CDR Mini System

FW-R7/17/21/22

Service
Service
Service

Service Manual

SERVICING

For servicing FW-R7, the set can be divided into two parts:
1. Except for the CD-R/W module the set has to be repaired on component level.
2. The **CD-R/W module** will be **exchanged completely** in case of a failure.
   The defective CD-R/W module has to be returned for central repair.

Available circuit descriptions: *The Basics of Compact Disc Recordable/Rewritable* **4822 725 25242**
3rd generation Compact Disc Recording **3104 125 40100**

Table of Contents

CLASS 1
LASER PRODUCT

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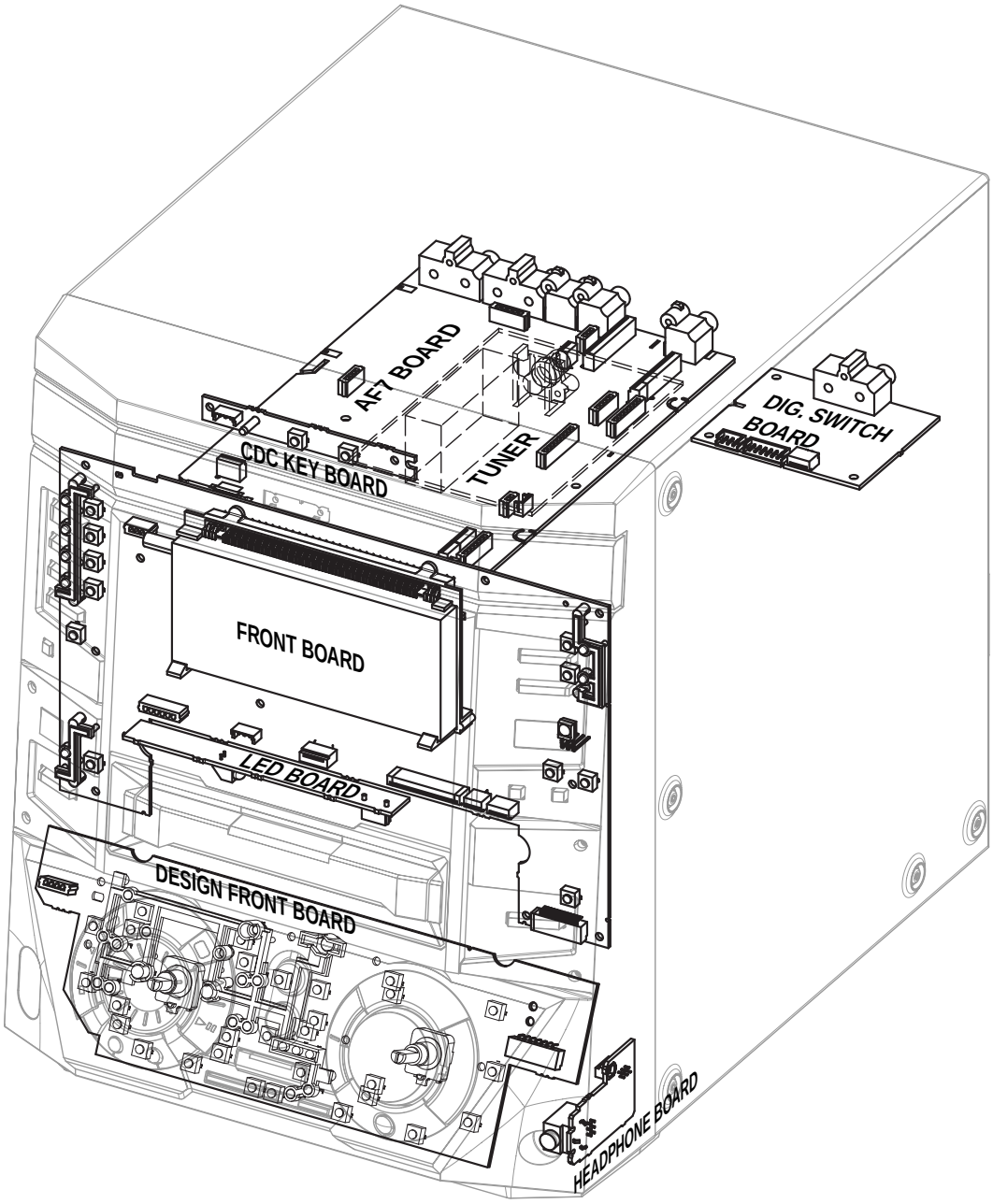
GB 3103 785 25050

PHILIPS

Location of Printed Circuit Boards



Location of PCB R7 2000 02 14

Technical Specification

General:

Mains voltage	: 120 / 240V switchable (for /21)
	: 230V (for /22)
	: 120V (for /37)
Mains frequency	: 50 ~ 60Hz
Power consumption	: 76W at 1/8 P_{RATED}
	: 175W at max output
	: ≤15W at Stand by
	: ≤2W at ECO Stand by

Tuner:

FM

Tuning range	: 87.5MHz - 108MHz
Grid	: 100kHz
IF	: 10.7MHz
Aerial input	: 75Ω
Sensitivity Mono	: < 7µV (26dB S/N)
d (RF=1mV,Δf=75kHz)	: 3% - typ. 2%
IF rejection	: > 60dB
Image rejection	: > 25dB
-3dB Limiting Point	: < 23.5dBf

MW

Tuning range	: 531kHz - 1062kHz
Grid	: 9kHz
IF	: 450kHz ±1kHz
Sensitivity at 26dB S/N	: < 4.0mV/m
d (RF=50mV,m=80%)	: < 5% - typ. 3%
IF rejection	: > 45dB
Image rejection	: > 28dB

Amplifier:

Output power	: 2 x 50W at 6Ω
Headphone	: 3.5mm stereo jack
Frequency response	: 20Hz - 20kHz (-3dB) Limit
Equalizer	: Digital Sound Control

Input sensitivity

Aux/Line	: 500mV ±2dB

CDC unit:

Frequency response within	: 20Hz - 20kHz at ±3dB
Signal/Noise ratio	: > 94dB (A-weighted)
Distortion at 1kHz,0dB	: -90dB
Channel unbalance	: < 0.3dB
Channel crosstalk at 1kHz	: -60dB
De-emphasis	: 0 or 15/50 µS

Laser

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

CDR unit:

CD Playback:

Frequency response within	: 20Hz - 20kHz at ±3dB
Signal/Noise ratio	: > 90dB (A-weighted)
Distortion at 1kHz,0dB	: -80dB
Channel unbalance	: < 1dB
Channel crosstalk at 1kHz	: -60dB
De-emphasis	: 0 or 15/50 µS

Analog recording - digital playback:

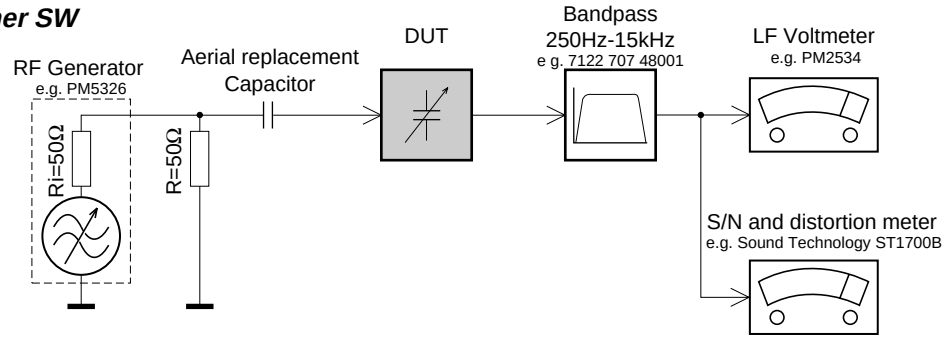
Frequency response within	: 20Hz - 20kHz at ±3dB
Signal/Noise ratio	: > 84dB (A-weighted)
Distortion at 1kHz,0dB	: -77dB
Channel unbalance	: < 1dB
Channel crosstalk at 1kHz	: -60dB
De-emphasis	: 0 or 15/50 µS

Laser

Output power	: ≤1mW during reading
	: ≤20mW during writing
	Laser class 3B
Wave length	: 780nm ±20nm

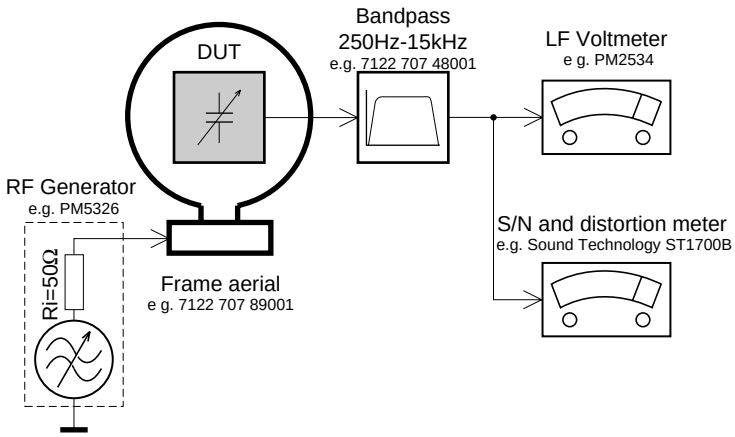
Measurement Setup

Tuner SW



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

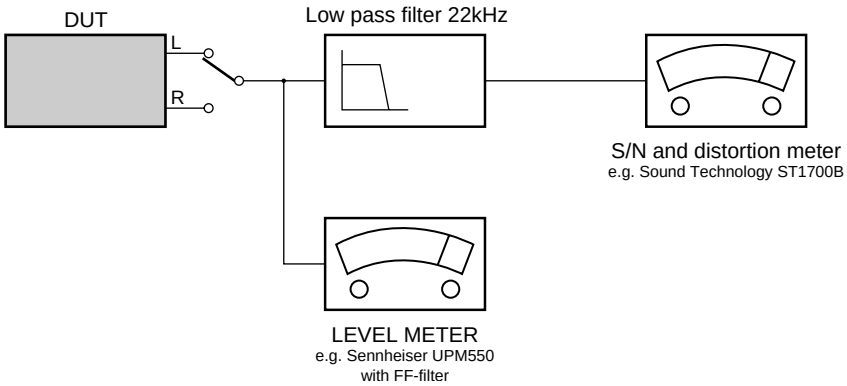
Tuner AM (MW,LW)



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)
L.P.F. = 13 th order filter 4822 395 30204



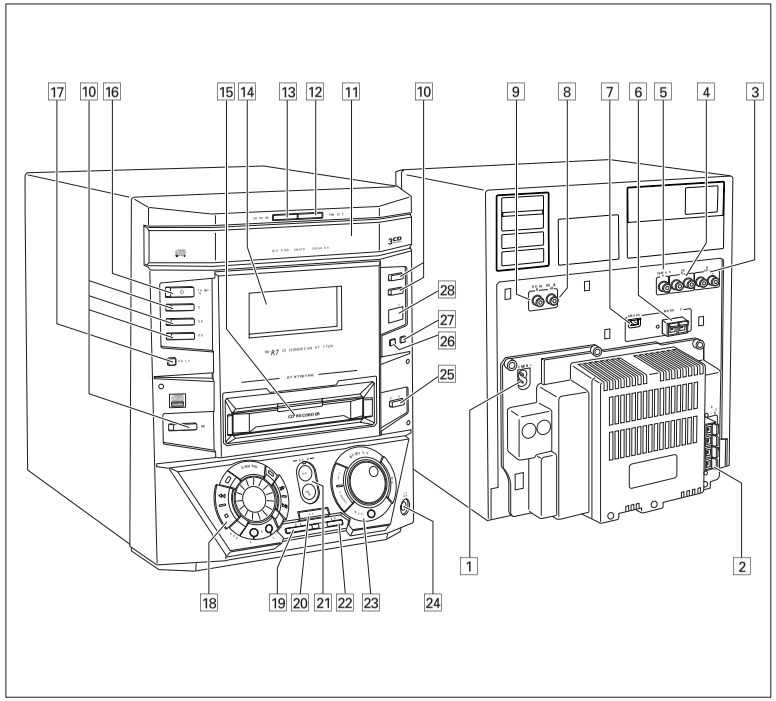
RC5 Codes

Remote control key	*System Code*	*Command Code*	*Remote control key*	*System Code*	*Command Code*
Standby	17,20, 21, 26	12	ALARM	16	89
CD1	20	55	SLEEP	16	38
CD2	20	56	BRIGHTNESS	16	71
CD3	20	57	REPEAT	20, 26	29
CDR	26	63	SHUFFLE	20, 26	28
Tuner	17	63	TRACK INCREMENT	26	114
Aux	21	63	VOLUME +	16	16
1(ABC)	17,20, 21, 26	01	VOLUME -	16	17
2 (DEF)	17,20, 21, 26	02	►	20, 26	53
3 (GHI)	17,20, 21, 26	03	▮▮	20, 26	48
4 (JKL)	17,20, 21, 26	04	⏮	17,20, 21, 26	33
5 (MN)	17,20, 21, 26	05	⏭	17,20, 21, 26	32
6 (OPQ)	17,20, 21, 26	06	◄◄ **CD, CDR MODE**	20, 26	50
7 (RST)	17,20, 21, 26	07	◄◄ **AUX, TUNER MODE**	17, 21	31
8 (UVW)	17,20, 21, 26	08	►► **CD, CDR MODE**	20, 26	52
9 (XYZ)	17,20, 21, 26	09	►► **AUX, TUNER MODE**	17, 21	30
0 (Space)	17,20, 21, 26	00	■	20, 26	54
YES	17,20, 21, 26	87	INCREDIBLE SURROUND	16	64
NO	17,20, 21, 26	49	PURE	16	52
EDIT (TEXT)	17,20, 21, 26	82	LOUDNESS	16	50
PROGRAM	20, 26	36	BALANCE L	16	27
PROGRAM **TUNER MODE**	17	122	BALANCE R	16	26
MUTE	16	13			

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



On the back

1 **AC MAINS ~** ..... ***After all other connections have been made***, connect the power cord to the power outlet. ***For optimal performance use only the original power cable.***

2 **SPEAKERS 6 Ω FRONT L/R** ... connect to the supplied speakers

3 **LINE OUT L/R** ..... connect to the analog audio input of an additional appliance

4 **AUX IN L/R** ..... connect to the analog audio output of an additional appliance

5 **SUBWOOFER OUT** ..... connect to the input of a subwoofer

6 **FM AERIAL 300 Ω** ..... connect the supplied wire antenna here

7 **AM AERIAL** ..... connect the supplied loop antenna here

8 **DIGITAL OUT** ..... connect to the coaxial input of a digital appliance

9 **DIGITAL IN** ..... connect to the coaxial output of a digital appliance

On the front

10 **Source selection**
- **CD 1, CD 2, CD 3** ..... selects the CD changer, switches to CD 1, CD 2 or CD 3
- **CDR** ..... selects the CD recorder
- **TUNER** ..... selects the tuner
- **DIGITAL / ANALOG AUX** .... selects the input for an additional appliance

11 ..... CD changer tray

12 **OPEN/CLOSE** ..... opens and closes the CD changer tray

13 **CD CHANGE** ..... selects the next disc tray

14 ..... display

15 **CD RECORDER** ..... CD recorder tray

16 ⏻ **STANDBY ON** ..... switches the unit on and to standby

17 **DISPLAY** ..... selects display information/text

18 **Multiple function control**

Rotary control:

JOG CONTROL ..... CDC, CDR: selects the previous/next track
TUNER: selects the previous/next preset tuner station

Keys to press:

YES ..... confirms a selection

▷▷ **SEARCH** ..... CDC, CDR: searches forward, reviews the tracks in a program, controls the cursor in different menus
TUNER: tunes to a higher radio frequency

PLAY/PAUSE ▷▯▯ ..... starts and interrupts playback/recording

PROG ..... opens/closes the program menu

EDIT TEXT ..... enters/exits the text edit menu

EDIT TRACK ..... enters/exits the track edit menu

REC LEVEL ..... enables the rotary control to adjust the level for recordings

STOP □ ..... stops CD play/record, closes program memory

◁◁ **SEARCH** ..... CDC, CDR: searches backward, reviews the tracks in a program, controls the cursor in different menus
TUNER: tunes to a lower radio frequency

NO ..... cancels a selection

19 **FINALIZE** ..... finalizes and unfinalizes recordings

20 **REC TYPE** ..... enters/exits the recording menu

21 **RECORD**
- **CD→CD** ..... selects high speed recording and automatic finalizing of current CD
- **COMPILE CD** ..... selects high speed recording and automatic finalizing of current program

22 **ERASE** ..... erases recordings

23 **Sound control**
- **MASTER VOLUME** ..... adjusts the volume
- **DSC** ..... **D**IGITAL **S**OUND **C**ONTROL selects sound characteristics
- **INCREDIBLE SURROUND** .. creates an incredibly wide stereo effect
- **LOUDNESS** ..... boosts treble and bass
- **PURE** ..... switches DSC settings on/off

24 🎧 ..... 3.5 mm headphone jack
Note: Connecting the headphones will switch off the speakers.

25 **OPEN/CLOSE** ..... opens and closes the CD recorder tray

26 **CD TEXT** ..... switches through CD text information

27 **CLOCK/TIMER** ..... selects the clock function, activates and deactivates the timer

28 **iR SENSOR** ..... sensor for the infrared remote control

Note: You will recognize that various keys will be illuminated on the unit depending on the different modes or programs you are in. This is for your guidance in order to facilitate the finding of the relevant keys for selection.

English

Power

The type plate is located on the rear of the unit.

1 Check whether the power voltage as shown on the type plate corresponds to your local power voltage. If it does not, consult your dealer or service organization.

2 ***Make sure all connections have been made before switching on the power supply.***

3 Connect the supplied power cable to AC MAINS ~ and to the power outlet. This switches on the power supply.

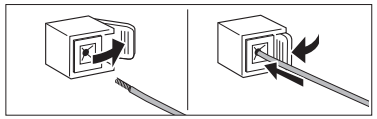
For optimal performance use only the original power cable.

When the unit is switched to standby, it is still consuming some power. To disconnect the unit from the power completely, remove the power cable from the power outlet.

To avoid overheating of the set, a safety circuit has been built in. Therefore, your unit may disconnect under extreme conditions. If this happens, switch the unit off and let it cool down before reusing it.

Speaker connections

The speaker connections are click-fit connectors. Use them as shown below.



1 Connect the colored (or marked) wire to the red terminal and the black (or unmarked) wire to the black terminal.

2 Connect:
– Left speaker to L (red and black)
– Right speaker to R (red and black)

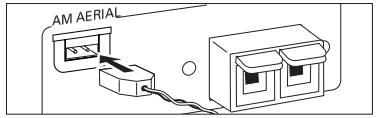
Antenna connections

AM antenna
The supplied loop antenna is for indoor use only.

1 Fit the plug of the loop antenna to AM AERIAL as shown below.

2 Position the antenna as far as possible from a TV, VCR or other radiation sources.

3 Turn the antenna for optimum reception.



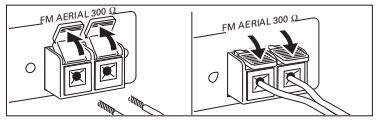
FM antenna
The supplied wire antenna can only be used to receive nearby stations. For better reception we recommend using a cable antenna system or an outdoor antenna.

1 Open the FM AERIAL 300 Ω click-fits by pushing the lever down as shown below.

2 Insert each wire of the antenna into one hole.

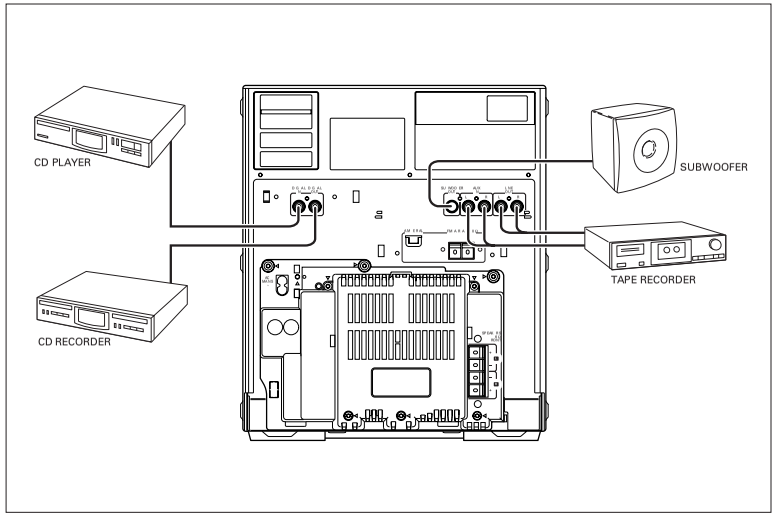
3 Close the click-fits using the lever.

4 Move the antenna in different positions for optimum reception.



The unit complies with the FCC-Rules, Part 15 and with 21 CFR 1040.10. Operation is subject to the following two conditions:
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

English



Analog audio connections

AUX IN L/R
It is possible to use an additional appliance, e.g. tape recorder, TV or VCR, with the unit.

1 Insert the red plug of a cinch cable to the red jack AUX IN R and insert the white plug to the white jack AUX IN L.

2 Connect the other end of the cinch cable to the audio outputs of the additional appliance.

3 Press DIGITAL / ANALOG AUX repeatedly to select the analog input for the appliance.
→►AUX Analog is displayed.

4 Operate your appliance as usual and adjust volume and sound with the unit.

Note: It is not possible to connect a turntable directly to AUX IN L/R. *If you wish to use a turntable with the unit, you have to connect an amplifier to* AUX IN L/R *on the unit. Then connect the turntable to the amplifier.*

LINE OUT L/R
You can use these outputs for playback or recording on any analog audio equipment e.g. amplifier or tape recorder.

• Use a cinch cable to connect the analog audio inputs of the additional appliance with LINE OUT L/R on the unit and operate your appliance as usual.

Digital audio connections

DIGITAL IN
You can use this coaxial input for recordings from any digital audio equipment with a digital coaxial output e.g. CD player or DVD player.

1 Use a coaxial cable to connect the coaxial output of the additional appliance with DIGITAL IN on the unit.

2 Press DIGITAL / ANALOG AUX repeatedly to select the digital input for the appliance.
→►AUX Digital is displayed.

3 Operate your appliance as usual.

DIGITAL OUT
You can use this coaxial output for recordings on any digital audio equipment with a digital coaxial input e.g. CD recorder.

• Use a coaxial cable to connect the coaxial input of the additional appliance with DIGITAL OUT on the unit and operate your appliance as usual.

Connecting a subwoofer

A subwoofer can be used to enhance the bass performance of your unit dramatically.

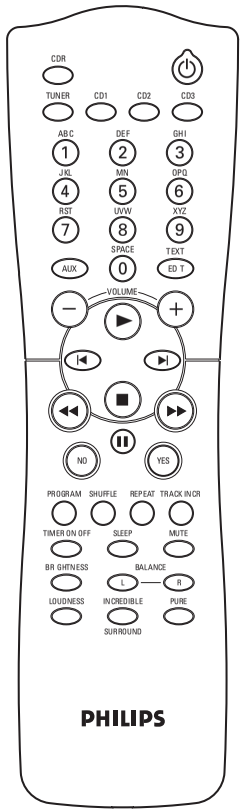
1 Use a cinch cable to connect the input of the subwoofer with SUBWOOFER OUT at the unit.

2 Follow the instructions supplied with the subwoofer.

Remote control buttons

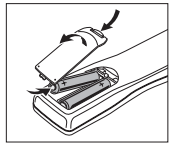
⏻ .....switches the unit to standby
CDR, TUNER, CD1,
CD2, CD3, AUX.....selects the sources
Number/alphabet keys
1–0.....keys in numbers for tracks or stations
ABC – XYZ .....keys in letters for text
SPACE .....keys in a space within the text
EDIT TEXT.....enters the text edit menu
– VOLUME.....decreases the volume
+ VOLUME.....increases the volume
▶ .....starts playback/recording
⏮ .....CDC, CDR: selects the previous track
TUNER: selects the previous preset tuner station
⏭ .....CDC, CDR: selects the next track
TUNER: selects the next preset tuner station
■ .....stops CD play/recording, closes program memory
▶▶ .....CDC, CDR: searches forward, reviews the tracks in a program, controls the cursor in different menus
TUNER: tunes to a higher radio frequency
◀◀ .....CDC, CDR: searches backward, reviews the tracks in a program, controls the cursor in different menus
TUNER: tunes to a lower radio frequency
⏸ .....interrupts playback/recording
YES.....selects a selection
NO .....cancels a selection
PROGRAM .....opens/closes the program menu
SHUFFLE.....plays tracks in random order
REPEAT .....repeats a track, the entire CD(RW) or the program
TRACK INCR. .....selects automatic or manual increment of a track
TIMER ON/OFF .....activates and deactivates the timer
SLEEP.....activates the sleep timer
MUTE.....mutes the sound
BRIGHTNESS .....controls the brightness of the display
L BALANCE.....adjusts the volume balance to the left speaker
R BALANCE .....adjusts the volume balance to the right speaker
LOUDNESS .....boosts treble and bass
INCREDIBLE
SURROUND .....creates an incredibly wide stereo effect
PURE.....switches DSC settings on/off

Note: Always press the source key of the source you wish to control (e.g. CD1*) before selecting the desired function key (e.g.* SHUFFLE*).*



Remote control batteries

Open the battery compartment of the remote control and insert 2 alkaline batteries, type **AA** (R06, UM-3).



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

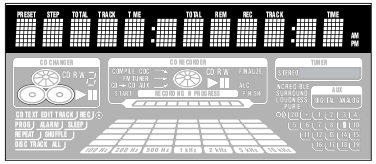
Remove batteries if they are dead or if the remote control is not to be used for a long time.

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

Display

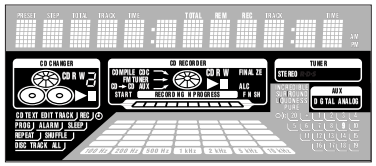
The display of the unit is divided into 3 sections, which show you the following:

Information area



This area is used for feedback of the CD changer, CD recorder, tuner frequencies, menu options, values and scrolling text messages.

Status lights and flags



Flags
CD TEXT.....CD text is available
CD TEXT EDIT.....text edit menu is active
EDIT TRACK.....track edit menu is active
REC ◴.....record timer is selected
PROG.....program menu is active
◴.....clock is selected
ALARM ◴.....alarm timer is selected
SLEEP.....sleep timer is selected
REPEAT DISC.....selected disc is played repeatedly
REPEAT TRACK.....current track is played repeatedly
REPEAT ALL.....all discs in the CD changer (or the program) are (is) played repeatedly
SHUFFLE.....either all tracks of the program or of the loaded disc(s) in the CD changer or CD recorder are played in random order

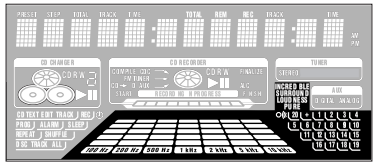
CD Changer
.....number of disc trays loaded
▶.....playback is activated
⏸.....playback is interrupted
CD 1, 2, 3.....disc tray 1, 2 or 3 is selected and loaded with a pre-recorded CD, finalized CDR or CDRW
CD R 1, 2, 3.....disc tray 1, 2 or 3 is selected and loaded with an unfinalized CDR
CD RW 1, 2, 3.....disc tray 1, 2 or 3 is selected and loaded with an unfinalized CDRW

CD Recorder
COMPILE CDC .....current program is being recorded with high speed dubbing and auto finalize
FM TUNER .....FM station is being recorded
CD→CD .....current disc is being recorded with high speed dubbing and auto finalize
AUX .....material from an external source is being recorded
▶.....playback is activated
⏸.....playback is interrupted
RECORDING IN PROGRESS..recording in progress
.....status of recording progress is shown
CD.....pre-recorded CD, finalized CDR or CDRW inserted
CD R.....unfinalized CDR inserted
CD RW.....unfinalized CDRW inserted
FINALIZE.....(un)finalizing will start
ALC.....auto level control is active

Tuner
STEREO.....FM station is being received in stereo

AUX
DIGITAL.....digital input in use for external source
ANALOG.....analog input in use for external source

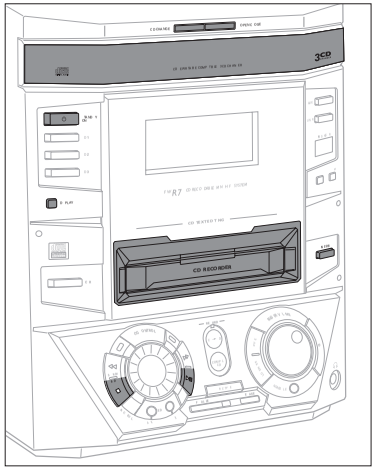
Music calendar, sound lights and remote control



INCREDIBLE SURROUND....Incredible Surround is active
LOUDNESS.....Loudness is active
PURE.....DSC settings are switched off
.....command from remote control is being received

Music calendar
1–20.....CDC, CDR: actual track number played, number of tracks on a disc/program
TUNER: preset number of tuned station
+.....CDC, CDR: disc or program contains more than 20 tracks
TUNER: more than 20 radio stations are stored
.....spectrum analyzer

English



Switching on, switching to standby

- **To switch the unit on** press ⏻ STANDBY ON on the unit.

- **To switch the unit to standby** press ⏻ STANDBY ON again on the unit (⏻ on the remote control).

Loading the CD changer, CD recorder

Important!

1) This system is designed for regular CD(RW)s. Therefore, do not use any accessories such as disc stabilizer rings or CD treatment sheets, etc. as offered on the market, because they may cause jamming of the changer mechanism.

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

1 ***CD changer:***
Press OPEN/CLOSE on the unit to open the CD changer tray.
→►`Open CDC` is displayed and the tray is opened.

CD recorder:
Press OPEN/CLOSE on the unit to open the CD recorder tray.
→►`Open CDR` is displayed and the tray is opened.

2 ***CD changer:***
You can load up to three discs in the CD changer for continuous playback without interruption. Insert an audio disc (printed side up) in the right disc tray.
- You can load another disc in the left disc tray.
- To insert a third audio disc, press CD CHANGE on the unit.
  →►The CD carousel will rotate until the empty disc tray is at the right hand side.

CD recorder:
Insert an audio disc (printed side up) in the tray.

3 ***CD changer:***
Press OPEN/CLOSE on the unit again to close the tray.
→►The tray is closed and `Reading` is displayed.
→►If an unfinalized disc is inserted, `Initializing` will be displayed.
→►CD, the disc tray number, the total number of tracks and the total playing time of the disc in the last selected disc tray are displayed. The track numbers light up in the music calendar.

CD recorder:
Press OPEN/CLOSE on the unit again to close the tray.
→►The tray is closed and `Reading` is displayed.
→►If an unfinalized disc is inserted, `Initializing` will be displayed.
→►CDR, the total number of tracks and the total playing time of the disc are displayed. The track numbers light up in the music calendar.

Playing a CD(RW)

1 Press PLAY/PAUSE ▷▯▯ (▶ on the remote control) to start playback.
CD changer:
→►CD, the disc tray number, the current track number and elapsed playing time are displayed. The current track number is also blinking in the music calendar.
CD recorder:
→►CDR, the current track number and elapsed playing time are displayed. The current track number is also blinking in the music calendar.

- To switch through the following information, repeatedly press DISPLAY on the unit:
  →►Track number, remaining playing time of current track
  →►Track number, remaining playing time of disc
  →►Track number, actual playing time of current track

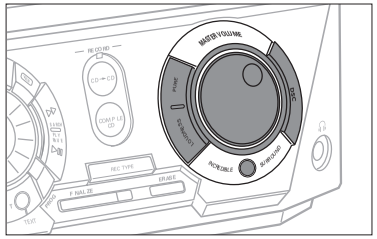
2 Press STOP □ (■ on the remote control) to stop playback.
CD changer:
→►CD, the disc tray number, the total number of tracks and the total playing time of the disc are displayed.
CD recorder:
→►CDR, the total number of tracks and the total playing time of the disc are displayed.

- To switch through the following information, repeatedly press DISPLAY on the unit:
  →►Total number of tracks, total playing time of disc
  →►CD text is displayed.

- You can interrupt playback by pressing PLAY/PAUSE ▷▯▯ (▮▮ on the remote control).
  →►The time where playback was interrupted is blinking.

- To resume playback press PLAY/PAUSE ▷▯▯ (▶ on the remote control) again.

English



Sound control

Volume adjustment
- Adjust the volume by using MASTER VOLUME (— VOLUME/ + on the remote control).
  →►The volume level in dB (decibel) is displayed.

DSC
Digital **S**ound **C**ontrol enables you to select different preset sound settings.
- Press DSC repeatedly to select the desired sound characteristics.
  →►`Optimal`, `Jazz`, `Classic`, `Rock`, `Vocal`, `Techno`.

Incredible Surround
Stereo sound is determined by the distance between the front speakers. Incredible Surround enables you to enjoy an incredibly wide stereo effect, regardless of the speakers' distance.

- Press INCREDIBLE SURROUND (INCREDIBLE SURROUND on the remote control) to switch the surround sound effect either on or off.
  →►**INCREDIBLE SURROUND** is shown and `Incredible Surround` is displayed if the surround sound effect is on.

Note: The effect of Incredible Surround may vary with different types of music.

PURE
- Press PURE repeatedly to switch the DSC settings either on or off.
  →►**PURE** is shown and `Pure` is displayed if the DSC settings are switched off.

LOUDNESS
- Press LOUDNESS to switch loudness either on or off.
  →►**LOUDNESS** is shown and `Loudness` is displayed if loudness is on.

MUTE
This feature allows you to temporarily switch off the sound without switching off the unit.
1 Press MUTE on the remote control to switch off the sound.
→►`Mute` is displayed and playback/recording will be continued without sound.

2 Press MUTE on the remote control again to switch on the sound again.

Speaker balance
It is possible to adjust the relative volume balance between the connected front speakers.

- Press L BALANCE or R BALANCE on the remote control to adjust the relative volume of the left or right front speaker.
  →►`Balance L` (or R) and the actual volume of the left (or right) front speaker are displayed.
  →►When the volume of both speakers is balanced, `Balance L=R` is displayed.

Demo mode

The demo mode displays various features of the unit and will start automatically.

- *If any source key is pressed:*
  →►The unit switches to the selected source.
  If ⏻ STANDBY ON *is pressed:*
  →►The unit switches to standby. After a few seconds, the demonstration will start again.

Cancelling the demo mode
- Keep STOP □ on the unit pressed for at least 3 seconds to cancel the demo mode.
  →►The demo mode is cancelled permanently. The unit switches to standby. A few seconds later the unit switches to an economy power save mode.

Selecting a disc on the CD changer

• Press either CD 1, CD 2 or CD 3 to select a particular disc.

Selecting a track and searching

Selecting a track during playback

• Rotate JOG CONTROL (press ⏮ or ⏭ on the remote control) to skip to the beginning of the previous or next track on the selected disc.
–►Playback continues with the selected track.

Selecting a track when playback is stopped

1 Rotate JOG CONTROL (press ⏮ or ⏭ on the remote control) to skip to the required track number.

2 Press PLAY/PAUSE ▷▯▯ (▶ on the remote control) to start playback.
–►Playback starts with the selected track.

Note: Instead of using ⏮ or ⏭ on the remote control, you can also directly key in the required track number by using the numerical keys. For 2-digit numbers, press the keys in rapid succession.

Searching for a passage during playback

1 Keep ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control) pressed to find a particular passage in a backward or forward direction.
–►Searching is started and playback continues at a low volume. After 3 seconds, the search speeds up with volume muted.

2 Release the key at the desired passage.
–►Normal playback continues.

Note: During SHUFFLE, *while repeating a track or while playing a program, searching is only possible within the current track.*

SHUFFLE and REPEAT

Repeating a track, the disc or the program

1 Repeatedly press REPEAT on the remote control during playback to select either:
–►**REPEAT TRACK**: The current track is played repeatedly.
–►**REPEAT DISC**: The entire selected disc is played repeatedly.
–►**REPEAT ALL**: All discs in the CD changer (or the program) are (is) played repeatedly.

2 Playback starts in the chosen mode.

3 To return to normal playback, press REPEAT on the remote control until the display indication disappears.

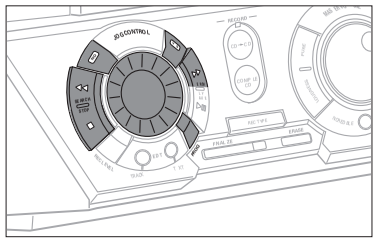
Note: **REPEAT DISC** *is not possible during* SHUFFLE *or while playing a program.*

Playing tracks in random order

1 Press SHUFFLE on the remote control during playback.
–►**SHUFFLE** is shown and either all tracks of the program or of the loaded disc(s) in the CD changer or CD recorder are played in random order.

2 To return to normal playback, press SHUFFLE again.

CD text



Programming track numbers

You can select tracks and store them either in the CD changer or CD recorder memory. If you use the program for playback you can choose one of the two memories, else if you like to specify tracks for recording, use the CD changer memory only! You can store any track more than once.

1 Load the desired disc(s) in the disc tray(s).

2 Press either CD 1, CD 2, CD 3, or CDR to select the disc.

3 Press PROG on the unit (PROGRAM on the remote control).
–►**PROG** starts blinking and `Program` is displayed.

4 ***If either CD 1, CD 2 or CD 3 is selected:***
Rotate JOG CONTROL to select either:
–►`CD1 (or 2, 3) All`: All tracks of CD 1 (or 2, 3) will be programmed.
–►`CD1 (or 2, 3)` and track number: The track number of CD 1 (or 2, 3) will be programmed.

If CDR is selected:
Rotate JOG CONTROL (press the numerical keys on the remote control; for 2-digit numbers, press the keys in rapid succession) to select a track number.

5 Press YES to store your selection in the memory.
–►The number of programmed tracks (**STEP**), `Prog` and the total program time are displayed. The track number blinks in the music calendar.

6 Select and store all desired tracks in this way.

7 Press PROG on the unit (PROGRAM on the remote control) to end programming.
–►**PROG** stays shown and the program is currently available.

Note: If the maximum number of programmable tracks is reached, the display shows `Program full`.

Erasing a track from the program

1 If necessary, press STOP □ on the unit (■ on the remote control) to stop playback.

2 Press either CD 1, CD 2, CD 3, or CDR to select the desired memory.

3 Press PROG (PROGRAM on the remote control), followed by ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control) to move through the program steps.
–►The track number at the selected step and the total program time are displayed.

4 Press NO to remove the track from the program.
–►`Cleared` is displayed briefly.
–►The next programmed track number will move up to this position and is displayed together with the step number and the remaining total program time.

Clearing the program

1 If necessary, press STOP □ on the unit (■ on the remote control) to stop playback.

2 Press NO.
–►`Clear Prog?` is displayed.

3 Press YES to clear the program.
–►`Prog Cleared` will be displayed and **PROG** goes off.

Note: When you open the CD recorder tray or the CD changer tray the respective program will be cleared.

Making a program for recording

1 Select and store all desired tracks in the CD changer memory (see "Programming track numbers").

2 Enter the recording menu (see "Internal recording").

• If the total time of the program is of larger size than the remaining recording time of the CDR(W):
–►`Not fitting!` will be displayed briefly, followed by the remaining recording time and `Record Prog?`
If you nevertheless start recording, only those tracks of the program that fit onto the CDR(W) will be recorded in entirety.

• To change the program, press NO.
–►`Edit Program` will be displayed briefly, **PROG** and the time of the program start blinking. Now you can change the program (see "Programming track numbers", "Erasing a track from the program" and "Clearing the program").

Basic information

The CD recorder deck offers you 3 main functions:
- **Recording** from the internal CD changer and tuner or from a selected external source
- **Finalizing** your CDR(W) discs and **unfinalizing** your CDRW discs
- **Erasing** a CDRW disc

The recording procedure is the same for CDR and CDRW discs. ***Make sure the CDR(W) is absolutely free of scratches and dust particles.***

For recordings, the minimum track length is 4 seconds. You can record up to a maximum of 99 tracks on a disc. The minimum of recording time left on the disc is 7 seconds. Otherwise `Does not fit` is displayed and you cannot enter the record standby mode.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
- *play a recorded CDR on a standard CD player or*
- *play a recorded CDRW on a CDRW compatible CD player and CD recorder.*

Copyright protection

The **S**erial **C**opy **M**anagement **S**ystem (SCMS) prevents the making of a digital copy from a digital copy. The system allows making a digital recording from the original, however in some countries this may require the authorization of copyright holders.

When you try to record copy protected material from an external source, `Copy Protect` will be displayed. No further digital recording is possible then.

When you try to record copy protected material from the internal CD changer, no digital recording is possible, however the CD recorder will automatically switch to analog recording.

Recording CD text

If the original CD has CD Text, this text will be recorded automatically, provided that the CD text is not copy protected. In that case, recording of CD text will not be possible and `Text Protect` will be displayed.

Direct Line Recording (DLR)

The CD recorder is equipped with the high-performance **D**irect **L**ine **R**ecording technique. It ensures a perfect recording of the source material, meaning a true "bit for bit" recording. DLR will always become active when you make normal recordings in listen mode.

Auto Level Control (ALC)

Auto **L**evel **C**ontrol ensures that the tracks on the recorded disc have a similar volume level. At all times the already recorded tracks of the CDR(W) disc will be taken as reference for the volume level of the following recordings. ALC is active when **ALC** is shown.

Auto level control becomes active when:
- COMPILE CD is being used,
- a disc, a track or a track edit is being high speed recorded and the CDR(W) has recordings on it,
- a program (consisting from more than one disc) from the CD changer is being high speed recorded, or
- CD→CD is being used and the CDR(W) has recordings on it.

Auto level control will not become active when:
- CD→CD is being used and the CDR(W) has no recordings on it,
- making recordings from the FM tuner,
- making recordings from an external source, or
- making normal recordings in listen mode.

REC LEVEL key

You can adjust the reference record level. This is also possible when ALC is active. This feature can be used for fading your recordings in or out.

1 Keep REC LEVEL on the unit pressed to enable the rotary control to adjust the record level.

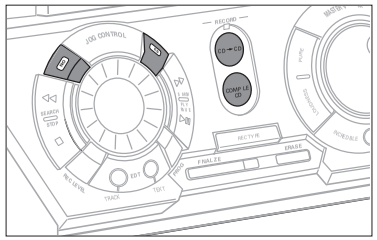
2 Turn the rotary control to the left to adjust the desired record level.
→►The actual record level (in dB) will be displayed.

• The record level is reset after the unit has been switched to standby.

Recording modes

For internal recordings you can record from the internal CD changer or tuner. You can choose from the following recording modes:
- **High speed recording and automatic finalizing: Fast and easy!** Record and finalize your CDR(W) in one quick step while the sound is muted. You can record the current CD or a program from the CD changer.
- **High speed recording:** Record your CDR(W) fast while the sound is muted. You can record an entire CD, a track, a program or a track edit from the CD changer.
- **Normal recording and listening:** Listen to the recording while you are making it. You can record an entire CD, a track, a program or a track edit from the CD changer.
- **Manual recording:** Start and stop your recording manually while listening to it. You can do radio recordings from the FM tuner.

High speed recording and automatic finalizing



High speed recording and automatic finalizing of the current disc

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Press CD→CD on the unit to enter the recording mode.
→►Both decks will be selected in the display, the arrow starts blinking. The remaining recording time of the CDR(W), the total playing time of the source CD and `Record CD1` (or `2`, `3`)`?` are displayed.

3 Press YES to start recording and finalizing.
→►The arrow lights, **RECORDING IN PROGRESS** is shown, high speed recording and finalizing start, and the actual recording time remaining starts to count down.

Note: If a program was already available before pressing CD→CD, *this will be ignored.* **PROG** *goes off and the current disc will be recorded. After finishing the recording,* **PROG** *is shown and the program is available again.*

High speed recording and automatic finalizing (optional) of the current program

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Press COMPILE CD on the unit to enter the record mode.
→►Both decks will be selected in the display, the arrow starts blinking. The remaining recording time of the CDR(W), the total playing time of the source CD and `Record Prog?` are displayed.

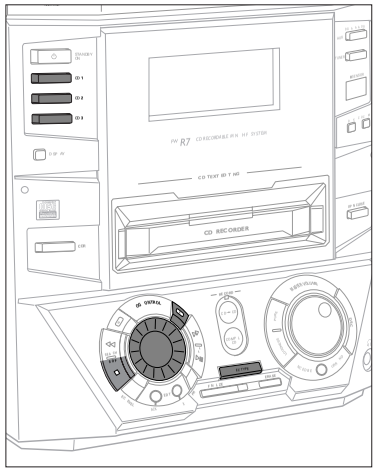
3 Press either:
YES to confirm,
or
NO to change the program.
→►**PROG** starts blinking. Now you can change the program (see "Program") and return to the record mode by pressing COMPILE CD.

4 `Auto Fin?` is displayed.
Press either:
YES, if the CDR(W) is to be finalized after recording,
or
NO, if the CDR(W) is not to be finalized after recording.
→►The arrow lights, **RECORDING IN PROGRESS** is shown, high speed recording and finalizing (if selected) start and the actual recording time remaining starts to count down.

Note: If no program is available and you press COMPILE CD, *you enter immediately into the program menu. Start your programming and return to the record mode by pressing* PROGRAM *or* COMPILE CD.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
- *play a recorded CDR on a standard CD player or*
- *play a recorded CDRW on a CDRW compatible CD player and CD recorder.*



High speed recording

High speed recording of an entire disc, a track, a program or a track edit

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Press either CD 1, CD 2 or CD 3 to select the disc from which you wish to record.

3 Press REC TYPE on the unit to enter into the recording menu.

4 Rotate JOG CONTROL to select one of the following high speed recording modes:

If a disc from the CD changer is selected:

–►`CD Fast?`: for high speed recording of an entire disc
- Continue with step 5.

–►`Track Fast?`: for high speed recording of a track
- Press YES to confirm.
- Rotate JOG CONTROL to select the track.
  –►`Rec Tr` and the track number is displayed.
- Continue with step 6.

If CD changer program mode is available:

–►`Prog Fast?`: for high speed recording of the selected disc or of the program

If CD changer track edit mode is available:

–►`A-B Fast?`: for high speed recording of the A–B track

5 Press YES to confirm your selection.
–►Both decks will be selected in the display, the arrow starts blinking. The remaining recording time of the CDR(W), the total recording time of the CDR(W) and either `Record CD1` (or 2, 3)?, `Record Prog?` or `Record A-B?` is displayed.

Note: When the CDR(W) already contains a recording, ALC will also become active and **ALC** *will be shown.*

6 Press YES to start high speed recording.
–►The arrow lights, **RECORDING IN PROGRESS** is shown, high speed recording starts and the actual recording time remaining starts to count down.

- To stop recording, press STOP □ on the unit.

Normal recording and listening

Normal recording and listening of an entire disc, a track, a program or a track edit

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Follow steps 2 and 3 of "High speed recording".

3 Rotate JOG CONTROL to select one of the following normal record options:

If CD changer is selected:

–►`CD Listen?`: for listening to the entire disc during normal recording

–►`TrackListen?`: for listening to the track during normal recording
- Press YES to confirm.
- Rotate JOG CONTROL to select the desired track.
  –►`Rec Tr` and the track number is displayed.
- Continue with step 6 of "High speed recording".

If CD changer program mode is available:

–►`Prog Listen?`: for listening to the program during normal recording

If CD changer track edit mode is available:

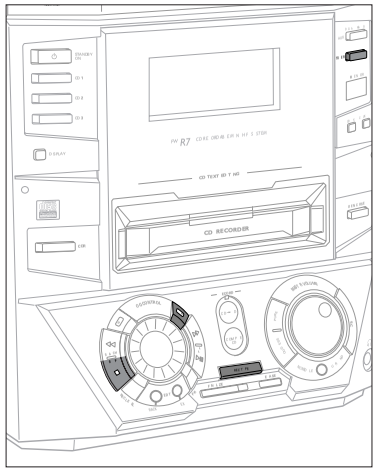
–►`A-B Listen?`: for listening to the A–B track during normal recording

4 Follow steps 5 and 6 of "High speed recording".

- To stop recording, press STOP □ on the unit.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
– play a recorded CDR on a standard CD player or
– play a recorded CDRW on a CDRW compatible CD player and CD recorder.



Manual recording

Manual recording from the FM tuner

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Press TUNER repeatedly to select the FM tuner. Then select the desired radio station (see "Tuning to radio stations").

3 Press REC TYPE on the unit to enter the recording menu.
–►`FM Tuner?` is displayed.

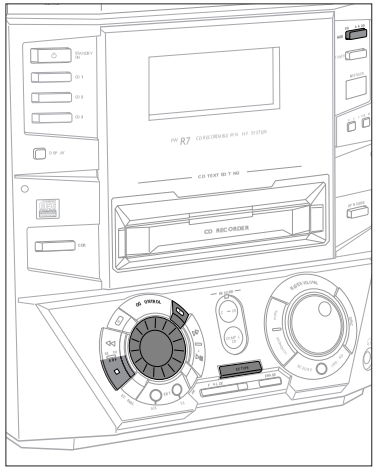
4 Press YES to confirm.
–►`Wait` and `Record?` are displayed.

5 Press YES to start recording.
–►The arrow lights, **RECORDING IN PROGRESS** is shown, manual recording starts and the actual recording time remaining starts to count down.

6 Press STOP □ to stop recording.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
– play a recorded CDR on a standard CD player or
– play a recorded CDRW on a CDRW compatible CD player and CD recorder.



Analog or digital recording?

When making recordings from an external source, we recommend to do analog recording only if digital recording is not possible. Digital recording will usually result in better sound quality.

Recording with automatic start

Recording of an entire disc or a track with automatic start

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Repeatedly press DIGITAL / ANALOG AUX to select the input for the external source from which you want to record.
–►`AUX Digital` is displayed if the digital input is selected.
–►`AUX Analog` is displayed if the analog input is selected.

3 Press REC TYPE on the unit to enter the recording menu.

4 Rotate JOG CONTROL to select either:
–►`AUX CD?`: for recording with synchronized start of an entire disc
–►`AUX Track?`: for recording with synchronized start of a track

5 Press YES to confirm your selection.
–►`Start Source, AUX` and the remaining recording time of the CDR(W) are displayed.

6 Start playback on the selected source.
–►The CD recorder starts to record simultaneously and **RECORDING IN PROGRESS** is shown. The remaining recording time on the CDR(W) is displayed.

Note: If you start playback on the selected source within a track, recording starts at the beginning of the next track or after 2.7 seconds of silence in analog recordings.

7 ***If a digital source is selected:***
After the recording process, the CD recorder stops automatically.

Note: Recordings from DAT or DCC will automatically stop after 20 seconds of silence.

If an analog source is selected:
At the end of the recording process, the CD recorder stops after a silence of 20 seconds on the source material.

• To stop recording manually, press STOP □ on the unit.
–►**RECORDING IN PROGRESS** goes off.

Manual recording

Manual recording from an external source

1 Make sure the CDR(W) is absolutely free of scratches and dust particles.

2 Repeatedly press DIGITAL / ANALOG AUX to select the input for the external source from which you want to record.
–►`AUX Digital` is displayed if the digital input is selected.
–►`AUX Analog` is displayed if the analog input is selected.

3 Press REC TYPE on the unit to enter the recording menu.

4 Rotate JOG CONTROL to select the type of recording.
–►`AUX Manual?`: for manual start of recording

5 Press YES to confirm your selection.
–►`Wait` is displayed.
–►`Record?, AUX` and the remaining recording time of the CDR(W) are displayed.

6 Start playback on the external source in order to set the optimal recording level on the CD recorder (see "REC LEVEL key").

7 Stop playback on the external source.

8 Go to the beginning of the desired track.

9 Press YES on the unit and simultaneously start playback on the external source.
–►The CD recorder starts to record and **RECORDING IN PROGRESS** is shown. The remaining recording time of the CDR(W) is displayed.

Note: If `Check Input` *is flashing, check the digital connection.*

10 Press STOP □ on the unit to stop recording.
–►`Update` is displayed and **RECORDING IN PROGRESS** goes off.

DO NOT FORGET TO FINALIZE!

Finalizing a CDR(W) disc is a simple procedure, necessary to:
– play a recorded CDR on a standard CD player or
– play a recorded CDRW on a CDRW compatible CD player and CD recorder.

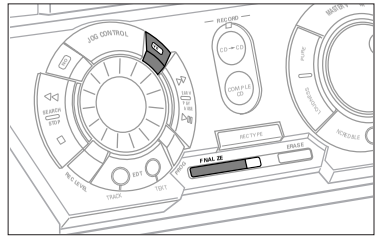
Automatic track increment

In recording mode, tracks will be incremented automatically so that the track numbers are in the same position as the original.

• To **switch** the automatic track increment function **on**, press as often as necessary TRACK INCR. on the remote control during stop when CDR is selected.
–►`Auto Tr ON` is displayed and the function is on. Track increments are now automatically detected from digital source material. In analog source material, a silence of 2.7 seconds or more is detected as a track increment.

• To **switch** the automatic track increment function **off**, press as often as necessary TRACK INCR. on the remote control during stop when CDR is selected.
–►`Auto Tr OFF` is displayed and the function is off. Track numbers can now be incremented manually by pressing TRACK INCR. on the remote control during recording. The minimum track length is 4 seconds.

Notes: – Track numbers cannot be changed after recording.
– The automatic track increment only works with consumer sources with a digital output signal according to the IEC 958 (consumer part) audio standard. DAT, DVD and DCC do not deliver this signal.



Finalizing CDR(W) discs

Finalizing a CDR(W) disc is a simple procedure, necessary to:
– play a recorded CDR on a standard CD player,
– play a recorded CDRW on a CDRW compatible CD player and CD recorder,
– avoid further unwanted recordings on a disc, or
– avoid erasure of tracks on a CDRW.

Notes: – Finalizing will take about 2–4 minutes.
– After finalization of the CDR(W), **CDR(W)** *changes to* **CD** *on the display.*
– During finalization no other operating commands can be executed.

Auto finalizing
When using either CD→CD or COMPILE CD, your recordings will be finalized automatically (see "High speed recording and automatic finalizing").

Manual finalizing when recording is in progress

1 Press FINALIZE on the unit during recording.
–►`Auto Final?` is displayed.

2 Press YES to confirm.
–►**FINALIZE** is shown. The finalization will start after recording and the actual finalizing time left will start to count down.

Manual finalizing when recording is stopped

1 Insert the CDR(W) you want to finalize in the CD recorder tray.

2 Press CDR to select the CD recorder.

3 Press FINALIZE on the unit.
–►`Finalize?` is displayed.

4 Press YES to start finalizing.
–►**FINALIZE** is shown, `Final` is displayed and the actual finalizing time left starts to count down.

Unfinalizing CDRW discs

If you want to record (or erase) on (from) a finalized CDRW, you have to unfinalize it first.

Notes: – Unfinalizing will take approximately 2 minutes.
– After unfinalizing of the CDRW, **CD** *changes to* **CDRW** *on the display.*
– When unfinalizing a CDRW with CD text on it available, this text will be transferred to the CD recorder memory. In case the memory is full, you have to erase text (see "Erasing from the memory") or to finalize another disc first in order to obtain memory space.

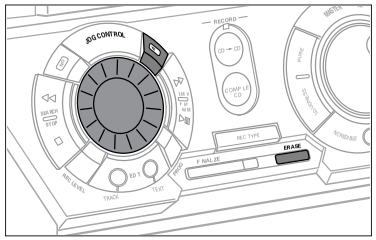
1 Insert the CDRW you want to unfinalize in the CD recorder tray.

2 Press CDR to select the CD recorder.

3 Press FINALIZE on the unit.
–►`Unfinalize?` is displayed.

4 Press YES to start unfinalizing.
–►`Unfinal` is displayed and the operation time remaining starts to count down.

Erasing from a CDRW disc



It is possible to erase one or more tracks (starting from the end of the last track) or the entire CDRW.

Erasing an entire CDRW

1 Insert the CDRW you want to erase in the CD recorder tray.

2 Press CDR to select the CD recorder.

3 Press ERASE to enter the erasing menu.

4 Rotate JOG CONTROL to select:
–►`Erase Disc?`: for erasing the entire disc

5 Press YES to confirm your selection.
–►`Erase?`, the total playing time and the total number of tracks to be erased are displayed. All track numbers will blink in the music calendar.

6 Press YES to start erasing.
–►`Erase` is displayed and the operation time remaining starts to count down. The track number of the actual erased track will go off in the music calendar.

Erasing one or more tracks

1 Insert the CDRW from which you want to erase tracks in the CD recorder tray.

2 Press CDR to select the CD recorder.

3 Press ERASE to enter the erasing menu.

4 Rotate JOG CONTROL to select the track number(s) you wish to erase.
–►`Erase` and the track number (e.g. `10+`)? are displayed.

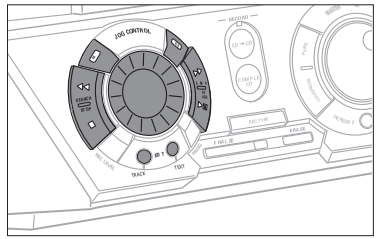
• To select more tracks to be erased, repeat step 4.

Note: When erasing more tracks, the tracks to be erased must be selected in sequence, starting from the last recorded track. Example: The CDRW has 5 tracks recorded on it. Now, you can erase tracks 5 and 4. You can also erase tracks 5, 4 and 3, but you cannot erase tracks 5 and 3!

–►All track numbers selected for erasing will blink in the music calendar. The remaining track numbers light up.

5 Press YES to confirm your selection.
–►`Erase?` is displayed.

6 Press YES to start erasing.
–►`Erase` is displayed and the operation time remaining starts to count down. The track number of the currently erased track will go off in the music calendar.



EDIT TEXT (on CD recorder only)

Storing text during stop mode

After you have recorded your CDR(W) you can enter text, e.g. names to discs and tracks. The text will be displayed during playback. You can enter up to 60 characters per text field. Only use an unfinalized CDR or CDRW (finalized CDRW must be unfinalized first).

1 If necessary, press STOP □ on the unit (■ on the remote control) to stop playback.

2 Press CDR to select the CD recorder.

3 Press EDIT TEXT on the unit to enter the text edit menu.
–►**CD TEXT EDIT** is blinking, `Text Edit` is displayed.

4 Press YES to confirm.

5 Rotate JOG CONTROL to select either:
–►`Album Artist`: for editing the CD artist.
–►`Album Title`: for editing the CD title.
–►`Artist Tr 1` or (2, 3,...): for editing the artist of track 1 or (2, 3,...).
–►`Title Tr 1` or (2, 3,...): for editing the title of track 1 or (2, 3,...).

