	C11	3841	I11	3853	A4	3860	G5	3867	A4	3883	D2	7816-A	D11
1803	F14	2820	B6	2845	A4	2853	B3	2867	C12	2886	B9	2890	D10	2894	C7	3719	D12	3743	I11	3757	C9	3761	B9	3765	D11	3844	F5	3854	G6	3863	A4	3874	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	A4	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

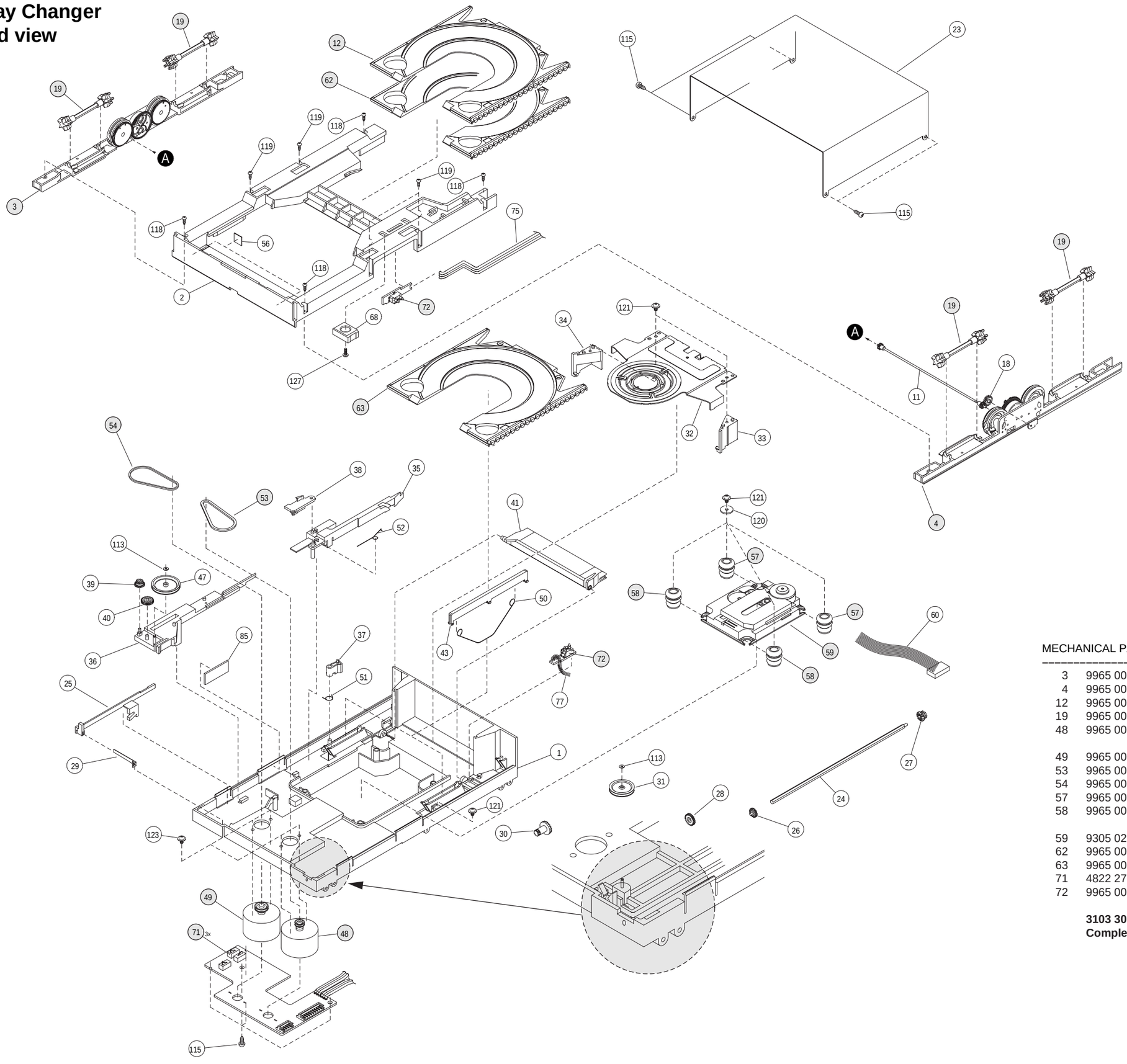
10-10

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		



10-11

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

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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

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

DIODES

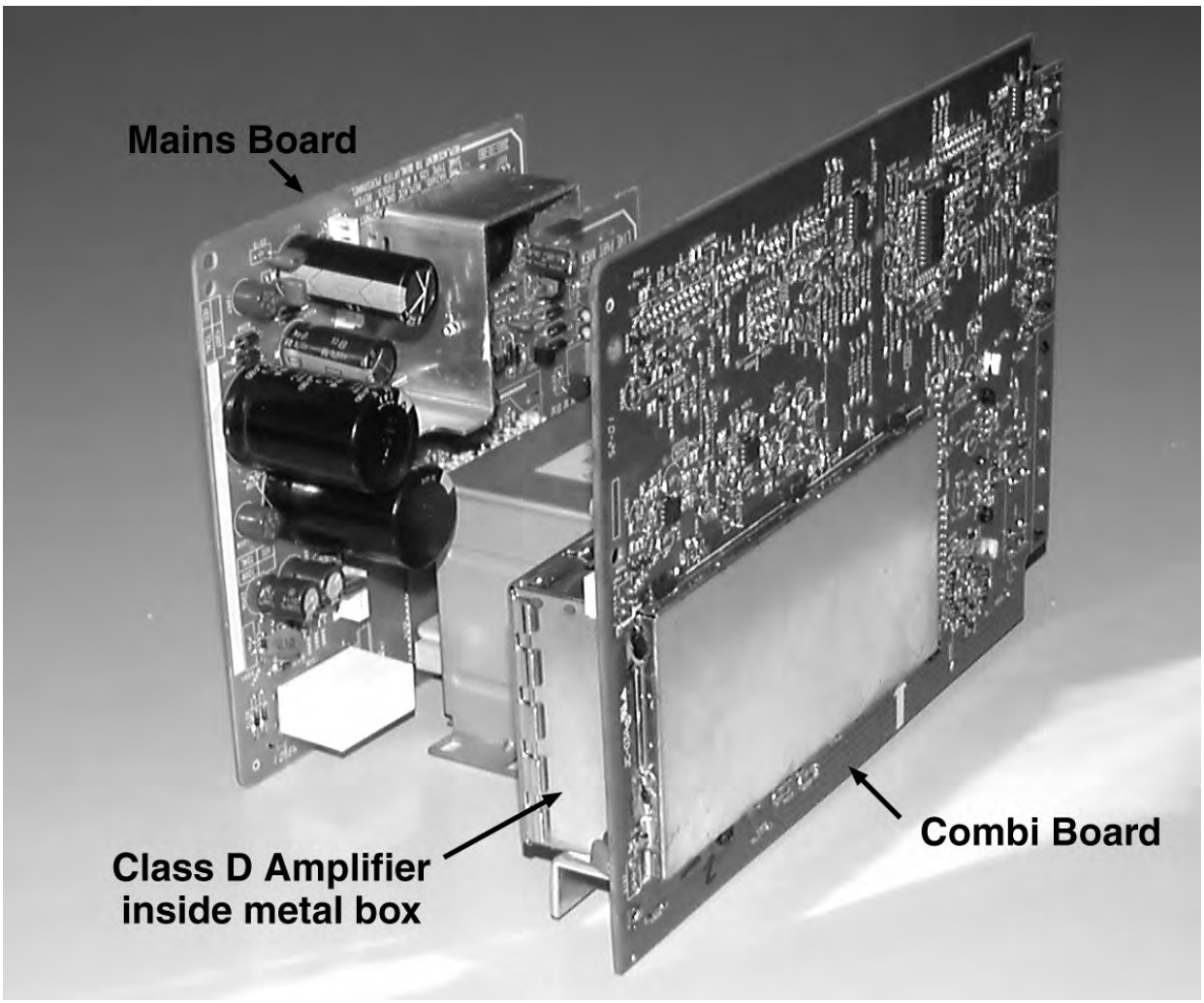
6801 ©	9322 129 34685	BZX284-C3V9
6804 ©	4822 130 11397	BAS316
6805 ©	4822 130 11397	BAS316
6806 ©	4822 130 11397	BAS316
6807 ©	4822 130 11397	BAS316
6808 ©	4822 130 11397	BAS316
6809 ©	4822 130 11397	BAS316
6810 ©	4822 130 11397	BAS316
6811 ©	9340 548 52115	BZX284-C5V1
6812 ©	9340 548 47115	PDZ3,3B

TRANSISTORS

7806 ©	4822 130 60511	BC847B
7811 ©	4822 130 60511	BC847B

INTEGRATED CIRCUITS

7800 ©	9352 641 80557	SAA7324H/M2B, CD10 Signal processor
7801 ©	9352 622 36118	TZA1025T/V2 HF-Amplifier
7802	4822 209 32852	TDA7073A/N2
7803	4822 209 32852	TDA7073A/N2
7813	5322 209 11306	HEF4094BT
7814 ©	4822 209 17345	M62320FP, I2C SHIFT REGISTER
7815	4822 209 32852	TDA7073A/N2
7816 ©	4822 209 33165	TDA1308T/N1



Power 2002 Module

(70W Class D)

stage M.4/C.7

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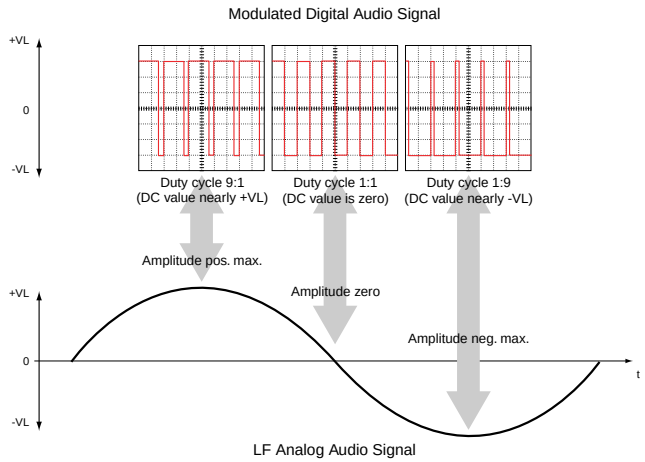
Class-D Circuit Description (Based on Power 2002 Module - 70W Class D)

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 effiency
- 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). One channel gets inverted clock to balance supply loading.

