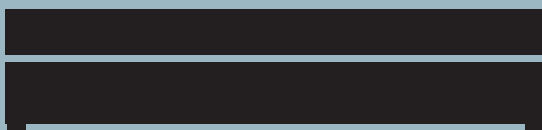# DVD 2

Type 4629

Service Manual
English

*German, French, Italian, Spanish, Danish, Dutch and Simplified Chinese
versions are available in the Retail System*
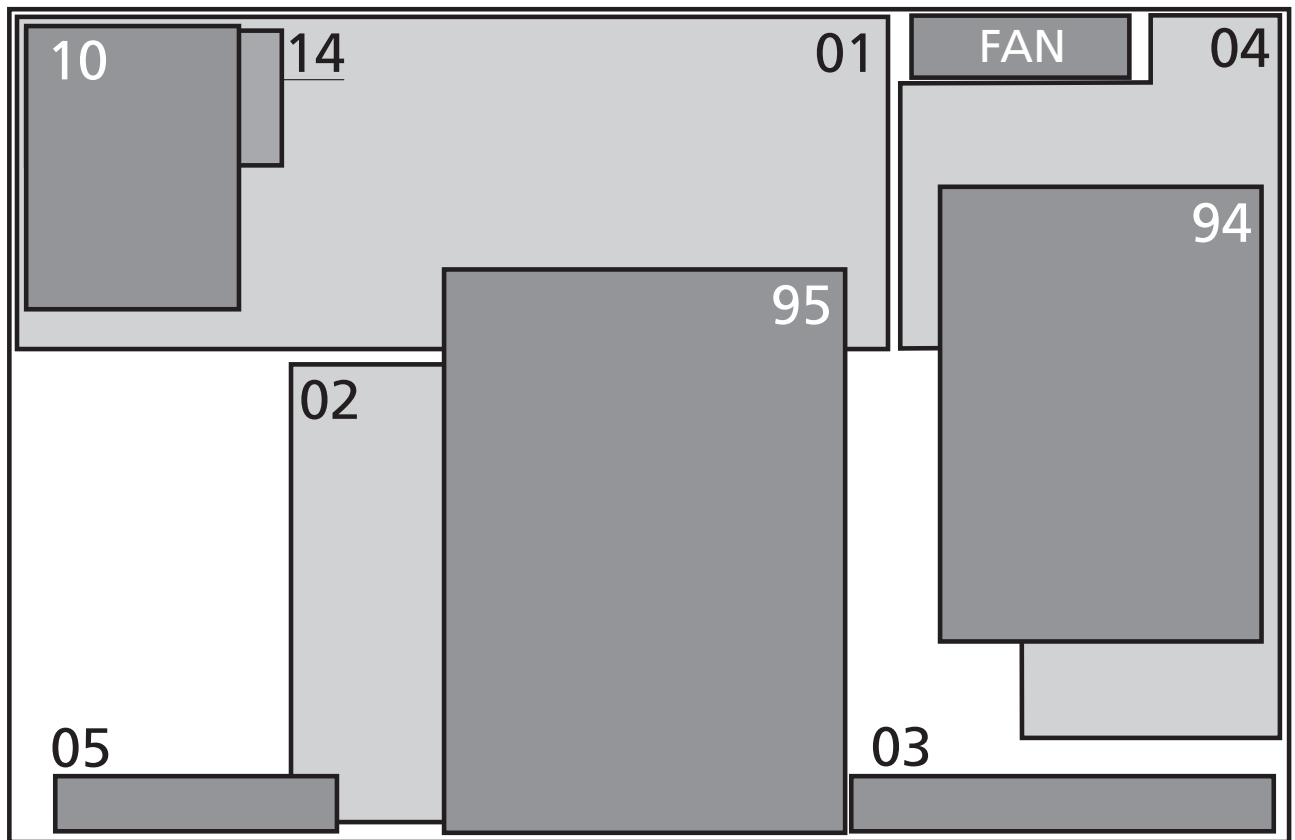
*This Service Manual must be returned
with the defective parts/back-up suitcase !*

BANG & OLUFSEN

CONTENTS

Survey of modules

PCB01	Analog
PCB02	Digital
PCB03	Display
PCB04	Power Supply
PCB05	AV Input
PCB10	HDMI
PCB14	Keyboard (AVL)
94 Module	Harddrive (HDD)
95 Module	DVD Drive
Fan	

How to service

Front line service

The static-protective field service kit must always be used when DVD 2 is disassembled or modules are being handled.
It is not allowed to solder in the customer's home. Therefore, accessible modules are mounted with plugs and connectors, and can be exchanged without the use of a solder iron.

DVD 2 has been developed for simple module exchange to comply with the on-site service strategy. Module exchange is possible on-site, at the dealershop or in the service workshop, whatever is most convenient in each case. For on-site service a Back-up suitcase must be used.
Module exchange is the recommended way to perform service, due to the fact that most of the modules are multi-layer based, and most of the circuits are on a single main PCB.

An electrical fault symptom can be removed during one visit to the customers home, if you bring a DVD 2 Back-up suitcase with you.
Is it a mechanical symptom, the specific part must be brought with you separately.

Service documentation

Service documentation for DVD2 will be a Service Manual with part nos. for the Back-up suitcase, electrical and mechanical parts, User's guides, etc.

In the Back-up suitcase, an enclosed appendix with detailed description of available nuclei will be located. This could be helpful when operating in service mode.

Preparations before service

Fault description and error codes must be returned with the replaced parts.
Use the Module Repair form or the form in the Retail Order System, Exchange Module. To help the Bang & Olufsen Module Repair department it is very important that you answer the following questions:

1   Which products are in the setup?
2   Which software versions are used in these products?
3   How are the products linked together?
4   What happens in the actual situation?

Note: In this case, the error code is generated by the Diagnostic Software and contains 6 decimal numbers, it is not possible to clear the error code.

Recommended tools for service

Service cable
Software disc
DVD/CD Player Test Pack
White cotton gloves
Soft lint-free cloth

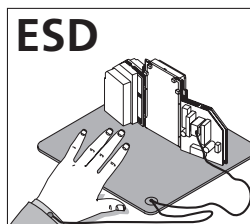## Warnings

ESD

STATIC ELECTRICITY
MAY DESTROY THE
PRODUCT

The internal electronics are very sensitive to static electricity, which may damage
the product.
When electrical replacement or disassembly is necessary, use ESD-mat and tools.

Static-protective field service kit

ESD

A static-protective field service kit must always be used when the product is
disassembled or modules are being handled.
Follow the instructions in the guide and use the ESD-mat for both old and new
modules.

Please note:
When mains voltage on the product is required, remove the connection between
the product and the ESD-mat.

The chassis or modules must always be connected to the static-protective field
service kit or placed in an ESD-proof bag.

Laser exposure

CLASS 1
LASER PRODUCT   RW DVD + ReWritable   DVD VIDEO   COMPACT disc DIGITAL VIDEO   COMPACT disc DIGITAL AUDIO

The DVD 2 contains a laser system and is classified as a class 1 laser product.
The DVD 2 must be opened by qualified personal only.

Symbol of safety components

When replacing components with this symbol, the same type has to be used, also
the same values for ohm and watt.
The new component is to be mounted in the same way as the replaced one.

General Warnings

Wear cotton gloves to avoid fingerprints on the product.

The aluminium and display surface on the product is very sensitive, so handling
should be done with great care to avoid damage.

When transporting the DVD 2, it is recommended to use the product cover.
Do not move the product or the HDD when it is operating. The HDD is very
sensitive to bumps which can cause great damage.

Cleaning

Clean the DVD 2 surfaces using a lint-free cloth which you have wrung firmly in
lukewarm water.

Never use alcohol or other solvents to clean any parts of the DVD 2.
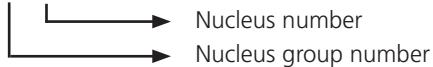
Service Mode

Diagnostic Software(DS)

Service Mode in DVD 2 is a new software implemented in the PCB02, Digital and is called 'Diagnostic Software'. The Diagnostic Software consists of independent 'atomic' tests, called nuclei. Each nucleus forms a test to indicate possible hardware failure.
Execution of each test is done by typing individual nucleus numbers in the command promt line (a promt in the 'Diagnostic Software'), which look like this:

DS:>

In this case use 'HyperTerminal' as user interface. HyperTerminal is a 'Windows' component, please see next page for setup.

Each nucleus has a unique number of four digits. This number is the input of the command line interface.

[XX YY _ _]
→ Nucleus number
→ Nucleus group number

The **Nucleus groups** are defined as follows:

Nucleus Group Number	Nucleus Group Name
0	Scripts
1	Codec (e.g. Chrysalis, Leco)
2	Boot EEPROM
3	NVRAM
4	SDRAM
5	FLASH
6	Video Input Processor
7	DVIO
8	Progressive Scan
9	Basic Engine
10	Display and Control Board
11	Analogue Board
12	System
13	Electronic Program Guide Board
15	HDMI
16	Analogue Slave Processor
17	Analogue Board EEPROM
18	Video Matrix
19	Audio Matrix
20	Front End
21	Hard Disk

The **Nucleus numbers** are individual 2 digit numbers according to specific tests, and are listed in a '**detailed description of available nuclei**' which is an appendix to the service manual.

In this description, there will be technical expressions like e.g. CHR and DVIO, which are abbreviations for 'Codec Host Repository' and 'Digital Video Input Output' .

For an easy overview these are listed in the glossary below:

Glossary

AC3   : Audio Compression format 3
ACK   : Acknowledge
ADC   : Analogue to Digital Conversion
AMIX   : Audio Matrix (Audio switching)
ANAB   : Analogue Board
AROM   : Analogue Board EEPROM
ASP   : Analogue Slave Processor
ATA   : AT Attachment
ATAPI   : AT Attachment Packet Interface
BE   : Basic Engine
BROM   : BOOT EEPROM
CHR   : Codec Host Repository
CRC   : Cyclic Redundancy Check
DAC   : Digital to Analogue Conversion
DB   : Digital Board
DCB   : Display and Control Board
DENC   : Digital (video) ENCoder
DMA   : Direct Memory Access
DS   : Diagnostic and Service Software
DSP   : Digital Signal Processor
DTTM   : Digital Terrestrial Tuner Module
DV   : Digital Video
DVIO   : Digital Video Input Output
EPGB   : Electronic Program Guide Board
FRE   : Front End (Tuner)
HDD   : Hard Disk Drive
HDMI   : High Definition Multimedia Interface
IC   : Integrated Circuit
IDE   : Integrated Drive Electronics
IH   : Interface Handler
IIC   : Inter IC Communication
INT   : Interrupt
LED   : Light Emitting Diode
NVRAM   : Non Volatile Random Access Memory
OPC   : Optimal Power Control
PIO   : Peripheral IO pin
PSCAN   : Progressive Scan
RC   : Remote Control
S2B   : Serial to Basic Engine
SYS   : System
TOC   : Table Of Contents
UART   : Universal Asynchronous Receiver Transmitter
UDF   : Universal Disc Format
VIP   : Video Input Processor
VMIX   : Video Matrix (Video switching)

Setup & Connection

Tools required

To enter Service Mode it is necessary to connect DVD 2 to a PC with a service cable. The required tools are:

- PC with com port (if no com port is available, use USB/COM converter part. no. 3375151)
- Service Cable (part.no. 6278222)
- HyperTerminal (Windows Component)

Setup

The first-time setup is described below. This is a one time only procedure.

1. Open PC or laptop (if no COM port is available, connect USB/COM Converter)
2. Run HyperTerminal (usually placed: Start/Programs/Accessories/Communications)
3. The 'Connection description' box appears on the screen
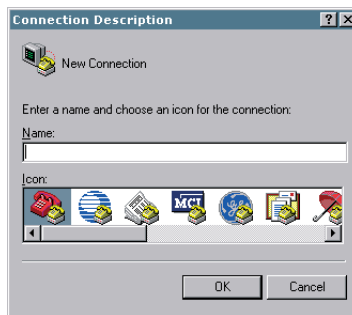
In the line 'Name' type 'DVD2' and choose an icon for the connection. Click OK. The following appears on the screen:

In the line 'Connect using' choose the COM port (if USB/COM converter is used, choose the 'virtual COM port' that represent the USB-converter) to be used. Click OK.

The following appears on the screen.
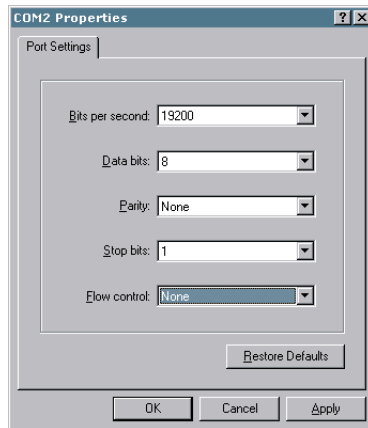
Use the following Port Settings:

Bits per second   19200
Data bits   8
Parity   None
Stop bits   1
Flow control   None

Click OK to continue. The following window should appear on the screen.
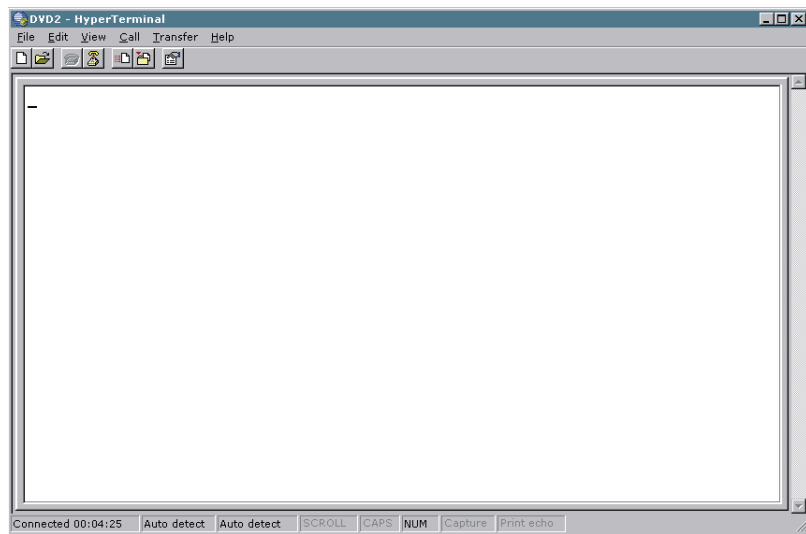
Now the HyperTerminal is ready to use, but before going any further it would be wise to save the connection setup, in this way it will be easy to connect next time. This can be done in following way: Click 'File', Click 'Save As.'
The 'File Name' is already suggested as 'DVD2', but the location in the line 'Save in' should be changed to a known location e.g. 'Desktop', for easy access.

Activation

1. Disconnect DVD 2 from the mains
2. Connect Service Cable from P1103 on PCB02 to COM port
3. Open HyperTerminal
4. Power on DVD 2 and confirm the following 'read out' in the HyperTerminal window:

Factory Diagnostics and Service Software
DVD Video Recorder (Sep 28 2006, 18:29:46)

Version :1388   Build   :20060928_1821
Release :SG1_1   Buildtype :dev
Baseline :SGP29atl#SG1_1_20050609_base Variant   :sxc

DS:>

Usage

The commands that can be given are the numbers of the nuclei. A command must
be terminated with an <ENTER> character from the control PC. When typing
commands, the backspace key can be used to make corrections. Apart from this,
the Up and Down arrows can be used to browse through previous commands.
When non-supported commands are entered, the interface returns to the
command prompt line DS:>
E.g.

DS:> 1888
DS:>

If the command (the nucleus number) is recognised, the nucleus is executed.
Result and output of an activated (and terminated) nucleus will be sent back to
the control service PC.
Example in case the command is correct:

DS:> 1200
120000: Hardware ID = 0x27
Test OK @

DS:>

Example in case there is an error in the communication:

DS:> 1100
110002: Communication with PCB01, Analog fails
Error @

DS:>

ERROR handling

When a command is terminated by the user, and an error occurs in the communication, the results are returned from a diagnostic nucleus to the control/service PC.

The result looks as follows
<number> : <string> [Error] @

<number> is a 6-digit decimal number padded with leading zeros if its value is less than 6 digits. The first four digits identify the generating nucleus (group and nucleus); the last two digits indicate the error number.

[XX YY ZZ]

→ Error Code
→ Nucleus Number
→ Nucleus Group Number
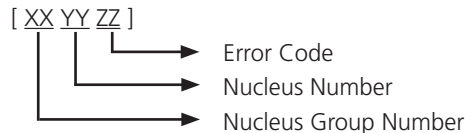
For further specifications please refer to the enclosed appendix.

Cancelling Service Mode

To cancel Service Mode, disconnect DVD 2 from mains and wait 10 sec. before rebooting the system.

End User/Dealer script

The 'End User/Dealer script interface' gives a diagnosis on the DVD 2.
During this mode, a number of hardware tests (nuclei) are automatically executed to check if the recorder is faulty. The diagnosis is simply a "FAIL" or "PASS" message. If the message "FAIL" appears on the display, there is apparently a failure in the recorder. If the message "PASS" appears, the nuclei in this mode have been executed successfully. There can be still a failure in the recorder because the nuclei in this mode do not cover the complete functionality of the recorder.