6 Press YES to confirm the selection.

7 Rotate JOG CONTROL (press the alphabet keys on the remote control) to select a character.

8 Press YES to confirm the selection.
–►The cursor moves to the next character space.

9 Repeat steps 7 and 8 for adding further characters.

10 Press EDIT TEXT to save the characters that have been selected and to exit to the last position in the text editing menu.
–►`Update` is displayed.

Storing text during recording

You can store and edit text even while recording a single track or single CD, or when recording from an external source or tuner. Editing text during finalizing is not possible. Make sure, when using high speed recording and automatic finalizing, to enter the text before finalizing starts, otherwise automatic finalizing will be cancelled.

• Follow steps 3–10 of "Storing text during stop mode".

Note: Editing text is not possible when a copy protected track is analog recorded. Editing is stopped, `CDText Saved` *is displayed and your text is saved for later editing.*

Auto copied text

When an artist's name has been stored for a track, it will be copied automatically into the next track.

• Press either:
EDIT TEXT to confirm the copied text,
or
NO to delete the copied text and enter new text.

Inserting a space

1 Press ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control) to move to the position where the space is to be inserted.
–►The position starts blinking.

2 Press YES to confirm the position of the insert character.
–►A space will be inserted, text will move to the right.

Deleting and substituting a character

1 Press ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control) to move to the character's position to be deleted or substituted.
–►The character starts blinking.

2 ***If you want to delete the character:***
Press NO.
–►The character is deleted and the text is shifted one position to the left.

If you want to substitute the character:
Rotate JOG CONTROL (press the alphabet keys on the remote control) to select a new character.

Press YES to confirm the selection.

• To change another character, press ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control).

Erasing text

1 Press EDIT TEXT to enter the text edit menu.
→►**CD TEXT EDIT** is blinking, `Text Edit` is displayed.

2 Rotate JOG CONTROL to select the text erase menu.
→►`Text Erase` is displayed.

3 Press YES to confirm.

4 Rotate JOG CONTROL to select one of the following:
→►`All Text`: All text of the selected disc is chosen to be erased in one step.
→►`Album Artist`: CD artist's name is chosen to be erased.
→►`Album Title`: CD title is chosen to be erased.
→►`Artist Tr 1` or (2, 3,...): artist's name of track 1 or (2, 3,...) is chosen to be erased.
→►`Title Tr 1` or (2, 3,...): title of track 1 or (2, 3,...) is chosen to be erased.

5 Press YES to confirm your selection.
→►`Erase?` or `Erase All?` is displayed.

6 Press YES to start erasing.
→►`Update` is displayed and the chosen text is erased.

Erasing from the memory

When the text memory of your CD recorder is full, the messages `Memory Full` and `Finalize Disc` will be displayed. If you still want to add a new disc to the text memory, you either have to erase another disc from the memory or you have to finalize another disc.

1 Press EDIT TEXT to enter the text edit menu.
→►**CD TEXT EDIT** is blinking, `Text Edit` is displayed.

2 Rotate JOG CONTROL to select the memory view menu.
→►`Text Memory` is displayed.

3 Press YES to confirm.

4 Rotate JOG CONTROL to select the disc you wish to erase from the text memory.

5 Press YES to confirm.
→►`Erase Memory` is displayed.

6 Press YES to confirm the text erasure of that particular disc.

Note: If there are no discs stored in the text memory, `Memory Empty` *will be displayed.*

Track editing (on CD changer only)

You can create a "track" by marking a passage of music within one track on the current disc. This new "track" can be used for recording or playing. The minimum track length is 4 seconds.

1 Press EDIT TRACK on the unit.
→►**EDIT TRACK** starts blinking, `Track` and the current track number ? are displayed. The current track number also blinks in the music calendar.

2 Rotate JOG CONTROL until the desired track number is displayed.

3 Press YES to confirm the selected track.
→►The marker position `A` and the track time will be displayed. The first 4 seconds of the track will be played continuously.

4 Press PLAY/PAUSE ▷▯▯ on the unit to play to the desired start position of your new "track" (The initial position of marker `A` is always the start of the chosen track).

• To fast forward to the desired start position, press ◁◁ SEARCH or ▷▷ SEARCH on the unit.

• To fine tune the position, first press PLAY/PAUSE ▷▯▯ on the unit, then rotate JOG CONTROL.

5 Press YES to confirm the position of marker `A`.
→►The marker position `B` and the new "track" time will be displayed. The first 4 seconds before marker position `B` **until marker position** `B` will be played continuously.

6 Press PLAY/PAUSE ▷▯▯ on the unit to play to the stop position of your new "track" (the initial position of marker `B` is always the position of marker `A` plus 4 seconds).

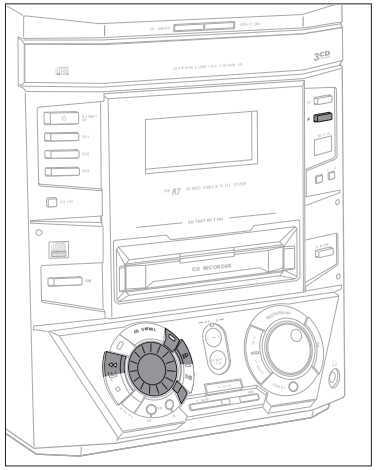
7 Press YES to confirm the marked passage.
→►**EDIT TRACK** is shown, `A–B` and the track edit time are displayed.

Note: If you open the CD changer tray, the edit is deleted.

Clearing the track edit

1 Press NO during stop.
→►`Clear A–B?` is displayed.

2 Press YES to clear the markers.
→►The markers `A–B` are cleared.



Tuning to radio stations

1 Press TUNER to select the tuner.
→►`Tuner` is scrolled.

2 Press TUNER again to select the desired waveband.
→►The selected waveband is displayed.

3 Keep ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control) pressed for more than a half second.
→►The selected waveband and `Searching` are displayed. The radio tunes to a station with sufficient signal strength.

4 Repeat searching until you find the desired station.

• To tune to a weak station, briefly press ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control) as often as necessary for optimum reception.

Storing radio stations

It is possible to store up to 40 radio stations. Stations can be selected and programmed automatically or you can do that yourself. Programming will overwrite your former presets starting from the last active preset station. After programming the last stored preset station will be tuned.

Automatic programming

If no preset is tuned, automatic programming starts at preset number one.

1 Follow steps 1 and 2 of "Tuning to radio stations".

2 Keep PROG (PROGRAM on the remote control) pressed for more than 2 seconds.
→►`Autoprogram` is displayed, **PROG** and the current preset number in the music calendar start blinking.
→►All available radio stations for the selected waveband are stored automatically. **PROG** goes off, the preset number, the waveband and the frequency of the last preset station are displayed briefly.

• To store radio stations for another waveband, repeat steps 1–2. Make sure to select the next available preset number first before proceeding, otherwise already programmed radio stations may be erased.

• To exit the automatic programming, press PROG (PROGRAM on the remote control).

Note: Strong stations will always automatically be programmed first, followed by the weak stations.

Manual programming

1 Follow steps 1 and 2 of "Tuning to radio stations".

2 Keep PROG (PROGRAM on the remote control) pressed for less than 2 seconds.
→►**PROG** and the current preset number in the music calendar start flashing.

3 Press ◁◁ SEARCH or ▷▷ SEARCH (◀◀ or ▶▶ on the remote control) to tune to the desired radio station.

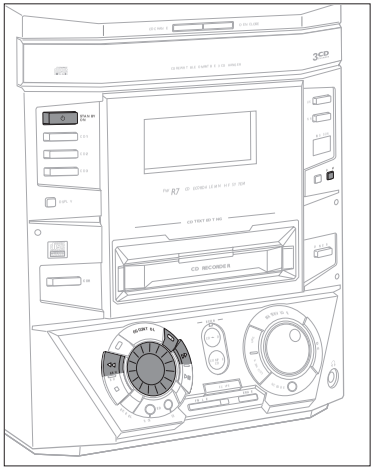
• To allocate the radio station to another preset number, rotate JOG CONTROL (press ⏮ or ⏭ on the remote control).

4 Press YES to confirm the setting.
→►**PROG** goes off, the preset number, the waveband and the frequency of the preset station are displayed.

• To exit manual programming, press PROG (PROGRAM on the remote control).

Tuning to preset stations

• Use JOG CONTROL (⏮ or ⏭ on the remote control) until the preset number of the desired station is displayed.



Clock setting

Manual clock setting

1 Press ⏻ STANDBY ON as often as necessary on the unit to switch the unit to standby.

2 Press CLOCK/TIMER on the unit.

3 Rotate JOG CONTROL to select the clock.
–►`Clock` is displayed and 🕘 starts blinking.

4 Press YES to confirm the selection.
–►The day of the week digit blinks.

5 Rotate JOG CONTROL to set the day.

6 Use ⧏◁ SEARCH or ▷⧐ SEARCH on the unit to move from day of the week to hour.

7 Rotate JOG CONTROL to set the hour.

8 Repeat steps 6 and 7 to set the minutes.

9 Press YES to confirm the settings.

You can select different timer functions which will be activated at a chosen time. Make sure the clock is set before using one of these features.

Sleep timer

You can set a certain period of time before the unit switches off.

1 Press SLEEP on the remote control until the desired sleeper time is displayed.
–►**SLEEP** is shown and `Sleep 60 min, 45 min, 30 min, 15 min` is displayed or, `Sleep OFF` is displayed.

2 As soon as the desired time is displayed, do not press SLEEP again.
–►After the chosen time has elapsed, the unit switches to standby.

• To deactivate the sleep timer, press SLEEP on the remote control until `Sleep OFF` is displayed.

Alarm timer

Alarm timer setting

The unit can be used as an alarm clock, whereby the tuner, CD recorder or CD changer starts playback automatically at a preset time.

1 Press ⏻ STANDBY ON as often as necessary on the unit to switch the unit to standby.

2 Press CLOCK/TIMER on the unit.

3 Rotate JOG CONTROL to select the alarm timer.
–►`Alarm` is displayed, **ALARM** is blinking.

4 Press YES to confirm the selection.
–►The hour digit is blinking.

5 Rotate JOG CONTROL to set the hour.

6 Use ⧏◁ SEARCH or ▷⧐ SEARCH on the unit to move from hour to minutes.

7 Rotate JOG CONTROL to set the minutes.

8 Press YES to confirm the time settings.

9 Rotate JOG CONTROL to select the source you want to be woken up with.

10 Press YES on the unit to confirm the source selection.

• To stop the alarm, press ⏻ STANDBY ON on the unit.

Record timer

Record timer setting

The unit can do recordings automatically from an external source or from a preset radio station at a preset time.

1 Follow steps 1 and 2 of "Alarm timer setting".

2 Rotate JOG CONTROL to select the record timer.
–►`Rec Timer` is displayed, **REC** is shown and 🕘 starts blinking.

3 Press YES on the unit to confirm the selection.
–►The hour digit for the start of recording blinks.

4 Rotate JOG CONTROL to set the hour of start of recording.

5 Use ⧏◁ SEARCH or ▷⧐ SEARCH on the unit to move from hour to minutes of start of recording.

6 Rotate JOG CONTROL to set the minutes of start of recording.

7 Continue this procedure by using ⧏◁ SEARCH or ▷⧐ SEARCH to move on to hour and minutes of end of recording and to the day of the week. After each move, always rotate JOG CONTROL to do the settings.

8 Press YES to confirm the settings.

9 Rotate JOG CONTROL to select from which you want to record.

If you have chosen the tuner as source:
Rotate JOG CONTROL again to select a preset radio station and confirm this selected station by pressing YES.

10 Press YES on the unit to confirm the source selection.

• To stop the recording press STOP □ on the unit.

Switching the alarm and record timer on/off

• Press TIMER ON/OFF on the remote control repeatedly to switch the alarm and/or record timer on or off:
–► **ALARM** is shown and `Alarm ON` is displayed when the alarm timer is on.
–► **REC** is shown and `REC Timer ON` is displayed when the record timer is on.
–► **ALARM** and **REC** are shown, `REC+Alarm ON` is displayed when the alarm and record timer are on.
–► **ALARM** and **REC** go off, `REC+AlarmOFF` is displayed when the alarm and record timer are off.

Subject to modification without notice.

General
AC Power ..... 120 V / 60 Hz
Power consumption
Active ..... 66 W
Standby ..... < 22 W
Economy power save mode ..... < 2 W
Dimensions, w × h × d ..... 10.4 × 12.2 × 15.7 in.
Weight (without speakers) ..... 9 kg

Amplifier
Output power ..... 2 × 50 W FTC, 6 Ω, 1 kHz, THD 10%
Frequency response ..... 40–16,000 Hz FTC, +0.5/-1.5 dB
S/N ratio ..... ≥ 80 dBA (IEC)
Input sensitivity
AUX IN L/R ..... 800 mV
DIGITAL IN ..... 500 mV_{pp} (75 Ω)/12–56 kHz
Output
Impedance speakers ..... ≥ 6 Ω
Impedance headphones ..... 32 Ω–600 Ω
LINE OUT L/R ..... 500 mV
DIGITAL OUT ..... 500 mV_{pp} (75 Ω)/44.1 kHz
SUBWOOFER OUT ..... 1 V

CD changer
Number of programmable tracks 40
Frequency range ..... 20–20,000 Hz
S/N ratio ..... ≥ 92 dBA
Cross talk ..... ≤ -65 dB (1 kHz)
Total harmonic distortion ..... ≤ -94 dB (1 kHz)

CD recorder
Number of programmable tracks 99
CD playback
Frequency range ..... 20–20,000 Hz
S/N ratio playback ..... ≥ 92 dBA
Cross talk ..... ≤ -65 dB (1 kHz)
Total harmonic distortion ..... ≤ -84 dB (1 kHz)
Analog recording, digital playback
Frequency range ..... 20–20,000 Hz
S/N ratio playback ..... ≥ 86 dBA
Cross talk ..... ≤ -65 dB (1 kHz)
Total harmonic distortion ..... ≤ -81 dB (1 kHz)

Laser (CD recorder)
Type ..... Semiconductor laser GaAlAs
Wave length ..... 775–795 nm (at 25° C)
Output power ..... 2.5 mW (Read), 35 mW (Write)
Beam divergence ..... 60 degree

Tuner
Wave range
FM ..... 87.5–108.0 MHz
AM ..... 530–1,700 kHz

Speakers
System ..... 3 way bass reflex
Impedance ..... 6 Ω
Woofer ..... 1 × 6.5"
Tweeter ..... 1 × 2.5", Ferro fluid cooled
Tweeter ..... 1 × 1", Polydome
Dimensions, h × w × d ..... 12.2 × 9.4 × 12.7 in.
Weight ..... 4.6 kg/each

English

TROUBLESHOOTING

WARNING

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

If a fault occurs, first check the points listed, before taking the unit for repair.

If you are unable to solve a problem by following these hints, consult your dealer or service center.

LASER SAFETY

This unit employs a laser. Only a qualified service person should remove the cover or attempt to service this device, due to possible eye injury.

PROBLEM	POSSIBLE CAUSE	SOLUTION
No sound, no power	Volume is not correctly adjusted.	Adjust the volume.
	Headphones are connected.	Disconnect headphones.
	Speakers are wrongly or not connected.	Make sure speakers are properly connected.
	Power cable is not securely connected.	Connect power cable properly.
No reaction to controls	Electrostatic discharge	Disconnect the unit from power supply, then reconnect after a few seconds.
Poor radio reception	Weak radio signal	Direct the antenna for optimum reception.
	Antenna is positioned near a radiation source such as a TV, VCR, computer, etc.	Change the position of the interfering unit or try to switch it off.
Poor bass sound	Speakers are not in phase.	Connect the colored (or marked) wires to the colored terminals and the black (or unmarked) wires to the black terminals.
Bad sound	Badly matched setting for the given type of music or sound.	Correct the sound settings on the unit.
Remote control does not function properly	Batteries are inserted incorrectly.	Insert batteries correctly.
	Batteries are flat.	Insert new batteries.
	Distance to the unit is too large.	Reduce distance.
`Insert Disc` **indication**	The CD(RW) is scratched badly or dirty.	Replace or clean the disc.
	No CD(RW) inserted or inserted upside down.	Insert a CD(RW), with label facing upwards.
	The laser lens is steamed up.	Wait until the lens has cleared.
`Wrong Disc` **indication,** `Use Audio CD` **indication**	No digital audio disc is inserted.	Insert a digital audio disc marked with "Digital Audio" and the special logo.
`Disc Recover` **indication**	Power loss	Wait a few minutes. The disc is being repaired.
`Disc Error` **indication**	`Disc Recover` was not able to repair the disc.	The disc can still be played, but not recorded or finalized further.
`Check Input` **indication**	Wrong input is chosen.	Select the correct input.
	No correct digital source is detected after starting recording.	Make sure the connection cable is properly connected.
Does not record	CDR(W) is scratched or dirty.	Make sure the CDR(W) is absolutely free of scratches and dust particles.
	The inserted disc is not recordable.	Insert a digital CDR(W) and make sure it is unfinalized.
	Recording process is interrupted (power loss, mechanical shock).	Start recording again.
Recorded disc does not play in another standard CD player	The inserted CDR(W) is not finalized.	Finalize the CDR(W).
	The CDRW is inserted in a non-CDRW compatible CD player.	Insert the CDRW in a CDRW compatible CD player.

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 Pulsarmband 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 Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

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

(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 D RECT 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 !

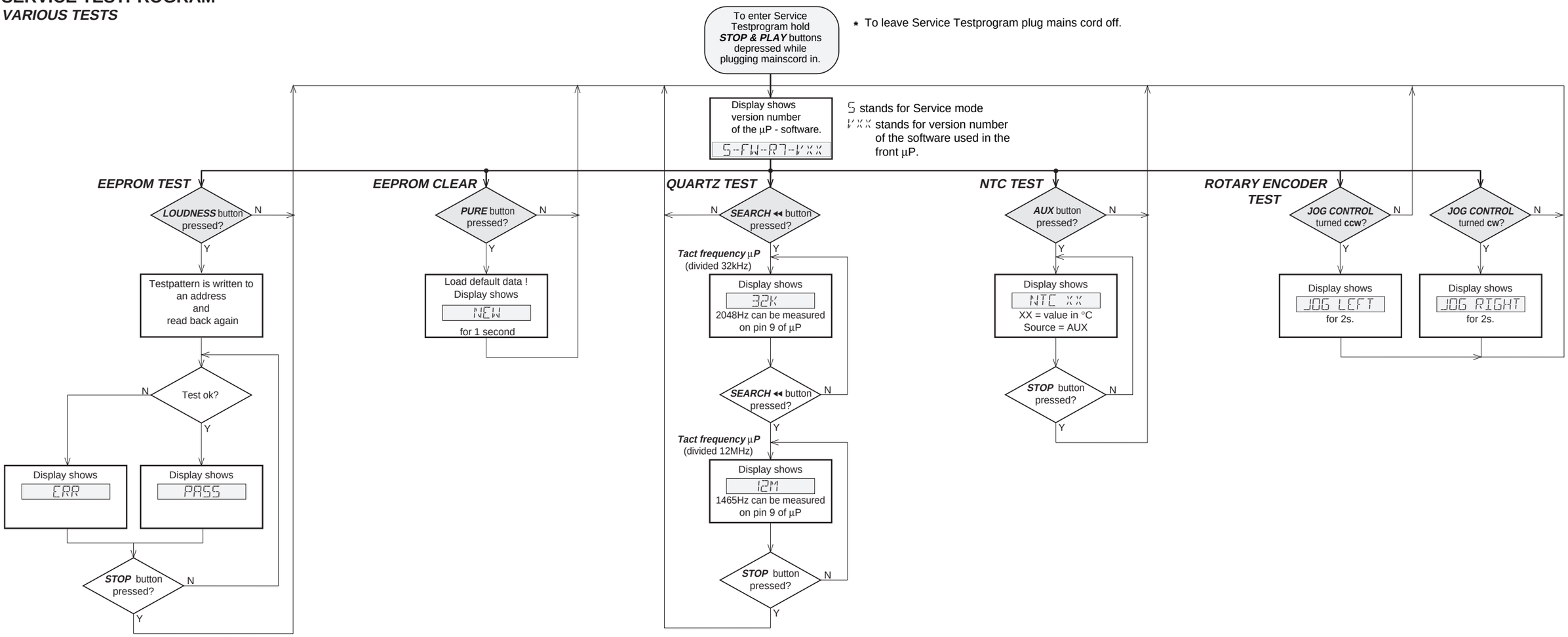
(GB)
After servicing and before returning the set to customer perform a leakage current measurement test from all exposed metal parts to earth ground, to assure no shock hazard exists.
The leakage current must not exceed 0.5mA.

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

3-2

SERVICE TESTPROGRAM

VARIOUS TESTS



3-3

SERVICE TESTPROGRAM
CDR MODULE

To enter Service Testprogram hold ***PLAY & STOP*** buttons depressed while plugging mainscord in.

* To leave Service Testprogram plug mains cord off.

Display shows version number of the µP - software.
S--FW-R7-1XXX

S stands for Service mode
1XXX stands for version number of he software used in the front µP.

CDR ELECTRICAL TEST

Insert CD-DA disc before starting the test

CDR button pressed? N / Y

MODULE INFORMATION

Display shows for 2s each:
- Software version of DASP (flash ROM 7703)
- Software version of basic engine processor (flash EPROM 7208)

MAIN BOARD DIAGNOSTIC

DRAM TEST 7702
Display shows: DTST1
FFWD button pressed? N / Y

CHECKSUM TEST 7703
Display shows: DTST2
FFWD button pressed? N / Y

ERASE TEST 7208
Display shows: DTST3

ADC/DAC TEST 7406
Display shows: DTST4
FFWD button pressed? N / Y

COMMUNICATION TEST (DSA BUS)
Display shows: DTST5
FFWD button pressed? N / Y

TEST O K ? N
Display shows: DERR ***n*** (n=number of failed test)
FFWD button pressed? N / Y
all errors shown? N / Y
Display shows next error
Y

CDR - LOADER TEST

CD-DA disc inserted? N
Display shows: NO DISC
FFWD button pressed? N / Y
Y

Display shows actual playing time.
The test is performed by playing 5s at beginning, 5s in the middle and 5s at the end of the disc.
FFWD button pressed? N / Y
Exit CDR electrical Test

TEST O K ? N
Display shows: DERR 1
FFWD button pressed? N / Y
Y

Exit CDR electrical Test

Exit CDR electrical Test

CDR MECHANICAL TEST

for visual inspection only

FINALIZE button pressed? N / Y

FOCUS TEST
Objective moves continuously up/down.
Display shows: BUSY

STOP button pressed? N / Y
Exit Mech. Testprogram

SLIDE TEST
NEXT button pressed? N / Y
Slide moves continuously in/out.
Display shows: BUSY
PREV button pressed? N / Y
Dependent on the moving direction, slide moves to inner or outer end position.

TRAY TEST
OPEN/CLOSE button pressed? N / Y
Tray opens.
Display shows: OPENED
(even when tray is blocked)
OPEN/CLOSE button pressed? N / Y
Tray closes.
Display shows: CLOSE
(even when tray is blocked)

CDR DC-ERASE MODE

ERASE button pressed? N / Y

Complete disc will be erased with double speed. (starting from PMA-area up to and including AT P leadout area)
The display shows the countdown of the remaining time required to complete the operation:
ER mm ss
mm: remaining minutes
ss: remaining seconds

Disc erased? N / Y

Display shows: PASSED

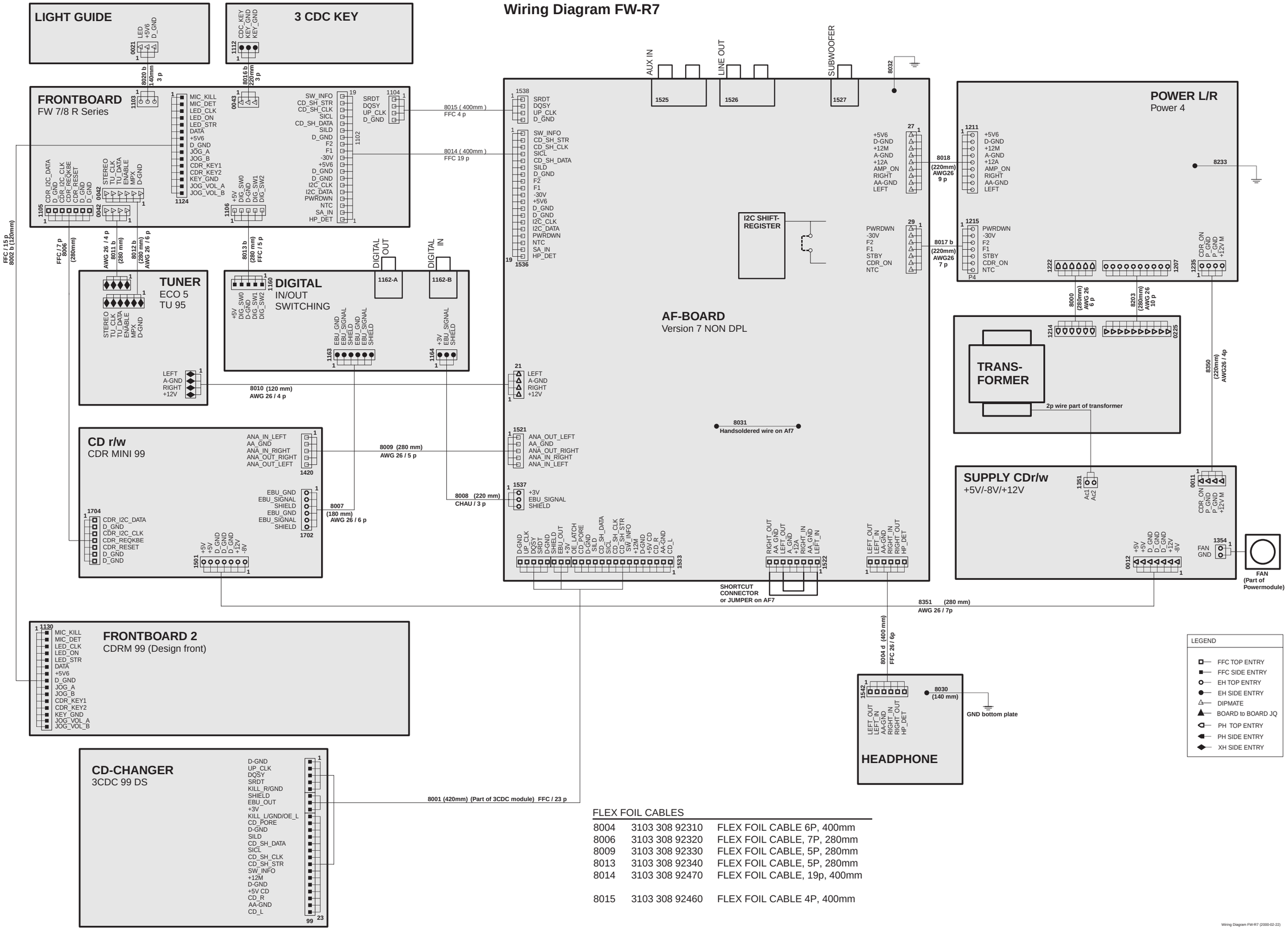
STOP button pressed? N / Y

Exit DC-ERASE Mode

Note: With the DC-Erase mode the CD-RW can be changed back in its original state, like a new disc. Stopping the erase-function by switching power off will leave the disc in an unpredictable status!

4-1

Wiring Diagram FW-R7

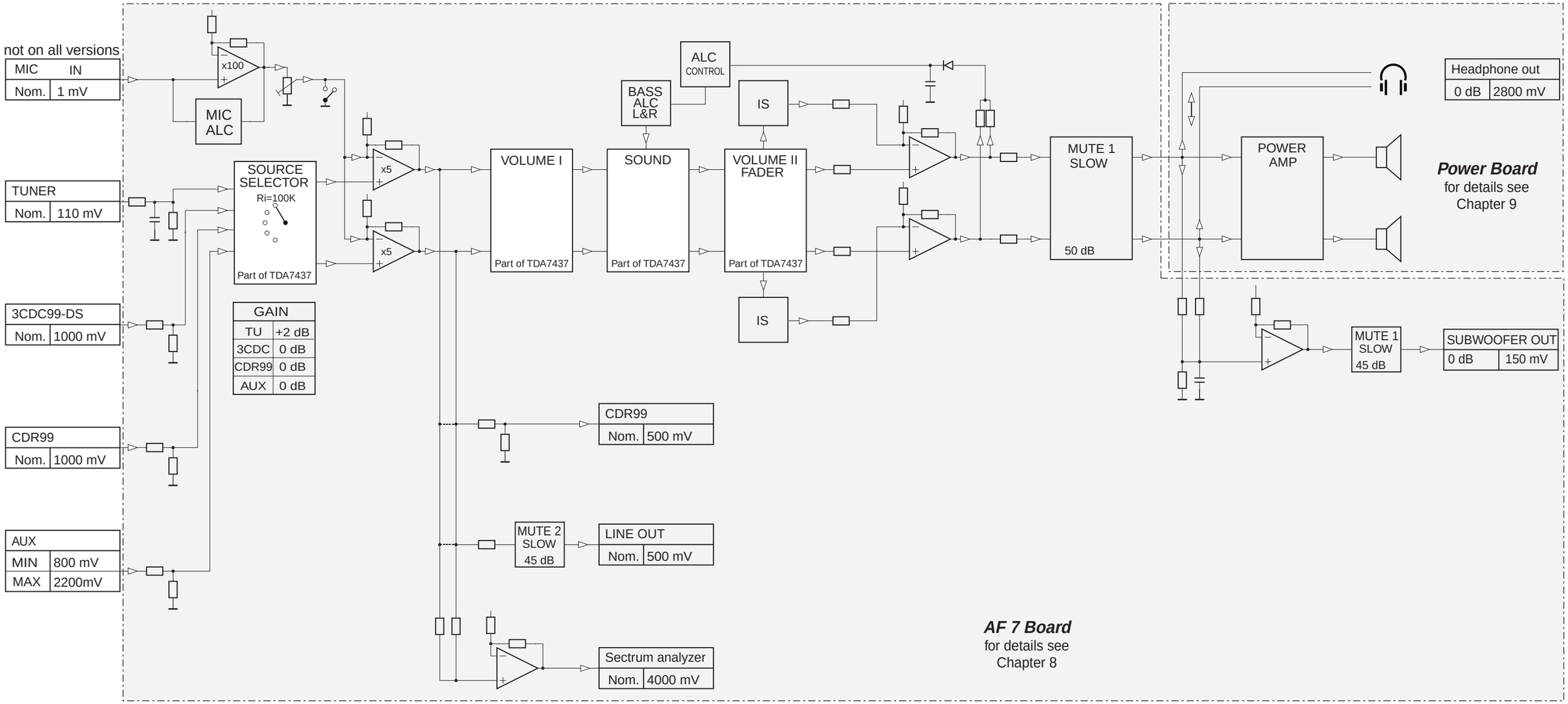


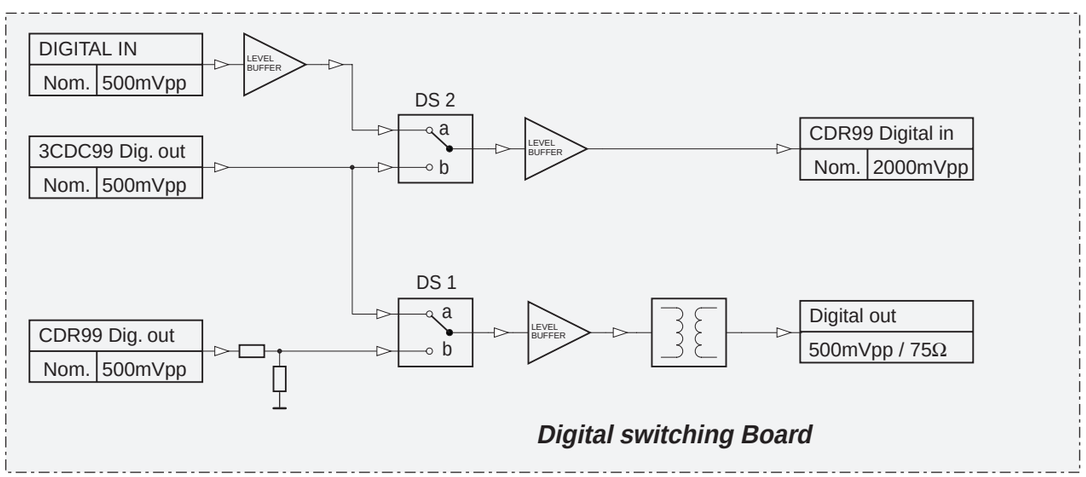
FLEX FOIL CABLES

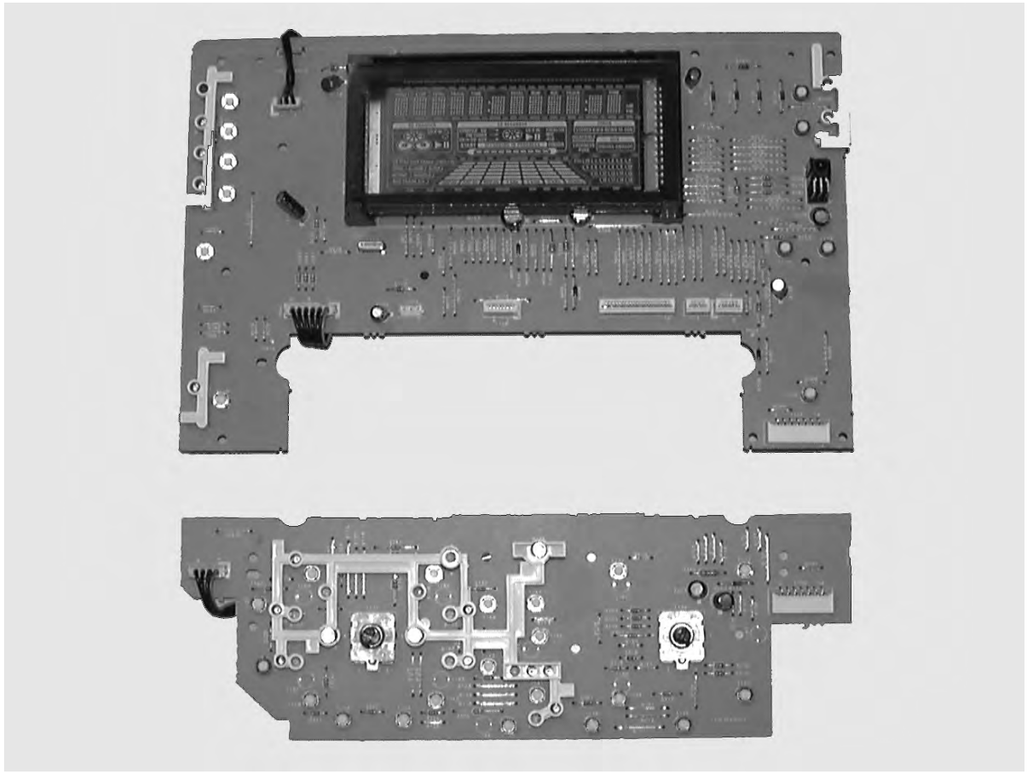
8004	3103 308 92310	FLEX FOIL CABLE 6P, 400mm
8006	3103 308 92320	FLEX FOIL CABLE, 7P, 280mm
8009	3103 308 92330	FLEX FOIL CABLE, 5P, 280mm
8013	3103 308 92340	FLEX FOIL CABLE, 5P, 280mm
8014	3103 308 92470	FLEX FOIL CABLE, 19p, 400mm
8015	3103 308 92460	FLEX FOIL CABLE 4P, 400mm

5-1

Block / Leveldiagram



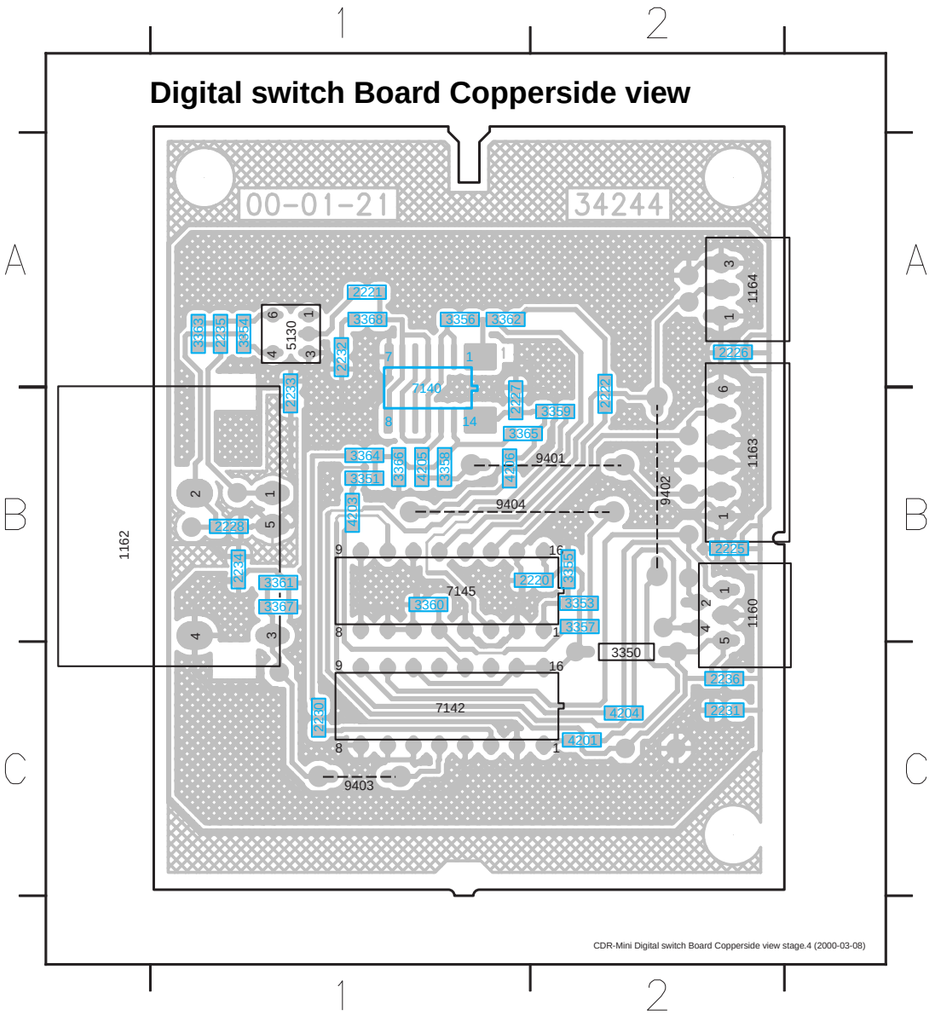




Front Board

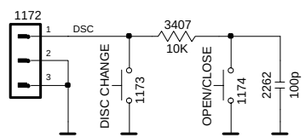
TABLE OF CONTENTS

6-1

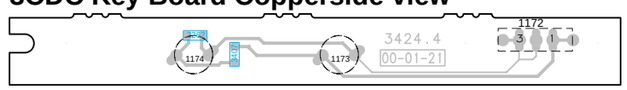


1160 B2
1162 B1
1163 B2
1164 A2
2220 B2
2221 A1
2222 B2
2225 B2
2226 A2
2227 A2
2228 B1
2230 C1
2231 C2
2232 A1
2233 B1
2234 B1
2235 A1
2236 C2
3350 C2
3351 B1
3353 B2
3354 A1
3355 B2
3356 A1
3357 B2
3358 B1
3359 B2
3360 B1
3361 B1
3362 A1
3363 A1
3364 B1
3365 B1
3366 B1
3367 B1
3368 A1
4201 C2
4203 B1
4204 C2
4205 B1
4206 B1
5130 A1
7140 B1
7142 C1
7145 B1
9401 B2
9402 B2
9403 C1
9404 B1

3 CDC-Key

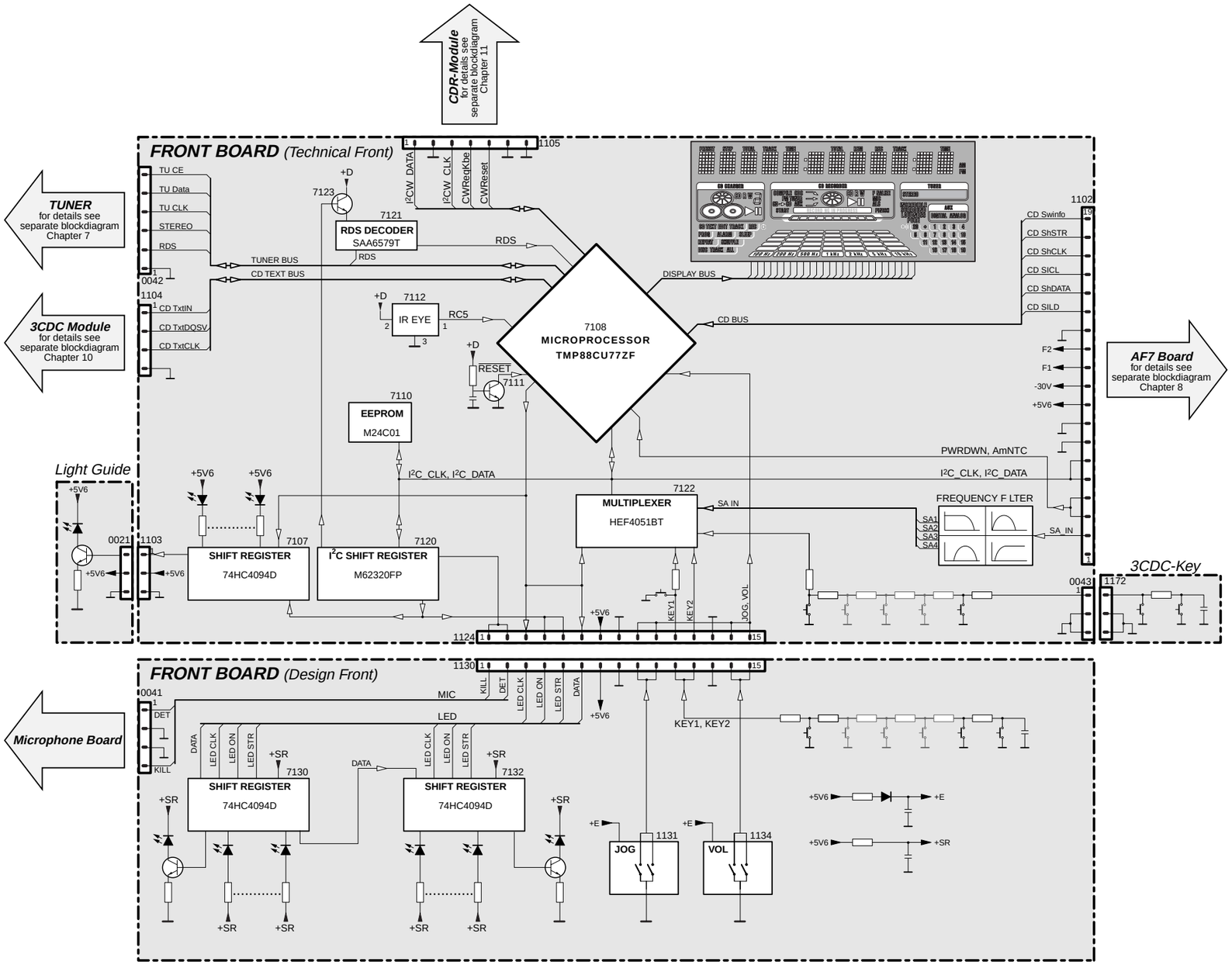


3CDC Key Board Copperside view



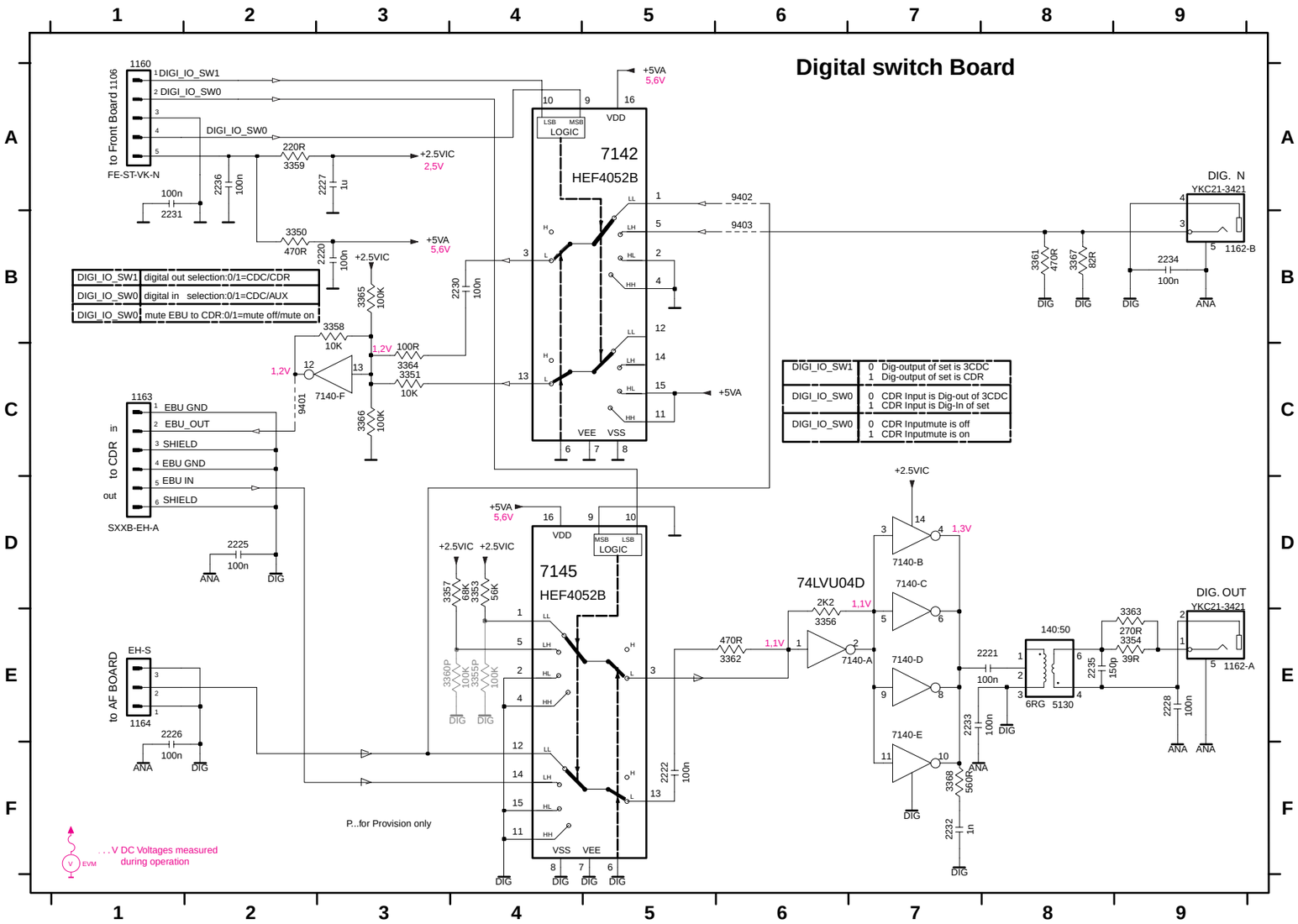
6-2

Blockdiagram



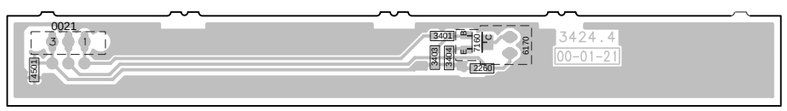
6-3

Digital switch Board



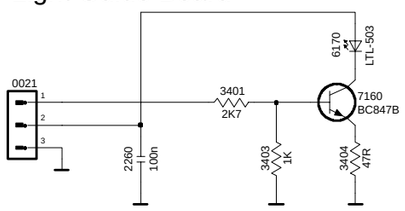
1160 A1
1162-A E9
1162-B B9
1163 C1
1164 E1
2220 B3
2221 E8
2222 F5
2225 D2
2226 E1
2227 A3
2228 E9
2230 B4
2231 B1
2232 F7
2233 E7
2234 B9
2235 E8
2236 A2
3350 B2
3351 C3
3353 D4
3354 E9
3355 E4
3356 E6
3357 D3
3358 B3
3359 A2
3360 E3
3361 B8
3362 E6
3363 E9
3364 C3
3365 B3
3366 C3
3367 B8
3368 F7
5130 E8
7140-A E6
7140-B D7
7140-C D7
7140-D E7
7140-E E7
7140-F C3
7142 A5
7145 D4
9401 C2
9402 A6
9403 B6
F600 A2
F601 A2
F602 E9
F603 A2
F604 E9
F605 A1
F606 A2
F607 C2
F608 B9
F609 D2
F610 E1
F611 E1
F612 E1

Light Guide Copperside view



CDR-Mini LED Board Copperside view stage .4 (2000-02-23)

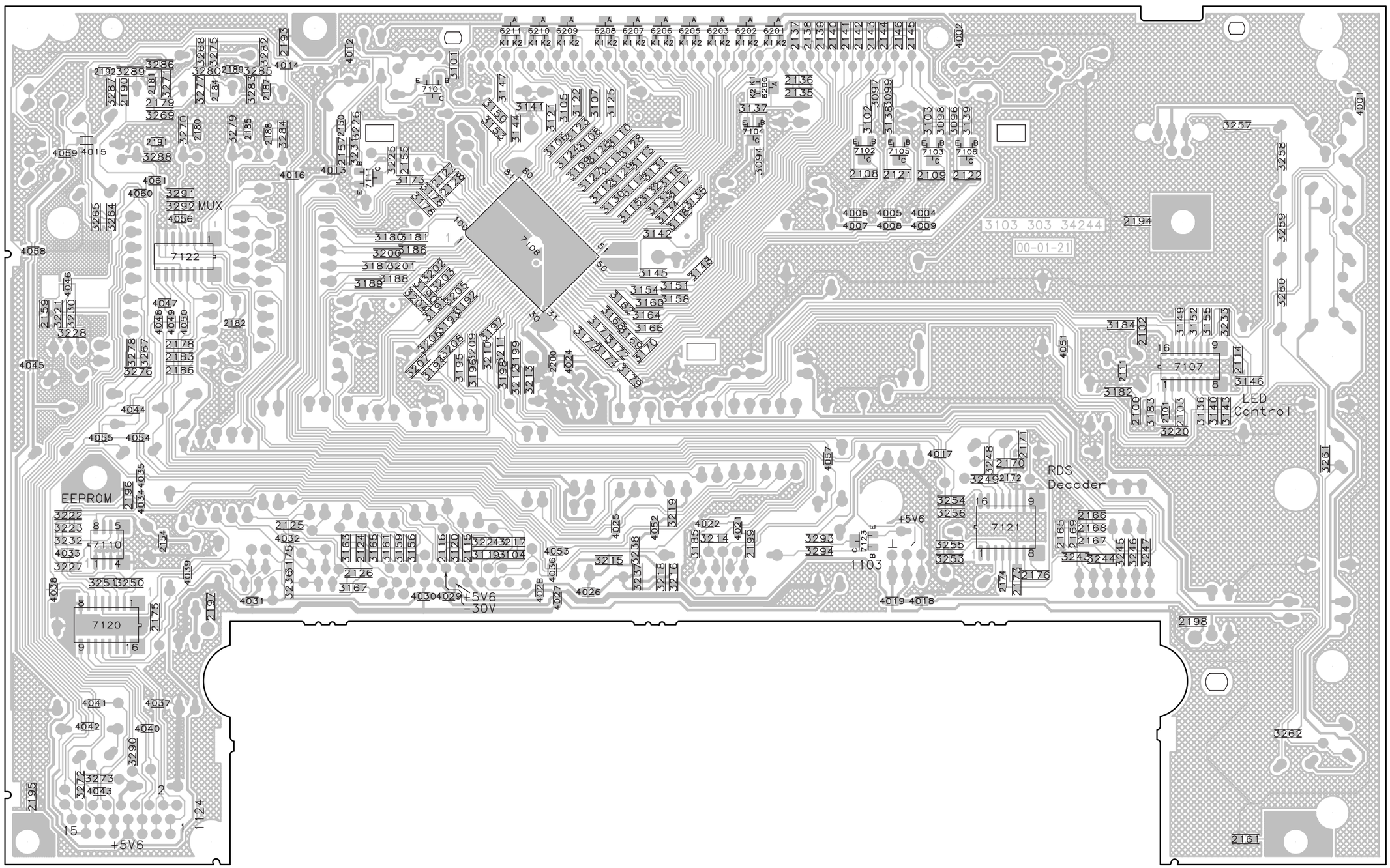
Light Guide Board



6-4

2100 B6
2101 B6
2102 B6
2103 B6
2108 A5
2109 A5
2111 B6
2114 B7
2115 C3
2116 C3
2121 A5
2122 A5
2123 C2
2125 C2
2126 C2
2127 A3
2128 A3
2135 A5
2136 A5
2137 A5
2138 A5
2139 A5
2140 A5
2141 A5
2142 A5
2143 A5
2144 A5
2145 A5
2146 A5
2150 A2
2154 C1
2155 A3
2157 B1
2159 B1
2161 D7
2165 C6
2166 C6
2167 C6
2168 C6
2169 C6
2170 B6
2171 B6
2172 C6
2173 C6
2174 C6
2175 C1
2176 C6
2178 B1
2179 A1
2180 A1
2181 A1
2182 B2
2183 B1
2184 A2
2185 A2
2186 B1
2187 A2
2188 A2
2189 A2
2190 A1
2191 A1
2192 A1
2193 A2
2194 A6
2195 D1
2196 C1
2197 C2
2198 C7
2199 C4
2200 B3
3094 A4
3096 A5
3097 A5
3098 A5
3099 A5
3101 A3
3102 A5
3103 A5
3104 C3
3105 A5
3106 A3
3107 A3
3108 A3
3109 A3
3110 A4
3111 A4
3112 A4
3113 A4
3114 A4
3115 A4
3116 A4
3117 A4
3118 A4
3119 C3
3120 C3
3121 A3
3122 A3
3123 A3
3124 A3
3125 A4
3126 A4
3127 A3
3128 A4
3129 A4
3130 A4
3131 A4
3132 A4
3133 A4
3134 A4
3135 A4
3136 B7
3137 A4
3138 A5
3139 A5
3140 B7
3141 A3
3142 A4
3143 B7
3144 A3
3145 A4
3146 B7
3147 A3
3148 A4
3149 B6
3150 C3
3151 B4
3152 B7
3153 A3
3154 B4
3155 B7
3156 C3
3158 B4
3159 C2
3160 B4
3161 C2
3162 B4
3163 C2
3164 B4
3165 C2
3166 B4
3167 C2
3168 B4
3169 B4
3170 B4
3171 B4
3172 B4
3173 A3
3174 B4
3175 C2
3176 A3
3177 B3
3178 A3
3179 B4
3180 A2
3181 A3
3182 B6
3183 B6
3184 B6
3185 C3
3186 B4
3187 C4
3188 B4
3189 B2
3190 B3
3191 B3
3192 B3
3193 B3
3194 B3
3195 B3
3196 B3
3197 B3
3198 B3
3199 B3
3200 A2
3201 A3
3202 A3
3203 B3
3204 B3
3205 B3
3206 B3
3207 B3
3208 B3
3209 B3
3210 B3
3211 B3
3212 B3
3213 B3
3214 C4
3215 C4
3216 C4
3217 C3
3218 C4
3219 C4
3220 B6
3221 B1
3222 A1
3223 A2
3224 C3
3225 A2
3226 A2
3227 C1
3228 B1
3230 B1
3231 A2
3232 C1
3233 B7
3236 C2
3237 C4
3238 C4
3243 C6
3244 C6
3245 C5
3246 C5
3247 A7
3248 B5
3249 C5
3250 C1
3251 C1
3253 C5
3254 C5
3255 C5
3256 C5
3257 A7
3259 A7
3260 B7
3261 B7
3262 D7
3263 A1
3264 A1
3265 A1
3266 B1
3267 A1
3268 A1
3269 A1
3270 A1
3271 A1
3272 D1
3273 D1
3275 A2
3276 B1
3277 A1
3278 A1
3279 A2
3280 A2
3282 A2
3283 A2
3284 A2
3285 A2
3286 A1
3287 A1
3288 A1
3289 A1
3290 D1
3291 A1
3292 A1
3293 C5
3294 C5
4001 A7
4002 A5
4004 A5
4005 A5
4006 A5
4007 A5
4008 A5
4009 A5
4012 A2
4013 A2
4014 A2
4015 A1
4016 A2
4017 B5
4018 C5
4019 C5
4021 C4
4022 C4
4024 B3
4025 C4
4026 C3
4027 C3
4028 C3
4029 C3
4030 C3
4031 C2
4032 C2
4033 C1
4034 C1
4035 C1
4036 C3
4037 D1
4038 C1
4039 C1
4040 D1
4041 D1
4042 D1
4043 D1
4044 B1
4045 B1
4046 B1
4047 B1
4048 B1
4049 B1
4050 B1
4051 B6
4052 C4
4053 C3
4054 B1
4055 B1
4056 A1
4057 B5
4058 A1
4059 A1
4060 A1
4061 A1
6200 A4
6201 A4
6202 A4
6203 A4
6205 A4
6206 A4
6207 A4
6208 A4
6209 A3
6210 A3
6211 A3
7101 A3
7102 A5
7103 A5
7104 A4
7105 A5
7106 A5
7107 B6
7108 A3
7110 C1
7111 A2
7120 C1
7121 C6
7122 A1
7123 C5

Front 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.