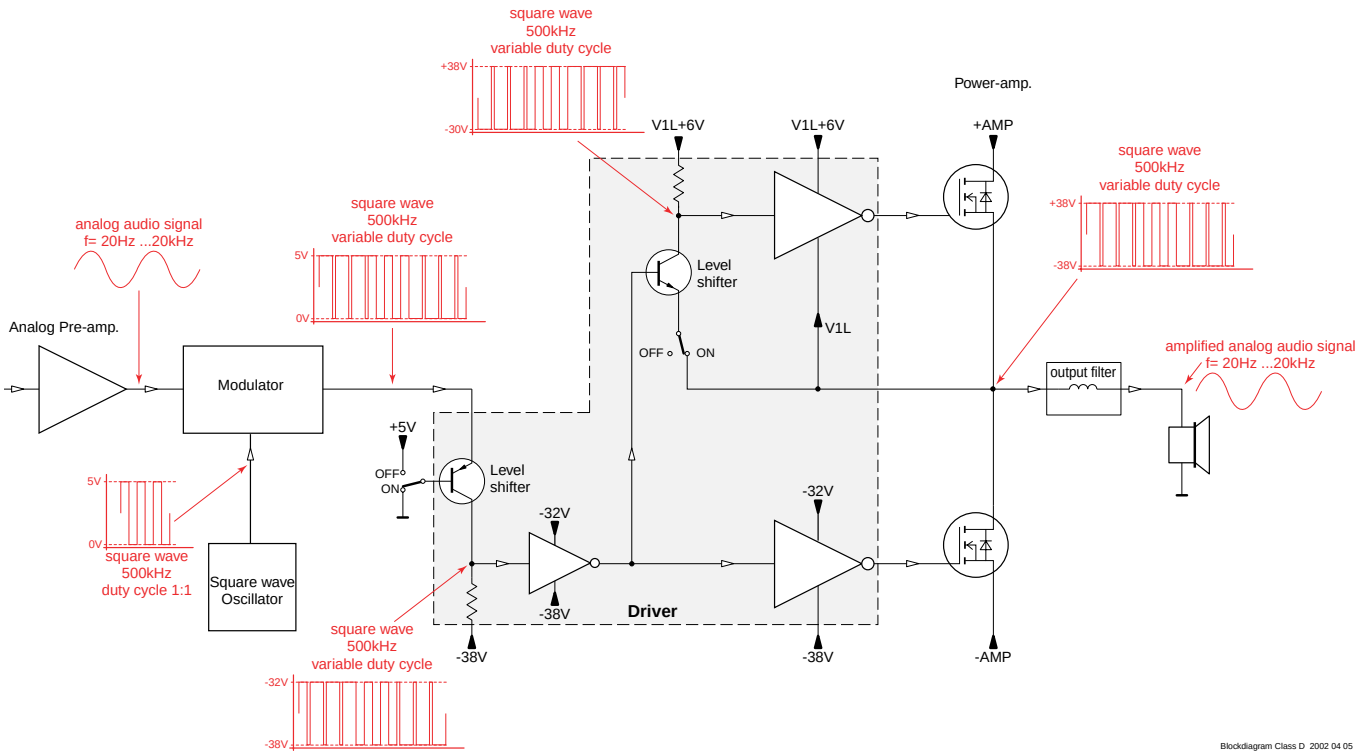
- **Modulator**
  The modulator forms the pulse width modulated signal. For each channel a seperate modulation is required.

- **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

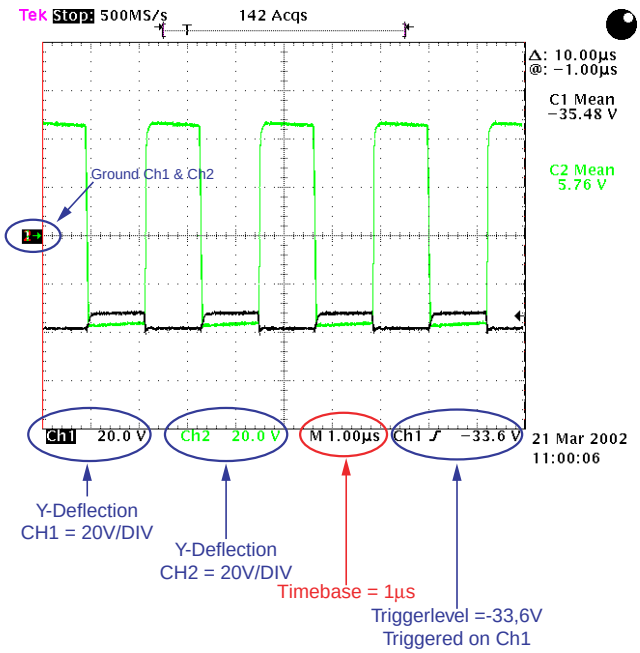
In case **7121** is defect replace following parts:
7121, 7113, 7118, 7117 and 3130

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

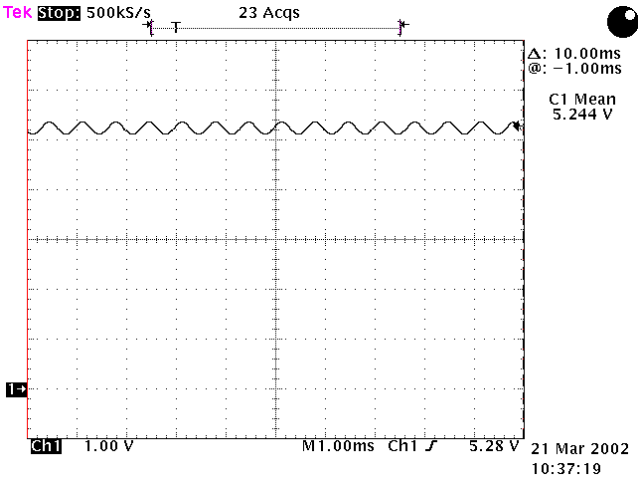
If none of the FETs is defective the fault is most probably located in the modulator. To check the operation - follow the given signals.

General description of Oscilloscope setup:



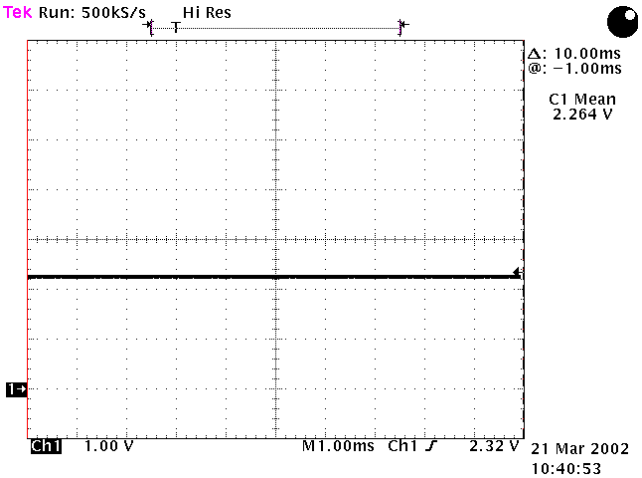
The following signals are measured at:
AUX in = 500mV/1kHz, Volume = -28dB

Measuringpoint Ⓐ: Output pre-amplifier

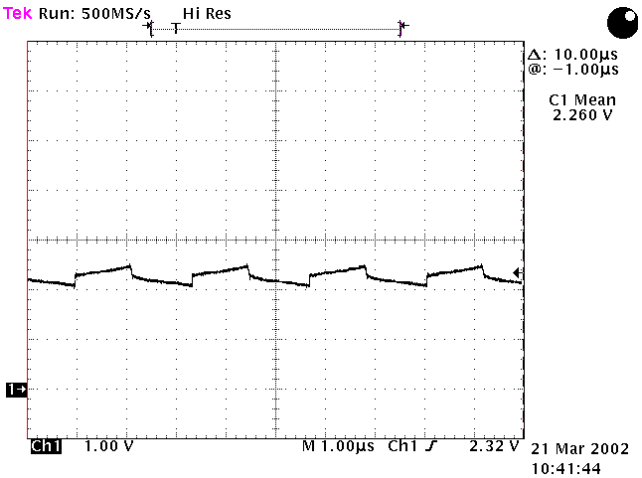


Normal analog signal measured (1kHz- Timebase 1µs). If this signal can´t be measured - the fault is outside the shielding box.

Measuringpoint Ⓑ: Input Modulator

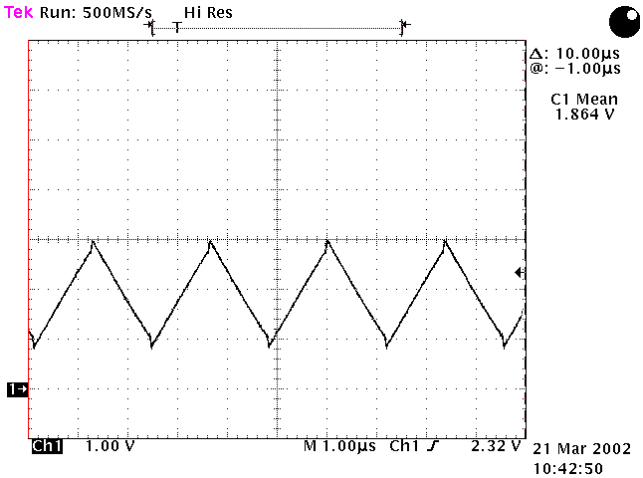


The 1kHz signal not visible anymore. Reducing the timebase to 1µs shows the oscillogram below.



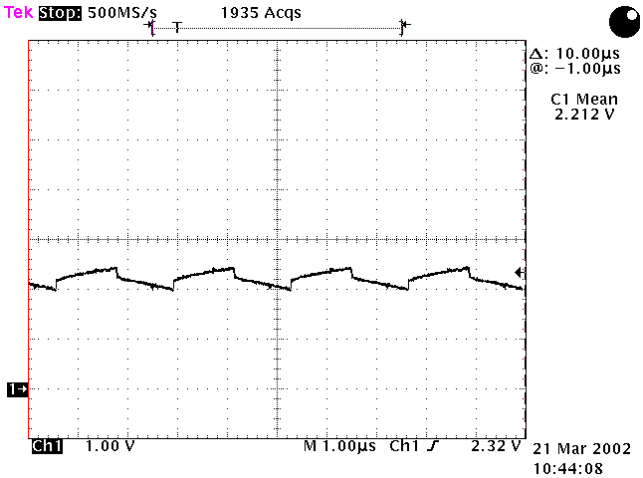
Service Hints

Measuringpoint Ⓒ:



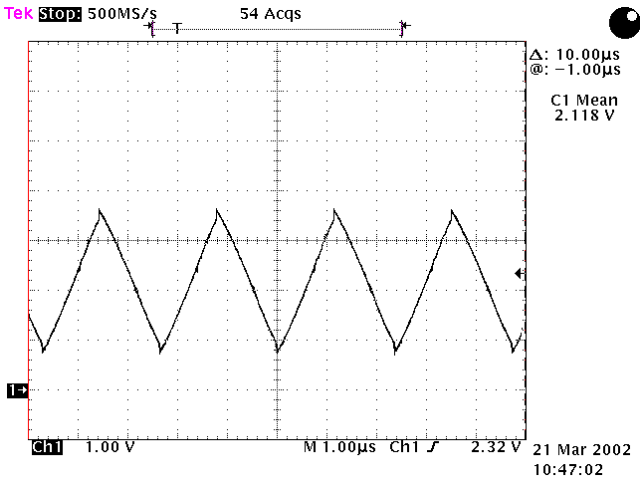
The first stage of the modulator is an integrator. An integrated rectangle results in a triangle.

Measuringpoint Ⓓ:



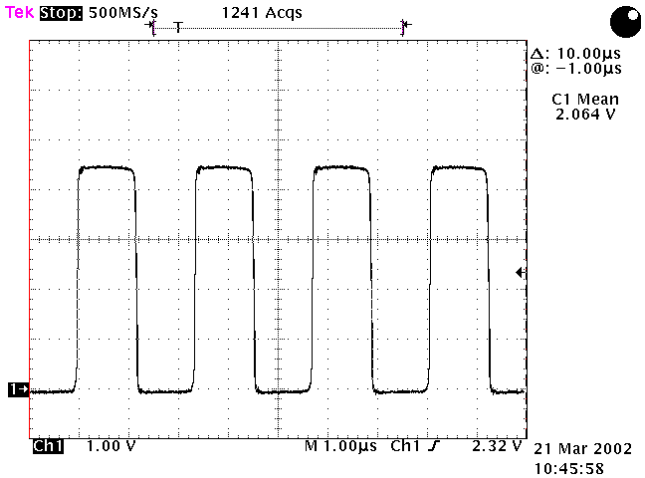
The oscillator signal (squarewave) is fed to the second integrator (7122-B).