Before the product is returned to the customer this 'End User/Dealer script' test must be executed to ensure correct functionality of the recorder. If the test fails, continue to the fault flow chart to locate the error.
This test can be executed by:

1. Typing 'script' in the command promt line (see section fault flow chart for further information)

    or by

2. Pressing button 'S6' on back panel when connecting to the mains. The DVD Recorder is tested stand-alone: no other equipment than the DVD Recorder is needed.

Cancelling 'End User/Dealer script'

To cancel 'End User/Dealer' script, disconnect DVD 2 from mains and wait 10 sec. before rebooting the system.

Dealer test

Perform built-in dealer test:
- Unplug power cord
- Press and hold 'play' buton (S6)
- Connect to mains and release button after 2 sec.

PASS in display = No errors found
FAIL xxxxxx = Error found in DVD 2

If the Dealer test fails in the test sequence, it will display an error code.
Locate the error code and refer to the error list in enclosed appendix.

If it is not possible to locate the error code, and the DVD 2 is still faulty, continue
with the fault flow chart.

Fault flow chart

Fault symptom:
No start up
No STBY. LED (normally red)
No Display

Possible causes:
Mains not supplied
Blown fuse F1 on PCB04, Power Supply
Missing voltages
Defective PCBs
Defective cables

No

Yes

Confirm the mains
supply is connected
and applied

OK?

Replace/reconnect
mains cable

Fuse F1 on PCB04,
Power Supply

OK?

Replace fuse F1 on
PCB04 and connect
to mains

Does fuse F1 on
PCB04, Power Supply
blow again?

Replace PCB04,
Power Supply

Confirm:
+3.3V Stby. on PCB04, J2 pin 5
+5V Stby. on PCB04, J2 pin 3
+12V Stby. on PCB04, J2 pin 1

OK?

Disconnect J2 on PCB04, Power Supply

Confirm:
+3.3V Stby. on PCB04, J2 pin 5
+5V Stby. on PCB04, J2 pin 3
+12V Stby. on PCB04, J2 pin 1

OK?

Replace PCB04,
Power Supply

Go to next
page

Reconnect J2 on PCB04, Power Supply
Disconnect cable P1101 on PCB14,
Keyboard

Confirm:
+3.3V Stby. on PCB04, J2 pin 5
+5V Stby. on PCB04, J2 pin 3
+12V Stby. on PCB04, J2 pin 1

OK?

Reconnect P1101 on PCB14
Disconnect P1100 on PCB14, Keyboard

Confirm:
+3.3V Stby. on PCB04, J2 pin 5
+5V Stby. on PCB04, J2 pin 3
+12V Stby. on PCB04, J2 pin 1

OK?

Replace PCB01,
Analog

Replace PCB03,
Display

Replace PCB14,
Keyboard

From previous
page

No

Yes

Confirm:
3.3V on PCB04, J1 pin 1, 2, 3, 4
5V on PCB04, J2 pin 9
-5V on PCB04, J1 pin 12

OK?

Disconnect J1 on PCB04, Power Supply
Confirm:
3.3V on PCB04, J1 pin 1, 2, 3, 4
5V on PCB04, J2 pin 9
-5V on PCB04, J1 pin 12

OK?

Replace PCB04,
Power Supply

Go to next
page

Reconnect J1 on PCB04, Power Supply
Disconnect P1004 on PCB02, Digital
Confirm:
3.3V on PCB04, J1 pin 1, 2, 3, 4
5V on PCB04, J2 pin 9
-5V on PCB04, J1 pin 12

OK?

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing

Replace PCB10,
HDMI

From previous
page

Start HyperTerminal
(Refer to Service Mode for use)

Is HyperTerm promt OK?

Go to next
page

Confirm:
3.3V Stby. on PCB01, P1932 pin 5
5V Stby. on PCB01, P1932 pin 3
12V Stby. on PCB01, P1932 pin 1

OK?

Reconnect/Replace
cable W16

Confirm:
3.3V on PCB03, P1500 pin 1, 2, 3, 4
5V on PCB02, P1500 pin 9
-5V on PCB02, P1500 pin 12

OK?

Reconnect/Replace
cable W10

Replace PCB02,
Digital

HyperTerm OK?

Replace PCB01,
Analog

HyperTerm OK?

Replace PCB14,
Keyboard

HyperTerm OK?

Disconnect PCB10,
HDMI

HyperTerm OK?

Is DVD 2 OK?
Otherwise start at the
beginning with the
new PCB

Is DVD 2 OK?
Otherwise start at the
beginning with the
new PCB

Is DVD 2 OK?
Otherwise start at the
beginning with the
new PCB

Replace PCB10,
HDMI

Is DVD 2 OK?
Otherwise start at the
beginning with the
new PCB

No

Yes

From previous page

Confirm communication with PCB02, Digital by typing: DS:>1228 at prompt

OK?

Replace PCB02, Digital

Refer to 'Adjustments' when replacing

Confirm communication with ASP on PCB01, Analog by typing: DS:>1600 at prompt

OK?

Replace PCB01, Analog

Confirm 'slash version' by typing: DS:>1218 at prompt. Slash version must be '11221'

OK?

Set slash by typing 'DS:1217 11221' at prompt

Confirm result by typing DS:>1218
OK?

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Confirm IEEE unique number by typing: DS:>1208 at prompt Result must be a '10-digit-hexadecimal-number'
OK?

Set IEEE unique number by typing DS:>1207 xxxxxxxxxx at prompt. Confirm result by typing DS:>1208
OK?

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Confirm 'diversity string' by typing: DS:>1229 at prompt. Result must be a '128-digit-decimal-number'
OK?

To set 'diversity string' please refer to 'Adjustments' Confirm result by typing DS:>1208
OK?

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Confirm 'SettingsDisplay' by typing: DS:>1228 at prompt
OK?

Replace PCB02, Digital
Refter to 'Adjustments' when replacing

No

Yes

Fault symptom:
DVD 2 does not complete startup sequence
STBY. LED (red -> green)
Display shows ① or ②
① 'BUSY' for about 45 sec., then 'STARTING'
    for about 15 sec., then 'CLOCK'
② 'STARTING' and HDD reboots for every 45 sec.

Possible causes:
Defective DVD 'DVD Drive'
Defective HDD
Defective PCB

No

Yes

Confirm:
+5V on
PCB04 J5 pin 4
+12V on PCB04 J5
pin 1

OK?

Replace PCB04,
Power Supply

Start HyperTerminal
(Refer to
Service Mode for use)
Confirm
communication with
DVD Drive by typing:
DS:>900 at prompt
Test OK?

Replace DVD Drive

Confirm 'open/close'
function by typing:
DS:>904 at prompt
(open)
DS:>905 at prompt
(close)

Test OK?

Replace DVD Drive

Check HDD

Confirm:
+5V on PCB04 J4
pin 4
+12V on PCB04 J4
pin 1
OK?

Replace PCB04,
Power Supply

Confirm
communication with
HDD by typing:
DS:>2100 at prompt

Test OK?

Replace HDD
(Check cables W11 &
W13 before replacing)

Refer to 'Adjustments'
when replacing

Confirm HDD
diagnostic test by
typing:
DS:>2105 at prompt

Test OK?

Perform an 'image download' from DVD
format disc, by typing:
DS:>2107 at prompt
Refer to 'Adjustments' for further
information
(Formatting a new HDD)
WARNING!: All recording data will be lost

Replace HDD
(Check cables W11 &
W13 before replacing)

Refer to 'Adjustments'
when replacing

Confirm
communication with
PCB10, by typing:
DS:>1501 at prompt

Test OK?

Replace PCB10, HDMI

See next page

From previous page

No

Yes

Confirm communication with FrontEnd (Tuner) on PCB01, by typing:
DS:>2000 at prompt

Test OK?

Replace PCB01, Analog

Confirm communication with ASP on PCB01 by typing:
DS:>1600 at prompt

Test OK?

Replace PCB01, Analog

Confirm communication with PCB02 by typing:
DS:>100 at prompt

Test OK?

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Confirm 'slash version' by typing:
DS:>1218 at prompt
Slash version must be '11221'
Test OK?

Set slash by typing:
DS:>1217 11221 at prompt

Confirm result by typing:
DS:>1218
Test OK?

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Confirm IEEE unique number by typing:
DS:>1208 at prompt
Result must be a '10-digit-hexadecimal-number'
Test OK?

Set IEEE unique number by typing:
DS:>1207 xxxxxxxxxx at prompt. Confirm result by typing:
DS:>1208
OK?

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Confirm 'diversity string' by typing:
DS:>1229 at prompt
Result must be a '128-digit-decimal-number'
Test OK?

To set 'diversity string', please refer to 'Adjustments'
Confirm result by typing:
DS:>1208
Test OK?

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Confirm 'SettingsDisplay' by typing:
DS:>1228 at prompt

Test OK?

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Fault symptom:
DVD 2 starts up but goes to standby
Stby. LED = Red
Display shows 'STARTING' and the DVD 2 is
locked!
After a few minutes DVD 2 reboots and the
sequence is repeated

Possible causes:
Defective HDD
Defective Power Supply

No

Yes

Confirm on PCB04,
Power Supply:
+5V on J4 pin 4
+12V on J4 pin 1

Replace PCB04,
Power Supply

Start HyperTerminal
(Refer to Service Mode
for use)
Confirm
communication with
HDD by typing:
DS:>2100 at prompt

Replace HDD
(Check cables W11 &
W13 before replacing)

Refer to 'Adjustments'
when replacing

Confirm HDD
diagnostic test by
typing:
DS:>2105 at prompt
OK?

Perform an 'image download' from DVD
format disc, by typing:
DS:>2107 at prompt
Refer to 'Adjustments' for further
information
(Formatting a new HDD)
WARNING!: All recording Data will be lost

Replace HDD
(Check cables W11 &
W13 before replacing)

Refer to 'Adjustments'
when replacing

Fault symptom:
Fan error
Fan continues running in standby
Fan not running
Fan always runs at high speed

Possible causes:
Defective Fan
Defective NTC on PCB03, Display
Defective software

No

Yes

Is the Fan running when DVD 2 is on?

Confirm 5~12V on PCB01 P1913 between pin 1 and pin 2 OK?

Replace PCB01, Analog

Replace Fan

* Measuring made at 22 deg. celsius

Fan speed low (normal/switched on):
-5V PCB01 P1913 between pin 1 and pin 2
-1.6V or higher at PCB03 P1910 pin 8

Fan speed high (switched on):
-10~12V PCB01 P1913 between pin 1 and pin 2
- 1.6V or lower at PCB03 P1910 pin 8

Fan off (stby. only):
-1.9V or higher at PCB03 P1910 pin 8

Is the Fan speed normal?*

Is DC level lower than 1.6V at PCB03 P1910 pin 8?

Verify that the software version is the latest available. Refer to 'Adjustments' for readout OK?

Update to latest version. Software can be downloaded at Bang & Olufsen Retail system under the BeoWise section

Replace PCB03, Display

Replace PCB01, Analog

Confirm that Fan stops running approx. 15 sec. after DVD 2 is switched off

Is DC level higher than 1.9V at PCB03 P1910 pin 8?

Wait 1-2 minutes and measure again (DC level should increase)

Replace PCB03, Display

Verify that the software version is the latest available. Refer to 'Adjustments' for readout OK?

Update to latest version. Software can be downloaded at Bang & Olufsen Retail system under the BeoWise section

```
┌──────────┐
│          │ ──────────► No
│          │
└────┬─────┘
     │
     ▼
    Yes
```

HDD playback check

```
From the HDD                Verify that the              Update to latest
browser check the           software version is the      version. Software can
following features:    ───► latest available.       ───► be downloaded at
- Sorting & Deleting        Refer to 'Adjustments'       Bang & Olufsen Retail
- Child lock & Protect      for readout                  system under the
- Editing features          OK?                          BeoWise section
     │                           │
     ▼                           ▼
Playback a title from       Observe by listening         Replace HDD
the HDD browser and         that the HDD sounds          (Check cables W11 &
check the following    ───► normal                  ───► W13 before replacing)
features:                   OK?
- Pause, Jump                                            Refer to 'Adjustments'
functions & Next/                                        when replacing
Previous chapter
- Editing features
     │                           │
     ▼                           ▼
Playback a title from       Replace PCB02,
the HDD browser and         Digital
check for:                  Refer to 'Adjustments'
- No echo & 'lipsync'       when replacing
  errors
- No freeze & pixel
  errors
```

DVD playback check

```
From the DVD Menu           Verify that the              Update to latest
playback a DVD video disc   software version is the      version. Software can
title, and check the   ───► latest available.       ───► be downloaded at
following                   Refer to 'Adjustments'       Bang & Olufsen Retail
features:                   for readout                  system under the
- Pause, Jump functions &   OK?                          BeoWise section
Next/Previous chapter
- Child lock & Protect
- Editing features
     │                           │
     ▼                           ▼
Playback the following types Observe by listening        Replace DVD Drive
of discs from the test pack: that the DVD Drive
- VCD/SVCD              ───► sounds normal           ───►
- MP3 disc                  OK?
- Pictures disc (.JPG
slideshow)
- DVD-DL dual layer for layer
shift
     │                           │
     ▼                           ▼
Playback Audio CD-RW discs  Replace PCB02,
from test pack:             Digital
- Track 3 (Finger print)    Refer to 'Adjustments'
- Track 8 (600µ black dot - when replacing
max. after 1 min.)
```

Manual recording
with TSB (Time Shift
Buffer)

Copying HDD title to
a recordable disc

No

Yes

1 Switch on the Recorder and select
   a tuner channel
   - The active Tuner channel will be
     recorded into the TSB (Time Shift
     Buffer), a temporary HDD storage
     area
2 By pressing the "<<", ">>" or
   "STOP" button, the Time shift bar
   appears on the screen, check the
   following features:
   - Search forward/backward
   - Instant replay, pause, etc. on the
     live TV function

OK?

Is it a Source Input
problem?

Verify that the
software version is the
latest available.
Refer to 'Adjustments'
for readout
OK?

Update to latest
version. Software can
be downloaded at
Bang & Olufsen Retail
system under the
BeoWise section

Refer to Audio/Video
fault

Observe by listening
that the HDD sounds
normal
OK?

Replace HDD
(Check cables W11 &
W13 before replacing)

Refer to 'Adjustments'
when replacing

1 Record a short title
   (1-2 minute) from
   tuner
2 Play back the
   recorded title from
   HDD browser
OK?

Replace PCB02, Digital
Refer to 'Adjustments'
when replacing

1 Insert a DVD+RW disc
2 In 'HDD browser' select the recorded
   title and copy it to the recordable
   DVD
3 From the 'Disc Menu' select the
   copied title and check the following:
   - Edit (Disc/title) and Play

Verify that the
software version is the
latest available.
Refer to 'Adjustments'
for readout
OK?

Update to latest
version. Software can
be downloaded at
Bang & Olufsen Retail
system under the
BeoWise section

Is the copy function
OK?

Check the disc for dirt,
fingerprints and
scratches

Disc OK?

Replace the disc with
a new one and retry
with the same
procedure

Continue from
Manual/Timer
recording check

Replace
DVD Drive

Manual HDD
recording

Timer HDD
recording

No

Yes

Make a manual recording to the HDD
using different recording sources:
- Cam 1 and 2 (front)
- Tuner
- Rear EXT 1/2

From the HDD browser select the
recorded title and check the
following:
- Edit title feature
- Play the title

Make a Timer recording with:
- VPS/PDC on, and off
- Guide+ system (if available)
- Show View System
- Manual recording
Play back the recorded title from the
HDD browser

Is it a Source Input
problem?

Refer to Audio/Video
fault

Verify that the
software version is the
latest available.
Refer to 'Adjustments'
for readout
OK?

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing

Update to latest
version. Software can
be downloaded at
Bang & Olufsen Retail
system under the
BeoWise section

Audio Fault symptom:
No audio
Low audio quality
Audio drop out

Possible causes:
Defective PCB
Poor source/media
Cable/connection fault
Software fault

No

Yes

Check audio signal
path from tuner to
EXT1. Confirm sound
out at PCB01, Scart1,
pin1 and 3
OK?

Playback CD from
DVD drive

Sound OK?

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing
OK?

Is Tuner sound OK?

Replace PCB01,
Analog
Sound OK?

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing

Replace PCB01,
Analog

Confirm that there is
audio in both L/R
channel
OK?

Replace PCB01,
Analog

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing

Confirm that audio
quality is OK without
dropouts
OK?

Verify that the
software version is the
latest available.
Refer to 'Adjustments'
for readout
OK?

Update to latest
version. Software can
be downloaded at
Bang & Olufsen Retail
system under the
BeoWise section

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing

Replace PCB01,
Analog

See next page

From previous page

No

Yes

Playback a DVD title in 5.1 Dolby Digital and stereo
OK?

Verify that the software version is the latest available. Refer to 'Adjustments' for readout
OK?

Update to latest version. Software can be downloaded at Bang & Olufsen Retail system under the BeoWise section

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Replace PCB01, Analog

Record a title from Scart 1 or Scart 2. Confirm that sound is OK

OK?