CDR-Mini Front Board Copperside view stage .4 (2000-02-23)

6-5

0401 G1
0402 G1
0403 G1
0404 G2
0405 H2
0406 H2
1101 A9
1102 A15
1103 D13
1104 D15
1105 E15
1106 F15
1107 E4
1108 D3
2100 A12
2101 A11
2102 A11
2103 B11
2108 A2
2109 A3
2110 A12
2111 A12
2114 D12
2115 B14
2116 B14
2121 B2
2122 B3
2124 D14
2125 D14
2126 D14
2127 E4
2128 E4
2134 G10
2135 C11
2136 C11
2137 C11
2138 C11
2139 D11
2140 D11
2141 D11
2142 D11
2143 D11
2144 D11
2145 D11
2146 E11
2150 H3
2151 H11
2152 A4
2153 H4
2154 H5
2155 H3
2156 A10
2157 H3
2158 H8
2159 H7
2161 H1
2193 H1
2194 H1
2195 H1
2196 H2
2197 H2
2198 H2
2199 F15
2200 F10
3094 B1
3095 E11
3096 B3
3097 A2
3098 A3
3099 B2
3101 A1
3102 A2
3103 A3
3104 A15
3105 B5
3106 B5
3107 B6
3108 B6
3109 B6
3110 B7
3111 B7
3112 B7
3113 B7
3114 B8
3115 B8
3116 B8
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3118 B9
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3120 B15
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3122 B5
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3130 B8
3131 B8
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3140 B12
3141 C5
3142 C10
3143 B12
3144 C4
3145 C10
3146 C12
3147 C5
3148 C10
3149 C12
3150 C4
3151 C10
3152 C12
3153 C5
3154 C10
3155 C12
3156 C14
3157 D15
3158 C10
3159 C15
3160 D10
3161 C14
3162 D10
3163 C15
3164 D10
3165 C15
3166 D10
3167 D15
3168 D10
3169 D10
3170 D10
3171 E10
3172 E10
3173 E4
3174 E10
3175 D14
3176 E5
3177 E10
3178 E4
3179 E10
3180 E5
3181 E4
3182 A12
3183 A12
3184 A12
3185 E15
3186 F5
3187 F5
3188 F6
3189 F6
3190 F6
3191 F7
3192 F7
3193 F7
3194 F7
3195 F8
3196 F8
3197 F8
3198 F9
3199 F9
3200 G5
3201 G6
3202 G6
3203 G6
3204 G6
3205 G7
3206 G7
3207 G7
3208 G8
3209 G8
3210 G8
3211 G8
3212 G9
3213 F9
3214 E15
3215 F11
3216 F12
3217 A14
3218 H12
3219 H11
3220 B11
3221 H8
3222 H5
3223 H5
3224 B14
3225 H4
3226 H3
3227 H5
3231 H3
3232 H5
3233 D12
3234 H6
3235 A12
3236 D15
3237 F12
3238 H12
5101 C2
5102 F10
5103 D4
5104 F11
5109 A4
5110 A10
5111 A1
5112 B1
6101 B13
6102 B13
6103 B13
6104 C13
6105 C13
6106 C13
6107 C13
6108 F11
6109 H6
6110 H11
6200 C1
6201 C1
6202 D1
6203 D1
6205 E1
6206 E1
6207 E1
6209 F1
6210 F1
6211 F1
7101 A1
7102 A2
7103 A3
7104 A11
7105 B11
7106 B11
7107 D6
7108 H6
7111 H3
7112 H6
7710 A11
7711 A11
7712 H8

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

A B C D E F G H

FRONT BOARD SHEET 1

BJ721GNK

1101 *DISPLAY*

5109 2u2 F1

5110 2u2 F2

7101 BC847B
7102 BC847B
7103 BC847B
7104 BC847B
7105 BC847B
7106 BC847B
7107 BC847B

4,6V +D -27,7V -27,8V -30V!

12x BAW56 6200 6201 6202 6203 6205 6206 6207 6208 6209 6210 6211

5101 2u2 -30V

5103 2u2 -30V

5111 2u2 P351

5112 2u2 P361

VFT - DRIVER PE
VFT - DRIVER PD
VFT - DRIVER P9
VFT - DRIVER P8
VFT - DRIVER PF
VFT - DRIVER P7
VFT - DRIVER P6
VFT - DRIVER - CIRCUIT
ADRESS / DATA - BUS

7108 TMP88CU77ZF CPU

CPU - CLK
I/O
RAM
ROM

P1 3-STATE I/O
P3 3-STATE I/O
P4 ANALOG IN 3-STATE I/O
P5 ANALOG IN 3-STATE I/O

12x180p

7112 IR-EYE TSOP2836

7710 M24C01 EEPROM

7111 BC847B

1108

LEDShDATA
LEDShCLK
LEDShSTR
LED_ON

74HC4094D 7107 SRG8

0V = LED on
5V = LED off

7x LTL-1CHAE 6101 6102 6103 6104 6105 6106 6107

EH-B 1103

Sh_DATA

1102 to AF-BOARD (1536)
HP_DET
SA_IN
AmNTC
PWRDWN
I2C_DATA
I2C_CLK

1104 to AF-BOARD (1538)
CDTXTin
CdTxtDQSV
CDTXTCLK

1105 to CDR-Module (1704)
I2CW_DATA
I2CW_CLK
CWReqKbe
CWReset

1106 to Digital switching (1160)
DIGI_IO_SW2
DIGI_IO_SW0
DIGI_IO_SW1

FE-BT-VK-N

CDSILD
CDShDATA
CDSICL
CDShCLK
CDShSTR
CDSwInfo

KEY

DATA BUS TO SHEET 2

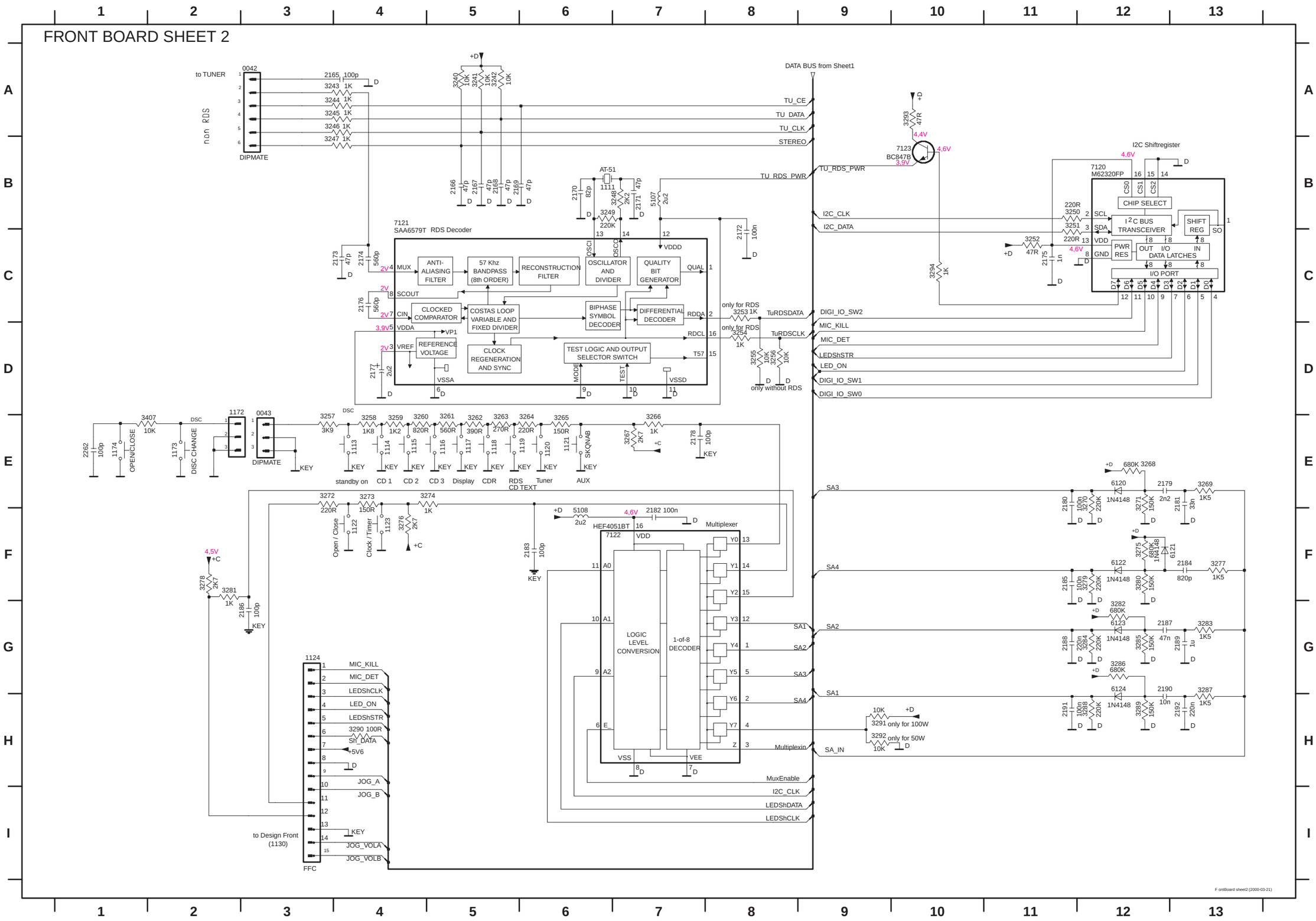
RESET JOG_VOLB I2CW_DATA I2CW_CLK JOG_B TU_DATA JOG_VOLA RC5 CDTXTDQSV JOG_A CDSwInfo TuRDSCLK CDShSTR CDSICL CDTXTCLK CDTXTin CDShDATA CDSILD CDShCLK I2C_CLK I2C_DATA PWRDWN AmNTC MuxEnable CWReqKbe CWReset LEDSDCLK LEDSHDATA TuRDSDATA STEREO TU_CLK TU_CE

shield1 shield2 shield3 shield4 shield5

. . . V DC Voltages measured during operation

6-6

FRONT BOARD SHEET 2



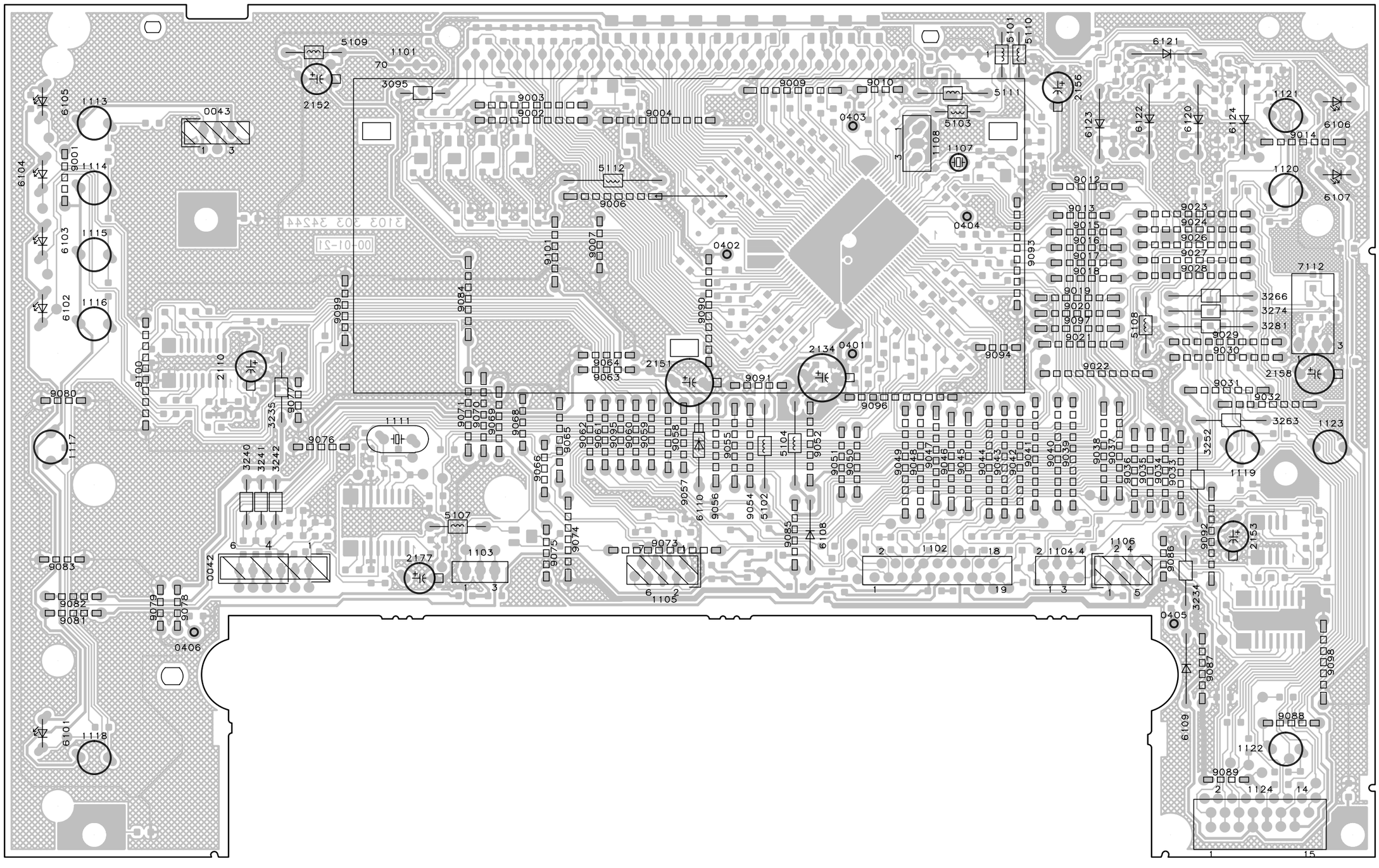
0042 A3
0043 E3
1111 B6
1113 E4
1114 E4
1115 E4
1116 E5
1117 E5
1118 E5
1119 E6
1120 E6
1121 E6
1122 F4
1123 F4
1124 G3
2165 A3
2166 B5
2167 B5
2168 B5
2169 B5
2170 B6
2171 B7
2172 C8
2173 C4
2174 C4
2175 C11
2176 C4
2177 D4
2178 E7
2179 E12
2180 E11
2181 E13
2182 F7
2183 F6
2184 F13
2185 F11
2186 G3
2187 G12
2188 G11
2189 G13
2190 G12
2191 H11
2192 H13
3240 A5
3241 A5
3242 A5
3243 A3
3244 A3
3245 A3
3246 A3
3247 B3
3248 B7
3249 B6
3250 B11
3251 B11
3252 C11
3253 C8
3254 D8
3255 D8
3256 D8
3257 D3
3258 E4
3259 E4
3260 D4
3261 D5
3262 E5
3263 D5
3264 D6
3265 E6
3266 E7
3267 E7
3268 E12
3269 E13
3270 E12
3271 E12
3272 E3
3273 E4
3274 E5
3275 F12
3276 F4
3277 F13
3278 F2
3279 F12
3280 F12
3281 F2
3282 G12
3283 G13
3284 G12
3285 G12
3286 G12
3287 G13
3288 H12
3289 H12
3290 H4
3291 H9
3292 H9
3293 A10
3294 C10
5107 B7
5108 F6
6120 E12
6121 F13
6122 F12
6123 G12
6124 G12
7120 B12
7121 B4
7122 F6
7123 B10
F424 G10
F425 G10
F426 F10

F427 E10
F478 A3
F479 A3
F480 A3
F481 A3
F482 A3
F483 B3
F484 C6
F485 B7
F486 C7
F487 D8
F488 D8
F489 E3
F490 E3
F491 G4
F492 G4
F493 G4
F494 H4
F495 H4
F496 H4
F497 H4
F498 H4
F499 H4
F500 H4
F501 I3
F502 I3
F503 I4
F504 I4
F505 I4
F506 H8

6-7

0042 C2	0406 C1	1107 A5	1117 B1	1124 D7	2158 B7	3242 B2	5102 C4	5111 A6	6106 A7	6122 A6	9004 A4	9014 A7	9021 B6	9029 B7	9036 C6	9043 B6	9050 B5	9058 B4	9065 B3	9074 C3	9081 C1	9088 D7	9095 B4
0043 A2	1101 A3	1108 A5	1118 D1	2110 B2	2177 C3	3252 B7	5103 A5	5112 A4	6107 A7	6123 A6	9006 A4	9015 A6	9022 B6	9030 B7	9037 B6	9044 B5	9051 B5	9059 B4	9066 C3	9075 C3	9082 C1	9089 D7	9096 B5
0401 B5	1102 C5	1111 B3	1119 C7	2134 B5	3095 A2	3263 B7	5104 B4	6101 D1	6108 C5	6124 A7	9007 A4	9016 A6	9023 A7	9031 B7	9038 B6	9045 B5	9052 B5	9060 B4	9068 B3	9076 B2	9083 C1	9090 B4	9097 B6
0402 A4	1103 C3	1113 A1	1120 A7	2151 B4	3234 C7	3266 B7	5107 C3	6102 B1	6109 D7	7112 A7	9009 A5	9017 A6	9024 A7	9032 B7	9039 B6	9046 B5	9053 C4	9061 B4	9069 B3	9077 B2	9084 B3	9091 B4	9098 D7
0403 A5	1104 C6	1114 A1	1121 A7	2152 A2	3235 B2	3274 B7	5108 B6	6103 A1	6110 C4	9001 A1	9010 A5	9018 B6	9025 A7	9033 C6	9040 B6	9047 B5	9054 B4	9062 B3	9070 B3	9078 C1	9085 C4	9092 C7	9099 B2
0404 A5	1105 C4	1115 A1	1122 D7	2153 C7	3240 B2	3281 B7	5109 A2	6104 A1	6120 A7	9002 A3	9012 A6	9019 B6	9026 A7	9034 C6	9041 B6	9048 B5	9055 C4	9063 B4	9071 B3	9079 C1	9086 C6	9093 A6	9100 B1
0405 C6	1106 C6	1116 B1	1123 B7	2156 A6	3241 B2	5101 A6	5110 A6	6105 A1	6121 A6	9003 A3	9013 A6	9020 B6	9028 A7	9035 C6	9042 B6	9049 B5	9057 C4	9064 B4	9073 C4	9080 B1	9087 D7	9094 B6	9101 A3

Front 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.

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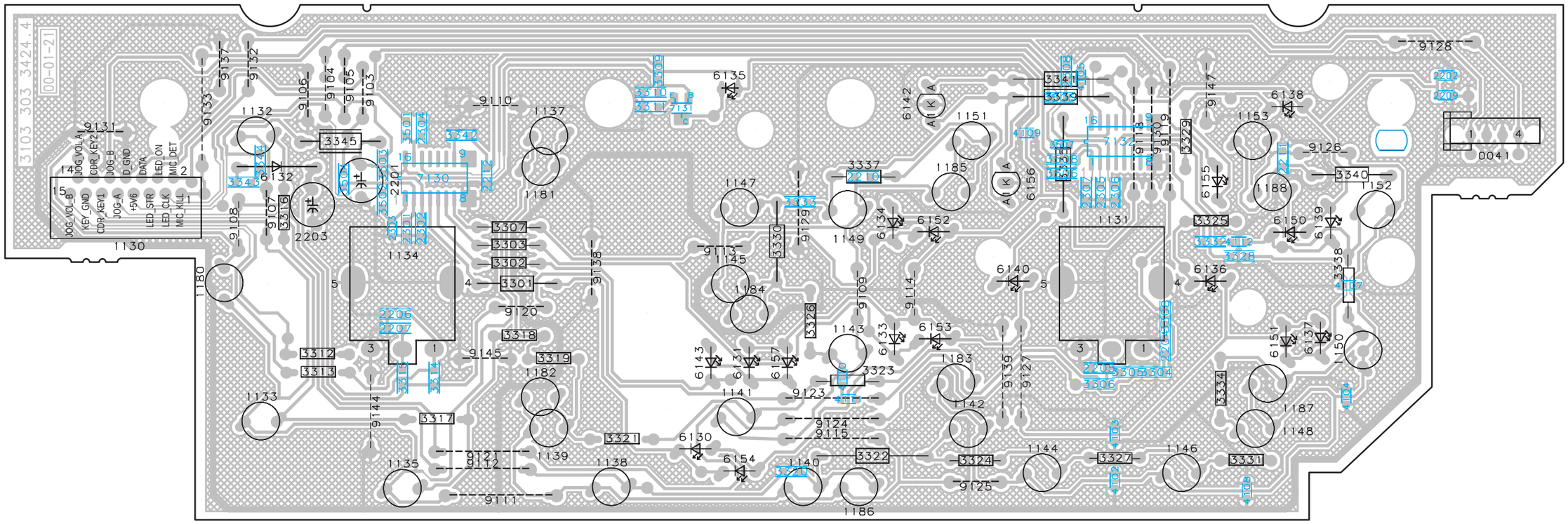
0041 A10	1139 C4	1148 C9	1183 B7	2204 B8	2304 A3	3305 C8	3318 B4	3327 C8	3337 A6	3501 A3	4103 C8	6130 C5	6139 B9	6155 A8	9106 A3	9115 C6	9127 C7	9139 C7
1130 B1	1140 C6	1149 B6	1184 B5	2205 C8	2305 A8	3306 C8	3319 B4	3328 B8	3338 B9	3502 A3	4104 C9	6131 C5	6140 B7	6156 A7	9107 B2	9118 A8	9128 A10	9144 C3
1131 B8	1141 C5	1150 B9	1185 A7	2206 B3	2306 A8	3307 B4	3320 C6	3329 A8	3339 A7	3503 A3	4105 A7	6132 A2	6142 A6	6157 C6	9108 B2	9119 A8	9129 B6	9145 B4
1132 A2	1142 C7	1151 A7	1186 C6	2207 B3	2307 A7	3312 B3	3321 C5	3330 B6	3340 A9	3504 A3	4107 B9	6133 B6	6143 C5	7130 A3	9109 B6	9120 B4	9130 A8	9147 A8
1133 C2	1143 B6	1152 A9	1187 C9	2211 A9	2308 A7	3313 C3	3322 C6	3331 C9	3341 A7	3505 A7	4108 C9	6134 B6	6150 B9	7131 A5	9110 A4	9121 C4	9131 A1	
1134 B3	1144 C7	1153 A9	1188 A9	2212 A4	3301 B4	3314 C3	3323 C6	3332 B8	3342 A4	3506 A7	4109 A7	6135 A5	6151 B9	7132 A8	9111 C4	9123 C6	9132 A2	
1135 C3	1145 B5	1180 B2	2201 A3	2301 B3	3302 B4	3315 C3	3324 C7	3333 A6	3343 A2	3507 A7	4110 C6	6136 B8	6152 B7	9103 A3	9112 C4	9124 C6	9133 A2	
1137 A4	1146 C8	1181 A4	2202 A10	2302 B3	3303 B4	3316 B2	3325 B8	3334 C8	3344 A2	3508 A7	4111 C6	6137 B9	6153 B7	9104 A3	9113 B5	9125 C7	9137 A2	
1138 C5	1147 A5	1182 C4	2203 B3	2303 B3	3304 C8	3317 C3	3326 B6	3335 A7	3345 A3	4102 C8	4112 B8	6138 A9	6154 C5	9105 A3	9114 B6	9126 A9	9138 B4	

Design Front Copperside view



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

CDR-Mini Design-Front Copperside view stage.4 (2000-02-23)

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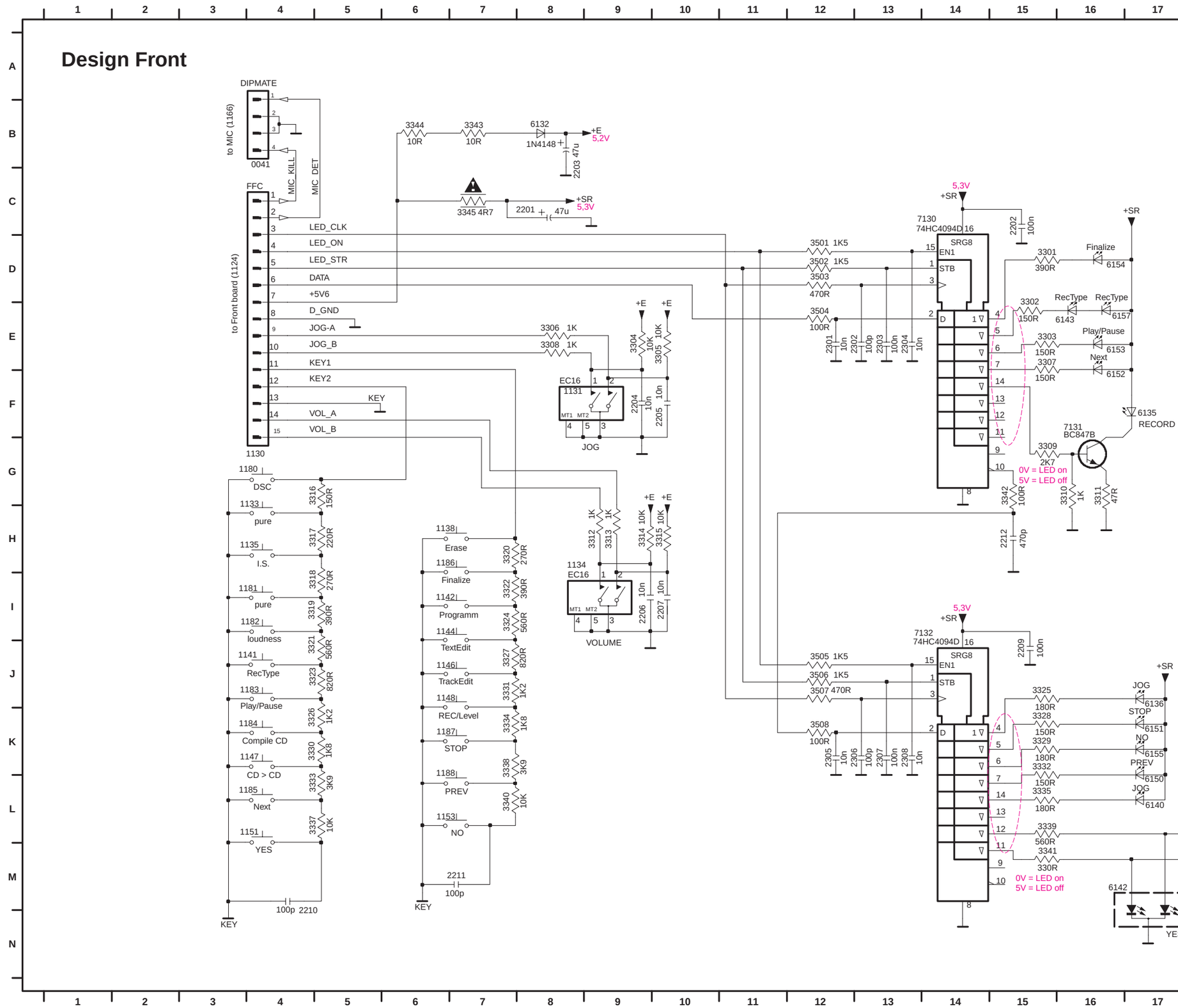
Design Front



0041 B4	6132 B8	3301 D15	F558 K16
1130 G4	6133 E16	3302 E15	F559 L16
1131 F8	6134 F16	3303 E15	
1132 G4	6135 F17	3304 E9	
1133 H4	6136 J17	3305 E10	
1134 H8	6137 K17	3306 E8	
1135 H4	6138 K17	3307 E15	
1137 I4	6139 L17	3308 E8	
1138 H7	6140 L17	3309 G15	
1139 I4	6142 M16	3310 G16	
1140 H7	6143 E16	3311 G16	
1141 J4	6150 L18	3312 H9	
1142 I7	6151 K18	3313 H9	
1143 J4	6152 F17	3314 H9	
1144 I7	6153 E17	3315 H10	
1145 K4	6154 D17	3316 G5	
1146 J7	6155 K18	3317 H5	
1147 K4	6156 M18	3318 I5	
1148 J7	6157 E17	3319 I4	
1149 L4	7130 C13	3320 H7	
1150 K7	7131 F16	3321 J4	
1151 L4	7132 I13	3322 I7	
1152 L6	F400 C4	3323 J5	
1153 L7	F401 D4	3324 I7	
1180 G3	F402 D4	3325 J15	
1181 I3	F403 D4	3326 K4	
1182 J3	F404 D4	3327 J7	
1183 K3	F405 E4	3328 K15	
1184 K3	F406 E4	3329 K15	
1185 L3	F407 E4	3330 K4	
1186 I6	F408 E4	3331 J7	
1187 K6	F409 F4	3332 K15	
1188 L6	F410 F4	3333 L5	
2201 C8	F411 F4	3334 K7	
2202 C15	F412 F4	3335 L15	
2203 C8	F413 C4	3337 L5	
2204 F9	F414 A4	3338 K7	
2205 F10	F415 B4	3339 L15	
2206 I9	F416 B4	3340 L7	
2207 I10	F417 C4	3341 M15	
2209 J15	F418 L15	3342 G15	
2210 M4	F419 L16	3343 B7	
2211 M7	F420 M15	3344 B6	
2212 H15	F421 M16	3345 C7	
2301 E12	F550 D16	3501 D12	
2302 E13	F551 D15	3502 D12	
2303 E13	F552 E16	3503 D12	
2304 E13	F553 E16	3504 E12	
2305 K12	F554 G16	3505 J12	
2306 K13	F555 J16	3506 J12	
2307 K13	F556 K16	3507 J12	
2308 K13	F557 K16	3508 K12	
		6130 D16	
		6131 E16	

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ELECTRICAL PARTSLIST FRONT BOARD

MISCELLANEOUS

1101	3103 308 52930	DISPLAY, BJ721GNK	
1102	8203 303 90420	FLEX FOIL CONNECTOR 19P	
1104	4822 267 10733	FFC SOCKET, 4P	
1105	4822 267 10953	FLEX FOIL CONNECTOR 7P	
1106	4822 267 10954	FFC SOCKET, 5P	
1113	4822 276 13775	TACT SWITCH	
1114	4822 276 13775	TACT SWITCH	
1115	4822 276 13775	TACT SWITCH	
1116	4822 276 13775	TACT SWITCH	
1117	4822 276 13775	TACT SWITCH	
1118	4822 276 13775	TACT SWITCH	
1119	4822 276 13775	TACT SWITCH	
1120	4822 276 13775	TACT SWITCH	
1121	4822 276 13775	TACT SWITCH	
1122	4822 276 13775	TACT SWITCH	
1123	4822 276 13775	TACT SWITCH	
1124	4822 265 10979	FLEX FOIL CONNECTOR 15P	
1130	4822 265 10979	FLEX FOIL CONNECTOR 15P	
1131	8203 303 84410	JOG ENCODER	
1134	8203 303 84730	VOL ENCODER	
1135	4822 276 13775	TACT SWITCH	
1138	4822 276 13775	TACT SWITCH	
1141	4822 276 13775	TACT SWITCH	
1142	4822 276 13775	TACT SWITCH	
1144	4822 276 13775	TACT SWITCH	
1146	4822 276 13775	TACT SWITCH	
1147	4822 276 13775	TACT SWITCH	
1148	4822 276 13775	TACT SWITCH	
1151	4822 276 13775	TACT SWITCH	
1153	4822 276 13775	TACT SWITCH	
1160	4822 267 10958	FFC-CONNECTOR, 5P, SIDE ENTRY	
1162	4822 267 31448	CINCH SOCKET, 2-FOLD	
1173	4822 276 13775	TACT SWITCH	
1174	4822 276 13775	TACT SWITCH	
1180	4822 276 13775	TACT SWITCH	
1181	4822 276 13775	TACT SWITCH	
1182	4822 276 13775	TACT SWITCH	
1183	4822 276 13775	TACT SWITCH	
1184	4822 276 13775	TACT SWITCH	
1185	4822 276 13775	TACT SWITCH	
1186	4822 276 13775	TACT SWITCH	
1187	4822 276 13775	TACT SWITCH	
1188	4822 276 13775	TACT SWITCH	

CAPACITORS

2100 ©	5322 122 32531	100pF	5%		50V
2101 ©	4822 126 14585	100nF	10%		50V
2102 ©	4822 122 33177	10nF	20%		50V
2103 ©	4822 122 33177	10nF	20%		50V
2103 ©	5322 122 31647	1nF	10%		63V
2108 ©	4822 126 10326	180pF	5%		
2109 ©	4822 126 10326	180pF	5%		
2110	4822 124 40433	47µF	20%		25V
2111 ©	4822 126 14585	100nF	10%		50V
2114 ©	5322 122 34099	470pF	10%		63V
2115 ©	5322 122 32448	10pF	5%		50V
2116 ©	5322 122 32448	10pF	5%		50V
2121 ©	4822 126 10326	180pF	5%		
2122 ©	4822 126 10326	180pF	5%		
2124 ©	5322 122 32448	10pF	5%		50V
2125 ©	5322 122 32448	10pF	5%		50V
2126 ©	5322 122 32448	10pF	5%		50V
2127 ©	4822 126 13486	15pF	2%		63V
2128 ©	4822 126 13486	15pF	2%		63V

CAPACITORS

2134	4822 124 12245	220µF	20%		16V
2135 ©	4822 126 10326	180pF	5%		
2136 ©	4822 126 10326	180pF	5%		
2137 ©	4822 126 10326	180pF	5%		
2138 ©	4822 126 10326	180pF	5%		
2139 ©	4822 126 10326	180pF	5%		
2140 ©	4822 126 10326	180pF	5%		
2141 ©	4822 126 10326	180pF	5%		
2142 ©	4822 126 10326	180pF	5%		
2143 ©	4822 126 10326	180pF	5%		
2144 ©	4822 126 10326	180pF	5%		
2145 ©	4822 126 10326	180pF	5%		
2146 ©	4822 126 10326	180pF	5%		
2150 ©	4822 126 14585	100nF	10%		50V
2151	4822 124 12245	220µF	20%		16V
2152	4822 124 22833	10µF	20%		50V
2153	4822 124 21913	1µF	20%		63V
2154 ©	4822 126 13838	100nF	10%		50V
2155 ©	4822 122 33177	10nF	20%		50V
2156	4822 124 22833	10µF	20%		50V
2157 ©	4822 122 33177	10nF	20%		50V
2158	4822 124 81286	47µF	20%		16V
2159 ©	4822 122 33127	2,2nF	10%		63V
2161 ©	5322 122 31647	1nF	10%		63V
2165 ©	5322 122 32531	100pF	5%		50V
2166 ©	4822 126 13692	47pF	1%		63V
2167 ©	4822 126 13692	47pF	1%		63V
2168 ©	4822 126 13692	47pF	1%		63V
2169 ©	4822 126 13692	47pF	1%		63V
2170 ©	4822 126 13695	82pF	1%		63V
2171 ©	4822 126 13692	47pF	1%		63V
2172 ©	4822 126 14585	100nF	10%		50V
2173 ©	4822 126 13692	47pF	1%		63V
2174 ©	5322 116 80853	560pF	5%		63V
2175 ©	5322 122 31647	1nF	10%		63V
2176 ©	4822 122 33173	560pF	10%		63V
2177	4822 124 22652	2,2µF	20%		50V
2178 ©	5322 122 32531	100pF	5%		50V
2179 ©	4822 122 33127	2,2nF	10%		63V
2180 ©	4822 126 14076	220nF	20%		25V
2180 ©	4822 126 14585	100nF	10%		50V
2181 ©	4822 126 12105	33nF	5%		63V
2182 ©	4822 126 14585	100nF	10%		50V
2183 ©	5322 122 32531	100pF	5%		50V
2184 ©	5322 126 10184	820pF	5%		50V
2185 ©	4822 126 13482	470nF	20%		16V
2185 ©	4822 126 14585	100nF	10%		50V
2186 ©	5322 122 32531	100pF	5%		50V
2187 ©	4822 126 13751	47nF	10%		50V
2188 ©	4822 126 14076	220nF	20%		25V
2189 ©	4822 126 14043	1µF	20%		16V
2190 ©	4822 122 33177	10nF	20%		50V
2191 ©	4822 126 14076	220nF	20%		25V
2191 ©	4822 126 14585	100nF	10%		50V
2192 ©	4822 126 14076	220nF	20%		25V
2193 ©	5322 122 31647	1nF	10%		63V
2194 ©	5322 122 31647	1nF	10%		63V
2195 ©	5322 122 31647	1nF	10%		63V
2196 ©	5322 122 31647	1nF	10%		63V
2197 ©	5322 122 31647	1nF	10%		63V
2198 ©	5322 122 31647	1nF	10%		63V
2199 ©	4822 122 33177	10nF	20%		50V
2200 ©	4822 126 14585	100nF	10%		50V
2201	4822 124 81286	47µF	20%		16V

ELECTRICAL PARTSLIST FRONT BOARD

CAPACITORS

2202 ©	4822 126 14585	100nF	10%		50V
2203	4822 124 81286	47µF	20%		16V
2204 ©	4822 122 33177	10nF	20%		50V
2205 ©	4822 122 33177	10nF	20%		50V
2206 ©	4822 122 33177	10nF	20%		50V
2207 ©	4822 122 33177	10nF	20%		50V
2209 ©	4822 126 14585	100nF	10%		50V
2210 ©	5322 122 32531	100pF	5%		50V
2211 ©	5322 122 32531	100pF	5%		50V
2212 ©	5322 122 34099	470pF	10%		63V
2220 ©	4822 126 14585	100nF	10%		50V
2221 ©	4822 126 14585	100nF	10%		50V
2222 ©	4822 126 14585	100nF	10%		50V
2227 ©	4822 126 14043	1µF	20%		16V
2228 ©	4822 126 14585	100nF	10%		50V
2230 ©	4822 126 14585	100nF	10%		50V
2232 ©	5322 126 10511	1nF	5%		50V
2234 ©	4822 126 14585	100nF	10%		50V
2235 ©	5322 122 33538	150pF	5%		63V
2260 ©	4822 126 14585	100nF	10%		50V
2262 ©	5322 122 32531	100pF	5%		50V
2301 ©	4822 122 33177	10nF	20%		50V
2302 ©	5322 122 32531	100pF	5%		50V
2303 ©	4822 126 14585	100nF	10%		50V
2304 ©	4822 122 33177	10nF	20%		50V
2305 ©	4822 122 33177	10nF	20%		50V
2306 ©	5322 122 32531	100pF	5%		50V
2307 ©	4822 126 14585	100nF	10%		50V
2308 ©	4822 122 33177	10nF	20%		50V

RESISTORS

3094 ©	4822 051 20471	470Ω	5%	0,1W
3095	4822 050 11002	1kΩ	5%	0,2W
3096 ©	4822 051 20471	470Ω	5%	0,1W
3097 ©	4822 051 20471	470Ω	5%	0,1W
3098 ©	4822 051 20471	470Ω	5%	0,1W
3099 ©	4822 051 20471	470Ω	5%	0,1W
3101 ©	4822 051 20472	4,7kΩ	5%	0,1W
3102 ©	4822 117 11149	82kΩ	1%	0,1W
3103 ©	4822 117 11149	82kΩ	1%	0,1W
3104 ©	4822 117 11503	220Ω	5%	0,1W
3105 ©	4822 117 11503	220Ω	5%	0,1W
3106 ©	4822 117 11503	220Ω	5%	0,1W
3107 ©	4822 117 11503	220Ω	5%	0,1W
3108 ©	4822 117 11503	220Ω	5%	0,1W
3109 ©	4822 117 11503	220Ω	5%	0,1W
3110 ©	4822 117 11503	220Ω	5%	0,1W
3111 ©	4822 117 11503	220Ω	5%	0,1W
3112 ©	4822 117 11503	220Ω	5%	0,1W
3113 ©	4822 117 11503	220Ω	5%	0,1W
3114 ©	4822 117 11503	220Ω	5%	0,1W
3115 ©	4822 117 11503	220Ω	5%	0,1W
3116 ©	4822 117 11503	220Ω	5%	0,1W
3117 ©	4822 117 11503	220Ω	5%	0,1W
3118 ©	4822 117 11503	220Ω	5%	0,1W
3119 ©	4822 117 11503	220Ω	5%	0,1W
3120 ©	4822 117 11503	220Ω	5%	0,1W
3121 ©	4822 117 11503	220Ω	5%	0,1W
3122 ©	4822 117 11503	220Ω	5%	0,1W
3123 ©	4822 117 11503	220Ω	5%	0,1W
3124 ©	4822 117 11503	220Ω	5%	0,1W
3125 ©	4822 117 11503	220Ω	5%	0,1W
3126 ©	4822 117 11503	220Ω	5%	0,1W
3127 ©	4822 117 11503	220Ω	5%	0,1W

RESISTORS

3128 ©	4822 117 11503	220Ω	5%	0,1W
3129 ©	4822 117 11503	220Ω	5%	0,1W
3130 ©	4822 117 11503	220Ω	5%	0,1W
3131 ©	4822 117 11503	220Ω	5%	0,1W
3132 ©	4822 117 11503	220Ω	5%	0,1W
3133 ©	4822 117 11503	220Ω	5%	0,1W
3134 ©	4822 117 11503	220Ω	5%	0,1W
3135 ©	4822 117 11503	220Ω	5%	0,1W
3136 ©	4822 117 11504	270Ω	1%	0.1W
3137 ©	4822 051 20472	4,7kΩ	5%	0,1W
3138 ©	4822 117 11149	82kΩ	1%	0,1W
3139 ©	4822 117 11149	82kΩ	1%	0,1W
3140 ©	4822 117 11504	270Ω	1%	0.1W
3141 ©	4822 117 11503	220Ω	5%	0,1W
3142 ©	4822 117 11503	220Ω	5%	0,1W
3143 ©	4822 117 11504	270Ω	1%	0.1W
3144 ©	4822 117 11503	220Ω	5%	0,1W
3145 ©	4822 051 20471	470Ω	5%	0,1W
3146 ©	4822 117 11504	270Ω	1%	0.1W
3147 ©	4822 117 11503	220Ω	5%	0,1W
3148 ©	4822 117 11503	220Ω	5%	0,1W
3149 ©	4822 117 11504	270Ω	1%	0.1W
3150 ©	4822 117 11503	220Ω	5%	0,1W
3151 ©	4822 117 11503	220Ω	5%	0,1W
3152 ©	4822 117 11504	270Ω	1%	0.1W
3153 ©	4822 051 10102	1kΩ	2%	0,25W
3154 ©	4822 117 11503	220Ω	5%	0,1W
3155 ©	4822 117 11504	270Ω	1%	0.1W
3156 ©	4822 051 10102	1kΩ	2%	0,25W
3158 ©	4822 117 11503	220Ω	5%	0,1W
3159 ©	4822 051 20471	470Ω	5%	0,1W
3160 ©	4822 117 11503	220Ω	5%	0,1W
3161 ©	4822 051 10102	1kΩ	2%	0,25W
3162 ©	4822 117 11503	220Ω	5%	0,1W
3163 ©	4822 051 10102	1kΩ	2%	0,25W
3164 ©	4822 117 11503	220Ω	5%	0,1W
3165 ©	4822 051 20471	470Ω	5%	0,1W
3166 ©	4822 117 11503	220Ω	5%	0,1W
3167 ©	4822 051 10102	1kΩ	2%	0,25W
3168 ©	4822 117 11503	220Ω	5%	0,1W
3169 ©	4822 117 11503	220Ω	5%	0,1W
3170 ©	4822 117 11503	220Ω	5%	0,1W
3171 ©	4822 117 11503	220Ω	5%	0,1W
3172 ©	4822 051 10102	1kΩ	2%	0,25W
3173 ©	4822 051 10102	1kΩ	2%	0,25W
3174 ©	4822 051 10102	1kΩ	2%	0,25W
3175 ©	4822 051 10102	1kΩ	2%	0,25W
3176 ©	4822 051 20101	100Ω	5%	0,1W
3177 ©	4822 051 10102	1kΩ	2%	0,25W
3178 ©	4822 051 20101	100Ω	5%	0,1W
3179 ©	4822 051 10102	1kΩ	2%	0,25W
3180 ©	4822 051 10102	1kΩ	2%	0,25W
3181 ©	4822 051 10102	1kΩ	2%	0,25W
3182 ©	4822 051 20471	470Ω	5%	0,1W
3183 ©	4822 117 11139	1,5kΩ	1%	0,1W
3184 ©	4822 117 11139	1,5kΩ	1%	0,1W
3185 ©	4822 051 20101	100Ω	5%	0,1W
3186 ©	4822 051 10102	1kΩ	2%	0,25W
3187 ©	4822 051 10102	1kΩ	2%	0,25W
3188 ©	4822 051 10102	1kΩ	2%	0,25W
3189 ©	4822 051 20471	470Ω	5%	0,1W
3190 ©	4822 051 10102	1kΩ	2%	0,25W
3191 ©	4822 051 20471	470Ω	5%	0,1W
3192 ©	4822 051 10102	1kΩ	2%	0,25W

ELECTRICAL PARTSLIST FRONT BOARD

RESISTORS

3193 ©	4822 051 10102	1kΩ	2%	0,25W
3194 ©	4822 051 10102	1kΩ	2%	0,25W
3195 ©	4822 051 10102	1kΩ	2%	0,25W
3196 ©	4822 051 10102	1kΩ	2%	0,25W
3197 ©	4822 051 10102	1kΩ	2%	0,25W
3198 ©	4822 051 10102	1kΩ	2%	0,25W
3199 ©	4822 051 10102	1kΩ	2%	0,25W
3200 ©	4822 051 10102	1kΩ	2%	0,25W
3201 ©	4822 051 10102	1kΩ	2%	0,25W
3202 ©	4822 051 10102	1kΩ	2%	0,25W
3203 ©	4822 051 10102	1kΩ	2%	0,25W
3204 ©	4822 051 10102	1kΩ	2%	0,25W
3205 ©	4822 051 10102	1kΩ	2%	0,25W
3206 ©	4822 051 10102	1kΩ	2%	0,25W
3207 ©	4822 051 10102	1kΩ	2%	0,25W
3208 ©	4822 051 10102	1kΩ	2%	0,25W
3209 ©	4822 051 10102	1kΩ	2%	0,25W
3210 ©	4822 051 10102	1kΩ	2%	0,25W
3211 ©	4822 051 10102	1kΩ	2%	0,25W
3212 ©	4822 051 10102	1kΩ	2%	0,25W
3213 ©	4822 051 10102	1kΩ	2%	0,25W
3214 ©	4822 051 20101	100Ω	5%	0,1W
3215 ©	4822 051 20478	4,7Ω	5%	0,1W
3216 ©	4822 051 20478	4,7Ω	5%	0,1W
3217 ©	4822 051 20684	680kΩ	5%	0,1W
3218 ©	4822 051 20478	4,7Ω	5%	0,1W
3219 ©	4822 051 20478	4,7Ω	5%	0,1W
3220 ©	4822 051 20101	100Ω	5%	0,1W
3221 ©	4822 051 20101	100Ω	5%	0,1W
3222 ©	4822 117 10833	10kΩ	1%	0,1W
3223 ©	4822 117 10833	10kΩ	1%	0,1W
3224 ©	4822 051 20684	680kΩ	5%	0,1W
3225 ©	4822 051 10102	1kΩ	2%	0,25W
3226 ©	4822 117 10837	100kΩ	1%	0,1W
3227 ©	4822 051 10102	1kΩ	2%	0,25W
3228 ©	4822 117 10833	10kΩ	1%	0,1W
3230 ©	4822 051 10102	1kΩ	2%	0,25W
3231 ©	4822 117 10837	100kΩ	1%	0,1W
3232 ©	4822 051 10102	1kΩ	2%	0,25W
3233 ©	4822 051 20101	100Ω	5%	0,1W
3234	4822 116 52175	100Ω	5%	0,5W
3235	4822 116 52195	47Ω	5%	0,5W
3236 ©	4822 051 20333	33kΩ	5%	0,1W
3237 ©	4822 051 20478	4,7Ω	5%	0,1W
3238 ©	4822 051 20478	4,7Ω	5%	0,1W
3240	4822 050 21003	10kΩ	2%	0,25W
3241	4822 050 21003	10kΩ	2%	0,25W
3242	4822 050 21003	10kΩ	2%	0,25W
3243 ©	4822 051 10102	1kΩ	2%	0,25W
3244 ©	4822 051 10102	1kΩ	2%	0,25W
3245 ©	4822 051 10102	1kΩ	2%	0,25W
3246 ©	4822 051 10102	1kΩ	2%	0,25W
3247 ©	4822 051 10102	1kΩ	2%	0,25W
3248 ©	4822 117 11449	2,2kΩ	1%	0,1W
3249 ©	4822 117 13579	220kΩ	1%	0.1W
3250 ©	4822 117 11503	220Ω	5%	0,1W
3251 ©	4822 117 11503	220Ω	5%	0,1W
3252	4822 116 52195	47Ω	5%	0,5W
3253 ©	4822 051 10102	1kΩ	2%	0,25W
3254 ©	4822 051 10102	1kΩ	2%	0,25W
3255 ©	4822 117 10833	10kΩ	1%	0,1W
3256 ©	4822 117 10833	10kΩ	1%	0,1W
3257 ©	4822 051 20392	3,9kΩ	5%	0,1W
3258 ©	4822 051 20182	1,8kΩ	5%	0,1W

RESISTORS

3259 ©	4822 051 20122	1,2kΩ	5%	0,1W
3260 ©	4822 117 11454	820Ω	1%	
3261 ©	4822 051 20561	560Ω	5%	0,1W
3262 ©	4822 051 20391	390Ω	5%	0,1W
3263	4822 116 83876	270Ω	5%	0.16W
3264 ©	4822 117 11503	220Ω	5%	0,1W
3265 ©	4822 117 10353	150Ω	5%	0,1W
3266	4822 050 11002	1kΩ	5%	0,2W
3267 ©	4822 117 12955	2,7kΩ	1%	0,1W
3268 ©	4822 051 20684	680kΩ	5%	0,1W
3269 ©	4822 117 11139	1,5kΩ	1%	0,1W
3270 ©	4822 051 20474	470kΩ	5%	0,1W
3270 ©	4822 117 13579	220kΩ	1%	0.1W
3271 ©	4822 051 20154	150kΩ	5%	0,1W
3271 ©	4822 117 10834	47kΩ	1%	0,1W
3272 ©	4822 117 11503	220Ω	5%	0,1W
3273 ©	4822 117 10353	150Ω	5%	0,1W
3274	4822 050 11002	1kΩ	5%	0,2W
3275 ©	4822 051 20684	680kΩ	5%	0,1W
3276 ©	4822 117 12955	2,7kΩ	1%	0,1W
3277 ©	4822 117 11139	1,5kΩ	1%	0,1W
3278 ©	4822 117 12955	2,7kΩ	1%	0,1W
3279 ©	4822 051 20474	470kΩ	5%	0,1W
3279 ©	4822 117 13579	220kΩ	1%	0.1W
3280 ©	4822 051 20154	150kΩ	5%	0,1W
3280 ©	4822 117 10834	47kΩ	1%	0,1W
3281	4822 050 11002	1kΩ	5%	0,2W
3282 ©	4822 051 20684	680kΩ	5%	0,1W
3283 ©	4822 117 11139	1,5kΩ	1%	0,1W
3284 ©	4822 051 20474	470kΩ	5%	0,1W
3284 ©	4822 117 13579	220kΩ	1%	0.1W
3285 ©	4822 051 20154	150kΩ	5%	0,1W
3285 ©	4822 117 10834	47kΩ	1%	0,1W
3286 ©	4822 051 20684	680kΩ	5%	0,1W
3287 ©	4822 117 11139	1,5kΩ	1%	0,1W
3288 ©	4822 051 20474	470kΩ	5%	0,1W
3288 ©	4822 117 13579	220kΩ	1%	0.1W
3289 ©	4822 051 20154	150kΩ	5%	0,1W
3289 ©	4822 117 10834	47kΩ	1%	0,1W
3290 ©	4822 051 20101	100Ω	5%	0,1W
3292 ©	4822 117 10833	10kΩ	1%	0,1W
3293 ©	4822 051 20479	47Ω	5%	0,1W
3294 ©	4822 051 10102	1kΩ	2%	0,25W
3301	4822 116 83881	390Ω	5%	0,5W
3302	4822 116 83868	150Ω	5%	0,5W
3302	4822 116 83881	390Ω	5%	0,5W
3303	4822 116 83868	150Ω	5%	0,5W
3304 ©	4822 117 10833	10kΩ	1%	0,1W
3305 ©	4822 117 10833	10kΩ	1%	0,1W
3306 ©	4822 051 10102	1kΩ	2%	0,25W
3307	4822 116 83868	150Ω	5%	0,5W
3308 ©	4822 051 10102	1kΩ	2%	0,25W
3309 ©	4822 117 12955	2,7kΩ	1%	0,1W
3310 ©	4822 051 10102	1kΩ	2%	0,25W
3311 ©	4822 051 20479	47Ω	5%	0,1W
3312	4822 050 11002	1kΩ	5%	0,2W
3313	4822 050 11002	1kΩ	5%	0,2W
3314 ©	4822 117 10833	10kΩ	1%	0,1W
3315 ©	4822 117 10833	10kΩ	1%	0,1W
3316	4822 116 83868	150Ω	5%	0,5W
3317	4822 116 83872	220Ω	5%	0,5W
3318	4822 116 83876	270Ω	5%	0.16W
3319	4822 116 83881	390Ω	5%	0,5W
3320 ©	4822 117 11504	270Ω	1%	0.1W

ELECTRICAL PARTSLIST FRONT BOARD

RESISTORS

3321	4822 116 52226	560Ω	5%	0,5W
3322	4822 116 83881	390Ω	5%	0,5W
3323	4822 116 52231	820Ω	5%	0,5W
3324	4822 116 52226	560Ω	5%	0,5W
3325	4822 116 52213	180Ω	5%	0,5W
3326	4822 116 52207	1,2kΩ	5%	0,5W
3327	4822 116 52231	820Ω	5%	0,5W
3328 ©	4822 117 10353	150Ω	5%	0,1W
3329	4822 116 52213	180Ω	5%	0,5W
3330	4822 116 52249	1,8kΩ	5%	0,16W
3331	4822 116 52207	1,2kΩ	5%	0,5W
3332 ©	4822 117 10353	150Ω	5%	0,1W
3333 ©	4822 051 20392	3,9kΩ	5%	0,1W
3334	4822 116 52249	1,8kΩ	5%	0,16W
3335	4822 116 52213	180Ω	5%	0,5W
3337	4822 050 21003	10kΩ	2%	0,25W
3338	4822 116 52276	3,9kΩ	5%	0,5W
3339	4822 116 52226	560Ω	5%	0,5W
3340	4822 050 21003	10kΩ	2%	0,25W
3341	4822 116 52219	330Ω	5%	0,5W
3342 ©	4822 051 20101	100Ω	5%	0,1W
3343 ©	4822 051 20109	10Ω	5%	0,1W
3344 ©	4822 051 20109	10Ω	5%	0,1W
3345	4822 052 10478	4,7Ω	5%	NFR
3350	4822 116 83883	470Ω	5%	0,16W
3351 ©	4822 117 10833	10kΩ	1%	0,1W
3353 ©	4822 117 11148	56kΩ	1%	0,1W
3354 ©	4822 051 20399	39Ω	5%	0,1W
3356 ©	4822 117 11449	2,2kΩ	1%	0,1W
3357 ©	4822 051 20683	68kΩ	5%	0,1W
3358 ©	4822 117 10833	10kΩ	1%	0,1W
3359 ©	4822 117 11503	220Ω	5%	0,1W
3362 ©	4822 051 20471	470Ω	5%	0,1W
3364 ©	4822 051 20101	100Ω	5%	0,1W
3366 ©	4822 117 10837	100kΩ	1%	0,1W
3367 ©	4822 051 20829	82Ω	5%	0,1W
3368 ©	4822 051 20561	560Ω	5%	0,1W
3401 ©	4822 117 12955	2,7kΩ	1%	0,1W
3403 ©	4822 051 10102	1kΩ	2%	0,25W
3404 ©	4822 051 20479	47Ω	5%	0,1W
3407 ©	4822 117 10833	10kΩ	1%	0,1W
3501 ©	4822 117 11139	1,5kΩ	1%	0,1W
3502 ©	4822 117 11139	1,5kΩ	1%	0,1W
3503 ©	4822 051 20471	470Ω	5%	0,1W
3504 ©	4822 051 20101	100Ω	5%	0,1W
3505 ©	4822 117 11139	1,5kΩ	1%	0,1W
3506 ©	4822 117 11139	1,5kΩ	1%	0,1W
3507 ©	4822 051 20471	470Ω	5%	0,1W
3508 ©	4822 051 20101	100Ω	5%	0,1W

4001 ©	4822 051 20008	CHIP JUMPER 0805
4002 ©	4822 051 20008	CHIP JUMPER 0805
4004 ©	4822 051 20008	CHIP JUMPER 0805
4005 ©	4822 051 20008	CHIP JUMPER 0805
4006 ©	4822 051 20008	CHIP JUMPER 0805
4007 ©	4822 051 20008	CHIP JUMPER 0805
4008 ©	4822 051 20008	CHIP JUMPER 0805
4009 ©	4822 051 20008	CHIP JUMPER 0805
4012 ©	4822 051 20008	CHIP JUMPER 0805
4013 ©	4822 051 20008	CHIP JUMPER 0805
4014 ©	4822 051 20008	CHIP JUMPER 0805
4015 ©	4822 051 20008	CHIP JUMPER 0805
4016 ©	4822 051 20008	CHIP JUMPER 0805
4017 ©	4822 051 20008	CHIP JUMPER 0805
4018 ©	4822 051 20008	CHIP JUMPER 0805