Measuringpoint Ⓔ:



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

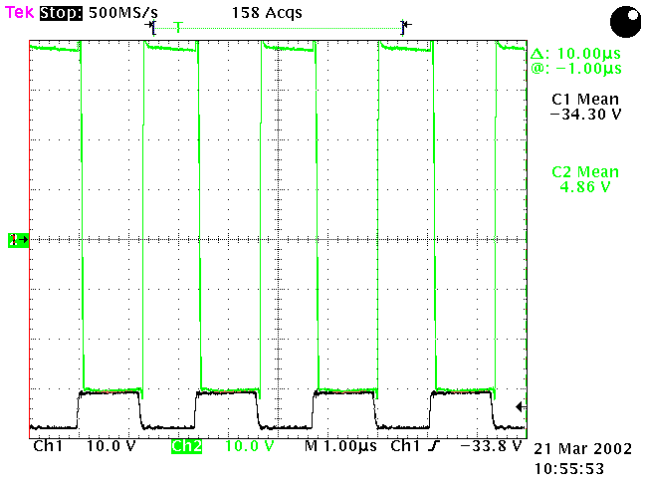
Measuringpoint Ⓕ: Output modulator



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.

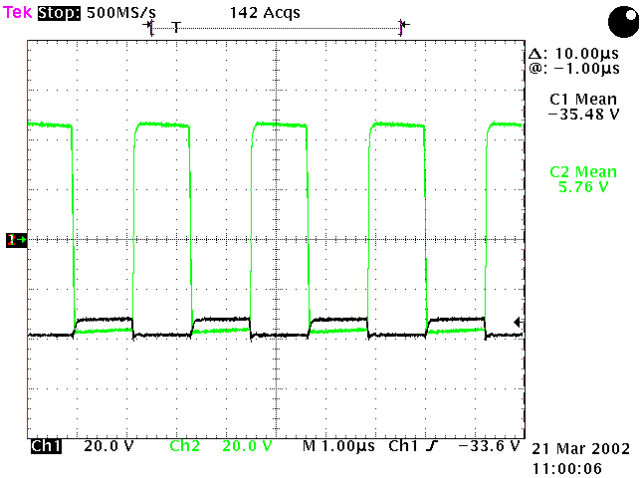
Measuringpoint Ⓖ:



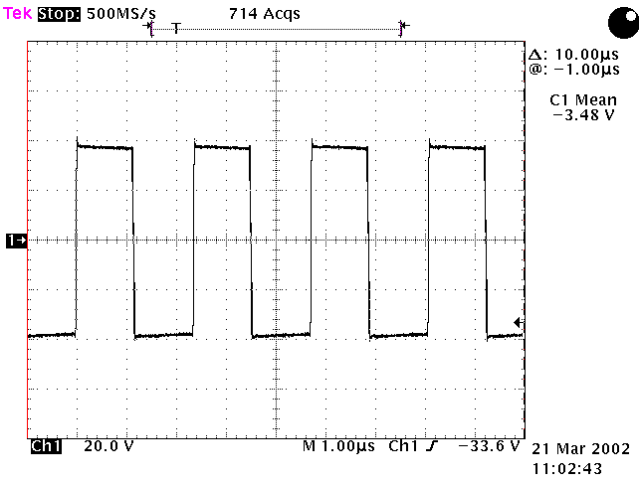
The low-side driver signal (Ch1) is the modulator output level-shifted by transistor 7128. The high-side driver signal (Ch2) is the inverted low-side driver signal level-shifted by transistor 7119.

Service Hints

Measuringpoint Ⓗ: gate-signal of the FETs



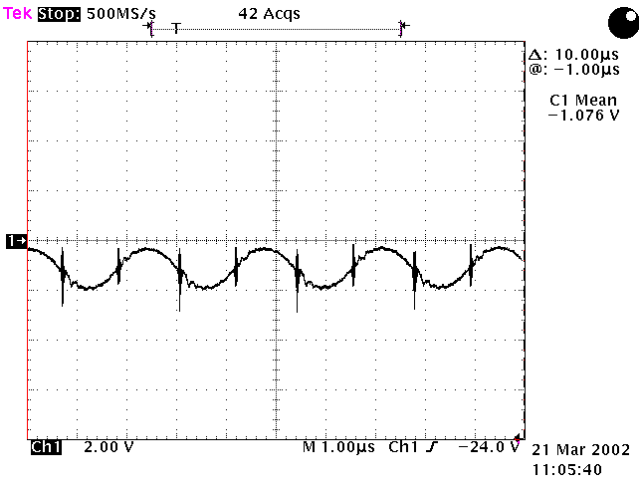
Measuringpoint Ⓘ:

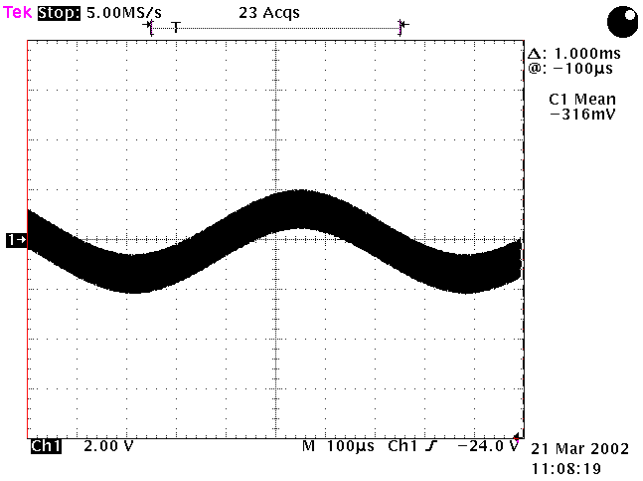


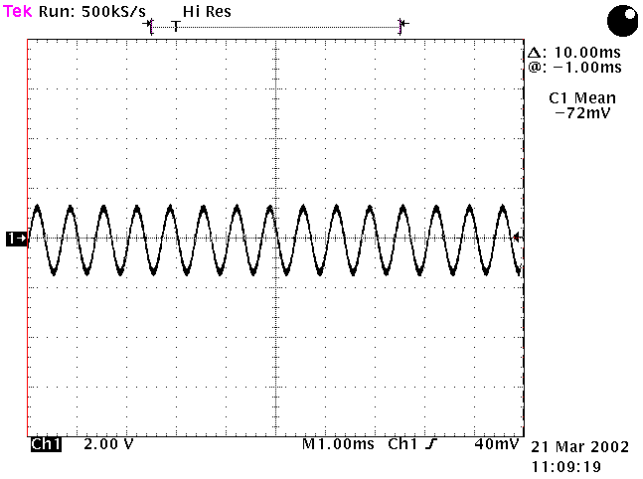
Digital output signal.

Measuringpoint Ⓙ:

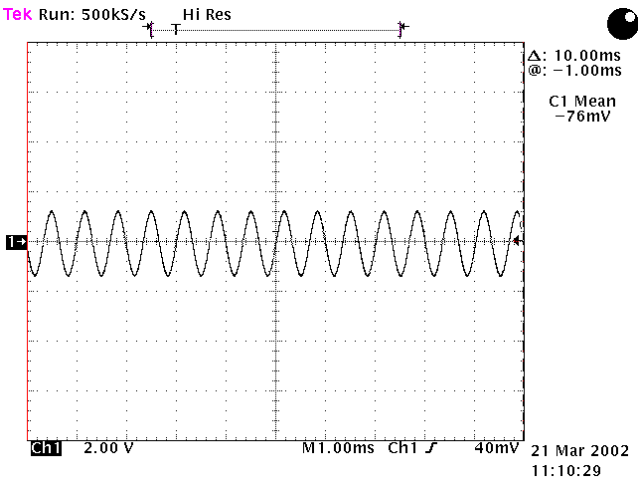
The following three signals are measured after output filter 5101 with different timebases.







Measuringpoint Ⓚ:



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

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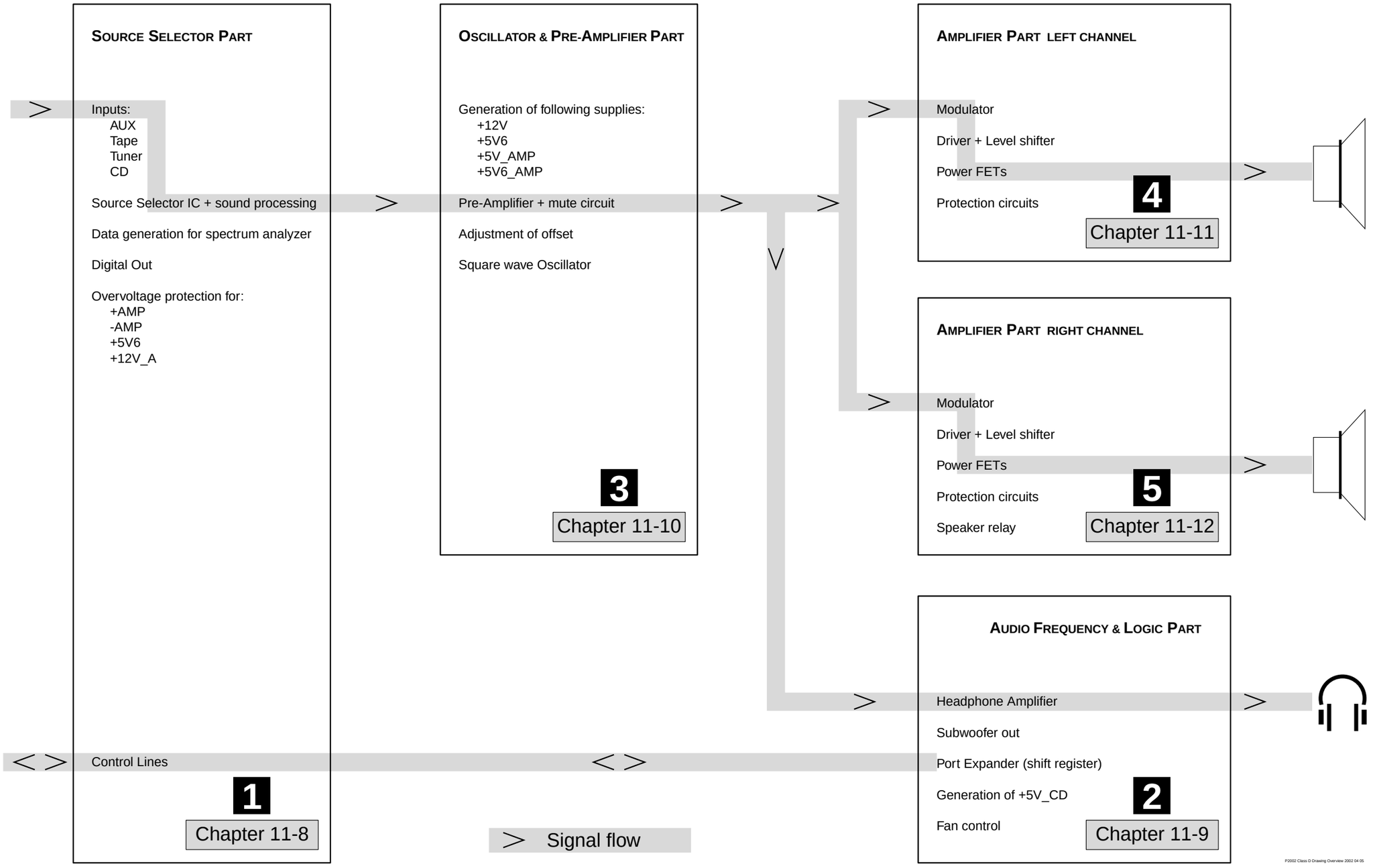
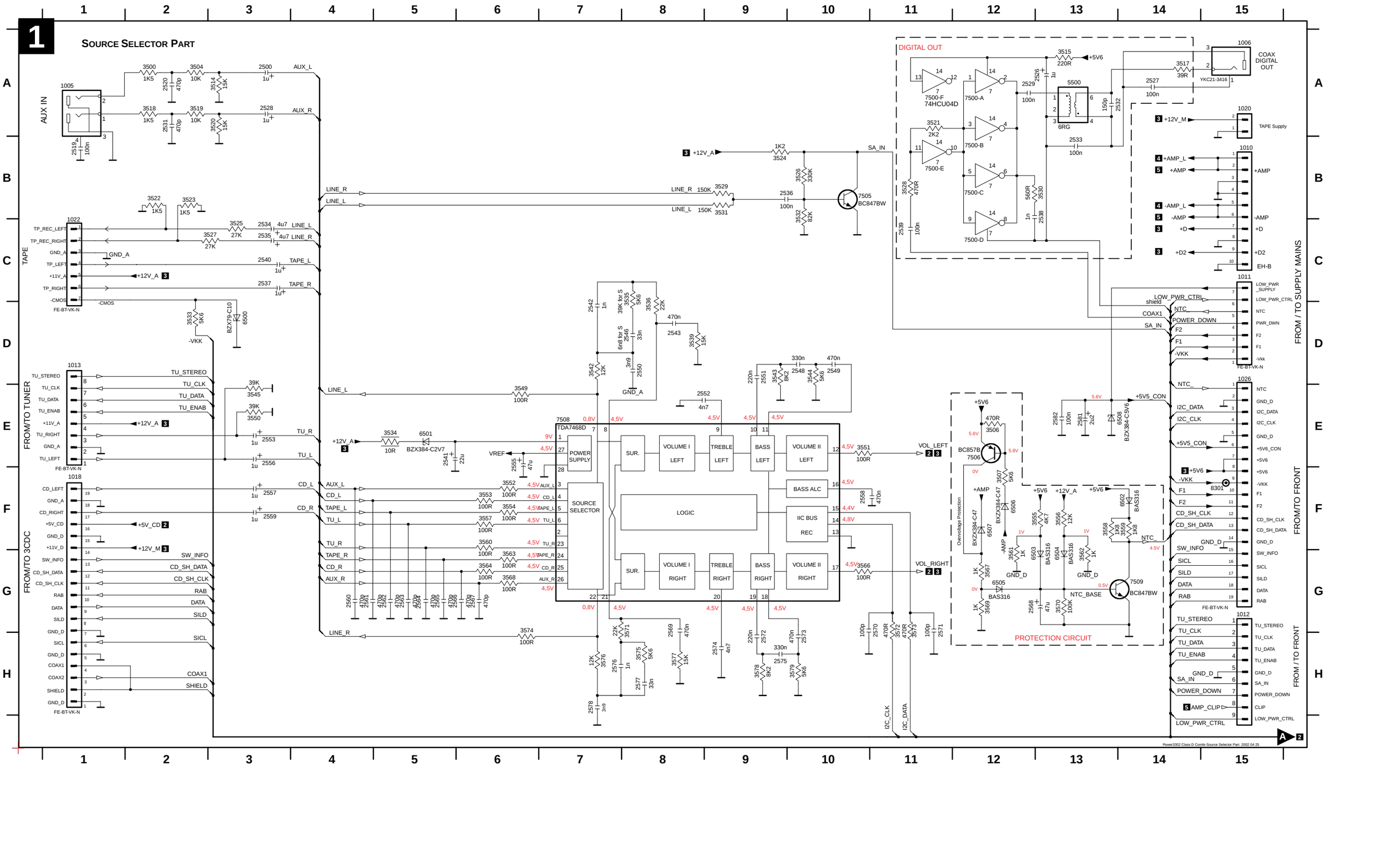
Power 2002 70W Class D
Combi Board Circuit Diagram Overview



11-8

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	3538	D8	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	3539	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	3540	D10	3555	F13	3563	G6	3572	G10	4501	D13	6506	F12	7500-E	B11		
1020	A15	2527	A14	2536	B9	2544	D10	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		



11-9

2 AUDIO FREQUENCY & LOGIC PART

HEADPHONE AMPLIFIER

from Source Selector 7506

VOL_LEFT 2403 1u +12V_A 3401 470R 2401 470p 3400 27K 2400 100p 3404 6K8 3403 27K 2404 100p 3405 5K6 V_MID 5.2V 2406 470u 3407 4K7 7400-B NJM4556AM 5.2V 2402 100u AMP_LEFT 3K3 3402 11.5V 3406 10R 6405 BAS316 +12V_A 2405 4u7

VOL_RIGHT 2408 1u 3413 470R 2409 470p 6K8 3408 27K 3409 2407 100p GND_A 7400-A NJM4556AM 5.2V 2410 100u AMP_RIGHT 3K3 3410 2411 100p 3415 27K 22u 2412

SUBWOOFER OUT 2413 100n 1004 YKC21-3416 3418 470R SUB_W 3419 2K2 2414 470p 7403 BC817-25 2K2 3420 AMP_MUTE 3

7404 BC817-25 2K2 3421 7405 BC857BW 4.8V +5V 1u 2417 3422 4K7 4.6V 3423 10K MUTE_SW

FROM/TO HP SOCKET BOARD 1014 HP_DET HP_RIGHT GND_A HP_LEFT FE-BT-VK-N 3424 10K +5V HP_DET 39R 3425 39R 3426 39R 3429 39R 3430

BC817-25 7407 0.8V BC817-25 7408 0.8V 3432 1K 3433 1K 100p 2418 2419 1u 100p

7410 BC857BW 4.8V 4.8V +5V 1u 2420 3436 4K7 4.1V 3439 10K MUTE_HP

4.1V = MUTE
4.8V = ACTIVE

FAN CONTROL for Layout stage .6

Fan runs always. Higher volume increase the speed.

+12V_M 3412 5R6 FAN_CONT 4K7 3411 BZX384-C4V7 6400 100u 2416 11.5V 7402 BC337-40 8.2V 7.5V 1401 FAN 2415 1u EH-B

FAN CONTROL for Layout stage .7

Fan runs not at low volumes.
Higher volume starts the fan.
The fan-speed depends on the output power.

+12V_M 3412 5R6 FAN_CONT 4K7 3411 1.5V..11V 11.5V 7402 BC337-40 1V..10.3V 2416 100u 1401 FAN 2415 1u EH-B

+5V_CD 4.4V 2R2 3440 BC807-25W(COL) 7411 4.7V 1N4148 6402 +5V6 3437 5K6 3.9V 5K6 3431 0V 7409 BC817-25W(COL) 0.7V 3434 2K2 3438 10K

10K 3427 10K 3428

M62320FP 7406

4 AMP_OFF AMP_OFF MUTE_SW HP_DET MUTE_HP

3 OZ_SW 5 AMP_RELAIS

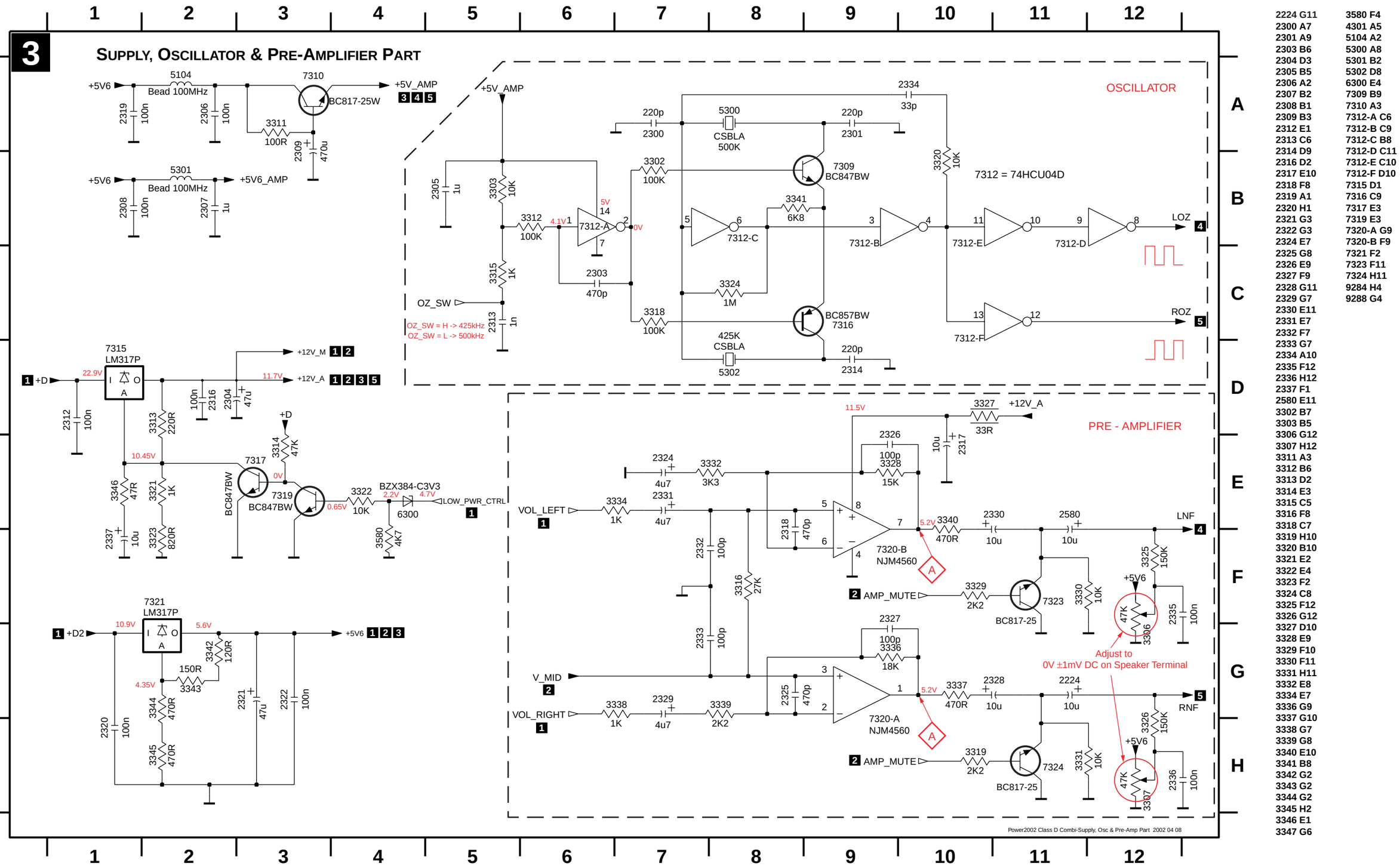
I/O PORT D0 D1 D2 D3 D4 D5 D6 D7 DATA LATCHES OUT I/O IN REG SHIFT TRANSCEIVER I²C BUS CHIP SELECT CS2 CS1 CS0 RES PWR GND VDD SDA SCL SO