Replace PCB01, Analog
Sound OK?

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Verify that there is no 'lipsync' error

OK?

Verify that the software version is the latest available. Refer to 'Adjustments' for readout
OK?

Update to latest version. Software can be downloaded at Bang & Olufsen Retail system under the BeoWise section

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Verify that audio is OK when using DV-input

OK?

Check IEEE cable, try with new one

OK?

Replace IEEE cable

Replace PCB02, Digital
Refer to 'Adjustments' when replacing

Video Fault symptom:
No picture
Bad picture quality (pixel error)
Picture drop out

Possible causes:
Defective PCB
Poor source/media
Cable fault
Software fault

No

Yes

Check video signal
path from tuner to
EXT 1. Confirm picture
out at PCB01, Scart 1,
pin 19
OK?

Play back DVD video
from DVD Drive

Sound OK?

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing
OK?

Replace PCB01,
Analog

Replace PCB01,
Analog
Sound OK?

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing

Confirm that video
quality is OK (no pixel
error) and without
dropouts
OK?

Verify that the
software version is the
latest available.
Refer to 'Adjustments'
for readout
OK?

Update to latest
version. Software can
be downloaded at
Bang & Olufsen Retail
system under the
BeoWise section

Confirm that video is
OK when using DV-
input

OK?

Check IEEE cable,
replace with new
cable

OK?

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing

Replace PCB01,
Analog

Playback DVD video
and confirm picture
quality is OK

OK?

Check the disc for dirt,
fingerprints and
scratches

Disc OK?

Replace PCB02,
Digital
Refer to 'Adjustments'
when replacing

Replace DVD Drive

Adjustments, software update, repair tips and final check after repair

Adjustments

Adjustments described

- Region Code
- Alignment of 'Slash information' (or slash version)
- Alignment of IEEE Unique number
- Alignment of 'Diversity String'
- Formatting of a new HDD

General

Important:
Adjustments/alignments are necessary when:

- HDD is replaced (formatting)
- PCB02, Digital is replaced
  (region code, slash information, IEEE Unique number and Diversity String must be set)
- AVL keyboard is replaced (AVL software update)

Necessary tools

- PC or laptop with 'HyperTerminal' installed (Windows component)
- Toshiba Flash Rom Writer (for AVL keyboard update)
- Service cable
- DVD Format disc for HDD
- Software disc (only for software update)

Region code

The region code is stored in PCB02, Digital. Region code setting in PCB02, Digital, determine the playability of region restricted discs.

Region code setting, by sending Beo4 or Beo5 commands, use the following procedure:

1. Disk tray closed and no disc.
2. Set DVD 2 to 'tuner mode' (press 'EXIT' or 'BACK' in any menu/browser).
3. Invoke HDD Browser. (Press 'GO' and '0'), place the cursor on 'Hard Disk'.
4. Press 'GO' wait for IR-indicator to flash and enter immediately
   159121212005 XXX then 'GO'.
5. There is no indication that the region code is changed, so the technician has to try if the change was succesful or not (using a commercial DVD with the desired region code).

   XXX table:
   001 = region code 1
   002 = region code 2
   003 = region code 3
   004 = region code 4
   005 = region code 5
   006 = region code 6

Region table

Region	Area	Countries
1	US, US territories and Canada	American Samoa, Canada, Guam, Palau, Mariana Islands, Marshall Islands, Puerto Rico, Micronesia, United States, U.S. Virgin Islands
2	UK, Europe, Japan, South Africa and Middle East	Albania, Andorra, Austria, Bahrain, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Egypt, Finland, France, Germany, Gibraltar, Greece, Greenland, Hungary, Iceland, Iran, Iraq, Ireland, Israel, Italy, Japan, Jordan, Kuwait, Lebanon, Liechtenstein, Luxembourg, Macedonia, Malta, Moldova, Monaco, Netherlands, Norway, Oman, Poland, Portugal, Qatar, Romania, San Marino, Saudi Arabia, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Syria, United Arab Emirates, United Kingdom, Vatican City, Yemen, Yugoslavia
3	Southeast and East Asia	Cambodia, Hong Kong, Indonesia, Laos, Malaysia, Myanmar, Phillipines, South Korea, Taiwan, Thailand, Vietnam
4	Australia, New Zealand, Central and South America	Antigua, Argentina, Aruba, Australia, Bahamas, Barbados, Barbuda, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Falkland Islands, French Guiana, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, New Guinea, New Zealand, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad, Tobago, Uruguay
5	Former Soviet Union, Indian sub-continent, Africa, North Korea and Mongolia	Afghanistan, Algeria, Angola, Bangladesh, Belarus, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Djibouti, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Gabon, Gambia, Georgia, Ghana, Guinea, Guinea-Bissau, India, Ivory Coast, Kazakhstan, Kenya, Latvia, Lesotho, Liberia, Libya, Lithuania, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mongolia, Morocco, Mozambique, Namibia, Niger, Nigeria, North Korea, Pakistan, Russia, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, Sri Lanka, St. Helena, Sudan, Tanzania, Togo, Tunisia, Turkmenistan, Uganda, Ukraine, Uzbekistan, Zambia, Zimbabwe
6	China	China

Alignment of front plate lid

In some cases it may be necessary to adjust the front plate lid to align the gap between the front plate lid and cabinet. If the front plate lid is out of alignment, it may result in the lid not closing correctly (the lid will not remain closed).

Adjustment can be performed at the front of DVD 2 by using a screwdriver. When the front plate lid is opened, a torx screw, in the squared hole on the left side of the black profile, will appear.
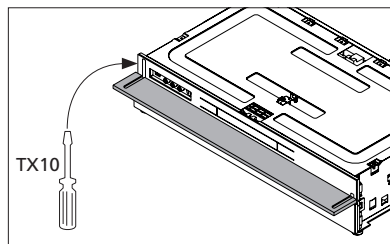
By turning the screw clockwise the front plate lid is aligned towards 'closed position'. Turning the screw counter-clockwise aligns the front plate lid towards 'opened position'.

Align the gap between the plates and the cabinet to 2 mm.
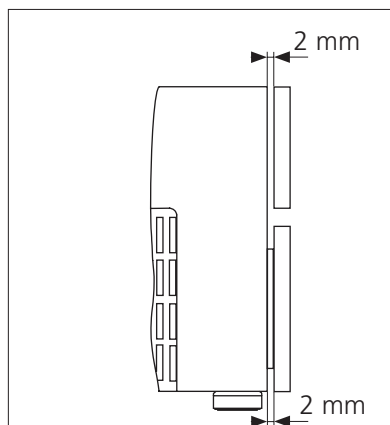
Alignment of 'Slash information' (or slash version)

When PCB02, Digital is replaced, it is necessary to align the slash version. The slash version is unique for DVD 2, and can be regarded as a initialization. The slash version for DVD 2 is 11221, and is stored in NVM (item 7809) on PCB02, Digital.

For alignment the following procedure must be followed:

1. Start HyperTerminal.
2. Connect DVD 2 (P1103) to a COM port (use USB/COM converter if no COM port is available).
3. Power on DVD 2 and confirm that 'Diagnostic info.' appears on screen.
4. Type in command promt line DS:> 1217 11221. Screen shows.

DS:> 1217 11221
121700:
Test OK @

The alignment can be confirmed by typing at promt DS:>1218, e.g.

DS:> 1218
121800: The slash version is = 11221
Test OK @

Alignment of 'IEEE unique number'

The IEEE unique number can be regarded as the serial number of the hardware (PCB02, Digital), and is placed in NVM (item 7809) on PCB02, Digital.
In case of failure PCB02, Digital is replaced by an empty device. After replacement of the NVM, DVD 2 can only startup in Diagnostic software mode because the Slash version is not in place.
By way of commands via the Diagnostic Software (DS) and hyperterminal connection to the PC, these factory settings must be restored in the NVM. The number is a 10-digit hexadecimal number.
In most cases it is possible to read out the IEEE unique number from the defective PCB02, Digital, and in that way easy to copy it into the replaced part.

For alignment follow this procedure:

1. Start HyperTerminal.
2. Connect DVD 2 (P1103) to a COM port (use USB/COM converter if no COM port is available).
3. Power on DVD 2 and confirm that 'Diagnostic info.' appears on screen.
4. Type in command promt line DS:> 1207 [IEEE number].
    Example of the screen information:
    DS:> 1207 3E5CE929C4
    120700:
    Test OK @

DVD 2 now has its original IEEE unique number

The alignment can be confirmed by typing in the command promt line DS:>1208
Example of the screen information:
DS:> 1208
120800: The DvIdNumber is: 3E5CE929C4
Test OK @

In case of failure on PCB02, Digital, if the NVM and CHRYSALIS (item 7400) are damaged, it is not possible to read out the IEEE unique number.
In that case, the IEEE number must be calculated by means of a formula and of the 'internal' serial number. This 'internal' serial number (Prod. No.) contains 14 characters and is located at the bottom of DVD 2 (not at the 'bottom plate', this must be removed first). Location illustrated below:
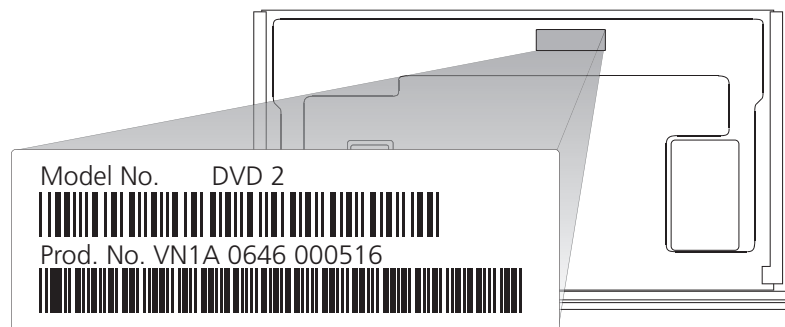
The calculation has to be done in two sections. Section 1: for the first 5-digit hexadecimal number and section 2: for the last 5-digit hexadecimal number. The procedure is described below.

Note the serial number of DVD 2, e.g. **VN1A 0646 000516**
VN = Production center
1A = Change code (this is not used
          for the calculation)
06 = Production year
46 = Production week
000516 = Lot and serial number

Definition: L1 = **V** (the first letter in production center code)
              L2 = **N** (the second letter in production center code)
L1 and L2 are numerically defined by alphabetical order, which means L1 (**V**) becomes the numeric value 22 (because 'V' is the 22th letter in the alphabet), and L2 (**N**) becomes the numeric value 14.

Section1
To calculate the first 5-digit hexadecimal number this formula has to be used:
(35828 x production year) + (676 x production week) + (26 x L1) + L2 + 8788

In this case (example) :
(35828 x 6) + (676 x 46) + (26 x 22) + 14 + 8788 = 255.438

Now this value (decimal number) has to be translated to a hexadecimal number.
Example: 255438 (decimal) = 3E5CE (hex) (use e.g Windows calculator as 'translator').

Section 2
The last 5 numbers exist out of the lot and serial number. This value (decimal number) has to be translated to a hexadecimal number. In case the lot and serial number starts with 0....., the previous digit (to the left - in this case 6) are imported.
Example: 000516 => 600516 (decimal) = 929C4 (hex)

Bottom line, the 10-digit IEEE unique number, in this case, will be = **3E5CE929C4**

Alignment of 'Diversity String'

The boot EEPROM, item 7810 on PCB02, Digital contains the "Diversity String". During startup, the "Diversity String" tells the software, which hardware version is present. This setting is stored during the production of PCB02, Digital.
In case of failure and when PCB02, Digital has been replaced, it is adviseable to ensure that the EEPROM contain the correct boot script.
With DS command: 1229, the settings can be displayed.

Note
An error in the diversity string will render DVD 2 unable to boot-up and PCB02, Digital becomes defective

Via the Dignostic Software, the "Diversity String" is stored with the command 1226, followed by the "Diversity String" as parameter.

The diversity string (128 digits) used in BHDR2/02 is as follows:
4442484969254001463035F390000007104030000010102000101004008080
0445644523230303 12E31303801020208080000000100020100000000000000
00

Example:
DS:> 1226 4442484969254001463035F39000000710403000001010200010
10040080800445644523230303 12E31303801020208080000000100020100000
00000000000
Test OK @

Formatting a new HDD

In case of failure the HDD is replaced by a new unformatted HDD. To prepare the new HDD for use, it must be formatted with a 'Master Format DVD' via the Diagnostic Software nucleus 2107. To carry out formatting follow this procedure:

1. Start HyperTerminal.
2. Connect DVD 2 (P1103) to a COM port (use USB/COM converter if no COM port is available).
3. Power on DVD 2 and confirm that 'Diagnostic info.' appears on screen.
4. Type in command promt line DS:> 2107.
5. Screen shows: Please insert the Master DVD. When this is done, push carefully the tray of the DVD drive. The process is completed when the screen shows:

   DS:> 2107
   Please insert the Master DVD <OK>
   Executing transfer table 1 of 4.........
   Please wait... <OK>
   210700: Transfer OK
   Test OK @

   Example of media error could be:
   DS:> 2107
   Please insert the Master DVD
   210704: Invalid medium, no DVD is inserted
   Error @

Creating a 'Master Format DVD'

Use same procedure as 'Creating a Software Upgrade Disc' see page 4.10. The file for this procedure is ' MasterDVD_BHDR.zip' (unzipped = MasterDVD_BnO.nrg)
Important: The media for this burning is not a CD-R but instead a DVD-R.

Software update

Software section described

- Software version read out.
- The software modules for DVD 2.
- Software upgrade procedure for PCB02, Digital.
- Software upgrade procedure for PCB14, Keyboard (AVL).

Software version read out

How to read out the firmware version, to confirm DVD 2
- has the latest version or
- has been upgraded succesfully

Follow the procedure below:
- Power up DVD 2
- On Beo4, press:
- **MENU GO** (for V.Mem MENU)
- **1** (for 'System' menu)
- ▼ ▼ (to goto 'Setup')
- ▶ (to enter 'Setup')
- ▶ (to clear Time Shift Buffer)
- ▼ ▼ (to goto 'Display')
- **0** (to enable 'Version info')
- ▼ ▼ ▼ (to goto 'Version info')
- **GO GO** (to send OK command)
- The TV connected to DVD 2 will display:

(C) Bang & Olufsen 2006
Version information:
DIF05_9/7145 AN SV 11221
BE 51.05.02.12 ASP 1,18 ,1,10 FP
BnO_705_6A
20070129_1830 pro sxc
EPG:4.01 AVL Ver:1.18

- Press <EXIT> button to exit

The software modules for DVD 2
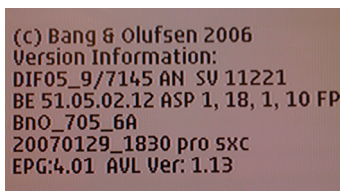
The software modules for DVD 2 are described below:

Software module	Description	Upgrade method
DIF05_9/7145 AN	Digital board version	Not possible
SV 11221	Slash version	Can be modified in DS
BE 51.05.02.12	DVD Drive version	Via Software Download Disc
ASP 1,18	Analog Slave Processor(ASP)	Not possible
1,10 FP	Vaccum Fluoreescent Display(VFD)	Not possible
BnO_705_6A	Recorder Application	Via Software Download Disc
20070129_1830 pro sxc	Diagnostic application (incl. boot, download)	Via Software Download Disc
EPG:4.01	EPG library version	Via Software Download Disc
AVL Ver:1.18	AVL micro-controller	Via 'Hitachi Flash Rom Writer'

Software upgrade procedure for PCB02, Digital

Information

A vital part of the DVD 2 is advanced software platforms. Therefore, it is very important that the product always contains the latest software version on all platforms, before it is returned to customer.

Even though DVD 2 is highly tested according to the software section, it might be possible in the future, that a better software will be developed for handling strange unexpected faults to a certain situation. Because of that it might be necessary to perform a software update to solve the problem.

The software upgrade disc is included in a Back-up suitcase, otherwise it can be downloaded from the Bang & Olufsens Retail System under the 'BeoWise' section.

Requirement

-    Software disc only.

Creating a software upgrade disc

Requirement: Nero Burning Rom (6 or higher) and a PC/Laptop with CD-R/DVD-R drive.

Use following procedure to burn a software disc:

-    Download software file 'BnO_xxx_xx.zip' from the Bang & Olufsens Retail System under the 'BeoWise' section, and unzip the file to a known location ('BnO_xxx_ xx.nrg' image file is created).
-    Double click the *.nrg file (Nero automatically opens an 'Image Burn Compilation'.
-    Insert a blank CD-R disc and make sure that following settings are set:
-    Write speed : 8 x (1200 KB/s) or lower.
-    Write method : Disc-at-once.
-    Click 'Burn' and wait for process to end.

Software upgrade procedure

Software upgrade procedure for PCB02, Digital:

-    Disconnect DVD 2 from mains.
-    Open the 'Front Lid' (IMPORTANT!).
-    Push the button S1+S4 (located on the back of DVD 2) while connecting to mains. Release the buttons after 3 sec.
-    The display shows following:
     'DOWNLOAD'
     'FORCED DL'
     'OPENING'
     'INSERT DISC' (the user now has approx. 10 sec. to place the software upgrade disc before the tray closes automatically).
     'CLOSING'   <u>WARNING</u>: Do not disconnect from mains when updating

The update is finished when the disc is ejected, and 'REMOVE DISC' appears in the display. Close the tray and confirm that 'DONE' appears in display.