RESISTORS

4019 ©	4822 051 20008	CHIP JUMPER 0805
4021 ©	4822 051 20008	CHIP JUMPER 0805
4022 ©	4822 051 20008	CHIP JUMPER 0805
4024 ©	4822 051 20008	CHIP JUMPER 0805
4025 ©	4822 051 20008	CHIP JUMPER 0805
4026 ©	4822 051 20008	CHIP JUMPER 0805
4027 ©	4822 051 20008	CHIP JUMPER 0805
4028 ©	4822 051 20008	CHIP JUMPER 0805
4029 ©	4822 051 20008	CHIP JUMPER 0805
4030 ©	4822 051 20008	CHIP JUMPER 0805
4031 ©	4822 051 20008	CHIP JUMPER 0805
4032 ©	4822 051 20008	CHIP JUMPER 0805
4033 ©	4822 051 20008	CHIP JUMPER 0805
4034 ©	4822 051 20008	CHIP JUMPER 0805
4035 ©	4822 051 20008	CHIP JUMPER 0805
4036 ©	4822 051 20008	CHIP JUMPER 0805
4037 ©	4822 051 20008	CHIP JUMPER 0805
4038 ©	4822 051 20008	CHIP JUMPER 0805
4039 ©	4822 051 20008	CHIP JUMPER 0805
4040 ©	4822 051 20008	CHIP JUMPER 0805
4041 ©	4822 051 20008	CHIP JUMPER 0805
4042 ©	4822 051 20008	CHIP JUMPER 0805
4043 ©	4822 051 20008	CHIP JUMPER 0805
4044 ©	4822 051 20008	CHIP JUMPER 0805
4045 ©	4822 051 20008	CHIP JUMPER 0805
4046 ©	4822 051 20008	CHIP JUMPER 0805
4047 ©	4822 051 20008	CHIP JUMPER 0805
4048 ©	4822 051 20008	CHIP JUMPER 0805
4049 ©	4822 051 20008	CHIP JUMPER 0805
4050 ©	4822 051 20008	CHIP JUMPER 0805
4051 ©	4822 051 20008	CHIP JUMPER 0805
4052 ©	4822 051 20008	CHIP JUMPER 0805
4053 ©	4822 051 20008	CHIP JUMPER 0805
4054 ©	4822 051 20008	CHIP JUMPER 0805
4055 ©	4822 051 20008	CHIP JUMPER 0805
4056 ©	4822 051 20008	CHIP JUMPER 0805
4057 ©	4822 051 20008	CHIP JUMPER 0805
4058 ©	4822 051 20008	CHIP JUMPER 0805
4059 ©	4822 051 20008	CHIP JUMPER 0805
4060 ©	4822 051 20008	CHIP JUMPER 0805
4061 ©	4822 051 20008	CHIP JUMPER 0805
4102 ©	4822 051 20008	CHIP JUMPER 0805
4103 ©	4822 051 20008	CHIP JUMPER 0805
4104 ©	4822 051 20008	CHIP JUMPER 0805
4105 ©	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
4109 ©	4822 051 20008	CHIP JUMPER 0805
4110 ©	4822 051 20008	CHIP JUMPER 0805
4111 ©	4822 051 20008	CHIP JUMPER 0805
4112 ©	4822 051 20008	CHIP JUMPER 0805
4201 ©	4822 051 20008	CHIP JUMPER 0805
4203 ©	4822 051 20008	CHIP JUMPER 0805
4204 ©	4822 051 20008	CHIP JUMPER 0805
4205 ©	4822 051 20008	CHIP JUMPER 0805
4206 ©	4822 051 20008	CHIP JUMPER 0805
4501 ©	4822 051 20008	CHIP JUMPER 0805

COILS

1107	4822 242 70938	CRYSTAL 32,768kHz
1108	5322 242 73686	CERAMIC RESONATOR, 12MHZ
1111	4822 242 72195	XTAL 4,332MHz
5101	4822 156 21721	2,2µH

ELECTRICAL PARTSLIST FRONT BOARD

COILS

5102	4822 156 21721	2,2µH
5103	4822 156 21721	2,2µH
5104	4822 156 21721	2,2µH
5107	4822 156 21721	2,2µH
5108	4822 156 21721	2,2µH
5109	4822 156 21721	2,2µH
5110	4822 156 21721	2,2µH
5111	4822 156 21721	2,2µH
5112	4822 156 21721	2,2µH
5130	2422 536 00019	TRANSFORMER, DIGITAL OUT

DIODES

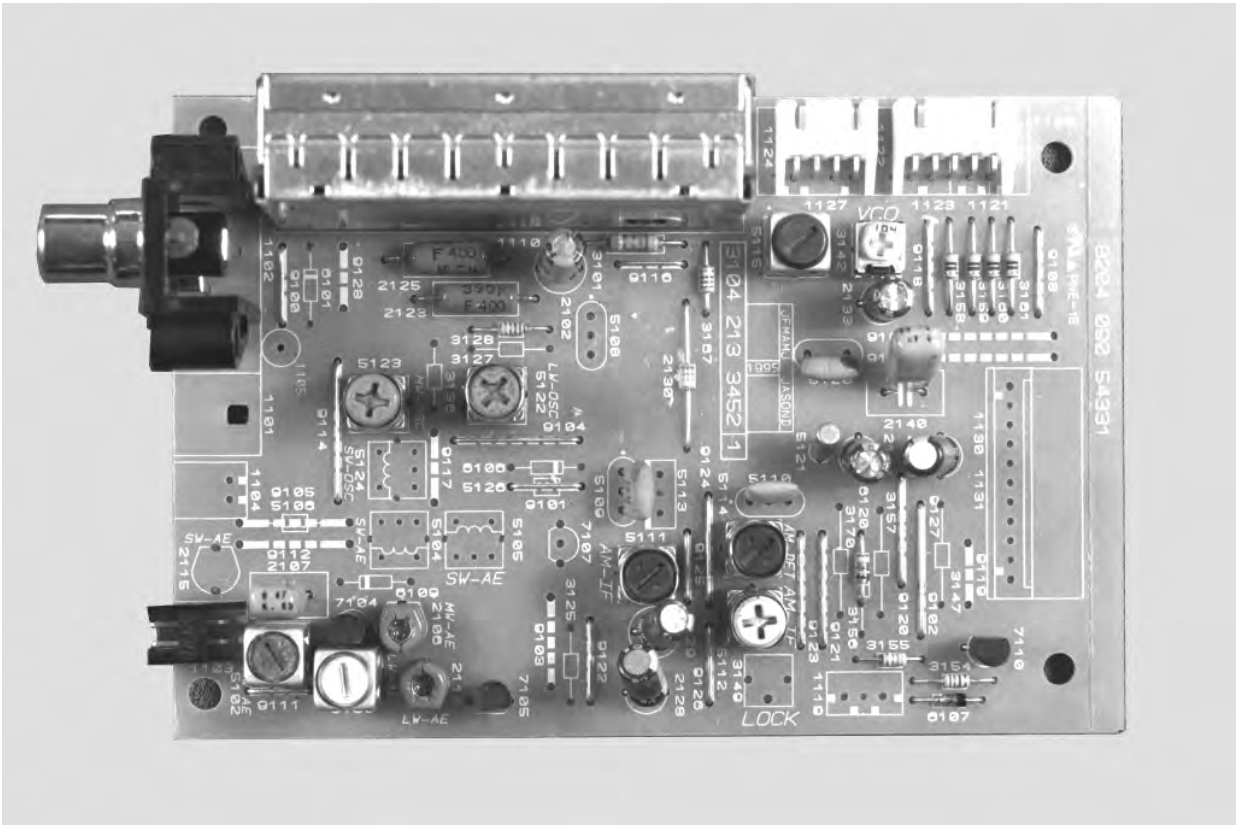
6101	4822 130 11589	LED, LTL-1CHAE
6102	4822 130 11589	LED, LTL-1CHAE
6103	4822 130 11589	LED, LTL-1CHAE
6104	4822 130 11589	LED, LTL-1CHAE
6105	9322 131 65675	LED, LTL-1CHEE
6106	4822 130 11589	LED, LTL-1CHAE
6107	4822 130 11589	LED, LTL-1CHAE
6108	4822 130 30621	1N4148
6109	4822 130 30621	1N4148
6110	4822 130 30621	1N4148
6120	4822 130 30621	1N4148
6121	4822 130 30621	1N4148
6122	4822 130 30621	1N4148
6123	4822 130 30621	1N4148
6124	4822 130 30621	1N4148
6132	4822 130 30621	1N4148
6135	8203 303 84440	LED 5MM BLUE
6136	8203 303 84850	LED, LTL2R3KFK-071A
6140	8203 303 84850	LED, LTL2R3KFK-071A
6143	4822 130 11589	LED, LTL-1CHAE
6150	4822 130 11589	LED, LTL-1CHAE
6151	4822 130 11589	LED, LTL-1CHAE
6152	4822 130 11589	LED, LTL-1CHAE
6153	4822 130 11589	LED, LTL-1CHAE
6154	4822 130 11589	LED, LTL-1CHAE
6155	4822 130 11589	LED, LTL-1CHAE
6156	8203 303 84450	LED 5MM AMBER/H.E.RED
6157	4822 130 11589	LED, LTL-1CHAE
6170	8203 303 84430	LED 5MM 90 DEGREE BLUE
6200	5322 130 30691	BAW56
6201	5322 130 30691	BAW56
6202	5322 130 30691	BAW56
6203	5322 130 30691	BAW56
6205	5322 130 30691	BAW56
6206	5322 130 30691	BAW56
6207	5322 130 30691	BAW56
6208	5322 130 30691	BAW56
6209	5322 130 30691	BAW56
6210	5322 130 30691	BAW56
6211	5322 130 30691	BAW56

TRANSISTORS

7101 ©	4822 130 60511	BC847B
7102 ©	4822 130 60511	BC847B
7103 ©	4822 130 60511	BC847B
7104 ©	4822 130 60511	BC847B
7105 ©	4822 130 60511	BC847B
7106 ©	4822 130 60511	BC847B
7111 ©	4822 130 60511	BC847B
7123 ©	4822 130 60511	BC847B
7131 ©	4822 130 60511	BC847B
7160 ©	4822 130 60511	BC847B

INTEGRATED CIRCUITS

7107 ©	4822 209 15449	74HC4094D, SHIFT REGISTER
7108 ©	8203 303 90210	TMP88CU77ZF, µP
7110 ©	9322 131 04668	M24C01, EEPROM
7112	9322 137 14667	IR RECEIVER TSOP2836ZC1
7112	9322 155 22667	IR RECEIVER TSOP2836
7120 ©	4822 209 17345	M62320FP, I2C SHIFT REGISTER
7121	4822 209 31981	SAA6579T/V1
7122 ©	5322 209 11446	HEF4051BT, MULTIPLEXER
7130 ©	4822 209 15449	74HC4094D, SHIFT REGISTER
7132 ©	4822 209 15449	74HC4094D, SHIFT REGISTER
7140 ©	4822 209 17235	74LVU04D, 6-FOLD INVERTER
7142	4822 209 10263	HEF4052BP, SELECTOR IC
7145	4822 209 10263	HEF4052BP, SELECTOR IC



Tuner 95

(3 Band RDS Tuner)

TABLE OF CONTENTS

TUNER ADJUSTMENT TABLE (**TUNER 95** FM/MW/LW - version with AM-frame aerial)

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (50kHz grid)			108MHz	check	6	7...9V
			87.5MHz	check		1.3...2V
MW 531 - 1602kHz (9kHz grid)			1602kHz	5123		8.3V ±0.2V
			531kHz	check		1V ±0.4V
LW 153 - 279kHz (3kHz grid)			279kHz	5122		8.3V ±0.2V
			153kHz	check		1V ±0.4V
FM - IF						
FM	98MHz 1mV continuous wave **shortcircuit pin 21 of IC7108 to ground**	A	98MHz	5107	1 2	0mV ±3mV
FM - VCO						
FM	98MHz 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz [1]
DISTORTION						
FM	98MHz 1mV 90% Left + 9% pilot mod=1kHz	A	98MHz	mixcoil inside tuner 1110	4	min. distortion
AM IF						
MW	450kHz Δf=10kHz as low as possible	100nF, 50R, C, C	MW	5111	7	max., f_o symmetric
				5112		
	450kHz continuous wave			5114	1 2	0mV ±2mV
AM RF [2]						
MW	558kHz	B	558kHz	5102	7	max., f_o symmetric
	1494kHz	Δf = ±30kHz V_{RF} as low as possible	1494kHz	2106		
LW	198kHz		198kHz	5103		

Tuner 95, 3104 217 04120 (2000-02-17)

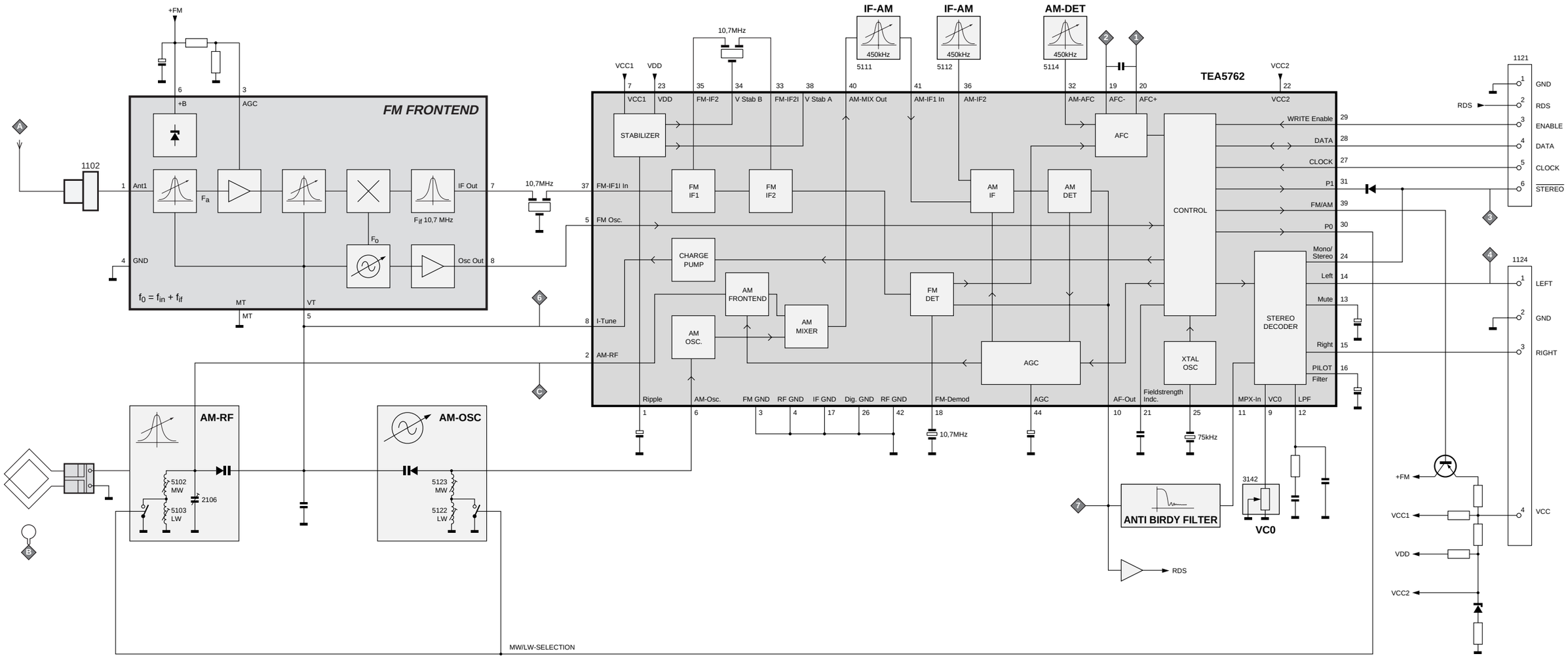
[1] If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum)

[2] For AM RF adjustments the original frame antenna has to be used !

↕ Repeat

7A-3

BLOCK DIAGRAM TUNER95

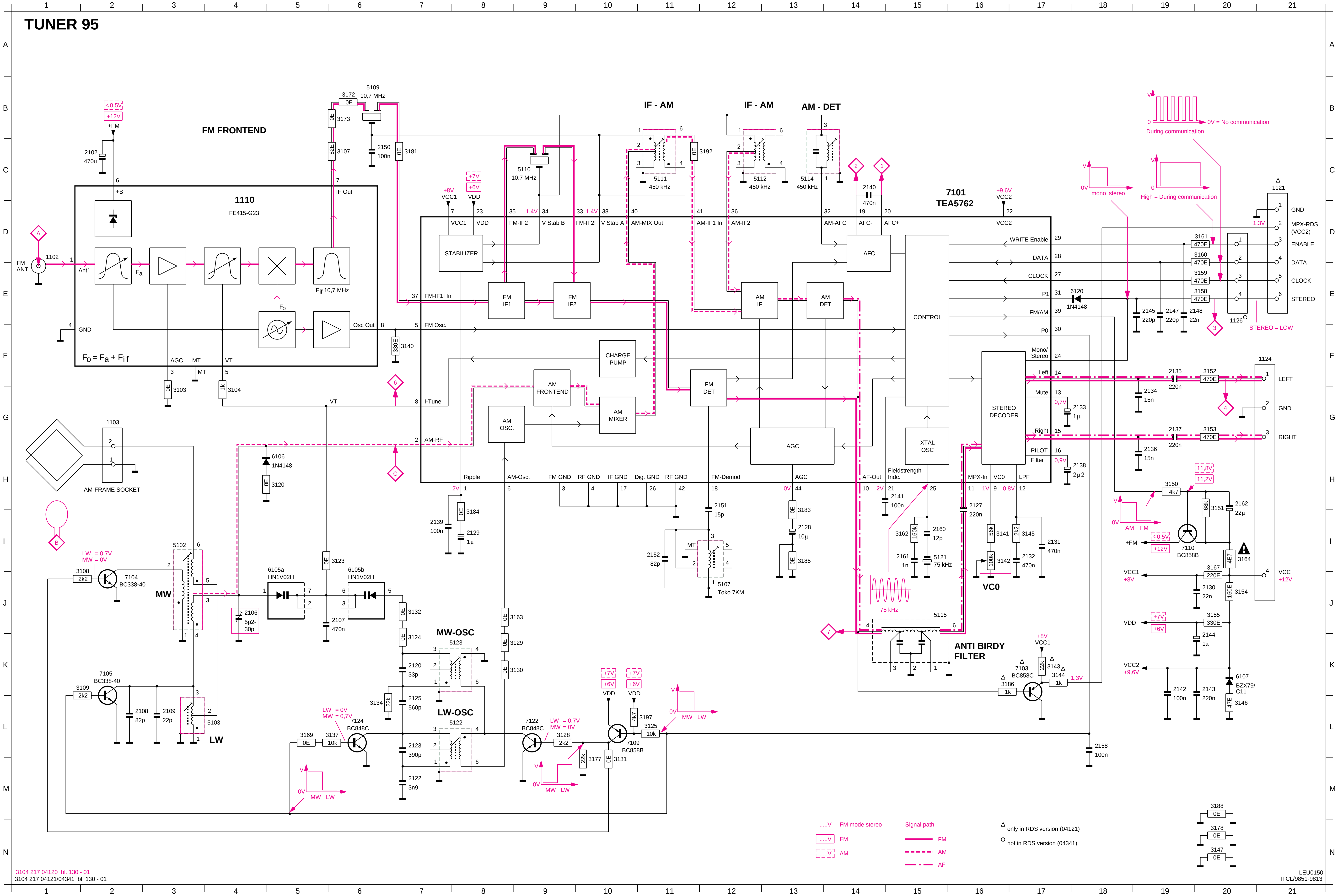


1102	D1	1124	F21	2107	J6	2122	M7	2128	I13	2132	I17	2136	H19	2140	C14	2144	K20	2150	C6
1103	G2	1126	E20	2108	L2	2123	L7	2129	I8	2133	G18	2137	G19	2141	H15	2145	E19	2151	H12
1110	D4	2102	C2	2109	L3	2125	L7	2130	J20	2134	G19	2138	H18	2142	K19	2147	E19	2152	I11
1121	C21	2106	J4	2120	K7	2127	H16	2131	I17	2135	F19	2139	I7	2143	K20	2148	E19	2158	L18

2160	I15	3104	G4	3120	H5	3128	L9	3132	J7	3141	I16	3145	I17	3151	I20	3155	J20	3161	D19
2161	I15	3107	C6	3123	I6	3129	K8	3134	L6	3142	I16	3146	L20	3152	F20	3158	E19	3162	I15
2162	H20	3108	J1	3124	K7	3130	K8	3137	L5	3143	K17	3147	N20	3153	G20	3159	E19	3163	J8
3103	G3	3109	K1	3125	L11	3131	M10	3140	F7	3144	K17	3150	H19	3154	J20	3160	D19	3164	I20

3167	I20	3177	M10	3184	I8	3192	C12	5107	J12	5112	C12	5122	L7	6106	H5	7103	K17	7110	I19
3169	L5	3178	N20	3185	I13	3197	L11	5109	B6	5114	C13	5123	K7	6107	K20	7104	J2	7122	L9
3172	B6	3181	C7	3186	K16	5102	I3	5110	C9	5115	J15	6105a	I5	6120	E17	7105	K2	7124	L6
3173	B6	3183	I13	3188	M20	5103	L4	5111	C11	5121	I15	6105b	I6	7101	C15	7109	L10		

TUNER 95



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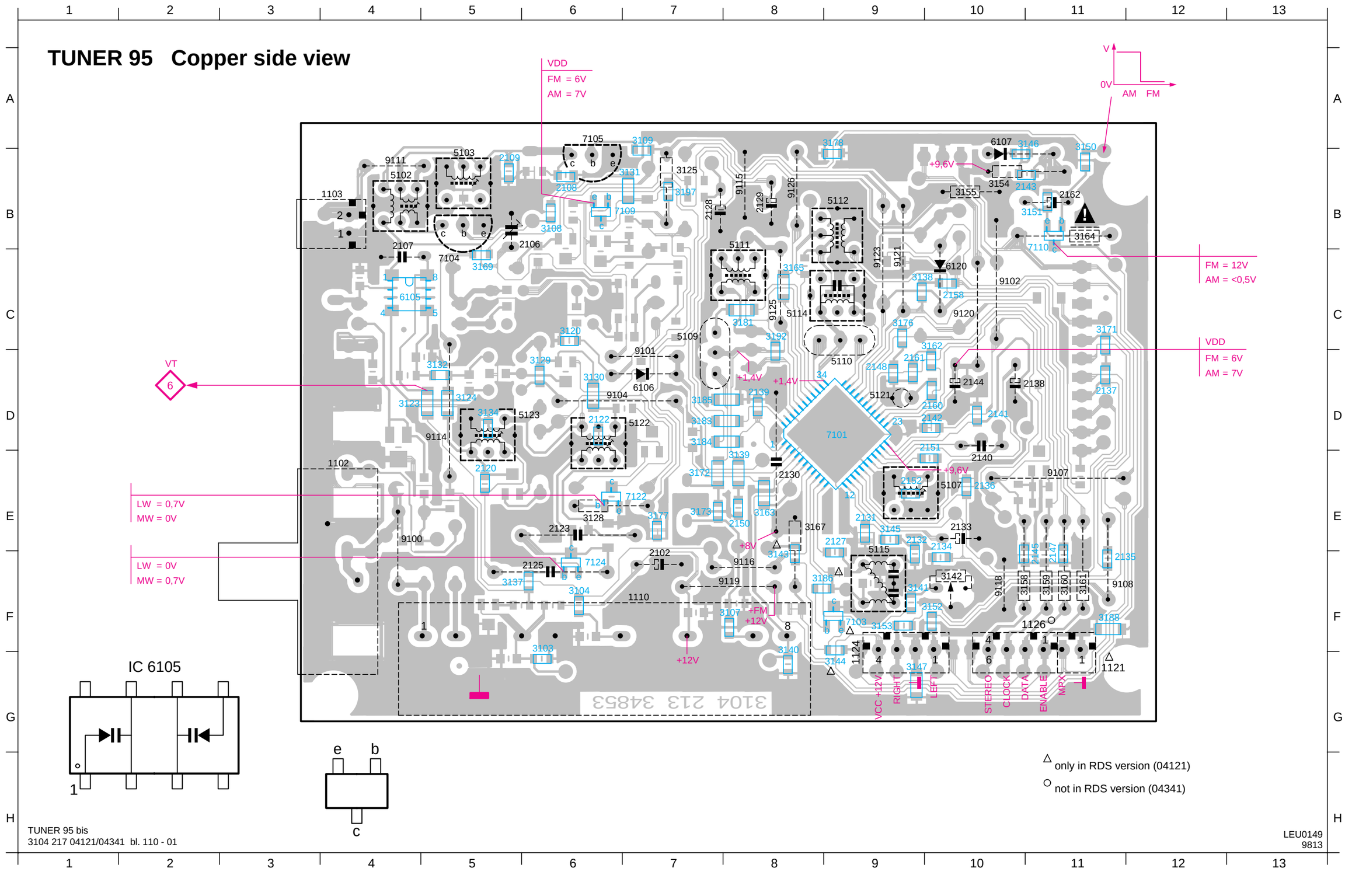
1102	E4	2107	B4	2128	B7	2136	F10	2144	D10	2160	D9	3120	C6	3132	D5	3143	F8	3153	F9	3163	E8	3176	C9	3188	F11	5111	B8	6106	D7	7110	C11	9108	F11	9121	C9
1103	B4	2108	B6	2129	B8	2137	D11	2145	F11	2161	D9	3123	D4	3134	D5	3144	G9	3154	B10	3164	B11	3177	E7	3192	C8	5112	B9	6107	A10	7122	E7	9111	B4	9123	C9
1110	F7	2109	B5	2130	E8	2138	D10	2147	F11	2162	B11	3124	D5	3137	F5	3145	E9	3155	B10	3165	C8	3178	A8	3197	B7	5114	C8	6120	C10	7124	F6	9114	D5	9125	C8
1121	G11	2120	E5	2131	E9	2139	D8	2148	D9	3103	G6	3125	B7	3138	C9	3146	A10	3158	F11	3167	E8	3181	C8	5102	B4	5115	F9	7101	D9	9100	E4	9115	B8	9126	B8
1124	G9	2122	D6	2132	E9	2140	E10	2150	E8	3104	F6	3128	E6	3139	E8	3147	G9	3159	F11	3169	C5	3183	D7	5103	B5	5121	D9	7103	F9	9101	D7	9116	F8		
1126	F10	2123	E6	2133	E10	2141	D10	2151	E9	3107	F7	3129	D6	3140	G8	3150	B11	3160	F11	3171	C11	3184	D7	5107	E10	5122	D7	7104	C5	9102	C10	9118	F10		
2102	F7	2125	F6	2134	F10	2142	D9	2152	E9	3108	B6	3130	D6	3141	F9	3151	B10	3161	F11	3172	E7	3185	D7	5109	C7	5123	D5	7105	A6	9104	D6	9119	F7		
2106	B5	2127	E9	2135	F11	2143	B10	2158	C10	3109	A7	3131	B6	3142	F10	3152	F9	3162	C9	3173	E7	3186	F8	5110	D9	6105	C4	7109	B6	9107	E11	9120	C10		



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ELECTRICAL PARTSLIST TUNER 95

MISCELLANEOUS

1102	4822 267 10283	SOCKET COAX, IEC 75Ω
1103	4822 265 31184	JST CONNECTOR 2 POLE
1110	4822 210 10492	FRONTEND ASSY /02/08
1110	4822 210 10739	FM-FRONTEND FE415-G23

CAPACITORS

2102	4822 124 80791	470µF	20%	16V	
2106	4822 125 60102	30pF TRIMCAP			
2107	4822 121 51252	470nF	5%	63V	
2108 ©	4822 126 13695	82pF	1%	63V	
2109 ©	5322 122 32658	22pF	5%	50V	
2120 ©	5322 122 32659	33pF	5%	50V	
2122 ©	5322 126 10465	3,9nF	10%	63V	
2123	4822 121 10766	390pF	1%	630V	
2125	4822 121 10578	560pF	1%	630V	
2127 ©	4822 122 32927	220nF	10%	63V	
2128	4822 124 41579	10µF	20%	50V	
2129	4822 124 40242	1µF	20%	63V	
2130	4822 126 11585	22nF	20%	50V	
2131 ©	4822 122 33325	470nF	20%	50V	
2132 ©	4822 122 33325	470nF	20%	50V	
2133	4822 124 40242	1µF	20%	63V	
2134 ©	4822 126 13188	15nF	5%	63V	
2135 ©	4822 122 32927	220nF	10%	63V	
2136 ©	4822 126 13188	15nF	5%	63V	
2137 ©	4822 122 32927	220nF	10%	63V	
2138	4822 124 41576	2,2µF	20%	50V	
2140	4822 121 51252	470nF	5%	63V	
2141 ©	4822 122 31947	100nF	20%	50V	
2142 ©	4822 122 31947	100nF	20%	50V	
2143 ©	4822 122 32927	220nF	10%	63V	
2144	4822 124 40242	1µF	20%	63V	
2145 ©	4822 122 33575	220pF	5%	50V	
2147 ©	4822 122 33575	220pF	5%	50V	
2148 ©	4822 122 33575	220pF	5%	50V	
2150 ©	4822 122 31947	100nF	20%	50V	
2158 ©	4822 122 31947	100nF	20%	50V	
2160 ©	4822 122 32139	12pF	5%	63V	
2161 ©	5322 122 34123	1nF	10%	50V	
2162	4822 124 81151	22µF	20%	50V	

RESISTORS

3090	4822 116 52206	120Ω	5%	0,5W
3091	4822 116 52206	120Ω	5%	0,5W
3092	4822 116 52219	330Ω	5%	0,5W
3102 ©	4822 117 13579	220kΩ	1%	0.1W
3103 ©	4822 051 20184	180kΩ	5%	0,1W
3104 ©	4822 051 10102	1kΩ	2%	0,25W
3107 ©	4822 051 20829	82Ω	5%	0,1W
3108 ©	4822 117 11449	2,2kΩ	1%	0,1W
3109 ©	4822 117 11449	2,2kΩ	1%	0,1W
3120 ©	4822 051 20008	CHIP JUMPER 0805		
3123 ©	4822 051 10008	CHIP JUMPER 1206		
3124 ©	4822 051 10008	CHIP JUMPER 1206		
3125	4822 116 83864	10kΩ	5%	0,5W
3128	4822 116 52256	2,2kΩ	5%	0,16W
3129 ©	4822 051 20008	CHIP JUMPER 0805		
3130 ©	4822 051 10008	CHIP JUMPER 1206		
3131 ©	4822 051 10008	CHIP JUMPER 1206		
3132 ©	4822 051 20008	CHIP JUMPER 0805		
3134 ©	4822 051 20223	22kΩ	5%	0,1W
3137 ©	4822 117 10833	10kΩ	1%	0,1W

RESISTORS

3140 ©	4822 051 20331	330Ω	5%	0,1W
3141 ©	4822 117 11148	56kΩ	1%	0,1W
3142	4822 100 11163	100kΩ TRIMPOT LIN.		
3143 ©	4822 051 20223	22kΩ	5%	0,1W
3144 ©	4822 051 10102	1kΩ	2%	0,25W
3145 ©	4822 117 11449	2,2kΩ	1%	0,1W
3146 ©	4822 051 20479	47Ω	5%	0,1W
3150 ©	4822 051 20472	4,7kΩ	5%	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 116 83868	150Ω	5%	0,5W
3155	4822 116 52219	330Ω	5%	0,5W
3158	4822 116 83883	470Ω	5%	0,16W
3159	4822 116 83883	470Ω	5%	0,16W
3160	4822 116 83883	470Ω	5%	0,16W
3161	4822 116 83883	470Ω	5%	0,16W
3162 ©	4822 117 13579	220kΩ	1%	0.1W
3163 ©	4822 051 10008	CHIP JUMPER 1206		
3164	4822 052 10478	4,7Ω	5%	NFR
3167	4822 116 83872	220Ω	5%	0,5W
3169 ©	4822 051 20008	CHIP JUMPER 0805		
3172 ©	4822 051 10008	CHIP JUMPER 1206		
3181 ©	4822 051 10008	CHIP JUMPER 1206		
3183 ©	4822 051 10008	CHIP JUMPER 1206		
3184 ©	4822 051 10008	CHIP JUMPER 1206		
3185 ©	4822 051 10008	CHIP JUMPER 1206		
3186 ©	4822 051 10102	1kΩ	2%	0,25W
3188 ©	4822 051 10008	CHIP JUMPER 1206		
3191 ©	4822 117 10353	150Ω	5%	0,1W
3192 ©	4822 051 20008	CHIP JUMPER 0805		
3197 ©	4822 051 20472	4,7kΩ	5%	0,1W

COILS

5102	4822 157 71634	RF-COIL MW
5103	4822 157 71635	RF-COIL LW
5109	4822 157 71639	FM-IF FILTER 10,7MHz
5110	4822 242 70665	FM-IF FILTER 10,7MHz
5111	4822 158 60511	AM-IF FILTER 450kHz
5112	4822 157 70302	AM-IF FILTER 450kHz
5114	4822 157 70302	AM-IF FILTER 450kHz
5115	4822 157 71636	ANTI BIRDY FILTER
5120	4822 242 10251	CER. DISCR. 10.7MG61KA-TF21
5121	4822 242 10261	QUARTZ 75kHz
5122	4822 157 60517	RF-COIL AM
5123	4822 157 60517	RF-COIL AM

DIODES

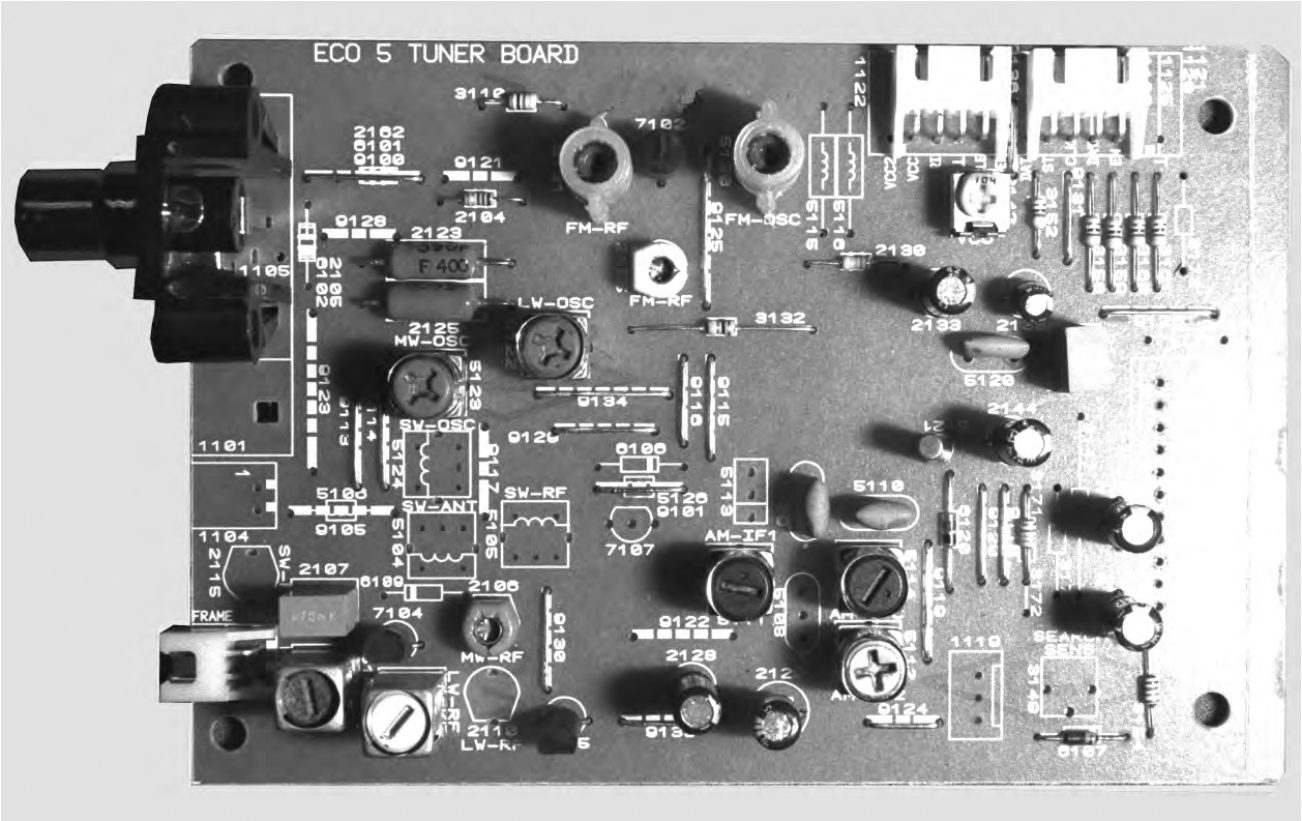
6105 ©	4822 130 83075	HN1V02H	
6106	4822 130 30621	1N4148	
6107	4822 130 34488	BZX79-C11	
6120	4822 130 30621	1N4148	

TRANSISTORS

7103 ©	4822 130 42513	BC858C	
7104	5322 130 44779	BC338-40	
7105	5322 130 44779	BC338-40	
7109 ©	5322 130 41983	BC858B	
7110 ©	5322 130 41983	BC858B	
7122 ©	5322 130 42136	BC848C	
7124 ©	5322 130 42136	BC848C	

INTEGRATED CIRCUITS

7101	4822 209 90315	TEA5762H/V1, RADIO IC



Tuner ECO 5

(3 Band Tuner)

TABLE OF CONTENTS

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

Waverange	Input frequency	Input	Tuned to	Adjust	Output	Scope/Voltmeter
VARICAP ALIGNMENT						
FM 87.5 - 108MHz (65 81 - 74, 87 5 - 108MHz)			108MHz	5130		8V ±0.2V
			87.5MHz (65.81MHz)	check		4.3V ±0.5V (1 2V ±0.5V)
MW FM/AM-version, 10kHz grid 530 - 1700kHz			1700kHz	5123		8V ±0.2V
			530kHz	check		1.1V ±0.4V
FM/MW-version, 9kHz grid 531 - 1602kHz			1602kHz	5123		6.9V ±0.2V
			531kHz	check	1	1.1V ±0.4V
LW 153 - 279kHz			279kHz	5122		8V ±0.2V
			153kHz	check		1.1V ±0.4V
MW FM/MW/LW- version, 9kHz grid 531 - 1602kHz			1602kHz	5123		8V ±0.2V
			531kHz	check		1.1V ±0.4V
FM IF						
FM	10.7MHz, 50mV continuous wave	F	IC 7101 21 shortcircuit to block AFC 2141	5119	2	0 ± 3 mV DC
FM RF						
FM 87.5 - 108MHz (65 81 - 74, 87 5 - 108MHz)	108MHz	A	108MHz	2155	4	MAX
	87.5MHz (65.81MHz)	mod=1kHz Δf=±22.5kHz	87.5MHz (65.81MHz)	5131		
VCO						
FM	98MHz, 1mV continuous wave	A	98MHz	3142	3	152kHz ±1kHz [1]
AM IF						
MW	450kHz connect pin 6 of IC 7101 (AM Osc.) with short wire to ground (pin 4)	C	IC 7101 36 100nF 220R	5111	4	max. f_o symmetric
		Δf=±15kHz V_{RF} = 3mV	IC 7101 40 100nF 220R see remark [2]	5112		
AM AFC **MW**		C continuous wave V_{RF} = 10mV		5114	2	0 ± 2 mV DC
AM RF [3]						
MW [4] FM/MW/LW- and FM/MW-version (9kHz grid) 531 - 1602kHz	1494kHz	B	1494kHz	2106	4	max. f_o symmetric
	558kHz		558kHz	5102		
LW	198kHz		198kHz	5103		
MW FM/AM-version, 10kHz grid 530 - 1700kHz	1500kHz	Δf = ±30kHz V_{RF} as low as possible	1500kHz	2106		
	560kHz		560kHz	5102		

ECO5, discr. co l, 090797

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

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

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

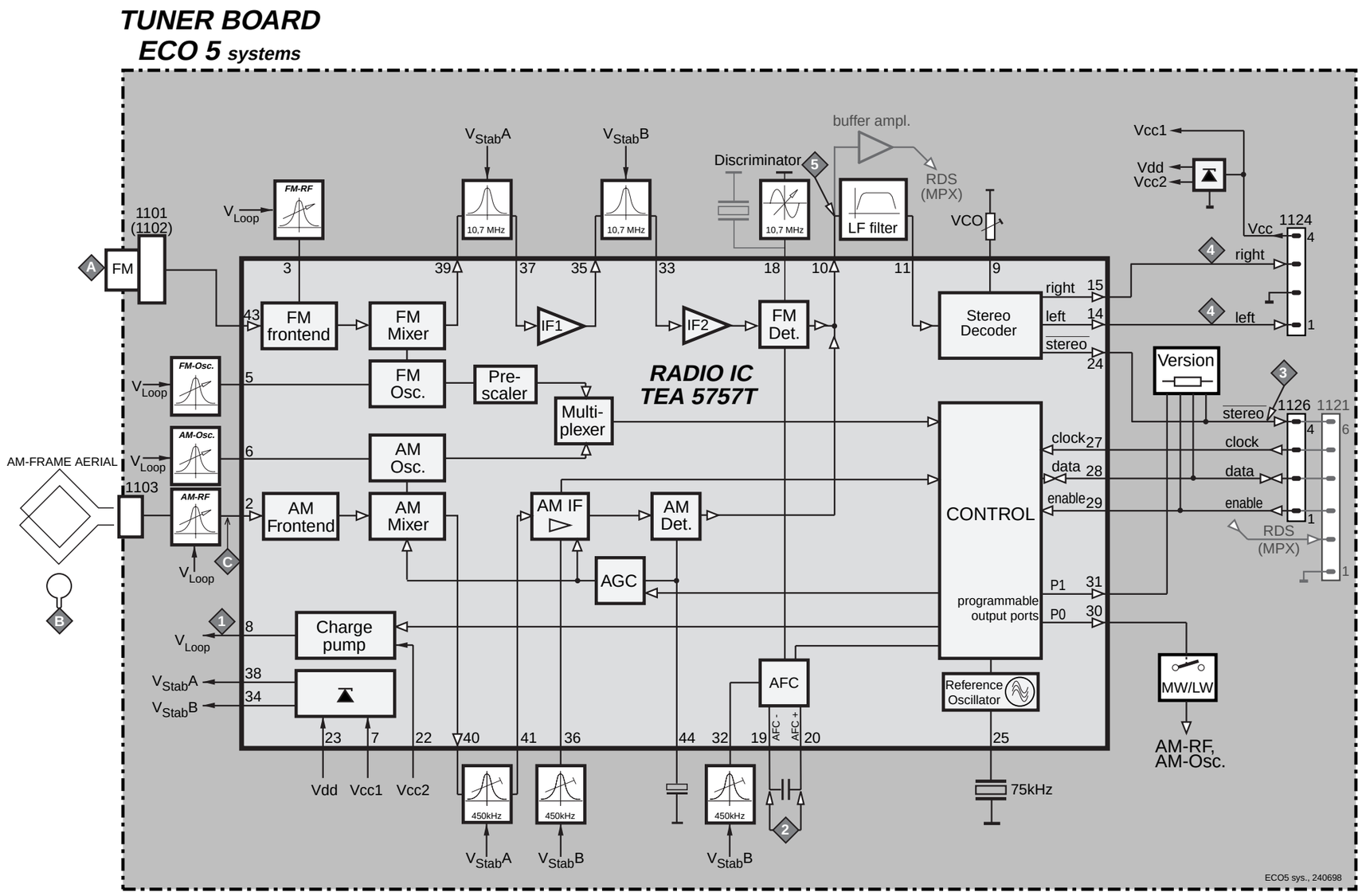
3) For AM RF adjustments the original frame antenna has to be used !

4) MW has to be aligned before LW.

↕ Repeat

7B-3

BLOCK DIAGRAM TUNER ECO5



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TUNER BOARD ECO5 / Systems

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

x = component mounted
SW = Software initial sation

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

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

Vdc FM mode stereo
Vdc MW mode
Vdc LW mode

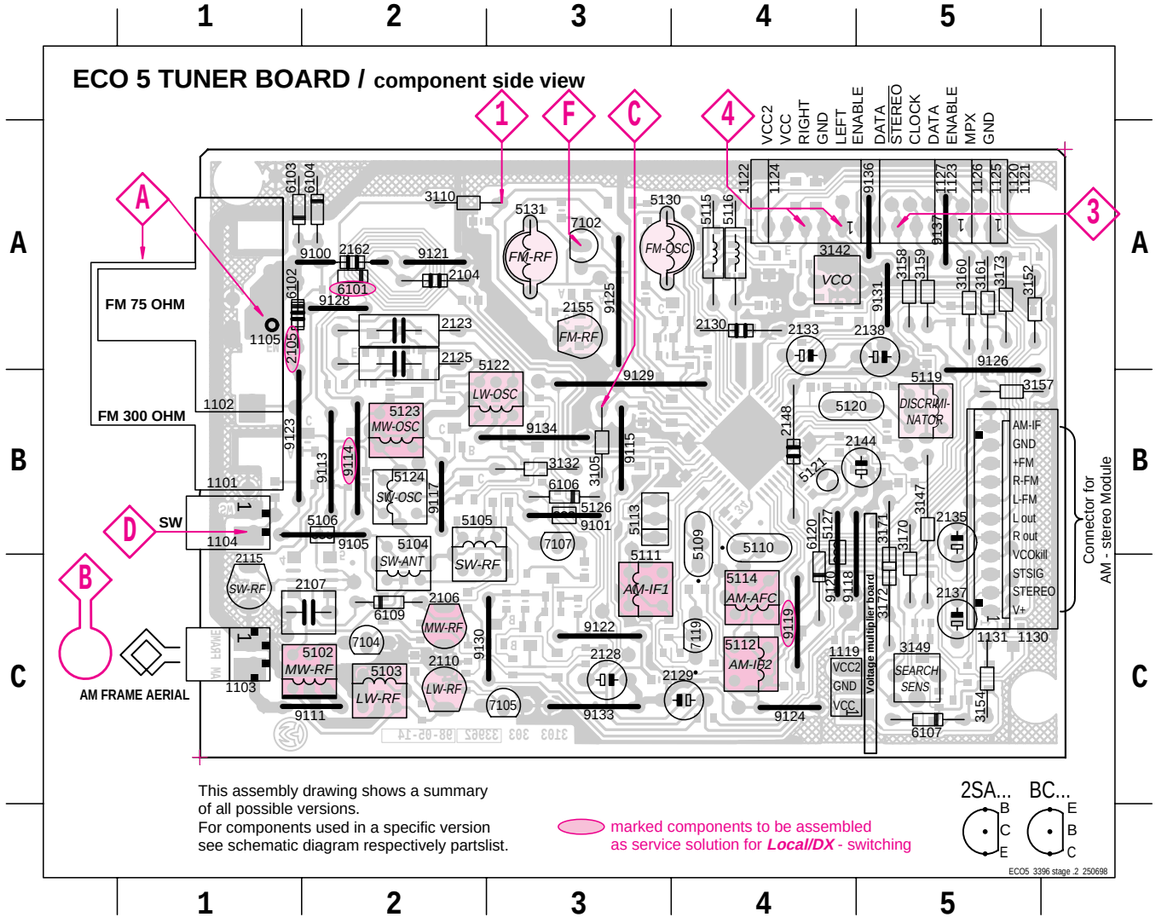
Vo tages measured while set is tuned to a strong transmitter

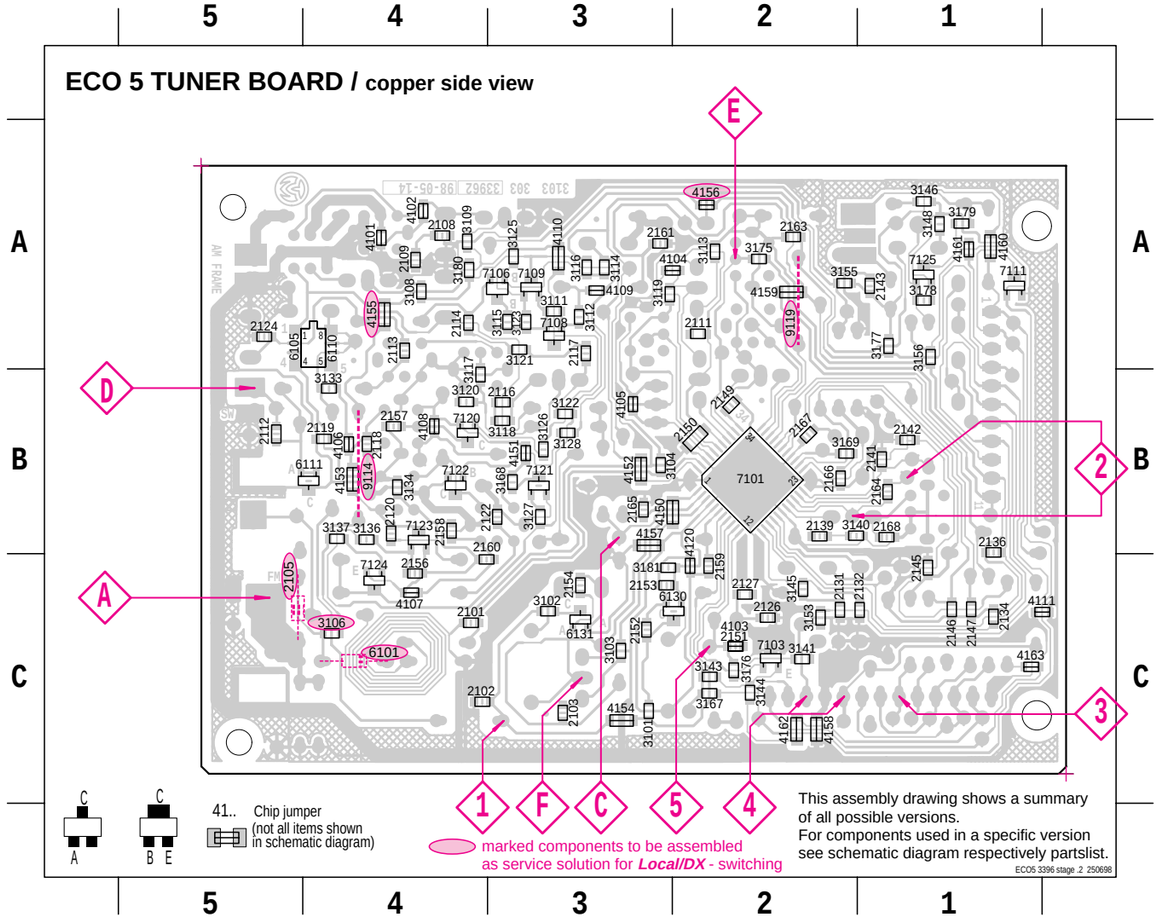
ECO5 systems d scr coil 030998

7B-5

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

2101 C4	2120 B4	2145 C1	2160 C4	3108 A4	3122 B3	3144 C2	3178 A1	4110 A3	4160 A1	7109 A3	
2102 C4	2122 B3	2146 C1	2161 A3	3109 A4	3123 A3	3145 C2	3179 A1	4111 C1	4161 A1	7111 A1	
2103 C3	2124 A5	2147 C1	2163 A2	3111 A3	3125 A3	3146 A1	3180 A4	4120 C2	4162 C1	7120 B4	
2108 A4	2126 C2	2149 B2	2164 B1	3112 A3	3126 B3	3148 A1	3181 C3	4150 B2	4163 C1	7121 B3	
2109 A4	2127 C2	2150 B2	2165 B3	3113 A2	3127 B3	3153 C2	4101 A4	4151 B3	6105 A4	7122 B4	
2111 A2	2131 C2	2151 C2	2166 B2	3114 A3	3128 B3	3155 A2	4102 A4	4152 B3	6110 A4	7123 B4	
2112 B5	2132 C1	2152 C3	2167 B2	3115 A3	3133 B4	3156 A1	4103 C2	4153 B4	6111 B4	7124 C4	
2113 A4	2134 C1	2153 C3	2168 B 1	3116 A3	3134 B4	3167 C2	4104 A2	4154 C3	6130 C2	7125 A1	
2114 A4	2136 B1	2154 C3	3101 C3	3117 B4	3136 B4	3168 B3	4105 B3	4155 A4	6131 C3		
2116 B3	2139 B2	2156 C4	3102 C3	3118 B3	3137 B4	3169 B2	4106 B4	4156 A2	7101 B2		
2117 A3	2141 B1	2157 B4	3103 C3	3119 A3	3140 B2	3175 A2	4107 C4	4157 B3	7103 C2		
2118 B4	2142 B1	2158 B4	3104 B3	3120 B4	3141 C2	3176 C2	4108 B4	4158 C2	7106 A3		
2119 B4	2143 A1	2159 C2	3106 C4	3121 A3	3143 C2	3177 A1	4109 A3	4159 A2	7108 A3		





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ELECTRICAL PARTSLIST TUNER ECO5

MISCELLANEOUS

1101	4822 267 31505	SOCKET 2P CLICKFIT	
1102	4822 267 10283	SOCKET COAX, IEC 75Ω	
1103	4822 265 31184	JST CONNECTOR 2 POLE	

CAPACITORS

2101 ©	4822 126 13692	47pF	1%	63V	
2101 ©	5322 122 32531	100pF	5%	50V	
2102 ©	4822 122 33177	10nF	20%	50V	
2103 ©	5322 122 31647	1nF	10%	63V	
2104	4822 122 33195	100pF	10%	50V	
2106	4822 125 60101	3-11pF	TRIMCAP		
2107	4822 121 51319	1µF	20%	50V	
2120 ©	5322 122 32658	22pF	5%	50V	
2125	4822 121 10673	560PF	1%	630V	
2126 ©	5322 122 31863	330pF	5%	50V	
2127 ©	4822 126 13473	220nF	20%	50V	
2128	4822 124 40248	10µF	20%	63V	
2129	4822 124 41584	100µF	20%	10V	
2130	4822 126 11585	22nF	20%	50V	
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	
2134 ©	5322 122 32654	22nF	10%	63V	
2135	4822 124 40746	0,22µF	20%	63V	
2136 ©	4822 126 13188	15nF	5%	63V	
2136 ©	5322 122 32654	22nF	10%	63V	
2137	4822 124 40746	0,22µF	20%	63V	
2138	4822 124 22652	2,2µF	20%	50V	
2139 ©	4822 126 14236	15pF	5%	50V	
2141 ©	4822 126 13838	100nF	10%	50V	
2142 ©	4822 126 13838	100nF	10%	50V	
2143 ©	4822 126 13473	220nF	20%	50V	
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 126 11585	22nF	20%	50V	
2149 ©	5322 122 32654	22nF	10%	63V	
2150 ©	4822 122 33496	100nF	10%	63V	
2152 ©	4822 126 12105	33nF	5%	63V	
2153 ©	4822 126 13486	15pF	2%	63V	
2155	4822 125 60101	3-11pF	TRIMCAP		
2159 ©	5322 122 32659	33pF	5%	50V	
2160 ©	5322 122 32654	22nF	10%	63V	
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	
2168 ©	4822 126 13695	82pF	1%	63V	

RESISTORS

3101 ©	4822 051 20333	33kΩ	5%	0,1W
3102 ©	4822 117 10837	100kΩ	1%	0,1W
3103 ©	4822 117 10965	18kΩ	2%	0,1W
3104 ©	4822 117 11448	180Ω	10%	0,1W
3105	4822 116 83872	220Ω	5%	0,5W
3110	4822 116 52195	47Ω	5%	0,5W
3120 ©	4822 051 20008	CHIP JUMPER 0805		
3132	4822 116 52195	47Ω	5%	0,5W
3134 ©	4822 051 20223	22kΩ	5%	0,1W
3141 ©	4822 117 11148	56kΩ	1%	0,1W

RESISTORS

3142	4822 100 12159	TRIMPOT. 100kΩ		
3145 ©	4822 117 11449	2,2kΩ	1%	0,1W
3146 ©	4822 051 20229	22Ω	5%	0,1W
3152	4822 116 83883	470Ω	5%	0,16W
3153 ©	4822 051 20471	470Ω	5%	0,1W
3154	4822 116 83868	150Ω	5%	0,5W
3155 ©	4822 051 20471	470Ω	5%	0,1W
3156 ©	4822 117 10837	100kΩ	1%	0,1W
3158	4822 116 83883	470Ω	5%	0,16W
3159	4822 116 83883	470Ω	5%	0,16W
3160	4822 116 83883	470Ω	5%	0,16W
3161	4822 116 83883	470Ω	5%	0,16W
3167 ©	4822 117 11503	220Ω	5%	0,1W
3169 ©	4822 051 20154	150kΩ	5%	0,1W
3170	4822 116 52234	100kΩ	5%	0,5W
3171	4822 116 52219	330Ω	5%	0,5W
4101 ©	4822 051 20008	CHIP JUMPER 0805		
4102 ©	4822 051 20008	CHIP JUMPER 0805		
4103 ©	4822 051 20008	CHIP JUMPER 0805		
4104 ©	4822 051 20008	CHIP JUMPER 0805		
4105 ©	4822 051 20008	CHIP JUMPER 0805		
4106 ©	4822 051 20008	CHIP JUMPER 0805		
4108 ©	4822 051 20008	CHIP JUMPER 0805		
4111 ©	4822 051 20008	CHIP JUMPER 0805		
4120 ©	4822 051 20008	CHIP JUMPER 0805		
4150 ©	4822 051 20008	CHIP JUMPER 0805		
4152 ©	4822 051 20008	CHIP JUMPER 0805		
4153 ©	4822 051 20008	CHIP JUMPER 0805		
4154 ©	4822 051 20008	CHIP JUMPER 0805		
4157 ©	4822 051 20008	CHIP JUMPER 0805		
4158 ©	4822 051 20008	CHIP JUMPER 0805		
4159 ©	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	4822 158 60511	AM-IF FILTER 450kHz
5112	4822 157 70302	AM-IF FILTER 450kHz
5114	4822 157 70302	AM-IF FILTER 450kHz
5119	4822 157 11443	DISCRIMINATOR COIL
5121	4822 242 10261	QUARTZ 75kHz
5123	4822 157 60517	RF-COIL AM
5130	4822 157 11843	RF COIL 1,5 TURNS
5131	4822 157 11843	RF COIL 1,5 TURNS

DIODES

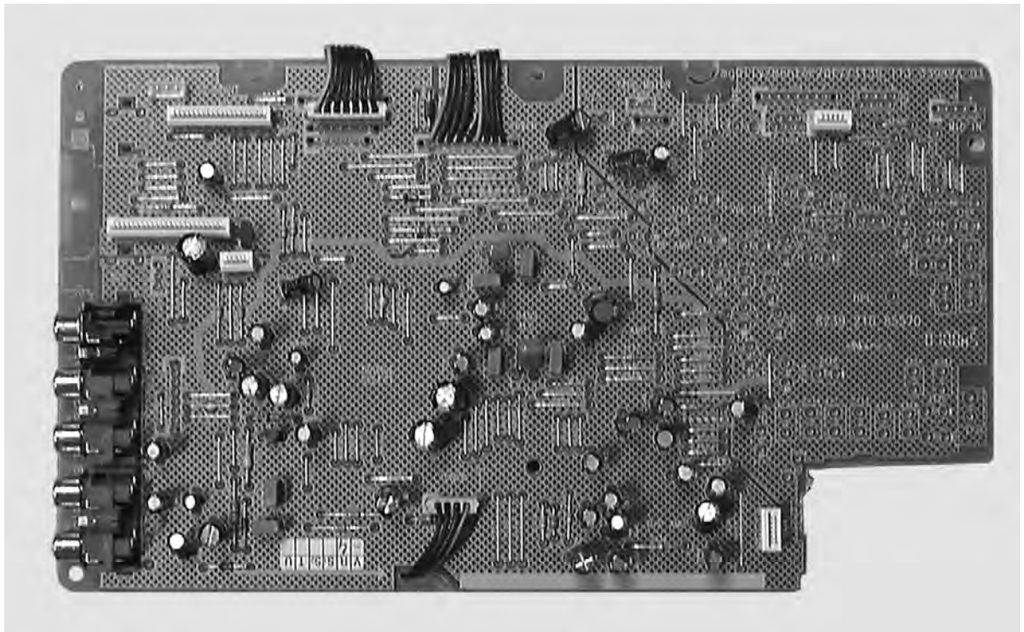
6103	4822 130 30621	1N4148
6104	4822 130 30621	1N4148
6105 ©	4822 130 83075	HN1V02H
6106	4822 130 30621	1N4148
6107	4822 130 34488	BZX79-C11
6120	4822 130 30621	1N4148
6130 ©	4822 130 82833	1SV228
6131 ©	4822 130 82833	1SV228