+5V +5V6 1N4148 6401 3435 270R 4.1V 100n 2421 GND_D

MIC_DET I2C_DATA I2C_CLK

11-10

3 SUPPLY, OSCILLATOR & PRE-AMPLIFIER PART



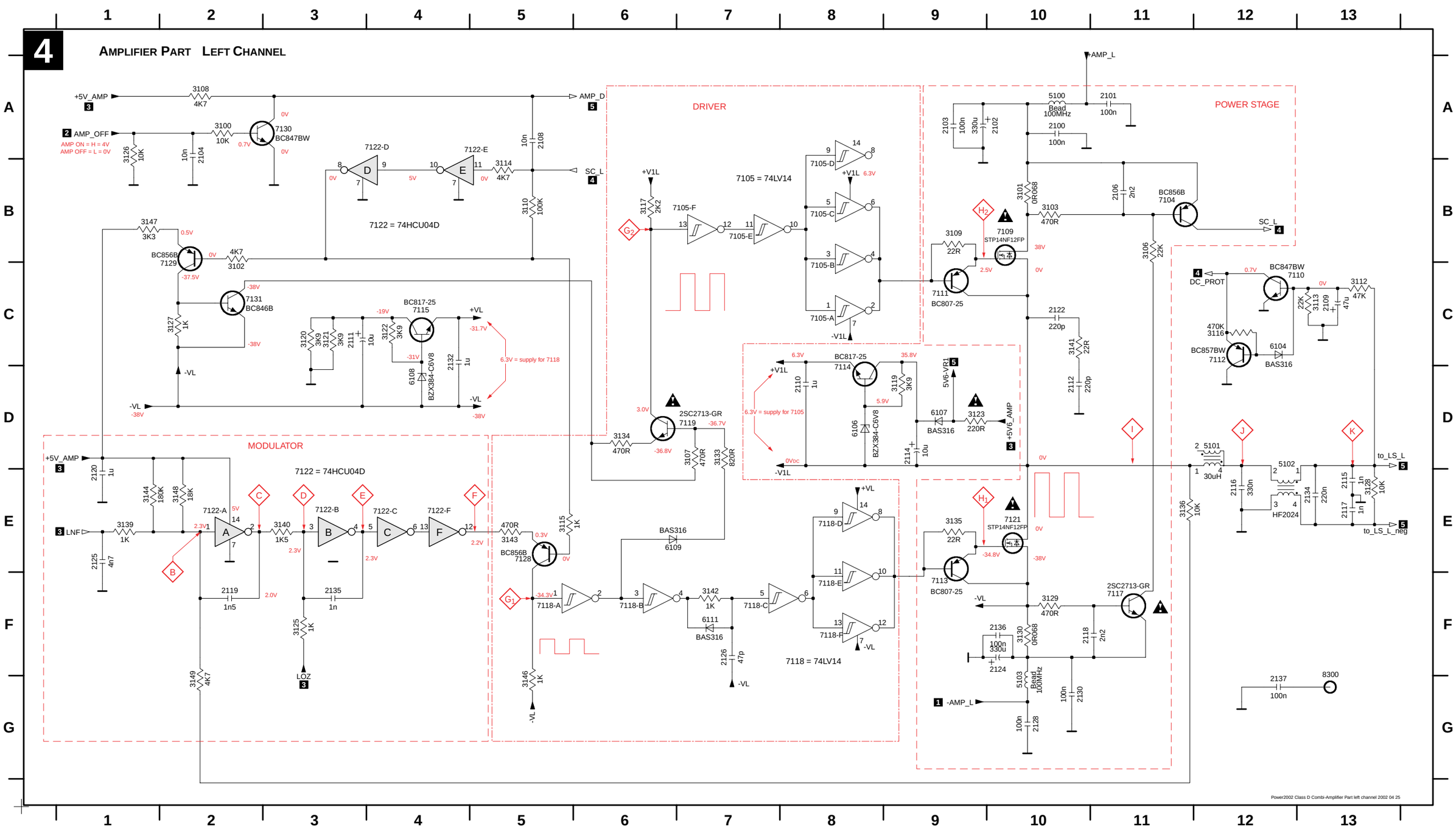
◇ for wave forms see chapter 11-4 Service Hints

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

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

11-11

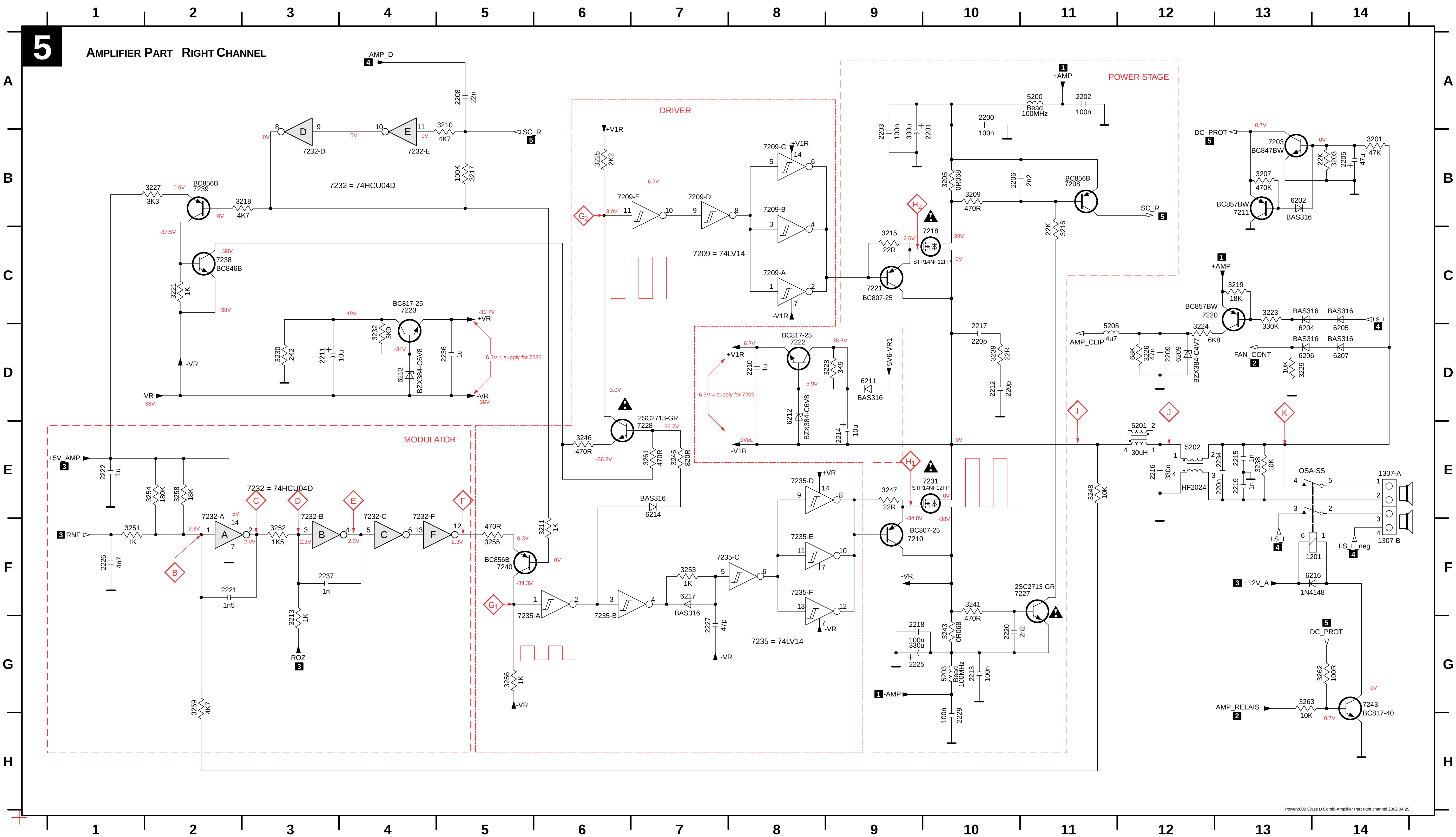
2100 A10 2101 A11 2102 A10 2103 A9 2104 A2 2106 B11 2108 A5 2109 C13 2110 D8 2111 C3 2112 D10 2114 D9 2115 E13 2116 E12 2117 E13 2118 F10 2119 F2 2120 E1 2122 C10 2124 F10 2125 E1 2126 F7 2128 G10 2130 G10 2132 C4 2134 E13 2135 F3 2136 F10 2137 G12 3100 A2 3101 B10 3102 C2 3103 B10 3106 B11 3107 D7 3108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



◇ for wave forms see chapter 11-4 Service Hints

11-12

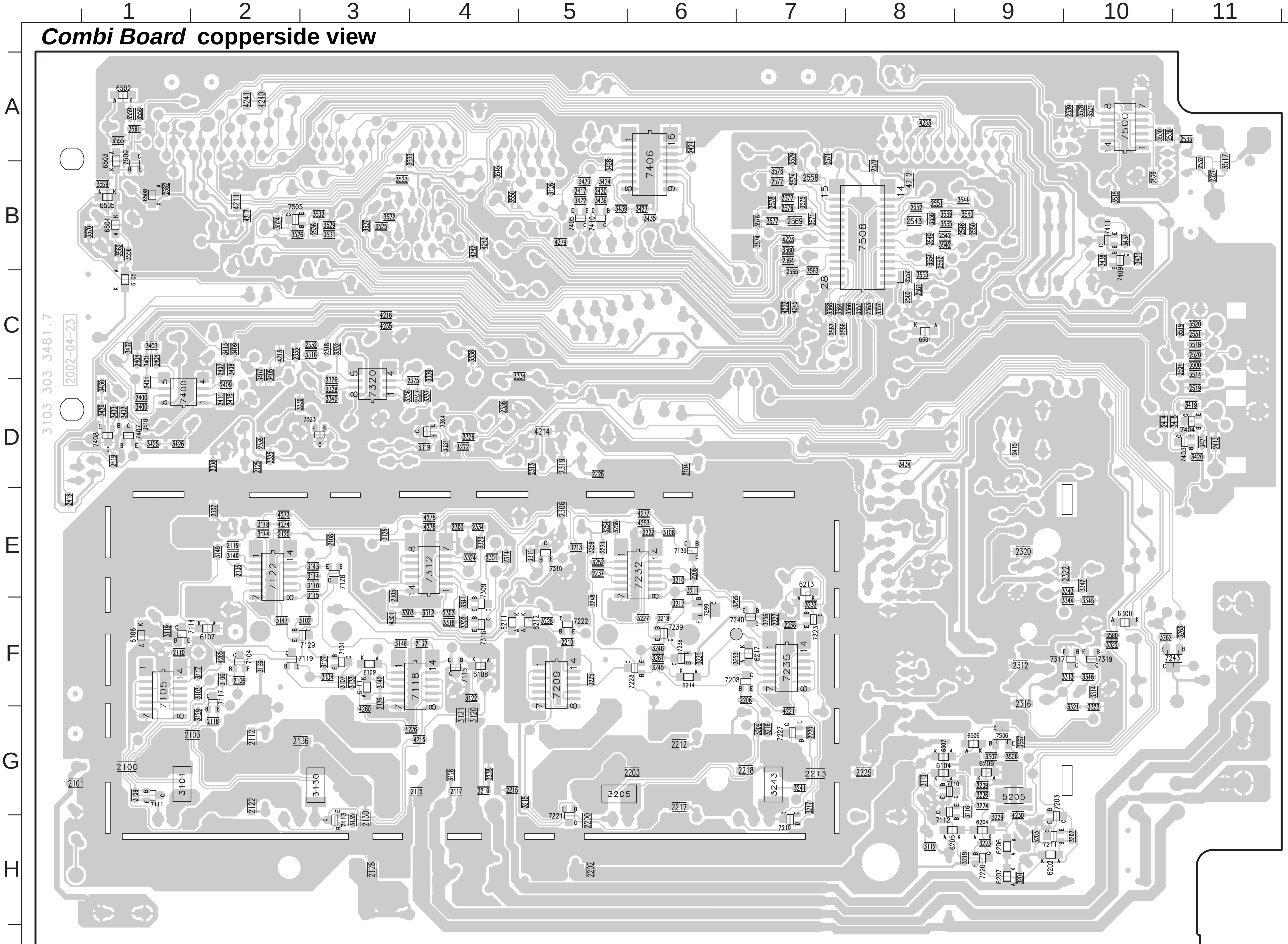
1201 F14	2203 B9	2211 D3	2217 D10	2225 G9	2237 F3	3210 A5	3218 B3	3226 D12	3238 E13	3247 E9	3255 F5	3263 G13	6202 B13	6211 D9	7203 B13	7209-E B6	7221 C9	7232-A F2	7235-A G5	7238 C2
1307-A E14	2205 B14	2212 D10	2218 G9	2226 F2	3201 B14	3211 F6	3219 C13	3227 B2	3239 D10	3248 E11	3256 G5	5200 A11	6204 D13	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