If all software platforms are up-to-date, the message 'SYS OK' appears in the display followed by 'DONE', and the system goes into Standby.

Software upgrade procedure for PCB14, Keyboard (AVL)

Information

DVD 2 contains AVL (Audio Video Link - converts B&O IR commands to Philips IR command) which is placed on PCB14, Keyboard. If new features are developed in the future, it might be necessary to update the AVL. For this purpose a service plug P1104 is placed on PCB14, Keyboard.

To transfer the updated data, a special software tool 'Hitachi Flash Rom Writer must be used. This tool can be downloaded from the Bang & Olufsens Retail System under, the 'BeoWise' section.

Requirements

- Laptop or PC.
- Hitachi Flash Rom Writer
- xxx.s32 format file to be flashed into AVL.
- Service cable (Order part no. 6278222).

Software upgrade procedure

Open the programmer software by double clicking on the programmer software application file "FW.exe".

FW.EXE

Programmer window appears on the screen, as illustrated below:
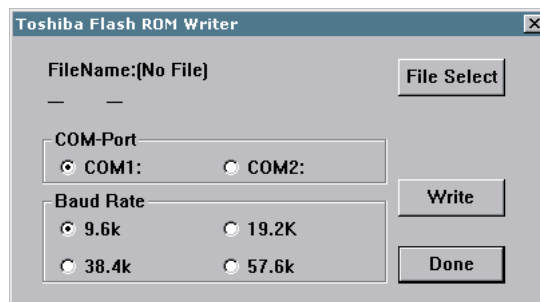
- Click 'File Select'.
- Change 'Files of type' to 'SFile(*.sxx)'.
- Browse to the location where the 'BnOAVL-vx.x_xxxx.s32' file is placed and click 'open' to select it.

Now the programmer should look like this:
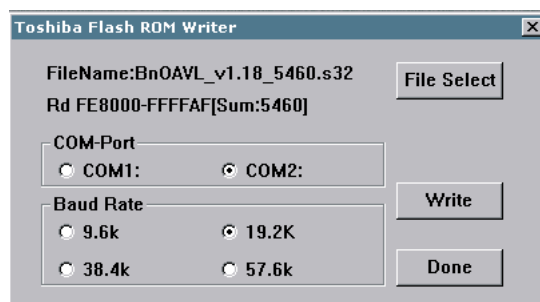
- Select the COM port (use USB/COM converter if no COM port is available).
- Select Baud Rate 19.2K (recommended).
- Disconnect DVD 2 from the mains.
- Connect the diagnostic cable from the PC to the UART connector (P1104) on PCB14, Keyboard (AVL).
- Power up DVD 2 and wait 5 sec. before continuing.
- Click 'Write'.

NOTE!
When you click 'Write', it starts reading and then starts writing. When the writing procedure is finished, a 'check sum value' is displayed. Compare this 'check sum value' with the last four characters in the filename before .s32 (in this case = 5460). Checksum value for both should be the same, this indicates successful programming.

Compare

Toshiba Flash ROM Writer

FileName:BnOAVL_v1.18 5460.s32
Rd FE8000-FFFFAF[Sum 5460]

File Select

COM-Port
○ COM1:   ● COM2:

Baud Rate
○ 9.6k   ● 19.2K

○ 38.4k   ○ 57.6k

Write

Done
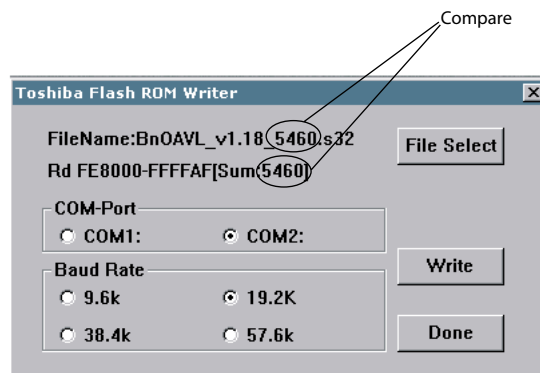
- Disconnect DVD 2 from mains and remove Service Cable.
- Reboot the recorder.

Confirm the software version by using the 'Software version read out' procedure described on page 4.9.

Repair tips

Description of buttons placed on back panel

Because of the reduced number of buttons on DVD 2, only 1 button for the user (disc tray open/close), there are six recessed buttons on the back of DVD 2. The function for each button are described from left to right:

S1 Open / Close
S2 Next
S3 Standby
S4 Record
S5 Stop
S6 Play

In that way, additional functions are available for service.

Built-in Service Modes

DVD 2 has several 'Built-in Service Modes' which gives new service possibilities. These are 'Diagnostic test' or other 'service tests' and are activated by pressing 1 or 2 buttons while connecting to the mains. The buttons are mapped as follows from left to right: S1 to S6:

Mode no.	Service Mode	Keys	Comments
1	End-user / Dealer Diagnostic	S6	
2	Player Diagnostics	S1 & S6	Only with the service cable connected
3	Player Diagnostics	S2 & S6	Only with the service cable connected
4	Forced Download	S1 & S4	The same as no. 5
5	Forced Download	S2 & S4	The same as no. 4
6	Trade Mode (Toggle function)	S1 & S5	Local key disabled. Only control by RC
7	Virgin Mode*	S3	Reset DVD 2 to Virgin Mode

* 'Virgin Mode' is the state the recorder is in from the manufacturer (no setup has been performed).

'End User / Dealer script'

The 'End User / Dealer script' test is further described at page 2.6 and can also be activated by use of the Diagnostic Software (DS), and typing, 'script' in command promt line.

Final check after repair

The final check after repair, describes the activities that are needed to ensure the product will be returned in perfect condition to the customer.

Insulation test

Each product must be insulation tested after having been dismantled. Make the test when the product has been reassembled and is ready to be returned to the customer.
Flashovers must not occur during the testing procedure!

Make the insulation test as follows:
Short-circuit the two pins of the mains plug and connect them to one of the terminals of the insulation tester. Connect the other terminal to ground on the aerial socket.

NOTE!
To avoid damaging the product, it is essential that both terminals of the insulation tester have good contact.

Slowly turn the voltage control of the insulation tester until a voltage of 2.5 kV AC and max. 10mA is obtained.
Maintain that voltage for one second, then slowly turn it down to 0 V AC again.

Customer setup

Remember to inform the customer of any changes that have been made in the user setup, due to procedures in the Service Manual, such as Connections, Sound, Picture, etc.
Restore the product to the customer setup.

Check all sources are working correctly

- Check that picture and sound from all sources are working correctly.
- Check that HDD browser is working correctly.

Product cleaning

Never user alcohol or other solvents to clean any part of the product.
Use a soft, lint-free cloth to clean the surfaces of the product.

Cabinet surfaces

Wipe dust off the surfaces using a dry, soft cloth. Remove grease stains or persistent dirt with a soft, lint-free, firmly wrung cloth, dipped in a solution of water containing only a few drops of mild detergent, such as washing-up liquid.

Dealer script

The 'End User/Dealer script interface' gives a diagnosis on the DVD 2.
In this mode, a number of hardware tests (nuclei) are automatically executed to check if the recorder is faulty. The diagnosis is simply a "FAIL" or "PASS" message. If the message "FAIL" appears on the display, there is apparently a failure in the recorder. If the message "PASS" appears, the nuclei in this mode have been executed successfully. There can be still a failure in the recorder because the nuclei in this mode do not cover the complete functionality of the recorder.

Before the product is returned to customer this 'End User/Dealer script' test must be executed to ensure correct functionality of the recorder. If the test fails, continue to the fault flow chart to locate the error.
This test can be executed by:

1. Typing 'script' at the command promt line by using the diagnostic software (see section 'Fault flow chart' for further information).
2. Pressing button 'S6' on back panel when connecting to mains.

Software check

A vital part of the DVD 2 is advanced software platforms. Therefore, it is very important that the product always contains the latest software version on all platforms, before it is returned to customer. For further information please refer to 'Ajustments'. Software can be downloaded from the Bang & Olufsen Retail System under the 'BeoWise' section.

Region code (when replacing PCB02, Digital)

When PCB02, Digital is replaced, it is necessary to confirm that the region code is correct. When installing a new PCB02, Digital, it is always set for the region code 2 (preset). Therefore, it is important to set the region code to the area you want. It is not possible to read out the setting and there is no indication when the region code is changed. The test must be done by playing back a restricted region coded disc.

Check 'IEEE unique number'

It is very important '**IEEE unique number' is correct.** The read out can easily be done by typing at promt DS:>1218, e.g.

DS:> 1218
121800: The slash version is = 11221
Test OK @

'**IEEE unique number' must be 11221**

Check 'Diversity String'

It is very important that the 'Diversity String' is correct.

Note
An error in the Diversity string will render DVD 2 unable to boot-up, and PCB02, Digital becomes defective.

With DS command 1229 the settings can easily be displayed.

The Diversity string (128 digits) used in BHDR2/02 is as follows:
44424849692540014630355F39000000710403000001010200010100400808 0044564452323030312E31303801020208080000000100020100000000000000 00

Replacement of modules

Modules that can be replaced

Warning – Disconnect mains and wait 30 seconds before dismantling

The PCB04, Power Supply and the local power supplies on the different boards must be discharged before dismantling. This is done by disconnecting mains, and then waiting 30 seconds before replacing any modules.

Warning – Static electricity
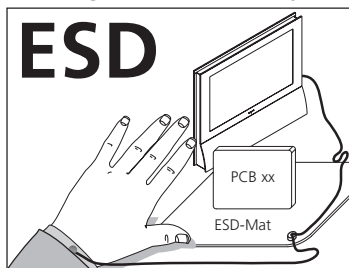
Static electricity may damage the product.
A static-protective field service kit must always be used when the product is disassembled or modules are being handled.

Notice!

All modules must be placed on the ESD-mat or in an ESD-proof bag.

Purpose of replacement of modules

Short instructions for replacement of the available modules, with reference to additional illustrations:
- The correct sequence for replacing modules.
- Text and illustrations.
- Reference to adjustment.
  Modules that do not require any special procedure may be shown as only illustrations.

After replacement of modules

After replacing a module, connect ServiceTool and flash update the product. This should be done to make sure that the new hardware is updated with the latest software.

- Remove all cables

- Remove screws

4x
TX10
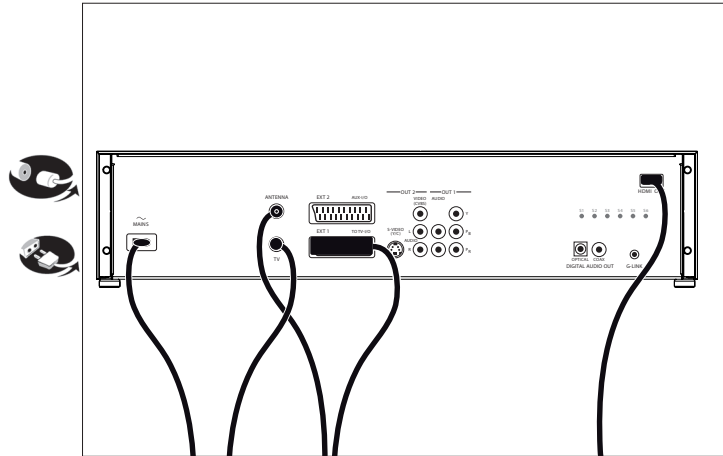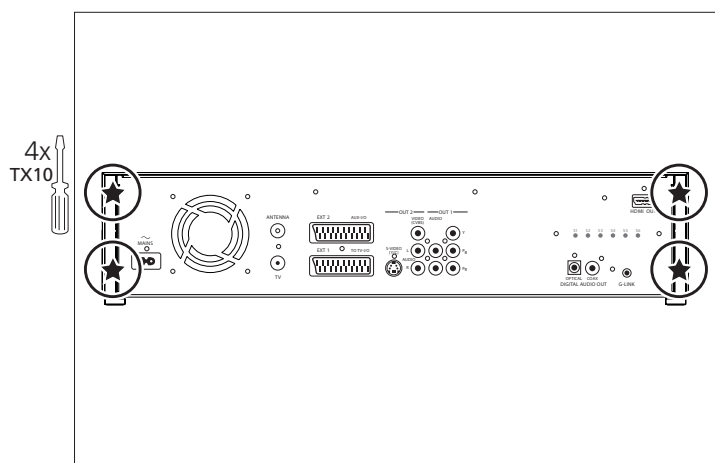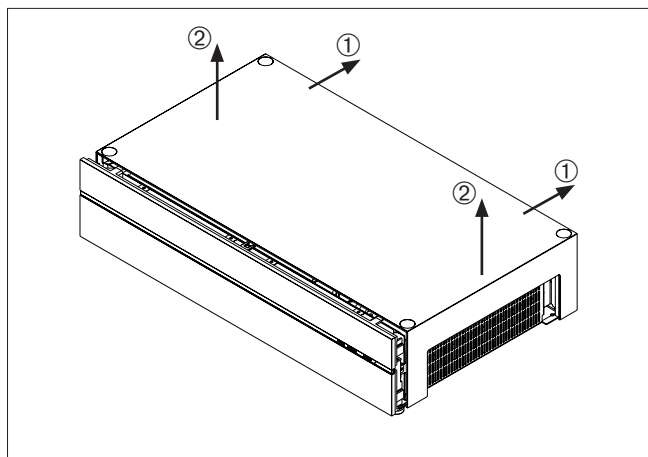
- Remove top cover

- Remove screws for top plate

6x
TX10
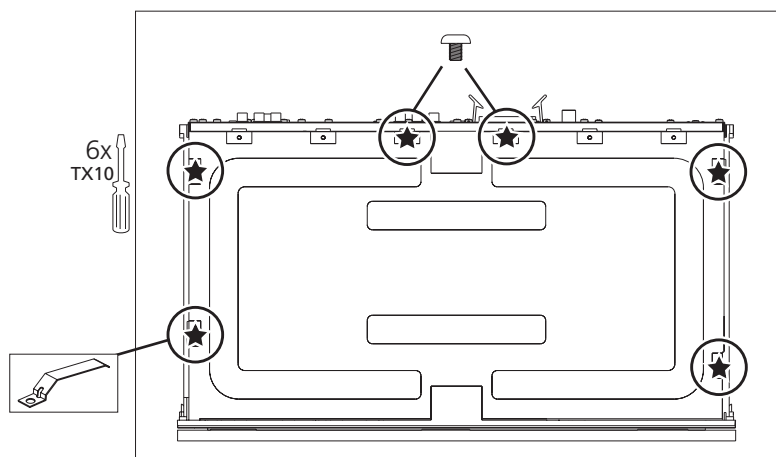
☞ 5.2 Remove top cover

- Gently pull off front plate lid
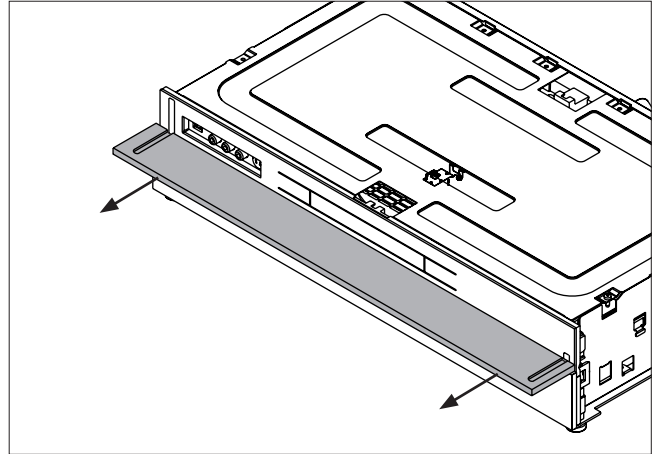
- Release snaplock to remove front plate
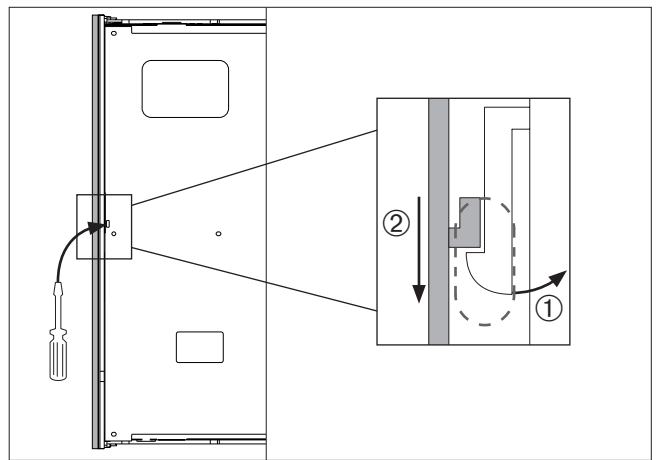
- Remove front feet and middle screw