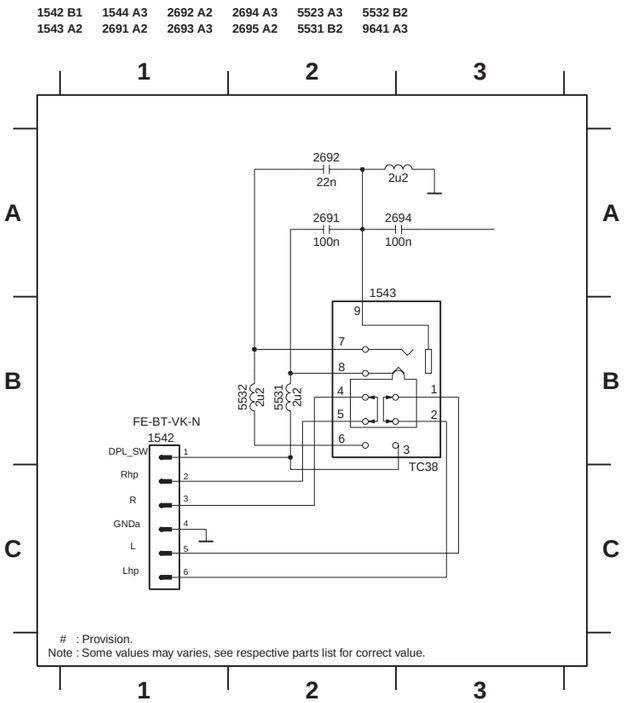
TRANSISTORS

7102	4822 130 60093	2SA838B
7111 ©	5322 130 42755	BC847C

INTEGRATED CIRCUITS

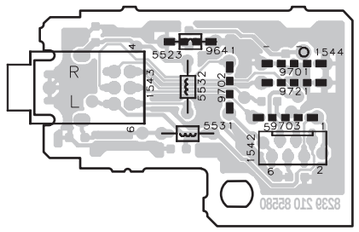
7101 ©	4822 209 90924	TEA5757H/V1, RADIO IC



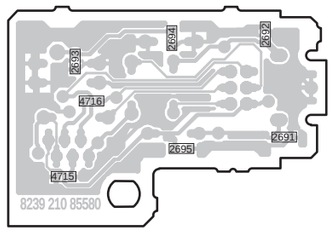


Headphone Board

Componentside view



Copperside view



AF7 Board

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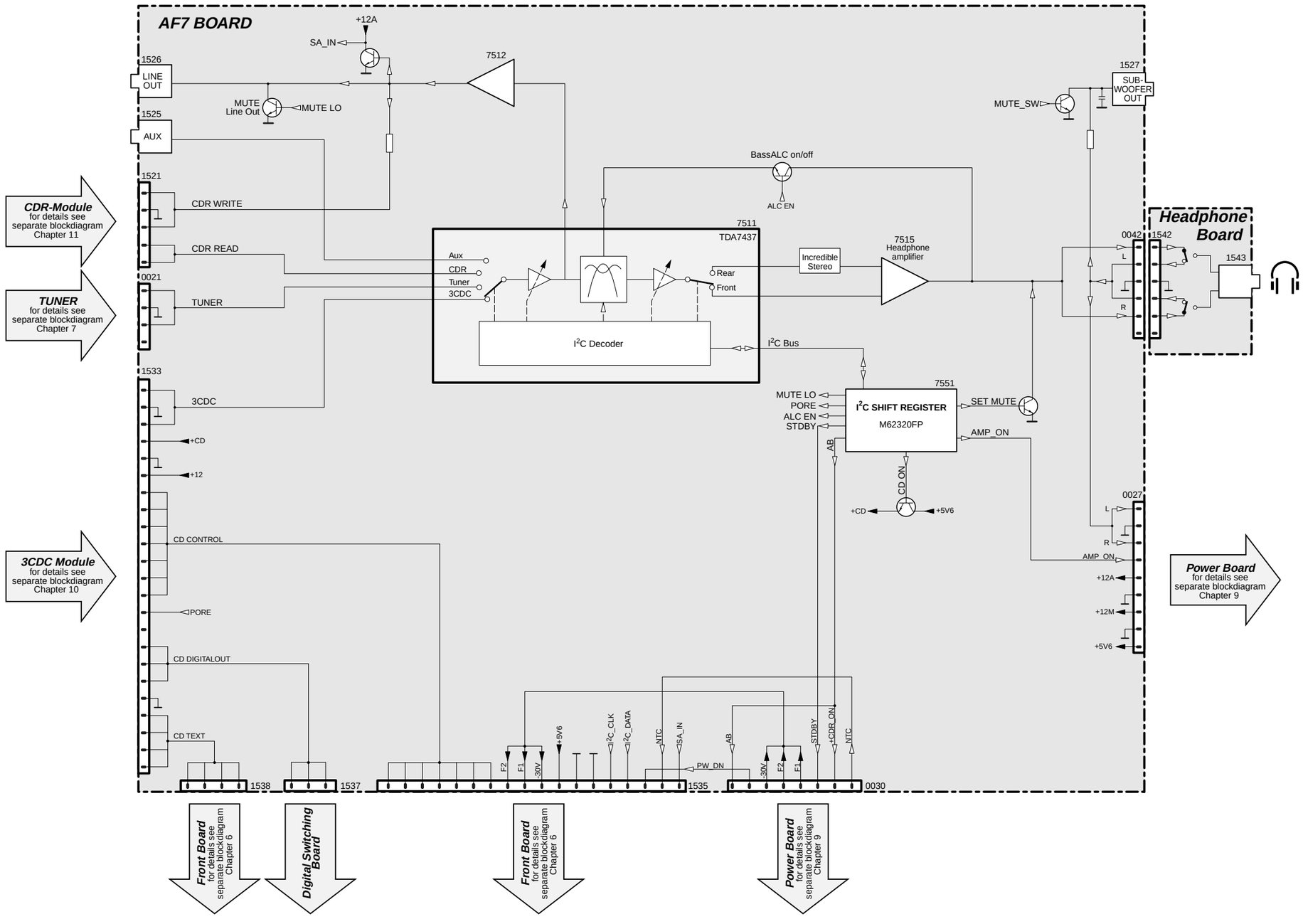
Blockdiagram AF7 Board



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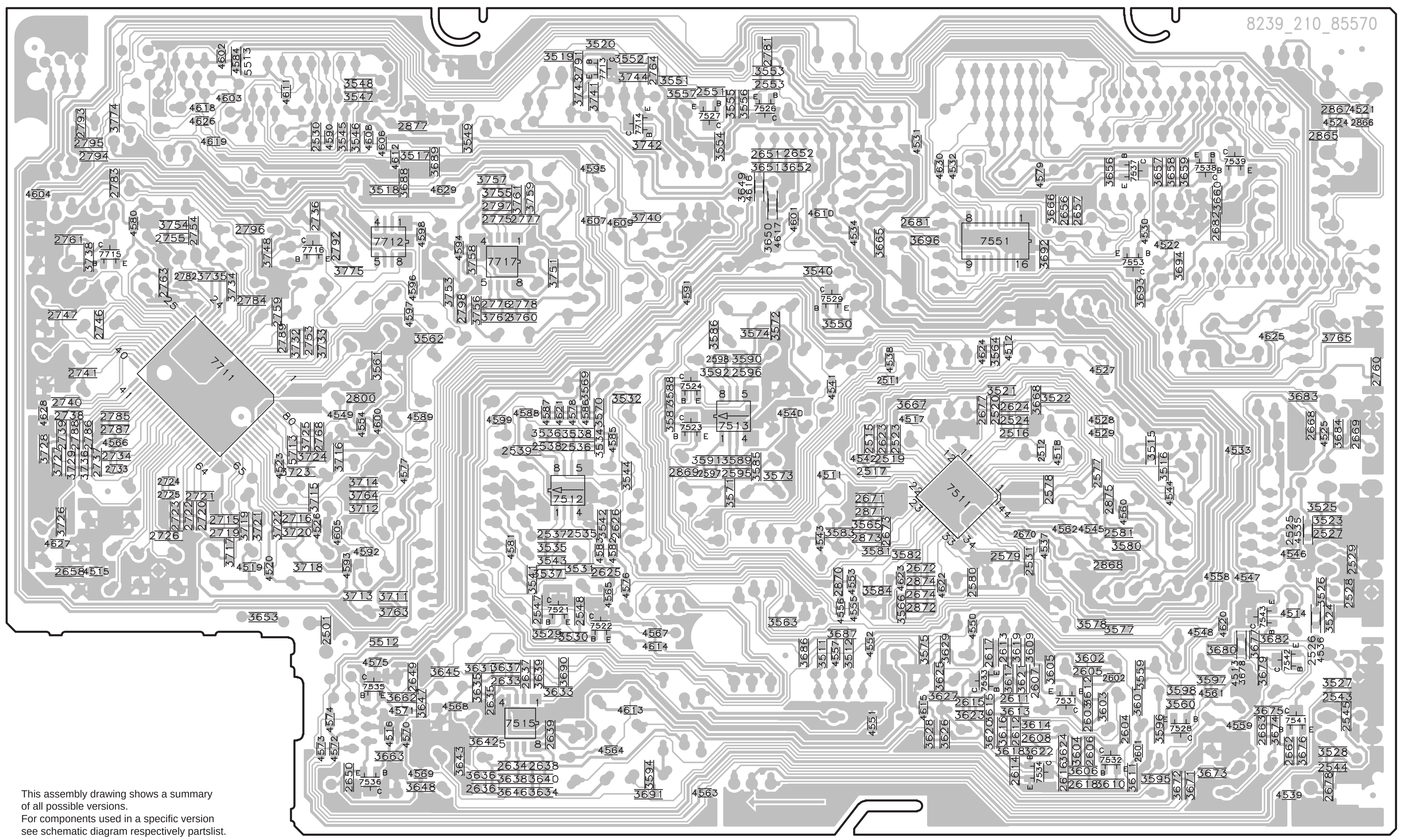
2501 E2	2545 F9	2613 E7	2662 F9	2734 D1	2783 B1	2873 D6	3534 D4	3560 F8	3588 C5	3617 E7	3645 E3	3675 F9	3716 D2	3744 A4	4517 D6	4541 C6	4565 E4	4589 D3	4613 F4	7515 F4	7712 B3
2511 C6	2547 E4	2614 F7	2663 F9	2736 B2	2784 C2	2874 E6	3535 E4	3561 C3	3589 D5	3618 F7	3646 F3	3676 F9	3717 E2	3748 C2	4518 D7	4542 D6	4566 D1	4590 B2	4614 E4	7521 E4	7713 A4
2512 D7	2548 E4	2615 F7	2668 D9	2737 D1	2785 D1	2875 D8	3536 D4	3562 C3	3590 C5	3619 E7	3647 F3	3677 E9	3718 E2	3751 C4	4519 E2	4543 D6	4567 E4	4591 C5	4615 F6	7522 E4	7714 B4
2515 D6	2551 A5	2616 F7	2669 D9	2738 D1	2786 D1	2877 B3	3537 E4	3563 E5	3591 D5	3620 F7	3648 F3	3678 E8	3719 D2	3753 C3	4520 E2	4544 D8	4568 F3	4592 E2	4616 B5	7523 D5	7715 C1
2516 D7	2553 A5	2617 E7	2670 D7	2739 D1	2787 D1	3511 E6	3538 D4	3564 C7	3592 C5	3621 E7	3649 B5	3679 E9	3720 D2	3754 B1	4521 B9	4545 D7	4569 F3	4593 E2	4617 B5	7524 C5	7716 C2
2517 D6	2577 D7	2618 F7	2671 D6	2740 D1	2788 D1	3512 E6	3540 C6	3565 D6	3594 F4	3622 F7	3650 B5	3680 E8	3721 D2	3755 B3	4522 B8	4546 E9	4570 F3	4594 B3	4618 B1	7526 B5	7717 C3
2519 D6	2578 D7	2623 D6	2672 E6	2741 C1	2789 C2	3515 D8	3541 E4	3566 E6	3595 F8	3623 F7	3651 B5	3682 E9	3722 D2	3756 C3	4523 D2	4547 E8	4571 F3	4595 B4	4619 B1	7527 B5	
2520 D7	2579 E7	2624 D7	2673 D6	2746 C1	2791 A4	3516 D8	3542 D4	3569 C4	3596 F8	3624 F7	3652 B5	3683 D9	3723 D2	3757 B3	4524 B9	4548 E8	4572 F2	4596 C3	4620 E8	7528 F8	
2523 D6	2580 E7	2625 E4	2674 E6	2747 C1	2792 B2	3517 B3	3543 E4	3570 D4	3597 E8	3625 E6	3653 E2	3684 D9	3724 D2	3758 C3	4525 D9	4549 D2	4573 F2	4597 C3	4621 D4	7529 C6	
2524 D7	2581 D8	2626 D4	2677 D7	2753 C2	2793 B1	3518 B3	3544 D4	3571 D5	3598 F8	3626 F6	3656 B8	3686 E5	3725 D2	3759 B4	4526 D2	4550 E7	4574 F2	4598 B3	4622 E6	7531 F7	
2525 D9	2595 D5	2633 E3	2678 F9	2754 B1	2794 B1	3519 A4	3545 B2	3572 C5	3601 F8	3627 F6	3657 B8	3687 E6	3726 D1	3760 C4	4527 C7	4551 F6	4575 E3	4599 D3	4623 E6	7532 F8	
2526 E9	2596 C5	2634 F3	2681 B6	2755 B1	2795 B1	3520 A4	3546 B2	3573 D5	3602 E7	3628 F6	3658 B8	3688 B3	3727 D1	3761 B3	4528 D7	4552 E6	4576 E4	4600 D3	4624 C7	7533 E7	
2527 D9	2597 D5	2635 F3	2682 B8	2759 C2	2796 B2	3521 C7	3547 A2	3574 C5	3603 F7	3629 E6	3659 B8	3689 B3	3728 D1	3762 C3	4529 D7	4553 E6	4577 D3	4601 B5	4625 C9	7534 F7	
2528 E9	2598 C5	2636 F3	2715 D2	2760 C9	2797 B3	3522 D7	3548 A2	3575 E6	3604 F7	3631 E3	3660 B8	3690 E4	3729 D1	3763 E3	4530 B8	4554 D2	4578 D4	4602 A1	4626 B1	7535 E3	
2529 E9	2601 F8	2637 E4	2716 D2	2761 B1	2798 C3	3523 D9	3549 B3	3577 E8	3605 E7	3633 F4	3662 F3	3691 F4	3732 C2	3764 D2	4531 B6	4555 E6	4579 B7	4603 A2	4627 E1	7536 F2	
2530 B2	2602 E8	2638 F4	2719 D2	2763 C1	2800 D2	3524 E9	3550 C6	3578 E7	3606 F7	3634 F4	3663 F3	3692 C7	3733 C2	3765 C9	4532 B6	4556 E6	4580 B1	4604 B1	4628 D1	7537 B8	
2531 E7	2603 F7	2639 F4	2720 D1	2764 A4	2865 B9	3525 D9	3551 A5	3580 E8	3609 E7	3635 E3	3665 B6	3693 C8	3734 C2	3774 B1	4533 D8	4557 E6	4581 E3	4605 D2	4629 B3	7538 B8	
2535 D4	2604 F8	2649 E3	2721 D1	2768 D2	2866 B9	3526 E9	3552 A4	3581 E6	3610 F8	3636 F3	3666 B7	3694 C8	3735 C1	3775 C2	4534 B6	4558 E8	4582 E4	4606 B3	4630 B6	7539 B8	
2536 D4	2605 E7	2650 F2	2722 D1	2775 B3	2867 B9	3527 E9	3553 A5	3582 E6	3611 F8	3637 E3	3667 D6	3696 B6	3736 D1	4511 D6	4535 D9	4559 F8	4583 E4	4607 B4	5512 E3	7541 F9	
2537 D4	2606 F7	2651 B5	2723 D1	2776 C3	2868 E8	3528 F9	3554 B5	3583 D6	3612 F7	3638 F3	3668 D7	3711 E3	3738 C1	4512 C7	4536 E9	4560 D8	4584 A2	4608 B2	5513 A2	7542 E9	
2538 D4	2607 E7	2652 B5	2724 D1	2777 B4	2869 D5	3529 E4	3555 B5	3584 E6	3613 F7	3639 E4	3671 F8	3712 D2	3740 B4	4513 E8	4537 E7	4561 F8	4585 D4	4609 B4	5713 D2	7543 E9	
2539 D3	2608 F7	2656 B7	2725 D1	2778 C4	2870 E6	3530 E4	3556 B5	3585 D5	3614 F7	3640 F4	3672 F8	3713 E2	3741 A4	4514 E9	4538 C6	4562 D7	4586 D4	4610 B6	7511 D7	7551 B7	
2543 F9	2611 F7	2657 B7	2726 D1	2781 A5	2871 D6	3531 E4	3557 A5	3586 C5	3615 F7	3642 F3	3673 F8	3714 D2	3742 B4	4515 E1	4539 F9	4563 F5	4587 D4	4611 A2	7512 D4	7553 C8	
2544 F9	2612 F7	2658 E1	2733 D1	2782 C1	2872 E6	3532 D4	3559 E8	3587 D5	3616 F7	3643 F3	3674 F9	3715 D2	3743 A4	4516 F3	4540 D5	4564 F4	4588 D4	4612 B3	7513 D5	7711 C1	

AF7 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.

AF7 Board Layout stage .1 1999 12 21

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Circuit Diagram AF7 Board

To and from CDR Module
To and from Tuner Board
To and from Microphone Board

Bass ALC Circuit
Incredible Surround Circuit

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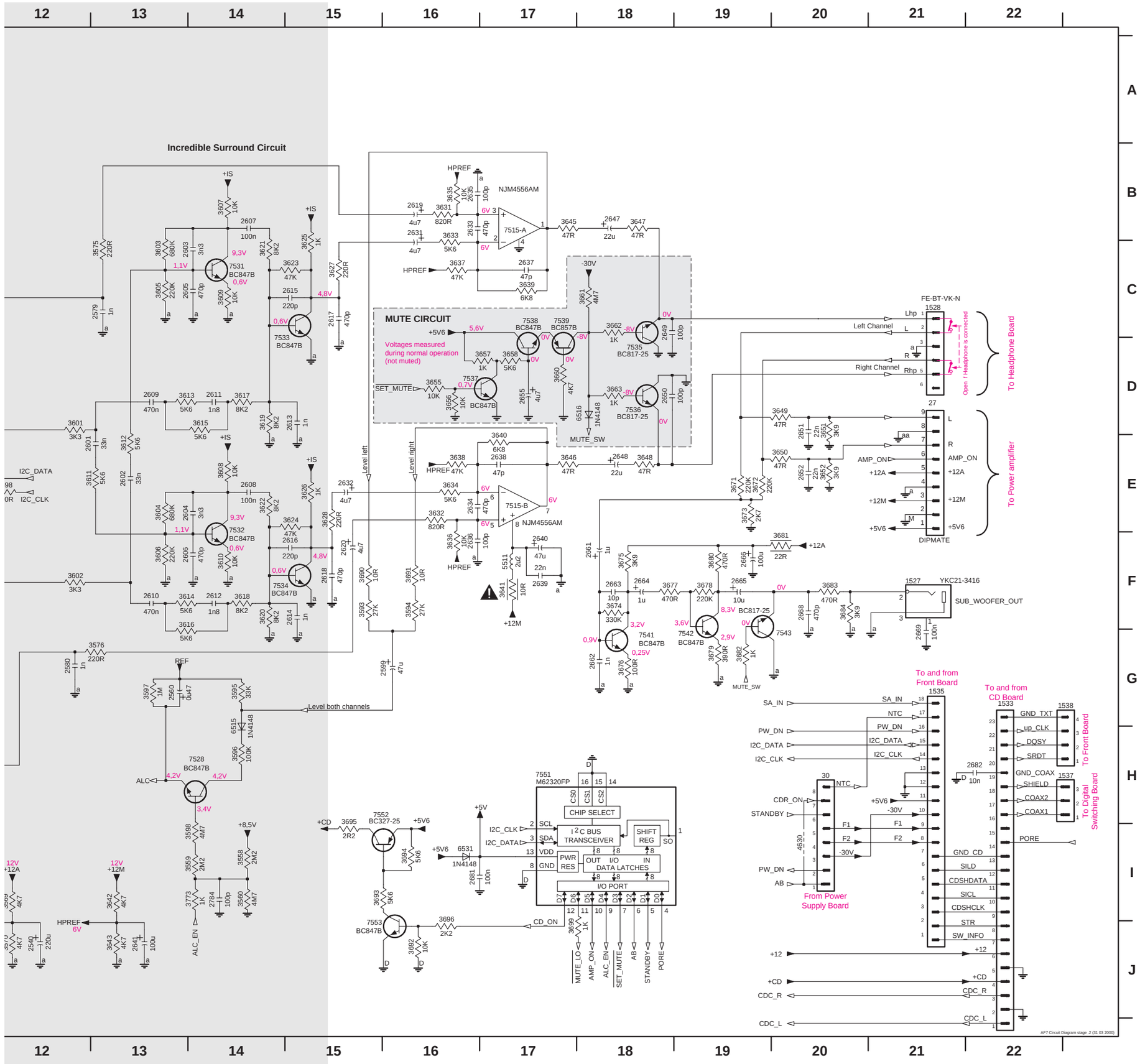

0021	E1	2617	C15	3552	J2	3651	E20
0026	H1	2618	F15	3553	J3	3652	E20
0027	D21	2619	B16	3554	I3	3655	D16
0030	H20	2620	F15	3555	I3	3656	D16
1521	A1	2621	J10	3556	J3	3657	D17
1525	C1	2623	C3	3557	J3	3658	D17
1526	H1	2624	C3	3558	I14	3660	D17
1527	F21	2625	C6	3559	I14	3661	C18
1528	C21	2626	I7	3560	I14	3662	D18
1533	G22	2631	C16	3563	B6	3663	D18
1535	G21	2632	E15	3564	J7	3667	C3
1537	H22	2633	C16	3565	C8	3668	C3
1538	G22	2634	E16	3566	G8	3671	E19
2216	F15	2635	B16	3569	I12	3672	E19
2355	D17	2636	F16	3570	J12	3673	E19
2511	E2	2637	C17	3571	B10	3674	F18
2512	E2	2638	E17	3572	I8	3675	F18
2513	D3	2639	F17	3573	B10	3676	G18
2514	F3	2640	F17	3574	I9	3677	F18
2515	D4	2641	J13	3575	C13	3678	F19
2516	F4	2647	B18	3576	G13	3679	G19
2517	F11	2648	E18	3577	E11	3680	F19
2519	E4	2649	D18	3578	E11	3681	F20
2520	F4	2650	D18	3579	H1	3682	G19
2521	E3	2651	E20	3580	G11	3683	F20
2522	F3	2652	E20	3581	C9	3684	F20
2523	C4	2661	F18	3582	H9	3686	E1
2524	C4	2662	G18	3583	C9	3687	F1
2527	C2	2663	F18	3584	H9	3688	F3
2528	D2	2664	F18	3585	A10	3689	E3
2531	G11	2665	F19	3586	H9	3690	F15
2532	G11	2666	F19	3587	A10	3691	F16
2533	C6	2668	F20	3588	J9	3692	J16
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2535	C6	2670	D10	3590	I8	3694	I16
2536	I6	2671	C8	3591	B9	3695	I15
2537	B6	2672	G8	3592	I7	3696	J16
2539	I6	2673	C8	3593	F15	3697	E11
2540	J12	2674	G8	3594	F16	3698	E12
2541	C5	2675	D7	3595	G14	3699	J17
2542	I5	2676	G7	3596	H14	3773	I14
2543	G2	2677	E5	3597	G13	3929	J10
2544	H2	2681	I16	3598	I14	4517	E5
2545	H1	2682	H22	3599	C10	4518	F5
2547	G4	2784	I14	3601	D12	4535	C2
2548	H3	2868	C10	3602	F12	4536	C2
2549	A5	2869	C9	3603	C13	4578	H6
2550	I5	2870	G9	3604	E13	4618	B2
2551	J2	2871	C8	3605	C13	4619	B2
2552	I3	2872	G8	3606	F13	4630	I20
2553	J2	2873	C8	3607	B14	5511	F17
2560	G13	2874	G8	3608	E14	5734	F15
2563	D7	2876	I10	3609	C14	6512	H10
2564	G7	3511	E1	3610	F14	6514	I10
2571	B10	3512	E1	3611	E13	6515	H14
2572	H8	3513	D3	3612	E13	6516	D18
2573	B10	3514	F3	3613	D13	6531	I16
2574	H9	3515	D3	3614	F13	7511	D6
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2582	H11	3525	C2	3622	E14	7522	H3
2583	H10	3526	C2	3623	C15	7523	A10
2591	C10	3527	G2	3624	E15	7524	I9
2592	H9	3528	H2	3625	C15	7525	G10
2593	B9	3529	H4	3626	E15	7526	J3
2594	I8	3530	H3	3627	C15	7527	J3
2595	A9	3531	C6	3628	E15	7528	H14
2596	H8	3532	H6	3631	B16	7529	H4
2597	B9	3533	C6	3632	E16	7531	C14
2598	I7	3534	I6	3633	C16	7532	F14
2599	G16	3535	B6	3634	E16	7533	D15
2601	E13	3536	H6	3635	B16	7535	D18
2602	E13	3537	B6	3636	F16	7536	D18
2603	C14	3538	H6	3637	C16	7537	D17
2604	E14	3539	I6	3638	E16	7538	D17
2605	C14	3540	H4	3639	C17	7539	D17
2606	F14	3541	C5	3640	E17	7541	G18
2607	B14	3542	I5	3641	F17	7542	F19
2608	E14	3543	A6	3642	I13	7543	F19
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2610	F13	3545	B1	3645	B17	7552	I15
2611	D14	3546	B1	3646	E17	7553	J16
2612	F14	3547	B1	3647	B18		
2613	D15	3548	B1	3648	E18		
2614	F15	3550	H4	3649	D20		
2615	C15	3551	J2	3650	E20		

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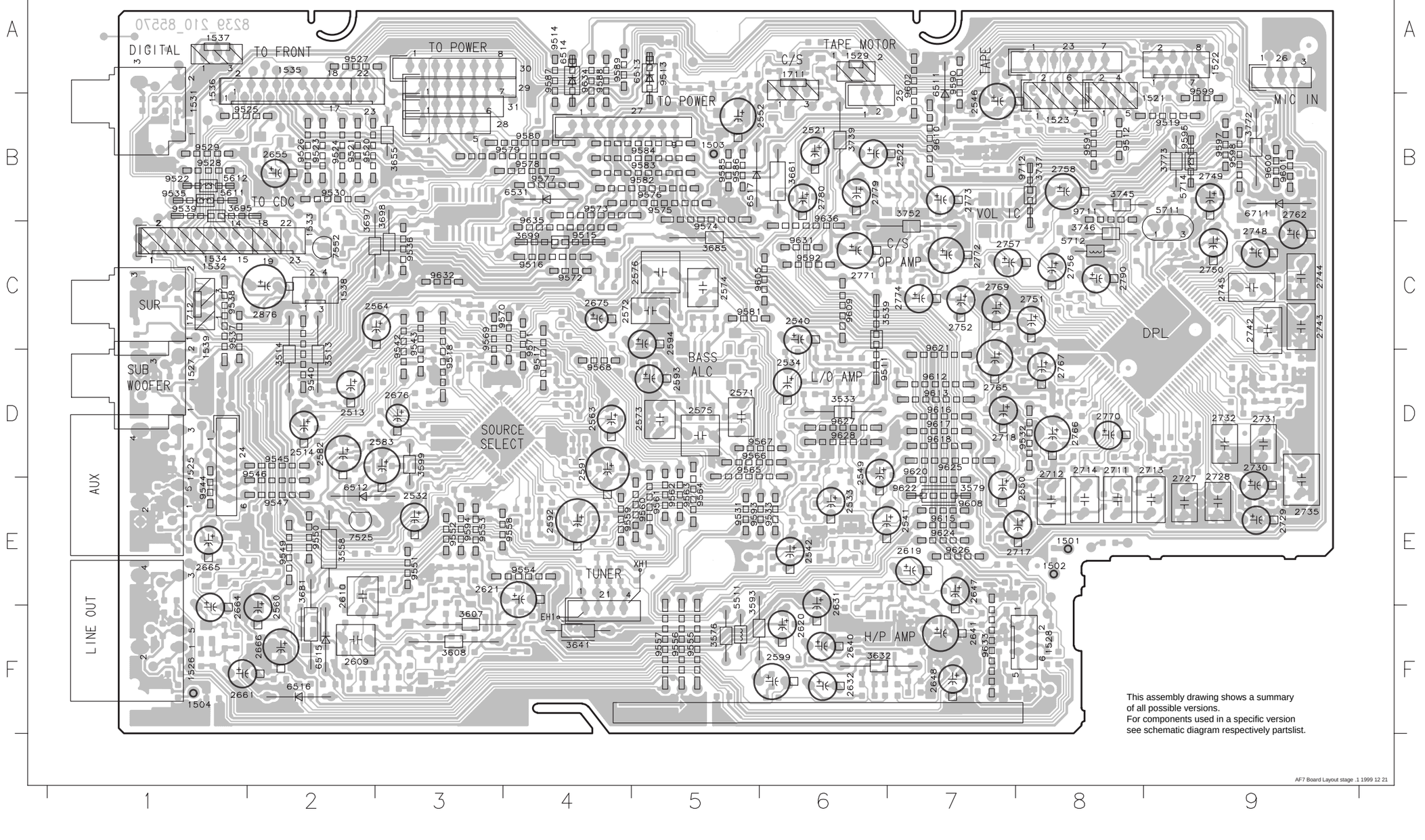
21 E4	1504 F1	1535 A2	2534 D6	2573 D5	2619 E7	2666 F2	2731 D9	2757 C7	2780 B6	3608 F3	3745 B8	6513 A5	9515 C4	9528 B1	9543 C3	9557 F5	9570 C4	9583 B5	9597 B9	9616 D7	9633 F7
23 A8	1521 B8	1536 A2	2540 C6	2574 C5	2620 F6	2675 C4	2732 D9	2758 B8	2790 C8	3632 F6	3746 C8	6514 A4	9516 C4	9529 B1	9544 E1	9558 E4	9571 C4	9584 B5	9598 B9	9617 D7	9634 A4
24 D1	1522 A9	1537 A1	2541 E7	2575 D5	2621 E4	2676 D3	2735 E9	2762 B9	2876 D8	3641 F4	3752 C7	6515 F2	9517 D4	9530 B2	9545 D2	9559 E4	9572 C4	9585 B5	9599 B9	9618 D7	9635 C4
25 A6	1523 B8	1538 C2	2542 E6	2576 C5	2631 E6	2711 E8	2742 C9	2765 D8	3513 D2	3655 B3	3772 B9	6516 F2	9518 D3	9531 E5	9546 D2	9560 E5	9573 B4	9586 B5	9600 B9	9620 E7	9636 C6
26 A9	1525 E1	1539 C1	2546 A7	2582 D2	2632 F6	2712 E8	2743 C9	2766 D8	3514 D2	3661 B6	3773 B9	6517 B5	9519 B9	9532 D8	9547 E2	9561 E5	9574 C5	9587 A4	9601 B9	9621 D7	9711 C8
27 B4	1526 F1	1711 A6	2549 D7	2583 D3	2640 F6	2713 E9	2744 C9	2767 D8	3533 D6	3681 F2	5511 F5	6531 B4	9520 B2	9533 E6	9549 E2	9562 E5	9575 B5	9588 A4	9602 A7	9622 E7	9712 B8
28 B3	1527 D1	1712 C1	2550 E8	2591 D5	2641 F7	2714 E8	2745 C9	2769 C7	3539 C6	3685 C5	5611 B1	6711 B9	9521 B2	9535 B1	9550 E2	9563 E5	9576 B5	9589 A4	9605 C6	9624 E7	
29 A3	1528 F8	2513 D2	2552 B6	2592 E4	2647 E7	2717 E8	2748 C9	2770 D8	3558 E2	3695 B1	5612 B1	7525 E2	9522 B1	9536 C3	9551 E3	9564 E5	9577 B4	9590 A7	9608 E7	9625 D7	
30 A3	1529 A6	2514 D2	2560 F2	2593 D5	2648 F7	2718 D8	2749 B9	2771 C6	3576 F5	3697 C2	5711 B9	7552 C2	9523 B2	9537 C1	9552 E3	9565 D5	9578 B4	9591 B8	9609 C6	9626 E7	
31 A3	1531 B1	2521 B6	2563 D4	2594 C5	2655 B2	2727 E9	2750 C9	2772 C7	3579 F7	3698 C4	5712 C8	9511 C6	9524 B2	9538 C1	9553 E3	9566 D5	9579 B4	9592 C6	9610 B7	9627 D6	
1501 E8	1532 C1	2522 B6	2564 C3	2599 F6	2661 F1	2728 E9	2751 C8	2773 B7	3593 F5	3699 C4	5714 B9	9512 B8	9525 B1	9539 B1	9554 E4	9567 D6	9580 B4	9593 E5	9612 D7	9628 D6	
1502 E8	1533 C1	2532 E3	2571 D5	2609 F2	2664 E1	2729 E9	2752 C7	2774 C7	3599 D3	3737 B8	6511 B7	9513 A5	9526 B2	9540 D2	9555 F5	9568 D4	9581 C5	9594 E3	9613 D7	9631 C6	
1503 B5	1534 C1	2533 E6	2572 C5	2610 E3	2665 E1	2730 D9	2756 C8	2779 B6	3607 F3	3739 B6	6512 E2	9514 A4	9527 A2	9542 C3	9556 F5	9569 C3	9582 B5	9595 B9	9615 E7	9632 C3	

AF7 Board componentside view



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ELECTRICAL PARTSLIST AF7 BOARD

MISCELLANEOUS

1521	4822 267 10954	FFC SOCKET, 5P	
1525	4822 267 20452	CINCH SOCKET 2P	
1526	4822 267 20452	CINCH SOCKET 2P	
1527	4822 267 31729	CINCH SOCKET, 1P	
1528	4822 267 10731	FFC SOCKET, 6P	
1533	4822 267 10757	FFC SOCKET, 23P, TOP ENTRY	
1535	4822 265 11553	FFC SOCKET, 19P	
1538	4822 267 10733	FFC SOCKET, 4P	
1542	4822 267 10731	FFC SOCKET, 6P	
1543	4822 265 11529	HEADPHONE SOCKET	

CAPACITORS

2501©	4822 126 13838	100nF	10%	50V	
2511©	4822 126 13838	100nF	10%	50V	
2512©	4822 126 13838	100nF	10%	50V	
2513	4822 124 40769	4,7µF	20%	100V	
2514	4822 124 40769	4,7µF	20%	100V	
2515©	5322 122 32531	100pF	5%	50V	
2516©	5322 122 32531	100pF	5%	50V	
2517©	4822 126 14585	100nF	10%	50V	
2519©	5322 122 32531	100pF	5%	50V	
2520©	5322 122 32531	100pF	5%	50V	
2521	4822 124 40769	4,7µF	20%	100V	
2522	4822 124 40769	4,7µF	20%	100V	
2523©	5322 122 32658	22pF	5%	50V	
2524©	5322 122 32658	22pF	5%	50V	
2527©	5322 122 34099	470pF	10%	63V	
2528©	5322 122 34099	470pF	10%	63V	
2529©	4822 126 13838	100nF	10%	50V	
2531©	5322 122 32654	22nF	10%	63V	
2532	4822 124 40433	47µF	20%	25V	
2533	4822 124 40769	4,7µF	20%	100V	
2534	4822 124 40769	4,7µF	20%	100V	
2535©	4822 122 32535	680pF			
2536©	4822 122 32535	680pF			
2537©	4822 126 13486	15pF	2%	63V	
2538©	4822 126 13486	15pF	2%	63V	
2539©	5322 122 32531	100pF	5%	50V	
2540	4822 124 12245	220µF	20%	16V	
2541	4822 124 21913	1µF	20%	63V	
2542	4822 124 21913	1µF	20%	63V	
2543©	4822 122 33127	2,2nF	10%	63V	
2544©	4822 122 33127	2,2nF	10%	63V	
2545©	4822 126 13838	100nF	10%	50V	
2547©	5322 122 32448	10pF	5%	50V	
2548©	5322 122 32448	10pF	5%	50V	
2549	4822 124 40769	4,7µF	20%	100V	
2550	4822 124 40769	4,7µF	20%	100V	
2551©	4822 126 14585	100nF	10%	50V	
2552	4822 124 41751	47µF	20%	16V	
2553©	4822 126 13486	15pF	2%	63V	
2560	5322 124 41948	0,47µF	20%	50V	
2563	4822 124 40746	0,22µF	20%	63V	
2564	4822 124 40746	0,22µF	20%	63V	
2571	4822 121 42408	220nF	5%	63V	
2572	4822 121 42408	220nF	5%	63V	
2573	4822 121 51252	470nF	5%	63V	
2574	4822 121 51252	470nF	5%	63V	
2575	4822 121 51319	1µF	20%	50V	
2576	4822 121 51319	1µF	20%	50V	
2577©	4822 122 33127	2,2nF	10%	63V	
2578©	4822 122 33127	2,2nF	10%	63V	

CAPACITORS

2579©	5322 122 31647	1nF	10%	63V	
2580©	5322 122 31647	1nF	10%	63V	
2581©	4822 122 33127	2,2nF	10%	63V	
2582	4822 124 40207	100µF	20%	25V	
2583	4822 124 40207	100µF	20%	25V	
2591	4822 124 80144	220µF	20%	25V	
2592	4822 124 80144	220µF	20%	25V	
2593	4822 124 40433	47µF	20%	25V	
2594	4822 124 40433	47µF	20%	25V	
2595©	5322 122 34099	470pF	10%	63V	
2596©	5322 122 34099	470pF	10%	63V	
2597©	4822 122 33575	220pF	5%	50V	
2598©	4822 122 33575	220pF	5%	50V	
2599	4822 124 41751	47µF	20%	16V	
2601©	4822 126 12105	33nF	5%	63V	
2602©	4822 126 12105	33nF	5%	63V	
2603©	4822 122 33891	3,3nF	10%	63V	
2604©	4822 122 33891	3,3nF	10%	63V	
2605©	5322 122 34099	470pF	10%	63V	
2606©	5322 122 34099	470pF	10%	63V	
2607©	4822 126 14585	100nF	10%	50V	
2608©	4822 126 14585	100nF	10%	50V	
2609	4822 121 51252	470nF	5%	63V	
2610	4822 121 51252	470nF	5%	63V	
2611©	4822 126 10847	1,8nF	10%	50V	
2612©	4822 126 10847	1,8nF	10%	50V	
2613©	5322 122 31647	1nF	10%	63V	
2614©	5322 122 31647	1nF	10%	63V	
2615©	4822 122 33575	220pF	5%	50V	
2616©	4822 122 33575	220pF	5%	50V	
2617©	5322 122 34099	470pF	10%	63V	
2618©	5322 122 34099	470pF	10%	63V	
2619	4822 124 40769	4,7µF	20%	100V	
2620	4822 124 40769	4,7µF	20%	100V	
2621	4822 124 40207	100µF	20%	25V	
2623©	4822 126 14043	1µF	20%	16V	
2624©	4822 126 14043	1µF	20%	16V	
2625©	4822 122 33575	220pF	5%	50V	
2626©	4822 122 33575	220pF	5%	50V	
2631	4822 124 40769	4,7µF	20%	100V	
2632	4822 124 40769	4,7µF	20%	100V	
2633©	5322 122 34099	470pF	10%	63V	
2634©	5322 122 34099	470pF	10%	63V	
2635©	5322 122 32531	100pF	5%	50V	
2636©	5322 122 32531	100pF	5%	50V	
2637©	4822 126 13692	47pF	1%	63V	
2638©	4822 126 13692	47pF	1%	63V	
2639©	5322 122 32654	22nF	10%	63V	
2640	4822 124 40433	47µF	20%	25V	
2641	4822 124 40207	100µF	20%	25V	
2647	4822 124 81151	22µF	20%	50V	
2648	4822 124 81151	22µF	20%	50V	
2649©	5322 122 32531	100pF	5%	50V	
2650©	5322 122 32531	100pF	5%	50V	
2651©	5322 122 32654	22nF	10%	63V	
2652©	5322 122 32654	22nF	10%	63V	
2655	4822 124 40769	4,7µF	20%	100V	
2661	4822 124 21913	1µF	20%	63V	
2662©	5322 122 31647	1nF	10%	63V	
2663©	5322 122 32448	10pF	5%	50V	

ELECTRICAL PARTSLIST AF7 BOARD

CAPACITORS

2664	4822 124 21913	1µF	20%	63V	
2665	4822 124 40248	10µF	20%	63V	
2666	4822 124 40207	100µF	20%	25V	
2668©	5322 122 34099	470pF	10%	63V	
2669©	4822 126 13838	100nF	10%	50V	
2670©	4822 126 13838	100nF	10%	50V	
2671©	4822 126 13838	100nF	10%	50V	
2672©	4822 126 13838	100nF	10%	50V	
2673©	5322 122 32654	22nF	10%	63V	
2674©	5322 122 32654	22nF	10%	63V	
2675	5322 124 41948	0,47µF	20%	50V	
2676	5322 124 41948	0,47µF	20%	50V	
2677©	5322 122 34098	10nF	10%	50V	
2681©	4822 126 14585	100nF	10%	50V	
2682©	5322 122 34098	10nF	10%	50V	
2691©	5322 122 32654	22nF	10%	63V	
2692©	5322 122 32654	22nF	10%	63V	
2694©	4822 126 13838	100nF	10%	50V	
2781©	5322 122 32654	22nF	10%	63V	
2784©	5322 122 32531	100pF	5%	50V	
2868©	4822 126 14585	100nF	10%	50V	
2869©	4822 126 14043	1µF	20%	16V	
2870©	4822 126 14043	1µF	20%	16V	
2871©	5322 122 32654	22nF	10%	63V	
2872©	5322 126 10223	4,7nF	10%	63V	
2873©	5322 126 10223	4,7nF	10%	63V	
2874©	5322 122 32654	22nF	10%	63V	
2876	4822 124 80791	470µF	20%	16V	

RESISTORS

3511©	4822 051 10102	1kΩ	2%	0,25W	
3512©	4822 051 10102	1kΩ	2%	0,25W	
3513	4822 116 52243	1,5kΩ	5%	0,16W	
3514	4822 116 52243	1,5kΩ	5%	0,16W	
3515©	4822 051 20471	470Ω	5%	0,1W	
3516©	4822 051 20471	470Ω	5%	0,1W	
3517©	4822 051 20332	3,3kΩ	5%	0,1W	
3518©	4822 051 20332	3,3kΩ	5%	0,1W	
3519©	4822 051 20333	33kΩ	5%	0,1W	
3520©	4822 051 20333	33kΩ	5%	0,1W	
3521©	4822 117 10965	18kΩ	2%	0,1W	
3522©	4822 117 10965	18kΩ	2%	0,1W	
3525©	4822 117 12955	2,7kΩ	1%	0,1W	
3526©	4822 117 12955	2,7kΩ	1%	0,1W	
3527©	4822 051 10102	1kΩ	2%	0,25W	
3528©	4822 051 10102	1kΩ	2%	0,25W	
3529©	4822 117 11449	2,2kΩ	1%	0,1W	
3530©	4822 117 11449	2,2kΩ	1%	0,1W	
3531©	4822 117 11449	2,2kΩ	1%	0,1W	
3532©	4822 117 11449	2,2kΩ	1%	0,1W	
3533	4822 116 52234	100kΩ	5%	0,5W	
3534©	4822 117 10837	100kΩ	1%	0,1W	
3535©	4822 051 20124	120kΩ	5%	0,1W	
3536©	4822 051 20124	120kΩ	5%	0,1W	
3537©	4822 051 20333	33kΩ	5%	0,1W	
3538©	4822 051 20333	33kΩ	5%	0,1W	
3539	4822 052 10339	33Ω	5%	NFR	
3540©	4822 117 10833	10kΩ	1%	0,1W	
3541©	4822 051 10102	1kΩ	2%	0,25W	
3542©	4822 051 10102	1kΩ	2%	0,25W	

RESISTORS

3543©	4822 051 20332	3,3kΩ	5%	0,1W	
3544©	4822 051 20332	3,3kΩ	5%	0,1W	
3545©	4822 117 11139	1,5kΩ	1%	0,1W	
3546©	4822 117 11139	1,5kΩ	1%	0,1W	
3547©	4822 117 10965	18kΩ	2%	0,1W	
3548©	4822 117 10965	18kΩ	2%	0,1W	
3550©	4822 117 10834	47kΩ	1%	0,1W	
3551©	4822 051 20154	150kΩ	5%	0,1W	
3552©	4822 051 20154	150kΩ	5%	0,1W	
3553©	4822 051 20334	330kΩ	5%	0,1W	
3554©	4822 117 10353	150Ω	5%	0,1W	
3555©	4822 051 20391	390Ω	5%	0,1W	
3556©	4822 051 20122	1,2kΩ	5%	0,1W	
3557©	4822 117 11149	82kΩ	1%	0,1W	
3558	4822 053 20225	2,2MΩ	5%	0,25W	
3559©	4822 051 20225	2,2MΩ	5%	0,1W	
3560©	4822 051 20475	4,7MΩ	5%	0,1W	
3563©	4822 117 12955	2,7kΩ	1%	0,1W	
3564©	4822 117 12955	2,7kΩ	1%	0,1W	
3565©	4822 051 20472	4,7kΩ	5%	0,1W	
3566©	4822 051 20472	4,7kΩ	5%	0,1W	
3569©	4822 051 20472	4,7kΩ	5%	0,1W	
3570©	4822 051 20472	4,7kΩ	5%	0,1W	
3571©	4822 051 20472	4,7kΩ	5%	0,1W	
3572©	4822 051 20472	4,7kΩ	5%	0,1W	
3573©	4822 051 20472	4,7kΩ	5%	0,1W	
3574©	4822 051 20472	4,7kΩ	5%	0,1W	
3575©	4822 117 11503	220Ω	5%	0,1W	
3576	4822 116 83872	220Ω	5%	0,5W	
3577©	4822 051 20471	470Ω	5%	0,1W	
3578©	4822 051 20471	470Ω	5%	0,1W	
3579	4822 052 10478	4,7Ω	5%	NFR	
3580©	4822 117 12955	2,7kΩ	1%	0,1W	
3581©	4822 117 11449	2,2kΩ	1%	0,1W	
3582©	4822 117 11449	2,2kΩ	1%	0,1W	
3583©	4822 117 11503	220Ω	5%	0,1W	
3584©	4822 117 11503	220Ω	5%	0,1W	
3585©	4822 117 10834	47kΩ	1%	0,1W	
3586©	4822 117 10834	47kΩ	1%	0,1W	
3587©	4822 051 20154	150kΩ	5%	0,1W	
3588©	4822 051 20154	150kΩ	5%	0,1W	
3589©	4822 117 11449	2,2kΩ	1%	0,1W	
3590©	4822 117 11449	2,2kΩ	1%	0,1W	
3591©	4822 051 20223	22kΩ	5%	0,1W	
3592©	4822 051 20223	22kΩ	5%	0,1W	
3593	4822 116 52264	27kΩ	5%	0,5W	
3594©	4822 051 20273	27kΩ	5%	0,1W	
3595©	4822 051 20333	33kΩ	5%	0,1W	
3596©	4822 117 10837	100kΩ	1%	0,1W	
3597©	4822 051 20105	1MΩ	5%	0,1W	
3598©	4822 051 20475	4,7MΩ	5%	0,1W	
3599	4822 116 52175	100Ω	5%	0,5W	
3601©	4822 051 20332	3,3kΩ	5%	0,1W	
3602©	4822 051 20332	3,3kΩ	5%	0,1W	
3603©	4822 051 20684	680kΩ	5%	0,1W	
3604©	4822 051 20684	680kΩ	5%	0,1W	
3605©	4822 117 13579	220kΩ	1%	0,1W	
3606©	4822 117 13579	220kΩ	1%	0,1W	
3607	4822 050 21003	10kΩ	2%	0,25W	
3608	4822 050 21003	10kΩ	2%	0,25W	

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ELECTRICAL PARTSLIST AF7 BOARD

RESISTORS

3609 ©	4822 117 10833	10kΩ	1%	0,1W
3610 ©	4822 117 10833	10kΩ	1%	0,1W
3611 ©	4822 051 20562	5,6kΩ	5%	0,1W
3612 ©	4822 051 20562	5,6kΩ	5%	0,1W
3613 ©	4822 051 20562	5,6kΩ	5%	0,1W
3614 ©	4822 051 20562	5,6kΩ	5%	0,1W
3615 ©	4822 051 20562	5,6kΩ	5%	0,1W
3616 ©	4822 051 20562	5,6kΩ	5%	0,1W
3617 ©	4822 051 20822	8,2kΩ	5%	0,1W
3618 ©	4822 051 20822	8,2kΩ	5%	0,1W
3619 ©	4822 051 20822	8,2kΩ	5%	0,1W
3620 ©	4822 051 20822	8,2kΩ	5%	0,1W
3621 ©	4822 051 20822	8,2kΩ	5%	0,1W
3622 ©	4822 051 20822	8,2kΩ	5%	0,1W
3623 ©	4822 117 10834	47kΩ	1%	0,1W
3624 ©	4822 117 10834	47kΩ	1%	0,1W
3625 ©	4822 051 10102	1kΩ	2%	0,25W
3626 ©	4822 051 10102	1kΩ	2%	0,25W
3627 ©	4822 117 11503	220Ω	5%	0,1W
3628 ©	4822 117 11503	220Ω	5%	0,1W
3629 ©	4822 117 11454	820Ω	1%	
3631 ©	4822 117 11454	820Ω	1%	
3632	4822 116 52231	820Ω	5%	0,5W
3633 ©	4822 051 20562	5,6kΩ	5%	0,1W
3634 ©	4822 051 20562	5,6kΩ	5%	0,1W
3635 ©	4822 117 10833	10kΩ	1%	0,1W
3636 ©	4822 117 10833	10kΩ	1%	0,1W
3637 ©	4822 117 10834	47kΩ	1%	0,1W
3638 ©	4822 117 10834	47kΩ	1%	0,1W
3639 ©	4822 117 11507	6,8kΩ	1%	0,1W
3640 ©	4822 117 11507	6,8kΩ	1%	0,1W
3641 ▲	4822 052 10109	10Ω	5%	NFR
3642 ©	4822 051 20472	4,7kΩ	5%	0,1W
3643 ©	4822 051 20472	4,7kΩ	5%	0,1W
3645 ©	4822 051 20479	47Ω	5%	0,1W
3646 ©	4822 051 20479	47Ω	5%	0,1W
3647 ©	4822 051 20479	47Ω	5%	0,1W
3648 ©	4822 051 20479	47Ω	5%	0,1W
3649 ©	4822 051 20479	47Ω	5%	0,1W
3650 ©	4822 051 20479	47Ω	5%	0,1W
3651 ©	4822 051 20392	3,9kΩ	5%	0,1W
3652 ©	4822 051 20392	3,9kΩ	5%	0,1W
3655	4822 050 21003	10kΩ	2%	0,25W
3656 ©	4822 117 10833	10kΩ	1%	0,1W
3657 ©	4822 051 10102	1kΩ	2%	0,25W
3658 ©	4822 051 20562	5,6kΩ	5%	0,1W
3660 ©	4822 051 20472	4,7kΩ	5%	0,1W
3661	4822 053 20475	4,7MΩ	5%	0,25W
3662 ©	4822 051 10102	1kΩ	2%	0,25W
3663 ©	4822 051 10102	1kΩ	2%	0,25W
3667 ©	4822 051 20392	3,9kΩ	5%	0,1W
3668 ©	4822 051 20392	3,9kΩ	5%	0,1W
3671 ©	4822 117 13579	220kΩ	1%	0.1W
3672 ©	4822 117 13579	220kΩ	1%	0.1W
3673 ©	4822 117 12955	2,7kΩ	1%	0,1W
3674 ©	4822 051 20334	330kΩ	5%	0,1W
3675 ©	4822 051 20392	3,9kΩ	5%	0,1W
3676 ©	4822 051 20101	100Ω	5%	0,1W
3677 ©	4822 051 20471	470Ω	5%	0,1W
3678 ©	4822 117 13579	220kΩ	1%	0.1W

RESISTORS

3679 ©	4822 051 20391	390Ω	5%	0,1W
3680 ©	4822 051 20471	470Ω	5%	0,1W
3681	4822 052 10229	22Ω	5%	0,33W
3682 ©	4822 051 10102	1kΩ	2%	0,25W
3683 ©	4822 051 20471	470Ω	5%	0,1W
3684 ©	4822 051 20392	3,9kΩ	5%	0,1W
3686 ©	4822 117 11383	12kΩ	1%	0,1W
3687 ©	4822 117 11383	12kΩ	1%	0,1W
3688 ©	4822 051 20471	470Ω	5%	0,1W
3689 ©	4822 051 20471	470Ω	5%	0,1W
3690 ©	4822 051 20109	10Ω	5%	0,1W
3691 ©	4822 051 20109	10Ω	5%	0,1W
3692 ©	4822 117 10833	10kΩ	1%	0,1W
3693 ©	4822 051 20562	5,6kΩ	5%	0,1W
3694 ©	4822 051 20562	5,6kΩ	5%	0,1W
3695	4822 116 81154	2,2Ω	5%	0,5W
3696 ©	4822 117 11449	2,2kΩ	1%	0,1W
3697	4822 116 83883	470Ω	5%	0,16W
3698	4822 116 83883	470Ω	5%	0,16W
3699	4822 050 11002	1kΩ	5%	0,2W
3773	4822 050 11002	1kΩ	5%	0,2W
4516 ©	4822 051 20008	CHIP JUMPER 0805		
4517 ©	4822 051 20008	CHIP JUMPER 0805		
4518 ©	4822 051 20008	CHIP JUMPER 0805		
4519 ©	4822 051 20008	CHIP JUMPER 0805		
4520 ©	4822 051 20008	CHIP JUMPER 0805		
4521 ©	4822 051 20008	CHIP JUMPER 0805		
4522 ©	4822 051 20008	CHIP JUMPER 0805		
4524 ©	4822 051 20008	CHIP JUMPER 0805		
4525 ©	4822 051 20008	CHIP JUMPER 0805		
4526 ©	4822 051 20008	CHIP JUMPER 0805		
4527 ©	4822 051 20008	CHIP JUMPER 0805		
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4529 ©	4822 051 20008	CHIP JUMPER 0805		
4531 ©	4822 051 20008	CHIP JUMPER 0805		
4532 ©	4822 051 20008	CHIP JUMPER 0805		
4533 ©	4822 051 20008	CHIP JUMPER 0805		
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4556 ©	4822 051 20008	CHIP JUMPER 0805		
4557 ©	4822 051 20008	CHIP JUMPER 0805		

RESISTORS

4558 ©	4822 051 20008	CHIP JUMPER 0805
4559 ©	4822 051 20008	CHIP JUMPER 0805
4560 ©	4822 051 20008	CHIP JUMPER 0805
4561 ©	4822 051 20008	CHIP JUMPER 0805
4562 ©	4822 051 20008	CHIP JUMPER 0805
4563 ©	4822 051 20008	CHIP JUMPER 0805
4564 ©	4822 051 20008	CHIP JUMPER 0805
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4569 ©	4822 051 20008	CHIP JUMPER 0805
4570 ©	4822 051 20008	CHIP JUMPER 0805
4571 ©	4822 051 20008	CHIP JUMPER 0805
4572 ©	4822 051 20008	CHIP JUMPER 0805
4573 ©	4822 051 20008	CHIP JUMPER 0805
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4575 ©	4822 051 20008	CHIP JUMPER 0805
4576 ©	4822 051 20008	CHIP JUMPER 0805
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4582 ©	4822 051 20008	CHIP JUMPER 0805
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4595 ©	4822 051 20008	CHIP JUMPER 0805
4597 ©	4822 051 20008	CHIP JUMPER 0805
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4601 ©	4822 051 20008	CHIP JUMPER 0805
4602 ©	4822 051 20008	CHIP JUMPER 0805
4603 ©	4822 051 20008	CHIP JUMPER 0805
4605 ©	4822 051 20008	CHIP JUMPER 0805
4606 ©	4822 051 20008	CHIP JUMPER 0805
4607 ©	4822 051 20008	CHIP JUMPER 0805
4608 ©	4822 051 20008	CHIP JUMPER 0805
4609 ©	4822 051 20008	CHIP JUMPER 0805
4611 ©	4822 051 20008	CHIP JUMPER 0805
4612 ©	4822 051 20008	CHIP JUMPER 0805
4613 ©	4822 051 20008	CHIP JUMPER 0805
4614 ©	4822 051 20008	CHIP JUMPER 0805
4615 ©	4822 051 20008	CHIP JUMPER 0805
4618 ©	4822 051 20008	CHIP JUMPER 0805
4619 ©	4822 051 20008	CHIP JUMPER 0805
4620 ©	4822 051 20008	CHIP JUMPER 0805
4621 ©	4822 051 20008	CHIP JUMPER 0805
4622 ©	4822 051 20008	CHIP JUMPER 0805
4623 ©	4822 051 20008	CHIP JUMPER 0805
4624 ©	4822 051 20008	CHIP JUMPER 0805
4625 ©	4822 051 20008	CHIP JUMPER 0805
4626 ©	4822 051 20008	CHIP JUMPER 0805
4627 ©	4822 051 20008	CHIP JUMPER 0805
4629 ©	4822 051 20008	CHIP JUMPER 0805

RESISTORS

4630 ©	4822 051 20008	CHIP JUMPER 0805
4715 ©	4822 051 20008	CHIP JUMPER 0805
4716 ©	4822 051 20008	CHIP JUMPER 0805

COILS

5511	4822 157 62552	2,2µH
5523	4822 157 62552	2,2µH
5531	4822 157 62552	2,2µH
5532	4822 157 62552	2,2µH

DIODES

6512	4822 130 30862	BZX79-C9V1
6514	4822 130 31878	1N4003G
6515	4822 130 30621	1N4148
6516	4822 130 30621	1N4148
6531	4822 130 30621	1N4148

TRANSISTORS

7521 ©	4822 130 60511	BC847B
7522 ©	4822 130 60511	BC847B
7523 ©	4822 130 60511	BC847B
7524 ©	4822 130 60511	BC847B
7525	4822 130 40959	BC547B
7526 ©	4822 130 60373	BC856B
7527 ©	4822 130 60511	BC847B
7528 ©	4822 130 60511	BC847B
7529 ©	4822 130 60373	BC856B
7531 ©	4822 130 60511	BC847B
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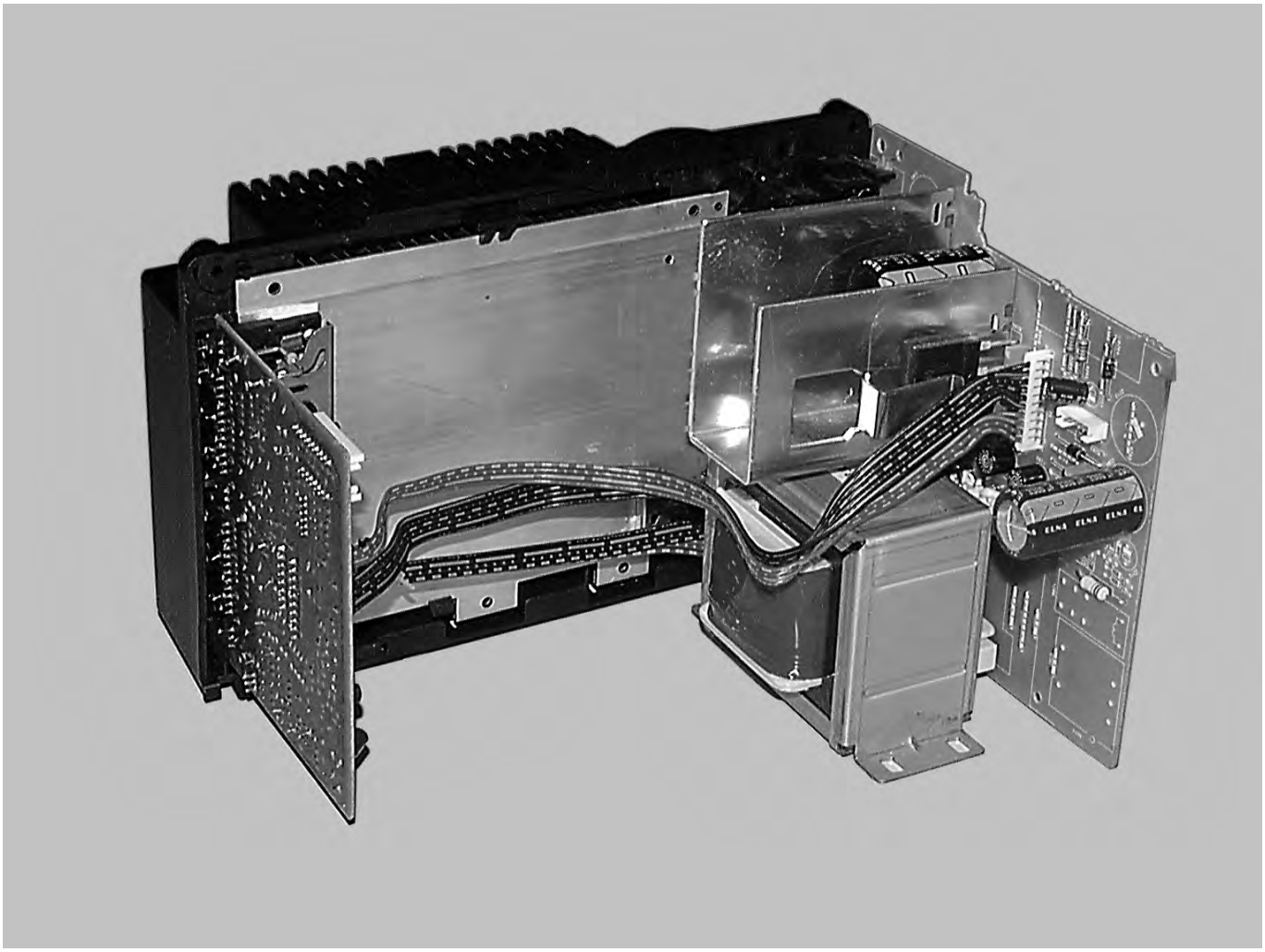
7533 ©	4822 130 60511	BC847B
7534 ©	4822 130 60511	BC847B
7535 ©	4822 130 42804	BC817-25
7536 ©	4822 130 42804	BC817-25
7537 ©	4822 130 60511	BC847B
7538 ©	4822 130 60511	BC847B
7539 ©	4822 130 60373	BC856B
7541 ©	4822 130 60511	BC847B
7542 ©	4822 130 60511	BC847B
7543 ©	4822 130 42804	BC817-25
7552	4822 130 41246	BC327-25
7553 ©	4822 130 60511	BC847B

INTEGRATED CIRCUITS

7511 ©	4822 209 17386	TDA7437T, Selector&Sound processor
7512 ©	4822 209 83357	NJM4560M, 2-FOLD OP-AMP.
7513 ©	4822 209 83357	NJM4560M, 2-FOLD OP-AMP.
7515 ©	4822 209 31378	NJM4556M, 2-FOLD OP-AMP.
7551 ©	4822 209 17345	M62320FP, I2C SHIFT REGISTER



POWER 4-CDR Module

stage .6

TABLE OF CONTENTS

CIRCUIT DESCRIPTION FOR POWER4-MODULE

Supply-part

General *(pos. numbers refer to circuit diagram chapter 9-7)*

The primary circuitry depends on the version:

- Versions with fixed primary voltage: 100VAC for /26
  120VAC for /37
  220-240VAC for /22/25/30/33/34
  Versions /22/25/26/37 use radial type-fuse 1201, versions /30/33/34 use glass tube fuse 1202.
  For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.