11-13

Combi Board copperside view

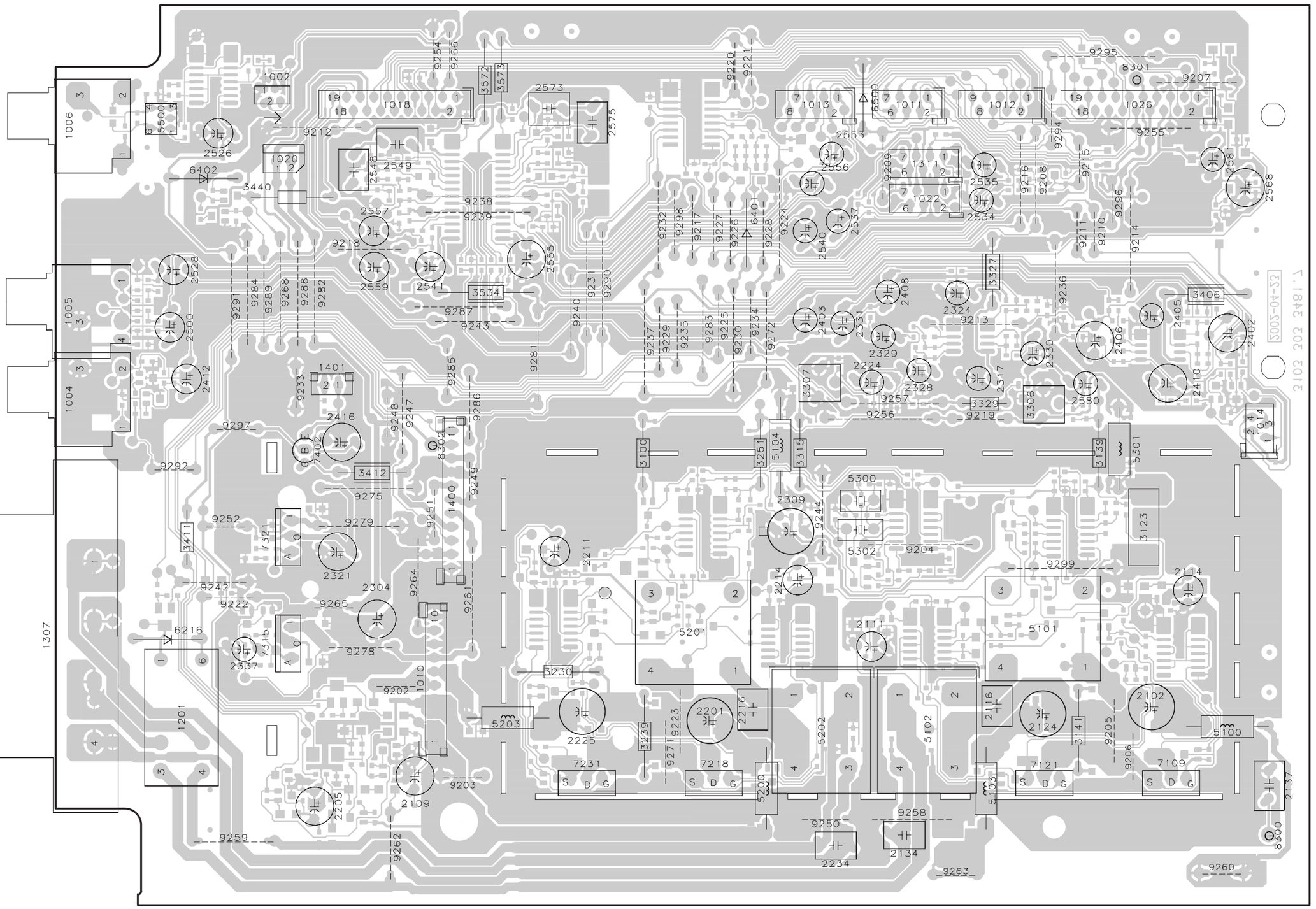


This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

Power2002 70W Class D - Combi Board stage.7 2002 04 22

2100	G1
2101	G1
2103	G2
2104	D6
2106	F2
2108	E3
2110	F1
2112	G2
2115	G4
2117	G4
2118	G2
2119	E2
2120	E2
2122	G2
2125	D2
2126	F3
2128	H3
2130	H3
2132	F4
2135	E2
2136	G3
2200	H5
2202	H5
2203	G6
2206	F7
2208	E6
2209	G9
2210	F5
2212	G6
2213	G7
2215	G4
2217	G6
2218	G7
2219	G4
2220	G7
2221	E5
2222	E6
2226	D5
2227	F7
2229	G8
2236	F7
2237	E5
2300	E4
2301	E4
2303	F4
2305	F3
2306	E5
2307	E2
2308	D2
2312	F9
2313	D5
2314	E4
2316	F9
2318	C3
2319	D5
2320	E9
2322	E10
2325	D4
2326	D3
2327	D4
2332	C3
2333	C2
2334	E4
2335	D2
2336	D4
2400	D1
2401	D1
2404	C1
2407	C2
2409	D2
2411	D2
2413	D11
2414	D10
2415	D9
2417	B5
2418	E1
2419	D1
2420	B5
2421	A6
2519	D11
2520	C11
2527	B11
2529	B10
2531	C11
2532	B11
2533	A11
2536	B3
2538	A10
2539	A10
2542	B8
2543	B8
2546	B9
2550	B9
2551	B8
2552	B8
2558	B7
2560	C8
2561	C8
2562	B8
2563	C8
2564	B7
2565	C7
2566	C7
2567	C7
2569	B7
2570	B8
2571	A7
2572	B7
2574	B7
2576	B7
2577	B7
2578	B7
2582	B1
3101	G1
3102	F3
3103	F2
3106	F2
3107	F3
3108	E6
3109	G1
3110	E3
3112	H8
3113	G8
3114	E3
3115	E3
3116	G9
3117	F2
3119	F1
3120	G4
3121	G4
3122	F4
3125	E3
3126	B5
3127	F3
3128	G4
3129	G2
3130	G3
3133	F3
3134	F3
3135	H3
3136	F2
3140	E2
3142	F3
3143	E3
3144	E2
3146	F3
3147	F2
3148	E2
3149	E2
3201	H9
3203	H9
3205	G5
3207	H10
3209	G7
3210	E6
3211	E6
3213	E5
3215	G5
3216	G7
3217	F6
3218	F6
3219	H9
3221	F6
3223	H9
3224	G9
3225	F5
3226	G9
3227	F6
3228	F5
3229	H9
3232	F7
3238	G4
3241	G7
3243	G7
3245	F6
3246	F6
3247	G7
3248	F5
3252	E5
3253	F6
3254	E5
3255	F6
3256	F7
3258	E5
3259	E5
3261	F6
3262	F10
3263	F11
3302	F4
3303	F3
3311	E5
3312	F4
3313	F10
3314	F10
3316	C3
3318	F4
3319	D4
3320	E4
3321	G10
3322	F10
3323	G10
3324	E4
3325	D2
3326	D4
3328	D3
3330	D2
3331	D4
3332	C3
3334	C5
3336	D3
3337	D4
3338	C4
3339	C4
3340	D3
3341	F4
3342	E10
3343	E10
3344	F10
3345	F10
3346	F10
3400	D1
3401	C1
3402	C1
3403	C1
3404	C1
3405	C2
3407	C2
3408	C2
3409	C2
3410	D1
3413	C2
3415	D2
3418	D11
3419	D11
3420	D11
3421	D11
3422	B5
3423	B5
3424	B5
3425	D1
3426	D1
3427	B6
3428	B5
3429	D1
3430	D1
3431	B10
3432	D1
3433	D1
3434	D8
3435	B6
3436	B5
3437	B10
3438	B10
3439	B5
3500	C11
3504	C11
3506	G9
3507	G9
3514	C11
3515	B10
3517	B11
3518	C11
3519	C11
3520	C11
3521	A10
3522	B3
3523	B3
3524	B2
3525	B3
3526	B2
3527	B3
3528	A10
3529	B3
3530	A10
3531	B3
3532	B3
3533	B4
3535	B8
3536	B8
3539	B8
3542	B8
3543	B9
3544	B9
3545	B4
3549	B8
3550	B4
3551	C8
3552	C8
3553	C8
3554	B8
3555	A1
3556	B1
3557	C8
3558	A1
3559	A1
3560	B7
3561	A1
3562	B1
3563	C7
3564	C7
3566	C8
3567	G9
3568	C7
3569	B1
3570	B1
3571	B7
3574	B7
3575	B7
3576	B7
3577	B7
3578	B7
3579	A7
3580	F10
4211	B2
4212	B8
4213	C2
4214	D5
4215	G4
4216	C3
4217	B2
4221	G7
4223	B7
4226	G4
4230	H9
4232	C7
4233	A8
4235	C3
4240	A2
4241	A2
4242	B4
4243	B4
4245	C7
4253	E6
4260	G3
4265	F2
4272	D4
4273	E2
4274	E2
4275	E4
4276	E4
4277	E6
4279	B5
4301	F3
5205	G9
6104	G8
6105	C1
6106	F1
6107	F2
6108	F4
6109	F3
6111	F3
6202	H9
6204	H9
6205	H8
6206	H9
6207	H9
6209	G9
6211	F4
6212	F5
6213	E7
6214	F6
6217	F7
6300	F10
6501	C8
6502	A1
6503	B1
6504	B1
6505	B1
6506	G9
6507	G8
6508	B1
7104	F2
7105	F1
7110	G8
7111	G1
7112	H8
7113	H3
7114	F1
7115	F4
7117	F2
7118	F4
7119	F3
7122	E2
7128	E3
7129	F3
7130	E6
7131	F3
7203	G9
7208	F6
7209	F5
7210	H7
7211	H9
7220	H9
7221	H5
7222	F5
7223	F7
7227	G7
7228	F6
7232	E6
7235	F7
7238	F6
7239	F6
7240	F7
7243	F10
7299	F6
7309	E4
7310	E5
7312	E4
7316	F4
7317	F9
7319	F10
7320	D3
7323	D3
7324	D4
7400	D1
7403	D11
7404	D11
7405	B5
7406	B6
7407	D1
7408	D1
7409	C10
7410	B5
7411	B10
7500	A10
7505	B2
7506	G9
7508	B8
7509	A1