2x
TX10

1x
TX8
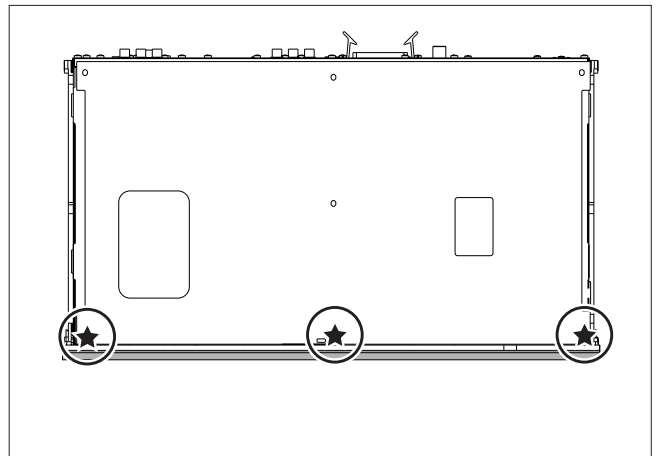
- Remove loader front
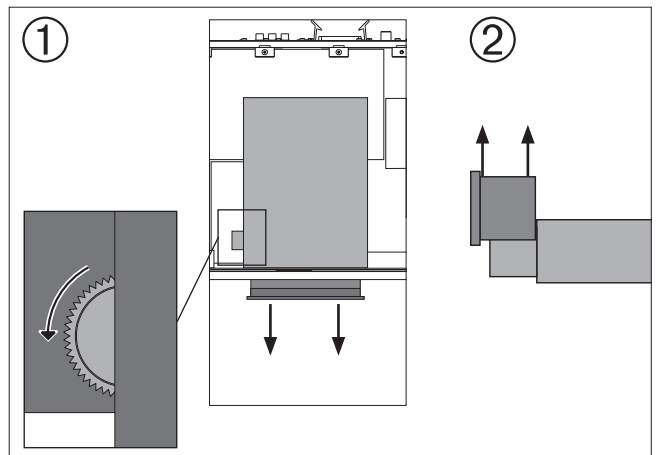
- Remove screws holding 95 Module, DVD Drive

4x
TX10
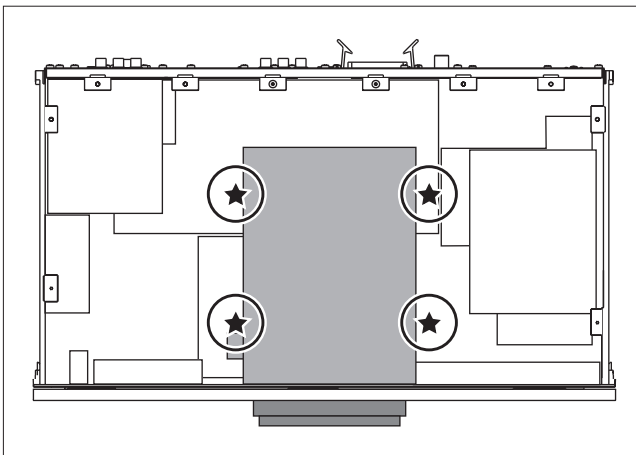
- Remove 95 Module, DVD Drive
  and remove screws shown

2x
TX10
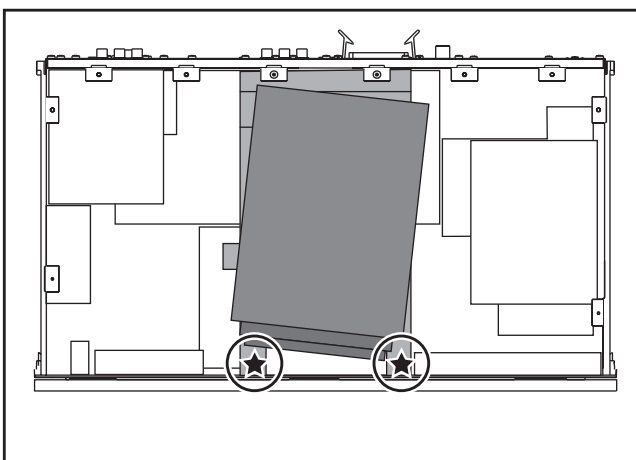
- Remove screws on front

6x
TX10
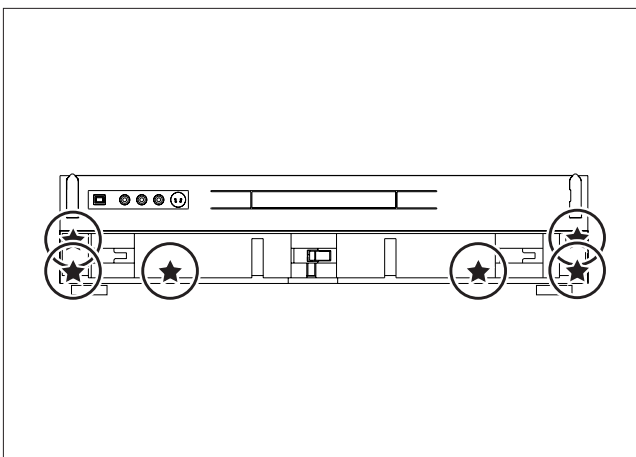
- Release snaplocks and gently pull off front
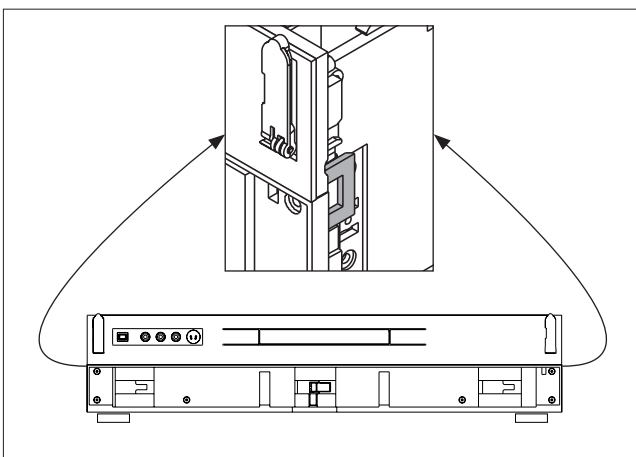
☞ 5.2 Remove top cover
☞ 5.3 Remove DVD 2 front

- Remove screws for bracket
  and pull off bracket

2x
TX10

- Remove screws on back of DVD 2

10x
TX10

- Remove screws

3x
TX10
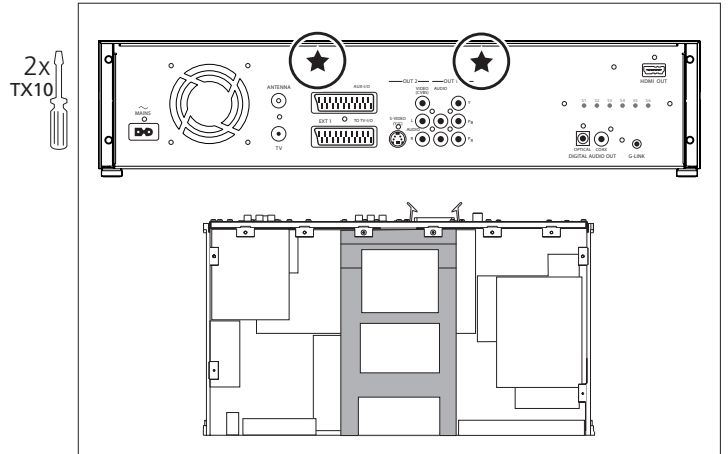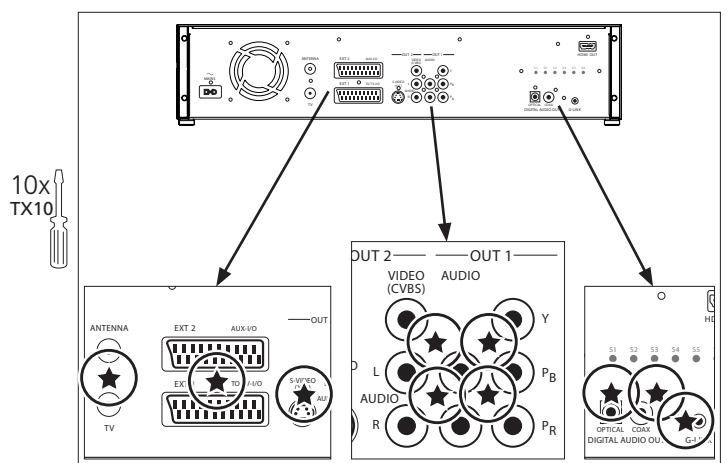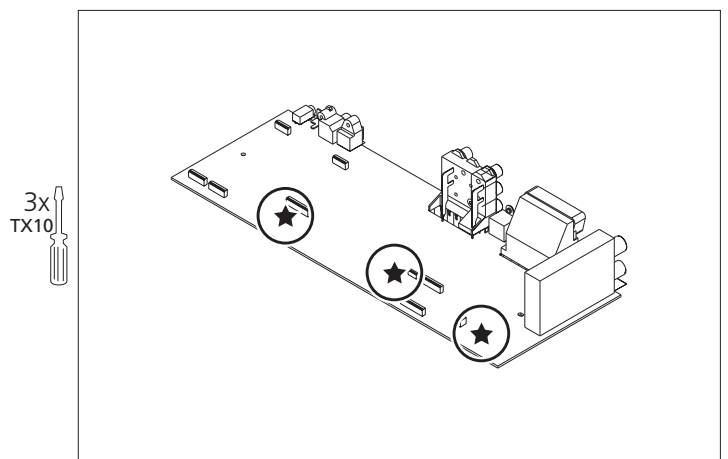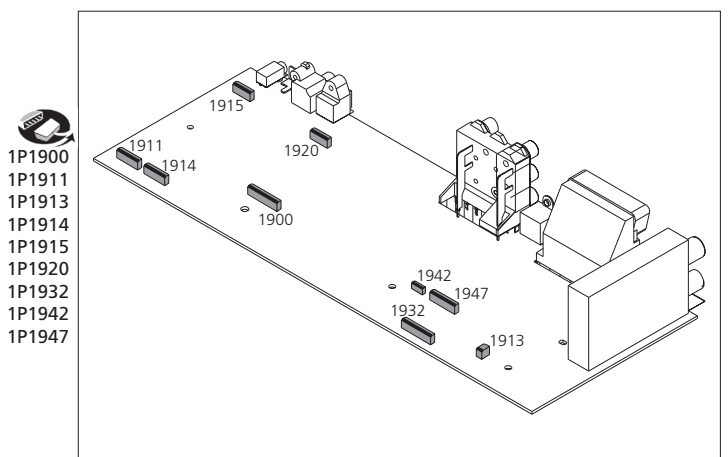
- Remove cables

1P1900
1P1911
1P1913
1P1914
1P1915
1P1920
1P1932
1P1942
1P1947

1915
1911
1914
1920
1900
1942
1947
1932
1913

☞ 5.2 Remove top cover
☞ 5.3 Remove DVD 2 front

- Remove screws for bracket
  and pull off bracket

2x
TX10

- Remove cables

2P1004
2P1101
2P1102
2P1104
2P1203
2P1900
2P1904

1904
1104
1900
1004
1203
1102
1101

- Remove screws

4x
TX10
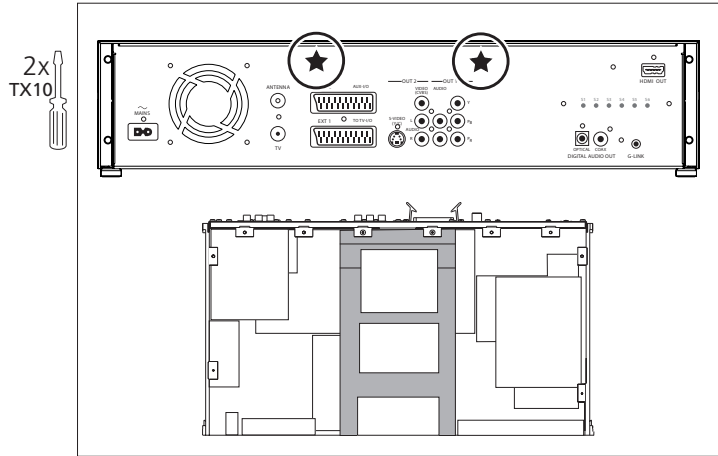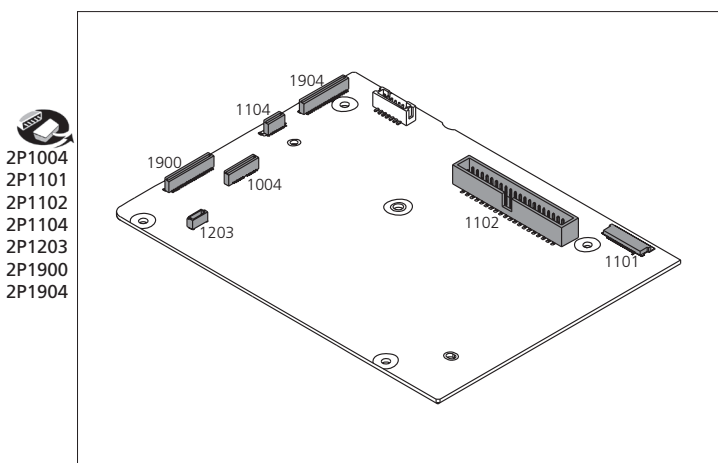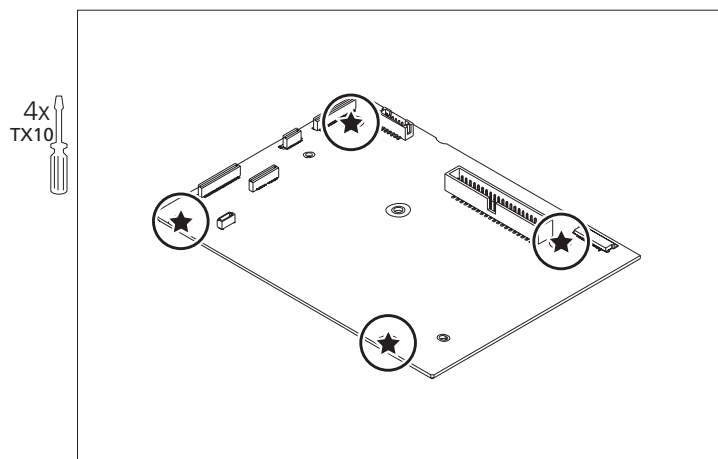
☞ 5.2 Remove top cover
☞ 5.3 Remove DVD 2 front

- Remove screws

2x
TX10
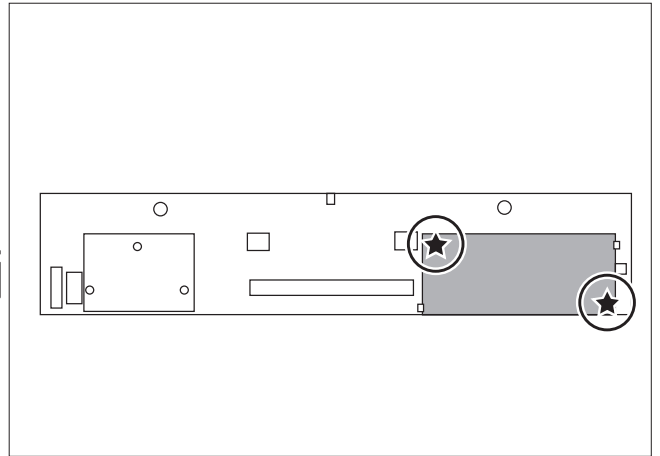
- Release snaplocks
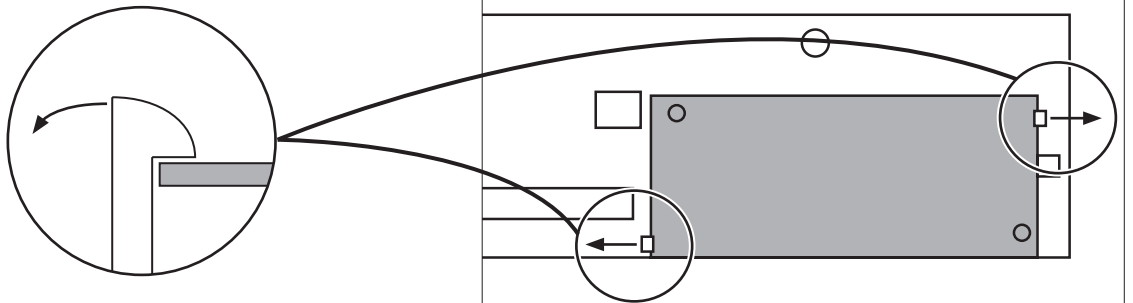
- Remove cable