- Version with switchable primary voltage: 110-127/220-240VAC for /21
  In version /21 voltage selector 1210 is built-in and each primary winding is protected separately (fuses 1201 and 1200).
  For correct replacement see service printing on printed board respectively version table in circuit diagram or partslist.

- European versions – "*low power standby feature"*
  For detailed description see below.

Circuit details:

- **Low power standby feature**

An additional small standby transformer, connected in series to the mains transformer, reduces power consumption in standby-mode.
In case power is switched on, the control line ECO is low → relay 1208 is activated → standby transformer 5211 is shortened and out of work.
When the set is switched off (standby) the control line ECO is high → relay 1208 is not activated → standby transformer 5211 is now connected in series to the primary winding of the mains transformer 1008. As the impedance of the standby transformer is much higher than the impedance of the mains transformer, the mainsvoltage is divided by approx. 85% (standby transformer) to 15% (mains transformer). Thus the mains transformer delivers very low secondary voltage → power consumption is less than 100mW.
Via standby transformer and rectifiers 6209-6212 the supply voltage +C is substituted. The 5,6V regulator is still working and so the microprocessor is kept running.

- **DC voltages +A, +B1/+B2, +C**

These voltages supply the Super Class G amplifier, described later in this chapter.
The whole power supply is optimized for the special characteristic of this type of amplifier. For that reason several "tricky" details have been applied to ensure optimal efficiency and symmetrical load to the mains transformer.

Generation of +A

Common full wave rectifying with bridge rectifier 6201, using 100% secondary winding of mains transformer (pin 9-15).

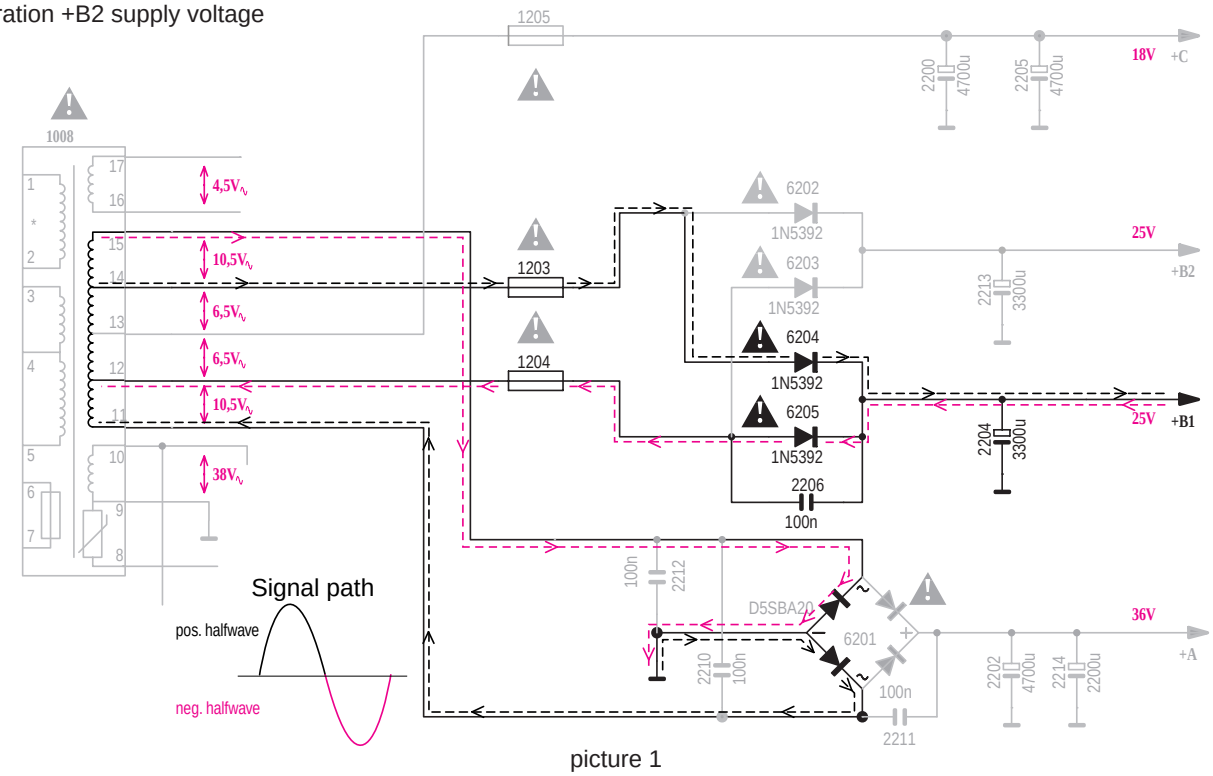
Generation of +B1/+B2

The power supply is designed to cover both, 2-channel and 4-channel application.
While for 2-channel application only one supply voltage +B1 is sufficient, 4-channel application requires an additional supply part +B2 which supplies the Center/Surround-amplifiers and the +12V-regulator (current required by 4 amplifiers would overload a single rectifier).

The supply for 2-channel versions consists of one full wave rectifier:
– 2 diodes of bridge rectifier 6201, with 6204/6205 for generation of +B1
– +B2 is connected in parallel with a bridge wire.

The supply for 4-channel versions consists of two separate full wave rectifiers:
– 2 diodes of bridge rectifier 6201, with 6204/6205 (for +B1) and
– 2 diodes of bridge rectifier 6201, with 6202/6203 (for +B2),
using approx. 70% secondary winding of mains transformer (pin 9-14 respectively pin 12-15).
As example for generation of +B2 see picture 1.

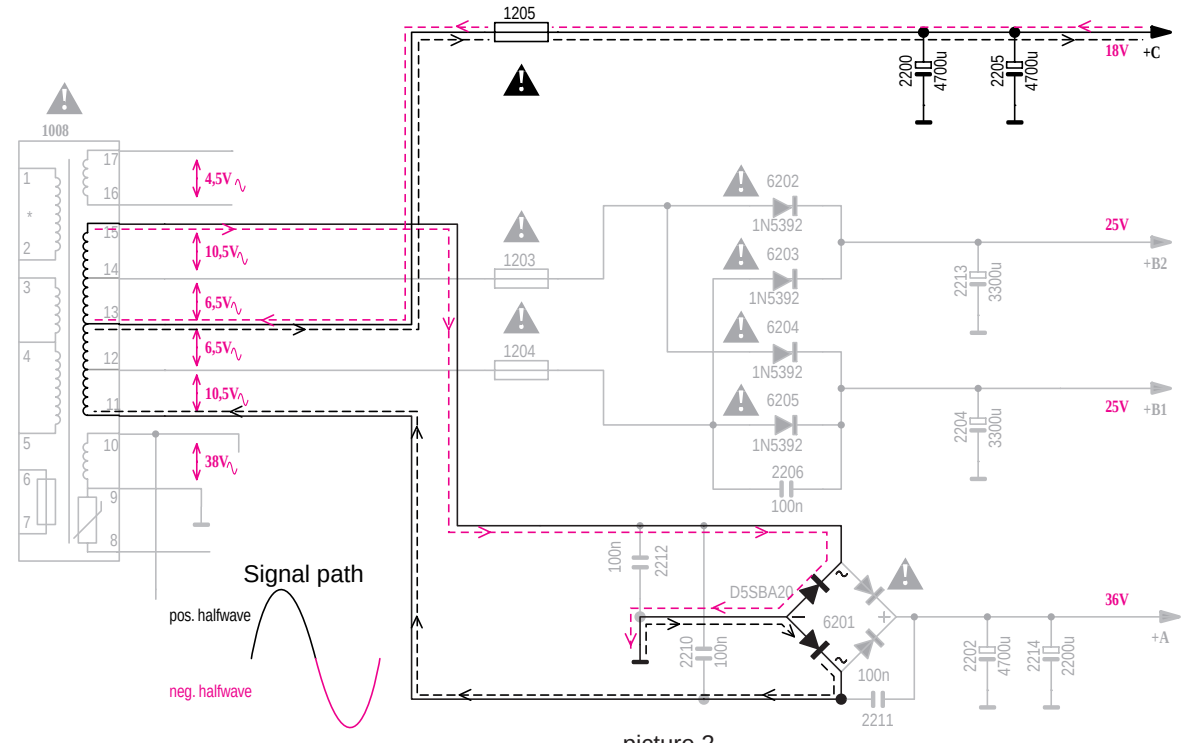
Generation +B2 supply voltage



picture 1

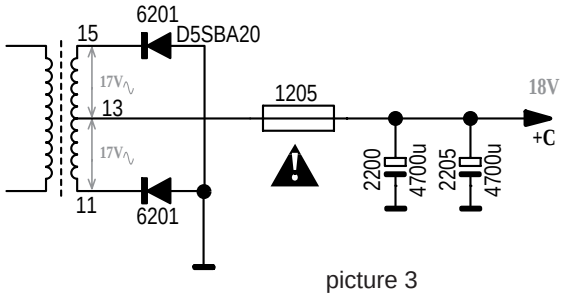
Generation of +C

Full wave rectifying with 2 diodes of bridge rectifier 6201, using 50% secondary winding of mains transformer (pin 13-15/13-11). See pictures 2 and 3 below.



picture 2

Simplified



picture 3

Circuit details (continoued):

- **Supply voltages for FTD** (**F**luorescent **T**ube **D**isplay)
  The FTD requires two supply voltages, delivered by separate windings of the mains transformer:
  – 4,5V$_{AC}$ for FTD heating (transformer pin 16/17)
  – -30V stabilized by the -30V regulator located on the amplifier part. The supply part delivers -35V unstabilized (transformer pin 9/10), typical value: -35V...-45V.

- **Stabilized +5V6**
  Stabilizer 7201 generates the supply voltage +5V6 for the microprocessor. In fault condition the output voltage can rise up to approx. 17V, which would definitely damage the device. Therefore an overvoltage protection for the +5V6 supply is implemented.
  Whenever the output of stabilizer rises above 7,5V, the base of 7202 reaches 0,7V (7,5V - voltage drop on 6207), the transistor switches through and short circuits the input voltage. This causes the safety resistor 3204 to blow out and interrupt immediately.

- **Temperature monitoring**
  The mains transformer is equipped with a NTC, embedded in the secondary winding (pin 8/9). Via the NTC line the temperature of the mains transformer is continuously monitored by the microprocessor. Further actions depend on the software of the set. Usually the set will be switched to standby mode when the transformer is overheated.

- **Power down (PWDN) monitoring**
  In order to enable proper switch off conditions the mains supply is monitored by the microprocessor via the PWDN line. In case of mains supply interrupts the PWDN line becomes low, while the +5V6 is still stable. This enables the microprocessor to take actions for a save shut-down (e.g. mute, reset of electronics, release of head support of tape deck).

Amplifier part

+12V-regulator *(pos. numbers refer to circuit diagram chapter 9-9)*

Is used to supply all motors (+12M) and all analogue circuits (+12A) in the set. +12C is provisional only.

- **Power on/off:**
  Switching on/off is done via the STBY-line from the microprocessor. H=ON, L=OFF
  If the STBY line is high - transistor 7222 is conductive. Base of 7224 becomes less positive than the emitter. This causes transistor 7224 to switch trough and supply the base of 7221. Consequently 7221 swiches trough too.
  Via 3218 transistor 3228 is conductive as soon as B2 is available. Consequently switching transistor 7227 is also switched through.

  If the STBY line is switched to low level base current for 7222 is blocked. In turn 7224 and 7221 are blocked. → OFF.

- **Regulation:**
  Key components are power-transistor 7221, reference diode 6221 and transistor 7223.
  After power is switched on via the STBY line as described above the +12A increases until 7223 becomes conductive via reference diode 6221 → 7223 reduces base current of 7221 → +12A is stable (typical +12,4V).
  In normal operating mode 7227 is always switched trough as described above.

- **Protections:**
  In case of <u>overcurrent</u> (typical 2,5A) 7227 gets out of saturation → 7226 becomes conductive → 7225 becomes conductive via 6225 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.
  Restarting is only possible with power OFF→ ON.

  In case of <u>overvoltage</u> (more than +15V on emitter of 7221) 7225 is now activated via 6233 → 7228 is blocked (no base current anymore) → 7227 is blocked too → no +12V.

  These protections are implemented for saving the set-electronic in any fault-condition.

-30V-regulator

- Grid supply for the FTD switched by the microprocessor.
  Simple regulation with 6251 as reference. Typical value: -29V. Maximum current: 30mA

Circuit details (continoued):

VCD- Supply:

Is a provision for versions with a Video CD Player.

This circuitry consists of a switched supply with a regulator to 5,1V (±0,15V).

- **Switching on/off** is done via the VCD_ON line from the microprocessor (H=on, L=off). If the VCD_ON line is high - transistor 7236 becomes conductive. This causes transistor 7238 to switch through. +5VCD is available. If the VCD_ON is low - transistor 7236 is blocked → no base current through 7238 → transistor 7238 is blocked too → +5VCD is switched off.

- **Regulation** is done via Z- diode 6244 and transistor 7237.
  If the +5VCD exceeds 5,1V the basis of transistor 7237 becomes higher than 0,6V via Z- diode 6244. Consequently transistor 7237 becomes conductive. This causes a reduced base current through 7236. Transistor 7236 becomes less conductive and reduces the base current trough 7238. Transistor 7238 becomes less conductive too and reduces the +5VCD.

Amplifier:

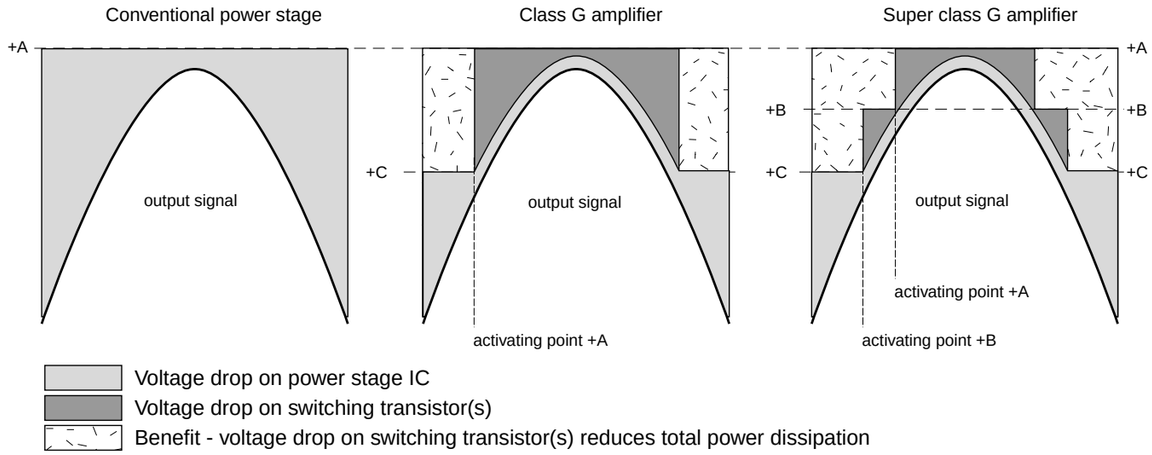
Attention: In the POWER 4 module the power amplifier IC AN7164 is used as a bridge-amplifier.
Any connection from output to ground will destroy the outpout stages!

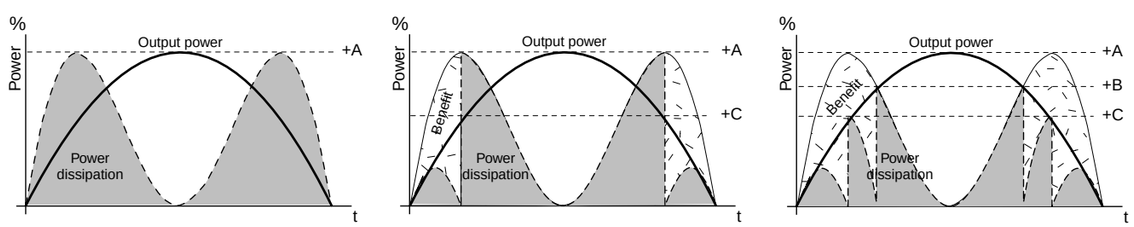
- Via the AMP_ON control line, connected to pins 6 (Stby), the power amplifiers are switched on/off by the µP.
  High level (approx. 4,5V): power amplifiers switched on
  Low level (approx. 0V): power amplifiers switched off

- Super class G - operation

  The power amplifiers operate as so-called super class G - amplifiers:
  The supply pins 12 (Vcc) are not just connected to one fixed DC-supply as in conventional amplifiers.
  Dependent on the output power there are three different DC-voltages supplied to the power amplifiers:
  ⇒ +C (+18V) for low output power
  ⇒ +B (+25V) for medium output power
  ⇒ +A (+36V for high output power

Principle / benefit of Super Class G





9-5

- advantages: - best efficiency
  - less power drawn from the mains transformer than by conventional operating amplifiers reduces transformer heating.
  - reduced power dissipation at the amplifier ICs results in
    • less junction temperature and better reliability
    • possibility of higher output power with smaller cooling fin
    • smaller size

- Functional description of the super class G - circiuitry used in Power4-module

  The DC-level on the amplifier output pins is normally Vcc/2.
  With low signals +C is supplying the amplifiers via decoupling diode 6312. The DC-level on the output pins is therefore approx. 8,6V and approx. 8V on the base of 7315.
  When the output signal increases, also DC-level on base of 7315 increases via diodes 6305, 6306, 6307 and 6308. At a certain output power 7315 becomes slightly conductive and enables low base current for 7304 which becomes conductive too and pulls gate of FET 7303 up to a more positive level. Thus FET 7303 begins to switch through and connects the higher DC supply +B1 slowly to the power stages.
  This does not end up in a hard switching but in a smooth regulating because Vcc is coupled back to the emitter of 7315 via Zener diode 6310. As soon as Vcc increases also the level on emitter 7315 is increased by a 3,9V lower level than Vcc.
  When the output power is increased further +B1 would not be high enough to enable undistorted output signal. The more the output level increases the more increases the DC-level on base of 7315 which causes the transistor more and more conducting until the summary of the voltage drop on 3340+E/B 7304+3342 becomes approx. 1,4V. Now the necessary VBE for a darlington-type transistor is obtained, 7305 begins to switch through and connects the again higher DC supply +A slowly to the power stages. 7305 regulates +A, same as described before for +B.
  7322 and 7316 switch the ripple capacitor 2355, dependent on the output power.
  With low output power the DC-level on base 7322 is approx. 8V. Via Zener diode 6310 and resistor 3333 the emitter is pulled to Vcc (+C at low levels). 7322 is switched through and in turn 7316. The ripple capacitor 2325 is connected to ground and functions as in normal amplifiers. Hum is suppressed and good S/N-ratio is guaranteed even during silent music passages.
  When the supply voltage has to be switched to a higher level the DC-level of the ripple capacitor has to increase in the same relation, otherwise the reference voltages inside the IC would not fit to the actual Vcc. Because of the different delays this relation cannot be obtained and a continuously connected capacitor to the ripple input would cause distortion. For that reason the ripple capacitor 2325 is disconnected as soon as the output power exceeds a certain value. When the output signal increases, also DC-level on base of 7322 increases via diodes 6305, 6306, 6307 and 6308. 7322 blocks and in turn 7316. The ripple capacitor 2325 is disconnected from ground. The circuitry is designed so that 2325 is disconnected just before 7303 begins to switch +B through (see above).

- For Center/Surround-amplifier the function of the Super Class G circuit is similar. Instead of +B1 there +B2 is connected.

- For the /37-versions with two channel-application the so called MATRIX SURROUND is added. The 2 surround-speakers are added in a way, that in case of STEREO a high signal can be measured (up to 10W per speaker at 6 Ohm). In MONO only a few 100mW are available. Result: The widening of the STEREO base is increased without any additional electronic or amplifier.

- In all four channel versions a pre-amplifier out for SURROUND is available to add a wireless speaker system (e.g. FB206,FB208).

9-6

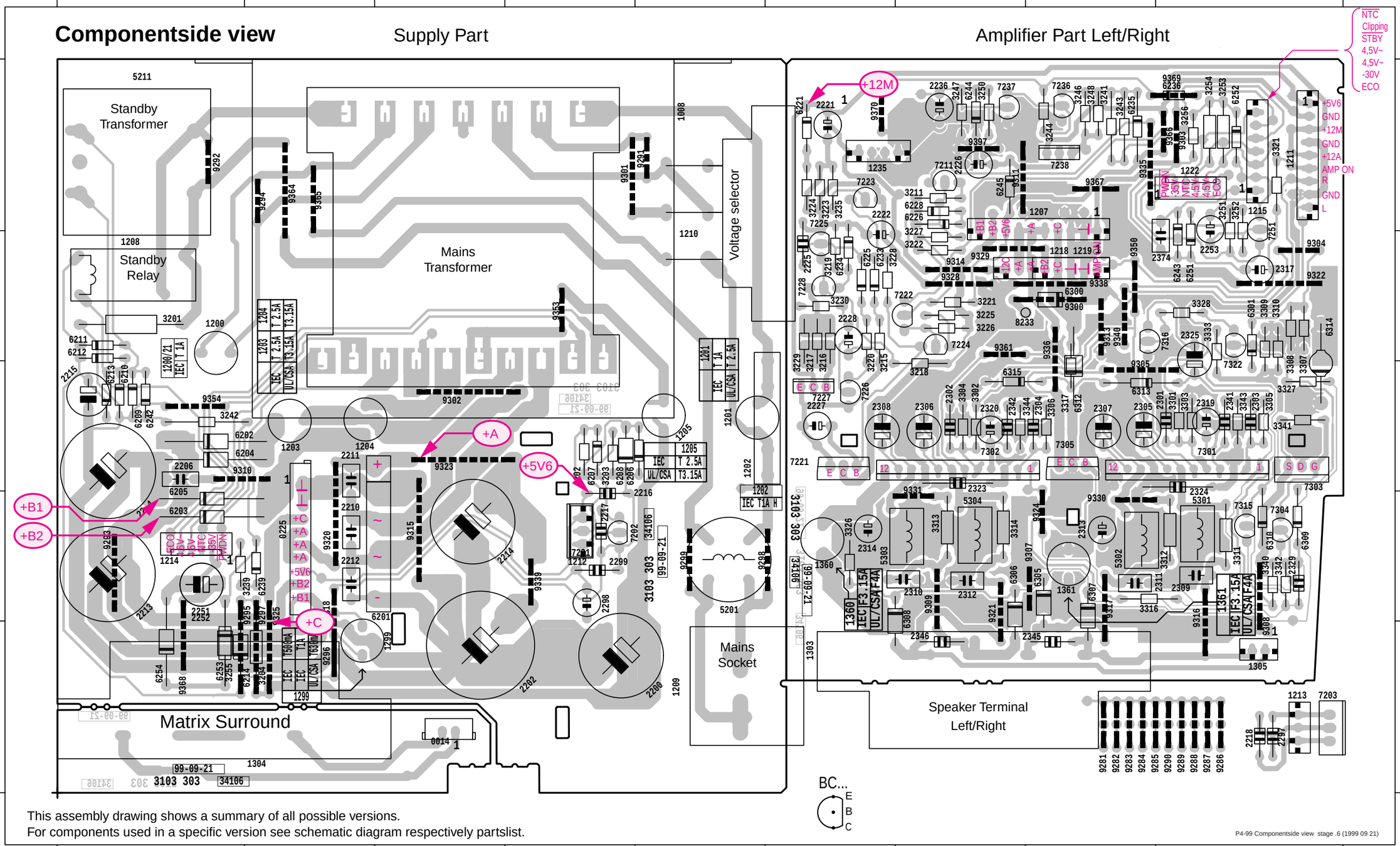
0014 E 3	1211 A 9	1360 D 6	2217 D 4	2298 D 4	2312 D 7	2346 E 7	3221 B 7	3242 C 1	3301 C 9	3314 D 7	5201 D 5	6208 C 4	6235 A 8	6305 D 8	7211 A 7	7301 C 9	9285 E 8	9298 D 6	9313 B 8	9329 B 7	9365 A 2
0225 D 2	1212 D 4	1361 D 8	2218 E 9	2299 D 4	2313 D 8	2374 B 9	3222 B 7	3243 A 8	3302 C 7	3316 D 8	5211 A 1	6209 C 1	6236 A 9	6306 D 7	7221 C 6	7302 C 7	9286 E 9	9299 D 5	9314 B 7	9330 D 8	9366 A 9
1008 A 3	1213 E 9	2200 E 5	2221 A 6	2301 C 9	2314 D 6	3201 B 1	3223 A 6	3244 A 8	3303 C 9	3317 C 8	5301 D 9	6210 C 1	6239 D 2	6307 D 8	7222 B 7	7303 C 9	9287 E 9	9300 B 8	9315 D 3	9331 D 7	9367 A 8
1200 B 1	1214 D 1	2202 E 4	2222 B 6	2302 C 7	2317 B 9	3202 C 4	3224 A 6	3246 A 8	3304 C 7	3321 A 9	5302 D 8	6211 B 1	6242 C 1	6308 E 6	7223 A 6	7304 D 9	9288 E 9	9301 A 4	9316 E 9	9335 A 8	9368 E 1
1201 C 5	1215 A 9	2204 C 1	2225 B 6	2303 C 9	2319 C 9	3203 C 4	3225 B 7	3247 A 7	3305 C 9	3326 D 6	5303 D 7	6212 B 1	6243 B 9	6309 D 9	7224 B 7	7305 C 8	9289 E 9	9302 C 3	9317 D 8	9336 B 8	9369 A 9
1202 C 5	1218 B 8	2206 C 1	2226 A 7	2304 C 8	2320 C 7	3204 E 2	3226 B 7	3248 A 8	3306 C 8	3327 C 9	5304 D 7	6213 C 1	6244 A 7	6310 D 9	7225 B 6	7315 D 9	9290 E 9	9303 A 9	9318 E 2	9338 B 8	9370 A 6
1203 C 2	1219 B 8	2210 D 2	2227 C 6	2305 C 8	2323 C 7	3211 A 7	3227 B 7	3250 A 7	3307 B 9	3328 B 9	6201 D 2	6214 E 1	6245 A 7	6312 C 8	7226 C 6	7316 B 8	9291 A 5	9304 B 9	9320 D 2	9339 D 4	9397 A 7
1204 C 2	1222 A 9	2211 C 2	2228 B 6	2306 C 7	2324 C 9	3215 B 6	3228 B 6	3251 A 9	3308 B 9	3333 B 9	6202 C 1	6221 A 6	6251 B 9	6313 C 8	7227 C 6	7322 B 9	9292 A 1	9305 C 8	9321 D 7	9340 B 8	
1205 C 5	1235 A 6	2212 D 2	2236 A 7	2307 C 8	2325 B 9	3216 B 6	3229 B 6	3252 B 9	3309 B 9	3340 D 9	6203 D 1	6225 B 6	6252 A 9	6314 C 9	7228 B 6	8233 B 7	9293 D 1	9307 D 8	9322 B 9	9350 B 8	
1207 B 8	1299 E 2	2213 D 1	2251 D 1	2308 C 6	2329 D 9	3217 B 6	3230 B 6	3253 A 9	3310 B 9	3341 C 9	6204 C 1	6226 A 7	6253 E 1	6315 C 7	7236 A 8	9281 E 8	9294 A 2	9308 D 9	9323 C 3	9353 B 4	
1208 B 1	1303 E 7	2214 D 4	2252 D 1	2309 D 9	2341 C 9	3218 C 7	3235 A 6	3254 A 9	3311 D 9	3342 D 9	6205 D 1	6228 A 7	6254 E 1	7201 D 4	7237 A 7	9282 E 8	9295 E 1	9309 D 7	9324 D 8	9354 C 1	
1209 E 5	1304 E 1	2215 C 1	2253 A 9	2310 D 7	2342 C 7	3219 B 6	3239 D 1	3255 E 1	3312 D 9	3343 C 9	6206 C 5	6233 B 6	6300 B 8	7202 D 4	7238 A 8	9283 E 8	9296 E 2	9310 C 1	9325 E 2	9361 B 7	
1210 A 5	1305 E 9	2216 D 4	2297 E 9	2311 D 8	2345 E 8	3220 B 6	3241 A 8	3256 A 9	3313 D 7	3344 C 7	6207 C 4	6234 B 6	6301 B 9	7203 E 9	7251 A 9	9284 E 8	9297 E 2	9311 A 7	9328 B 7	9364 A 2	

1 2 3 4 5 6 7 8 9

Componentside view

Supply Part

Amplifier Part Left/Right



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

9-7

SUPPLY PART

MAINS SOCKET
1209
110-127 VAC
220-240 VAC
5201
not for /37
1210
only /21
1201
T1A IEC
T2,5A UL
1008
3201 10M for /37 ONLY
not for /21
9294
T1A EC
1200 only for /21
9292
not for /22
4,5V~
10,5V~
6,5V~
6,5V~
10,5V~
38V~
1205
T2,5A EC
T3,15A UL
18V +C
2200 4700u
1203
T2,5A EC
T3,15A UL
1204
T2,5A EC
T3,15A UL
6202 1N5392
6203 1N5392
PROVISIONAL
2213 3300u
25V +B2
6204 1N5392
6205 1N5392
2206 100n
2204 3300u
25V +B1
9293
100n 2212
D5SBA20
6201
2210 100n
100n 2211
2202 4700u
2214
2203
PROVISIONAL
36V +A
0225
+C 18V
+A 36V
+5V6 5,6V
+B2 25V
+B1 25V
TO AMPLIFIER PART CONNECTOR 1207

LOW POWER STANDBY CIRCUIT
not for /21
Relay drawn active = Power on
1208 STBY-REL
18V
4V .. 6V
6213 1N4148
5211 STANDBY TRANSFORMER
6209 1N4148
6210 1N4148
6211 1N4148
6212 1N4148
+C
3R3 3204
6214 1N4002
9297 if 1299 is stuffed
9295 not for /22
6242 1N4148
2215 220u
3242 4k7
+C N POWER ON
+C N STANDBY
6253 1N4003
6254 1N4002
-42V
2251 100u
6239 1N4148
3239 4k7
T500mA IEC
T630mA UL
T1A for VCD
1299 PROVISIONAL

5,6V REGULATOR
7201 L7805CV
17,2V
5,6V +5V6
2298 1u
2299 100n
3202 10k
2216 100n
BZX79-C6V8 6207
Overvoltage protection
0V
7202 BC368
6206 1N4148
6208 1N4002
3203 270
2217 100n

EVM .....V DC-voltages measured with low output power

1214
4-6V
4,5V~
-42V
1 ECO
2 4,5V
3 4,5V
4 NTC
5 -35V
6 PWDN
TO AMPLIFIER PART CONNECTOR 1222

P4-99 Supply (1999 09 21)

0225 A11
1008 A 4
1200 B 3
1201 A 3
1202 A 3
1203 B 6
1204 B 6
1205 A 6
1208 D 2
1209 B 1
1210 A 2
1214 I11
2200 A 8
2202 D 9
2203 D 9
2204 B 9
2206 C 8
2210 D 7
2211 D 8
2212 C 7
2213 B 9
2214 D 9
2215 G 2
2216 G 7
2217 H 8
2251 E 4
2298 G 5
2299 G 6
3201 C 1
3202 G 7
3203 H 8
3204 G 1
3239 D 5
3242 H 1
5201 A 1
5211 E 1
6201 C 8
6202 A 8
6203 A 8
6204 B 8
6205 B 8
6206 H 6
6207 G 8
6208 H 7
6209 F 2
6210 F 2
6211 F 2
6212 F 2
6213 E 2
6214 G 1
6239 D 5
6242 G 1
6253 D 4
6254 D 4
7201 F 6
7202 G 9
9292 C 2
9293 B 9
9294 B 3
9295 F 4

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9365 A 2	9329 B 7	9313 B 8	9298 D 6	9285 E 8	7301 C 9	7211 A 7	6305 D 8	6235 A 8	6208 C 4	5201 D 5	3314 D 7	3301 C 9	3242 C 1	3221 B 7	2346 E 7	2312 D 7	2298 D 4	2217 D 4	1360 D 6	1211 A 9	0014 E 3
9366 A 9	9330 D 8	9314 B 7	9299 D 5	9286 E 9	7302 C 7	7221 C 6	6306 D 7	6236 A 9	6209 C 1	5211 A 1	3316 D 8	3302 C 7	3243 A 8	3222 B 7	2374 B 9	2313 D 8	2299 D 4	2218 E 9	1361 D 8	1212 D 4	0225 D 2
9367 A 8	9331 D 7	9315 D 3	9300 B 8	9287 E 9	7303 C 9	7222 B 7	6307 D 8	6239 D 2	6210 C 1	5301 D 9	3317 C 8	3303 C 9	3244 A 8	3223 A 6	3201 B 1	2314 D 6	2301 C 9	2221 A 6	2200 E 5	1213 E 9	1008 A 3
9368 E 1	9335 A 8	9316 E 9	9301 A 4	9288 E 9	7304 D 9	7223 A 6	6308 E 6	6242 C 1	6211 B 1	5302 D 8	3321 A 9	3304 C 7	3246 A 8	3224 A 6	3202 C 4	2317 B 9	2302 C 7	2222 B 6	2202 E 4	1214 D 1	1200 B 1
9369 A 9	9336 B 8	9317 D 8	9302 C 3	9289 E 9	7305 C 8	7224 B 7	6309 D 9	6243 B 9	6212 B 1	5303 D 7	3326 D 6	3305 C 9	3247 A 7	3225 B 7	3203 C 4	2319 C 9	2303 C 9	2225 B 6	2204 C 1	1215 A 9	1201 C 5
9370 A 6	9338 B 8	9318 E 2	9303 A 9	9290 E 9	7315 D 9	7225 B 6	6310 D 9	6244 A 7	6213 C 1	5304 D 7	3327 C 9	3306 C 8	3248 A 8	3226 B 7	3204 E 2	2320 C 7	2304 C 8	2226 A 7	2206 C 1	1218 B 8	1202 C 5
9397 A 7	9339 D 4	9320 D 2	9304 B 9	9291 A 5	7316 B 8	7226 C 6	6312 C 8	6245 A 7	6214 E 1	6201 D 2	3328 B 9	3307 B 9	3250 A 7	3227 B 7	3211 A 7	2323 C 7	2305 C 8	2227 C 6	2210 D 2	1219 B 8	1203 C 2
	9340 B 8	9321 D 7	9305 C 8	9292 A 1	7322 B 9	7227 C 6	6313 C 8	6251 B 9	6221 A 6	6202 C 1	3333 B 9	3308 B 9	3251 A 9	3228 B 6	3215 B 6	2324 C 9	2306 C 7	2228 B 6	2211 C 2	1222 A 9	1204 C 2
	9350 B 8	9322 B 9	9307 D 8	9293 D 1	8233 B 7	7228 B 6	6314 C 9	6252 A 9	6225 B 6	6203 D 1	3340 D 9	3309 B 9	3252 B 9	3229 B 6	3216 B 6	2325 B 9	2307 C 8	2236 A 7	2212 D 2	1235 A 6	1205 C 5
	9353 B 4	9323 C 3	9308 D 9	9294 A 2	9281 E 8	7236 A 8	6315 C 7	6253 E 1	6226 A 7	6204 C 1	3341 C 9	3310 B 9	3253 A 9	3230 B 6	3217 B 6	2329 D 9	2308 C 6	2251 D 1	2213 D 1	1299 E 2	1207 B 8
	9354 C 1	9324 D 8	9309 D 7	9295 E 1	9282 E 8	7237 A 7	7201 D 4	6254 E 1	6228 A 7	6205 D 1	3342 D 9	3311 D 9	3254 A 9	3235 A 6	3218 C 7	2341 C 9	2309 D 9	2252 D 1	2214 D 4	1303 E 7	1208 B 1
	9361 B 7	9325 E 2	9310 C 1	9296 E 2	9283 E 8	7238 A 8	7202 D 4	6300 B 8	6233 B 6	6206 C 5	3343 C 9	3312 D 9	3255 E 1	3239 D 1	3219 B 6	2342 C 7	2310 D 7	2253 A 9	2215 C 1	1304 E 1	1209 E 5
	9364 A 2	9328 B 7	9311 A 7	9297 E 2	9284 E 8	7251 A 9	7203 E 9	6301 B 9	6234 B 6	6207 C 4	3344 C 7	3313 D 7	3256 A 9	3241 A 8	3220 B 6	2345 E 8	2311 D 8	2297 E 9	2216 D 4	1305 E 9	1210 A 5

9 8 7 6 5 4 3 2 1

A B C D E

NTC
Clipping
STBY
4,5V~
4,5V~
-30V
ECO

Copperside view

Amplifier Part Left/Right

Supply Part

+12M

Voltage selector

Mains Socket

Speaker Terminal Left/Right

Standby Transformer

Standby Relay

Matrix Surround Circuit

+A

+5V6

+B1

+B2

+C

BC...
C
B
E

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

9-9

AMPLIFIER PART LEFT/RIGHT

+12V REGULATOR

-30V REGULATOR

LEFT AMPLIFIER

AN7591
7301

RIPPLE FILTER

RIGHT AMPLIFIER

AN7591
7302

RIPPLE FILTER

SUPER CLASS-G CIRCUIT

BYV28-200/20 6314
BYV27-100/20 6312
7303 STP16NE06FP
7304 BC556
7305 BDW94C
7315 BC547
7322 BC558B
6310 BZX79-C3V9
6309 1N4148
6301 BZX79-F22V (F24V for 50W/FTC)
6306 1N4002
6307 1N4002
6305 1N4002
6308 1N4002
T274 F3.15A EC F4A UL/CSA

SUPPLY PART CONNECTOR 0227

1207
GND 1
GND 2
GND 3
C 18V 4
A 5
A 36V 6
A 7
5V6 5.6V 8
B 25V 9
B 25V 10

SUPPLY PART CONNECTOR 1214

1222
ECO 4V-6V 6
4,5V 5
4,5V 4
NTC 4.5V 3
-35V -42V 2
PWDN 8V 1

TO/FROM FRONT (CONTROL) BOARD

1215
PWDN 8V 1
-30V -29V 2
4,5V 3
4,5V 4
STBY 4.5V 5
CDR-ON 6
NTC 4.5V 7

TO/FROM AF-BOARD

1211
5V6 5.6V 1
GND-D 2
12M 12.4V 3
GND-A 4
12A 12.4V 5
AMP_ON 4.5V 6
R 7
GND-A 8
L 9

H = AMP ON, L = AMP OFF

TO POWER SUPPLY CDR

1235
CDR-ON 1
GND 2
GND 3
12V 4

LEFT / RIGHT

1303
LEFT 4
R 3
B 2
RIGHT 1

only for matrix surround versions

1305
0014
1304
SURROUND L 4
SURROUND R 1

EVM ...V DC-voltages measured with low output power

P CDR Amplifier part 2000 02 16)

9-10

POWER SUPPLY CDR

from P4 CDR Transformer 11V AC
1351
1350 T2A5
6350 1N5392
6351 1N5392
6352 1N5392
6353 1N5392
GND_P
+CDR
12.9V
2352 6m8
1353 T315mA

VOLTAGE DOUBLER
2354 470u
1N4003 6357
1N4003 6358
2355 470u

-8.4V REGULATOR
1N4003 6360
1N4003 6361
BC327-40 7357
-13.8V
-8.4V
-8V
-8.9V
1m 2358
3363 560R
3364 470R
47u 2359
6362 BZX79-C4V7
6363 BZX79-C3V9
100u 2360

+5V REGULATOR
Regulator
BD438 7351
5 2V
12.3V
3354 100K
Overvoltage Protection
3352 1K
3353 1K
BZX79-C5V6 6355
BZX79-C3V3 6356
3376 150R
3358 150R
100n 2356
3360 1K
7355 BC337-40
0 6V
3361 10K
Overcurrent Sensor
0.5V
7350 BC557C
10u 2350
3350 3K3
Switching transistor
BD438 7352
5.2V
4.4V
3351 100R
3356 100R
1V
7353 BC547C
3355 4K7
1 8V
0.2V
7354 BC547C
0.9V
1N4148 6359
3359 110R
2353 4u7
BZX79-F3V9 6354
3357 120R
2351 47u
012
+5V
5 2V
12.2V
+12M
-8.4V
-8V
DIPMATE
to CDR Module
7356 BC547C
0.6V
0 6V
011
CDR-ON
GND_P
+12M
12.2V
DIPMATE
from Power-Supply part

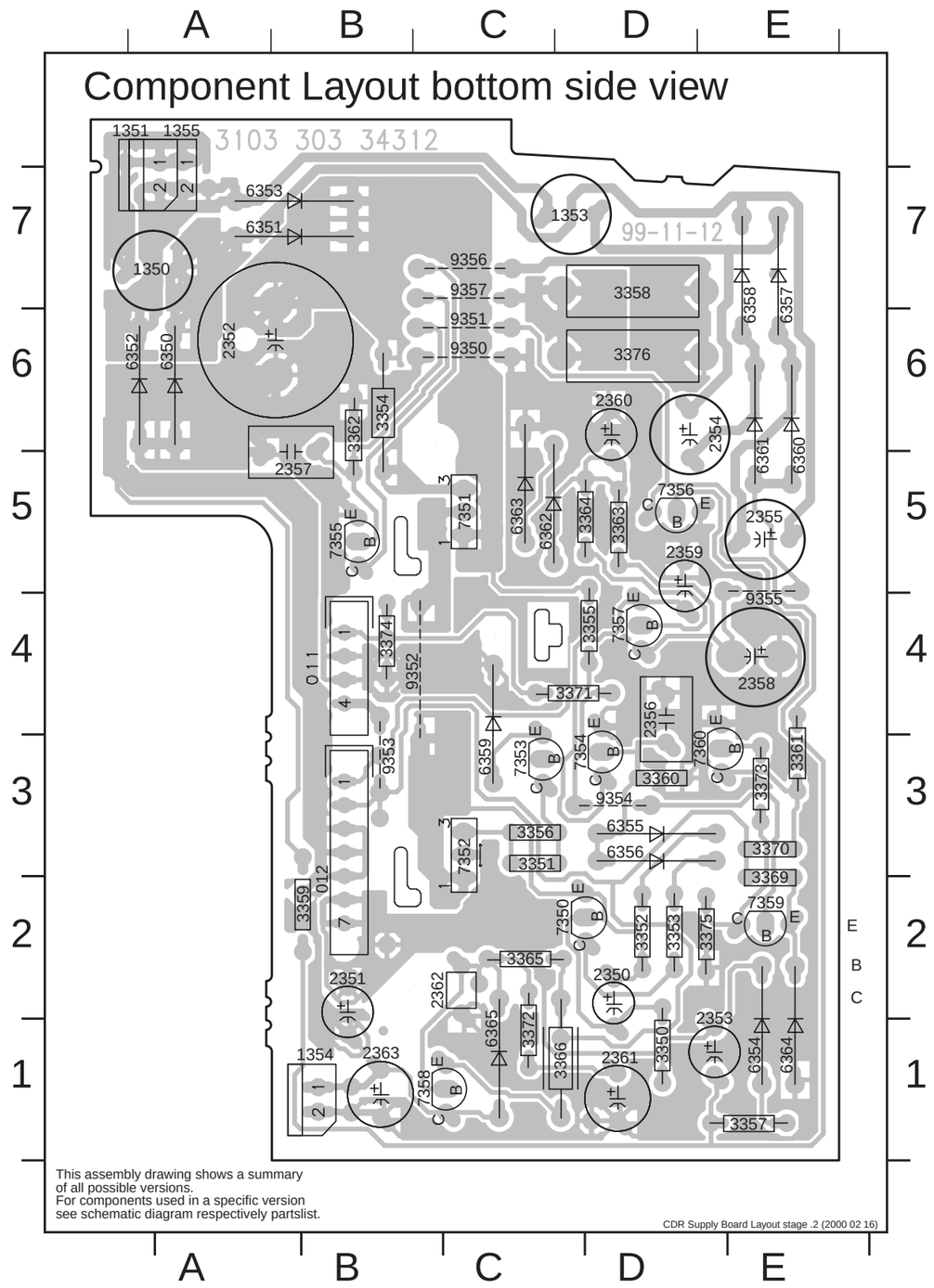
+5V SWITCHING PART
CDR-ON
3369 560R
BZX79-C5V1 6364
5 3V
3371 100K
5V
BC557C 7359
0V
3373 10K
7360 BC547C
3370 1K8
10.5V
3374 39K
3375 10K

FAN CONTROL
+12M
3365 220R
3366 5R6
12.2V
11 8V
BC327-25 7358
7 9V
6365 BZX79-C3V9
3372 1K
2362
2361 100u
2363 100u
1354
7 9V
FAN +
EH-B

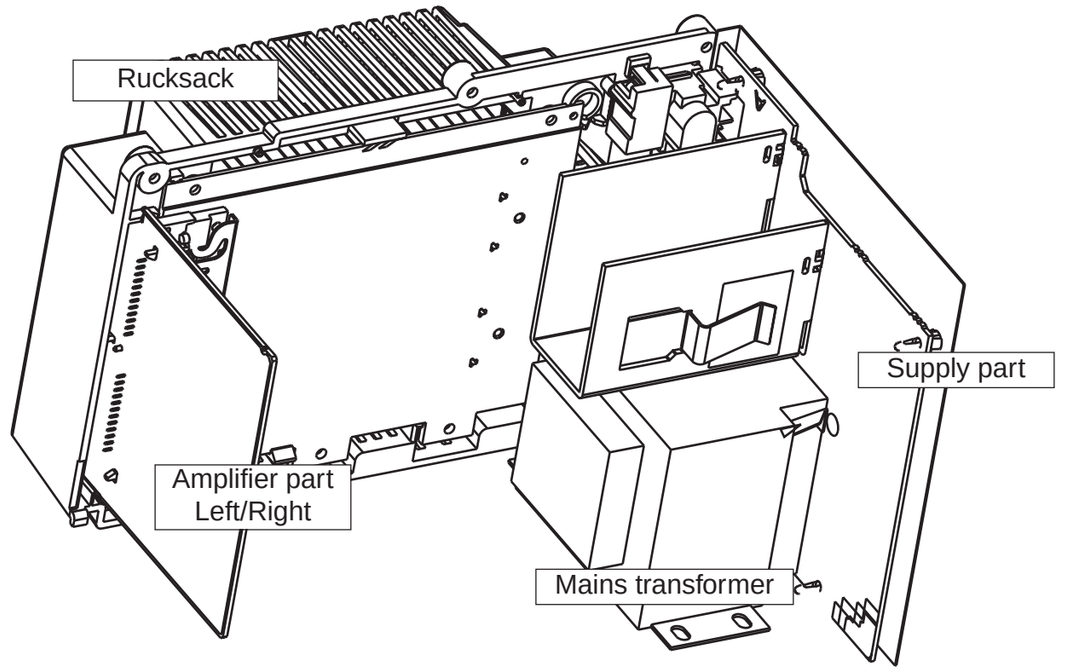
Circuit Diagram PowerSupply CDR (15.02.2000)

011 C9
012 A9
1350 A2
1351 A1
1353 B2
1354 E9
1355 A1
2350 A7
2351 B8
2352 B4
2353 B8
2354 C1
2355 C2
2356 C5
2357 D6
2358 D2
2359 D3
2360 E2
2361 F6
2362 F6
2363 F8
3350 A7
3351 B7
3352 B5
3353 B6
3354 B4
3355 B6
3356 B7
3357 B8
3358 C5
3359 C8
3360 C6
3361 D5
3362 D7
3363 D2
3364 D3
3365 E6
3366 E7
3369 E5
3370 E5
3371 E3
3372 E6
3373 F5
3374 F3
3375 F4
3376 C4
6350 A3
6351 A3
6352 B3
6353 B3
6354 B8
6355 B5
6356 B6
6357 C2
6358 C2
6359 C7
6360 C2
6361 C2
6362 D3
6363 E3
6364 E4
6365 F7
7350 A6
7351 A5
7352 A7
7353 B7
7354 C6
7355 C5
7356 C7
7357 C3
7358 E7
7359 E4
7360 F5

011	B4	2352	B7	2361	D1	3356	C3	3365	C2	3376	D6	6358	E7	7351	C5	7360	E3
012	B3	2353	E2	2362	C2	3357	E1	3366	D1	6350	A6	6359	C4	7352	C3	9350	C6
1350	A7	2354	E5	2363	B1	3358	D7	3369	E2	6351	A7	6360	E6	7353	C3	9351	C6
1351	A7	2355	E5	3350	D1	3359	B3	3370	E3	6352	A6	6361	E6	7354	D3	9352	C4
1353	D7	2356	D4	3351	C2	3360	D3	3371	D4	6353	A7	6362	D5	7355	B5	9353	B3
1354	B1	2357	B5	3352	D2	3361	E3	3372	C1	6354	E1	6363	C5	7356	D5	9354	D3
1355	A7	2358	E4	3353	D2	3362	B5	3373	E3	6355	D3	6364	E1	7357	D4	9355	E4
2350	D2	2359	D5	3354	B6	3363	D5	3374	B4	6356	D3	6365	C1	7358	C1	9356	C7
2351	B2	2360	D6	3355	D4	3364	D5	3375	E2	6357	E7	7350	D2	7359	E2	9357	C6



PARTSLIST POWER4 MODULE



MECHANICAL PARTSLIST POWER4 MODULE

0201	4822 426 10607	RUCKSACK	0255	4822 255 40179	SPRING CLIP TO220
0215	4822 492 11735	SPRING TRANSISTOR	1003	4822 361 11161	KD1206PTS3, FAN
0222	3103 304 07050	INSULATING WASHER (TO126)			

ELECTRICAL PARTSLIST POWER4 MODULE

MISCELLANEOUS

1200 ⚠	4822 071 51002	FUSE T1A	
1201 ⚠	4822 071 51002	FUSE T1A	
1201 ⚠	4822 253 50137	FUSE T 2,5A UL	
1203 ⚠	4822 071 52502	FUSE T 2,5A	
1203 ⚠	4822 252 51121	FUSE T3,15A UL	
1204 ⚠	4822 071 52502	FUSE T 2,5A	
1204 ⚠	4822 252 51121	FUSE T3,15A UL	
1205 ⚠	4822 071 52502	FUSE T 2,5A	
1205 ⚠	4822 252 51121	FUSE T3,15A UL	
1208 ⚠	2422 132 07402	RELAY 1P 12V	
1209 ⚠	4822 265 31015	MAINS SOCKET, IEC	
1209 ⚠	4822 265 31016	MAINS SOCKET, UL	
1210 ⚠	4822 272 10269	VOLTAGE SELECTOR	
1303	4822 267 31176	SPEAKER TERMINAL	
1350 ⚠	4822 071 52502	FUSE T 2,5A	
1353 ⚠	4822 071 53151	FUSE 315mA	
1360 ⚠	4822 252 11225	FUSE F3.15A IEC 250V	
1360 ⚠	4822 252 11226	FUSE F4A UL/CSA 250V	
1361 ⚠	4822 252 11225	FUSE F3.15A IEC 250V	
1361 ⚠	4822 252 11226	FUSE F4A UL/CSA 250V	
5211 ⚠	3103 308 30590	TRANSFORMER, STANDBY /37	
5211 ⚠	4822 146 10756	TRANSFORMER, STANDBY	

CAPACITORS

2200	2020 012 93403	4700µF	20%	25V
2202	4822 124 80415	4700µF	20%	50V
2204	4822 124 42367	3300µF	20%	35V
2206	5322 121 42386	100nF	5%	63V
2309	4822 124 21913	1µF	20%	63V