Combi Board componentside view



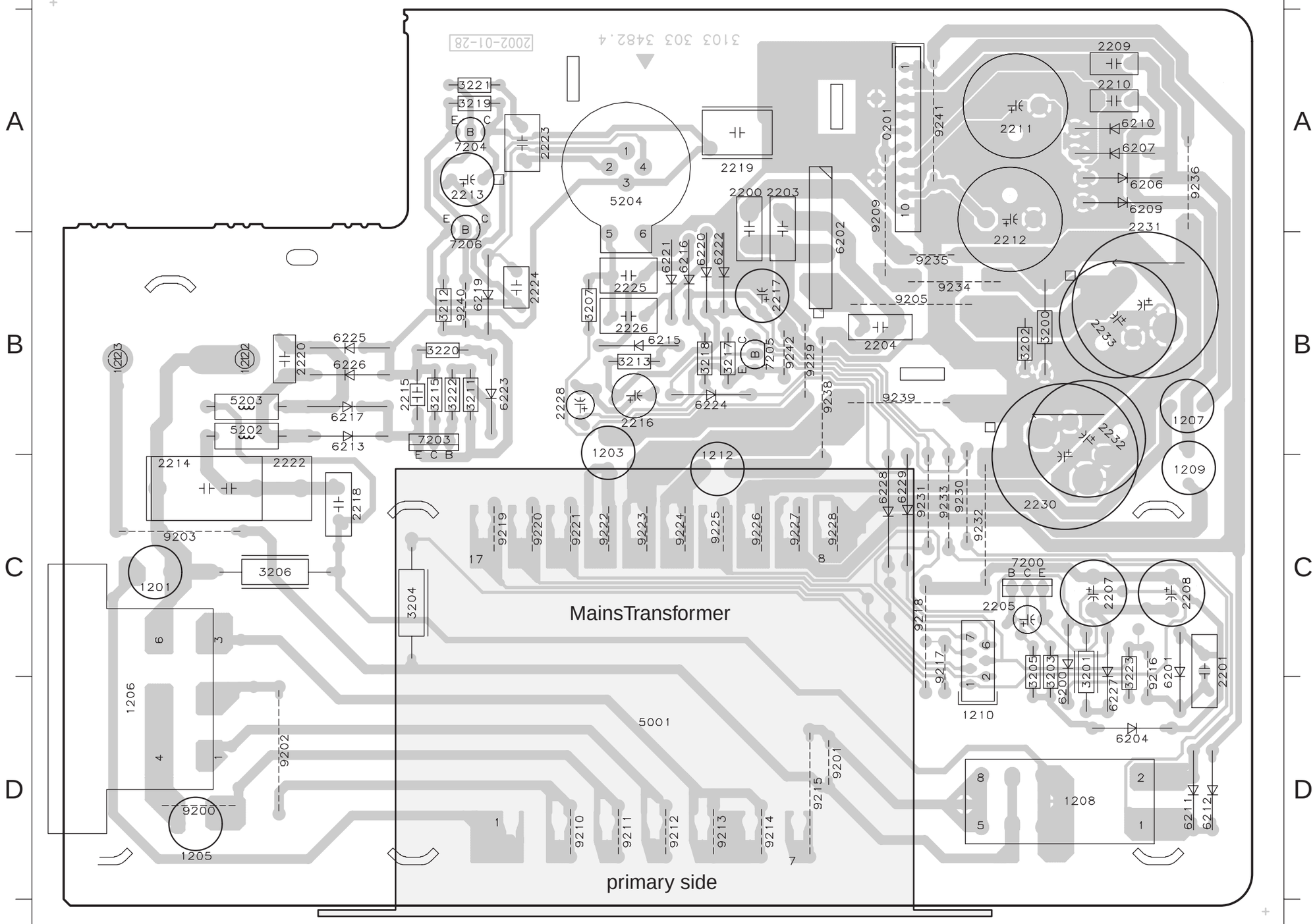
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

Power2002 70W Class D - Combi Board stage.7 2002 04 22

1002	A3
1004	D1
1005	C1
1006	B1
1010	G4
1011	A8
1012	A9
1013	A7
1014	D11
1018	A4
1020	B3
1022	B8
1026	A10
1201	G2
1307	F1
1311	B8
1400	E4
1401	D3
2102	G10
2109	H4
2111	F8
2114	F11
2116	G9
2124	G9
2134	H8
2137	H11
2201	G6
2205	H3
2211	E5
2214	F7
2216	G7
2224	D8
2225	G5
2234	H8
2304	F3
2309	E7
2317	D9
2321	F3
2324	C9
2328	D8
2329	D8
2330	D10
2331	C8
2337	G2
2402	C11
2403	C7
2405	C11
2406	D10
2408	C8
2410	D11
2412	D2
2416	D3
2500	C2
2526	B2
2528	C2
2534	B9
2535	B9
2537	B8
2540	C7
2541	C4
2548	B3
2549	B4
2553	B8
2555	C5
2556	B8
2557	B3
2559	C3
2568	B11
2573	A5
2575	B6
2580	D10
2581	B11
3100	E6
3123	E10
3139	E10
3141	G10
3230	G5
3239	G6
3251	E7
3306	D9
3307	D7
3315	E7
3327	C9
3329	D9
3406	C11
3411	E2
3412	E3
3440	B2
3534	C4
3572	A4
3573	A5
5100	G11
5101	F9
5102	G8
5103	H9
5104	E7
5200	H7
5201	F6
5202	G7
5203	G5
5300	E8
5301	E10
5302	E8
5500	B1
6216	F2
6401	B7
6402	B2
6500	A8
7109	G11
7121	G10
7218	G6
7231	G5
7315	F2
7321	E2
7402	E3
8300	H11
8301	A10
8302	E4
9202	G4
9203	H4
9204	E8
9205	G10
9206	G10
9207	A11
9208	B9
9209	B8
9210	C10
9211	C10
9212	B3
9213	C9
9214	C10
9215	B10
9216	B9
9217	C6
9218	C3
9219	D9
9220	A7
9221	A7
9222	F2
9223	G6
9224	B7
9225	C7
9226	C7
9227	C7
9228	C7
9229	D6
9230	D7
9231	C5
9232	C6
9233	D3
9234	C7
9235	D6
9236	C10
9237	D6
9238	B4
9239	B4
9240	C5
9242	F2
9243	C4
9244	E7
9247	D4
9248	D4
9249	E4
9250	H8
9251	E4
9252	E2
9254	A4
9255	B10
9256	D8
9257	D8
9258	H8
9259	H2
9260	H11
9261	F4
9262	H4
9263	H9
9264	F4
9265	F3
9266	A4
9268	C3
9271	G6
9272	D7
9275	E3
9278	F3
9279	E3
9281	D5
9282	C3
9283	C6
9284	C2
9285	D4
9286	D4
9287	C4
9288	C3
9289	C2
9290	C6
9291	C2
9292	E2
9294	B10
9295	A10
9296	B10
9297	D2
9298	B6
9299	F10

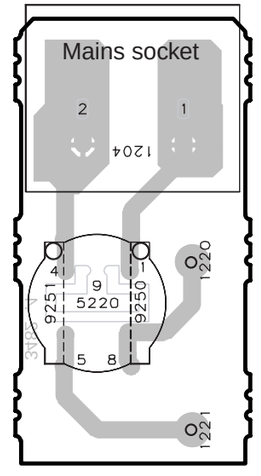
11-15

Mains Board copperside view



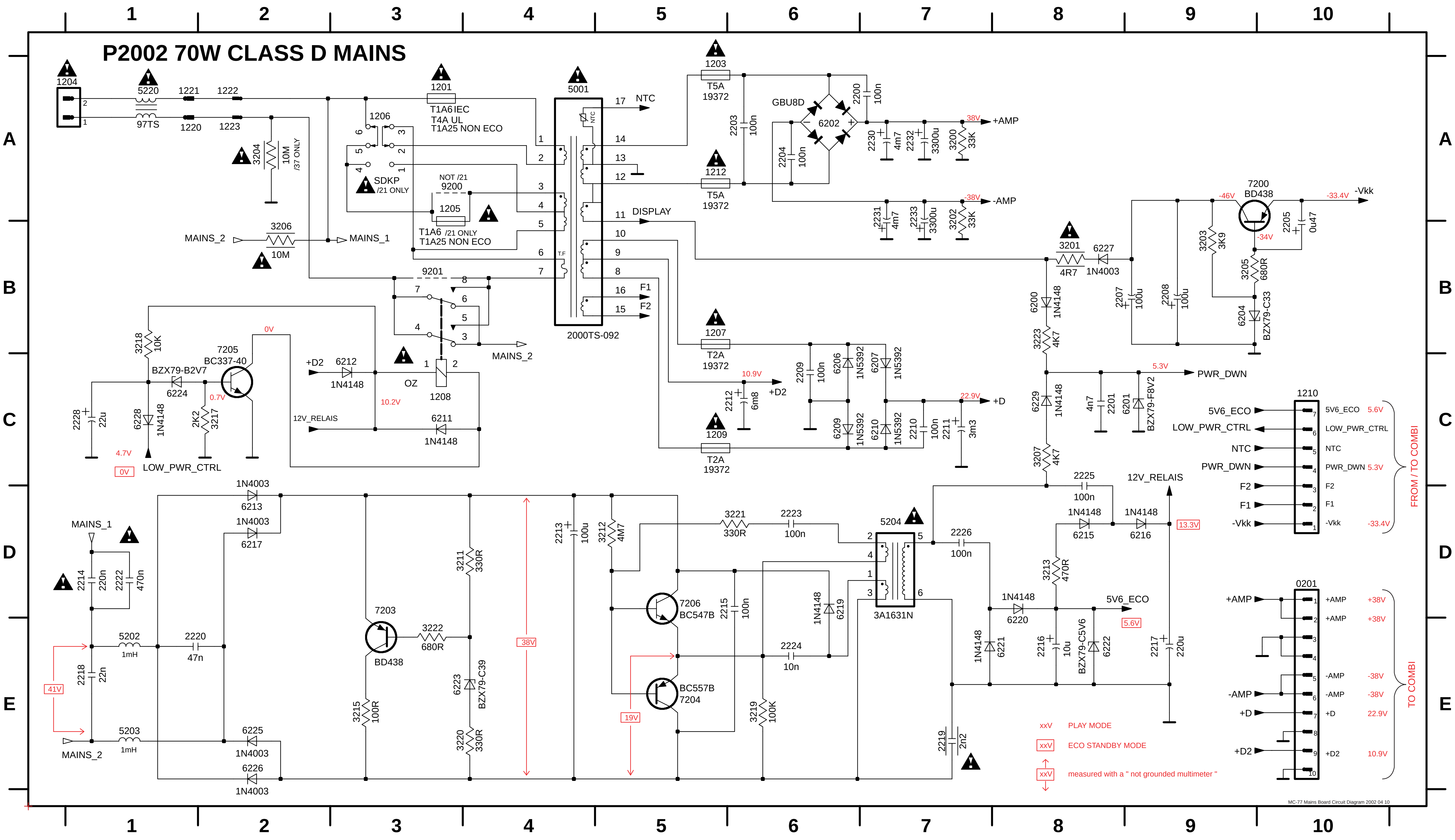
This assembly drawing shows a summary of all possible versions.
For components used in a specific version see schematic diagram respectively partslist.