3P9101
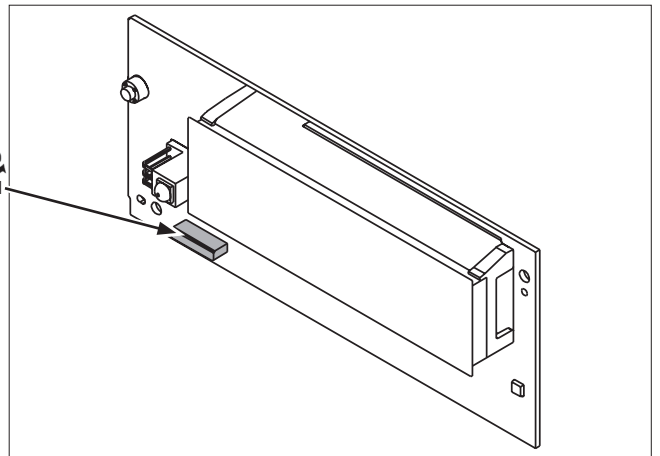
☞ 5.2 Remove top cover
☞ 5.12 Remove 94 Module, Harddrive (HDD)

- Remove screw on back of DVD 2

1x
TX10

ANTENNA

TV

- Remove cables

J2

J1

J4

J5

- Remove screws

3x
TX10
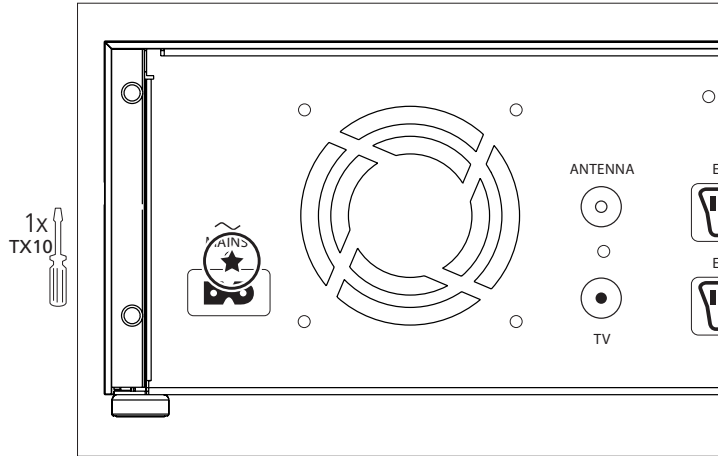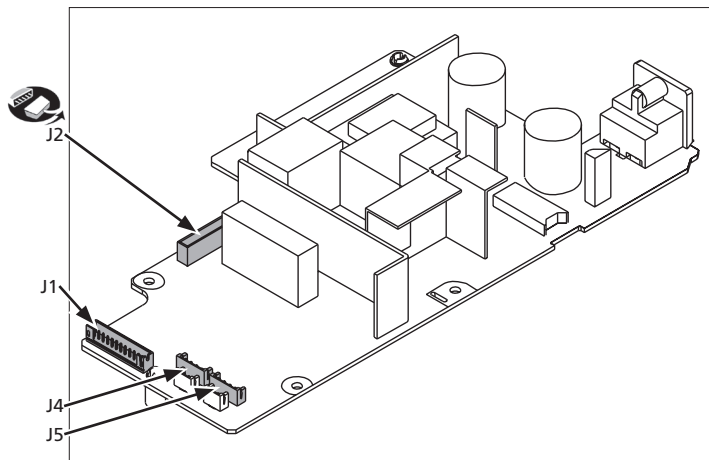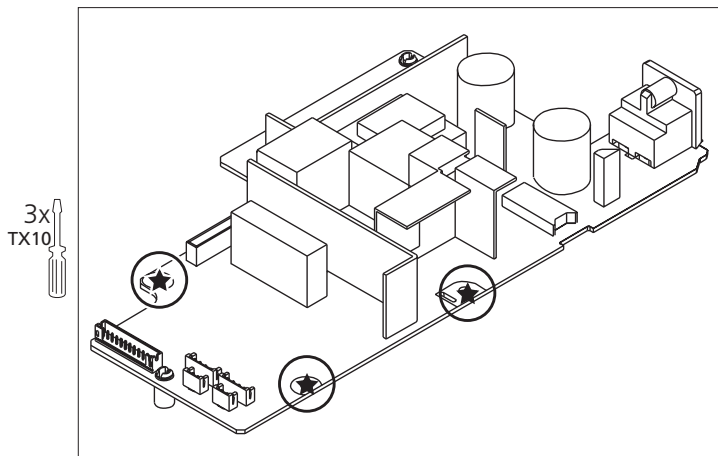
☞ 5.2 Remove top cover
☞ 5.3 Remove DVD 2 front

- Remove screws

3x
TX10
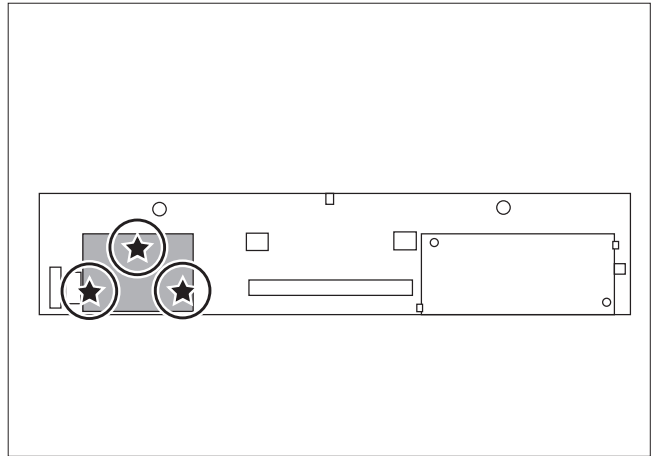
- Remove cable

5P1922
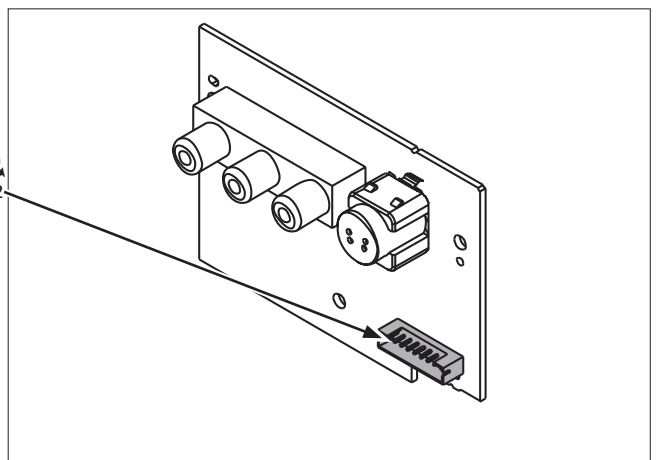
☞ 5.2 Remove top cover

- Remove screws on back of DVD 2

2x
TX10

★

★
HDMI OUT

S1 S2 S3 S4 S5 S6

OPTICAL COAX
DIGITAL AUDIO OUT   G-LINK

- Remove cable

10P1911
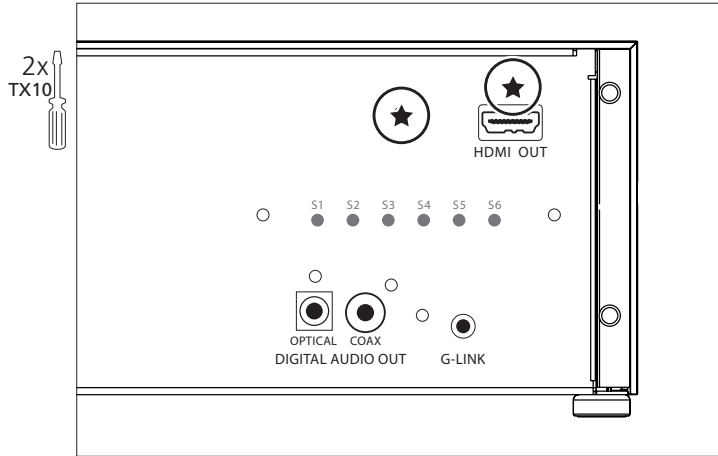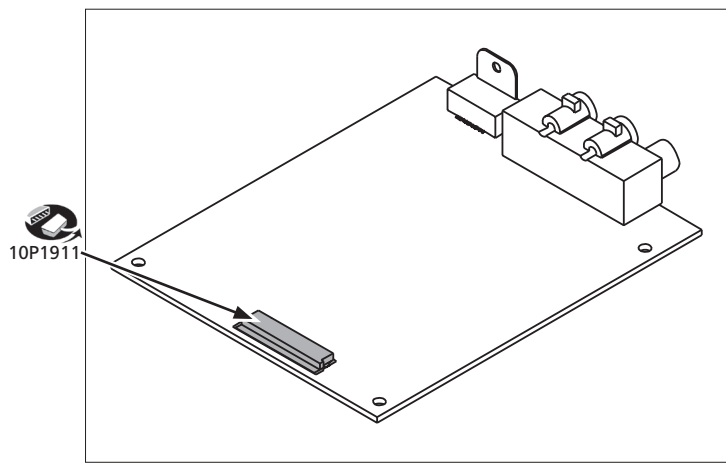
- Remove screw and pull off PCB10, HDMI

1x
TX10

★
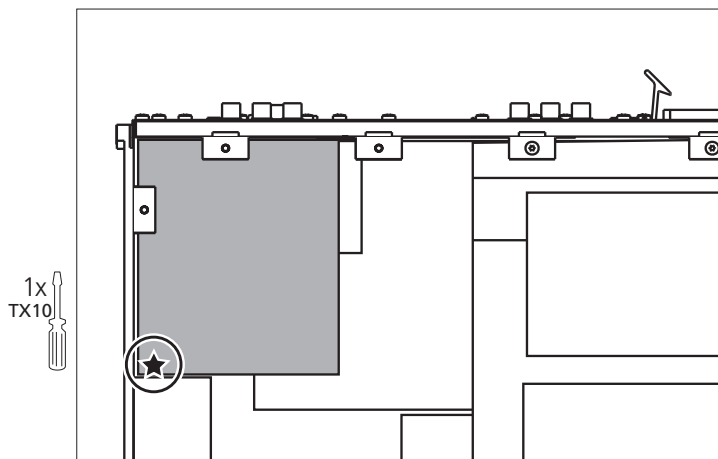
☞ 5.2 Remove top cover
☞ 5.10 Remove PCB10, HDMI

- Remove cables from PCB14, Keyboard (AVL)

14P1100
14P1101
14P1102
14P1103

1102
1100
1101
1103

- Remove screws on back of DVD 2

2x
TX10

HDMI OUT

S1   S2   S3   S4   S5   S6

OPTICAL   COAX
DIGITAL AUDIO OUT   G-LINK
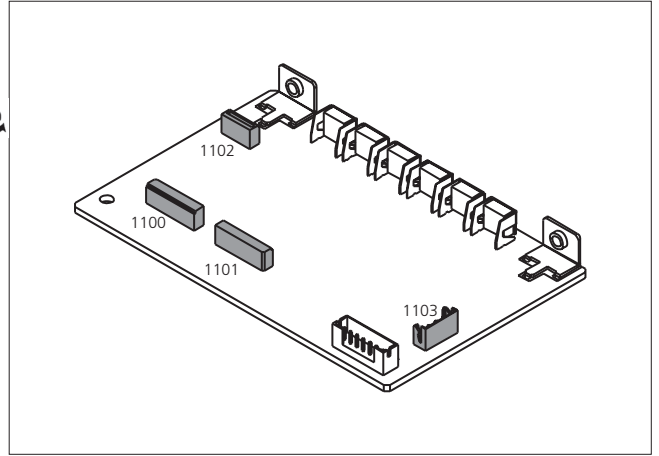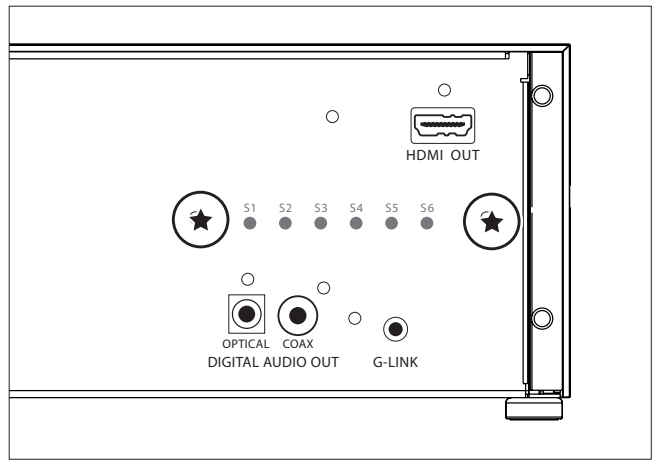
- Remove screw and pull off PCB14, Keyboard (AVL)

1x
TX10
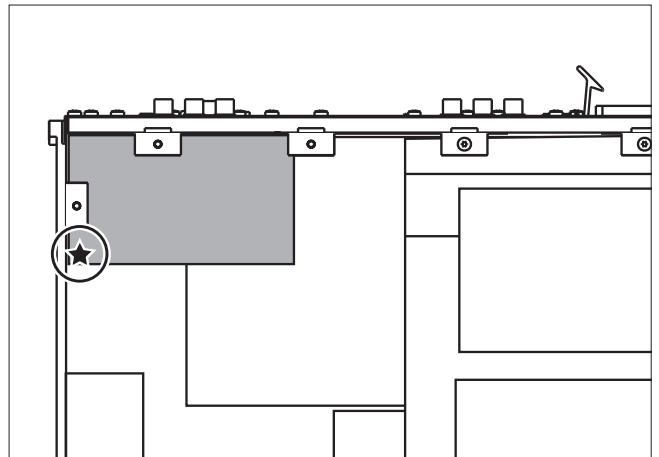
☞ 5.2 Remove top cover

- Remove screws

3x
TX10
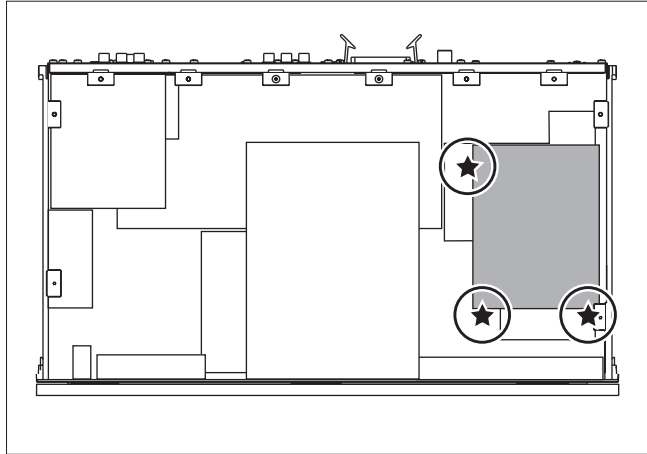
- Remove cables from 94 Module, Harddrive (HDD)

IDE
Power
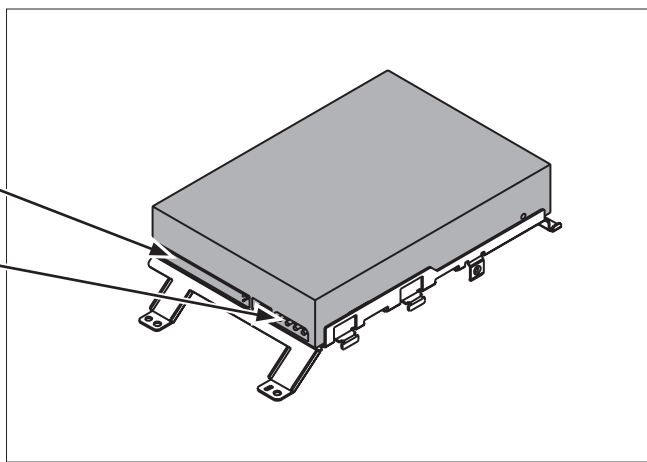
- Pull out 94 Module, Harddrive (HDD)