CAPACITORS

2210	5322 121 42386	100nF	5%	63V
2211	5322 121 42386	100nF	5%	63V
2212	5322 121 42386	100nF	5%	63V
2215	4822 124 80144	220µF	20%	25V
2216	4822 126 12882	100nF	20%	50V
2217	4822 126 12882	100nF	20%	50V
2221	4822 124 40248	10µF	20%	63V
2222	4822 124 40433	47µF	20%	25V
2225	4822 126 12882	100nF	20%	50V
2227	4822 124 22652	2,2µF	20%	50V
2228	4822 124 40248	10µF	20%	63V
2251	4822 124 40255	100µF	20%	50V
2253	4822 124 41407	0,47µF	20%	63V
2299	4822 126 12882	100nF	20%	50V
2301	4822 126 11714	4,7nF	20%	16V
2302	4822 126 11714	4,7nF	20%	16V
2303	4822 126 11714	4,7nF	20%	16V
2304	4822 126 11714	4,7nF	20%	16V
2305	4822 124 40207	100µF	20%	25V
2306	4822 124 40207	100µF	20%	25V
2307	4822 124 40207	100µF	20%	25V
2308	4822 124 40207	100µF	20%	25V
2309	4822 121 43526	47nF	5%	100V
2310	4822 121 43526	47nF	5%	100V
2311	4822 121 43526	47nF	5%	100V
2312	4822 121 43526	47nF	5%	100V
2313	4822 124 21913	1µF	20%	63V
2314	4822 124 21913	1µF	20%	63V
2317	4822 124 40433	47µF	20%	25V
2319	4822 124 40433	47µF	20%	25V

9-12

ELECTRICAL PARTSLIST POWER4 MODULE

CAPACITORS

2320	4822 124 40433	47µF	20%	25V
2323	4822 126 11714	4,7nF	20%	16V
2324	4822 126 11714	4,7nF	20%	16V
2325	4822 124 40248	10µF	20%	63V
2329	4822 122 33848	47pF	5%	50V
2341	4822 126 11714	4,7nF	20%	16V
2342	4822 126 11714	4,7nF	20%	16V
2345	4822 126 12882	100nF	20%	50V
2346	4822 126 12882	100nF	20%	50V
2350	4822 124 11947	10µF	20%	16V
2351	4822 124 40433	47µF	20%	25V
2352	4822 124 12328	6800µF	20%	16V
2353	4822 124 40769	4,7µF	20%	100V
2354	4822 124 80791	470µF	20%	16V
2355	4822 124 80791	470µF	20%	16V
2356	5322 121 42386	100nF	5%	63V
2357	5322 121 42386	100nF	5%	63V
2358	4822 124 81144	1000µF	20%	16V
2359	4822 124 40433	47µF	20%	25V
2360	4822 124 41584	100µF	20%	10V
2361	4822 124 23052	100µF	20%	16V
2363	4822 124 23052	100µF	20%	16V
2374	4822 121 43526	47nF	5%	100V

RESISTORS

2362	4822 117 12063	10kΩ		NTC
3201 ⚠	4822 053 21106	10MΩ	5%	0,5W
3202	4822 050 21003	10kΩ	2%	0,25W
3203	4822 116 83876	270Ω	5%	0.16W
3204 ⚠	4822 052 10338	3,3Ω		NFR25
3211	4822 116 52176	10Ω	5%	0,5W
3215	4822 116 52244	15kΩ	5%	0,5W
3216	4822 050 11002	1kΩ	5%	0,2W
3217	4822 050 11002	1kΩ	5%	0,2W
3218	4822 050 21003	10kΩ	2%	0,25W
3219	4822 116 52269	3,3kΩ	5%	0,5W
3220	4822 116 52269	3,3kΩ	5%	0,5W
3221	4822 116 83884	47kΩ	5%	0,16W
3222	4822 050 23303	33kΩ	1%	0,6W
3223	4822 116 52206	120Ω	5%	0,5W
3224	4822 116 83868	150Ω	5%	0,5W
3225	4822 116 83876	270Ω	5%	0.16W
3226	4822 050 11002	1kΩ	5%	0,2W
3227	4822 116 52256	2,2kΩ	5%	0,16W
3228	4822 050 11002	1kΩ	5%	0,2W
3229	4822 050 11002	1kΩ	5%	0,2W
3230	4822 116 52269	3,3kΩ	5%	0,5W
3235	4822 116 52199	68Ω	5%	0,16W
3239	4822 116 52283	4,7kΩ	5%	0,5W
3241	4822 116 52249	1,8kΩ	5%	0,16W
3242	4822 116 52283	4,7kΩ	5%	0,5W
3243	4822 116 52249	1,8kΩ	5%	0,16W
3251	4822 116 52283	4,7kΩ	5%	0,5W
3252	4822 116 52256	2,2kΩ	5%	0,16W
3253 ⚠	4822 052 10479	47Ω	5%	0,3W
3254 ⚠	4822 052 10479	47Ω	5%	0,3W
3256	4822 116 52257	22kΩ	5%	0,5W
3301	4822 116 83961	6,8kΩ	5%	0,16W
3302	4822 116 83961	6,8kΩ	5%	0,16W
3303	4822 116 83881	390Ω	5%	0,5W

RESISTORS

3304	4822 116 83881	390Ω	5%	0,5W
3305	4822 116 52219	330Ω	5%	0,5W
3306	4822 116 52219	330Ω	5%	0,5W
3307	4822 116 52228	680Ω	5%	0,5W
3308	4822 116 52228	680Ω	5%	0,5W
3309	4822 116 52231	820Ω	5%	0,5W
3310	4822 116 52231	820Ω	5%	0,5W
3311	4822 050 24708	4,7Ω	1%	0,6W
3312	4822 050 24708	4,7Ω	1%	0,6W
3313	4822 050 24708	4,7Ω	1%	0,6W
3314	4822 050 24708	4,7Ω	1%	0,6W
3316	4822 116 83883	470Ω	5%	0,16W
3317	4822 116 52249	1,8kΩ	5%	0,16W
3321	4822 116 52276	3,9kΩ	5%	0,5W
3326	4822 116 52283	4,7kΩ	5%	0,5W
3327	4822 116 52219	330Ω	5%	0,5W
3328	4822 050 21003	10kΩ	2%	0,25W
3333	4822 116 83884	47kΩ	5%	0,16W
3340	4822 116 52219	330Ω	5%	0,5W
3341	4822 116 52283	4,7kΩ	5%	0,5W
3342	4822 116 52269	3,3kΩ	5%	0,5W
3343	4822 116 83872	220Ω	5%	0,5W
3344	4822 116 83872	220Ω	5%	0,5W
3350	4822 116 52269	3,3kΩ	5%	0,5W
3351	4822 116 52175	100Ω	5%	0,5W
3352	4822 050 11002	1kΩ	5%	0,2W
3353	4822 050 11002	1kΩ	5%	0,2W
3354	4822 116 52234	100kΩ	5%	0,5W
3355	4822 116 52283	4,7kΩ	5%	0,5W
3356	4822 116 52175	100Ω	5%	0,5W
3357	4822 116 52206	120Ω	5%	0,5W
3358 ⚠	4822 053 11151	150Ω	5%	2W
3359	4822 050 21101	110Ω	1%	0,6W
3360	4822 050 11002	1kΩ	5%	0,2W
3361	4822 050 21003	10kΩ	2%	0,25W
3362	4822 116 52257	22kΩ	5%	0,5W
3363	4822 116 52226	560Ω	5%	0,5W
3364	4822 116 83883	470Ω	5%	0,16W
3365	4822 116 83872	220Ω	5%	0,5W
3366 ⚠	4822 052 10568	5,6Ω	5%	0,33W
3369	4822 116 52226	560Ω	5%	0,5W
3370	4822 116 52249	1,8kΩ	5%	0,16W
3371	4822 116 52234	100kΩ	5%	0,5W
3372	4822 050 11002	1kΩ	5%	0,2W
3373	4822 050 21003	10kΩ	2%	0,25W
3374	4822 116 83882	39kΩ	5%	0,5W
3375	4822 050 21003	10kΩ	2%	0,25W
3376 ⚠	4822 053 11151	150Ω	5%	2W

COILS

5201 ⚠	4822 157 11832	400µH
5301	4822 157 62255	COIL 18,5 TURNS
5302	4822 157 62255	COIL 18,5 TURNS
5303	4822 157 62255	COIL 18,5 TURNS
5304	4822 157 62255	COIL 18,5 TURNS

DIODES

6201 ⚠	4822 130 82078	D5SBA20
6204 ⚠	5322 130 80686	1N5392
6205 ⚠	5322 130 80686	1N5392
6206	4822 130 30621	1N4148
6207	4822 130 34278	BZX79-C6V8

ELECTRICAL PARTSLIST POWER4 MODULE

DIODES

6208	4822 130 31878	1N4003G
6209	4822 130 30621	1N4148
6210	4822 130 30621	1N4148
6211	4822 130 30621	1N4148
6212	4822 130 30621	1N4148
6213	4822 130 30621	1N4148
6214	4822 130 31878	1N4003G
6221	9331 668 80133	DIO REG BZX79-B11
6225	4822 130 34382	BZX79-B8V2
6226	4822 130 30621	1N4148
6228	4822 130 30621	1N4148
6233	4822 130 31024	BZX79-C18
6234	4822 130 30621	1N4148
6235	4822 130 30621	1N4148
6239	4822 130 30621	1N4148
6242	4822 130 30621	1N4148
6243	3198 010 58280	BZX79-B8V2
6251	4822 130 34328	BZX79-C30
6252	4822 130 34173	BZX79-B5V6
6253	4822 130 31878	1N4003G
6254	4822 130 31878	1N4003G
6300	4822 130 31878	1N4003G
6301	9338 872 90673	BZX55-F24
6305	4822 130 31878	1N4003G
6306	4822 130 31878	1N4003G
6307	4822 130 31878	1N4003G
6308	4822 130 31878	1N4003G
6309	4822 130 30621	1N4148
6310	4822 130 31981	BZX79-B3V9
6312	4822 130 10871	SBYV27
6313	4822 130 30621	1N4148
6314	4822 130 80791	BYV28-200/20
6315	4822 130 34278	BZX79-C6V8
6350	5322 130 80686	1N5392
6351	5322 130 80686	1N5392
6352	5322 130 80686	1N5392
6353	5322 130 80686	1N5392
6354	3198 010 53980	DIO REG BZX79-B3V9
6355	4822 130 34173	BZX79-B5V6
6356	5322 130 31504	BZX79-B3V3
6357	4822 130 31878	1N4003G
6358	4822 130 31878	1N4003G
6359	4822 130 30621	1N4148
6360	4822 130 31878	1N4003G
6361	4822 130 31878	1N4003G
6362	4822 130 34174	BZX79-B4V7
6363	4822 130 31981	BZX79-B3V9
6364	4822 130 34233	BZX79-B5V1
6365	4822 130 31981	BZX79-B3V9

TRANSISTORS

7202	9332 592 40126	BC368
7211	4822 130 44503	BC547C
7221	9322 139 23687	BDX53BFP
7222	4822 130 40959	BC547B
7223	4822 130 40959	BC547B
7224	4822 130 41691	BC556B
7225	4822 130 40959	BC547B
7226	4822 130 41691	BC556B
7227	4822 130 40995	BD438
7228	4822 130 40959	BC547B

TRANSISTORS

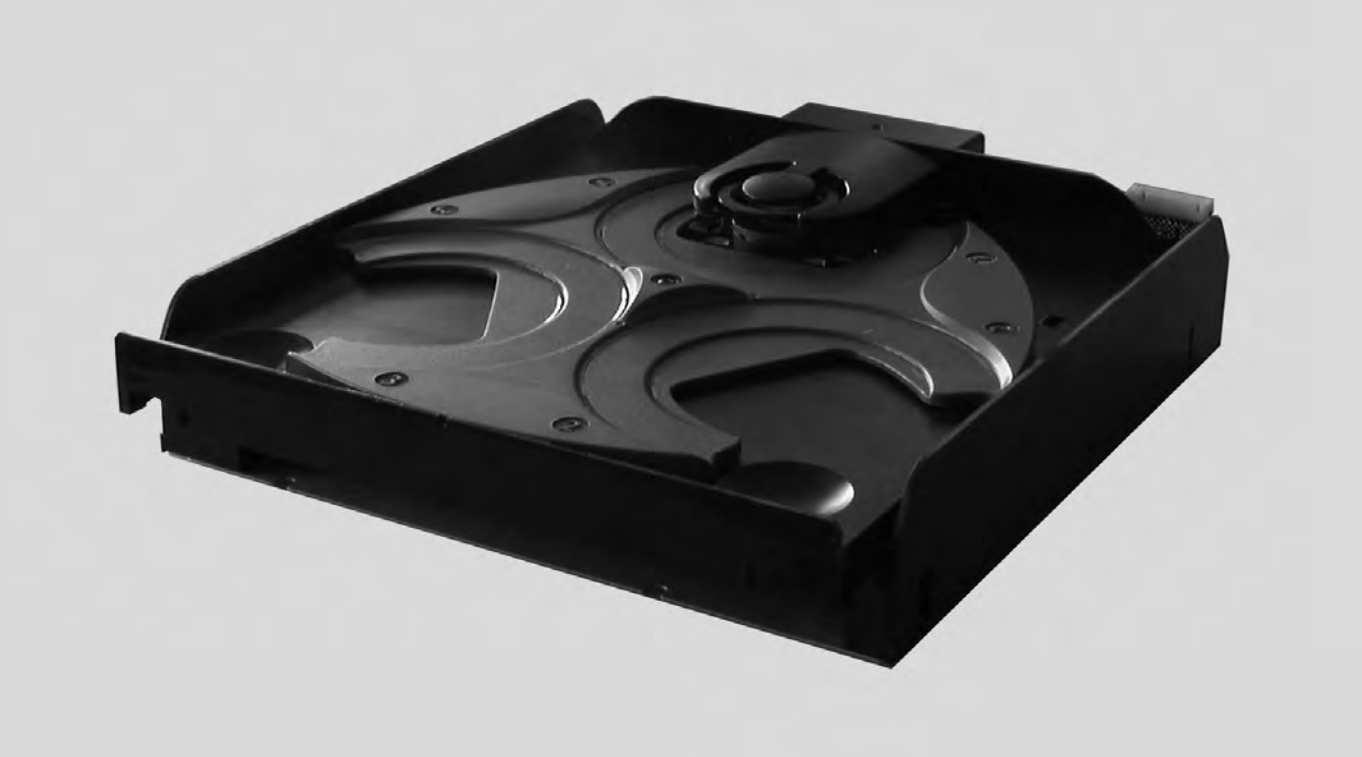
7251	4822 130 41327	BC327-40
7303	4822 130 11336	STP16NE06FP
7304	4822 130 41691	BC556B
7305	4822 130 10847	BDW94C
7315	4822 130 40959	BC547B
7316	4822 130 40959	BC547B
7322	4822 130 44568	BC557B
7350	9336 500 90126	BC557C
7351	4822 130 40995	BD438
7352	4822 130 40995	BD438
7353	4822 130 44503	BC547C
7354	4822 130 44503	BC547C
7355	4822 130 41344	BC337-40
7356	4822 130 44503	BC547C
7357	4822 130 41327	BC327-40
7358	4822 130 41246	BC327-25
7359	9336 500 90126	BC557C
7360	4822 130 44503	BC547C

INTEGRATED CIRCUITS

7201	4822 209 80817	L7805CV
7301	9322 153 02682	AN7591, POWER STAGE
7302	9322 153 02682	AN7591, POWER STAGE

MAINS TRANSFORMER

1008	3103 308 30540	TRANSFORMER MAINS FOR /37
1008	3103 308 30550	TRANSFORMER MAINS FOR /22
1008	3103 308 30560	TRANSFORMER MAINS FOR /21



3CDC99-DS Module

(3 Disc Carousel Changer)

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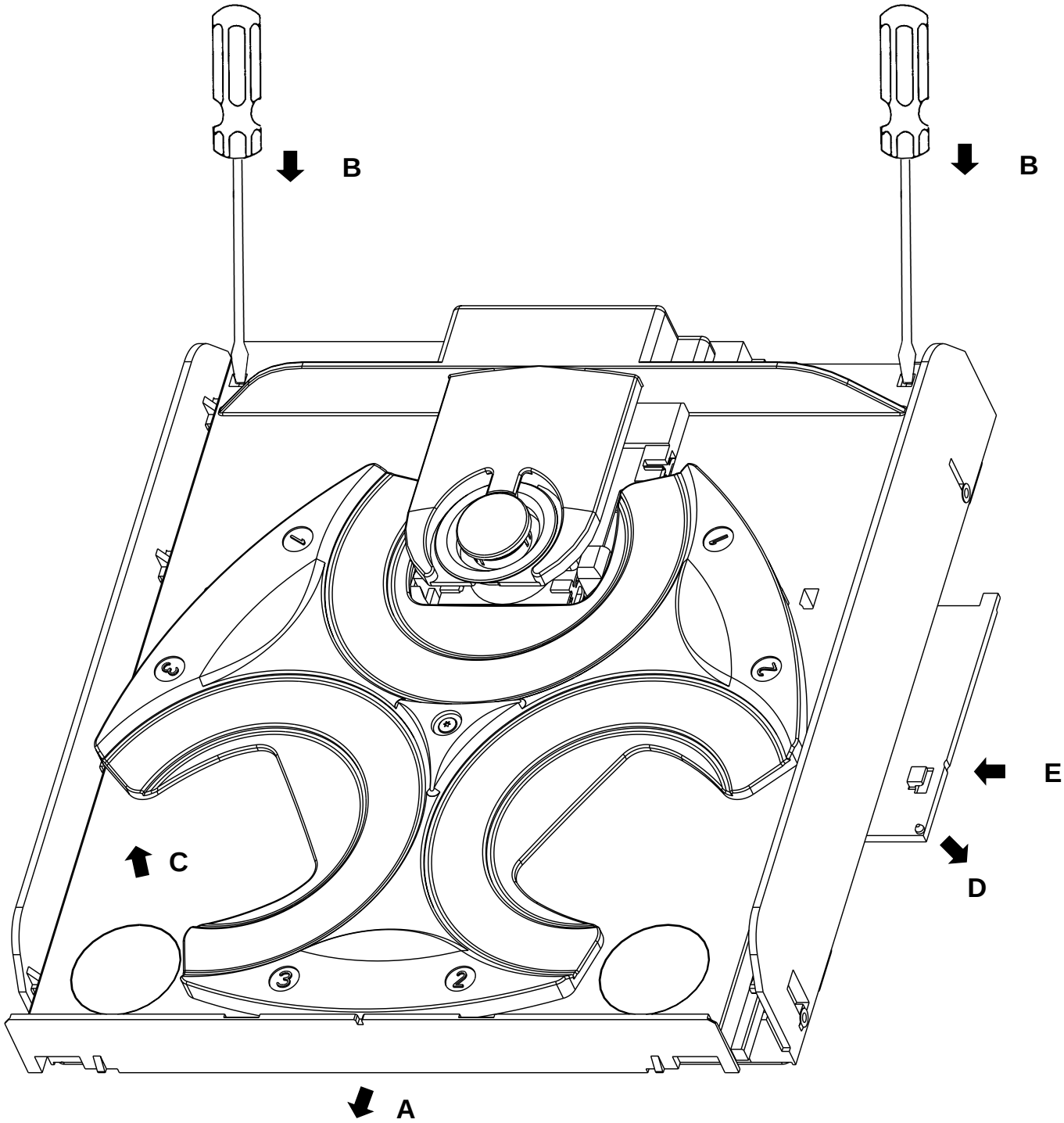
Dismantling Hints



Dismantling of Drawer

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

Dismantling of Flex Plate

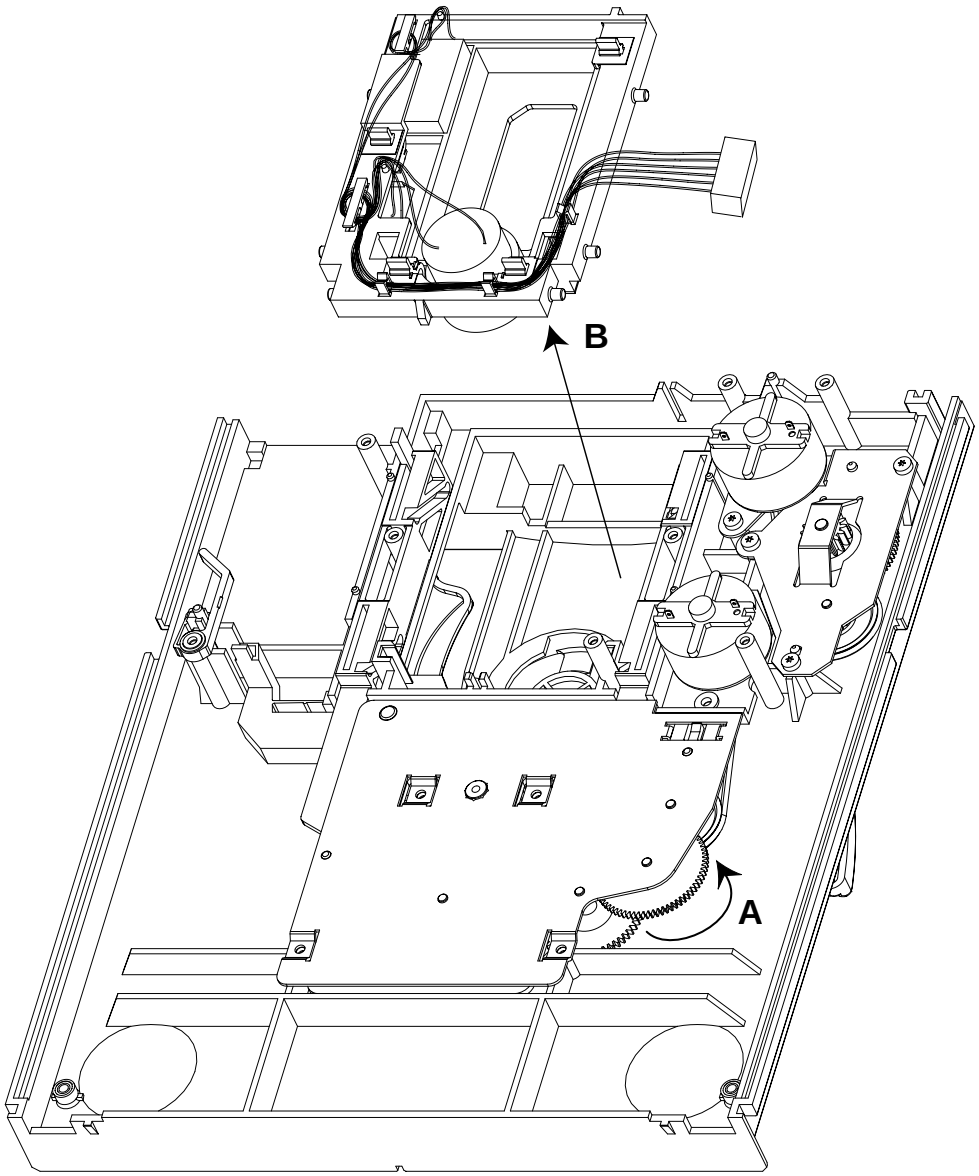
→ **D** Lift plate to unlock pin from bottom plate
→ **E** Move plate inwards to demount from bottom plate

Servicing Hints

Replacement of CD Drive

See also exploded view of changer mechanism.

1. Dismantle printed circuit board: remove 5 screws.
2. Disconnect flexfoil cable and JST connector.
   Pay attention to WARNING!
3. Loosen 2 screws (pos 107,108) and remove CD drive-lockings (pos 105,106).
4. Turn gearwheel (pos 42) of disc change mechanism by finger to move CD drive support in upper position as shown in picture below Ⓐ.
5. Dismantle CD drive support (pos 95) Ⓑ.
6. Replace CD drive (pos 100). The wire tree of JST connector has to be desoldered and resoldered on the new CD drive again.

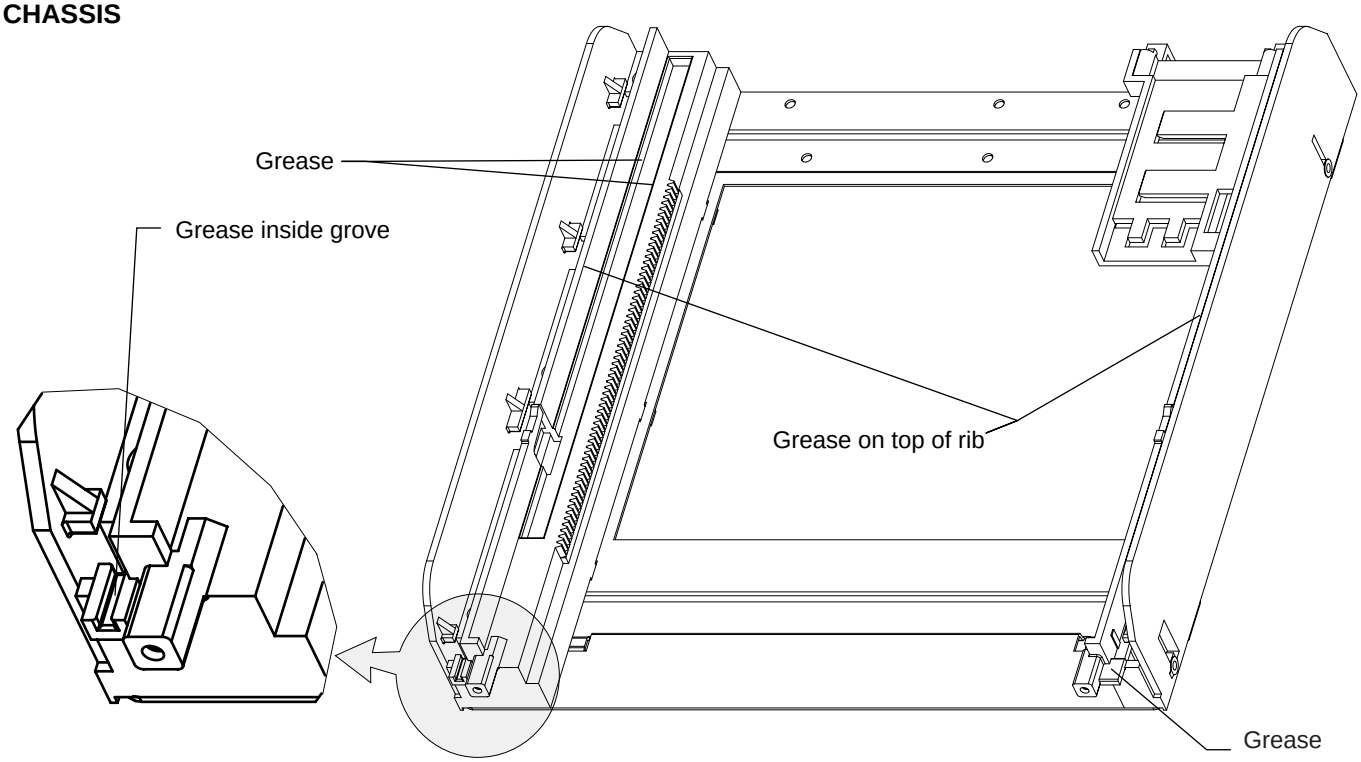


Mounting of Carousel

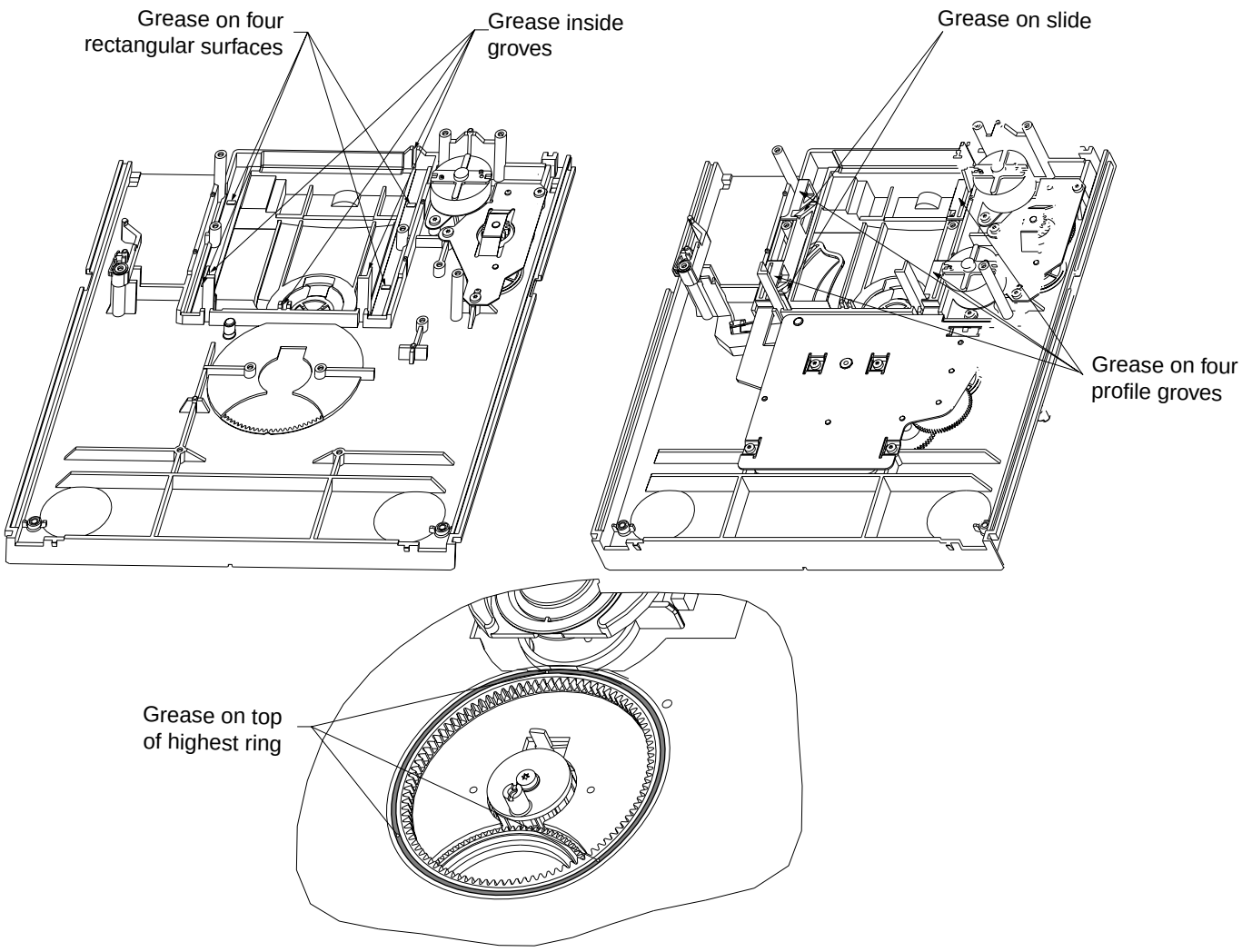
1. Turn gearwheel (pos 42) of disc change mechanism by finger until CD drive is in play position.
2. Mount carousel (pos 115) so that disc is positioned right on turntable. Carousel position number doesn´t matter.

Lubrication Instructions

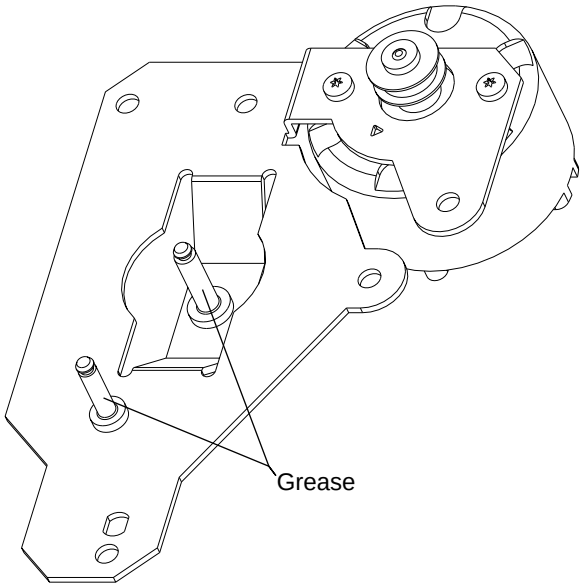
CHASSIS



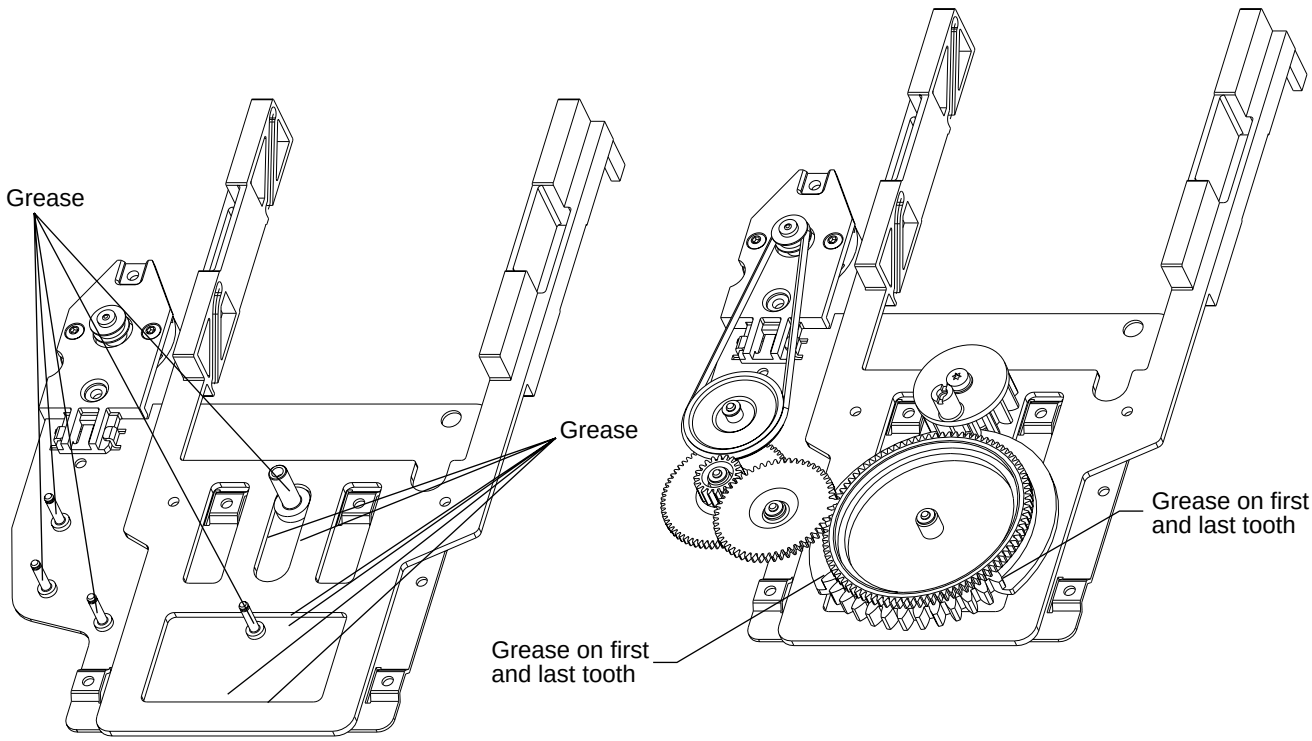
DRAWER



DRAWER MECHANISM



DISC CHANGE MECHANISM



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

WARNING

CHARGED CAPACITORS ON THE SERVO BOARD MAY DAMAGE THE CD DRIVE ELECTRONICS WHEN CONNECTING A NEW CD 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 cable from old CD drive
2. Put a paper clip onto the flexfoil cable to short-circuit connections (fig.1)
3. Remove old CD drive
4. Remove paper clip from flexfoil cable
5. Connect flexfoil cable to new CD drive
6. Position new CD drive on its studs
7. Remove soldered short-circuit from Laserunit (see below)

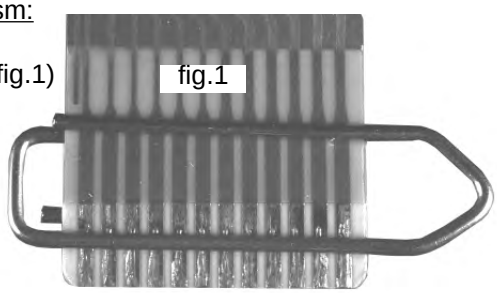
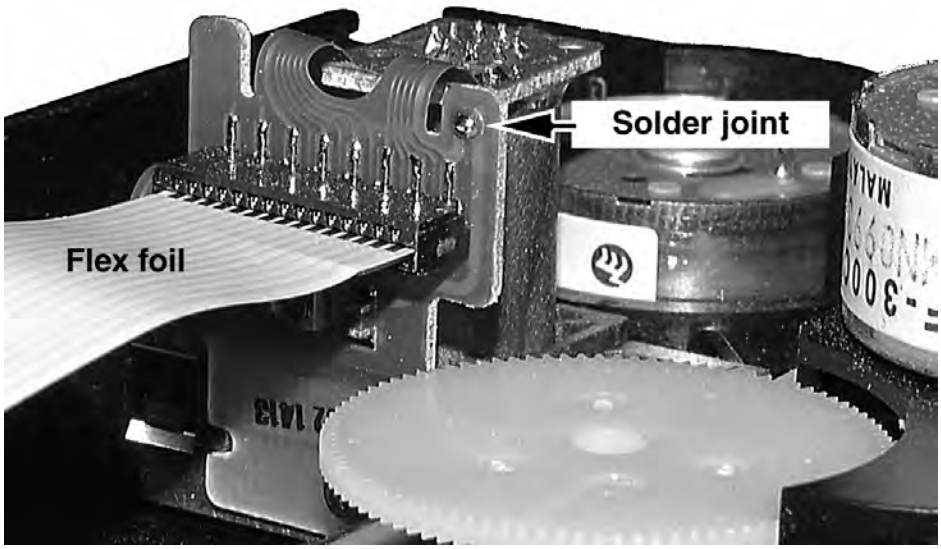
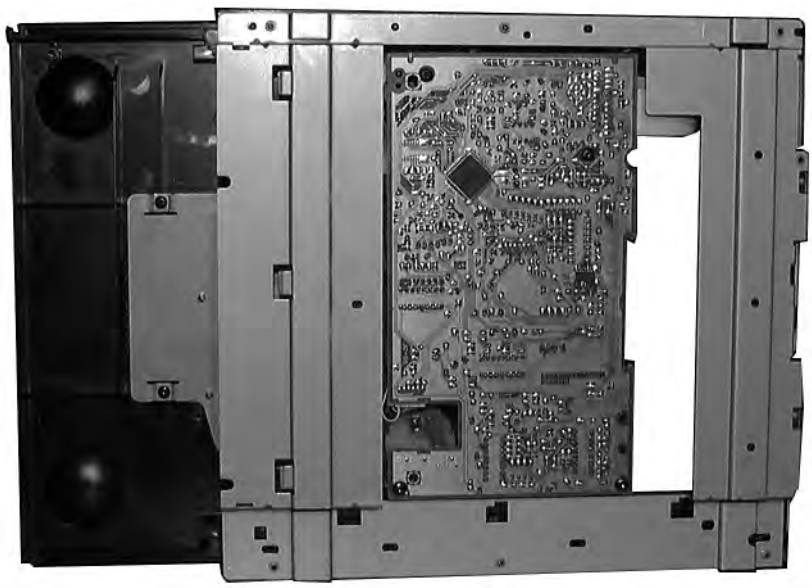


fig.1

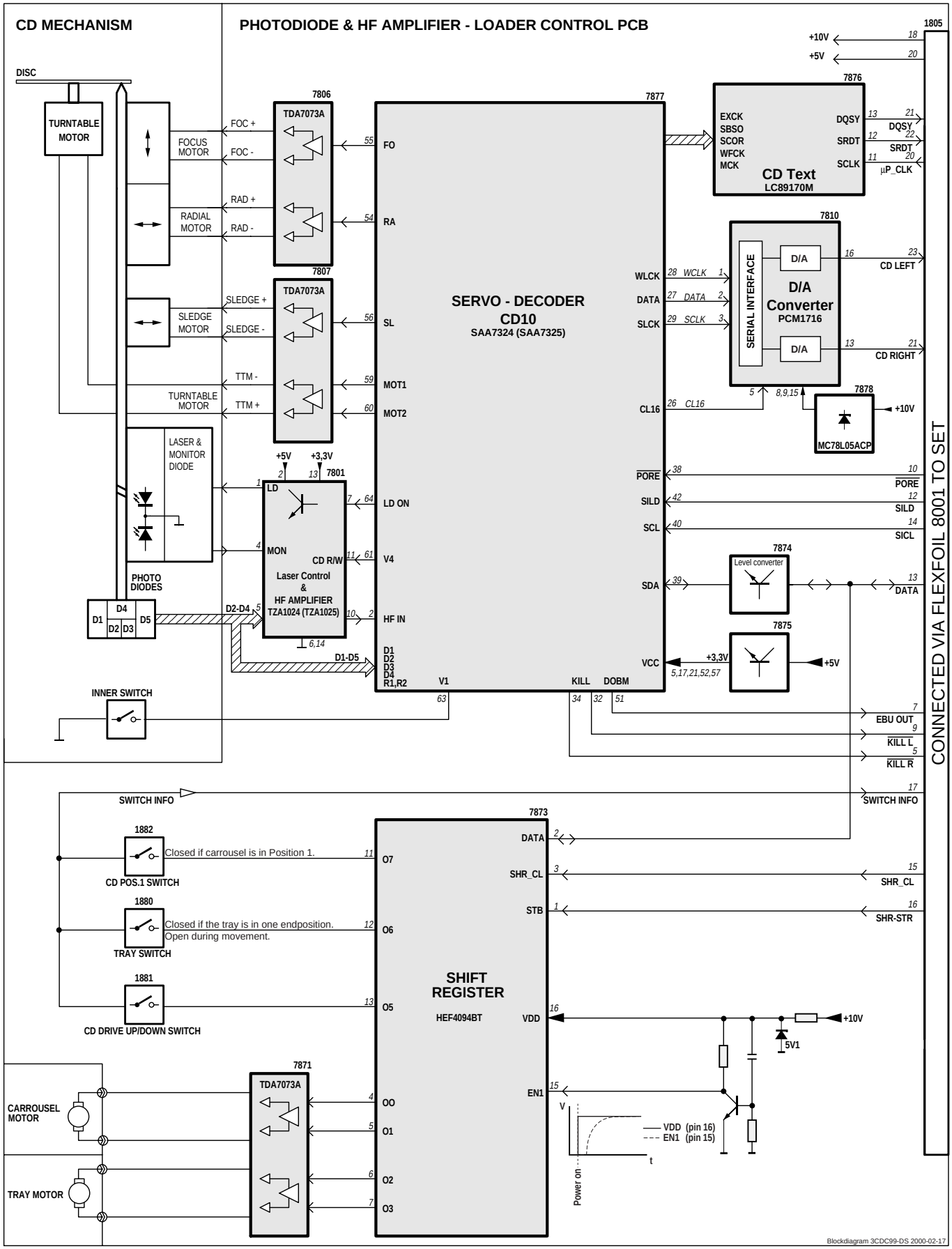
Attention: The laser diode of this CD drive is protected against ESD by a solder joint which shortcircuits the laser diode to ground.
For proper functionality of the CD drive this solder joint must be removed **after** connecting the drive to the set.



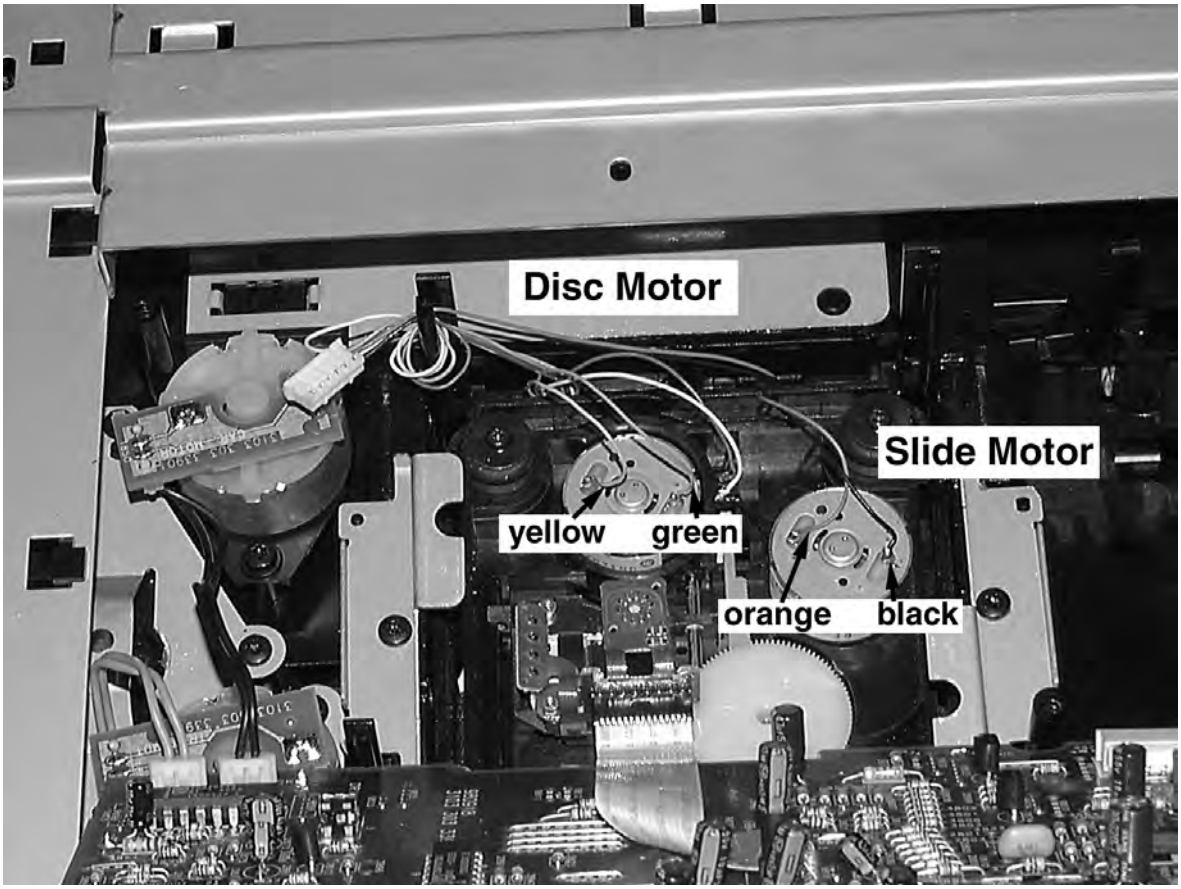
Service Position



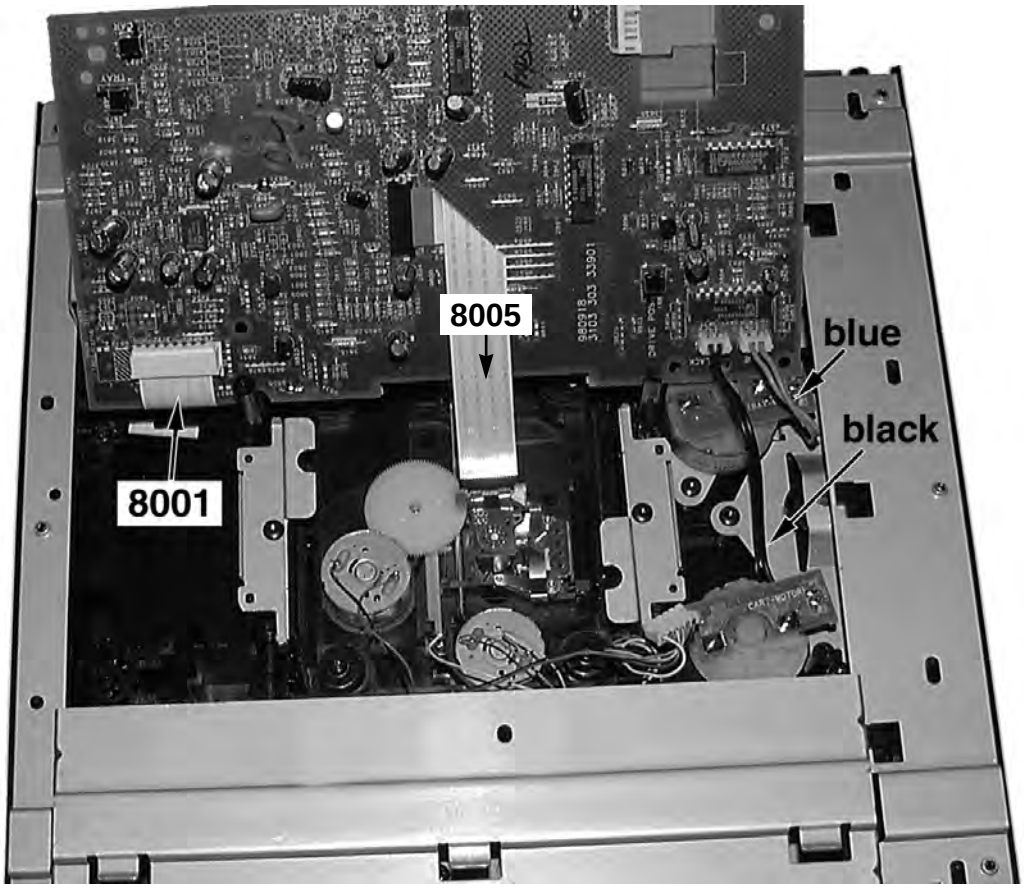
Blockdiagram



Wiring of CD Drive



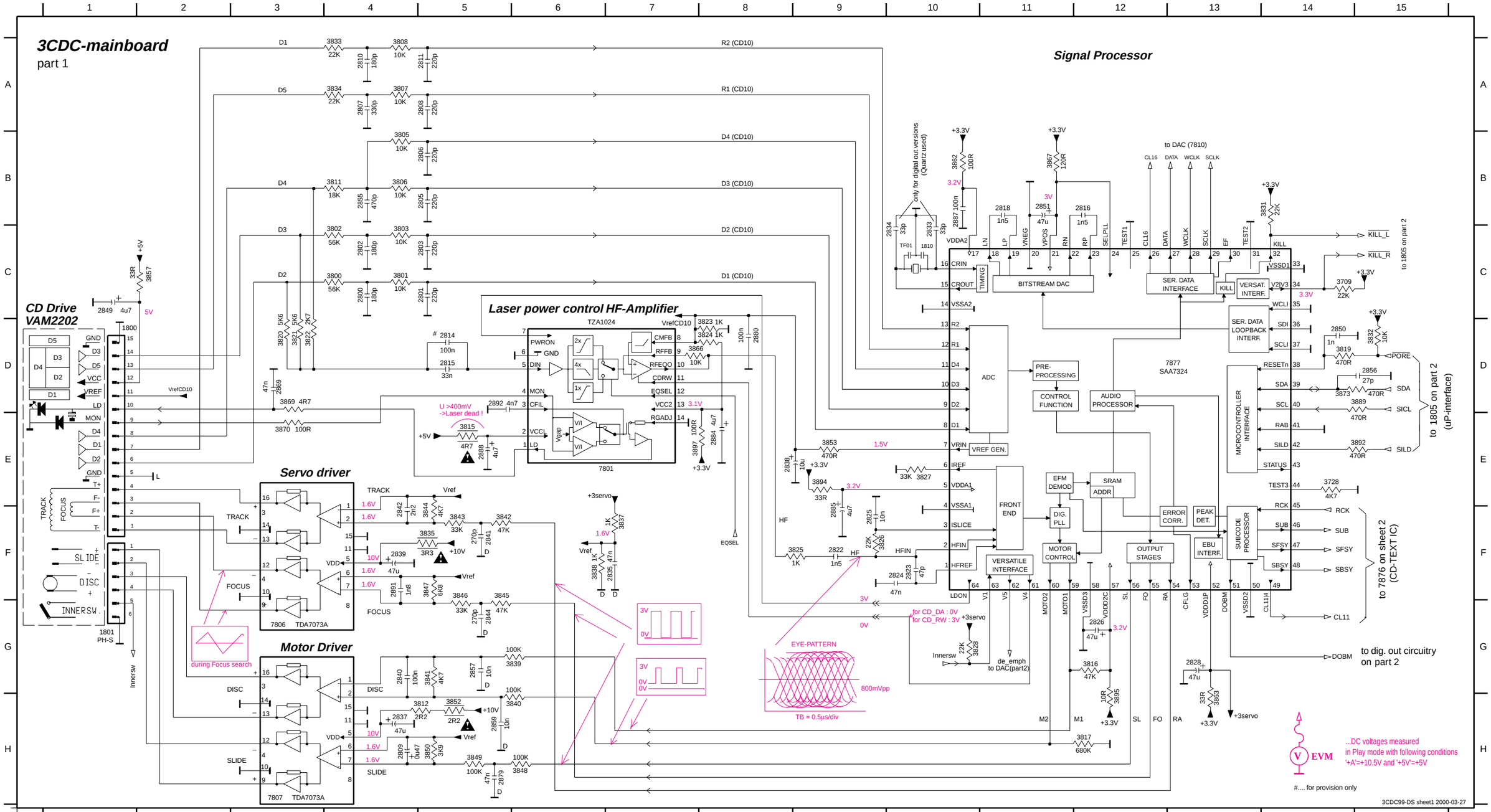
Pict. 1



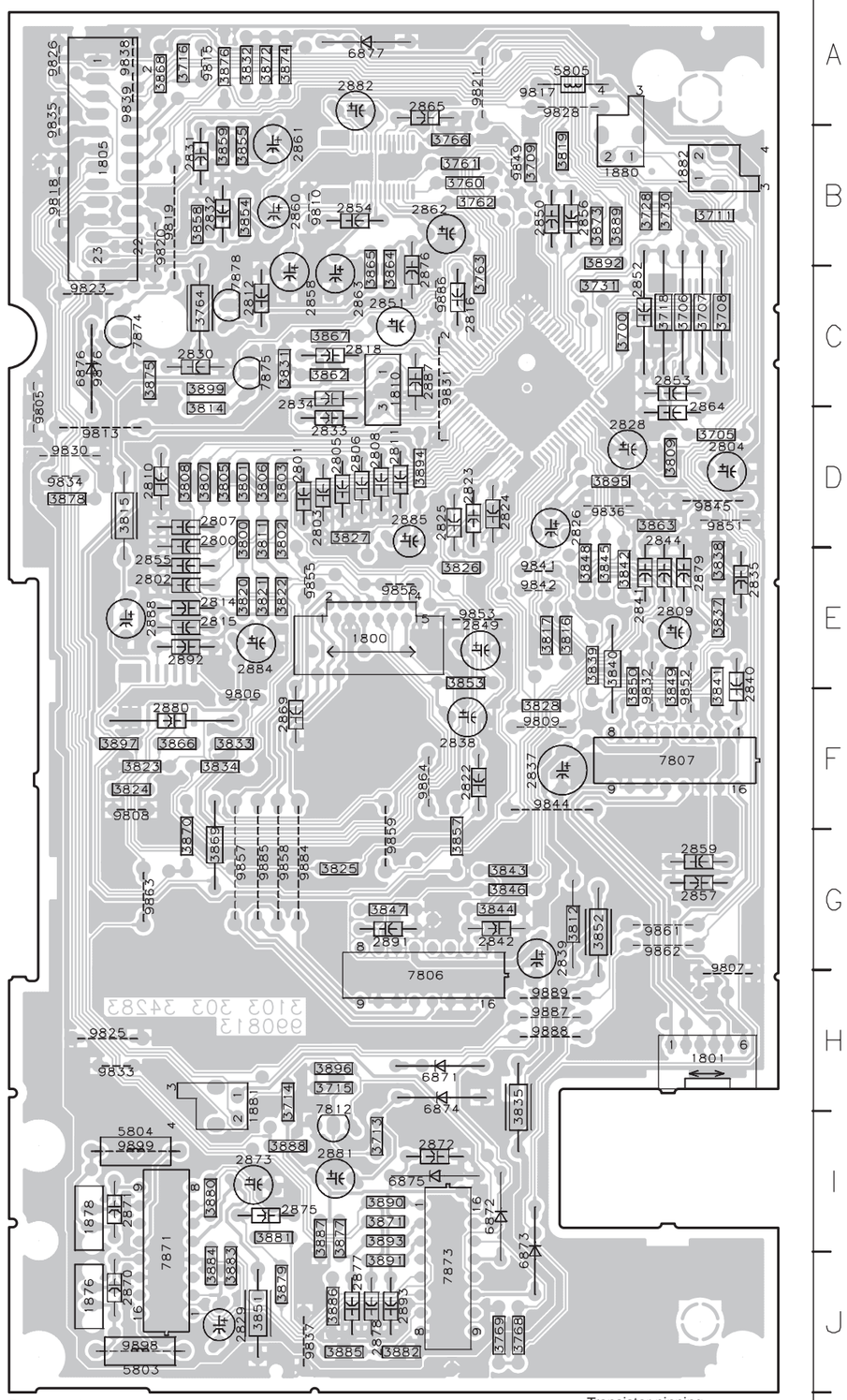
Pict. 2

10-9

1800 D2	2803 C5	2810 A4	2822 F9	2833 C10	2840 G4	2851 B11	2879 H5	2891 F4	3802 C4	3811 B4	3820 D3	3826 F9	3834 A4	3841 G5	3847 F5	3857 C2	3870 E3	3897 E7
1801 G1	2805 B5	2811 A5	2823 F10	2834 C10	2841 F5	2855 B4	2880 D8	2892 D5	3803 C4	3812 H5	3821 D3	3827 E10	3835 F5	3842 F5	3848 H6	3862 B10	3873 D14	7801 E7
1810 C10	2806 B5	2814 D5	2824 F10	2835 F7	2842 F4	2856 D15	2884 E8	3709 C14	3805 B4	3815 E5	3822 D3	3828 G10	3837 F7	3843 F5	3849 H5	3863 H13	3889 D15	7806 G3
2800 C4	2807 A4	2815 D5	2825 F9	2837 H4	2844 G5	2857 G5	2885 F9	3728 E14	3806 B4	3816 G12	3823 D8	3831 B14	3838 F6	3844 F5	3850 H5	3866 D7	3892 E15	7807 H3
2801 C5	2808 A5	2816 B12	2826 G12	2838 E8	2849 C1	2859 H5	2887 B10	3800 C4	3807 A4	3817 H12	3824 D8	3832 D15	3839 G6	3845 F5	3852 H5	3867 B11	3894 E9	7877 D12
2802 C4	2809 H4	2818 B11	2828 G13	2839 F4	2850 D14	2869 D3	2888 E5	3801 C4	3808 A4	3819 D14	3825 F9	3833 A4	3840 H6	3846 F5	3853 E9	3869 D3	3895 H12	