Power2002 70W Class D - Mains Board stage.4 2002 03 27



0201 D10	1207 B5	1222 A2	2204 A6	2210 C7	2215 D5	2220 E1	2226 D7	2233 A7	3204 A2	3212 D5	3219 E6	5001 A4	6201 C9	6209 C6	6215 D8	6221 E8	6226 E2	7203 D3	9201 B3
1201 A3	1208 C3	1223 A2	2205 A10	2211 C7	2216 E8	2222 D1	2228 C1	3200 A8	3205 B9	3213 D8	3220 E4	5202 E1	6202 A6	6210 C7	6216 D9	6222 E8	6227 B8	7204 E5	
1203 A5	1209 C5	2200 A6	2207 B8	2212 C6	2217 E9	2223 D6	2230 A7	3201 B8	3206 B2	3215 E3	3221 D6	5203 E1	6204 B9	6211 C3	6217 D2	6223 E3	6228 C1	7205 B2	
1205 A3	1210 C10	2201 C8	2208 B9	2213 D4	2218 E1	2224 E6	2231 B7	3202 A8	3207 C8	3217 C2	3222 E3	5204 D7	6206 C6	6212 C3	6219 D6	6224 C1	6229 C8	7206 D5	
1206 A3	1212 B5	2203 A6	2209 C6	2214 D1	2219 E7	2225 C8	2232 A7	3203 B9	3211 D4	3218 B1	3223 B8	6200 B8	6207 C7	6213 D2	6220 D8	6225 E2	7200 A9	9200 A3	

P2002 70W CLASS D MAINS


1 2 3 4 5 6 7 8 9 10
A B C D E
1204
5220
97TS
1221
1222
1220
1223
3204
10M
/37 ONLY
1201
T1A6 IEC
T4A UL
T1A25 NON ECO
1206
SDKP
/21 ONLY
NOT /21
9200
1205
T1A6 /21 ONLY
T1A25 NON ECO
MAINS_2
3206
10M
MAINS_1
5001
17 NTC
14
13
12
11 DISPLAY
10
9
8
16 F1
15 F2
2000TS-092
1203
T5A
19372
1212
T5A
19372
GBU8D
6202
2200
100n
2203
100n
2204
100n
38V +AMP
2230 4m7
2232 3300u
3200 33K
-38V -AMP
2231 4m7
2233 3300u
3202 33K
7200
BD438
-46V
-33.4V -Vkk
-34V
2205 0u47
3203 3K9
3205 680R
6204 BZX79-C33
3201
4R7
6227
1N4003
2207 100u
2208 100u
6200 1N4148
3223 4K7
5.3V PWR_DWN
2201 4n7
6201 BZX79-F8V2
6229 1N4148
3207 4K7
9201
OZ
1208
MAINS_2
3218 10K
7205
BC337-40
0V
BZX79-B2V7
6224
0.7V
+D2
6212
1N4148
10.2V
2228 22u
6228 1N4148
3217 2K2
4.7V
0V
LOW_PWR_CTRL
12V_RELAIS
6211
1N4148
1207
T2A
19372
10.9V
+D2
2212 6m8
2209 100n
6206 1N5392
6207 1N5392
6209 1N5392
6210 1N5392
2210 100n
2211 3m3
22.9V +D
1209
T2A
19372
2225
100n
12V_RELAIS
1210
5V6_ECO 5.6V
LOW_PWR_CTRL
NTC
PWR_DWN 5.3V
F2
F1
-Vkk -33.4V
FROM / TO COMBI
1N4003
6213
1N4003
6217
MAINS_1
2214 220n
2222 470n
5202
1mH
2220
47n
2218 22n
41V
5203
1mH
MAINS_2
6225
1N4003
6226
1N4003
7203
BD438
3222
680R
3215 100R
3211 330R
6223 BZX79-C39
3220 330R
38V
2213 100u
3212 4M7
3221
330R
2223
100n
7206
BC547B
2215 100n
BC557B
7204
19V
3219 100K
2224
10n
6219 1N4148
5204
3A1631N
2226
100n
1N4148
6215
1N4148
6216
13.3V
3213 470R
1N4148
6220
5V6_ECO
5.6V
6221 1N4148
2216 10u
6222 BZX79-C5V6
2217 220u
2219 2n2
0201
+AMP +38V
+AMP +38V
-AMP -38V
-AMP -38V
+D 22.9V
+D2 10.9V
TO COMBI
xxV PLAY MODE
xxV ECO STANDBY MODE
xxV measured with a " not grounded multimeter "
MC-77 Mains Board Circuit Diagram 2002 04 10

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

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

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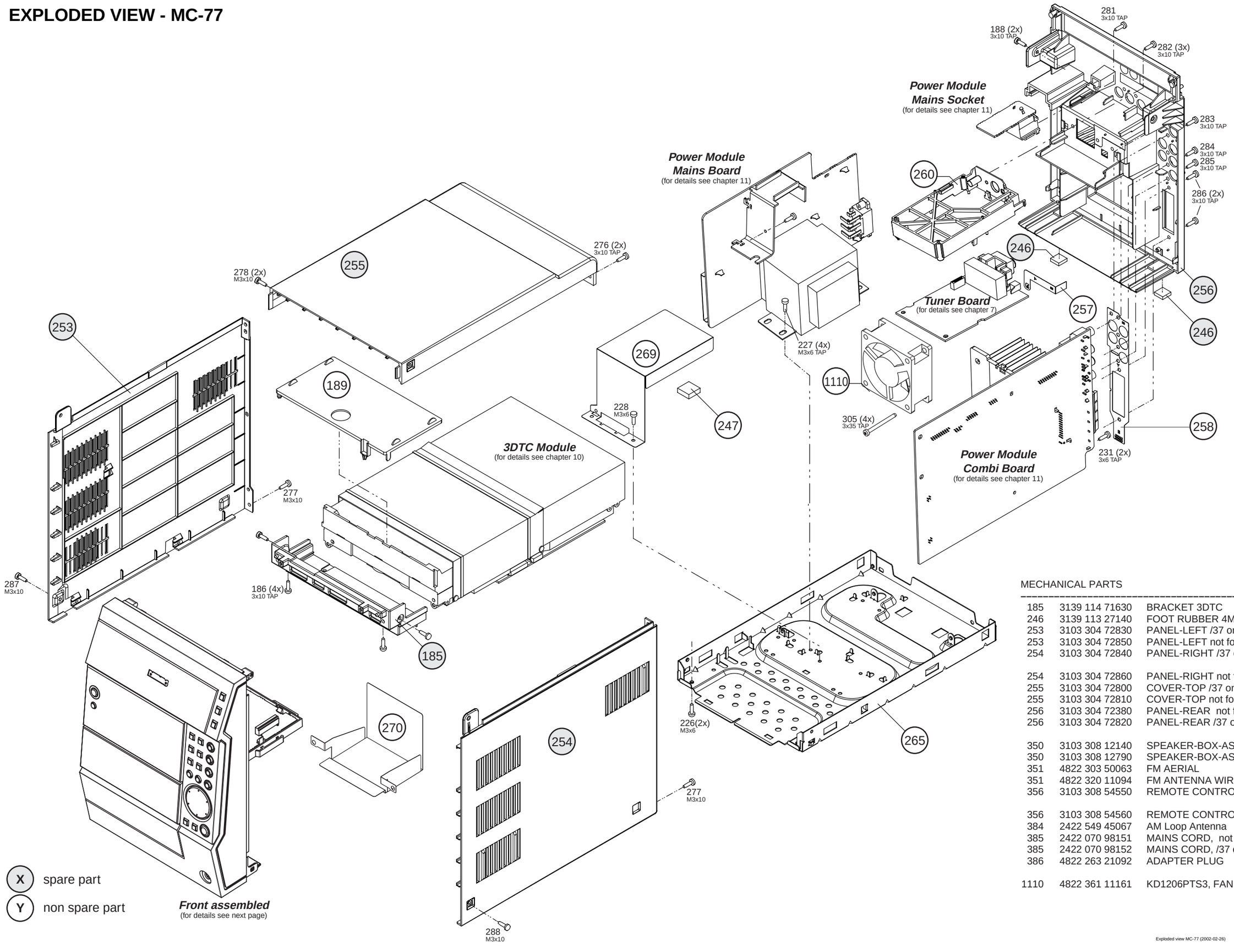
EXPLODED VIEW - MC-77



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

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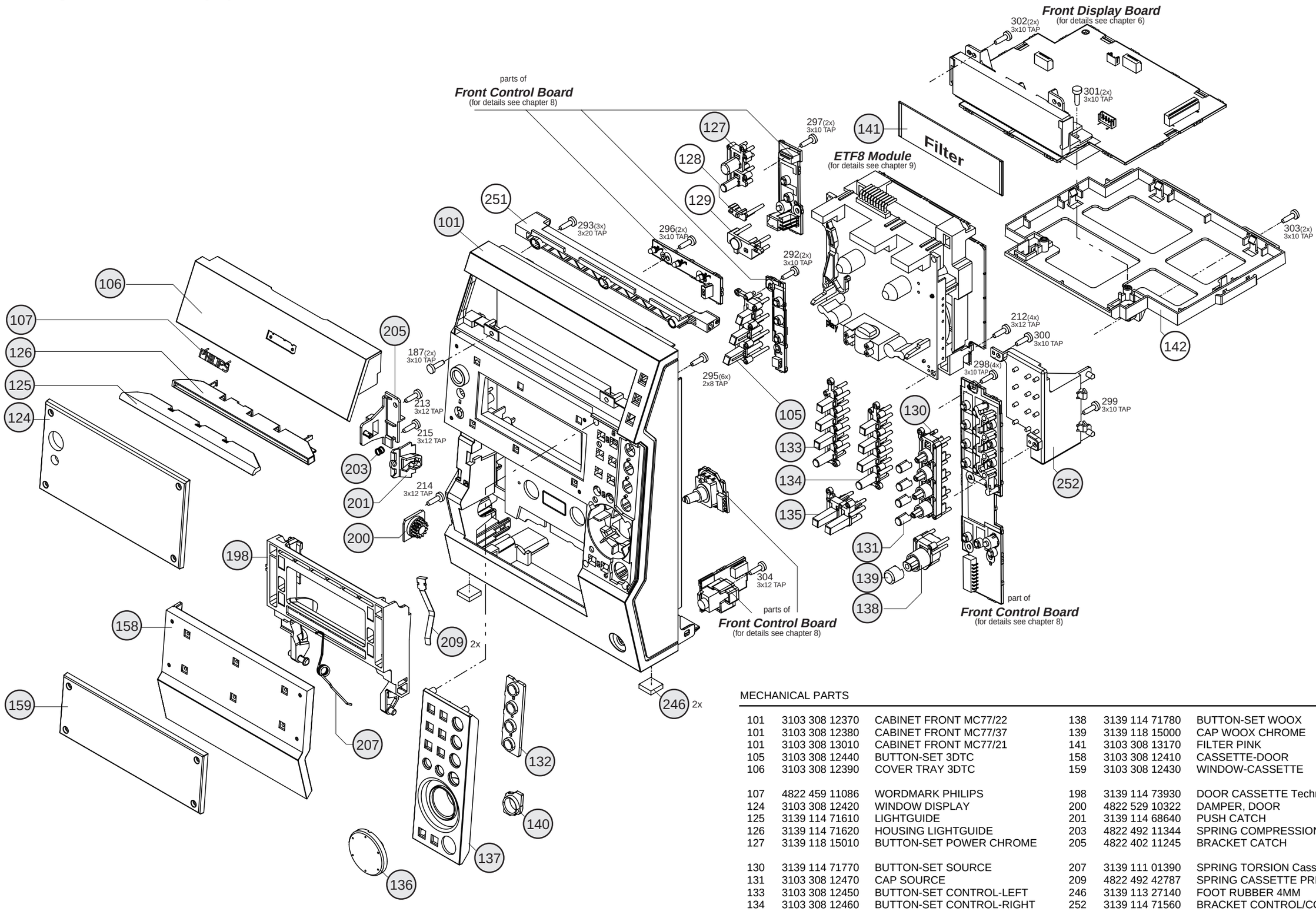
EXPLODED VIEW - Front



X spare part

Y non spare part

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			

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