!
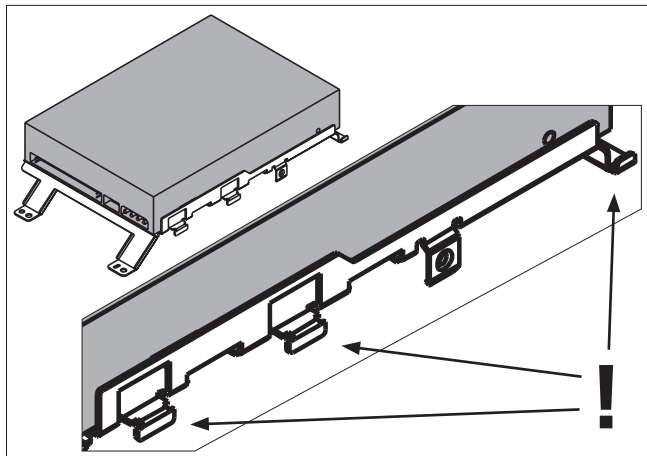
- Remove brackets from 94 Module, Harddrive (HDD)
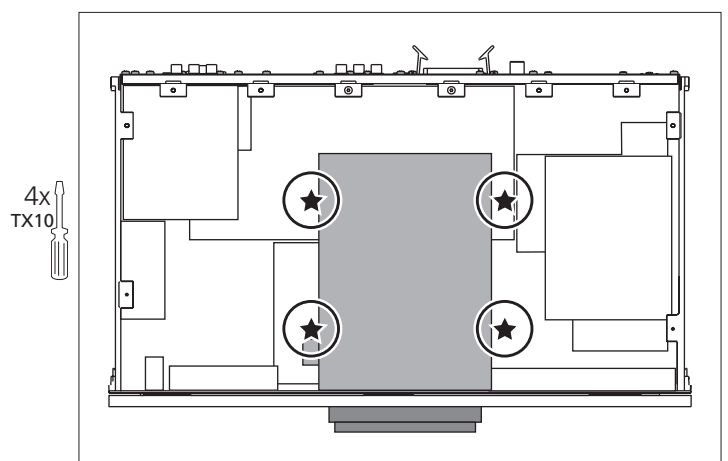
4x
TX10
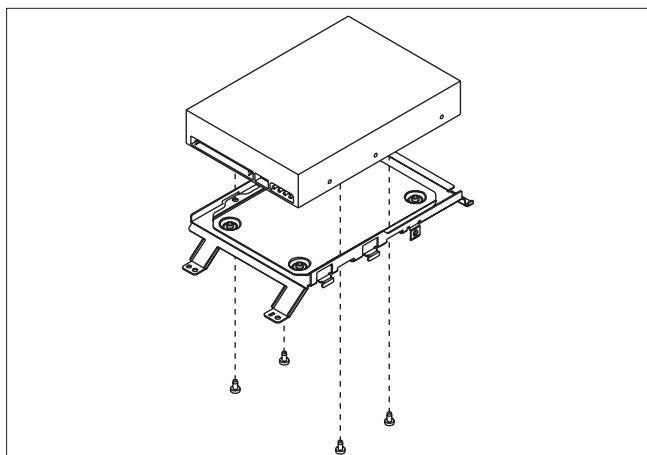
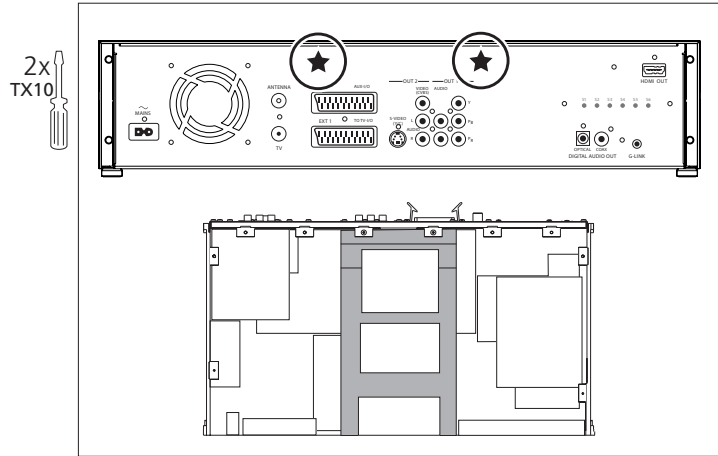☞ 5.2 Remove cover

- Remove loader front
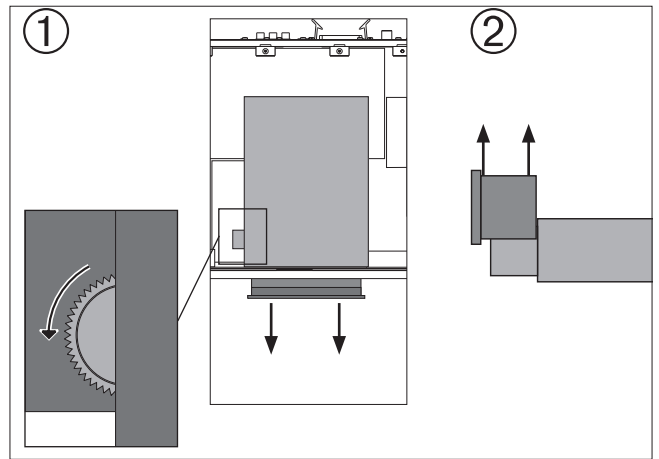
- Remove cables from 95 Module, DVD Drive
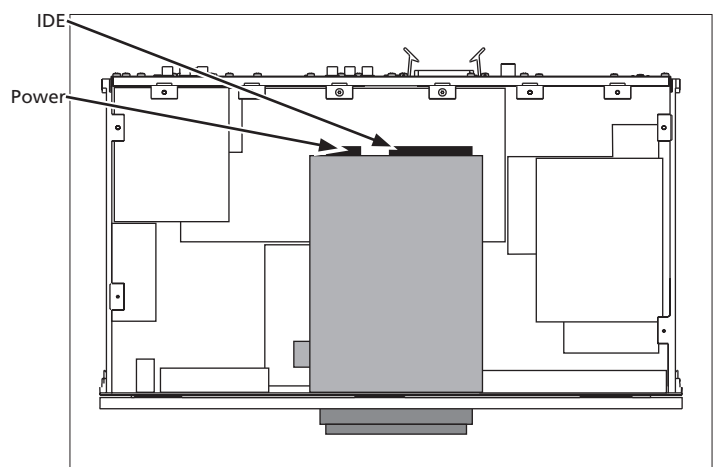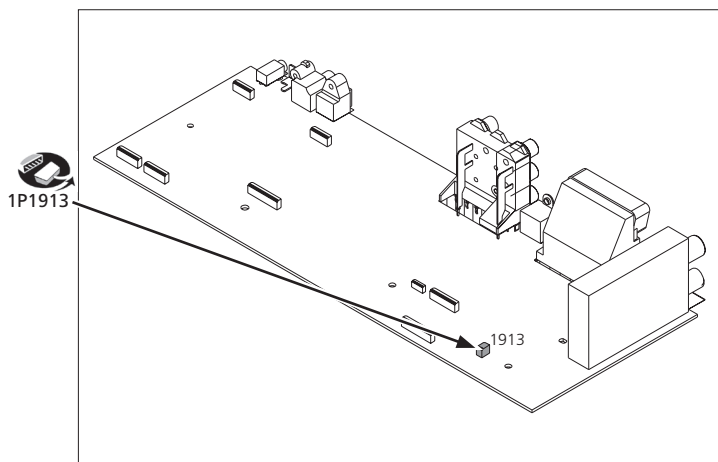
IDE

Power

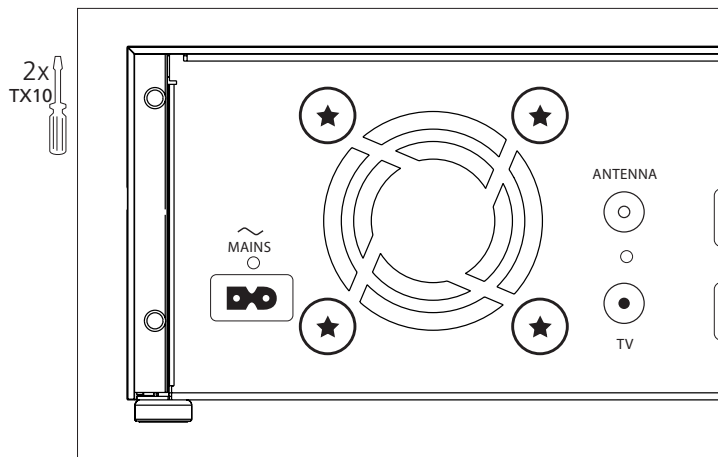- Remove screws holding 95 Module, DVD Drive

4x
TX10

☞ 5.2 Remove top cover
☞ 5.3 Remove DVD 2 front

- Remove screws for bracket
  and pull off bracket

2x
TX10

- Remove cable

1P1913

1913

- Remove screws on back of DVD 2 and pull off Fan

2x
TX10

ANTENNA

MAINS

TV

| SPECIFICATION GUIDELINES FOR SERVICE USE	DVD 2
Type	4629
Market	Australia, Austria, Azerbaijan, Bahrain, Belgium, Botswana, Bulgaria, China, Croatia, Czech Repub., Denmark, Dubai, Egypt, Estonia, Faroe Islands, Finland, France, Georgia, Germany, Ghana, Greece, Greenland, Holland, Hong Kong, Hungary, Ireland, Iceland, India, Indonesia, Israel, Italy, Kazakhstan, Kuwait, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malaysia, Morocco, New Zealand, Nigeria, Norway, Oman, Panama, Pakistan, Peru, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovak Rep., Slovenia, South Africa, Spain, Switzerland, Sweden, Thailand, Turkey, Ukraine, United Arab Emirates, United Kingdom, Uzbekistan
CTV system	PAL B/G, PAL D/K, SECAM L/L', PAL I
Cabinet finish	Aluminium/black
Remote control via BeoVision	Beo4, Beo5 (recommended)
Video	Colour decoder
Record	PAL
	DVD Format: DVD±RW, DVD±R, DVD±R DL
Playback	NTSC, PAL
	DVD Format: DVD±RW, DVD±R, DVD±R DL, DVD Video, CD, VCD/ SVCD, CD-R,CD-RW, JPEG/MP3 (CD)
Disc sizes	12 cm, 8 cm
Tuner	PAL B/G, PAL D/K, SECAM L/L', PAL I
Frequency range	45.25 MHz – 857 MHz (PLL tuning with AFC for optimum reception)
Tunings possibilities	Automatic Search Tuning
Resolution	62.5 kHz
Stop level (vision carrier)	≥ 37 dB/µV
Tuning Principle	Automatic B, G, I, DK and L/L' detection, manual selection in 'STORE' mode
RF - Loop Through	
Frequency range	45 MHz – 860 MHz
HDD	250GB
Record and playback	Simultaneous
Playing time	47 hours in highest quality, 400 hours in super extended play
Number of Timer Recordings	Max. 300
Time shift / RePlay buffer size	3 hours
Video	All outputs loaded with 75 ohms
Signal-to-noise-ratio audio	≥ 55dB on all output
Bandwidth	4.8MHz -3dB
Audio	
Record	Dolby Digital 2.0 Sound
Playback	Dolby Digital, MP3, MPEG2 Multi channel, MPEG1, PCM
Digital Output (Coaxial / Optical)	LCM, MPEG 1, MPEG 2, AC3, DTS
Signal-to-noise-ratio	>85 dB, unweighted
Frequency response 20Hz-20kHz	± 0.5dB
Scart routing	
On mode	Source selection routed to EXT1
Off mode	EXT2 routed to EXT1
OSD Menu	National language :English, Danish, Dutch, Spanish, Italian, German, French, Swedish
Naming	Automatic naming of recording, generating of thumbnails
Pincode protection	No

DVD region	According to country	

Laser Output Power & Wavelength	DVD	CD
Output power during reading	0.8mW	0.3mW
Output power during writing	20mW	-
Wavelength	650nm	780nm

Front indicators	
- STANDBY indicator	Two colour (red, green)
- Display	FTD (Fluorescent Tube Display)

Dimensions W x H x D	47 x 10.1 x 26.3 cm
Weight	7.0 kg

Power supply	198 - 276 volts 50/60 Hz
Power consumption	Typical 35 watts / St-By < 3 watt

Response time	
- STANDBY to VMEM (Playback, Record, Live-TV)	Max. 15 sec.
- V.Tuner to Pause	Less than 1 sec.

CONNECTIONS
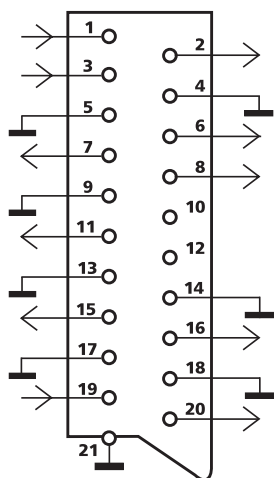
EXT 1	SCART 1 (Connected to TV)	

	Pin 1	Audio R out 1.8V RMS 150 ohms
	Pin 2	Audio R in 1V RMS 40 kohms
	Pin 3	Audio L out 1.8V RMS 150 ohms
	Pin 4	Audio GND
	Pin 5	Blue GND
	Pin 6	Audio L in 1V RMS 40 kohms
	Pin 7	Blue 0.7 Vpp ± 0,1V into 75 ohms (out TV) (in AUX)
	Pin 8	16:9/4:3 info
		<2V = TV
		>4.5V <7V = 16:9 DVD,
		>9.5V <12V = 4:3 DVD), TV=AVL 1 way
	Pin 9	Green GND
	Pin 10	Not used
	Pin 11	Green 0.7 Vpp ± 0,1V into 75 ohms (out TV) (in AUX)
	Pin 12	Not used
	Pin 13	Red GND
	Pin 14	Blanking GND
	Pin 15	Red 0.7 Vpp ± 0,1V into 75 ohms (out TV) (in AUX)
	Pin 16	Blanking Logic 0 = 0V to 0.4V (in 75 ohms = CVBS)
		Logic 1 = 1V to 3V (in 75 ohms = RGB)
	Pin 17	Video out GND
	Pin 18	Video in GND
	Pin 19	Composite video out 1 Vpp ± 0,1V into 75 ohms
	Pin 20	Composite video in 1 Vpp ± 0,1V into 75 ohms
	Pin 21	Shield

EXT 2	SCART 2 (Connected to AUX)
	Same Pin connection as EXT 1
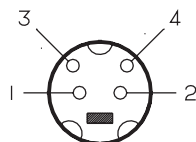
Y/C (OUT 2)	Auto config if Y/C signal is present

|	Superimposed DC-level on pin 4 (load > 100k)	
	Pin 1	Y GND
	Pin 2	C GND
	Pin 3	Luminance in (Y) 1 Vpp ± 3 dB into 75 ohms
	Pin 4	Chrominance in (C) 300 mVpp ± 3 dB into 75 ohms
	16:9 sense : <2.4 Vdc = 4:3 >3.4 Vdc = 16:9	
	Audio(L & R) Output voltage : 2Vrms max.	
	Output impedance : > 10k ohms	

DV IN

(i.LINK) connector (IEEE 1394, 4-pin)

Pin 4   Pin 1
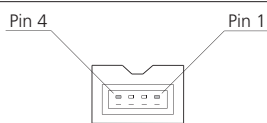
Pin 1	TPB0-
Pin 2	TPB0+
Pin 3	TPA0-
Pin 4	TPA0+

HDMI OUT

Type A connector (19 pins)

Pin1   Pin19

Pin2   Pin18
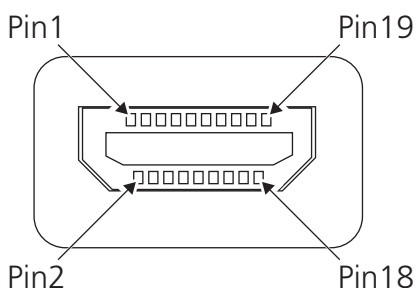
Pin 1	T.M.D.S. Data 2+
Pin 2	T.M.D.S. Data 2 Shield
Pin 3	T.M.D.S. Data 2-
Pin 4	T.M.D.S. Data 1+
Pin 5	T.M.D.S. Data 1 Shield
Pin 6	T.M.D.S. Data 1-
Pin 7	T.M.D.S. Data 0+
Pin 8	T.M.D.S. Data 0 Shield
Pin 9	T.M.D.S. Data 0-
Pin 10	T.M.D.S. Clock+
Pin 11	T.M.D.S. Clock Shield
Pin 12	T.M.D.S. Clock-
Pin 13	CEC
Pin 14	Reserved (N.C. on device)
Pin 15	SCL
Pin 16	SDA
Pin 17	DDC/CEC Ground
Pin 18	+5Volts Power
Pin 19	Hot Plug Detect

Audio/Video Front Input Connectors		
	Audio (L & R)	Input voltage : 2.2Vrms
		Input impedance : > 10 kohms
	Video - Cr	Input voltage : 1Vpp ± 3dB
		Input impedance : 75 ohms
	Video - YC	Superimposed DC-level on pin 4 (load >100kohms)
		< 2.4V is detected as 4:3 aspect ratio
		> 3.5V is detected as 16:9 aspect ratio
		Input voltage Y : 1Vpp ± 3dB
		Input impedance Y : 75 ohms
		Input voltage C : 300mVpp ± 3dB
		Input impedance C : 75 ohms

Out 1		
	Component Video Y/Pb/Pr	
	Audio (L & R)	Output voltage : 2Vrms max.
		Output impedance : > 10k ohms