3CDC99 DS Board Componentside view



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

Transistor pinning

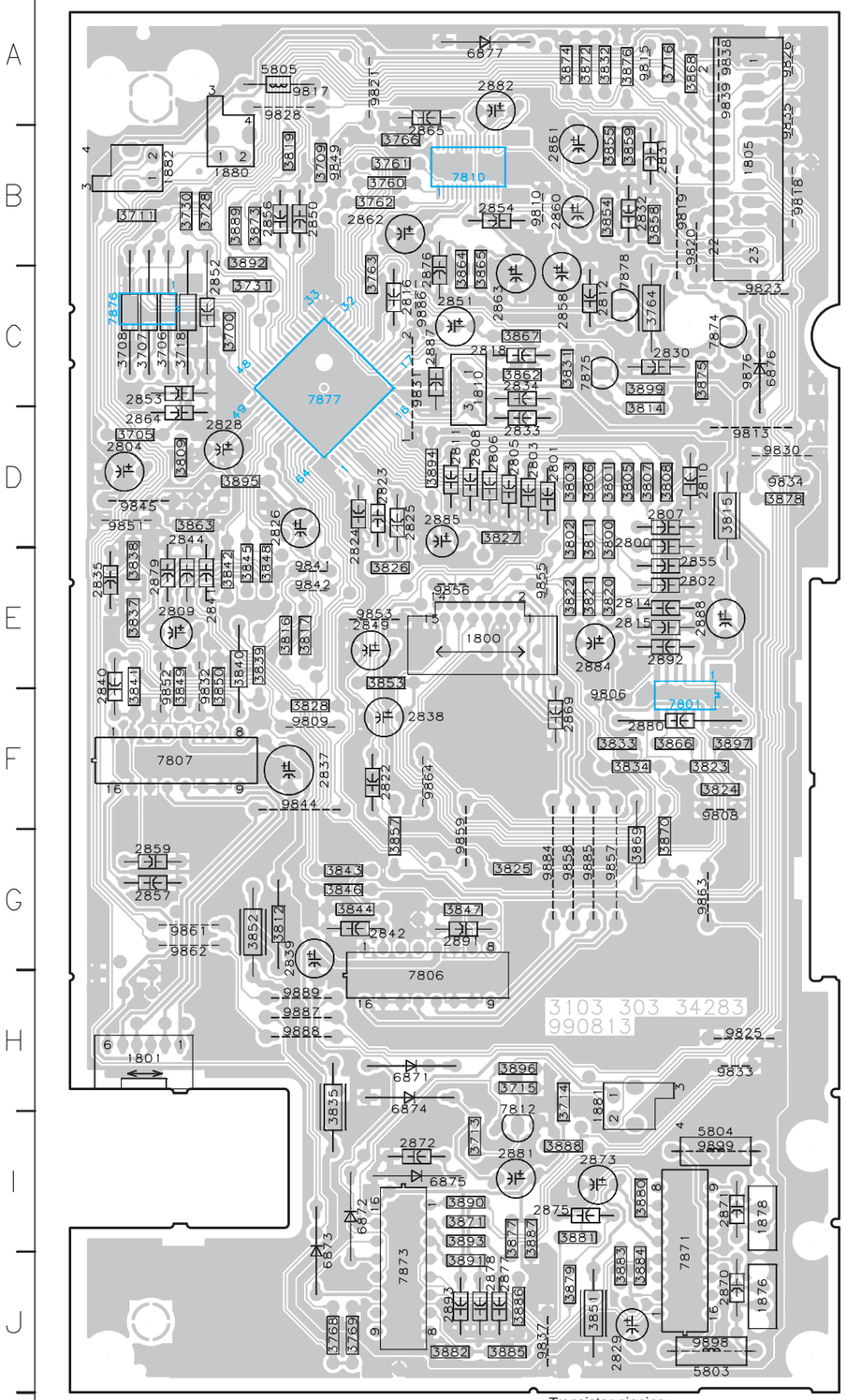
3CDC99DS Layout stage .3 2000 02 09

Mapping

1800	E3	3714	H2	3886	J3
1801	H5	3715	H3	3887	I3
1805	A1	3716	A2	3888	I3
1810	D3	3718	C5	3889	B5
1876	J1	3728	B5	3890	I3
1878	I1	3730	B5	3891	I3
1880	A5	3731	C5	3892	C4
1881	I2	3760	B3	3893	I3
1882	B5	3761	B3	3894	D4
2800	D2	3762	B3	3895	D5
2801	D3	3763	C4	3896	H3
2802	E2	3764	C2	3897	F1
2803	D3	3766	B3	3899	C2
2804	D5	3768	J4	5803	J1
2805	D3	3769	J4	5804	I1
2806	D3	3800	D2	5805	A5
2807	D2	3801	D2	6871	H4
2808	D3	3802	D3	6872	I4
2809	E5	3803	D2	6873	I4
2810	D2	3805	D2	6874	H4
2811	D3	3806	D2	6875	I4
2812	C2	3807	D2	6876	C1
2814	E2	3808	D2	6877	A3
2815	E1	3809	D5	7801	F2
2816	C4	3811	D2	7806	H3
2818	C3	3812	G4	7807	F5
2822	F4	3814	D2	7810	B3
2823	D4	3815	D1	7812	H3
2824	D4	3816	E5	7871	I1
2825	D4	3817	E4	7873	J4
2826	D4	3819	B5	7874	C1
2828	D5	3820	E2	7875	C2
2829	J2	3821	E2	7876	C5
2830	C2	3822	E3	7877	C4
2831	B2	3823	F1	7878	C2
2832	B2	3824	F1	9805	C1
2833	D2	3825	G3	9806	E2
2834	C2	3826	E4	9807	G5
2835	E5	3827	E3	9808	F1
2837	F4	3828	F4	9809	F4
2838	F4	3831	C2	9810	B3
2839	H4	3832	A2	9813	D1
2840	E5	3833	F2	9815	A2
2841	E5	3834	F2	9817	A5
2842	G4	3835	H4	9818	B1
2844	E5	3837	E5	9819	B2
2849	E4	3838	D5	9820	B2
2850	B4	3839	E5	9821	A4
2851	C3	3840	E5	9823	C1
2852	C5	3841	E5	9825	H1
2853	C5	3842	E5	9826	A1
2854	B3	3843	G4	9828	A5
2855	E2	3844	G4	9830	D1
2856	C4	3845	E5	9831	C4
2857	G5	3846	G4	9832	E5
2858	C3	3847	G3	9833	H1
2859	G5	3848	E5	9834	D1
2860	B3	3849	E5	9835	A1
2861	A2	3850	E5	9836	D5
2862	B4	3851	J2	9837	J3
2863	C3	3852	G5	9838	A1
2864	D5	3853	F4	9839	A1
2865	A3	3854	B2	9841	E4
2869	F2	3855	B2	9842	E4
2870	J1	3857	G4	9844	F4
2871	I1	3858	B2	9845	D5
2872	I4	3859	A2	9849	A4
2873	I2	3862	C3	9851	D5
2875	I3	3863	D5	9852	E5
2876	B3	3864	B3	9853	E4
2877	J3	3865	C3	9855	E3
2878	J3	3866	F2	9856	E3
2879	E5	3867	C3	9857	G2
2880	F2	3868	B2	9858	G3
2881	I3	3869	G2	9859	G3
2882	A3	3870	G2	9861	G5
2884	E2	3871	I3	9862	G5
2885	E3	3872	A2	9863	G2
2887	C4	3873	B5	9864	F3
2888	E1	3874	A3	9876	C1
2891	G3	3875	C1	9884	G3
2892	E2	3876	A2	9885	G2
2893	J3	3877	I3	9886	C3
3700	C5	3878	D1	9887	H4
3705	D5	3879	J3	9888	H4
3706	C5	3880	I2	9889	H4
3707	C5	3881	I2	9898	J1
3708	C5	3882	J3	9899	I1
3709	B4	3883	J2		
3711	B5	3884	I2		
3713	I3	3885	J3		

10-10

3CDC99 DS Board Copperside view



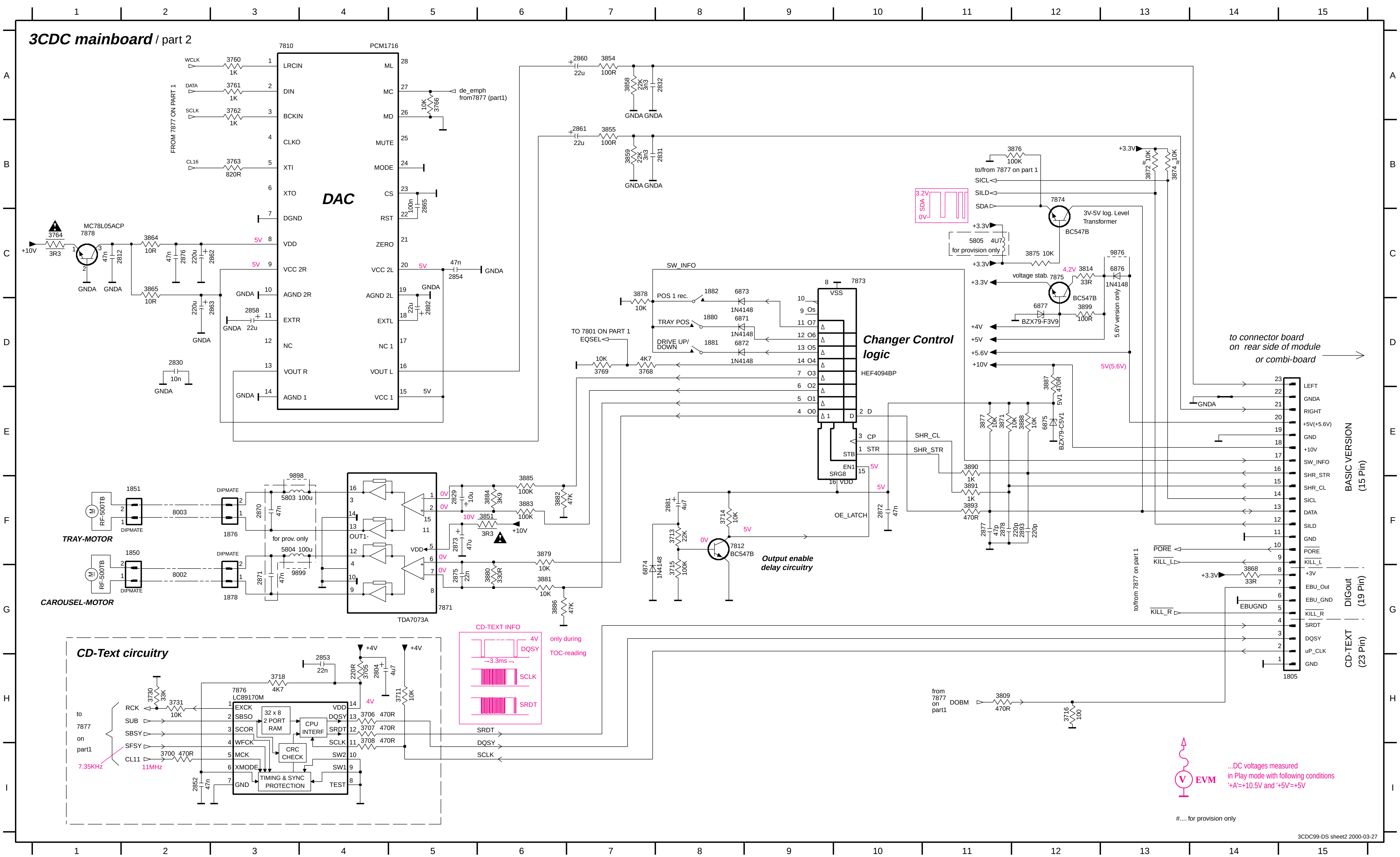
This assembly drawing shows a summary
of all possible versions.
For components used in a specific version
see schematic diagram respectively partslist.

Transistor pinning

3CDC99DS Layout stage .3 2000 02 09

 10-11

1805 H15	2804 H4	2852 I2	2862 C2	2872 F10	2881 F8	3707 H4	3716 H12	3762 A3	3809 H11	3859 B7	3874 B13	3880 G6	3886 G6	3896 G10	6872 D8	7810 A3	7876 H3	9839 C14
1876 F3	2812 C1	2853 H4	2863 D2	2873 F5	2882 D5	3708 H4	3718 H3	3763 B3	3814 C12	3864 C2	3875 C12	3881 G6	3887 D12	3899 D12	6873 C8	7812 F8	7878 C1	9876 C13
1878 G3	2829 F5	2854 C5	2864 H12	2875 G5	2893 F12	3711 H5	3730 H2	3764 C1	3851 F6	3865 C2	3876 B12	3882 F6	3888 E12	5803 F3	6874 G7	7871 G5	9826 H14	9898 E3
1880 D8	2830 D2	2858 D3	2865 B5	2876 C2	3700 I2	3713 F8	3731 H2	3766 A5	3854 A7	3868 G14	3877 E11	3883 F6	3890 E11	5804 F3	6875 E12	7873 C10	9834 F10	9899 G3
1881 D8	2831 B8	2860 A7	2870 F3	2877 F11	3705 H4	3714 F8	3760 A3	3768 D7	3855 B7	3871 E11	3878 C7	3884 F6	3891 F11	5805 C11	6876 C13	7874 B12	9835 G11	
1882 C8	2832 A8	2861 B7	2871 G3	2878 F11	3706 H4	3715 G8	3761 A3	3769 D7	3858 A7	3872 B13	3879 F6	3885 E6	3893 F11	6871 D8	6877 D12	7875 C12	9838 C14	



3CDC mainboard / part 2
DAC
7810 PCM1716
FROM 7877 ON PART 1
WCLK DATA SCLK CL16
LRCIN DIN BCKIN CLKO XTI XTO DGND VDD VCC 2R AGND 2R EXTR NC VOUT R AGND 1
ML MC MD MUTE MODE CS RST ZERO VCC 2L AGND 2L EXTL NC 1 VOUT L VCC 1
de_emph from7877 (part1)
MC78L05ACP 7878
Changer Control logic
HEF4094BP
7873
SW_INFO
POS 1 rec.
TRAY POS
DRIVE UP/ DOWN
TO 7801 ON PART 1 EQSEL
to/from 7877 on part 1
SICL SILD SDA
3V-5V log. Level Transformer
BC547B
voltage stab.
for provision only
5.6V version only
to connector board on rear side of module or combi-board
LEFT GNDA RIGHT +5V(+5.6V) GND +10V SW_INFO SHR_STR SHR_CL SICL DATA SILD GND PORE KILL_L +3V EBU_Out EBU_GND KILL_R SRDT DQSY uP_CLK GND
BASIC VERSION (15 Pin)
DIGout (19 Pin)
CD-TEXT (23 Pin)
1805
TRAY-MOTOR
CAROUSEL-MOTOR
RF-500TB
DIPMATE
for prov. only
TDA7073A
7871
Output enable delay circuitry
7812 BC547B
OE_LATCH
CD-Text circuitry
7876 LC89170M
EXCK SBSO SCOR WFCK MCK XMODE GND
VDD DQSY SRDT SCLK SW2 SW1 TEST
32 x 8 2 PORT RAM
CPU INTERF
CRC CHECK
TIMING & SYNC PROTECTION
to 7877 on part1
RCK SUB SBSY SFSY CL11
7.35KHz 11MHz
CD-TEXT INFO
only during TOC-reading
3.3ms
from 7877 on part1 DOBM
to/from 7877 on part 1
EVM
...DC voltages measured in Play mode with following conditions '+A'=+10.5V and '+5V'=+5V
#.... for provision only
3CDC99-DS sheet2 2000-03-27

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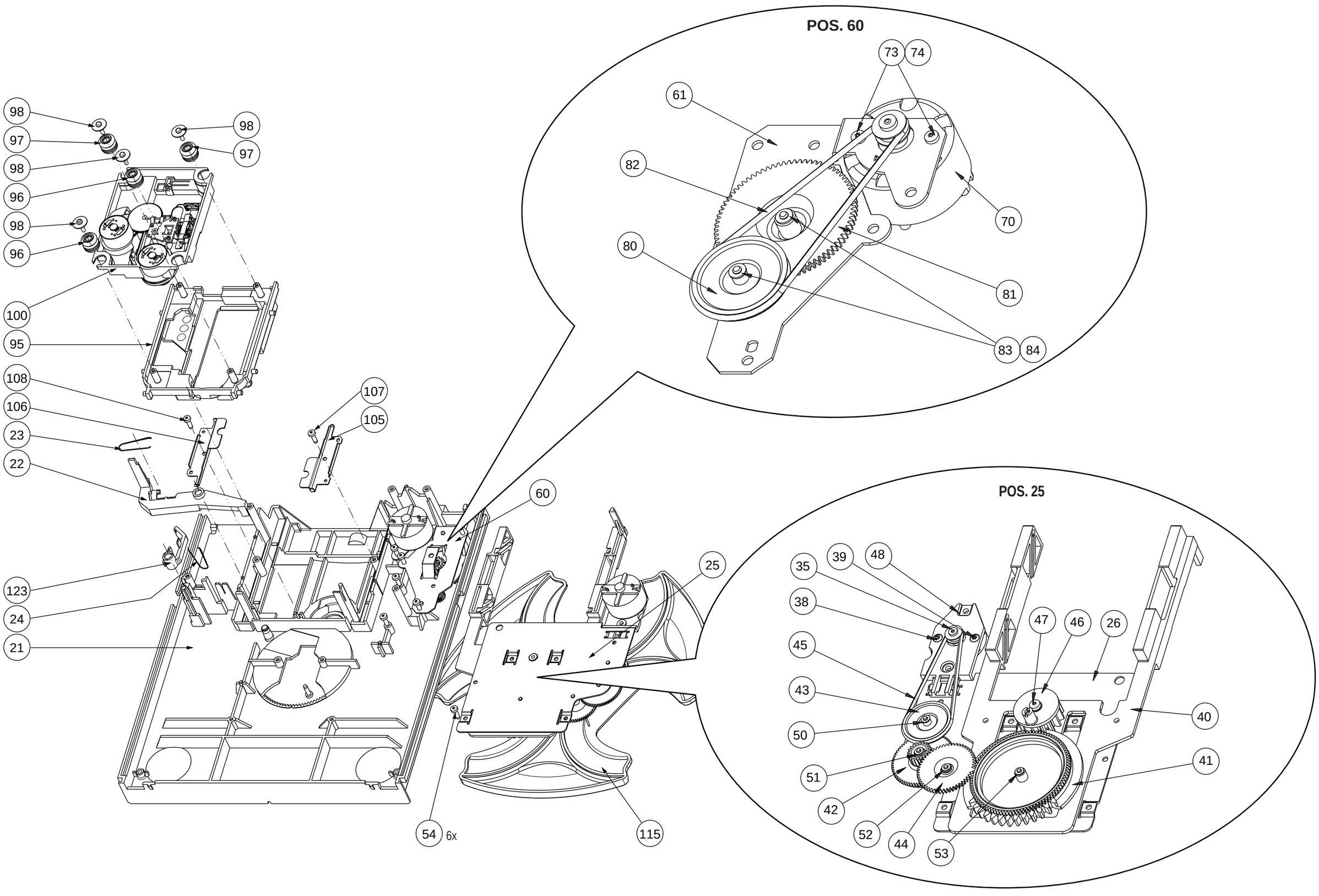
POS. 60
73
74
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96
100
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108
106
23
22
123
24
21
107
105
60
25
54
6x
115
POS. 25
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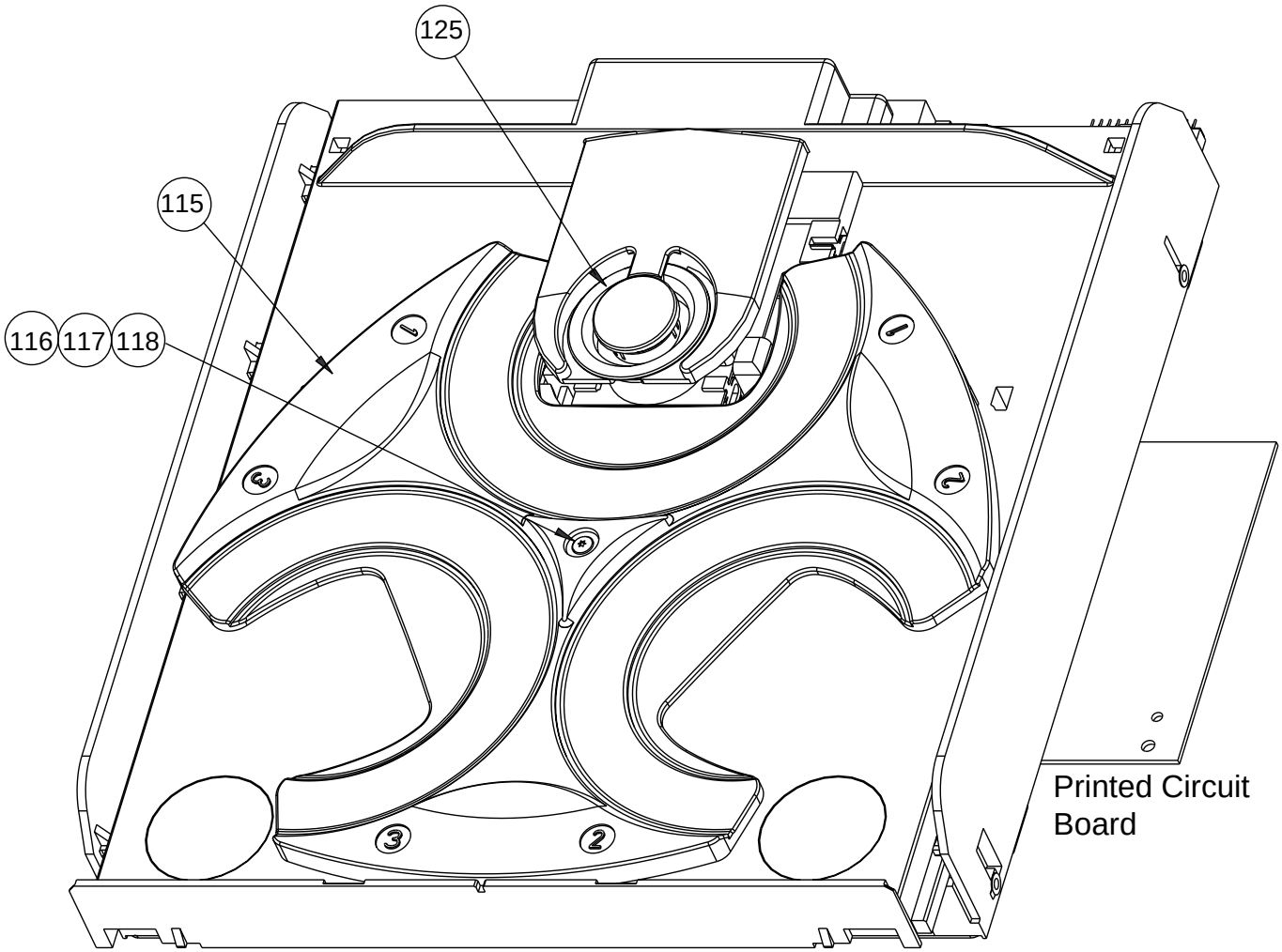
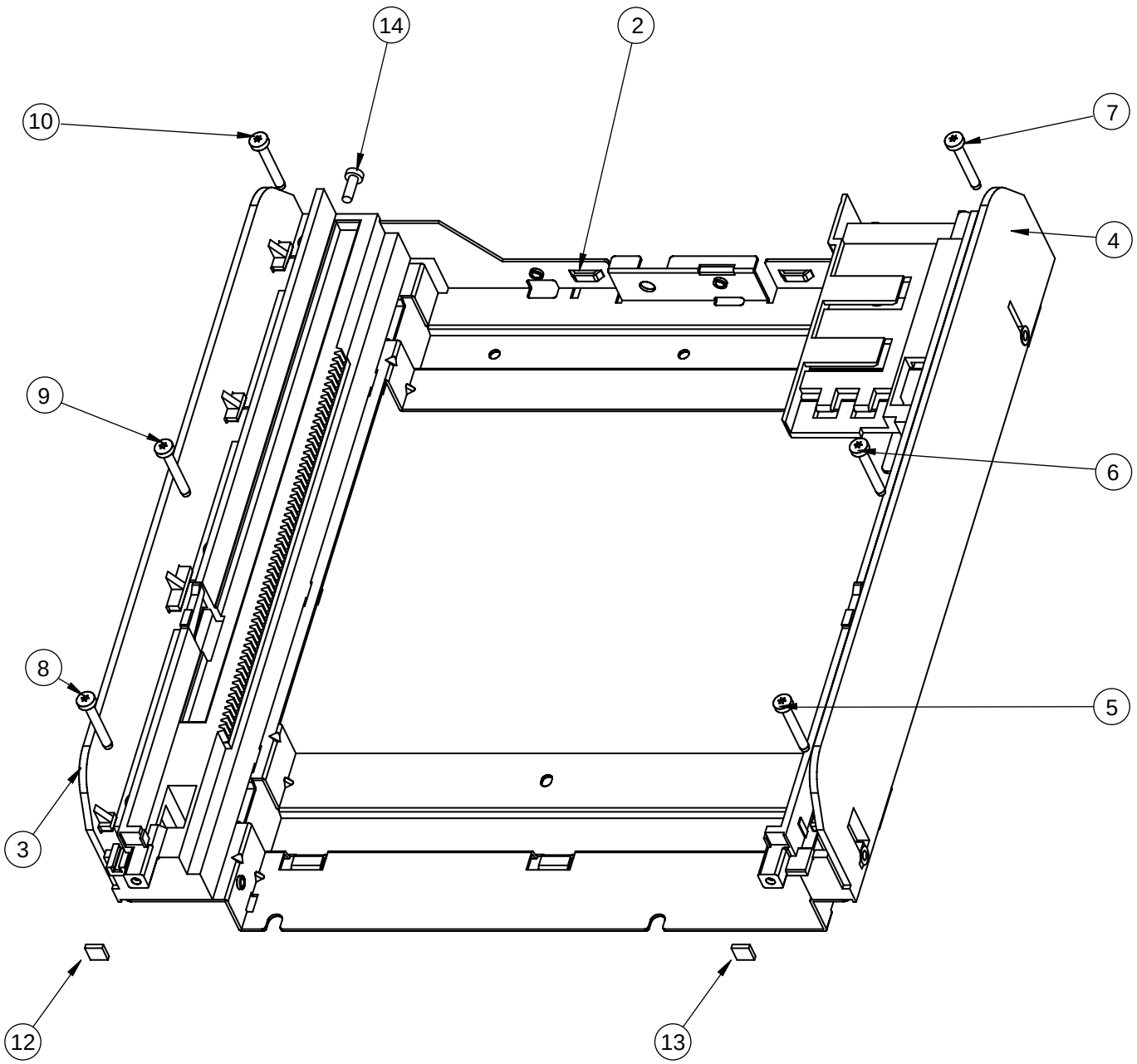


MECHANICAL PARTSLIST 3CDC-99 MODULE

0003	4822 463 11235	GUIDING LEFT
0004	4822 463 11236	GUIDING RIGHT
0012	4822 466 12146	RUBBER
0013	4822 466 12146	RUBBER
0021	4822 418 10403	DRAWER
0022	4822 402 11236	BRACKET TUMBLER
0023	4822 492 11721	SPRING
0024	4822 492 11721	SPRING
0038	4822 502 12548	SCREW M2,6x3,5
0039	4822 502 12548	SCREW M2,6X3,5
0040	4822 463 11237	SLIDE
0041	4822 522 10509	CONTROL DISC
0042	4822 522 10492	GEAR WHEEL
0043	4822 528 10937	PULLEY
0044	4822 522 10493	IDLER WHEEL
0045	4822 358 10115	BELT
0046	4822 466 10735	ECCENTRIC GEAR WHEEL
0050	4822 532 12364	WASHER
0051	4822 532 12364	WASHER
0052	4822 532 12364	WASHER

continued on next page



MECHANICAL PARTSLIST 3CDC-99 MODULE

0053	4822 532 12364	WASHER
0073	4822 502 12548	SCREW M2,6X3,5
0074	4822 502 12548	SCREW M2,6X3,5
0080	4822 528 10937	PULLEY
0081	4822 522 10494	GEAR DRAWER
0082	4822 358 10115	BELT
0083	4822 532 12364	WASHER
0084	4822 532 12364	WASHER
0095	4822 404 10985	SUPPORT-VAM
0096	4822 529 10387	RUBBER DAMPER CD DRIVE, FRONT
0097	4822 529 10387	RUBBER DAMPER CD DRIVE, FRONT
0100	9305 022 30201	VAM2202/01
0115	4822 466 10736	CAROUSEL
0117	4822 532 12365	BUSH DRAWER
0123	4822 402 11237	SWITCH-BRACKET
0125	4822 401 11708	DISC CLAMP VAM DRIVE 3CDC

ELECTRICAL PARTSLIST 3CDC-99 MODULE

MISCELLANEOUS

0035	4822 361 10753	CAROUSEL MOTOR
0070	4822 361 10753	TRAY MOTOR
1800	4822 265 10925	FFC SOCKET, 15P
1805	4822 265 11533	FFC SOCKET, 23P
1880	4822 276 13503	SWITCH
1881	4822 276 13503	SWITCH
1882	4822 276 13503	SWITCH
8001	3103 308 92020	FLEX FOIL CABLE 23P, 420mm
8005	3103 308 91820	FLEX FOIL CABLE 15P, 95mm

CAPACITORS

2800	4822 126 10053	180pF	10%	50V
2801	4822 122 10466	220pF	10%	50V
2802	4822 126 10053	180pF	10%	50V
2803	4822 122 10466	220pF	10%	50V
2804	4822 124 40769	4,7µF	20%	100V
2805	4822 122 10466	220pF	10%	50V
2806	4822 122 10466	220pF	10%	50V
2807	4822 126 12787	330pF	10%	50V
2808	4822 122 10466	220pF	10%	50V
2809	5322 124 41948	0,47µF	20%	50V
2810	4822 126 10053	180pF	10%	50V
2811	4822 122 10466	220pF	10%	50V
2812	4822 126 12785	47nF	20%	50V
2815	4822 126 13174	33nF	20%	16V
2816	4822 126 12878	1,5nF	10%	16V
2818	4822 126 12878	1,5nF	10%	16V
2822	4822 126 12878	1,5nF	10%	16V
2823	4822 122 33848	47pF	5%	50V
2824	4822 126 12785	47nF	20%	50V
2825	4822 121 51387	10nF	20%	16V
2826	4822 124 80231	47µF	20%	16V
2828	4822 124 40433	47µF	20%	25V
2829	4822 124 21732	10µF	20%	25V
2830	4822 121 51387	10nF	20%	16V
2831	4822 122 10577	3,3nF	10%	16V
2832	4822 122 10577	3,3nF	10%	16V
2833	4822 122 33069	33pF	5%	50V
2834	4822 122 33069	33pF	5%	50V
2835	4822 126 12785	47nF	20%	50V
2837	4822 124 40433	47µF	20%	25V
2838	4822 124 40248	10µF	20%	63V
2839	4822 124 40433	47µF	20%	25V
2840	4822 126 12882	100nF	20%	50V
2841	4822 126 12702	270pF	10%	50V
2842	4822 126 12339	2,2nF	10%	16V
2844	4822 126 12702	270pF	10%	50V
2849	4822 124 40769	4,7µF	20%	100V
2850	4822 122 33197	1nF	10%	50V
2851	4822 124 40433	47µF	20%	25V
2852	4822 126 12785	47nF	20%	50V
2853	4822 126 11585	22nF	20%	50V
2854	4822 126 12785	47nF	20%	50V
2855	4822 122 33519	470pF	10%	50V
2856	4822 122 33848	47pF	5%	50V
2857	4822 121 51387	10nF	20%	16V
2858	4822 124 81151	22µF	20%	50V
2859	4822 121 51387	10nF	20%	16V
2860	4822 124 41596	22µF	20%	50V
2861	4822 124 41596	22µF	20%	50V
2862	4822 124 11912	220µF	20%	6,3V

CAPACITORS

2863	4822 124 11912	220µF	20%	6,3V
2865	4822 126 12882	100nF	20%	50V
2869	4822 126 12785	47nF	20%	50V
2872	4822 126 12785	47nF	20%	50V
2873	4822 124 12233	47µF	20%	25V
2875	4822 126 11585	22nF	20%	50V
2876	4822 126 12785	47nF	20%	50V
2877	4822 122 33848	47pF	5%	50V
2878	4822 122 10466	220pF	10%	50V
2879	4822 126 12785	47nF	20%	50V
2880	4822 126 12882	100nF	20%	50V
2881	4822 124 40769	4,7µF	20%	100V
2882	4822 124 81151	22µF	20%	50V
2884	4822 124 40769	4,7µF	20%	100V
2885	4822 124 40769	4,7µF	20%	100V
2887	4822 126 12882	100nF	20%	50V
2888	4822 124 40769	4,7µF	20%	100V
2891	4822 122 10576	1,8nF	10%	16V
2892	4822 126 11714	4,7nF	20%	16V
2893	4822 122 10466	220pF	10%	50V

RESISTORS

3700	4822 116 83883	470Ω	5%	0,16W
3705	4822 116 83872	220Ω	5%	0,5W
3706	4822 116 83883	470Ω	5%	0,16W
3707	4822 116 83883	470Ω	5%	0,16W
3708	4822 116 83883	470Ω	5%	0,16W
3709	4822 116 52257	22kΩ	5%	0,5W
3711	4822 050 21003	10kΩ	2%	0,25W
3713	4822 116 52257	22kΩ	5%	0,5W
3714	4822 050 21003	10kΩ	2%	0,25W
3715	4822 116 52234	100kΩ	5%	0,5W
3716	4822 116 52175	100Ω	5%	0,5W
3718	4822 116 52283	4,7kΩ	5%	0,5W
3728	4822 116 52283	4,7kΩ	5%	0,5W
3730	4822 050 23303	33kΩ	1%	0,6W
3731	4822 050 21003	10kΩ	2%	0,25W
3760	4822 050 11002	1kΩ	5%	0,2W
3761	4822 050 11002	1kΩ	5%	0,2W
3762	4822 050 11002	1kΩ	5%	0,2W
3763	4822 116 52231	820Ω	5%	0,5W
3764	4822 052 10338	3,3Ω		NFR25
3766	4822 050 21003	10kΩ	2%	0,25W
3768	4822 116 52283	4,7kΩ	5%	0,5W
3769	4822 050 21003	10kΩ	2%	0,25W
3800	4822 116 52291	56kΩ	5%	0,5W
3801	4822 050 21003	10kΩ	2%	0,25W
3802	4822 116 52291	56kΩ	5%	0,5W
3803	4822 050 21003	10kΩ	2%	0,25W
3805	4822 050 21003	10kΩ	2%	0,25W
3806	4822 050 21003	10kΩ	2%	0,25W
3807	4822 050 21003	10kΩ	2%	0,25W
3808	4822 050 21003	10kΩ	2%	0,25W
3809	4822 116 83883	470Ω	5%	0,16W
3811	4822 116 52251	18kΩ	5%	0,5W
3812	4822 053 10228	2,2Ω	5%	1W
3814	4822 116 52191	33Ω	5%	0,5W
3815	4822 052 10478	4,7Ω	5%	NFR
3816	4822 116 83884	47kΩ	5%	0,16W
3817	4822 116 52298	680kΩ	5%	0,5W
3819	4822 116 83883	470Ω	5%	0,16W
3820	4822 116 52289	5,6kΩ	5%	0,16W

ELECTRICAL PARTSLIST 3CDC-99 MODULE

RESISTORS

3821	4822 116 52289	5,6kΩ	5%	0,16W
3822	4822 116 52263	2,7kΩ	5%	0,5W
3823	4822 050 11002	1kΩ	5%	0,2W
3824	4822 050 11002	1kΩ	5%	0,2W
3825	4822 050 11002	1kΩ	5%	0,2W
3826	4822 116 52257	22kΩ	5%	0,5W
3827	4822 050 23303	33kΩ	1%	0,6W
3828	4822 116 52257	22kΩ	5%	0,5W
3831	4822 116 52257	22kΩ	5%	0,5W
3832	4822 050 21003	10kΩ	2%	0,25W
3833	4822 116 52257	22kΩ	5%	0,5W
3834	4822 116 52257	22kΩ	5%	0,5W
3835	4822 052 10338	3,3Ω		NFR25
3837	4822 050 11002	1kΩ	5%	0,2W
3838	4822 050 11002	1kΩ	5%	0,2W
3839	4822 116 52234	100kΩ	5%	0,5W
3840	4822 116 52234	100kΩ	5%	0,5W
3841	4822 116 52283	4,7kΩ	5%	0,5W
3842	4822 116 83884	47kΩ	5%	0,16W
3843	4822 050 23303	33kΩ	1%	0,6W
3844	4822 116 52283	4,7kΩ	5%	0,5W
3845	4822 116 83884	47kΩ	5%	0,16W
3846	4822 050 23303	33kΩ	1%	0,6W
3847	4822 116 83961	6,8kΩ	5%	0,16W
3848	4822 116 52234	100kΩ	5%	0,5W
3849	4822 116 52234	100kΩ	5%	0,5W
3850	4822 116 52276	3,9kΩ	5%	0,5W
3851	4822 052 10338	3,3Ω		NFR25
3852	4822 052 10228	2,2Ω	5%	0,33W
3853	4822 116 83883	470Ω	5%	0,16W
3854	4822 116 52175	100Ω	5%	0,5W
3855	4822 116 52175	100Ω	5%	0,5W
3857	4822 116 52191	33Ω	5%	0,5W
3858	4822 116 52257	22kΩ	5%	0,5W
3859	4822 116 52257	22kΩ	5%	0,5W
3862	4822 116 52175	100Ω	5%	0,5W
3863	4822 116 52191	33Ω	5%	0,5W
3864	4822 116 52176	10Ω	5%	0,5W
3865	4822 116 52176	10Ω	5%	0,5W
3866	4822 050 21003	10kΩ	2%	0,25W
3867	4822 116 52206	120Ω	5%	0,5W
3869	4822 050 24708	4,7Ω	1%	0,6W
3870	4822 116 52175	100Ω	5%	0,5W
3871	4822 050 21003	10kΩ	2%	0,25W
3872	4822 050 21003	10kΩ	2%	0,25W
3873	4822 116 83883	470Ω	5%	0,16W
3874	4822 050 21003	10kΩ	2%	0,25W
3875	4822 050 21003	10kΩ	2%	0,25W
3876	4822 116 52234	100kΩ	5%	0,5W
3877	4822 050 21003	10kΩ	2%	0,25W
3878	4822 050 21003	10kΩ	2%	0,25W
3879	4822 050 21003	10kΩ	2%	0,25W
3880	4822 116 52219	330Ω	5%	0,5W
3881	4822 050 21003	10kΩ	2%	0,25W
3882	4822 116 83884	47kΩ	5%	0,16W
3883	4822 116 52234	100kΩ	5%	0,5W
3884	4822 116 52276	3,9kΩ	5%	0,5W
3885	4822 116 52234	100kΩ	5%	0,5W
3886	4822 116 83884	47kΩ	5%	0,16W
3887	4822 116 83883	470Ω	5%	0,16W

RESISTORS

3888	4822 050 21003	10kΩ	2%	0,25W
3889	4822 116 83883	470Ω	5%	0,16W
3890	4822 050 11002	1kΩ	5%	0,2W
3891	4822 050 11002	1kΩ	5%	0,2W
3892	4822 116 83883	470Ω	5%	0,16W
3893	4822 116 83883	470Ω	5%	0,16W
3894	4822 116 52191	33Ω	5%	0,5W
3895	4822 116 52176	10Ω	5%	0,5W
3897	4822 116 52175	100Ω	5%	0,5W
3899	4822 116 52175	100Ω	5%	0,5W

COILS

1810	4822 242 10849	CRYSTAL 8,46MHz

DIODES

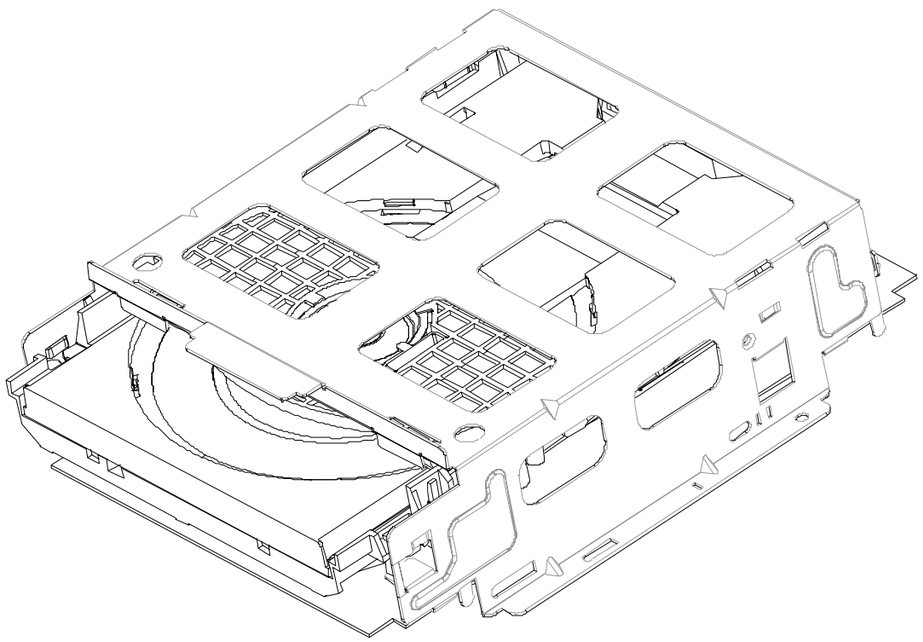
6871	4822 130 30621	1N4148
6872	4822 130 30621	1N4148
6873	4822 130 30621	1N4148
6874	4822 130 30621	1N4148
6875	3198 010 55180	DIO REG BZX79-B5V1
6877	3198 010 53980	DIO REG BZX79-B3V9

TRANSISTORS

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

INTEGRATED CIRCUITS

7801 ©	4822 209 17286	TZA1024T/N1 HF-AMPLIFIER
7806	9352 628 49112	IC TDA7073A/N4
7807	9352 628 49112	IC TDA7073A/N4
7810 ©	8203 303 11278	D/A CONVERTER PCM1716
7871	9352 628 49112	IC TDA7073A/N4
7873	5322 209 10421	HEF4094BP
7876 ©	4822 209 16143	LC89170M
7877 ©	9352 641 80557	SAA7324H/M2B CD10/M2B
7878	4822 209 72042	MC78L05ACP



CDR99 Module

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SERVICING HINT

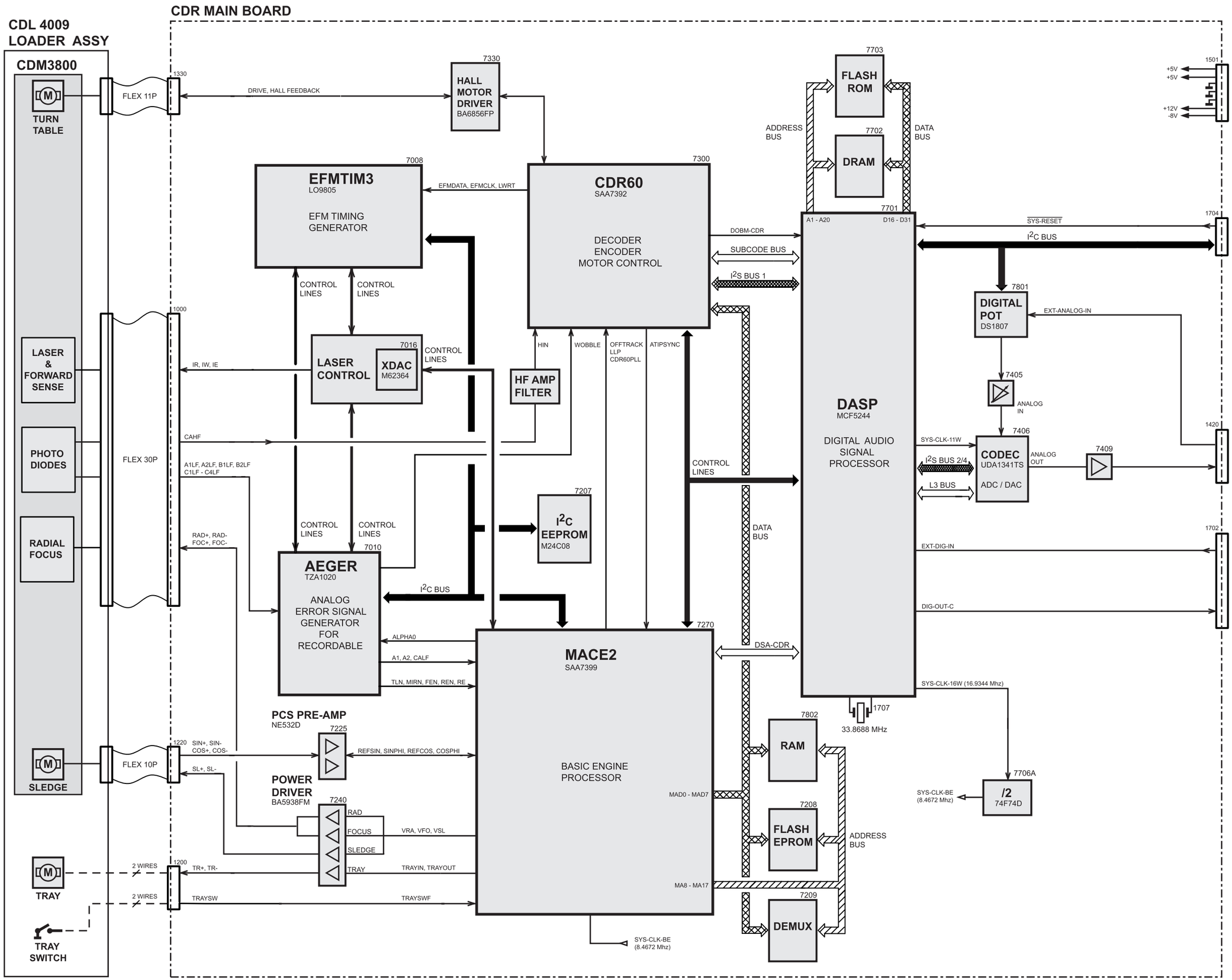
The **CD-R/W module** will be **exchanged completely** in case of a failure. For checking the CD R/W module use the Service Testprogram (chapter 3-4).

The defective CD-R/W module has to be returned for central repair. Service Code for new Module = **3104129 52590**

Available circuit descriptions: *The Basics of Compact Disc Recordable/Rewritable* **4822 725 25242**
3rd generation Compact Disc Recording **3104 125 40100**

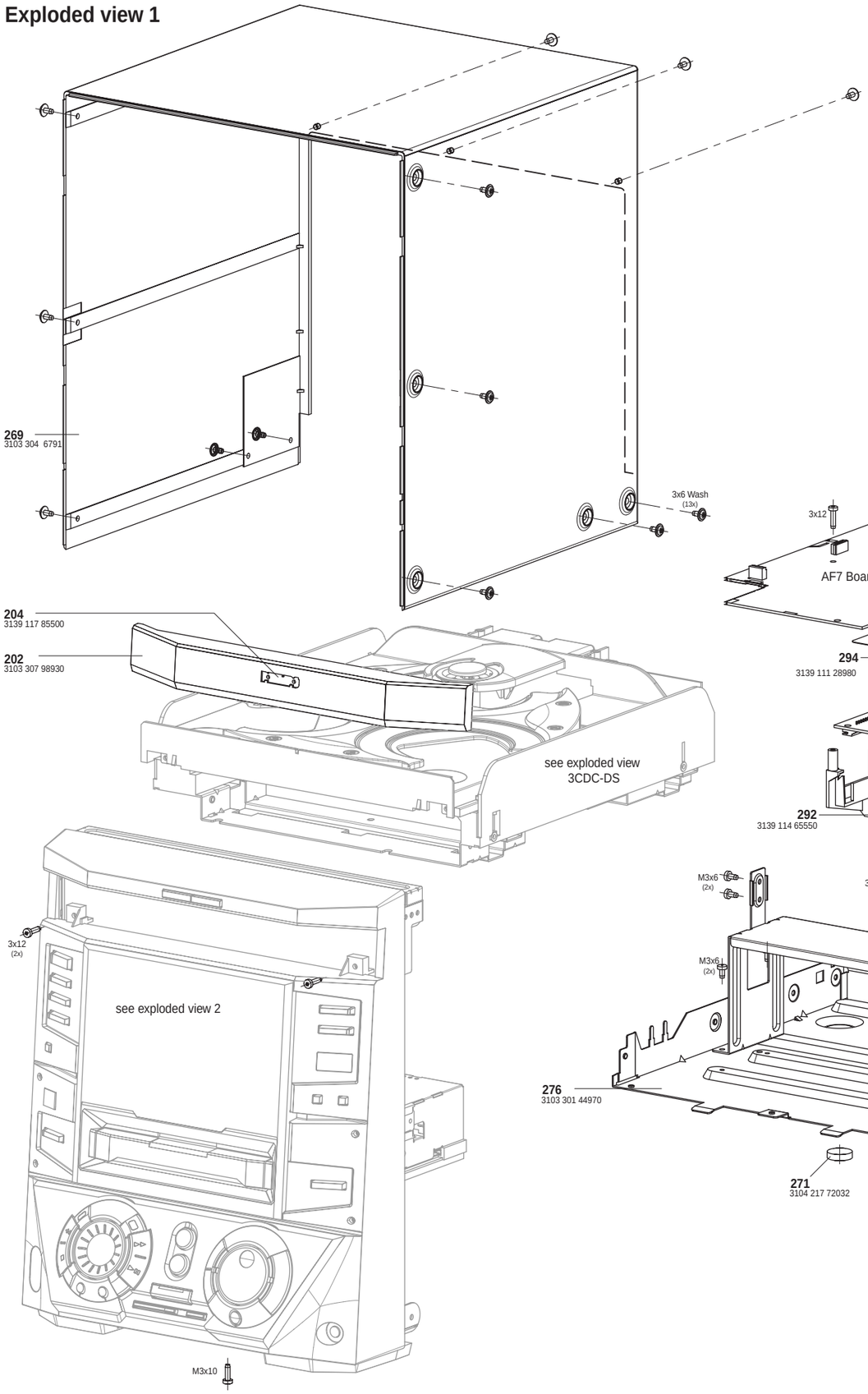
11-2

BLOCK DIAGRAM CDR-MODULE



12-1

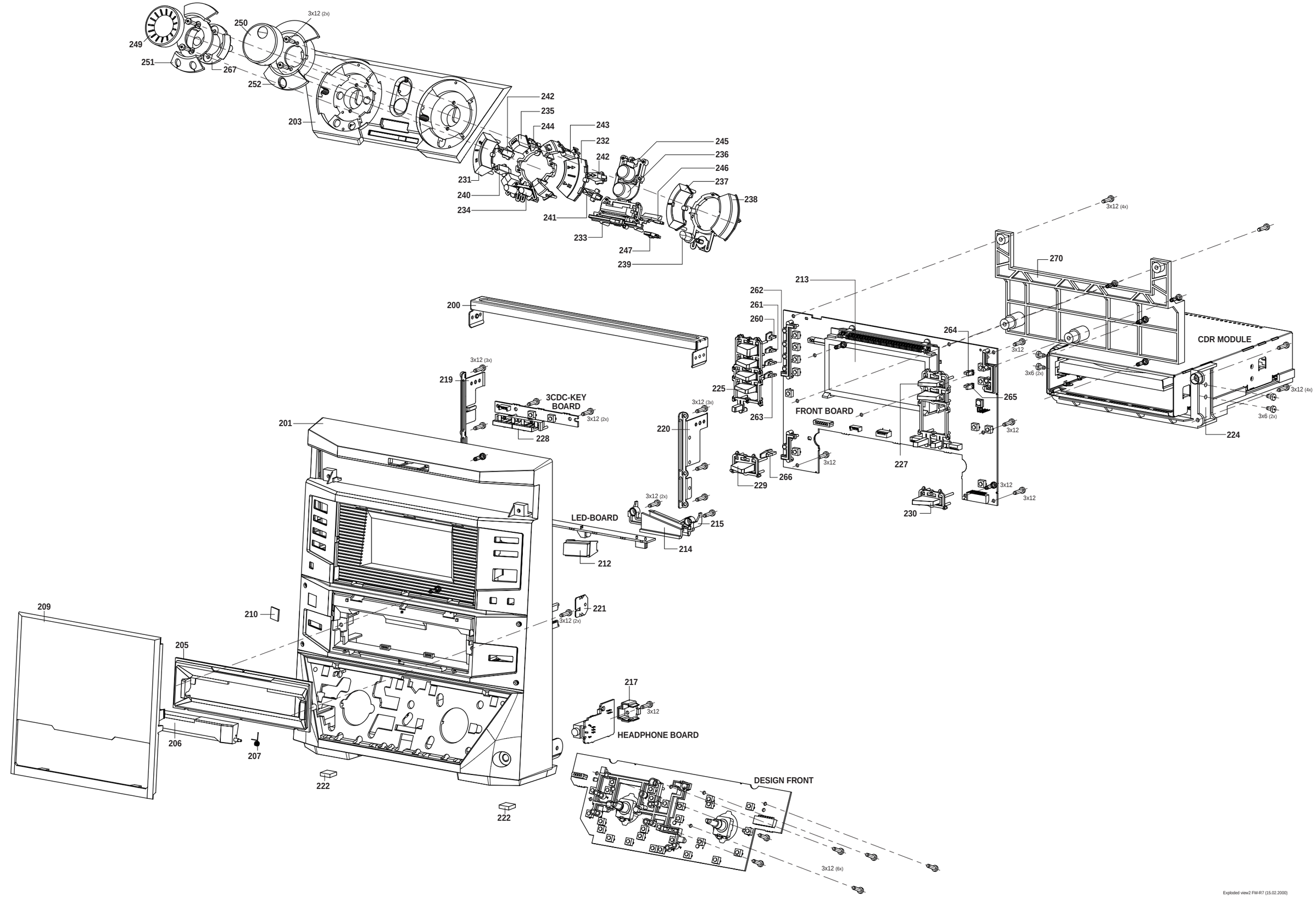
Exploded view 1



Partslist on chapter 12-3

12-2

Exploded view 2



MECHANICAL PARTS

201	3103 307 98591	CABINET FRONT
202	3103 307 98931	COVER 3CDC TRAY
203	3103 307 98581	CABINET INSERT
204	4822 454 13408	WORDMARK PHILIPS
205	3103 307 98921	FRAME ORNAMENTAL
206	3103 304 69271	DOOR CDRM99
207	3103 301 06490	SPRING DOOR CDR
209	3103 307 98602	WINDOW DISPLAY/CDR
210	4822 454 13339	ORNAMENTAL PLATE
212	3103 304 68130	LENS IR
213	3103 304 68990	CUTSHEET FTD
214	3103 304 67810	LIGHT GUIDE CDR
215	3103 304 68120	HOLDER LIGHT GUIDE
222	4822 462 40683	FOOT RUBBER
225	3103 307 98941	BUTTON-SET POWER
226	3103 301 45270	BRACKET CDR RIGHT
227	3103 307 99031	BUTTON-SET AUX/TUNER
228	3103 307 98951	BUTTON-SET 3CDC-OPEN
229	3103 307 98961	BUTTON-CDR SELECT
230	3103 307 98971	BUTTON-CDR OPEN
231	3103 307 98611	BUTTON-STOP PREV
232	3103 307 98621	BUTTON-PLAY NEXT
233	3103 307 98642	BUTTON-SET REC-TYPE
234	3103 307 98631	BUTTON-SET TRACK-MENUE
235	3103 304 68711	BUTTON-SET YES-NO-REC-PROG
236	3103 307 98652	BUTTON-SET CD-REC
237	3103 307 98662	BUTTON-PURE LOUDNESS
238	3103 307 98671	BUTTON-SET DSC-IS
239	3103 304 68970	CAP INCREDIBLE SURROUND
240	3103 304 68750	LIGHTGUIDE STOP
241	3103 304 68760	LIGHTGUIDE PLAY
242	3103 304 68770	LIGHTGUIDE PREV-NEXT
243	3103 307 98681	LIGHT GUIDE YES
244	3103 307 98691	LIGHT GUIDE NO
245	3103 304 68800	LIGHTGUIDE CD-REC
246	3103 304 68810	LIGHTGUIDE REC-TYPE
247	3103 304 68820	LIGHTGUIDE FINALIZE
249	3103 307 98701	ROTARY JOG
250	3103 307 98711	ROTARY VOLUME
251	3103 307 98721	COVER JOG
252	3103 307 98731	COVER VOLUME
260	3103 304 67360	LIGHT GUIDE POWER
261	3103 304 67370	LIGHT GUIDE CD1
262	3103 304 67380	LIGHT GUIDE CD2
263	3103 304 67390	LIGHT GUIDE CD3
264	3103 304 67870	LIGHT GUIDE AUX
265	3103 304 67880	LIGHT GUIDE TUNER
266	3103 304 67930	LIGHT GUIDE CDR
267	3103 304 68830	LIGHT GUIDE JOG-ROTARY
271	4822 462 40683	FOOT RUBBER
293	4822 402 10288	BRACKET MAINS SOCKET
297	4822 466 93148	SPACER

MISCELLANEOUS

	3103 307 99140	SPEAKER-BOX LEFT
	3103 307 99150	SPEAKER-BOX RIGHT
	4822 303 50063	FM AERIAL
	4822 320 11094	FW ANTENNA WIRE /37
	4822 303 50082	AM FRAME AERIAL
	3139 228 83630	REMOTE CONTROL RC2505/01
	3104 128 92560	MAINS CORD, UL
	4622 004 50290	CORDSET
1008	3103 308 30540	TRANSFORMER MAINS FOR /37
1008	3103 308 30550	TRANSFORMER MAINS FOR /22
1008	3103 308 30560	TRANSFORMER MAINS FOR /21
8002	4822 320 12335	FLEX FOIL CABLE,17P, 125mm
8004	3103 308 92310	FLEX FOIL CABLE 6P, 400mm
8006	3103 308 92320	FLEXFOIL CABLE, 7P, 280mm
8009	3103 308 92330	FLEX FOIL CABLE, 5P, 280mm
8013	3103 308 92340	FLEX FOIL CABLE, 5P, 280mm
8014	3103 308 92470	FLEX FOIL CABLE, 19p, 400mm
8015	3103 308 92460	FLEX FOIL CABLE 4P, 400mm

REPLACEMENTS

	3104129 52590	CD-R/W MODULE