Aerial	
	Coax aerial in 75 ohms

TV	
	Coax aerial out 75 ohms

Subject to change without notice

Wiring diagram
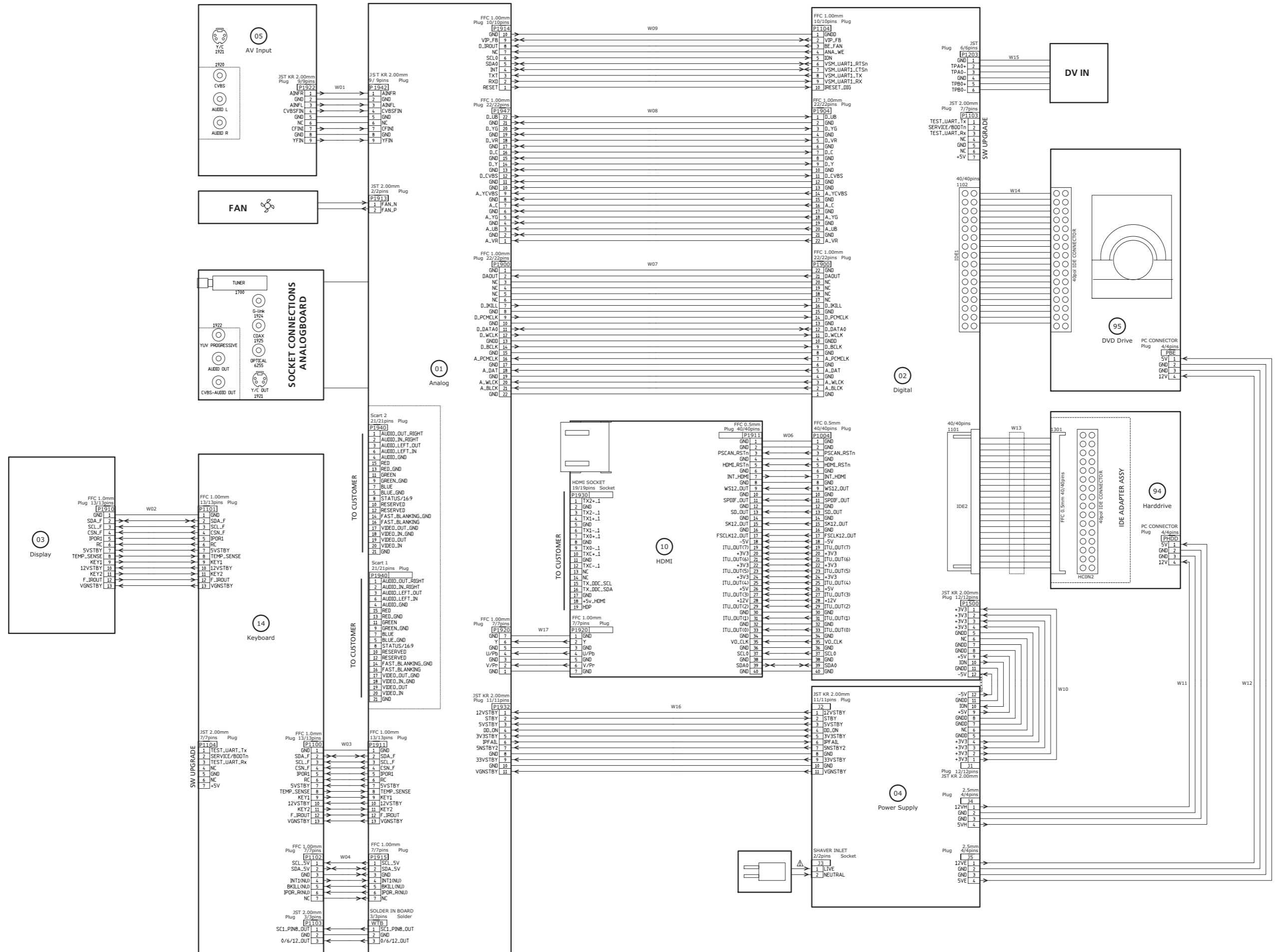
Overall block diagram
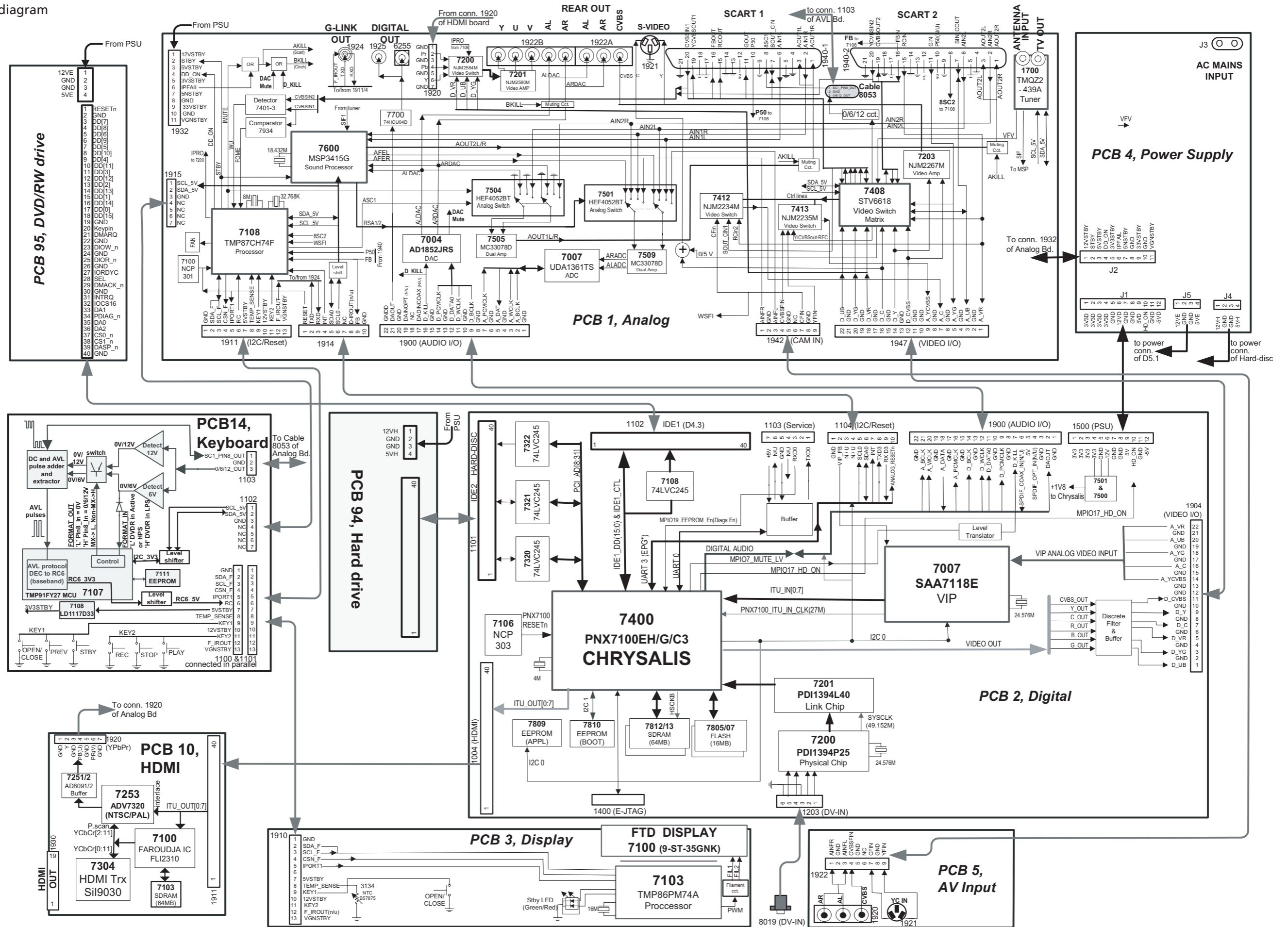
PCB4, Power Supply block diagram

Available parts
DVD 2

10

14

02

9001

04

9010

9011

9012

9013

8 8

01

9002

9014

Not for sale

9003

9004

05

9015

9005

9006

03

9007 *Incl. pos. no. 9006*

9008

9009

2
1

Not for sale

2
1

4

4

2
1

3

9016

2

2

2

2

2

9017

9018

95

9019

5

5

5

5

94

9020

9021

6

6
7

6
7

6
7

6
7
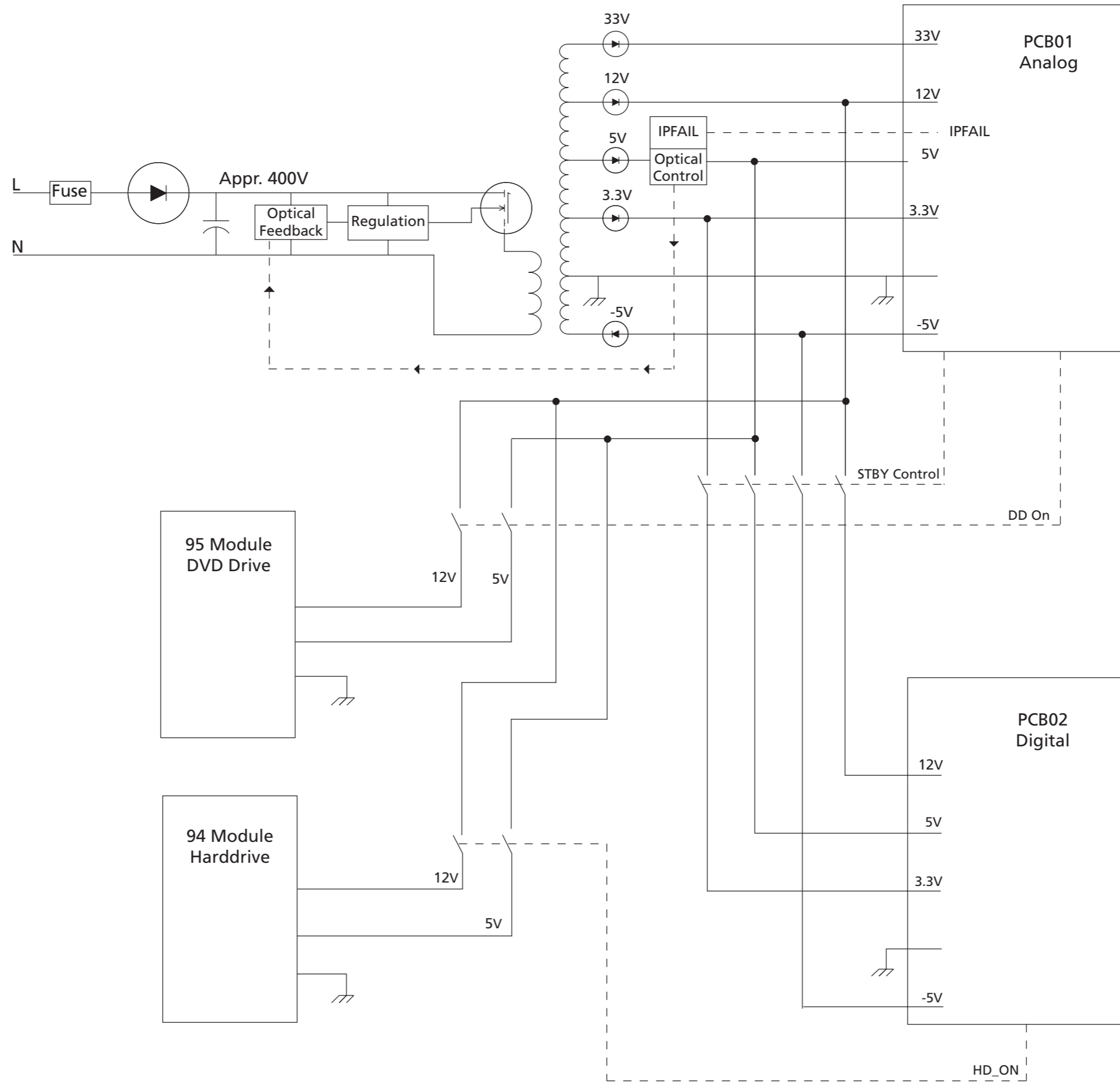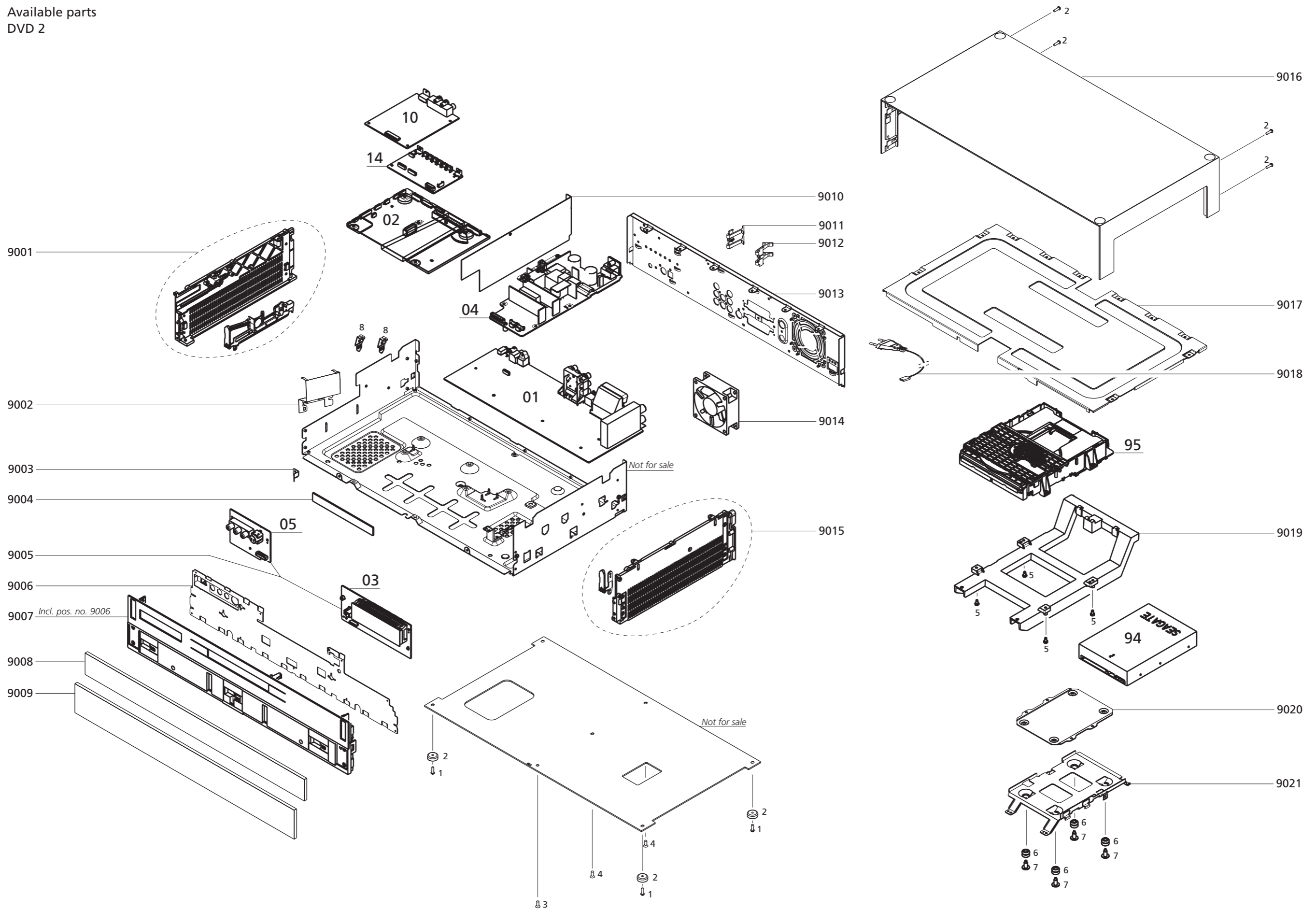
DVD 2

9001	3321079	Side bracket, left	
9002	3112134	Shield	
9003	2816427	Contact spring	
9004	3451498	Cover	
9005	8003591	PCB03, Display and PCB05, AV Input	
9006	3112121	Shield	
9007	3451511	Front, incl. pos. no. 9006	
9008	3454220	Front plate, top	
9009	3454225	Front plate	
9010	3907030	Thermal shield	
9011	2816429	Scart clips	
9012	2816429	Scart clips	
9013	3112142	Back plate	
9014	8400053	Fan	
9015	3321142	Side bracket, right	
9016	3454205	Top cover	
9017	3112116	Top plate	
9018	6100245	Mains lead, EU	
	6100328	Mains lead, GB/HK	
	6100248	Mains lead, AUS	
	6100040	Mains lead, China	
9019	3130418	Bracket	
9020	3112127	Bracket	
9021	3112126	Bracket, HDD	

01Module	8003581	PCB01, Analog

02Module	8003582	PCB02, Digital

04Module	8003386	PCB04, Power Supply

10Module	8003594	PCB10, HDMI

14Module	8003383	PCB14, Keyboard

94Module	8003602	Harddrive

95Module	8003613	DVD Drive

Screws etc.

1	2052011	Screw 3 x 10mm
2	3103147	Foot
3	2052009	Screw 3 x 8mm
4	2015013	Screw 3.5 x 8mm
5	2013066	Screw
6	2938054	Damper
7	2013068	Screw
8	2816428	Bracket HDMI

Wire bundles

W01	6200374	Cable, 9 pole
W02	6200372	Cable, 13 pole
W03	6200381	Cable, 13 pole
W04	6200380	Cable, 7 pole
W06	6200378	Cable, 40 pole
W07	6200376	Cable, 22 pole
W08	6200369	Cable, 22 pole
W09	6200368	Cable, 10 pole
W10	6200370	Cable, 12 pole
W11	6200377	Cable, 4 pole
W12	6200373	Cable, 4 pole
W13	6200375	Cable, 40 pole
W14	6200371	Cable, 40 pole
W15	6270888	Cable, 6 pole
W16	6200367	Cable, 11 pole
W17	6200379	Cable, 7 pole

Packing

	3392928	Outer carton
	3393012	Packing, complete

Parts not shown

3658025	Product cover
6278222	Service cable
6780018	DVD 2 software ver. 1.1
6780019	Master Format DVD
6710035	Ferrite core
3395319	Back-up suitcase

Available documentation

See Retail Ordering System